H. O. No. 214

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 70° to 79°, inclusive

Vol. VIII

UNITED STATES NAVY DEPARTMENT
HYDROGRAPHIC OFFICE

CORRECTIONS TO BE APPLIED TO THE OBSERVED ALTITUDE OF

Sun Star **Moon**

Obs. Alt.	☉	☆
° ′	′	′
6 30	+ 8.2	−7.9
6 40	8.4	7.7
6 50	8.6	7.6
7 0	8.7	7.4
7 10	8.9	7.2
7 20	+ 9.0	−7.1
7 30	9.2	7.0
7 40	9.3	6.8
7 50	9.5	6.7
8 0	9.6	6.6
8 10	+ 9.7	−6.4
8 20	9.8	6.3
8 30	10.0	6.2
8 40	10.1	6.1
8 50	10.2	6.0
9 0	+10.3	−5.9
9 20	10.5	5.7
9 40	10.6	5.5
10 0	10.8	5.3
10 20	11.0	5.2
10 40	+11.2	−5.0
11 0	11.3	4.9
11 30	11.5	4.7
12 0	11.7	4.5
12 30	11.9	4.3
13 0	+12.0	−4.1
13 30	12.2	4.0
14 0	12.3	3.8
15 0	12.6	3.6
16 0	12.8	3.4
17 0	+13.0	−3.2
18 0	13.2	3.0
19 0	13.3	2.8
20 0	13.5	2.6
22 0	13.7	2.4
24 0	+14.0	−2.2
26 0	14.1	2.0
28 0	14.3	1.8
30 0	14.4	1.7
32 0	14.6	1.6
34 0	+14.7	−1.4
36 0	14.8	1.3
38 0	14.9	1.3
40 0	15.0	1.2
45 0	15.1	1.0
50 0	+15.3	−0.8
55 0	15.4	0.7
60 0	15.5	0.6
65 0	15.6	0.5
70 0	15.7	0.4
75 0	+15.8	−0.3
80 0	15.8	0.2
85 0	15.9	−0.1
90 0	+16.0	0.0

Date		Additional Sun's Corr.
		′
Jan.	1	+0. 3
Feb.	1	+0. 3
Mar.	1	+0. 2
Apr.	1	0. 0
May	1	−0. 1
June	1	−0. 2
July	1	−0. 2
Aug.	1	−0. 2
Sept.	1	−0. 1
Oct.	1	0. 0
Nov.	1	+0. 2
Dec.	1	+0. 3

Obs. Alt. Lower Limb	HORIZONTAL PARALLAX 54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
5.5	+59.6	+60.9	+62.1	+63.4	+64.7	+66.0	+67.3	+68.5
6.0	60.2	61.4	62.7	64.0	65.3	66.5	67.8	69.1
6.5	60.7	61.9	63.2	64.5	65.8	67.0	68.3	69.6
7.0	61.1	62.4	63.6	64.9	66.2	67.4	68.7	70.0
7.5	61.5	62.7	64.0	65.3	66.5	67.8	69.1	70.4
8.0	+61.8	+63.1	+64.3	+65.6	+66.9	+68.1	+69.4	+70.7
8.5	62.1	63.3	64.6	65.9	67.1	68.4	69.7	70.9
9.0	62.3	63.6	64.8	66.1	67.4	68.6	69.9	71.1
9.5	62.5	63.8	65.0	66.3	67.6	68.8	70.1	71.3
10.0	62.7	64.0	65.2	66.5	67.7	69.0	70.3	71.5
11	+63.0	+64.2	+65.5	+66.7	+68.0	+69.3	+70.5	+71.8
12	63.2	64.4	65.7	66.9	68.2	69.5	70.7	72.0
13	63.3	64.6	65.8	67.0	68.3	69.6	70.8	72.1
14	63.4	64.6	65.9	67.1	68.4	69.6	70.9	72.1
15	63.4	64.6	65.9	67.1	68.4	69.6	70.9	72.1
16	+63.4	+64.6	+65.8	+67.1	+68.3	+69.6	+70.8	+72.0
17	63.3	64.5	65.8	67.0	68.2	69.5	70.7	71.9
18	63.2	64.4	65.6	66.9	68.1	69.3	70.6	71.8
19	63.1	64.3	65.5	66.7	67.9	69.2	70.4	71.6
20	62.9	64.1	65.3	66.5	67.8	69.0	70.2	71.4
21	+62.7	+63.9	+65.1	+66.3	+67.5	+68.7	+70.0	+71.2
22	62.5	63.7	64.9	66.1	67.3	68.5	69.7	70.9
23	62.2	63.4	64.6	65.9	67.0	68.2	69.4	70.6
24	62.0	63.1	64.3	65.5	66.7	67.9	69.1	70.3
25	61.7	62.9	64.0	65.2	66.4	67.6	68.8	69.9
26	+61.3	+62.5	+63.7	+64.9	+66.0	+67.2	+68.4	+69.6
27	61.0	62.2	63.3	64.5	65.7	66.8	68.0	69.2
28	60.7	61.8	63.0	64.1	65.3	66.4	67.6	68.8
29	60.3	61.4	62.6	63.7	64.9	66.0	67.2	68.4
30	59.9	61.0	62.2	63.3	64.4	65.6	66.7	67.9
31	+59.5	+60.6	+61.7	+62.9	+64.0	+65.1	+66.3	+67.4
32	59.0	60.2	61.3	62.4	63.5	64.7	65.8	66.9
33	58.6	59.7	60.8	61.9	63.1	64.2	65.3	66.4
34	58.1	59.2	60.3	61.4	62.5	63.6	64.8	65.9
35	57.7	58.7	59.8	60.9	62.0	63.1	64.2	65.3
36	+57.2	+58.2	+59.3	+60.4	+61.5	+62.6	+63.7	+64.7
37	56.7	57.7	58.8	59.8	60.9	62.0	63.1	64.2
38	56.1	57.2	58.2	59.3	60.4	61.4	62.5	63.6
39	55.6	56.6	57.7	58.7	59.8	60.8	61.9	62.9
40	55.0	56.1	57.1	58.1	59.2	60.2	61.3	62.3
41	+54.4	+55.5	+56.5	+57.5	+58.6	+59.6	+60.6	+61.6
42	53.9	54.9	55.9	56.9	57.9	59.0	60.0	61.0
43	53.3	54.3	55.3	56.3	57.3	58.3	59.3	60.3
44	52.7	53.7	54.6	55.6	56.6	57.6	58.6	59.6
45	52.0	53.0	54.0	55.0	56.0	56.9	57.9	58.9
46	+51.4	+52.4	+53.3	+54.3	+55.3	+56.2	+57.2	+58.2
47	50.7	51.7	52.6	53.6	54.6	55.5	56.5	57.4
48	50.1	51.0	52.0	52.9	53.9	54.8	55.7	56.7
49	49.4	50.3	51.3	52.2	53.1	54.1	55.0	55.9
50	48.7	49.6	50.5	51.5	52.4	53.3	54.2	55.1
51	+48.0	+48.9	+49.8	+50.7	+51.6	+52.5	+53.4	+54.3
52	47.3	48.2	49.1	50.0	50.9	51.8	52.7	53.5
53	46.6	47.5	48.3	49.2	50.1	51.0	51.8	52.7
54	45.8	46.7	47.6	48.4	49.3	50.2	51.0	51.9
55	45.1	46.0	46.8	47.6	48.5	49.3	50.2	51.0
56	+44.4	+45.2	+46.0	+46.8	+47.7	+48.5	+49.4	+50.2
57	43.6	44.4	45.2	46.0	46.9	47.7	48.5	49.3
58	42.8	43.6	44.4	45.2	46.0	46.9	47.7	48.5
59	42.1	42.9	43.6	44.4	45.2	46.0	46.8	47.6
60	41.3	42.1	42.8	43.6	44.4	45.1	45.9	46.7
61	+40.5	+41.2	+42.0	+42.7	+43.5	+44.3	+45.0	+45.8
62	39.6	40.4	41.1	41.9	42.6	43.4	44.1	44.9
63	38.8	39.6	40.3	41.0	41.8	42.5	43.2	43.9
64	38.0	38.7	39.4	40.2	40.9	41.6	42.3	43.0
65	37.2	37.9	38.6	39.3	40.0	40.7	41.4	42.1
66	+36.4	+37.0	+37.7	+38.4	+39.1	+39.8	+40.4	+41.1
67	35.5	36.2	36.8	37.5	38.2	38.8	39.5	40.2
68	34.7	35.3	36.0	36.6	37.3	37.9	38.6	39.2
69	33.8	34.4	35.1	35.7	36.3	37.0	37.6	38.2
70	32.9	33.6	34.2	34.8	35.4	36.0	36.7	37.3
71	+32.1	+32.7	+33.3	+33.9	+34.5	+35.1	+35.7	+36.3
72	31.2	31.8	32.3	32.9	33.5	34.1	34.7	35.3
73	30.3	30.9	31.4	32.0	32.6	33.2	33.7	34.3
74	29.4	30.0	30.5	31.1	31.6	32.2	32.7	33.3
75	28.5	29.1	29.6	30.1	30.7	31.2	31.8	32.3
76	+27.7	+28.2	+28.7	+29.2	+29.7	+30.2	+30.8	+31.3
77	26.8	27.3	27.7	28.2	28.8	29.3	29.8	30.2
78	25.8	26.3	26.8	27.3	27.8	28.3	28.7	29.2
79	24.9	25.4	25.9	26.3	26.8	27.3	27.7	28.2
80	24.0	24.5	24.9	25.4	25.8	26.3	26.7	27.2
81	+23.1	+23.6	+24.0	+24.4	+24.8	+25.3	+25.7	+26.2
82	22.2	22.6	23.0	23.4	23.9	24.3	24.7	25.1
83	21.3	21.7	22.1	22.5	22.9	23.3	23.7	24.1
84	20.4	20.8	21.1	21.5	21.9	22.3	22.6	23.0
85	19.4	19.8	20.2	20.5	20.9	21.3	21.6	22.0
86	+18.5	+18.9	+19.2	+19.6	+19.9	+20.3	+20.6	+20.9
87	17.6	17.9	18.2	18.6	18.9	19.2	19.6	19.9
88	16.7	17.0	17.3	17.6	17.9	18.2	18.5	18.8
89	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8
90	+14.7	+15.0	+15.3	+15.6	+15.8	+16.1	+16.4	+16.7

Obs. Alt. Upper Limb	HORIZONTAL PARALLAX 54′	55′	56′	57′	58′	59′	60′	61′
°	′	′	′	′	′	′	′	′
5.5	+29.4	+30.2	+30.9	+31.6	+32.3	+33.0	+33.7	+34.4
6.0	30.1	30.8	31.5	32.3	33.0	33.7	34.4	35.1
6.5	30.7	31.4	32.1	32.8	33.5	34.3	35.0	35.7
7.0	31.2	31.9	32.6	33.3	34.0	34.8	35.5	36.2
7.5	31.6	32.3	33.0	33.7	34.5	35.2	35.9	36.6
8.0	+32.0	+32.7	+33.4	+34.1	+34.8	+35.5	+36.3	+37.0
8.5	32.3	33.0	33.7	34.4	35.1	35.9	36.6	37.3
9.0	32.6	33.3	34.0	34.7	35.4	36.1	36.8	37.5
9.5	32.8	33.5	34.2	34.9	35.6	36.3	37.1	37.8
10.0	33.0	33.7	34.4	35.1	35.8	36.5	37.3	38.0
11	+33.3	+34.0	+34.7	+35.4	+36.2	+36.9	+37.6	+38.3
12	33.6	34.3	35.0	35.7	36.4	37.1	37.8	38.5
13	33.7	34.4	35.1	35.8	36.5	37.2	37.9	38.6
14	33.8	34.5	35.2	35.9	36.6	37.3	38.0	38.7
15	33.8	34.5	35.2	35.9	36.6	37.3	38.0	38.7
16	+33.8	+34.5	+35.2	+35.9	+36.6	+37.3	+38.0	+38.6
17	33.8	34.5	35.1	35.8	36.5	37.2	37.9	38.6
18	33.7	34.3	35.0	35.7	36.4	37.1	37.7	38.4
19	33.5	34.2	34.9	35.6	36.2	36.9	37.6	38.2
20	33.4	34.0	34.7	35.4	36.0	36.7	37.4	38.1
21	+33.2	+33.9	+34.5	+35.2	+35.8	+36.5	+37.2	+37.8
22	33.0	33.6	34.3	34.9	35.6	36.3	36.9	37.6
23	32.7	33.4	34.0	34.7	35.3	36.0	36.6	37.3
24	32.5	33.1	33.7	34.4	35.0	35.7	36.3	37.0
25	32.2	32.8	33.4	34.1	34.7	35.4	36.0	36.6
26	+31.9	+32.5	+33.1	+33.7	+34.4	+35.0	+35.6	+36.2
27	31.5	32.1	32.8	33.4	34.0	34.6	35.2	35.9
28	31.2	31.8	32.4	33.0	33.6	34.2	34.9	35.5
29	30.8	31.4	32.0	32.6	33.2	33.8	34.4	35.0
30	30.4	31.0	31.6	32.2	32.8	33.4	34.0	34.6
31	+30.0	+30.6	+31.2	+31.8	+32.3	+32.9	+33.5	+34.1
32	29.6	30.1	30.7	31.3	31.9	32.5	33.0	33.6
33	29.1	29.7	30.3	30.8	31.4	32.0	32.5	33.1
34	28.7	29.2	29.8	30.3	30.9	31.5	32.0	32.6
35	28.2	28.7	29.3	29.8	30.4	30.9	31.5	32.0
36	+27.7	+28.2	+28.8	+29.3	+29.8	+30.4	+30.9	+31.5
37	27.2	27.7	28.2	28.8	29.3	29.8	30.3	30.9
38	26.7	27.2	27.7	28.2	28.7	29.2	29.7	30.3
39	26.1	26.6	27.1	27.6	28.1	28.6	29.1	29.6
40	25.6	26.1	26.6	27.1	27.6	28.0	28.5	29.0
41	+25.0	+25.5	+26.0	+26.4	+26.9	+27.4	+27.9	+28.4
42	24.4	24.9	25.4	25.8	26.3	26.8	27.2	27.7
43	23.8	24.3	24.7	25.2	25.6	26.1	26.6	27.0
44	23.2	23.6	24.1	24.6	25.0	25.4	25.9	26.3
45	22.6	23.0	23.4	23.9	24.3	24.7	25.2	25.6
46	+21.9	+22.4	+22.8	+23.2	+23.6	+24.0	+24.5	+24.9
47	21.3	21.7	22.1	22.5	22.9	23.3	23.8	24.2
48	20.6	21.0	21.4	21.8	22.2	22.6	23.0	23.4
49	19.9	20.3	20.7	21.1	21.5	21.9	22.3	22.6
50	19.2	19.6	20.0	20.4	20.7	21.1	21.5	21.9
51	+18.5	+18.9	+19.3	+19.6	+20.0	+20.3	+20.7	+21.1
52	17.8	18.2	18.5	18.9	19.2	19.6	19.9	20.3
53	17.1	17.5	17.8	18.1	18.4	18.8	19.1	19.4
54	16.4	16.7	17.0	17.3	17.7	18.0	18.3	18.6
55	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8
56	+14.9	+15.2	+15.5	+15.8	+16.1	+16.3	+16.6	+16.9
57	14.2	14.4	14.7	15.0	15.2	15.5	15.8	16.1
58	13.4	13.6	13.9	14.2	14.4	14.7	14.9	15.2
59	12.6	12.8	13.1	13.3	13.6	13.8	14.1	14.3
60	11.8	12.0	12.3	12.5	12.7	13.0	13.2	13.4
61	+11.0	+11.2	+11.4	+11.6	+11.9	+12.1	+12.3	+12.5
62	10.2	10.4	10.6	10.8	11.0	11.2	11.4	11.6
63	9.4	9.6	9.8	9.9	10.1	10.3	10.5	10.7
64	8.6	8.7	8.9	9.1	9.2	9.4	9.6	9.7
65	7.7	7.9	8.0	8.2	8.3	8.5	8.7	8.8
66	+ 6.9	+ 7.0	+ 7.2	+ 7.3	+ 7.5	+ 7.6	+ 7.7	+ 7.9
67	6.1	6.2	6.3	6.4	6.5	6.7	6.8	6.9
68	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
69	4.3	4.4	4.5	4.6	4.7	4.8	4.8	4.9
70	3.5	3.5	3.6	3.7	3.8	3.8	3.9	4.0
71	+ 2.6	+ 2.7	+ 2.7	+ 2.8	+ 2.8	+ 2.9	+ 2.9	+ 3.0
72	1.7	1.8	1.8	1.9	1.9	1.9	2.0	2.0
73	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 0.9	+ 1.0	+ 1.0	+ 1.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	− 0.9	− 0.9	− 0.9	− 1.0	− 1.0	− 1.0	− 1.0	− 1.0
76	− 1.8	− 1.9	− 1.9	− 1.9	− 1.9	− 2.0	− 2.0	− 2.0
77	2.7	2.8	2.8	2.9	2.9	2.9	3.0	3.0
78	3.6	3.7	3.8	3.8	3.9	3.9	4.0	4.1
79	4.5	4.6	4.7	4.8	4.8	4.9	5.0	5.1
80	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1
81	− 6.3	− 6.5	− 6.6	− 6.7	− 6.8	− 6.9	− 7.0	− 7.2
82	7.3	7.4	7.5	7.7	7.8	7.9	8.1	8.2
83	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2
84	9.1	9.3	9.4	9.6	9.8	9.9	10.1	10.3
85	10.0	10.2	10.4	10.6	10.8	10.9	11.1	11.3
86	−10.9	−11.2	−11.4	−11.5	−11.7	−12.0	−12.2	−12.3
87	11.9	12.1	12.3	12.5	12.7	13.0	13.2	13.4
88	12.8	13.0	13.3	13.5	13.7	14.0	14.2	14.4
89	13.7	14.0	14.3	14.5	14.7	15.0	15.3	15.5
90	−14.7	−15.0	−15.3	−15.6	−15.8	−16.1	−16.4	−16.7

Additional Correction for Height of Eye

Ht. Eye	Corr.	Ht. Eye	Corr.
(ft.)	′	(ft.)	′
0	0.0	100	− 9.8
1	−1.0	150	12.0
2	1.4	200	13.9
3	1.7	250	15.5
4	2.0	300	17.0
5	−2.2	350	−18.3
6	2.4	400	19.6
7	2.6	450	20.8
8	2.8	500	21.9
9	2.9	550	23.0
10	−3.1	600	−24.0
11	3.2	650	25.0
12	3.4	700	25.9
13	3.5	750	26.8
14	3.7	800	27.7
15	−3.8	850	−28.6
16	3.9	900	29.4
17	4.0	950	30.2
18	4.1	1000	31.0
19	4.3	1050	31.8
20	−4.4	1100	−32.5
21	4.5	1150	33.2
22	4.6	1200	34.0
23	4.7	1250	34.6
24	4.8	1300	35.3
25	−4.9	1350	−36.0
26	5.0	1400	36.7
27	5.1	1450	37.3
28	5.2	1500	38.0
29	5.3	1550	38.6
30	−5.4	1600	−39.2
31	5.4	1650	39.8
32	5.5	1700	40.5
33	5.6	1800	41.6
34	5.7	1900	42.7
35	−5.8	2000	−43.8
37	6.0	2100	44.9
39	6.1	2200	46.0
41	6.3	2300	47.0
43	6.4	2400	47.9
45	−6.6	2500	−49.0
47	6.7	2600	50.0
49	6.9	2700	50.9
51	7.0	2800	51.9
53	7.1	2900	52.8
55	−7.3	3000	−53.7
60	7.6	3100	54.6
65	7.9	3200	55.4
70	8.2	3300	56.3
75	8.5	3400	57.1
80	−8.8	3500	−58.0
85	9.0	3600	58.8
90	9.3	3700	59.6
95	9.6	3800	60.4
100	−9.8	4000	−62.0

BUBBLE SEXTANT CORRECTION TO OBSERVED ALTITUDE OF SUN OR STAR

FOR REFRACTION AND PARALLAX

Observed Altitude	Sun's Correction	Star's Correction
° ′	′	′
6 30	−7.8	−7.9
6 40	7.6	7.7
6 50	7.4	7.6
7 0	7.3	7.4
7 10	7.1	7.2
7 20	−7.0	−7.1
7 30	6.8	7.0
7 40	6.7	6.8
7 50	6.5	6.7
8 0	6.4	6.6
8 10	−6.3	−6.4
8 20	6.2	6.3
8 30	6.1	6.2
8 40	5.9	6.1
8 50	5.8	6.0
9 0	−5.7	−5.9
9 20	5.5	5.7
9 40	5.3	5.5
10 0	−5.2	−5.3
10 20	5.0	5.2
10 40	−4.9	−5.0
11 0	4.7	4.9
11 30	4.5	4.7
12 0	4.3	4.5
12 30	4.1	4.3
13 0	−4.0	−4.1
13 30	3.8	4.0
14 0	3.7	3.8
15 0	3.4	3.6
16 0	3.2	3.3
17 0	−3.0	−3.1
18 0	2.8	3.0
19 0	2.7	2.8
20 0	2.5	2.6
21 0	2.4	2.5
22 0	−2.3	−2.4
24 0	2.0	2.2
26 0	1.9	2.0
28 0	1.7	1.8
30 0	1.6	1.7
32 0	−1.4	−1.6
34 0	1.3	1.4
36 0	1.2	1.3
38 0	1.1	1.2
40 0	1.0	1.2
45 0	−0.9	−1.0
50 0	0.7	0.8
55 0	0.6	0.7
60 0	0.5	0.6
65 0	0.4	0.5
70 0	−0.3	−0.4
75 0	0.2	0.3
80 0	0.1	0.2
85 0	−0.1	−0.1
90 0	0.0	0.0

FOR CONVERSION OF ARC TO TIME

°	h m	°	h m	°	h m	°	h m	°	h m	°	h m
0	0 0	60	4 0	120	8 0	180	12 0	240	16 0	300	20 0
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56
15	1 0	75	5 0	135	9 0	195	13 0	255	17 0	315	21 0
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56
45	3 0	105	7 0	165	11 0	225	15 0	285	19 0	345	23 0
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56
60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	360	24 0

′	m s
0	0 0
1	0 4
2	0 8
3	0 12
4	0 16
5	0 20
6	0 24
7	0 28
8	0 32
9	0 36
10	0 40
11	0 44
12	0 48
13	0 52
14	0 56
15	1 0
16	1 4
17	1 8
18	1 12
19	1 16
20	1 20
21	1 24
22	1 28
23	1 32
24	1 36
25	1 40
26	1 44
27	1 48
28	1 52
29	1 56
30	2 0
31	2 4
32	2 8
33	2 12
34	2 16
35	2 20
36	2 24
37	2 28
38	2 32
39	2 36
40	2 40
41	2 44
42	2 48
43	2 52
44	2 56
45	3 0
46	3 4
47	3 8
48	3 12
49	3 16
50	3 20
51	3 24
52	3 28
53	3 32
54	3 36
55	3 40
56	3 44
57	3 48
58	3 52
59	3 56
60	4 0

″	s
0	0.00
1	0.07
2	0.13
3	0.20
4	0.27
5	0.33
6	0.40
7	0.47
8	0.53
9	0.60
10	0.67
11	0.73
12	0.80
13	0.87
14	0.93
15	1.00
16	1.07
17	1.13
18	1.20
19	1.27
20	1.33
21	1.40
22	1.47
23	1.53
24	1.60
25	1.67
26	1.73
27	1.80
28	1.87
29	1.93
30	2.00
31	2.07
32	2.13
33	2.20
34	2.27
35	2.33
36	2.40
37	2.47
38	2.53
39	2.60
40	2.67
41	2.73
42	2.80
43	2.87
44	2.93
45	3.00
46	3.07
47	3.13
48	3.20
49	3.27
50	3.33
51	3.40
52	3.47
53	3.53
54	3.60
55	3.67
56	3.73
57	3.80
58	3.87
59	3.93
60	4.00

16—15503

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U. S. Hydrographic Office.

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 70° to 79°, inclusive

Vol. VIII

UNITED STATES NAVY DEPARTMENT
HYDROGRAPHIC OFFICE

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16—18566

STATUTES OF AUTHORIZATION

There shall be a Hydrographic Office attached to the Bureau of Navigation in the Navy Department for the improvement of the means for navigating safely the vessels of the Navy and of the mercantile marine by providing, under the authority of the Secretary of the Navy, accurate and cheap nautical charts, sailing directions, navigators, and manuals of instructions for the use of all vessels of the United States, and for the benefit and use of navigators generally. (R. S. 431.)

The Secretary of the Navy is authorized to cause to be prepared, at the Hydrographic Office attached to the Bureau of Navigation in the Navy Department, maps, charts, and nautical books relating to and required in navigation, and to publish and furnish them to navigators at the cost of printing and paper, and to purchase the plates and copyrights of such existing maps, charts, navigators, sailing directions, and instructions as he may consider necessary, and when he may deem it expedient to do so, and under such regulations and instructions as he may prescribe. (R. S. 432.)

16—18598

PREFACE

These tables consist essentially of tabulated solutions of the astronomical triangle, so arranged as to yield the mariner his computed altitude and azimuth by inspection.

The scheme of precomputing such values for ready use is a long established one. It is in the scope, arrangement, and convenience of interpolation, developed in the Division of Research of the Hydrographic Office, that these tables are unique.

The tables are applicable equally to sights of the sun, moon, planets, and navigational stars; and inasmuch as they are designed for use in connection with celestial bodies of declinations both of same name as, and contrary name to the latitude, they apply to both northern and southern hemispheres.

For greater convenience in use, the values for only 10 degrees of latitude are included in each volume of the publication.

GEORGE S. BRYAN,
Captain, U. S. Navy,
Hydrographer.

18598

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Description of the Tables

The tables are equally applicable to sights of the sun, moon, planets, and navigational stars.

The arrangement is on a basis of whole degrees of latitude, the data for each degree comprising a section of 24 pages, with 2 additional pages for star identification.

Declination arguments in whole and half degrees head the main columns of each page, while hour angle arguments in whole degrees appear at the sides. Within the limits of each declination column are four groups of figures representing, from left to right—the altitude (Alt.); the multiplier (Δd) for declination difference; the multiplier (Δt) for hour angle difference; and the azimuth (Az.). The declination arguments for celestial bodies not used in practical navigation are omitted.

The altitudes have been computed to an accuracy of one-tenth of a minute of arc by seven place logarithms.

The azimuth has been computed to an accuracy of one-tenth of a degree.

Δd represents the change in altitude due to a change of 1′ of arc of declination.

Δt represents the change in altitude due to a change of 1′ of arc of hour angle.

ΔL represents the change in altitude due to a change of 1′ of arc of latitude. A special table on pages 262–3 gives the corrections for minutes of latitude.

There are three principal processes used for finding line of position with these tables, namely—

(1) Assuming both latitude and longitude, using only the Δd correction.

(2) Assuming latitude with the D. R. longitude, using the Δd and Δt corrections.

(3) Working from the D. R. position, using the Δd, Δt, and ΔL corrections.

(1) SOLUTION FOR LINE OF POSITION, USING Δd CORRECTION

This is the primary method for which the tables were originally designed. The solution is short and simple.

The tables are entered with arguments of nearest whole degree of latitude, nearest whole or half degree of declination, and nearest whole degree of hour angle. Alt., Δd, and Az. are taken from the body of the tables.

The azimuth obtained from the tables is correct for the values with which the tables are entered and, for plotting lines of position generally needs no correction. If extreme accuracy is desired, the azimuth may be interpolated by inspection. The tabulated azimuth is reckoned from the elevated pole of the observer, to the east when the body is rising or east of the meridian; and to the west when the body is setting or west of the meridian.

The altitude (Alt.) obtained from the tables is correct for the values with which the tables are entered; but since the exact declination of the body will usually differ from the tabulated declination, a correction to the altitude must be made for this difference. For example, if the exact declination of a star is 57° 33′.1 and the table is entered with a declination of 57° 30′, the declination difference is 3′.1. Since Δd represents the change in altitude due to a change of 1′ of arc of declination, if Δd is multiplied by the declination difference, the correction to the altitude for declination difference is obtained. When this correction is applied to the tabulated altitude (Alt.) the altitude thus obtained is the correct calculated altitude for arguments of whole degree of latitude, whole degree of hour angle, and the exact declination of the body.

In order to obviate the necessity of multiplying Δd by the declination difference to obtain the correction, a multiplication table on the back cover pages automatically indicates by inspection this entire operation. The multiplication table is entered with arguments, Δd at the side, and the declination difference at the top. The correction to the altitude for declination difference is taken from the body of the table. The multiplication table is so arranged that it may be entered at the top with both whole numbers and tenths. For example, using Δd, 65, and declination difference 6′.4, the multiplication table is entered with 65 at the side and 6′ at the top, the correction is 3′.9; with 65 at the side and 0′.4 at the top the correction is 0′.3; the total correction to the altitude for declination difference being 3′.9+ 0′.3=4′.2.

By glancing at the values of altitude for adjoining tabulated declinations between which the exact declination lies, it may be determined whether the altitude is increasing or decreasing as the tabulated declination approaches the exact declination. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing. *Watch the plus or minus signs for Δd, and apply correctly. The multiplier Δd must never be interpolated.*

When the Δd correction is made to the tabulated altitude the sight must be plotted from an assumed position as follows:

Latitude.—The whole degree with which the tables were entered.

Longitude.—The longitude which was assumed in finding the local hour angle in whole degrees.

16—18598

Example 1.—At sea, March 31, 1940, in dead reckoning position, Lat. 69° 58′.1 N.; Long. 10° 01′.0 W., the navigator of the U. S. S. *California* observed the lower limb of the sun for line of position as follows: Sextant altitude, 17° 48′.2; I. C.,—0′.5; watch, 9h 01m 20s; C–W, 0h 42m 05s; chronometer, slow 0m 05s; height of eye, 36 feet.

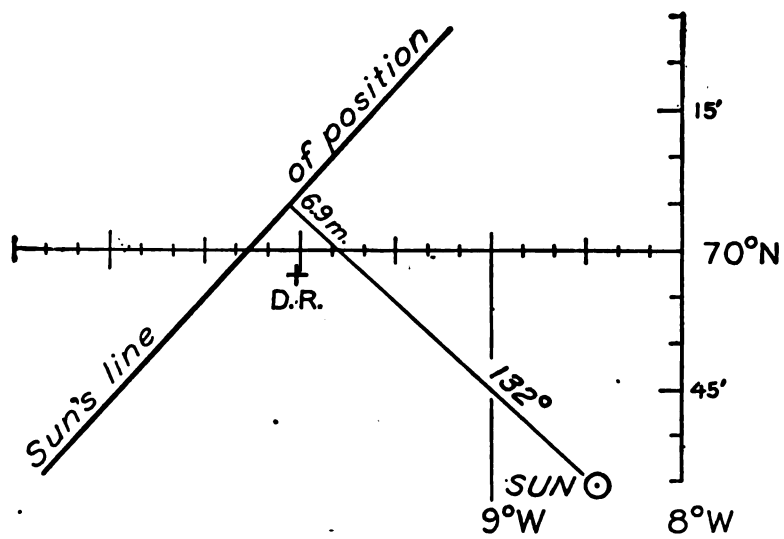
Watch	9h 01m 20s	Hs	17° 48′.2
C–W	42 05	Corr	+6.8
Chronometer	9 43 25	Ho	17 55.0
C. C	+05		
G. C. T	9 43 30		
Eq. t	−4 15		
G. A. T	9 39 15		
G. H. A	21 39 15		

I. C	−0′.5	
Alt. C	+13.2	
Date C	0.0	
Ht. eye C	−5.9	
Correction	+6.8	

Declination 4° 10′.2 N. (from Nautical Almanac).

Arc	324° 48′.8 W.	
or	35 11.2 E.	
Longitude	9 48.8 W.	(Assumed to give whole degree of L. H. A.)
L. H. A	45 00.0 E.	
Latitude	70 00.0 N.	(Assume nearest whole degree of latitude.)
Declination	4 10.2 N.	(Enter table with Lat. 70°, H. A. 45°, and declination 4°, same name as latitude.)

	Alt.	*Δd*	*Az.*
	17° 52′.0	+97 (See note.)	132°.2
Δd correction for 10′.2	+9.9 (See note.)		
Hc	18 01.9		
Ho	17 55.0		
Alt. Int.	6.9 miles away from N. 132° E.		



NOTE.—Plus 97 is obtained from the Δd column abreast Alt. in the tables. The value 9′.9 (corr. for 10′.2 dec.) is obtained at a glance from the multiplication table on back cover pages, using 10′.2 declination difference at top of page and .97 at side of page as arguments. The value 9′.9 is added because, as the tabulated declination (4°) approaches the exact declination of the body (4° 10′.2), the altitude is increasing.

The tabulated azimuth is reckoned from the elevated pole of the observer toward the east, when the body is rising or east of the meridian, and requires no correction.

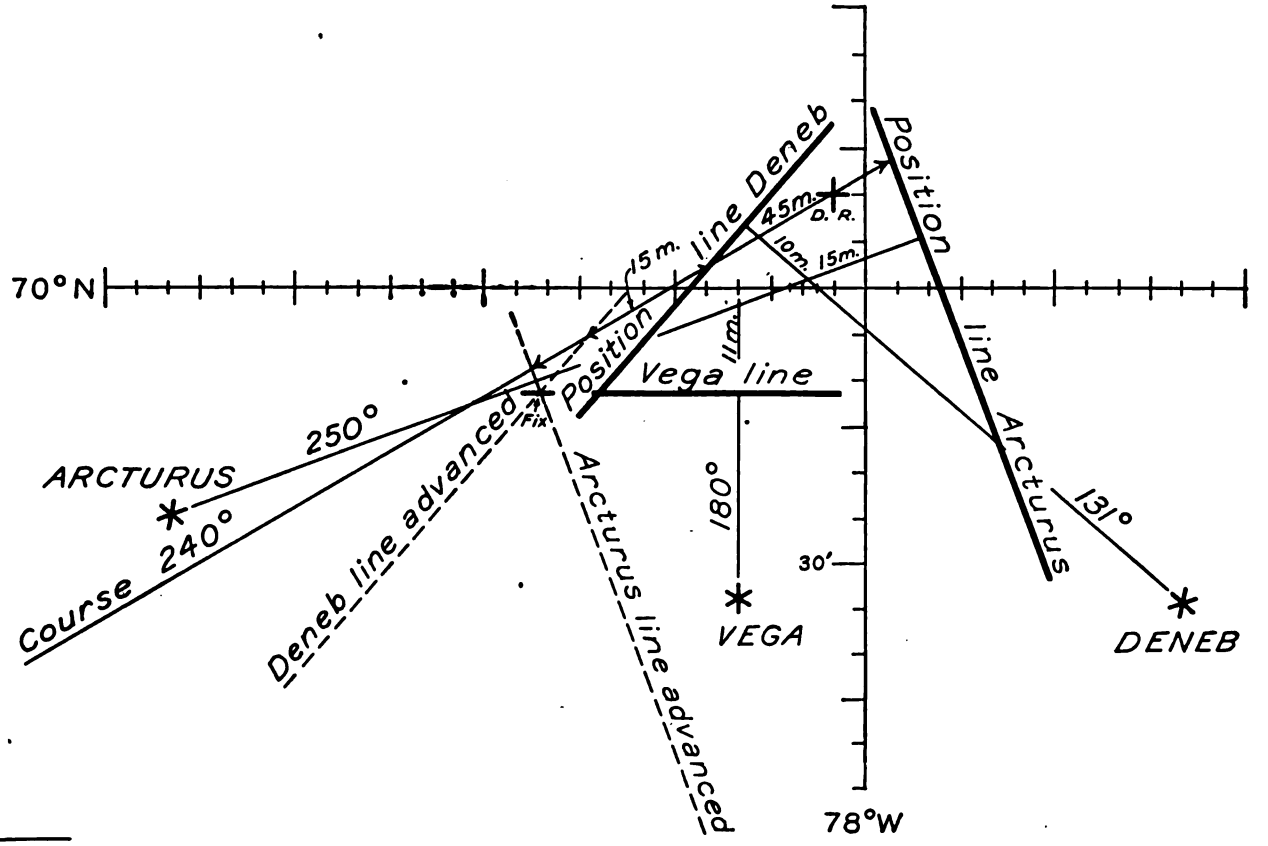
The sight is plotted from the nearest whole degree of latitude (70°), and the assumed longitude (9° 48′.8 W.).

Example 2.—On October 1, 1940, at twilight, a plane was in dead reckoning position, Lat. 70° 10′.0 N.; Long. 78° 09′.8 W.; true course, 240°; ground speed, 180 knots, when the navigator observed, with a bubble octant (I. C. 0′.0), the following stars for a fix of position:

Star	*G. C. T.*	*Declination*	*Obs. alt. (Hs)*
Arcturus	22h 52m 27s	19° 29′.6 N.	27° 29′.2
Deneb	23 02 25	45 04.5 N.	60 19.2
Vega	23 07 30	38 44.1 N.	58 55.7

Required the fix at the observation of the star Vega.

ARCTURUS		DENEB		VEGA	
G. C. T.	22h 52m 27s		23h 02m 25s		23h 07m 30s
G. H. A. for 0h G. C. T.	156° 20′.4		59° 42′.9		90° 50′.4
Corr. for 22h 52m 27s	344 03.1	Corr. for 23h 02m 25s	346 33.1	Corr. for 23h 07m 30s	347 49.5
G. H. A.	140 23.5 W.		46 16.0 W.		78 39.9 W.
Longitude	78 23.5 W.		78 16.0 W.		78 39.9 W.
L. H. A.	62 W.		32 E.		0
Latitude	70 N.		70 N.		70 N.
Declination	19 29.6 N.		45 04.5 N.		38 44.1 N.
	Alt. *Δd* *Az.*		*Alt.* *Δd* *Az.*		*Alt.* *Δd* *Az.*
	27° 42′.7 −94 109°.9		60° 24′.4 +93 130°.6		58° 30′.0 +1.0 180°
Δd corr. 0′.4	−.4	Δd corr. 4′.5	+4.2	Δd corr. 14′.1	+14.1
Hc	27 42.3	Hc	60 28.6	Hc	58 44.1
Ho	27 27.3	Ho	60 18.6	Ho	58 55.1
Alt. Int.	15.0 miles away from N. 110° W. (250°).	Alt. Int.	10.0 miles away from N. 131° E.	Alt. Int.	11.0 miles toward 180°.



Plot Arcturus from Lat. 70° N.; Long. 78° 23′.5 W.
Plot Deneb from Lat. 70° N., Long. 78° 16′.0 W.
Plot Vega from Lat. 70° N., Long. 78° 39′.9 W.
The time elapsed between Arcturus and Vega sights is 15m, or ground speed 45 miles.
The time elapsed between Deneb and Vega sights is 5m, or ground speed 15 miles.
The position of the plane, or the fix, is Lat. 69° 48′.0 N., Long 79° 42′.0 W.

16—18508

(2) SOLUTION FOR LINE OF POSITION, USING BOTH Δd AND Δt CORRECTIONS

If the navigator desires to plot the sight from his dead reckoning longitude (and the nearest whole degree of latitude to his dead reckoning latitude) it may be done by applying an additional correction to the altitude for hour angle difference, as follows:

Since the exact local hour angle of the body will usually differ from the tabulated whole degree of hour angle found in the tables, a correction to the altitude for this difference may be made, thus allowing the sight to be plotted from the dead reckoning longitude, and the nearest whole degree of latitude. For example, if the exact hour angle of a star is 20° 10′.2 and the tables are entered with an hour angle of 20°, the hour angle difference is 10′.2.

Since Δt represents the change in altitude due to a change of 1′ of arc of hour angle, if Δt is multiplied by the hour angle difference the correction for hour angle difference is obtained. When this correction, together with the Δd correction, is applied to the tabulated altitude, the value thus obtained is the correct computed altitude for arguments of whole degree of latitude, the exact hour angle, and the exact declination of the body.

When successive Δt values have large differences in numerical value always interpolate forward from the lower entering hour angle, but never interpolate backward from the nearest entering hour angle.

The Δt correction is obtained from the multiplication table in exactly the same manner as the Δd correction, i. e., entering the multiplication table with Δt at the side and the hour angle difference at the top of the page, the Δt correction is taken from the body of the table by inspection.

By glancing at the values of altitude for tabulated hour angles between which the exact hour angle lies, it may be determined whether the altitude is increasing or decreasing as the tabulated hour angle approaches the exact hour angle. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing.

The use of Δt is not in general recommended when the altitude of the observed body is greater than 80°.

When both the Δd and the Δt corrections have been made to the tabulated altitude, the sight is plotted from the following position:

Latitude.—The whole degree with which the tables were entered.

Longitude.—The dead reckoning longitude.

Example 3.—At sea, March 20, 1940, during evening twilight, in dead reckoning position, Lat. 70° 15′.0 N.; Long. 20° 10′.0 W.; the navigator of the U. S. S. *Arizona* observed the lower limb of the moon for line of position as follows: Sextant altitude, 24° 00′.0; I. C., −1′.5; watch, 6h 31m 20s; C–W, 1h 20m 30s; chromometer, slow 0m 02s; height of eye, 44 feet.

Watch	18h	31m	20s	Hs	24°	00′.0	I. C	−1′.5
C–W	1	20	30	Corr	+1	01.6	Alt. C	+69.6
							Ht. Eye C.	−6.5
Chronometer	7	51	50	Ho	25°	01′.6		
C. C			+02				Corr	+61.6
G. C. T	19	51	52				Moon's H. P	60′.4
R. A. M. S. +12h	11	49	29.7					
Corr. tab. VI (N. A.)		3	15.8				R. A. Moon 20h	9h 15m 56s
							Corr. for 8m	−19
G. S. T	31	44	37.5					
R. A. Moon	9	15	37.0				R. A.	9 15 37
G. H. A	22	29	00.5				Dec. Moon 20h	11° 00′.4 N.
or arc		337°	15′.1 W.				Corr. for 8m	+1.2
G. H. A		22	44.9 E.					
Longitude		20	10.0 W.				Declination	11 01.6 N.
L. H. A		42	54.9 E.					
Latitude		70	00.0 N. (Assume nearest whole degree.)					
Declination		11	01.6 N. (Enter table with Lat. 70°, H. A. 43°, and declination 11°, same name as latitude.)					

		Alt.	*Δd*	*Δt*	*Δz.*
		25° 08′.4	+97	+26	132°.3
Δd correction for 1′.6	+1′.6				
Δt correction for 5′.1	+1.3				
Total correction	+2.9	+2.9			
Hc		25 11.3			
Ho		25 01.6			
Alt. Int		9.7 miles away from N. 132° E.			

From Lat. 70° N., Long. 20° 10′.0 W., plot azimuth line 132°, then lay off from above position 9.7 miles away from moon along bearing 132°, and draw position line at right angles to azimuth.

Example 4.—At sea, October 1, 1940, during evening twilight, in dead reckoning position, Lat. 69° 55′.0 N.; Long. 164° 29′.5 W.; the navigator of a steamship obtained nearly simultaneous observations of three stars for a fix of position as follows:

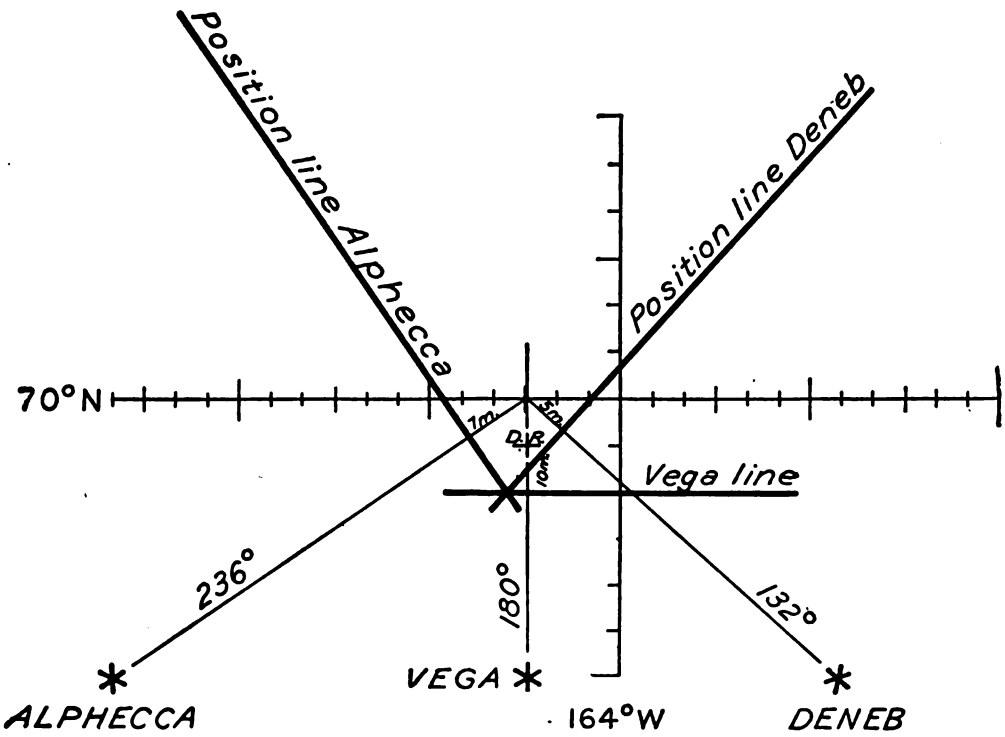
Star	*G. C. T. (Oct. 2)*	*Declination*	*True altitude (Ho.)*
Vega	4h 49m 52s	38° 44′.1 N.	58° 54′.1
Alphecca	4 50 30	26 55.1 N.	39 44.8
Deneb	4 51 30	45 04.5 N.	60 53.5

VEGA		ALPHECCA		DENEB	
G. H. A. for 0h G. C. T.	91° 49′.6		137° 31′.2		60° 42′.1
Corr. for 4h 49m 52s	72 39.9	Corr. for 4h 50m 30s	72 49.4	Corr. for 4h 51m 30s	73 04.4
G. H. A.	164 29.5 W.		210 20.6 W.		133 46.5 W.
D. R. Longitude	164 29.5 W.		164 29.5 W.		164 29.5 W.
L. H. A.	0		45 51.1 W.		30 43.0 E.
Latitude	70 00.0 N.		70 00.0 N.		70 00.0 N.
Declination	38 44.1 N.		26 55.1 N.		45 04.5 N.

	Alt.	*Δd*	*Az.*
	58° 30′.0	+1.0	180°
Δd corr. for 14′.1	+14.1		
Hc	58 44.1		
Ho	58 54.1		
Alt. Int.	10.0	miles toward 180°	

	Alt.	*Δd*	*Δt*	*Az.*
	39° 39′.9	−95	+29	123°.6
Δd corr. for 4′.9	−4.7			
Δt corr. for 8′.9	+2.6			
Hc	39 37.8			
Ho	39 44.8			
Alt. Int.	7.0	miles toward N. 124° W. (236°).		

	Alt.	*Δd*	*Δt*	*Az.*
	60° 39′.9	+93	+26	132°.0
Δd corr. for 4′.5	+4.2			
Δt corr. for 17′.0	+4.4			
Hc	60 48.5			
Ho	60 53.5			
Alt. Int.	5.0	miles toward 132°.		



Plot all stars from Lat. 70° N., Long. 164° 29′.5 W. The vessel is located in Lat. 69° 50′.0 N., Long. 164° 35′.W.

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(3) SOLUTION FOR POSITION LINE FROM THE DEAD RECKONING POSITION USING Δd, Δt, AND ΔL

If the navigator desires to plot the sight from the dead reckoning position, in addition to the Δd and Δt corrections, a correction to the altitude for latitude (called the ΔL correction) must be made. It will be necessary to correct either backward or forward for as much as 30′ difference in latitude between the integral degree of latitude with which the table is entered and the dead reckoning latitude. At the end of this book will be found a ΔL multiplication table from which corrections for odd minutes of latitude may be taken directly by inspection. The values in this table are the product of the ΔL value times the odd minutes of latitude. The value ΔL is the natural cosine of the azimuth, so that it is only necessary to know the azimuth of observation and the difference of latitude between dead reckoning position and integral latitude of table, as arguments for entry. In working from the dead reckoning position, corrections are made for Δd and Δt exactly as shown in the previous examples.

The L. H. A. for the dead reckoning longitude is found by applying the dead reckoning longitude to the G. H. A. Choose the integral tabular degree of latitude nearest to the dead reckoning latitude.

With selected integral degree of latitude, the L. H. A., and declination as arguments, take from the main table Alt., Δd, Δt, and Az. With the arguments azimuth and the difference of latitude between the dead reckoning position and the tabulated latitude of table, take the correction for latitude directly by inspection from the ΔL multiplication table at the back of the book.

When the dead reckoning latitude is greater than the selected tabulated latitude, the correction from the ΔL multiplication table is *minus*, but when the dead reckoning latitude is less than the tabulated latitude, the correction is *plus* providing the tabulated Az. is greater than 90°. Opposite corrections from the above are made when the Az. is less than 90°.

Example 5.—At sea, November 1, 1940, during evening twilight, in dead reckoning position, Lat. 70° 14′.0 S., Long. 140° 10′.0 E., simultaneous observations were taken of the star Acamar, bearing northeastward; true altitude, 52° 20′.1; and of the star Peacock, bearing westward; true altitude, 64° 16′.8; watch, 9h 10m 12s; C–W, 2h 39m 20s; chronometer, fast 0m 02s. Find the lines of position.

Watch	21h	10m	12s
C–W	2	39	20
Chronometer face	11	49	32
C. C			−02
G. C. T	11	49	30

Acamar, declination	40°	32′.5 S.
Peacock, declination	56	55.7 S.

ACAMAR

G. H. A. for 0h G. C. T	356°	07′.1	
Correction for 11h 49m 30s	177	51.6	
G. H. A	173	58.7	W.
or	186	01.3	E.
Longitude	140	10.0	E.
L. H. A	45	51.3	E.
Latitude	70	14.0	S.
Declination	40	32.5	S.

	Alt.	*Δd*	*Δt*	*Az.*
	51° 48′.9	+92	+31	117°.0
Δd corr. for 32′.5	+29′.9			
Δt corr. for 8′.7	+2.7			
ΔL corr. for 14′.0	−6.4			
Total correction	+26.2	+26.2		
Hc	52	15.1		
Ho	52	20.1		

Alt. Int. 5.0 miles toward S. 117° E. (63°).

PEACOCK

G. H. A. for 0h G. C. T	94°	53′.2	
Correction for 11h 49m 30s	177	51.6	
G. H. A	272	44.8	W.
or	87	15.2	E.
Longitude	140	10.0	E.
L. H. A	52	54.8	W.
Latitude	70	14.0	S.
Declination	56	55.7	S.

	Alt.	*Δd*	*Δt*	*Az.*
	64° 11′.0	−78	+34	92°.8
Δd corr. for 4′.3	−3′.3			
Δt corr. for 5′.2	+1.8			
ΔL corr. for 14′.0	−0.7			
Total correction	−2.2	−2.2		
Hc	64	08.8		
Ho	64	16.8		

Alt. Int. 8.0 miles toward S. 92°.8 W. (273°).

From dead reckoning position, Lat. 70° 14′.0 S., Long. 140° 10′.0 E., plot bearing of star Acamar 63°, and the bearing of Peacock 273°. From the dead reckoning position plot 5 miles toward Acamar and 8 miles toward Peacock, and draw both position lines at right angles to their respective azimuths.

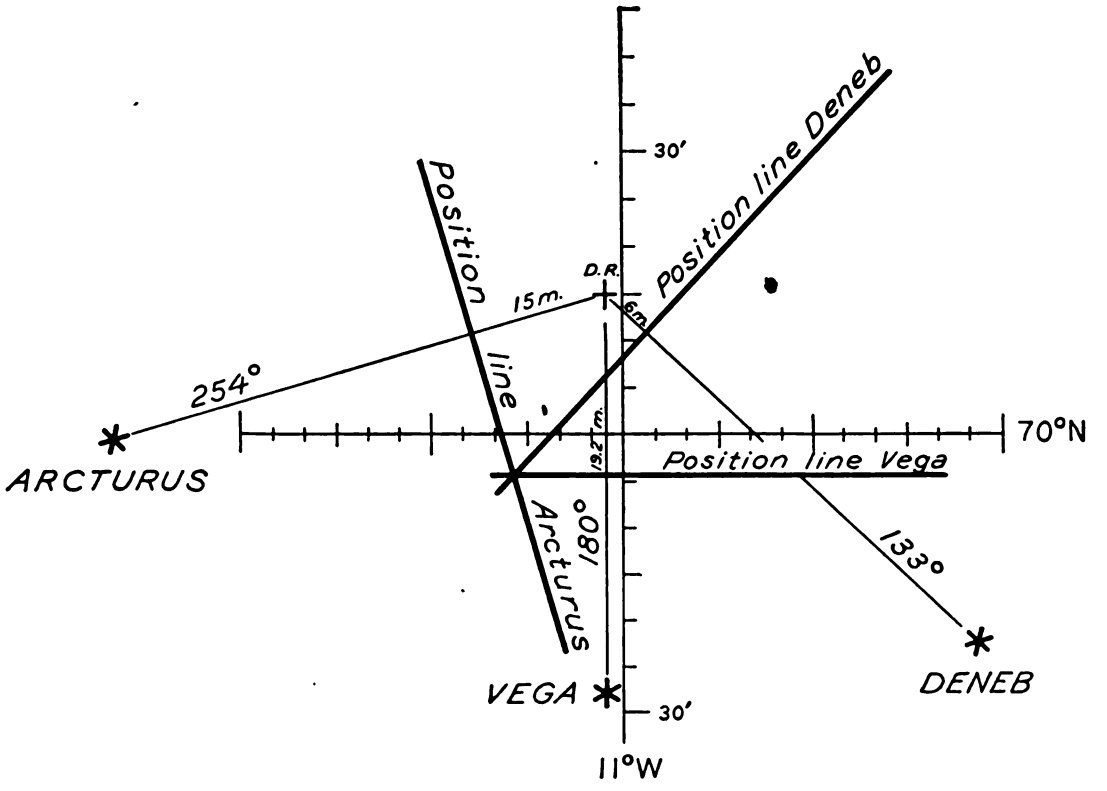
Example 6.—At sea, October 2, 1940, during evening twilight, in dead reckoning position, Lat. 70° 15′.0 N., Long. 11° 05′.6 W., the navigator of a steamship obtained nearly simultaneous observations of three stars for a fix of position as follows:

Star	*G. C. T.*	*Declination*	*True altitude (Ho.)*
Vega	18h 34m 01s	38° 44′.1 N.	58° 48′.3
Arcturus	18 35 10	19 29.6 N.	26 39.5
Deneb	18 36 02	45 04.5 N.	60 45.7

VEGA		ARCTURUS		DENEB	
G. H. A. for 0h G. C. T.	91° 49′.6		157° 19′.5		60° 42′.1
Corr. for 18h 34m 01s	279 16.0	Corr. for 18h 35m 10s	279 33.3	Corr. for 18h 36m 02s	279 46.3
G. H. A.	371 05.6 W.		76 52.8 W.		340 28.4 W.
Longitude	11 05.6 W.		11 05.6 W.		11 05.6 W.
L. H. A.	0		65 47.2 W.		30 37.2 E.
Latitude	70 15.0 N.		70 15.0 N.		70 15.0 N.
Declination	38 44.1 N.		19 29.6 N.		45 04.5 N.

Alt.	*Δd*	*Az.*		*Alt.*	*Δd*	*Δt.*	*Az.*		*Alt.*	*Δd*	*Δt*	*Az.*
58° 30′.0	+1.0	180°		26° 24′.7	−94	+33	106°.0		60° 55′.0	+94	−25	133°.3
Δd corr. for 14′.1	+14.1			Δd corr. for 0′.4	−.4				Δd corr. for 4′.5	+4.3		
ΔL corr. for 15′.0	−15.0			Δt corr. for 12′.8	+4.3				Δt corr. for 37′.2	−9.4		
				ΔL corr. for 15′.0	−4.1				ΔL corr. for 15′.0	−10.2		
Hc	58 29.1			Hc	26 24.5				Hc	60 39.7		
Ho	58 48.3			Ho	26 39.5				Ho	60 45.7		
Alt. Int.	19.2 miles toward 180°.			Alt. Int.	15.0 miles toward N. 106° W. (254°).				Alt. Int.	6.0 miles toward 133°.		

The three stars are plotted from the dead reckoning position, Lat. 70° 15′.0 N., Long. 11° 05′.6 W. The vessel is located in Lat. 69° 56′.0 N., Long. 11° 35′.0 W.



16—18508

STAR IDENTIFICATION

With the observed altitude and azimuth enter the double-page Star Identification Table immediately following the proper latitude section and extract the tabulated values of declination and hour angle. Eye interpolation will suffice for accuracy.

Combine the H. A. with the longitude to determine the G. H. A. of the star, or with the L. S. T. to obtain its R. A. Enter the Nautical Almanac with the declination and G. H. A., or the declination and R. A., and identify the star.

Example 7.—At sea, February 10, 1940, at dawn, in dead reckoning position, Lat. 70° 20′.0 S., Long. 80° 15′.0 W., an unknown star was observed through a break in the clouds; true altitude, 71° 22′.3; true bearing S. 101° E.; G. C. T., $8^h\ 01^m\ 01^s$. Required, the name of the star.

SOLUTION

Enter star identification table with approximate value of arguments Az. 100° and Alt. 72°, and find:

Dec. 61° S. *H. A.* 39° E. ($2^h\ 36^m$)

To obtain G. H. A.				*To obtain R. A.*		
Longitude	80°	15′.0	W.	G. C. T.	8^h	01^m
L. H. A.	39	00.0	E.	R. A. M. S.+12^h	9	16
G. H. A.	41	15.0	W.	G. S. T.	17	17
	360°			Longitude W.	5	21
G. H. A.	401	15.0	W. (for G. C. T. $8^h\ 01^m\ 01^s$).	L. S. T.	11	56
N. A. correction	120	35.1	W. (for $8^h\ 01^m\ 01^s$).	L. H. A.	2	36 E.
G. H. A.	280	39.9	W.	R. A.	14	32

Open the Nautical Almanac (p. 172) to stars for February. Glance along date line 10, for approximate G. H. A. 280° 39′.9 and declination 61° S., or open (to p. 162) and with same declination and R. A. $14^h\ 32^m$, then the star sought is Rigil Kentaurus.

GREAT CIRCLE SAILING

Enter that section of the tables corresponding to the latitude of departure and find that declination column which is headed by a value nearest to the latitude of destination. From this column, and opposite that H. A. argument nearest the difference in longitude between the departure and the destination, extract the tabulated values of altitude (alt.), Δd, Δt, and azimuth (az.), and solve for Hc.

Subtract the value of altitude (Hc) from 90° and convert the resultant into minutes of arc to obtain the Great Circle Distance in miles. The azimuth becomes the Great Circle Course and is measured from the elevated pole, east or west, to the destination.

Example 8.—Find the Initial Course and Great Circle Distance between Hammerfest Lighthouse, Norway, Lat. 70° 40′.0 N., Long. 23° 40′.0 E., and Cape Charles Lighthouse, U. S. A., Lat. 37° 07′.0 N., Long. 75° 54′.0 W.

Departure		*Destination*	
Lat.	70° 40′.0 N.	Lat.	37° 07′.0 N.
Long.	23° 40′.0 E.	Long.	75° 54′.0 W.

SOLUTION

Diff. long. 99° 34′; latitude of departure, 70° 40′ N.; latitude of destination, 37° 07′ N.

Enter tables with Lat. 70°; H. A., 99°; and declination 37° (same name as latitude).

			Alt.	*Δd*	*Δt*	*Az.*
			31° 31′.2	+92	−32	67°.7
Corr. for 7′ dec. × 92=	+6′.4	Total correction	+10.6			
Corr. for 34′ H. A. × 32=	−10.9					
Corr. for 40′ lat=	+15.1	Hc	31 41.8			
		(Subtract)	90 00.0			
Total correction	+10.6	Zenith distance	58 18.2	= 3,498.2 nautical miles, Great Circle Distance.		

Great Circle Course, N. 67°.7 W. (292°).

If the point of destination is 37° 07′.0 S., instead of 37° 07′.0 N., then the supplement of the difference of longitude is found—180° −99° 34′=80° 26′.

Enter table with H. A. 80°; Lat. 70°; declination, 37° (same name as latitude); and find:

			Alt.	*Δd*	*Δt*	*Az.*
			37° 48′.2	+90	−34	84°.5
Corr. for 7′ dec. × 90=	+6′.3	Total correction	+1.3			
Corr. for 26′ H. A. × 34=	−8.8					
Corr. for 40′ lat=	+3.8	Hc	37 49.5			
		(Add)	90 00.0			
Total correction	+1.3	Zenith distance	127 49.5	= 7,669.5 nautical miles, Great Circle Distance.		

Great Circle Course, N. 84°.5 W. (275°.5).

In those cases where the various arguments used cannot be found within these tables, then resort must be had to other means without the tables for finding a solution.

POLAR NAVIGATION

The Hydrographic Office has now completed all computations for values of altitude and azimuth for the last book of the series H. O. Publication No. 214, Volume IX, which is the belt included between the limits of 80° and 90° North or South latitude. Due to the considerable expense involved for the printing of Volume IX, and also to the very limited demand for navigational tables in the immediate vicinity of the pole, the publishing of this final book will be deferred until some later date. In order that a reliable and accurate supplementary means may be now available to the navigator for work within 10 degrees or less from the pole, the following alternative process is given here that is convenient, accurate, and simple of application, for finding by inspection and without interpolation, the computed values of altitude and azimuth for any celestial body in the heavens, together with a simple means for the plotting of the lines of position to give the final fix. The chart used for plotting is a polar chart with the pole located at the center of a circle and the radiating lines are the different meridians east and west of Greenwich. It is seen that near the poles the many meridians converge very rapidly toward the pole, therefore, any observer's particular meridian is very difficult of determination because a departure in position of but 5 miles or so, may change the resultant longitude by as much as 10 degrees or more. In the process that follows of fixing position near the poles, the navigator has no immediate concern whatever with the dead reckoning position of the vessel either as to the latitude or the longitude. In the polar regions, whenever observations are taken of either the sun, moon, planets, or stars, the observer's *Assumed Position* is always regarded as being located directly at the pole. In this locality the navigator will invariably use an accurate timepiece always set to the Greenwich civil or sidereal time. When an observer is located at either of the poles of the earth, the observer's zenith and the elevated pole coincide, the plane of the horizon coincides with the plane of the equator, hence, all vertical circles of azimuth cutting the horizon coincide with all hour circles, or meridian circles of longitude cutting the Equator, then all parallel circles of altitude coincide with similar parallel circles of declination. It is at once seen that altitude is always equal to declination and azimuth is always equal to hour angle, or what is the same thing, it is the longitude of the meridian as measured from Greenwich. Since every assumed position used in this process is located directly at the pole, then in lieu of H. O. Publication No. 214, Volume IX, the Nautical Almanac is substituted and now becomes the new and complete navigational table to find directly the computed altitude and azimuth, because every celestial body in the heavens has accurately recorded in the Almanac the true value of its coordinates—declination (altitude) and Greenwich hour angle (azimuth) for any given instant of Greenwich Civil Time (G. C. T.). It has already been shown that the declination of the celestial body is the computed altitude (Hc) with respect to the horizon, while the Greenwich hour angle indicates the true value of azimuth as measured from the prime meridian. The radiating lines on any polar chart are azimuth lines and are also the meridians on which the celestial body is located, or transits at any particular instant of time and upon which the intercept is measured *toward* the celestial body if the observed altitude is greater than the declination (computed altitude) or *away from* the celestial body if the observed sextant altitude is less than the declination. The radiating meridian lines from the pole are azimuth circles indicating true directions and are measured from the initial point, which is longitude 0° (Greenwich). The procedure here is as follows and differs in no particular essential from any other ordinary sight observed anywhere on earth. The *Assumed Position* is always the elevated pole. When the celestial body is observed, note the exact G. C. T. From the Nautical Almanac find the proper declination and Greenwich hour angle of the body for the exact G. C. T. of observation. When the true observed altitude (Ho) is greater than the declination (Hc), go from the pole *toward* the celestial body, along the azimuth (G. H. A.) or, what is the same thing, go along the meridian upon which the celestial body lies. If the observed altitude is less than the declination, go from the pole *away* from the celestial body along the azimuth, or longitude equivalent to the Greenwich hour angle. Two sights on well-separated bearings give as good a fix close to the poles as anywhere else on earth.

Example.—Near the pole, about midnight, on June 29, 1940, the true observed altitude of the moon by bubble octant was 9° 48′.3, corrected G. C. T. $23^h15^m12^s$, and the true observed altitude of the sun 21° 57′.7, and the corrected G. C. T. $23^h17^m24^s$. Find the position of the airship.

SOLUTION

MOON				SUN			
G. C. T.	23^h	15^m	12^s	G. C. T.	23^h	17^m	24^s
G. H. A.	236°	11′.0	W.	G. H. A.	168°	30′.6	W.
or	123	49.0	E.				
Declination	10	57.0	N.	Declination	23	12.2	N.
Hc	10	57.0		Hc	23	12.2	
Ho	9	48.3		Ho	21	57.7	
Alt. Int.	1	08.7 (or 68′.7) miles away from moon along azimuth, or longitude 123° 49′.0 E.		Alt. Int.	1	14.5 (or 74′.5) miles away from sun along azimuth, or longitude 168° 30′.6 W.	

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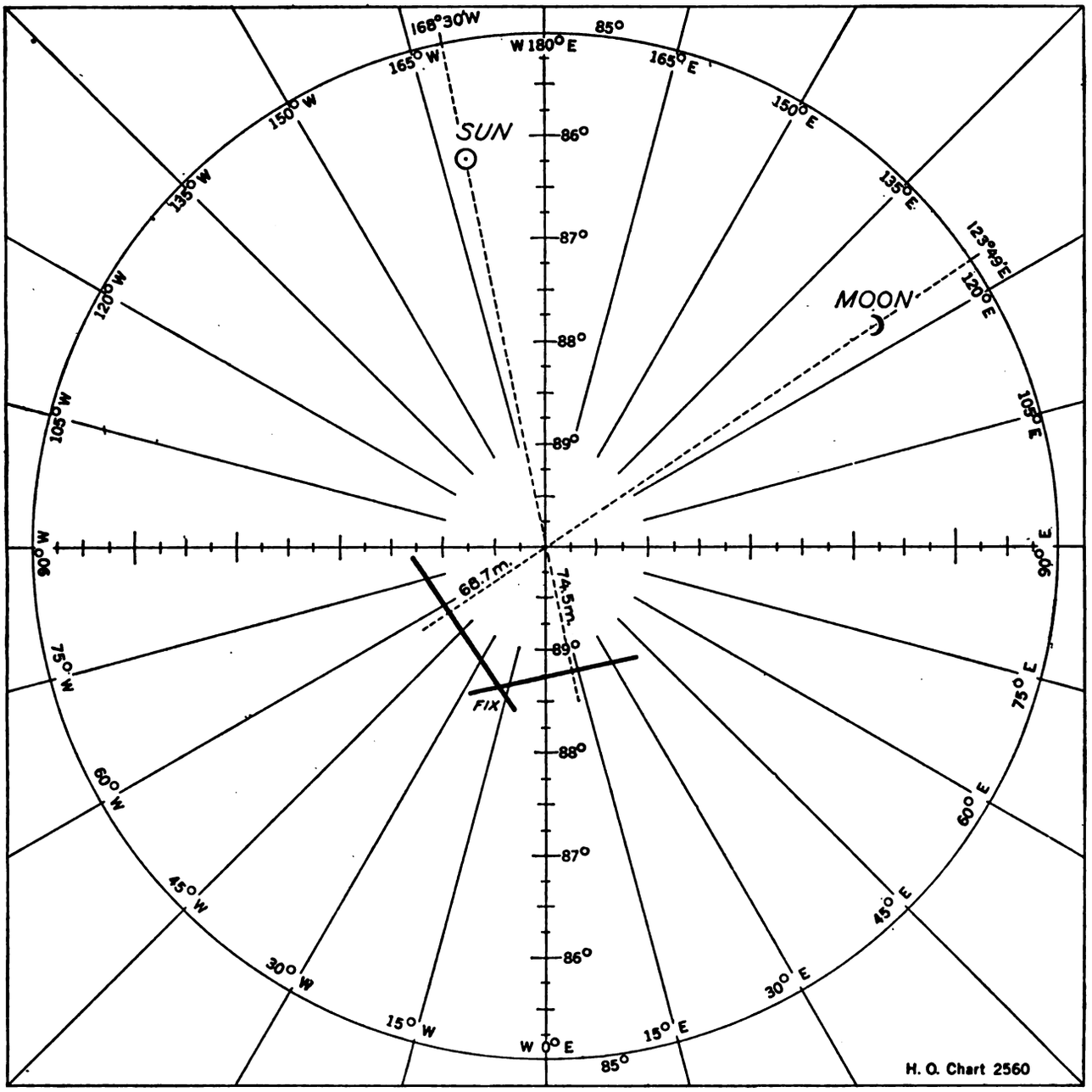

On any polar projection, such as H. O. Chart No. 2560, plot the meridian of 123° 49′.0 E. Since this is the moon's G. H. A., that body is located on this meridian. Plot the meridian of 168° 30′.6 W., since this is the sun's G. H. A., that body is located on this meridian, lay off a point 68.7 miles away from the pole and also from the moon, then draw the line of position at right angles to the azimuth 123° 49′.0 E., again lay off another point 74.5 miles away from the pole and also away from the sun and draw a perpendicular to the azimuth 168° 30′.6 W. The intersection is the fix of position. Thus, it is seen that any vessel can navigate safely and with accurate results in and about the pole over the belt from 80° to the pole, without using H. O. Publication No. 214, Volume IX.

MAP PROJECTIONS USED NEAR THE POLES

When navigating within 10 degrees or less of the pole, the best projections to use are the Polar Gnomonic Chart (H. O. Misc. No. 9172), the Azimuthal Equidistant Chart (H. O. Chart No. 2560 and 2560A), or any Stereographic Projection Chart. On any of the above charts the straight-line track joining any two points is practically a great circle. The distance can readily be measured along the chosen track, and the true course and the various changes of course, as the different meridians are crossed, can be readily found with an ordinary protractor when placed between the indicated track and any other selected meridian.

Circles of equal altitude for the sun near the poles are of very large radius as the sun is always low. Within 5 degrees of the pole the correction for a line of position does not exceed 3′, hence, the position line is correct when used as a straight line, but when stars are of high declination, the position line is curving and this curve should be taken into consideration when plotting a straight line of position. (See Naval Institute Proceedings Vol. 66, December 1940, Page 1713).

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H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	00
1	19 59.8	1.0 01	178.9	20 29.8	1.0 01	178.9	20 59.8	1.0 01	178.9	21 29.8	1.0 01	178.9	21 59.8	1.0 01	178.9	22 29.8	1.0 01	178.9	22 59.8	1.0 01	178.9	23 29.8	1.0 01	178.9	1
2	19 59.2	1.0 02	177.9	20 29.2	1.0 02	177.9	20 59.2	1.0 02	177.9	21 29.2	1.0 02	177.9	21 59.2	1.0 02	177.8	22 29.2	1.0 02	177.8	22 59.2	1.0 02	177.8	23 29.2	1.0 02	177.8	2
3	19 58.3	1.0 02	176.8	20 28.3	1.0 02	176.8	20 58.3	1.0 02	176.8	21 28.3	1.0 02	176.8	21 58.3	1.0 02	176.8	22 28.3	1.0 02	176.8	22 58.3	1.0 02	176.7	23 28.2	1.0 02	176.7	3
4	19 57.0	1.0 03	175.7	20 26.9	1.0 03	175.7	20 56.9	1.0 03	175.7	21 26.9	1.0 03	175.7	21 56.9	1.0 03	175.7	22 26.9	1.0 03	175.7	22 56.9	1.0 03	175.7	23 26.9	1.0 03	175.6	4
05	19 55.2	1.0 03	174.7	20 25.2	1.0 03	174.7	20 55.2	1.0 04	174.6	21 25.2	1.0 04	174.6	21 55.2	1.0 04	174.6	22 25.2	1.0 04	174.6	22 55.1	1.0 04	174.6	23 25.1	1.0 04	174.6	05
6	19 53.1	1.0 04	173.6	20 23.1	1.0 04	173.6	20 53.1	1.0 04	173.6	21 23.1	1.0 04	173.6	21 53.1	1.0 04	173.5	22 23.0	1.0 04	173.5	22 53.0	1.0 04	173.5	23 23.0	1.0 04	173.5	6
7	19 50.7	1.0 05	172.6	20 20.6	1.0 05	172.5	20 50.6	1.0 05	172.5	21 20.6	1.0 05	172.5	21 50.6	1.0 05	172.5	22 20.5	1.0 05	172.4	22 50.5	1.0 05	172.4	23 20.5	1.0 05	172.4	7
8	19 47.8	1.0 05	171.5	20 17.8	1.0 05	171.5	20 47.8	1.0 05	171.4	21 17.7	1.0 05	171.4	21 47.7	1.0 05	171.4	22 17.6	1.0 05	171.4	22 47.6	1.0 05	171.3	23 17.6	1.0 05	171.3	8
9	19 44.6	1.0 06	170.4	20 14.6	1.0 06	170.4	20 44.5	1.0 06	170.4	21 14.5	1.0 06	170.3	21 44.4	1.0 06	170.3	22 14.4	1.0 06	170.3	22 44.3	1.0 06	170.2	23 14.3	1.0 06	170.2	9
10	19 41.0	1.0 07	169.4	20 11.0	1.0 07	169.3	20 40.9	1.0 07	169.3	21 10.8	1.0 07	169.3	21 40.8	1.0 07	169.2	22 10.7	1.0 07	169.2	22 40.6	1.0 07	169.2	23 10.6	1.0 07	169.1	10
1	19 37.0	1.0 07	168.3	20 07.0	1.0 07	168.3	20 36.9	1.0 07	168.2	21 06.8	1.0 07	168.2	21 36.7	1.0 07	168.2	22 06.7	1.0 07	168.1	22 36.6	1.0 07	168.1	23 06.5	1.0 07	168.0	1
2	19 32.7	1.0 08	167.3	20 02.6	1.0 08	167.2	20 32.5	1.0 08	167.2	21 02.4	1.0 08	167.1	21 32.4	1.0 08	167.1	22 02.3	1.0 08	167.1	22 32.2	1.0 08	167.0	23 02.1	1.0 08	167.0	2
3	19 28.0	1.0 08	166.2	19 57.9	1.0 08	166.2	20 27.8	1.0 09	166.1	20 57.7	1.0 09	166.1	21 27.6	1.0 09	166.0	21 57.5	1.0 09	166.0	22 27.4	1.0 09	165.9	22 57.3	1.0 09	165.9	3
4	19 22.9	1.0 09	165.1	19 52.8	1.0 09	165.1	20 22.7	1.0 09	165.0	20 52.6	1.0 09	165.0	21 22.4	1.0 09	165.0	21 52.3	1.0 09	164.9	22 22.2	1.0 09	164.9	22 52.1	1.0 09	164.8	4
15	19 17.5	1.0 10	164.1	19 47.3	1.0 10	164.0	20 17.2	1.0 10	164.0	20 47.1	1.0 10	163.9	21 16.9	1.0 10	163.9	21 46.8	1.0 10	163.8	22 16.7	1.0 10	163.8	22 46.5	1.0 10	163.7	15
6	19 11.7	1.0 10	163.0	19 41.5	99 10	163.0	20 11.4	99 10	162.9	20 41.2	99 10	162.9	21 11.0	99 10	162.8	21 40.9	99 10	162.8	22 10.7	99 10	162.7	22 40.6	99 10	162.7	6
7	19 05.5	99 11	162.0	19 35.3	99 11	161.9	20 05.1	99 11	161.9	20 35.0	99 11	161.8	21 04.8	99 11	161.8	21 34.6	99 11	161.7	22 04.5	99 11	161.6	22 34.3	99 11	161.6	7
8	18 59.0	99 11	160.9	19 28.8	99 12	160.9	19 58.6	99 12	160.8	20 28.4	99 12	160.7	20 58.2	99 12	160.7	21 28.0	99 12	160.6	21 57.8	99 12	160.6	22 27.6	99 12	160.5	8
9	18 52.1	99 12	159.9	19 21.9	99 12	159.8	19 51.7	99 12	159.8	20 21.4	99 12	159.7	20 51.2	99 12	159.6	21 21.0	99 12	159.6	21 50.8	99 12	159.5	22 20.6	99 12	159.4	9
20	18 44.8	99 13	158.8	19 14.6	99 13	158.8	19 44.4	99 13	158.7	20 14.1	99 13	158.6	20 43.9	99 13	158.6	21 13.7	99 13	158.5	21 43.4	99 13	158.4	22 13.2	99 13	158.4	20
1	18 37.2	99 13	157.8	19 07.0	99 13	157.7	19 36.7	99 13	157.6	20 06.5	99 13	157.6	20 36.2	99 13	157.5	21 06.0	99 13	157.4	21 35.7	99 13	157.4	22 05.4	99 14	157.3	1
2	18 29.3	99 14	156.7	18 59.0	99 14	156.7	19 28.8	99 14	156.6	19 58.5	99 14	156.5	20 28.2	99 14	156.4	20 57.9	99 14	156.4	21 27.6	99 14	156.3	21 57.3	99 14	156.2	2
3	18 21.0	99 14	155.7	18 50.7	99 14	155.6	19 20.4	99 14	155.5	19 50.1	99 14	155.5	20 19.8	99 15	155.4	20 49.5	99 15	155.3	21 19.2	99 15	155.2	21 48.9	99 15	155.2	3
4	18 12.4	99 15	154.6	18 42.1	99 15	154.6	19 11.8	99 15	154.5	19 41.4	99 15	154.4	20 11.1	99 15	154.3	20 40.8	99 15	154.3	21 10.4	99 15	154.2	21 40.1	99 15	154.1	4
25	18 03.5	99 15	153.6	18 33.1	99 16	153.5	19 02.8	99 16	153.4	19 32.4	99 16	153.4	20 02.1	99 16	153.3	20 31.7	99 16	153.2	21 01.3	99 16	153.1	21 31.0	99 16	153.0	25
6	17 54.2	99 16	152.6	18 23.8	99 16	152.5	18 53.4	99 16	152.4	19 23.0	99 16	152.3	19 52.7	99 16	152.2	20 22.3	99 16	152.1	20 51.9	99 16	152.1	21 21.5	99 16	152.0	6
7	17 44.6	99 17	151.5	18 14.2	99 17	151.4	18 43.8	99 17	151.4	19 13.3	99 17	151.3	19 42.9	99 17	151.2	20 12.5	99 17	151.1	20 42.1	99 17	151.0	21 11.7	99 17	150.9	7
8	17 34.6	99 17	150.5	18 04.2	99 17	150.4	18 33.8	99 17	150.3	19 03.3	99 17	150.2	19 32.9	99 17	150.1	20 02.4	99 17	150.0	20 32.0	99 17	150.0	21 01.6	99 17	149.9	8
9	17 24.3	98 18	149.5	17 53.9	98 18	149.4	18 23.4	98 18	149.3	18 53.0	98 18	149.2	19 22.5	98 18	149.1	19 52.0	98 18	149.0	20 21.6	98 18	148.9	20 51.1	98 18	148.8	9
30	17 13.8	98 18	148.4	17 43.3	98 18	148.3	18 12.8	98 18	148.2	18 42.3	98 18	148.2	19 11.8	98 18	148.1	19 41.3	98 18	148.0	20 10.8	98 18	147.9	20 40.3	98 18	147.8	30
1	17 02.9	98 19	147.4	17 32.3	98 19	147.3	18 01.8	98 19	147.2	18 31.3	98 19	147.1	19 00.8	98 19	147.0	19 30.3	98 19	146.9	19 59.7	98 19	146.8	20 29.2	98 19	146.7	1
2	16 51.7	98 19	146.4	17 21.1	98 19	146.3	17 50.6	98 19	146.2	18 20.0	98 19	146.1	18 49.5	98 19	146.0	19 18.9	98 19	145.9	19 48.3	98 20	145.8	20 17.8	98 20	145.7	2
3	16 40.1	98 20	145.4	17 09.6	98 20	145.3	17 39.0	98 20	145.1	18 08.4	98 20	145.0	18 37.8	98 20	144.9	19 07.2	98 20	144.8	19 36.6	98 20	144.7	20 06.1	98 20	144.6	3
4	16 28.3	98 20	144.3	16 57.7	98 20	144.2	17 27.1	98 20	144.1	17 56.5	98 20	144.0	18 25.9	98 20	143.9	18 55.3	98 20	143.8	19 24.6	98 20	143.7	19 54.0	98 21	143.6	4
35	16 16.2	98 21	143.3	16 45.6	98 21	143.2	17 14.9	98 21	143.1	17 44.3	98 21	143.0	18 13.6	98 21	142.9	18 43.0	98 21	142.8	19 12.3	98 21	142.7	19 41.7	98 21	142.5	35
6	16 03.8	98 21	142.3	16 33.1	98 21	142.2	17 02.5	98 21	142.1	17 31.8	98 21	142.0	18 01.1	98 21	141.8	18 30.4	98 21	141.7	18 59.8	98 21	141.6	19 29.1	98 22	141.5	6
7	15 51.1	98 22	141.3	16 20.4	98 22	141.2	16 49.7	98 22	141.0	17 19.0	98 22	140.9	17 48.3	98 22	140.8	18 17.6	98 22	140.7	18 46.9	98 22	140.6	19 16.2	98 22	140.5	7
8	15 38.1	98 22	140.3	16 07.4	98 22	140.1	16 36.7	98 22	140.0	17 05.9	98 22	139.9	17 35.2	98 22	139.8	18 04.5	98 22	139.7	18 33.7	98 22	139.6	19 03.0	97 22	139.4	8
9	15 24.9	97 23	139.2	15 54.1	97 23	139.1	16 23.3	97 23	139.0	16 52.6	97 23	138.9	17 21.8	97 23	138.8	17 51.0	97 23	138.7	18 20.3	97 23	138.5	18 49.5	97 23	138.4	9
40	15 11.3	97 23	138.2	15 40.5	97 23	138.1	16 09.8	97 23	138.0	16 39.0	97 23	137.9	17 08.1	97 23	137.8	17 37.3	97 23	137.6	18 06.5	97 23	137.5	18 35.7	97 23	137.4	40
1	14 57.5	97 23	137.2	15 26.7	97 24	137.1	15 55.9	97 24	137.0	16 25.1	97 24	136.9	16 54.2	97 24	136.7	17 23.4	97 24	136.6	17 52.5	97 24	136.5	18 21.7	97 24	136.4	1
2	14 43.5	97 24	136.2	15 12.6	97 24	136.1	15 41.8	97 24	136.0	16 10.9	97 24	135.9	16 40.0	97 24	135.7	17 09.2	97 24	135.6	17 38.3	97 24	135.5	18 07.4	97 24	135.4	2
3	14 29.1	97 24	135.2	14 58.3	97 24	135.1	15 27.4	97 24	135.0	15 56.5	97 24	134.8	16 25.6	97 24	134.7	16 54.7	97 25	134.6	17 23.8	97 25	134.5	17 52.8	97 25	134.3	3
4	14 14.6	97 25	134.2	14 43.6	97 25	134.1	15 12.7	97 25	134.0	15 41.8	97 25	133.8	16 10.9	97 25	133.7	16 39.9	97 25	133.6	17 09.0	97 25	133.4	17 38.0	97 25	133.3	4
45	13 59.7	97 25	133.2	14 28.8	97 25	133.1	14 57.8	97 25	133.0	15 26.9	97 25	132.8	15 55.9	97 25	132.7	16 24.9	97 25	132.6	16 54.0	97 25	132.4	17 23.0	97 25	132.3	45
6	13 44.7	97 26	132.2	14 13.7	97 26	132.1	14 42.7	97 26	132.0	15 11.7	97 26	131.8	15 40.7	97 26	131.7	16 09.7	97 26	131.6	16 38.7	97 26	131.4	17 07.7	97 26	131.3	6
7	13 29.3	97 26	131.2	13 58.3	97 26	131.1	14 27.3	97 26	131.0	14 56.3	97 26	130.8	15 25.3	97 26	130.7	15 54.2	97 26	130.6	16 23.2	97 26	130.4	16 52.2	97 26	130.3	7
8	13 13.8	97 26	130.2	13 42.7	97 26	130.1	14 11.7	97 26	130.0	14 40.6	96 26	129.8	15 09.6	96 26	129.7	15 38.5	96 27	129.6	16 07.5	96 27	129.4	16 36.4	96 27	129.3	8
9	12 58.0	96 27	129.2	13 26.9	96 27	129.1	13 55.9	96 27	129.0	14 24.8	96 27	128.8	14 53.7	96 27	128.7	15 22.6	96 27	128.6	15 51.5	96 27	128.4	16 20.4	96 27	128.3	9
50	12 42.0	96 27	128.3	13 10.9	96 27	128.1	13 39.8	96 27	128.0	14 08.7	96 27	127.8	14 37.6	96 27	127.7	15 06.4	96 27	127.6	15 35.3	96 27	127.4	16 04.2	96 27	127.3	50
1	12 25.8	96 27	127.3	12 54.6	96 27	127.1	13 23.5	96 28	127.0	13 52.4	96 28	126.8	14 21.2	96 28	126.7	14 50.1	96 28	126.6	15 18.9	96 28	126.4	15 47.7	96 28	126.3	1
2	12 09.3	96 28	126.3	12 38.2	96 28	126.1	13 07.0	96 28	126.0	13 35.8	96 28	125.9	14 04.7	96 28	125.7	14 33.5	96 28	125.6	15 02.3	96 28	125.4	15 31.1	96 28	125.3	2
3	11 52.7	96 28	125.3	12 21.5	96 28	125.2	12 50.3	96 28	125.0	13 19.1	96 28	124.9	13 47.9	96 28	124.7	14 16.7	96 28	124.6	14 45.5	96 28	124.4	15 14.2	96 28	124.3	3
4	11 35.8	96 28	124.3	12 04.6	96 28	124.2	12 33.4	96 29	124.0	13 02.2	96 29	123.9	13 30.9	96 29	123.7	13 59.7	96 29	123.6	14 28.4	96 29	123.4	14 57.2	96 29	123.3	4
55	11 18.8	96 29	123.3	11 47.5	96 29	123.2	12 16.3	96 29	123.1	12 45.0	96 29	122.9	13 13.8	96 29	122.8	13 42.5	96 29	122.6	14 11.2	96 29	122.5	14 39.9	96 29	122.3	55
6	11 01.6	96 29	122.4	11 30.3	96 29	122.2	11 59.0	96 29	122.1	12 27.7	96 29	121.9	12 56.4	96 29	121.8	13 25.1	96 29	121.6	13 53.8	96 29	121.5	14 22.5	96 29	121.3	6
7	10 44.1	96 29	121.4	11 12.8	96 29	121.2	11 41.5	96 29	121.1	12 10.2	96 30	120.9	12 38.9	96 30	120.8	13 07.5	96 30	120.6	13 36.2	96 30	120.5	14 04.9	96 30	120.3	7
8	10 26.5	96 30	120.4	10 55.2	96 30	120.3	11 23.9	96 30	120.1	11 52.5	96 30	120.0	12 21.2	96 30	119.8	12 49.8	96 30	119.7	13 18.4	96 30	119.5	13 47.1	96 30	119.4	8
9	10 08.7	96 30	119.5	10 37.4	96 30	119.3	11 06.0	96 30	119.1	11 34.6	96 30	119.0	12 03.3	96 30	118.8	12 31.9	96 30	118.7	13 00.5	96 30	118.5	13 29.1	96 30	118.4	9
60	9 50.8	96 30	118.5	10 19.4	96 30	118.3	10 48.0	96 30	118.2	11 16.6	96 30	118.0	11 45.2	96 30	117.9	12 13.8	96 30	117.7	12 42.4	96 30	117.6	13 11.0	96 30	117.4	60
1	9 32.7	96 30	117.5	10 01.3	96 31	117.4	10 29.8	96 31	117.2	10 58.4	96 31	117.1	11 27.0	96 31	116.9	11 55.6	96 31	116.7	12 24.1	96 31	116.6	12 52.7	96 31	116.4	1
2	9 14.4	96 31	116.5	9 43.0	96 31	116.4	10 11.5	96 31	116.2	10 40.1	96 31	116.1	11 08.6	96 31	115.9	11 37.1	96 31	115.8	12 05.7	96 31	115.6	12 34.2	96 31	115.5	2
3	8 56.0	96 31	115.6	9 24.5	96 31	115.4	9 53.0	96 31	115.3	10 21.6	96 31	115.1	10 50.1	96 31	115.0	11 18.6	96 31	114.8	11 47.1	96 31	114.6	12 15.6	96 31	114.5	3
4	8 37.4	96 31	114.6	9 05.9	96 31	114.5	9 34.4	96 31	114.3	10 02.9	96 31	114.1	10 31.4	96 31	114.0	10 59.9	96 31	113.8	11 28.4	96 31	113.7	11 56.9	96 31	113.5	4
65	8 18.7	96 31	113.7	8 47.1	96 31	113.5	9 15.6	96 32	113.3	9 44.1	96 32	113.2	10 12.6	96 32	113.0	10 41.1	96 32	112.9	11 09.5	96 32	112.7	11 38.0	96 32	112.5	65
6	7 59.8	96 32	112.7	8 28.3	96 32	112.5	8 56.7	96 32	112.4	9 25.2	96 32	112.2	9 53.6	96 32	112.1	10 22.1	96 32	111.9	10 50.5	96 32	111.7	11 19.0	96 32	111.6	6
7	7 40.8	96 32	111.7	8 09.2	96 32	111.6	8 37.7	96 32	111.4	9 06.1	96 32	111.3	9 34.5	96 32	111.1	10 03.0	96 32	110.9	10 31.4	96 32	110.8	10 59.8	96 32	110.6	7
8	7 21.7	96 32	110.8	7 50.1	96 32	110.6	8 18.5	96 32	110.5	8 46.9	96 32	110.3	9 15.3	96 32	110.1	9 43.7	96 32	110.0	10 12.1	96 32	109.8	10 40.5	96 32	109.7	8
9	7 02.4	96 32	109.8	7 30.8	96 32	109.7	7 59.2	96 32	109.5	8 27.6	96 32	109.3	8 56.0	96 32	109.2	9 24.4	96 32	109.0	9 52.8	96 32	108.9	10 21.2	96 32	108.7	9
70	6 43.1	96 32	108.9	7 11.4	96 32	108.7	7 39.8	96 33	108.6	8 08.2	96 33	108.4	8 36.6	96 33	108.2	9 04.9	96 33	108.1	9 33.3	96 33	107.9	10 01.7	96 33	107.7	70
1	6 23.6	96 33	107.9	6 52.0	96 33	107.8	7 20.3	96 33	107.6	7 48.7	96 33	107.4	8 17.0	96 33	107.3	8 45.4	96 33	107.1	9 13.7	96 33	106.9	9 42.1	96 33	106.8	1
2	6 04.0	96 33	107.0	6 32.4	96 33	106.8	7 00.7	96 33	106.6	7 29.0	96 33	106.5	7 57.4	96 33	106.3	8 25.7	96 33	106.2	8 54.0	96 33	106.0	9 22.4	96 33	105.8	2
3	5 44.3	96 33	106.0	6 12.7	96 33	105.9	6 41.0	96 33	105.7	7 09.3	96 33	105.5	7 37.6	96 33	105.4	8 06.0	96 33	105.2	8 34.3	96 33	105.0	9 02.6	96 33	104.9	3
4	5 24.6	96 33	105.1	5 52.9	96 33	104.9	6 21.2	96 33	104.7	6 49.5	96 33	104.6	7 17.8	96 33	104.4	7 46.1	96 33	104.2	8 14.4	96 33	104.1	8 42.7	96 33	103.9	4
75	5 04.7	96 33	104.1	5 33.0	96 33	104.0	6 01.3	96 33	103.8	6 29.6	96 33	103.6	6 57.9	96 33	103.5	7 26.2	96 33	103.3	7 54.5	96 33	103.1	8 22.7	96 33	103.0	75
6				5 13.1	96 33	103.0	5 41.3	96 33	102.9	6 09.6	96 33	102.7	6 37.9	96 33	102.5	7 06.2	96 33	102.3	7 34.4	96 34	102.2	8 02.7	96 34	102.0	6
7							5 21.3	96 34	101.9	5 49.6	96 34	101.7	6 17.8	96 34	101.6	6 46.1	96 34	101.4	7 14.4	96 34	101.2	7 42.6	96 34	101.1	7
8							5 01.2	96 34	101.0	5 29.4	96 34	100.8	5 57.7	96 34	100.6	6 25.9	96 34	100.5	6 54.2	96 34	100.3	7 22.4	96 34	100.1	8
9										5 09.3	96 34	99.8	5 37.5	96 34	99.7	6 05.7	96 34	99.5	6 34.0	96 34	99.3	7 02.2	96 34	99.2	9
80													5 17.2	96 34	98.7	5 45.5	96 34	98.6	6 13.7	96 34	98.4	6 41.9	96 34	98.2	80
1																5 25.2	96 34	97.6	5 53.4	96 34	97.4	6 21.6	96 34	97.3	1
2																5 04.8	96 34	96.7	5 33.0	96 34	96.5	6 01.2	96 34	96.3	2
3																			5 12.6	96 34	95.6	5 40.8	96 34	95.4	3
4																						5 20.3	96 34	94.4	4
85																									85

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	20 00.0 1.0 00	180.0	19 30.0 1.0 00	180.0	19 00.0 1.0 00	180.0	18 30.0 1.0 00	180.0	18 00.0 1.0 00	180.0	17 30.0 1.0 00	180.0	17 00.0 1.0 00	180.0	16 30.0 1.0 00	180.0	00
1	19 59.8 1.0 01	178.9	19 29.8 1.0 01	178.9	18 59.8 1.0 01	178.9	18 29.8 1.0 01	178.9	17 59.8 1.0 01	178.9	17 29.8 1.0 01	179.0	16 59.8 1.0 01	179.0	16 29.8 1.0 01	179.0	1
2	19 59.2 1.0 02	177.9	19 29.2 1.0 02	177.9	18 59.2 1.0 02	177.9	18 29.2 1.0 02	177.9	17 59.2 1.0 02	177.9	17 29.2 1.0 02	177.9	16 59.3 1.0 02	177.9	16 29.3 1.0 02	177.9	2
3	19 58.3 1.0 02	176.8	19 28.3 1.0 02	176.8	18 58.3 1.0 02	176.8	18 28.3 1.0 02	176.8	17 58.3 1.0 02	176.8	17 28.3 1.0 02	176.9	16 58.3 1.0 02	176.9	16 28.3 1.0 02	176.9	3
4	19 57.0 1.0 03	175.7	19 27.0 1.0 03	175.8	18 57.0 1.0 03	175.8	18 27.0 1.0 03	175.8	17 57.0 1.0 03	175.8	17 27.0 1.0 03	175.8	16 57.0 1.0 03	175.8	16 27.0 1.0 03	175.8	4
05	19 55.2 1.0 03	174.7	19 25.3 1.0 03	174.7	18 55.3 1.0 03	174.7	18 25.3 1.0 03	174.7	17 55.3 1.0 03	174.7	17 25.3 1.0 03	174.8	16 55.3 1.0 03	174.8	16 25.3 1.0 03	174.8	05
6	19 53.1 1.0 04	173.6	19 23.2 1.0 04	173.6	18 53.2 1.0 04	173.7	18 23.2 1.0 04	173.7	17 53.2 1.0 04	173.7	17 23.3 1.0 04	173.7	16 53.3 1.0 04	173.7	16 23.3 1.0 04	173.8	6
7	19 50.7 1.0 05	172.6	19 20.7 1.0 05	172.6	18 50.7 1.0 05	172.6	18 20.8 1.0 05	172.6	17 50.8 1.0 05	172.6	17 20.8 1.0 05	172.7	16 50.9 1.0 05	172.7	16 20.9 1.0 05	172.7	7
8	19 47.8 1.0 05	171.5	19 17.9 1.0 05	171.5	18 47.9 1.0 05	171.5	18 17.9 1.0 05	171.6	17 48.0 1.0 05	171.6	17 18.0 1.0 05	171.6	16 48.1 1.0 05	171.7	16 18.1 1.0 05	171.7	8
9	19 44.6 1.0 06	170.4	19 14.7 1.0 06	170.5	18 44.7 1.0 06	170.5	18 14.8 1.0 06	170.5	17 44.8 1.0 06	170.6	17 14.8 1.0 06	170.6	16 44.9 1.0 06	170.6	16 14.9 1.0 06	170.6	9
10	19 41.0 1.0 07	169.4	19 11.1 1.0 07	169.4	18 41.1 1.0 07	169.4	18 11.2 1.0 07	169.5	17 41.2 1.0 07	169.5	17 11.3 1.0 06	169.5	16 41.4 1.0 06	169.6	16 11.4 1.0 06	169.6	10
1	19 37.0 1.0 07	168.3	19 07.1 1.0 07	168.3	18 37.2 1.0 07	168.4	18 07.3 1.0 07	168.4	17 37.3 1.0 07	168.5	17 07.4 1.0 07	168.5	16 37.5 1.0 07	168.5	16 07.5 1.0 07	168.6	1
2	19 32.7 1.0 08	167.3	19 02.8 1.0 08	167.3	18 32.9 1.0 08	167.3	18 03.0 1.0 08	167.4	17 33.0 1.0 08	167.4	17 03.1 1.0 08	167.5	16 33.2 1.0 08	167.5	16 03.3 1.0 08	167.5	2
3	19 28.0 1.0 08	166.2	18 58.1 1.0 08	166.2	18 28.2 1.0 08	166.3	17 58.3 1.0 08	166.3	17 28.4 1.0 08	166.4	16 58.5 1.0 08	166.4	16 28.6 1.0 08	166.5	15 58.7 1.0 08	166.5	3
4	19 22.9 1.0 09	165.1	18 53.0 1.0 09	165.2	18 23.1 1.0 09	165.2	17 53.2 1.0 09	165.3	17 23.4 1.0 09	165.3	16 53.5 1.0 09	165.4	16 23.6 1.0 09	165.4	15 53.7 1.0 09	165.5	4
15	19 17.5 1.0 10	164.1	18 47.6 1.0 10	164.1	18 17.7 1.0 10	164.2	17 47.9 1.0 10	164.2	17 18.0 1.0 10	164.3	16 48.1 1.0 10	164.3	16 18.2 1.0 10	164.4	15 48.4 1.0 09	164.4	15
6	19 11.7 1.0 10	163.0	18 41.8 1.0 10	163.1	18 11.9 1.0 10	163.1	17 42.1 1.0 10	163.2	17 12.2 1.0 10	163.2	16 42.4 1.0 10	163.3	16 12.5 1.0 10	163.3	15 42.7 1.0 10	163.4	6
7	19 05.5 99 11	162.0	18 35.7 99 11	162.0	18 05.8 99 11	162.1	17 36.0 99 11	162.1	17 06.1 99 11	162.2	16 36.3 99 11	162.3	16 06.5 99 11	162.3	15 36.6 99 11	162.4	7
8	18 59.0 99 11	160.9	18 29.1 99 11	161.0	17 59.3 99 11	161.0	17 29.5 99 11	161.1	16 59.7 99 11	161.2	16 29.9 99 11	161.2	16 00.1 99 11	161.3	15 30.2 99 11	161.3	8
9	18 52.1 99 12	159.9	18 22.3 99 12	159.9	17 52.5 99 12	160.0	17 22.7 99 12	160.1	16 52.9 99 12	160.1	16 23.1 99 12	160.2	15 53.3 99 12	160.2	15 23.5 99 12	160.3	9
20	18 44.8 99 13	158.8	18 15.1 99 13	158.9	17 45.3 99 13	159.0	17 15.5 99 13	159.0	16 45.7 99 12	159.1	16 16.0 99 12	159.1	15 46.2 99 12	159.2	15 16.4 99 12	159.3	20
1	18 37.2 99 13	157.8	18 07.5 99 13	157.8	17 37.7 99 13	157.9	17 08.0 99 13	158.0	16 38.2 99 13	158.1	16 08.5 99 13	158.1	15 38.7 99 13	158.2	15 09.0 99 13	158.2	1
2	18 29.3 99 14	156.7	17 59.6 99 14	156.8	17 29.9 99 14	156.9	17 00.1 99 14	156.9	16 30.4 99 14	157.0	16 00.7 99 14	157.1	15 30.9 99 14	157.2	15 01.2 99 14	157.2	2
3	18 21.0 99 14	155.7	17 51.3 99 14	155.8	17 21.6 99 14	155.8	16 51.9 99 14	155.9	16 22.2 99 14	156.0	15 52.5 99 14	156.1	15 22.8 99 14	156.1	14 53.1 99 14	156.2	3
4	18 12.4 99 15	154.6	17 42.7 99 15	154.7	17 13.1 99 15	154.8	16 43.4 99 15	154.9	16 13.7 99 15	155.0	15 44.0 99 15	155.0	15 14.3 99 15	155.1	14 44.6 99 15	155.2	4
25	18 03.5 99 15	153.6	17 33.8 99 15	153.7	17 04.2 99 15	153.8	16 34.5 99 15	153.8	16 04.8 99 15	153.9	15 35.2 99 15	154.0	15 05.5 99 15	154.1	14 35.9 99 15	154.2	25
6	17 54.2 99 16	152.6	17 24.6 99 16	152.7	16 54.9 99 16	152.7	16 25.3 99 16	152.8	15 55.7 99 16	152.9	15 26.0 99 16	153.0	14 56.4 99 16	153.1	14 26.8 99 16	153.1	6
7	17 44.6 99 17	151.5	17 15.0 99 17	151.6	16 45.4 99 16	151.7	16 15.8 99 16	151.8	15 46.1 99 16	151.9	15 16.5 99 16	152.0	14 46.9 99 16	152.0	14 17.3 99 16	152.1	7
8	17 34.6 99 17	150.5	17 05.0 99 17	150.6	16 35.5 99 17	150.7	16 05.9 99 17	150.8	15 36.3 99 17	150.8	15 06.7 99 17	150.9	14 37.1 99 17	151.0	14 07.6 99 17	151.1	8
9	17 24.3 98 18	149.5	16 54.8 98 18	149.6	16 25.3 98 18	149.6	15 55.7 99 18	149.7	15 26.2 99 17	149.8	14 56.6 99 17	149.9	14 27.0 99 17	150.0	13 57.5 99 17	150.1	9
30	17 13.8 98 18	148.4	16 44.2 98 18	148.5	16 14.7 98 18	148.6	15 45.2 98 18	148.7	15 15.7 98 18	148.8	14 46.2 98 18	148.9	14 16.6 98 18	149.0	13 47.1 98 18	149.1	30
1	17 02.9 98 19	147.4	16 33.4 98 19	147.5	16 03.9 98 19	147.6	15 34.4 98 19	147.7	15 04.9 98 18	147.8	14 35.4 98 18	147.9	14 05.9 98 18	148.0	13 36.4 98 18	148.1	1
2	16 51.7 98 19	146.4	16 22.2 98 19	146.5	15 52.7 98 19	146.6	15 23.3 98 19	146.7	14 53.8 98 19	146.8	14 24.3 98 19	146.9	13 54.9 98 19	147.0	13 25.4 98 19	147.1	2
3	16 40.1 98 20	145.4	16 10.7 98 20	145.5	15 41.3 98 20	145.6	15 11.8 98 20	145.7	14 42.4 98 19	145.8	14 13.0 98 19	145.9	13 43.5 98 19	146.0	13 14.1 98 19	146.1	3
4	16 28.3 98 20	144.3	15 58.9 98 20	144.4	15 29.5 98 20	144.5	15 00.1 98 20	144.6	14 30.7 98 20	144.7	14 01.3 98 20	144.8	13 31.9 98 20	144.9	13 02.5 98 20	145.0	4
35	16 16.2 98 21	143.3	15 46.8 98 21	143.4	15 17.5 98 21	143.5	14 48.1 98 21	143.6	14 18.7 98 20	143.7	13 49.3 98 20	143.8	13 20.0 98 20	143.9	12 50.6 98 20	144.0	35
6	16 03.8 98 21	142.3	15 34.5 98 21	142.4	15 05.1 98 21	142.5	14 35.8 98 21	142.6	14 06.4 98 21	142.7	13 37.1 98 21	142.8	13 07.7 98 21	142.9	12 38.4 98 21	143.0	6
7	15 51.1 98 22	141.3	15 21.8 98 22	141.4	14 52.5 98 22	141.5	14 23.2 98 21	141.6	13 53.9 98 21	141.7	13 24.5 98 21	141.8	12 55.2 98 21	141.9	12 25.9 98 21	142.0	7
8	15 38.1 98 22	140.3	15 08.9 98 22	140.4	14 39.6 98 22	140.5	14 10.3 98 22	140.6	13 41.0 98 22	140.7	13 11.7 98 22	140.8	12 42.4 98 22	140.9	12 13.1 98 22	141.0	8
9	15 24.9 97 23	139.2	14 55.6 97 22	139.4	14 26.4 97 22	139.5	13 57.1 98 22	139.6	13 27.9 98 22	139.7	12 58.6 98 22	139.8	12 29.4 98 22	139.9	12 00.1 98 22	140.0	9
40	15 11.3 97 23	138.2	14 42.1 97 23	138.4	14 12.9 97 23	138.5	13 43.7 97 23	138.6	13 14.5 97 23	138.7	12 45.2 97 23	138.8	12 16.0 97 23	138.9	11 46.8 97 23	139.1	40
1	14 57.5 97 23	137.2	14 28.4 97 23	137.3	13 59.2 97 23	137.5	13 30.0 97 23	137.6	13 00.8 97 23	137.7	12 31.6 97 23	137.8	12 02.4 97 23	137.9	11 33.2 97 23	138.1	1
2	14 43.5 97 24	136.2	14 14.3 97 24	136.3	13 45.2 97 24	136.5	13 16.0 97 24	136.6	12 46.8 97 24	136.7	12 17.7 97 24	136.8	11 48.5 97 24	136.9	11 19.3 97 24	137.1	2
3	14 29.1 97 24	135.2	14 00.0 97 24	135.3	13 30.9 97 24	135.5	13 01.8 97 24	135.6	12 32.6 97 24	135.7	12 03.5 97 24	135.8	11 34.4 97 24	136.0	11 05.2 97 24	136.1	3
4	14 14.6 97 25	134.2	13 45.5 97 25	134.3	13 16.4 97 25	134.5	12 47.3 97 25	134.6	12 18.2 97 24	134.7	11 49.1 97 24	134.8	11 20.0 97 24	135.0	10 50.9 97 24	135.1	4
45	13 59.7 97 25	133.2	13 30.7 97 25	133.3	13 01.6 97 25	133.5	12 32.5 97 25	133.6	12 03.5 97 25	133.7	11 34.4 97 25	133.9	11 05.3 97 25	134.0	10 36.3 97 25	134.1	45
6	13 44.7 97 26	132.2	13 15.6 97 25	132.4	12 46.6 97 25	132.5	12 17.6 97 25	132.6	11 48.5 97 25	132.7	11 19.5 97 25	132.9	10 50.5 97 25	133.0	10 21.4 97 25	133.1	6
7	13 29.3 97 26	131.2	13 00.3 97 26	131.4	12 31.3 97 26	131.5	12 02.3 97 26	131.6	11 33.3 97 26	131.8	11 04.3 97 26	131.9	10 35.3 97 26	132.0	10 06.3 97 26	132.1	7
8	13 13.8 97 26	130.2	12 44.8 97 26	130.4	12 15.9 97 26	130.5	11 46.9 97 26	130.6	11 17.9 97 26	130.8	10 48.9 97 26	130.9	10 20.0 97 26	131.0	9 51.0 97 26	131.2	8
9	12 58.0 96 27	129.2	12 29.1 96 27	129.4	12 00.1 96 27	129.5	11 31.2 96 27	129.7	11 02.3 96 26	129.8	10 33.3 96 26	129.9	10 04.4 97 26	130.1	9 35.4 97 26	130.2	9
50	12 42.0 96 27	128.3	12 13.1 96 27	128.4	11 44.2 96 27	128.5	11 15.3 96 27	128.7	10 46.4 96 27	128.8	10 17.5 96 27	128.9	9 48.5 96 27	129.1	9 19.6 96 27	129.2	50
1	12 25.8 96 27	127.3	11 56.9 96 27	127.4	11 28.0 96 27	127.5	10 59.2 96 27	127.7	10 30.3 96 27	127.8	10 01.4 96 27	128.0	9 32.5 96 27	128.1	9 03.6 96 27	128.2	1
2	12 09.3 96 28	126.3	11 40.5 96 28	126.4	11 11.7 96 28	126.6	10 42.8 96 28	126.7	10 14.0 96 28	126.8	9 45.1 96 28	127.0	9 16.2 96 27	127.1	8 47.4 96 27	127.3	2
3	11 52.7 96 28	125.3	11 23.9 96 28	125.4	10 55.1 96 28	125.6	10 26.3 96 28	125.7	9 57.4 96 28	125.9	9 28.6 96 28	126.0	8 59.8 96 28	126.1	8 30.9 96 28	126.3	3
4	11 35.8 96 28	124.3	11 07.1 96 28	124.5	10 38.3 96 28	124.6	10 09.5 96 28	124.8	9 40.7 96 28	124.9	9 11.9 96 28	125.0	8 43.1 96 28	125.2	8 14.3 96 28	125.3	4
55	11 18.8 96 29	123.3	10 50.0 96 29	123.5	10 21.3 96 29	123.6	9 52.5 96 29	123.8	9 23.8 96 29	123.9	8 55.0 96 28	124.1	8 26.2 96 28	124.2	7 57.5 96 28	124.4	55
6	11 01.6 96 29	122.4	10 32.8 96 29	122.5	10 04.1 96 29	122.7	9 35.4 96 29	122.8	9 06.6 96 29	123.0	8 37.9 96 29	123.1	8 09.2 96 29	123.2	7 40.4 96 29	123.4	6
7	10 44.1 96 29	121.4	10 15.4 96 29	121.5	9 46.7 96 29	121.7	9 18.0 96 29	121.8	8 49.3 96 29	122.0	8 20.6 96 29	122.1	7 51.9 96 29	122.3	7 23.2 96 29	122.4	7
8	10 26.5 96 30	120.4	9 57.9 96 30	120.6	9 29.2 96 30	120.7	9 00.5 96 30	120.9	8 31.8 96 29	121.0	8 03.2 96 29	121.2	7 34.5 96 29	121.3	7 05.8 96 29	121.5	8
9	10 08.7 95 30	119.5	9 40.1 95 30	119.6	9 11.5 95 30	119.8	8 42.8 96 30	119.9	8 14.2 96 30	120.1	7 45.5 96 30	120.2	7 16.8 96 30	120.4	6 48.2 96 30	120.5	9
60	9 50.8 95 30	118.5	9 22.2 95 30	118.6	8 53.6 95 30	118.8	8 24.9 95 30	118.9	7 56.3 95 30	119.1	7 27.7 95 30	119.2	6 59.1 95 30	119.4	6 30.4 95 30	119.5	60
1	9 32.7 95 30	117.5	9 04.1 95 30	117.7	8 35.5 95 30	117.8	8 06.9 95 30	118.0	7 38.3 95 30	118.1	7 09.7 95 30	118.3	6 41.1 95 30	118.4	6 12.5 95 30	118.6	1
2	9 14.4 95 31	116.5	8 45.8 95 31	116.7	8 17.3 95 31	116.9	7 48.7 95 31	117.0	7 20.1 95 31	117.2	6 51.5 95 31	117.3	6 23.0 95 30	117.5	5 54.4 95 30	117.6	2
3	8 56.0 95 31	115.6	8 27.4 95 31	115.7	7 58.9 95 31	115.9	7 30.3 95 31	116.1	7 01.8 95 31	116.2	6 33.2 95 31	116.4	6 04.7 95 31	116.5	5 36.1 95 31	116.7	3
4	8 37.4 95 31	114.6	8 08.9 95 31	114.8	7 40.3 95 31	114.9	7 11.8 95 31	115.1	6 43.3 95 31	115.2	6 14.8 95 31	115.4	5 46.2 95 31	115.6	5 17.7 95 31	115.7	4
65	8 18.7 95 31	113.7	7 50.2 95 31	113.8	7 21.7 95 31	114.0	6 53.2 95 31	114.1	6 24.7 95 31	114.3	5 56.2 95 31	114.4	5 27.7 95 31	114.6			65
6	7 59.8 95 32	112.7	7 31.3 95 32	112.9	7 02.8 95 32	113.0	6 34.4 95 32	113.2	6 05.9 95 32	113.3	5 37.4 95 32	113.5	5 08.9 95 31	113.7			6
7	7 40.8 95 32	111.7	7 12.3 95 32	111.9	6 43.9 95 32	112.1	6 15.4 95 32	112.2	5 47.0 95 32	112.4	5 18.5 95 32	112.5					7
8	7 21.7 95 32	110.8	6 53.2 95 32	111.0	6 24.8 95 32	111.1	5 56.4 95 32	111.3	5 27.9 95 32	111.4							8
9	7 02.4 95 32	109.8	6 34.0 95 32	110.0	6 05.6 95 32	110.2	5 37.2 95 32	110.3	5 08.8 95 32	110.5							9
70	6 43.1 95 32	108.9	6 14.7 95 32	109.0	5 46.3 95 32	109.2	5 17.9 95 32	109.4									70
1	6 23.6 95 33	107.9	5 55.2 95 33	108.1	5 26.9 95 33	108.3											1
2	6 04.0 94 33	107.0	5 35.7 95 33	107.1	5 07.3 95 33	107.3											2
3	5 44.3 94 33	106.0	5 16.0 94 33	106.2													3
4	5 24.6 94 33	105.1															4
75	5 04.7 94 33	104.1															75

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0
1	23 59.8	1.0 01	178.9	24 29.8	1.0 01	178.9	24 59.8	1.0 01	178.9	25 29.8	1.0 01	178.9
2	23 59.2	1.0 02	177.8	24 29.2	1.0 02	177.8	24 59.2	1.0 02	177.8	25 29.2	1.0 02	177.8
3	23 58.2	1.0 02	176.7	24 28.2	1.0 02	176.7	24 58.2	1.0 02	176.7	25 28.2	1.0 02	176.7
4	23 56.9	1.0 03	175.6	24 26.9	1.0 03	175.6	24 56.9	1.0 03	175.6	25 26.8	1.0 03	175.6
05	23 55.1	1.0 04	174.5	24 25.1	1.0 04	174.5	24 55.1	1.0 04	174.5	25 25.1	1.0 04	174.5
6	23 53.0	1.0 04	173.5	24 22.9	1.0 04	173.4	24 52.9	1.0 04	173.4	25 22.9	1.0 04	173.4
7	23 50.4	1.0 05	172.4	24 20.4	1.0 05	172.3	24 50.4	1.0 05	172.3	25 20.3	1.0 05	172.3
8	23 47.5	1.0 06	171.3	24 17.5	1.0 06	171.2	24 47.4	1.0 06	171.2	25 17.4	1.0 06	171.2
9	23 44.2	1.0 06	170.2	24 14.2	1.0 06	170.2	24 44.1	1.0 06	170.1	25 14.1	1.0 06	170.1
10	23 40.5	1.0 07	169.1	24 10.5	1.0 07	169.1	24 40.4	1.0 07	169.0	25 10.3	1.0 07	169.0
1	23 36.4	1.0 07	168.0	24 06.4	1.0 07	168.0	24 36.3	1.0 07	167.9	25 06.2	1.0 08	167.9
2	23 32.0	1.0 08	166.9	24 01.9	1.0 08	166.9	24 31.8	1.0 08	166.8	25 01.7	1.0 08	166.8
3	23 27.2	1.0 09	165.8	23 57.1	1.0 09	165.8	24 27.0	1.0 09	165.7	24 56.8	1.0 09	165.7
4	23 22.0	1.0 09	164.8	23 51.8	1.0 09	164.7	24 21.7	1.0 09	164.7	24 51.6	1.0 09	164.6
15	23 16.4	1.0 10	163.7	23 46.2	1.0 10	163.6	24 16.1	1.0 10	163.6	24 46.0	1.0 10	163.5
6	23 10.4	99 11	162.6	23 40.3	99 11	162.5	24 10.1	99 11	162.5	24 39.9	99 11	162.4
7	23 04.1	99 11	161.5	23 33.9	99 11	161.5	24 03.7	99 11	161.4	24 33.6	99 11	161.3
8	22 57.4	99 12	160.4	23 27.2	99 12	160.4	23 57.0	99 12	160.3	24 26.8	99 12	160.3
9	22 50.4	99 12	159.4	23 20.1	99 12	159.3	23 49.9	99 12	159.2	24 19.7	99 12	159.2
20	22 42.9	99 13	158.3	23 12.7	99 13	158.2	23 42.5	99 13	158.2	24 12.2	99 13	158.1
1	22 35.2	99 14	157.2	23 04.9	99 14	157.1	23 34.6	99 14	157.1	24 04.4	99 14	157.0
2	22 27.1	99 14	156.2	22 56.8	99 14	156.1	23 26.5	99 14	156.0	23 56.2	99 14	155.9
3	22 18.6	99 15	155.1	22 48.3	99 15	155.0	23 18.0	99 15	154.9	23 47.6	99 15	154.8
4	22 09.8	99 15	154.0	22 39.4	99 15	153.9	23 09.1	99 15	153.9	23 38.7	99 15	153.8
25	22 00.6	99 16	153.0	22 30.2	99 16	152.9	22 59.9	99 16	152.8	23 29.5	99 16	152.7
6	21 51.1	99 16	151.9	22 20.7	99 16	151.8	22 50.3	99 16	151.7	23 19.9	99 17	151.6
7	21 41.3	99 17	150.8	22 10.8	99 17	150.7	22 40.4	99 17	150.7	23 10.0	99 17	150.6
8	21 31.1	98 17	149.8	22 00.7	98 18	149.7	22 30.2	98 18	149.6	22 59.7	98 18	149.5
9	21 20.6	98 18	148.7	21 50.1	98 18	148.6	22 19.6	98 18	148.5	22 49.2	98 18	148.4
30	21 09.8	98 19	147.7	21 39.3	98 19	147.6	22 08.8	98 19	147.5	22 38.3	98 19	147.4
1	20 58.7	98 19	146.6	21 28.1	98 19	146.5	21 57.6	98 19	146.4	22 27.0	98 19	146.3
2	20 47.2	98 20	145.6	21 16.6	98 20	145.5	21 46.1	98 20	145.4	22 15.5	98 20	145.3
3	20 35.5	98 20	144.5	21 04.9	98 20	144.4	21 34.2	98 20	144.3	22 03.6	98 20	144.2
4	20 23.4	98 21	143.5	20 52.8	98 21	143.4	21 22.1	98 21	143.3	21 51.5	98 21	143.1
35	20 11.0	98 21	142.4	20 40.4	98 21	142.3	21 09.7	98 21	142.2	21 39.0	98 21	142.1
6	19 58.4	98 22	141.4	20 27.7	98 22	141.3	20 57.0	98 22	141.2	21 26.3	98 22	141.1
7	19 45.4	98 22	140.4	20 14.7	98 22	140.2	20 44.0	98 22	140.1	21 13.2	98 22	140.0
8	19 32.2	97 23	139.3	20 01.4	97 23	139.2	20 30.7	97 23	139.1	20 59.9	97 23	139.0
9	19 18.7	97 23	138.3	19 47.9	97 23	138.2	20 17.1	97 23	138.1	20 46.3	97 23	137.9
40	19 04.9	97 23	137.3	19 34.1	97 23	137.1	20 03.2	97 24	137.0	20 32.4	97 24	136.9
1	18 50.8	97 24	136.2	19 20.0	97 24	136.1	19 49.1	97 24	136.0	20 18.2	97 24	135.9
2	18 36.5	97 24	135.2	19 05.6	97 24	135.1	19 34.7	97 24	135.0	20 03.8	97 24	134.8
3	18 21.9	97 25	134.2	18 51.0	97 25	134.1	19 20.1	97 25	133.9	19 49.1	97 25	133.8
4	18 07.1	97 25	133.2	18 36.1	97 25	133.1	19 05.2	97 25	132.9	19 34.2	97 25	132.8
45	17 52.0	97 26	132.2	18 21.0	97 26	132.0	18 50.0	97 26	131.9	19 19.0	97 26	131.8
6	17 36.7	97 26	131.2	18 05.7	97 26	131.0	18 34.6	97 26	130.9	19 03.6	97 26	130.8
7	17 21.1	97 26	130.2	17 50.1	96 26	130.0	18 19.0	96 26	129.9	18 47.9	96 26	129.7
8	17 05.3	96 27	129.1	17 34.2	96 27	129.0	18 03.1	96 27	128.9	18 32.0	96 27	128.7
9	16 49.3	96 27	128.1	17 18.2	96 27	128.0	17 47.0	96 27	127.9	18 15.9	96 27	127.7
50	16 33.0	96 27	127.1	17 01.9	96 28	127.0	17 30.7	96 28	126.8	17 59.6	96 28	126.7
1	16 16.6	96 28	126.1	16 45.4	96 28	126.0	17 14.2	96 28	125.8	17 43.0	96 28	125.7
2	15 59.9	96 28	125.1	16 28.7	96 28	125.0	16 57.5	96 28	124.8	17 26.2	96 28	124.7
3	15 43.0	96 28	124.1	16 11.8	96 28	124.0	16 40.5	96 29	123.8	17 09.3	96 29	123.7
4	15 25.9	96 29	123.2	15 54.7	96 29	123.0	16 23.4	96 29	122.9	16 52.1	96 29	122.7
55	15 08.6	96 29	122.2	15 37.3	96 29	122.0	16 06.0	96 29	121.9	16 34.7	96 29	121.7
6	14 51.2	96 29	121.2	15 19.9	96 29	121.0	15 48.5	96 30	120.9	16 17.2	96 30	120.7
7	14 33.5	96 30	120.2	15 02.2	96 30	120.0	15 30.8	96 30	119.9	15 59.5	95 30	119.7
8	14 15.7	95 30	119.2	14 44.3	95 30	119.1	15 12.9	95 30	118.9	15 41.5	95 30	118.7
9	13 57.7	95 30	118.2	14 26.3	95 30	118.1	14 54.9	95 30	117.9	15 23.5	95 30	117.8
60	13 39.5	95 31	117.2	14 08.1	95 31	117.1	14 36.7	95 31	116.9	15 05.2	95 31	116.8
1	13 21.2	95 31	116.3	13 49.8	95 31	116.1	14 18.3	95 31	116.0	14 46.8	95 31	115.8
2	13 02.7	95 31	115.3	13 31.3	95 31	115.1	13 59.8	95 31	115.0	14 28.3	95 31	114.8
3	12 44.1	95 31	114.3	13 12.6	95 31	114.2	13 41.1	95 31	114.0	14 09.6	95 31	113.8
4	12 25.3	95 32	113.4	12 53.8	95 32	113.2	13 22.3	95 32	113.0	13 50.7	95 32	112.9
65	12 06.4	95 32	112.4	12 34.9	95 32	112.2	13 03.3	95 32	112.1	13 31.8	95 32	111.9
6	11 47.4	95 32	111.4	12 15.8	95 32	111.3	12 44.2	95 32	111.1	13 12.7	95 32	110.9
7	11 28.2	95 32	110.5	11 56.6	95 32	110.3	12 25.0	95 32	110.1	12 53.4	95 32	110.0
8	11 08.9	95 32	109.5	11 37.3	95 32	109.3	12 05.7	95 32	109.2	12 34.1	95 32	109.0
9	10 49.5	95 33	108.5	11 17.9	95 33	108.4	11 46.3	95 33	108.2	12 14.6	95 33	108.0
70	10 30.0	95 33	107.6	10 58.4	94 33	107.4	11 26.7	94 33	107.2	11 55.1	94 33	107.1
1	10 10.4	94 33	106.6	10 38.7	94 33	106.4	11 07.1	94 33	106.3	11 35.4	94 33	106.1
2	9 50.7	94 33	105.7	10 19.0	94 33	105.5	10 47.3	94 33	105.3	11 15.6	94 33	105.1
3	9 30.9	94 33	104.7	9 59.2	94 33	104.5	10 27.5	94 33	104.4	10 55.8	94 33	104.2
4	9 11.0	94 33	103.7	9 39.3	94 33	103.6	10 07.6	94 33	103.4	10 35.8	94 33	103.2
75	8 51.0	94 33	102.8	9 19.3	94 33	102.6	9 47.6	94 33	102.5	10 15.8	94 33	102.3
6	8 31.0	94 34	101.8	8 59.2	94 34	101.7	9 27.5	94 34	101.5	9 55.7	94 34	101.3
7	8 10.9	94 34	100.9	8 39.1	94 34	100.7	9 07.3	94 34	100.5	9 35.6	94 34	100.4
8	7 50.7	94 34	99.9	8 18.9	94 34	99.8	8 47.1	94 34	99.6	9 15.4	94 34	99.4
9	7 30.4	94 34	99.0	7 58.7	94 34	98.8	8 26.9	94 34	98.7	8 55.1	94 34	98.5
80	7 10.1	94 34	98.0	7 38.4	94 34	97.9	8 06.6	94 34	97.7	8 34.8	94 34	97.5
1	6 49.8	94 34	97.1	7 18.0	94 34	96.9	7 46.2	94 34	96.8	8 14.4	94 34	96.6
2	6 29.4	94 34	96.2	6 57.6	94 34	96.0	7 25.8	94 34	95.8	7 54.0	94 34	95.6
3	6 09.0	94 34	95.2	6 37.2	94 34	95.0	7 05.4	94 34	94.9	7 33.6	94 34	94.7
4	5 48.5	94 34	94.3	6 16.7	94 34	94.1	6 44.9	94 34	93.9	7 13.1	94 34	93.8
85	5 28.1	94 34	93.3	5 56.3	94 34	93.2	6 24.4	94 34	93.0	6 52.6	94 34	92.8
6	5 07.6	94 34	92.4	5 35.8	94 34	92.2	6 03.9	94 34	92.0	6 32.1	94 34	91.9
7				5 15.2	94 34	91.3	5 43.4	94 34	91.1	6 11.6	94 34	90.9
8							5 22.9	94 34	90.2	5 51.1	94 34	90.0
9							5 02.4	94 34	89.2	5 30.6	94 34	89.1
90										5 10.0	94 34	88.1

H.A.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	27 00.0	1.0 00	180.0	27 30.0	1.0 00	180.0
1	25 59.8	1.0 01	178.9	26 29.8	1.0 01	178.9	26 59.8	1.0 01	178.9	27 29.8	1.0 01	178.9
2	25 59.2	1.0 02	177.8	26 29.2	1.0 02	177.8	26 59.2	1.0 02	177.8	27 29.2	1.0 02	177.8
3	25 58.2	1.0 02	176.7	26 28.2	1.0 02	176.7	26 58.2	1.0 02	176.7	27 28.2	1.0 02	176.6
4	25 56.8	1.0 03	175.6	26 26.8	1.0 03	175.6	26 56.8	1.0 03	175.5	27 26.8	1.0 03	175.5
05	25 55.1	1.0 04	174.5	26 25.0	1.0 04	174.5	26 55.0	1.0 04	174.4	27 25.0	1.0 04	174.4
6	25 52.9	1.0 04	173.4	26 22.9	1.0 04	173.3	26 52.8	1.0 04	173.3	27 22.8	1.0 04	173.3
7	25 50.3	1.0 05	172.3	26 20.3	1.0 05	172.2	26 50.2	1.0 05	172.2	27 20.2	1.0 05	172.2
8	25 47.3	1.0 06	171.2	26 17.3	1.0 06	171.1	26 47.3	1.0 06	171.1	27 17.2	1.0 06	171.1
9	25 44.0	1.0 06	170.1	26 13.9	1.0 06	170.0	26 43.9	1.0 06	170.0	27 13.8	1.0 06	170.0
10	25 40.3	1.0 07	169.0	26 10.2	1.0 07	168.9	26 40.1	1.0 07	168.9	27 10.1	1.0 07	168.8
1	25 36.1	1.0 08	167.9	26 06.1	1.0 08	167.8	26 36.0	1.0 08	167.8	27 05.9	1.0 08	167.7
2	25 31.6	1.0 08	166.8	26 01.5	1.0 08	166.7	26 31.4	1.0 08	166.7	27 01.3	1.0 08	166.6
3	25 26.7	1.0 09	165.7	25 56.6	1.0 09	165.6	26 26.5	1.0 09	165.6	26 56.4	1.0 09	165.5
4	25 21.5	1.0 09	164.6	25 51.3	1.0 09	164.5	26 21.2	1.0 09	164.5	26 51.1	1.0 10	164.4
15	25 15.8	1.0 10	163.5	25 45.7	1.0 10	163.4	26 15.5	1.0 10	163.4	26 45.4	1.0 10	163.3
6	25 09.8	99 11	162.4	25 39.6	99 11	162.3	26 09.4	99 11	162.3	26 39.3	99 11	162.2
7	25 03.4	99 11	161.3	25 33.2	99 11	161.2	26 03.0	99 11	161.2	26 32.8	99 11	161.1
8	24 56.6	99 12	160.2	25 26.4	99 12	160.1	25 56.2	99 12	160.1	26 26.0	99 12	160.0
9	24 49.5	99 12	159.1	25 19.2	99 13	159.0	25 49.0	99 13	159.0	26 18.8	99 13	158.9
20	24 42.0	99 13	158.0	25 11.7	99 13	157.9	25 41.5	99 13	157.9	26 11.2	99 13	157.8
1	24 34.1	99 14	156.9	25 03.8	99 14	156.9	25 33.6	99 14	156.8	26 03.3	99 14	156.7
2	24 25.9	99 14	155.8	24 55.6	99 14	155.8	25 25.3	99 14	155.7	25 55.0	99 14	155.6
3	24 17.3	99 15	154.8	24 47.0	99 15	154.7	25 16.7	99 15	154.6	25 46.3	99 15	154.5
4	24 08.4	99 15	153.7	24 38.0	99 16	153.6	25 07.7	99 16	153.5	25 37.3	99 16	153.4
25	23 59.1	99 16	152.6	24 28.7	99 16	152.5	24 58.4	99 16	152.4	25 28.0	99 16	152.3
6	23 49.5	99 16	151.5	24 19.1	99 17	151.4	24 48.7	99 17	151.4	25 18.3	99 17	151.3
7	23 39.6	99 17	150.5	24 09.1	99 17	150.4	24 38.7	99 17	150.3	25 08.2	99 17	150.2
8	23 29.3	98 18	149.4	23 58.8	98 18	149.3	24 28.3	98 18	149.2	24 57.9	98 18	149.1
9	23 18.7	98 18	148.3	23 48.2	98 18	148.2	24 17.7	98 18	148.1	24 47.2	98 18	148.0
30	23 07.7	98 19	147.3	23 37.2	98 19	147.2	24 06.7	98 19	147.1	24 36.1	98 19	147.0
1	22 56.5	98 19	146.2	23 25.9	98 19	146.1	23 55.4	98 19	146.0	24 24.8	98 19	145.9
2	22 44.9	98 20	145.1	23 14.3	98 20	145.0	23 43.7	98 20	144.9	24 13.1	98 20	144.8
3	22 33.0	98 20	144.1	23 02.4	98 20	144.0	23 31.8	98 20	143.9	24 01.2	98 20	143.8
4	22 20.8	98 21	143.0	22 50.2	98 21	142.9	23 19.5	98 21	142.8	23 48.9	98 21	142.7
35	22 08.3	98 21	142.0	22 37.7	98 21	141.9	23 07.0	98 21	141.8	23 36.3	98 21	141.6
6	21 55.6	98 22	140.9	22 24.8	98 22	140.8	22 54.1	98 22	140.7	23 23.4	98 22	140.6
7	21 42.5	98 22	139.9	22 11.7	97 22	139.8	22 41.0	97 22	139.7	23 10.2	97 22	139.5
8	21 29.1	97 23	138.9	21 58.3	97 23	138.7	22 27.6	97 23	138.6	22 56.8	97 23	138.5
9	21 15.5	97 23	137.8	21 44.7	97 23	137.7	22 13.8	97 23	137.6	22 43.0	97 24	137.4
40	21 01.6	97 24	136.8	21 30.7	97 24	136.6	21 59.9	97 24	136.5	22 29.0	97 24	136.4
1	20 47.4	97 24	135.7	21 16.5	97 24	135.6	21 45.6	97 24	135.5	22 14.7	97 24	135.4
2	20 32.9	97 25	134.7	21 02.0	97 25	134.6	21 31.1	97 25	134.4	22 00.2	97 25	134.3
3	20 18.2	97 25	133.7	20 47.3	97 25	133.5	21 16.3	97 25	133.4	21 45.4	97 25	133.3
4	20 03.2	97 25	132.7	20 32.3	97 25	132.5	21 01.3	97 25	132.4	21 30.3	97 26	132.2
45	19 48.0	97 26	131.6	20 17.0	97 26	131.5	20 46.0	97 26	131.4	21 15.0	97 26	131.2
6	19 32.6	97 26	130.6	20 01.5	97 26	130.5	20 30.5	96 26	130.3	20 59.4	96 26	130.2
7	19 16.9	96 27	129.6	19 45.8	96 27	129.5	20 14.7	96 27	129.3	20 43.6	96 27	129.2
8	19 00.9	96 27	128.6	19 29.8	96 27	128.4	19 58.7	96 27	128.3	20 27.6	96 27	128.2
9	18 44.8	96 27	127.6	19 13.6	96 27	127.4	19 42.5	96 27	127.3	20 11.3	96 27	127.1
50	18 28.4	96 28	126.6	18 57.2	96 28	126.4	19 26.1	96 28	126.3	19 54.9	96 28	126.1
1	18 11.8	96 28	125.6	18 40.6	96 28	125.4	19 09.4	96 28	125.3	19 38.2	96 28	125.1
2	17 55.0	96 28	124.5	18 23.8	96 28	124.4	18 52.6	96 28	124.3	19 21.3	96 28	124.1
3	17 38.0	96 29	123.5	18 06.8	96 29	123.4	18 35.5	96 29	123.2	19 04.2	96 29	123.1
4	17 20.8	96 29	122.5	17 49.5	96 29	122.4	18 18.2	96 29	122.2	18 46.9	96 29	122.1
55	17 03.4	96 29	121.6	17 32.1	96 29	121.4	18 00.8	96 29	121.2	18 29.4	96 29	121.1
6	16 45.8	96 30	120.6	17 14.5	95 30	120.4	17 43.1	95 30	120.3	18 11.8	95 30	120.1
7	16 28.1	95 30	119.6	16 56.7	95 30	119.4	17 25.3	95 30	119.3	17 53.9	95 30	119.1
8	16 10.2	95 30	118.6	16 38.7	95 30	118.4	17 07.3	95 30	118.3	17 35.9	95 30	118.1
9	15 52.0	95 30	117.6	16 20.6	95 30	117.4	16 49.2	95 31	117.3	17 17.7	95 31	117.1
60	15 33.8	95 31	116.6	16 02.3	95 31	116.5	16 30.9	95 31	116.3	16 59.4	95 31	116.1
1	15 15.4	95 31	115.6	15 43.9	95 31	115.5	16 12.4	95 31	115.3	16 40.9	95 31	115.1
2	14 56.8	95 31	114.7	15 25.3	95 31	114.5	15 53.8	95 31	114.3	16 22.2	95 31	114.2
3	14 38.1	95 31	113.7	15 06.5	95 32	113.5	15 35.0	95 32	113.3	16 03.4	95 32	113.2
4	14 19.2	95 32	112.7	14 47.6	95 32	112.5	15 16.1	95 32	112.4	15 44.5	95 32	112.2
65	14 00.2	95 32	111.7	14 28.6	95 32	111.6	14 57.0	95 32	111.4	15 25.4	95 32	111.2
6	13 41.1	95 32	110.8	14 09.5	95 32	110.6	14 37.9	95 32	110.4	15 06.3	95 32	110.3
7	13 21.8	95 32	109.8	13 50.2	95 32	109.6	14 18.6	95 32	109.5	14 46.9	95 32	109.3
8	13 02.5	95 32	108.8	13 30.8	95 32	108.7	13 59.2	95 33	108.5	14 27.5	94 33	108.3
9	12 43.0	94 33	107.9	13 11.3	94 33	107.7	13 39.7	94 33	107.5	14 08.0	94 33	107.4
70	12 23.4	94 33	106.9	12 51.7	94 33	106.7	13 20.0	94 33	106.6	13 48.3	94 33	106.4
1	12 03.7	94 33	105.9	12 32.0	94 33	105.8	13 00.3	94 33	105.6	13 28.6	94 33	105.4
2	11 43.9	94 33	105.0	12 12.2	94 33	104.8	12 40.5	94 33	104.6	13 08.8	94 33	104.5
3	11 24.1	94 33	104.0	11 52.3	94 33	103.8	12 20.6	94 33	103.7	12 48.9	94 33	103.5
4	11 04.1	94 33	103.1	11 32.4	94 33	102.9	12 00.6	94 33	102.7	12 28.9	94 33	102.6
75	10 44.1	94 34	102.1	11 12.3	94 34	101.9	11 40.6	94 34	101.8	12 08.8	94 34	101.6
6	10 24.0	94 34	101.2	10 52.2	94 34	101.0	11 20.5	94 34	100.8	11 48.7	94 34	100.6
7	10 03.8	94 34	100.2	10 32.0	94 34	100.0	11 00.3	94 34	99.9	11 28.5	94 34	99.7
8	9 43.6	94 34	99.3	10 11.8	94 34	99.1	10 40.0	94 34	98.9	11 08.2	94 34	98.7
9	9 23.3	94 34	98.3	9 51.5	94 34	98.1	10 19.7	94 34	98.0	10 47.9	94 34	97.8
80	9 03.0	94 34	97.4	9 31.2	94 34	97.2	9 59.4	94 34	97.0	10 27.6	94 34	96.8
1	8 42.6	94 34	96.4	9 10.8	94 34	96.2	9 39.0	94 34	96.1	10 07.2	94 34	95.9
2	8 22.2	94 34	95.5	8 50.4	94 34	95.3	9 18.6	94 34	95.1	9 46.7	94 34	94.9
3	8 01.8	94 34	94.5	8 29.9	94 34	94.4	8 58.1	94 34	94.2	9 26.3	94 34	94.0
4	7 41.3	94 34	93.6	8 09.5	94 34	93.4	8 37.6	94 34	93.2	9 05.8	94 34	93.1
85	7 20.8	94 34	92.6	7 49.0	94 34	92.5	8 17.1	94 34	92.3	8 45.3	94 34	92.1
6	7 00.3	94 34	91.7	7 28.5	94 34	91.5	7 56.6	94 34	91.4	8 24.8	94 34	91.2
7	6 39.8	94 34	90.8	7 07.9	94 34	90.6	7 36.1	94 34	90.4	8 04.3	94 34	90.2
8	6 19.2	94 34	89.8	6 47.4	94 34	89.6	7 15.6	94 34	89.5	7 43.7	94 34	89.3
9	5 58.7	94 34	88.9	6 26.9	94 34	88.7	6 55.1	94 34	88.5	7 23.2	94 34	88.4
90	5 38.2	94 34	87.9	6 06.4	94 34	87.8	6 34.6	94 34	87.6	7 02.7	94 34	87.4

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	16 00.0 1.0 00	180.0	15 30.0 1.0 00	180.0	15 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	00
1	15 59.8 1.0 01	179.0	15 29.8 1.0 01	179.0	14 59.8 1.0 01	179.0	14 29.8 1.0 01	179.0	13 59.8 1.0 01	179.0	13 29.8 1.0 01	179.0	12 59.8 1.0 01	179.0	12 29.8 1.0 01	179.0	1
2	15 59.3 1.0 02	177.9	15 29.3 1.0 02	177.9	14 59.3 1.0 02	177.9	14 29.3 1.0 02	177.9	13 59.3 1.0 02	178.0	13 29.3 1.0 02	178.0	12 59.3 1.0 02	178.0	12 29.3 1.0 02	178.0	2
3	15 58.3 1.0 02	176.9	15 28.3 1.0 02	176.9	14 58.3 1.0 02	176.9	14 28.3 1.0 02	176.9	13 58.3 1.0 02	176.9	13 28.4 1.0 02	176.9	12 58.4 1.0 02	176.9	12 28.4 1.0 02	177.0	3
4	15 57.0 1.0 03	175.8	15 27.0 1.0 03	175.9	14 57.0 1.0 03	175.9	14 27.1 1.0 03	175.9	13 57.1 1.0 03	175.9	13 27.1 1.0 03	175.9	12 57.1 1.0 03	175.9	12 27.1 1.0 03	175.9	4
05	15 55.4 1.0 03	174.8	15 25.4 1.0 03	174.8	14 55.4 1.0 03	174.8	14 25.4 1.0 03	174.9	13 55.4 1.0 03	174.9	13 25.4 1.0 03	174.9	12 55.4 1.0 03	174.9	12 25.5 1.0 03	174.9	05
6	15 53.3 1.0 04	173.8	15 23.3 1.0 04	173.8	14 53.4 1.0 04	173.8	14 23.4 1.0 04	173.8	13 53.4 1.0 04	173.9	13 23.4 1.0 04	173.9	12 53.4 1.0 04	173.9	12 23.5 1.0 04	173.9	6
7	15 50.9 1.0 05	172.7	15 20.9 1.0 05	172.8	14 51.0 1.0 05	172.8	14 21.0 1.0 05	172.8	13 51.0 1.0 05	172.8	13 21.0 1.0 05	172.9	12 51.1 1.0 05	172.9	12 21.1 1.0 05	172.9	7
8	15 48.1 1.0 05	171.7	15 18.2 1.0 05	171.7	14 48.2 1.0 05	171.8	14 18.2 1.0 05	171.8	13 48.3 1.0 05	171.8	13 18.3 1.0 05	171.8	12 48.3 1.0 05	171.9	12 18.4 1.0 05	171.9	8
9	15 45.0 1.0 06	170.7	15 15.0 1.0 06	170.7	14 45.1 1.0 06	170.7	14 15.1 1.0 06	170.8	13 45.2 1.0 06	170.8	13 15.2 1.0 06	170.8	12 45.3 1.0 06	170.8	12 15.3 1.0 06	170.9	9
10	15 41.5 1.0 06	169.6	15 11.5 1.0 06	169.7	14 41.6 1.0 06	169.7	14 11.6 1.0 06	169.7	13 41.7 1.0 06	169.8	13 11.8 1.0 06	169.8	12 41.8 1.0 06	169.8	12 11.9 1.0 06	169.9	10
1	15 37.6 1.0 07	168.6	15 07.7 1.0 07	168.6	14 37.7 1.0 07	168.7	14 07.8 1.0 07	168.7	13 37.9 1.0 07	168.7	13 07.9 1.0 07	168.8	12 38.0 1.0 07	168.8	12 08.1 1.0 07	168.8	1
2	15 33.4 1.0 08	167.6	15 03.4 1.0 08	167.6	14 33.5 1.0 08	167.6	14 03.6 1.0 08	167.7	13 33.7 1.0 08	167.7	13 03.8 1.0 08	167.8	12 33.9 1.0 08	167.8	12 03.9 1.0 08	167.8	2
3	15 28.8 1.0 08	166.5	14 58.9 1.0 08	166.6	14 29.0 1.0 08	166.6	13 59.1 1.0 08	166.7	13 29.1 1.0 08	166.7	12 59.2 1.0 08	166.7	12 29.3 1.0 08	166.8	11 59.4 1.0 08	166.8	3
4	15 23.8 1.0 09	165.5	14 53.9 1.0 09	165.5	14 24.0 1.0 09	165.6	13 54.1 1.0 09	165.6	13 24.2 1.0 09	165.7	12 54.4 1.0 09	165.7	12 24.5 1.0 09	165.8	11 54.6 1.0 09	165.8	4
15	15 18.5 1.0 09	164.5	14 48.6 1.0 09	164.5	14 18.7 1.0 09	164.6	13 48.9 1.0 09	164.6	13 19.0 1.0 09	164.7	12 49.1 1.0 09	164.7	12 19.2 1.0 09	164.8	11 49.4 1.0 09	164.8	15
6	15 12.8 1.0 10	163.4	14 43.0 1.0 10	163.5	14 13.1 1.0 10	163.5	13 43.3 1.0 10	163.6	13 13.4 1.0 10	163.6	12 43.5 1.0 10	163.7	12 13.7 1.0 10	163.7	11 43.8 1.0 10	163.8	6
7	15 06.8 99 11	162.4	14 37.0 99 11	162.5	14 07.1 99 11	162.5	13 37.3 99 11	162.6	13 07.4 99 10	162.6	12 37.6 99 10	162.7	12 07.8 99 10	162.7	11 37.9 99 10	162.8	7
8	15 00.4 99 11	161.4	14 30.6 99 11	161.4	14 00.8 99 11	161.5	13 31.0 99 11	161.6	13 01.1 99 11	161.6	12 31.3 99 11	161.7	12 01.5 99 11	161.7	11 31.7 99 11	161.8	8
9	14 53.7 99 12	160.4	14 23.9 99 12	160.4	13 54.1 99 12	160.5	13 24.3 99 12	160.5	12 54.5 99 12	160.6	12 24.7 99 12	160.7	11 54.9 99 12	160.7	11 25.1 99 12	160.8	9
20	14 46.6 99 12	159.3	14 16.9 99 12	159.4	13 47.1 99 12	159.5	13 17.3 99 12	159.5	12 47.5 99 12	159.6	12 17.7 99 12	159.6	11 47.9 99 12	159.7	11 18.2 99 12	159.8	20
1	14 39.2 99 13	158.3	14 09.5 99 13	158.4	13 39.7 99 13	158.4	13 09.9 99 13	158.5	12 40.2 99 13	158.6	12 10.4 99 13	158.6	11 40.7 99 13	158.7	11 10.9 99 13	158.8	1
2	14 31.5 99 13	157.3	14 01.7 99 13	157.4	13 32.0 99 13	157.4	13 02.3 99 13	157.5	12 32.5 99 13	157.6	12 02.8 99 13	157.6	11 33.0 99 13	157.7	11 03.3 99 13	157.8	2
3	14 23.4 99 14	156.3	13 53.7 99 14	156.3	13 23.9 99 14	156.4	12 54.2 99 14	156.5	12 24.5 99 14	156.6	11 54.8 99 14	156.6	11 25.1 99 14	156.7	10 55.4 99 14	156.8	3
4	14 15.0 99 15	155.3	13 45.3 99 15	155.3	13 15.6 99 14	155.4	12 45.9 99 14	155.5	12 16.2 99 14	155.5	11 46.5 99 14	155.6	11 16.8 99 14	155.7	10 47.1 99 14	155.8	4
25	14 06.2 99 15	154.2	13 36.5 99 15	154.3	13 06.9 99 15	154.4	12 37.2 99 15	154.5	12 07.5 99 15	154.5	11 37.9 99 15	154.6	11 08.2 99 15	154.7	10 38.5 99 15	154.8	25
6	13 57.1 99 16	153.2	13 27.5 99 16	153.3	12 57.8 99 16	153.4	12 28.2 99 16	153.5	11 58.5 99 16	153.5	11 28.9 99 15	153.6	10 59.2 99 15	153.7	10 29.6 99 15	153.8	6
7	13 47.7 99 16	152.2	13 18.1 99 16	152.3	12 48.5 99 16	152.4	12 18.9 99 16	152.4	11 49.2 99 16	152.5	11 19.6 99 16	152.6	10 50.0 99 16	152.7	10 20.4 99 16	152.8	7
8	13 38.0 99 17	151.2	13 08.4 99 17	151.3	12 38.8 99 17	151.4	12 09.2 99 17	151.4	11 39.6 99 17	151.5	11 10.0 99 17	151.6	10 40.4 99 16	151.7	10 10.8 99 16	151.8	8
9	13 27.9 99 17	150.2	12 58.4 99 17	150.3	12 28.8 99 17	150.4	11 59.2 99 17	150.4	11 29.7 99 17	150.5	11 00.1 99 17	150.6	10 30.5 99 17	150.7	10 01.0 99 17	150.8	9
30	13 17.6 98 18	149.2	12 48.0 98 18	149.3	12 18.5 98 18	149.3	11 49.0 98 18	149.4	11 19.4 98 18	149.5	10 49.9 98 18	149.6	10 20.3 98 18	149.7	9 50.8 98 17	149.8	30
1	13 06.9 98 18	148.2	12 37.4 98 18	148.3	12 07.9 98 18	148.3	11 38.4 98 18	148.4	11 08.9 98 18	148.5	10 39.3 98 18	148.6	10 09.8 98 18	148.7	9 40.3 98 18	148.8	1
2	12 55.9 98 19	147.2	12 26.4 98 19	147.2	11 57.0 98 19	147.3	11 27.5 98 19	147.4	10 58.0 98 19	147.5	10 28.5 98 19	147.6	9 59.0 98 18	147.7	9 29.5 98 18	147.8	2
3	12 44.6 98 19	146.1	12 15.2 98 19	146.2	11 45.7 98 19	146.3	11 16.3 98 19	146.4	10 46.8 98 19	146.5	10 17.4 98 19	146.6	9 47.9 98 19	146.7	9 18.5 98 19	146.8	3
4	12 33.1 98 20	145.1	12 03.6 98 20	145.2	11 34.2 98 20	145.3	11 04.8 98 20	145.4	10 35.4 98 20	145.5	10 05.9 98 20	145.6	9 36.5 98 19	145.7	9 07.1 98 19	145.8	4
35	12 21.2 98 20	144.1	11 51.8 98 20	144.2	11 22.4 98 20	144.3	10 53.0 98 20	144.5	10 23.6 98 20	144.6	9 54.2 98 20	144.7	9 24.8 98 20	144.8	8 55.4 98 20	144.9	35
6	12 09.0 98 21	143.1	11 39.7 98 21	143.2	11 10.3 98 21	143.4	10 40.9 98 21	143.5	10 11.6 98 21	143.6	9 42.2 98 20	143.7	9 12.8 98 20	143.8	8 43.5 98 20	143.9	6
7	11 56.6 98 21	142.1	11 27.2 98 21	142.3	10 57.9 98 21	142.4	10 28.6 98 21	142.5	9 59.2 98 21	142.6	9 29.9 98 21	142.7	9 00.6 98 21	142.8	8 31.2 98 21	142.9	7
8	11 43.8 98 22	141.2	11 14.5 98 22	141.3	10 45.2 98 22	141.4	10 15.9 98 22	141.5	9 46.6 98 21	141.6	9 17.3 98 21	141.7	8 48.0 98 21	141.8	8 18.7 98 21	141.9	8
9	11 30.8 98 22	140.2	11 01.6 98 22	140.3	10 32.3 98 22	140.4	10 03.0 98 22	140.5	9 33.7 98 22	140.6	9 04.5 98 22	140.7	8 35.2 98 22	140.8	8 05.9 98 22	140.9	9
40	11 17.5 97 23	139.2	10 48.3 97 23	139.3	10 19.1 97 22	139.4	9 49.8 97 22	139.5	9 20.6 97 22	139.6	8 51.3 97 22	139.7	8 22.1 97 22	139.8	7 52.8 98 22	140.0	40
1	11 04.0 97 23	138.2	10 34.8 97 23	138.3	10 05.6 97 23	138.4	9 36.4 97 23	138.5	9 07.1 97 23	138.6	8 37.9 97 23	138.8	8 08.7 97 23	138.9	7 39.5 97 23	139.0	1
2	10 50.2 97 23	137.2	10 21.0 97 23	137.3	9 51.8 97 23	137.4	9 22.6 97 23	137.5	8 53.5 97 23	137.7	8 24.3 97 23	137.8	7 55.1 97 23	137.9	7 25.9 97 23	138.0	2
3	10 36.1 97 24	136.2	10 07.0 97 24	136.3	9 37.8 97 24	136.4	9 08.7 97 24	136.6	8 39.5 97 24	136.7	8 10.3 97 24	136.8	7 41.2 97 24	136.9	7 12.0 97 24	137.0	3
4	10 21.8 97 24	135.2	9 52.7 97 24	135.3	9 23.5 97 24	135.5	8 54.4 97 24	135.6	8 25.3 97 24	135.7	7 56.2 97 24	135.8	7 27.0 97 24	135.9	6 57.9 97 24	136.1	4
45	10 07.2 97 25	134.2	9 38.1 97 25	134.4	9 09.0 97 25	134.5	8 39.9 97 25	134.6	8 10.8 97 24	134.7	7 41.7 97 24	134.9	7 12.7 97 24	135.0	6 43.6 97 24	135.1	45
6	9 52.4 97 25	133.2	9 23.3 97 25	133.4	8 54.3 97 25	133.5	8 25.2 97 25	133.6	7 56.1 97 25	133.8	7 27.1 97 25	133.9	6 58.0 97 25	134.0	6 29.0 97 25	134.1	6
7	9 37.3 97 26	132.3	9 08.3 97 25	132.4	8 39.3 97 25	132.5	8 10.2 97 25	132.7	7 41.2 97 25	132.8	7 12.2 97 25	132.9	6 43.1 97 25	133.0	6 14.1 97 25	133.2	7
8	9 22.0 97 26	131.3	8 53.0 97 26	131.4	8 24.0 97 26	131.6	7 55.0 97 26	131.7	7 26.0 97 26	131.8	6 57.0 97 26	131.9	6 28.0 97 26	132.1	5 59.0 97 26	132.2	8
9	9 06.5 97 26	130.3	8 37.5 97 26	130.4	8 08.5 97 26	130.6	7 39.6 97 26	130.7	7 10.6 97 26	130.8	6 41.6 97 26	131.0	6 12.7 97 26	131.1	5 43.7 97 26	131.2	9
50	8 50.7 96 27	129.3	8 21.8 96 27	129.5	7 52.8 96 27	129.6	7 23.9 96 26	129.7	6 55.0 96 26	129.9	6 26.0 96 26	130.0	5 57.1 96 26	130.1	5 28.2 96 26	130.3	50
1	8 34.7 96 27	128.4	8 05.8 96 27	128.5	7 36.9 96 27	128.6	7 08.0 96 27	128.8	6 39.1 96 27	128.9	6 10.2 96 27	129.0	5 41.3 96 27	129.2	5 12.4 96 27	129.3	1
2	8 18.5 96 27	127.4	7 49.7 96 27	127.5	7 20.8 96 27	127.7	6 51.9 96 27	127.8	6 23.0 96 27	127.9	5 54.2 96 27	128.1	5 25.3 96 27	128.2			2
3	8 02.1 96 28	126.4	7 33.3 96 28	126.6	7 04.4 96 28	126.7	6 35.6 96 28	126.8	6 06.7 96 28	127.0	5 37.9 96 27	127.1	5 09.1 96 27	127.3			3
4	7 45.5 96 28	125.5	7 16.7 96 28	125.6	6 47.9 96 28	125.7	6 19.1 96 28	125.9	5 50.3 96 28	126.0	5 21.4 96 28	126.2					4
55	7 28.7 96 28	124.5	6 59.9 96 28	124.6	6 31.1 96 28	124.8	6 02.3 96 28	124.9	5 33.6 96 28	125.1	5 04.8 96 28	125.2					55
6	7 11.7 96 29	123.5	6 42.9 96 29	123.7	6 14.2 96 29	123.8	5 45.4 96 29	124.0	5 16.7 96 28	124.1							6
7	6 54.5 96 29	122.6	6 25.8 96 29	122.7	5 57.0 96 29	122.9	5 28.3 96 29	123.0									7
8	6 37.1 96 29	121.6	6 08.4 96 29	121.8	5 39.7 96 29	121.9	5 11.0 96 29	122.0									8
9	6 19.5 96 30	120.6	5 50.9 96 30	120.8	5 22.2 96 29	120.9											9
60	6 01.8 95 30	119.7	5 33.1 95 30	119.8	5 04.5 95 30	120.0											60
1	5 43.9 95 30	118.7	5 15.3 95 30	118.9													1
2	5 25.8 95 30	117.8															2
3	5 07.6 95 30	116.8															3

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74

L 7

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
91									5 17.7 94 34	87.0	5 45.9 94 34	86.8	6 14.1 94 34	86.7	6 42.2 94 34	86.5	91
2											5 25.4 94 34	85.9	5 53.6 94 34	85.7	6 21.8 94 34	85.5	2
3											5 05.0 94 34	85.0	5 33.1 94 34	84.8	6 01.3 94 34	84.6	3
4													5 12.7 94 34	83.8	5 40.9 94 34	83.7	4
95															5 20.5 94 34	82.7	95
6															5 00.2 94 34	81.8	6

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	00
1	27 59.8	1.0 01	178.9	28 29.8	1.0 01	178.9	28 59.8	1.0 01	178.9	29 29.8	1.0 01	178.9	29 59.8	1.0 01	178.9	30 29.8	1.0 01	178.9	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9	1
2	27 59.2	1.0 02	177.8	28 29.2	1.0 02	177.7	28 59.2	1.0 02	177.7	29 29.2	1.0 02	177.7	29 59.2	1.0 02	177.7	30 29.2	1.0 02	177.7	30 59.2	1.0 02	177.7	31 29.2	1.0 02	177.7	2
3	27 58.2	1.0 02	176.6	28 28.2	1.0 02	176.6	28 58.2	1.0 02	176.6	29 28.2	1.0 02	176.6	29 58.2	1.0 02	176.6	30 28.2	1.0 02	176.6	30 58.2	1.0 02	176.6	31 28.1	1.0 02	176.6	3
4	27 56.8	1.0 03	175.5	28 26.8	1.0 03	175.5	28 56.8	1.0 03	175.5	29 26.8	1.0 03	175.5	29 56.7	1.0 03	175.5	30 26.7	1.0 03	175.4	30 56.7	1.0 03	175.4	31 26.7	1.0 03	175.4	4
05	27 55.0	1.0 04	174.4	28 25.0	1.0 04	174.4	28 54.9	1.0 04	174.4	29 24.9	1.0 04	174.3	29 54.9	1.0 04	174.3	30 24.9	1.0 04	174.3	30 54.9	1.0 04	174.3	31 24.9	1.0 04	174.3	05
6	27 52.8	1.0 04	173.3	28 22.8	1.0 04	173.3	28 52.7	1.0 04	173.2	29 22.7	1.0 04	173.2	29 52.7	1.0 04	173.2	30 22.7	1.0 04	173.2	30 52.6	1.0 04	173.1	31 22.6	1.0 04	173.1	6
7	27 50.2	1.0 05	172.2	28 20.1	1.0 05	172.1	28 50.1	1.0 05	172.1	29 20.1	1.0 05	172.1	29 50.0	1.0 05	172.0	30 20.0	1.0 05	172.0	30 50.0	1.0 05	172.0	31 19.9	1.0 05	172.0	7
8	27 47.2	1.0 06	171.0	28 17.1	1.0 06	171.0	28 47.1	1.0 06	171.0	29 17.0	1.0 06	170.9	29 47.0	1.0 06	170.9	30 17.0	1.0 06	170.9	30 46.9	1.0 06	170.8	31 16.9	1.0 06	170.8	8
9	27 43.8	1.0 06	169.9	28 13.7	1.0 06	169.9	28 43.7	1.0 06	169.9	29 13.6	1.0 06	169.8	29 43.6	1.0 06	169.8	30 13.5	1.0 06	169.7	30 43.4	1.0 06	169.7	31 13.4	1.0 06	169.7	9
10	27 40.0	1.0 07	168.8	28 09.9	1.0 07	168.8	28 39.9	1.0 07	168.7	29 09.8	1.0 07	168.7	29 39.7	1.0 07	168.7	30 09.7	1.0 07	168.6	30 39.6	1.0 07	168.6	31 09.5	1.0 07	168.5	10
1	27 35.8	1.0 08	167.7	28 05.7	1.0 08	167.6	28 35.7	1.0 08	167.6	29 05.6	1.0 08	167.6	29 35.5	1.0 08	167.5	30 05.4	1.0 08	167.5	30 35.3	1.0 08	167.4	31 05.2	1.0 08	167.4	1
2	27 31.2	1.0 08	166.6	28 01.2	1.0 08	166.5	28 31.1	1.0 08	166.5	29 01.0	1.0 08	166.4	29 30.9	1.0 08	166.4	30 00.8	1.0 08	166.3	30 30.7	1.0 08	166.3	31 00.5	1.0 08	166.2	2
3	27 26.3	1.0 09	165.5	27 56.2	1.0 09	165.4	28 26.1	1.0 09	165.4	28 55.9	1.0 09	165.3	29 25.8	1.0 09	165.3	29 55.7	1.0 09	165.2	30 25.6	1.0 09	165.2	30 55.5	1.0 09	165.1	3
4	27 20.9	1.0 10	164.4	27 50.8	1.0 10	164.3	28 20.7	1.0 10	164.2	28 50.5	1.0 10	164.2	29 20.4	1.0 10	164.1	29 50.3	1.0 10	164.1	30 20.1	1.0 10	164.0	30 50.0	1.0 10	164.0	4
15	27 15.2	1.0 10	163.2	27 45.1	99 10	163.2	28 14.9	99 10	163.1	28 44.8	99 10	163.1	29 14.6	99 10	163.0	29 44.5	99 10	163.0	30 14.3	99 10	162.9	30 44.1	99 10	162.8	15
6	27 09.1	99 11	162.1	27 38.9	99 11	162.1	28 08.8	99 11	162.0	28 38.6	99 11	162.0	29 08.4	99 11	161.9	29 38.3	99 11	161.8	30 08.1	99 11	161.8	30 37.9	99 11	161.7	6
7	27 02.6	99 11	161.0	27 32.4	99 11	161.0	28 02.2	99 12	160.9	28 32.1	99 12	160.8	29 01.9	99 12	160.8	29 31.7	99 12	160.7	30 01.5	99 12	160.6	30 31.3	99 12	160.6	7
8	26 55.8	99 12	159.9	27 25.6	99 12	159.9	27 55.3	99 12	159.8	28 25.1	99 12	159.7	28 54.9	99 12	159.7	29 24.7	99 12	159.6	29 54.5	99 12	159.5	30 24.2	99 12	159.4	8
9	26 48.5	99 13	158.8	27 18.3	99 13	158.8	27 48.1	99 13	158.7	28 17.8	99 13	158.6	28 47.6	99 13	158.5	29 17.3	99 13	158.5	29 47.1	99 13	158.4	30 16.9	99 13	158.3	9
20	26 40.9	99 13	157.7	27 10.7	99 13	157.7	27 40.4	99 13	157.6	28 10.2	99 13	157.5	28 39.9	99 13	157.4	29 09.6	99 13	157.4	29 39.4	99 14	157.3	30 09.1	99 14	157.2	20
1	26 33.0	99 14	156.6	27 02.7	99 14	156.6	27 32.4	99 14	156.5	28 02.1	99 14	156.4	28 31.8	99 14	156.3	29 01.5	99 14	156.2	29 31.2	99 14	156.2	30 00.9	99 14	156.1	1
2	26 24.7	99 14	155.5	26 54.4	99 15	155.5	27 24.0	99 15	155.4	27 53.7	99 15	155.3	28 23.4	99 15	155.2	28 53.1	99 15	155.1	29 22.8	99 15	155.0	29 52.4	99 15	155.0	2
3	26 16.0	99 15	154.4	26 45.7	99 15	154.4	27 15.3	99 15	154.3	27 45.0	99 15	154.2	28 14.6	99 15	154.1	28 44.3	99 15	154.0	29 13.9	99 15	153.9	29 43.6	99 15	153.8	3
4	26 07.0	99 16	153.3	26 36.6	99 16	153.3	27 06.2	99 16	153.2	27 35.9	99 16	153.1	28 05.5	99 16	153.0	28 35.1	99 16	152.9	29 04.7	99 16	152.8	29 34.3	99 16	152.7	4
25	25 57.6	99 16	152.3	26 27.2	99 16	152.2	26 56.8	99 16	152.1	27 26.4	99 16	152.0	27 56.0	99 16	151.9	28 25.6	99 16	151.8	28 55.2	99 16	151.7	29 24.8	99 17	151.6	25
6	25 47.9	99 17	151.2	26 17.4	99 17	151.1	26 47.0	99 17	151.0	27 16.6	99 17	150.9	27 46.2	99 17	150.8	28 15.7	99 17	150.7	28 45.3	99 17	150.6	29 14.8	99 17	150.5	6
7	25 37.8	99 17	150.1	26 07.3	98 17	150.0	26 36.9	98 17	149.9	27 06.4	98 18	149.8	27 36.0	98 18	149.7	28 05.5	98 18	149.6	28 35.0	98 18	149.5	29 04.6	98 18	149.4	7
8	25 27.4	98 18	149.0	25 56.9	98 18	148.9	26 26.4	98 18	148.8	26 55.9	98 18	148.7	27 25.4	98 18	148.6	27 55.0	98 18	148.5	28 24.4	98 18	148.4	28 53.9	98 18	148.3	8
9	25 16.7	98 18	147.9	25 46.2	98 18	147.8	26 15.6	98 19	147.7	26 45.1	98 19	147.6	27 14.6	98 19	147.5	27 44.1	98 19	147.4	28 13.5	98 19	147.3	28 43.0	98 19	147.2	9
30	25 05.6	98 19	146.9	25 35.1	98 19	146.8	26 04.5	98 19	146.6	26 34.0	98 19	146.5	27 03.4	98 19	146.4	27 32.8	98 19	146.3	28 02.3	98 19	146.2	28 31.7	98 19	146.1	30
1	24 54.2	98 20	145.8	25 23.7	98 20	145.7	25 53.1	98 20	145.6	26 22.5	98 20	145.5	26 51.9	98 20	145.3	27 21.3	98 20	145.2	27 50.7	98 20	145.1	28 20.1	98 20	145.0	1
2	24 42.5	98 20	144.7	25 11.9	98 20	144.6	25 41.3	98 20	144.5	26 10.7	98 20	144.4	26 40.1	98 20	144.3	27 09.4	98 20	144.2	27 38.8	98 20	144.0	28 08.2	98 20	143.9	2
3	24 30.5	98 21	143.6	24 59.9	98 21	143.5	25 29.2	98 21	143.4	25 58.6	98 21	143.3	26 27.9	98 21	143.2	26 57.3	98 21	143.1	27 26.6	98 21	143.0	27 55.9	98 21	142.8	3
4	24 18.2	98 21	142.6	24 47.5	98 21	142.5	25 16.9	98 21	142.4	25 46.2	98 21	142.2	26 15.5	98 21	142.1	26 44.8	98 21	142.0	27 14.1	98 21	141.9	27 43.4	98 21	141.8	4
35	24 05.6	98 22	141.5	24 34.9	98 22	141.4	25 04.2	98 22	141.3	25 33.5	98 22	141.2	26 02.7	98 22	141.0	26 32.0	98 22	140.9	27 01.3	98 22	140.8	27 30.5	98 22	140.7	35
6	23 52.7	98 22	140.5	24 21.9	98 22	140.3	24 51.2	98 22	140.2	25 20.4	97 22	140.1	25 49.7	97 22	140.0	26 18.9	97 22	139.9	26 48.2	97 22	139.7	27 17.4	97 22	139.6	6
7	23 39.5	97 23	139.4	24 08.7	97 23	139.3	24 37.9	97 23	139.2	25 07.1	97 23	139.0	25 36.3	97 23	138.9	26 05.5	97 23	138.8	26 34.7	97 23	138.7	27 03.9	97 23	138.5	7
8	23 26.0	97 23	138.4	23 55.2	97 23	138.2	24 24.4	97 23	138.1	24 53.5	97 23	138.0	25 22.7	97 23	137.9	25 51.9	97 23	137.7	26 21.0	97 23	137.6	26 50.2	97 23	137.5	8
9	23 12.2	97 23	137.3	23 41.4	97 23	137.2	24 10.5	97 24	137.1	24 39.7	97 24	136.9	25 08.8	97 24	136.8	25 37.9	97 24	136.7	26 07.1	97 24	136.5	26 36.2	97 24	136.4	9
40	22 58.1	97 24	136.3	23 27.3	97 24	136.1	23 56.4	97 24	136.0	24 25.5	97 24	135.9	24 54.6	97 24	135.7	25 23.7	97 24	135.6	25 52.8	97 24	135.5	26 21.9	97 24	135.3	40
1	22 43.8	97 24	135.2	23 12.9	97 24	135.1	23 42.0	97 24	135.0	24 11.1	97 24	134.8	24 40.2	97 25	134.7	25 09.2	97 25	134.5	25 38.3	97 25	134.4	26 07.3	97 25	134.3	1
2	22 29.2	97 25	134.2	22 58.3	97 25	134.0	23 27.3	97 25	133.9	23 56.4	97 25	133.8	24 25.4	97 25	133.6	24 54.5	97 25	133.5	25 23.5	97 25	133.4	25 52.5	97 25	133.2	2
3	22 14.4	97 25	133.1	22 43.4	97 25	133.0	23 12.4	97 25	132.9	23 41.5	97 25	132.7	24 10.5	97 25	132.6	24 39.5	97 25	132.5	25 08.4	97 26	132.3	25 37.4	97 26	132.2	3
4	21 59.3	97 26	132.1	22 28.3	97 26	132.0	22 57.3	97 26	131.8	23 26.2	97 26	131.7	23 55.2	97 26	131.5	24 24.2	97 26	131.4	24 53.1	97 26	131.3	25 22.1	96 26	131.1	4
45	21 43.9	97 26	131.1	22 12.9	97 26	130.9	22 41.9	97 26	130.8	23 10.8	96 26	130.7	23 39.7	96 26	130.5	24 08.7	96 26	130.4	24 37.6	96 26	130.2	25 06.5	96 26	130.1	45
6	21 28.4	96 26	130.1	21 57.3	96 26	129.9	22 26.2	96 26	129.8	22 55.1	96 27	129.6	23 24.0	96 27	129.5	23 52.9	96 27	129.3	24 21.8	96 27	129.2	24 50.7	96 27	129.0	6
7	21 12.5	96 27	129.0	21 41.4	96 27	128.9	22 10.3	96 27	128.7	22 39.2	96 27	128.6	23 08.1	96 27	128.4	23 36.9	96 27	128.3	24 05.8	96 27	128.1	24 34.6	96 27	128.0	7
8	20 56.5	96 27	128.0	21 25.3	96 27	127.9	21 54.2	96 27	127.7	22 23.0	96 27	127.6	22 51.9	96 27	127.4	23 20.7	96 27	127.3	23 49.5	96 27	127.1	24 18.3	96 28	127.0	8
9	20 40.2	96 28	127.0	21 09.0	96 28	126.8	21 37.8	96 28	126.7	22 06.7	96 28	126.5	22 35.5	96 28	126.4	23 04.3	96 28	126.2	23 33.1	96 28	126.1	24 01.8	96 28	125.9	9
50	20 23.7	96 28	126.0	20 52.5	96 28	125.8	21 21.3	96 28	125.7	21 50.1	96 28	125.5	22 18.8	96 28	125.4	22 47.6	96 28	125.2	23 16.4	96 28	125.1	23 45.1	96 28	124.9	50
1	20 07.0	96 28	125.0	20 35.7	96 28	124.8	21 04.5	96 28	124.7	21 33.3	96 28	124.5	22 02.0	96 28	124.3	22 30.7	96 28	124.2	22 59.5	96 29	124.0	23 28.2	96 29	123.9	1
2	19 50.1	96 29	123.9	20 18.8	96 29	123.8	20 47.5	96 29	123.6	21 16.2	96 29	123.5	21 45.0	96 29	123.3	22 13.7	96 29	123.2	22 42.4	96 29	123.0	23 11.0	96 29	122.9	2
3	19 32.9	96 29	122.9	20 01.6	96 29	122.8	20 30.3	96 29	122.6	20 59.0	96 29	122.5	21 27.7	96 29	122.3	21 56.4	96 29	122.2	22 25.1	96 29	122.0	22 53.7	96 29	121.8	3
4	19 15.6	96 29	121.9	19 44.3	96 29	121.8	20 13.0	96 29	121.6	20 41.6	96 29	121.5	21 10.3	95 29	121.3	21 38.9	95 29	121.1	22 07.6	95 29	121.0	22 36.2	95 30	120.8	4
55	18 58.1	96 30	120.9	19 26.7	95 30	120.8	19 55.4	95 30	120.6	20 24.0	95 30	120.5	20 52.6	95 30	120.3	21 21.3	95 30	120.1	21 49.9	95 30	120.0	22 18.5	95 30	119.8	55
6	18 40.4	95 30	119.9	19 09.0	95 30	119.8	19 37.6	95 30	119.6	20 06.2	95 30	119.5	20 34.8	95 30	119.3	21 03.4	95 30	119.1	21 32.0	95 30	119.0	22 00.6	95 30	118.8	6
7	18 22.5	95 30	118.9	18 51.1	95 30	118.8	19 19.7	95 30	118.6	19 48.3	95 30	118.5	20 16.9	95 30	118.3	20 45.4	95 30	118.1	21 14.0	95 30	118.0	21 42.5	95 30	117.8	7
8	18 04.5	95 30	117.9	18 33.1	95 30	117.8	19 01.6	95 30	117.6	19 30.2	95 30	117.5	19 58.7	95 31	117.3	20 27.2	95 31	117.1	20 55.8	95 31	117.0	21 24.3	95 31	116.8	8
9	17 46.3	95 31	117.0	18 14.8	95 31	116.8	18 43.4	95 31	116.6	19 11.9	95 31	116.5	19 40.4	95 31	116.3	20 08.9	95 31	116.1	20 37.4	95 31	116.0	21 05.9	95 31	115.8	9
60	17 27.9	95 31	116.0	17 56.4	95 31	115.8	18 24.9	95 31	115.6	18 53.4	95 31	115.5	19 21.9	95 31	115.3	19 50.4	95 31	115.1	20 18.9	95 31	115.0	20 47.3	95 31	114.8	60
1	17 09.4	95 31	115.0	17 37.9	95 31	114.8	18 06.4	95 31	114.7	18 34.8	95 31	114.5	19 03.3	95 31	114.3	19 31.7	95 31	114.2	20 00.2	95 31	114.0	20 28.6	95 31	113.8	1
2	16 50.7	95 31	114.0	17 19.2	95 31	113.8	17 47.6	95 31	113.7	18 16.1	95 31	113.5	18 44.5	95 32	113.3	19 12.9	95 32	113.2	19 41.4	95 32	113.0	20 09.8	95 32	112.8	2
3	16 31.9	95 32	113.0	17 00.3	95 32	112.9	17 28.8	95 32	112.7	17 57.2	95 32	112.5	18 25.6	95 32	112.3	18 54.0	95 32	112.2	19 22.4	95 32	112.0	19 50.8	95 32	111.8	3
4	16 12.9	95 32	112.0	16 41.4	95 32	111.9	17 09.8	95 32	111.7	17 38.2	95 32	111.5	18 06.6	95 32	111.4	18 34.9	95 32	111.2	19 03.3	95 32	111.0	19 31.7	95 32	110.9	4
65	15 53.8	95 32	111.1	16 22.2	95 32	110.9	16 50.6	95 32	110.7	17 19.0	95 32	110.6	17 47.4	95 32	110.4	18 15.7	95 32	110.2	18 44.1	94 32	110.0	19 12.4	94 32	109.9	65
6	15 34.6	95 32	110.1	16 03.0	95 32	109.9	16 31.4	95 32	109.8	16 59.7	95 32	109.6	17 28.1	94 32	109.4	17 56.4	94 32	109.2	18 24.8	94 32	109.1	18 53.1	94 32	108.9	6
7	15 15.3	95 32	109.1	15 43.7	94 32	109.0	16 12.0	94 32	108.8	16 40.3	94 32	108.6	17 08.7	94 33	108.4	17 37.0	94 33	108.3	18 05.3	94 33	108.1	18 33.6	94 33	107.9	7
8	14 55.9	94 33	108.2	15 24.2	94 33	108.0	15 52.5	94 33	107.8	16 20.8	94 33	107.6	16 49.2	94 33	107.5	17 17.5	94 33	107.3	17 45.7	94 33	107.1	18 14.0	94 33	106.9	8
9	14 36.3	94 33	107.2	15 04.6	94 33	107.0	15 32.9	94 33	106.8	16 01.2	94 33	106.7	16 29.5	94 33	106.5	16 57.8	94 33	106.3	17 26.1	94 33	106.1	17 54.3	94 33	106.0	9
70	14 16.7	94 33	106.2	14 45.0	94 33	106.0	15 13.2	94 33	105.9	15 41.5	94 33	105.7	16 09.8	94 33	105.5	16 38.1	94 33	105.4	17 06.3	94 33	105.2	17 34.6	94 33	105.0	70
1	13 56.9	94 33	105.3	14 25.2	94 33	105.1	14 53.5	94 33	104.9	15 21.7	94 33	104.7	15 50.0	94 33	104.6	16 18.2	94 33	104.4	16 46.5	94 33	104.2	17 14.7	94 33	104.0	1
2	13 37.1	94 33	104.3	14 05.3	94 33	104.1	14 33.6	94 33	103.9	15 01.8	94 33	103.8	15 30.1	94 33	103.6	15 58.3	94 33	103.4	16 26.5	94 33	103.2	16 54.8	94 33	103.1	2
3	13 17.1	94 33	103.3	13 45.4	94 33	103.2	14 13.6	94 33	103.0	14 41.9	94 33	102.8	15 10.1	94 33	102.6	15 38.3	94 33	102.5	16 06.5	94 34	102.3	16 34.7	94 34	102.1	3
4	12 57.1	94 33	102.4	13 25.4	94 34	102.2	13 53.6	94 34	102.0	14 21.8	94 34	101.9	14 50.0	94 34	101.7	15 18.2	94 34	101.5	15 46.4	94 34	101.3	16 14.6	94 34	101.1	4
75	12 37.0	94 34	101.4	13 05.3	94 34	101.2	13 33.5	94 34	101.1	14 01.7	94 34	100.9	14 29.9	94 34	100.7	14 58.1	94 34	100.5	15 26.3	94 34	100.4	15 54.5	94 34	100.2	75
6	12 16.9	94 34	100.5	12 45.1	94 34	100.3	13 13.3	94 34	100.1	13 41.5	94 34	99.9	14 09.7	94 34	99.8	14 37.9	94 34	99.6	15 06.1	94 34	99.4	15 34.2	94 34	99.2	6
7	11 56.7	94 34	99.5	12 24.9	94 34	99.3	12 53.1	94 34	99.2	13 21.3	94 34	99.0	13 49.5	94 34	98.8	14 17.6	94 34	98.6	14 45.8	94 34	98.5	15 14.0	94 34	98.3	7
8	11 36.4	94 34	98.6	12 04.6	94 34	98.4	12 32.8	94 34	98.2	13 01.0	94 34	98.0	13 29.2	94 34	97.9	13 57.3	94 34	97.7	14 25.5	94 34	97.5	14 53.6	94 34	97.3	8
9	11 16.1	94 34	97.6	11 44.3	94 34	97.4	12 12.5	94 34	97.3	12 40.6	94 34	97.1	13 08.8	94 34	96.9	13 37.0	94 34	96.7	14 05.1	94 34	96.6	14 33.2	94 34	96.4	9
80	10 55.7	94 34	96.7	11 23.9	94 34	96.5	11 52.1	94 34	96.3	12 20.3	94 34	96.1	12 48.4	94 34	96.0	13 16.6	94 34	95.8	13 44.7	94 34	95.6	14 12.8	94 34	95.4	80
1	10 35.3	94 34	95.7	11 03.5	94 34	95.5	11 31.7	94 34	95.4	11 59.8	94 34	95.2	12 28.0	94 34	95.0	12 56.1	94 34	94.8	13 24.3	94 34	94.7	13 52.4	94 34	94.5	1
2	10 14.9	94 34	94.8	10 43.1	94 34	94.6	11 11.2	94 34	94.4	11 39.4	94 34	94.2	12 07.5	94 34	94.1	12 35.7	94 34	93.9	13 03.8	94 34	93.7	13 31.9	94 34	93.5	2
3	9 54.4	94 34	93.8	10 22.6	94 34	93.7	10 50.8	94 34	93.5	11 18.9	94 34	93.3	11 47.0	94 34	93.1	12 15.2	94 34	92.9	12 43.3	94 34	92.8	13 11.4	94 34	92.6	3
4	9 34.0	94 34	92.9	10 02.1	94 34	92.7	10 30.3	94 34	92.5	10 58.4	94 34	92.4	11 26.5	94 34	92.2	11 54.7	94 34	92.0	12 22.8	94 34	91.8	12 50.9	94 34	91.6	4
85	9 13.5	94 34	91.9	9 41.6	94 34	91.8	10 09.8	94 34	91.6	10 37.9	94 34	91.4	11 06.0	94 34	91.2	11 34.2	94 34	91.1	12 02.3	94 34	90.9	12 30.4	94 34	90.7	85
6	8 52.9	94 34	91.0	9 21.1	94 34	90.8	9 49.2	94 34	90.7	10 17.4	94 34	90.5	10 45.5	94 34	90.3	11 13.6	94 34	90.1	11 41.8	94 34	89.9	12 09.9	94 34	89.8	6
7	8 32.4	94 34	90.1	9 00.6	94 34	89.9	9 28.7	94 34	89.7	9 56.9	94 34	89.5	10 25.0	94 34	89.4	10 53.1	94 34	89.2	11 21.2	94 34	89.0	11 49.4	94 34	88.8	7
8	8 11.9	94 34	89.1	8 40.1	94 34	88.9	9 08.2	94 34	88.8	9 36.3	94 34	88.6	10 04.5	94 34	88.4	10 32.6	94 34	88.2	11 00.7	94 34	88.1	11 28.9	94 34	87.9	8
9	7 51.4	94 34	88.2	8 19.5	94 34	88.0	8 47.7	94 34	87.8	9 15.8	94 34	87.7	9 44.0	94 34	87.5	10 12.1	94 34	87.3	10 40.2	94 34	87.2	11 08.4	94 34	87.0	9
90	7 30.9	94 34	87.2	7 59.0	94 34	87.1	8 27.2	94 34	86.9	8 55.3	94 34	86.7	9 23.5	94 34	86.5	9 51.6	94 34	86.4	10 19.7	94 34	86.2	10 47.9	94 34	86.0	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°
00	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0
1	11 59.8	1.0 01	179.0	11 29.8	1.0 01	179.0	10 59.8	1.0 01	179.0	10 29.8	1.0 01	179.0	9 59.8	1.0 01	179.0	9 29.8	1.0 01	179.0	8 59.8	1.0 01	179.0	8 29.8	1.0 01	179.0
2	11 59.3	1.0 02	178.0	11 29.3	1.0 02	178.0	10 59.3	1.0 02	178.0	10 29.3	1.0 02	178.0	9 59.3	1.0 02	178.0	9 29.3	1.0 01	178.0	8 59.3	1.0 01	178.0	8 29.3	1.0 01	178.0
3	11 58.4	1.0 02	177.0	11 28.4	1.0 02	177.0	10 58.4	1.0 02	177.0	10 28.4	1.0 02	177.0	9 58.4	1.0 02	177.0	9 28.4	1.0 02	177.0	8 58.4	1.0 02	177.0	8 28.4	1.0 02	177.0
4	11 57.1	1.0 03	176.0	11 27.1	1.0 03	176.0	10 57.1	1.0 03	176.0	10 27.1	1.0 03	176.0	9 57.1	1.0 03	176.0	9 27.1	1.0 03	176.0	8 57.2	1.0 03	176.0	8 27.2	1.0 03	176.0
05	11 55.5	1.0 03	174.9	11 25.5	1.0 03	175.0	10 55.5	1.0 03	175.0	10 25.5	1.0 03	175.0	9 55.5	1.0 03	175.0	9 25.5	1.0 03	175.0	8 55.6	1.0 03	175.0	8 25.6	1.0 03	175.0
6	11 53.5	1.0 04	173.9	11 23.5	1.0 04	173.9	10 53.5	1.0 04	174.0	10 23.5	1.0 04	174.0	9 53.6	1.0 04	174.0	9 23.6	1.0 04	174.0	8 53.6	1.0 04	174.0	8 23.6	1.0 04	174.1
7	11 51.1	1.0 05	172.9	11 21.2	1.0 04	172.9	10 51.2	1.0 04	173.0	10 21.2	1.0 04	173.0	9 51.2	1.0 04	173.0	9 21.3	1.0 04	173.0	8 51.3	1.0 04	173.0	8 21.3	1.0 04	173.1
8	11 48.4	1.0 05	171.9	11 18.5	1.0 05	171.9	10 48.5	1.0 05	172.0	10 18.5	1.0 05	172.0	9 48.6	1.0 05	172.0	9 18.6	1.0 05	172.0	8 48.6	1.0 05	172.1	8 18.7	1.0 05	172.1
9	11 45.4	1.0 06	170.9	11 15.4	1.0 06	170.9	10 45.4	1.0 06	171.0	10 15.5	1.0 06	171.0	9 45.5	1.0 06	171.0	9 15.6	1.0 06	171.0	8 45.6	1.0 06	171.1	8 15.7	1.0 06	171.1
10	11 41.9	1.0 06	169.9	11 12.0	1.0 06	169.9	10 42.0	1.0 06	169.9	10 12.1	1.0 06	170.0	9 42.1	1.0 06	170.0	9 12.2	1.0 06	170.0	8 42.3	1.0 06	170.1	8 12.3	1.0 06	170.1
1	11 38.1	1.0 07	168.9	11 08.2	1.0 07	168.9	10 38.3	1.0 07	168.9	10 08.3	1.0 07	169.0	9 38.4	1.0 07	169.0	9 08.5	1.0 07	169.0	8 38.5	1.0 07	169.1	8 08.6	1.0 07	169.1
2	11 34.0	1.0 08	167.9	11 04.1	1.0 07	167.9	10 34.2	1.0 07	167.9	10 04.2	1.0 07	168.0	9 34.3	1.0 07	168.0	9 04.4	1.0 07	168.1	8 34.5	1.0 07	168.1	8 04.6	1.0 07	168.1
3	11 29.5	1.0 08	166.9	10 59.6	1.0 08	166.9	10 29.7	1.0 08	166.9	9 59.8	1.0 08	167.0	9 29.9	1.0 08	167.0	9 00.0	1.0 08	167.1	8 30.1	1.0 08	167.1	8 00.2	1.0 08	167.1
4	11 24.7	1.0 09	165.9	10 54.8	1.0 09	165.9	10 24.9	1.0 09	165.9	9 55.0	1.0 09	166.0	9 25.1	1.0 09	166.0	8 55.2	1.0 09	166.1	8 25.3	1.0 08	166.1	7 55.4	1.0 08	166.2
15	11 19.5	1.0 09	164.8	10 49.6	1.0 09	164.9	10 19.7	1.0 09	164.9	9 49.9	1.0 09	165.0	9 20.0	1.0 09	165.0	8 50.1	1.0 09	165.1	8 20.2	1.0 09	165.1	7 50.3	1.0 09	165.2
6	11 14.0	1.0 10	163.8	10 44.1	1.0 10	163.9	10 14.2	1.0 10	163.9	9 44.4	1.0 10	164.0	9 14.5	1.0 10	164.0	8 44.6	1.0 10	164.1	8 14.8	1.0 10	164.1	7 44.9	1.0 10	164.2
7	11 08.1	99 10	162.8	10 38.2	99 10	162.9	10 08.4	99 10	162.9	9 38.5	99 10	163.0	9 08.7	99 10	163.0	8 38.8	99 10	163.1	8 09.0	99 10	163.1	7 39.2	99 10	163.2
8	11 01.8	99 11	161.8	10 32.0	99 11	161.9	10 02.2	99 11	161.9	9 32.4	99 11	162.0	9 02.5	99 11	162.1	8 32.7	99 11	162.1	8 02.9	99 11	162.2	7 33.0	99 11	162.2
9	10 55.3	99 12	160.8	10 25.5	99 11	160.9	9 55.7	99 11	160.9	9 25.9	99 11	161.0	8 56.0	99 11	161.1	8 26.2	99 11	161.1	7 56.4	99 11	161.2	7 26.6	99 11	161.2
20	10 48.4	99 12	159.8	10 18.6	99 12	159.9	9 48.8	99 12	160.0	9 19.0	99 12	160.0	8 49.2	99 12	160.1	8 19.4	99 12	160.1	7 49.6	99 12	160.2	7 19.8	99 12	160.2
1	10 41.1	99 13	158.8	10 11.4	99 13	158.9	9 41.6	99 13	159.0	9 11.8	99 12	159.0	8 42.1	99 12	159.1	8 12.3	99 12	159.1	7 42.5	99 12	159.2	7 12.7	99 12	159.3
2	10 33.5	99 13	157.8	10 03.8	99 13	157.9	9 34.1	99 13	158.0	9 04.3	99 13	158.0	8 34.6	99 13	158.1	8 04.8	99 13	158.2	7 35.1	99 13	158.2	7 05.3	99 13	158.3
3	10 25.6	99 14	156.8	9 55.9	99 14	156.9	9 26.2	99 14	157.0	8 56.5	99 14	157.0	8 26.7	99 14	157.1	7 57.0	99 14	157.2	7 27.3	99 13	157.2	6 57.6	99 13	157.3
4	10 17.4	99 14	155.8	9 47.7	99 14	155.9	9 18.0	99 14	156.0	8 48.3	99 14	156.0	8 18.6	99 14	156.1	7 48.9	99 14	156.2	7 19.2	99 14	156.3	6 49.5	99 14	156.3
25	10 08.8	99 15	154.8	9 39.2	99 15	154.9	9 09.5	99 15	155.0	8 39.8	99 15	155.1	8 10.1	99 15	155.1	7 40.4	99 15	155.2	7 10.8	99 15	155.3	6 41.1	99 14	155.4
6	10 00.0	99 15	153.8	9 30.3	99 15	153.9	9 00.6	99 15	154.0	8 31.0	99 15	154.1	8 01.3	99 15	154.2	7 31.7	99 15	154.2	7 02.0	99 15	154.3	6 32.4	99 15	154.4
7	9 50.7	99 16	152.9	9 21.1	99 16	152.9	8 51.5	99 16	153.0	8 21.9	99 16	153.1	7 52.2	99 16	153.2	7 22.6	99 16	153.2	6 53.0	99 16	153.3	6 23.3	99 16	153.4
8	9 41.2	99 16	151.9	9 11.6	99 16	151.9	8 42.0	99 16	152.0	8 12.4	99 16	152.1	7 42.8	99 16	152.2	7 13.2	99 16	152.3	6 43.6	99 16	152.4	6 14.0	99 16	152.4
9	9 31.4	99 17	150.9	9 01.8	99 17	151.0	8 32.2	99 17	151.0	8 02.7	99 17	151.1	7 33.1	99 17	151.2	7 03.5	99 17	151.3	6 33.9	99 17	151.4	6 04.4	99 17	151.5
30	9 21.2	98 17	149.9	8 51.7	98 17	150.0	8 22.2	98 17	150.1	7 52.6	98 17	150.1	7 23.1	99 17	150.2	6 53.5	99 17	150.3	6 24.0	99 17	150.4	5 54.4	99 17	150.5
1	9 10.8	98 18	148.9	8 41.3	98 18	149.0	8 11.8	98 18	149.1	7 42.2	98 18	149.2	7 12.7	98 18	149.3	6 43.2	98 18	149.3	6 13.7	98 18	149.4	5 44.1	98 18	149.5
2	9 00.0	98 18	147.9	8 30.6	98 18	148.0	8 01.1	98 18	148.1	7 31.6	98 18	148.2	7 02.1	98 18	148.3	6 32.6	98 18	148.4	6 03.1	98 18	148.5	5 33.6	98 18	148.6
3	8 49.0	98 19	146.9	8 19.5	98 19	147.0	7 50.1	98 19	147.1	7 20.6	98 19	147.2	6 51.1	98 19	147.3	6 21.7	98 19	147.4	5 52.2	98 19	147.5	5 22.7	98 19	147.6
4	8 37.6	98 19	145.9	8 08.2	98 19	146.0	7 38.8	98 19	146.1	7 09.3	98 19	146.2	6 39.9	98 19	146.3	6 10.5	98 19	146.4	5 41.0	98 19	146.5	5 11.6	98 19	146.6
35	8 26.0	98 20	145.0	7 56.6	98 20	145.1	7 27.2	98 20	145.2	6 57.8	98 20	145.3	6 28.4	98 20	145.4	5 59.0	98 20	145.5	5 29.6	98 20	145.6	5 00.1	98 20	145.7
6	8 14.1	98 20	144.0	7 44.7	98 20	144.1	7 15.3	98 20	144.2	6 45.9	98 20	144.3	6 16.6	98 20	144.4	5 47.2	98 20	144.5	5 17.8	98 20	144.6			
7	8 01.9	98 21	143.0	7 32.5	98 21	143.1	7 03.2	98 21	143.2	6 33.8	98 21	143.3	6 04.5	98 21	143.4	5 35.1	98 21	143.5	5 05.8	98 21	143.6			
8	7 49.4	98 21	142.0	7 20.1	98 21	142.1	6 50.7	98 21	142.2	6 21.4	98 21	142.3	5 52.1	98 21	142.4	5 22.8	98 21	142.6						
9	7 36.6	98 22	141.0	7 07.3	98 22	141.2	6 38.0	98 22	141.3	6 08.8	98 22	141.4	5 39.5	98 22	141.5	5 10.2	98 22	141.6						
40	7 23.6	98 22	140.1	6 54.3	98 22	140.2	6 25.1	98 22	140.3	5 55.8	98 22	140.4	5 26.5	98 22	140.5									
1	7 10.3	97 23	139.1	6 41.0	97 23	139.2	6 11.8	97 22	139.3	5 42.6	97 22	139.4	5 13.4	97 22	139.6									
2	6 56.7	97 23	138.1	6 27.5	97 23	138.2	5 58.3	97 23	138.4	5 29.1	97 23	138.5												
3	6 42.9	97 23	137.2	6 13.7	97 23	137.3	5 44.6	97 23	137.4	5 15.4	97 23	137.5												
4	6 28.8	97 24	136.2	5 59.7	97 24	136.3	5 30.5	97 24	136.4	5 01.4	97 24	136.5												
45	6 14.5	97 24	135.2	5 45.4	97 24	135.3	5 16.3	97 24	135.5															
6	5 59.9	97 25	134.3	5 30.8	97 25	134.4	5 01.7	97 25	134.5															
7	5 45.1	97 25	133.3	5 16.0	97 25	133.4																		
8	5 30.0	97 26	132.3	5 01.0	97 25	132.5																		
9	5 14.7	97 26	131.4																					

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°
91	7 10.4	94 34	86.3	7 38.6	94 34	86.1	8 06.7	94 34	86.0	8 34.9	94 34	85.8	9 03.0	94 34	85.6	9 31.1	94 34	85.4	9 59.3	94 34	85.3	10 27.4	94 34	85.1
2	6 49.9	94 34	85.4	7 18.1	94 34	85.2	7 46.2	94 34	85.0	8 14.4	94 34	84.9	8 42.6	94 34	84.7	9 10.7	94 34	84.5	9 38.8	94 34	84.3	10 07.0	94 34	84.2
3	6 29.5	94 34	84.4	6 57.7	94 34	84.3	7 25.8	94 34	84.1	7 54.0	94 34	83.9	8 22.1	94 34	83.7	8 50.3	94 34	83.6	9 18.4	94 34	83.4	9 46.6	94 34	83.2
4	6 09.1	94 34	83.5	6 37.3	94 34	83.3	7 05.4	94 34	83.2	7 33.6	94 34	83.0	8 01.8	94 34	82.8	8 29.9	94 34	82.6	8 58.1	94 34	82.5	9 26.2	94 34	82.3
95	5 48.7	94 34	82.6	6 16.9	94 34	82.4	6 45.1	94 34	82.2	7 13.2	94 34	82.0	7 41.4	94 34	81.9	8 09.6	94 34	81.7	8 37.8	94 34	81.5	9 05.9	94 34	81.4
6	5 28.4	94 34	81.6	5 56.6	94 34	81.5	6 24.8	94 34	81.3	6 52.9	94 34	81.1	7 21.1	94 34	80.9	7 49.3	94 34	80.8	8 17.5	94 34	80.6	8 45.7	94 34	80.4
7	5 08.1	94 34	80.7	5 36.3	94 34	80.5	6 04.5	94 34	80.4	6 32.7	94 34	80.2	7 00.9	94 34	80.0	7 29.1	94 34	79.8	7 57.3	94 34	79.7	8 25.4	94 34	79.5
8				5 16.1	94 34	79.6	5 44.3	94 34	79.4	6 12.5	94 34	79.2	6 40.7	94 34	79.1	7 08.9	94 34	78.9	7 37.1	94 34	78.7	8 05.3	94 33	78.6
9							5 24.2	94 33	78.5	5 52.4	94 33	78.3	6 20.6	94 33	78.1	6 48.8	94 33	78.0	7 17.0	94 33	77.8	7 45.2	94 33	77.6
100							5 04.1	94 33	77.6	5 32.3	94 33	77.4	6 00.5	94 33	77.2	6 28.8	94 33	77.0	6 57.0	94 33	76.9	7 25.2	94 33	76.7
1										5 12.3	94 33	76.5	5 40.6	94 33	76.3	6 08.8	94 33	76.1	6 37.0	94 33	75.9	7 05.3	94 33	75.8
2													5 20.7	94 33	75.4	5 48.9	94 33	75.2	6 17.2	94 33	75.0	6 45.4	94 33	74.8
3													5 00.9	94 33	74.4	5 29.1	94 33	74.3	5 57.4	94 33	74.1	6 25.7	94 33	73.9
4																5 09.4	94 33	73.3	5 37.7	94 33	73.2	6 06.0	94 33	73.0
105																			5 18.1	94 33	72.2	5 46.4	94 32	72.1
6																						5 27.0	94 32	71.1
7																						5 07.6	94 32	70.2

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	00
1	31 59.8	1.0 01	178.8	32 29.8	1.0 01	178.8	32 59.8	1.0 01	178.8	33 29.8	1.0 01	178.8	33 59.8	1.0 01	178.8	34 29.8	1.0 01	178.8	34 59.8	1.0 01	178.8	35 29.8	1.0 01	178.8	1
2	31 59.2	1.0 02	177.7	32 29.2	1.0 02	177.7	32 59.2	1.0 02	177.7	33 29.2	1.0 02	177.7	33 59.2	1.0 02	177.7	34 29.2	1.0 02	177.7	34 59.2	1.0 02	177.6	35 29.2	1.0 02	177.6	2
3	31 58.1	1.0 02	176.5	32 28.1	1.0 02	176.5	32 58.1	1.0 02	176.5	33 28.1	1.0 02	176.5	33 58.1	1.0 02	176.5	34 28.1	1.0 02	176.5	34 58.1	1.0 02	176.5	35 28.1	1.0 02	176.4	3
4	31 56.7	1.0 03	175.4	32 26.7	1.0 03	175.4	32 56.7	1.0 03	175.4	33 26.7	1.0 03	175.3	33 56.6	1.0 03	175.3	34 26.6	1.0 03	175.3	34 56.6	1.0 03	175.3	35 26.6	1.0 03	175.3	4
05	31 54.8	1.0 04	174.2	32 24.8	1.0 04	174.2	32 54.8	1.0 04	174.2	33 24.8	1.0 04	174.2	33 54.8	1.0 04	174.2	34 24.7	1.0 04	174.1	34 54.7	1.0 04	174.1	35 24.7	1.0 04	174.1	05
6	31 52.6	1.0 04	173.1	32 22.5	1.0 04	173.1	32 52.5	1.0 04	173.0	33 22.5	1.0 05	173.0	33 52.5	1.0 05	173.0	34 22.4	1.0 05	173.0	34 52.4	1.0 05	172.9	35 22.4	1.0 05	172.9	6
7	31 49.9	1.0 05	171.9	32 19.9	1.0 05	171.9	32 49.8	1.0 05	171.9	33 19.8	1.0 05	171.8	33 49.8	1.0 05	171.8	34 19.7	1.0 05	171.8	34 49.7	1.0 05	171.8	35 19.6	1.0 05	171.7	7
8	31 46.8	1.0 06	170.8	32 16.8	1.0 06	170.8	32 46.7	1.0 06	170.7	33 16.7	1.0 06	170.7	33 46.6	1.0 06	170.7	34 16.6	1.0 06	170.6	34 46.5	1.0 06	170.6	35 16.5	1.0 06	170.5	8
9	31 43.3	1.0 06	169.6	32 13.3	1.0 06	169.6	32 43.2	1.0 07	169.6	33 13.1	1.0 07	169.5	33 43.1	1.0 07	169.5	34 13.0	1.0 07	169.4	34 43.0	1.0 07	169.4	35 12.9	1.0 07	169.4	9
10	31 39.4	1.0 07	168.5	32 09.4	1.0 07	168.4	32 39.3	1.0 07	168.4	33 09.2	1.0 07	168.4	33 39.1	1.0 07	168.3	34 09.1	1.0 07	168.3	34 39.0	1.0 07	168.2	35 08.9	1.0 07	168.2	10
1	31 35.1	1.0 08	167.3	32 05.1	1.0 08	167.3	32 35.0	1.0 08	167.3	33 04.9	1.0 08	167.2	33 34.8	1.0 08	167.2	34 04.7	1.0 08	167.1	34 34.6	1.0 08	167.1	35 04.5	1.0 08	167.0	1
2	31 30.4	1.0 08	166.2	32 00.3	1.0 08	166.2	32 30.2	1.0 09	166.1	33 00.1	1.0 09	166.1	33 30.0	1.0 09	166.0	33 59.9	1.0 09	165.9	34 29.8	1.0 09	165.9	34 59.7	1.0 09	165.8	2
3	31 25.4	1.0 09	165.1	31 55.2	1.0 09	165.0	32 25.1	1.0 09	165.0	32 55.0	1.0 09	164.9	33 24.9	1.0 09	164.8	33 54.7	1.0 09	164.8	34 24.6	1.0 09	164.7	34 54.5	1.0 09	164.7	3
4	31 19.9	1.0 10	163.9	31 49.7	1.0 10	163.9	32 19.6	1.0 10	163.8	32 49.4	1.0 10	163.7	33 19.3	1.0 10	163.7	33 49.1	1.0 10	163.6	34 19.0	99 10	163.6	34 48.8	99 10	163.5	4
15	31 14.0	99 10	162.8	31 43.8	99 10	162.7	32 13.7	99 10	162.7	32 43.5	99 11	162.6	33 13.3	99 11	162.5	33 43.2	99 11	162.5	34 13.0	99 11	162.4	34 42.8	99 11	162.3	15
6	31 07.7	99 11	161.6	31 37.5	99 11	161.6	32 07.3	99 11	161.5	32 37.2	99 11	161.4	33 07.0	99 11	161.4	33 36.8	99 11	161.3	34 06.6	99 11	161.2	34 36.4	99 11	161.2	6
7	31 01.1	99 12	160.5	31 30.8	99 12	160.4	32 00.6	99 12	160.4	32 30.4	99 12	160.3	33 00.2	99 12	160.2	33 30.0	99 12	160.2	33 59.8	99 12	160.1	34 29.6	99 12	160.0	7
8	30 54.0	99 12	159.4	31 23.8	99 12	159.3	31 53.6	99 12	159.2	32 23.3	99 12	159.2	32 53.1	99 13	159.1	33 22.8	99 13	159.0	33 52.6	99 13	158.9	34 22.4	99 13	158.9	8
9	30 46.6	99 13	158.2	31 16.3	99 13	158.2	31 46.1	99 13	158.1	32 15.8	99 13	158.0	32 45.6	99 13	157.9	33 15.3	99 13	157.9	33 45.0	99 13	157.8	34 14.8	99 13	157.7	9
20	30 38.8	99 14	157.1	31 08.5	99 14	157.0	31 38.2	99 14	157.0	32 08.0	99 14	156.9	32 37.7	99 14	156.8	33 07.4	99 14	156.7	33 37.1	99 14	156.6	34 06.8	99 14	156.5	20
1	30 30.6	99 14	156.0	31 00.3	99 14	155.9	31 30.0	99 14	155.8	31 59.7	99 14	155.7	32 29.4	99 14	155.7	32 59.1	99 14	155.6	33 28.7	99 14	155.5	33 58.4	99 15	155.4	1
2	30 22.1	99 15	154.9	30 51.8	99 15	154.8	31 21.4	99 15	154.7	31 51.1	99 15	154.6	32 20.7	99 15	154.5	32 50.4	99 15	154.4	33 20.0	99 15	154.3	33 49.7	99 15	154.2	2
3	30 13.2	99 15	153.7	30 42.8	99 15	153.7	31 12.5	99 16	153.6	31 42.1	99 16	153.5	32 11.7	99 16	153.4	32 41.4	99 16	153.3	33 11.0	99 16	153.2	33 40.6	99 16	153.1	3
4	30 04.0	99 16	152.6	30 33.6	99 16	152.5	31 03.2	99 16	152.4	31 32.8	99 16	152.3	32 02.4	99 16	152.3	32 32.0	99 16	152.2	33 01.5	99 16	152.1	33 31.1	99 16	152.0	4
25	29 54.3	99 17	151.5	30 23.9	99 17	151.4	30 53.5	99 17	151.3	31 23.1	99 17	151.2	31 52.6	99 17	151.1	32 22.2	99 17	151.0	32 51.7	99 17	150.9	33 21.3	98 17	150.8	25
6	29 44.4	98 17	150.4	30 13.9	98 17	150.3	30 43.5	98 17	150.2	31 13.0	98 17	150.1	31 42.5	98 17	150.0	32 12.1	98 17	149.9	32 41.6	98 18	149.8	33 11.1	98 18	149.7	6
7	29 34.1	98 18	149.3	30 03.6	98 18	149.2	30 33.1	98 18	149.1	31 02.6	98 18	149.0	31 32.1	98 18	148.9	32 01.6	98 18	148.8	32 31.1	98 18	148.7	33 00.6	98 18	148.6	7
8	29 23.4	98 18	148.2	29 52.9	98 18	148.1	30 22.4	98 18	148.0	30 51.9	98 18	147.9	31 21.3	98 19	147.8	31 50.8	98 19	147.7	32 20.3	98 19	147.5	32 49.7	98 19	147.4	8
9	29 12.4	98 19	147.1	29 41.9	98 19	147.0	30 11.3	98 19	146.9	30 40.8	98 19	146.8	31 10.2	98 19	146.6	31 39.6	98 19	146.5	32 09.1	98 19	146.4	32 38.5	98 19	146.3	9
30	29 01.1	98 19	146.0	29 30.6	98 19	145.9	30 00.0	98 20	145.8	30 29.4	98 20	145.7	30 58.8	98 20	145.5	31 28.2	98 20	145.4	31 57.6	98 20	145.3	32 26.9	98 20	145.2	30
1	28 49.5	98 20	144.9	29 18.9	98 20	144.8	29 48.3	98 20	144.7	30 17.6	98 20	144.5	30 47.0	98 20	144.4	31 16.4	98 20	144.3	31 45.7	98 20	144.2	32 15.1	98 20	144.1	1
2	28 37.5	98 20	143.8	29 06.9	98 20	143.7	29 36.2	98 21	143.6	30 05.6	98 21	143.4	30 34.9	98 21	143.3	31 04.2	98 21	143.2	31 33.5	98 21	143.1	32 02.9	98 21	143.0	2
3	28 25.3	98 21	142.7	28 54.6	98 21	142.6	29 23.9	98 21	142.5	29 53.2	98 21	142.4	30 22.5	98 21	142.2	30 51.8	98 21	142.1	31 21.1	98 21	142.0	31 50.3	98 21	141.8	3
4	28 12.7	98 22	141.6	28 42.0	98 22	141.5	29 11.2	98 22	141.4	29 40.5	98 22	141.3	30 09.8	98 22	141.1	30 39.0	98 22	141.0	31 08.3	97 22	140.9	31 37.5	97 22	140.7	4
35	27 59.8	98 22	140.6	28 29.0	97 22	140.4	28 58.3	97 22	140.3	29 27.5	97 22	140.2	29 56.7	97 22	140.0	30 25.9	97 22	139.9	30 55.2	97 22	139.8	31 24.4	97 22	139.6	35
6	27 46.6	97 22	139.5	28 15.8	97 23	139.3	28 45.0	97 23	139.2	29 14.2	97 23	139.1	29 43.4	97 23	138.9	30 12.6	97 23	138.8	30 41.8	97 23	138.7	31 10.9	97 23	138.5	6
7	27 33.1	97 23	138.4	28 02.3	97 23	138.3	28 31.5	97 23	138.1	29 00.6	97 23	138.0	29 29.8	97 23	137.9	29 58.9	97 23	137.7	30 28.1	97 23	137.6	30 57.2	97 23	137.5	7
8	27 19.4	97 23	137.3	27 48.5	97 24	137.2	28 17.6	97 24	137.1	28 46.8	97 24	136.9	29 15.9	97 24	136.8	29 45.0	97 24	136.6	30 14.1	97 24	136.5	30 43.2	97 24	136.4	8
9	27 05.3	97 24	136.3	27 34.4	97 24	136.1	28 03.5	97 24	136.0	28 32.6	97 24	135.8	29 01.7	97 24	135.7	29 30.8	97 24	135.6	29 59.8	97 24	135.4	30 28.9	97 24	135.3	9
40	26 51.0	97 24	135.2	27 20.0	97 24	135.1	27 49.1	97 24	134.9	28 18.2	97 24	134.8	28 47.2	97 25	134.6	29 16.2	97 25	134.5	29 45.3	97 25	134.3	30 14.3	97 25	134.2	40
1	26 36.4	97 25	134.1	27 05.4	97 25	134.0	27 34.4	97 25	133.8	28 03.5	97 25	133.7	28 32.5	97 25	133.6	29 01.5	97 25	133.4	29 30.5	97 25	133.3	29 59.4	97 25	133.1	1
2	26 21.5	97 25	133.1	26 50.5	97 25	132.9	27 19.5	97 25	132.8	27 48.5	97 25	132.6	28 17.5	97 25	132.5	28 46.4	97 26	132.3	29 15.4	96 26	132.2	29 44.3	96 26	132.0	2
3	26 06.4	97 26	132.0	26 35.4	97 26	131.9	27 04.3	97 26	131.7	27 33.3	96 26	131.6	28 02.2	96 26	131.4	28 31.1	96 26	131.3	29 00.1	96 26	131.1	29 29.0	96 26	131.0	3
4	25 51.0	96 26	130.9	26 20.0	96 26	130.8	26 48.9	96 26	130.7	27 17.8	96 26	130.5	27 46.7	96 26	130.4	28 15.6	96 26	130.2	28 44.5	96 26	130.1	29 13.4	96 26	129.9	4
45	25 35.4	96 26	129.9	26 04.3	96 26	129.8	26 33.2	96 27	129.6	27 02.1	96 27	129.5	27 30.9	96 27	129.3	27 59.8	96 27	129.2	28 28.7	96 27	129.0	28 57.5	96 27	128.9	45
6	25 19.6	96 27	128.9	25 48.4	96 27	128.7	26 17.3	96 27	128.6	26 46.1	96 27	128.4	27 15.0	96 27	128.3	27 43.8	96 27	128.1	28 12.6	96 27	128.0	28 41.4	96 27	127.8	6
7	25 03.5	96 27	127.8	25 32.3	96 27	127.7	26 01.1	96 27	127.5	26 29.9	96 27	127.4	26 58.7	96 27	127.2	27 27.5	96 27	127.1	27 56.3	96 28	126.9	28 25.1	96 28	126.7	7
8	24 47.2	96 28	126.8	25 15.9	96 28	126.7	25 44.7	96 28	126.5	26 13.5	96 28	126.3	26 42.3	96 28	126.2	27 11.0	96 28	126.0	27 39.8	96 28	125.9	28 08.5	96 28	125.7	8
9	24 30.6	96 28	125.8	24 59.4	96 28	125.6	25 28.1	96 28	125.5	25 56.9	96 28	125.3	26 25.6	96 28	125.1	26 54.3	96 28	125.0	27 23.0	96 28	124.8	27 51.7	96 28	124.7	9
50	24 13.9	96 28	124.7	24 42.6	96 28	124.6	25 11.3	96 28	124.4	25 40.0	96 28	124.3	26 08.7	96 28	124.1	26 37.4	96 29	123.9	27 06.1	96 29	123.8	27 34.7	96 29	123.6	50
1	23 56.9	96 29	123.7	24 25.6	96 29	123.6	24 54.3	96 29	123.4	25 23.0	96 29	123.2	25 51.6	96 29	123.1	26 20.3	96 29	122.9	26 48.9	95 29	122.7	27 17.6	95 29	122.6	1
2	23 39.7	96 29	122.7	24 08.4	96 29	122.5	24 37.0	96 29	122.4	25 05.7	96 29	122.2	25 34.3	95 29	122.0	26 02.9	95 29	121.9	26 31.6	95 29	121.7	27 00.2	95 29	121.5	2
3	23 22.4	95 29	121.7	23 51.0	96 29	121.5	24 19.6	95 29	121.4	24 48.2	95 29	121.2	25 16.8	95 29	121.0	25 45.4	95 30	120.9	26 14.0	95 30	120.7	26 42.6	95 30	120.5	3
4	23 04.8	95 30	120.7	23 33.4	95 30	120.5	24 02.0	95 30	120.3	24 30.6	95 30	120.2	24 59.2	95 30	120.0	25 27.7	95 30	119.8	25 56.3	95 30	119.7	26 24.8	95 30	119.5	4
55	22 47.0	95 30	119.6	23 15.6	95 30	119.5	23 44.2	95 30	119.3	24 12.7	95 30	119.1	24 41.3	95 30	119.0	25 09.8	95 30	118.8	25 38.3	95 30	118.6	26 06.9	95 30	118.5	55
6	22 29.1	95 30	118.6	22 57.7	95 30	118.5	23 26.2	95 30	118.3	23 54.7	95 30	118.1	24 23.3	95 30	118.0	24 51.8	95 30	117.8	25 20.2	95 30	117.6	25 48.7	95 30	117.4	6
7	22 11.0	95 30	117.6	22 39.6	95 30	117.5	23 08.1	95 31	117.3	23 36.6	95 31	117.1	24 05.0	95 31	117.0	24 33.5	95 31	116.8	25 02.0	95 31	116.6	25 30.4	95 31	116.4	7
8	21 52.8	95 31	116.6	22 21.3	95 31	116.5	22 49.7	95 31	116.3	23 18.2	95 31	116.1	23 46.7	95 31	115.9	24 15.1	95 31	115.8	24 43.6	95 31	115.6	25 12.0	95 31	115.4	8
9	21 34.3	95 31	115.6	22 02.8	95 31	115.5	22 31.3	95 31	115.3	22 59.7	95 31	115.1	23 28.1	95 31	114.9	23 56.6	95 31	114.8	24 25.0	95 31	114.6	24 53.4	95 31	114.4	9
60	21 15.8	95 31	114.6	21 44.2	95 31	114.5	22 12.6	95 31	114.3	22 41.1	95 31	114.1	23 09.5	95 31	113.9	23 37.9	95 31	113.8	24 06.2	95 31	113.6	24 34.6	95 32	113.4	60
1	20 57.0	95 31	113.6	21 25.5	95 31	113.5	21 53.9	95 32	113.3	22 22.3	95 32	113.1	22 50.6	95 32	112.9	23 19.0	95 32	112.8	23 47.4	95 32	112.6	24 15.7	94 32	112.4	1
2	20 38.2	95 32	112.7	21 06.6	95 32	112.5	21 34.9	95 32	112.3	22 03.3	95 32	112.1	22 31.7	95 32	112.0	23 00.0	94 32	111.8	23 28.3	94 32	111.6	23 56.7	94 32	111.4	2
3	20 19.2	95 32	111.7	20 47.5	95 32	111.5	21 15.9	95 32	111.3	21 44.2	94 32	111.1	22 12.6	94 32	111.0	22 40.9	94 32	110.8	23 09.2	94 32	110.6	23 37.5	94 32	110.4	3
4	20 00.0	94 32	110.7	20 28.4	94 32	110.5	20 56.7	94 32	110.3	21 25.0	94 32	110.2	21 53.3	94 32	110.0	22 21.6	94 32	109.8	22 49.9	94 32	109.6	23 18.2	94 32	109.4	4
65	19 40.8	94 32	109.7	20 09.1	94 32	109.5	20 37.4	94 32	109.3	21 05.7	94 32	109.2	21 34.0	94 32	109.0	22 02.3	94 32	108.8	22 30.5	94 33	108.6	22 58.8	94 33	108.4	65
6	19 21.4	94 32	108.7	19 49.7	94 33	108.5	20 18.0	94 33	108.4	20 46.3	94 33	108.2	21 14.5	94 33	108.0	21 42.8	94 33	107.8	22 11.0	94 33	107.6	22 39.3	94 33	107.5	6
7	19 01.9	94 33	107.7	19 30.2	94 33	107.6	19 58.5	94 33	107.4	20 26.7	94 33	107.2	20 55.0	94 33	107.0	21 23.2	94 33	106.8	21 51.4	94 33	106.7	22 19.6	94 33	106.5	7
8	18 42.3	94 33	106.8	19 10.6	94 33	106.6	19 38.8	94 33	106.4	20 07.1	94 33	106.2	20 35.3	94 33	106.0	21 03.5	94 33	105.9	21 31.7	94 33	105.7	21 59.9	94 33	105.5	8
9	18 22.6	94 33	105.8	18 50.9	94 33	105.6	19 19.1	94 33	105.4	19 47.3	94 33	105.3	20 15.5	94 33	105.1	20 43.7	94 33	104.9	21 11.9	94 33	104.7	21 40.1	94 33	104.5	9
70	18 02.8	94 33	104.8	18 31.0	94 33	104.6	18 59.3	94 33	104.5	19 27.5	94 33	104.3	19 55.7	94 33	104.1	20 23.9	94 33	103.9	20 52.0	94 33	103.7	21 20.2	94 33	103.6	70
1	17 42.9	94 33	103.9	18 11.1	94 33	103.7	18 39.3	94 33	103.5	19 07.5	94 33	103.3	19 35.7	94 33	103.1	20 03.9	94 33	103.0	20 32.1	94 33	102.8	21 00.2	94 33	102.6	1
2	17 23.0	94 33	102.9	17 51.2	94 33	102.7	18 19.4	94 33	102.5	18 47.5	94 33	102.4	19 15.7	94 34	102.2	19 43.9	94 34	102.0	20 12.0	94 34	101.8	20 40.1	94 34	101.6	2
3	17 02.9	94 34	101.9	17 31.1	94 34	101.7	17 59.3	94 34	101.6	18 27.4	94 34	101.4	18 55.6	94 34	101.2	19 23.7	94 34	101.0	19 51.9	94 34	100.8	20 20.0	94 34	100.7	3
4	16 42.8	94 34	101.0	17 11.0	94 34	100.8	17 39.1	94 34	100.6	18 07.3	94 34	100.4	18 35.4	94 34	100.2	19 03.6	94 34	100.1	19 31.7	94 34	99.9	19 59.8	94 34	99.7	4
75	16 22.6	94 34	100.0	16 50.8	94 34	99.8	17 18.9	94 34	99.7	17 47.1	94 34	99.5	18 15.2	94 34	99.3	18 43.3	94 34	99.1	19 11.4	94 34	98.9	19 39.5	94 34	98.7	75
6	16 02.4	94 34	99.1	16 30.5	94 34	98.9	16 58.7	94 34	98.7	17 26.8	94 34	98.5	17 54.9	94 34	98.3	18 23.1	94 34	98.1	18 51.2	94 34	98.0	19 19.2	94 34	97.8	6
7	15 42.1	94 34	98.1	16 10.2	94 34	97.9	16 38.4	94 34	97.7	17 06.5	94 34	97.6	17 34.6	94 34	97.4	18 02.7	94 34	97.2	18 30.8	94 34	97.0	18 58.9	94 34	96.8	7
8	15 21.8	94 34	97.1	15 49.9	94 34	97.0	16 18.0	94 34	96.8	16 46.1	94 34	96.6	17 14.2	94 34	96.4	17 42.3	94 34	96.2	18 10.4	94 34	96.1	18 38.5	94 34	95.9	8
9	15 01.4	94 34	96.2	15 29.5	94 34	96.0	15 57.6	94 34	95.8	16 25.7	94 34	95.7	16 53.8	94 34	95.5	17 21.9	94 34	95.3	17 50.0	94 34	95.1	18 18.1	94 34	94.9	9
80	14 41.0	94 34	95.2	15 09.1	94 34	95.1	15 37.2	94 34	94.9	16 05.3	94 34	94.7	16 33.4	94 34	94.5	17 01.5	94 34	94.3	17 29.5	94 34	94.2	17 57.6	94 34	94.0	80
1	14 20.5	94 34	94.3	14 48.6	94 34	94.1	15 16.7	94 34	93.9	15 44.8	94 34	93.8	16 12.9	94 34	93.6	16 41.0	94 34	93.4	17 09.1	94 34	93.2	17 37.1	94 34	93.0	1
2	14 00.0	94 34	93.4	14 28.1	94 34	93.2	14 56.2	94 34	93.0	15 24.3	94 34	92.8	15 52.4	94 34	92.6	16 20.5	94 34	92.4	16 48.6	94 34	92.3	17 16.6	93 34	92.1	2
3	13 39.5	94 34	92.4	14 07.7	94 34	92.2	14 35.7	94 34	92.1	15 03.8	94 34	91.9	15 31.9	94 34	91.7	16 00.0	94 34	91.5	16 28.1	94 34	91.3	16 56.1	93 34	91.1	3
4	13 19.0	94 34	91.5	13 47.1	94 34	91.3	14 15.2	94 34	91.1	14 43.3	94 34	90.9	15 11.4	94 34	90.7	15 39.5	94 34	90.6	16 07.5	94 34	90.4	16 35.6	93 34	90.2	4
85	12 58.5	94 34	90.5	13 26.6	94 34	90.3	13 54.7	94 34	90.2	14 22.8	94 34	90.0	14 50.9	94 34	89.8	15 19.0	94 34	89.6	15 47.0	94 34	89.4	16 15.1	93 34	89.3	85
6	12 38.0	94 34	89.6	13 06.1	94 34	89.4	13 34.2	94 34	89.2	14 02.3	94 34	89.0	14 30.4	94 34	88.9	14 58.4	94 34	88.7	15 26.5	94 34	88.5	15 54.5	93 34	88.3	6
7	12 17.5	94 34	88.7	12 45.6	94 34	88.5	13 13.7	94 34	88.3	13 41.8	94 34	88.1	14 09.8	94 34	87.9	14 37.9	94 34	87.7	15 06.0	94 34	87.6	15 34.0	94 34	87.4	7
8	11 57.0	94 34	87.7	12 25.1	94 34	87.5	12 53.2	94 34	87.4	13 21.3	94 34	87.2	13 49.3	94 34	87.0	14 17.4	94 34	86.8	14 45.5	94 34	86.6	15 13.5	94 34	86.4	8
9	11 36.5	94 34	86.8	12 04.6	94 34	86.6	12 32.7	94 34	86.4	13 00.8	94 34	86.2	13 28.9	94 34	86.1	13 56.9	94 34	85.9	14 25.0	94 34	85.7	14 53.1	94 34	85.5	9
90	11 16.0	94 34	85.8	11 44.1	94 34	85.7	12 12.2	94 34	85.5	12 40.3	94 34	85.3	13 08.4	94 34	85.1	13 36.5	94 34	84.9	14 04.6	94 34	84.8	14 32.6	94 34	84.6	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0				00
1	7 59.8	1.0 01	179.0	7 29.8	1.0 01	179.0	6 59.8	1.0 01	179.0	6 29.8	1.0 01	179.0	5 59.8	1.0 01	179.0	5 29.8	1.0 01	179.0							1
2	7 59.3	1.0 02	178.0	7 29.3	1.0 01	178.0	6 59.3	1.0 01	178.0	6 29.3	1.0 01	178.0	5 59.3	1.0 01	178.0	5 29.3	1.0 01	178.1							2
3	7 58.4	1.0 02	177.0	7 28.4	1.0 02	177.0	6 58.4	1.0 02	177.1	6 28.4	1.0 02	177.1	5 58.4	1.0 02	177.1	5 28.4	1.0 02	177.1							3
4	7 57.2	1.0 03	176.0	7 27.2	1.0 03	176.1	6 57.2	1.0 03	176.1	6 27.2	1.0 03	176.1	5 57.2	1.0 03	176.1	5 27.2	1.0 03	176.1							4
05	7 55.6	1.0 03	175.1	7 25.6	1.0 03	175.1	6 55.6	1.0 03	175.1	6 25.6	1.0 03	175.1	5 55.6	1.0 03	175.1	5 25.6	1.0 03	175.1							05
6	7 53.6	1.0 04	174.1	7 23.7	1.0 04	174.1	6 53.7	1.0 04	174.1	6 23.7	1.0 04	174.1	5 53.7	1.0 04	174.1	5 23.7	1.0 04	174.2							6
7	7 51.3	1.0 04	173.1	7 21.4	1.0 04	173.1	6 51.4	1.0 04	173.1	6 21.4	1.0 04	173.2	5 51.4	1.0 04	173.2	5 21.5	1.0 04	173.2							7
8	7 48.7	1.0 05	172.1	7 18.7	1.0 05	172.1	6 48.8	1.0 05	172.2	6 18.8	1.0 05	172.2	5 48.8	1.0 05	172.2	5 18.9	1.0 05	172.2							8
9	7 45.7	1.0 06	171.1	7 15.8	1.0 06	171.1	6 45.8	1.0 06	171.2	6 15.8	1.0 06	171.2	5 45.9	1.0 06	171.2	5 15.9	1.0 05	171.3							9
10	7 42.4	1.0 06	170.1	7 12.4	1.0 06	170.2	6 42.5	1.0 06	170.2	6 12.5	1.0 06	170.2	5 42.6	1.0 06	170.3	5 12.6	1.0 06	170.3							10
1	7 38.7	1.0 07	169.1	7 08.7	1.0 07	169.2	6 38.8	1.0 07	169.2	6 08.9	1.0 07	169.2	5 38.9	1.0 07	169.3	5 09.0	1.0 07	169.3							1
2	7 34.6	1.0 07	168.2	7 04.7	1.0 07	168.2	6 34.8	1.0 07	168.2	6 04.9	1.0 07	168.3	5 34.9	1.0 07	168.3	5 05.0	1.0 07	168.3							2
3	7 30.3	1.0 08	167.2	7 00.3	1.0 08	167.2	6 30.4	1.0 08	167.3	6 00.5	1.0 08	167.3	5 30.6	1.0 08	167.3	5 00.7	1.0 08	167.4							3
4	7 25.5	1.0 08	166.2	6 55.6	1.0 08	166.2	6 25.7	1.0 08	166.3	5 55.8	1.0 08	166.3	5 25.9	1.0 08	166.4										4
15	7 20.5	1.0 09	165.2	6 50.6	1.0 09	165.3	6 20.7	1.0 09	165.3	5 50.8	1.0 09	165.3	5 20.9	1.0 09	165.4										15
6	7 15.0	1.0 10	164.2	6 45.2	1.0 10	164.3	6 15.3	1.0 10	164.3	5 45.5	1.0 09	164.4	5 15.6	1.0 09	164.4										6
7	7 09.3	99 10	163.2	6 39.5	99 10	163.3	6 09.6	99 10	163.3	5 39.8	99 10	163.4	5 09.9	99 10	163.5										7
8	7 03.2	99 11	162.3	6 33.4	99 11	162.3	6 03.6	99 11	162.4	5 33.7	99 11	162.4	5 03.9	99 11	162.5										8
9	6 56.8	99 11	161.3	6 27.0	99 11	161.3	5 57.2	99 11	161.4	5 27.4	99 11	161.5													9
20	6 50.1	99 12	160.3	6 20.3	99 12	160.4	5 50.5	99 12	160.4	5 20.7	99 12	160.5													20
1	6 43.0	99 12	159.3	6 13.2	99 12	159.4	5 43.4	99 12	159.5	5 13.7	99 12	159.5													1
2	6 35.6	99 13	158.4	6 05.8	99 13	158.4	5 36.1	99 13	158.5	5 06.3	99 13	158.5													2
3	6 27.8	99 13	157.4	5 58.1	99 13	157.4	5 28.4	99 13	157.5																3
4	6 19.8	99 14	156.4	5 50.1	99 14	156.5	5 20.4	99 14	156.5																4
25	6 11.4	99 14	155.4	5 41.7	99 14	155.5	5 12.0	99 14	155.6																25
6	6 02.7	99 15	154.5	5 33.1	99 15	154.5	5 03.4	99 15	154.6																6
7	5 53.7	99 16	153.5	5 24.1	99 16	153.6																			7
8	5 44.4	99 16	152.5	5 14.8	99 16	152.6																			8
9	5 34.8	99 17	151.5	5 05.2	99 16	151.6																			9
30	5 24.8	99 17	150.6																						30
1	5 14.6	98 18	149.6																						1
2	5 04.1	98 18	148.6																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	10 55.5	94 34	84.9	11 23.7	94 34	84.7	11 51.8	94 34	84.6	12 19.9	94 34	84.4	12 48.0	94 34	84.2	13 16.1	94 34	84.0	13 44.1	94 34	83.8	14 12.2	94 34	83.7	91
2	10 35.1	94 34	84.0	11 03.2	94 34	83.8	11 31.4	94 34	83.6	11 59.5	94 34	83.4	12 27.6	94 34	83.3	12 55.7	94 34	83.1	13 23.8	94 34	82.9	13 51.8	94 34	82.7	2
3	10 14.7	94 34	83.0	10 42.9	94 34	82.9	11 11.0	94 34	82.7	11 39.1	94 34	82.5	12 07.2	94 34	82.3	12 35.3	94 34	82.2	13 03.4	94 34	82.0	13 31.5	94 34	81.8	3
4	9 54.4	94 34	82.1	10 22.5	94 34	81.9	10 50.6	94 34	81.8	11 18.8	94 34	81.6	11 46.9	94 34	81.4	12 15.0	94 34	81.2	12 43.1	94 34	81.0	13 11.2	94 34	80.9	4
95	9 34.1	94 34	81.2	10 02.2	94 34	81.0	10 30.4	94 34	80.8	10 58.5	94 34	80.6	11 26.6	94 34	80.5	11 54.8	94 34	80.3	12 22.9	94 34	80.1	12 51.0	94 34	79.9	95
6	9 13.8	94 34	80.2	9 42.0	94 34	80.1	10 10.1	94 34	79.9	10 38.3	94 34	79.7	11 06.4	94 34	79.5	11 34.6	94 34	79.4	12 02.7	94 34	79.2	12 30.8	94 34	79.0	6
7	8 53.6	94 34	79.3	9 21.8	94 34	79.1	9 50.0	94 34	79.0	10 18.1	94 34	78.8	10 46.3	94 33	78.6	11 14.4	94 33	78.4	11 42.6	94 33	78.3	12 10.7	94 33	78.1	7
8	8 33.5	94 33	78.4	9 01.7	94 33	78.2	9 29.9	94 33	78.0	9 58.0	94 33	77.9	10 26.2	94 33	77.7	10 54.4	94 33	77.5	11 22.5	94 33	77.3	11 50.7	94 33	77.2	8
9	8 13.4	94 33	77.5	8 41.6	94 33	77.3	9 09.8	94 33	77.1	9 38.0	94 33	76.9	10 06.2	94 33	76.8	10 34.4	94 33	76.6	11 02.5	94 33	76.4	11 30.7	94 33	76.2	9
100	7 53.4	94 33	76.5	8 21.6	94 33	76.4	8 49.8	94 33	76.2	9 18.0	94 33	76.0	9 46.2	94 33	75.8	10 14.4	94 33	75.7	10 42.6	94 33	75.5	11 10.8	94 33	75.3	100
1	7 33.5	94 33	75.6	8 01.7	94 33	75.4	8 30.0	94 33	75.3	8 58.2	94 33	75.1	9 26.4	94 33	74.9	9 54.6	94 33	74.7	10 22.8	94 33	74.6	10 51.0	94 33	74.4	1
2	7 13.7	94 33	74.7	7 41.9	94 33	74.5	8 10.2	94 33	74.3	8 38.4	94 33	74.2	9 06.6	94 33	74.0	9 34.8	94 33	73.8	10 03.1	94 33	73.6	10 31.3	94 33	73.5	2
3	6 53.9	94 33	73.7	7 22.2	94 33	73.6	7 50.4	94 33	73.4	8 18.7	94 33	73.2	8 46.9	94 33	73.1	9 15.2	94 33	72.9	9 43.4	94 33	72.7	10 11.6	94 33	72.6	3
4	6 34.3	94 33	72.8	7 02.6	94 33	72.6	7 30.8	94 33	72.5	7 59.1	94 32	72.3	8 27.4	94 32	72.1	8 55.6	94 32	72.0	9 23.9	94 32	71.8	9 52.1	94 32	71.6	4
105	6 14.7	94 32	71.9	6 43.0	94 32	71.7	7 11.3	94 32	71.6	7 39.6	94 32	71.4	8 07.9	94 32	71.2	8 36.1	94 32	71.0	9 04.4	94 32	70.9	9 32.7	94 32	70.7	105
6	5 55.3	94 32	71.0	6 23.6	94 32	70.8	6 51.9	94 32	70.6	7 20.2	94 32	70.5	7 48.5	94 32	70.3	8 16.8	94 32	70.1	8 45.1	94 32	70.0	9 13.4	94 32	69.8	6
7	5 35.9	94 32	70.0	6 04.3	94 32	69.9	6 32.6	94 32	69.7	7 00.9	94 32	69.5	7 29.2	94 32	69.4	7 57.6	94 32	69.2	8 25.9	94 32	69.0	8 54.2	94 32	68.9	7
8	5 16.7	95 32	69.1	5 45.0	95 32	68.9	6 13.4	94 32	68.8	6 41.7	94 32	68.6	7 10.1	94 32	68.4	7 38.4	94 32	68.3	8 06.8	94 32	68.1	8 35.1	94 32	67.9	8
9				5 26.0	95 32	68.0	5 54.3	95 32	67.9	6 22.7	95 32	67.7	6 51.1	95 32	67.5	7 19.4	95 31	67.4	7 47.8	95 31	67.2	8 16.1	95 31	67.0	9
110				5 07.0	95 31	67.1	5 35.4	95 31	66.9	6 03.8	95 31	66.8	6 32.2	95 31	66.6	7 00.6	95 31	66.4	7 28.9	95 31	66.3	7 57.3	95 31	66.1	110
1							5 16.6	95 31	66.0	5 45.0	95 31	65.8	6 13.4	95 31	65.7	6 41.8	95 31	65.5	7 10.2	95 31	65.4	7 38.6	95 31	65.2	1
2										5 26.3	95 31	64.9	5 54.8	95 31	64.8	6 23.2	95 31	64.6	6 51.6	95 31	64.4	7 20.1	95 31	64.3	2
3										5 07.8	95 31	64.0	5 36.3	95 31	63.8	6 04.7	95 31	63.7	6 33.2	95 30	63.5	7 01.6	95 30	63.3	3
4													5 17.9	95 30	62.9	5 46.4	95 30	62.7	6 14.9	95 30	62.6	6 43.4	95 30	62.4	4
115																5 28.3	95 30	61.8	5 56.8	95 30	61.7	6 25.3	95 30	61.5	115
6																5 10.2	95 30	60.9	5 38.8	95 30	60.7	6 07.3	95 30	60.6	6
7																			5 21.0	95 29	59.8	5 49.5	95 29	59.7	7
8																			5 03.3	95 29	58.9	5 31.9	95 29	58.7	8
9																						5 14.4	95 29	57.8	9

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat 74°

La 75

La 76

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	00
1	35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8	1
2	35 59.1	1.0 02	177.6	36 29.1	1.0 02	177.6	36 59.1	1.0 02	177.6	37 29.1	1.0 02	177.6	37 59.1	1.0 02	177.6	38 29.1	1.0 02	177.6	38 59.1	1.0 02	177.6	39 29.1	1.0 02	177.6	2
3	35 58.1	1.0 02	176.4	36 28.1	1.0 02	176.4	36 58.1	1.0 02	176.4	37 28.1	1.0 02	176.4	37 58.1	1.0 02	176.4	38 28.0	1.0 02	176.4	38 58.0	1.0 03	176.4	39 28.0	1.0 03	176.3	3
4	35 56.6	1.0 03	175.2	36 26.6	1.0 03	175.2	36 56.6	1.0 03	175.2	37 26.6	1.0 03	175.2	37 56.5	1.0 03	175.2	38 26.5	1.0 03	175.2	38 56.5	1.0 03	175.1	39 26.5	1.0 03	175.1	4
05	35 54.7	1.0 04	174.1	36 24.7	1.0 04	174.0	36 54.6	1.0 04	174.0	37 24.6	1.0 04	174.0	37 54.6	1.0 04	174.0	38 24.6	1.0 04	173.9	38 54.6	1.0 04	173.9	39 24.5	1.0 04	173.9	05
6	35 52.4	1.0 05	172.9	36 22.3	1.0 05	172.8	36 52.3	1.0 05	172.8	37 22.3	1.0 05	172.8	37 52.2	1.0 05	172.8	38 22.2	1.0 05	172.7	38 52.2	1.0 05	172.7	39 22.1	1.0 05	172.7	6
7	35 49.6	1.0 05	171.7	36 19.6	1.0 05	171.7	36 49.5	1.0 05	171.6	37 19.5	1.0 05	171.6	37 49.4	1.0 05	171.6	38 19.4	1.0 05	171.5	38 49.3	1.0 05	171.5	39 19.3	1.0 05	171.5	7
8	35 46.4	1.0 06	170.5	36 16.4	1.0 06	170.5	36 46.3	1.0 06	170.4	37 16.3	1.0 06	170.4	37 46.2	1.0 06	170.4	38 16.2	1.0 06	170.3	38 46.1	1.0 06	170.3	39 16.0	1.0 06	170.2	8
9	35 42.8	1.0 07	169.3	36 12.8	1.0 07	169.3	36 42.7	1.0 07	169.2	37 12.6	1.0 07	169.2	37 42.6	1.0 07	169.2	38 12.5	1.0 07	169.1	38 42.4	1.0 07	169.1	39 12.4	1.0 07	169.0	9
10	35 38.8	1.0 07	168.1	36 08.7	1.0 07	168.1	36 38.7	1.0 07	168.1	37 08.6	1.0 07	168.0	37 38.5	1.0 08	168.0	38 08.4	1.0 08	167.9	38 38.3	1.0 08	167.9	39 08.2	1.0 08	167.8	10
1	35 34.4	1.0 08	167.0	36 04.3	1.0 08	166.9	36 34.2	1.0 08	166.9	37 04.1	1.0 08	166.8	37 34.0	1.0 08	166.8	38 03.9	1.0 08	166.7	38 33.8	1.0 08	166.7	39 03.7	1.0 08	166.6	1
2	35 29.6	1.0 09	165.8	35 59.5	1.0 09	165.7	36 29.3	1.0 09	165.7	36 59.2	1.0 09	165.6	37 29.1	1.0 09	165.6	37 59.0	1.0 09	165.5	38 28.9	1.0 09	165.5	38 58.7	1.0 09	165.4	2
3	35 24.3	1.0 09	164.6	35 54.2	1.0 09	164.6	36 24.1	1.0 09	164.5	36 53.9	1.0 10	164.4	37 23.8	1.0 10	164.4	37 53.6	1.0 10	164.3	38 23.5	1.0 10	164.3	38 53.3	1.0 10	164.2	3
4	35 18.7	99 10	163.4	35 48.5	99 10	163.4	36 18.4	99 10	163.3	36 48.2	99 10	163.3	37 18.0	99 10	163.2	37 47.9	99 10	163.1	38 17.7	99 10	163.1	38 47.5	99 10	163.0	4
15	35 12.6	99 11	162.3	35 42.5	99 11	162.2	36 12.3	99 11	162.1	36 42.1	99 11	162.1	37 11.9	99 11	162.0	37 41.7	99 11	161.9	38 11.5	99 11	161.9	38 41.3	99 11	161.8	15
6	35 06.2	99 11	161.1	35 36.0	99 11	161.0	36 05.8	99 12	161.0	36 35.6	99 12	160.9	37 05.4	99 12	160.8	37 35.2	99 12	160.7	38 04.9	99 12	160.7	38 34.7	99 12	160.6	6
7	34 59.3	99 12	159.9	35 29.1	99 12	159.9	35 58.9	99 12	159.8	36 28.7	99 12	159.7	36 58.4	99 12	159.6	37 28.2	99 12	159.6	37 57.9	99 12	159.5	38 27.7	99 12	159.4	7
8	34 52.1	99 13	158.8	35 21.9	99 13	158.7	35 51.6	99 13	158.6	36 21.3	99 13	158.5	36 51.1	99 13	158.5	37 20.8	99 13	158.4	37 50.5	99 13	158.3	38 20.3	99 13	158.2	8
9	34 44.5	99 13	157.6	35 14.2	99 13	157.5	35 43.9	99 13	157.4	36 13.6	99 13	157.4	36 43.3	99 14	157.3	37 13.1	99 14	157.2	37 42.8	99 14	157.1	38 12.5	99 14	157.0	9
20	34 36.5	99 14	156.5	35 06.2	99 14	156.4	35 35.9	99 14	156.3	36 05.5	99 14	156.2	36 35.2	99 14	156.1	37 04.9	99 14	156.0	37 34.6	99 14	155.9	38 04.2	99 14	155.8	20
1	34 28.1	99 15	155.3	34 57.8	99 15	155.2	35 27.4	99 15	155.1	35 57.1	99 15	155.0	36 26.7	99 15	154.9	36 56.4	99 15	154.8	37 26.0	99 15	154.7	37 55.7	99 15	154.6	1
2	34 19.3	99 15	154.2	34 49.0	99 15	154.1	35 18.6	99 15	154.0	35 48.2	99 15	153.9	36 17.8	99 15	153.8	36 47.5	99 15	153.7	37 17.1	99 16	153.6	37 46.7	99 16	153.5	2
3	34 10.2	99 16	153.0	34 39.8	99 16	152.9	35 09.4	99 16	152.8	35 39.0	99 16	152.7	36 08.6	99 16	152.6	36 38.2	99 16	152.5	37 07.7	99 16	152.4	37 37.3	99 16	152.3	3
4	34 00.7	99 16	151.9	34 30.3	99 16	151.8	34 59.8	99 16	151.7	35 29.4	99 17	151.5	35 59.0	99 17	151.4	36 28.5	98 17	151.3	36 58.1	98 17	151.2	37 27.6	98 17	151.1	4
25	33 50.8	98 17	150.7	34 20.4	98 17	150.6	34 49.9	98 17	150.5	35 19.4	98 17	150.4	35 49.0	98 17	150.3	36 18.5	98 17	150.2	36 48.0	98 17	150.1	37 17.5	98 17	150.0	25
6	33 40.6	98 18	149.6	34 10.1	98 18	149.5	34 39.6	98 18	149.4	35 09.1	98 18	149.2	35 38.6	98 18	149.1	36 08.1	98 18	149.0	36 37.6	98 18	148.9	37 07.0	98 18	148.8	6
7	33 30.1	98 18	148.4	33 59.5	98 18	148.3	34 29.0	98 18	148.2	34 58.5	98 18	148.1	35 27.9	98 18	148.0	35 57.4	98 18	147.9	36 26.8	98 19	147.7	36 56.2	98 19	147.6	7
8	33 19.1	98 19	147.3	33 48.6	98 19	147.2	34 18.0	98 19	147.1	34 47.4	98 19	147.0	35 16.9	98 19	146.8	35 46.3	98 19	146.7	36 15.7	98 19	146.6	36 45.1	98 19	146.5	8
9	33 07.9	98 19	146.2	33 37.3	98 19	146.1	34 06.7	98 19	145.9	34 36.1	98 20	145.8	35 05.5	98 20	145.7	35 34.8	98 20	145.6	36 04.2	98 20	145.5	36 33.6	98 20	145.3	9
30	32 56.3	98 20	145.1	33 25.7	98 20	144.9	33 55.0	98 20	144.8	34 24.4	98 20	144.7	34 53.7	98 20	144.6	35 23.1	98 20	144.4	35 52.4	98 20	144.3	36 21.7	98 20	144.2	30
1	32 44.4	98 20	143.9	33 13.7	98 21	143.8	33 43.0	98 21	143.7	34 12.4	98 21	143.6	34 41.7	98 21	143.4	35 11.0	98 21	143.3	35 40.3	98 21	143.2	36 09.5	98 21	143.0	1
2	32 32.2	98 21	142.8	33 01.4	98 21	142.7	33 30.7	98 21	142.6	34 00.0	98 21	142.4	34 29.3	98 21	142.3	34 58.5	98 21	142.2	35 27.8	97 21	142.0	35 57.0	97 21	141.9	2
3	32 19.6	98 21	141.7	32 48.9	98 22	141.6	33 18.1	97 22	141.5	33 47.3	97 22	141.3	34 16.6	97 22	141.2	34 45.8	97 22	141.0	35 15.0	97 22	140.9	35 44.2	97 22	140.8	3
4	32 06.7	97 22	140.6	32 35.9	97 22	140.5	33 05.2	97 22	140.3	33 34.4	97 22	140.2	34 03.6	97 22	140.1	34 32.7	97 22	139.9	35 01.9	97 22	139.8	35 31.1	97 22	139.6	4
35	31 53.6	97 23	139.5	32 22.7	97 23	139.4	32 51.9	97 23	139.2	33 21.1	97 23	139.1	33 50.2	97 23	138.9	34 19.4	97 23	138.8	34 48.5	97 23	138.7	35 17.6	97 23	138.5	35
6	31 40.1	97 23	138.4	32 09.2	97 23	138.3	32 38.4	97 23	138.1	33 07.5	97 23	138.0	33 36.6	97 23	137.8	34 05.7	97 23	137.7	34 34.8	97 23	137.5	35 03.9	97 23	137.4	6
7	31 26.3	97 23	137.3	31 55.4	97 24	137.2	32 24.5	97 24	137.0	32 53.6	97 24	136.9	33 22.7	97 24	136.7	33 51.8	97 24	136.6	34 20.8	97 24	136.4	34 49.9	97 24	136.3	7
8	31 12.3	97 24	136.2	31 41.3	97 24	136.1	32 10.4	97 24	135.9	32 39.4	97 24	135.8	33 08.5	97 24	135.6	33 37.5	97 24	135.5	34 06.5	97 24	135.3	34 35.5	97 24	135.2	8
9	30 57.9	97 24	135.1	31 26.9	97 24	135.0	31 56.0	97 24	134.8	32 25.0	97 25	134.7	32 54.0	97 25	134.5	33 23.0	97 25	134.4	33 52.0	97 25	134.2	34 20.9	97 25	134.1	9
40	30 43.3	97 25	134.0	31 12.3	97 25	133.9	31 41.3	97 25	133.7	32 10.3	97 25	133.6	32 39.2	97 25	133.4	33 08.2	96 25	133.3	33 37.1	96 25	133.1	34 06.0	96 25	133.0	40
1	30 28.4	97 25	133.0	30 57.4	97 25	132.8	31 26.3	96 25	132.7	31 55.3	96 25	132.5	32 24.2	96 25	132.4	32 53.1	96 26	132.2	33 22.0	96 26	132.0	33 50.9	96 26	131.9	1
2	30 13.3	96 26	131.9	30 42.2	96 26	131.7	31 11.1	96 26	131.6	31 40.0	96 26	131.4	32 08.9	96 26	131.3	32 37.8	96 26	131.1	33 06.6	96 26	130.9	33 35.5	96 26	130.8	2
3	29 57.9	96 26	130.8	30 26.8	96 26	130.7	30 55.6	96 26	130.5	31 24.5	96 26	130.4	31 53.3	96 26	130.2	32 22.2	96 26	130.0	32 51.0	96 26	129.9	33 19.8	96 26	129.7	3
4	29 42.2	96 26	129.8	30 11.1	96 27	129.6	30 39.9	96 27	129.4	31 08.7	96 27	129.3	31 37.5	96 27	129.1	32 06.3	96 27	129.0	32 35.1	96 27	128.8	33 03.9	96 27	128.6	4
45	29 26.3	96 27	128.7	29 55.1	96 27	128.5	30 23.9	96 27	128.4	30 52.7	96 27	128.2	31 21.5	96 27	128.0	31 50.3	96 27	127.9	32 19.0	96 27	127.7	32 47.8	96 27	127.5	45
6	29 10.2	96 27	127.6	29 39.0	96 27	127.5	30 07.7	96 27	127.3	30 36.5	96 27	127.1	31 05.2	96 28	127.0	31 34.0	96 28	126.8	32 02.7	96 28	126.6	32 31.4	96 28	126.5	6
7	28 53.8	96 28	126.6	29 22.6	96 28	126.4	29 51.3	96 28	126.3	30 20.0	96 28	126.1	30 48.7	96 28	125.9	31 17.4	96 28	125.7	31 46.1	96 28	125.6	32 14.8	96 28	125.4	7
8	28 37.2	96 28	125.5	29 05.9	96 28	125.4	29 34.6	96 28	125.2	30 03.3	96 28	125.0	30 32.0	96 28	124.9	31 00.6	96 28	124.7	31 29.3	95 28	124.5	31 57.9	95 28	124.3	8
9	28 20.4	96 28	124.5	28 49.1	96 28	124.3	29 17.8	96 28	124.2	29 46.4	95 29	124.0	30 15.0	95 29	123.8	30 43.7	95 29	123.6	31 12.3	95 29	123.5	31 40.9	95 29	123.3	9
50	28 03.4	95 29	123.4	28 32.0	95 29	123.3	29 00.7	95 29	123.1	29 29.3	95 29	122.9	29 57.9	95 29	122.8	30 26.5	95 29	122.6	30 55.0	95 29	122.4	31 23.6	95 29	122.2	50
1	27 46.2	95 29	122.4	28 14.8	95 29	122.2	28 43.4	95 29	122.1	29 12.0	95 29	121.9	29 40.5	95 29	121.7	30 09.1	95 29	121.5	30 37.6	95 29	121.4	31 06.1	95 29	121.2	1
2	27 28.7	95 29	121.4	27 57.3	95 29	121.2	28 25.9	95 29	121.0	28 54.4	95 29	120.9	29 23.0	95 30	120.7	29 51.5	95 30	120.5	30 20.0	95 30	120.3	30 48.5	95 30	120.1	2
3	27 11.1	95 30	120.3	27 39.7	95 30	120.2	28 08.2	95 30	120.0	28 36.7	95 30	119.8	29 05.2	95 30	119.6	29 33.7	95 30	119.5	30 02.2	95 30	119.3	30 30.7	95 30	119.1	3
4	26 53.3	95 30	119.3	27 21.8	95 30	119.1	27 50.3	95 30	119.0	28 18.8	95 30	118.8	28 47.3	95 30	118.6	29 15.8	95 30	118.4	29 44.2	95 30	118.2	30 12.6	95 30	118.1	4
55	26 35.3	95 30	118.3	27 03.8	95 30	118.1	27 32.3	95 30	117.9	28 00.8	95 30	117.8	28 29.2	95 30	117.6	28 57.6	95 31	117.4	29 26.0	95 31	117.2	29 54.4	95 31	117.0	55
6	26 17.2	95 31	117.3	26 45.6	95 31	117.1	27 14.1	95 31	116.9	27 42.5	95 31	116.7	28 10.9	95 31	116.6	28 39.3	95 31	116.4	29 07.7	95 31	116.2	29 36.1	95 31	116.0	6
7	25 58.9	95 31	116.3	26 27.3	95 31	116.1	26 55.7	95 31	115.9	27 24.1	95 31	115.7	27 52.5	95 31	115.5	28 20.9	95 31	115.4	28 49.2	94 31	115.2	29 17.6	94 31	115.0	7
8	25 40.4	95 31	115.2	26 08.8	95 31	115.1	26 37.2	95 31	114.9	27 05.5	95 31	114.7	27 33.9	94 31	114.5	28 02.2	94 31	114.3	28 30.6	94 31	114.1	28 58.9	94 31	114.0	8
9	25 21.8	95 31	114.2	25 50.1	95 31	114.1	26 18.5	95 31	113.9	26 46.8	94 31	113.7	27 15.2	94 31	113.5	27 43.5	94 32	113.3	28 11.8	94 32	113.1	28 40.0	94 32	112.9	9
60	25 03.0	95 32	113.2	25 31.3	94 32	113.1	25 59.6	94 32	112.9	26 28.0	94 32	112.7	26 56.3	94 32	112.5	27 24.6	94 32	112.3	27 52.8	94 32	112.1	28 21.1	94 32	111.9	60
1	24 44.0	94 32	112.2	25 12.4	94 32	112.1	25 40.7	94 32	111.9	26 09.0	94 32	111.7	26 37.2	94 32	111.5	27 05.5	94 32	111.3	27 33.7	94 32	111.1	28 02.0	94 32	110.9	1
2	24 25.0	94 32	111.2	24 53.3	94 32	111.1	25 21.6	94 32	110.9	25 49.8	94 32	110.7	26 18.1	94 32	110.5	26 46.3	94 32	110.3	27 14.5	94 32	110.1	27 42.7	94 32	109.9	2
3	24 05.8	94 32	110.2	24 34.1	94 32	110.1	25 02.3	94 32	109.9	25 30.6	94 32	109.7	25 58.8	94 32	109.5	26 27.0	94 32	109.3	26 55.2	94 32	109.1	27 23.4	94 32	108.9	3
4	23 46.5	94 32	109.2	24 14.7	94 32	109.1	24 43.0	94 32	108.9	25 11.2	94 32	108.7	25 39.4	94 33	108.5	26 07.6	94 33	108.3	26 35.8	94 33	108.1	27 03.9	94 33	107.9	4
65	23 27.0	94 33	108.3	23 55.3	94 33	108.1	24 23.5	94 33	107.9	24 51.7	94 33	107.7	25 19.9	94 33	107.5	25 48.0	94 33	107.3	26 16.2	94 33	107.1	26 44.3	94 33	106.9	65
6	23 07.5	94 33	107.3	23 35.7	94 33	107.1	24 03.9	94 33	106.9	24 32.1	94 33	106.7	25 00.3	94 33	106.5	25 28.4	94 33	106.3	25 56.5	94 33	106.1	26 24.7	94 33	106.0	6
7	22 47.9	94 33	106.3	23 16.0	94 33	106.1	23 44.2	94 33	105.9	24 12.4	94 33	105.7	24 40.5	94 33	105.5	25 08.7	94 33	105.4	25 36.8	94 33	105.2	26 04.9	94 33	105.0	7
8	22 28.1	94 33	105.3	22 56.3	94 33	105.1	23 24.4	94 33	104.9	23 52.6	94 33	104.8	24 20.7	94 33	104.6	24 48.8	94 33	104.4	25 16.9	94 33	104.2	25 45.0	94 33	104.0	8
9	22 08.3	94 33	104.3	22 36.4	94 33	104.2	23 04.6	94 33	104.0	23 32.7	94 33	103.8	24 00.8	94 33	103.6	24 28.9	94 33	103.4	24 57.0	94 33	103.2	25 25.1	94 33	103.0	9
70	21 48.3	94 33	103.4	22 16.5	94 33	103.2	22 44.6	94 33	103.0	23 12.7	94 33	102.8	23 40.8	94 33	102.6	24 08.9	94 33	102.4	24 37.0	94 34	102.2	25 05.0	93 34	102.0	70
1	21 28.3	94 33	102.4	21 56.5	94 34	102.2	22 24.6	94 34	102.0	22 52.7	94 34	101.8	23 20.8	94 34	101.6	23 48.8	94 34	101.4	24 16.9	93 34	101.3	24 44.9	93 34	101.1	1
2	21 08.3	94 34	101.4	21 36.4	94 34	101.2	22 04.5	94 34	101.1	22 32.6	94 34	100.9	23 00.6	94 34	100.7	23 28.7	94 34	100.5	23 56.7	93 34	100.3	24 24.8	93 34	100.1	2
3	20 48.1	94 34	100.5	21 16.2	94 34	100.3	21 44.3	94 34	100.1	22 12.4	94 34	99.9	22 40.4	94 34	99.7	23 08.5	93 34	99.5	23 36.5	93 34	99.3	24 04.5	93 34	99.1	3
4	20 27.9	94 34	99.5	20 56.0	94 34	99.3	21 24.1	94 34	99.1	21 52.1	94 34	98.9	22 20.2	93 34	98.7	22 48.2	93 34	98.6	23 16.2	93 34	98.4	23 44.2	93 34	98.2	4
75	20 07.6	94 34	98.5	20 35.7	94 34	98.4	21 03.8	94 34	98.2	21 31.8	93 34	98.0	21 59.9	93 34	97.8	22 27.9	93 34	97.6	22 55.9	93 34	97.4	23 23.9	93 34	97.2	75
6	19 47.3	94 34	97.6	20 15.4	94 34	97.4	20 43.4	94 34	97.2	21 11.5	93 34	97.0	21 39.5	93 34	96.8	22 07.5	93 34	96.6	22 35.5	93 34	96.4	23 03.5	93 34	96.2	6
7	19 27.0	94 34	96.6	19 55.0	94 34	96.4	20 23.1	93 34	96.3	20 51.1	93 34	96.1	21 19.1	93 34	95.9	21 47.1	93 34	95.7	22 15.1	93 34	95.5	22 43.1	93 34	95.3	7
8	19 06.6	94 34	95.7	19 34.6	93 34	95.5	20 02.6	93 34	95.3	20 30.7	93 34	95.1	20 58.7	93 34	94.9	21 26.7	93 34	94.7	21 54.7	93 34	94.5	22 22.6	93 34	94.3	8
9	18 46.1	94 34	94.7	19 14.2	93 34	94.5	19 42.2	93 34	94.4	20 10.2	93 34	94.2	20 38.2	93 34	94.0	21 06.2	93 34	93.8	21 34.2	93 34	93.6	22 02.2	93 34	93.4	9
80	18 25.7	93 34	93.8	18 53.7	93 34	93.6	19 21.7	93 34	93.4	19 49.7	93 34	93.2	20 17.7	93 34	93.0	20 45.7	93 34	92.8	21 13.7	93 34	92.6	21 41.7	93 34	92.4	80
1	18 05.2	93 34	92.8	18 33.2	93 34	92.6	19 01.2	93 34	92.5	19 29.2	93 34	92.3	19 57.2	93 34	92.1	20 25.2	93 34	91.9	20 53.2	93 34	91.7	21 21.2	93 34	91.5	1
2	17 44.7	93 34	91.9	18 12.7	93 34	91.7	18 40.7	93 34	91.5	19 08.7	93 34	91.3	19 36.7	93 34	91.1	20 04.7	93 34	90.9	20 32.7	93 34	90.8	21 00.7	93 34	90.6	2
3	17 24.1	93 34	90.9	17 52.2	93 34	90.8	18 20.2	93 34	90.6	18 48.2	93 34	90.4	19 16.2	93 34	90.2	19 44.2	93 34	90.0	20 12.2	93 34	89.8	20 40.1	93 34	89.6	3
4	17 03.6	93 34	90.0	17 31.7	93 34	89.8	17 59.7	93 34	89.6	18 27.7	93 34	89.4	18 55.7	93 34	89.3	19 23.7	93 34	89.1	19 51.7	93 34	88.9	20 19.6	93 34	88.7	4
85	16 43.1	93 34	89.1	17 11.1	93 34	88.9	17 39.2	93 34	88.7	18 07.2	93 34	88.5	18 35.2	93 34	88.3	19 03.2	93 34	88.1	19 31.1	93 34	87.9	19 59.1	93 34	87.7	85
6	16 22.6	93 34	88.1	16 50.6	93 34	87.9	17 18.6	93 34	87.8	17 46.7	93 34	87.6	18 14.7	93 34	87.4	18 42.7	93 34	87.2	19 10.6	93 34	87.0	19 38.6	93 34	86.8	6
7	16 02.1	93 34	87.2	16 30.1	93 34	87.0	16 58.2	93 34	86.8	17 26.2	93 34	86.6	17 54.2	93 34	86.5	18 22.2	93 34	86.3	18 50.2	93 34	86.1	19 18.1	93 34	85.9	7
8	15 41.6	93 34	86.3	16 09.6	93 34	86.1	16 37.7	93 34	85.9	17 05.7	93 34	85.7	17 33.7	93 34	85.5	18 01.7	93 34	85.3	18 29.7	93 34	85.1	18 57.7	93 34	84.9	8
9	15 21.1	94 34	85.3	15 49.2	93 34	85.1	16 17.2	93 34	85.0	16 45.2	93 34	84.8	17 13.3	93 34	84.6	17 41.3	93 34	84.4	18 09.3	93 34	84.2	18 37.2	93 34	84.0	9
90	15 00.7	94 34	84.4	15 28.7	93 34	84.2	15 56.8	93 34	84.0	16 24.8	93 34	83.8	16 52.8	93 34	83.7	17 20.9	93 34	83.5	17 48.9	93 34	83.3	18 16.9	93 34	83.1	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	14 40.3	94 34	83.5	15 08.3	94 34	83.3	15 36.4	93 34	83.1	16 04.4	93 34	82.9	16 32.5	93 34	82.7	17 00.5	93 34	82.5	17 28.5	93 34	82.4	17 56.5	93 34	82.2	91
2	14 19.9	94 34	82.5	14 48.0	94 34	82.4	15 16.0	94 34	82.2	15 44.1	93 34	82.0	16 12.1	93 34	81.8	16 40.2	93 34	81.6	17 08.2	93 34	81.4	17 36.2	93 34	81.2	2
3	13 59.6	94 34	81.6	14 27.7	94 34	81.4	14 55.7	94 34	81.2	15 23.8	94 34	81.1	15 51.8	93 34	80.9	16 19.9	93 34	80.7	16 47.9	93 34	80.5	17 15.9	93 34	80.3	3
4	13 39.3	94 34	80.7	14 07.4	94 34	80.5	14 35.5	94 34	80.3	15 03.6	94 34	80.1	15 31.6	94 34	80.0	15 59.7	93 34	79.8	16 27.7	93 34	79.6	16 55.7	93 34	79.4	4
95	13 19.1	94 34	79.8	13 47.2	94 34	79.6	14 15.3	94 34	79.4	14 43.4	94 34	79.2	15 11.4	94 34	79.0	15 39.5	94 34	78.8	16 07.6	93 33	78.7	16 35.6	93 33	78.5	95
6	12 58.9	94 34	78.8	13 27.0	94 34	78.7	13 55.1	94 33	78.5	14 23.2	94 33	78.3	14 51.3	94 33	78.1	15 19.4	94 33	77.9	15 47.5	94 33	77.7	16 15.5	94 33	77.6	6
7	12 38.8	94 33	77.9	13 07.0	94 33	77.7	13 35.1	94 33	77.6	14 03.2	94 33	77.4	14 31.3	94 33	77.2	14 59.4	94 33	77.0	15 27.4	94 33	76.8	15 55.5	94 33	76.6	7
8	12 18.8	94 33	77.0	12 46.9	94 33	76.8	13 15.1	94 33	76.6	13 43.2	94 33	76.5	14 11.3	94 33	76.3	14 39.4	94 33	76.1	15 07.5	94 33	75.9	15 35.6	94 33	75.7	8
9	11 58.8	94 33	76.1	12 27.0	94 33	75.9	12 55.1	94 33	75.7	13 23.3	94 33	75.5	13 51.4	94 33	75.4	14 19.5	94 33	75.2	14 47.6	94 33	75.0	15 15.7	94 33	74.8	9
100	11 39.0	94 33	75.1	12 07.1	94 33	75.0	12 35.3	94 33	74.8	13 03.4	94 33	74.6	13 31.6	94 33	74.4	13 59.7	94 33	74.3	14 27.9	94 33	74.1	14 56.0	94 33	73.9	100
1	11 19.2	94 33	74.2	11 47.4	94 33	74.0	12 15.5	94 33	73.9	12 43.7	94 33	73.7	13 11.9	94 33	73.5	13 40.0	94 33	73.3	14 08.2	94 33	73.2	14 36.3	94 33	73.0	1
2	10 59.5	94 33	73.3	11 27.7	94 33	73.1	11 55.9	94 33	73.0	12 24.1	94 33	72.8	12 52.2	94 33	72.6	13 20.4	94 33	72.4	13 48.6	94 32	72.2	14 16.7	94 32	72.1	2
3	10 39.9	94 32	72.4	11 08.1	94 32	72.2	11 36.3	94 32	72.0	12 04.5	94 32	71.9	12 32.7	94 32	71.7	13 00.9	94 32	71.5	13 29.1	94 32	71.3	13 57.3	94 32	71.2	3
4	10 20.4	94 32	71.5	10 48.6	94 32	71.3	11 16.8	94 32	71.1	11 45.1	94 32	70.9	12 13.3	94 32	70.8	12 41.5	94 32	70.6	13 09.7	94 32	70.4	13 37.9	94 32	70.2	4
105	10 01.0	94 32	70.5	10 29.2	94 32	70.4	10 57.5	94 32	70.2	11 25.7	94 32	70.0	11 54.0	94 32	69.9	12 22.2	94 32	69.7	12 50.4	94 32	69.5	13 18.6	94 32	69.3	105
6	9 41.7	94 32	69.6	10 09.9	94 32	69.5	10 38.2	94 32	69.3	11 06.5	94 32	69.1	11 34.7	94 32	68.9	12 03.0	94 32	68.8	12 31.3	94 32	68.6	12 59.5	94 32	68.4	6
7	9 22.5	94 32	68.7	9 50.8	94 32	68.5	10 19.1	94 32	68.4	10 47.4	94 32	68.2	11 15.7	94 32	68.0	11 43.9	94 32	67.9	12 12.2	94 32	67.7	12 40.5	94 32	67.5	7
8	9 03.4	94 32	67.8	9 31.7	94 32	67.6	10 00.1	94 31	67.4	10 28.4	94 31	67.3	10 56.7	94 31	67.1	11 25.0	94 31	66.9	11 53.3	94 31	66.8	12 21.6	94 31	66.6	8
9	8 44.5	94 31	66.9	9 12.8	94 31	66.7	9 41.2	94 31	66.5	10 09.5	94 31	66.4	10 37.8	94 31	66.2	11 06.2	94 31	66.0	11 34.5	94 31	65.9	12 02.8	94 31	65.7	9
110	8 25.7	95 31	65.9	8 54.1	95 31	65.8	9 22.4	95 31	65.6	9 50.8	95 31	65.5	10 19.1	95 31	65.3	10 47.5	94 31	65.1	11 15.8	94 31	65.0	11 44.2	94 31	64.8	110
1	8 07.0	95 31	65.0	8 35.4	95 31	64.9	9 03.8	95 31	64.7	9 32.2	95 31	64.5	10 00.6	95 31	64.4	10 28.9	95 31	64.2	10 57.3	95 31	64.0	11 25.7	95 31	63.9	1
2	7 48.5	95 31	64.1	8 16.9	95 31	63.9	8 45.3	95 31	63.8	9 13.7	95 31	63.6	9 42.1	95 30	63.5	10 10.5	95 30	63.3	10 38.9	95 30	63.1	11 07.3	95 30	63.0	2
3	7 30.1	95 30	63.2	7 58.5	95 30	63.0	8 27.0	95 30	62.9	8 55.4	95 30	62.7	9 23.9	95 30	62.5	9 52.3	95 30	62.4	10 20.7	95 30	62.2	10 49.1	95 30	62.1	3
4	7 11.9	95 30	62.3	7 40.3	95 30	62.1	8 08.8	95 30	62.0	8 37.3	95 30	61.8	9 05.7	95 30	61.6	9 34.2	95 30	61.5	10 02.6	95 30	61.3	10 31.1	95 30	61.1	4
115	6 53.8	95 30	61.3	7 22.3	95 30	61.2	7 50.8	95 30	61.0	8 19.3	95 30	60.9	8 47.7	95 30	60.7	9 16.2	95 30	60.6	9 44.7	95 30	60.4	10 13.2	95 30	60.2	115
6	6 35.8	95 30	60.4	7 04.4	95 30	60.3	7 32.9	95 30	60.1	8 01.4	95 29	60.0	8 29.9	95 29	59.8	8 58.4	95 29	59.6	9 26.9	95 29	59.5	9 55.4	95 29	59.3	6
7	6 18.1	95 29	59.5	6 46.6	95 29	59.4	7 15.2	95 29	59.2	7 43.7	95 29	59.0	8 12.3	95 29	58.9	8 40.8	95 29	58.7	9 09.3	95 29	58.6	9 37.9	95 29	58.4	7
8	6 00.5	95 29	58.6	6 29.1	95 29	58.4	6 57.6	95 29	58.3	7 26.2	95 29	58.1	7 54.8	95 29	58.0	8 23.4	95 29	57.8	8 51.9	95 29	57.7	9 20.5	95 29	57.5	8
9	5 43.0	95 29	57.7	6 11.7	95 29	57.5	6 40.3	95 29	57.4	7 08.9	95 29	57.2	7 37.5	95 29	57.1	8 06.1	95 28	56.9	8 34.7	95 28	56.8	9 03.3	95 28	56.6	9
120	5 25.8	95 28	56.7	5 54.4	95 28	56.6	6 23.1	95 28	56.4	6 51.7	95 28	56.3	7 20.3	95 28	56.1	7 49.0	95 28	56.0	8 17.6	95 28	55.8	8 46.2	95 28	55.7	120
1	5 08.7	96 28	55.8	5 37.4	96 28	55.7	6 06.1	96 28	55.5	6 34.7	96 28	55.4	7 03.4	96 28	55.2	7 32.1	96 28	55.1	8 00.7	96 28	54.9	8 29.4	96 28	54.8	1
2				5 20.5	96 28	54.8	5 49.2	96 28	54.6	6 17.9	96 28	54.5	6 46.6	96 28	54.3	7 15.3	96 28	54.2	7 44.0	96 28	54.0	8 12.7	96 27	53.9	2
3				5 03.9	96 27	53.8	5 32.6	96 27	53.7	6 01.3	96 27	53.5	6 30.1	96 27	53.4	6 58.8	96 27	53.3	7 27.5	96 27	53.1	7 56.2	96 27	53.0	3
4							5 16.2	96 27	52.8	5 44.9	96 27	52.6	6 13.7	96 27	52.5	6 42.4	96 27	52.3	7 11.2	96 27	52.2	7 39.9	96 27	52.0	4
125										5 28.7	96 27	51.7	5 57.5	96 27	51.6	6 26.3	96 27	51.4	6 55.1	96 26	51.3	7 23.9	96 26	51.1	125
6										5 12.7	96 26	50.8	5 41.5	96 26	50.6	6 10.4	96 26	50.5	6 39.2	96 26	50.4	7 08.0	96 26	50.2	6
7													5 25.8	96 26	49.7	5 54.6	96 26	49.6	6 23.5	96 26	49.5	6 52.3	96 26	49.3	7
8													5 10.2	96 26	48.8	5 39.1	96 26	48.7	6 08.0	96 25	48.5	6 36.9	96 25	48.4	8
9																5 23.8	96 25	47.8	5 52.7	96 25	47.6	6 21.6	96 25	47.5	9
130																5 08.7	96 25	46.8	5 37.7	96 25	46.7	6 06.6	96 25	46.6	130
1																			5 22.8	97 24	45.8	5 51.8	97 24	45.7	1
2																			5 08.3	97 24	44.9	5 37.3	97 24	44.7	2
3																						5 22.9	97 24	43.8	3
4																						5 08.8	97 23	42.9	4

H.A.	20° 00′		20° 30′		21° 00′		21° 30′		22° 00′		22° 30′		23° 00′		23° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	40 00.0 1.0 00	180.0	40 30.0 1.0 00	180.0	41 00.0 1.0 00	180.0	41 30.0 1.0 00	180.0	42 00.0 1.0 00	180.0	42 30.0 1.0 00	180.0	43 00.0 1.0 00	180.0	43 30.0 1.0 00	180.0	00
1	39 59.8 1.0 01	178.8	40 29.8 1.0 01	178.8	40 59.8 1.0 01	178.8	41 29.8 1.0 01	178.8	41 59.8 1.0 01	178.8	42 29.8 1.0 01	178.7	42 59.8 1.0 01	178.7	43 29.8 1.0 01	178.7	1
2	39 59.1 1.0 02	177.5	40 29.1 1.0 02	177.5	40 59.1 1.0 02	177.5	41 29.1 1.0 02	177.5	41 59.1 1.0 02	177.5	42 29.1 1.0 02	177.5	42 59.1 1.0 02	177.5	43 29.1 1.0 02	177.5	2
3	39 58.0 1.0 03	176.3	40 28.0 1.0 03	176.3	40 58.0 1.0 03	176.3	41 28.0 1.0 03	176.3	41 58.0 1.0 03	176.3	42 28.0 1.0 03	176.2	42 58.0 1.0 03	176.2	43 28.0 1.0 03	176.2	3
4	39 56.5 1.0 03	175.1	40 26.5 1.0 03	175.1	40 56.5 1.0 03	175.1	41 26.4 1.0 03	175.0	41 56.4 1.0 03	175.0	42 26.4 1.0 03	175.0	42 56.4 1.0 03	175.0	43 26.4 1.0 03	174.9	4
05	39 54.5 1.0 04	173.9	40 24.5 1.0 04	173.8	40 54.5 1.0 04	173.8	41 24.4 1.0 04	173.8	41 54.4 1.0 04	173.8	42 24.4 1.0 04	173.7	42 54.4 1.0 04	173.7	43 24.3 1.0 04	173.7	05
6	39 52.1 1.0 05	172.6	40 22.1 1.0 05	172.6	40 52.0 1.0 05	172.6	41 22.0 1.0 05	172.6	41 52.0 1.0 05	172.5	42 21.9 1.0 05	172.5	42 51.9 1.0 05	172.5	43 21.9 1.0 05	172.4	6
7	39 49.3 1.0 05	171.4	40 19.2 1.0 05	171.4	40 49.2 1.0 06	171.4	41 19.1 1.0 06	171.3	41 49.1 1.0 06	171.3	42 19.0 1.0 06	171.2	42 49.0 1.0 06	171.2	43 18.9 1.0 06	171.2	7
8	39 46.0 1.0 06	170.2	40 15.9 1.0 06	170.2	40 45.9 1.0 06	170.1	41 15.8 1.0 06	170.1	41 45.7 1.0 06	170.0	42 15.7 1.0 06	170.0	42 45.6 1.0 06	170.0	43 15.6 1.0 06	169.9	8
9	39 42.3 1.0 07	169.0	40 12.2 1.0 07	168.9	40 42.1 1.0 07	168.9	41 12.1 1.0 07	168.8	41 42.0 1.0 07	168.8	42 11.9 1.0 07	168.8	42 41.8 1.0 07	168.7	43 11.7 1.0 07	168.7	9
10	39 38.1 1.0 08	167.8	40 08.1 1.0 08	167.7	40 38.0 1.0 08	167.7	41 07.9 1.0 08	167.6	41 37.8 1.0 08	167.6	42 07.7 1.0 08	167.5	42 37.6 1.0 08	167.5	43 07.5 1.0 08	167.4	10
1	39 33.6 1.0 08	166.6	40 03.5 1.0 08	166.5	40 33.4 1.0 08	166.4	41 03.3 1.0 08	166.4	41 33.1 1.0 08	166.3	42 03.0 1.0 08	166.3	42 32.9 1.0 09	166.2	43 02.8 1.0 09	166.1	1
2	39 28.6 1.0 09	165.3	39 58.5 1.0 09	165.3	40 28.3 1.0 09	165.2	40 58.2 1.0 09	165.2	41 28.1 1.0 09	165.1	41 57.9 1.0 09	165.0	42 27.8 1.0 09	165.0	42 57.7 1.0 09	164.9	2
3	39 23.2 1.0 10	164.1	39 53.0 99 10	164.1	40 22.9 99 10	164.0	40 52.7 99 10	163.9	41 22.6 99 10	163.9	41 52.4 99 10	163.8	42 22.3 99 10	163.7	42 52.1 99 10	163.7	3
4	39 17.4 99 10	162.9	39 47.2 99 10	162.8	40 17.0 99 10	162.8	40 46.8 99 10	162.7	41 16.7 99 11	162.6	41 46.5 99 11	162.6	42 16.3 99 11	162.5	42 46.1 99 11	162.4	4
15	39 11.1 99 11	161.7	39 40.9 99 11	161.6	40 10.7 99 11	161.6	40 40.5 99 11	161.5	41 10.3 99 11	161.4	41 40.1 99 11	161.3	42 09.9 99 11	161.3	42 39.7 99 11	161.2	15
6	39 04.5 99 12	160.5	39 34.3 99 12	160.4	40 04.1 99 12	160.4	40 33.8 99 12	160.3	41 03.6 99 12	160.2	41 33.3 99 12	160.1	42 03.1 99 12	160.0	42 32.9 99 12	159.9	6
7	38 57.5 99 12	159.3	39 27.2 99 12	159.2	39 56.9 99 13	159.1	40 26.7 99 13	159.1	40 56.4 99 13	159.0	41 26.2 99 13	158.9	41 55.9 99 13	158.8	42 25.6 99 13	158.7	7
8	38 50.0 99 13	158.1	39 19.7 99 13	158.0	39 49.4 99 13	157.9	40 19.2 99 13	157.8	40 48.9 99 13	157.8	41 18.6 99 13	157.7	41 48.3 99 13	157.6	42 18.0 99 13	157.5	8
9	38 42.2 99 14	156.9	39 11.8 99 14	156.8	39 41.5 99 14	156.7	40 11.2 99 14	156.6	40 40.9 99 14	156.5	41 10.6 99 14	156.4	41 40.2 99 14	156.3	42 09.9 99 14	156.2	9
20	38 33.9 99 14	155.7	39 03.6 99 14	155.6	39 33.2 99 14	155.5	40 02.9 99 15	155.4	40 32.5 99 15	155.3	41 02.2 99 15	155.2	41 31.8 99 15	155.1	42 01.4 99 15	155.0	20
1	38 25.3 99 15	154.5	38 54.9 99 15	154.4	39 24.5 99 15	154.3	39 54.2 99 15	154.2	40 23.8 99 15	154.1	40 53.4 99 15	154.0	41 23.0 99 15	153.9	41 52.6 99 15	153.8	1
2	38 16.3 99 16	153.4	38 45.9 99 16	153.3	39 15.5 99 16	153.1	39 45.0 99 16	153.0	40 14.6 99 16	152.9	40 44.2 99 16	152.8	41 13.8 99 16	152.7	41 43.3 99 16	152.6	2
3	38 06.9 99 16	152.2	38 36.4 99 16	152.1	39 06.0 99 16	152.0	39 35.5 98 16	151.9	40 05.1 98 16	151.7	40 34.6 98 17	151.6	41 04.2 98 17	151.5	41 33.7 98 17	151.4	3
4	37 57.1 98 17	151.0	38 26.6 98 17	150.9	38 56.2 98 17	150.8	39 25.7 98 17	150.7	39 55.2 98 17	150.5	40 24.7 98 17	150.4	40 54.2 98 17	150.3	41 23.7 98 17	150.2	4
25	37 47.0 98 18	149.8	38 16.5 98 18	149.7	38 46.0 98 18	149.6	39 15.4 98 18	149.5	39 44.9 98 18	149.4	40 14.4 98 18	149.2	40 43.8 98 18	149.1	41 13.3 98 18	149.0	25
6	37 36.5 98 18	148.7	38 06.0 98 18	148.5	38 35.4 98 18	148.4	39 04.8 98 18	148.3	39 34.3 98 18	148.2	40 03.7 98 18	148.1	40 33.1 98 18	147.9	41 02.5 98 19	147.8	6
7	37 25.7 98 19	147.5	37 55.1 98 19	147.4	38 24.5 98 19	147.3	38 53.9 98 19	147.1	39 23.3 98 19	147.0	39 52.7 98 19	146.9	40 22.0 98 19	146.7	40 51.4 98 19	146.6	7
8	37 14.5 98 19	146.3	37 43.8 98 19	146.2	38 13.2 98 19	146.1	38 42.6 98 19	146.0	39 11.9 98 20	145.8	39 41.3 98 20	145.7	40 10.6 98 20	145.6	40 39.9 98 20	145.4	8
9	37 02.9 98 20	145.2	37 32.3 98 20	145.1	38 01.6 98 20	144.9	38 30.9 98 20	144.8	39 00.2 98 20	144.7	39 29.5 98 20	144.5	39 58.8 98 20	144.4	40 28.1 98 20	144.2	9
30	36 51.0 98 20	144.0	37 20.3 98 20	143.9	37 49.6 98 20	143.8	38 18.9 98 21	143.6	38 48.2 98 21	143.5	39 17.4 98 21	143.4	39 46.7 97 21	143.2	40 15.9 97 21	143.1	30
1	36 38.8 98 21	142.9	37 08.1 98 21	142.8	37 37.3 97 21	142.6	38 06.6 97 21	142.5	38 35.8 97 21	142.3	39 05.0 97 21	142.2	39 34.2 97 21	142.0	40 03.4 97 21	141.9	1
2	36 26.3 97 21	141.8	36 55.5 97 22	141.6	37 24.7 97 22	141.5	37 53.9 97 22	141.3	38 23.1 97 22	141.2	38 52.3 97 22	141.0	39 21.5 97 22	140.9	39 50.6 97 22	140.7	2
3	36 13.4 97 22	140.6	36 42.6 97 22	140.5	37 11.8 97 22	140.3	37 40.9 97 22	140.2	38 10.1 97 22	140.0	38 39.2 97 22	139.9	39 08.4 97 22	139.7	39 37.5 97 22	139.6	3
4	36 00.2 97 22	139.5	36 29.4 97 23	139.3	36 58.5 97 23	139.2	37 27.6 97 23	139.0	37 56.7 97 23	138.9	38 25.8 97 23	138.7	38 54.9 97 23	138.6	39 24.0 97 23	138.4	4
35	35 46.8 97 23	138.4	36 15.9 97 23	138.2	36 45.0 97 23	138.1	37 14.0 97 23	137.9	37 43.1 97 23	137.8	38 12.2 97 23	137.6	38 41.2 97 23	137.4	39 10.2 97 23	137.3	35
6	35 33.0 97 23	137.2	36 02.0 97 24	137.1	36 31.1 97 24	136.9	37 00.1 97 24	136.8	37 29.2 97 24	136.6	37 58.2 97 24	136.5	38 27.2 97 24	136.3	38 56.2 97 24	136.1	6
7	35 18.9 97 24	136.1	35 47.9 97 24	136.0	36 16.9 97 24	135.8	36 45.9 97 24	135.7	37 14.9 97 24	135.5	37 43.9 97 24	135.3	38 12.8 97 24	135.2	38 41.8 96 24	135.0	7
8	35 04.5 97 24	135.0	35 33.5 97 24	134.9	36 02.5 97 25	134.7	36 31.4 97 25	134.5	37 00.4 96 25	134.4	37 29.3 96 25	134.2	37 58.2 96 25	134.0	38 27.1 96 25	133.9	8
9	34 49.9 97 25	133.9	35 18.8 96 25	133.7	35 47.8 96 25	133.6	36 16.7 96 25	133.4	36 45.6 96 25	133.3	37 14.5 96 25	133.1	37 43.3 96 25	132.9	38 12.2 96 25	132.7	9
40	34 35.0 96 25	132.8	35 03.9 96 25	132.6	35 32.8 96 25	132.5	36 01.6 96 26	132.3	36 30.5 96 26	132.1	36 59.3 96 26	132.0	37 28.2 96 26	131.8	37 57.0 96 26	131.6	40
1	34 19.8 96 26	131.7	34 48.6 96 26	131.5	35 17.5 96 26	131.4	35 46.3 96 26	131.2	36 15.2 96 26	131.0	36 44.0 96 26	130.9	37 12.8 96 26	130.7	37 41.5 96 26	130.5	1
2	34 04.3 96 26	130.6	34 33.2 96 26	130.4	35 02.0 96 26	130.3	35 30.8 96 26	130.1	35 59.5 96 26	129.9	36 28.3 96 26	129.8	36 57.1 96 27	129.6	37 25.8 96 27	129.4	2
3	33 48.6 96 27	129.5	34 17.4 96 27	129.4	34 46.2 96 27	129.2	35 14.9 96 27	129.0	35 43.7 96 27	128.8	36 12.4 96 27	128.7	36 41.1 96 27	128.5	37 09.8 96 27	128.3	3
4	33 32.7 96 27	128.4	34 01.4 96 27	128.3	34 30.2 96 27	128.1	34 58.9 96 27	127.9	35 27.6 96 27	127.7	35 56.3 96 27	127.6	36 24.9 96 27	127.4	36 53.6 95 27	127.2	4
45	33 16.5 96 27	127.4	33 45.2 96 27	127.2	34 13.9 96 28	127.0	34 42.6 96 28	126.8	35 11.2 96 28	126.7	35 39.9 95 28	126.5	36 08.5 95 28	126.3	36 37.1 95 28	126.1	45
6	33 00.1 96 28	126.3	33 28.7 96 28	126.1	33 57.4 96 28	125.9	34 26.0 96 28	125.8	34 54.7 95 28	125.6	35 23.3 95 28	125.4	35 51.9 95 28	125.2	36 20.4 95 28	125.0	6
7	32 43.4 95 28	125.2	33 12.0 95 28	125.0	33 40.7 95 28	124.9	34 09.3 95 28	124.7	34 37.9 95 28	124.5	35 06.4 95 28	124.3	35 35.0 95 28	124.1	36 03.5 95 29	123.9	7
8	32 26.5 95 28	124.2	32 55.1 95 29	124.0	33 23.7 95 29	123.8	33 52.3 95 29	123.6	34 20.8 95 29	123.4	34 49.4 95 29	123.2	35 17.9 95 29	123.1	35 46.4 95 29	122.9	8
9	32 09.4 95 29	123.1	32 38.0 95 29	122.9	33 06.6 95 29	122.7	33 35.1 95 29	122.6	34 03.6 95 29	122.4	34 32.1 95 29	122.2	35 00.6 95 29	122.0	35 29.0 95 29	121.8	9
50	31 52.2 95 29	122.0	32 20.7 95 29	121.9	32 49.2 95 29	121.7	33 17.7 95 29	121.5	33 46.2 95 29	121.3	34 14.6 95 29	121.1	34 43.1 95 30	120.9	35 11.5 95 30	120.7	50
1	31 34.7 95 30	121.0	32 03.2 95 30	120.8	32 31.6 95 30	120.6	33 00.1 95 30	120.4	33 28.5 95 30	120.2	33 57.0 95 30	120.1	34 25.4 95 30	119.9	34 53.8 95 30	119.7	1
2	31 17.0 95 30	120.0	31 45.4 95 30	119.8	32 13.9 95 30	119.6	32 42.3 95 30	119.4	33 10.7 95 30	119.2	33 39.1 95 30	119.0	34 07.5 95 30	118.8	34 35.8 94 30	118.6	2
3	30 59.1 95 30	118.9	31 27.5 95 30	118.7	31 55.9 95 30	118.5	32 24.3 95 30	118.3	32 52.7 95 30	118.2	33 21.1 96 30	118.0	33 49.4 94 30	117.8	34 17.7 94 30	117.6	3
4	30 41.0 95 30	117.9	31 09.4 95 30	117.7	31 37.8 95 30	117.5	32 06.2 95 31	117.3	32 34.5 94 31	117.1	33 02.9 94 31	116.9	33 31.2 94 31	116.7	33 59.5 94 31	116.5	4
55	30 22.8 95 31	116.8	30 51.2 95 31	116.7	31 19.5 94 31	116.5	31 47.9 94 31	116.3	32 16.2 94 31	116.1	32 44.5 94 31	115.9	33 12.8 94 31	115.7	33 41.0 94 31	115.5	55
6	30 04.4 94 31	115.8	30 32.8 94 31	115.6	31 01.1 94 31	115.4	31 29.4 94 31	115.2	31 57.7 94 31	115.0	32 25.9 94 31	114.8	32 54.2 94 31	114.6	33 22.4 94 31	114.4	6
7	29 45.9 94 31	114.8	30 14.2 94 31	114.6	30 42.5 94 31	114.4	31 10.7 94 31	114.2	31 39.0 94 31	114.0	32 07.2 94 31	113.8	32 35.5 94 31	113.6	33 03.7 94 32	113.4	7
8	29 27.2 94 31	113.8	29 55.4 94 31	113.6	30 23.7 94 32	113.4	30 52.0 94 32	113.2	31 20.2 94 32	113.0	31 48.4 94 32	112.8	32 16.6 94 32	112.6	32 44.7 94 32	112.4	8
9	29 08.3 94 32	112.8	29 36.6 94 32	112.6	30 04.8 94 32	112.4	30 33.0 94 32	112.2	31 01.2 94 32	112.0	31 29.4 94 32	111.8	31 57.6 94 32	111.6	32 25.7 94 32	111.4	9
60	28 49.3 94 32	111.7	29 17.5 94 32	111.5	29 45.8 94 32	111.4	30 13.9 94 32	111.2	30 42.1 94 32	111.0	31 10.3 94 32	110.8	31 38.4 94 32	110.6	32 06.5 94 32	110.3	60
1	28 30.2 94 32	110.7	28 58.4 94 32	110.5	29 26.6 94 32	110.3	29 54.7 94 32	110.1	30 22.9 94 32	109.9	30 51.0 94 32	109.7	31 19.1 94 32	109.5	31 47.2 94 32	109.3	1
2	28 10.9 94 32	109.7	28 39.1 94 32	109.5	29 07.3 94 32	109.3	29 35.4 94 32	109.1	30 03.5 94 32	108.9	30 31.6 94 32	108.7	30 59.7 94 33	108.5	31 27.8 94 33	108.3	2
3	27 51.6 94 32	108.7	28 19.7 94 33	108.5	28 47.9 94 33	108.3	29 16.0 94 33	108.1	29 44.1 94 33	107.9	30 12.2 94 33	107.7	30 40.2 94 33	107.5	31 08.3 93 33	107.3	3
4	27 32.1 94 33	107.7	28 00.2 94 33	107.5	28 28.3 94 33	107.3	28 56.4 94 33	107.1	29 24.5 94 33	106.9	29 52.6 94 33	106.7	30 20.6 93 33	106.5	30 48.6 93 33	106.3	4
65	27 12.5 94 33	106.7	27 40.6 94 33	106.5	28 08.7 94 33	106.3	28 36.8 94 33	106.1	29 04.8 93 33	105.9	29 32.9 93 33	105.7	30 00.9 93 33	105.5	30 28.9 93 33	105.3	65
6	26 52.8 94 33	105.8	27 20.9 94 33	105.6	27 48.9 94 33	105.4	28 17.0 93 33	105.2	28 45.0 93 33	105.0	29 13.1 93 33	104.8	29 41.1 93 33	104.5	30 09.0 93 33	104.3	6
7	26 33.0 94 33	104.8	27 01.0 94 33	104.6	27 29.1 93 33	104.4	27 57.1 93 33	104.2	28 25.2 93 33	104.0	28 53.2 93 33	103.8	29 21.2 93 33	103.6	29 49.1 93 33	103.4	7
8	26 13.1 94 33	103.8	26 41.1 93 33	103.6	27 09.2 93 33	103.4	27 37.2 93 33	103.2	28 05.2 93 33	103.0	28 33.2 93 33	102.8	29 01.2 93 33	102.6	29 29.1 93 33	102.4	8
9	25 53.1 93 33	102.8	26 21.2 93 33	102.6	26 49.2 93 33	102.4	27 17.2 93 33	102.2	27 45.2 93 34	102.0	28 13.1 93 34	101.8	28 41.1 93 34	101.6	29 09.0 93 34	101.4	9
70	25 33.1 93 34	101.8	26 01.1 93 34	101.6	26 29.1 93 34	101.4	26 57.1 93 34	101.2	27 25.1 93 34	101.0	27 53.0 93 34	100.8	28 21.0 93 34	100.6	28 48.9 93 34	100.4	70
1	25 12.9 93 34	100.9	25 41.0 93 34	100.7	26 09.0 93 34	100.5	26 36.9 93 34	100.3	27 04.9 93 34	100.1	27 32.8 93 34	99.9	28 00.8 93 34	99.6	28 28.7 93 34	99.4	1
2	24 52.8 93 34	99.9	25 20.8 93 34	99.7	25 48.7 93 34	99.5	26 16.7 93 34	99.3	26 44.7 93 34	99.1	27 12.6 93 34	98.9	27 40.5 93 34	98.7	28 08.4 93 34	98.5	2
3	24 32.5 93 34	98.9	25 00.5 93 34	98.7	25 28.5 93 34	98.5	25 56.4 93 34	98.3	26 24.4 93 34	98.1	26 52.3 93 34	97.9	27 20.2 93 34	97.7	27 48.1 93 34	97.5	3
4	24 12.2 93 34	98.0	24 40.2 93 34	97.8	25 08.2 93 34	97.6	25 36.1 93 34	97.4	26 04.0 93 34	97.2	26 31.9 93 34	97.0	26 59.8 93 34	96.8	27 27.7 93 34	96.5	4
75	23 51.9 93 34	97.0	24 19.8 93 34	96.8	24 47.8 93 34	96.6	25 15.7 93 34	96.4	25 43.6 93 34	96.2	26 11.5 93 34	96.0	26 39.4 93 34	95.8	27 07.3 93 34	95.6	75
6	23 31.5 93 34	96.1	23 59.4 93 34	95.9	24 27.4 93 34	95.7	24 55.3 93 34	95.5	25 23.2 93 34	95.2	25 51.1 93 34	95.0	26 19.0 93 34	94.8	26 46.9 93 34	94.6	6
7	23 11.1 93 34	95.1	23 39.0 93 34	94.9	24 07.0 93 34	94.7	24 34.9 93 34	94.5	25 02.8 93 34	94.3	25 30.7 93 34	94.1	25 58.5 93 34	93.9	26 26.4 93 34	93.7	7
8	22 50.6 93 34	94.1	23 18.6 93 34	93.9	23 46.5 93 34	93.7	24 14.4 93 34	93.5	24 42.3 93 34	93.3	25 10.2 93 34	93.1	25 38.1 93 34	92.9	26 05.9 93 34	92.7	8
9	22 30.1 93 34	93.2	22 58.1 93 34	93.0	23 26.0 93 34	92.8	23 53.9 93 34	92.6	24 21.8 93 34	92.4	24 49.7 93 34	92.2	25 17.6 93 34	92.0	25 45.4 93 34	91.8	9
80	22 09.6 93 34	92.2	22 37.6 93 34	92.1	23 05.5 93 34	91.9	23 33.4 93 34	91.7	24 01.3 93 34	91.5	24 29.2 93 34	91.3	24 57.0 93 34	91.0	25 24.9 93 34	90.8	80
1	21 49.1 93 34	91.3	22 17.1 93 34	91.1	22 45.0 93 34	90.9	23 12.9 93 34	90.7	23 40.8 93 34	90.5	24 08.7 93 34	90.3	24 36.5 93 34	90.1	25 04.4 93 34	89.9	1
2	21 28.6 93 34	90.4	21 56.5 93 34	90.2	22 24.5 93 34	90.0	22 52.4 93 34	89.8	23 20.3 93 34	89.6	23 48.1 93 34	89.4	24 16.0 93 34	89.2	24 43.8 93 34	89.0	2
3	21 08.1 93 34	89.4	21 36.0 93 34	89.2	22 03.9 93 34	89.0	22 31.8 93 34	88.8	22 59.7 93 34	88.6	23 27.6 93 34	88.4	23 55.5 93 34	88.2	24 23.3 93 34	88.0	3
4	20 47.6 93 34	88.5	21 15.5 93 34	88.3	21 43.4 93 34	88.1	22 11.3 93 34	87.9	22 39.2 93 34	87.7	23 07.1 93 34	87.5	23 35.0 93 34	87.3	24 02.8 93 34	87.1	4
85	20 27.1 93 34	87.6	20 55.0 93 34	87.4	21 22.9 93 34	87.2	21 50.8 93 34	87.0	22 18.7 93 34	86.8	22 46.6 93 34	86.6	23 14.5 93 34	86.4	23 42.3 93 34	86.2	85
6	20 06.6 93 34	86.6	20 34.5 93 34	86.4	21 02.4 93 34	86.2	21 30.4 93 34	86.0	21 58.3 93 34	85.8	22 26.1 93 34	85.6	22 54.0 93 34	85.4	23 21.9 93 34	85.2	6
7	19 46.1 93 34	85.7	20 14.0 93 34	85.5	20 42.0 93 34	85.3	21 09.9 93 34	85.1	21 37.8 93 34	84.9	22 05.7 93 34	84.7	22 33.6 93 34	84.5	23 01.4 93 34	84.3	7
8	19 25.6 93 34	84.8	19 53.6 93 34	84.6	20 21.5 93 34	84.4	20 49.5 93 34	84.2	21 17.4 93 34	84.0	21 45.3 93 34	83.8	22 13.2 93 34	83.6	22 41.0 93 34	83.4	8
9	19 05.2 93 34	83.8	19 33.2 93 34	83.6	20 01.1 93 34	83.4	20 29.1 93 34	83.3	20 57.0 93 34	83.1	21 24.9 93 34	82.9	21 52.8 93 34	82.7	22 20.7 93 34	82.5	9
90	18 44.8 93 34	82.9	19 12.8 93 34	82.7	19 40.8 93 34	82.5	20 08.7 93 34	82.3	20 36.6 93 34	82.1	21 04.6 93 34	81.9	21 32.5 93 34	81.7	22 00.4 93 34	81.5	90

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	18 24.5	93	34	82.0	18 52.5	93	34	81.8	19 20.4	93	34	81.6	19 48.4	93	34	81.4	20 16.3	93	34	81.2	20 44.3	93	34	81.0	21 12.2	93	34	80.8	21 40.1	93	34	80.6	91
2	18 04.2	93	34	81.1	18 32.2	93	34	80.9	19 00.2	93	34	80.7	19 28.1	93	34	80.5	19 56.1	93	34	80.3	20 24.0	93	34	80.1	20 51.9	93	34	79.9	21 19.9	93	34	79.7	2
3	17 43.9	93	34	80.1	18 11.9	93	34	79.9	18 39.9	93	34	79.8	19 07.9	93	34	79.6	19 35.9	93	34	79.4	20 03.8	93	34	79.2	20 31.8	93	34	79.0	20 59.7	93	34	78.8	3
4	17 23.8	93	34	79.2	17 51.8	93	34	79.0	18 19.8	93	34	78.8	18 47.8	93	33	78.6	19 15.7	93	33	78.5	19 43.7	93	33	78.3	20 11.7	93	33	78.1	20 39.6	93	33	77.9	4
95	17 03.6	93	33	78.3	17 31.7	93	33	78.1	17 59.7	93	33	77.9	18 27.7	93	33	77.7	18 55.7	93	33	77.5	19 23.6	93	33	77.4	19 51.6	93	33	77.2	20 19.6	93	33	77.0	95
6	16 43.6	93	33	77.4	17 11.6	93	33	77.2	17 39.6	93	33	77.0	18 07.7	93	33	76.8	18 35.7	93	33	76.6	19 03.7	93	33	76.4	19 31.6	93	33	76.2	19 59.6	93	33	76.1	6
7	16 23.6	94	33	76.5	16 51.6	93	33	76.3	17 19.7	93	33	76.1	17 47.7	93	33	75.9	18 15.7	93	33	75.7	18 43.8	93	33	75.5	19 11.8	93	33	75.3	19 39.7	93	33	75.1	7
8	16 03.7	94	33	75.5	16 31.7	94	33	75.4	16 59.8	94	33	75.2	17 27.9	93	33	75.0	17 55.9	93	33	74.8	18 23.9	93	33	74.6	18 51.9	93	33	74.4	19 19.9	93	33	74.2	8
9	15 43.8	94	33	74.6	16 11.9	94	33	74.4	16 40.0	94	33	74.3	17 08.1	94	33	74.1	17 36.1	94	33	73.9	18 04.2	93	33	73.7	18 32.2	93	33	73.5	19 00.2	93	33	73.3	9
100	15 24.1	94	33	73.7	15 52.2	94	33	73.5	16 20.3	94	33	73.4	16 48.4	94	33	73.2	17 16.5	94	33	73.0	17 44.5	94	33	72.8	18 12.6	94	33	72.6	18 40.6	93	33	72.4	100
1	15 04.4	94	33	72.8	15 32.6	94	33	72.6	16 00.7	94	33	72.4	16 28.8	94	32	72.3	16 56.9	94	32	72.1	17 25.0	94	32	71.9	17 53.1	94	32	71.7	18 21.1	94	32	71.5	1
2	14 44.9	94	32	71.9	15 13.0	94	32	71.7	15 41.2	94	32	71.5	16 09.3	94	32	71.4	16 37.4	94	32	71.2	17 05.5	94	32	71.0	17 33.6	94	32	70.8	18 01.7	94	32	70.6	2
3	14 25.4	94	32	71.0	14 53.6	94	32	70.8	15 21.8	94	32	70.6	15 49.9	94	32	70.4	16 18.0	94	32	70.3	16 46.2	94	32	70.1	17 14.3	94	32	69.9	17 42.4	94	32	69.7	3
4	14 06.1	94	32	70.1	14 34.3	94	32	69.9	15 02.5	94	32	69.7	15 30.6	94	32	69.5	15 58.8	94	32	69.4	16 26.9	94	32	69.2	16 55.1	94	32	69.0	17 23.2	94	32	68.8	4
105	13 46.9	94	32	69.2	14 15.1	94	32	69.0	14 43.3	94	32	68.8	15 11.5	94	32	68.6	15 39.6	94	32	68.5	16 07.8	94	32	68.3	16 36.0	94	32	68.1	17 04.1	94	32	67.9	105
6	13 27.7	94	32	68.2	13 56.0	94	32	68.1	14 24.2	94	32	67.9	14 52.4	94	32	67.7	15 20.6	94	32	67.5	15 48.8	94	31	67.4	16 17.0	94	31	67.2	16 45.2	94	31	67.0	6
7	13 08.7	94	31	67.3	13 37.0	94	31	67.2	14 05.2	94	31	67.0	14 33.5	94	31	66.8	15 01.7	94	31	66.6	15 29.9	94	31	66.5	15 58.1	94	31	66.3	16 26.4	94	31	66.1	7
8	12 49.9	94	31	66.4	13 18.1	94	31	66.3	13 46.4	94	31	66.1	14 14.7	94	31	65.9	14 42.9	94	31	65.7	15 11.2	94	31	65.6	15 39.4	94	31	65.4	16 07.7	94	31	65.2	8
9	12 31.1	94	31	65.5	12 59.4	94	31	65.4	13 27.7	94	31	65.2	13 56.0	94	31	65.0	14 24.3	94	31	64.8	14 52.6	94	31	64.7	15 20.8	94	31	64.5	15 49.1	94	31	64.3	9
110	12 12.5	94	31	64.6	12 40.8	94	31	64.4	13 09.2	94	31	64.3	13 37.5	94	31	64.1	14 05.8	94	31	63.9	14 34.1	94	31	63.8	15 02.4	94	31	63.6	15 30.7	94	30	63.4	110
1	11 54.0	95	31	63.7	12 22.4	95	30	63.5	12 50.7	94	30	63.4	13 19.1	94	30	63.2	13 47.4	94	30	63.0	14 15.8	94	30	62.9	14 44.1	94	30	62.7	15 12.4	94	30	62.5	1
2	11 35.7	95	30	62.8	12 04.1	95	30	62.6	12 32.5	95	30	62.5	13 00.8	95	30	62.3	13 29.2	95	30	62.1	13 57.6	95	30	62.0	14 25.9	94	30	61.8	14 54.3	94	30	61.6	2
3	11 17.5	95	30	61.9	11 45.9	95	30	61.7	12 14.4	95	30	61.6	12 42.8	95	30	61.4	13 11.1	95	30	61.2	13 39.5	95	30	61.1	14 07.9	95	30	60.9	14 36.3	95	30	60.7	3
4	10 59.5	95	30	61.0	11 28.0	95	30	60.8	11 56.4	95	30	60.7	12 24.8	95	30	60.5	12 53.2	95	30	60.3	13 21.6	95	30	60.2	13 50.1	95	29	60.0	14 18.5	95	29	59.8	4
115	10 41.7	95	30	60.1	11 10.1	95	29	59.9	11 38.6	95	29	59.8	12 07.0	95	29	59.6	12 35.5	95	29	59.4	13 03.9	95	29	59.3	13 32.4	95	29	59.1	14 00.8	95	29	58.9	115
6	10 23.9	95	29	59.2	10 52.4	95	29	59.0	11 20.9	95	29	58.9	11 49.4	95	29	58.7	12 17.9	95	29	58.5	12 46.4	95	29	58.4	13 14.8	95	29	58.2	13 43.3	95	29	58.0	6
7	10 06.4	95	29	58.3	10 34.9	95	29	58.1	11 03.5	95	29	57.9	11 32.0	95	29	57.8	12 00.5	95	29	57.6	12 29.0	95	29	57.5	12 57.5	95	29	57.3	13 26.0	95	29	57.2	7
8	9 49.0	95	29	57.4	10 17.6	95	29	57.2	10 46.1	95	29	57.0	11 14.7	95	28	56.9	11 43.2	95	28	56.7	12 11.8	95	28	56.6	12 40.3	95	28	56.4	13 08.8	95	28	56.3	8
9	9 31.9	95	28	56.4	10 00.4	95	28	56.3	10 29.0	95	28	56.1	10 57.6	95	28	56.0	11 26.2	95	28	55.8	11 54.7	95	28	55.7	12 23.3	95	28	55.5	12 51.8	95	28	55.4	9
120	9 14.8	95	28	55.5	9 43.5	95	28	55.4	10 12.1	95	28	55.2	10 40.7	95	28	55.1	11 09.3	95	28	54.9	11 37.9	95	28	54.8	12 06.5	95	28	54.6	12 35.1	95	28	54.5	120
1	8 58.0	96	28	54.6	9 26.7	95	28	54.5	9 55.3	95	28	54.3	10 23.9	95	28	54.2	10 52.6	95	28	54.0	11 21.2	95	27	53.9	11 49.8	95	27	53.7	12 18.4	95	27	53.6	1
2	8 41.4	96	27	53.7	9 10.1	96	27	53.6	9 38.7	96	27	53.4	10 07.4	96	27	53.3	10 36.1	96	27	53.1	11 04.7	96	27	53.0	11 33.4	96	27	52.8	12 02.0	96	27	52.7	2
3	8 24.9	96	27	52.8	8 53.6	96	27	52.7	9 22.3	96	27	52.5	9 51.0	96	27	52.4	10 19.7	96	27	52.2	10 48.4	96	27	52.1	11 17.1	96	27	51.9	11 45.8	96	27	51.8	3
4	8 08.7	96	27	51.9	8 37.4	96	27	51.8	9 06.2	96	27	51.6	9 34.9	96	27	51.5	10 03.6	96	27	51.3	10 32.4	96	26	51.2	11 01.1	96	26	51.0	11 29.8	96	26	50.9	4
125	7 52.6	96	26	51.0	8 21.4	96	26	50.9	8 50.2	96	26	50.7	9 18.9	96	26	50.6	9 47.7	96	26	50.4	10 16.5	96	26	50.3	10 45.2	96	26	50.1	11 14.0	96	26	50.0	125
6	7 36.8	96	26	50.1	8 05.6	96	26	49.9	8 34.4	96	26	49.8	9 03.2	96	26	49.7	9 32.0	96	26	49.5	10 00.8	96	26	49.4	10 29.6	96	26	49.2	10 58.4	96	26	49.1	6
7	7 21.2	96	26	49.2	7 50.0	96	26	49.0	8 18.8	96	26	48.9	8 47.7	96	26	48.8	9 16.5	96	26	48.6	9 45.3	96	25	48.5	10 14.1	96	26	48.3	10 43.0	96	26	48.2	7
8	7 05.7	96	26	48.3	7 34.6	96	26	48.1	8 03.5	96	26	48.0	8 32.3	96	26	47.9	9 01.2	96	26	47.7	9 30.1	96	26	47.6	9 58.9	96	25	47.4	10 27.8	96	26	47.3	8
9	6 50.5	96	26	47.4	7 19.4	96	26	47.2	7 48.3	96	26	47.1	8 17.2	96	26	46.9	8 46.1	96	26	46.8	9 15.0	96	26	46.7	9 43.9	96	26	46.5	10 12.8	96	26	46.4	9
130	6 35.5	96	25	46.4	7 04.5	96	26	46.3	7 33.4	96	24	46.2	8 02.3	96	24	46.0	8 31.3	96	24	45.9	9 00.2	96	24	45.8	9 29.1	96	24	45.6	9 58.0	96	24	45.5	130
1	6 20.8	97	24	45.5	6 49.8	97	24	45.4	7 18.7	97	24	45.3	7 47.7	97	24	45.1	8 16.7	97	24	45.0	8 45.6	97	24	44.9	9 14.6	97	24	44.7	9 43.5	97	24	44.6	1
2	6 06.3	97	24	44.6	6 35.3	97	24	44.5	7 04.3	97	24	44.4	7 33.3	97	24	44.2	8 02.3	97	24	44.1	8 31.3	97	24	44.0	9 00.2	97	24	43.8	9 29.2	97	23	43.7	2
3	5 52.0	97	23	43.7	6 21.0	97	23	43.6	6 50.0	97	23	43.4	7 19.1	97	23	43.3	7 48.1	97	23	43.2	8 17.1	97	23	43.1	8 46.1	97	23	42.9	9 15.2	97	23	42.8	3
4	5 37.9	97	23	42.8	6 07.0	97	23	42.7	6 36.0	97	23	42.5	7 05.1	97	23	42.4	7 34.2	97	23	42.3	8 03.2	97	23	42.2	8 32.3	97	23	42.0	9 01.3	97	23	41.9	4
135	5 24.1	97	23	41.9	5 53.2	97	23	41.7	6 22.3	97	22	41.6	6 51.4	97	22	41.5	7 20.5	97	22	41.4	7 49.6	97	22	41.3	8 18.7	97	22	41.1	8 47.8	97	22	41.0	135
6	5 10.5	97	22	41.0	5 39.6	97	22	40.8	6 08.8	97	22	40.7	6 37.9	97	22	40.6	7 07.0	97	22	40.5	7 36.2	97	22	40.4	8 05.3	97	22	40.2	8 34.4	97	22	40.1	6
7					5 26.4	97	22	39.9	5 55.5	97	22	39.8	6 24.7	97	22	39.7	6 53.8	97	22	39.6	7 23.0	97	22	39.4	7 52.2	97	21	39.3	8 21.3	97	21	39.2	7
8					5 13.3	97	21	39.0	5 42.5	97	21	38.9	6 11.7	97	21	38.8	6 40.9	97	21	38.7	7 10.1	97	21	38.5	7 39.3	97	21	38.4	8 08.5	97	21	38.3	8
9					5 00.5	97	21	38.1	5 29.8	97	21	38.0	5 59.0	97	21	37.9	6 28.2	97	21	37.7	6 57.4	97	21	37.6	7 26.7	97	21	37.5	7 55.9	97	21	37.4	9
140									5 17.3	98	20	37.1	5 46.5	98	20	36.9	6 15.8	98	20	36.8	6 45.0	98	20	36.7	7 14.3	98	20	36.6	7 43.5	98	20	36.5	140
1									5 05.0	98	20	36.1	5 34.3	98	20	36.0	6 03.6	98	20	35.9	6 32.9	98	20	35.8	7 02.2	98	20	35.7	7 31.5	98	20	35.6	1
2													5 22.4	98	19	35.1	5 51.7	98	19	35.0	6 21.0	98	19	34.9	6 50.3	98	19	34.8	7 19.6	98	19	34.7	2
3													5 10.7	98	19	34.2	5 40.1	98	19	34.1	6 09.4	98	19	34.0	6 38.8	98	19	33.9	7 08.1	98	19	33.8	3
4																	5 28.7	98	18	33.2	5 58.1	98	18	33.1	6 27.4	98	18	33.0	6 56.8	98	18	32.9	4
145																	5 17.6	98	18	32.3	5 47.0	98	18	32.2	6 16.4	98	18	32.1	6 45.8	98	18	32.0	145
6																	5 06.8	98	17	31.4	5 36.2	98	18	31.3	6 05.6	98	18	31.2	6 35.1	98	17	31.1	6
7																					5 25.7	98	17	30.4	5 55.2	98	17	30.3	6 24.6	98	17	30.2	7
8																					5 15.5	98	17	29.4	5 45.0	98	17	29.3	6 14.5	98	16	29.3	8
9																					5 05.5	98	16	28.5	5 35.0	98	16	28.4	6 04.6	98	16	28.4	9
150																									5 25.4	99	16	27.5	5 55.0	99	16	27.5	150
1																									5 16.1	99	15	26.6	5 45.6	99	15	26.5	1
2																									5 07.0	99	15	25.7	5 36.6	99	15	25.6	2
3																													5 27.9	99	14	24.7	3
4																													5 19.5	99	14	23.8	4
155																													5 11.3	99	13	22.9	155
6																													5 03.5	99	13	22.0	6

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 70°

H.A.	24° 00′ Alt.		Az.	24° 30′ Alt.		Az.	25° 00′ Alt.		Az.	25° 30′ Alt.		Az.	26° 00′ Alt.		Az.	26° 30′ Alt.		Az.	27° 00′ Alt.		Az.	27° 30′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	44 00.0	1.0 00	180.0	44 30.0	1.0 00	180.0	45 00.0	1.0 00	180.0	45 30.0	1.0 00	180.0	46 00.0	1.0 00	180.0	46 30.0	1.0 00	180.0	47 00.0	1.0 00	180.0	47 30.0	1.0 00	180.0	00
1	43 59.8	1.0 01	178.7	44 29.8	1.0 01	178.7	44 59.8	1.0 01	178.7	45 29.8	1.0 01	178.7	45 59.8	1.0 01	178.7	46 29.8	1.0 01	178.7	46 59.8	1.0 01	178.7	47 29.8	1.0 01	178.7	1
2	43 59.1	1.0 02	177.5	44 29.1	1.0 02	177.4	44 59.1	1.0 02	177.4	45 29.1	1.0 02	177.4	45 59.1	1.0 02	177.4	46 29.1	1.0 02	177.4	46 59.1	1.0 02	177.4	47 29.1	1.0 02	177.4	2
3	43 58.0	1.0 03	176.2	44 27.9	1.0 03	176.2	44 57.9	1.0 03	176.2	45 27.9	1.0 03	176.1	45 57.9	1.0 03	176.1	46 27.9	1.0 03	176.1	46 57.9	1.0 03	176.1	47 27.9	1.0 03	176.1	3
4	43 56.4	1.0 03	174.9	44 26.3	1.0 03	174.9	44 56.3	1.0 03	174.9	45 26.3	1.0 03	174.9	45 56.3	1.0 03	174.8	46 26.3	1.0 04	174.8	46 56.3	1.0 04	174.8	47 26.2	1.0 04	174.8	4
05	43 54.3	1.0 04	173.7	44 24.3	1.0 04	173.6	44 54.3	1.0 04	173.6	45 24.2	1.0 04	173.6	45 54.2	1.0 04	173.5	46 24.2	1.0 04	173.5	46 54.2	1.0 04	173.5	47 24.1	1.0 04	173.4	05
6	43 51.8	1.0 05	172.4	44 21.8	1.0 05	172.4	44 51.8	1.0 05	172.3	45 21.7	1.0 05	172.3	45 51.7	1.0 05	172.2	46 21.6	1.0 05	172.2	46 51.6	1.0 05	172.2	47 21.6	1.0 05	172.1	6
7	43 48.9	1.0 06	171.1	44 18.8	1.0 06	171.1	44 48.8	1.0 06	171.0	45 18.7	1.0 06	171.0	45 48.7	1.0 06	171.0	46 18.6	1.0 06	170.9	46 48.6	1.0 06	170.9	47 18.5	1.0 06	170.8	7
8	43 45.5	1.0 06	169.9	44 15.4	1.0 06	169.8	44 45.4	1.0 06	169.8	45 15.3	1.0 06	169.7	45 45.2	1.0 07	169.7	46 15.2	1.0 07	169.6	46 45.1	1.0 07	169.6	47 15.0	1.0 07	169.5	8
9	43 41.7	1.0 07	168.6	44 11.6	1.0 07	168.5	44 41.5	1.0 07	168.5	45 11.4	1.0 07	168.4	45 41.3	1.0 07	168.4	46 11.2	1.0 07	168.3	46 41.1	1.0 07	168.3	47 11.1	1.0 07	168.2	9
10	43 37.4	1.0 08	167.3	44 07.3	1.0 08	167.3	44 37.2	1.0 08	167.2	45 07.1	1.0 08	167.2	45 37.0	1.0 08	167.1	46 06.9	1.0 08	167.0	46 36.7	1.0 08	167.0	47 06.6	1.0 08	166.9	10
1	43 32.7	1.0 09	166.1	44 02.5	1.0 09	166.0	44 32.4	1.0 09	166.0	45 02.3	1.0 09	165.9	45 32.2	1.0 09	165.8	46 02.0	1.0 09	165.8	46 31.9	1.0 09	165.7	47 01.8	1.0 09	165.6	1
2	43 27.5	1.0 09	164.8	43 57.4	1.0 09	164.8	44 27.2	1.0 09	164.7	44 57.1	99 09	164.6	45 26.9	99 09	164.6	45 56.8	99 10	164.5	46 26.6	99 10	164.4	46 56.4	99 10	164.3	2
3	43 21.9	99 10	163.6	43 51.8	99 10	163.5	44 21.6	99 10	163.4	44 51.4	99 10	163.4	45 21.2	99 10	163.3	45 51.1	99 10	163.2	46 20.9	99 10	163.1	46 50.7	99 10	163.0	3
4	43 15.9	99 11	162.3	43 45.7	99 11	162.3	44 15.5	99 11	162.2	44 45.3	99 11	162.1	45 15.1	99 11	162.0	45 44.9	99 11	161.9	46 14.7	99 11	161.8	46 44.5	99 11	161.8	4
15	43 09.5	99 11	161.1	43 39.3	99 11	161.0	44 09.0	99 12	160.9	44 38.8	99 12	160.8	45 08.6	99 12	160.7	45 38.3	99 12	160.7	46 08.1	99 12	160.6	46 37.8	99 12	160.5	15
6	43 02.6	99 12	159.8	43 32.4	99 12	159.8	44 02.1	99 12	159.7	44 31.8	99 12	159.6	45 01.6	99 12	159.5	45 31.3	99 12	159.4	46 01.0	99 12	159.3	46 30.8	99 12	159.2	6
7	42 55.3	99 13	158.6	43 25.1	99 1[illegible]	158.5	43 54.8	99 13	158.4	44 24.5	99 13	158.3	44 54.2	99 13	158.2	45 23.9	99 13	158.1	45 53.6	99 13	158.0	46 23.2	99 13	157.9	7
8	42 47.6	99 14	157.4	43 17.3	99 14	157.3	43 47.0	99 14	157.2	44 16.7	99 14	157.1	44 46.4	99 14	157.0	45 16.0	99 14	156.9	45 45.7	99 14	156.8	46 15.3	99 14	156.6	8
9	42 39.5	99 14	156.1	43 09.2	99 14	156.0	43 38.8	99 14	155.9	44 08.5	99 14	155.8	44 38.1	99 14	155.7	45 07.7	99 14	155.6	45 37.4	99 15	155.5	46 07.0	99 15	155.4	9
20	42 31.0	99 15	154.9	43 00.7	99 15	154.8	43 30.3	99 15	154.7	43 59.9	99 15	154.6	44 29.5	99 15	154.5	44 59.1	99 15	154.4	45 28.7	99 15	154.2	45 58.2	99 15	154.1	20
1	42 22.2	99 15	153.7	42 51.7	99 16	153.6	43 21.3	99 16	153.5	43 50.9	99 16	153.4	44 20.4	99 16	153.2	44 50.0	98 16	153.1	45 19.5	98 16	153.0	45 49.1	98 16	152.9	1
2	42 12.9	98 16	152.5	42 42.4	98 16	152.4	43 11.9	98 16	152.2	43 41.5	98 16	152.1	44 11.0	98 16	152.0	44 40.5	98 16	151.9	45 10.0	98 17	151.7	45 39.5	98 17	151.6	2
3	42 03.2	98 17	151.3	42 32.7	98 17	151.1	43 02.2	98 17	151.0	43 31.7	98 17	150.9	44 01.2	98 17	150.8	44 30.6	98 17	150.6	45 00.1	98 17	150.5	45 29.6	98 17	150.4	3
4	41 53.1	98 17	150.1	42 22.6	98 17	149.9	42 52.1	98 18	149.8	43 21.5	98 18	149.7	43 51.0	98 18	149.5	44 20.4	98 18	149.4	44 49.8	98 18	149.3	45 19.2	98 18	149.1	4
25	41 42.7	98 18	148.9	42 12.1	98 18	148.7	42 41.6	98 18	148.6	43 11.0	98 18	148.5	43 40.4	98 18	148.3	44 09.8	98 18	148.2	44 39.1	98 18	148.0	45 08.5	98 18	147.9	25
6	41 31.9	98 19	147.7	42 01.3	98 19	147.5	42 30.7	98 19	147.4	43 00.0	98 19	147.2	43 29.4	98 19	147.1	43 58.7	98 19	147.0	44 28.1	98 19	146.8	44 57.4	98 19	146.7	6
7	41 20.8	98 19	146.5	41 50.1	98 19	146.3	42 19.4	98 19	146.2	42 48.8	98 19	146.0	43 18.1	98 19	145.9	43 47.4	98 20	145.7	44 16.7	98 20	145.6	44 46.0	98 20	145.4	7
8	41 09.2	98 20	145.3	41 38.5	98 20	145.1	42 07.8	98 20	145.0	42 37.1	98 20	144.8	43 06.4	98 20	144.7	43 35.7	98 20	144.5	44 04.9	97 20	144.4	44 34.1	97 20	144.2	8
9	40 57.4	98 20	144.1	41 26.6	98 20	143.9	41 55.9	97 20	143.8	42 25.1	97 21	143.6	42 54.4	97 21	143.5	43 23.6	97 21	143.3	43 52.8	97 21	143.2	44 22.0	97 21	143.0	9
30	40 45.2	97 21	142.9	41 14.4	97 21	142.8	41 43.6	97 21	142.6	42 12.8	97 21	142.5	42 42.0	97 21	142.3	43 11.1	97 21	142.1	43 40.3	97 21	142.0	44 09.4	97 21	141.8	30
1	40 32.6	97 21	141.7	41 01.8	97 22	141.6	41 31.0	97 22	141.4	42 00.1	97 22	141.3	42 29.3	97 22	141.1	42 58.4	97 22	141.0	43 27.5	97 22	140.8	43 56.6	97 22	140.6	1
2	40 19.8	97 22	140.6	40 48.9	97 22	140.4	41 18.0	97 22	140.3	41 47.1	97 22	140.1	42 16.2	97 22	139.9	42 45.3	97 22	139.8	43 14.4	97 22	139.6	43 43.4	97 23	139.4	2
3	40 06.6	97 22	139.4	40 35.7	97 23	139.3	41 04.7	97 23	139.1	41 33.8	97 23	138.9	42 02.8	97 23	138.8	42 31.9	97 23	138.6	43 00.9	97 23	138.4	43 29.9	97 23	138.2	3
4	39 53.1	97 23	138.3	40 22.1	97 23	138.1	40 51.1	97 23	137.9	41 20.2	97 23	137.8	41 49.2	97 23	137.6	42 18.2	97 23	137.4	42 47.1	97 23	137.2	43 16.1	96 24	137.1	4
35	39 39.2	97 24	137.1	40 08.3	97 24	136.9	40 37.2	97 24	136.8	41 06.2	97 24	136.6	41 35.2	96 24	136.4	42 04.1	96 24	136.3	42 33.0	96 24	136.1	43 01.9	96 24	135.9	35
6	39 25.1	97 24	136.0	39 54.1	97 24	135.8	40 23.0	96 24	135.6	40 52.0	96 24	135.4	41 20.9	96 24	135.3	41 49.8	96 24	135.1	42 18.7	96 24	134.9	42 47.5	96 25	134.7	6
7	39 10.7	96 24	134.8	39 39.6	96 25	134.7	40 08.5	96 25	134.5	40 37.4	96 25	134.3	41 06.3	96 25	134.1	41 35.1	96 25	133.9	42 04.0	96 25	133.8	42 32.8	96 25	133.6	7
8	38 56.0	96 25	133.7	39 24.9	96 25	133.5	39 53.8	96 25	133.3	40 22.6	96 25	133.2	40 51.4	96 25	133.0	41 20.2	96 25	132.8	41 49.0	96 25	132.6	42 17.8	96 26	132.4	8
9	38 41.1	96 25	132.6	39 09.9	96 26	132.4	39 38.7	96 26	132.2	40 07.5	96 26	132.0	40 36.3	96 26	131.8	41 05.0	96 26	131.7	41 33.8	96 26	131.5	42 02.5	96 26	131.3	9
40	38 25.8	96 26	131.4	38 54.6	96 26	131.3	39 23.4	96 26	131.1	39 52.1	96 26	130.9	40 20.8	96 26	130.7	40 49.6	96 26	130.5	41 18.3	96 26	130.3	41 46.9	96 26	130.1	40
1	38 10.3	96 26	130.3	38 39.0	96 26	130.1	39 07.8	96 26	130.0	39 36.5	96 26	129.8	40 05.2	96 27	129.6	40 33.8	96 27	129.4	41 02.5	95 27	129.2	41 31.1	95 27	129.0	1
2	37 54.5	96 27	129.2	38 23.2	96 27	129.0	38 51.9	96 27	128.8	39 20.6	96 27	128.7	39 49.2	95 27	128.5	40 17.8	95 27	128.3	40 46.4	95 27	128.1	41 15.0	95 27	127.9	2
3	37 38.5	96 27	128.1	38 07.2	96 27	127.9	38 35.8	96 27	127.7	39 04.4	95 27	127.5	39 33.0	95 27	127.3	40 01.6	95 27	127.2	40 30.2	95 28	126.9	40 58.7	95 28	126.7	3
4	37 22.2	95 28	127.0	37 50.8	95 28	126.8	38 19.4	95 28	126.6	38 48.0	95 28	126.4	39 16.6	95 28	126.2	39 45.1	95 28	126.0	40 13.7	95 28	125.8	40 42.2	95 28	125.6	4
45	37 05.7	95 28	125.9	37 34.3	95 28	125.7	38 02.9	95 28	125.5	38 31.4	95 28	125.3	38 59.9	95 28	125.1	39 28.4	95 28	124.9	39 56.9	95 28	124.7	40 25.4	95 28	124.5	45
6	36 49.0	95 28	124.8	37 17.5	95 28	124.6	37 46.0	95 28	124.4	38 14.5	95 28	124.2	38 43.0	95 29	124.0	39 11.5	95 29	123.8	39 39.9	95 29	123.6	40 08.3	95 29	123.4	6
7	36 32.0	95 29	123.7	37 00.5	95 29	123.6	37 29.0	95 29	123.4	37 57.5	95 29	123.2	38 25.9	95 29	123.0	38 54.3	95 29	122.7	39 22.7	95 29	122.5	39 51.1	95 29	122.3	7
8	36 14.9	95 29	122.7	36 43.3	95 29	122.5	37 11.8	95 29	122.3	37 40.2	95 29	122.1	38 08.6	95 29	121.9	38 37.0	95 29	121.7	39 05.3	94 29	121.5	39 33.7	94 29	121.2	8
9	35 57.5	95 29	121.6	36 25.9	95 29	121.4	36 54.3	95 29	121.2	37 22.7	95 29	121.0	37 51.1	95 30	120.8	38 19.4	94 30	120.6	38 47.7	94 30	120.4	39 16.0	94 30	120.2	9
50	35 39.9	95 30	120.5	36 08.3	95 30	120.3	36 36.7	95 30	120.1	37 05.0	94 30	119.9	37 33.3	94 30	119.7	38 01.6	94 30	119.5	38 29.9	94 30	119.3	38 58.2	94 30	119.1	50
1	35 22.1	95 30	119.5	35 50.5	94 30	119.3	36 18.8	94 30	119.1	36 47.1	94 30	118.9	37 15.4	94 30	118.6	37 43.7	94 30	118.4	38 11.9	94 30	118.2	38 40.1	94 30	118.0	1
2	35 04.2	94 30	118.4	35 32.5	94 30	118.2	36 00.8	94 30	118.0	36 29.1	94 30	117.8	36 57.3	94 30	117.6	37 25.5	94 31	117.4	37 53.8	94 31	117.2	38 21.9	94 31	116.9	2
3	34 46.0	94 30	117.4	35 14.3	94 31	117.2	35 42.6	94 31	116.9	36 10.8	94 31	116.7	36 39.0	94 31	116.5	37 07.2	94 31	116.3	37 35.4	94 31	116.1	38 03.6	94 31	115.9	3
4	34 27.7	94 31	116.3	34 56.0	94 31	116.1	35 24.2	94 31	115.9	35 52.4	94 31	115.7	36 20.6	94 31	115.5	36 48.8	94 31	115.3	37 16.9	94 31	115.0	37 45.0	94 31	114.8	4
55	34 09.3	94 31	115.3	34 37.5	94 31	115.1	35 05.7	94 31	114.9	35 33.8	94 31	114.6	36 02.0	94 31	114.4	36 30.1	94 31	114.2	36 58.2	94 31	114.0	37 26.3	94 31	113.8	55
6	33 50.6	94 31	114.2	34 18.8	94 31	114.0	34 47.0	94 31	113.8	35 15.1	94 31	113.6	35 43.2	94 32	113.4	36 11.3	94 32	113.2	36 39.4	94 32	113.0	37 07.5	93 32	112.7	6
7	33 31.8	94 32	113.2	34 00.0	94 32	113.0	34 28.1	94 32	112.8	34 56.2	94 32	112.6	35 24.3	94 32	112.4	35 52.4	94 32	112.1	36 20.4	93 32	111.9	36 48.5	93 32	111.7	7
8	33 12.9	94 32	112.2	33 41.0	94 32	112.0	34 09.1	94 32	111.8	34 37.2	94 32	111.5	35 05.3	94 32	111.3	35 33.3	93 32	111.1	36 01.3	93 32	110.9	36 29.3	93 32	110.7	8
9	32 53.8	94 32	111.2	33 21.9	94 32	110.9	33 50.0	94 32	110.7	34 18.1	93 32	110.5	34 46.1	93 32	110.3	35 14.1	93 32	110.1	35 42.1	93 32	109.9	36 10.1	93 32	109.6	9
60	32 34.6	94 32	110.1	33 02.7	94 32	109.9	33 30.8	93 32	109.7	33 58.8	93 32	109.5	34 26.8	93 32	109.3	34 54.8	93 32	109.1	35 22.7	93 32	108.8	35 50.7	93 32	108.6	60
1	32 15.3	94 32	109.1	32 43.3	93 32	108.9	33 11.4	93 32	108.7	33 39.4	93 33	108.5	34 07.4	93 33	108.3	34 35.3	93 33	108.1	35 03.3	93 33	107.8	35 31.2	93 33	107.6	1
2	31 55.8	93 33	108.1	32 23.9	93 33	107.9	32 51.9	93 33	107.7	33 19.9	93 33	107.5	33 47.8	93 33	107.3	34 15.8	93 33	107.0	34 43.7	93 33	106.8	35 11.6	93 33	106.6	2
3	31 36.3	93 33	107.1	32 04.3	93 33	106.9	32 32.3	93 33	106.7	33 00.2	93 33	106.5	33 28.2	93 33	106.3	33 56.1	93 33	106.0	34 24.0	93 33	105.8	34 51.8	93 33	105.6	3
4	31 16.6	93 33	106.1	31 44.6	93 33	105.9	32 12.6	93 33	105.7	32 40.5	93 33	105.5	33 08.4	93 33	105.3	33 36.3	93 33	105.0	34 04.2	93 33	104.8	34 32.0	93 33	104.6	4
65	30 56.9	93 33	105.1	31 24.8	93 33	104.9	31 52.8	93 33	104.7	32 20.7	93 33	104.5	32 48.6	93 33	104.3	33 16.5	93 33	104.0	33 44.3	93 33	103.8	34 12.1	93 33	103.6	65
6	30 37.0	93 33	104.1	31 04.9	93 33	103.9	31 32.9	93 33	103.7	32 00.8	93 33	103.5	32 28.6	93 33	103.3	32 56.5	93 33	103.0	33 24.3	93 33	102.8	33 52.1	93 33	102.6	6
7	30 17.1	93 33	103.1	30 45.0	93 33	102.9	31 12.9	93 33	102.7	31 40.8	93 33	102.5	32 08.6	93 33	102.3	32 36.5	93 34	102.1	33 04.3	93 34	101.8	33 32.1	93 34	101.6	7
8	29 57.0	93 34	102.2	30 24.9	93 34	101.9	30 52.8	93 34	101.7	31 20.7	93 34	101.5	31 48.5	93 34	101.3	32 16.4	93 34	101.1	32 44.2	93 34	100.9	33 11.9	93 34	100.6	8
9	29 36.9	93 34	101.2	30 04.8	93 34	101.0	30 32.7	93 34	100.8	31 00.6	93 34	100.5	31 28.4	93 34	100.3	31 56.2	93 34	100.1	32 24.0	93 34	99.9	32 51.7	92 34	99.6	9
70	29 16.8	93 34	100.2	29 44.7	93 34	100.0	30 12.5	93 34	99.8	30 40.4	93 34	99.6	31 08.2	93 34	99.3	31 36.0	93 34	99.1	32 03.7	93 34	98.9	32 31.5	92 34	98.7	70
1	28 56.5	93 34	99.2	29 24.4	93 34	99.0	29 52.3	93 34	98.8	30 20.1	93 34	98.6	30 47.9	93 34	98.4	31 15.7	93 34	98.2	31 43.4	92 34	97.9	32 11.2	92 34	97.7	1
2	28 36.3	93 34	98.3	29 04.1	93 34	98.1	29 32.0	93 34	97.8	29 59.8	93 34	97.6	30 27.6	93 34	97.4	30 55.3	93 34	97.2	31 23.1	92 34	97.0	31 50.8	92 34	96.7	2
3	28 15.9	93 34	97.3	28 43.8	93 34	97.1	29 11.6	93 34	96.9	29 39.4	93 34	96.7	30 07.2	93 34	96.4	30 35.0	93 34	96.2	31 02.7	92 34	96.0	31 30.4	92 34	95.8	3
4	27 55.6	93 34	96.3	28 23.4	93 34	96.1	28 51.2	93 34	95.9	29 19.0	93 34	95.7	29 46.8	93 34	95.5	30 14.5	92 34	95.3	30 42.3	92 34	95.0	31 10.0	92 34	94.8	4
75	27 35.1	93 34	95.4	28 03.0	93 34	95.2	28 30.8	93 34	95.0	28 58.6	93 34	94.7	29 26.3	93 34	94.5	29 54.1	92 34	94.3	30 21.8	92 34	94.1	30 49.5	92 34	93.9	75
6	27 14.7	93 34	94.4	27 42.5	93 34	94.2	28 10.3	93 34	94.0	28 38.1	93 34	93.8	29 05.9	93 34	93.6	29 33.6	92 34	93.4	30 01.3	92 34	93.1	30 29.0	92 34	92.9	6
7	26 54.2	93 34	93.5	27 22.0	93 34	93.3	27 49.8	93 34	93.0	28 17.6	93 34	92.8	28 45.4	92 34	92.6	29 13.1	92 34	92.4	29 40.8	92 34	92.2	30 08.5	92 34	92.0	7
8	26 33.7	93 34	92.5	27 01.5	93 34	92.3	27 29.3	93 34	92.1	27 57.1	93 34	91.9	28 24.9	92 34	91.7	28 52.6	92 34	91.5	29 20.3	92 34	91.2	29 48.0	92 34	91.0	8
9	26 13.2	93 34	91.6	26 41.0	93 34	91.4	27 08.8	93 34	91.2	27 36.6	93 34	90.9	28 04.4	92 34	90.7	28 32.1	92 34	90.5	28 59.8	92 34	90.3	29 27.5	92 34	90.1	9
80	25 52.7	93 34	90.6	26 20.5	93 34	90.4	26 48.3	93 34	90.2	27 16.1	93 34	90.0	27 43.8	92 34	89.8	28 11.6	92 34	89.6	28 39.3	92 34	89.4	29 07.0	92 34	89.1	80
1	25 32.2	93 34	89.7	26 00.0	93 34	89.5	26 27.8	93 34	89.3	26 55.6	93 34	89.1	27 23.3	92 34	88.9	27 51.0	92 34	88.6	28 18.8	92 34	88.4	28 46.5	92 34	88.2	1
2	25 11.7	93 34	88.8	25 39.5	93 34	88.5	26 07.3	93 34	88.3	26 35.0	93 34	88.1	27 02.8	92 34	87.9	27 30.5	92 34	87.7	27 58.3	92 34	87.5	28 26.0	92 34	87.3	2
3	24 51.2	93 34	87.8	25 19.0	93 34	87.6	25 46.8	93 34	87.4	26 14.5	93 34	87.2	26 42.3	92 34	87.0	27 10.0	92 34	86.8	27 37.8	92 34	86.6	28 05.5	92 34	86.3	3
4	24 30.7	93 34	86.9	24 58.5	93 34	86.7	25 26.3	93 34	86.5	25 54.1	93 34	86.3	26 21.8	93 34	86.1	26 49.6	92 34	85.8	27 17.3	92 34	85.6	27 45.0	92 34	85.4	4
85	24 10.2	93 34	86.0	24 38.0	93 34	85.8	25 05.8	93 34	85.5	25 33.6	93 34	85.3	26 01.4	93 34	85.1	26 29.1	92 34	84.9	26 56.8	92 34	84.7	27 24.6	92 34	84.5	85
6	23 49.7	93 34	85.0	24 17.5	93 34	84.8	24 45.4	93 34	84.6	25 13.2	93 34	84.4	25 40.9	93 34	84.2	26 08.7	92 34	84.0	26 36.4	92 34	83.8	27 04.1	92 34	83.6	6
7	23 29.3	93 34	84.1	23 57.1	93 34	83.9	24 24.9	93 34	83.7	24 52.7	93 34	83.5	25 20.5	93 34	83.3	25 48.3	93 34	83.1	26 16.0	92 34	82.9	26 43.8	92 34	82.6	7
8	23 08.9	93 34	83.2	23 36.7	93 34	83.0	24 04.6	93 34	82.8	24 32.4	93 34	82.6	25 00.2	93 34	82.4	25 27.9	93 34	82.2	25 55.7	92 34	81.9	26 23.4	92 34	81.7	8
9	22 48.5	93 34	82.3	23 16.4	93 34	82.1	23 44.2	93 34	81.9	24 12.0	93 34	81.7	24 39.9	93 34	81.4	25 07.6	93 34	81.2	25 35.4	93 34	81.0	26 03.2	92 34	80.8	9
90	22 28.2	93 34	81.3	22 56.1	93 34	81.1	23 23.9	93 34	80.9	23 51.8	93 34	80.7	24 19.6	93 34	80.5	24 47.4	93 34	80.3	25 15.2	93 34	80.1	25 42.9	93 34	79.9	90

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	22 08.0	93 34	80.4	22 35.8	93 34	80.2	23 03.7	93 34	80.0	23 31.5	93 34	79.8	23 59.4	93 34	79.6	24 27.2	93 34	79.4	24 55.0	93 34	79.2	25 22.8	93 34	79.0	91
2	21 47.8	93 34	79.5	22 15.6	93 34	79.3	22 43.5	93 34	79.1	23 11.4	93 34	78.9	23 39.2	93 34	78.7	24 07.0	93 33	78.5	24 34.8	93 33	78.3	25 02.6	93 33	78.1	2
3	21 27.6	93 33	78.6	21 55.5	93 33	78.4	22 23.4	93 33	78.2	22 51.3	93 33	78.0	23 19.1	93 33	77.8	23 47.0	93 33	77.6	24 14.8	93 33	77.4	24 42.6	93 33	77.2	3
4	21 07.5	93 33	77.7	21 35.4	93 33	77.5	22 03.3	93 33	77.3	22 31.2	93 33	77.1	22 59.1	93 33	76.9	23 27.0	93 33	76.7	23 54.8	93 33	76.5	24 22.6	93 33	76.3	4
95	20 47.5	93 33	76.8	21 15.4	93 33	76.6	21 43.4	93 33	76.4	22 11.3	93 33	76.2	22 39.2	93 33	76.0	23 07.0	93 33	75.8	23 34.9	93 33	75.6	24 02.7	93 33	75.4	95
6	20 27.6	93 33	75.9	20 55.5	93 33	75.7	21 23.5	93 33	75.5	21 51.4	93 33	75.3	22 19.3	93 33	75.1	22 47.2	93 33	74.9	23 15.1	93 33	74.7	23 42.9	93 33	74.5	6
7	20 07.7	93 33	75.0	20 35.7	93 33	74.8	21 03.6	93 33	74.6	21 31.6	93 33	74.4	21 59.5	93 33	74.2	22 27.4	93 33	74.0	22 55.3	93 33	73.8	23 23.2	93 33	73.6	7
8	19 47.9	93 33	74.0	20 15.9	93 33	73.9	20 43.9	93 33	73.7	21 11.9	93 33	73.5	21 39.8	93 33	73.3	22 07.7	93 33	73.1	22 35.6	93 33	72.9	23 03.5	93 33	72.7	8
9	19 28.3	93 33	73.1	19 56.3	93 33	73.0	20 24.3	93 33	72.8	20 52.2	93 33	72.6	21 20.2	93 33	72.4	21 48.1	93 32	72.2	22 16.1	93 32	72.0	22 44.0	93 32	71.8	9
100	19 08.7	93 32	72.2	19 36.7	93 32	72.0	20 04.7	93 32	71.9	20 32.7	93 32	71.7	21 00.7	93 32	71.5	21 28.7	93 32	71.3	21 56.6	93 32	71.1	22 24.6	93 32	70.9	100
1	18 49.2	93 32	71.3	19 17.2	93 32	71.1	19 45.2	93 32	71.0	20 13.3	93 32	70.8	20 41.3	93 32	70.6	21 09.3	93 32	70.4	21 37.3	93 32	70.2	22 05.2	93 32	70.0	1
2	18 29.8	94 32	70.4	18 57.9	94 32	70.2	19 25.9	93 32	70.1	19 53.9	93 32	69.9	20 22.0	93 32	69.7	20 50.0	93 32	69.5	21 18.0	93 32	69.3	21 46.0	93 32	69.1	2
3	18 10.5	94 32	69.5	18 38.6	94 32	69.3	19 06.7	94 32	69.2	19 34.7	94 32	69.0	20 02.8	93 32	68.8	20 30.8	93 32	68.6	20 58.9	93 32	68.4	21 26.9	93 32	68.2	3
4	17 51.3	94 32	68.6	18 19.4	94 32	68.4	18 47.5	94 32	68.3	19 15.6	94 32	68.1	19 43.7	94 32	67.9	20 11.8	94 32	67.7	20 39.8	93 32	67.5	21 07.9	93 31	67.3	4
105	17 32.3	94 32	67.7	18 00.4	94 32	67.6	18 28.5	94 31	67.4	18 56.7	94 31	67.2	19 24.8	94 31	67.0	19 52.9	94 31	66.8	20 20.9	94 31	66.6	20 49.0	94 31	66.4	105
6	17 13.4	94 31	66.8	17 41.5	94 31	66.7	18 09.7	94 31	66.5	18 37.8	94 31	66.3	19 05.9	94 31	66.1	19 34.1	94 31	65.9	20 02.2	94 31	65.7	20 30.3	94 31	65.5	6
7	16 54.6	94 31	65.9	17 22.7	94 31	65.8	17 50.9	94 31	65.6	18 19.1	94 31	65.4	18 47.2	94 31	65.2	19 15.4	94 31	65.0	19 43.5	94 31	64.8	20 11.7	94 31	64.7	7
8	16 35.9	94 31	65.0	17 04.1	94 31	64.9	17 32.3	94 31	64.7	18 00.5	94 31	64.5	18 28.7	94 31	64.3	18 56.9	94 31	64.1	19 25.0	94 31	64.0	19 53.2	94 31	63.8	8
9	16 17.3	94 31	64.1	16 45.6	94 31	64.0	17 13.8	94 31	63.8	17 42.0	94 30	63.6	18 10.3	94 30	63.4	18 38.5	94 30	63.3	19 06.7	94 30	63.1	19 34.8	94 30	62.9	9
110	15 58.9	94 30	63.2	16 27.2	94 30	63.1	16 55.5	94 30	62.9	17 23.7	94 30	62.7	17 52.0	94 30	62.5	18 20.2	94 30	62.4	18 48.4	94 30	62.2	19 16.6	94 30	62.0	110
1	15 40.7	94 30	62.4	16 09.0	94 30	62.2	16 37.3	94 30	62.0	17 05.6	94 30	61.8	17 33.8	94 30	61.7	18 02.1	94 30	61.5	18 30.4	94 30	61.3	18 58.6	94 30	61.1	1
2	15 22.6	94 30	61.5	15 50.9	94 30	61.3	16 19.2	94 30	61.1	16 47.5	94 30	60.9	17 15.9	94 30	60.8	17 44.1	94 30	60.6	18 12.4	94 30	60.4	18 40.7	94 30	60.2	2
3	15 04.6	95 30	60.6	15 33.0	95 30	60.4	16 01.3	94 30	60.2	16 29.7	94 30	60.1	16 58.0	94 29	59.9	17 26.3	94 29	59.7	17 54.7	94 29	59.5	18 23.0	94 29	59.4	3
4	14 46.8	95 29	59.7	15 15.2	95 29	59.5	15 43.6	95 29	59.3	16 12.0	95 29	59.2	16 40.4	95 29	59.0	17 08.7	95 29	58.8	17 37.1	94 29	58.7	18 05.4	94 29	58.5	4
115	14 29.2	95 29	58.8	14 57.6	95 29	58.6	15 26.0	95 29	58.4	15 54.4	95 29	58.3	16 22.8	95 29	58.1	16 51.2	95 29	57.9	17 19.6	95 29	57.8	17 48.0	95 29	57.6	115
6	14 11.8	95 29	57.9	14 40.2	95 29	57.7	15 08.6	95 29	57.6	15 37.1	95 29	57.4	16 05.5	95 29	57.2	16 33.9	95 29	57.1	17 02.3	95 28	56.9	17 30.7	95 28	56.7	6
7	13 54.5	95 29	57.0	14 22.9	95 28	56.8	14 51.4	95 28	56.7	15 19.9	95 28	56.5	15 48.3	95 28	56.3	16 16.8	95 28	56.2	16 45.2	95 28	56.0	17 13.7	95 28	55.8	7
8	13 37.3	95 28	56.1	14 05.9	95 28	55.9	14 34.4	95 28	55.8	15 02.9	95 28	55.6	15 31.3	95 28	55.4	15 59.8	95 28	55.3	16 28.3	95 28	55.1	16 56.8	95 28	55.0	8
9	13 20.4	95 28	55.2	13 48.9	95 28	55.0	14 17.5	95 28	54.9	14 46.0	95 28	54.7	15 14.5	95 28	54.6	15 43.1	95 28	54.4	16 11.6	95 28	54.2	16 40.1	95 28	54.1	9
120	13 03.6	95 28	54.3	13 32.2	95 28	54.2	14 00.8	95 28	54.0	14 29.3	95 27	53.8	14 57.9	95 27	53.7	15 26.5	95 27	53.5	15 55.0	95 27	53.4	16 23.5	95 27	53.2	120
1	12 47.1	95 27	53.4	13 15.7	95 27	53.3	13 44.3	95 27	53.1	14 12.9	95 27	52.9	14 41.5	95 27	52.8	15 10.1	95 27	52.6	15 38.6	95 27	52.5	16 07.2	95 27	52.3	1
2	12 30.7	95 27	52.5	12 59.3	95 27	52.4	13 28.0	95 27	52.2	13 56.6	95 27	52.1	14 25.2	95 27	51.9	14 53.8	95 27	51.8	15 22.5	95 27	51.6	15 51.1	95 27	51.4	2
3	12 14.5	96 27	51.6	12 43.2	96 27	51.5	13 11.8	96 27	51.3	13 40.5	96 26	51.2	14 09.2	96 26	51.0	14 37.8	96 26	50.9	15 06.5	95 26	50.7	15 35.1	95 26	50.6	3
4	11 58.5	96 26	50.7	12 27.2	96 26	50.6	12 55.9	96 26	50.4	13 24.6	96 26	50.3	13 53.3	96 26	50.1	14 22.0	96 26	50.0	14 50.7	96 26	49.8	15 19.4	96 26	49.7	4
125	11 42.7	96 26	49.8	12 11.5	96 26	49.7	12 40.2	96 26	49.5	13 08.9	96 26	49.4	13 37.7	96 26	49.3	14 06.4	96 26	49.1	14 35.1	96 26	49.0	15 03.8	96 26	48.8	125
6	11 27.1	96 26	48.9	11 55.9	96 26	48.8	12 24.7	96 26	48.7	12 53.5	96 25	48.5	13 22.2	96 25	48.4	13 51.0	96 25	48.2	14 19.7	96 25	48.1	14 48.5	96 25	47.9	6
7	11 11.8	96 25	48.1	11 40.6	96 25	47.9	12 09.4	96 25	47.8	12 38.2	96 25	47.6	13 07.0	96 25	47.5	13 35.8	96 25	47.3	14 04.6	96 25	47.2	14 33.4	96 25	47.0	7
8	10 56.6	96 25	47.2	11 25.5	96 25	47.0	11 54.3	96 25	46.9	12 23.1	96 25	46.7	12 52.0	96 25	46.6	13 20.8	96 25	46.5	13 49.6	96 25	46.3	14 18.4	96 24	46.2	8
9	10 41.7	96 25	46.3	11 10.6	96 24	46.1	11 39.4	96 24	46.0	12 08.3	96 24	45.8	12 37.2	96 24	45.7	13 06.0	96 24	45.6	13 34.9	96 24	45.4	14 03.8	96 24	45.3	9
130	10 27.0	96 24	45.4	10 55.9	96 24	45.2	11 24.8	96 24	45.1	11 53.7	96 24	45.0	12 22.6	96 24	44.8	12 51.5	96 24	44.7	13 20.4	96 24	44.5	13 49.3	96 24	44.4	130
1	10 12.5	96 24	44.5	10 41.4	96 24	44.3	11 10.4	96 24	44.2	11 39.3	96 24	44.1	12 08.2	96 24	43.9	12 37.2	96 23	43.8	13 06.1	96 23	43.7	13 35.0	96 23	43.5	1
2	9 58.2	97 23	43.6	10 27.2	97 23	43.4	10 56.2	97 23	43.3	11 25.2	97 23	43.2	11 54.1	97 23	43.0	12 23.1	97 23	42.9	12 52.1	97 23	42.8	13 21.0	97 23	42.6	2
3	9 44.2	97 23	42.7	10 13.2	97 23	42.6	10 42.2	97 23	42.4	11 11.2	97 23	42.3	11 40.2	97 23	42.2	12 09.2	97 23	42.0	12 38.2	97 23	41.9	13 07.2	97 23	41.8	3
4	9 30.4	97 23	41.8	9 59.4	97 23	41.7	10 28.5	97 22	41.5	10 57.5	97 22	41.4	11 26.6	97 22	41.3	11 55.6	97 22	41.1	12 24.6	97 22	41.0	12 53.7	97 22	40.9	4
135	9 16.8	97 22	40.9	9 45.9	97 22	40.8	10 15.0	97 22	40.6	10 44.1	97 22	40.5	11 13.2	97 22	40.4	11 42.2	97 22	40.3	12 11.3	97 22	40.1	12 40.4	97 22	40.0	135
6	9 03.5	97 22	40.0	9 32.6	97 22	39.9	10 01.8	97 22	39.7	10 30.9	97 22	39.6	11 00.0	97 22	39.5	11 29.1	97 22	39.4	11 58.2	97 21	39.2	12 27.3	97 21	39.1	6
7	8 50.5	97 21	39.1	9 19.6	97 21	39.0	9 48.8	97 21	38.8	10 17.9	97 21	38.7	10 47.1	97 21	38.6	11 16.2	97 21	38.5	11 45.3	97 21	38.4	12 14.5	97 21	38.2	7
8	8 37.7	97 21	38.2	9 06.8	97 21	38.1	9 36.0	97 21	38.0	10 05.2	97 21	37.8	10 34.4	97 21	37.7	11 03.6	97 21	37.6	11 32.7	97 21	37.5	12 01.9	97 21	37.4	8
9	8 25.1	97 21	37.3	8 54.3	97 20	37.2	9 23.5	97 20	37.1	9 52.7	97 20	36.9	10 21.9	97 20	36.8	10 51.2	97 20	36.7	11 20.4	97 20	36.6	11 49.6	97 20	36.5	9
140	8 12.8	98 20	36.4	8 42.0	97 20	36.3	9 11.3	97 20	36.2	9 40.5	97 20	36.1	10 09.8	97 20	35.9	10 39.0	97 20	35.8	11 08.3	97 20	35.7	11 37.5	97 20	35.6	140
1	8 00.7	98 20	35.5	8 30.0	98 20	35.4	8 59.3	98 20	35.3	9 28.6	98 19	35.2	9 57.9	98 19	35.1	10 27.1	98 19	34.9	10 56.4	98 19	34.8	11 25.7	98 19	34.7	1
2	7 49.0	98 19	34.6	8 18.3	98 19	34.5	8 47.6	98 19	34.4	9 16.9	98 19	34.3	9 46.2	98 19	34.2	10 15.5	98 19	34.1	10 44.8	98 19	33.9	11 14.1	98 19	33.8	2
3	7 37.4	98 19	33.7	8 06.8	98 19	33.6	8 36.1	98 19	33.5	9 05.5	98 19	33.4	9 34.8	98 19	33.3	10 04.2	98 18	33.2	10 33.5	98 18	33.1	11 02.8	98 18	32.9	3
4	7 26.2	98 18	32.8	7 55.6	98 18	32.7	8 24.9	98 18	32.6	8 54.3	98 18	32.5	9 23.7	98 18	32.4	9 53.1	98 18	32.3	10 22.4	98 18	32.2	10 51.8	98 18	32.1	4
145	7 15.2	98 18	31.9	7 44.6	98 18	31.8	8 14.0	98 18	31.7	8 43.4	98 18	31.6	9 12.8	98 18	31.5	9 42.2	98 18	31.4	10 11.6	98 18	31.3	10 41.0	98 17	31.2	145
6	7 04.5	98 17	31.0	7 34.0	98 17	30.9	8 03.4	98 17	30.8	8 32.8	98 17	30.7	9 02.3	98 17	30.6	9 31.7	98 17	30.5	10 01.1	98 17	30.4	10 30.5	98 17	30.3	6
7	6 54.1	98 17	30.1	7 23.6	98 17	30.0	7 53.0	98 17	29.9	8 22.5	98 17	29.8	8 52.0	98 17	29.7	9 21.4	98 17	29.6	9 50.9	98 17	29.5	10 20.3	98 17	29.4	7
8	6 43.9	98 16	29.2	7 13.4	98 16	29.1	7 42.9	98 16	29.0	8 12.4	98 16	28.9	8 41.9	98 16	28.8	9 11.4	98 16	28.7	9 40.9	98 16	28.6	10 10.4	98 16	28.5	8
9	6 34.1	98 16	28.3	7 03.6	98 16	28.2	7 33.1	98 16	28.1	8 02.7	98 16	28.0	8 32.2	98 16	27.9	9 01.7	98 16	27.8	9 31.2	98 16	27.7	10 00.7	98 16	27.6	9
150	6 24.5	99 16	27.4	6 54.1	99 15	27.3	7 23.6	99 15	27.2	7 53.2	98 15	27.1	8 22.7	98 15	27.0	8 52.3	98 15	26.9	9 21.8	98 15	26.8	9 51.4	98 15	26.8	150
1	6 15.2	99 15	26.5	6 44.8	99 15	26.4	7 14.4	99 15	26.3	7 44.0	99 15	26.2	8 13.5	99 15	26.1	8 43.1	99 15	26.0	9 12.7	99 15	26.0	9 42.3	99 15	25.9	1
2	6 06.2	99 15	25.6	6 35.8	99 14	25.5	7 05.4	99 14	25.4	7 35.0	99 14	25.3	8 04.6	99 14	25.2	8 34.2	99 14	25.1	9 03.8	99 14	25.1	9 33.4	99 14	25.0	2
3	5 57.5	99 14	24.6	6 27.2	99 14	24.6	6 56.8	99 14	24.5	7 26.4	99 14	24.4	7 56.0	99 14	24.3	8 25.7	99 14	24.3	8 55.3	99 14	24.2	9 24.9	99 14	24.1	3
4	5 49.1	99 14	23.7	6 18.8	99 13	23.7	6 48.4	99 13	23.6	7 18.1	99 13	23.5	7 47.7	99 13	23.4	8 17.4	99 13	23.4	8 47.0	99 13	23.3	9 16.7	99 13	23.2	4
155	5 41.0	99 13	22.8	6 10.7	99 13	22.8	6 40.4	99 13	22.7	7 10.0	99 13	22.6	7 39.7	99 13	22.5	8 09.4	99 13	22.5	8 39.1	99 13	22.4	9 08.8	99 13	22.3	155
6	5 33.2	99 12	21.9	6 02.9	99 12	21.9	6 32.6	99 12	21.8	7 02.3	99 12	21.7	7 32.0	99 12	21.6	8 01.7	99 12	21.6	8 31.4	99 12	21.5	9 01.1	99 12	21.4	6
7	5 25.7	99 12	21.0	5 55.4	99 12	20.9	6 25.1	99 12	20.9	6 54.9	99 12	20.8	7 24.6	99 12	20.7	7 54.3	99 12	20.7	8 24.0	99 12	20.6	8 53.8	99 12	20.5	7
8	5 18.5	99 12	20.1	5 48.2	99 11	20.0	6 18.0	99 11	20.0	6 47.7	99 11	19.9	7 17.5	99 11	19.8	7 47.2	99 11	19.8	8 17.0	99 11	19.7	8 46.7	99 11	19.6	8
9	5 11.6	99 11	19.2	5 41.3	99 11	19.1	6 11.1	99 11	19.1	6 40.9	99 11	19.0	7 10.7	99 11	18.9	7 40.4	99 11	18.9	8 10.2	99 11	18.8	8 40.0	99 11	18.8	9
160	5 05.0	99 10	18.3	5 34.8	99 10	18.2	6 04.6	99 10	18.2	6 34.4	99 10	18.1	7 04.1	99 10	18.0	7 33.9	99 10	18.0	8 03.7	99 10	17.9	8 33.5	99 10	17.9	160
1				5 28.5	99 10	17.3	5 58.3	99 10	17.3	6 28.1	99 10	17.2	6 57.9	99 10	17.1	7 27.8	99 10	17.1	7 57.6	99 10	17.0	8 27.4	99 10	17.0	1
2				5 22.6	99 09	16.4	5 52.4	99 09	16.4	6 22.2	99 09	16.3	6 52.1	99 09	16.2	7 21.9	99 09	16.2	7 51.7	99 09	16.1	8 21.5	99 09	16.1	2
3				5 16.9	99 09	15.5	5 46.8	99 09	15.4	6 16.6	99 09	15.4	6 46.5	99 09	15.3	7 16.3	99 09	15.3	7 46.2	99 09	15.2	8 16.0	99 09	15.2	3
4				5 11.6	1.0 08	14.6	5 41.5	1.0 08	14.5	6 11.3	1.0 08	14.5	6 41.2	1.0 08	14.4	7 11.1	1.0 08	14.4	7 40.9	1.0 08	14.3	8 10.8	1.0 08	14.3	4
165				5 06.6	1.0 08	13.7	5 36.5	1.0 08	13.6	6 06.3	1.0 08	13.6	6 36.2	1.0 08	13.5	7 06.1	1.0 08	13.5	7 36.0	1.0 08	13.5	8 05.9	1.0 08	13.4	165
6				5 01.9	1.0 07	12.8	5 31.8	1.0 07	12.7	6 01.7	1.0 07	12.7	6 31.6	1.0 07	12.6	7 01.5	1.0 07	12.6	7 31.4	1.0 07	12.6	8 01.3	1.0 07	12.5	6
7							5 27.4	1.0 07	11.8	5 57.3	1.0 07	11.8	6 27.2	1.0 07	11.7	6 57.2	1.0 07	11.7	7 27.1	1.0 07	11.7	7 57.0	1.0 07	11.6	7
8							5 23.4	1.0 06	10.9	5 53.3	1.0 06	10.9	6 23.2	1.0 06	10.8	6 53.2	1.0 06	10.8	7 23.1	1.0 06	10.8	7 53.0	1.0 06	10.7	8
9							5 19.7	1.0 06	10.0	5 49.6	1.0 06	10.0	6 19.5	1.0 06	09.9	6 49.5	1.0 06	09.9	7 19.4	1.0 06	09.9	7 49.3	1.0 06	09.8	9
170							5 16.3	1.0 05	09.1	5 46.2	1.0 05	09.1	6 16.1	1.0 05	09.0	6 46.1	1.0 05	09.0	7 16.0	1.0 05	09.0	7 46.0	1.0 05	08.9	170
1							5 13.2	1.0 05	08.2	5 43.1	1.0 05	08.2	6 13.1	1.0 05	08.1	6 43.0	1.0 05	08.1	7 13.0	1.0 05	08.1	7 43.0	1.0 05	08.0	1
2							5 10.4	1.0 04	07.3	5 40.4	1.0 04	07.3	6 10.3	1.0 04	07.2	6 40.3	1.0 04	07.2	7 10.3	1.0 04	07.2	7 40.2	1.0 04	07.2	2
3							5 08.0	1.0 04	06.4	5 37.9	1.0 04	06.3	6 07.9	1.0 04	06.3	6 37.9	1.0 04	06.3	7 07.9	1.0 03	06.3	7 37.8	1.0 03	06.3	3
4							5 05.9	1.0 03	05.5	5 35.8	1.0 03	05.4	6 05.8	1.0 03	05.4	6 35.8	1.0 03	05.4	7 05.8	1.0 03	05.4	7 35.8	1.0 03	05.4	4
175							5 04.1	1.0 02	04.5	5 34.1	1.0 02	04.5	6 04.0	1.0 02	04.5	6 34.0	1.0 02	04.5	7 04.0	1.0 02	04.5	7 34.0	1.0 02	04.5	175
6							5 02.6	1.0 02	03.6	5 32.6	1.0 02	03.6	6 02.6	1.0 02	03.6	6 32.6	1.0 02	03.6	7 02.6	1.0 02	03.6	7 32.6	1.0 02	03.6	6
7							5 01.5	1.0 01	02.7	5 31.5	1.0 01	02.7	6 01.5	1.0 01	02.7	6 31.5	1.0 01	02.7	7 01.4	1.0 01	02.7	7 31.4	1.0 01	02.7	7
8							5 00.7	1.0 01	01.8	5 30.6	1.0 01	01.8	6 00.6	1.0 01	01.8	6 30.6	1.0 01	01.8	7 00.6	1.0 01	01.8	7 30.6	1.0 01	01.8	8
9							5 00.2	1.0 00	00.9	5 30.2	1.0 00	00.9	6 00.2	1.0 00	00.9	6 30.2	1.0 00	00.9	7 00.2	1.0 00	00.9	7 30.2	1.0 00	00.9	9
180							5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	180

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	48 00.0	1.0 00	180.0	48 30.0	1.0 00	180.0	49 00.0	1.0 00	180.0	50 00.0	1.0 00	180.0	52 00.0	1.0 00	180.0	54 00.0	1.0 00	180.0	54 30.0	1.0 00	180.0	55 30.0	1.0 00	180.0	00
1	47 59.8	1.0 01	178.7	48 29.8	1.0 01	178.7	48 59.8	1.0 01	178.7	49 59.8	1.0 01	178.7	51 59.8	1.0 01	178.6	53 59.7	1.0 01	178.6	54 29.7	1.0 01	178.6	55 29.7	1.0 01	178.6	1
2	47 59.1	1.0 02	177.4	48 29.1	1.0 02	177.3	48 59.0	1.0 02	177.3	49 59.0	1.0 02	177.3	51 59.0	1.0 02	177.2	53 59.0	1.0 02	177.2	54 29.0	1.0 02	177.2	55 29.0	1.0 02	177.1	2
3	47 57.9	1.0 03	176.0	48 27.9	1.0 03	176.0	48 57.9	1.0 03	176.0	49 57.8	1.0 03	176.0	51 57.8	1.0 03	175.9	53 57.7	1.0 03	175.8	54 27.7	1.0 03	175.7	55 27.7	1.0 03	175.7	3
4	47 56.2	1.0 04	174.7	48 26.2	1.0 04	174.7	48 56.2	1.0 04	174.7	49 56.1	1.0 04	174.6	51 56.1	1.0 04	174.5	53 56.0	1.0 04	174.4	54 25.9	1.0 04	174.3	55 25.9	1.0 04	174.3	4
05	47 54.1	1.0 04	173.4	48 24.1	1.0 04	173.4	48 54.0	1.0 04	173.3	49 54.0	1.0 04	173.3	51 53.8	1.0 04	173.1	53 53.7	1.0 05	173.0	54 23.7	1.0 05	172.9	55 23.6	1.0 05	172.8	05
6	47 51.5	1.0 05	172.1	48 21.5	1.0 05	172.1	48 51.4	1.0 05	172.0	49 51.3	1.0 05	171.9	51 51.1	1.0 05	171.7	53 50.9	1.0 05	171.6	54 20.9	1.0 05	171.5	55 20.8	1.0 06	171.4	6
7	47 48.5	1.0 06	170.8	48 18.4	1.0 06	170.7	48 48.3	1.0 06	170.7	49 48.2	1.0 06	170.6	51 48.0	1.0 06	170.4	53 47.7	1.0 06	170.2	54 17.6	1.0 06	170.1	55 17.4	1.0 06	170.0	7
8	47 44.9	1.0 07	169.5	48 14.9	1.0 07	169.4	48 44.8	1.0 07	169.4	49 44.6	1.0 07	169.3	51 44.3	1.0 07	169.0	53 43.9	1.0 07	168.8	54 13.8	1.0 07	168.7	55 13.6	1.0 07	168.5	8
9	47 41.0	1.0 07	168.2	48 10.9	1.0 07	168.1	48 40.8	1.0 07	168.0	49 40.6	1.0 08	167.9	51 40.1	1.0 08	167.6	53 39.7	1.0 08	167.4	54 09.5	1.0 08	167.3	55 09.3	1.0 08	167.1	9
10	47 36.5	1.0 08	166.9	48 06.4	1.0 08	166.8	48 36.3	1.0 08	166.7	49 36.0	1.0 08	166.6	51 35.5	1.0 08	166.3	53 34.9	99 09	166.0	54 04.8	99 09	165.9	55 04.5	99 09	165.7	10
1	47 31.6	1.0 09	165.6	48 01.5	1.0 09	165.5	48 31.3	1.0 09	165.4	49 31.0	99 09	165.3	51 30.4	99 09	164.9	53 29.7	99 10	164.6	53 59.5	99 10	164.5	54 59.2	99 10	164.3	1
2	47 26.3	99 10	164.3	47 56.1	99 10	164.2	48 25.9	99 10	164.1	49 25.6	99 10	163.9	51 24.8	99 10	163.6	53 24.0	99 10	163.2	53 53.8	99 10	163.1	54 53.4	99 10	162.9	2
3	47 20.5	99 10	163.0	47 50.3	99 10	162.9	48 20.1	99 10	162.8	49 19.7	99 11	162.6	51 18.8	99 11	162.2	53 17.9	99 11	161.8	53 47.6	99 11	161.7	54 47.1	99 11	161.5	3
4	47 14.2	99 11	161.7	47 44.0	99 11	161.6	48 13.8	99 11	161.5	49 13.3	99 11	161.3	51 12.3	99 12	160.9	53 11.2	99 12	160.4	53 40.9	99 12	160.3	54 40.3	99 12	160.1	4
15	47 07.6	99 12	160.4	47 37.3	99 12	160.3	48 07.1	99 12	160.2	49 06.5	99 12	160.0	51 05.4	99 12	159.5	53 04.1	99 13	159.1	53 33.8	99 13	159.0	54 33.1	99 13	158.7	15
6	47 00.5	99 13	159.1	47 30.2	99 13	159.0	47 59.9	99 13	158.9	48 59.3	99 13	158.7	50 58.0	99 13	158.2	52 56.6	99 13	157.7	53 26.2	99 13	157.6	54 25.4	99 14	157.3	6
7	46 52.9	99 13	157.8	47 22.6	99 13	157.7	47 52.3	99 13	157.6	48 51.6	99 14	157.4	50 50.1	99 14	156.9	52 48.6	99 14	156.4	53 18.1	99 14	156.2	54 17.3	99 14	155.9	7
8	46 45.0	99 14	156.5	47 14.6	99 14	156.4	47 44.2	99 14	156.3	48 43.5	99 14	156.1	50 41.9	99 15	155.6	52 40.1	98 15	155.0	53 09.6	98 15	154.9	54 08.7	98 15	154.6	8
9	46 36.6	99 15	155.3	47 06.2	99 15	155.1	47 35.8	99 15	155.0	48 34.9	99 15	154.8	50 33.2	98 15	154.2	52 31.2	98 16	153.7	53 00.7	98 16	153.5	53 59.6	98 16	153.2	9
20	46 27.8	99 15	154.0	46 57.4	99 15	153.9	47 26.9	98 15	153.7	48 26.0	98 16	153.5	50 24.0	98 16	152.9	52 21.9	98 16	152.3	52 51.3	98 16	152.2	53 50.2	98 16	151.8	20
1	46 18.6	98 16	152.7	46 48.1	98 16	152.6	47 17.6	98 16	152.5	48 16.6	98 16	152.2	50 14.5	98 17	151.6	52 12.2	98 17	151.0	52 41.5	98 17	150.8	53 40.3	98 17	150.5	1
2	46 09.0	98 17	151.5	46 38.5	98 17	151.3	47 07.9	98 17	151.2	48 06.8	98 17	150.9	50 04.5	98 17	150.3	52 02.0	98 18	149.7	52 31.3	98 18	149.5	53 30.0	98 18	149.2	2
3	45 59.0	98 17	150.2	46 28.4	98 17	150.1	46 57.9	98 17	150.0	47 56.7	98 18	149.7	49 54.2	98 18	149.0	51 51.4	98 18	148.4	52 20.7	98 18	148.2	53 19.2	97 19	147.8	3
4	45 48.6	98 18	149.0	46 18.0	98 18	148.8	46 47.4	98 18	148.7	47 46.1	98 18	148.4	49 43.4	98 19	147.8	51 40.5	97 19	147.1	52 09.7	97 19	146.9	53 08.1	97 19	146.5	4
25	45 37.9	98 19	147.7	46 07.2	98 19	147.6	46 36.5	98 19	147.4	47 35.2	98 19	147.1	49 32.3	97 19	146.5	51 29.1	97 20	145.8	51 58.3	97 20	145.6	52 56.6	97 20	145.2	25
6	45 26.7	98 19	146.5	45 56.0	98 19	146.4	46 25.3	98 19	146.2	47 23.8	98 20	145.9	49 20.8	97 20	145.2	51 17.4	97 20	144.5	51 46.5	97 20	144.3	52 44.7	97 20	143.9	6
7	45 15.2	98 20	145.3	45 44.5	97 20	145.1	46 13.7	97 20	145.0	47 12.2	97 20	144.6	49 08.9	97 20	143.9	51 05.3	97 21	143.2	51 34.3	97 21	143.0	52 32.4	97 21	142.6	7
8	45 03.4	97 20	144.1	45 32.6	97 20	143.9	46 01.8	97 20	143.7	47 00.1	97 21	143.4	48 56.6	97 21	142.7	50 52.8	97 21	141.9	51 21.8	97 21	141.7	52 19.7	96 22	141.3	8
9	44 51.1	97 21	142.9	45 20.3	97 21	142.7	45 49.4	97 21	142.5	46 47.7	97 21	142.2	48 44.0	97 22	141.4	50 40.0	97 22	140.6	51 08.9	96 22	140.4	52 06.7	96 22	140.0	9
30	44 38.6	97 22	141.6	45 07.7	97 22	141.5	45 36.8	97 22	141.3	46 34.9	97 22	140.9	48 31.0	97 22	140.2	50 26.8	96 23	139.4	50 55.7	96 23	139.2	51 53.4	96 23	138.7	30
1	44 25.7	97 22	140.4	44 54.7	97 22	140.3	45 23.8	97 22	140.1	46 21.8	97 22	139.7	48 17.7	96 23	139.0	50 13.3	96 23	138.1	50 42.1	96 23	137.9	51 39.7	96 23	137.5	1
2	44 12.4	97 23	139.3	44 41.5	97 23	139.1	45 10.5	97 23	138.9	46 08.4	97 23	138.5	48 04.1	96 23	137.7	49 59.4	96 24	136.9	50 28.2	96 24	136.7	51 25.6	96 24	136.2	2
3	43 58.9	97 23	138.1	44 27.9	97 23	137.9	44 56.8	96 23	137.7	45 54.7	96 23	137.3	47 50.1	96 24	136.5	49 45.2	96 24	135.7	50 13.9	96 24	135.4	51 11.3	95 24	135.0	3
4	43 45.0	96 24	136.9	44 13.9	96 24	136.7	44 42.8	96 24	136.5	45 40.6	96 24	136.1	47 35.8	96 24	135.3	49 30.7	96 25	134.4	49 59.4	95 25	134.2	50 56.6	95 25	133.7	4
35	43 30.8	96 24	135.7	43 59.7	96 24	135.5	44 28.6	96 24	135.3	45 26.2	96 24	134.9	47 21.3	96 25	134.1	49 15.9	95 25	133.2	49 44.5	95 25	133.0	50 41.6	95 25	132.5	35
6	43 16.4	96 25	134.5	43 45.2	96 25	134.3	44 14.0	96 25	134.2	45 11.5	96 25	133.8	47 06.4	96 25	132.9	49 00.8	95 26	132.0	49 29.4	95 26	131.8	50 26.3	95 26	131.3	6
7	43 01.6	96 25	133.4	43 30.4	96 25	133.2	43 59.1	96 25	133.0	44 56.6	96 25	132.6	46 51.2	95 26	131.7	48 45.4	95 26	130.8	49 13.9	95 26	130.6	50 10.8	95 26	130.1	7
8	42 46.5	96 26	132.2	43 15.3	96 26	132.0	43 44.0	96 26	131.8	44 41.3	96 26	131.4	46 35.7	95 26	130.6	48 29.8	95 27	129.6	48 58.2	95 27	129.4	49 54.9	95 27	128.9	8
9	42 31.2	96 26	131.1	42 59.9	96 26	130.9	43 28.5	96 26	130.7	44 25.8	95 26	130.3	46 20.0	95 27	129.4	48 13.8	95 27	128.4	48 42.2	95 27	128.2	49 38.8	94 27	127.7	9
40	42 15.6	95 26	129.9	42 44.2	95 26	129.7	43 12.8	95 27	129.5	44 10.0	95 27	129.1	46 04.0	95 27	128.2	47 57.6	94 27	127.3	48 25.9	94 28	127.0	49 22.5	94 28	126.5	40
1	41 59.7	95 27	128.8	42 28.3	95 27	128.6	42 56.9	95 27	128.4	43 53.9	95 27	128.0	45 47.8	95 28	127.1	47 41.2	94 28	126.1	48 09.4	94 28	125.9	49 05.9	94 28	125.3	1
2	41 43.6	95 27	127.7	42 12.1	95 27	127.5	42 40.7	95 27	127.2	43 37.6	95 28	126.8	45 31.3	95 28	125.9	47 24.5	94 28	124.9	47 52.7	94 28	124.7	48 49.0	94 28	124.2	2
3	41 27.2	95 28	126.5	41 55.7	95 28	126.3	42 24.2	95 28	126.1	43 21.1	95 28	125.7	45 14.5	94 28	124.8	47 07.5	94 29	123.8	47 35.7	94 29	123.5	48 31.9	94 29	123.0	3
4	41 10.6	95 28	125.4	41 39.1	95 28	125.2	42 07.5	95 28	125.0	43 04.3	95 28	124.6	44 57.6	94 29	123.6	46 50.4	94 29	122.7	47 18.5	94 29	122.4	48 14.6	93 29	121.9	4
45	40 53.8	95 28	124.3	41 22.2	95 28	124.1	41 50.6	95 29	123.9	42 47.3	94 29	123.4	44 40.4	94 29	122.5	46 33.0	94 29	121.5	47 01.0	93 29	121.3	47 57.1	93 30	120.7	45
6	40 36.7	95 29	123.2	41 05.1	95 29	123.0	41 33.4	94 29	122.8	42 30.1	94 29	122.3	44 23.0	94 29	121.4	46 15.4	93 30	120.4	46 43.4	93 30	120.1	47 39.3	93 30	119.6	6
7	40 19.5	94 29	122.1	40 47.8	94 29	121.9	41 16.1	94 29	121.7	42 12.6	94 29	121.2	44 05.3	94 30	120.3	45 57.6	93 30	119.3	46 25.5	93 30	119.0	47 21.4	93 30	118.5	7
8	40 02.0	94 29	121.0	40 30.3	94 30	120.8	40 58.5	94 30	120.6	41 55.0	94 30	120.1	43 47.5	94 30	119.2	45 39.6	93 30	118.2	46 07.5	93 30	117.9	47 03.2	93 31	117.4	8
9	39 44.3	94 30	119.9	40 12.5	94 30	119.7	40 40.8	94 30	119.5	41 37.1	94 30	119.0	43 29.5	93 30	118.1	45 21.4	93 31	117.1	45 49.3	93 31	116.8	46 44.9	93 31	116.3	9
50	39 26.4	94 30	118.9	39 54.6	94 30	118.6	40 22.8	94 30	118.4	41 19.1	94 30	118.0	43 11.3	93 31	117.0	45 03.0	93 31	116.0	45 30.9	93 31	115.7	46 26.4	92 31	115.2	50
1	39 08.3	94 30	117.8	39 36.5	94 30	117.6	40 04.7	94 31	117.3	41 00.9	94 31	116.9	42 52.9	93 31	115.9	44 44.5	93 31	114.9	45 12.3	92 31	114.6	46 07.8	92 31	114.1	1
2	38 50.1	94 31	116.7	39 18.2	94 31	116.5	39 46.3	94 31	116.3	40 42.5	93 31	115.8	42 34.4	93 31	114.8	44 25.8	93 31	113.8	44 53.6	92 31	113.6	45 49.0	92 32	113.0	2
3	38 31.7	94 31	115.7	38 59.8	94 31	115.4	39 27.9	94 31	115.2	40 23.9	93 31	114.7	42 15.7	93 31	113.8	44 07.0	92 32	112.7	44 34.7	92 32	112.5	45 30.0	92 32	111.9	3
4	38 13.1	94 31	114.6	38 41.2	94 31	114.4	39 09.2	93 31	114.2	40 05.2	93 31	113.7	41 56.8	93 32	112.7	43 48.0	92 32	111.7	44 15.6	92 32	111.4	45 10.9	92 32	110.9	4
55	37 54.4	93 31	113.6	38 22.4	93 32	113.3	38 50.4	93 32	113.1	39 46.3	93 32	112.6	41 37.8	93 32	111.7	43 28.8	92 32	110.6	43 56.5	92 32	110.4	44 51.7	92 32	109.8	55
6	37 35.5	93 32	112.5	38 03.5	93 32	112.3	38 31.5	93 32	112.1	39 27.3	93 32	111.6	41 18.7	93 32	110.6	43 09.5	92 32	109.6	43 37.2	92 32	109.3	44 32.3	92 32	108.8	6
7	37 16.5	93 32	111.5	37 44.4	93 32	111.2	38 12.4	93 32	111.0	39 08.2	93 32	110.5	40 59.4	92 32	109.6	42 50.2	92 33	108.5	43 17.7	92 33	108.3	44 12.8	92 33	107.7	7
8	36 57.3	93 32	110.4	37 25.2	93 32	110.2	37 53.2	93 32	110.0	38 48.9	93 32	109.5	40 40.0	92 33	108.5	42 30.6	92 33	107.5	42 58.2	92 33	107.2	43 53.2	92 33	106.7	8
9	36 38.0	93 32	109.4	37 05.9	93 32	109.2	37 33.8	93 32	109.0	38 29.5	93 33	108.5	40 20.5	92 33	107.5	42 11.0	92 33	106.5	42 38.5	92 33	106.2	43 33.5	91 33	105.6	9
60	36 18.6	93 33	108.4	36 46.5	93 33	108.2	37 14.3	93 33	107.9	38 10.0	93 33	107.5	40 00.9	92 33	106.5	41 51.3	92 33	105.4	42 18.8	92 33	105.2	43 13.7	91 33	104.6	60
1	35 59.1	93 33	107.4	36 26.9	93 33	107.1	36 54.8	93 33	106.9	37 50.3	93 33	106.4	39 41.2	92 33	105.5	41 31.5	92 33	104.4	41 58.9	92 33	104.2	42 53.8	91 33	103.6	1
2	35 39.4	93 33	106.4	36 07.3	93 33	106.1	36 35.1	93 33	105.9	37 30.6	92 33	105.4	39 21.3	92 33	104.4	41 11.5	92 33	103.4	41 39.0	91 33	103.1	42 33.8	91 33	102.6	2
3	35 19.7	93 33	105.4	35 47.5	93 33	105.1	36 15.3	93 33	104.9	37 10.8	92 33	104.4	39 01.4	92 33	103.4	40 51.5	92 33	102.4	41 19.0	91 34	102.1	42 13.7	91 34	101.6	3
4	34 59.9	93 33	104.4	35 27.6	93 33	104.1	35 55.4	93 33	103.9	36 50.9	92 33	103.4	38 41.4	92 33	102.4	40 31.4	91 34	101.4	40 58.9	91 34	101.1	41 53.6	91 34	100.6	4
65	34 39.9	93 33	103.4	35 07.7	93 33	103.1	35 35.4	92 33	102.9	36 30.9	92 33	102.4	38 21.3	92 34	101.4	40 11.3	91 34	100.4	40 38.7	91 34	100.1	41 33.4	91 34	99.6	65
6	34 19.9	93 33	102.4	34 47.7	92 34	102.1	35 15.4	92 34	101.9	36 10.8	92 34	101.4	38 01.2	92 34	100.4	39 51.1	91 34	99.4	40 18.5	91 34	99.1	41 13.1	91 34	98.6	6
7	33 59.8	93 34	101.4	34 27.6	92 34	101.2	34 55.3	92 34	100.9	35 50.6	92 34	100.4	37 41.0	92 34	99.5	39 30.8	91 34	98.4	39 58.2	91 34	98.2	40 52.8	91 34	97.6	7
8	33 39.7	92 34	100.4	34 07.4	92 34	100.2	34 35.1	92 34	99.9	35 30.4	92 34	99.5	37 20.7	92 34	98.5	39 10.5	91 34	97.5	39 37.8	91 34	97.2	40 32.4	91 34	96.6	8
9	33 19.5	92 34	99.4	33 47.2	92 34	99.2	34 14.9	92 34	99.0	35 10.2	92 34	98.5	37 00.4	92 34	97.5	38 50.1	91 34	96.5	39 17.5	91 34	96.2	40 12.0	91 34	95.7	9
70	32 59.2	92 34	98.4	33 26.9	92 34	98.2	33 54.6	92 34	98.0	34 49.8	92 34	97.5	36 40.0	92 34	96.5	38 29.7	91 34	95.5	38 57.0	91 34	95.2	39 51.6	91 34	94.7	70
1	32 38.9	92 34	97.5	33 06.6	92 34	97.2	33 34.2	92 34	97.0	34 29.5	92 34	96.5	36 19.6	92 34	95.6	38 09.3	91 34	94.5	38 36.6	91 34	94.3	39 31.1	91 34	93.8	1
2	32 18.5	92 34	96.5	32 46.2	92 34	96.3	33 13.8	92 34	96.1	34 09.1	92 34	95.6	35 59.2	92 34	94.6	37 48.8	91 34	93.6	38 16.1	91 34	93.3	39 10.7	91 34	92.8	2
3	31 58.1	92 34	95.5	32 25.8	92 34	95.3	32 53.4	92 34	95.1	33 48.6	92 34	94.6	35 38.7	92 34	93.7	37 28.3	91 34	92.6	37 55.6	91 34	92.4	38 50.2	91 34	91.8	3
4	31 37.7	92 34	94.6	32 05.3	92 34	94.4	32 33.0	92 34	94.1	33 28.2	92 34	93.7	35 18.2	92 34	92.7	37 07.8	91 34	91.7	37 35.1	91 34	91.4	38 29.6	91 34	90.9	4
75	31 17.2	92 34	93.6	31 44.8	92 34	93.4	32 12.5	92 34	93.2	33 07.7	92 34	92.7	34 57.7	92 34	91.7	36 47.3	91 34	90.7	37 14.6	91 34	90.5	38 09.1	91 34	90.0	75
6	30 56.7	92 34	92.7	31 24.4	92 34	92.5	31 52.0	92 34	92.2	32 47.2	92 34	91.8	34 37.2	92 34	90.8	36 26.8	91 34	89.8	36 54.1	91 34	89.5	37 48.6	91 34	89.0	6
7	30 36.2	92 34	91.7	31 03.8	92 34	91.5	31 31.5	92 34	91.3	32 26.6	92 34	90.8	34 16.7	92 34	89.9	36 06.2	91 34	88.9	36 33.6	91 34	88.6	37 28.1	91 34	88.1	7
8	30 15.7	92 34	90.8	30 43.3	92 34	90.6	31 11.0	92 34	90.3	32 06.1	92 34	89.9	33 56.2	92 34	88.9	35 45.7	91 34	87.9	36 13.0	91 34	87.7	37 07.6	91 34	87.2	8
9	29 55.2	92 34	89.9	30 22.8	92 34	89.6	30 50.4	92 34	89.4	31 45.6	92 34	88.9	33 35.6	92 34	88.0	35 25.2	91 34	87.0	35 52.6	91 34	86.7	36 47.1	91 34	86.2	9
80	29 34.6	92 34	88.9	30 02.3	92 34	88.7	30 29.9	92 34	88.5	31 25.1	92 34	88.0	33 15.1	92 34	87.1	35 04.7	91 34	86.1	35 32.1	91 34	85.8	36 26.6	91 34	85.3	80
1	29 14.1	92 34	88.0	29 41.8	92 34	87.8	30 09.4	92 34	87.5	31 04.6	92 34	87.1	32 54.7	92 34	86.1	34 44.3	91 34	85.2	35 11.6	91 34	84.9	36 06.2	91 34	84.4	1
2	28 53.6	92 34	87.0	29 21.3	92 34	86.8	29 48.9	92 34	86.6	30 44.1	92 34	86.1	32 34.2	92 34	85.2	34 23.9	91 34	84.2	34 51.2	91 34	84.0	35 45.8	91 34	83.5	2
3	28 33.1	92 34	86.1	29 00.8	92 34	85.9	29 28.4	92 34	85.7	30 23.6	92 34	85.2	32 13.8	92 34	84.3	34 03.5	91 34	83.3	34 30.8	91 34	83.1	35 25.4	91 34	82.6	3
4	28 12.7	92 34	85.2	28 40.3	92 34	85.0	29 08.0	92 34	84.8	30 03.2	92 34	84.3	31 53.4	92 34	83.4	33 43.1	91 34	82.4	34 10.5	91 34	82.2	35 05.1	91 34	81.7	4
85	27 52.2	92 34	84.3	28 19.9	92 34	84.1	28 47.6	92 34	83.8	29 42.8	92 34	83.4	31 33.0	92 34	82.5	33 22.8	91 34	81.5	33 50.1	91 34	81.3	34 44.8	91 34	80.8	85
6	27 31.8	92 34	83.3	27 59.5	92 34	83.1	28 27.2	92 34	82.9	29 22.4	92 34	82.5	31 12.7	92 34	81.6	33 02.5	91 34	80.6	33 29.9	91 34	80.4	34 24.6	91 34	79.9	6
7	27 11.5	92 34	82.4	27 39.2	92 34	82.2	28 06.8	92 34	82.0	29 02.1	92 34	81.6	30 52.4	92 34	80.6	32 42.3	91 34	79.7	33 09.7	91 34	79.5	34 04.4	91 34	79.0	7
8	26 51.2	92 34	81.5	27 18.9	92 34	81.3	27 46.5	92 34	81.1	28 41.8	92 34	80.6	30 32.2	92 34	79.7	32 22.1	91 34	78.8	32 49.5	91 33	78.6	33 44.3	91 33	78.1	8
9	26 30.9	92 34	80.6	26 58.6	92 34	80.4	27 26.3	92 34	80.2	28 21.6	92 34	79.7	30 12.0	92 34	78.8	32 02.0	91 34	77.9	32 29.5	91 33	77.7	33 24.3	91 33	77.2	9
90	26 10.7	92 34	79.7	26 38.4	92 34	79.5	27 06.1	92 34	79.3	28 01.5	92 34	78.8	29 51.9	92 33	77.9	31 42.0	92 33	77.0	32 09.4	91 33	76.8	33 04.3	91 33	76.3	90

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	25 50.5	93 34	78.8	26 18.3	92 33	78.6	26 46.0	92 33	78.4	27 41.4	92 33	77.9	29 31.9	92 33	77.0	31 22.0	92 33	76.1	31 49.5	92 33	75.9	32 44.4	91 33	75.4	91
2	25 30.4	93 33	77.9	25 58.2	92 33	77.7	26 25.9	92 33	77.5	27 21.3	92 33	77.0	29 11.9	92 33	76.1	31 02.1	92 33	75.2	31 29.6	92 33	75.0	32 24.6	91 33	74.5	2
3	25 10.4	93 33	77.0	25 38.2	93 33	76.8	26 05.9	92 33	76.6	27 01.4	92 33	76.1	28 52.0	92 33	75.3	30 42.3	92 33	74.3	31 09.9	92 33	74.1	32 04.8	92 33	73.6	3
4	24 50.4	93 33	76.1	25 18.2	93 33	75.9	25 46.0	92 33	75.7	26 41.5	92 33	75.2	28 32.2	92 33	74.4	30 22.6	92 33	73.5	30 50.2	92 33	73.2	31 45.2	92 33	72.8	4
95	24 30.6	93 33	75.2	24 58.4	93 33	75.0	25 26.2	93 33	74.8	26 21.7	92 33	74.3	28 12.5	92 33	73.5	30 03.0	92 33	72.6	30 30.6	92 32	72.4	31 25.6	92 32	71.9	95
6	24 10.8	93 33	74.3	24 38.6	93 33	74.1	25 06.4	93 33	73.9	26 02.0	93 33	73.4	27 52.9	92 33	72.6	29 43.5	92 32	71.7	30 11.1	92 32	71.5	31 06.2	92 32	71.0	6
7	23 51.0	93 33	73.4	24 18.9	93 33	73.2	24 46.7	93 33	73.0	25 42.3	93 33	72.6	27 33.4	92 32	71.7	29 24.0	92 32	70.8	29 51.7	92 32	70.6	30 46.8	92 32	70.1	7
8	23 31.4	93 33	72.5	23 59.3	93 32	72.3	24 27.2	93 32	72.1	25 22.8	93 32	71.7	27 13.9	92 32	70.8	29 04.7	92 32	69.9	29 32.4	92 32	69.7	30 27.6	92 32	69.3	8
9	23 11.9	93 32	71.6	23 39.8	93 32	71.4	24 07.7	93 32	71.2	25 03.4	93 32	70.8	26 54.6	93 32	69.9	28 45.5	92 32	69.1	29 13.2	92 32	68.9	30 08.4	92 32	68.4	9
100	22 52.5	93 32	70.7	23 20.4	93 32	70.5	23 48.3	93 32	70.3	24 44.1	93 32	69.9	26 35.4	93 32	69.1	28 26.4	92 32	68.2	28 54.1	92 32	68.0	29 49.4	92 32	67.5	100
1	22 33.2	93 32	69.8	23 01.1	93 32	69.6	23 29.0	93 32	69.4	24 24.8	93 32	69.0	26 16.3	93 32	68.2	28 07.4	92 31	67.3	28 35.1	92 31	67.1	29 30.5	92 31	66.7	1
2	22 14.0	93 32	68.9	22 41.9	93 32	68.7	23 09.9	93 32	68.5	24 05.7	93 32	68.1	25 57.3	93 31	67.3	27 48.5	93 31	66.5	28 16.3	93 31	66.2	29 11.7	92 31	65.8	2
3	21 54.9	93 32	68.0	22 22.9	93 32	67.8	22 50.9	93 32	67.6	23 46.8	93 31	67.2	25 38.4	93 31	66.4	27 29.8	93 31	65.6	27 57.5	93 31	65.4	28 53.1	92 31	65.0	3
4	21 35.9	93 31	67.1	22 03.9	93 31	66.9	22 31.9	93 31	66.7	23 27.9	93 31	66.4	25 19.7	93 31	65.6	27 11.1	93 31	64.7	27 39.0	93 31	64.5	28 34.5	93 31	64.1	4
105	21 17.1	94 31	66.2	21 45.1	93 31	66.1	22 13.1	93 31	65.9	23 09.2	93 31	65.5	25 01.0	93 31	64.7	26 52.6	93 31	63.9	27 20.5	93 31	63.7	28 16.2	93 30	63.2	105
6	20 58.4	94 31	65.4	21 26.4	94 31	65.2	21 54.5	94 31	65.0	22 50.6	93 31	64.6	24 42.6	93 31	63.8	26 34.3	93 30	63.0	27 02.2	93 30	62.8	27 57.9	93 30	62.4	6
7	20 39.8	94 31	64.5	21 07.9	94 31	64.3	21 36.0	94 31	64.1	22 32.1	94 31	63.7	24 24.2	93 30	62.9	26 16.1	93 30	62.1	26 44.0	93 30	61.9	27 39.8	93 30	61.5	7
8	20 21.3	94 31	63.6	20 49.4	94 30	63.4	21 17.6	94 30	63.2	22 13.8	94 30	62.8	24 06.0	93 30	62.1	25 58.0	93 30	61.3	26 26.0	93 30	61.1	27 21.8	93 30	60.7	8
9	20 03.0	94 30	62.7	20 31.2	94 30	62.5	20 59.3	94 30	62.3	21 55.6	94 30	62.0	23 47.9	94 30	61.2	25 40.1	93 30	60.4	26 08.1	93 30	60.2	27 04.0	93 29	59.8	9
110	19 44.8	94 30	61.8	20 13.0	94 30	61.6	20 41.2	94 30	61.5	21 37.5	94 30	61.1	23 30.0	94 30	60.3	25 22.3	93 29	59.6	25 50.3	93 29	59.4	26 46.3	93 29	59.0	110
1	19 26.8	94 30	60.9	19 55.0	94 30	60.8	20 23.3	94 30	60.6	21 19.6	94 30	60.2	23 12.3	94 29	59.5	25 04.7	94 29	58.7	25 32.8	94 29	58.5	26 28.8	93 29	58.1	1
2	19 09.0	94 30	60.1	19 37.2	94 29	59.9	20 05.5	94 29	59.7	21 01.9	94 29	59.3	22 54.7	94 29	58.6	24 47.2	94 29	57.9	25 15.3	94 29	57.7	26 11.5	94 29	57.3	2
3	18 51.3	94 29	59.2	19 19.5	94 29	59.0	19 47.8	94 29	58.8	20 44.3	94 29	58.5	22 37.2	94 29	57.7	24 29.9	94 29	57.0	24 58.1	94 28	56.8	25 54.3	94 28	56.4	3
4	18 33.7	94 29	58.3	19 02.0	94 29	58.1	19 30.3	94 29	58.0	20 26.9	94 29	57.6	22 20.0	94 28	56.9	24 12.8	94 28	56.1	24 41.0	94 28	56.0	25 37.3	94 28	55.6	4
115	18 16.3	95 29	57.4	18 44.7	94 29	57.3	19 13.0	94 29	57.1	20 09.7	94 29	56.7	22 02.9	94 28	56.0	23 55.9	94 28	55.3	24 24.1	94 28	55.1	25 20.5	94 28	54.7	115
6	17 59.1	95 28	56.5	18 27.5	95 28	56.4	18 55.9	95 28	56.2	19 52.6	95 28	55.9	21 45.9	94 28	55.2	23 39.1	94 28	54.4	24 07.3	94 28	54.3	25 03.8	94 27	53.9	6
7	17 42.1	95 28	55.7	18 10.5	95 28	55.5	18 38.9	95 28	55.3	19 35.7	95 28	55.0	21 29.2	94 28	54.3	23 22.5	94 27	53.6	23 50.8	94 27	53.4	24 47.3	94 27	53.0	7
8	17 25.2	95 28	54.8	17 53.7	95 28	54.6	18 22.1	95 28	54.5	19 19.0	95 28	54.1	21 12.6	95 27	53.4	23 06.1	94 27	52.7	23 34.4	94 27	52.6	24 31.0	94 27	52.2	8
9	17 08.6	95 28	53.9	17 37.1	95 27	53.8	18 05.5	95 27	53.6	19 02.5	95 27	53.3	20 56.2	95 27	52.6	22 49.8	95 27	51.9	23 18.2	95 27	51.7	24 14.9	94 27	51.3	9
120	16 52.1	95 27	53.0	17 20.6	95 27	52.9	17 49.1	95 27	52.7	18 46.1	95 27	52.4	20 40.0	95 27	51.7	22 33.8	95 26	51.0	23 02.2	95 26	50.9	23 59.0	95 26	50.5	120
1	16 35.8	95 27	52.2	17 04.3	95 27	52.0	17 32.9	95 27	51.8	18 30.0	95 27	51.5	20 24.0	95 26	50.9	22 17.9	95 26	50.2	22 46.4	95 26	50.0	23 43.2	95 26	49.7	1
2	16 19.7	95 27	51.3	16 48.3	95 26	51.1	17 16.8	95 26	51.0	18 14.0	95 26	50.6	20 08.2	95 26	50.0	22 02.2	95 26	49.3	22 30.7	95 26	49.2	23 27.7	95 26	48.8	2
3	16 03.7	95 26	50.4	16 32.4	95 26	50.3	17 01.0	95 26	50.1	17 58.2	95 26	49.8	19 52.6	95 26	49.1	21 46.8	95 25	48.5	22 15.3	95 25	48.3	23 12.3	95 25	48.0	3
4	15 48.0	96 26	49.5	16 16.7	96 26	49.4	16 45.4	96 26	49.2	17 42.7	95 26	48.9	19 37.2	95 25	48.3	21 31.5	95 25	47.6	22 00.1	95 25	47.5	22 57.2	95 25	47.1	4
125	15 32.5	96 26	48.7	16 01.2	96 25	48.5	16 29.9	96 25	48.3	17 27.3	96 25	48.0	19 21.9	95 25	47.4	21 16.5	95 25	46.8	21 45.1	95 25	46.6	22 42.3	95 25	46.3	125
6	15 17.2	96 25	47.8	15 46.0	96 25	47.6	16 14.7	96 25	47.5	17 12.1	96 25	47.2	19 06.9	96 25	46.6	21 01.6	96 24	45.9	21 30.3	95 24	45.8	22 27.5	95 24	45.5	6
7	15 02.1	96 25	46.9	15 30.9	96 25	46.8	15 59.7	96 25	46.6	16 57.2	96 25	46.3	18 52.1	96 24	45.7	20 47.0	96 24	45.1	21 15.7	96 24	44.9	22 13.0	96 24	44.6	7
8	14 47.3	96 24	46.0	15 16.1	96 24	45.9	15 44.9	96 24	45.7	16 42.5	96 24	45.4	18 37.6	96 24	44.8	20 32.5	96 24	44.2	21 01.3	96 24	44.1	21 58.7	96 23	43.8	8
9	14 32.6	96 24	45.1	15 01.4	96 24	45.0	15 30.3	96 24	44.9	16 27.9	96 24	44.6	18 23.2	96 24	44.0	20 18.3	96 23	43.4	20 47.1	96 23	43.2	21 44.6	96 23	42.9	9
130	14 18.2	96 24	44.3	14 47.0	96 24	44.1	15 15.9	96 24	44.0	16 13.7	96 23	43.7	18 09.1	96 23	43.1	20 04.3	96 23	42.5	20 33.2	96 23	42.4	21 30.7	96 23	42.1	130
1	14 04.0	96 23	43.4	14 32.9	96 23	43.3	15 01.8	96 23	43.1	15 59.6	96 23	42.8	17 55.1	96 23	42.3	19 50.6	96 23	41.7	20 19.4	96 22	41.5	21 17.1	96 22	41.3	1
2	13 50.0	97 23	42.5	14 18.9	96 23	42.4	14 47.9	96 23	42.2	15 45.8	96 23	42.0	17 41.4	96 22	41.4	19 37.0	96 22	40.8	20 05.9	96 22	40.7	21 03.7	96 22	40.4	2
3	13 36.2	97 23	41.6	14 05.2	97 22	41.5	14 34.2	97 22	41.4	15 32.1	97 22	41.1	17 28.0	97 22	40.6	19 23.7	96 22	40.0	19 52.7	96 22	39.9	20 50.5	96 22	39.6	3
4	13 22.7	97 22	40.8	13 51.7	97 22	40.6	14 20.7	97 22	40.5	15 18.8	97 22	40.2	17 14.8	97 22	39.7	19 10.7	96 21	39.2	19 39.6	97 21	39.0	20 37.5	96 21	38.7	4
135	13 09.4	97 22	39.9	13 38.5	97 22	39.8	14 07.5	97 22	39.6	15 05.6	97 21	39.4	17 01.8	97 21	38.8	18 57.8	97 21	38.3	19 26.8	97 21	38.2	20 24.8	97 21	37.9	135
6	12 56.4	97 21	39.0	13 25.5	97 21	38.9	13 54.6	97 21	38.7	14 52.7	97 21	38.5	16 49.0	97 21	38.0	18 45.2	97 21	37.5	19 14.3	97 21	37.3	20 12.3	97 20	37.1	6
7	12 43.6	97 21	38.1	13 12.7	97 21	38.0	13 41.9	97 21	37.9	14 40.1	97 21	37.6	16 36.5	97 20	37.1	18 32.9	97 20	36.6	19 01.9	97 20	36.5	20 00.1	97 20	36.2	7
8	12 31.1	97 20	37.2	13 00.2	97 20	37.1	13 29.4	97 20	37.0	14 27.7	97 20	36.8	16 24.3	97 20	36.3	18 20.8	97 20	35.8	18 49.9	97 20	35.6	19 48.1	97 20	35.4	8
9	12 18.8	97 20	36.4	12 48.0	97 20	36.2	13 17.2	97 20	36.1	14 15.5	97 20	35.9	16 12.2	97 20	35.4	18 08.9	97 19	34.9	18 38.0	97 19	34.8	19 36.3	97 19	34.5	9
140	12 06.7	97 20	35.5	12 36.0	97 20	35.4	13 05.2	97 20	35.3	14 03.6	97 19	35.0	16 00.5	97 19	34.5	17 57.3	97 19	34.1	18 26.4	97 19	33.9	19 24.8	97 19	33.7	140
1	11 54.9	98 19	34.6	12 24.2	98 19	34.5	12 53.5	98 19	34.4	13 52.0	98 19	34.2	15 49.0	97 19	33.7	17 45.9	97 19	33.2	18 15.1	97 18	33.1	19 13.5	97 18	32.9	1
2	11 43.4	98 19	33.7	12 12.7	98 19	33.6	12 42.0	98 19	33.5	13 40.6	98 19	33.3	15 37.7	98 18	32.8	17 34.8	98 18	32.4	18 04.0	98 18	32.3	19 02.5	97 18	32.0	2
3	11 32.2	98 18	32.8	12 01.5	98 18	32.7	12 30.8	98 18	32.6	13 29.5	98 18	32.4	15 26.7	98 18	32.0	17 23.9	98 18	31.5	17 53.2	98 18	31.4	18 51.8	98 18	31.2	3
4	11 21.2	98 18	32.0	11 50.5	98 18	31.9	12 19.9	98 18	31.8	13 18.6	98 18	31.5	15 16.0	98 17	31.1	17 13.3	98 17	30.7	17 42.6	98 17	30.6	18 41.3	98 17	30.3	4
145	11 10.4	98 17	31.1	11 39.8	98 17	31.0	12 09.2	98 17	30.9	13 08.0	98 17	30.7	15 05.5	98 17	30.3	17 03.0	98 17	29.8	17 32.3	98 17	29.7	18 31.1	98 17	29.5	145
6	11 00.0	98 17	30.2	11 29.4	98 17	30.1	11 58.8	98 17	30.0	12 57.7	98 17	29.8	14 55.3	98 17	29.4	16 52.9	98 16	29.0	17 22.3	98 16	28.9	18 21.1	98 16	28.7	6
7	10 49.8	98 16	29.3	11 19.2	98 16	29.2	11 48.7	98 16	29.1	12 47.6	98 16	28.9	14 45.4	98 16	28.5	16 43.1	98 16	28.1	17 12.5	98 16	28.0	18 11.4	98 16	27.8	7
8	10 39.9	98 16	28.4	11 09.4	98 16	28.3	11 38.8	98 16	28.2	12 37.8	98 16	28.1	14 35.7	98 16	27.7	16 33.6	98 15	27.3	17 03.0	98 15	27.2	18 01.9	98 15	27.0	8
9	10 30.2	98 16	27.5	10 59.8	98 16	27.5	11 29.3	98 15	27.4	12 28.3	98 15	27.2	14 26.3	98 15	26.8	16 24.3	98 15	26.4	16 53.8	98 15	26.3	17 52.7	98 15	26.1	9
150	10 20.9	98 15	26.7	10 50.4	98 15	26.6	11 20.0	98 15	26.5	12 19.1	98 15	26.3	14 17.2	98 15	25.9	16 15.3	98 15	25.6	16 44.8	98 14	25.5	17 43.8	98 14	25.3	150
1	10 11.8	99 15	25.8	10 41.4	99 15	25.7	11 11.0	99 15	25.6	12 10.1	99 14	25.4	14 08.4	99 14	25.1	16 06.6	98 14	24.7	16 36.1	98 14	24.6	17 35.2	98 14	24.5	1
2	10 03.0	99 14	24.9	10 32.6	99 14	24.8	11 02.2	99 14	24.7	12 01.4	99 14	24.6	13 59.8	99 14	24.2	15 58.1	99 14	23.9	16 27.7	99 14	23.8	17 26.8	99 13	23.6	2
3	9 54.6	99 14	24.0	10 24.2	99 14	23.9	10 53.8	99 14	23.9	11 53.0	99 14	23.7	13 51.5	99 13	23.4	15 50.0	99 13	23.0	16 19.6	99 13	22.9	17 18.8	99 13	22.8	3
4	9 46.3	99 13	23.1	10 16.0	99 13	23.0	10 45.6	99 13	23.0	11 44.9	99 13	22.8	13 43.5	99 13	22.5	15 42.1	99 13	22.2	16 11.7	99 13	22.1	17 11.0	99 13	21.9	4
155	9 38.4	99 13	22.2	10 08.1	99 13	22.2	10 37.8	99 13	22.1	11 37.1	99 13	21.9	13 35.8	99 12	21.6	15 34.5	99 12	21.3	16 04.1	99 12	21.3	17 03.4	99 12	21.1	155
6	9 30.8	99 12	21.4	10 00.5	99 12	21.3	10 30.2	99 12	21.2	11 29.6	99 12	21.1	13 28.4	99 12	20.8	15 27.1	99 12	20.5	15 56.8	99 12	20.4	16 56.2	99 12	20.3	6
7	9 23.5	99 12	20.5	9 53.2	99 12	20.4	10 22.9	99 12	20.3	11 22.4	99 12	20.2	13 21.2	99 11	19.9	15 20.1	99 11	19.6	15 49.8	99 11	19.6	16 49.2	99 11	19.4	7
8	9 16.5	99 11	19.6	9 46.2	99 11	19.5	10 16.0	99 11	19.4	11 15.4	99 11	19.3	13 14.4	99 11	19.0	15 13.4	99 11	18.8	15 43.1	99 11	18.7	16 42.5	99 11	18.6	8
9	9 09.7	99 11	18.7	9 39.5	99 11	18.6	10 09.3	99 11	18.6	11 08.8	99 11	18.4	13 07.9	99 10	18.2	15 06.9	99 10	17.9	15 36.6	99 10	17.9	16 36.2	99 10	17.7	9
160	9 03.3	99 10	17.8	9 33.1	99 10	17.7	10 02.9	99 10	17.7	11 02.5	99 10	17.6	13 01.6	99 10	17.3	15 00.7	99 10	17.1	15 30.5	99 10	17.0	16 30.1	99 10	16.9	160
1	8 57.2	99 10	16.9	9 27.0	99 10	16.9	9 56.8	99 10	16.8	10 56.4	99 10	16.7	12 55.6	99 09	16.5	14 54.8	99 09	16.2	15 24.6	99 09	16.2	16 24.2	99 09	16.0	1
2	8 51.4	99 09	16.0	9 21.2	99 09	16.0	9 51.0	99 09	15.9	10 50.7	99 09	15.8	12 50.0	99 09	15.6	14 49.3	99 09	15.4	15 19.1	99 09	15.3	16 18.7	99 09	15.2	2
3	8 45.9	99 09	15.1	9 15.7	99 09	15.1	9 45.5	99 09	15.0	10 45.2	99 09	14.9	12 44.6	99 08	14.7	14 44.0	99 08	14.5	15 13.8	99 08	14.5	16 13.5	99 08	14.4	3
4	8 40.6	1.0 08	14.3	9 10.5	1.0 08	14.2	9 40.4	1.0 08	14.2	10 40.1	1.0 08	14.1	12 39.5	1.0 08	13.9	14 39.0	1.0 08	13.7	15 08.8	1.0 08	13.6	16 08.5	1.0 08	13.5	4
165	8 35.7	1.0 08	13.4	9 05.6	1.0 08	13.3	9 35.5	1.0 08	13.3	10 35.3	1.0 08	13.2	12 34.8	1.0 07	13.0	14 34.3	1.0 07	12.8	15 04.1	1.0 07	12.8	16 03.9	1.0 07	12.7	165
6	8 31.2	1.0 07	12.5	9 01.1	1.0 07	12.4	9 31.0	1.0 07	12.4	10 30.7	1.0 07	12.3	12 30.3	1.0 07	12.1	14 29.9	1.0 07	12.0	14 59.8	1.0 07	11.9	15 59.5	1.0 07	11.8	6
7	8 26.9	1.0 07	11.6	8 56.8	1.0 07	11.5	9 26.7	1.0 07	11.5	10 26.5	1.0 07	11.4	12 26.1	1.0 06	11.3	14 25.8	1.0 06	11.1	14 55.7	1.0 06	11.1	15 55.5	1.0 06	11.0	7
8	8 22.9	1.0 06	10.7	8 52.8	1.0 06	10.7	9 22.8	1.0 06	10.6	10 22.6	1.0 06	10.5	12 22.3	1.0 06	10.3	14 22.0	1.0 06	10.2	14 51.9	1.0 06	10.2	15 51.7	1.0 06	10.1	8
9	8 19.3	1.0 06	09.8	8 49.2	1.0 06	09.8	9 19.1	1.0 06	09.7	10 19.0	1.0 06	09.7	12 18.7	1.0 05	09.5	14 18.5	1.0 05	09.4	14 48.4	1.0 05	09.4	15 48.3	1.0 05	09.3	9
170	8 15.9	1.0 05	08.9	8 45.9	1.0 05	08.9	9 15.8	1.0 05	08.9	10 15.7	1.0 05	08.8	12 15.5	1.0 05	08.7	14 15.3	1.0 05	08.5	14 45.2	1.0 05	08.5	15 45.1	1.0 05	08.4	170
1	8 12.9	1.0 05	08.0	8 42.9	1.0 04	08.0	9 12.8	1.0 04	08.0	10 12.7	1.0 04	07.9	12 12.6	1.0 04	07.8	14 12.4	1.0 04	07.7	14 42.3	1.0 04	07.7	15 42.2	1.0 04	07.6	1
2	8 10.2	1.0 04	07.1	8 40.2	1.0 04	07.1	9 10.1	1.0 04	07.1	10 10.1	1.0 04	07.0	12 09.9	1.0 04	06.9	14 09.8	1.0 04	06.8	14 39.7	1.0 04	06.8	15 39.7	1.0 04	06.8	2
3	8 07.8	1.0 03	06.2	8 37.8	1.0 03	06.2	9 07.8	1.0 03	06.2	10 07.7	1.0 03	06.2	12 07.6	1.0 03	06.1	14 07.5	1.0 03	06.0	14 37.4	1.0 03	06.0	15 37.4	1.0 03	05.9	3
4	8 05.7	1.0 03	05.3	8 35.7	1.0 03	05.3	9 05.7	1.0 03	05.3	10 05.7	1.0 03	05.3	12 05.6	1.0 03	05.2	14 05.5	1.0 03	05.2	14 35.5	1.0 03	05.1	15 35.4	1.0 03	05.1	4
175	8 04.0	1.0 02	04.5	8 34.0	1.0 02	04.4	9 04.0	1.0 02	04.4	10 03.9	1.0 02	04.4	12 03.9	1.0 02	04.3	14 03.8	1.0 02	04.3	14 33.8	1.0 02	04.3	15 33.8	1.0 02	04.2	175
6	8 02.6	1.0 02	03.6	8 32.5	1.0 02	03.6	9 02.5	1.0 02	03.5	10 02.5	1.0 02	03.5	12 02.5	1.0 02	03.5	14 02.4	1.0 02	03.4	14 32.4	1.0 02	03.4	15 32.4	1.0 02	03.4	6
7	8 01.4	1.0 01	02.7	8 31.4	1.0 01	02.7	9 01.4	1.0 01	02.7	10 01.4	1.0 01	02.6	12 01.4	1.0 01	02.6	14 01.4	1.0 01	02.6	14 31.4	1.0 01	02.6	15 31.4	1.0 01	02.5	7
8	8 00.6	1.0 01	01.8	8 30.6	1.0 01	01.8	9 00.6	1.0 01	01.8	10 00.6	1.0 01	01.8	12 00.6	1.0 01	01.7	14 00.6	1.0 01	01.7	14 30.6	1.0 01	01.7	15 30.6	1.0 01	01.7	8
9	8 00.2	1.0 00	00.9	8 30.2	1.0 00	00.9	9 00.2	1.0 00	00.9	10 00.2	1.0 00	00.9	12 00.2	1.0 00	00.9	14 00.2	1.0 00	00.9	14 30.2	1.0 00	00.9	15 30.2	1.0 00	00.8	9
180	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0	12 00.0	1.0 00	00.0	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0	180

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	56 00.0	1.0 00	180.0	57 00.0	1.0 00	180.0	58 30.0	1.0 00	180.0	60 00.0	1.0 00	180.0	62 00.0	1.0 00	180.0	62 30.0	1.0 00	180.0	63 00.0	1.0 00	180.0	65 00.0	1.0 00	180.0	00
1	55 59.7	1.0 01	178.6	56 59.7	1.0 01	178.5	58 29.7	1.0 01	178.5	59 59.7	1.0 01	178.5	61 59.7	1.0 01	178.4	62 29.7	1.0 01	178.4	62 59.7	1.0 01	178.4	64 59.7	1.0 02	178.3	1
2	55 59.0	1.0 02	177.1	56 59.0	1.0 02	177.1	58 28.9	1.0 02	177.0	59 58.9	1.0 02	176.9	61 58.9	1.0 02	176.8	62 28.9	1.0 02	176.8	62 58.8	1.0 02	176.8	64 58.8	1.0 02	176.7	2
3	55 57.7	1.0 03	175.7	56 57.6	1.0 03	175.6	58 27.6	1.0 03	175.5	59 57.5	1.0 03	175.4	61 57.4	1.0 03	175.3	62 27.4	1.0 03	175.2	62 57.4	1.0 03	175.2	64 57.3	1.0 03	175.0	3
4	55 55.9	1.0 04	174.2	56 55.8	1.0 04	174.1	58 25.7	1.0 04	174.0	59 55.6	1.0 04	173.9	61 55.5	1.0 04	173.7	62 25.4	1.0 04	173.6	62 55.4	1.0 04	173.6	64 55.2	1.0 04	173.3	4
05	55 53.5	1.0 05	172.8	56 53.4	1.0 05	172.7	58 23.3	1.0 05	172.5	59 53.2	1.0 05	172.4	61 52.9	1.0 05	172.1	62 22.9	1.0 05	172.0	62 52.8	1.0 05	172.0	64 52.5	1.0 05	171.7	05
6	55 50.7	1.0 06	171.3	56 50.6	1.0 06	171.2	58 20.4	1.0 06	171.0	59 50.2	1.0 06	170.8	61 49.8	1.0 06	170.5	62 19.7	1.0 06	170.4	62 49.7	1.0 06	170.4	64 49.3	1.0 06	170.0	6
7	55 47.4	1.0 06	169.9	56 47.2	1.0 06	169.8	58 16.9	1.0 07	169.5	59 46.6	1.0 07	169.3	61 46.2	1.0 07	169.0	62 16.1	1.0 07	168.9	62 45.9	1.0 07	168.8	64 45.4	1.0 07	168.3	7
8	55 43.5	1.0 07	168.5	56 43.3	1.0 07	168.3	58 12.9	1.0 08	168.1	59 42.5	1.0 08	167.8	61 42.0	99 08	167.4	62 11.8	99 08	167.3	62 41.7	99 08	167.2	64 41.0	99 08	166.7	8
9	55 39.2	1.0 08	167.0	56 38.9	1.0 08	166.9	58 08.4	99 08	166.6	59 37.9	99 09	166.3	61 37.2	99 09	165.8	62 07.0	99 09	165.7	62 36.8	99 09	165.6	64 36.0	99 09	165.1	9
10	55 34.3	99 09	165.6	56 34.0	99 09	165.4	58 03.4	99 09	165.1	59 32.8	99 09	164.8	61 31.9	99 10	164.3	62 01.7	99 10	164.2	62 31.5	99 10	164.0	64 30.4	99 10	163.4	10
1	55 29.0	99 10	164.2	56 28.5	99 10	164.0	57 57.9	99 10	163.6	59 27.2	99 10	163.3	61 26.1	99 11	162.7	61 55.8	99 11	162.6	62 25.5	99 10	162.5	64 24.3	99 11	161.8	1
2	55 23.1	99 11	162.8	56 22.6	99 11	162.6	57 51.9	99 11	162.2	59 21.0	99 11	161.8	61 19.8	99 11	161.2	61 49.4	99 12	161.1	62 19.1	99 12	160.9	64 17.6	99 12	160.2	2
3	55 16.8	99 11	161.4	56 16.2	99 11	161.1	57 45.3	99 12	160.7	59 14.4	99 12	160.3	61 12.9	99 12	159.7	61 42.5	99 12	159.5	62 12.1	99 12	159.3	64 10.3	99 12	158.6	3
4	55 10.0	99 12	160.0	56 09.4	99 12	159.7	57 38.3	99 12	159.3	59 07.2	99 13	158.8	61 05.5	99 13	158.2	61 35.1	98 13	158.0	62 04.6	98 13	157.8	64 02.6	98 14	157.0	4
15	55 02.7	99 13	158.6	56 02.0	99 13	158.3	57 30.8	99 13	157.8	58 59.5	99 14	157.4	60 57.6	98 14	156.7	61 27.1	98 14	156.5	61 56.6	98 14	156.3	63 54.3	98 15	155.4	15
6	54 55.0	99 14	157.2	55 54.2	99 14	156.9	57 22.8	98 14	156.4	58 51.4	98 14	155.9	60 49.3	98 15	155.2	61 18.7	98 15	155.0	61 48.1	98 15	154.7	63 45.5	98 16	153.8	6
7	54 46.8	98 14	155.8	55 45.9	98 15	155.5	57 14.4	98 15	155.0	58 42.8	98 15	154.5	60 40.4	98 16	153.7	61 09.8	98 16	153.5	61 39.1	98 16	153.2	63 36.2	97 16	152.3	7
8	54 38.2	98 15	154.4	55 37.1	98 15	154.1	57 05.5	98 16	153.6	58 33.7	98 16	153.0	60 31.1	98 16	152.2	61 00.3	98 16	152.0	61 29.6	98 17	151.7	63 26.4	97 17	150.7	8
9	54 29.1	98 16	153.0	55 28.0	98 16	152.7	56 56.1	98 16	152.2	58 24.2	98 17	151.6	60 21.3	97 17	150.7	60 50.5	97 17	150.5	61 19.7	97 17	150.2	63 16.2	97 18	149.2	9
20	54 19.6	98 17	151.7	55 18.3	98 17	151.3	56 46.3	98 17	150.8	58 14.2	97 17	150.2	60 11.0	97 18	149.3	60 40.1	97 18	149.0	61 09.3	97 18	148.8	63 05.4	97 19	147.7	20
1	54 09.6	98 17	150.3	55 08.3	98 17	150.0	56 36.1	97 18	149.4	58 03.7	97 18	148.7	60 00.3	97 18	147.8	60 29.3	97 19	147.6	60 58.4	97 19	147.3	62 54.2	96 19	146.2	1
2	53 59.3	98 18	149.0	54 57.8	97 18	148.6	56 25.4	97 18	148.0	57 52.9	97 19	147.3	59 49.1	97 19	146.4	60 18.1	97 19	146.1	60 47.1	96 20	145.9	62 42.6	96 20	144.7	2
3	53 48.5	97 19	147.6	54 46.9	97 19	147.2	56 14.3	97 19	146.6	57 41.6	97 20	145.9	59 37.6	96 20	145.0	60 06.5	96 20	144.7	60 35.4	96 20	144.4	62 30.5	96 21	143.2	3
4	53 37.3	97 19	146.3	54 35.6	97 20	145.9	56 02.8	97 20	145.3	57 29.9	97 20	144.6	59 25.6	96 21	143.5	59 54.4	96 21	143.3	60 23.2	96 21	143.0	62 18.0	95 21	141.8	4
25	53 25.7	97 20	145.0	54 23.9	97 20	144.6	55 50.9	97 20	143.9	57 17.8	96 21	143.2	59 13.2	96 21	142.1	59 41.9	96 21	141.9	60 10.7	96 22	141.6	62 05.1	95 22	140.3	25
6	53 13.7	97 21	143.7	54 11.8	97 21	143.2	55 38.7	96 21	142.6	57 05.3	96 21	141.8	59 00.4	96 22	140.8	59 29.1	96 22	140.5	59 57.7	95 22	140.2	61 51.8	95 23	138.9	6
7	53 01.4	97 21	142.4	53 59.3	96 21	141.9	55 26.0	96 22	141.2	56 52.4	96 22	140.5	58 47.2	95 23	139.4	59 15.8	95 23	139.1	59 44.4	95 23	138.8	61 38.2	95 23	137.5	7
8	52 48.7	96 22	141.1	53 46.5	96 22	140.6	55 13.0	96 22	139.9	56 39.2	96 23	139.1	58 33.7	95 23	138.0	59 02.2	95 23	137.7	59 30.7	95 23	137.4	61 24.1	94 24	136.1	8
9	52 35.6	96 22	139.8	53 33.3	96 23	139.3	54 59.6	96 23	138.6	56 25.6	95 23	137.8	58 19.8	95 24	136.7	58 48.2	95 24	136.4	59 16.6	95 24	136.1	61 09.7	94 25	134.7	9
30	52 22.2	96 23	138.5	53 19.7	96 23	138.0	54 45.8	96 23	137.3	56 11.6	95 24	136.5	58 05.5	95 24	135.3	58 33.9	94 24	135.0	59 02.2	94 25	134.7	60 55.0	94 25	133.3	30
1	52 08.4	96 24	137.2	53 05.8	96 24	136.8	54 31.7	95 24	136.0	55 57.3	95 24	135.2	57 50.9	94 25	134.0	58 19.2	94 25	133.7	58 47.4	94 25	133.4	60 39.9	93 26	132.0	1
2	51 54.3	96 24	136.0	52 51.6	95 24	135.5	54 17.3	95 25	134.7	55 42.7	95 25	133.9	57 36.0	94 25	132.7	58 04.2	94 26	132.4	58 32.4	94 26	132.0	60 24.4	93 26	130.6	2
3	51 39.9	95 25	134.7	52 37.1	95 25	134.2	54 02.6	95 25	133.5	55 27.8	94 25	132.6	57 20.7	94 26	131.4	57 48.9	94 26	131.1	58 17.0	94 26	130.7	60 08.7	93 27	129.3	3
4	51 25.2	95 25	133.5	52 22.2	95 25	133.0	53 47.5	95 26	132.2	55 12.5	94 26	131.3	57 05.2	94 26	130.1	57 33.3	93 27	129.8	58 01.3	93 27	129.4	59 52.7	92 27	128.0	4
35	51 10.1	95 26	132.3	52 07.1	95 26	131.8	53 32.2	94 26	130.9	54 56.9	94 26	130.1	56 49.4	93 27	128.8	57 17.3	93 27	128.5	57 45.3	93 27	128.2	59 36.4	92 28	126.7	35
6	50 54.8	95 26	131.0	51 51.6	95 26	130.5	53 16.5	94 27	129.7	54 41.1	94 27	128.8	56 33.2	93 27	127.6	57 01.1	93 27	127.2	57 29.0	93 28	126.9	59 19.8	92 28	125.4	6
7	50 39.2	95 26	129.8	51 35.9	94 27	129.3	53 00.6	94 27	128.5	54 25.0	94 27	127.6	56 16.8	93 28	126.3	56 44.7	93 28	126.0	57 12.4	93 28	125.6	59 02.9	92 28	124.2	7
8	50 23.3	94 27	128.6	51 19.8	94 27	128.1	52 44.4	94 27	127.3	54 08.6	93 28	126.4	56 00.2	93 28	125.1	56 27.9	92 28	124.7	56 55.6	92 28	124.4	58 45.8	91 29	122.9	8
9	50 07.1	94 27	127.4	51 03.6	94 28	126.9	52 27.9	94 28	126.1	53 51.9	93 28	125.2	55 43.3	92 29	123.9	56 11.0	92 29	123.5	56 38.6	92 29	123.2	58 28.5	91 29	121.7	9
40	49 50.7	94 28	126.3	50 47.0	94 28	125.7	52 11.2	93 28	124.9	53 35.0	93 29	124.0	55 26.1	92 29	122.7	55 53.7	92 29	122.3	56 21.3	92 29	122.0	58 10.9	91 30	120.4	40
1	49 34.0	94 28	125.1	50 30.2	94 28	124.5	51 54.3	93 29	123.7	53 17.9	93 29	122.8	55 08.7	92 29	121.4	55 36.3	92 29	121.1	56 03.8	92 30	120.7	57 53.1	91 30	119.2	1
2	49 17.1	94 29	123.9	50 13.2	93 29	123.4	51 37.1	93 29	122.5	53 00.5	92 29	121.6	54 51.1	92 30	120.3	55 18.6	92 30	119.9	55 46.0	91 30	119.6	57 35.1	90 30	118.0	2
3	49 00.0	93 29	122.8	49 56.0	93 29	122.2	51 19.7	93 29	121.3	52 42.9	92 30	120.4	54 33.3	92 30	119.1	55 00.7	91 30	118.7	55 28.1	91 30	118.4	57 16.9	90 31	116.8	3
4	48 42.6	93 29	121.6	49 38.5	93 30	121.1	51 02.0	93 30	120.2	52 25.1	92 30	119.2	54 15.2	91 30	117.9	54 42.6	91 30	117.6	55 09.9	91 31	117.2	56 58.5	90 31	115.7	4
45	48 25.0	93 30	120.5	49 20.8	93 30	119.9	50 44.2	92 30	119.0	52 07.1	92 30	118.1	53 57.0	91 31	116.8	54 24.3	91 31	116.4	54 51.6	91 31	116.0	56 39.9	90 31	114.5	45
6	48 07.2	93 30	119.3	49 02.9	93 30	118.8	50 26.1	92 30	117.9	51 48.9	92 31	117.0	53 38.6	91 31	115.6	54 05.8	91 31	115.3	54 33.0	91 31	114.9	56 21.2	90 32	113.4	6
7	47 49.2	93 30	118.2	48 44.8	93 30	117.6	50 07.9	92 31	116.8	51 30.6	92 31	115.8	53 20.0	91 31	114.5	53 47.2	91 31	114.1	54 14.3	90 31	113.8	56 02.2	89 32	112.2	7
8	47 31.1	93 31	117.1	48 26.6	92 31	116.5	49 49.5	92 31	115.6	51 12.0	91 31	114.7	53 01.2	91 32	113.4	53 28.4	90 32	113.0	53 55.5	90 32	112.6	55 43.2	89 32	111.1	8
9	47 12.7	92 31	116.0	48 08.1	92 31	115.4	49 30.9	92 31	114.5	50 53.3	91 31	113.6	52 42.3	90 32	112.2	53 09.4	90 32	111.9	53 36.5	90 32	111.5	55 23.9	89 32	110.0	9
50	46 54.2	92 31	114.9	47 49.5	92 31	114.3	49 12.2	92 32	113.4	50 34.4	91 32	112.5	52 23.2	90 32	111.1	52 50.3	90 32	110.8	53 17.3	90 32	110.4	55 04.6	89 32	108.9	50
1	46 35.5	92 31	113.8	47 30.7	92 32	113.2	48 53.3	91 32	112.3	50 15.3	91 32	111.4	52 04.0	90 32	110.0	52 31.0	90 32	109.7	52 58.0	90 32	109.3	54 45.1	89 33	107.8	1
2	46 16.6	92 32	112.7	47 11.8	92 32	112.2	48 34.2	91 32	111.3	49 56.2	91 32	110.3	51 44.7	90 32	109.0	52 11.7	90 33	108.6	52 38.6	90 33	108.2	54 25.5	89 33	106.7	2
3	45 57.6	92 32	111.7	46 52.7	92 32	111.1	48 15.0	91 32	110.2	49 36.9	91 32	109.2	51 25.2	90 33	107.9	51 52.2	90 33	107.5	52 19.0	89 33	107.2	54 05.8	88 33	105.6	3
4	45 38.5	92 32	110.6	46 33.5	92 32	110.0	47 55.7	91 32	109.1	49 17.4	91 33	108.2	51 05.6	90 33	106.8	51 32.5	90 33	106.5	51 59.4	89 33	106.1	53 46.0	88 33	104.6	4
55	45 19.2	92 32	109.5	46 14.2	91 32	108.9	47 36.2	91 33	108.0	48 57.9	90 33	107.1	50 45.9	90 33	105.8	51 12.8	89 33	105.4	51 39.6	89 33	105.0	53 26.1	88 33	103.5	55
6	44 59.8	92 33	108.5	45 54.7	91 33	107.9	47 16.7	91 33	107.0	48 38.2	90 33	106.0	50 26.1	90 33	104.7	50 53.0	89 33	104.3	51 19.7	89 33	104.0	53 06.1	88 33	102.5	6
7	44 40.3	92 33	107.4	45 35.1	91 33	106.9	46 57.0	91 33	106.0	48 18.4	90 33	105.0	50 06.2	89 33	103.7	50 33.0	89 33	103.3	50 59.8	89 33	103.0	52 46.0	88 34	101.4	7
8	44 20.6	91 33	106.4	45 15.4	91 33	105.8	46 37.2	91 33	104.9	47 58.6	90 33	104.0	49 46.2	89 33	102.6	50 13.0	89 33	102.3	50 39.7	89 34	101.9	52 25.9	88 34	100.4	8
9	44 00.9	91 33	105.4	44 55.6	91 33	104.8	46 17.3	91 33	103.9	47 38.6	90 33	102.9	49 26.2	89 34	101.6	49 52.9	89 34	101.3	50 19.6	89 34	100.9	52 05.7	88 34	99.4	9
60	43 41.1	91 33	104.3	44 35.7	91 33	103.8	45 57.4	90 33	102.9	47 18.6	90 34	101.9	49 06.0	89 34	100.6	49 32.8	89 34	100.2	49 59.4	89 34	99.9	51 45.4	88 34	98.4	60
1	43 21.1	91 33	103.3	44 15.8	91 33	102.7	45 37.3	90 34	101.8	46 58.4	90 34	100.9	48 45.8	89 34	99.6	49 12.5	89 34	99.2	49 39.2	89 34	98.9	51 25.1	88 34	97.4	1
2	43 01.1	91 33	102.3	43 55.7	91 34	101.7	45 17.2	90 34	100.8	46 38.3	90 34	99.9	48 25.6	89 34	98.6	48 52.3	89 34	98.2	49 18.9	89 34	97.9	51 04.7	88 34	96.4	2
3	42 41.1	91 34	101.3	43 35.6	91 34	100.7	44 57.0	90 34	99.8	46 18.0	90 34	98.9	48 05.3	89 34	97.6	48 31.9	89 34	97.2	48 58.5	89 34	96.9	50 44.3	88 34	95.4	3
4	42 20.9	91 34	100.3	43 15.4	91 34	99.7	44 36.8	90 34	98.8	45 57.7	90 34	97.9	47 44.9	89 34	96.6	48 11.5	89 34	96.3	48 38.1	89 34	95.9	50 23.8	88 34	94.4	4
65	42 00.7	91 34	99.3	42 55.1	91 34	98.7	44 16.5	90 34	97.9	45 37.4	90 34	96.9	47 24.5	89 34	95.6	47 51.1	89 34	95.3	48 17.7	88 34	94.9	50 03.4	88 34	93.5	65
6	41 40.4	91 34	98.3	42 34.8	91 34	97.8	43 56.1	90 34	96.9	45 17.0	90 34	96.0	47 04.1	89 34	94.6	47 30.7	89 34	94.3	47 57.2	88 34	94.0	49 42.9	88 34	92.5	6
7	41 20.1	91 34	97.3	42 14.5	91 34	96.8	43 35.7	90 34	95.9	44 56.5	90 34	95.0	46 43.6	89 34	93.7	47 10.2	89 34	93.3	47 36.8	88 34	93.0	49 22.4	88 34	91.6	7
8	40 59.7	91 34	96.4	41 54.1	90 34	95.8	43 15.3	90 34	94.9	44 36.1	90 34	94.0	46 23.1	89 34	92.7	46 49.7	89 34	92.4	47 16.3	88 34	92.0	49 01.8	88 34	90.6	8
9	40 39.3	91 34	95.4	41 33.6	90 34	94.8	42 54.8	90 34	94.0	44 15.6	90 34	93.1	46 02.6	89 34	91.8	46 29.2	89 34	91.4	46 55.8	88 34	91.1	48 41.3	88 34	89.7	9
70	40 18.8	91 34	94.4	41 13.2	90 34	93.9	42 34.3	90 34	93.0	43 55.1	89 34	92.1	45 42.1	89 34	90.8	46 08.7	89 34	90.5	46 35.2	88 34	90.1	48 20.8	88 34	88.7	70
1	39 58.4	91 34	93.5	40 52.7	90 34	92.9	42 13.8	90 34	92.1	43 34.6	89 34	91.1	45 21.6	89 34	89.9	45 48.2	89 34	89.5	46 14.7	88 34	89.2	48 00.3	88 34	87.8	1
2	39 37.9	91 34	92.5	40 32.2	90 34	92.0	41 53.3	90 34	91.1	43 14.1	89 34	90.2	45 01.0	89 34	88.9	45 27.6	89 34	88.6	45 54.2	88 34	88.3	47 39.8	88 34	86.9	2
3	39 17.4	91 34	91.6	40 11.7	90 34	91.0	41 32.8	90 34	90.2	42 53.6	89 34	89.3	44 40.5	89 34	88.0	45 07.1	89 34	87.7	45 33.7	88 34	87.4	47 19.3	88 34	86.0	3
4	38 56.8	91 34	90.6	39 51.1	90 34	90.1	41 12.3	90 34	89.2	42 33.0	89 34	88.3	44 20.0	89 34	87.1	44 46.6	89 34	86.8	45 13.2	88 34	86.4	46 58.8	88 34	85.1	4
75	38 36.3	91 34	89.7	39 30.6	90 34	89.1	40 51.8	90 34	88.3	42 12.5	89 34	87.4	43 59.5	89 34	86.2	44 26.2	89 34	85.8	44 52.7	88 34	85.5	46 38.4	88 34	84.2	75
6	38 15.8	91 34	88.8	39 10.1	90 34	88.2	40 31.3	90 34	87.4	41 52.0	90 34	86.5	43 39.1	89 34	85.3	44 05.7	89 34	84.9	44 32.3	88 34	84.6	46 18.0	88 34	83.3	6
7	37 55.3	91 34	87.8	38 49.6	90 34	87.3	40 10.8	90 34	86.4	41 31.6	90 34	85.6	43 18.6	89 34	84.3	43 45.3	89 34	84.0	44 11.9	88 34	83.7	45 57.7	88 34	82.4	7
8	37 34.8	91 34	86.9	38 29.1	90 34	86.4	39 50.3	90 34	85.5	41 11.1	90 34	84.6	42 58.2	89 34	83.4	43 24.9	89 34	83.1	43 51.5	89 34	82.8	45 37.3	88 34	81.5	8
9	37 14.3	91 34	86.0	38 08.6	90 34	85.4	39 29.9	90 34	84.6	40 50.7	90 34	83.7	42 37.9	89 34	82.5	43 04.5	89 34	82.2	43 31.2	89 34	81.9	45 17.1	88 34	80.6	9
80	36 53.9	91 34	85.0	37 48.2	90 34	84.5	39 09.4	90 34	83.7	40 30.3	90 34	82.8	42 17.5	89 34	81.6	42 44.2	89 34	81.3	43 10.9	89 34	81.0	44 56.9	88 34	79.7	80
1	36 33.4	91 34	84.1	37 27.8	90 34	83.6	38 49.1	90 34	82.8	40 10.0	90 34	81.9	41 57.3	89 34	80.7	42 24.0	89 34	80.4	42 50.6	89 34	80.1	44 36.7	88 34	78.8	1
2	36 13.0	91 34	83.2	37 07.4	91 34	82.7	38 28.7	90 34	81.9	39 49.7	90 34	81.0	41 37.0	89 34	79.9	42 03.8	89 34	79.6	42 30.4	89 34	79.2	44 16.6	88 33	78.0	2
3	35 52.7	91 34	82.3	36 47.1	91 34	81.8	38 08.4	90 34	81.0	39 29.4	90 34	80.1	41 16.9	89 34	79.0	41 43.6	89 33	78.7	42 10.3	89 33	78.4	43 56.6	88 33	77.1	3
4	35 32.4	91 34	81.4	36 26.8	91 34	80.9	37 48.2	90 34	80.1	39 09.3	90 34	79.3	40 56.7	89 33	78.1	41 23.5	89 33	77.8	41 50.2	89 33	77.5	43 36.6	88 33	76.2	4
85	35 12.1	91 34	80.5	36 06.6	91 34	80.0	37 28.0	90 34	79.2	38 49.1	90 33	78.4	40 36.7	89 33	77.2	41 03.5	89 33	76.9	41 30.2	89 33	76.6	43 16.7	88 33	75.4	85
6	34 51.9	91 34	79.6	35 46.4	91 34	79.1	37 07.9	90 33	78.3	38 29.1	90 33	77.5	40 16.7	89 33	76.3	40 43.5	89 33	76.0	41 10.3	89 33	75.7	42 56.9	88 33	74.5	6
7	34 31.7	91 33	78.7	35 26.3	91 33	78.2	36 47.8	90 33	77.4	38 09.1	90 33	76.6	39 56.8	90 33	75.5	40 23.7	89 33	75.2	40 50.5	89 33	74.9	42 37.1	89 33	73.7	7
8	34 11.6	91 33	77.8	35 06.2	91 33	77.3	36 27.8	90 33	76.5	37 49.1	90 33	75.7	39 37.0	90 33	74.6	40 03.9	89 33	74.3	40 30.7	89 33	74.0	42 17.5	89 33	72.8	8
9	33 51.6	91 33	76.9	34 46.2	91 33	76.4	36 07.9	91 33	75.7	37 29.3	90 33	74.9	39 17.3	90 33	73.7	39 44.1	90 33	73.5	40 11.0	89 33	73.2	41 57.9	89 32	72.0	9
90	33 31.7	91 33	76.0	34 26.3	91 33	75.5	35 48.1	91 33	74.8	37 09.5	90 33	74.0	38 57.6	90 33	72.9	39 24.5	90 33	72.6	39 51.4	90 32	72.3	41 38.5	89 32	71.1	90

16—18596

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	33 11.8	91 33	75.2	34 06.5	91 33	74.7	35 28.3	91 33	73.9	36 49.8	90 33	73.1
2	32 52.0	91 33	74.3	33 46.7	91 33	73.8	35 08.6	91 33	73.0	36 30.2	91 33	72.3
3	32 32.3	91 33	73.4	33 27.1	91 33	72.9	34 49.0	91 32	72.2	36 10.7	91 32	71.4
4	32 12.6	92 33	72.5	33 07.5	91 32	72.0	34 29.6	91 32	71.3	35 51.3	91 32	70.5
95	31 53.1	92 32	71.7	32 48.0	91 32	71.2	34 10.2	91 32	70.4	35 32.0	91 32	69.7
6	31 33.7	92 32	70.8	32 28.7	92 32	70.3	33 50.9	91 32	69.6	35 12.9	91 32	68.8
7	31 14.4	92 32	69.9	32 09.4	92 32	69.4	33 31.7	91 32	68.7	34 53.8	91 32	68.0
8	30 55.2	92 32	69.0	31 50.2	92 32	68.6	33 12.6	91 32	67.9	34 34.8	91 31	67.1
9	30 36.0	92 32	68.2	31 31.2	92 32	67.7	32 53.7	92 31	67.0	34 16.0	91 31	66.3
100	30 17.0	92 31	67.3	31 12.3	92 31	66.9	32 34.9	92 31	66.2	33 57.2	91 31	65.4
1	29 58.2	92 31	66.5	30 53.4	92 31	66.0	32 16.2	92 31	65.3	33 38.6	92 31	64.6
2	29 39.4	92 31	65.6	30 34.8	92 31	65.1	31 57.6	92 31	64.5	33 20.2	92 31	63.8
3	29 20.8	92 31	64.7	30 16.2	92 31	64.3	31 39.1	92 31	63.6	33 01.8	92 30	62.9
4	29 02.3	93 31	63.9	29 57.8	92 30	63.4	31 20.8	92 30	62.8	32 43.6	92 30	62.1
105	28 44.0	93 30	63.0	29 39.5	92 30	62.6	31 02.6	92 30	61.9	32 25.6	92 30	61.2
6	28 25.7	93 30	62.2	29 21.3	93 30	61.7	30 44.6	92 30	61.1	32 07.6	92 30	60.4
7	28 07.7	93 30	61.3	29 03.3	93 30	60.9	30 26.7	93 30	60.2	31 49.9	92 29	59.6
8	27 49.7	93 30	60.5	28 45.5	93 30	60.0	30 09.0	93 29	59.4	31 32.3	92 29	58.7
9	27 32.0	93 29	59.6	28 27.8	93 29	59.2	29 51.4	93 29	58.6	31 14.8	93 29	57.9
110	27 14.3	93 29	58.8	28 10.2	93 29	58.4	29 34.0	93 29	57.7	30 57.5	93 29	57.1
1	26 56.9	93 29	57.9	27 52.8	93 29	57.5	29 16.7	93 28	56.9	30 40.3	93 28	56.3
2	26 39.6	93 29	57.1	27 35.6	93 28	56.7	28 59.6	93 28	56.1	30 23.4	93 28	55.4
3	26 22.4	94 28	56.2	27 18.6	94 28	55.8	28 42.6	93 28	55.2	30 06.6	93 28	54.6
4	26 05.4	94 28	55.4	27 01.7	94 28	55.0	28 25.9	93 28	54.4	29 49.9	93 27	53.8
115	25 48.6	94 28	54.5	26 44.9	94 28	54.2	28 09.3	94 27	53.6	29 33.4	93 27	53.0
6	25 32.0	94 27	53.7	26 28.4	94 27	53.3	27 52.9	94 27	52.7	29 17.2	94 27	52.1
7	25 15.6	94 27	52.8	26 12.0	94 27	52.5	27 36.6	94 27	51.9	29 01.0	94 27	51.3
8	24 59.3	94 27	52.0	25 55.8	94 27	51.6	27 20.6	94 26	51.1	28 45.1	94 26	50.5
9	24 43.2	94 26	51.2	25 39.9	94 26	50.8	27 04.7	94 26	50.2	28 29.4	94 26	49.7
120	24 27.3	95 26	50.3	25 24.0	94 26	50.0	26 49.0	94 26	49.4	28 13.8	94 26	48.8
1	24 11.6	95 26	49.5	25 08.4	95 26	49.1	26 33.5	94 25	48.6	27 58.5	94 25	48.0
2	23 56.1	95 26	48.6	24 53.0	95 25	48.3	26 18.2	95 25	47.8	27 43.3	94 25	47.2
3	23 40.8	95 25	47.8	24 37.8	95 25	47.5	26 03.1	95 25	46.9	27 28.4	95 25	46.4
4	23 25.7	95 25	47.0	24 22.8	95 25	46.6	25 48.2	95 24	46.1	27 13.6	95 24	45.6
125	23 10.8	95 24	46.1	24 08.0	95 24	45.8	25 33.6	95 24	45.3	26 59.1	95 24	44.8
6	22 56.1	95 24	45.3	23 53.3	95 24	45.0	25 19.1	95 24	44.5	26 44.7	95 24	43.9
7	22 41.7	96 24	44.5	23 39.0	95 24	44.1	25 04.8	95 23	43.6	26 30.6	95 23	43.1
8	22 27.4	96 23	43.6	23 24.8	96 23	43.3	24 50.8	95 23	42.8	26 16.6	95 23	42.3
9	22 13.4	96 23	42.8	23 10.8	96 23	42.5	24 36.9	96 23	42.0	26 02.9	96 22	41.5
130	21 59.5	96 23	41.9	22 57.1	96 23	41.6	24 23.3	96 22	41.2	25 49.4	96 22	40.7
1	21 45.9	96 22	41.1	22 43.5	96 22	40.8	24 09.9	96 22	40.3	25 36.2	96 22	39.9
2	21 32.5	96 22	40.3	22 30.2	96 22	40.0	23 56.7	96 22	39.5	25 23.1	96 21	39.1
3	21 19.4	96 22	39.4	22 17.2	96 21	39.1	23 43.8	96 21	38.7	25 10.3	96 21	38.2
4	21 06.5	96 21	38.6	22 04.3	96 21	38.3	23 31.1	96 21	37.9	24 57.7	96 21	37.4
135	20 53.8	97 21	37.8	21 51.7	97 21	37.5	23 18.6	96 20	37.1	24 45.4	96 20	36.6
6	20 41.3	97 20	36.9	21 39.4	97 20	36.6	23 06.3	97 20	36.2	24 33.3	97 20	35.8
7	20 29.1	97 20	36.1	21 27.2	97 20	35.8	22 54.3	97 20	35.4	24 21.4	97 19	35.0
8	20 17.2	97 20	35.2	21 15.3	97 19	35.0	22 42.6	97 19	34.6	24 09.7	97 19	34.2
9	20 05.4	97 19	34.4	21 03.7	97 19	34.2	22 31.0	97 19	33.8	23 58.3	97 19	33.4
140	19 54.0	97 19	33.6	20 52.3	97 19	33.3	22 19.7	97 18	32.9	23 47.1	97 18	32.6
1	19 42.8	97 18	32.7	20 41.2	97 18	32.5	22 08.7	97 18	32.1	23 36.2	97 18	31.7
2	19 31.8	97 18	31.9	20 30.3	97 18	31.7	21 57.9	97 18	31.3	23 25.6	97 17	30.9
3	19 21.1	98 17	31.1	20 19.6	98 17	30.8	21 47.4	98 17	30.5	23 15.1	97 17	30.1
4	19 10.6	98 17	30.2	20 09.2	98 17	30.0	21 37.1	98 17	29.7	23 05.0	98 17	29.3
145	19 00.4	98 17	29.4	19 59.1	98 16	29.2	21 27.1	98 16	28.8	22 55.0	98 16	28.5
6	18 50.5	98 16	28.6	19 49.2	98 16	28.3	21 17.3	98 16	28.0	22 45.4	98 16	27.7
7	18 40.8	98 16	27.7	19 39.6	98 16	27.5	21 07.8	98 15	27.2	22 36.0	98 15	26.9
8	18 31.4	98 15	26.9	19 30.3	98 15	26.7	20 58.6	98 15	26.4	22 26.8	98 15	26.1
9	18 22.2	98 15	26.0	19 21.2	98 15	25.8	20 49.6	98 15	25.5	22 18.0	98 14	25.2
150	18 13.4	98 14	25.2	19 12.4	98 14	25.0	20 40.9	98 14	24.7	22 09.3	98 14	24.4
1	18 04.7	98 14	24.4	19 03.8	98 14	24.2	20 32.4	98 14	23.9	22 01.0	98 14	23.6
2	17 56.4	99 13	23.5	18 55.6	98 13	23.4	20 24.2	99 13	23.1	21 52.9	98 13	22.8
3	17 48.4	99 13	22.7	18 47.6	99 13	22.5	20 16.3	99 13	22.3	21 45.1	99 13	22.0
4	17 40.6	99 12	21.9	18 39.8	99 12	21.7	20 08.7	99 12	21.4	21 37.5	99 12	21.2
155	17 33.1	99 12	21.0	18 32.4	99 12	20.9	20 01.3	99 12	20.6	21 30.2	99 12	20.4
6	17 25.9	99 12	20.2	18 25.2	99 11	20.0	19 54.2	99 11	19.8	21 23.2	99 11	19.5
7	17 18.9	99 11	19.3	18 18.3	99 11	19.2	19 47.4	99 11	19.0	21 16.5	99 11	18.7
8	17 12.3	99 11	18.5	18 11.7	99 11	18.4	19 40.9	99 10	18.1	21 10.1	99 10	17.9
9	17 05.9	99 10	17.7	18 05.4	99 10	17.5	19 34.7	99 10	17.3	21 03.9	99 10	17.1
160	16 59.8	99 10	16.8	17 59.4	99 10	16.7	19 28.7	99 09	16.5	20 58.0	99 09	16.3
1	16 54.0	99 09	16.0	17 53.6	99 09	15.9	19 23.0	99 09	15.7	20 52.4	99 09	15.5
2	16 48.5	99 09	15.1	17 48.2	99 09	15.0	19 17.6	99 09	14.8	20 47.0	99 08	14.7
3	16 43.3	99 08	14.3	17 43.0	99 08	14.2	19 12.5	99 08	14.0	20 42.0	99 08	13.9
4	16 38.4	1.0 08	13.5	17 38.1	1.0 08	13.4	19 07.7	1.0 08	13.2	20 37.2	99 07	13.0
165	16 33.8	1.0 07	12.6	17 33.5	1.0 07	12.5	19 03.1	1.0 07	12.4	20 32.7	1.0 07	12.2
6	16 29.4	1.0 07	11.8	17 29.2	1.0 07	11.7	18 58.9	1.0 07	11.5	20 28.5	1.0 07	11.4
7	16 25.4	1.0 06	10.9	17 25.2	1.0 06	10.9	18 54.9	1.0 06	10.7	20 24.6	1.0 06	10.6
8	16 21.6	1.0 06	10.1	17 21.5	1.0 06	10.0	18 51.2	1.0 06	09.9	20 21.0	1.0 06	09.8
9	16 18.2	1.0 05	09.3	17 18.1	1.0 05	09.2	18 47.8	1.0 05	09.1	20 17.6	1.0 05	09.0
170	16 15.0	1.0 05	08.4	17 14.9	1.0 05	08.3	18 44.8	1.0 05	08.3	20 14.6	1.0 05	08.2
1	16 12.2	1.0 04	07.6	17 12.1	1.0 04	07.5	18 42.0	1.0 04	07.4	20 11.8	1.0 04	07.3
2	16 09.6	1.0 04	06.7	17 09.6	1.0 04	06.7	18 39.4	1.0 04	06.6	20 09.3	1.0 04	06.5
3	16 07.4	1.0 03	05.9	17 07.3	1.0 03	05.8	18 37.2	1.0 03	05.8	20 07.1	1.0 03	05.7
4	16 05.4	1.0 03	05.0	17 05.4	1.0 03	05.0	18 35.3	1.0 03	05.0	20 05.3	1.0 03	04.9
175	16 03.8	1.0 02	04.2	17 03.7	1.0 02	04.2	18 33.7	1.0 02	04.1	20 03.6	1.0 02	04.1
6	16 02.4	1.0 02	03.4	17 02.4	1.0 02	03.3	18 32.4	1.0 02	03.3	20 02.3	1.0 02	03.3
7	16 01.4	1.0 02	02.5	17 01.3	1.0 02	02.5	18 31.3	1.0 01	02.5	20 01.3	1.0 01	02.4
8	16 00.6	1.0 01	01.7	17 00.6	1.0 01	01.7	18 30.6	1.0 01	01.7	20 00.6	1.0 01	01.6
9	16 00.2	1.0 00	00.8	17 00.1	1.0 00	00.8	18 30.1	1.0 00	00.8	20 00.1	1.0 00	00.8
180	16 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	18 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0

42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
38 38.0	90 32	72.0	39 05.0	90 32	71.7	39 31.9	90 32	71.5	41 19.1	89 32	70.3	91
38 18.6	90 32	71.2	38 45.5	90 32	70.9	39 12.5	90 32	70.6	40 59.8	89 32	69.4	2
37 59.2	90 32	70.3	38 26.2	90 32	70.0	38 53.2	90 32	69.8	40 40.7	89 32	68.6	3
37 39.9	90 32	69.5	38 07.0	90 32	69.2	38 34.0	90 32	68.9	40 21.6	89 32	67.8	4
37 20.7	90 32	68.6	37 47.8	90 32	68.4	38 14.9	90 32	68.1	40 02.7	90 31	66.9	95
37 01.7	90 32	67.8	37 28.8	90 32	67.5	37 55.9	90 32	67.2	39 43.9	90 31	66.1	6
36 42.8	91 31	66.9	37 09.9	90 31	66.7	37 37.0	90 31	66.4	39 25.2	90 31	65.3	7
36 23.9	91 31	66.1	36 51.1	91 31	65.8	37 18.3	90 31	65.6	39 06.6	90 31	64.5	8
36 05.2	91 31	65.3	36 32.5	91 31	65.0	36 59.7	91 31	64.7	38 48.1	90 31	63.7	9
35 46.7	91 31	64.4	36 13.9	91 31	64.2	36 41.2	91 31	63.9	38 29.8	90 30	62.8	100
35 28.2	91 31	63.6	35 55.5	91 30	63.3	36 22.8	91 30	63.1	38 11.6	90 30	62.0	1
35 09.9	91 30	62.8	35 37.3	91 30	62.5	36 04.6	91 30	62.3	37 53.5	91 30	61.2	2
34 51.7	91 30	61.9	35 19.1	91 30	61.7	35 46.5	91 30	61.4	37 35.6	91 30	60.4	3
34 33.7	92 30	61.1	35 01.1	91 30	60.9	35 28.5	91 30	60.6	37 17.9	91 29	59.6	4
34 15.8	92 30	60.3	34 43.3	92 30	60.0	35 10.7	91 29	59.8	37 00.2	91 29	58.8	105
33 58.0	92 29	59.5	34 25.6	92 29	59.2	34 53.1	92 29	59.0	36 42.8	91 29	58.0	6
33 40.4	92 29	58.6	34 08.0	92 29	58.4	34 35.5	92 29	58.2	36 25.4	91 29	57.2	7
33 23.0	92 29	57.8	33 50.6	92 29	57.6	34 18.2	92 29	57.4	36 08.3	92 28	56.4	8
33 05.7	92 29	57.0	33 33.4	92 28	56.8	34 01.0	92 28	56.5	35 51.3	92 28	55.6	9
32 48.6	92 28	56.2	33 16.3	92 28	56.0	33 44.0	92 28	55.7	35 34.4	92 28	54.8	110
32 31.6	93 28	55.4	32 59.3	92 28	55.1	33 27.1	92 28	54.9	35 17.7	92 28	54.0	1
32 14.8	93 28	54.6	32 42.6	93 28	54.3	33 10.4	93 28	54.1	35 01.2	92 27	53.2	2
31 58.2	93 27	53.7	32 26.0	93 27	53.5	32 53.8	93 27	53.3	34 44.9	92 27	52.4	3
31 41.7	93 27	52.9	32 09.6	93 27	52.7	32 37.5	93 27	52.5	34 28.7	93 27	51.6	4
31 25.4	93 27	52.1	31 53.4	93 27	51.9	32 21.3	93 27	51.7	34 12.7	93 26	50.8	115
31 09.3	93 27	51.3	31 37.3	93 26	51.1	32 05.3	93 26	50.9	33 56.9	93 26	50.0	6
30 53.4	93 26	50.5	31 21.4	93 26	50.3	31 49.4	93 26	50.1	33 41.3	93 26	49.2	7
30 37.6	94 26	49.7	31 05.7	94 26	49.5	31 33.8	94 26	49.3	33 25.8	93 25	48.4	8
30 22.1	94 26	48.9	30 50.2	94 26	48.7	31 18.3	94 25	48.5	33 10.6	93 25	47.6	9
30 06.7	94 25	48.1	30 34.9	94 25	47.9	31 03.1	94 25	47.7	32 55.5	94 25	46.8	120
29 51.5	94 25	47.3	30 19.8	94 25	47.1	30 48.0	94 25	46.9	32 40.6	94 24	46.1	1
29 36.6	94 25	46.5	30 04.8	94 25	46.3	30 33.1	94 24	46.1	32 25.9	94 24	45.3	2
29 21.8	94 24	45.7	29 50.1	94 24	45.5	30 18.4	94 24	45.3	32 11.5	94 24	44.5	3
29 07.2	95 24	44.8	29 35.6	95 24	44.7	30 03.9	94 24	44.5	31 57.2	94 23	43.7	4
28 52.9	95 24	44.0	29 21.3	95 24	43.9	29 49.7	95 23	43.7	31 43.1	94 23	42.9	125
28 38.7	95 23	43.2	29 07.2	95 23	43.1	29 35.6	95 23	42.9	31 29.2	95 23	42.1	6
28 24.7	95 23	42.4	28 53.2	95 23	42.3	29 21.7	95 23	42.1	31 15.6	95 22	41.3	7
28 11.0	95 23	41.6	28 39.6	95 22	41.5	29 08.1	95 22	41.3	31 02.1	95 22	40.6	8
27 57.5	95 22	40.8	28 26.1	95 22	40.7	28 54.7	95 22	40.5	30 48.9	95 22	39.8	9
27 44.2	96 22	40.0	28 12.8	95 22	39.9	28 41.5	95 22	39.7	30 35.9	95 21	39.0	130
27 31.1	96 21	39.2	27 59.8	96 21	39.1	28 28.5	96 21	38.9	30 23.1	95 21	38.2	1
27 18.2	96 21	38.4	27 47.0	96 21	38.3	28 15.7	96 21	38.1	30 10.5	96 21	37.4	2
27 05.6	96 21	37.6	27 34.4	96 21	37.5	28 03.1	96 21	37.3	29 58.1	96 20	36.7	3
26 53.2	96 20	36.8	27 22.0	96 20	36.7	27 50.8	96 20	36.5	29 46.0	96 20	35.9	4
26 41.0	96 20	36.0	27 09.8	96 20	35.9	27 38.7	96 20	35.7	29 34.1	96 19	35.1	135
26 29.0	96 20	35.2	26 57.9	96 19	35.1	27 26.8	96 19	34.9	29 22.4	96 19	34.3	6
26 17.3	97 19	34.4	26 46.3	97 19	34.3	27 15.2	96 19	34.1	29 10.9	96 19	33.5	7
26 05.8	97 19	33.6	26 34.8	97 19	33.5	27 03.8	97 19	33.3	28 59.7	97 18	32.7	8
25 54.6	97 18	32.8	26 23.6	97 18	32.7	26 52.7	97 18	32.5	28 48.7	97 18	32.0	9
25 43.6	97 18	32.0	26 12.7	97 18	31.9	26 41.7	97 18	31.7	28 38.0	97 18	31.2	140
25 32.8	97 18	31.2	26 01.9	97 17	31.1	26 31.1	97 17	31.0	28 27.5	97 17	30.4	1
25 22.3	97 17	30.4	25 51.5	97 17	30.3	26 20.6	97 17	30.2	28 17.2	97 17	29.6	2
25 12.0	97 17	29.6	25 41.2	97 17	29.5	26 10.4	97 17	29.4	28 07.2	97 16	28.8	3
25 02.0	98 16	28.8	25 31.3	97 16	28.7	26 00.5	97 16	28.6	27 57.4	97 16	28.1	4
24 52.2	98 16	28.0	25 21.5	98 16	27.9	25 50.8	98 16	27.8	27 47.9	98 15	27.3	145
24 42.7	98 15	27.2	25 12.1	98 15	27.1	25 41.4	98 15	27.0	27 38.6	98 15	26.5	6
24 33.5	98 15	26.4	25 02.8	98 15	26.3	25 32.2	98 15	26.2	27 29.6	98 15	25.7	7
24 24.5	98 15	25.6	24 53.9	98 15	25.5	25 23.3	98 14	25.4	27 20.8	98 14	25.0	8
24 15.7	98 14	24.8	24 45.2	98 14	24.7	25 14.6	98 14	24.6	27 12.2	98 14	24.2	9
24 07.2	98 14	24.0	24 36.7	98 14	23.9	25 06.2	98 14	23.8	27 04.0	98 13	23.4	150
23 59.0	98 13	23.2	24 28.5	98 13	23.1	24 58.0	98 13	23.0	26 56.0	98 13	22.6	1
23 51.1	98 13	22.4	24 20.6	98 13	22.3	24 50.1	98 13	22.2	26 48.2	98 12	21.8	2
23 43.4	99 12	21.6	24 12.9	99 12	21.5	24 42.5	99 12	21.4	26 40.7	98 12	21.1	3
23 35.9	99 12	20.8	24 05.5	99 12	20.7	24 35.1	99 12	20.6	26 33.4	99 12	20.3	4
23 28.8	99 11	20.0	23 58.4	99 11	19.9	24 28.0	99 11	19.9	26 26.5	99 11	19.5	155
23 21.9	99 11	19.2	23 51.5	99 11	19.1	24 21.2	99 11	19.1	26 19.7	99 11	18.7	6
23 15.3	99 11	18.4	23 44.9	99 11	18.3	24 14.6	99 11	18.3	26 13.3	99 10	17.9	7
23 08.9	99 10	17.6	23 38.6	99 10	17.5	24 08.3	99 10	17.5	26 07.1	99 10	17.2	8
23 02.8	99 10	16.8	23 32.6	99 10	16.8	24 02.3	99 10	16.7	26 01.2	99 09	16.4	9
22 57.0	99 09	16.0	23 26.8	99 09	16.0	23 56.5	99 09	15.9	25 55.5	99 09	15.6	160
22 51.5	99 09	15.2	23 21.3	99 09	15.2	23 51.1	99 09	15.1	25 50.2	99 09	14.8	1
22 46.3	99 08	14.4	23 16.1	99 08	14.4	23 45.9	99 08	14.3	25 45.0	99 08	14.0	2
22 41.3	99 08	13.6	23 11.1	99 08	13.6	23 40.9	99 08	13.5	25 40.2	99 08	13.3	3
22 36.6	99 07	12.8	23 06.4	99 07	12.8	23 36.3	99 07	12.7	25 35.6	99 07	12.5	4
22 32.2	1.0 07	12.0	23 02.0	1.0 07	12.0	23 31.9	1.0 07	11.9	25 31.3	1.0 07	11.7	165
22 28.0	1.0 06	11.2	22 57.9	1.0 06	11.2	23 27.8	1.0 06	11.1	25 27.3	1.0 06	10.9	6
22 24.2	1.0 06	10.4	22 54.1	1.0 06	10.4	23 24.0	1.0 06	10.3	25 23.5	1.0 06	10.1	7
22 20.6	1.0 05	09.6	22 50.5	1.0 05	09.6	23 20.4	1.0 05	09.5	25 20.1	1.0 05	09.4	8
22 17.3	1.0 05	08.8	22 47.3	1.0 05	08.8	23 17.2	1.0 05	08.7	25 16.9	1.0 05	08.6	9
22 14.3	1.0 05	08.0	22 44.3	1.0 04	08.0	23 14.2	1.0 04	07.9	25 13.9	1.0 04	07.8	170
22 11.6	1.0 04	07.2	22 41.6	1.0 04	07.2	23 11.5	1.0 04	07.1	25 11.3	1.0 04	07.0	1
22 09.2	1.0 04	06.4	22 39.1	1.0 04	06.4	23 09.1	1.0 04	06.4	25 08.9	1.0 03	06.2	2
22 07.0	1.0 03	05.6	22 37.0	1.0 03	05.6	23 07.0	1.0 03	05.6	25 06.8	1.0 03	05.5	3
22 05.2	1.0 03	04.8	22 35.1	1.0 03	04.8	23 05.1	1.0 03	04.8	25 05.0	1.0 03	04.7	4
22 03.6	1.0 02	04.0	22 33.6	1.0 02	04.0	23 03.6	1.0 02	04.0	25 03.5	1.0 02	03.9	175
22 02.3	1.0 02	03.2	22 32.3	1.0 02	03.2	23 02.3	1.0 02	03.2	25 02.2	1.0 02	03.1	6
22 01.3	1.0 01	02.4	22 31.3	1.0 01	02.4	23 01.3	1.0 01	02.4	25 01.3	1.0 01	02.3	7
22 00.6	1.0 01	01.6	22 30.6	1.0 01	01.6	23 00.6	1.0 01	01.6	25 00.6	1.0 01	01.6	8
22 00.1	1.0 00	00.8	22 30.1	1.0 00	00.8	23 00.1	1.0 00	00.8	25 00.1	1.0 00	00.8	9
22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	25 00.0	1.0 00	00.0	180

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′ Alt.	Az.	37° 00′ Alt.	Az.	38° 30′ Alt.	Az.	40° 00′ Alt.	Az.	42° 00′ Alt.	Az.	42° 30′ Alt.	Az.	43° 00′ Alt.	Az.	45° 00′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	56 00.0 1.0 00 180.0		57 00.0 1.0 00 180.0		58 30.0 1.0 00 180.0		60 00.0 1.0 00 180.0		62 00.0 1.0 00 180.0		62 30.0 1.0 00 180.0		63 00.0 1.0 00 180.0		65 00.0 1.0 00 180.0		00
1	55 59.7 1.0 01 178.6		56 59.7 1.0 01 178.5		58 29.7 1.0 01 178.5		59 59.7 1.0 01 178.5		61 59.7 1.0 01 178.4		62 29.7 1.0 01 178.4		62 59.7 1.0 01 178.4		64 59.7 1.0 02 178.3		1
2	55 59.0 1.0 02 177.1		56 59.0 1.0 02 177.1		58 28.9 1.0 02 177.0		59 58.9 1.0 02 176.9		61 58.9 1.0 02 176.8		62 28.9 1.0 02 176.8		62 58.8 1.0 02 176.8		64 58.8 1.0 02 176.7		2
3	55 57.7 1.0 03 175.7		56 57.6 1.0 03 175.6		58 27.6 1.0 03 175.5		59 57.5 1.0 03 175.4		61 57.4 1.0 03 175.3		62 27.4 1.0 03 175.2		62 57.4 1.0 03 175.2		64 57.3 1.0 03 175.0		3
4	55 55.9 1.0 04 174.2		56 55.8 1.0 04 174.1		58 25.7 1.0 04 174.0		59 55.6 1.0 04 173.9		61 55.5 1.0 04 173.7		62 25.4 1.0 04 173.6		62 55.4 1.0 04 173.6		64 55.2 1.0 04 173.3		4
05	55 53.5 1.0 05 172.8		56 53.4 1.0 05 172.7		58 23.3 1.0 05 172.5		59 53.2 1.0 05 172.4		61 52.9 1.0 05 172.1		62 22.9 1.0 05 172.0		62 52.8 1.0 05 172.0		64 52.5 1.0 05 171.7		05
6	55 50.7 1.0 06 171.3		56 50.6 1.0 06 171.2		58 20.4 1.0 06 171.0		59 50.2 1.0 06 170.8		61 49.8 1.0 06 170.5		62 19.7 1.0 06 170.4		62 49.7 1.0 06 170.4		64 49.3 1.0 06 170.0		6
7	55 47.4 1.0 06 169.9		56 47.2 1.0 06 169.8		58 16.9 1.0 07 169.5		59 46.6 1.0 07 169.3		61 46.2 1.0 07 169.0		62 16.1 1.0 07 168.9		62 45.9 1.0 07 168.8		64 45.4 1.0 07 168.3		7
8	55 43.5 1.0 07 168.5		56 43.3 1.0 07 168.3		58 12.9 1.0 08 168.1		59 42.5 1.0 08 167.8		61 42.0 99 08 167.4		62 11.8 99 08 167.3		62 41.7 99 08 167.2		64 41.0 99 08 166.7		8
9	55 39.2 1.0 08 167.0		56 38.9 1.0 08 166.9		58 08.4 99 08 166.6		59 37.9 99 09 166.3		61 37.2 99 09 165.8		62 07.0 99 09 165.7		62 36.8 99 09 165.6		64 36.0 99 09 165.1		9
10	55 34.3 99 09 165.6		56 34.0 99 09 165.4		58 03.4 99 09 165.1		59 32.8 99 09 164.8		61 31.9 99 10 164.3		62 01.7 99 10 164.2		62 31.5 99 10 164.0		64 30.4 99 10 163.4		10
1	55 29.0 99 10 164.2		56 28.5 99 10 164.0		57 57.9 99 10 163.6		59 27.2 99 10 163.3		61 26.1 99 11 162.7		61 55.8 99 11 162.6		62 25.5 99 11 162.5		64 24.3 99 11 161.8		1
2	55 23.1 99 11 162.8		56 22.6 99 11 162.6		57 51.9 99 11 162.2		59 21.0 99 11 161.8		61 19.8 99 11 161.2		61 49.4 99 12 161.1		62 19.1 99 12 160.9		64 17.6 99 12 160.2		2
3	55 16.8 99 11 161.4		56 16.2 99 11 161.1		57 45.3 99 12 160.7		59 14.4 99 12 160.3		61 12.9 99 12 159.7		61 42.5 99 12 159.5		62 12.1 99 12 159.3		64 10.3 99 13 158.6		3
4	55 10.0 99 12 160.0		56 09.4 99 12 159.7		57 38.3 99 12 159.3		59 07.2 99 13 158.8		61 05.5 99 13 158.2		61 35.1 99 13 158.0		62 04.6 99 13 157.8		64 02.6 99 14 157.0		4
15	55 02.7 99 13 158.6		56 02.0 99 13 158.3		57 30.8 99 13 157.8		58 59.5 99 14 157.4		60 57.6 98 14 156.7		61 27.1 98 14 156.5		61 56.6 98 14 156.3		63 54.3 98 15 155.4		15
6	54 55.0 99 14 157.2		55 54.2 99 14 156.9		57 22.8 98 14 156.4		58 51.4 98 14 155.9		60 49.3 98 15 155.2		61 18.7 98 15 155.0		61 48.1 98 15 154.7		63 45.5 98 16 153.8		6
7	54 46.8 98 14 155.8		55 45.9 98 15 155.5		57 14.4 98 15 155.0		58 42.8 98 15 154.5		60 40.4 98 16 153.7		61 09.8 98 16 153.5		61 39.1 98 16 153.2		63 36.2 97 16 152.3		7
8	54 38.2 98 15 154.4		55 37.1 98 15 154.1		57 05.5 98 16 153.6		58 33.7 98 16 153.0		60 31.1 98 16 152.2		61 00.3 98 16 152.0		61 29.6 98 17 151.7		63 26.4 97 17 150.7		8
9	54 29.1 98 16 153.0		55 28.0 98 16 152.7		56 56.1 98 16 152.2		58 24.2 98 17 151.6		60 21.3 97 17 150.7		60 50.5 97 17 150.5		61 19.7 97 17 150.2		63 16.2 97 18 149.2		9
20	54 19.6 98 17 151.7		55 18.3 98 17 151.3		56 46.3 98 17 150.8		58 14.2 97 17 150.2		60 11.0 97 18 149.3		60 40.1 97 18 149.0		61 09.3 97 18 148.8		63 05.4 97 19 147.7		20
1	54 09.6 98 17 150.3		55 08.3 98 17 150.0		56 36.1 97 18 149.4		58 03.7 97 18 148.7		60 00.3 97 19 147.8		60 29.3 97 19 147.6		60 58.4 97 19 147.3		62 54.2 96 19 146.2		1
2	53 59.3 98 18 149.0		54 57.8 97 18 148.6		56 25.4 97 18 148.0		57 52.9 97 19 147.3		59 49.1 97 19 146.4		60 18.1 97 19 146.1		60 47.1 96 20 145.9		62 42.6 96 20 144.7		2
3	53 48.5 97 19 147.6		54 46.9 97 19 147.2		56 14.3 97 19 146.6		57 41.6 97 20 145.9		59 37.6 96 20 145.0		60 06.5 96 20 144.7		60 35.4 96 20 144.4		62 30.5 96 21 143.2		3
4	53 37.3 97 19 146.3		54 35.6 97 20 145.9		56 02.8 97 20 145.3		57 29.9 97 20 144.6		59 25.6 96 21 143.5		59 54.4 96 21 143.3		60 23.2 96 21 143.0		62 18.0 95 21 141.8		4
25	53 25.7 97 20 145.0		54 23.9 97 20 144.6		55 50.9 97 20 143.9		57 17.8 96 21 143.2		59 13.2 96 21 142.1		59 41.9 96 21 141.9		60 10.7 96 22 141.6		62 05.1 96 22 140.3		25
6	53 13.7 97 21 143.7		54 11.8 97 21 143.2		55 38.7 96 21 142.6		57 05.3 96 21 141.8		59 00.4 96 22 140.8		59 29.1 96 22 140.5		59 57.7 95 22 140.2		61 51.8 95 23 138.9		6
7	53 01.4 97 21 142.4		53 59.3 96 21 141.9		55 26.0 96 22 141.2		56 52.4 96 22 140.5		58 47.2 95 23 139.4		59 15.8 95 23 139.1		59 44.4 95 23 138.8		61 38.2 95 23 137.5		7
8	52 48.7 96 22 141.1		53 46.5 96 22 140.6		55 13.0 96 22 139.9		56 39.2 96 23 139.1		58 33.7 95 23 138.0		59 02.2 95 23 137.7		59 30.7 95 23 137.4		61 24.1 94 24 136.1		8
9	52 35.6 96 22 139.8		53 33.3 96 23 139.3		54 59.6 96 23 138.6		56 25.6 96 23 137.8		58 19.8 95 24 136.7		58 48.2 95 24 136.4		59 16.6 95 24 136.1		61 09.7 94 25 134.7		9
30	52 22.2 96 23 138.5		53 19.7 96 23 138.0		54 45.8 96 23 137.3		56 11.6 95 24 136.5		58 05.5 95 24 135.3		58 33.9 94 24 135.0		59 02.2 94 25 134.7		60 55.0 94 25 133.3		30
1	52 08.4 96 24 137.2		53 05.8 96 24 136.8		54 31.7 96 24 136.0		55 57.3 95 24 135.2		57 50.9 94 25 134.0		58 19.2 94 25 133.7		58 47.4 94 25 133.4		60 39.9 93 26 132.0		1
2	51 54.3 96 24 136.0		52 51.6 95 24 135.5		54 17.3 95 25 134.7		55 42.7 95 25 133.9		57 36.0 94 25 132.7		58 04.2 94 26 132.4		58 32.4 94 26 132.0		60 24.4 93 26 130.6		2
3	51 39.9 95 25 134.7		52 37.1 95 25 134.2		54 02.6 95 25 133.5		55 27.8 94 25 132.6		57 20.7 94 26 131.4		57 48.9 94 26 131.1		58 17.0 94 26 130.7		60 08.7 93 27 129.3		3
4	51 25.2 95 25 133.5		52 22.2 95 25 133.0		53 47.5 95 26 132.2		55 12.5 94 26 131.3		57 05.2 94 26 130.1		57 33.3 93 27 129.8		58 01.3 93 27 129.4		59 52.7 92 27 128.0		4
35	51 10.1 95 26 132.3		52 07.1 95 26 131.8		53 32.2 94 26 130.9		54 56.9 94 26 130.1		56 49.4 93 27 128.8		57 17.3 93 27 128.5		57 45.3 93 27 128.2		59 36.4 92 28 126.7		35
6	50 54.8 95 26 131.0		51 51.6 95 26 130.5		53 16.5 94 27 129.7		54 41.1 94 27 128.8		56 33.2 93 27 127.6		57 01.1 93 27 127.2		57 29.0 93 28 126.9		59 19.8 92 28 125.4		6
7	50 39.2 95 26 129.8		51 35.9 94 27 129.3		53 00.6 94 27 128.5		54 25.0 94 27 127.6		56 16.8 93 28 126.3		56 44.7 93 28 126.0		57 12.4 92 28 125.6		59 02.9 92 28 124.2		7
8	50 23.3 94 27 128.6		51 19.8 94 27 128.1		52 44.4 94 27 127.3		54 08.6 93 28 126.4		56 00.2 93 28 125.1		56 27.9 92 28 124.7		56 55.6 92 28 124.4		58 45.8 91 29 122.9		8
9	50 07.1 94 27 127.4		51 03.6 94 28 126.9		52 27.9 94 28 126.1		53 51.9 93 28 125.2		55 43.3 92 29 123.9		56 11.0 92 29 123.5		56 38.6 92 29 123.2		58 28.5 91 29 121.7		9
40	49 50.7 94 28 126.3		50 47.0 94 28 125.7		52 11.2 93 28 124.9		53 35.0 93 29 124.0		55 26.1 92 29 122.7		55 53.7 92 29 122.3		56 21.3 92 29 122.0		58 10.9 91 30 120.4		40
1	49 34.0 94 28 125.1		50 30.2 94 28 124.5		51 54.3 93 29 123.7		53 17.9 93 29 122.8		55 08.7 92 29 121.4		55 36.3 92 29 121.1		56 03.8 92 30 120.7		57 53.1 91 30 119.2		1
2	49 17.1 94 29 123.9		50 13.2 93 29 123.4		51 37.1 93 29 122.5		53 00.5 92 29 121.6		54 51.1 92 30 120.3		55 18.6 92 30 119.9		55 46.0 91 30 119.6		57 35.1 90 30 118.0		2
3	49 00.0 93 29 122.8		49 56.0 93 29 122.2		51 19.7 93 29 121.3		52 42.9 92 30 120.4		54 33.3 92 30 119.1		55 00.7 91 30 118.7		55 28.1 91 30 118.4		57 16.9 90 31 116.8		3
4	48 42.6 93 29 121.6		49 38.5 93 30 121.1		51 02.0 93 30 120.2		52 25.1 92 30 119.2		54 15.2 91 30 117.9		54 42.6 91 30 117.6		55 09.9 91 31 117.2		56 58.5 90 31 115.7		4
45	48 25.0 93 30 120.5		49 20.8 93 30 119.9		50 44.2 92 30 119.0		52 07.1 92 30 118.1		53 57.0 91 31 116.8		54 24.3 91 31 116.4		54 51.6 91 31 116.0		56 39.9 90 31 114.5		45
6	48 07.2 93 30 119.3		49 02.9 93 30 118.8		50 26.1 92 30 117.9		51 48.9 92 31 117.0		53 38.6 91 31 115.6		54 05.8 91 31 115.3		54 33.0 91 31 114.9		56 21.2 90 32 113.4		6
7	47 49.2 93 30 118.2		48 44.8 93 30 117.6		50 07.9 92 31 116.8		51 30.6 92 31 115.8		53 20.0 91 31 114.5		53 47.2 91 31 114.1		54 14.3 90 31 113.8		56 02.2 89 32 112.2		7
8	47 31.1 93 31 117.1		48 26.6 92 31 116.5		49 49.5 92 31 115.6		51 12.0 91 31 114.7		53 01.2 91 32 113.4		53 28.4 90 32 113.0		53 55.5 90 32 112.6		55 43.2 89 32 111.1		8
9	47 12.7 92 31 116.0		48 08.1 92 31 115.4		49 30.9 92 31 114.5		50 53.3 91 31 113.6		52 42.3 90 32 112.2		53 09.4 90 32 111.9		53 36.5 90 32 111.5		55 23.9 89 32 110.0		9
50	46 54.2 92 31 114.9		47 49.5 92 31 114.3		49 12.2 92 32 113.4		50 34.4 91 32 112.5		52 23.2 90 32 111.1		52 50.3 90 32 110.8		53 17.3 90 32 110.4		55 04.6 89 32 108.9		50
1	46 35.5 92 31 113.8		47 30.7 92 32 113.2		48 53.3 91 32 112.3		50 15.3 91 32 111.4		52 04.0 90 32 110.0		52 31.0 90 32 109.7		52 58.0 90 32 109.3		54 45.1 89 33 107.8		1
2	46 16.6 92 32 112.7		47 11.8 92 32 112.2		48 34.2 91 32 111.3		49 56.2 91 32 110.3		51 44.7 90 32 109.0		52 11.7 90 33 108.6		52 38.6 90 33 108.2		54 25.5 89 33 106.7		2
3	45 57.6 92 32 111.7		46 52.7 92 32 111.1		48 15.0 91 32 110.2		49 36.9 91 32 109.2		51 25.2 90 33 107.9		51 52.2 90 33 107.5		52 19.0 89 33 107.2		54 05.8 88 33 105.6		3
4	45 38.5 92 32 110.6		46 33.5 92 32 110.0		47 55.7 91 32 109.1		49 17.4 91 33 108.2		51 05.6 90 33 106.8		51 32.5 90 33 106.5		51 59.4 89 33 106.1		53 46.0 88 33 104.6		4
55	45 19.2 92 32 109.5		46 14.2 91 32 108.9		47 36.2 91 33 108.0		48 57.9 90 33 107.1		50 45.9 90 33 105.8		51 12.8 89 33 105.4		51 39.6 89 33 105.0		53 26.1 88 33 103.5		55
6	44 59.8 92 33 108.5		45 54.7 91 33 107.9		47 16.7 91 33 107.0		48 38.2 90 33 106.0		50 26.1 90 33 104.7		50 53.0 89 33 104.3		51 19.7 89 33 104.0		53 06.1 88 33 102.5		6
7	44 40.3 92 33 107.4		45 35.1 91 33 106.9		46 57.0 91 33 106.0		48 18.4 90 33 105.0		50 06.2 89 33 103.7		50 33.0 89 33 103.3		50 59.8 89 33 103.0		52 46.0 88 34 101.4		7
8	44 20.6 91 33 106.4		45 15.4 91 33 105.8		46 37.2 91 33 104.9		47 58.6 90 33 104.0		49 46.2 89 33 102.6		50 13.0 89 33 102.3		50 39.7 89 34 101.9		52 25.9 88 34 100.4		8
9	44 00.9 91 33 105.4		44 55.6 91 33 104.8		46 17.3 91 33 103.9		47 38.6 90 33 102.9		49 26.2 89 34 101.6		49 52.9 89 34 101.3		50 19.6 89 34 100.9		52 05.7 88 34 99.4		9
60	43 41.1 91 33 104.3		44 35.7 91 33 103.8		45 57.4 90 33 102.9		47 18.6 90 34 101.9		49 06.0 89 34 100.6		49 32.8 89 34 100.2		49 59.4 89 34 99.9		51 45.4 88 34 98.4		60
1	43 21.1 91 33 103.3		44 15.8 91 33 102.7		45 37.3 90 34 101.8		46 58.4 90 34 100.9		48 45.8 89 34 99.6		49 12.5 89 34 99.2		49 39.2 89 34 98.9		51 25.1 88 34 97.4		1
2	43 01.1 91 33 102.3		43 55.7 91 34 101.7		45 17.2 90 34 100.8		46 38.3 90 34 99.9		48 25.6 89 34 98.6		48 52.3 89 34 98.2		49 18.9 89 34 97.9		51 04.7 88 34 96.4		2
3	42 41.1 91 34 101.3		43 35.6 91 34 100.7		44 57.0 90 34 99.8		46 18.0 90 34 98.9		48 05.3 89 34 97.6		48 31.9 89 34 97.2		48 58.5 89 34 96.9		50 44.3 88 34 95.4		3
4	42 20.9 91 34 100.3		43 15.4 91 34 99.7		44 36.8 90 34 98.8		45 57.7 90 34 97.9		47 44.9 89 34 96.6		48 11.5 89 34 96.3		48 38.1 89 34 95.9		50 23.8 88 34 94.4		4
65	42 00.7 91 34 99.3		42 55.1 91 34 98.7		44 16.5 90 34 97.9		45 37.4 90 34 96.9		47 24.5 89 34 95.6		47 51.1 89 34 95.3		48 17.7 88 34 94.9		50 03.4 88 34 93.5		65
6	41 40.4 91 34 98.3		42 34.8 91 34 97.8		43 56.1 90 34 96.9		45 17.0 90 34 96.0		47 04.1 89 34 94.6		47 30.7 89 34 94.3		47 57.2 88 34 94.0		49 42.9 88 34 92.5		6
7	41 20.1 91 34 97.3		42 14.5 91 34 96.8		43 35.7 90 34 95.9		44 56.5 90 34 95.0		46 43.6 89 34 93.7		47 10.2 89 34 93.3		47 36.8 88 34 93.0		49 22.4 88 34 91.6		7
8	40 59.7 91 34 96.4		41 54.1 90 34 95.8		43 15.3 90 34 94.9		44 36.1 90 34 94.0		46 23.1 89 34 92.7		46 49.7 89 34 92.4		47 16.3 88 34 92.0		49 01.8 88 34 90.6		8
9	40 39.3 91 34 95.4		41 33.6 90 34 94.8		42 54.8 90 34 94.0		44 15.6 90 34 93.1		46 02.6 89 34 91.8		46 29.2 89 34 91.4		46 55.8 88 34 91.1		48 41.3 88 34 89.7		9
70	40 18.8 91 34 94.4		41 13.2 90 34 93.9		42 34.3 90 34 93.0		43 55.1 89 34 92.1		45 42.1 89 34 90.8		46 08.7 89 34 90.5		46 35.2 88 34 90.1		48 20.8 88 34 88.7		70
1	39 58.4 91 34 93.5		40 52.7 90 34 92.9		42 13.8 90 34 92.1		43 34.6 89 34 91.1		45 21.6 89 34 89.9		45 48.2 89 34 89.5		46 14.7 88 34 89.2		48 00.3 88 34 87.8		1
2	39 37.9 91 34 92.5		40 32.2 90 34 92.0		41 53.3 90 34 91.1		43 14.1 89 34 90.2		45 01.0 89 34 88.9		45 27.6 89 34 88.6		45 54.2 88 34 88.3		47 39.8 88 34 86.9		2
3	39 17.4 91 34 91.6		40 11.7 90 34 91.0		41 32.8 90 34 90.2		42 53.6 89 34 89.3		44 40.5 89 34 88.0		45 07.1 89 34 87.7		45 33.7 88 34 87.4		47 19.3 88 34 86.0		3
4	38 56.8 91 34 90.6		39 51.1 90 34 90.1		41 12.3 90 34 89.2		42 33.0 89 34 88.3		44 20.0 89 34 87.1		44 46.6 89 34 86.8		45 13.2 88 34 86.4		46 58.8 88 34 85.1		4
75	38 36.3 91 34 89.7		39 30.6 90 34 89.1		40 51.8 90 34 88.3		42 12.5 90 34 87.4		43 59.5 89 34 86.2		44 26.2 89 34 85.8		44 52.7 88 34 85.5		46 38.4 88 34 84.2		75
6	38 15.8 91 34 88.8		39 10.1 90 34 88.2		40 31.3 90 34 87.4		41 52.0 90 34 86.5		43 39.1 89 34 85.3		44 05.7 89 34 84.9		44 32.3 89 34 84.6		46 18.0 88 34 83.3		6
7	37 55.3 91 34 87.8		38 49.6 90 34 87.3		40 10.8 90 34 86.4		41 31.6 90 34 85.6		43 18.6 89 34 84.3		43 45.3 89 34 84.0		44 11.9 89 34 83.7		45 57.7 88 34 82.4		7
8	37 34.8 91 34 86.9		38 29.1 90 34 86.4		39 50.3 90 34 85.5		41 11.1 90 34 84.6		42 58.2 89 34 83.4		43 24.9 89 34 83.1		43 51.5 89 34 82.8		45 37.3 88 34 81.5		8
9	37 14.3 91 34 86.0		38 08.6 90 34 85.4		39 29.9 90 34 84.6		40 50.7 90 34 83.7		42 37.9 89 34 82.5		43 04.5 89 34 82.2		43 31.2 89 34 81.9		45 17.1 88 34 80.6		9
80	36 53.9 91 34 85.0		37 48.2 90 34 84.5		39 09.4 90 34 83.7		40 30.3 90 34 82.8		42 17.5 89 34 81.6		42 44.2 89 34 81.3		43 10.9 89 34 81.0		44 56.9 88 34 79.7		80
1	36 33.4 91 34 84.1		37 27.8 90 34 83.6		38 49.1 90 34 82.8		40 10.0 90 34 81.9		41 57.3 89 34 80.7		42 24.0 89 34 80.4		42 50.6 89 34 80.1		44 36.7 88 34 78.8		1
2	36 13.0 91 34 83.2		37 07.4 91 34 82.7		38 28.7 90 34 81.9		39 49.7 90 34 81.0		41 37.0 89 34 79.9		42 03.8 89 34 79.6		42 30.4 89 34 79.2		44 16.6 88 33 78.0		2
3	35 52.7 91 34 82.3		36 47.1 91 34 81.8		38 08.4 90 34 81.0		39 29.4 90 34 80.1		41 16.9 89 34 79.0		41 43.6 89 33 78.7		42 10.3 89 33 78.4		43 56.6 88 33 77.1		3
4	35 32.4 91 34 81.4		36 26.8 91 34 80.9		37 48.2 90 34 80.1		39 09.3 90 34 79.3		40 56.7 89 33 78.1		41 23.5 89 33 77.8		41 50.2 89 33 77.5		43 36.6 88 33 76.2		4
85	35 12.1 91 34 80.5		36 06.6 91 34 80.0		37 28.0 90 34 79.2		38 49.1 90 33 78.4		40 36.7 89 33 77.2		41 03.5 89 33 76.9		41 30.2 89 33 76.6		43 16.7 88 33 75.4		85
6	34 51.9 91 34 79.6		35 46.4 91 34 79.1		37 07.9 90 33 78.3		38 29.1 90 33 77.5		40 16.7 89 33 76.3		40 43.5 89 33 76.0		41 10.3 89 33 75.7		42 56.9 88 33 74.5		6
7	34 31.7 91 33 78.7		35 26.3 91 33 78.2		36 47.8 90 33 77.4		38 09.1 90 33 76.6		39 56.8 90 33 75.5		40 23.7 89 33 75.2		40 50.5 89 33 74.9		42 37.1 89 33 73.7		7
8	34 11.6 91 33 77.8		35 06.2 91 33 77.3		36 27.8 91 33 76.5		37 49.1 90 33 75.7		39 37.0 90 33 74.6		40 03.9 89 33 74.3		40 30.7 89 33 74.0		42 17.5 89 33 72.8		8
9	33 51.6 91 33 76.9		34 46.2 91 33 76.4		36 07.9 91 33 75.7		37 29.3 90 33 74.9		39 17.3 90 33 73.7		39 44.1 90 33 73.5		40 11.0 89 33 73.2		41 57.9 89 32 72.0		9
90	33 31.7 91 33 76.0		34 26.3 91 33 75.5		35 48.1 91 33 74.8		37 09.5 90 33 74.0		38 57.6 90 33 72.9		39 24.5 90 33 72.6		39 51.4 90 32 72.3		41 38.5 89 32 71.1		90

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′		37° 00′		38° 30′		40° 00′		42° 00′		42° 30′		43° 00′		45° 00′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	33 11.8 91 33	75.2	34 06.5 91 33	74.7	35 28.3 91 33	73.9	36 49.8 90 33	73.1	38 38.0 90 32	72.0	39 05.0 90 32	71.7	39 31.9 90 32	71.5	41 19.1 89 32	70.3	91
2	32 52.0 91 33	74.3	33 46.7 91 33	73.8	35 08.6 91 33	73.0	36 30.2 91 32	72.3	38 18.6 90 32	71.2	38 45.5 90 32	70.9	39 12.5 90 32	70.6	40 59.8 89 32	69.4	2
3	32 32.3 91 33	73.4	33 27.1 91 33	72.9	34 49.0 91 32	72.2	36 10.7 91 32	71.4	37 59.2 90 32	70.3	38 26.2 90 32	70.0	38 53.2 90 32	69.8	40 40.7 89 32	68.6	3
4	32 12.6 92 33	72.5	33 07.5 91 32	72.0	34 29.6 91 32	71.3	35 51.3 91 32	70.5	37 39.9 90 32	69.5	38 07.0 90 32	69.2	38 34.0 90 32	68.9	40 21.6 89 32	67.8	4
95	31 53.1 92 32	71.7	32 48.0 91 32	71.2	34 10.2 91 32	70.4	35 32.0 91 32	69.7	37 20.7 90 32	68.6	37 47.8 90 32	68.4	38 14.9 90 32	68.1	40 02.7 90 31	66.9	95
6	31 33.7 92 32	70.8	32 28.7 92 32	70.3	33 50.9 91 32	69.6	35 12.9 91 32	68.8	37 01.7 90 32	67.8	37 28.8 90 32	67.5	37 55.9 90 31	67.2	39 43.9 90 31	66.1	6
7	31 14.4 92 32	69.9	32 09.4 92 32	69.4	33 31.7 91 32	68.7	34 53.8 91 32	68.0	36 42.8 91 31	66.9	37 09.9 90 31	66.7	37 37.0 90 31	66.4	39 25.2 90 31	65.3	7
8	30 55.2 92 32	69.0	31 50.2 92 32	68.6	33 12.6 91 32	67.9	34 34.8 91 31	67.1	36 23.9 91 31	66.1	36 51.1 91 31	65.8	37 18.3 90 31	65.6	39 06.6 90 31	64.5	8
9	30 36.0 92 32	68.2	31 31.2 92 32	67.7	32 53.7 92 31	67.0	34 16.0 91 31	66.3	36 05.2 91 31	65.3	36 32.5 91 31	65.0	36 59.7 91 31	64.7	38 48.1 90 31	63.7	9
100	30 17.0 92 31	67.3	31 12.3 92 31	66.9	32 34.9 92 31	66.2	33 57.2 91 31	65.4	35 46.7 91 31	64.4	36 13.9 91 31	64.2	36 41.2 91 31	63.9	38 29.8 90 30	62.8	100
1	29 58.2 92 31	66.5	30 53.4 92 31	66.0	32 16.2 92 31	65.3	33 38.6 92 31	64.6	35 28.2 91 31	63.6	35 55.5 91 30	63.3	36 22.8 91 30	63.1	38 11.6 90 30	62.0	1
2	29 39.4 92 31	65.6	30 34.8 92 31	65.1	31 57.6 92 31	64.5	33 20.2 92 31	63.8	35 09.9 91 30	62.8	35 37.3 91 30	62.5	36 04.6 91 30	62.3	37 53.5 91 30	61.2	2
3	29 20.8 92 31	64.7	30 16.2 92 31	64.3	31 39.1 92 31	63.6	33 01.8 92 30	62.9	34 51.7 91 30	61.9	35 19.1 91 30	61.7	35 46.5 91 30	61.4	37 35.6 91 30	60.4	3
4	29 02.3 93 31	63.9	29 57.8 92 30	63.4	31 20.8 92 30	62.8	32 43.6 92 30	62.1	34 33.7 92 30	61.1	35 01.1 91 30	60.9	35 28.5 91 30	60.6	37 17.9 91 29	59.6	4
105	28 44.0 93 30	63.0	29 39.5 92 30	62.6	31 02.6 92 30	61.9	32 25.6 92 30	61.2	34 15.8 92 30	60.3	34 43.3 92 30	60.0	35 10.7 91 29	59.8	37 00.2 91 29	58.8	105
6	28 25.7 93 30	62.2	29 21.3 93 30	61.7	30 44.6 92 30	61.1	32 07.6 92 30	60.4	33 58.0 92 29	59.5	34 25.6 92 29	59.2	34 53.1 92 29	59.0	36 42.8 91 29	58.0	6
7	28 07.7 93 30	61.3	29 03.3 93 30	60.9	30 26.7 93 30	60.2	31 49.9 92 29	59.6	33 40.4 92 29	58.6	34 08.0 92 29	58.4	34 35.5 92 29	58.2	36 25.4 91 29	57.2	7
8	27 49.7 93 30	60.5	28 45.5 93 30	60.0	30 09.0 93 29	59.4	31 32.3 92 29	58.7	33 23.0 92 29	57.8	33 50.6 92 29	57.6	34 18.2 92 29	57.4	36 08.3 92 28	56.4	8
9	27 32.0 93 29	59.6	28 27.8 93 29	59.2	29 51.4 93 29	58.6	31 14.8 93 29	57.9	33 05.7 92 29	57.0	33 33.4 92 28	56.8	34 01.0 92 28	56.5	35 51.3 92 28	55.6	9
110	27 14.3 93 29	58.8	28 10.2 93 29	58.4	29 34.0 93 29	57.7	30 57.5 93 29	57.1	32 48.6 92 28	56.2	33 16.3 92 28	56.0	33 44.0 92 28	55.7	35 34.4 92 28	54.8	110
1	26 56.9 93 29	57.9	27 52.8 93 29	57.5	29 16.7 93 28	56.9	30 40.3 93 28	56.3	32 31.6 93 28	55.4	32 59.3 92 28	55.1	33 27.1 92 28	54.9	35 17.7 92 28	54.0	1
2	26 39.6 93 29	57.1	27 35.6 93 28	56.7	28 59.6 93 28	56.1	30 23.4 93 28	55.4	32 14.8 93 28	54.6	32 42.6 93 28	54.3	33 10.4 93 28	54.1	35 01.2 92 27	53.2	2
3	26 22.4 94 28	56.2	27 18.6 94 28	55.8	28 42.6 93 28	55.2	30 06.6 93 28	54.6	31 58.2 93 27	53.7	32 26.0 93 27	53.5	32 53.8 93 27	53.3	34 44.9 92 27	52.4	3
4	26 05.4 94 28	55.4	27 01.7 94 28	55.0	28 25.9 93 28	54.4	29 49.9 93 27	53.8	31 41.7 93 27	52.9	32 09.6 93 27	52.7	32 37.5 93 27	52.5	34 28.7 93 27	51.6	4
115	25 48.6 94 28	54.5	26 44.9 94 28	54.2	28 09.3 94 27	53.6	29 33.4 93 27	53.0	31 25.4 93 27	52.1	31 53.4 93 27	51.9	32 21.3 93 27	51.7	34 12.7 93 26	50.8	115
6	25 32.0 94 27	53.7	26 28.4 94 27	53.3	27 52.9 94 27	52.7	29 17.2 94 27	52.1	31 09.3 93 27	51.3	31 37.3 93 26	51.1	32 05.3 93 26	50.9	33 56.9 93 26	50.0	6
7	25 15.6 94 27	52.8	26 12.0 94 27	52.5	27 36.6 94 27	51.9	29 01.0 94 27	51.3	30 53.4 93 26	50.5	31 21.4 93 26	50.3	31 49.4 93 26	50.1	33 41.3 93 26	49.2	7
8	24 59.3 94 27	52.0	25 55.8 94 27	51.6	27 20.6 94 26	51.1	28 45.1 94 26	50.5	30 37.6 94 26	49.7	31 05.7 94 26	49.5	31 33.8 94 26	49.3	33 25.8 93 25	48.4	8
9	24 43.2 94 26	51.2	25 39.9 94 26	50.8	27 04.7 94 26	50.2	28 29.4 94 26	49.7	30 22.1 94 26	48.9	30 50.2 94 26	48.7	31 18.3 94 25	48.5	33 10.6 93 25	47.6	9
120	24 27.3 95 26	50.3	25 24.0 94 26	50.0	26 49.0 94 26	49.4	28 13.8 94 26	48.8	30 06.7 94 25	48.1	30 34.9 94 25	47.9	31 03.1 94 25	47.7	32 55.5 94 25	46.8	120
1	24 11.6 95 26	49.5	25 08.4 95 26	49.1	26 33.5 94 25	48.6	27 58.5 94 25	48.0	29 51.5 94 25	47.3	30 19.8 94 25	47.1	30 48.0 94 25	46.9	32 40.6 94 24	46.1	1
2	23 56.1 95 26	48.6	24 53.0 95 25	48.3	26 18.2 95 25	47.8	27 43.3 94 25	47.2	29 36.6 94 25	46.5	30 04.8 94 25	46.3	30 33.1 94 24	46.1	32 25.9 94 24	45.3	2
3	23 40.8 95 25	47.8	24 37.8 95 25	47.5	26 03.1 95 25	46.9	27 28.4 95 25	46.4	29 21.8 94 24	45.7	29 50.1 94 24	45.5	30 18.4 94 24	45.3	32 11.5 94 24	44.5	3
4	23 25.7 95 25	47.0	24 22.8 95 25	46.6	25 48.2 95 24	46.1	27 13.6 95 24	45.6	29 07.2 95 24	44.8	29 35.6 95 24	44.7	30 03.9 94 24	44.5	31 57.2 94 23	43.7	4
125	23 10.8 95 24	46.1	24 08.0 95 24	45.8	25 33.6 95 24	45.3	26 59.1 95 24	44.8	28 52.9 95 24	44.0	29 21.3 95 24	43.9	29 49.7 95 23	43.7	31 43.1 94 23	42.9	125
6	22 56.1 95 24	45.3	23 53.3 95 24	45.0	25 19.1 95 24	44.5	26 44.7 95 24	43.9	28 38.7 95 23	43.2	29 07.2 95 23	43.1	29 35.6 95 23	42.9	31 29.2 95 23	42.1	6
7	22 41.7 96 24	44.5	23 39.0 95 24	44.1	25 04.8 95 23	43.6	26 30.6 95 23	43.1	28 24.7 95 23	42.4	28 53.2 95 23	42.3	29 21.7 95 23	42.1	31 15.6 95 22	41.3	7
8	22 27.4 96 23	43.6	23 24.8 96 23	43.3	24 50.8 95 23	42.8	26 16.6 95 23	42.3	28 11.0 95 23	41.6	28 39.6 95 22	41.5	29 08.1 95 22	41.3	31 02.1 95 22	40.6	8
9	22 13.4 96 23	42.8	23 10.8 96 23	42.5	24 36.9 96 23	42.0	26 02.9 96 22	41.5	27 57.5 95 22	40.8	28 26.1 95 22	40.7	28 54.7 95 22	40.5	30 48.9 95 22	39.8	9
130	21 59.5 96 23	41.9	22 57.1 96 23	41.6	24 23.3 96 22	41.2	25 49.4 96 22	40.7	27 44.2 96 22	40.0	28 12.8 95 22	39.9	28 41.5 95 22	39.7	30 35.9 95 21	39.0	130
1	21 45.9 96 22	41.1	22 43.5 96 22	40.8	24 09.9 96 22	40.3	25 36.2 96 22	39.9	27 31.1 96 21	39.2	27 59.8 96 21	39.1	28 28.5 96 21	38.9	30 23.1 95 21	38.2	1
2	21 32.5 96 22	40.3	22 30.2 96 22	40.0	23 56.7 96 22	39.5	25 23.1 96 21	39.1	27 18.2 96 21	38.4	27 47.0 96 21	38.3	28 15.7 96 21	38.1	30 10.5 96 21	37.4	2
3	21 19.4 96 22	39.4	22 17.2 96 21	39.1	23 43.8 96 21	38.7	25 10.3 96 21	38.2	27 05.6 96 21	37.6	27 34.4 96 21	37.5	28 03.1 96 21	37.3	29 58.1 96 20	36.7	3
4	21 06.5 96 21	38.6	22 04.3 96 21	38.3	23 31.1 96 21	37.9	24 57.7 96 21	37.4	26 53.2 96 20	36.8	27 22.0 96 20	36.7	27 50.8 96 20	36.5	29 46.0 96 20	35.9	4
135	20 53.8 97 21	37.8	21 51.7 97 21	37.5	23 18.6 96 20	37.1	24 45.4 96 20	36.6	26 41.0 96 20	36.0	27 09.8 96 20	35.9	27 38.7 96 20	35.7	29 34.1 96 19	35.1	135
6	20 41.3 97 20	36.9	21 39.4 97 20	36.6	23 06.3 97 20	36.2	24 33.3 97 20	35.8	26 29.0 96 20	35.2	26 57.9 96 19	35.1	27 26.8 96 19	34.9	29 22.4 96 19	34.3	6
7	20 29.1 97 20	36.1	21 27.2 97 20	35.8	22 54.3 97 20	35.4	24 21.4 97 19	35.0	26 17.3 97 19	34.4	26 46.3 97 19	34.3	27 15.2 96 19	34.1	29 10.9 96 19	33.5	7
8	20 17.2 97 20	35.2	21 15.3 97 19	35.0	22 42.6 97 19	34.6	24 09.7 97 19	34.2	26 05.8 97 19	33.6	26 34.8 97 19	33.5	27 03.8 97 19	33.3	28 59.7 97 18	32.7	8
9	20 05.4 97 19	34.4	21 03.7 97 19	34.2	22 31.0 97 19	33.8	23 58.3 97 19	33.4	25 54.6 97 18	32.8	26 23.6 97 18	32.7	26 52.7 97 18	32.5	28 48.7 97 18	32.0	9
140	19 54.0 97 19	33.6	20 52.3 97 19	33.3	22 19.7 97 18	32.9	23 47.1 97 18	32.6	25 43.6 97 18	32.0	26 12.7 97 18	31.9	26 41.7 97 18	31.7	28 38.0 97 18	31.2	140
1	19 42.8 97 18	32.7	20 41.2 97 18	32.5	22 08.7 97 18	32.1	23 36.2 97 18	31.7	25 32.8 97 18	31.2	26 01.9 97 17	31.1	26 31.1 97 17	31.0	28 27.5 97 17	30.4	1
2	19 31.8 97 18	31.9	20 30.3 97 18	31.7	21 57.9 97 18	31.3	23 25.6 97 17	30.9	25 22.3 97 17	30.4	25 51.5 97 17	30.3	26 20.6 97 17	30.2	28 17.2 97 17	29.6	2
3	19 21.1 98 17	31.1	20 19.6 98 17	30.8	21 47.4 98 17	30.5	23 15.1 97 17	30.1	25 12.0 97 17	29.6	25 41.2 97 17	29.5	26 10.4 97 17	29.4	28 07.2 97 16	28.8	3
4	19 10.6 98 17	30.2	20 09.2 98 17	30.0	21 37.1 98 17	29.7	23 05.0 98 17	29.3	25 02.0 98 16	28.8	25 31.3 97 16	28.7	26 00.5 97 16	28.6	27 57.4 97 16	28.1	4
145	19 00.4 98 17	29.4	19 59.1 98 16	29.2	21 27.1 98 16	28.8	22 55.0 98 16	28.5	24 52.2 98 16	28.0	25 21.5 98 16	27.9	25 50.8 98 16	27.8	27 47.9 98 15	27.3	145
6	18 50.5 98 16	28.6	19 49.2 98 16	28.3	21 17.3 98 16	28.0	22 45.4 98 16	27.7	24 42.7 98 15	27.2	25 12.1 98 15	27.1	25 41.4 98 15	27.0	27 38.6 98 15	26.5	6
7	18 40.8 98 16	27.7	19 39.6 98 16	27.5	21 07.8 98 15	27.2	22 36.0 98 15	26.9	24 33.5 98 15	26.4	25 02.8 98 15	26.3	25 32.2 98 15	26.2	27 29.6 98 15	25.7	7
8	18 31.4 98 15	26.9	19 30.3 98 15	26.7	20 58.6 98 15	26.4	22 26.8 98 15	26.1	24 24.5 98 15	25.6	24 53.9 98 15	25.5	25 23.3 98 14	25.4	27 20.8 98 14	25.0	8
9	18 22.2 98 15	26.0	19 21.2 98 15	25.8	20 49.6 98 15	25.5	22 18.0 98 14	25.2	24 15.7 98 14	24.8	24 45.2 98 14	24.7	25 14.6 98 14	24.6	27 12.2 98 14	24.2	9
150	18 13.4 98 14	25.2	19 12.4 98 14	25.0	20 40.9 98 14	24.7	22 09.3 98 14	24.4	24 07.2 98 14	24.0	24 36.7 98 14	23.9	25 06.2 98 14	23.8	27 04.0 98 13	23.4	150
1	18 04.7 98 14	24.4	19 03.8 98 14	24.2	20 32.4 98 14	23.9	22 01.0 98 14	23.6	23 59.0 98 13	23.2	24 28.5 98 13	23.1	24 58.0 98 13	23.0	26 56.0 98 13	22.6	1
2	17 56.4 99 13	23.5	18 55.6 99 13	23.4	20 24.2 99 13	23.1	21 52.9 98 13	22.8	23 51.1 98 13	22.4	24 20.6 98 13	22.3	24 50.1 98 13	22.2	26 48.2 98 12	21.8	2
3	17 48.4 99 13	22.7	18 47.6 99 13	22.5	20 16.3 99 13	22.3	21 45.1 99 13	22.0	23 43.4 99 12	21.6	24 12.9 99 12	21.5	24 42.5 99 12	21.4	26 40.7 98 12	21.1	3
4	17 40.6 99 12	21.9	18 39.8 99 12	21.7	20 08.7 99 12	21.4	21 37.5 99 12	21.2	23 35.9 99 12	20.8	24 05.5 99 12	20.7	24 35.1 99 12	20.6	26 33.4 99 12	20.3	4
155	17 33.1 99 12	21.0	18 32.4 99 12	20.9	20 01.3 99 12	20.6	21 30.2 99 12	20.4	23 28.8 99 11	20.0	23 58.4 99 11	19.9	24 28.0 99 11	19.9	26 26.5 99 11	19.5	155
6	17 25.9 99 12	20.2	18 25.2 99 11	20.0	19 54.2 99 11	19.8	21 23.2 99 11	19.5	23 21.9 99 11	19.2	23 51.5 99 11	19.1	24 21.2 99 11	19.1	26 19.7 99 11	18.7	6
7	17 18.9 99 11	19.3	18 18.3 99 11	19.2	19 47.4 99 11	19.0	21 16.5 99 11	18.7	23 15.3 99 11	18.4	23 44.9 99 11	18.3	24 14.6 99 10	18.3	26 13.3 99 10	17.9	7
8	17 12.3 99 11	18.5	18 11.7 99 11	18.4	19 40.9 99 10	18.1	21 10.1 99 10	17.9	23 08.9 99 10	17.6	23 38.6 99 10	17.5	24 08.3 99 10	17.5	26 07.1 99 10	17.2	8
9	17 05.9 99 10	17.7	18 05.4 99 10	17.5	19 34.7 99 10	17.3	21 03.9 99 10	17.1	23 02.8 99 10	16.8	23 32.6 99 10	16.8	24 02.3 99 10	16.7	26 01.2 99 09	16.4	9
160	16 59.8 99 10	16.8	17 59.4 99 10	16.7	19 28.7 99 09	16.5	20 58.0 99 09	16.3	22 57.0 99 09	16.0	23 26.8 99 09	16.0	23 56.5 99 09	15.9	25 55.5 99 09	15.6	160
1	16 54.0 99 09	16.0	17 53.6 99 09	15.9	19 23.0 99 09	15.7	20 52.4 99 09	15.5	22 51.5 99 09	15.2	23 21.3 99 09	15.2	23 51.1 99 09	15.1	25 50.2 99 09	14.8	1
2	16 48.5 99 09	15.1	17 48.2 99 09	15.0	19 17.6 99 09	14.8	20 47.0 99 08	14.7	22 46.3 99 08	14.4	23 16.1 99 08	14.4	23 45.9 99 08	14.3	25 45.0 99 08	14.0	2
3	16 43.3 99 08	14.3	17 43.0 99 08	14.2	19 12.5 99 08	14.0	20 42.0 99 08	13.9	22 41.3 99 08	13.6	23 11.1 99 08	13.6	23 40.9 99 08	13.5	25 40.2 99 08	13.3	3
4	16 38.4 1.0 08	13.5	17 38.1 1.0 08	13.4	19 07.7 1.0 08	13.2	20 37.2 99 07	13.0	22 36.6 99 07	12.8	23 06.4 99 07	12.8	23 36.3 99 07	12.7	25 35.6 99 07	12.5	4
165	16 33.8 1.0 07	12.6	17 33.5 1.0 07	12.5	19 03.1 1.0 07	12.4	20 32.7 1.0 07	12.2	22 32.2 1.0 07	12.0	23 02.0 1.0 07	12.0	23 31.9 1.0 07	11.9	25 31.3 1.0 07	11.7	165
6	16 29.4 1.0 07	11.8	17 29.2 1.0 07	11.7	18 58.9 1.0 07	11.5	20 28.5 1.0 07	11.4	22 28.0 1.0 06	11.2	22 57.9 1.0 06	11.2	23 27.8 1.0 06	11.1	25 27.3 1.0 06	10.9	6
7	16 25.4 1.0 06	10 9	17 25.2 1.0 06	10.9	18 54.9 1.0 06	10.7	20 24.6 1.0 06	10.6	22 24.2 1.0 06	10.4	22 54.1 1.0 06	10.4	23 24.0 1.0 06	10.3	25 23.5 1.0 06	10.1	7
8	16 21.6 1.0 06	10.1	17 21.5 1.0 06	10.0	18 51.2 1.0 06	09.9	20 21.0 1.0 06	09.8	22 20.6 1.0 05	09.6	22 50.5 1.0 05	09.6	23 20.4 1.0 05	09.5	25 20.1 1.0 05	09.4	8
9	16 18.2 1.0 05	09.3	17 18.1 1.0 05	09.2	18 47.8 1.0 05	09.1	20 17.6 1.0 05	09.0	22 17.3 1.0 05	08.8	22 47.3 1.0 05	08.8	23 17.2 1.0 05	08.7	25 16.9 1.0 05	08.6	9
170	16 15.0 1.0 05	08.4	17 14.9 1.0 05	08.3	18 44.8 1.0 05	08.3	20 14.6 1.0 05	08.2	22 14.3 1.0 05	08.0	22 44.3 1.0 04	08.0	23 14.2 1.0 04	07.9	25 13.9 1.0 04	07.8	170
1	16 12.2 1.0 04	07.6	17 12.1 1.0 04	07.5	18 42.0 1.0 04	07.4	20 11.8 1.0 04	07.3	22 11.6 1.0 04	07.2	22 41.6 1.0 04	07.2	23 11.5 1.0 04	07.1	25 11.3 1.0 04	07.0	1
2	16 09.6 1.0 04	06.7	17 09.6 1.0 04	06.7	18 39.4 1.0 04	06.6	20 09.3 1.0 04	06.5	22 09.2 1.0 04	06.4	22 39.1 1.0 04	06.4	23 09.1 1.0 04	06.4	25 08.9 1.0 03	06.2	2
3	16 07.4 1.0 03	05.9	17 07.3 1.0 03	05.8	18 37.2 1.0 03	05.8	20 07.1 1.0 03	05.7	22 07.0 1.0 03	05.6	22 37.0 1.0 03	05.6	23 07.0 1.0 03	05.6	25 06.8 1.0 03	05.5	3
4	16 05.4 1.0 03	05.0	17 05.4 1.0 03	05.0	18 35.3 1.0 03	05.0	20 05.3 1.0 03	04.9	22 05.2 1.0 03	04.8	22 35.1 1.0 03	04.8	23 05.1 1.0 03	04.8	25 05.0 1.0 03	04.7	4
175	16 03.8 1.0 02	04.2	17 03.7 1.0 02	04.2	18 33.7 1.0 02	04.1	20 03.6 1.0 02	04.1	22 03.6 1.0 02	04.0	22 33.6 1.0 02	04.0	23 03.6 1.0 02	04.0	25 03.5 1.0 02	03.9	175
6	16 02.4 1.0 02	03.4	17 02.4 1.0 02	03.3	18 32.4 1.0 02	03.3	20 02.3 1.0 02	03.3	22 02.3 1.0 02	03.2	22 32.3 1.0 02	03.2	23 02.3 1.0 02	03.2	25 02.2 1.0 02	03.1	6
7	16 01.4 1.0 01	02.5	17 01.3 1.0 01	02.5	18 31.3 1.0 01	02.5	20 01.3 1.0 01	02.4	22 01.3 1.0 01	02.4	22 31.3 1.0 01	02.4	23 01.3 1.0 01	02.4	25 01.3 1.0 01	02.3	7
8	16 00.6 1.0 01	01.7	17 00.6 1.0 01	01.7	18 30.6 1.0 01	01.7	20 00.6 1.0 01	01.6	22 00.6 1.0 01	01.6	22 30.6 1.0 01	01.6	23 00.6 1.0 01	01.6	25 00.6 1.0 01	01.6	8
9	16 00.2 1.0 00	00.8	17 00.1 1.0 00	00.8	18 30.1 1.0 00	00.8	20 00.1 1.0 00	00.8	22 00.1 1.0 00	00.8	22 30.1 1.0 00	00.8	23 00.1 1.0 00	00.8	25 00.1 1.0 00	00.8	9
180	16 00.0 1.0 00	00.0	17 00.0 1.0 00	00.0	18 30.0 1.0 00	00.0	20 00.0 1.0 00	00.0	22 00.0 1.0 00	00.0	22 30.0 1.0 00	00.0	23 00.0 1.0 00	00.0	25 00.0 1.0 00	00.0	180

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat.

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	48 00.0	1.0 00	180.0	48 30.0	1.0 00	180.0	49 00.0	1.0 00	180.0	50 00.0	1.0 00	180.0
1	47 59.8	1.0 01	178.7	48 29.8	1.0 01	178.7	48 59.8	1.0 01	178.7	49 59.8	1.0 01	178.7
2	47 59.1	1.0 02	177.4	48 29.1	1.0 02	177.3	48 59.0	1.0 02	177.3	49 59.0	1.0 02	177.3
3	47 57.9	1.0 03	176.0	48 27.9	1.0 03	176.0	48 57.9	1.0 03	176.0	49 57.8	1.0 03	176.0
4	47 56.2	1.0 04	174.7	48 26.2	1.0 04	174.7	48 56.2	1.0 04	174.7	49 56.1	1.0 04	174.6
05	47 54.1	1.0 04	173.4	48 24.1	1.0 04	173.4	48 54.0	1.0 04	173.3	49 54.0	1.0 04	173.3
6	47 51.5	1.0 05	172.1	48 21.5	1.0 05	172.1	48 51.4	1.0 05	172.0	49 51.3	1.0 05	171.9
7	47 48.5	1.0 06	170.8	48 18.4	1.0 06	170.7	48 48.3	1.0 06	170.7	49 48.2	1.0 06	170.6
8	47 44.9	1.0 07	169.5	48 14.9	1.0 07	169.4	48 44.8	1.0 07	169.4	49 44.6	1.0 07	169.3
9	47 41.0	1.0 07	168.2	48 10.9	1.0 07	168.1	48 40.8	1.0 07	168.0	49 40.6	1.0 08	167.9
10	47 36.5	1.0 08	166.9	48 06.4	1.0 08	166.8	48 36.3	1.0 08	166.7	49 36.0	1.0 08	166.6
1	47 31.6	1.0 09	165.6	48 01.5	1.0 09	165.5	48 31.3	1.0 09	165.4	49 31.0	99 09	165.3
2	47 26.3	99 10	164.3	47 56.1	99 10	164.2	48 25.9	99 10	164.1	49 25.6	99 10	163.9
3	47 20.5	99 10	163.0	47 50.3	99 10	162.9	48 20.1	99 10	162.8	49 19.7	99 11	162.6
4	47 14.2	99 11	161.7	47 44.0	99 11	161.6	48 13.8	99 11	161.5	49 13.3	99 11	161.3
15	47 07.6	99 12	160.4	47 37.3	99 12	160.3	48 07.1	99 12	160.2	49 06.5	99 12	160.0
6	47 00.5	99 12	159.1	47 30.2	99 13	159.0	47 59.9	99 13	158.9	48 59.3	99 13	158.7
7	46 52.9	99 13	157.8	47 22.6	99 13	157.7	47 52.3	99 13	157.6	48 51.6	99 14	157.4
8	46 45.0	99 14	156.5	47 14.6	99 14	156.4	47 44.2	99 14	156.3	48 43.5	99 14	156.1
9	46 36.6	99 15	155.3	47 06.2	99 15	155.1	47 35.8	99 15	155.0	48 34.9	99 15	154.8
20	46 27.8	99 15	154.0	46 57.4	99 15	153.9	47 26.9	98 15	153.7	48 26.0	98 16	153.5
1	46 18.6	99 16	152.7	46 48.1	98 16	152.6	47 17.6	98 16	152.5	48 16.6	98 16	152.2
2	46 09.0	98 17	151.5	46 38.5	98 17	151.3	47 07.9	98 17	151.2	48 06.8	98 17	150.9
3	45 59.0	98 17	150.2	46 28.4	98 17	150.1	46 57.9	98 17	150.0	47 56.7	98 18	149.7
4	45 48.6	98 18	149.0	46 18.0	98 18	148.8	46 47.4	98 18	148.7	47 46.1	98 18	148.4
25	45 37.9	98 19	147.7	46 07.2	98 19	147.6	46 36.5	98 19	147.4	47 35.2	98 19	147.1
6	45 26.7	98 19	146.5	45 56.0	98 19	146.4	46 25.3	98 19	146.2	47 23.8	98 20	145.9
7	45 15.2	98 20	145.3	45 44.5	97 20	145.1	46 13.7	97 20	145.0	47 12.2	97 20	144.6
8	45 03.4	97 20	144.1	45 32.6	97 20	143.9	46 01.8	97 20	143.7	47 00.1	97 21	143.4
9	44 51.1	97 21	142.9	45 20.3	97 21	142.7	45 49.4	97 21	142.5	46 47.7	97 21	142.2
30	44 38.6	97 22	141.6	45 07.7	97 22	141.5	45 36.8	97 22	141.3	46 34.9	97 22	140.9
1	44 25.7	97 22	140.4	44 54.7	97 22	140.3	45 23.8	97 22	140.1	46 21.8	97 22	139.7
2	44 12.4	97 23	139.3	44 41.5	97 23	139.1	45 10.5	97 23	138.9	46 08.4	97 23	138.5
3	43 58.9	97 23	138.1	44 27.9	97 23	137.9	44 56.8	96 23	137.7	45 54.7	96 23	137.3
4	43 45.0	96 24	136.9	44 13.9	96 24	136.7	44 42.8	96 24	136.5	45 40.6	96 24	136.1
35	43 30.8	96 24	135.7	43 59.7	96 24	135.5	44 28.6	96 24	135.3	45 26.2	96 24	134.9
6	43 16.4	96 25	134.5	43 45.2	96 25	134.3	44 14.0	96 25	134.2	45 11.5	96 25	133.8
7	43 01.6	96 25	133.4	43 30.4	96 25	133.2	43 59.1	96 25	133.0	44 56.6	96 25	132.6
8	42 46.5	96 26	132.2	43 15.3	96 26	132.0	43 44.0	96 26	131.8	44 41.3	96 26	131.4
9	42 31.2	96 26	131.1	42 59.9	96 26	130.9	43 28.5	96 26	130.7	44 25.8	95 26	130.3
40	42 15.6	95 26	129.9	42 44.2	95 26	129.7	43 12.8	95 27	129.5	44 10.0	95 27	129.1
1	41 59.7	95 27	128.8	42 28.3	95 27	128.6	42 56.9	95 27	128.4	43 53.9	95 27	128.0
2	41 43.6	95 27	127.7	42 12.1	95 27	127.5	42 40.7	95 27	127.2	43 37.6	95 28	126.8
3	41 27.2	95 28	126.5	41 55.7	95 28	126.3	42 24.2	95 28	126.1	43 21.1	95 28	125.7
4	41 10.6	95 28	125.4	41 39.1	95 28	125.2	42 07.5	95 28	125.0	43 04.3	95 28	124.6
45	40 53.8	95 28	124.3	41 22.2	95 28	124.1	41 50.6	95 29	123.9	42 47.3	94 29	123.4
6	40 36.7	95 29	123.2	41 05.1	95 29	123.0	41 33.4	94 29	122.8	42 30.1	94 29	122.3
7	40 19.5	94 29	122.1	40 47.8	94 29	121.9	41 16.1	94 29	121.7	42 12.6	94 29	121.2
8	40 02.0	94 29	121.0	40 30.3	94 30	120.8	40 58.5	94 30	120.6	41 55.0	94 30	120.1
9	39 44.3	94 30	119.9	40 12.5	94 30	119.7	40 40.8	94 30	119.5	41 37.1	94 30	119.0
50	39 26.4	94 30	118.9	39 54.6	94 30	118.6	40 22.8	94 30	118.4	41 19.1	94 30	118.0
1	39 08.3	94 30	117.8	39 36.5	94 30	117.6	40 04.7	94 31	117.3	41 00.9	94 31	116.9
2	38 50.1	94 31	116.7	39 18.2	94 31	116.5	39 46.3	94 31	116.3	40 42.5	93 31	115.8
3	38 31.7	94 31	115.7	38 59.8	94 31	115.4	39 27.9	94 31	115.2	40 23.9	93 31	114.7
4	38 13.1	94 31	114.6	38 41.2	94 31	114.4	39 09.2	93 31	114.2	40 05.2	93 31	113.7
55	37 54.4	93 31	113.6	38 22.4	93 32	113.3	38 50.4	93 32	113.1	39 46.3	93 32	112.6
6	37 35.5	93 32	112.5	38 03.5	93 32	112.3	38 31.5	93 32	112.1	39 27.3	93 32	111.6
7	37 16.5	93 32	111.5	37 44.4	93 32	111.2	38 12.4	93 32	111.0	39 08.2	93 32	110.5
8	36 57.3	93 32	110.4	37 25.2	93 32	110.2	37 53.2	93 32	110.0	38 48.9	93 32	109.5
9	36 38.0	93 32	109.4	37 05.9	93 32	109.2	37 33.8	93 32	109.0	38 29.5	93 33	108.5
60	36 18.6	93 33	108.4	36 46.5	93 33	108.2	37 14.3	93 33	107.9	38 10.0	93 33	107.5
1	35 59.1	93 33	107.4	36 26.9	93 33	107.1	36 54.8	93 33	106.9	37 50.3	93 33	106.4
2	35 39.4	93 33	106.4	36 07.3	93 33	106.1	36 35.1	93 33	105.9	37 30.6	92 33	105.4
3	35 19.7	93 33	105.4	35 47.5	93 33	105.1	36 15.3	93 33	104.9	37 10.8	92 33	104.4
4	34 59.9	93 33	104.4	35 27.6	93 33	104.1	35 55.4	93 33	103.9	36 50.9	92 33	103.4
65	34 39.9	93 33	103.4	35 07.7	93 33	103.1	35 35.4	92 33	102.9	36 30.9	92 33	102.4
6	34 19.9	93 33	102.4	34 47.7	92 34	102.1	35 15.4	92 34	101.9	36 10.8	92 34	101.4
7	33 59.8	93 34	101.4	34 27.6	92 34	101.2	34 55.3	92 34	100.9	35 50.6	92 34	100.4
8	33 39.7	92 34	100.4	34 07.4	92 34	100.2	34 35.1	92 34	99.9	35 30.4	92 34	99.5
9	33 19.5	92 34	99.4	33 47.2	92 34	99.2	34 14.9	92 34	99.0	35 10.2	92 34	98.5
70	32 59.2	92 34	98.4	33 26.9	92 34	98.2	33 54.6	92 34	98.0	34 49.8	92 34	97.5
1	32 38.9	92 34	97.5	33 06.6	92 34	97.2	33 34.2	92 34	97.0	34 29.5	92 34	96.5
2	32 18.5	92 34	96.5	32 46.2	92 34	96.3	33 13.8	92 34	96.1	34 09.1	92 34	95.6
3	31 58.1	92 34	95.5	32 25.8	92 34	95.3	32 53.4	92 34	95.1	33 48.6	92 34	94.6
4	31 37.7	92 34	94.6	32 05.3	92 34	94.4	32 33.0	92 34	94.1	33 28.2	92 34	93.7
75	31 17.2	92 34	93.6	31 44.8	92 34	93.4	32 12.5	92 34	93.2	33 07.7	92 34	92.7
6	30 56.7	92 34	92.7	31 24.4	92 34	92.5	31 52.0	92 34	92.2	32 47.2	92 34	91.8
7	30 36.2	92 34	91.7	31 03.8	92 34	91.5	31 31.5	92 34	91.3	32 26.6	92 34	90.8
8	30 15.7	92 34	90.8	30 43.3	92 34	90.6	31 11.0	92 34	90.3	32 06.1	92 34	89.9
9	29 55.2	92 34	89.9	30 22.8	92 34	89.6	30 50.4	92 34	89.4	31 45.6	92 34	88.9
80	29 34.6	92 34	88.9	30 02.3	92 34	88.7	30 29.9	92 34	88.5	31 25.1	92 34	88.0
1	29 14.1	92 34	88.0	29 41.8	92 34	87.8	30 09.4	92 34	87.5	31 04.6	92 34	87.1
2	28 53.6	92 34	87.0	29 21.3	92 34	86.8	29 48.9	92 34	86.6	30 44.1	92 34	86.1
3	28 33.1	92 34	86.1	29 00.8	92 34	85.9	29 28.4	92 34	85.7	30 23.6	92 34	85.2
4	28 12.7	92 34	85.2	28 40.3	92 34	85.0	29 08.0	92 34	84.8	30 03.2	92 34	84.3
85	27 52.2	92 34	84.3	28 19.9	92 34	84.1	28 47.6	92 34	83.8	29 42.8	92 34	83.4
6	27 31.8	92 34	83.3	27 59.5	92 34	83.1	28 27.2	92 34	82.9	29 22.4	92 34	82.5
7	27 11.5	92 34	82.4	27 39.2	92 34	82.2	28 06.8	92 34	82.0	29 02.1	92 34	81.6
8	26 51.2	92 34	81.5	27 18.9	92 34	81.3	27 46.5	92 34	81.1	28 41.8	92 34	80.6
9	26 30.9	92 34	80.6	26 58.6	92 34	80.4	27 26.3	92 34	80.2	28 21.6	92 34	79.7
90	26 10.7	92 34	79.7	26 38.4	92 34	79.5	27 06.1	92 34	79.3	28 01.5	92 34	78.8

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	52 00.0	1.0 00	180.0	54 00.0	1.0 00	180.0	54 30.0	1.0 00	180.0	55 30.0	1.0 00	180.0
1	51 59.8	1.0 01	178.6	53 59.7	1.0 01	178.6	54 29.7	1.0 01	178.6	55 29.7	1.0 01	178.6
2	51 59.0	1.0 02	177.2	53 59.0	1.0 02	177.2	54 29.0	1.0 02	177.2	55 29.0	1.0 02	177.1
3	51 57.8	1.0 03	175.9	53 57.7	1.0 03	175.8	54 27.7	1.0 03	175.7	55 27.7	1.0 03	175.7
4	51 56.1	1.0 04	174.5	53 56.0	1.0 04	174.4	54 25.9	1.0 05	174.3	55 25.9	1.0 04	174.3
05	51 53.8	1.0 04	173.1	53 53.7	1.0 05	173.0	54 23.7	1.0 05	172.9	55 23.6	1.0 05	172.8
6	51 51.1	1.0 05	171.7	53 50.9	1.0 05	171.6	54 20.9	1.0 05	171.5	55 20.8	1.0 05	171.4
7	51 48.0	1.0 06	170.4	53 47.7	1.0 06	170.2	54 17.6	1.0 06	170.1	55 17.4	1.0 06	170.0
8	51 44.3	1.0 07	169.0	53 43.9	1.0 07	168.8	54 13.8	1.0 07	168.7	55 13.6	1.0 07	168.5
9	51 40.1	1.0 08	167.6	53 39.7	1.0 08	167.4	54 09.5	1.0 08	167.3	55 09.3	1.0 08	167.1
10	51 35.5	1.0 08	166.3	53 34.9	99 09	166.0	54 04.8	99 09	165.9	55 04.5	99 09	165.7
1	51 30.4	99 09	164.9	53 29.7	99 10	164.6	53 59.5	99 10	164.5	54 59.2	99 10	164.3
2	51 24.8	99 10	163.6	53 24.0	99 10	163.2	53 53.8	99 10	163.1	54 53.4	99 10	162.9
3	51 18.8	99 11	162.2	53 17.9	99 11	161.8	53 47.6	99 11	161.7	54 47.1	99 11	161.5
4	51 12.3	99 12	160.9	53 11.2	99 12	160.4	53 40.9	99 12	160.3	54 40.3	99 12	160.1
15	51 05.4	99 12	159.5	53 04.1	99 13	159.1	53 33.8	99 13	159.0	54 33.1	99 13	158.7
6	50 58.0	99 13	158.2	52 56.6	99 13	157.7	53 26.2	99 13	157.6	54 25.4	99 14	157.3
7	50 50.1	99 14	156.9	52 48.6	99 14	156.4	53 18.1	99 14	156.2	54 17.3	99 14	155.9
8	50 41.9	99 15	155.6	52 40.1	98 15	155.0	53 09.6	98 15	154.9	54 08.7	98 15	154.6
9	50 33.2	98 15	154.2	52 31.2	98 16	153.7	53 00.7	98 16	153.5	53 59.6	98 16	153.2
20	50 24.0	98 16	152.9	52 21.9	98 16	152.3	52 51.3	98 16	152.2	53 50.2	98 16	151.8
1	50 14.5	98 17	151.6	52 12.2	98 17	151.0	52 41.5	98 17	150.8	53 40.3	98 17	150.5
2	50 04.5	98 17	150.3	52 02.0	98 17	149.7	52 31.3	98 18	149.5	53 30.0	98 18	149.2
3	49 54.2	98 18	149.0	51 51.4	98 18	148.4	52 20.7	98 18	148.2	53 19.2	97 19	147.8
4	49 43.4	98 19	147.8	51 40.5	97 19	147.1	52 09.7	97 19	146.9	53 08.1	97 19	146.5
25	49 32.3	97 19	146.5	51 29.1	97 20	145.8	51 58.3	97 20	145.6	52 56.6	97 20	145.2
6	49 20.8	97 20	145.2	51 17.4	97 20	144.5	51 46.5	97 20	144.3	52 44.7	97 20	143.9
7	49 08.9	97 20	143.9	51 05.3	97 21	143.2	51 34.3	97 21	143.0	52 32.4	97 21	142.6
8	48 56.6	97 21	142.7	50 52.8	97 21	141.9	51 21.8	97 21	141.7	52 19.7	96 22	141.3
9	48 44.0	97 22	141.4	50 40.0	97 22	140.6	51 08.9	96 22	140.4	52 06.7	96 22	140.0
30	48 31.0	97 22	140.2	50 26.8	96 23	139.4	50 55.7	96 23	139.2	51 53.4	96 23	138.7
1	48 17.7	96 23	139.0	50 13.3	96 23	138.1	50 42.1	96 23	137.9	51 39.7	96 23	137.5
2	48 04.1	96 23	137.7	49 59.4	96 24	136.9	50 28.2	96 24	136.7	51 25.6	96 24	136.2
3	47 50.1	96 24	136.5	49 45.2	96 24	135.7	50 13.9	96 24	135.4	51 11.3	95 24	135.0
4	47 35.8	96 24	135.3	49 30.7	96 25	134.4	49 59.4	95 25	134.2	50 56.6	95 25	133.7
35	47 21.3	96 25	134.1	49 15.9	95 25	133.2	49 44.5	95 25	133.0	50 41.6	95 25	132.5
6	47 06.4	96 26	132.9	49 00.8	95 26	132.0	49 29.4	95 26	131.8	50 26.3	95 26	131.3
7	46 51.2	95 26	131.7	48 45.4	95 26	130.8	49 13.9	95 26	130.6	50 10.8	95 26	130.1
8	46 35.7	95 26	130.6	48 29.8	95 27	129.6	48 58.2	95 27	129.4	49 54.9	95 27	128.9
9	46 20.0	95 27	129.4	48 13.8	95 27	128.4	48 42.2	95 27	128.2	49 38.8	94 27	127.7
40	46 04.0	95 27	128.2	47 57.6	94 27	127.3	48 25.9	94 28	127.0	49 22.5	94 28	126.5
1	45 47.8	95 28	127.1	47 41.2	94 28	126.1	48 09.4	94 28	125.9	49 05.9	94 28	125.3
2	45 31.3	95 28	125.9	47 24.5	94 28	124.9	47 52.7	94 28	124.7	48 49.0	94 28	124.2
3	45 14.5	94 28	124.8	47 07.5	94 29	123.8	47 35.7	94 29	123.5	48 31.9	94 29	123.0
4	44 57.6	94 29	123.6	46 50.4	94 29	122.7	47 18.5	94 29	122.4	48 14.6	93 29	121.9
45	44 40.4	94 29	122.5	46 33.0	94 29	121.5	47 01.0	93 29	121.3	47 57.1	93 30	120.7
6	44 23.0	94 29	121.4	46 15.4	93 30	120.4	46 43.4	93 30	120.1	47 39.3	93 30	119.6
7	44 05.3	94 30	120.3	45 57.6	93 30	119.3	46 25.5	93 30	119.0	47 21.4	93 30	118.5
8	43 47.5	94 30	119.2	45 39.6	93 30	118.2	46 07.5	93 30	117.9	47 03.2	93 31	117.4
9	43 29.5	93 30	118.1	45 21.4	93 31	117.1	45 49.3	93 31	116.8	46 44.9	93 31	116.3
50	43 11.3	93 31	117.0	45 03.0	93 31	116.0	45 30.9	93 31	115.7	46 26.4	92 31	115.2
1	42 52.9	93 31	115.9	44 44.5	93 31	114.9	45 12.3	93 31	114.6	46 07.8	92 31	114.1
2	42 34.4	93 31	114.8	44 25.8	93 31	113.8	44 53.6	92 31	113.6	45 49.0	92 32	113.0
3	42 15.7	93 31	113.8	44 07.0	92 32	112.7	44 34.7	92 32	112.5	45 30.0	92 32	111.9
4	41 56.8	93 32	112.7	43 48.0	92 32	111.7	44 15.6	92 32	111.4	45 10.9	92 32	110.9
55	41 37.8	93 32	111.7	43 28.8	92 32	110.6	43 56.5	92 32	110.4	44 51.7	92 32	109.8
6	41 18.7	93 32	110.6	43 09.5	92 32	109.6	43 37.2	92 32	109.3	44 32.3	92 32	108.8
7	40 59.4	93 32	109.6	42 50.2	92 33	108.5	43 17.7	92 33	108.3	44 12.8	92 33	107.7
8	40 40.0	92 33	108.5	42 30.6	92 33	107.5	42 58.2	92 33	107.2	43 53.2	92 33	106.7
9	40 20.5	92 33	107.5	42 11.0	92 33	106.5	42 38.5	92 33	106.2	43 33.5	91 33	105.6
60	40 00.9	92 33	106.5	41 51.3	92 33	105.4	42 18.8	92 33	105.2	43 13.7	91 33	104.6
1	39 41.2	92 33	105.5	41 31.5	92 33	104.4	41 58.9	92 33	104.2	42 53.8	91 33	103.6
2	39 21.3	92 33	104.4	41 11.5	92 33	103.4	41 39.0	91 33	103.1	42 33.8	91 33	102.6
3	39 01.4	92 33	103.4	40 51.5	92 33	102.4	41 19.0	91 34	102.1	42 13.7	91 34	101.6
4	38 41.4	92 33	102.4	40 31.4	91 34	101.4	40 58.9	91 34	101.1	41 53.6	91 34	100.6
65	38 21.3	92 34	101.4	40 11.3	91 34	100.4	40 38.7	91 34	100.1	41 33.4	91 34	99.6
6	38 01.2	92 34	100.4	39 51.1	91 34	99.4	40 18.5	91 34	99.1	41 13.1	91 34	98.6
7	37 41.0	92 34	99.5	39 30.8	91 34	98.4	39 58.2	91 34	98.2	40 52.8	91 34	97.6
8	37 20.7	92 34	98.5	39 10.5	91 34	97.5	39 37.8	91 34	97.2	40 32.4	91 34	96.6
9	37 00.4	92 34	97.5	38 50.1	91 34	96.5	39 17.5	91 34	96.2	40 12.0	91 34	95.7
70	36 40.0	92 34	96.5	38 29.7	91 34	95.5	38 57.0	91 34	95.2	39 51.6	91 34	94.7
1	36 19.6	92 34	95.6	38 09.3	91 34	94.5	38 36.6	91 34	94.3	39 31.1	91 34	93.8
2	35 59.2	92 34	94.6	37 48.8	91 34	93.6	38 16.1	91 34	93.3	39 10.7	91 34	92.8
3	35 38.7	92 34	93.7	37 28.3	91 34	92.6	37 55.6	91 34	92.4	38 50.2	91 34	91.8
4	35 18.2	92 34	92.7	37 07.8	91 34	91.7	37 35.1	91 34	91.4	38 29.6	91 34	90.9
75	34 57.7	92 34	91.7	36 47.3	91 34	90.7	37 14.6	91 34	90.5	38 09.1	91 34	90.0
6	34 37.2	92 34	90.8	36 26.8	91 34	89.8	36 54.1	91 34	89.5	37 48.6	91 34	89.0
7	34 16.7	92 34	89.9	36 06.2	91 34	88.9	36 33.6	91 34	88.6	37 28.1	91 34	88.1
8	33 56.2	92 34	88.9	35 45.7	91 34	87.9	36 13.0	91 34	87.7	37 07.6	91 34	87.2
9	33 35.6	92 34	88.0	35 25.2	91 34	87.0	35 52.6	91 34	86.7	36 47.1	91 34	86.2
80	33 15.1	92 34	87.1	35 04.7	91 34	86.1	35 32.1	91 34	85.8	36 26.6	91 34	85.3
1	32 54.7	92 34	86.1	34 44.3	91 34	85.2	35 11.6	91 34	84.9	36 06.2	91 34	84.4
2	32 34.2	92 34	85.2	34 23.9	91 34	84.2	34 51.2	91 34	84.0	35 45.8	91 34	83.5
3	32 13.8	92 34	84.3	34 03.5	91 34	83.3	34 30.8	91 34	83.1	35 25.4	91 34	82.6
4	31 53.4	92 34	83.4	33 43.1	91 34	82.4	34 10.5	91 34	82.2	35 05.1	91 34	81.7
85	31 33.0	92 34	82.5	33 22.8	91 34	81.5	33 50.1	91 34	81.3	34 44.8	91 34	80.8
6	31 12.7	92 34	81.6	33 02.5	91 34	80.6	33 29.9	91 34	80.4	34 24.6	91 34	79.9
7	30 52.4	92 34	80.6	32 42.3	91 34	79.7	33 09.7	91 34	79.5	34 04.4	91 33	79.0
8	30 32.2	92 34	79.7	32 22.1	91 34	78.8	32 49.5	91 33	78.6	33 44.3	91 33	78.1
9	30 12.0	92 34	78.8	32 02.0	92 33	77.9	32 29.5	91 33	77.7	33 24.3	91 33	77.2
90	29 51.9	92 33	77.9	31 42.0	92 33	77.0	32 09.4	91 33	76.8	33 04.3	91 33	76.3

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	25 50.5	93 34	78.8	26 18.3	92 33	78.6	26 46.0	92 33	78.4	27 41.4	92 33	77.9
2	25 30.4	93 33	77.9	25 58.2	92 33	77.7	26 25.9	92 33	77.5	27 21.3	92 33	77.0
3	25 10.4	93 33	77.0	25 38.2	93 33	76.8	26 05.9	92 33	76.6	27 01.4	92 33	76.1
4	24 50.4	93 33	76.1	25 18.2	93 33	75.9	25 46.0	93 33	75.7	26 41.5	92 33	75.2
95	24 30.6	93 33	75.2	24 58.4	93 33	75.0	25 26.2	93 33	74.8	26 21.7	92 33	74.3
6	24 10.8	93 33	74.3	24 38.6	93 33	74.1	25 06.4	93 33	73.9	26 02.0	93 33	73.4
7	23 51.0	93 33	73.4	24 18.9	93 33	73.2	24 46.7	93 33	73.0	25 42.3	93 33	72.6
8	23 31.4	93 33	72.5	23 59.3	93 32	72.3	24 27.2	93 32	72.1	25 22.8	93 32	71.7
9	23 11.9	93 32	71.6	23 39.8	93 32	71.4	24 07.7	93 32	71.2	25 03.4	93 32	70.8
100	22 52.5	93 32	70.7	23 20.4	93 32	70.5	23 48.3	93 32	70.3	24 44.1	93 32	69.9
1	22 33.2	93 32	69.8	23 01.1	93 32	69.6	23 29.0	93 32	69.4	24 24.8	93 32	69.0
2	22 14.0	93 32	68.9	22 41.9	93 32	68.7	23 09.9	93 32	68.5	24 05.7	93 32	68.1
3	21 54.9	93 32	68.0	22 22.9	93 32	67.8	22 50.9	93 32	67.6	23 46.8	93 31	67.2
4	21 35.9	93 31	67.1	22 03.9	93 31	66.9	22 31.9	93 31	66.7	23 27.9	93 31	66.4
105	21 17.1	94 31	66.2	21 45.1	93 31	66.1	22 13.1	93 31	65.9	23 09.2	93 31	65.5
6	20 58.4	94 31	65.4	21 26.4	94 31	65.2	21 54.5	94 31	65.0	22 50.6	93 31	64.6
7	20 39.8	94 31	64.5	21 07.9	94 31	64.3	21 36.0	94 31	64.1	22 32.1	94 31	63.7
8	20 21.3	94 31	63.6	20 49.4	94 30	63.4	21 17.6	94 30	63.2	22 13.8	94 30	62.8
9	20 03.0	94 30	62.7	20 31.2	94 30	62.5	20 59.3	94 30	62.3	21 55.6	94 30	62.0
110	19 44.8	94 30	61.8	20 13.0	94 30	61.6	20 41.2	94 30	61.5	21 37.5	94 30	61.1
1	19 26.8	94 30	60.9	19 55.0	94 30	60.8	20 23.3	94 30	60.6	21 19.6	94 30	60.2
2	19 09.0	94 30	60.1	19 37.2	94 29	59.9	20 05.5	94 29	59.7	21 01.9	94 29	59.3
3	18 51.3	94 29	59.2	19 19.5	94 29	59.0	19 47.8	94 29	58.8	20 44.3	94 29	58.5
4	18 33.7	94 29	58.3	19 02.0	94 29	58.1	19 30.3	94 29	58.0	20 26.9	94 29	57.6
115	18 16.3	95 29	57.4	18 44.7	94 29	57.3	19 13.0	94 29	57.1	20 09.7	94 28	56.7
6	17 59.1	95 28	56.5	18 27.5	95 28	56.4	18 55.9	95 28	56.2	19 52.6	95 28	55.9
7	17 42.1	95 28	55.7	18 10.5	95 28	55.5	18 38.9	95 28	55.3	19 35.7	95 28	55.0
8	17 25.2	95 28	54.8	17 53.7	95 28	54.6	18 22.1	95 28	54.5	19 19.0	95 28	54.1
9	17 08.6	95 28	53.9	17 37.1	95 27	53.8	18 05.5	95 27	53.6	19 02.5	95 27	53.3
120	16 52.1	95 27	53.0	17 20.6	95 27	52.9	17 49.1	95 27	52.7	18 46.1	95 27	52.4
1	16 35.8	95 27	52.2	17 04.3	95 27	52.0	17 32.9	95 27	51.8	18 30.0	95 27	51.5
2	16 19.7	95 27	51.3	16 48.3	95 26	51.1	17 16.8	95 26	51.0	18 14.0	95 26	50.6
3	16 03.7	95 26	50.4	16 32.4	95 26	50.3	17 01.0	95 26	50.1	17 58.2	95 26	49.8
4	15 48.0	96 26	49.5	16 16.7	96 26	49.4	16 45.4	96 26	49.2	17 42.7	95 26	48.9
125	15 32.5	96 26	48.7	16 01.2	96 25	48.5	16 29.9	96 25	48.3	17 27.3	96 25	48.0
6	15 17.2	96 25	47.8	15 46.0	96 25	47.6	16 14.7	96 25	47.5	17 12.1	96 25	47.2
7	15 02.1	96 25	46.9	15 30.9	96 25	46.8	15 59.7	96 25	46.6	16 57.2	96 25	46.3
8	14 47.3	96 24	46.0	15 16.1	96 24	45.9	15 44.9	96 24	45.7	16 42.5	96 24	45.4
9	14 32.6	96 24	45.1	15 01.4	96 24	45.0	15 30.3	96 24	44.9	16 27.9	96 24	44.6
130	14 18.2	96 24	44.3	14 47.0	96 24	44.1	15 15.9	96 24	44.0	16 13.7	96 23	43.7
1	14 04.0	96 23	43.4	14 32.9	96 23	43.3	15 01.8	96 23	43.1	15 59.6	96 23	42.8
2	13 50.0	97 23	42.5	14 18.9	96 23	42.4	14 47.9	96 23	42.2	15 45.8	96 23	42.0
3	13 36.2	97 23	41.6	14 05.2	97 22	41.5	14 34.2	97 22	41.4	15 32.1	97 22	41.1
4	13 22.7	97 22	40.8	13 51.7	97 22	40.6	14 20.7	97 22	40.5	15 18.8	97 22	40.2
135	13 09.4	97 22	39.9	13 38.5	97 22	39.8	14 07.5	97 22	39.6	15 05.6	97 21	39.4
6	12 56.4	97 21	39.0	13 25.5	97 21	38.9	13 54.6	97 21	38.7	14 52.7	97 21	38.5
7	12 43.6	97 21	38.1	13 12.7	97 21	38.0	13 41.9	97 21	37.9	14 40.1	97 21	37.6
8	12 31.1	97 20	37.2	13 00.2	97 20	37.1	13 29.4	97 20	37.0	14 27.7	97 20	36.8
9	12 18.8	97 20	36.4	12 48.0	97 20	36.2	13 17.2	97 20	36.1	14 15.5	97 20	35.9
140	12 06.7	97 20	35.5	12 36.0	97 20	35.4	13 05.2	97 20	35.3	14 03.6	97 19	35.0
1	11 54.9	98 19	34.6	12 24.2	98 19	34.5	12 53.5	98 19	34.4	13 52.0	98 19	34.2
2	11 43.4	98 19	33.7	12 12.7	98 19	33.6	12 42.0	98 19	33.5	13 40.6	98 19	33.3
3	11 32.2	98 18	32.8	12 01.5	98 18	32.7	12 30.8	98 18	32.6	13 29.5	98 18	32.4
4	11 21.2	98 18	32.0	11 50.5	98 18	31.9	12 19.9	98 18	31.8	13 18.6	98 18	31.5
145	11 10.4	98 17	31.1	11 39.8	98 17	31.0	12 09.2	98 17	30.9	13 08.0	98 17	30.7
6	11 00.0	98 17	30.2	11 29.4	98 17	30.1	11 58.8	98 17	30.0	12 57.7	98 17	29.8
7	10 49.8	98 16	29.3	11 19.2	98 16	29.2	11 48.7	98 16	29.1	12 47.6	98 16	28.9
8	10 39.9	98 16	28.4	11 09.4	98 16	28.3	11 38.8	98 16	28.2	12 37.8	98 16	28.1
9	10 30.2	98 16	27.5	10 59.8	98 16	27.5	11 29.3	98 15	27.4	12 28.3	98 15	27.2
150	10 20.9	98 15	26.7	10 50.4	98 15	26.6	11 20.0	98 15	26.5	12 19.1	98 15	26.3
1	10 11.8	99 15	25.8	10 41.4	99 15	25.7	11 11.0	99 15	25.6	12 10.1	99 14	25.4
2	10 03.0	99 14	24.9	10 32.6	99 14	24.8	11 02.2	99 14	24.7	12 01.4	99 14	24.6
3	9 54.6	99 14	24.0	10 24.2	99 14	23.9	10 53.8	99 14	23.9	11 53.0	99 14	23.7
4	9 46.3	99 13	23.1	10 16.0	99 13	23.0	10 45.6	99 13	23.0	11 44.9	99 13	22.8
155	9 38.4	99 13	22.2	10 08.1	99 13	22.2	10 37.8	99 13	22.1	11 37.1	99 13	21.9
6	9 30.8	99 12	21.4	10 00.5	99 12	21.3	10 30.2	99 12	21.2	11 29.6	99 12	21.1
7	9 23.5	99 12	20.5	9 53.2	99 12	20.4	10 22.9	99 12	20.3	11 22.4	99 12	20.2
8	9 16.5	99 11	19.6	9 46.2	99 11	19.5	10 16.0	99 11	19.4	11 15.4	99 11	19.3
9	9 09.7	99 11	18.7	9 39.5	99 11	18.6	10 09.3	99 11	18.6	11 08.8	99 11	18.4
160	9 03.3	99 10	17.8	9 33.1	99 10	17.7	10 02.9	99 10	17.7	11 02.5	99 10	17.6
1	8 57.2	99 10	16.9	9 27.0	99 10	16.9	9 56.8	99 10	16.8	10 56.4	99 10	16.7
2	8 51.4	99 09	16.0	9 21.2	99 09	16.0	9 51.0	99 09	15.9	10 50.7	99 09	15.8
3	8 45.9	99 09	15.1	9 15.7	99 09	15.1	9 45.5	99 09	15.0	10 45.2	99 09	14.9
4	8 40.6	1.0 08	14.3	9 10.5	1.0 08	14.2	9 40.4	1.0 08	14.2	10 40.1	1.0 08	14.1
165	8 35.7	1.0 08	13.4	9 05.6	1.0 08	13.3	9 35.5	1.0 08	13.3	10 35.3	1.0 08	13.2
6	8 31.2	1.0 07	12.5	9 01.1	1.0 07	12.4	9 31.0	1.0 07	12.4	10 30.7	1.0 07	12.3
7	8 26.9	1.0 07	11.6	8 56.8	1.0 07	11.5	9 26.7	1.0 07	11.5	10 26.5	1.0 07	11.4
8	8 22.9	1.0 06	10.7	8 52.8	1.0 06	10.7	9 22.8	1.0 06	10.6	10 22.6	1.0 06	10.5
9	8 19.3	1.0 06	09.8	8 49.2	1.0 06	09.8	9 19.1	1.0 06	09.7	10 19.0	1.0 05	09.7
170	8 15.9	1.0 05	08.9	8 45.9	1.0 05	08.9	9 15.8	1.0 05	08.9	10 15.7	1.0 05	08.8
1	8 12.9	1.0 05	08.0	8 42.9	1.0 04	08.0	9 12.8	1.0 04	08.0	10 12.7	1.0 04	07.9
2	8 10.2	1.0 04	07.1	8 40.2	1.0 04	07.1	9 10.1	1.0 04	07.1	10 10.1	1.0 04	07.0
3	8 07.8	1.0 03	06.2	8 37.8	1.0 03	06.2	9 07.8	1.0 03	06.2	10 07.7	1.0 03	06.2
4	8 05.7	1.0 03	05.3	8 35.7	1.0 03	05.3	9 05.7	1.0 03	05.3	10 05.7	1.0 03	05.3
175	8 04.0	1.0 02	04.5	8 34.0	1.0 02	04.4	9 04.0	1.0 02	04.4	10 03.9	1.0 02	04.4
6	8 02.6	1.0 02	03.6	8 32.5	1.0 02	03.6	9 02.5	1.0 02	03.5	10 02.5	1.0 02	03.5
7	8 01.4	1.0 01	02.7	8 31.4	1.0 01	02.7	9 01.4	1.0 01	02.7	10 01.4	1.0 01	02.6
8	8 00.6	1.0 01	01.8	8 30.6	1.0 01	01.8	9 00.6	1.0 01	01.8	10 00.6	1.0 01	01.8
9	8 00.2	1.0 00	00.9	8 30.2	1.0 00	00.9	9 00.2	1.0 00	00.9	10 00.2	1.0 00	00.9
180	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	10 00.0	1.0 00	00.0

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	29 31.9	92 33	77.0	31 22.0	92 33	76.1	31 49.5	92 33	75.9	32 44.4	91 33	75.4
2	29 11.9	92 33	76.1	31 02.1	92 33	75.2	31 29.6	92 33	75.0	32 24.6	91 33	74.5
3	28 52.0	92 33	75.3	30 42.3	92 33	74.3	31 09.9	92 33	74.1	32 04.8	92 33	73.6
4	28 32.2	92 33	74.4	30 22.6	92 33	73.5	30 50.2	92 33	73.2	31 45.2	92 33	72.8
95	28 12.5	92 33	73.5	30 03.0	92 33	72.6	30 30.6	92 32	72.4	31 25.6	92 32	71.9
6	27 52.9	92 33	72.6	29 43.5	92 32	71.7	30 11.1	92 32	71.5	31 06.2	92 32	71.0
7	27 33.4	92 32	71.7	29 24.0	92 32	70.8	29 51.7	92 32	70.6	30 46.8	92 32	70.1
8	27 13.9	92 32	70.8	29 04.7	92 32	69.9	29 32.4	92 32	69.7	30 27.6	92 32	69.3
9	26 54.6	93 32	69.9	28 45.5	92 32	69.1	29 13.2	92 32	68.9	30 08.4	92 32	68.4
100	26 35.4	93 32	69.1	28 26.4	92 32	68.2	28 54.1	92 32	68.0	29 49.4	92 32	67.5
1	26 16.3	93 32	68.2	28 07.4	92 31	67.3	28 35.1	92 31	67.1	29 30.5	92 31	66.7
2	25 57.3	93 31	67.3	27 48.5	93 31	66.5	28 16.3	93 31	66.2	29 11.7	92 31	65.8
3	25 38.4	93 31	66.4	27 29.8	93 31	65.6	27 57.5	93 31	65.4	28 53.1	92 31	65.0
4	25 19.7	93 31	65.6	27 11.1	93 31	64.7	27 39.0	93 31	64.5	28 34.5	93 31	64.1
105	25 01.0	93 31	64.7	26 52.6	93 31	63.9	27 20.5	93 31	63.7	28 16.2	93 30	63.2
6	24 42.6	93 31	63.8	26 34.3	93 30	63.0	27 02.2	93 30	62.8	27 57.9	93 30	62.4
7	24 24.2	93 30	62.9	26 16.1	93 30	62.1	26 44.0	93 30	61.9	27 39.8	93 30	61.5
8	24 06.0	93 30	62.1	25 58.0	93 30	61.3	26 26.0	93 30	61.1	27 21.8	93 30	60.7
9	23 47.9	94 30	61.2	25 40.1	93 30	60.4	26 08.1	93 30	60.2	27 04.0	93 29	59.8
110	23 30.0	94 30	60.3	25 22.3	93 29	59.6	25 50.3	93 29	59.4	26 46.3	93 29	59.0
1	23 12.3	94 29	59.5	25 04.7	94 29	58.7	25 32.8	94 29	58.5	26 28.8	93 29	58.1
2	22 54.7	94 29	58.6	24 47.2	94 29	57.9	25 15.3	94 29	57.7	26 11.5	94 29	57.3
3	22 37.2	94 29	57.7	24 29.9	94 29	57.0	24 58.1	94 28	56.8	25 54.3	94 28	56.4
4	22 20.0	94 28	56.9	24 12.8	94 28	56.1	24 41.0	94 28	56.0	25 37.3	94 28	55.6
115	22 02.9	94 28	56.0	23 55.9	94 28	55.3	24 24.1	94 28	55.1	25 20.5	94 28	54.7
6	21 45.9	94 28	55.2	23 39.1	94 28	54.4	24 07.3	94 28	54.3	25 03.8	94 27	53.9
7	21 29.2	94 28	54.3	23 22.5	94 27	53.6	23 50.8	94 27	53.4	24 47.3	94 27	53.0
8	21 12.6	95 27	53.4	23 06.1	94 27	52.7	23 34.4	94 27	52.6	24 31.0	94 27	52.2
9	20 56.2	95 27	52.6	22 49.8	95 27	51.9	23 18.2	95 27	51.7	24 14.9	94 27	51.3
120	20 40.0	95 27	51.7	22 33.8	95 26	51.0	23 02.2	95 26	50.9	23 59.0	95 26	50.5
1	20 24.0	95 26	50.9	22 17.9	95 26	50.2	22 46.4	95 26	50.0	23 43.2	95 26	49.7
2	20 08.2	95 26	50.0	22 02.2	95 26	49.3	22 30.7	95 26	49.2	23 27.7	95 26	48.8
3	19 52.6	95 26	49.1	21 46.8	95 25	48.5	22 15.3	95 25	48.3	23 12.3	95 25	48.0
4	19 37.2	95 25	48.3	21 31.5	95 25	47.6	22 00.1	95 25	47.5	22 57.2	95 25	47.1
125	19 21.9	95 25	47.4	21 16.5	95 25	46.8	21 45.1	95 25	46.6	22 42.3	95 25	46.3
6	19 06.9	96 25	46.6	21 01.6	96 24	45.9	21 30.3	95 24	45.8	22 27.5	95 24	45.5
7	18 52.1	96 24	45.7	20 47.0	96 24	45.1	21 15.7	96 24	44.9	22 13.0	96 24	44.6
8	18 37.6	96 24	44.8	20 32.5	96 24	44.2	21 01.3	96 24	44.1	21 58.7	96 23	43.8
9	18 23.2	96 24	44.0	20 18.3	96 23	43.4	20 47.1	96 23	43.2	21 44.6	96 23	42.9
130	18 09.1	96 23	43.1	20 04.3	96 23	42.5	20 33.2	96 23	42.4	21 30.7	96 23	42.1
1	17 55.1	96 23	42.3	19 50.6	96 23	41.7	20 19.4	96 22	41.5	21 17.1	96 22	41.3
2	17 41.4	96 22	41.4	19 37.0	96 22	40.8	20 05.9	96 22	40.7	21 03.7	96 22	40.4
3	17 28.0	97 22	40.6	19 23.7	96 22	40.0	19 52.7	96 22	39.9	20 50.5	96 22	39.6
4	17 14.8	97 22	39.7	19 10.7	97 21	39.2	19 39.6	97 21	39.0	20 37.5	96 21	38.7
135	17 01.8	97 21	38.8	18 57.8	97 21	38.3	19 26.8	97 21	38.2	20 24.8	97 21	37.9
6	16 49.0	97 21	38.0	18 45.2	97 21	37.5	19 14.3	97 21	37.3	20 12.3	97 20	37.1
7	16 36.5	97 20	37.1	18 32.9	97 20	36.6	19 01.9	97 20	36.5	20 00.1	97 20	36.2
8	16 24.3	97 20	36.3	18 20.8	97 20	35.8	18 49.9	97 20	35.6	19 48.1	97 20	35.4
9	16 12.2	97 20	35.4	18 08.9	97 19	34.9	18 38.0	97 19	34.8	19 36.3	97 19	34.5
140	16 00.5	97 19	34.5	17 57.3	97 19	34.1	18 26.4	97 19	33.9	19 24.8	97 19	33.7
1	15 49.0	97 19	33.7	17 45.9	97 19	33.2	18 15.1	97 18	33.1	19 13.5	97 18	32.9
2	15 37.7	98 18	32.8	17 34.8	98 18	32.4	18 04.0	98 18	32.3	19 02.5	97 18	32.0
3	15 26.7	98 18	32.0	17 23.9	98 18	31.5	17 53.2	98 18	31.4	18 51.8	98 18	31.2
4	15 16.0	98 17	31.1	17 13.3	98 17	30.7	17 42.6	98 17	30.6	18 41.3	98 17	30.3
145	15 05.5	98 17	30.3	17 03.0	98 17	29.8	17 32.3	98 17	29.7	18 31.1	98 17	29.5
6	14 55.3	98 17	29.4	16 52.9	98 16	29.0	17 22.3	98 16	28.9	18 21.1	98 16	28.7
7	14 45.4	98 16	28.5	16 43.1	98 16	28.1	17 12.5	98 16	28.0	18 11.4	98 16	27.8
8	14 35.7	98 16	27.7	16 33.6	98 15	27.3	17 03.0	98 15	27.2	18 01.9	98 15	27.0
9	14 26.3	98 15	26.8	16 24.3	98 15	26.4	16 53.8	98 15	26.3	17 52.7	98 15	26.1
150	14 17.2	98 15	25.9	16 15.3	98 15	25.6	16 44.8	98 14	25.5	17 43.8	98 14	25.3
1	14 08.4	99 14	25.1	16 06.6	98 14	24.7	16 36.1	98 14	24.6	17 35.2	98 14	24.5
2	13 59.8	99 14	24.2	15 58.1	99 14	23.9	16 27.7	99 14	23.8	17 26.8	99 13	23.6
3	13 51.5	99 13	23.4	15 50.0	99 13	23.0	16 19.6	99 13	22.9	17 18.8	99 13	22.8
4	13 43.5	99 13	22.5	15 42.1	99 13	22.2	16 11.7	99 13	22.1	17 11.0	99 13	21.9
155	13 35.8	99 12	21.6	15 34.5	99 12	21.3	16 04.1	99 12	21.3	17 03.4	99 12	21.1
6	13 28.4	99 12	20.8	15 27.1	99 12	20.5	15 56.8	99 12	20.4	16 56.2	99 12	20.3
7	13 21.2	99 11	19.9	15 20.1	99 11	19.6	15 49.8	99 11	19.6	16 49.2	99 11	19.4
8	13 14.4	99 11	19.0	15 13.4	99 11	18.8	15 43.1	99 11	18.7	16 42.5	99 11	18.6
9	13 07.9	99 10	18.2	15 06.9	99 10	17.9	15 36.6	99 10	17.9	16 36.2	99 10	17.7
160	13 01.6	99 10	17.3	15 00.7	99 10	17.1	15 30.5	99 10	17.0	16 30.1	99 10	16.9
1	12 55.6	99 09	16.5	14 54.8	99 09	16.2	15 24.6	99 09	16.2	16 24.2	99 09	16.0
2	12 50.0	99 09	15.6	14 49.3	99 09	15.4	15 19.1	99 09	15.3	16 18.7	99 09	15.2
3	12 44.6	99 08	14.7	14 44.0	99 08	14.5	15 13.8	99 08	14.5	16 13.5	99 08	14.4
4	12 39.5	1.0 08	13.9	14 39.0	1.0 08	13.7	15 08.8	1.0 08	13.6	16 08.5	1.0 08	13.5
165	12 34.8	1.0 07	13.0	14 34.3	1.0 07	12.8	15 04.1	1.0 07	12.8	16 03.9	1.0 07	12.7
6	12 30.3	1.0 07	12.1	14 29.9	1.0 07	12.0	14 59.8	1.0 07	11.9	15 59.5	1.0 07	11.8
7	12 26.1	1.0 06	11.3	14 25.8	1.0 06	11.1	14 55.7	1.0 06	11.1	15 55.5	1.0 06	11.0
8	12 22.3	1.0 06	10.4	14 22.0	1.0 06	10.2	14 51.9	1.0 06	10.2	15 51.7	1.0 06	10.1
9	12 18.7	1.0 05	09.5	14 18.5	1.0 05	09.4	14 48.4	1.0 05	09.4	15 48.3	1.0 05	09.3
170	12 15.5	1.0 05	08.7	14 15.3	1.0 05	08.5	14 45.2	1.0 05	08.5	15 45.1	1.0 05	08.4
1	12 12.6	1.0 04	07.8	14 12.4	1.0 04	07.7	14 42.3	1.0 04	07.7	15 42.2	1.0 04	07.6
2	12 09.9	1.0 04	06.9	14 09.8	1.0 04	06.8	14 39.7	1.0 04	06.8	15 39.7	1.0 04	06.8
3	12 07.6	1.0 03	06.1	14 07.5	1.0 03	06.0	14 37.5	1.0 03	06.0	15 37.4	1.0 03	05.9
4	12 05.6	1.0 03	05.2	14 05.5	1.0 03	05.1	14 35.5	1.0 03	05.1	15 35.4	1.0 03	05.1
175	12 03.9	1.0 02	04.3	14 03.8	1.0 02	04.3	14 33.8	1.0 02	04.3	15 33.8	1.0 02	04.2
6	12 02.5	1.0 02	03.5	14 02.4	1.0 02	03.4	14 32.4	1.0 02	03.4	15 32.4	1.0 02	03.4
7	12 01.4	1.0 01	02.6	14 01.4	1.0 01	02.6	14 31.4	1.0 01	02.6	15 31.4	1.0 01	02.5
8	12 00.6	1.0 01	01.7	14 00.6	1.0 01	01.7	14 30.6	1.0 01	01.7	15 30.6	1.0 01	01.7
9	12 00.2	1.0 00	00.9	14 00.2	1.0 00	00.9	14 30.2	1.0 00	00.9	15 30.2	1.0 00	00.8
180	12 00.0	1.0 00	00.0	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 30.0	1.0 00	00.0

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	56 00.0	1.0 00	180.0	57 00.0	1.0 00	180.0	58 30.0	1.0 00	180.0	60 00.0	1.0 00	180.0	62 00.0	1.0 00	180.0	62 30.0	1.0 00	180.0	63 00.0	1.0 00	180.0	65 00.0	1.0 00	180.0	00
1	55 59.7	1.0 01	178.6	56 59.7	1.0 01	178.5	58 29.7	1.0 01	178.5	59 59.7	1.0 01	178.5	61 59.7	1.0 01	178.4	62 29.7	1.0 01	178.4	62 59.7	1.0 01	178.4	64 59.7	1.0 00	178.3	1
2	55 59.0	1.0 02	177.1	56 59.0	1.0 02	177.1	58 28.9	1.0 02	177.0	59 58.9	1.0 02	176.9	61 58.9	1.0 02	176.8	62 28.9	1.0 02	176.8	62 58.8	1.0 02	176.8	64 58.8	1.0 02	176.7	2
3	55 57.7	1.0 03	175.7	56 57.6	1.0 03	175.6	58 27.6	1.0 03	175.5	59 57.5	1.0 03	175.4	61 57.4	1.0 03	175.3	62 27.4	1.0 03	175.2	62 57.4	1.0 03	175.2	64 57.3	1.0 03	175.0	3
4	55 55.9	1.0 04	174.2	56 55.8	1.0 04	174.1	58 25.7	1.0 04	174.0	59 55.6	1.0 04	173.9	61 55.5	1.0 04	173.7	62 25.4	1.0 04	173.6	62 55.4	1.0 04	173.6	64 55.2	1.0 04	173.3	4
05	55 53.5	1.0 05	172.8	56 53.4	1.0 05	172.7	58 23.3	1.0 05	172.5	59 53.2	1.0 05	172.4	61 52.9	1.0 05	172.1	62 22.9	1.0 05	172.0	62 52.8	1.0 05	172.0	64 52.5	1.0 05	171.7	05
6	55 50.7	1.0 06	171.3	56 50.6	1.0 06	171.2	58 20.4	1.0 06	171.0	59 50.2	1.0 06	170.8	61 49.8	1.0 06	170.5	62 19.7	1.0 06	170.4	62 49.7	1.0 06	170.4	64 49.3	1.0 06	170.0	6
7	55 47.4	1.0 06	169.9	56 47.2	1.0 06	169.8	58 16.9	1.0 07	169.5	59 46.6	1.0 07	169.3	61 46.2	1.0 07	169.0	62 16.1	1.0 07	168.9	62 45.9	1.0 07	168.8	64 45.4	1.0 07	168.3	7
8	55 43.5	1.0 07	168.5	56 43.3	1.0 07	168.3	58 12.9	1.0 08	168.1	59 42.5	1.0 08	167.8	61 42.0	99 08	167.4	62 11.8	99 08	167.3	62 41.7	99 08	167.2	64 41.0	99 08	166.7	8
9	55 39.2	1.0 08	167.0	56 38.9	1.0 08	166.9	58 08.4	99 08	166.6	59 37.9	99 09	166.3	61 37.2	99 09	165.8	62 07.0	99 09	165.7	62 36.8	99 09	165.6	64 36.0	99 09	165.1	9
10	55 34.3	99 09	165.6	56 34.0	99 09	165.4	58 03.4	99 09	165.1	59 32.8	99 09	164.8	61 31.9	99 10	164.3	62 01.7	99 10	164.2	62 31.5	99 10	164.0	64 30.4	99 10	163.4	10
1	55 29.0	99 10	164.2	56 28.5	99 10	164.0	57 57.9	99 10	163.6	59 27.2	99 10	163.3	61 26.1	99 11	162.7	61 55.8	99 11	162.6	62 25.5	99 11	162.5	64 24.3	99 11	161.8	1
2	55 23.1	99 11	162.8	56 22.6	99 11	162.6	57 51.9	99 11	162.2	59 21.0	99 11	161.8	61 19.8	99 11	161.2	61 49.4	99 12	161.1	62 19.1	99 12	160.9	64 17.6	99 12	160.2	2
3	55 16.8	99 11	161.4	56 16.2	99 11	161.1	57 45.3	99 12	160.7	59 14.4	99 12	160.3	61 12.9	99 12	159.7	61 42.5	99 12	159.5	62 12.1	99 12	159.3	64 10.3	98 13	158.6	3
4	55 10.0	99 12	160.0	56 09.4	99 12	159.7	57 38.3	99 12	159.3	59 07.2	99 13	158.8	61 05.5	99 13	158.2	61 35.1	98 13	158.0	62 04.6	98 13	157.8	64 02.6	98 14	157.0	4
15	55 02.7	99 13	158.6	56 02.0	99 13	158.3	57 30.8	99 13	157.8	58 59.5	99 14	157.4	60 57.6	98 14	156.7	61 27.1	98 14	156.5	61 56.6	98 14	156.3	63 54.3	98 15	155.4	15
6	54 55.0	99 14	157.2	55 54.2	99 14	156.9	57 22.8	98 14	156.4	58 51.4	98 15	155.9	60 49.3	98 15	155.2	61 18.7	98 15	155.0	61 48.1	98 15	154.7	63 45.5	98 16	153.8	6
7	54 46.8	98 14	155.8	55 45.9	98 15	155.5	57 14.4	98 15	155.0	58 42.8	98 16	154.5	60 40.4	98 16	153.7	61 09.8	98 16	153.5	61 39.1	98 16	153.2	63 36.2	97 16	152.3	7
8	54 38.2	98 15	154.4	55 37.1	98 15	154.1	57 05.5	98 16	153.6	58 33.7	98 16	153.0	60 31.1	98 16	152.2	61 00.3	98 16	152.0	61 29.6	98 17	151.7	63 26.4	97 17	150.7	8
9	54 29.1	98 16	153.0	55 28.0	98 16	152.7	56 56.1	98 16	152.2	58 24.2	98 17	151.6	60 21.3	97 17	150.7	60 50.5	97 17	150.5	61 19.7	97 17	150.2	63 16.2	97 18	149.2	9
20	54 19.6	98 17	151.7	55 18.3	98 17	151.3	56 46.3	98 17	150.8	58 14.2	97 17	150.2	60 11.0	97 18	149.3	60 40.1	97 18	149.0	61 09.3	97 18	148.8	63 05.4	97 19	147.7	20
1	54 09.6	98 17	150.3	55 08.3	98 17	150.0	56 36.1	97 18	149.4	58 03.7	97 18	148.7	60 00.3	97 18	147.8	60 29.3	97 19	147.6	60 58.4	97 19	147.3	62 54.2	96 19	146.2	1
2	53 59.3	98 18	149.0	54 57.8	97 18	148.6	56 25.4	97 18	148.0	57 52.9	97 19	147.3	59 49.1	97 19	146.4	60 18.1	97 19	146.1	60 47.1	96 20	145.9	62 42.6	96 20	144.7	2
3	53 48.5	97 19	147.6	54 46.9	97 19	147.2	56 14.3	97 19	146.6	57 41.6	97 20	145.9	59 37.6	96 20	145.0	60 06.5	96 20	144.7	60 35.4	96 20	144.4	62 30.5	96 21	143.2	3
4	53 37.3	97 19	146.3	54 35.6	97 20	145.9	56 02.8	97 20	145.3	57 29.9	97 20	144.6	59 25.6	96 21	143.5	59 54.4	96 21	143.3	60 23.2	96 21	143.0	62 18.0	95 21	141.8	4
25	53 25.7	97 20	145.0	54 23.9	97 20	144.6	55 50.9	97 20	143.9	57 17.8	96 21	143.2	59 13.2	96 21	142.1	59 41.9	96 21	141.9	60 10.7	96 22	141.6	62 05.1	95 22	140.3	25
6	53 13.7	97 21	143.7	54 11.8	97 21	143.2	55 38.7	96 21	142.6	57 05.3	96 21	141.8	59 00.4	96 22	140.8	59 29.1	96 22	140.5	59 57.7	95 22	140.2	61 51.8	95 23	138.9	6
7	53 01.4	97 21	142.4	53 59.3	96 21	141.9	55 26.0	96 22	141.2	56 52.4	96 22	140.5	58 47.2	95 23	139.4	59 15.8	95 23	139.1	59 44.4	95 23	138.8	61 38.2	95 23	137.5	7
8	52 48.7	96 22	141.1	53 46.5	96 22	140.6	55 13.0	96 22	139.9	56 39.2	96 23	139.1	58 33.7	95 23	138.0	59 02.2	95 23	137.7	59 30.7	95 23	137.4	61 24.1	94 24	136.1	8
9	52 35.6	96 22	139.8	53 33.3	96 23	139.3	54 59.6	96 23	138.6	56 25.6	95 23	137.8	58 19.8	95 24	136.7	58 48.2	95 24	136.4	59 16.6	95 24	136.1	61 09.7	94 25	134.7	9
30	52 22.2	96 23	138.5	53 19.7	96 23	138.0	54 45.8	96 23	137.3	56 11.6	95 24	136.5	58 05.5	95 24	135.3	58 33.9	94 24	135.0	59 02.2	94 25	134.7	60 55.0	94 25	133.3	30
1	52 08.4	96 24	137.2	53 05.8	96 24	136.8	54 31.7	95 24	136.0	55 57.3	95 24	135.2	57 50.9	94 25	134.0	58 19.2	94 25	133.7	58 47.4	94 25	133.4	60 39.9	93 26	132.0	1
2	51 54.3	96 24	136.0	52 51.6	95 24	135.5	54 17.3	95 25	134.7	55 42.7	95 25	133.9	57 36.0	94 25	132.7	58 04.2	94 26	132.4	58 32.4	94 26	132.0	60 24.4	93 26	130.6	2
3	51 39.9	95 25	134.7	52 37.1	95 25	134.2	54 02.6	95 25	133.5	55 27.8	94 25	132.6	57 20.7	94 26	131.4	57 48.9	94 26	131.1	58 17.0	94 26	130.7	60 08.7	93 27	129.3	3
4	51 25.2	95 25	133.5	52 22.2	95 25	133.0	53 47.5	95 26	132.2	55 12.5	94 26	131.3	57 05.2	94 26	130.1	57 33.3	93 27	129.8	58 01.3	93 27	129.4	59 52.7	92 27	128.0	4
35	51 10.1	95 26	132.3	52 07.1	95 26	131.8	53 32.2	94 26	130.9	54 56.9	94 26	130.1	56 49.4	93 27	128.8	57 17.3	93 27	128.5	57 45.3	93 27	128.2	59 36.4	92 28	126.7	35
6	50 54.8	95 26	131.0	51 51.6	95 26	130.5	53 16.5	94 27	129.7	54 41.1	94 27	128.8	56 33.2	93 27	127.6	57 01.1	93 27	127.2	57 29.0	93 28	126.9	59 19.8	92 28	125.4	6
7	50 39.2	95 26	129.8	51 35.9	94 27	129.3	53 00.6	94 27	128.5	54 25.0	94 27	127.6	56 16.8	93 28	126.3	56 44.7	93 28	126.0	57 12.4	92 28	125.6	59 02.9	92 28	124.2	7
8	50 23.3	94 27	128.6	51 19.8	94 27	128.1	52 44.4	94 27	127.3	54 08.6	93 28	126.4	56 00.2	93 28	125.1	56 27.9	92 28	124.7	56 55.6	92 28	124.4	58 45.8	91 29	122.9	8
9	50 07.1	94 27	127.4	51 03.6	94 28	126.9	52 27.9	94 28	126.1	53 51.9	93 28	125.2	55 43.3	92 29	123.9	56 11.0	92 29	123.5	56 38.6	92 29	123.2	58 28.5	91 29	121.7	9
40	49 50.7	94 28	126.3	50 47.0	94 28	125.7	52 11.2	93 28	124.9	53 35.0	93 29	124.0	55 26.1	92 29	122.7	55 53.7	92 29	122.3	56 21.3	92 29	122.0	58 10.9	91 30	120.4	40
1	49 34.0	94 28	125.1	50 30.2	94 28	124.5	51 54.3	93 29	123.7	53 17.9	93 29	122.8	55 08.7	92 29	121.4	55 36.3	92 29	121.1	56 03.8	92 30	120.7	57 53.1	91 30	119.2	1
2	49 17.1	94 29	123.9	50 13.2	93 29	123.4	51 37.1	93 29	122.5	53 00.5	93 29	121.6	54 51.1	92 30	120.3	55 18.6	92 30	119.9	55 46.0	91 30	119.6	57 35.1	90 30	118.0	2
3	49 00.0	93 29	122.8	49 56.0	93 29	122.2	51 19.7	93 29	121.3	52 42.9	92 30	120.4	54 33.3	92 30	119.1	55 00.7	91 30	118.7	55 28.1	91 30	118.4	57 16.9	90 31	116.8	3
4	48 42.6	93 29	121.6	49 38.5	93 30	121.1	51 02.0	93 30	120.2	52 25.1	92 30	119.2	54 15.2	91 30	117.9	54 42.6	91 30	117.6	55 09.9	91 31	117.2	56 58.5	90 31	115.7	4
45	48 25.0	93 30	120.5	49 20.8	93 30	119.9	50 44.2	92 30	119.0	52 07.1	92 30	118.1	53 57.0	91 31	116.8	54 24.3	91 31	116.4	54 51.6	91 31	116.0	56 39.9	90 31	114.5	45
6	48 07.2	93 30	119.3	49 02.9	93 30	118.8	50 26.1	92 30	117.9	51 48.9	92 31	117.0	53 38.6	91 31	115.6	54 05.8	91 31	115.3	54 33.0	91 31	114.9	56 21.2	90 32	113.4	6
7	47 49.2	93 30	118.2	48 44.8	93 30	117.6	50 07.9	92 31	116.8	51 30.6	92 31	115.8	53 20.0	91 31	114.5	53 47.2	91 31	114.1	54 14.3	90 31	113.8	56 02.2	89 32	112.2	7
8	47 31.1	93 31	117.1	48 26.6	92 31	116.5	49 49.5	92 31	115.6	51 12.0	91 31	114.7	53 01.2	91 32	113.4	53 28.4	90 32	113.0	53 55.5	90 32	112.6	55 43.2	89 32	111.1	8
9	47 12.7	92 31	116.0	48 08.1	92 31	115.4	49 30.9	92 31	114.5	50 53.3	91 31	113.6	52 42.3	90 32	112.2	53 09.4	90 32	111.9	53 36.5	90 32	111.5	55 23.9	89 32	110.0	9
50	46 54.2	92 31	114.9	47 49.5	92 31	114.3	49 12.2	92 32	113.4	50 34.4	91 32	112.5	52 23.2	90 32	111.1	52 50.3	90 32	110.8	53 17.3	90 32	110.4	55 04.6	89 32	108.9	50
1	46 35.5	92 31	113.8	47 30.7	92 32	113.2	48 53.3	91 32	112.3	50 15.3	91 32	111.4	52 04.0	90 32	110.0	52 31.0	90 32	109.7	52 58.0	90 32	109.3	54 45.1	89 33	107.8	1
2	46 16.6	92 32	112.7	47 11.8	92 32	112.2	48 34.2	91 32	111.3	49 56.2	91 32	110.3	51 44.7	90 32	109.0	52 11.7	90 33	108.6	52 38.6	90 33	108.2	54 25.5	89 33	106.7	2
3	45 57.6	92 32	111.7	46 52.7	92 32	111.1	48 15.0	91 32	110.2	49 36.9	91 32	109.2	51 25.2	90 33	107.9	51 52.2	90 33	107.5	52 19.0	89 33	107.2	54 05.8	88 33	105.6	3
4	45 38.5	92 32	110.6	46 33.5	92 32	110.0	47 55.7	91 32	109.1	49 17.4	91 33	108.2	51 05.6	90 33	106.8	51 32.5	90 33	106.5	51 59.4	89 33	106.1	53 46.0	88 33	104.6	4
55	45 19.2	92 32	109.5	46 14.2	91 32	108.9	47 36.2	91 33	108.0	48 57.9	90 33	107.1	50 45.9	90 33	105.8	51 12.8	89 33	105.4	51 39.6	89 33	105.0	53 26.1	88 33	103.5	55
6	44 59.8	92 33	108.5	45 54.7	91 33	107.9	47 16.7	91 33	107.0	48 38.2	90 33	106.0	50 26.1	90 33	104.7	50 53.0	89 33	104.3	51 19.7	89 33	104.0	53 06.1	88 33	102.5	6
7	44 40.3	92 33	107.4	45 35.1	91 33	106.9	46 57.0	91 33	106.0	48 18.4	90 33	105.0	50 06.2	89 33	103.7	50 33.0	89 33	103.3	50 59.8	89 33	103.0	52 46.0	88 34	101.4	7
8	44 20.6	91 33	106.4	45 15.4	91 33	105.8	46 37.2	91 33	104.9	47 58.6	90 33	104.0	49 46.2	89 33	102.6	50 13.0	89 33	102.3	50 39.7	89 34	101.9	52 25.9	88 34	100.4	8
9	44 00.9	91 33	105.4	44 55.6	91 33	104.8	46 17.3	91 33	103.9	47 38.6	90 33	102.9	49 26.2	89 34	101.6	49 52.9	89 34	101.3	50 19.6	89 34	100.9	52 05.7	88 34	99.4	9
60	43 41.1	91 33	104.3	44 35.7	91 33	103.8	45 57.4	90 33	102.9	47 18.6	90 34	101.9	49 06.0	89 34	100.6	49 32.8	89 34	100.2	49 59.4	89 34	99.9	51 45.4	88 34	98.4	60
1	43 21.1	91 33	103.3	44 15.8	91 33	102.7	45 37.3	90 34	101.8	46 58.4	90 34	100.9	48 45.8	89 34	99.6	49 12.5	89 34	99.2	49 39.2	89 34	98.9	51 25.1	88 34	97.4	1
2	43 01.1	91 33	102.3	43 55.7	91 34	101.7	45 17.2	90 34	100.8	46 38.3	90 34	99.9	48 25.6	89 34	98.6	48 52.3	89 34	98.2	49 18.9	89 34	97.9	51 04.7	88 34	96.4	2
3	42 41.1	91 34	101.3	43 35.6	91 34	100.7	44 57.0	90 34	99.8	46 18.0	90 34	98.9	48 05.3	89 34	97.6	48 31.9	89 34	97.2	48 58.5	89 34	96.9	50 44.3	88 34	95.4	3
4	42 20.9	91 34	100.3	43 15.4	91 34	99.7	44 36.8	90 34	98.8	45 57.7	90 34	97.9	47 44.9	89 34	96.6	48 11.5	89 34	96.3	48 38.1	89 34	95.9	50 23.8	88 34	94.4	4
65	42 00.7	91 34	99.3	42 55.1	91 34	98.7	44 16.5	90 34	97.9	45 37.4	90 34	96.9	47 24.5	89 34	95.6	47 51.1	89 34	95.3	48 17.7	88 34	94.9	50 03.4	88 34	93.5	65
6	41 40.4	91 34	98.3	42 34.8	91 34	97.8	43 56.1	90 34	96.9	45 17.0	90 34	96.0	47 04.1	89 34	94.6	47 30.7	89 34	94.3	47 57.2	88 34	94.0	49 42.9	88 34	92.5	6
7	41 20.1	91 34	97.3	42 14.5	91 34	96.8	43 35.7	90 34	95.9	44 56.5	90 34	95.0	46 43.6	89 34	93.7	47 10.2	89 34	93.3	47 36.8	88 34	93.0	49 22.4	88 34	91.6	7
8	40 59.7	91 34	96.4	41 54.1	91 34	95.8	43 15.3	90 34	94.9	44 36.1	90 34	94.0	46 23.1	89 34	92.7	46 49.7	89 34	92.4	47 16.3	88 34	92.0	49 01.8	88 34	90.6	8
9	40 39.3	91 34	95.4	41 33.6	90 34	94.8	42 54.8	90 34	94.0	44 15.6	90 34	93.1	46 02.6	89 34	91.8	46 29.2	89 34	91.4	46 55.8	88 34	91.1	48 41.3	88 34	89.7	9
70	40 18.8	91 34	94.4	41 13.2	90 34	93.9	42 34.3	90 34	93.0	43 55.1	89 34	92.1	45 42.1	89 34	90.8	46 08.7	89 34	90.5	46 35.2	88 34	90.1	48 20.8	88 34	88.7	70
1	39 58.4	91 34	93.5	40 52.7	90 34	92.9	42 13.8	90 34	92.1	43 34.6	89 34	91.1	45 21.6	89 34	89.9	45 48.2	89 34	89.5	46 14.7	88 34	89.2	48 00.3	88 34	87.8	1
2	39 37.9	91 34	92.5	40 32.2	90 34	92.0	41 53.3	90 34	91.1	43 14.1	89 34	90.2	45 01.0	89 34	88.9	45 27.6	89 34	88.6	45 54.2	88 34	88.3	47 39.8	88 34	86.9	2
3	39 17.4	91 34	91.6	40 11.7	90 34	91.0	41 32.8	90 34	90.2	42 53.6	89 34	89.3	44 40.5	89 34	88.0	45 07.1	89 34	87.7	45 33.7	88 34	87.4	47 19.3	88 34	86.0	3
4	38 56.8	91 34	90.6	39 51.1	90 34	90.1	41 12.3	90 34	89.2	42 33.0	89 34	88.3	44 20.0	89 34	87.1	44 46.6	89 34	86.8	45 13.2	88 34	86.4	46 58.8	88 34	85.1	4
75	38 36.3	91 34	89.7	39 30.6	90 34	89.1	40 51.8	90 34	88.3	42 12.5	90 34	87.4	43 59.5	89 34	86.2	44 26.2	89 34	85.8	44 52.7	88 34	85.5	46 38.4	88 34	84.2	75
6	38 15.8	91 34	88.8	39 10.1	90 34	88.2	40 31.3	90 34	87.4	41 52.0	90 34	86.5	43 39.1	89 34	85.3	44 05.7	89 34	84.9	44 32.3	88 34	84.6	46 18.0	88 34	83.3	6
7	37 55.3	91 34	87.8	38 49.6	90 34	87.3	40 10.8	90 34	86.4	41 31.6	90 34	85.6	43 18.6	89 34	84.3	43 45.3	89 34	84.0	44 11.9	88 34	83.7	45 57.7	88 34	82.4	7
8	37 34.8	91 34	86.9	38 29.1	90 34	86.4	39 50.3	90 34	85.5	41 11.1	90 34	84.6	42 58.2	89 34	83.4	43 24.9	89 34	83.1	43 51.5	88 34	82.8	45 37.3	88 34	81.5	8
9	37 14.3	91 34	86.0	38 08.6	90 34	85.4	39 29.9	90 34	84.6	40 50.7	90 34	83.7	42 37.9	89 34	82.5	43 04.5	89 34	82.2	43 31.2	89 34	81.9	45 17.1	88 34	80.6	9
80	36 53.9	91 34	85.0	37 48.2	90 34	84.5	39 09.4	90 34	83.7	40 30.3	90 34	82.8	42 17.5	89 34	81.6	42 44.2	89 34	81.3	43 10.9	89 34	81.0	44 56.9	88 34	79.7	80
1	36 33.4	91 34	84.1	37 27.8	90 34	83.6	38 49.1	90 34	82.8	40 10.0	90 34	81.9	41 57.3	89 34	80.7	42 24.0	89 34	80.4	42 50.6	89 34	80.1	44 36.7	88 34	78.8	1
2	36 13.0	91 34	83.2	37 07.4	91 34	82.7	38 28.7	90 34	81.9	39 49.7	90 34	81.0	41 37.0	89 34	79.9	42 03.8	89 34	79.6	42 30.4	89 34	79.2	44 16.6	88 33	78.0	2
3	35 52.7	91 34	82.3	36 47.1	91 34	81.8	38 08.4	90 34	81.0	39 29.4	90 34	80.1	41 16.9	89 34	79.0	41 43.6	89 33	78.7	42 10.3	89 33	78.4	43 56.6	88 33	77.1	3
4	35 32.4	91 34	81.4	36 26.8	91 34	80.9	37 48.2	90 34	80.1	39 09.3	90 34	79.3	40 56.7	89 33	78.1	41 23.5	89 33	77.8	41 50.2	89 33	77.5	43 36.6	88 33	76.2	4
85	35 12.1	91 34	80.5	36 06.6	91 34	80.0	37 28.0	90 34	79.2	38 49.1	90 33	78.4	40 36.7	89 33	77.2	41 03.5	89 33	76.9	41 30.2	89 33	76.6	43 16.7	88 33	75.4	85
6	34 51.9	91 34	79.6	35 46.4	91 34	79.1	37 07.9	90 33	78.3	38 29.1	90 33	77.5	40 16.7	89 33	76.3	40 43.5	89 33	76.0	41 10.3	89 33	75.7	42 56.9	88 33	74.5	6
7	34 31.7	91 34	78.7	35 26.3	91 33	78.2	36 47.8	90 33	77.4	38 09.1	90 33	76.6	39 56.8	90 33	75.5	40 23.7	89 33	75.2	40 50.5	89 33	74.9	42 37.1	88 33	73.7	7
8	34 11.6	91 33	77.8	35 06.2	91 33	77.3	36 27.8	91 33	76.5	37 49.1	90 33	75.7	39 37.0	90 33	74.6	40 03.9	89 33	74.3	40 30.7	89 33	74.0	42 17.5	89 33	72.8	8
9	33 51.6	91 33	76.9	34 46.2	91 33	76.4	36 07.9	91 33	75.7	37 29.3	90 33	74.9	39 17.3	90 33	73.7	39 44.1	90 33	73.5	40 11.0	89 33	73.2	41 57.9	89 32	72.0	9
90	33 31.7	91 33	76.0	34 26.3	91 33	75.5	35 48.1	91 33	74.8	37 09.5	90 33	74.0	38 57.6	90 33	72.9	39 24.5	90 33	72.6	39 51.4	89 33	72.3	41 38.5	89 32	71.1	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	33 11.8	91 33	75.2	34 06.5	91 33	74.7	35 28.3	91 33	73.9	36 49.8	90 33	73.1
2	32 52.0	91 33	74.3	33 46.7	91 33	73.8	35 08.6	91 33	73.0	36 30.2	91 32	72.3
3	32 32.3	91 33	73.4	33 27.1	91 33	72.9	34 49.0	91 32	72.2	36 10.7	91 32	71.4
4	32 12.6	92 33	72.5	33 07.5	91 32	72.0	34 29.6	91 32	71.3	35 51.3	91 32	70.5
95	31 53.1	92 32	71.7	32 48.0	91 32	71.2	34 10.2	91 32	70.4	35 32.0	91 32	69.7
6	31 33.7	92 32	70.8	32 28.7	92 32	70.3	33 50.9	91 32	69.6	35 12.9	91 32	68.8
7	31 14.4	92 32	69.9	32 09.4	92 32	69.4	33 31.7	91 32	68.7	34 53.8	91 32	68.0
8	30 55.2	92 32	69.0	31 50.2	92 32	68.6	33 12.6	91 32	67.9	34 34.8	91 31	67.1
9	30 36.0	92 32	68.2	31 31.2	92 32	67.7	32 53.7	92 31	67.0	34 16.0	91 31	66.3
100	30 17.0	92 31	67.3	31 12.3	92 31	66.9	32 34.9	92 31	66.2	33 57.2	91 31	65.4
1	29 58.2	92 31	66.5	30 53.4	92 31	66.0	32 16.2	92 31	65.3	33 38.6	92 31	64.6
2	29 39.4	92 31	65.6	30 34.8	92 31	65.1	31 57.6	92 31	64.5	33 20.2	92 31	63.8
3	29 20.8	92 31	64.7	30 16.2	92 31	64.3	31 39.1	92 31	63.6	33 01.8	92 30	62.9
4	29 02.3	93 31	63.9	29 57.8	92 30	63.4	31 20.8	92 30	62.8	32 43.6	92 30	62.1
105	28 44.0	93 30	63.0	29 39.5	92 30	62.6	31 02.6	92 30	61.9	32 25.6	92 30	61.2
6	28 25.7	93 30	62.2	29 21.3	93 30	61.7	30 44.6	92 30	61.1	32 07.6	92 30	60.4
7	28 07.7	93 30	61.3	29 03.3	93 30	60.9	30 26.7	93 30	60.2	31 49.9	92 29	59.6
8	27 49.7	93 30	60.5	28 45.5	93 30	60.0	30 09.0	93 29	59.4	31 32.3	92 29	58.7
9	27 32.0	93 29	59.6	28 27.8	93 29	59.2	29 51.4	93 29	58.6	31 14.8	93 29	57.9
110	27 14.3	93 29	58.8	28 10.2	93 29	58.4	29 34.0	93 29	57.7	30 57.5	93 29	57.1
1	26 56.9	93 29	57.9	27 52.8	93 29	57.5	29 16.7	93 28	56.9	30 40.3	93 28	56.3
2	26 39.6	93 29	57.1	27 35.6	93 28	56.7	28 59.6	93 28	56.1	30 23.4	93 28	55.4
3	26 22.4	94 28	56.2	27 18.6	94 28	55.8	28 42.6	93 28	55.2	30 06.6	93 28	54.6
4	26 05.4	94 28	55.4	27 01.7	94 28	55.0	28 25.9	93 28	54.4	29 49.9	93 27	53.8
115	25 48.6	94 28	54.5	26 44.9	94 28	54.2	28 09.3	94 27	53.6	29 33.4	93 27	53.0
6	25 32.0	94 27	53.7	26 28.4	94 27	53.3	27 52.9	94 27	52.7	29 17.2	94 27	52.1
7	25 15.6	94 27	52.8	26 12.0	94 27	52.5	27 36.6	94 27	51.9	29 01.0	94 27	51.3
8	24 59.3	94 27	52.0	25 55.8	94 27	51.6	27 20.6	94 26	51.1	28 45.1	94 26	50.5
9	24 43.2	94 26	51.2	25 39.9	94 26	50.8	27 04.7	94 26	50.2	28 29.4	94 26	49.7
120	24 27.3	95 26	50.3	25 24.0	94 26	50.0	26 49.0	94 26	49.4	28 13.8	94 26	48.8
1	24 11.6	95 26	49.5	25 08.4	95 26	49.1	26 33.5	94 25	48.6	27 58.5	94 25	48.0
2	23 56.1	95 26	48.6	24 53.0	95 25	48.3	26 18.2	95 25	47.8	27 43.3	94 25	47.2
3	23 40.8	95 25	47.8	24 37.8	95 25	47.5	26 03.1	95 25	46.9	27 28.4	95 25	46.4
4	23 25.7	95 25	47.0	24 22.8	95 25	46.6	25 48.2	95 24	46.1	27 13.6	95 24	45.6
125	23 10.8	95 24	46.1	24 08.0	95 24	45.8	25 33.6	95 24	45.3	26 59.1	95 24	44.8
6	22 56.1	95 24	45.3	23 53.3	95 24	45.0	25 19.1	95 24	44.5	26 44.7	95 24	43.9
7	22 41.7	96 24	44.5	23 39.0	95 24	44.1	25 04.8	95 23	43.6	26 30.6	95 23	43.1
8	22 27.4	96 23	43.6	23 24.8	96 23	43.3	24 50.8	95 23	42.8	26 16.6	95 23	42.3
9	22 13.4	96 23	42.8	23 10.8	96 23	42.5	24 36.9	96 23	42.0	26 02.9	96 22	41.5
130	21 59.5	96 23	41.9	22 57.1	96 23	41.6	24 23.3	96 22	41.2	25 49.4	96 22	40.7
1	21 45.9	96 22	41.1	22 43.5	96 22	40.8	24 09.9	96 22	40.3	25 36.2	96 22	39.9
2	21 32.5	96 22	40.3	22 30.2	96 22	40.0	23 56.7	96 22	39.5	25 23.1	96 21	39.1
3	21 19.4	96 22	39.4	22 17.2	96 21	39.1	23 43.8	96 21	38.7	25 10.3	96 21	38.2
4	21 06.5	96 21	38.6	22 04.3	96 21	38.3	23 31.1	96 21	37.9	24 57.7	96 21	37.4
135	20 53.8	97 21	37.8	21 51.7	97 21	37.5	23 18.6	96 20	37.1	24 45.4	96 20	36.6
6	20 41.3	97 20	36.9	21 39.4	97 20	36.6	23 06.3	97 20	36.2	24 33.3	97 20	35.8
7	20 29.1	97 20	36.1	21 27.2	97 20	35.8	22 54.3	97 20	35.4	24 21.4	97 19	35.0
8	20 17.2	97 20	35.2	21 15.3	97 19	35.0	22 42.6	97 19	34.6	24 09.7	97 19	34.2
9	20 05.4	97 19	34.4	21 03.7	97 19	34.2	22 31.0	97 19	33.8	23 58.3	97 19	33.4
140	19 54.0	97 19	33.6	20 52.3	97 19	33.3	22 19.7	97 18	32.9	23 47.1	97 18	32.6
1	19 42.8	97 18	32.7	20 41.2	97 18	32.5	22 08.7	97 18	32.1	23 36.2	97 18	31.7
2	19 31.8	97 18	31.9	20 30.3	97 18	31.7	21 57.9	97 18	31.3	23 25.6	97 17	30.9
3	19 21.1	98 17	31.1	20 19.6	98 17	30.8	21 47.4	98 17	30.5	23 15.1	97 17	30.1
4	19 10.6	98 17	30.2	20 09.2	98 17	30.0	21 37.1	98 17	29.7	23 05.0	98 17	29.3
145	19 00.4	98 17	29.4	19 59.1	98 16	29.2	21 27.1	98 16	28.8	22 55.0	98 16	28.5
6	18 50.5	98 16	28.6	19 49.2	98 16	28.3	21 17.3	98 16	28.0	22 45.4	98 16	27.7
7	18 40.8	98 16	27.7	19 39.6	98 16	27.5	21 07.8	98 15	27.2	22 36.0	98 15	26.9
8	18 31.4	98 15	26.9	19 30.3	98 15	26.7	20 58.6	98 15	26.4	22 26.8	98 15	26.1
9	18 22.2	98 15	26.0	19 21.2	98 15	25.8	20 49.6	98 15	25.5	22 18.0	98 14	25.2
150	18 13.4	98 14	25.2	19 12.4	98 14	25.0	20 40.9	98 14	24.7	22 09.3	98 14	24.4
1	18 04.7	98 14	24.4	19 03.8	98 14	24.2	20 32.4	98 14	23.9	22 01.0	98 14	23.6
2	17 56.4	99 13	23.5	18 55.6	99 13	23.4	20 24.2	99 13	23.1	21 52.9	98 13	22.8
3	17 48.4	99 13	22.7	18 47.6	99 13	22.5	20 16.3	99 13	22.3	21 45.1	99 13	22.0
4	17 40.6	99 12	21.9	18 39.8	99 12	21.7	20 08.7	99 12	21.4	21 37.5	99 12	21.2
155	17 33.1	99 12	21.0	18 32.4	99 12	20.9	20 01.3	99 12	20.6	21 30.2	99 12	20.4
6	17 25.9	99 12	20.2	18 25.2	99 11	20.0	19 54.2	99 11	19.8	21 23.2	99 11	19.5
7	17 18.9	99 11	19.3	18 18.3	99 11	19.2	19 47.4	99 11	19.0	21 16.5	99 11	18.7
8	17 12.3	99 11	18.5	18 11.7	99 11	18.4	19 40.9	99 10	18.1	21 10.1	99 10	17.9
9	17 05.9	99 10	17.7	18 05.4	99 10	17.5	19 34.7	99 10	17.3	21 03.9	99 10	17.1
160	16 59.8	99 10	16.8	17 59.4	99 10	16.7	19 28.7	99 09	16.5	20 58.0	99 09	16.3
1	16 54.0	99 09	16.0	17 53.6	99 09	15.9	19 23.0	99 09	15.7	20 52.4	99 09	15.5
2	16 48.5	99 09	15.1	17 48.2	99 09	15.0	19 17.6	99 09	14.8	20 47.0	99 08	14.7
3	16 43.3	99 08	14.3	17 43.0	99 08	14.2	19 12.5	99 08	14.0	20 42.0	99 08	13.9
4	16 38.4	1.0 08	13.5	17 38.1	1.0 08	13.4	19 07.7	1.0 08	13.2	20 37.2	99 07	13.0
165	16 33.8	1.0 07	12.6	17 33.5	1.0 07	12.5	19 03.1	1.0 07	12.4	20 32.7	1.0 07	12.2
6	16 29.4	1.0 07	11.8	17 29.2	1.0 07	11.7	18 58.9	1.0 07	11.5	20 28.5	1.0 07	11.4
7	16 25.4	1.0 06	10 9	17 25.2	1.0 06	10.9	18 54.9	1.0 06	10.7	20 24.6	1.0 06	10.6
8	16 21.6	1.0 06	10.1	17 21.5	1.0 06	10.0	18 51.2	1.0 06	09.9	20 21.0	1.0 06	09.8
9	16 18.2	1.0 05	09.3	17 18.1	1.0 05	09.2	18 47.8	1.0 05	09.1	20 17.6	1.0 05	09.0
170	16 15.0	1.0 05	08.4	17 14.9	1.0 05	08.3	18 44.8	1.0 05	08.3	20 14.6	1.0 05	08.2
1	16 12.2	1.0 04	07.6	17 12.1	1.0 04	07.5	18 42.0	1.0 04	07.4	20 11.8	1.0 04	07.3
2	16 09.6	1.0 04	06.7	17 09.6	1.0 04	06.7	18 39.4	1.0 04	06.6	20 09.3	1.0 04	06.5
3	16 07.4	1.0 03	05.9	17 07.3	1.0 03	05.8	18 37.2	1.0 03	05.8	20 07.1	1.0 03	05.7
4	16 05.4	1.0 03	05.0	17 05.4	1.0 03	05.0	18 35.3	1.0 03	05.0	20 05.3	1.0 03	04.9
175	16 03.8	1.0 02	04.2	17 03.7	1.0 02	04.2	18 33.7	1.0 02	04.1	20 03.6	1.0 02	04.1
6	16 02.4	1.0 02	03.4	17 02.4	1.0 02	03.3	18 32.4	1.0 02	03.3	20 02.3	1.0 02	03.3
7	16 01.4	1.0 01	02.5	17 01.3	1.0 01	02.5	18 31.3	1.0 01	02.5	20 01.3	1.0 01	02.4
8	16 00.6	1.0 01	01.7	17 00.6	1.0 01	01.7	18 30.6	1.0 01	01.7	20 00.6	1.0 01	01.6
9	16 00.2	1.0 00	00.8	17 00.1	1.0 00	00.8	18 30.1	1.0 00	00.8	20 00.1	1.0 00	00.8
180	16 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	18 30.0	1.0 00	00.0	20 00.0	1.0 00	00.0

H.A.	42° 00′			42° 30′			43° 00′			45° 00′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	38 38.0	90 32	72.0	39 05.0	90 32	71.7	39 31.9	90 32	71.5	41 19.1	89 32	70.3
2	38 18.6	90 32	71.2	38 45.5	90 32	70.9	39 12.5	90 32	70.6	40 59.8	89 32	69.4
3	37 59.2	90 32	70.3	38 26.2	90 32	70.0	38 53.2	90 32	69.8	40 40.7	89 32	68.6
4	37 39.9	90 32	69.5	38 07.0	90 32	69.2	38 34.0	90 32	68.9	40 21.6	89 32	67.8
95	37 20.7	90 32	68.6	37 47.8	90 32	68.4	38 14.9	90 32	68.1	40 02.7	90 31	66.9
6	37 01.7	90 32	67.8	37 28.8	90 32	67.5	37 55.9	90 31	67.2	39 43.9	90 31	66.1
7	36 42.8	91 31	66.9	37 09.9	90 31	66.7	37 37.0	90 31	66.4	39 25.2	90 31	65.3
8	36 23.9	91 31	66.1	36 51.1	91 31	65.8	37 18.3	90 31	65.6	39 06.6	90 31	64.5
9	36 05.2	91 31	65.3	36 32.5	91 31	65.0	36 59.7	91 31	64.7	38 48.1	90 31	63.7
100	35 46.7	91 31	64.4	36 13.9	91 31	64.2	36 41.2	91 31	63.9	38 29.8	90 30	62.8
1	35 28.2	91 31	63.6	35 55.5	91 30	63.3	36 22.8	91 30	63.1	38 11.6	90 30	62.0
2	35 09.9	91 30	62.8	35 37.3	91 30	62.5	36 04.6	91 30	62.3	37 53.5	91 30	61.2
3	34 51.7	91 30	61.9	35 19.1	91 30	61.7	35 46.5	91 30	61.4	37 35.6	91 30	60.4
4	34 33.7	92 30	61.1	35 01.1	91 30	60.9	35 28.5	91 30	60.6	37 17.9	91 29	59.6
105	34 15.8	92 30	60.3	34 43.3	92 30	60.0	35 10.7	91 29	59.8	37 00.2	91 29	58.8
6	33 58.0	92 29	59.5	34 25.6	92 29	59.2	34 53.1	92 29	59.0	36 42.8	91 29	58.0
7	33 40.4	92 29	58.6	34 08.0	92 29	58.4	34 35.5	92 29	58.2	36 25.4	91 29	57.2
8	33 23.0	92 29	57.8	33 50.6	92 29	57.6	34 18.2	92 29	57.4	36 08.3	92 28	56.4
9	33 05.7	92 29	57.0	33 33.4	92 28	56.8	34 01.0	92 28	56.5	35 51.3	92 28	55.6
110	32 48.6	92 28	56.2	33 16.3	92 28	56.0	33 44.0	92 28	55.7	35 34.4	92 28	54.8
1	32 31.6	93 28	55.4	32 59.3	92 28	55.1	33 27.1	92 28	54.9	35 17.7	92 28	54.0
2	32 14.8	93 28	54.6	32 42.6	93 28	54.3	33 10.4	93 28	54.1	35 01.2	92 27	53.2
3	31 58.2	93 27	53.7	32 26.0	93 27	53.5	32 53.8	93 27	53.3	34 44.9	92 27	52.4
4	31 41.7	93 27	52.9	32 09.6	93 27	52.7	32 37.5	93 27	52.5	34 28.7	93 27	51.6
115	31 25.4	93 27	52.1	31 53.4	93 27	51.9	32 21.3	93 27	51.7	34 12.7	93 26	50.8
6	31 09.3	93 27	51.3	31 37.3	93 26	51.1	32 05.3	93 26	50.9	33 56.9	93 26	50.0
7	30 53.4	93 26	50.5	31 21.4	93 26	50.3	31 49.4	93 26	50.1	33 41.3	93 26	49.2
8	30 37.6	94 26	49.7	31 05.7	94 26	49.5	31 33.8	94 26	49.3	33 25.8	93 25	48.4
9	30 22.1	94 26	48.9	30 50.2	94 26	48.7	31 18.3	94 25	48.5	33 10.6	93 25	47.6
120	30 06.7	94 25	48.1	30 34.9	94 25	47.9	31 03.1	94 25	47.7	32 55.5	94 25	46.8
1	29 51.5	94 25	47.3	30 19.8	94 25	47.1	30 48.0	94 25	46.9	32 40.6	94 24	46.1
2	29 36.6	94 25	46.5	30 04.8	94 25	46.3	30 33.1	94 24	46.1	32 25.9	94 24	45.3
3	29 21.8	94 24	45.7	29 50.1	94 24	45.5	30 18.4	94 24	45.3	32 11.5	94 24	44.5
4	29 07.2	95 24	44.8	29 35.6	95 24	44.7	30 03.9	94 24	44.5	31 57.2	94 23	43.7
125	28 52.9	95 24	44.0	29 21.3	95 24	43.9	29 49.7	95 23	43.7	31 43.1	94 23	42.9
6	28 38.7	95 23	43.2	29 07.2	95 23	43.1	29 35.6	95 23	42.9	31 29.2	95 23	42.1
7	28 24.7	95 23	42.4	28 53.2	95 23	42.3	29 21.7	95 23	42.1	31 15.6	95 22	41.3
8	28 11.0	95 23	41.6	28 39.6	95 22	41.5	29 08.1	95 22	41.3	31 02.1	95 22	40.6
9	27 57.5	95 22	40.8	28 26.1	95 22	40.7	28 54.7	95 22	40.5	30 48.9	95 22	39.8
130	27 44.2	96 22	40.0	28 12.8	95 22	39.9	28 41.5	95 22	39.7	30 35.9	95 21	39.0
1	27 31.1	96 21	39.2	27 59.8	96 21	39.1	28 28.5	96 21	38.9	30 23.1	95 21	38.2
2	27 18.2	96 21	38.4	27 47.0	96 21	38.3	28 15.7	96 21	38.1	30 10.5	96 21	37.4
3	27 05.6	96 21	37.6	27 34.4	96 21	37.5	28 03.1	96 21	37.3	29 58.1	96 20	36.7
4	26 53.2	96 20	36.8	27 22.0	96 20	36.7	27 50.8	96 20	36.5	29 46.0	96 20	35.9
135	26 41.0	96 20	36.0	27 09.8	96 20	35.9	27 38.7	96 20	35.7	29 34.1	96 19	35.1
6	26 29.0	96 20	35.2	26 57.9	96 19	35.1	27 26.8	96 19	34.9	29 22.4	96 19	34.3
7	26 17.3	97 19	34.4	26 46.3	97 19	34.3	27 15.2	96 19	34.1	29 10.9	96 19	33.5
8	26 05.8	97 19	33.6	26 34.8	97 19	33.5	27 03.8	97 19	33.3	28 59.7	97 18	32.7
9	25 54.6	97 18	32.8	26 23.6	97 18	32.7	26 52.7	97 18	32.5	28 48.7	97 18	32.0
140	25 43.6	97 18	32.0	26 12.7	97 18	31.9	26 41.7	97 18	31.7	28 38.0	97 18	31.2
1	25 32.8	97 18	31.2	26 01.9	97 17	31.1	26 31.1	97 17	31.0	28 27.5	97 17	30.4
2	25 22.3	97 17	30.4	25 51.5	97 17	30.3	26 20.6	97 17	30.2	28 17.2	97 17	29.6
3	25 12.0	97 17	29.6	25 41.2	97 17	29.5	26 10.4	97 17	29.4	28 07.2	97 16	28.8
4	25 02.0	98 16	28.8	25 31.3	97 16	28.7	26 00.5	97 16	28.6	27 57.4	97 16	28.1
145	24 52.2	98 16	28.0	25 21.5	98 16	27.9	25 50.8	98 16	27.8	27 47.9	98 15	27.3
6	24 42.7	98 15	27.2	25 12.1	98 15	27.1	25 41.4	98 15	27.0	27 38.6	98 15	26.5
7	24 33.5	98 15	26.4	25 02.8	98 15	26.3	25 32.2	98 15	26.2	27 29.6	98 15	25.7
8	24 24.5	98 15	25.6	24 53.9	98 15	25.5	25 23.3	98 14	25.4	27 20.8	98 14	25.0
9	24 15.7	98 14	24.8	24 45.2	98 14	24.7	25 14.6	98 14	24.6	27 12.2	98 14	24.2
150	24 07.2	98 14	24.0	24 36.7	98 14	23.9	25 06.2	98 14	23.8	27 04.0	98 13	23.4
1	23 59.0	98 13	23.2	24 28.5	98 13	23.1	24 58.0	98 13	23.0	26 56.0	98 13	22.6
2	23 51.1	98 13	22.4	24 20.6	98 13	22.3	24 50.1	98 13	22.2	26 48.2	98 12	21.8
3	23 43.4	99 12	21.6	24 12.9	99 12	21.5	24 42.5	99 12	21.4	26 40.7	98 12	21.1
4	23 35.9	99 12	20.8	24 05.5	99 12	20.7	24 35.1	99 12	20.6	26 33.4	99 12	20.3
155	23 28.8	99 11	20.0	23 58.4	99 11	19.9	24 28.0	99 11	19.9	26 26.5	99 11	19.5
6	23 21.9	99 11	19.2	23 51.5	99 11	19.1	24 21.2	99 11	19.1	26 19.7	99 11	18.7
7	23 15.3	99 11	18.4	23 44.9	99 11	18.3	24 14.6	99 10	18.3	26 13.3	99 10	17.9
8	23 08.9	99 10	17.6	23 38.6	99 10	17.5	24 08.3	99 10	17.5	26 07.1	99 10	17.2
9	23 02.8	99 10	16.8	23 32.6	99 10	16.8	24 02.3	99 10	16.7	26 01.2	99 09	16.4
160	22 57.0	99 09	16.0	23 26.8	99 09	16.0	23 56.5	99 09	15.9	25 55.5	99 09	15.6
1	22 51.5	99 09	15.2	23 21.3	99 09	15.2	23 51.1	99 09	15.1	25 50.2	99 09	14.8
2	22 46.3	99 08	14.4	23 16.1	99 08	14.4	23 45.9	99 08	14.3	25 45.0	99 08	14.0
3	22 41.3	99 08	13.6	23 11.1	99 08	13.6	23 40.9	99 08	13.5	25 40.2	99 08	13.3
4	22 36.6	99 07	12.8	23 06.4	99 07	12.8	23 36.3	99 07	12.7	25 35.6	99 07	12.5
165	22 32.2	1.0 07	12.0	23 02.0	1.0 07	12.0	23 31.9	1.0 07	11.9	25 31.3	1.0 07	11.7
6	22 28.0	1.0 06	11.2	22 57.9	1.0 06	11.2	23 27.8	1.0 06	11.1	25 27.3	1.0 06	10.9
7	22 24.2	1.0 06	10.4	22 54.1	1.0 06	10.4	23 24.0	1.0 06	10.3	25 23.5	1.0 06	10.1
8	22 20.6	1.0 05	09.6	22 50.5	1.0 05	09.6	23 20.4	1.0 05	09.5	25 20.1	1.0 05	09.4
9	22 17.3	1.0 05	08.8	22 47.3	1.0 05	08.8	23 17.2	1.0 05	08.7	25 16.9	1.0 05	08.6
170	22 14.3	1.0 05	08.0	22 44.3	1.0 04	08.0	23 14.2	1.0 04	07.9	25 13.9	1.0 04	07.8
1	22 11.6	1.0 04	07.2	22 41.6	1.0 04	07.2	23 11.5	1.0 04	07.1	25 11.3	1.0 04	07.0
2	22 09.2	1.0 04	06.4	22 39.1	1.0 04	06.4	23 09.1	1.0 04	06.4	25 08.9	1.0 03	06.2
3	22 07.0	1.0 03	05.6	22 37.0	1.0 03	05.6	23 07.0	1.0 03	05.6	25 06.8	1.0 03	05.5
4	22 05.2	1.0 03	04.8	22 35.1	1.0 03	04.8	23 05.1	1.0 03	04.8	25 05.0	1.0 03	04.7
175	22 03.6	1.0 02	04.0	22 33.6	1.0 02	04.0	23 03.6	1.0 02	04.0	25 03.5	1.0 02	03.9
6	22 02.3	1.0 02	03.2	22 32.3	1.0 02	03.2	23 02.3	1.0 02	03.2	25 02.2	1.0 02	03.1
7	22 01.3	1.0 01	02.4	22 31.3	1.0 01	02.4	23 01.3	1.0 01	02.4	25 01.3	1.0 01	02.3
8	22 00.6	1.0 01	01.6	22 30.6	1.0 01	01.6	23 00.6	1.0 01	01.6	25 00.6	1.0 01	01.6
9	22 00.1	1.0 00	00.8	22 30.1	1.0 00	00.8	23 00.1	1.0 00	00.8	25 00.1	1.0 00	00.8
180	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0	25 00.0	1.0 00	00.0

Lat. 70°

Lat. 71°

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Lat. 79°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	66 00.0	1.0 00	180.0	67 00.0	1.0 01	180.0	68 30.0	1.0 01	180.0	69 30.0	1.0 01	180.0	70 30.0	1.0 01	180.0	71 30.0	1.0 01	180.0	72 30.0	1.0 01	180.0	74 00.0	1.0 01	180.0	00
1	65 59.7	1.0 02	178.3	66 59.7	1.0 02	178.3	68 29.7	1.0 02	178.2	69 29.7	1.0 02	178.1	70 29.7	1.0 02	178.1	71 29.6	1.0 02	178.0	72 29.6	1.0 02	178.0	73 59.6	1.0 02	177.9	1
2	65 58.8	1.0 03	176.6	66 58.8	1.0 03	176.5	68 28.7	1.0 03	176.4	69 28.7	1.0 03	176.3	70 28.6	1.0 03	176.2	71 28.6	1.0 03	176.1	72 28.6	1.0 03	176.0	73 58.5	1.0 03	175.7	2
3	65 57.2	1.0 04	174.9	66 57.2	1.0 04	174.8	68 27.1	1.0 04	174.6	69 27.0	1.0 04	174.4	70 26.9	1.0 04	174.3	71 26.8	1.0 04	174.1	72 26.7	1.0 04	173.9	73 56.6	1.0 04	173.6	3
4	65 55.1	1.0 05	173.2	66 55.0	1.0 05	173.0	68 24.8	1.0 05	172.8	69 24.7	1.0 05	172.6	70 24.6	1.0 05	172.4	71 24.4	1.0 05	172.2	72 24.2	1.0 05	171.9	73 53.9	1.0 06	171.5	4
05	65 52.4	1.0 06	171.5	66 52.2	1.0 06	171.3	68 21.9	1.0 06	171.0	69 21.7	1.0 06	170.8	70 21.5	1.0 06	170.5	71 21.3	1.0 06	170.2	72 21.0	1.0 07	169.9	73 50.5	99 07	169.4	05
6	65 49.0	1.0 07	169.8	66 48.8	1.0 07	169.6	68 18.4	1.0 07	169.2	69 18.1	99 07	168.9	70 17.8	99 07	168.6	71 17.4	99 08	168.3	72 17.0	99 08	167.9	73 46.4	99 08	167.3	6
7	65 45.1	99 08	168.1	66 44.8	99 08	167.8	68 14.2	99 08	167.4	69 13.8	99 08	167.1	70 13.4	99 08	166.8	71 12.9	99 09	166.4	72 12.4	99 09	165.9	73 41.5	99 09	165.2	7
8	65 40.6	99 09	166.4	66 40.2	99 09	166.1	68 09.5	99 09	165.6	69 09.0	99 09	165.3	70 08.4	99 09	164.9	71 07.8	99 10	164.5	72 07.1	99 10	164.0	73 35.9	99 10	163.2	8
9	65 35.5	99 09	164.8	66 34.9	99 10	164.4	68 04.1	99 10	163.9	69 03.4	99 10	163.5	70 02.7	99 10	163.0	71 01.9	99 11	162.6	72 01.1	98 11	162.0	73 29.6	98 12	161.1	9
10	65 29.8	99 10	163.1	66 29.1	99 11	162.7	67 58.1	99 11	162.1	68 57.3	99 11	161.7	69 56.4	98 12	161.2	70 55.5	98 12	160.7	71 54.4	98 12	160.1	73 22.6	98 13	159.1	10
1	65 23.5	99 11	161.4	66 22.8	99 12	161.0	67 51.5	98 12	160.4	68 50.5	98 12	159.9	69 49.5	98 13	159.4	70 48.4	98 13	158.8	71 47.1	98 13	158.2	73 15.0	97 14	157.1	1
2	65 16.7	99 12	159.8	66 15.8	98 12	159.4	67 44.3	98 13	158.7	68 43.2	98 13	158.2	69 42.0	98 14	157.6	70 40.7	98 14	157.0	71 39.2	97 14	156.3	73 06.6	97 15	155.1	2
3	65 09.4	98 13	158.2	66 08.3	98 13	157.7	67 36.6	98 14	157.0	68 35.3	98 14	156.4	69 33.9	98 14	155.8	70 32.3	97 15	155.1	71 30.6	97 15	154.4	72 57.7	96 16	153.2	3
4	65 01.5	98 14	156.5	66 00.3	98 14	156.1	67 28.3	98 15	155.3	68 26.8	97 15	154.7	69 25.2	97 15	154.0	70 23.4	97 16	153.3	71 21.5	97 16	152.6	72 48.1	96 17	151.3	4
15	64 53.0	98 15	154.9	65 51.7	98 15	154.4	67 19.4	97 16	153.6	68 17.7	97 16	153.0	69 15.9	97 16	152.3	70 13.9	97 17	151.6	71 11.7	96 17	150.7	72 38.0	96 18	149.4	15
6	64 44.1	98 16	153.3	65 42.5	97 16	152.8	67 10.0	97 17	151.9	68 08.1	97 17	151.3	69 06.1	96 17	150.6	70 03.9	96 18	149.8	71 01.4	96 18	148.9	72 27.2	95 19	147.5	6
7	64 34.6	97 17	151.8	65 32.9	97 17	151.2	67 00.1	97 17	150.3	67 58.0	96 18	149.6	68 55.7	96 18	148.9	69 53.3	96 19	148.0	70 50.5	95 19	147.2	72 15.9	94 20	145.7	7
8	64 24.7	97 17	150.2	65 22.8	97 18	149.6	66 49.7	96 18	148.6	67 47.4	96 19	147.9	68 44.9	96 19	147.2	69 42.1	95 19	146.3	70 39.1	95 20	145.4	72 04.1	94 21	143.8	8
9	64 14.2	97 18	148.6	65 12.2	96 18	148.0	66 38.7	96 19	147.0	67 36.2	96 19	146.3	68 33.5	95 20	145.5	69 30.5	95 20	144.6	70 27.2	94 21	143.7	71 51.7	93 21	142.1	9
20	64 03.3	96 19	147.1	65 01.1	96 19	146.5	66 27.3	96 20	145.4	67 24.6	95 20	144.7	68 21.6	95 21	143.8	69 18.4	94 21	142.9	70 14.8	94 21	142.0	71 38.9	93 22	140.3	20
1	63 52.0	96 20	145.6	64 49.5	96 20	144.9	66 15.5	95 21	143.9	67 12.5	95 21	143.1	68 09.3	94 21	142.2	69 05.8	94 22	141.3	70 02.0	93 22	140.3	71 25.5	92 23	138.6	1
2	63 40.1	96 20	144.1	64 37.5	95 21	143.4	66 03.1	95 21	142.3	66 59.9	94 22	141.5	67 56.5	94 22	140.6	68 52.7	93 22	139.7	69 48.6	93 23	138.6	71 11.7	92 24	136.9	2
3	63 27.9	95 21	142.6	64 25.0	95 21	141.9	65 50.4	95 22	140.8	66 46.9	94 22	139.9	67 43.2	94 23	139.0	68 39.2	93 23	138.1	69 34.9	92 24	137.0	70 57.5	91 24	135.3	3
4	63 15.2	95 22	141.1	64 12.2	95 22	140.4	65 37.2	94 23	139.2	66 33.5	94 23	138.4	67 29.6	93 23	137.5	68 25.3	93 24	136.5	69 20.6	92 24	135.4	70 42.8	91 25	133.6	4
25	63 02.1	95 22	139.7	63 58.9	94 23	138.9	65 23.6	94 23	137.7	66 19.7	93 24	136.9	67 15.5	93 24	135.9	68 11.0	92 25	134.9	69 06.0	91 25	133.8	70 27.8	90 26	132.0	25
6	62 48.6	94 23	138.2	63 45.2	94 23	137.5	65 09.6	93 24	136.3	66 05.5	93 24	135.4	67 01.0	92 25	134.4	67 56.3	92 25	133.4	68 51.1	91 26	132.3	70 12.4	90 26	130.5	6
7	62 34.8	94 24	136.8	63 31.1	94 24	136.0	64 55.2	93 25	134.8	65 50.9	93 25	133.9	66 46.2	92 25	132.9	67 41.2	91 26	131.9	68 35.7	90 26	130.8	69 56.6	89 27	128.9	7
8	62 20.5	94 24	135.4	63 16.7	93 25	134.6	64 40.5	93 25	133.3	65 35.9	92 26	132.4	66 31.0	92 26	131.5	67 25.7	91 26	130.4	68 20.0	90 27	129.3	69 40.4	89 27	127.4	8
9	62 05.9	94 25	134.0	63 01.9	93 25	133.2	64 25.4	92 26	131.9	65 20.6	92 26	131.0	66 15.5	91 26	130.0	67 09.9	90 27	129.0	68 03.9	90 27	127.8	69 24.0	88 28	125.9	9
30	61 51.0	93 25	132.6	62 46.8	93 26	131.8	64 09.9	92 26	130.5	65 04.9	91 27	129.6	65 59.6	91 27	128.6	66 53.8	90 27	127.5	67 47.6	89 28	126.4	69 07.2	88 28	124.5	30
1	61 35.7	93 26	131.2	62 31.3	92 26	130.4	63 54.2	92 27	129.1	64 49.0	91 27	128.2	65 43.4	90 28	127.2	66 37.4	90 28	126.1	67 30.9	89 28	124.9	68 50.1	87 29	123.0	1
2	61 20.1	93 26	129.9	62 15.5	92 27	129.1	63 38.1	91 27	127.8	64 32.7	91 28	126.8	65 26.9	90 28	125.8	66 20.6	89 28	124.7	67 13.9	88 29	123.5	68 32.8	87 29	121.6	2
3	61 04.2	92 27	128.5	61 59.5	92 27	127.7	63 21.7	91 28	126.4	64 16.1	90 28	125.4	65 10.1	90 28	124.4	66 03.6	89 29	123.3	66 56.7	88 29	122.2	68 15.2	86 30	120.2	3
4	60 48.0	92 27	127.2	61 43.1	91 28	126.4	63 05.0	91 28	125.1	63 59.2	90 29	124.1	64 53.0	89 29	123.1	65 46.4	88 29	122.0	66 39.2	88 30	120.8	67 57.3	86 30	118.9	4
35	60 31.6	92 28	125.9	61 26.4	91 28	125.1	62 48.1	90 29	123.7	63 42.1	90 29	122.8	64 35.7	89 29	121.7	65 28.8	88 30	120.6	66 21.4	87 30	119.5	67 39.2	86 30	117.5	35
6	60 14.8	91 28	124.6	61 09.5	91 29	123.8	62 30.9	90 29	122.4	63 24.7	89 29	121.5	64 18.1	89 30	120.4	65 11.0	88 30	119.3	66 03.4	87 30	118.2	67 20.9	85 31	116.2	6
7	59 57.8	91 29	123.4	60 52.3	91 29	122.5	62 13.5	90 29	121.2	63 07.1	89 30	120.2	64 00.3	88 30	119.1	64 53.0	87 30	118.0	65 45.2	87 31	116.9	67 02.4	85 31	114.9	7
8	59 40.5	91 29	122.1	60 34.9	90 29	121.3	61 55.8	89 30	119.9	62 49.3	89 30	118.9	63 42.3	88 30	117.9	64 34.8	87 31	116.8	65 26.8	86 31	115.6	66 43.7	85 31	113.7	8
9	59 23.0	91 30	120.9	60 17.2	90 30	120.0	61 37.9	89 30	118.6	62 31.2	88 30	117.7	63 24.0	88 31	116.6	64 16.4	87 31	115.5	65 08.2	86 31	114.3	66 24.8	84 32	112.4	9
40	59 05.3	90 30	119.6	59 59.4	90 30	118.8	61 19.8	89 31	117.4	62 12.9	88 31	116.4	63 05.6	87 31	115.4	63 57.8	87 31	114.3	64 49.4	86 32	113.1	66 05.8	84 32	111.2	40
1	58 47.4	90 30	118.4	59 41.3	90 30	117.6	61 01.5	89 31	116.2	61 54.4	88 31	115.2	62 47.0	87 31	114.2	63 39.0	86 32	113.1	64 30.5	85 32	111.9	65 46.6	84 32	110.0	1
2	58 29.2	90 31	117.2	59 23.0	89 31	116.4	60 43.0	88 31	115.0	61 35.8	88 31	114.0	62 28.1	87 32	113.0	63 20.0	86 32	111.9	64 11.4	85 32	110.7	65 27.2	83 32	108.8	2
3	58 10.9	90 31	116.0	59 04.5	89 31	115.2	60 24.3	88 31	113.8	61 17.0	87 32	112.8	62 09.2	87 32	111.8	63 00.9	86 32	110.7	63 52.1	85 32	109.5	65 07.7	83 33	107.6	3
4	57 52.3	89 31	114.9	58 45.8	89 31	114.0	60 05.4	88 32	112.6	60 58.0	87 32	111.6	61 50.0	86 32	110.6	62 41.6	86 32	109.5	63 32.7	85 33	108.3	64 48.1	83 33	106.5	4
45	57 33.6	89 31	113.7	58 27.0	89 32	112.8	59 46.4	88 32	111.5	60 38.8	87 32	110.5	61 30.8	86 32	109.4	62 22.2	85 33	108.3	63 13.1	84 33	107.2	64 28.4	83 33	105.3	45
6	57 14.8	89 32	112.5	58 08.0	88 32	111.7	59 27.2	88 32	110.3	60 19.5	87 32	109.3	61 11.3	86 33	108.3	62 02.7	85 33	107.2	62 53.5	84 33	106.1	64 08.5	83 33	104.2	6
7	56 55.7	89 32	111.4	57 48.9	88 32	110.5	59 07.9	87 32	109.2	60 00.1	87 33	108.2	60 51.8	86 33	107.2	61 43.0	85 33	106.1	62 33.7	84 33	104.9	63 48.6	82 33	103.1	7
8	56 36.5	89 32	110.3	57 29.6	88 32	109.4	58 48.5	87 33	108.1	59 40.5	86 33	107.1	60 32.1	86 33	106.1	61 23.2	85 33	105.0	62 13.8	84 33	103.8	63 28.5	82 34	102.0	8
9	56 17.2	89 32	109.2	57 10.2	88 33	108.3	58 28.9	87 33	106.9	59 20.8	86 33	106.0	60 12.4	85 33	105.0	61 03.4	85 33	103.9	61 53.8	84 33	102.8	63 08.4	82 34	100.9	9
50	55 57.8	88 33	108.1	56 50.6	88 33	107.2	58 09.2	87 33	105.8	59 01.1	86 33	104.9	59 52.5	85 33	103.9	60 43.4	84 33	102.8	61 33.8	84 34	101.7	62 48.2	82 34	99.9	50
1	55 38.2	88 33	107.0	56 31.0	88 33	106.1	57 49.4	87 33	104.8	58 41.2	86 33	103.8	59 32.5	85 33	102.8	60 23.3	84 34	101.7	61 13.7	83 34	100.6	62 28.0	82 34	98.8	1
2	55 18.5	88 33	105.9	56 11.2	87 33	105.0	57 29.5	87 33	103.7	58 21.2	86 33	102.7	59 12.5	85 34	101.7	60 03.2	84 34	100.7	60 53.4	83 34	99.6	62 07.7	82 34	97.8	2
3	54 58.7	88 33	104.8	55 51.3	87 33	104.0	57 09.5	86 33	102.6	58 01.2	86 34	101.7	58 52.3	85 34	100.7	59 43.0	84 34	99.6	60 33.2	83 34	98.5	61 47.3	82 34	96.8	3
4	54 38.9	88 33	103.8	55 31.4	87 33	102.9	56 49.5	86 34	101.6	57 41.0	86 34	100.6	58 32.1	85 34	99.6	59 22.8	84 34	98.6	60 12.9	83 34	97.5	61 26.9	82 34	95.8	4
55	54 18.9	88 33	102.7	55 11.3	87 34	101.9	56 29.3	86 34	100.5	57 20.8	85 34	99.6	58 11.9	85 34	98.6	59 02.4	84 34	97.6	59 52.5	83 34	96.5	61 06.5	81 34	94.8	55
6	53 58.8	88 34	101.7	54 51.2	87 34	100.8	56 09.1	86 34	99.5	57 00.6	85 34	98.6	57 51.6	85 34	97.6	58 42.1	84 34	96.6	59 32.1	83 34	95.5	60 46.0	81 34	93.8	6
7	53 38.7	88 34	100.6	54 31.0	87 34	99.8	55 48.8	86 34	98.5	56 40.2	85 34	97.6	57 31.2	85 34	96.6	58 21.7	84 34	95.6	59 11.6	83 34	94.5	60 25.6	81 34	92.8	7
8	53 18.5	87 34	99.6	54 10.8	87 34	98.8	55 28.5	86 34	97.5	56 19.9	85 34	96.6	57 10.8	84 34	95.6	58 01.2	84 34	94.6	58 51.2	83 34	93.5	60 05.1	81 34	91.8	8
9	52 58.2	87 34	98.6	53 50.5	87 34	97.8	55 08.2	86 34	96.5	55 59.5	85 34	95.6	56 50.3	84 34	94.6	57 40.8	84 34	93.6	58 30.7	83 34	92.6	59 44.5	81 34	90.9	9
60	52 37.9	87 34	97.6	53 30.1	87 34	96.8	54 47.7	86 34	95.5	55 39.0	85 34	94.6	56 29.9	84 34	93.6	57 20.3	84 34	92.6	58 10.2	83 34	91.6	59 24.0	81 34	89.9	60
1	52 17.5	87 34	96.6	53 09.7	87 34	95.8	54 27.3	86 34	94.5	55 18.6	85 34	93.6	56 09.4	84 34	92.7	56 59.8	84 34	91.7	57 49.7	83 34	90.6	59 03.5	81 34	89.0	1
2	51 57.1	87 34	95.6	52 49.3	87 34	94.8	54 06.8	86 34	93.5	54 58.1	85 34	92.6	55 48.9	84 34	91.7	56 39.2	84 34	90.7	57 29.1	83 34	89.7	58 43.0	81 34	88.1	2
3	51 36.7	87 34	94.6	52 28.8	87 34	93.8	53 46.3	86 34	92.6	54 37.6	85 34	91.7	55 28.4	84 34	90.8	56 18.7	84 34	89.8	57 08.6	83 34	88.8	58 22.5	81 34	87.2	3
4	51 16.2	87 34	93.7	52 08.3	87 34	92.9	53 25.8	86 34	91.6	54 17.0	85 34	90.7	55 07.8	84 34	89.8	55 58.2	84 34	88.9	56 48.1	83 34	87.8	58 02.0	81 34	86.3	4
65	50 55.7	87 34	92.7	51 47.8	87 34	91.9	53 05.3	86 34	90.7	53 56.5	85 34	89.8	54 47.3	84 34	88.9	55 37.7	84 34	87.9	56 27.6	83 34	86.9	57 41.5	81 34	85.4	65
6	50 35.2	87 34	91.8	51 27.3	87 34	91.0	52 44.8	86 34	89.7	53 36.0	85 34	88.9	54 26.8	84 34	88.0	55 17.2	84 34	87.0	56 07.1	83 34	86.0	57 21.1	82 34	84.5	6
7	50 14.7	87 34	90.8	51 06.8	87 34	90.0	52 24.3	86 34	88.8	53 15.5	85 34	87.9	54 06.3	84 34	87.0	54 56.7	84 34	86.1	55 46.7	83 34	85.1	57 00.7	82 34	83.6	7
8	49 54.2	87 34	89.9	50 46.3	87 34	89.1	52 03.8	86 34	87.9	52 55.0	85 34	87.0	53 45.8	84 34	86.1	54 36.2	84 34	85.2	55 26.2	83 34	84.2	56 40.3	82 34	82.7	8
9	49 33.7	87 34	88.9	50 25.8	87 34	88.2	51 43.3	86 34	86.9	52 34.5	85 34	86.1	53 25.4	84 34	85.2	54 15.8	84 34	84.3	55 05.8	83 34	83.3	56 20.0	82 34	81.8	9
70	49 13.2	87 34	88.0	50 05.3	87 34	87.2	51 22.8	86 34	86.0	52 14.0	85 34	85.2	53 04.9	84 34	84.3	53 55.4	84 34	83.4	54 45.5	83 34	82.5	55 59.7	82 34	81.0	70
1	48 52.7	87 34	87.1	49 44.8	87 34	86.3	51 02.3	86 34	85.1	51 53.6	85 34	84.3	52 44.5	85 34	83.4	53 35.0	84 34	82.5	54 25.1	83 34	81.6	55 39.4	82 34	80.1	1
2	48 32.2	87 34	86.2	49 24.3	87 34	85.4	50 41.9	86 34	84.2	51 33.2	85 34	83.4	52 24.2	85 34	82.5	53 14.7	84 34	81.7	54 04.9	83 34	80.7	55 19.2	82 34	79.3	2
3	48 11.7	87 34	85.3	49 03.9	87 34	84.5	50 21.5	86 34	83.3	51 12.8	85 34	82.5	52 03.8	85 34	81.7	52 54.4	84 34	80.8	53 44.6	83 34	79.9	54 59.1	82 33	78.4	3
4	47 51.3	87 34	84.3	48 43.4	87 34	83.6	50 01.1	86 34	82.4	50 52.5	85 34	81.6	51 43.5	85 34	80.8	52 34.2	84 34	79.9	53 24.5	83 34	79.0	54 39.0	82 33	77.6	4
75	47 30.9	87 34	83.4	48 23.1	87 34	82.7	49 40.8	86 34	81.6	50 32.2	85 34	80.8	51 23.3	85 34	79.9	52 14.0	84 34	79.1	53 04.4	84 33	78.2	54 19.0	82 33	76.7	75
6	47 10.5	87 34	82.6	48 02.7	87 34	81.8	49 20.5	86 34	80.7	50 12.0	86 34	79.9	51 03.1	85 34	79.1	51 53.9	84 33	78.2	52 44.3	84 33	77.3	53 59.1	83 33	75.9	6
7	46 50.2	87 34	81.7	47 42.4	87 34	80.9	49 00.3	86 34	79.8	49 51.8	86 34	79.0	50 43.0	85 33	78.2	51 33.9	84 33	77.4	52 24.3	84 33	76.5	53 39.2	83 33	75.1	7
8	46 29.9	87 34	80.8	47 22.2	87 34	80.1	48 40.1	86 34	78.9	49 31.7	86 33	78.2	50 23.0	85 33	77.4	51 13.9	85 33	76.5	52 04.4	84 33	75.6	53 19.4	83 33	74.3	8
9	46 09.7	87 34	79.9	47 02.0	87 34	79.2	48 20.0	86 33	78.1	49 11.7	86 33	77.3	50 03.0	85 33	76.5	50 53.9	85 33	75.7	51 44.6	84 33	74.8	52 59.7	83 33	73.5	9
80	45 49.5	88 34	79.0	46 41.9	87 33	78.3	48 00.0	86 33	77.2	48 51.7	86 33	76.5	49 43.1	85 33	75.7	50 34.1	85 33	74.8	51 24.8	84 33	74.0	52 40.1	83 33	72.7	80
1	45 29.4	88 33	78.2	46 21.8	87 33	77.5	47 40.0	87 33	76.4	48 31.8	86 33	75.6	49 23.2	85 33	74.8	50 14.3	85 33	74.0	51 05.1	84 33	73.2	52 20.5	83 32	71.9	1
2	45 09.3	88 33	77.3	46 01.8	87 33	76.6	47 20.1	87 33	75.5	48 11.9	86 33	74.8	49 03.4	86 33	74.0	49 54.6	85 33	73.2	50 45.5	84 32	72.4	52 01.1	83 32	71.1	2
3	44 49.4	88 33	76.4	45 41.9	87 33	75.7	47 00.3	87 33	74.7	47 52.2	86 33	73.9	48 43.8	86 33	73.2	49 35.0	85 33	72.4	50 26.0	85 32	71.5	51 41.7	84 32	70.3	3
4	44 29.4	88 33	75.6	45 22.1	87 33	74.9	46 40.5	87 33	73.8	47 32.5	86 33	73.1	48 24.2	86 33	72.3	49 15.5	85 32	71.6	50 06.6	85 32	70.7	51 22.5	84 32	69.5	4
85	44 09.6	88 33	74.7	45 02.3	88 33	74.0	46 20.9	87 33	73.0	47 12.9	87 32	72.3	48 04.7	86 32	71.5	48 56.1	85 32	70.7	49 47.2	85 32	69.9	51 03.3	84 32	68.7	85
6	43 49.8	88 33	73.9	44 42.6	88 33	73.2	46 01.3	87 32	72.2	46 53.4	87 32	71.4	47 45.2	86 32	70.7	48 36.8	86 32	69.9	49 28.0	85 32	69.1	50 44.2	84 32	67.9	6
7	43 30.2	88 33	73.0	44 23.0	88 33	72.4	45 41.8	87 32	71.3	46 34.0	87 32	70.6	47 25.9	86 32	69.9	48 17.6	86 32	69.1	49 08.9	85 32	68.3	50 25.3	84 31	67.1	7
8	43 10.6	88 32	72.2	44 03.5	88 32	71.5	45 22.4	87 32	70.5	46 14.7	87 32	69.8	47 06.7	86 32	69.1	47 58.4	86 32	68.3	48 49.9	85 32	67.6	50 06.4	85 31	66.3	8
9	42 51.1	88 32	71.3	43 44.1	88 32	70.7	45 03.1	88 32	69.7	45 55.5	87 32	69.0	46 47.6	87 32	68.3	47 39.4	86 32	67.5	48 31.0	86 31	66.8	49 47.7	85 31	65.6	9
90	42 31.7	89 32	70.5	43 24.8	88 32	69.9	44 43.9	88 32	68.9	45 36.4	87 32	68.2	46 28.6	87 32	67.5	47 20.5	86 31	66.7	48 12.2	86 31	66.0	49 29.1	85 31	64.8	90

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	42 12.4	89 32	69.7	43 05.5	88 32	69.0	44 24.8	88 32	68.0	45 17.4	87 31	67.4	46 09.7	87 31	66.7	47 01.7	87 31	65.9	47 53.5	86 31	65.2	49 10.5	85 31	64.0	91
2	41 53.2	89 32	68.8	42 46.4	88 32	68.2	44 05.8	88 31	67.2	44 58.5	88 31	66.6	45 50.9	87 31	65.9	46 43.0	87 31	65.2	47 34.9	86 31	64.4	48 52.2	86 31	63.3	2
3	41 34.2	89 32	68.0	42 27.4	89 31	67.4	43 47.0	88 31	66.4	44 39.7	88 31	65.8	45 32.2	87 31	65.1	46 24.5	87 31	64.4	47 16.5	86 31	63.6	48 33.9	86 30	62.5	3
4	41 15.2	89 31	67.2	42 08.5	89 31	66.6	43 28.2	88 31	65.6	44 21.1	88 31	65.0	45 13.7	87 31	64.3	46 06.0	87 31	63.6	46 58.1	87 30	62.9	48 15.8	86 30	61.7	4
95	40 56.3	89 31	66.4	41 49.8	89 31	65.8	43 09.6	88 31	64.8	44 02.5	88 31	64.2	44 55.2	88 30	63.5	45 47.7	87 30	62.8	46 39.9	87 30	62.1	47 57.7	86 30	61.0	95
6	40 37.6	89 31	65.5	41 31.1	89 31	64.9	42 51.1	89 31	64.0	43 44.1	88 30	63.4	44 36.9	88 30	62.7	45 29.5	87 30	62.0	46 21.9	87 30	61.3	47 39.9	86 30	60.2	6
7	40 19.0	89 31	64.7	41 12.5	89 31	64.1	42 32.7	89 30	63.2	43 25.8	88 30	62.6	44 18.8	88 30	61.9	45 11.5	88 30	61.3	46 03.9	87 30	60.6	47 22.1	87 29	59.5	7
8	40 00.5	90 31	63.9	40 54.2	89 30	63.3	42 14.4	89 30	62.4	43 07.7	89 30	61.8	44 00.7	88 30	61.1	44 53.6	88 30	60.5	45 46.1	87 29	59.8	47 04.5	87 29	58.7	8
9	39 42.1	90 30	63.1	40 35.9	90 30	62.5	41 56.3	89 30	61.6	42 49.7	89 30	61.0	43 42.8	88 30	60.4	44 35.8	88 29	59.7	45 28.5	88 29	59.0	46 47.0	87 29	58.0	9
100	39 23.9	90 30	62.3	40 17.8	90 30	61.7	41 38.3	89 30	60.8	42 31.8	89 30	60.2	43 25.1	89 29	59.6	44 18.1	88 29	58.9	45 10.9	88 29	58.3	46 29.7	87 29	57.2	100
1	39 05.8	90 30	61.5	39 59.8	90 30	60.9	41 20.5	89 30	60.0	42 14.1	89 29	59.4	43 07.4	89 29	58.8	44 00.6	88 29	58.2	44 53.6	88 29	57.5	46 12.5	87 28	56.5	1
2	38 47.8	90 30	60.7	39 41.9	90 30	60.1	41 02.8	90 29	59.2	41 56.5	89 29	58.7	42 50.0	89 29	58.0	43 43.2	89 29	57.4	44 36.3	88 28	56.8	45 55.5	88 28	55.7	2
3	38 30.0	90 29	59.9	39 24.2	90 29	59.3	40 45.2	90 29	58.5	41 39.0	89 29	57.9	42 32.6	89 29	57.3	43 26.0	89 28	56.6	44 19.2	88 28	56.0	45 38.6	88 28	55.0	3
4	38 12.3	91 29	59.1	39 06.6	90 29	58.5	40 27.8	90 29	57.7	41 21.7	90 29	57.1	42 15.4	89 28	56.5	43 09.0	89 28	55.9	44 02.3	89 28	55.3	45 21.9	88 28	54.3	4
105	37 54.8	91 29	58.3	38 49.2	91 29	57.7	40 10.5	90 29	56.9	41 04.6	90 28	56.3	41 58.4	90 28	55.7	42 52.0	89 28	55.1	43 45.5	89 28	54.5	45 05.3	88 27	53.5	105
6	37 37.4	91 29	57.5	38 31.9	91 29	56.9	39 53.4	90 28	56.1	40 47.6	90 28	55.5	41 41.5	90 28	55.0	42 35.3	89 28	54.4	43 28.9	89 27	53.8	44 48.9	89 27	52.8	6
7	37 20.2	91 28	56.7	38 14.8	91 28	56.1	39 36.5	91 28	55.3	40 30.7	90 28	54.8	41 24.8	90 28	54.2	42 18.7	90 27	53.6	43 12.4	89 27	53.0	44 32.6	89 27	52.1	7
8	37 03.1	91 28	55.9	37 57.8	91 28	55.4	39 19.7	91 28	54.6	40 14.0	90 28	54.0	41 08.2	90 27	53.4	42 02.3	90 27	52.9	42 56.1	90 27	52.3	44 16.5	89 27	51.3	8
9	36 46.2	91 28	55.1	37 41.0	91 28	54.6	39 03.0	91 27	53.8	39 57.5	91 27	53.2	40 51.8	90 27	52.7	41 46.0	90 27	52.1	42 40.0	90 27	51.5	44 00.6	89 26	50.6	9
110	36 29.5	92 28	54.3	37 24.4	91 27	53.8	38 46.6	91 27	53.0	39 41.1	91 27	52.5	40 35.6	91 27	51.9	41 29.9	90 27	51.4	42 24.0	90 26	50.8	43 44.8	90 26	49.9	110
1	36 12.9	92 27	53.5	37 07.9	92 27	53.0	38 30.2	91 27	52.2	39 25.0	91 27	51.7	40 19.5	91 26	51.2	41 13.9	91 26	50.6	42 08.2	90 26	50.0	43 29.2	90 26	49.1	1
2	35 56.5	92 27	52.7	36 51.6	92 27	52.2	38 14.1	91 27	51.5	39 08.9	91 26	50.9	40 03.6	91 26	50.4	40 58.1	91 26	49.9	41 52.5	90 26	49.3	43 13.8	90 25	48.4	2
3	35 40.2	92 27	51.9	36 35.5	92 27	51.4	37 58.1	92 26	50.7	38 53.1	91 26	50.2	39 47.9	91 26	49.6	40 42.5	91 26	49.1	41 37.0	91 26	48.6	42 58.5	90 25	47.7	3
4	35 24.2	92 26	51.1	36 19.5	92 26	50.7	37 42.4	92 26	49.9	38 37.4	92 26	49.4	39 32.3	91 26	48.9	40 27.1	91 25	48.4	41 21.8	91 25	47.8	42 43.4	91 25	47.0	4
115	35 08.3	93 26	50.3	36 03.8	92 26	49.9	37 26.7	92 26	49.1	38 21.9	92 26	48.7	39 17.0	92 25	48.1	40 11.9	91 25	47.6	41 06.6	91 25	47.1	42 28.5	91 25	46.2	115
6	34 52.6	93 26	49.6	35 48.2	93 26	49.1	37 11.3	92 25	48.4	38 06.6	92 25	47.9	39 01.8	92 25	47.4	39 56.8	92 25	46.9	40 51.7	91 25	46.3	42 13.8	91 24	45.5	6
7	34 37.1	93 26	48.8	35 32.7	93 25	48.3	36 56.1	92 25	47.6	37 51.5	92 25	47.1	38 46.8	92 25	46.6	39 41.9	92 24	46.1	40 36.9	92 24	45.6	41 59.2	91 24	44.8	7
8	34 21.7	93 25	48.0	35 17.5	93 25	47.5	36 41.0	93 25	46.8	37 36.5	92 25	46.4	38 31.9	92 24	45.9	39 27.2	92 24	45.4	40 22.4	92 24	44.9	41 44.8	91 24	44.1	8
9	34 06.6	93 25	47.2	35 02.5	93 25	46.8	36 26.1	93 24	46.1	37 21.8	93 24	45.6	38 17.3	92 24	45.1	39 12.7	92 24	44.6	40 08.0	92 24	44.1	41 30.7	92 23	43.4	9
120	33 51.6	93 25	46.4	34 47.6	93 24	46.0	36 11.4	93 24	45.3	37 07.2	93 24	44.9	38 02.8	93 24	44.4	38 58.4	92 24	43.9	39 53.8	92 23	43.4	41 16.7	92 23	42.6	120
1	33 36.8	94 24	45.6	34 32.9	93 24	45.2	35 56.9	93 24	44.6	36 52.8	93 24	44.1	37 48.6	93 23	43.6	38 44.2	93 23	43.2	39 39.8	92 23	42.7	41 02.9	92 23	41.9	1
2	33 22.3	94 24	44.9	34 18.5	94 24	44.4	35 42.6	93 23	43.8	36 38.6	93 23	43.3	37 34.5	93 23	42.9	38 30.3	93 23	42.4	39 26.0	93 23	41.9	40 49.2	92 22	41.2	2
3	33 07.9	94 24	44.1	34 04.2	94 23	43.7	35 28.5	94 23	43.0	36 24.6	93 23	42.6	37 20.7	93 23	42.1	38 16.6	93 23	41.7	39 12.4	93 22	41.2	40 35.8	93 22	40.5	3
4	32 53.7	94 23	43.3	33 50.1	94 23	42.9	35 14.6	94 23	42.3	36 10.9	94 23	41.8	37 07.0	93 22	41.4	38 03.0	93 22	40.9	38 58.9	93 22	40.5	40 22.6	93 22	39.8	4
125	32 39.7	94 23	42.5	33 36.3	94 23	42.1	35 00.9	94 22	41.5	35 57.3	94 22	41.1	36 53.5	94 22	40.7	37 49.7	93 22	40.2	38 45.7	93 22	39.8	40 09.6	93 21	39.1	125
6	32 26.0	94 23	41.7	33 22.6	94 22	41.4	34 47.4	94 22	40.8	35 43.9	94 22	40.3	36 40.2	94 22	39.9	37 36.5	94 22	39.5	38 32.7	94 21	39.0	39 56.7	93 21	38.3	6
7	32 12.4	95 22	41.0	33 09.2	95 22	40.6	34 34.1	94 22	40.0	35 30.7	94 22	39.6	36 27.2	94 21	39.2	37 23.6	94 21	38.7	38 19.9	94 21	38.3	39 44.1	93 21	37.6	7
8	31 59.1	95 22	40.2	32 55.9	95 22	39.8	34 21.1	95 21	39.2	35 17.7	94 21	38.8	36 14.3	94 21	38.4	37 10.8	94 21	38.0	38 07.3	94 21	37.6	39 31.7	94 20	36.9	8
9	31 45.9	95 22	39.4	32 42.9	95 21	39.0	34 08.2	95 21	38.5	35 05.0	95 21	38.1	36 01.7	94 21	37.7	36 58.3	94 21	37.3	37 54.8	94 20	36.8	39 19.5	94 20	36.2	9
130	31 33.0	95 21	38.6	32 30.1	95 21	38.3	33 55.5	95 21	37.7	34 52.4	95 21	37.3	35 49.2	95 20	36.9	36 46.0	95 20	36.5	37 42.6	94 20	36.1	39 07.5	94 20	35.5	130
1	31 20.3	95 21	37.9	32 17.5	95 21	37.5	33 43.1	95 20	37.0	34 40.1	95 20	36.6	35 37.0	95 20	36.2	36 33.9	95 20	35.8	37 30.6	95 20	35.4	38 55.7	94 19	34.8	1
2	31 07.8	95 20	37.1	32 05.1	95 20	36.7	33 30.9	95 20	36.2	34 28.0	95 20	35.8	35 25.0	95 20	35.5	36 22.0	95 19	35.1	37 18.9	95 19	34.7	38 44.1	95 19	34.1	2
3	30 55.5	96 20	36.3	31 52.9	96 20	36.0	33 18.8	95 20	35.4	34 16.1	95 19	35.1	35 13.2	95 19	34.7	36 10.3	95 19	34.3	37 07.3	95 19	33.9	38 32.7	95 19	33.3	3
4	30 43.5	96 20	35.5	31 41.0	96 20	35.2	33 07.1	96 19	34.7	34 04.4	95 19	34.3	35 01.6	95 19	34.0	35 58.8	95 19	33.6	36 56.0	95 19	33.2	38 21.5	95 18	32.6	4
135	30 31.7	96 19	34.8	31 29.2	96 19	34.4	32 55.5	96 19	33.9	33 52.9	96 19	33.6	34 50.3	96 19	33.2	35 47.6	95 18	32.9	36 44.8	95 18	32.5	38 10.5	95 18	31.9	135
6	30 20.1	96 19	34.0	31 17.7	96 19	33.7	32 44.1	96 19	33.2	33 41.7	96 18	32.8	34 39.1	96 18	32.5	35 36.6	96 18	32.1	36 33.9	96 18	31.8	37 59.8	95 18	31.2	6
7	30 08.7	96 19	33.2	31 06.5	96 18	32.9	32 33.0	96 18	32.4	33 30.7	96 18	32.1	34 28.2	96 18	31.7	35 25.8	96 18	31.4	36 23.2	96 17	31.0	37 49.3	96 17	30.5	7
8	29 57.6	96 18	32.4	30 55.5	96 18	32.1	32 22.1	96 18	31.7	33 19.9	96 18	31.3	34 17.5	96 17	31.0	35 15.2	96 17	30.7	36 12.7	96 17	30.3	37 39.0	96 17	29.8	8
9	29 46.7	97 18	31.7	30 44.7	97 18	31.4	32 11.5	96 17	30.9	33 09.3	96 17	30.6	34 07.1	96 17	30.3	35 04.8	96 17	29.9	36 02.5	96 17	29.6	37 28.9	96 16	29.1	9
140	29 36.1	97 17	30.9	30 34.1	97 17	30.6	32 01.1	97 17	30.2	32 59.0	97 17	29.8	33 56.9	96 17	29.5	34 54.7	96 16	29.2	35 52.5	96 16	28.9	37 19.0	96 16	28.4	140
1	29 25.6	97 17	30.1	30 23.8	97 17	29.8	31 50.9	97 17	29.4	32 48.9	97 16	29.1	33 46.9	97 16	28.8	34 44.8	96 16	28.5	35 42.7	96 16	28.2	37 09.4	96 16	27.7	1
2	29 15.7	97 17	29.4	30 13.7	97 16	29.1	31 40.9	97 16	28.6	32 39.0	97 16	28.4	33 37.1	97 16	28.1	34 35.1	97 16	27.7	35 33.1	97 16	27.4	37 00.0	96 15	26.9	2
3	29 05.5	97 16	28.6	30 03.8	97 16	28.3	31 31.2	97 16	27.9	32 29.4	97 16	27.6	33 27.6	97 16	27.3	34 25.7	97 15	27.0	35 23.8	97 15	26.7	36 50.8	97 15	26.2	3
4	28 55.8	97 16	27.8	29 54.2	97 16	27.5	31 21.7	97 15	27.1	32 20.0	97 15	26.9	33 18.3	97 15	26.6	34 16.5	97 15	26.3	35 14.7	97 15	26.0	36 41.8	97 15	25.5	4
145	28 46.4	97 15	27.0	29 44.8	97 15	26.8	31 12.5	97 15	26.4	32 10.9	97 15	26.1	33 09.2	97 15	25.8	34 07.5	97 15	25.6	35 05.8	97 14	25.3	36 33.1	97 14	24.8	145
6	28 37.2	98 15	26.3	29 35.7	98 15	26.0	31 03.5	97 15	25.6	32 01.9	97 14	25.4	33 00.4	97 14	25.1	33 58.9	97 14	24.8	34 57.1	97 14	24.5	36 24.6	97 14	24.1	6
7	28 28.2	98 15	25.5	29 26.8	98 14	25.2	30 54.7	98 14	24.9	31 53.3	98 14	24.6	32 51.8	98 14	24.4	33 50.3	97 14	24.1	34 48.7	97 14	23.8	36 16.3	97 13	23.4	7
8	28 19.5	98 14	24.7	29 18.2	98 14	24.5	30 46.2	98 14	24.1	31 44.8	98 14	23.9	32 43.5	98 13	23.6	33 42.0	98 13	23.4	34 40.6	98 13	23.1	36 08.3	97 13	22.7	8
9	28 11.0	98 14	23.9	29 09.8	98 14	23.7	30 37.9	98 13	23.4	31 36.7	98 13	23.1	32 35.4	98 13	22.9	33 34.0	98 13	22.6	34 32.6	98 13	22.4	36 00.5	97 13	22.0	9
150	28 02.8	98 13	23.2	29 01.7	98 13	23.0	30 29.9	98 13	22.6	31 28.7	98 13	22.4	32 27.5	98 13	22.1	33 26.2	98 13	21.9	34 24.9	98 12	21.7	35 53.0	98 12	21.3	150
1	27 54.9	98 13	22.4	28 53.8	98 13	22.2	30 22.2	98 13	21.9	31 21.0	98 12	21.6	32 19.9	98 12	21.4	33 18.7	98 12	21.2	34 17.5	98 12	20.9	35 45.6	98 12	20.6	1
2	27 47.2	98 12	21.6	28 46.2	98 12	21.4	30 14.7	98 12	21.1	31 13.6	98 12	20.9	32 12.5	98 12	20.7	33 11.4	98 12	20.4	34 10.3	98 12	20.2	35 38.5	98 11	19.8	2
3	27 39.8	98 12	20.9	28 38.8	98 12	20.7	30 07.4	98 12	20.4	31 06.4	98 12	20.1	32 05.4	98 11	19.9	33 04.4	98 11	19.7	34 03.3	98 11	19.5	35 31.7	98 11	19.1	3
4	27 32.6	99 12	20.1	28 31.7	99 11	19.9	30 00.4	98 12	19.6	30 59.5	98 11	19.4	31 58.5	98 11	19.2	32 57.6	98 11	19.0	33 56.6	98 11	18.8	35 25.1	98 11	18.4	4
155	27 25.7	99 11	19.3	28 24.9	99 11	19.1	29 53.6	99 11	18.8	30 52.8	99 11	18.7	31 51.9	99 11	18.5	32 51.0	99 10	18.3	33 50.1	98 10	18.0	35 18.7	98 10	17.7	155
6	27 19.0	99 11	18.5	28 18.3	99 11	18.4	29 47.1	99 10	18.1	30 46.3	99 10	17.9	31 45.5	99 10	17.7	32 44.7	99 10	17.5	33 43.9	99 10	17.3	35 12.6	99 10	17.0	6
7	27 12.6	99 10	17.8	28 11.9	99 10	17.6	29 40.9	99 10	17.3	30 40.2	99 10	17.2	31 39.4	99 10	17.0	32 38.7	99 10	16.8	33 37.9	99 10	16.6	35 06.7	99 09	16.3	7
8	27 06.5	99 10	17.0	28 05.9	99 10	16.8	29 34.9	99 10	16.6	30 34.2	99 09	16.4	31 33.6	99 09	16.2	32 32.9	99 09	16.1	33 32.2	99 09	15.9	35 01.1	99 09	15.6	8
9	27 00.6	99 09	16.2	28 00.0	99 09	16.1	29 29.2	99 09	15.8	30 28.6	99 09	15.7	31 27.9	99 09	15.5	32 27.3	99 09	15.3	33 26.7	99 09	15.2	34 55.7	99 09	14.9	9
160	26 55.0	99 09	15.5	27 54.5	99 09	15.3	29 23.7	99 09	15.1	30 23.1	99 09	14.9	31 22.6	99 08	14.8	32 22.0	99 08	14.6	33 21.4	99 08	14.4	34 50.5	99 08	14.2	160
1	26 49.7	99 08	14.7	27 49.2	99 08	14.5	29 18.5	99 08	14.3	30 18.0	99 08	14.2	31 17.5	99 08	14.0	32 17.0	99 08	13.9	33 16.4	99 08	13.7	34 45.6	99 08	13.5	1
2	26 44.6	99 08	13.9	27 44.2	99 08	13.8	29 13.5	99 08	13.6	30 13.1	99 08	13.4	31 12.6	99 08	13.3	32 12.2	99 08	13.1	33 11.7	99 07	13.0	34 41.0	99 07	12.8	2
3	26 39.8	99 08	13.1	27 39.4	99 07	13.0	29 08.9	99 07	12.8	30 08.5	99 07	12.7	31 08.1	99 07	12.5	32 07.6	99 07	12.4	33 07.2	99 07	12.3	34 36.6	99 07	12.1	3
4	26 35.3	99 07	12.4	27 35.0	99 07	12.2	29 04.4	99 07	12.1	30 04.1	99 07	11.9	31 03.7	99 07	11.8	32 03.4	99 07	11.7	33 03.0	99 07	11.5	34 32.4	99 07	11.3	4
165	26 31.0	1.0 07	11.6	27 30.7	1.0 07	11.5	29 00.3	99 06	11.3	30 00.0	99 06	11.2	30 59.7	99 06	11.1	31 59.3	99 06	11.0	32 59.0	99 06	10.8	34 28.5	99 06	10.6	165
6	26 27.0	1.0 06	10.8	27 26.8	1.0 06	10.7	28 56.4	1.0 06	10.6	29 56.1	1.0 06	10.4	30 55.8	1.0 06	10.3	31 55.6	1.0 06	10.2	32 55.3	1.0 06	10.1	34 24.8	99 06	09.9	6
7	26 23.3	1.0 06	10.0	27 23.1	1.0 06	09.9	28 52.8	1.0 06	09.8	29 52.5	1.0 06	09.7	30 52.3	1.0 05	09.6	31 52.0	1.0 05	09.5	32 51.8	1.0 05	09.4	34 21.4	1.0 05	09.2	7
8	26 19.9	1.0 05	09.3	27 19.7	1.0 05	09.2	28 49.4	1.0 05	09.0	29 49.2	1.0 05	09.0	30 49.0	1.0 05	08.9	31 48.8	1.0 05	08.8	32 48.6	1.0 05	08.7	34 18.2	1.0 05	08.5	8
9	26 16.7	1.0 05	08.5	27 16.6	1.0 05	08.4	28 46.3	1.0 05	08.3	29 46.1	1.0 05	08.2	30 46.0	1.0 05	08.1	31 45.8	1.0 05	08.0	32 45.6	1.0 04	07.9	34 15.3	1.0 04	07.8	9
170	26 13.8	1.0 04	07.7	27 13.7	1.0 04	07.7	28 43.5	1.0 04	07.5	29 43.3	1.0 04	07.5	30 43.2	1.0 04	07.4	31 43.1	1.0 04	07.3	32 42.9	1.0 04	07.2	34 12.7	1.0 04	07.1	170
1	26 11.2	1.0 04	07.0	27 11.1	1.0 04	06.9	28 40.9	1.0 04	06.8	29 40.8	1.0 04	06.7	30 40.7	1.0 04	06.6	31 40.6	1.0 04	06.6	32 40.5	1.0 04	06.5	34 10.3	1.0 04	06.4	1
2	26 08.8	1.0 03	06.2	27 08.8	1.0 03	06.1	28 38.6	1.0 03	06.0	29 38.5	1.0 03	06.0	30 38.5	1.0 03	05.9	31 38.4	1.0 03	05.8	32 38.3	1.0 03	05.8	34 08.1	1.0 03	05.7	2
3	26 06.8	1.0 03	05.4	27 06.7	1.0 03	05.4	28 36.6	1.0 03	05.3	29 36.5	1.0 03	05.2	30 36.5	1.0 03	05.2	31 36.4	1.0 03	05.1	32 36.3	1.0 03	05.1	34 06.2	1.0 03	05.0	3
4	26 05.0	1.0 03	04.6	27 04.9	1.0 03	04.6	28 34.9	1.0 03	04.5	29 34.8	1.0 03	04.5	30 34.8	1.0 02	04.4	31 34.7	1.0 02	04.4	32 34.7	1.0 02	04.3	34 04.6	1.0 03	04.3	4
175	26 03.5	1.0 02	03.9	27 03.4	1.0 02	03.8	28 33.4	1.0 02	03.8	29 33.3	1.0 02	03.7	30 33.3	1.0 02	03.7	31 33.3	1.0 02	03.7	32 33.2	1.0 02	03.6	34 03.2	1.0 02	03.5	175
6	26 02.2	1.0 02	03.1	27 02.2	1.0 02	03.1	28 32.2	1.0 02	03.0	29 32.1	1.0 02	03.0	30 32.1	1.0 02	03.0	31 32.1	1.0 02	02.9	32 32.1	1.0 02	02.9	34 02.0	1.0 01	02.8	6
7	26 01.2	1.0 01	02.3	27 01.2	1.0 01	02.3	28 31.2	1.0 01	02.3	29 31.2	1.0 01	02.2	30 31.2	1.0 01	02.2	31 31.2	1.0 01	02.2	32 31.2	1.0 01	02.2	34 01.1	1.0 01	02.1	7
8	26 00.6	1.0 01	01.5	27 00.5	1.0 01	01.5	28 30.5	1.0 01	01.5	29 30.5	1.0 01	01.5	30 30.5	1.0 01	01.5	31 30.5	1.0 01	01.5	32 30.5	1.0 01	01.5	34 00.5	1.0 01	01.4	8
9	26 00.1	1.0 00	00.8	27 00.1	1.0 00	00.8	28 30.1	1.0 00	00.8	29 30.1	1.0 00	00.7	30 30.1	1.0 00	00.7	31 30.1	1.0 00	00.7	32 30.1	1.0 00	00.7	34 00.1	1.0 00	00.7	9
180	26 00.0	1.0 00	00.0	27 00.0	1.0 00	00.0	28 30.0	1.0 00	00.0	29 30.0	1.0 00	00.0	30 30.0	1.0 00	00.0	31 30.0	1.0 00	00.0	32 30.0	1.0 00	00.0	34 00.0	1.0 00	00.0	180

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat 75°

La 76

L 7

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	74 30.0	1.0 01	180.0	75 00.0	1.0 01	180.0	76 00.0	1.0 01	180.0	76 30.0	1.0 01	180.0
1	74 29.6	1.0 02	177.8	74 59.6	1.0 02	177.8	75 59.6	1.0 02	177.7	76 29.6	1.0 02	177.6
2	74 28.4	1.0 03	175.7	74 58.4	1.0 03	175.6	75 58.3	1.0 03	175.4	76 28.3	1.0 03	175.3
3	74 26.5	1.0 04	173.5	74 56.4	1.0 05	173.4	75 56.3	1.0 05	173.1	76 26.2	1.0 05	172.9
4	74 23.8	1.0 06	171.3	74 53.7	1.0 06	171.2	75 53.4	1.0 06	170.8	76 23.3	99 06	170.6
05	74 20.3	99 07	169.2	74 50.1	99 07	169.0	75 49.7	99 07	168.5	76 19.5	99 08	168.3
6	74 16.1	99 08	167.1	74 45.8	99 08	166.8	75 45.2	99 09	166.3	76 14.9	99 09	166.0
7	74 11.1	99 09	164.9	74 40.8	99 10	164.7	75 40.0	99 10	164.0	76 09.5	98 10	163.7
8	74 05.4	98 11	162.9	74 35.0	98 11	162.5	75 33.9	98 11	161.8	76 03.4	98 12	161.4
9	73 59.0	98 12	160.8	74 28.5	98 12	160.4	75 27.2	98 12	159.6	75 56.5	98 13	159.2
10	73 51.9	98 13	158.7	74 21.2	98 13	158.3	75 19.7	97 14	157.5	75 48.8	97 14	157.0
1	73 44.2	97 14	156.7	74 13.3	97 14	156.3	75 11.4	97 15	155.3	75 40.4	96 15	154.8
2	73 35.7	97 15	154.7	74 04.7	97 15	154.2	75 02.5	96 16	153.2	75 31.3	96 16	152.7
3	73 26.6	96 16	152.7	73 55.5	96 16	152.2	74 53.0	96 17	151.2	75 21.6	95 17	150.6
4	73 16.9	96 17	150.8	73 45.6	96 17	150.3	74 42.7	95 18	149.1	75 11.2	95 18	148.5
15	73 06.6	95 18	148.8	73 35.1	95 18	148.3	74 31.9	94 19	147.1	75 00.2	94 19	146.5
6	72 55.7	95 19	147.0	73 24.0	94 19	146.4	74 20.5	94 20	145.2	74 48.5	93 20	144.5
7	72 44.2	94 20	145.1	73 12.4	94 20	144.5	74 08.5	93 21	143.3	74 36.3	93 21	142.6
8	72 32.2	94 21	143.3	73 00.2	93 21	142.7	73 55.9	92 22	141.4	74 23.6	92 22	140.7
9	72 19.7	93 22	141.5	72 47.5	93 22	140.9	73 42.9	92 23	139.5	74 10.3	91 22	138.8
20	72 06.7	92 22	139.7	72 34.3	92 23	139.1	73 29.3	91 23	137.7	73 56.6	91 24	137.0
1	71 53.1	92 23	138.0	72 20.7	91 24	137.3	73 15.3	90 24	135.9	73 42.3	90 24	135.2
2	71 39.2	91 24	136.3	72 06.5	91 24	135.6	73 00.8	90 25	134.2	73 27.6	89 25	133.4
3	71 24.8	91 26	134.6	71 52.0	90 25	133.9	72 45.8	89 26	132.5	73 12.5	89 26	131.7
4	71 10.0	90 25	133.0	71 37.0	90 26	132.3	72 30.5	89 26	130.8	72 57.0	88 26	130.0
25	70 54.8	90 26	131.4	71 21.6	89 26	130.7	72 14.8	88 27	129.2	72 41.1	87 27	128.4
6	70 39.2	89 27	129.8	71 05.9	89 27	129.1	71 58.7	87 27	127.6	72 24.8	87 28	126.8
7	70 23.2	89 27	128.2	70 49.8	88 27	127.5	71 42.3	87 28	126.0	72 08.2	86 28	125.2
8	70 07.0	88 28	126.7	70 33.3	88 28	126.0	71 25.5	86 28	124.5	71 51.3	86 29	123.7
9	69 50.3	88 28	125.2	70 16.6	87 28	124.5	71 08.4	86 29	123.0	71 34.1	85 29	122.2
30	69 33.4	87 29	123.8	69 59.5	87 29	123.1	70 51.1	85 29	121.5	71 16.6	85 30	120.7
1	69 16.2	87 29	122.3	69 42.2	86 29	121.6	70 33.5	85 30	120.1	70 58.8	84 30	119.3
2	68 58.8	86 30	120.9	69 24.6	86 30	120.2	70 15.6	84 30	118.7	70 40.8	84 30	117.9
3	68 41.0	86 30	119.5	69 06.7	85 30	118.8	69 57.5	84 31	117.3	70 22.5	83 31	116.5
4	68 23.1	85 30	118.2	68 48.6	85 31	117.5	69 39.1	84 31	115.9	70 04.1	83 31	115.1
35	68 04.9	85 31	116.8	68 30.3	84 31	116.1	69 20.6	83 31	114.6	69 45.4	82 31	113.8
6	67 46.4	85 31	115.5	68 11.8	84 31	114.8	69 01.8	83 32	113.3	69 26.5	82 32	112.5
7	67 27.8	84 31	114.2	67 53.0	84 32	113.5	68 42.9	82 32	112.0	69 07.5	82 32	111.2
8	67 09.0	84 32	113.0	67 34.1	83 32	112.3	68 23.8	82 32	110.8	68 48.3	81 32	110.0
9	66 50.0	84 32	111.7	67 15.1	83 32	111.0	68 04.5	82 32	109.5	68 28.9	81 32	108.7
40	66 30.9	83 32	110.5	66 55.8	83 32	109.8	67 45.1	81 33	108.3	68 09.4	81 33	107.5
1	66 11.6	83 32	109.3	66 36.4	82 33	108.6	67 25.5	81 33	107.1	67 49.8	80 33	106.3
2	65 52.2	83 33	108.1	66 16.9	82 33	107.4	67 05.9	81 33	106.0	67 30.0	80 33	105.2
3	65 32.6	83 33	106.9	65 57.3	82 33	106.3	66 46.1	81 33	104.8	67 10.2	80 33	104.0
4	65 12.9	82 33	105.8	65 37.5	82 33	105.1	66 26.2	80 33	103.7	66 50.2	80 33	102.9
45	64 53.1	82 33	104.7	65 17.7	82 33	104.0	66 06.2	80 33	102.5	66 30.2	80 34	101.8
6	64 33.2	82 33	103.5	64 57.7	81 33	102.9	65 46.1	80 34	101.4	66 10.0	79 34	100.7
7	64 13.2	82 33	102.4	64 37.7	81 34	101.8	65 26.0	80 34	100.4	65 49.8	79 34	99.6
8	63 53.1	82 34	101.4	64 17.5	81 34	100.7	65 05.8	80 34	99.3	65 29.6	79 34	98.6
9	63 33.0	81 34	100.3	63 57.3	81 34	99.6	64 45.5	80 34	98.2	65 09.3	79 34	97.5
50	63 12.7	81 34	99.2	63 37.1	81 34	98.6	64 25.2	79 34	97.2	64 48.9	79 34	96.5
1	62 52.5	81 34	98.2	63 16.8	81 34	97.5	64 04.8	79 34	96.2	64 28.5	79 34	95.5
2	62 32.1	81 34	97.2	62 56.4	81 34	96.5	63 44.4	79 34	95.2	64 08.0	79 34	94.5
3	62 11.7	81 34	96.1	62 36.0	80 34	95.5	63 23.9	79 34	94.2	63 47.6	79 34	93.5
4	61 51.3	81 34	95.1	62 15.5	80 34	94.5	63 03.4	79 34	93.2	63 27.1	79 34	92.5
55	61 30.9	81 34	94.2	61 55.1	80 34	93.5	62 42.9	79 34	92.2	63 06.6	79 34	91.6
6	61 10.4	81 34	93.2	61 34.6	80 34	92.6	62 22.4	79 34	91.3	62 46.1	78 34	90.6
7	60 49.9	81 34	92.2	61 14.1	80 34	91.6	62 01.9	79 34	90.3	62 25.5	78 34	89.7
8	60 29.4	81 34	91.2	60 53.5	80 34	90.6	61 41.4	79 34	89.4	62 05.0	78 34	88.7
9	60 08.9	81 34	90.3	60 33.0	80 34	89.7	61 20.9	79 34	88.5	61 44.5	78 34	87.8
60	59 48.3	81 34	89.4	60 12.5	80 34	88.8	61 00.3	79 34	87.5	61 24.0	79 34	86.9
1	59 27.8	81 34	88.4	59 52.0	80 34	87.8	60 39.8	79 34	86.6	61 03.5	79 34	86.0
2	59 07.3	81 34	87.5	59 31.5	80 34	86.9	60 19.4	79 34	85.7	60 43.1	79 34	85.1
3	58 46.8	81 34	86.6	59 11.0	80 34	86.0	59 58.9	79 34	84.8	60 22.6	79 34	84.2
4	58 26.3	81 34	85.7	58 50.6	80 34	85.1	59 38.5	79 34	84.0	60 02.2	79 34	83.3
65	58 05.9	81 34	84.8	58 30.1	80 34	84.2	59 18.1	79 34	83.1	59 41.9	79 34	82.5
6	57 45.5	81 34	83.9	58 09.7	81 34	83.4	58 57.8	80 34	82.2	59 21.5	79 34	81.6
7	57 25.1	81 34	83.0	57 49.4	81 34	82.5	58 37.4	80 34	81.4	59 01.3	79 34	80.8
8	57 04.7	81 34	82.2	57 29.0	81 34	81.6	58 17.2	80 34	80.5	58 41.0	79 34	79.9
9	56 44.4	81 34	81.3	57 08.7	81 34	80.8	57 57.0	80 34	79.7	58 20.9	79 34	79.1
70	56 24.2	81 34	80.4	56 48.5	81 34	79.9	57 36.8	80 34	78.8	58 00.7	79 33	78.3
1	56 04.0	82 34	79.6	56 28.3	81 34	79.1	57 16.7	80 33	78.0	57 40.7	80 33	77.4
2	55 43.8	82 34	78.8	56 08.2	81 33	78.2	56 56.7	80 33	77.2	57 20.7	80 33	76.6
3	55 23.7	82 33	77.9	55 48.2	81 33	77.4	56 36.7	80 33	76.3	57 00.7	80 33	75.8
4	55 03.7	82 33	77.1	55 28.2	81 33	76.6	56 16.8	81 33	75.5	56 40.9	80 33	75.0
75	54 43.7	82 33	76.3	55 08.2	82 33	75.8	55 57.0	81 33	74.7	56 21.1	80 33	74.2
6	54 23.8	82 33	75.4	54 48.4	82 33	74.9	55 37.2	81 33	73.9	56 01.4	80 33	73.4
7	54 04.0	82 33	74.6	54 28.6	82 33	74.1	55 17.5	81 33	73.1	55 41.8	81 33	72.6
8	53 44.2	82 33	73.8	54 08.9	82 33	73.3	54 57.9	81 32	72.3	55 22.2	81 32	71.8
9	53 24.6	83 33	73.0	53 49.3	82 33	72.5	54 38.4	81 32	71.5	55 02.8	81 32	71.0
80	53 05.0	83 32	72.2	53 29.8	82 32	71.7	54 19.0	82 32	70.8	54 43.4	81 32	70.3
1	52 45.5	83 32	71.4	53 10.3	83 32	70.9	53 59.7	82 32	70.0	54 24.2	81 32	69.5
2	52 26.1	83 32	70.6	52 51.0	83 32	70.1	53 40.4	82 32	69.2	54 05.0	82 32	68.7
3	52 06.8	83 32	69.8	52 31.7	83 32	69.4	53 21.3	82 32	68.4	53 45.9	82 32	67.9
4	51 47.6	84 32	69.0	52 12.6	83 32	68.6	53 02.3	83 32	67.7	53 26.9	82 32	67.2
85	51 28.5	84 32	68.2	51 53.5	83 32	67.8	52 43.3	83 31	66.9	53 08.1	82 31	66.4
6	51 09.4	84 32	67.5	51 34.6	84 31	67.0	52 24.5	83 31	66.1	52 49.3	83 31	65.7
7	50 50.5	84 31	66.7	51 15.7	84 31	66.3	52 05.8	83 31	65.4	52 30.7	83 31	64.9
8	50 31.8	84 31	65.9	50 57.0	84 31	65.5	51 47.2	83 31	64.6	52 12.2	83 31	64.2
9	50 13.1	85 31	65.1	50 38.4	84 31	64.7	51 28.7	84 31	63.9	51 53.8	83 30	63.4
90	49 54.5	85 31	64.4	50 19.9	84 31	64.0	51 10.4	84 30	63.1	51 35.5	83 30	62.7

H.A.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	77 00.0	1.0 01	180.0	77 30.0	1.0 01	180.0	79 00.0	1.0 01	180.0	79 30.0	1.0 01	180.0
1	76 59.6	1.0 02	177.6	77 29.6	1.0 02	177.5	78 59.5	1.0 02	177.3	79 29.5	1.0 02	177.2
2	76 58.3	1.0 04	175.2	77 28.2	1.0 04	175.0	78 58.1	1.0 04	174.6	79 28.0	1.0 04	174.4
3	76 56.1	1.0 05	172.8	77 26.0	1.0 06	172.6	78 55.7	1.0 06	171.9	79 25.5	1.0 06	171.7
4	76 53.1	99 06	170.4	77 22.9	99 07	170.1	78 52.3	99 07	169.3	79 22.1	99 07	168.9
05	76 49.2	99 08	168.0	77 19.0	99 08	167.7	78 48.0	99 09	166.6	79 17.7	99 09	166.2
6	76 44.6	99 09	165.6	77 14.2	99 09	165.3	78 42.8	98 10	164.0	79 12.3	98 10	163.5
7	76 39.1	98 10	163.3	77 08.5	98 11	162.9	78 36.8	98 12	161.5	79 06.0	98 12	160.9
8	76 32.8	98 12	161.0	77 02.1	98 12	160.5	78 29.8	97 13	158.9	78 58.9	97 13	158.3
9	76 25.7	97 13	158.7	76 54.9	97 13	158.2	78 22.0	97 14	156.4	78 50.9	96 15	155.8
10	76 17.9	97 14	156.5	76 46.9	97 15	155.9	78 13.4	96 16	154.0	78 42.1	95 16	153.3
1	76 09.3	96 15	154.3	76 38.1	96 16	153.7	78 04.0	95 17	151.6	78 32.4	94 17	150.8
2	76 00.1	96 17	152.1	76 28.7	95 17	151.5	77 53.9	94 18	149.3	78 22.1	94 18	148.4
3	75 50.1	95 18	150.0	76 18.5	95 18	149.3	77 43.1	93 19	147.0	78 11.0	93 20	146.1
4	75 39.5	94 19	147.9	76 07.7	94 19	147.2	77 31.6	92 20	144.8	77 59.2	92 21	143.8
15	75 28.3	94 20	145.8	75 56.3	93 20	145.1	77 19.4	92 21	142.6	77 46.8	91 22	141.6
6	75 16.5	93 21	143.8	75 44.2	92 21	143.0	77 06.6	91 22	140.5	77 33.7	90 23	139.5
7	75 04.1	92 22	141.8	75 31.6	92 22	141.1	76 53.3	90 23	138.4	77 20.1	89 24	137.4
8	74 51.1	91 22	139.9	75 18.5	91 23	139.1	76 39.4	89 24	136.4	77 06.0	88 24	135.4
9	74 37.6	91 23	138.0	75 04.8	90 24	137.2	76 25.0	88 25	134.4	76 51.3	87 25	133.4
20	74 23.7	90 24	136.2	74 50.6	89 24	135.3	76 10.1	87 26	132.5	76 36.2	86 26	131.5
1	74 09.2	89 25	134.4	74 35.9	89 25	133.5	75 54.8	86 26	130.7	76 20.6	85 27	129.6
2	73 54.3	89 26	132.6	74 20.8	88 26	131.8	75 39.0	86 27	128.9	76 04.5	85 27	127.8
3	73 39.0	88 26	130.9	74 05.3	87 26	130.0	75 22.8	85 28	127.1	75 48.1	84 28	126.0
4	73 23.3	88 27	129.2	73 49.4	87 27	128.3	75 06.3	84 28	125.4	75 31.4	83 28	124.3
25	73 07.2	87 27	127.6	73 33.1	86 28	126.7	74 49.4	83 29	123.8	75 14.3	82 29	122.7
6	72 50.8	86 28	126.0	73 16.5	85 28	125.1	74 32.2	83 29	122.1	74 56.8	82 30	121.1
7	72 34.0	86 28	124.4	72 59.6	85 29	123.5	74 14.6	82 30	120.6	74 39.1	81 30	119.5
8	72 16.9	85 29	122.8	72 42.3	84 29	122.0	73 56.8	81 30	119.0	74 21.1	80 30	117.9
9	71 59.5	85 29	121.3	72 24.7	84 30	120.5	73 38.8	81 31	117.5	74 02.9	80 31	116.5
30	71 41.9	84 30	119.9	72 06.9	83 30	119.0	73 20.4	80 31	116.1	73 44.4	79 31	115.0
1	71 23.9	83 30	118.4	71 48.8	83 31	117.5	73 01.9	80 31	114.6	73 25.7	79 32	113.6
2	71 05.8	83 31	117.0	71 30.5	82 31	116.1	72 43.2	79 32	113.3	73 06.8	78 32	112.2
3	70 47.4	82 31	115.6	71 12.0	82 31	114.8	72 24.2	79 32	111.9	72 47.7	78 32	110.9
4	70 28.8	82 31	114.3	70 53.3	81 32	113.4	72 05.1	78 32	110.6	72 28.4	77 32	109.5
35	70 10.0	82 32	113.0	70 34.3	81 32	112.1	71 45.8	78 32	109.3	72 09.0	77 33	108.2
6	69 51.0	81 32	111.7	70 15.2	80 32	110.8	71 26.3	78 33	108.0	71 49.4	76 33	107.0
7	69 31.8	81 32	110.4	69 56.0	80 32	109.5	71 06.8	77 33	106.8	71 29.7	76 33	105.8
8	69 12.5	81 32	109.2	69 36.6	80 33	108.3	70 47.0	77 33	105.5	71 09.9	76 33	104.6
9	68 53.1	80 33	107.9	69 17.0	79 33	107.1	70 27.2	77 33	104.4	70 50.8	76 33	103.4
40	68 33.5	80 33	106.7	68 57.3	79 33	105.9	70 07.3	76 33	103.2	70 30.0	75 34	102.2
1	68 13.8	80 33	105.5	68 37.5	79 33	104.7	69 47.3	76 34	102.0	70 09.9	75 34	101.1
2	67 54.0	79 33	104.4	68 17.6	79 33	103.6	69 27.1	76 34	100.9	69 49.7	75 34	100.0
3	67 34.0	79 33	103.2	67 57.7	78 33	102.4	69 07.0	76 34	99.8	69 29.5	75 34	98.9
4	67 14.0	79 34	102.1	67 37.6	78 34	101.3	68 46.7	75 34	98.7	69 09.2	74 34	97.8
45	66 53.9	79 34	101.0	67 17.4	78 34	100.2	68 26.4	75 34	97.7	68 48.8	74 34	96.8
6	66 33.7	79 34	99.9	66 57.2	78 34	99.2	68 06.0	75 34	96.6	68 28.4	74 34	95.7
7	66 13.5	78 34	98.9	66 36.9	78 34	98.1	67 45.6	75 34	95.6	68 08.0	74 34	94.7
8	65 53.2	78 34	97.8	66 16.6	78 34	97.1	67 25.2	75 34	94.6	67 47.5	74 34	93.7
9	65 32.8	78 34	96.8	65 56.2	77 34	96.0	67 04.7	75 34	93.6	67 27.0	74 34	92.7
50	65 12.4	78 34	95.8	65 35.7	77 34	95.0	66 44.2	75 34	92.6	67 06.5	74 34	91.7
1	64 52.0	78 34	94.8	65 15.3	77 34	94.0	66 23.7	75 34	91.6	66 46.0	74 34	90.8
2	64 31.5	78 34	93.8	64 54.8	77 34	93.0	66 03.2	75 34	90.7	66 25.5	74 34	89.8
3	64 11.0	78 34	92.8	64 34.3	77 34	92.1	65 42.7	75 34	89.7	66 05.0	74 34	88.9
4	63 50.5	78 34	91.8	64 13.8	77 34	91.1	65 22.2	75 34	88.8	65 44.5	74 34	88.0
55	63 30.0	78 34	90.9	63 53.3	77 34	90.1	65 01.7	75 34	87.9	65 24.0	74 34	87.1
6	63 09.5	78 34	89.9	63 32.7	77 34	89.2	64 41.2	75 34	87.0	65 03.5	74 34	86.2
7	62 49.0	78 34	89.0	63 12.2	77 34	88.3	64 20.7	75 34	86.1	64 43.0	74 34	85.3
8	62 28.5	78 34	88.1	62 51.7	77 34	87.4	64 00.2	75 34	85.2	64 22.6	74 34	84.4
9	62 08.0	78 34	87.1	62 31.2	77 34	86.5	63 39.8	75 34	84.3	64 02.2	74 34	83.6
60	61 47.5	78 34	86.2	62 10.8	77 34	85.6	63 19.4	75 34	83.5	63 41.8	74 34	82.7
1	61 27.0	78 34	85.4	61 50.3	77 34	84.7	62 59.0	75 34	82.6	63 21.5	74 34	81.9
2	61 06.6	78 34	84.5	61 29.9	77 34	83.8	62 38.7	75 34	81.7	63 01.2	75 34	81.0
3	60 46.2	78 34	83.6	61 09.5	78 34	82.9	62 18.4	76 34	80.9	62 40.9	75 34	80.2
4	60 25.8	78 34	82.7	60 49.2	78 34	82.1	61 58.1	76 34	80.1	62 20.7	75 34	79.4
65	60 05.4	78 34	81.9	60 28.9	78 34	81.2	61 38.0	76 34	79.2	62 00.6	75 33	78.6
6	59 45.2	78 34	81.0	60 08.6	78 34	80.4	61 17.8	76 33	78.4	61 40.5	75 33	77.7
7	59 24.9	79 34	80.2	59 48.4	78 34	79.6	60 57.8	76 33	77.6	61 20.5	75 33	76.9
8	59 04.7	79 34	79.3	59 28.2	78 34	78.7	60 37.7	76 33	76.8	61 00.5	76 33	76.1
9	58 44.6	79 33	78.5	59 08.1	78 33	77.9	60 17.8	76 33	76.0	60 40.6	76 33	75.4
70	58 24.5	79 33	77.7	58 48.1	78 33	77.1	59 57.9	77 33	75.2	60 20.8	76 33	74.6
1	58 04.5	79 33	76.9	58 28.1	79 33	76.3	59 38.1	77 33	74.4	60 01.1	76 33	73.8
2	57 44.5	79 33	76.0	58 08.2	79 33	75.5	59 18.4	77 33	73.7	59 41.4	76 33	73.0
3	57 24.7	79 33	75.2	57 48.4	79 33	74.7	58 58.7	77 33	72.9	59 21.8	77 32	72.3
4	57 04.8	80 33	74.4	57 28.7	79 33	73.9	58 39.2	77 32	72.1	59 02.3	77 32	71.5
75	56 45.1	80 33	73.6	57 09.0	79 33	73.1	58 19.7	78 32	71.4	58 42.9	77 32	70.7
6	56 25.5	80 33	72.9	56 49.4	80 33	72.3	58 00.3	78 32	70.6	58 23.6	77 32	70.0
7	56 05.9	80 32	72.1	56 29.9	80 32	71.5	57 41.0	78 32	69.8	58 04.3	78 32	69.2
8	55 46.4	80 32	71.3	56 10.5	80 32	70.8	57 21.7	78 32	69.1	57 45.2	78 32	68.5
9	55 27.0	81 32	70.5	55 51.1	80 32	70.0	57 02.6	79 32	68.3	57 26.1	78 31	67.8
80	55 07.7	81 32	69.7	55 31.9	80 32	69.2	56 43.6	79 32	67.6	57 07.2	78 31	67.0
1	54 48.5	81 31	69.0	55 12.8	81 32	68.5	56 24.7	79 31	66.9	56 48.4	79 31	66.3
2	54 29.4	81 32	68.2	54 53.7	81 32	67.7	56 05.9	79 31	66.1	56 29.6	79 31	65.6
3	54 10.4	81 32	67.4	54 34.8	81 31	66.9	55 47.2	80 31	65.4	56 11.0	79 31	64.8
4	53 51.5	82 31	66.7	54 16.0	81 31	66.2	55 28.5	80 31	64.7	55 52.5	80 31	64.1
85	53 32.7	82 31	65.9	53 57.2	82 31	65.5	55 10.1	80 31	63.9	55 34.1	80 30	63.4
6	53 14.0	82 31	65.2	53 38.6	82 31	64.7	54 51.7	81 30	63.2	55 15.8	80 30	62.7
7	52 55.5	82 31	64.4	53 20.1	82 31	64.0	54 33.4	81 30	62.5	54 57.6	80 30	62.0
8	52 37.0	83 30	63.7	53 01.8	82 30	63.2	54 15.3	81 30	61.8	54 39.5	81 30	61.3
9	52 18.7	83 30	63.0	52 43.5	83 30	62.5	53 57.3	81 30	61.1	54 21.6	81 30	60.6
90	52 00.5	83 30	62.2	52 25.3	83 30	61.8	53 39.4	82 30	60.4	54 03.8	81 29	59.9

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
91	49 36.1	85 31	63.6	50 01.5	85 30	63.2	50 52.1	84 30	62.4	51 17.3	84 30	61.9	51 42.4	83 30	61.5	52 07.3	83 30	61.0	53 21.6	82 29	59.6	53 46.1	82 29	59.2	91
2	49 17.8	85 30	62.9	49 43.3	85 30	62.5	50 34.0	84 30	61.6	50 59.2	84 30	61.2	51 24.4	84 30	60.8	51 49.4	83 30	60.3	53 03.9	82 29	58.9	53 28.6	82 29	58.5	2
3	48 59.6	85 30	62.1	49 25.1	85 30	61.7	50 16.0	85 30	60.9	50 41.3	84 30	60.5	51 06.6	84 30	60.0	51 31.7	84 29	59.6	52 46.4	83 29	58.2	53 11.1	82 29	57.8	3
4	48 41.5	86 30	61.3	49 07.1	85 30	61.0	49 58.2	85 30	60.1	50 23.5	84 29	59.7	50 48.8	84 29	59.3	51 14.0	84 29	58.9	52 29.1	83 29	57.5	52 53.8	82 29	57.1	4
95	48 23.5	86 30	60.6	48 49.2	86 30	60.2	49 40.4	85 29	59.4	50 05.9	85 29	59.0	50 31.3	84 29	58.6	50 56.5	84 29	58.2	52 11.8	83 28	56.8	52 36.7	83 28	56.4	95
6	48 05.7	86 29	59.8	48 31.5	86 29	59.5	49 22.8	85 29	58.7	49 48.4	85 29	58.3	50 13.8	85 29	57.9	50 39.2	84 29	57.4	51 54.7	83 28	56.1	52 19.7	83 28	55.7	6
7	47 48.0	86 29	59.1	48 13.9	86 29	58.7	49 05.4	86 29	57.9	49 31.0	85 29	57.5	49 56.5	85 29	57.1	50 22.0	85 28	56.7	51 37.7	84 28	55.4	52 02.8	83 28	55.0	7
8	47 30.5	87 29	58.4	47 56.4	86 29	58.0	48 48.0	86 29	57.2	49 13.7	85 28	56.8	49 39.3	85 28	56.4	50 04.9	85 28	56.0	51 20.9	84 28	54.7	51 46.1	84 28	54.3	8
9	47 13.1	87 29	57.6	47 39.1	87 29	57.2	48 30.9	86 28	56.5	48 56.6	86 28	56.1	49 22.3	85 28	55.7	49 47.9	85 28	55.3	51 04.2	84 28	54.1	51 29.5	84 27	53.6	9
100	46 55.8	87 29	56.9	47 21.9	87 28	56.5	48 13.8	86 28	55.8	48 39.7	86 28	55.4	49 05.4	86 28	55.0	49 31.1	85 28	54.6	50 47.7	85 27	53.4	51 13.0	84 27	52.9	100
1	46 38.7	87 28	56.1	47 04.9	87 28	55.8	47 56.9	87 28	55.0	48 22.9	86 28	54.7	48 48.7	86 28	54.3	49 14.5	86 28	53.9	50 31.3	85 27	52.7	50 56.7	85 27	52.3	1
2	46 21.8	87 28	55.4	46 48.0	87 28	55.0	47 40.2	87 28	54.3	48 06.2	87 28	53.9	48 32.1	86 27	53.6	48 58.0	86 27	53.2	50 15.0	85 27	52.0	50 40.6	85 27	51.6	2
3	46 05.0	88 28	54.7	46 31.2	87 28	54.3	47 23.6	87 27	53.6	47 49.7	87 27	53.2	48 15.7	87 27	52.9	48 41.6	86 27	52.5	49 59.0	86 27	51.3	50 24.6	85 26	50.9	3
4	45 48.3	88 28	53.9	46 14.6	88 27	53.6	47 07.2	87 27	52.9	47 33.3	87 27	52.5	47 59.4	87 27	52.2	48 25.4	87 27	51.8	49 43.0	86 26	50.6	50 08.7	86 26	50.2	4
105	45 31.8	88 27	53.2	45 58.2	88 27	52.9	46 50.9	88 27	52.2	47 17.1	87 27	51.8	47 43.3	87 27	51.4	48 09.4	87 26	51.1	49 27.2	86 26	49.9	49 53.0	86 26	49.5	105
6	45 15.4	88 27	52.5	45 41.9	88 27	52.1	46 34.7	88 27	51.4	47 01.1	88 26	51.1	47 27.3	87 26	50.7	47 53.5	87 26	50.4	49 11.6	86 26	49.3	49 37.5	86 26	48.9	6
7	44 59.2	89 27	51.7	45 25.8	88 27	51.4	46 18.8	88 26	50.7	46 45.2	88 26	50.4	47 11.5	88 26	50.0	47 37.8	87 26	49.7	48 56.1	87 26	48.6	49 22.1	86 25	48.2	7
8	44 43.2	89 26	51.0	45 09.8	89 26	50.7	46 03.0	88 26	50.0	46 29.4	88 26	49.7	46 55.8	88 26	49.3	47 22.2	88 25	49.0	48 40.8	87 25	47.9	49 06.9	87 25	47.5	8
9	44 27.3	89 26	50.3	44 54.1	89 26	50.0	45 47.3	89 26	49.3	46 13.9	88 26	49.0	46 40.4	88 26	48.6	47 06.8	88 25	48.3	48 25.7	87 25	47.2	48 51.8	87 25	46.8	9
110	44 11.6	89 26	49.6	44 38.4	89 26	49.2	45 31.8	89 26	48.6	45 58.5	89 25	48.3	46 25.0	88 25	47.9	46 51.6	88 25	47.6	48 10.7	88 25	46.5	48 37.0	87 25	46.2	110
1	43 56.1	90 26	48.8	44 23.0	89 25	48.5	45 16.5	89 25	47.9	45 43.2	89 25	47.6	46 09.9	89 25	47.2	46 36.5	89 25	46.9	47 55.9	88 24	45.9	48 22.2	88 24	45.5	1
2	43 40.7	90 25	48.1	44 07.7	90 25	47.8	45 01.4	89 25	47.2	45 28.2	89 25	46.9	45 54.9	89 25	46.5	46 21.6	89 25	46.2	47 41.3	88 24	45.2	48 07.7	88 24	44.8	2
3	43 25.5	90 25	47.4	43 52.6	90 25	47.1	44 46.4	90 25	46.5	45 13.3	89 25	46.2	45 40.1	89 24	45.8	46 06.9	89 24	45.5	47 26.8	89 24	44.5	47 53.3	88 24	44.2	3
4	43 10.5	90 25	46.7	43 37.6	90 25	46.4	44 31.6	90 24	45.8	44 58.6	90 24	45.5	45 25.5	90 24	45.1	45 52.3	89 24	44.8	47 12.5	89 24	43.8	47 39.1	89 23	43.5	4
115	42 55.7	91 24	46.0	43 22.8	90 24	45.7	44 17.0	90 24	45.1	44 44.0	90 24	44.8	45 11.0	90 24	44.5	45 37.9	90 24	44.1	46 58.4	89 23	43.2	47 25.1	89 23	42.8	115
6	42 41.0	91 24	45.2	43 08.3	91 24	44.9	44 02.6	90 24	44.4	44 29.7	90 24	44.1	44 56.7	90 24	43.8	45 23.7	90 23	43.4	46 44.4	89 23	42.5	47 11.2	89 23	42.2	6
7	42 26.6	91 24	44.5	42 53.9	91 24	44.2	43 48.3	91 23	43.7	44 15.5	90 23	43.4	44 42.6	90 23	43.1	45 09.7	90 23	42.8	46 30.6	90 23	41.8	46 57.5	89 22	41.5	7
8	42 12.3	91 24	43.8	42 39.6	91 23	43.5	43 34.3	91 23	43.0	44 01.5	91 23	42.7	44 28.7	91 23	42.4	44 55.9	90 23	42.1	46 17.0	90 22	41.1	46 44.0	90 22	40.8	8
9	41 58.1	92 23	43.1	42 25.6	91 23	42.8	43 20.4	91 23	42.3	43 47.7	91 23	42.0	44 15.0	91 23	41.7	44 42.2	91 22	41.4	46 03.6	90 22	40.5	46 30.7	90 22	40.2	9
120	41 44.2	92 23	42.4	42 11.7	92 23	42.1	43 06.7	91 23	41.6	43 34.1	91 22	41.3	44 01.4	91 22	41.0	44 28.7	91 22	40.7	45 50.4	91 22	39.8	46 17.5	90 22	39.5	120
1	41 30.5	92 23	41.7	41 58.1	92 22	41.4	42 53.1	92 22	40.9	43 20.6	92 22	40.6	43 48.0	91 22	40.3	44 15.4	91 22	40.0	45 37.4	91 21	39.1	46 04.6	91 21	38.8	1
2	41 16.9	92 22	40.9	41 44.6	92 22	40.7	42 39.8	92 22	40.2	43 07.4	92 22	39.9	43 34.9	92 22	39.6	44 02.3	91 22	39.3	45 24.5	91 21	38.5	45 51.8	91 21	38.2	2
3	41 03.6	92 22	40.2	41 31.3	92 22	40.0	42 26.7	92 22	39.5	42 54.3	92 21	39.2	43 21.9	92 21	38.9	43 49.4	92 21	38.7	45 11.8	91 21	37.8	45 39.2	91 21	37.5	3
4	40 50.4	93 22	39.5	41 18.2	93 22	39.3	42 13.7	92 21	38.8	42 41.4	92 21	38.5	43 09.1	92 21	38.2	43 36.7	92 21	38.0	44 59.3	92 20	37.1	45 26.8	91 20	36.9	4
125	40 37.5	93 21	38.8	41 05.3	93 21	38.6	42 01.0	93 21	38.1	42 28.7	93 21	37.8	42 56.5	92 21	37.5	43 24.2	92 21	37.3	44 47.0	92 20	36.5	45 14.6	92 20	36.2	125
6	40 24.7	93 21	38.1	40 52.6	93 21	37.9	41 48.4	93 21	37.4	42 16.3	93 20	37.1	42 44.1	93 20	36.9	43 11.8	93 20	36.6	44 34.9	92 20	35.8	45 02.6	92 20	35.5	6
7	40 12.1	93 21	37.4	40 40.2	93 20	37.2	41 36.1	93 20	36.7	42 04.0	93 20	36.4	42 31.9	93 20	36.2	42 59.7	93 20	35.9	44 23.0	92 20	35.1	44 50.7	92 19	34.9	7
8	39 59.8	94 20	36.7	40 27.9	94 20	36.4	41 23.9	93 20	36.0	41 51.9	93 20	35.7	42 19.8	93 20	35.5	42 47.8	93 20	35.2	44 11.3	93 19	34.5	44 39.1	93 19	34.2	8
9	39 47.6	94 20	36.0	40 15.8	94 20	35.7	41 12.0	94 20	35.3	41 40.0	93 19	35.0	42 08.0	93 19	34.8	42 36.0	93 19	34.6	43 59.8	93 19	33.8	44 27.7	93 19	33.5	9
130	39 35.7	94 20	35.3	40 03.9	94 19	35.0	41 00.2	94 19	34.6	41 28.3	94 19	34.4	41 56.4	94 19	34.1	42 24.5	93 19	33.9	43 48.5	93 19	33.1	44 16.4	93 18	32.9	130
1	39 23.9	94 19	34.6	39 52.2	94 19	34.3	40 48.7	94 19	33.9	41 16.8	94 19	33.7	41 45.0	94 19	33.4	42 13.1	94 19	33.2	43 37.4	93 18	32.5	44 05.4	93 18	32.2	1
2	39 12.4	94 19	33.8	39 40.7	94 19	33.6	40 37.3	94 19	33.2	41 05.6	94 18	33.0	41 33.8	94 18	32.7	42 02.0	94 18	32.5	43 26.4	94 18	31.8	43 54.5	94 18	31.6	2
3	39 01.1	95 18	33.1	39 29.5	95 18	32.9	40 26.2	94 18	32.5	40 54.5	94 18	32.3	41 22.8	94 18	32.1	41 51.1	94 18	31.8	43 15.7	94 18	31.1	43 43.9	94 17	30.9	3
4	38 50.0	95 18	32.4	39 18.4	95 18	32.2	40 15.3	95 18	31.8	40 43.7	95 18	31.6	41 12.0	95 18	31.4	41 40.4	94 18	31.2	43 05.2	94 17	30.5	43 33.4	94 17	30.3	4
135	38 39.1	95 18	31.7	39 07.6	95 18	31.5	40 04.6	95 17	31.1	40 33.0	95 17	30.9	41 01.4	95 17	30.7	41 29.8	95 17	30.5	42 54.9	94 17	29.8	43 23.2	94 17	29.6	135
6	38 28.4	95 17	31.0	38 57.0	95 17	30.8	39 54.1	95 17	30.4	40 22.6	95 17	30.2	40 51.1	95 17	30.0	41 19.5	95 17	29.8	42 44.8	95 16	29.2	43 13.2	95 16	28.9	6
7	38 17.9	95 17	30.3	38 46.6	95 17	30.1	39 43.8	95 17	29.7	40 12.4	95 17	29.5	40 40.9	95 17	29.3	41 09.4	95 16	29.1	42 34.9	95 16	28.5	43 03.4	95 16	28.3	7
8	38 07.7	96 17	29.6	38 36.4	96 17	29.4	39 33.7	95 16	29.0	40 02.3	95 16	28.8	40 31.0	95 16	28.6	40 59.6	95 16	28.4	42 25.2	95 16	27.8	42 53.7	95 16	27.6	8
9	37 57.7	96 16	28.9	38 26.4	96 16	28.7	39 23.9	96 16	28.3	39 52.6	96 16	28.2	40 21.2	96 16	28.0	40 49.9	96 16	27.8	42 15.8	95 15	27.2	42 44.3	95 15	27.0	9
140	37 47.8	96 16	28.2	38 16.7	96 16	28.0	39 14.2	96 16	27.7	39 43.0	96 16	27.5	40 11.7	96 16	27.3	40 40.4	96 15	27.1	42 06.5	96 15	26.5	42 35.1	95 15	26.3	140
1	37 38.3	96 16	27.5	38 07.1	96 16	27.3	39 04.8	96 15	27.0	39 33.6	96 15	26.8	40 02.4	96 15	26.6	40 31.2	96 15	26.4	41 57.4	96 15	25.8	42 26.1	96 15	25.6	1
2	37 28.9	96 15	26.8	37 57.8	96 15	26.6	38 55.6	96 15	26.3	39 24.5	96 15	26.1	39 53.3	96 15	25.9	40 22.2	96 15	25.7	41 48.6	96 14	25.2	42 17.4	96 14	25.0	2
3	37 19.8	97 15	26.1	37 48.7	97 15	25.9	38 46.6	96 15	25.6	39 15.6	96 14	25.4	39 44.5	96 14	25.2	40 13.4	96 14	25.1	41 40.0	96 14	24.5	42 08.8	96 14	24.3	3
4	37 10.9	97 14	25.4	37 39.9	97 14	25.2	38 37.9	97 14	24.9	39 06.9	97 14	24.7	39 35.9	97 14	24.5	40 04.8	96 14	24.4	41 31.6	96 14	23.9	42 00.5	96 14	23.7	4
145	37 02.2	97 14	24.7	37 31.3	97 14	24.5	38 29.4	97 14	24.2	38 58.4	97 14	24.0	39 27.4	97 14	23.9	39 56.4	97 14	23.7	41 23.4	97 13	23.2	41 52.3	96 13	23.0	145
6	36 53.7	97 14	24.0	37 22.9	97 14	23.8	38 21.1	97 13	23.5	38 50.2	97 13	23.3	39 19.2	97 13	23.2	39 48.3	97 13	23.0	41 15.4	97 13	22.5	41 44.4	97 13	22.4	6
7	36 45.5	97 13	23.3	37 14.7	97 13	23.1	38 13.0	97 13	22.8	38 42.2	97 13	22.7	39 11.3	97 13	22.5	39 40.4	97 13	22.3	41 07.7	97 13	21.9	41 36.7	97 12	21.7	7
8	36 37.5	97 13	22.5	37 06.8	97 13	22.4	38 05.2	97 13	22.1	38 34.4	97 13	22.0	39 03.5	97 12	21.8	39 32.7	97 12	21.7	41 00.1	97 12	21.2	41 29.2	97 12	21.0	8
9	36 29.8	98 13	21.8	36 59.1	98 12	21.7	37 57.6	97 12	21.4	38 26.8	97 12	21.3	38 56.0	97 12	21.1	39 25.2	97 12	21.0	40 52.8	97 12	20.5	41 22.0	97 12	20.4	9
150	36 22.3	98 12	21.1	36 51.6	98 12	21.0	37 50.2	98 12	20.7	38 19.5	98 12	20.6	38 48.7	98 12	20.5	39 18.0	98 12	20.3	40 45.7	97 11	19.9	41 14.9	97 11	19.7	150
1	36 15.0	98 12	20.4	36 44.3	98 12	20.3	37 43.0	98 12	20.0	38 12.4	98 11	19.9	38 41.7	98 11	19.8	39 11.0	98 11	19.6	40 38.9	98 11	19.2	41 08.1	98 11	19.1	1
2	36 07.9	98 11	19.7	36 37.3	98 11	19.6	37 36.1	98 11	19.4	38 05.5	98 11	19.2	38 34.9	98 11	19.1	39 04.2	98 11	19.0	40 32.2	98 11	18.6	41 01.5	98 11	18.4	2
3	36 01.1	98 11	19.0	36 30.6	98 11	18.9	37 29.4	98 11	18.7	37 58.8	98 11	18.5	38 28.3	98 11	18.4	38 57.7	98 11	18.3	40 25.8	98 10	17.9	40 55.2	98 10	17.8	3
4	35 54.6	98 11	18.3	36 24.0	98 10	18.2	37 23.0	98 10	18.0	37 52.4	98 10	17.8	38 21.9	98 10	17.7	38 51.3	98 10	17.6	40 19.6	98 10	17.2	40 49.0	98 10	17.1	4
155	35 48.2	98 10	17.6	36 17.8	98 10	17.5	37 16.8	98 10	17.3	37 46.3	98 10	17.2	38 15.8	98 10	17.0	38 45.2	98 10	16.9	40 13.7	98 10	16.6	40 43.1	98 09	16.4	155
6	35 42.2	99 10	16.9	36 11.7	99 10	16.8	37 10.8	98 10	16.6	37 40.3	98 10	16.5	38 09.9	98 09	16.4	38 39.4	98 09	16.3	40 07.9	98 09	15.9	40 37.4	98 09	15.8	6
7	35 36.3	99 09	16.2	36 05.9	99 09	16.1	37 05.1	99 09	15.9	37 34.6	99 09	15.8	38 04.2	99 09	15.7	38 33.8	99 09	15.6	40 02.4	98 09	15.2	40 31.9	98 09	15.1	7
8	35 30.7	99 09	15.5	36 00.3	99 09	15.4	36 59.6	99 09	15.2	37 29.2	99 09	15.1	37 58.8	99 09	15.0	38 28.4	99 09	14.9	39 57.1	99 08	14.6	40 26.7	98 08	14.5	8
9	35 25.3	99 09	14.8	35 55.0	99 08	14.7	36 54.3	99 08	14.5	37 23.9	99 08	14.4	37 53.6	99 08	14.3	38 23.2	99 08	14.2	39 52.1	99 08	13.9	40 21.7	99 08	13.8	9
160	35 20.2	99 08	14.1	35 49.9	99 08	14.0	36 49.3	99 08	13.8	37 18.9	99 08	13.7	37 48.6	99 08	13.6	38 18.3	99 08	13.5	39 47.3	99 08	13.3	40 16.9	99 08	13.2	160
1	35 15.3	99 08	13.4	35 45.1	99 08	13.3	36 44.5	99 08	13.1	37 14.2	99 08	13.0	37 43.9	99 07	13.0	38 13.6	99 07	12.9	39 42.7	99 07	12.6	40 12.4	99 07	12.5	1
2	35 10.7	99 07	12.7	35 40.5	99 07	12.6	36 39.9	99 07	12.4	37 09.7	99 07	12.4	37 39.4	99 07	12.3	38 09.1	99 07	12.2	39 38.3	99 07	11.9	40 08.0	99 07	11.8	2
3	35 06.3	99 07	12.0	35 36.1	99 07	11.9	36 35.6	99 07	11.7	37 05.4	99 07	11.7	37 35.2	99 07	11.6	38 04.9	99 07	11.5	39 34.2	99 06	11.2	40 03.9	99 06	11.2	3
4	35 02.2	99 06	11.3	35 32.0	99 06	11.2	36 31.6	99 06	11.1	37 01.4	99 06	11.0	37 31.2	99 06	10.9	38 01.0	99 06	10.8	39 30.3	99 06	10.6	40 00.1	99 06	10.5	4
165	34 58.3	99 06	10.6	35 28.1	99 06	10.5	36 27.8	99 06	10.4	36 57.6	99 06	10.3	37 27.4	99 06	10.2	37 57.2	99 06	10.2	39 26.6	99 06	09.9	39 56.4	99 06	09.9	165
6	34 54.7	99 06	09.9	35 24.5	99 06	09.8	36 24.2	99 06	09.7	36 54.0	99 06	09.6	37 23.9	99 05	09.5	37 53.7	99 05	09.5	39 23.2	99 05	09.3	39 53.0	99 05	09.2	6
7	34 51.3	1.0 05	09.2	35 21.1	1.0 05	09.1	36 20.9	1.0 05	09.0	36 50.7	1.0 05	08.9	37 20.6	1.0 05	08.9	37 50.5	1.0 05	08.8	39 20.0	1.0 05	08.6	39 49.9	99 05	08.6	7
8	34 48.1	1.0 05	08.5	35 18.0	1.0 05	08.4	36 17.8	1.0 05	08.3	36 47.7	1.0 05	08.2	37 17.6	1.0 05	08.2	37 47.4	1.0 04	08.1	39 17.1	1.0 05	08.0	39 46.9	1.0 04	07.9	8
9	34 45.2	1.0 05	07.8	35 15.1	1.0 04	07.7	36 15.0	1.0 04	07.6	36 44.9	1.0 04	07.6	37 14.8	1.0 04	07.5	37 44.7	1.0 04	07.4	39 14.3	1.0 04	07.3	39 44.2	1.0 04	07.2	9
170	34 42.6	1.0 04	07.0	35 12.5	1.0 04	07.0	36 12.4	1.0 04	06.9	36 42.3	1.0 04	06.9	37 12.2	1.0 04	06.8	37 42.1	1.0 04	06.8	39 11.9	1.0 04	06.6	39 41.8	1.0 04	06.6	170
1	34 40.2	1.0 04	06.3	35 10.1	1.0 04	06.3	36 10.0	1.0 04	06.2	36 39.9	1.0 03	06.2	37 09.9	1.0 03	06.1	37 39.8	1.0 03	06.1	39 09.6	1.0 03	06.0	39 39.5	1.0 03	05.9	1
2	34 38.1	1.0 03	05.6	35 08.0	1.0 03	05.6	36 07.9	1.0 03	05.5	36 37.9	1.0 03	05.5	37 07.8	1.0 03	05.5	37 37.8	1.0 03	05.4	39 07.6	1.0 03	05.3	39 37.5	1.0 03	05.3	2
3	34 36.2	1.0 03	04.9	35 06.1	1.0 03	04.9	36 06.1	1.0 03	04.8	36 36.0	1.0 03	04.8	37 06.0	1.0 03	04.8	37 35.9	1.0 03	04.7	39 05.8	1.0 03	04.6	39 35.8	1.0 03	04.6	3
4	34 34.5	1.0 02	04.2	35 04.5	1.0 02	04.2	36 04.5	1.0 02	04.1	36 34.4	1.0 02	04.1	37 04.4	1.0 02	04.1	37 34.4	1.0 02	04.1	39 04.3	1.0 02	04.0	39 34.2	1.0 02	03.9	4
175	34 33.2	1.0 02	03.5	35 03.1	1.0 02	03.5	36 03.1	1.0 02	03.5	36 33.1	1.0 02	03.4	37 03.1	1.0 02	03.4	37 33.0	1.0 02	03.4	39 03.0	1.0 02	03.3	39 32.9	1.0 02	03.3	175
6	34 32.0	1.0 01	02.8	35 02.0	1.0 01	02.8	36 02.0	1.0 01	02.8	36 32.0	1.0 01	02.7	37 02.0	1.0 01	02.7	37 31.9	1.0 01	02.7	39 01.9	1.0 01	02.7	39 31.9	1.0 01	02.6	6
7	34 31.1	1.0 01	02.1	35 01.1	1.0 01	02.1	36 01.1	1.0 01	02.1	36 31.1	1.0 01	02.1	37 01.1	1.0 01	02.0	37 31.1	1.0 01	02.0	39 01.1	1.0 01	02.0	39 31.1	1.0 01	02.0	7
8	34 30.5	1.0 01	01.4	35 00.5	1.0 01	01.4	36 00.5	1.0 01	01.4	36 30.5	1.0 01	01.4	37 00.5	1.0 01	01.4	37 30.5	1.0 01	01.4	39 00.5	1.0 01	01.4	39 30.5	1.0 01	01.3	8
9	34 30.1	1.0 00	00.7	35 00.1	1.0 00	00.7	36 00.1	1.0 00	00.7	36 30.1	1.0 00	00.7	37 00.1	1.0 00	00.7	37 30.1	1.0 00	00.7	39 00.1	1.0 00	00.7	39 30.1	1.0 00	00.7	9
180	34 30.0	1.0 00	00.0	35 00.0	1.0 00	00.0	36 00.0	1.0 00	00.0	36 30.0	1.0 00	00.0	37 00.0	1.0 00	00.0	37 30.0	1.0 00	00.0	39 00.0	1.0 00	00.0	39 30.0	1.0 00	00.0	180

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	80 00.0	1.0 01	180.0	80 30.0	1.0 01	180.0	82 00.0	1.0 01	180.0	82 30.0	1.0 01	180.0	83 00.0	1.0 01	180.0	89 00.0	1.0 06	180.0	89 30.0	1.0 11	180.0	85 30.0	1.0 01	00.0	00
1	79 59.5	1.0 03	177.1	80 29.5	1.0 03	177.0	81 59.4	1.0 03	176.6	82 29.4	1.0 03	176.5	82 59.3	1.0 03	176.3	88 56.5	95 16	160.2	89 23.6	83 25	144.8	85 29.4	1.0 03	03.4	1
2	79 57.9	1.0 04	174.3	80 27.9	1.0 04	174.0	81 57.6	1.0 05	173.3	82 27.5	1.0 05	172.9	82 57.3	1.0 06	172.6	88 46.8	83 23	144.1	89 08.8	60 30	124.9	85 27.6	99 05	06.8	2
3	79 55.4	99 06	171.4	80 25.2	99 06	171.1	81 54.6	99 07	169.9	82 24.3	99 07	169.5	82 54.0	99 08	168.9	88 33.0	71 27	132.2	88 50.8	46 32	114.3	85 24.6	97 07	10.1	3
4	79 51.8	99 08	168.6	80 21.5	99 08	168.2	81 50.4	99 09	166.7	82 20.0	98 09	166.0	82 49.5	98 10	165.3	88 16.8	61 29	123.6	88 31.7	37 33	108.0	85 20.4	96 09	13.3	4
05	79 47.2	99 09	165.8	80 16.8	98 10	165.3	81 45.1	98 11	163.4	82 14.4	98 11	162.7	82 43.6	97 12	161.8	87 59.1	53 31	117.4	88 12.0	32 33	103.8	85 15.2	93 10	16.3	05
6	79 41.7	98 11	163.0	80 11.1	98 11	162.4	81 38.7	97 12	160.3	82 07.8	97 13	159.4	82 36.7	96 14	158.3	87 40.4	47 32	112.6	87 51.9	28 34	100.7	85 08.9	91 12	19.3	6
7	79 35.3	97 12	160.3	80 04.4	97 13	159.6	81 31.3	96 14	157.2	82 00.0	95 15	156.2	82 28.5	95 15	155.0	87 21.2	43 33	108.9	87 31.6	26 34	98.4	85 01.6	88 14	22.1	7
8	79 27.9	97 14	157.6	79 56.8	96 14	156.9	81 22.8	95 16	154.2	81 51.2	94 16	153.0	82 19.3	93 17	151.8	87 01.7	40 33	105.9	87 11.3	24 34	96.5	84 53.5	85 16	24.7	8
9	79 19.7	96 15	155.0	79 48.3	95 16	154.2	81 13.4	94 17	151.2	81 41.4	93 18	150.0	82 09.1	92 19	148.7	86 41.8	37 33	103.4	86 50.9	23 34	94.9	84 44.5	81 16	27.1	9
10	79 10.6	96 16	152.5	79 39.0	94 17	151.6	81 03.1	92 19	148.4	81 30.7	92 19	147.1	81 58.0	91 20	145.7	86 21.8	35 34	101.2	86 30.4	22 34	93.5	84 34.8	78 17	29.4	10
1	79 00.7	94 18	150.0	79 28.8	93 18	149.0	80 51.9	91 20	145.6	81 19.1	90 21	144.3	81 46.0	89 21	142.8	86 01.6	34 34	99.4	86 09.9	22 34	92.3	84 24.4	74 18	31.5	1
2	78 50.0	93 19	147.5	79 17.9	92 19	146.5	80 40.0	90 21	143.0	81 06.8	89 22	141.6	81 33.2	88 23	140.0	85 41.3	32 34	97.7	85 49.4	22 34	91.2	84 13.3	71 19	33.5	2
3	78 38.7	92 20	145.2	79 06.2	91 21	144.1	80 27.2	89 22	140.4	80 53.6	87 23	139.0	81 19.7	86 24	137.4	85 20.9	32 34	96.2	85 28.9	21 34	90.2	84 01.7	67 20	35.3	3
4	78 26.6	91 21	142.9	78 53.8	90 22	141.8	80 13.8	87 23	138.0	80 39.8	86 24	136.5	81 05.4	85 25	134.8	85 00.5	31 34	94.9	85 08.4	22 34	89.3	83 49.6	64 21	37.0	4
15	78 13.9	90 22	140.6	78 40.8	89 23	139.5	79 59.8	86 24	135.6	80 25.4	85 25	134.1	80 50.6	83 26	132.4	84 40.0	30 34	93.7	84 47.8	22 34	88.4	83 37.1	60 22	38.5	15
6	78 00.6	89 23	138.4	78 27.2	88 24	137.3	79 45.1	85 25	133.3	80 10.4	83 26	131.8	80 35.1	82 27	130.1	84 19.5	30 34	92.6	84 27.4	22 34	87.6	83 24.1	57 22	39.9	6
7	77 46.7	88 24	136.3	78 13.0	87 25	135.2	79 29.9	84 26	131.1	79 54.8	82 27	129.6	80 19.2	80 27	127.9	83 59.0	30 34	91.5	84 06.8	22 34	86.8	83 10.8	54 23	41.1	7
8	77 32.3	87 25	134.3	77 58.3	86 25	133.1	79 14.2	82 27	129.0	79 38.7	81 28	127.5	80 02.8	79 28	125.7	83 38.5	30 34	90.5	83 46.4	22 34	86.1	82 57.1	51 23	42.3	8
9	77 17.3	86 26	132.3	77 43.0	85 26	131.1	78 58.1	81 28	127.0	79 22.2	80 28	125.4	79 45.9	78 29	123.7	83 18.0	30 34	89.6	83 25.9	23 34	85.4	82 43.2	48 24	43.4	9
20	77 01.9	85 26	130.4	77 27.3	84 27	129.2	78 41.5	80 28	125.0	79 05.3	79 29	123.5	79 28.6	77 29	121.8	82 57.5	30 34	88.7	83 05.5	23 34	84.7	82 29.0	45 24	44.3	20
1	76 46.0	84 27	128.5	77 11.2	83 28	127.3	78 24.5	79 29	123.1	78 48.0	78 29	121.6	79 11.0	76 30	119.9	82 36.9	30 34	87.8	82 45.0	24 34	84.0	82 14.5	42 24	45.2	1
2	76 29.8	84 28	126.7	76 54.7	82 28	125.5	78 07.1	78 29	121.3	78 30.4	77 30	119.8	78 53.1	75 30	118.1	82 16.4	30 34	87.0	82 24.6	24 34	83.4	81 59.8	39 25	46.0	2
3	76 13.1	83 28	124.9	76 37.8	82 29	123.7	77 49.4	77 30	119.6	78 12.4	76 30	118.0	78 34.8	74 31	116.4	81 56.0	31 34	86.2	82 04.3	25 34	82.7	81 45.0	36 25	46.7	3
4	75 56.1	82 29	123.2	76 20.6	81 29	122.0	77 31.4	77 30	117.9	77 54.1	75 31	116.3	78 16.3	73 31	114.7	81 35.5	31 34	85.4	81 43.9	25 34	82.1	81 30.0	34 25	47.3	4
25	75 38.8	81 29	121.5	76 03.0	80 30	120.3	77 13.2	76 31	116.2	77 35.6	74 31	114.7	77 57.5	72 32	113.1	81 15.1	31 34	84.7	81 23.6	26 34	81.5	81 14.8	31 25	47.9	25
6	75 21.2	81 30	119.9	75 45.1	79 30	118.7	76 54.6	75 31	114.7	77 16.9	73 32	113.2	77 38.6	71 32	111.6	80 54.6	32 34	84.0	81 03.3	26 34	80.9	80 59.5	29 26	48.4	6
7	75 03.2	80 30	118.3	75 27.0	79 31	117.1	76 35.9	74 32	113.1	76 57.9	73 32	111.7	77 19.4	71 32	110.1	80 34.2	32 34	83.3	80 43.1	27 34	80.3	80 44.1	26 26	48.9	7
8	74 45.0	79 31	116.8	75 08.6	78 31	115.6	76 16.9	74 32	111.7	76 38.7	72 32	110.2	77 00.0	70 33	108.6	80 13.9	32 34	82.6	80 22.9	28 34	79.7	80 28.6	24 26	49.3	8
9	74 26.6	79 31	115.3	74 50.0	77 31	114.1	75 57.7	73 32	110.2	76 19.4	71 33	108.8	76 40.5	69 33	107.3	79 53.5	33 34	81.9	80 02.7	28 34	79.2	80 13.0	22 26	49.7	9
30	74 08.0	78 31	113.9	74 31.2	77 32	112.7	75 38.4	72 32	108.8	75 59.9	71 33	107.4	76 20.8	69 33	105.9	79 33.2	33 34	81.2	79 42.6	29 34	78.6	79 57.3	20 26	50.0	30
1	73 49.1	77 32	112.5	74 12.2	76 32	111.3	75 18.9	72 33	107.5	75 40.2	70 33	106.1	76 01.0	68 33	104.6	79 13.0	34 34	80.6	79 22.5	30 33	78.0	79 41.6	18 26	50.3	1
2	73 30.0	77 32	111.1	73 52.9	76 32	110.0	74 59.2	71 33	106.2	75 20.4	70 33	104.8	75 41.1	68 33	103.3	78 52.8	34 34	79.9	79 02.4	30 33	77.5	79 25.7	15 26	50.5	2
3	73 10.8	77 32	109.8	73 33.6	75 32	108.6	74 39.5	71 33	104.9	75 00.5	69 33	103.5	75 21.1	68 34	102.1	78 32.6	35 34	79.3	78 42.4	31 33	76.9	79 09.9	13 26	50.7	3
4	72 51.4	76 33	108.5	73 14.1	75 33	107.3	74 19.6	71 33	103.6	74 40.5	69 33	102.3	75 01.0	67 34	100.9	78 12.4	35 34	78.7	78 22.4	32 33	76.4	78 54.0	11 27	50.9	4
35	72 31.9	76 33	107.2	72 54.4	74 33	106.1	73 59.6	70 33	102.4	74 20.4	69 34	101.1	74 40.8	67 34	99.7	77 52.3	36 33	78.1	78 02.5	32 33	75.8	78 38.0	10 27	51.1	35
6	72 12.2	75 33	105.9	72 34.6	74 33	104.8	73 39.5	70 34	101.3	74 00.3	68 34	100.0	74 20.5	67 34	98.6	77 32.3	36 33	77.5	77 42.7	33 33	75.3	78 22.1	08 27	51.2	6
7	71 52.4	75 33	104.7	72 14.7	74 33	103.6	73 19.3	70 34	100.1	73 40.0	68 34	98.8	74 00.2	66 34	97.5	77 12.3	37 33	76.9	77 22.8	34 33	74.7	78 06.1	06 27	51.3	7
8	71 32.5	75 33	103.5	71 54.7	73 33	102.5	72 59.1	69 34	99.0	73 19.7	68 34	97.7	73 39.9	66 34	96.4	76 52.3	37 33	76.3	77 03.1	34 33	74.2	77 50.0	04 27	51.3	8
9	71 12.5	74 33	102.4	71 34.7	73 34	101.3	72 38.8	69 34	97.9	72 59.4	68 34	96.6	73 19.4	66 34	95.4	76 32.4	38 33	75.7	76 43.3	35 33	73.7	77 34.0	02 27	51.4	9
40	70 52.4	74 34	101.2	71 14.5	73 34	100.2	72 18.5	69 34	96.8	72 39.0	68 34	95.6	72 59.0	66 34	94.3	76 12.5	39 33	75.1	76 23.7	36 33	73.1	77 18.0	01 27	51.4	40
1	70 32.3	74 34	100.1	70 54.3	73 34	99.1	71 58.1	69 34	95.7	72 18.5	67 34	94.5	72 38.5	66 34	93.3	75 52.7	39 33	74.5	76 04.1	36 33	72.6	77 02.0	01 27	51.4	1
2	70 12.0	74 34	99.0	70 34.0	73 34	98.0	71 37.6	69 34	94.7	71 58.0	67 34	93.5	72 18.0	66 34	92.3	75 33.0	40 33	73.9	75 44.5	37 32	72.1	76 45.9	03 27	51.4	2
3	69 51.7	74 34	97.9	70 13.6	72 34	96.9	71 17.2	69 34	93.7	71 37.6	67 34	92.5	71 57.5	66 34	91.3	75 13.3	40 33	73.4	75 25.0	38 32	71.6	76 29.9	04 27	51.3	3
4	69 31.4	73 34	96.9	69 53.2	72 34	95.9	70 56.7	69 34	92.7	71 17.0	67 34	91.6	71 37.0	66 34	90.4	74 53.7	41 33	72.8	75 05.6	38 32	71.0	76 13.9	06 27	51.3	4
45	69 11.0	73 34	95.8	69 32.8	72 34	94.8	70 36.2	69 34	91.7	70 56.5	67 34	90.6	71 16.5	66 34	89.5	74 34.1	42 33	72.2	74 46.2	39 32	70.5	75 57.9	07 27	51.2	45
6	68 50.5	73 34	94.8	69 12.3	72 34	93.8	70 15.6	69 34	90.8	70 36.0	67 34	89.7	70 56.0	66 34	88.5	74 14.6	42 32	71.7	74 26.9	40 32	70.0	75 41.9	09 27	51.1	6
7	68 30.1	73 34	93.8	68 51.8	72 34	92.8	69 55.1	69 34	89.8	70 15.5	67 34	88.7	70 35.4	66 34	87.6	73 55.1	43 32	71.1	74 07.6	40 32	69.5	75 25.9	10 27	51.0	7
8	68 09.6	73 34	92.8	68 31.3	72 34	91.9	69 34.6	69 34	88.9	69 55.0	67 34	87.8	70 14.9	66 34	86.7	73 35.8	44 32	70.6	73 48.5	41 32	69.0	75 10.0	12 26	50.9	8
9	67 49.1	73 34	91.8	68 10.8	72 34	90.9	69 14.1	69 34	88.0	69 34.5	67 34	86.9	69 54.5	66 34	85.9	73 16.4	44 32	70.0	73 29.3	42 32	68.4	74 54.1	13 26	50.7	9
50	67 28.6	73 34	90.9	67 50.3	72 34	90.0	68 53.6	69 34	87.1	69 14.0	67 34	86.0	69 34.0	66 34	85.0	72 57.2	45 32	69.5	73 10.3	43 32	67.9	74 38.2	15 26	50.6	50
1	67 08.1	73 34	89.9	67 29.8	72 34	89.0	68 33.1	69 34	86.2	68 53.5	67 34	85.2	69 13.6	66 34	84.1	72 38.0	46 32	68.9	72 51.3	43 32	67.4	74 22.4	16 26	50.4	1
2	66 47.5	73 34	89.0	67 09.3	72 34	88.1	68 12.6	69 34	85.3	68 33.1	68 34	84.3	68 53.2	66 34	83.3	72 18.9	46 32	68.4	72 32.4	44 31	66.9	74 06.6	18 26	50.3	2
3	66 27.0	73 34	88.1	66 48.8	72 34	87.2	67 52.2	69 34	84.4	68 12.7	68 34	83.5	68 32.8	66 34	82.5	71 59.8	47 32	67.8	72 13.6	45 31	66.4	73 50.8	19 26	50.1	3
4	66 06.5	73 34	87.2	66 28.3	72 34	86.3	67 31.8	69 34	83.6	67 52.3	68 34	82.6	68 12.5	67 34	81.6	71 40.9	47 32	67.3	71 54.8	45 31	65.9	73 35.1	20 26	49.9	4
55	65 46.0	73 34	86.3	66 07.8	72 34	85.4	67 11.4	69 34	82.7	67 32.0	68 34	81.8	67 52.2	67 34	80.8	71 22.0	48 31	66.7	71 36.1	46 31	65.4	73 19.4	22 26	49.7	55
6	65 25.6	73 34	85.4	65 47.4	72 34	84.6	66 51.1	69 34	81.9	67 11.7	68 34	81.0	67 32.0	67 34	80.0	71 03.2	49 31	66.2	71 17.5	47 31	64.8	73 03.8	23 26	49.5	6
7	65 05.1	73 34	84.5	65 27.0	72 34	83.7	66 30.8	69 34	81.1	66 51.5	68 34	80.2	67 11.8	67 34	79.2	70 44.4	49 31	65.7	70 59.0	47 31	64.3	72 48.2	24 26	49.3	7
8	64 44.7	73 34	83.6	65 06.6	72 34	82.8	66 10.5	70 34	80.3	66 31.3	69 34	79.4	66 51.7	67 33	78.5	70 25.8	50 31	65.1	70 40.5	48 31	63.8	72 32.7	25 26	49.1	8
9	64 24.3	73 34	82.8	64 46.2	73 34	82.0	65 50.3	70 34	79.5	66 11.1	69 33	78.6	66 31.6	68 33	77.7	70 07.2	51 31	64.6	70 22.1	49 30	63.3	72 17.2	27 26	48.8	9
60	64 04.0	74 34	81.9	64 25.9	73 34	81.2	65 30.2	70 33	78.7	65 51.0	69 33	77.8	66 11.6	68 33	76.9	69 48.7	51 31	64.1	70 03.8	50 30	62.8	72 01.8	28 26	48.6	60
1	63 43.7	74 34	81.1	64 05.7	73 34	80.3	65 10.1	70 33	77.9	65 31.0	69 33	77.0	65 51.6	68 33	76.1	69 30.3	52 31	63.5	69 45.6	50 30	62.3	71 46.4	29 26	48.4	1
2	63 23.4	74 34	80.3	63 45.5	73 34	79.5	64 50.1	70 33	77.1	65 11.0	69 33	76.3	65 31.7	68 33	75.4	69 12.0	53 30	63.0	69 27.5	51 30	61.8	71 31.1	30 25	48.1	2
3	63 03.2	74 34	79.5	63 25.3	73 34	78.7	64 30.1	71 33	76.3	64 51.1	70 33	75.5	65 11.9	69 33	74.6	68 53.7	53 30	62.5	69 09.4	52 30	61.3	71 15.9	32 25	47.8	3
4	62 43.1	74 34	78.6	63 05.2	73 33	77.9	64 10.2	71 33	75.6	64 31.3	70 33	74.7	64 52.1	69 33	73.9	68 35.6	54 30	61.9	68 51.5	52 30	60.8	71 00.7	33 25	47.6	4
65	62 23.0	74 33	77.8	62 45.2	74 33	77.1	63 50.3	71 33	74.8	64 11.5	70 33	74.0	64 32.5	69 33	73.2	68 17.5	55 30	61.4	68 33.6	53 30	60.3	70 45.6	34 25	47.3	65
6	62 03.0	75 33	77.0	62 25.2	74 33	76.3	63 30.6	71 33	74.1	63 51.9	70 33	73.3	64 12.9	69 32	72.4	67 59.5	55 30	60.9	68 15.9	54 29	59.8	70 30.5	35 25	47.0	6
7	61 43.0	75 33	76.3	62 05.3	74 33	75.5	63 10.9	72 33	73.3	63 32.2	71 33	72.5	63 53.3	70 32	71.7	67 41.6	56 30	60.4	67 58.2	54 29	59.3	70 15.5	36 25	46.7	7
8	61 23.1	75 33	75.5	61 45.5	74 33	74.8	62 51.3	72 33	72.6	63 12.7	71 32	71.8	63 33.9	70 32	71.0	67 23.9	56 29	59.8	67 40.6	55 29	58.7	70 00.6	37 25	46.5	8
9	61 03.3	75 33	74.7	61 25.7	74 33	74.0	62 31.7	72 32	71.8	62 53.3	71 32	71.1	63 14.5	70 32	70.3	67 06.2	57 29	59.3	67 23.1	56 29	58.2	69 45.8	38 25	46.2	9
70	60 43.5	75 33	73.9	61 06.0	75 33	73.2	62 12.3	72 32	71.1	62 33.9	72 32	70.3	62 55.3	71 32	69.6	66 48.6	58 29	58.8	67 05.7	56 29	57.7	69 31.0	40 24	45.9	70
1	60 23.8	76 33	73.1	60 46.4	75 33	72.5	61 52.9	73 32	70.4	62 14.6	72 32	69.6	62 36.1	71 32	68.9	66 31.1	58 29	58.3	66 48.4	57 29	57.2	69 16.3	41 24	45.6	1
2	60 04.2	76 33	72.4	60 26.9	75 32	71.7	61 33.6	73 32	69.6	61 55.4	72 32	68.9	62 17.0	71 32	68.2	66 13.7	59 29	57.7	66 31.2	58 28	56.7	69 01.7	42 24	45.2	2
3	59 44.7	76 32	71.6	60 07.5	75 32	71.0	61 14.4	73 32	68.9	61 36.3	73 32	68.2	61 58.0	72 32	67.5	65 56.4	60 29	57.2	66 14.1	58 28	56.2	68 47.2	43 24	44.9	3
4	59 25.3	76 32	70.9	59 48.1	76 32	70.2	60 55.3	74 32	68.2	61 17.3	73 32	67.5	61 39.1	72 31	66.8	65 39.2	60 28	56.7	65 57.1	59 28	55.7	68 32.7	44 24	44.6	4
75	59 06.0	77 32	70.1	59 28.8	76 32	69.5	60 36.3	74 32	67.5	60 58.4	73 31	66.8	61 20.2	72 31	66.1	65 22.1	61 28	56.2	65 40.2	60 28	55.2	68 18.4	45 24	44.3	75
6	58 46.7	77 32	69.4	59 09.7	76 32	68.8	60 17.4	74 31	66.8	60 39.6	74 31	66.1	61 01.5	73 31	65.4	65 05.1	62 28	55.6	65 23.4	60 28	54.7	68 04.1	46 24	44.0	6
7	58 27.5	77 32	68.6	58 50.6	76 32	68.0	59 58.6	75 31	66.1	60 20.9	74 31	65.4	60 42.9	73 31	64.7	64 48.2	62 28	55.1	65 06.7	61 28	54.2	67 49.9	47 24	43.6	7
8	58 08.5	77 32	67.9	58 31.6	77 31	67.3	59 39.9	75 31	65.4	60 02.2	74 31	64.7	60 24.4	74 31	64.1	64 31.4	63 28	54.6	64 50.1	62 27	53.7	67 35.8	48 23	43.3	8
9	57 49.5	78 31	67.2	58 12.7	77 31	66.6	59 21.3	75 31	64.7	59 43.7	75 31	64.1	60 06.0	74 30	63.4	64 14.7	63 28	54.1	64 33.6	62 27	53.2	67 21.7	49 23	43.0	9
80	57 30.7	78 31	66.5	57 53.9	77 31	65.9	59 02.8	76 31	64.0	59 25.3	75 30	63.4	59 47.7	74 30	62.7	63 58.2	64 27	53.5	64 17.3	63 27	52.6	67 07.8	50 23	42.6	80
1	57 11.9	78 31	65.7	57 35.3	78 31	65.1	58 44.4	76 30	63.3	59 07.1	75 30	62.7	59 29.5	75 30	62.0	63 41.7	65 27	53.0	64 01.0	64 27	52.1	66 53.9	51 23	42.3	1
2	56 53.2	78 31	65.0	57 16.7	78 31	64.4	58 26.1	76 30	62.6	58 48.9	76 30	62.0	59 11.5	75 30	61.4	63 25.4	65 27	52.5	63 44.9	64 27	51.6	66 40.2	52 23	41.9	2
3	56 34.7	79 31	64.3	56 58.2	78 31	63.7	58 07.9	77 30	62.0	58 30.8	76 30	61.3	58 53.5	75 30	60.7	63 09.2	66 27	52.0	63 28.8	65 27	51.1	66 26.5	53 23	41.6	3
4	56 16.3	79 31	63.6	56 39.9	79 30	63.0	57 49.9	77 30	61.3	58 12.9	76 30	60.7	58 35.7	76 30	60.0	62 53.1	67 27	51.4	63 12.9	66 26	50.6	66 12.9	54 22	41.2	4
85	55 57.9	79 30	62.9	56 21.7	79 30	62.3	57 31.9	77 30	60.6	57 55.0	77 30	60.0	58 18.0	76 29	59.4	62 37.1	67 26	50.9	62 57.1	66 26	50.1	65 59.5	55 22	40.9	85
6	55 39.7	80 30	62.2	56 03.6	79 30	61.6	57 14.1	78 30	59.9	57 37.3	77 29	59.3	58 00.4	77 29	58.7	62 21.2	68 26	50.4	62 41.4	67 26	49.6	65 46.1	56 22	40.5	6
7	55 21.6	80 30	61.5	55 45.6	79 30	60.9	56 56.4	78 29	59.3	57 19.7	77 29	58.7	57 42.9	77 29	58.1	62 05.5	68 26	49.9	62 25.8	67 26	49.1	65 32.8	56 22	40.1	7
8	55 03.7	80 30	60.8	55 27.7	80 30	60.2	56 38.8	78 29	58.6	57 02.3	78 29	58.0	57 25.5	77 29	57.4	61 49.8	69 26	49.3	62 10.4	68 26	48.6	65 19.6	57 22	39.8	8
9	54 45.8	81 30	60.1	55 09.9	80 29	59.5	56 21.4	79 29	57.9	56 44.9	78 29	57.4	57 08.3	78 28	56.8	61 34.3	70 26	48.8	61 55.1	69 25	48.1	65 06.6	58 22	39.4	9
90	54 28.1	81 29	59.4	54 52.3	80 29	58.8	56 04.1	79 29	57.2	56 27.7	79 28	56.7	56 51.2	78 28	56.1	61 18.9	70 25	48.3	61 39.9	69 25	47.5	64 53.6	59 21	39.0	90

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	54 10.5	81 29	58.7	54 34.8	81 29	58.2	55 46.9	79 28	56.6	56 10.6	79 28	56.0	56 34.2	78 28	55.5	61 03.7	71 25	47.8	61 24.8	70 25	47.0	64 40.7	60 21	38.7	91
2	53 53.1	81 29	58.0	54 17.4	81 29	57.5	55 29.8	80 28	55.9	55 53.7	79 28	55.4	56 17.4	79 28	54.8	60 48.6	71 25	47.3	61 09.8	71 25	46.5	64 27.9	61 21	38.3	2
3	53 35.7	82 29	57.3	54 00.2	81 28	56.8	55 12.9	80 28	55.3	55 36.8	80 28	54.7	56 00.7	79 28	54.2	60 33.6	72 25	46.7	60 55.0	71 24	46.0	64 15.3	62 21	37.9	3
4	53 18.5	82 28	56.6	53 43.1	82 28	56.1	54 56.1	80 28	54.6	55 20.2	80 28	54.1	55 44.1	80 27	53.6	60 18.7	72 25	46.2	60 40.3	72 24	45.5	64 02.7	63 21	37.5	4
95	53 01.5	82 28	55.9	53 26.1	82 28	55.4	54 39.4	81 28	53.9	55 03.6	80 27	53.4	55 27.7	80 27	52.9	60 03.9	73 24	45.7	60 25.7	72 24	45.0	63 50.3	63 21	37.1	95
6	52 44.5	83 28	55.2	53 09.3	82 28	54.8	54 22.9	81 27	53.3	54 47.2	81 27	52.8	55 11.4	80 27	52.3	59 49.3	74 24	45.2	60 11.3	73 24	44.5	63 37.9	64 20	36.8	6
7	52 27.8	83 28	54.5	52 52.6	83 28	54.1	54 06.5	82 27	52.6	54 30.9	81 27	52.1	54 55.2	81 27	51.6	59 34.8	74 24	44.6	59 57.0	74 24	44.0	63 25.7	65 20	36.4	7
8	52 11.1	83 28	53.9	52 36.1	83 27	53.4	53 50.3	82 27	52.0	54 14.8	81 27	51.5	54 39.2	81 26	51.0	59 20.5	75 24	44.1	59 42.8	74 23	43.4	63 13.6	66 20	36.0	8
9	51 54.6	84 27	53.2	52 19.7	83 27	52.7	53 34.2	82 27	51.3	53 58.8	82 26	50.9	54 23.3	81 26	50.4	59 06.3	75 23	43.6	59 28.8	75 23	42.9	63 01.6	67 20	35.6	9
100	51 38.3	84 27	52.5	52 03.4	84 27	52.1	53 18.2	83 26	50.7	53 43.0	82 26	50.2	54 07.6	82 26	49.7	58 52.2	76 23	43.1	59 14.9	75 23	42.4	62 49.7	68 20	35.2	100
1	51 22.1	84 27	51.8	51 47.3	84 27	51.4	53 02.4	83 26	50.0	53 27.3	83 26	49.6	53 52.0	82 26	49.1	58 38.2	76 23	42.5	59 01.1	76 23	41.9	62 38.0	68 19	34.8	1
2	51 06.0	85 27	51.2	51 31.3	84 26	50.7	52 46.8	83 26	49.4	53 11.7	83 26	48.9	53 36.6	83 25	48.5	58 24.4	77 23	42.0	58 47.4	76 22	41.4	62 26.3	69 19	34.4	2
3	50 50.1	85 26	50.5	51 15.5	85 26	50.1	52 31.3	84 26	48.7	52 56.3	83 25	48.3	53 21.3	83 25	47.8	58 10.8	77 23	41.5	58 33.9	77 22	40.9	62 14.8	70 19	34.0	3
4	50 34.3	85 26	49.8	50 59.9	85 26	49.4	52 15.9	84 25	48.1	52 41.1	84 25	47.7	53 06.1	83 25	47.2	57 57.3	78 22	40.9	58 20.6	77 22	40.4	62 03.3	71 19	33.6	4
105	50 18.7	86 26	49.1	50 44.4	85 26	48.7	52 00.7	84 25	47.5	52 26.0	84 25	47.0	52 51.2	84 25	46.6	57 43.9	79 22	40.4	58 07.4	78 22	39.8	61 52.1	71 19	33.2	105
6	50 03.3	86 25	48.5	50 29.0	86 25	48.1	51 45.7	85 25	46.8	52 11.1	84 25	46.4	52 36.3	84 24	45.9	57 30.7	79 22	39.9	57 54.3	79 22	39.3	61 40.9	72 18	32.8	6
7	49 48.0	86 25	47.8	50 13.8	86 25	47.4	51 30.8	85 25	46.2	51 56.3	85 24	45.7	52 21.7	84 24	45.3	57 17.6	80 22	39.4	57 41.4	79 21	38.8	61 29.8	73 18	32.4	7
8	49 32.9	87 25	47.1	49 58.8	86 25	46.7	51 16.1	85 24	45.5	51 41.7	85 24	45.1	52 07.2	85 24	44.7	57 04.6	80 21	38.8	57 28.6	80 21	38.3	61 18.9	74 18	32.0	8
9	49 17.9	87 25	46.5	49 44.0	87 24	46.1	51 01.5	86 24	44.9	51 27.2	85 24	44.5	51 52.8	85 24	44.1	56 51.8	81 21	38.3	57 15.9	80 21	37.8	61 08.1	74 18	31.6	9
110	49 03.1	87 24	45.8	49 29.2	87 24	45.4	50 47.1	86 24	44.2	51 12.9	86 24	43.8	51 38.6	86 23	43.4	56 39.2	81 21	37.8	57 03.5	81 21	37.2	60 57.4	75 18	31.2	110
1	48 48.5	87 24	45.1	49 14.7	87 24	44.8	50 32.9	86 23	43.6	50 58.8	86 23	43.2	51 24.6	86 23	42.8	56 26.7	82 21	37.2	56 51.1	81 20	36.7	60 46.9	76 17	30.7	1
2	48 34.1	88 24	44.5	49 00.3	88 24	44.1	50 18.8	87 23	43.0	50 44.8	87 23	42.6	51 10.7	86 23	42.2	56 14.3	82 20	36.7	56 38.9	82 20	36.2	60 36.4	76 17	30.3	2
3	48 19.8	88 24	43.8	48 46.1	88 23	43.5	50 04.9	87 23	42.3	50 31.0	87 23	41.9	50 57.0	87 23	41.6	56 02.1	83 20	36.2	56 26.9	82 20	35.7	60 26.1	77 17	29.9	3
4	48 05.6	88 23	43.1	48 32.1	88 23	42.8	49 51.2	87 23	41.7	50 17.4	87 22	41.3	50 43.5	87 22	40.9	55 50.1	83 20	35.7	56 15.0	83 20	35.2	60 16.0	78 17	29.5	4
115	47 51.7	89 23	42.5	48 18.3	88 23	42.1	49 37.6	88 22	41.1	50 03.9	88 22	40.7	50 30.1	87 22	40.3	55 38.2	84 20	35.1	56 03.2	83 19	34.6	60 05.9	78 17	29.1	115
6	47 37.9	89 23	41.8	48 04.6	89 22	41.5	49 24.2	88 22	40.4	49 50.6	88 22	40.1	50 17.0	88 22	39.7	55 26.5	84 19	34.6	55 51.6	84 19	34.1	59 56.0	79 16	28.6	6
7	47 24.3	89 22	41.2	47 51.1	89 22	40.8	49 11.0	88 22	39.8	49 37.5	88 22	39.4	50 03.9	88 21	39.1	55 14.9	85 19	34.1	55 40.2	84 19	33.6	59 46.3	80 16	28.2	7
8	47 10.9	90 22	40.5	47 37.8	89 22	40.2	48 57.9	89 21	39.2	49 24.5	89 21	38.8	49 51.1	88 21	38.4	55 03.5	85 19	33.5	55 28.9	85 19	33.1	59 36.6	80 16	27.8	8
9	46 57.7	90 22	39.8	47 24.6	90 22	39.5	48 45.1	89 21	38.5	49 11.8	89 21	38.2	49 38.4	89 21	37.8	54 52.2	85 18	33.0	55 17.8	85 18	32.5	59 27.1	81 16	27.4	9
120	46 44.6	90 21	39.2	47 11.6	90 21	38.9	48 32.4	89 21	37.9	48 59.2	89 21	37.5	49 25.9	89 21	37.2	54 41.1	86 18	32.5	55 06.9	86 18	32.0	59 17.8	81 15	27.0	120
1	46 31.7	90 21	38.5	46 58.8	90 21	38.2	48 19.9	90 21	37.2	48 46.8	90 20	36.9	49 13.6	89 20	36.6	54 30.2	86 18	31.9	54 56.1	86 18	31.5	59 08.5	82 15	26.5	1
2	46 19.0	91 21	37.9	46 46.2	91 21	37.6	48 07.5	90 20	36.6	48 34.5	90 20	36.3	49 01.5	90 20	36.0	54 19.4	87 18	31.4	54 45.4	86 17	31.0	58 59.4	83 15	26.1	2
3	46 06.5	91 21	37.2	46 33.8	91 20	36.9	47 55.4	90 20	36.0	48 22.5	90 20	35.7	48 49.5	90 20	35.3	54 08.8	87 17	30.9	54 34.9	87 17	30.5	58 50.5	83 15	25.7	3
4	45 54.2	91 20	36.6	46 21.6	91 20	36.3	47 43.4	91 20	35.4	48 10.6	91 19	35.0	48 37.7	90 19	34.7	53 58.4	88 17	30.3	54 24.6	87 17	29.9	58 41.6	84 14	25.2	4
125	45 42.1	92 20	35.9	46 09.5	91 20	35.6	47 31.6	91 19	34.7	47 58.9	91 19	34.4	48 26.1	91 19	34.1	53 48.1	88 17	29.8	54 14.5	88 17	29.4	58 33.0	84 14	24.8	125
6	45 30.1	92 20	35.2	45 57.7	92 19	35.0	47 20.1	91 19	34.1	47 47.4	91 19	33.8	48 14.7	91 19	33.5	53 38.0	88 17	29.3	54 04.5	88 16	28.9	58 24.4	85 14	24.4	6
7	45 18.4	92 19	34.6	45 46.0	92 19	34.3	47 08.6	92 19	33.5	47 36.1	91 19	33.2	48 03.5	91 18	32.9	53 28.0	89 16	28.7	53 54.6	89 16	28.3	58 16.0	85 14	23.9	7
8	45 06.8	92 19	33.9	45 34.6	92 19	33.7	46 57.4	92 18	32.8	47 25.0	92 18	32.5	47 52.5	92 18	32.2	53 18.2	89 16	28.2	53 45.0	89 16	27.8	58 07.8	86 14	23.5	8
9	44 55.5	93 19	33.3	45 23.3	93 18	33.0	46 46.4	92 18	32.2	47 14.0	92 18	31.9	47 41.6	92 18	31.6	53 08.6	90 16	27.7	53 35.5	89 16	27.3	57 59.7	87 13	23.1	9
130	44 44.3	93 18	32.6	45 12.2	93 18	32.4	46 35.6	92 18	31.6	47 03.3	92 18	31.3	47 31.0	92 17	31.0	52 59.2	90 15	27.1	53 26.2	90 15	26.8	57 51.7	87 13	22.6	130
1	44 33.4	93 18	32.0	45 01.3	93 18	31.7	46 24.9	93 17	30.9	46 52.7	93 17	30.7	47 20.5	92 17	30.4	52 49.9	90 15	26.6	53 17.0	90 15	26.2	57 43.9	88 13	22.2	1
2	44 22.6	93 18	31.3	44 50.6	93 18	31.1	46 14.5	93 17	30.3	46 42.4	93 17	30.0	47 10.2	93 17	29.8	52 40.8	91 15	26.1	53 08.0	91 15	25.7	57 36.2	88 13	21.8	2
3	44 12.0	94 17	30.7	44 40.1	94 17	30.4	46 04.2	93 17	29.7	46 32.2	93 17	29.4	47 00.1	93 16	29.1	52 31.9	91 15	25.5	52 59.2	91 14	25.2	57 28.7	89 12	21.3	3
4	44 01.7	94 17	30.0	44 29.8	94 17	29.8	45 54.2	94 16	29.0	46 22.2	93 16	28.8	46 50.2	93 16	28.5	52 23.1	92 14	25.0	52 50.6	91 14	24.7	57 21.3	89 12	20.9	4
135	43 51.5	94 17	29.4	44 19.7	94 16	29.1	45 44.3	94 16	28.4	46 12.4	94 16	28.2	46 40.5	94 16	27.9	52 14.5	92 14	24.4	52 42.1	92 14	24.1	57 14.0	89 12	20.4	135
6	43 41.5	94 16	28.7	44 09.8	94 16	28.5	45 34.6	94 16	27.8	46 02.8	94 16	27.5	46 31.0	94 16	27.3	52 06.1	92 14	23.9	52 33.8	92 14	23.6	57 06.9	90 12	20.0	6
7	43 31.8	95 16	28.1	44 00.2	95 16	27.8	45 25.2	94 15	27.1	45 53.5	94 15	26.9	46 21.7	94 15	26.7	51 57.9	93 13	23.4	52 25.7	92 13	23.1	57 00.0	90 11	19.6	7
8	43 22.2	95 16	27.4	43 50.7	95 15	27.2	45 15.9	95 15	26.5	45 44.3	94 15	26.3	46 12.6	94 15	26.0	51 49.9	93 13	22.8	52 17.7	93 13	22.5	56 53.2	91 11	19.1	8
9	43 12.9	95 15	26.8	43 41.4	95 15	26.5	45 06.9	95 15	25.9	45 35.3	95 15	25.7	46 03.7	95 15	25.4	51 42.0	93 13	22.3	52 09.9	93 13	22.0	56 46.6	91 11	18.7	9
140	43 03.8	95 15	26.1	43 32.4	95 15	25.9	44 58.0	95 14	25.2	45 26.5	95 14	25.0	45 55.0	95 14	24.8	51 34.3	94 13	21.8	52 02.3	93 12	21.5	56 40.1	92 11	18.2	140
1	42 54.8	96 15	25.4	43 23.5	96 14	25.2	44 49.4	95 14	24.6	45 17.9	95 14	24.4	45 46.5	95 14	24.2	51 26.8	94 12	21.2	51 54.9	94 12	20.9	56 33.7	92 10	17.8	1
2	42 46.1	96 14	24.8	43 14.8	96 14	24.6	44 40.9	96 14	24.0	45 09.6	95 14	23.8	45 38.2	95 14	23.6	51 19.4	94 12	20.7	51 47.7	94 12	20.4	56 27.5	92 10	17.3	2
3	42 37.6	96 14	24.1	43 06.4	96 14	23.9	44 32.7	96 13	23.4	45 01.4	96 13	23.2	45 30.1	96 13	22.9	51 12.3	94 12	20.1	51 40.6	94 11	19.9	56 21.5	93 10	16.9	3
4	42 29.3	96 13	23.5	42 58.2	96 13	23.3	44 24.6	96 13	22.7	44 53.4	96 13	22.5	45 22.2	96 13	22.3	51 05.3	95 11	19.6	51 33.7	95 11	19.3	56 15.6	93 10	16.4	4
145	42 21.3	96 13	22.8	42 50.2	96 13	22.7	44 16.8	96 13	22.1	44 45.7	96 13	21.9	45 14.5	96 12	21.7	50 58.5	95 11	19.1	51 27.0	95 11	18.8	56 09.9	94 09	16.0	145
6	42 13.4	97 13	22.2	42 42.4	97 13	22.0	44 09.2	96 12	21.5	44 38.1	96 12	21.3	45 07.0	96 12	21.1	50 51.9	95 11	18.5	51 20.5	95 11	18.3	56 04.3	94 09	15.5	6
7	42 05.8	97 12	21.5	42 34.8	97 12	21.4	44 01.8	97 12	20.8	44 30.8	97 12	20.7	44 59.7	96 12	20.5	50 45.5	96 10	18.0	51 14.2	95 10	17.7	55 58.9	94 09	15.1	7
8	41 58.3	97 12	20.9	42 27.4	97 12	20.7	43 54.6	97 12	20.2	44 23.6	97 12	20.0	44 52.6	97 11	19.8	50 39.3	96 10	17.4	51 08.0	96 10	17.2	55 53.7	95 08	14.6	8
9	41 51.1	97 12	20.2	42 20.3	97 12	20.1	43 47.6	97 11	19.6	44 16.7	97 11	19.4	44 45.8	97 11	19.2	50 33.2	96 10	16.9	51 02.0	96 10	16.7	55 48.6	95 08	14.2	9
150	41 44.2	97 11	19.6	42 13.4	97 11	19.4	43 40.9	97 11	18.9	44 10.0	97 11	18.8	44 39.1	97 11	18.6	50 27.3	96 09	16.3	50 56.2	96 09	16.1	55 43.6	95 08	13.7	150
1	41 37.4	98 11	18.9	42 06.6	97 11	18.8	43 34.3	97 11	18.3	44 03.5	97 10	18.2	44 32.7	97 10	18.0	50 21.7	97 09	15.8	50 50.6	96 09	15.6	55 38.8	96 08	13.3	1
2	41 30.8	98 11	18.3	42 00.1	98 10	18.1	43 28.0	98 10	17.7	43 57.2	97 10	17.5	44 26.5	97 10	17.4	50 16.2	97 09	15.3	50 45.2	97 09	15.1	55 34.2	96 07	12.8	2
3	41 24.5	98 10	17.6	41 53.9	98 10	17.5	43 21.8	98 10	17.0	43 51.1	98 10	16.9	44 20.4	98 10	16.7	50 10.8	97 09	14.7	50 39.9	97 08	14.5	55 29.7	96 07	12.4	3
4	41 18.4	98 10	17.0	41 47.8	98 10	16.8	43 15.9	98 09	16.4	43 45.3	98 09	16.3	44 14.6	98 09	16.1	50 05.7	97 08	14.2	50 34.9	97 08	14.0	55 25.4	96 07	11.9	4
155	41 12.6	98 09	16.3	41 42.0	98 09	16.2	43 10.2	98 09	15.8	43 39.6	98 09	15.6	44 09.0	98 09	15.5	50 00.8	97 08	13.6	50 30.0	97 08	13.5	55 21.2	97 07	11.5	155
6	41 06.9	98 09	15.7	41 36.4	98 09	15.5	43 04.8	98 09	15.2	43 34.2	98 09	15.0	44 03.7	98 09	14.9	49 56.1	98 08	13.1	50 25.3	98 07	12.9	55 17.2	97 06	11.0	6
7	41 01.5	98 09	15.0	41 31.0	98 09	14.9	42 59.5	98 08	14.5	43 29.0	98 08	14.4	43 58.5	98 08	14.3	49 51.5	98 07	12.5	50 20.8	98 07	12.4	55 13.4	97 06	10.5	7
8	40 56.3	99 08	14.4	41 25.8	99 08	14.2	42 54.5	98 08	13.9	43 24.0	98 08	13.8	43 53.5	98 08	13.7	49 47.1	98 07	12.0	50 16.5	98 07	11.8	55 09.7	97 06	10.1	8
9	40 51.3	99 08	13.7	41 20.9	99 08	13.6	42 49.7	99 08	13.3	43 19.2	99 08	13.1	43 48.8	99 08	13.0	49 43.0	98 07	11.5	50 12.4	98 07	11.3	55 06.2	98 06	09.6	9
160	40 46.5	99 08	13.1	41 16.2	99 07	12.9	42 45.1	99 07	12.6	43 14.7	99 07	12.5	43 44.3	99 07	12.4	49 39.0	98 06	10.9	50 08.5	98 06	10.8	55 02.9	98 05	09.2	160
1	40 42.0	99 07	12.4	41 11.7	99 07	12.3	42 40.7	99 07	12.0	43 10.3	99 07	11.9	43 40.0	99 07	11.8	49 35.2	99 06	10.4	50 04.8	98 06	10.2	54 59.7	98 05	08.7	1
2	40 37.7	99 07	11.7	41 07.4	99 07	11.7	42 36.5	99 07	11.4	43 06.2	99 06	11.3	43 35.9	99 06	11.2	49 31.6	99 06	09.8	50 01.2	99 06	09.7	54 56.6	98 05	08.3	2
3	40 33.7	99 06	11.1	41 03.4	99 06	11.0	42 32.6	99 06	10.7	43 02.3	99 06	10.6	43 32.0	99 06	10.5	49 28.2	99 05	09.3	49 57.8	99 05	09.2	54 53.8	98 04	07.8	3
4	40 29.8	99 06	10.4	40 59.6	99 06	10.4	42 28.9	99 06	10.1	42 58.6	99 06	10.0	43 28.4	99 06	09.9	49 25.0	99 05	08.7	49 54.7	99 05	08.6	54 51.1	99 04	07.4	4
165	40 26.2	99 06	09.8	40 56.0	99 06	09.7	42 25.4	99 05	09.5	42 55.2	99 05	09.4	43 25.0	99 05	09.3	49 22.0	99 05	08.2	49 51.7	99 05	08.1	54 48.5	99 04	06.9	165
6	40 22.9	99 05	09.1	40 52.7	99 05	09.1	42 22.1	99 05	08.8	42 51.9	99 05	08.8	43 21.7	99 05	08.7	49 19.1	99 04	07.6	49 48.9	99 04	07.5	54 46.1	99 04	06.4	6
7	40 19.7	99 05	08.5	40 49.6	99 05	08.4	42 19.1	99 05	08.2	42 48.9	99 05	08.1	43 18.8	99 05	08.1	49 16.5	99 04	07.1	49 46.3	99 04	07.0	54 43.9	99 03	06.0	7
8	40 16.8	1.0 04	07.8	40 46.7	1.0 04	07.8	42 16.3	1.0 04	07.6	42 46.1	1.0 04	07.5	43 16.0	1.0 04	07.4	49 14.1	99 04	06.6	49 43.9	99 04	06.5	54 41.9	99 03	05.5	8
9	40 14.1	1.0 04	07.2	40 44.0	1.0 04	07.1	42 13.7	1.0 04	06.9	42 43.6	1.0 04	06.9	43 13.4	1.0 04	06.8	49 11.8	1.0 03	06.0	49 41.7	99 03	05.9	54 40.0	99 03	05.1	9
170	40 11.7	1.0 04	06.5	40 41.6	1.0 04	06.5	42 11.3	1.0 04	06.3	42 41.2	1.0 04	06.3	43 11.1	1.0 04	06.2	49 09.8	1.0 03	05.5	49 39.6	1.0 03	05.4	54 38.2	99 03	04.6	170
1	40 09.5	1.0 03	05.9	40 39.4	1.0 03	05.8	42 09.2	1.0 03	05.7	42 39.1	1.0 03	05.6	43 09.0	1.0 03	05.6	49 07.9	1.0 03	04.9	49 37.8	1.0 03	04.9	54 36.7	1.0 02	04.1	1
2	40 07.5	1.0 03	05.2	40 37.4	1.0 03	05.2	42 07.2	1.0 03	05.1	42 37.2	1.0 03	05.0	43 07.1	1.0 03	05.0	49 06.3	1.0 02	04.4	49 36.2	1.0 02	04.3	54 35.3	1.0 02	03.7	2
3	40 05.7	1.0 03	04.6	40 35.7	1.0 03	04.5	42 05.5	1.0 02	04.4	42 35.5	1.0 02	04.4	43 05.4	1.0 02	04.3	49 04.8	1.0 02	03.8	49 34.7	1.0 02	03.8	54 34.0	1.0 02	03.2	3
4	40 04.2	1.0 02	03.9	40 34.2	1.0 02	03.9	42 04.1	1.0 02	03.8	42 34.0	1.0 02	03.8	43 04.0	1.0 02	03.7	49 03.5	1.0 02	03.3	49 33.5	1.0 02	03.2	54 33.0	1.0 02	02.8	4
175	40 02.9	1.0 02	03.3	40 32.9	1.0 02	03.2	42 02.8	1.0 02	03.2	42 32.8	1.0 02	03.1	43 02.8	1.0 02	03.1	49 02.4	1.0 01	02.7	49 32.4	1.0 01	02.7	54 32.1	1.0 01	02.3	175
6	40 01.9	1.0 01	02.6	40 31.9	1.0 01	02.6	42 01.8	1.0 01	02.5	42 31.8	1.0 01	02.5	43 01.8	1.0 01	02.5	49 01.6	1.0 01	02.2	49 31.5	1.0 01	02.2	54 31.3	1.0 01	01.8	6
7	40 01.1	1.0 01	02.0	40 31.0	1.0 01	01.9	42 01.0	1.0 01	01.9	42 31.0	1.0 01	01.9	43 01.0	1.0 01	01.9	49 00.9	1.0 01	01.6	49 30.9	1.0 01	01.6	54 30.7	1.0 01	01.4	7
8	40 00.5	1.0 01	01.3	40 30.5	1.0 01	01.3	42 00.5	1.0 01	01.3	42 30.4	1.0 01	01.3	43 00.4	1.0 01	01.2	49 00.4	1.0 00	01.1	49 30.4	1.0 00	01.1	54 30.3	1.0 00	00.9	8
9	40 00.1	1.0 00	00.7	40 30.1	1.0 00	00.6	42 00.1	1.0 00	00.6	42 30.1	1.0 00	00.6	43 00.1	1.0 00	00.6	49 00.1	1.0 00	00.5	49 30.1	1.0 00	00.5	54 30.1	1.0 00	00.5	9
180	40 00.0	1.0 00	00.0	40 30.0	1.0 00	00.0	42 00.0	1.0 00	00.0	42 30.0	1.0 00	00.0	43 00.0	1.0 00	00.0	49 00.0	1.0 00	00.0	49 30.0	1.0 00	00.0	54 30.0	1.0 00	00.0	18

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	24	180	28	180	32	180	36	180	40	180	44	180	48	180	52	180	56	180	60	180	64	180	00
4	24	176	28	176	32	175	36	175	40	175	44	175	48	175	52	174	56	174	60	174	64	173	4
8	24	171	28	171	32	171	36	171	40	170	44	170	48	169	52	169	56	168	60	168	64	167	8
12	24	167	28	167	32	166	35	166	39	165	43	165	47	164	51	164	55	163	59	162	63	161	12
16	23	163	27	162	31	162	35	161	39	161	43	160	47	159	51	158	55	157	59	156	63	154	16
20	23	158	27	158	31	157	35	156	39	156	43	155	46	154	50	153	54	152	58	150	62	148	20
24	22	154	26	153	30	153	34	152	38	151	42	150	46	149	50	148	54	146	57	145	61	142	24
28	22	150	25	149	29	148	33	147	37	146	41	145	45	144	49	143	53	141	57	139	60	137	28
32	21	146	25	145	29	144	33	143	36	142	40	141	44	139	48	138	52	136	56	134	59	131	32
36	20	141	24	140	28	139	32	138	36	137	39	136	43	135	47	133	51	131	55	129	58	126	36
40	19	137	23	136	27	135	31	134	35	133	38	131	42	130	46	128	50	126	54	124	57	121	40
44	18	133	22	132	26	131	30	130	34	128	37	127	41	125	45	124	49	122	52	119	56	116	44
48	17	129	21	128	25	127	29	126	32	124	36	123	40	121	44	119	48	117	51	115	55	112	48
52	16	125	20	124	24	123	27	121	31	120	35	118	39	117	43	115	46	113	50	110	54	107	52
56	15	121	19	120	22	119	26	117	30	116	34	114	38	113	41	111	45	108	49	106	52	103	56
60	14	117	17	116	21	115	25	113	29	112	33	110	36	108	40	106	44	104	47	102	51	99	60
64	12	113	16	112	20	111	24	109	28	108	31	106	35	104	39	102	42	100	46	98	50	95	64
68	11	109	15	108	19	107	22	105	26	104	30	102	34	100	37	98	41	96	45	94	48	91	68
72	10	106	14	104	17	103	21	101	25	100	29	98	32	97	36	95	40	93	43	90	47	88	72
76	09	102	12	100	16	99	20	98	24	96	27	94	31	93	35	91	38	89	42	86	45	84	76
80	07	98	11	97	15	95	18	94	22	92	26	91	30	89	33	87	37	85	41	83	44	80	80
84	06	94	10	93	13	91	17	90	21	88	25	87	28	85	32	83	36	81	39	79	43	77	84
88	04	91	08	89	12	88	16	86	19	85	23	83	27	82	31	80	34	78	38	76	41	73	88
92	03	87	07	85	11	84	14	83	18	81	22	80	26	78	29	76	33	74	37	72	40	70	92
96	02	83	05	82	09	80	13	79	17	77	20	76	24	74	28	73	32	71	35	69	39	67	96
100	00	79	04	78	08	77	12	75	15	74	19	72	23	71	27	69	30	67	34	65	38	63	100
104	*01*	75	03	74	07	73	10	71	14	70	18	69	22	67	25	66	29	64	33	62	36	60	104
108	*02*	72	01	70	05	69	09	68	13	66	17	65	20	64	24	62	28	60	32	59	35	57	108
112	*04*	68	00	67	04	65	08	64	12	63	15	61	19	60	23	59	27	57	30	55	34	54	112
116	*05*	64	*01*	63	03	62	07	60	10	59	14	58	18	57	22	55	26	54	29	52	33	50	116
120	*06*	60	*02*	59	02	58	05	57	09	56	13	54	17	53	21	52	24	50	28	49	32	47	120
124	*07*	56	*03*	55	00	54	04	53	08	52	12	51	16	50	20	48	23	47	27	46	31	44	124
128	*08*	53	*04*	52	*01*	50	03	49	07	48	11	47	15	46	19	45	22	44	26	42	30	41	128
132	*09*	49	*06*	48	*02*	47	02	46	06	45	10	44	14	43	18	41	22	40	25	39	29	38	132
136	*10*	45	*06*	44	*03*	43	01	42	05	41	09	40	13	39	17	38	21	37	25	36	28	35	136
140	*11*	41	*07*	40	*03*	39	00	38	04	37	08	36	12	35	16	35	20	34	24	33	28	31	140
144	*12*	37	*08*	36	*04*	35	*00*	34	04	34	07	33	11	32	15	31	19	30	23	29	27	28	144
148	*13*	33	*09*	32	*05*	31	*01*	31	03	30	07	29	11	28	15	28	19	27	22	26	26	25	148
152	*14*	29	*10*	28	*06*	27	*02*	27	02	26	06	26	10	25	14	24	18	24	22	23	26	22	152
156	*14*	25	*10*	24	*06*	24	*02*	23	02	22	06	22	10	21	13	21	17	20	21	20	25	19	156
160	*15*	21	*11*	20	*07*	20	*03*	19	01	19	05	18	09	18	13	17	17	17	21	16	25	16	160
164	*15*	17	*11*	16	*07*	16	*03*	15	01	15	05	15	09	14	13	14	17	13	21	13	25	13	164
168	*16*	12	*12*	12	*08*	12	*04*	12	00	11	04	11	08	11	12	10	16	10	20	10	24	09	168
172	*16*	08	*12*	08	*08*	08	*04*	08	00	08	04	07	08	07	12	07	16	07	20	07	24	06	172
176	*16*	04	*12*	04	*08*	04	*04*	04	00	04	04	04	08	04	12	03	16	03	20	03	24	03	176
180	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18868

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec,	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	00
4	68	173	72	172	76	171	80	169	84	164	88	142	88	31	84	09	80	04	76	02	72	00	4
8	68	166	72	164	76	162	79	158	83	149	87	121	87	49	84	18	80	08	76	03	72	01	8
12	67	159	71	157	75	153	79	148	82	136	85	109	86	57	83	25	80	12	76	05	72	01	12
16	67	152	71	149	74	145	78	138	81	126	84	102	84	62	82	30	79	15	76	07	72	02	16
20	66	146	70	142	73	138	77	130	80	118	83	96	83	64	82	35	79	18	76	08	72	02	20
24	65	140	69	136	73	131	76	123	79	111	81	92	82	64	81	38	78	21	75	10	72	03	24
28	64	134	68	130	71	124	75	117	78	105	80	88	81	65	80	41	78	23	75	11	72	03	28
32	63	128	67	124	70	119	74	111	76	100	79	85	80	64	79	43	77	25	75	12	72	03	32
36	62	123	66	119	69	113	72	106	75	96	77	82	78	64	78	44	77	26	74	13	72	04	36
40	61	118	64	114	68	108	71	101	74	92	76	79	77	63	77	45	76	28	74	14	71	04	40
44	60	113	63	109	66	104	70	97	72	88	74	76	76	62	76	45	76	29	74	15	71	04	44
48	58	109	62	104	65	99	68	93	71	84	73	74	75	60	75	45	75	30	73	16	71	05	48
52	57	104	60	100	64	95	67	89	70	81	72	71	73	59	74	45	74	30	73	16	71	05	52
56	56	100	59	96	62	91	65	85	68	78	71	69	72	58	73	44	73	30	73	17	71	05	56
60	54	96	58	92	61	88	64	82	67	75	69	66	71	56	72	44	73	31	72	17	71	05	60
64	53	92	56	88	60	84	63	79	66	72	68	64	70	55	71	43	72	30	72	18	71	05	64
68	52	88	55	85	58	81	61	75	64	69	67	62	69	53	71	42	71	30	71	18	71	06	68
72	50	85	54	81	57	77	60	72	63	67	66	60	68	51	70	41	71	30	71	18	71	06	72
76	49	81	52	78	56	74	59	69	62	64	64	57	67	50	69	40	70	30	71	18	70	06	76
80	48	78	51	74	54	71	58	66	61	61	63	55	66	48	68	39	69	29	70	18	70	06	80
84	46	74	50	71	53	68	56	64	59	59	62	53	65	46	67	38	69	28	70	17	70	06	84
88	45	71	48	68	52	65	55	61	58	56	61	51	64	44	66	37	68	28	69	17	70	06	88
92	44	68	47	65	51	62	54	58	57	54	60	49	63	43	65	35	67	27	69	17	70	06	92
96	42	64	46	62	49	59	53	55	56	51	59	46	62	41	65	34	67	26	69	17	70	06	96
100	41	61	45	59	48	56	52	53	55	49	58	44	61	39	64	33	66	25	68	16	70	06	100
104	40	58	44	56	47	53	51	50	54	46	57	42	60	37	63	31	66	24	68	16	69	06	104
108	39	55	42	53	46	50	50	47	53	44	56	40	59	35	62	30	65	23	67	15	69	05	108
112	38	52	41	50	45	47	49	44	52	41	55	38	59	33	62	28	65	22	67	14	69	05	112
116	37	49	40	47	44	44	48	42	51	39	55	36	58	32	61	27	64	21	67	14	69	05	116
120	36	46	39	44	43	42	47	39	50	36	54	33	57	30	61	25	64	20	66	13	69	05	120
124	35	42	39	41	42	39	46	37	50	34	53	31	57	28	60	24	63	19	66	12	69	05	124
128	34	39	38	38	41	36	45	34	49	32	52	29	56	26	59	22	63	17	66	12	69	04	128
132	33	36	37	35	41	33	44	31	48	29	52	27	55	24	59	20	62	16	66	11	69	04	132
136	32	33	36	32	40	30	44	29	47	27	51	25	55	22	58	19	62	15	65	10	69	04	136
140	32	30	35	29	39	28	43	26	47	24	51	22	54	20	58	17	62	14	65	09	68	03	140
144	31	27	35	26	39	25	42	23	46	22	50	20	54	18	58	15	61	12	65	08	68	03	144
148	30	24	34	23	38	22	42	21	46	19	50	18	54	16	57	14	61	11	65	07	68	03	148
152	30	21	34	20	38	19	42	18	45	17	49	16	53	14	57	12	61	10	65	07	68	03	152
156	29	18	33	17	37	17	41	16	45	15	49	13	53	12	57	10	61	08	64	06	68	02	156
160	29	15	33	15	37	14	41	13	45	12	49	11	53	10	57	09	60	07	64	05	68	02	160
164	29	12	33	12	37	11	40	10	44	10	48	09	52	08	56	07	60	06	64	04	68	01	164
168	28	09	32	09	36	08	40	08	44	07	48	07	52	06	56	05	60	04	64	03	68	01	168
172	28	06	32	06	36	06	40	05	44	05	48	04	52	04	56	03	60	03	64	02	68	01	172
176	28	03	32	03	36	03	40	03	44	02	48	02	52	02	56	02	60	01	64	01	68	00	176
180	28	00	32	00	36	00	40	00	44	00	48	00	52	00	56	00	60	00	64	00	68	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat 74°

Lat 75

16—13866

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 70°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	24	180	28	180	32	180	36	180	40	180	44	180	48	180	52	180	56	180	60	180	64	180	00
4	24	176	28	176	32	175	36	175	40	175	44	175	48	175	52	174	56	174	60	174	64	173	4
8	24	171	28	171	32	171	36	171	40	170	44	170	48	169	52	169	56	168	60	168	64	167	8
12	24	167	28	167	32	166	35	166	39	165	43	165	47	164	51	164	55	163	59	162	63	161	12
16	23	163	27	162	31	162	35	161	39	161	43	160	47	159	51	158	55	157	59	156	63	154	16
20	23	158	27	158	31	157	35	156	39	156	43	155	46	154	50	153	54	152	58	150	62	148	20
24	22	154	26	153	30	153	34	152	38	151	42	150	46	149	50	148	54	146	57	145	61	142	24
28	22	150	25	149	29	148	33	147	37	146	41	145	45	144	49	143	53	141	57	139	60	137	28
32	21	146	25	145	29	144	33	143	36	142	40	141	44	139	48	138	52	136	56	134	59	131	32
36	20	141	24	140	28	139	32	138	36	137	39	136	43	135	47	133	51	131	55	129	58	126	36
40	19	137	23	136	27	135	31	134	35	133	38	131	42	130	46	128	50	126	54	124	57	121	40
44	18	133	22	132	26	131	30	130	34	128	37	127	41	125	45	124	49	122	52	119	56	116	44
48	17	129	21	128	25	127	29	126	32	124	36	123	40	121	44	119	48	117	51	115	55	112	48
52	16	125	20	124	24	123	27	121	31	120	35	118	39	117	43	115	46	113	50	110	54	107	52
56	15	121	19	120	22	119	26	117	30	116	34	114	38	113	41	111	45	108	49	106	52	103	56
60	14	117	17	116	21	115	25	113	29	112	33	110	36	108	40	106	44	104	47	102	51	99	60
64	12	113	16	112	20	111	24	109	28	108	31	106	35	104	39	102	42	100	46	98	50	95	64
68	11	109	15	108	19	107	22	105	26	104	30	102	34	100	37	98	41	96	45	94	48	91	68
72	10	106	14	104	17	103	21	101	25	100	29	98	32	97	36	95	40	93	43	90	47	88	72
76	09	102	12	100	16	99	20	98	24	96	27	94	31	93	35	91	38	89	42	86	45	84	76
80	07	98	11	97	15	95	18	94	22	92	26	91	30	89	33	87	37	85	41	83	44	80	80
84	06	94	10	93	13	91	17	90	21	88	25	87	28	85	32	83	36	81	39	79	43	77	84
88	04	91	08	89	12	88	16	86	19	85	23	83	27	82	31	80	34	78	38	76	41	73	88
92	03	87	07	85	11	84	14	83	18	81	22	80	26	78	29	76	33	74	37	72	40	70	92
96	02	83	05	82	09	80	13	79	17	77	20	76	24	74	28	73	32	71	35	69	39	67	96
100	00	79	04	78	08	77	12	75	15	74	19	72	23	71	27	69	30	67	34	65	38	63	100
104	*01*	75	03	74	07	73	10	71	14	70	18	69	22	67	25	66	29	64	33	62	36	60	104
108	*02*	72	01	70	05	69	09	68	13	66	17	65	20	64	24	62	28	60	32	59	35	57	108
112	*04*	68	00	67	04	65	08	64	12	63	15	61	19	60	23	59	27	57	30	55	34	54	112
116	*05*	64	*01*	63	03	62	07	60	10	59	14	58	18	57	22	55	26	54	29	52	33	50	116
120	*06*	60	*02*	59	02	58	05	57	09	56	13	54	17	53	21	52	24	50	28	49	32	47	120
124	*07*	56	*03*	55	00	54	04	53	08	52	12	51	16	50	20	48	23	47	27	46	31	44	124
128	*08*	53	*04*	52	*01*	50	03	49	07	48	11	47	15	46	19	45	22	44	26	42	30	41	128
132	*09*	49	*06*	48	*02*	47	02	46	06	45	10	44	14	43	18	41	22	40	25	39	29	38	132
136	*10*	45	*06*	44	*03*	43	01	42	05	41	09	40	13	39	17	38	21	37	25	36	28	35	136
140	*11*	41	*07*	40	*03*	39	00	38	04	37	08	36	12	35	16	35	20	34	24	33	28	31	140
144	*12*	37	*08*	36	*04*	35	*00*	34	04	34	07	33	11	32	15	31	19	30	23	29	27	28	144
148	*13*	33	*09*	32	*05*	31	*01*	31	03	30	07	29	11	28	15	28	19	27	22	26	26	25	148
152	*14*	29	*10*	28	*06*	27	*02*	27	02	26	06	26	10	25	14	24	18	24	22	23	26	22	152
156	*14*	25	*10*	24	*06*	24	*02*	23	02	22	06	22	10	21	13	21	17	20	21	20	25	19	156
160	*15*	21	*11*	20	*07*	20	*03*	19	01	19	05	18	09	18	13	17	17	17	21	16	25	16	160
164	*15*	17	*11*	16	*07*	16	*03*	15	01	15	05	15	09	14	13	14	17	13	21	13	25	13	164
168	*16*	12	*12*	12	*08*	12	*04*	12	00	11	04	11	08	11	12	10	16	10	20	10	24	09	168
172	*16*	08	*12*	08	*08*	08	*04*	08	00	08	04	07	08	07	12	07	16	07	20	07	24	06	172
176	*16*	04	*12*	04	*08*	04	*04*	04	00	04	04	04	08	04	12	03	16	03	20	03	24	03	176
180	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec,	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	00
4	68	173	72	172	76	171	80	169	84	164	88	142	88	31	84	09	80	04	76	02	72	00	4
8	68	166	72	164	76	162	79	158	83	149	87	121	87	49	84	18	80	08	76	03	72	01	8
12	67	159	71	157	75	153	79	148	82	136	85	109	86	57	83	25	80	12	76	05	72	01	12
16	67	152	71	149	74	145	78	138	81	126	84	102	84	62	82	30	79	15	76	07	72	02	16
20	66	146	70	142	73	138	77	130	80	118	83	96	83	64	82	35	79	18	76	08	72	02	20
24	65	140	69	136	73	131	76	123	79	111	81	92	82	64	81	38	78	21	75	10	72	03	24
28	64	134	68	130	71	124	75	117	78	105	80	88	81	65	80	41	78	23	75	11	72	03	28
32	63	128	67	124	70	119	74	111	76	100	79	85	80	64	79	43	77	25	75	12	72	03	32
36	62	123	66	119	69	113	72	106	75	96	77	82	78	64	78	44	77	26	74	13	72	04	36
40	61	118	64	114	68	108	71	101	74	92	76	79	77	63	77	45	76	28	74	14	71	04	40
44	60	113	63	109	66	104	70	97	72	88	74	76	76	62	76	45	76	29	74	15	71	04	44
48	58	109	62	104	65	99	68	93	71	84	73	74	75	60	75	45	75	30	73	16	71	05	48
52	57	104	60	100	64	95	67	89	70	81	72	71	73	59	74	45	74	30	73	16	71	05	52
56	56	100	59	96	62	91	65	85	68	78	71	69	72	58	73	44	73	30	73	17	71	05	56
60	54	96	58	92	61	88	64	82	67	75	69	66	71	56	72	44	73	31	72	17	71	05	60
64	53	92	56	88	60	84	63	79	66	72	68	64	70	55	71	43	72	30	72	18	71	05	64
68	52	88	55	85	58	81	61	75	64	69	67	62	69	53	71	42	71	30	71	18	71	06	68
72	50	85	54	81	57	77	60	72	63	67	66	60	68	51	70	41	71	30	71	18	71	06	72
76	49	81	52	78	56	74	59	69	62	64	64	57	67	50	69	40	70	30	71	18	70	06	76
80	48	78	51	74	54	71	58	66	61	61	63	55	66	48	68	39	69	29	70	18	70	06	80
84	46	74	50	71	53	68	56	64	59	59	62	53	65	46	67	38	69	28	70	17	70	06	84
88	45	71	48	68	52	65	55	61	58	56	61	51	64	44	66	37	68	28	69	17	70	06	88
92	44	68	47	65	51	62	54	58	57	54	60	49	63	43	65	35	67	27	69	17	70	06	92
96	42	64	46	62	49	59	53	55	56	51	59	46	62	41	65	34	67	26	69	17	70	06	96
100	41	61	45	59	48	56	52	53	55	49	58	44	61	39	64	33	66	25	68	16	70	06	100
104	40	58	44	56	47	53	51	50	54	46	57	42	60	37	63	31	66	24	68	16	69	06	104
108	39	55	42	53	46	50	50	47	53	44	56	40	59	35	62	30	65	23	67	15	69	05	108
112	38	52	41	50	45	47	49	44	52	41	55	38	59	33	62	28	65	22	67	14	69	05	112
116	37	49	40	47	44	44	48	42	51	39	55	36	58	32	61	27	64	21	67	14	69	05	116
120	36	46	39	44	43	42	47	39	50	36	54	33	57	30	61	25	64	20	66	13	69	05	120
124	35	42	39	41	42	39	46	37	50	34	53	31	57	28	60	24	63	19	66	12	69	05	124
128	34	39	38	38	41	36	45	34	49	32	52	29	56	26	59	22	63	17	66	12	69	04	128
132	33	36	37	35	41	33	44	31	48	29	52	27	55	24	59	20	62	16	66	11	69	04	132
136	32	33	36	32	40	30	44	29	47	27	51	25	55	22	58	19	62	15	65	10	69	04	136
140	32	30	35	29	39	28	43	26	47	24	51	22	54	20	58	17	62	14	65	09	68	03	140
144	31	27	35	26	39	25	42	23	46	22	50	20	54	18	58	15	61	12	65	08	68	03	144
148	30	24	34	23	38	22	42	21	46	19	50	18	54	16	57	14	61	11	65	07	68	03	148
152	30	21	34	20	38	19	42	18	45	17	49	16	53	14	57	12	61	10	65	07	68	03	152
156	29	18	33	17	37	17	41	16	45	15	49	13	53	12	57	10	61	08	64	06	68	02	156
160	29	15	33	15	37	14	41	13	45	12	49	11	53	10	57	09	60	07	64	05	68	02	160
164	29	12	33	12	37	11	40	10	44	10	48	09	52	08	56	07	60	06	64	04	68	01	164
168	28	09	32	09	36	08	40	08	44	07	48	07	52	06	56	05	60	04	64	03	68	01	168
172	28	06	32	06	36	06	40	05	44	05	48	04	52	04	56	03	60	03	64	02	68	01	172
176	28	03	32	03	36	03	40	03	44	02	48	02	52	02	56	02	60	01	64	01	68	00	176
180	28	00	32	00	36	00	40	00	44	00	48	00	52	00	56	00	60	00	64	00	68	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 70°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	00
1	18 59.8	1.0 01	178.9	19 29.8	1.0 01	178.9	19 59.8	1.0 01	178.9	20 29.8	1.0 01	178.9	20 59.8	1.0 01	178.9	21 29.8	1.0 01	178.9	21 59.8	1.0 01	178.9	22 29.8	1.0 01	178.9	1
2	18 59.3	1.0 02	177.9	19 29.3	1.0 02	177.9	19 59.3	1.0 02	177.9	20 29.3	1.0 02	177.9	20 59.3	1.0 02	177.9	21 29.3	1.0 02	177.9	21 59.3	1.0 02	177.8	22 29.3	1.0 02	177.8	2
3	18 58.4	1.0 02	176.8	19 28.4	1.0 02	176.8	19 58.4	1.0 02	176.8	20 28.4	1.0 02	176.8	20 58.4	1.0 02	176.8	21 28.4	1.0 02	176.8	21 58.3	1.0 02	176.8	22 28.3	1.0 02	176.8	3
4	18 57.1	1.0 03	175.8	19 27.1	1.0 03	175.8	19 57.1	1.0 03	175.7	20 27.1	1.0 03	175.7	20 57.1	1.0 03	175.7	21 27.1	1.0 03	175.7	21 57.1	1.0 03	175.7	22 27.1	1.0 03	175.7	4
05	18 55.5	1.0 03	174.7	19 25.5	1.0 03	174.7	19 55.5	1.0 03	174.7	20 25.5	1.0 03	174.7	20 55.4	1.0 03	174.6	21 25.4	1.0 03	174.6	21 55.4	1.0 03	174.6	22 25.4	1.0 03	174.6	05
6	18 53.5	1.0 04	173.7	19 23.5	1.0 04	173.6	19 53.5	1.0 04	173.6	20 23.5	1.0 04	173.6	20 53.4	1.0 04	173.6	21 23.4	1.0 04	173.6	21 53.4	1.0 04	173.5	22 23.4	1.0 04	173.5	6
7	18 51.2	1.0 04	172.6	19 21.2	1.0 04	172.6	19 51.1	1.0 05	172.6	20 21.1	1.0 05	172.5	20 51.1	1.0 05	172.5	21 21.0	1.0 05	172.5	21 51.0	1.0 05	172.5	22 21.0	1.0 05	172.4	7
8	18 48.5	1.0 05	171.5	19 18.5	1.0 05	171.5	19 48.4	1.0 05	171.5	20 18.4	1.0 05	171.5	20 48.3	1.0 05	171.4	21 18.3	1.0 05	171.4	21 48.3	1.0 05	171.4	22 18.2	1.0 05	171.4	8
9	18 45.4	1.0 06	170.5	19 15.4	1.0 06	170.5	19 45.4	1.0 06	170.4	20 15.3	1.0 06	170.4	20 45.3	1.0 06	170.4	21 15.2	1.0 06	170.3	21 45.2	1.0 06	170.3	22 15.1	1.0 06	170.3	9
10	18 42.0	1.0 06	169.4	19 12.0	1.0 06	169.4	19 41.9	1.0 06	169.4	20 11.9	1.0 06	169.3	20 41.8	1.0 06	169.3	21 11.8	1.0 06	169.3	21 41.7	1.0 06	169.2	22 11.6	1.0 06	169.2	10
1	18 38.3	1.0 07	168.4	19 08.2	1.0 07	168.3	19 38.1	1.0 07	168.3	20 08.1	1.0 07	168.3	20 38.0	1.0 07	168.2	21 07.9	1.0 07	168.2	21 37.9	1.0 07	168.2	22 07.8	1.0 07	168.1	1
2	18 34.2	1.0 07	167.3	19 04.1	1.0 07	167.3	19 34.0	1.0 07	167.3	20 03.9	1.0 08	167.2	20 33.9	1.0 08	167.2	21 03.8	1.0 08	167.1	21 33.7	1.0 08	167.1	22 03.6	1.0 08	167.1	2
3	18 29.7	1.0 08	166.3	18 59.6	1.0 08	166.2	19 29.5	1.0 08	166.2	19 59.4	1.0 08	166.2	20 29.3	1.0 08	166.1	20 59.3	1.0 08	166.1	21 29.2	1.0 08	166.0	21 59.1	1.0 08	166.0	3
4	18 24.9	1.0 09	165.2	18 54.8	1.0 09	165.2	19 24.7	1.0 09	165.1	19 54.6	1.0 09	165.1	20 24.5	1.0 09	165.1	20 54.4	1.0 09	165.0	21 24.3	1.0 09	165.0	21 54.2	1.0 09	164.9	4
15	18 19.7	1.0 09	164.2	18 49.6	1.0 09	164.1	19 19.5	1.0 09	164.1	19 49.4	1.0 09	164.0	20 19.3	1.0 09	164.0	20 49.1	1.0 09	163.9	21 19.0	1.0 09	163.9	21 48.9	1.0 09	163.8	15
6	18 14.2	1.0 10	163.1	18 44.1	1.0 10	163.1	19 14.0	1.0 10	163.0	19 43.8	1.0 10	163.0	20 13.7	1.0 10	162.9	20 43.6	1.0 10	162.9	21 13.4	1.0 10	162.8	21 43.3	1.0 10	162.8	6
7	18 08.4	99 10	162.1	18 38.3	99 10	162.0	19 08.1	99 10	162.0	19 38.0	99 10	161.9	20 07.8	99 10	161.9	20 37.6	99 10	161.8	21 07.5	99 10	161.8	21 37.3	99 10	161.7	7
8	18 02.2	99 11	161.0	18 32.1	99 11	161.0	19 01.9	99 11	160.9	19 31.7	99 11	160.9	20 01.5	99 11	160.8	20 31.4	99 11	160.8	21 01.2	99 11	160.7	21 31.0	99 11	160.6	8
9	17 55.7	99 11	160.0	18 25.5	99 11	159.9	18 55.3	99 11	159.9	19 25.1	99 12	159.8	19 55.0	99 12	159.8	20 24.8	99 12	159.7	20 54.6	99 12	159.6	21 24.4	99 12	159.6	9
20	17 48.9	99 12	158.9	18 18.7	99 12	158.9	18 48.4	99 12	158.8	19 18.2	99 12	158.8	19 48.0	99 12	158.7	20 17.8	99 12	158.6	20 47.6	99 12	158.6	21 17.4	99 12	158.5	20
1	17 41.7	99 13	157.9	18 11.5	99 13	157.8	18 41.2	99 13	157.8	19 11.0	99 13	157.7	19 40.8	99 13	157.6	20 10.5	99 13	157.6	20 40.3	99 13	157.5	21 10.1	99 13	157.4	1
2	17 34.2	99 13	156.9	18 03.9	99 13	156.8	18 33.7	99 13	156.7	19 03.4	99 13	156.7	19 33.2	99 13	156.6	20 02.9	99 13	156.5	20 32.7	99 13	156.5	21 02.4	99 13	156.4	2
3	17 26.3	99 14	155.8	17 56.1	99 14	155.8	18 25.8	99 14	155.7	18 55.5	99 14	155.6	19 25.2	99 14	155.5	19 55.0	99 14	155.5	20 24.7	99 14	155.4	20 54.4	99 14	155.3	3
4	17 18.2	99 14	154.8	17 47.9	99 14	154.7	18 17.6	99 14	154.6	18 47.3	99 14	154.6	19 17.0	99 14	154.5	19 46.7	99 14	154.4	20 16.4	99 14	154.3	20 46.1	99 14	154.3	4
25	17 09.7	99 15	153.7	17 39.4	99 15	153.7	18 09.1	99 15	153.6	18 38.7	99 15	153.5	19 08.4	99 15	153.4	19 38.1	99 15	153.4	20 07.8	99 15	153.3	20 37.5	99 15	153.2	25
6	17 00.9	99 15	152.7	17 30.6	99 15	152.6	18 00.2	99 15	152.6	18 29.9	99 15	152.5	18 59.5	99 15	152.4	19 29.2	99 15	152.3	19 58.8	99 15	152.2	20 28.5	99 15	152.2	6
7	16 51.8	99 16	151.7	17 21.4	99 16	151.6	17 51.1	99 16	151.5	18 20.7	99 16	151.4	18 50.3	99 16	151.4	19 20.0	99 16	151.3	19 49.6	99 16	151.2	20 19.2	99 16	151.1	7
8	16 42.4	99 16	150.6	17 12.0	99 16	150.6	17 41.6	99 16	150.5	18 11.2	99 16	150.4	18 40.8	99 16	150.3	19 10.4	99 16	150.2	19 40.0	99 16	150.1	20 09.6	99 17	150.1	8
9	16 32.6	99 17	149.6	17 02.2	99 17	149.5	17 31.8	99 17	149.4	18 01.4	99 17	149.4	18 31.0	99 17	149.3	19 00.6	99 17	149.2	19 30.1	99 17	149.1	19 59.7	99 17	149.0	9
30	16 22.6	99 17	148.6	16 52.2	99 17	148.5	17 21.7	99 17	148.4	17 51.3	99 17	148.3	18 20.8	99 17	148.2	18 50.4	99 17	148.1	19 19.9	99 17	148.1	19 49.5	99 18	148.0	30
1	16 12.3	98 18	147.6	16 41.8	98 18	147.5	17 11.3	98 18	147.4	17 40.9	98 18	147.3	18 10.4	98 18	147.2	18 39.9	98 18	147.1	19 09.5	98 18	147.0	19 39.0	98 18	146.9	1
2	16 01.6	98 18	146.5	16 31.2	98 18	146.4	17 00.7	98 18	146.4	17 30.2	98 18	146.3	17 59.7	98 18	146.2	18 29.2	98 18	146.1	18 58.7	98 18	146.0	19 28.2	98 18	145.9	2
3	15 50.7	98 19	145.5	16 20.2	98 19	145.4	16 49.7	98 19	145.3	17 19.2	98 19	145.2	17 48.7	98 19	145.1	18 18.1	98 19	145.0	18 47.6	98 19	144.9	19 17.1	98 19	144.8	3
4	15 39.5	98 19	144.5	16 09.0	98 19	144.4	16 38.4	98 19	144.3	17 07.9	98 19	144.2	17 37.3	98 19	144.1	18 06.8	98 19	144.0	18 36.2	98 19	143.9	19 05.7	98 19	143.8	4
35	15 28.0	98 20	143.5	15 57.5	98 20	143.4	16 26.9	98 20	143.3	16 56.3	98 20	143.2	17 25.7	98 20	143.1	17 55.2	98 20	143.0	18 24.6	98 20	142.9	18 54.0	98 20	142.8	35
6	15 16.3	98 20	142.5	15 45.7	98 20	142.4	16 15.1	98 20	142.3	16 44.5	98 20	142.2	17 13.9	98 20	142.0	17 43.3	98 20	141.9	18 12.6	98 20	141.8	18 42.0	98 20	141.7	6
7	15 04.2	98 20	141.4	15 33.6	98 21	141.3	16 03.0	98 21	141.2	16 32.4	98 21	141.1	17 01.7	98 21	141.0	17 31.1	98 21	140.9	18 00.4	98 21	140.8	18 29.8	98 21	140.7	7
8	14 51.9	98 21	140.4	15 21.3	98 21	140.3	15 50.6	98 21	140.2	16 20.0	98 21	140.1	16 49.3	98 21	140.0	17 18.6	98 21	139.9	17 48.0	98 21	139.8	18 17.3	98 21	139.7	8
9	14 39.4	98 21	139.4	15 08.7	98 21	139.3	15 38.0	98 21	139.2	16 07.3	98 22	139.1	16 36.6	98 22	139.0	17 05.9	98 22	138.9	17 35.2	98 22	138.8	18 04.5	98 22	138.6	9
40	14 26.5	98 22	138.4	14 55.8	98 22	138.3	15 25.1	98 22	138.2	15 54.4	98 22	138.1	16 23.7	98 22	138.0	16 52.9	98 22	137.8	17 22.2	98 22	137.7	17 51.5	98 22	137.6	40
1	14 13.4	98 22	137.4	14 42.7	98 22	137.3	15 11.9	98 22	137.2	15 41.2	98 22	137.1	16 10.4	97 22	136.9	16 39.7	97 22	136.8	17 08.9	97 23	136.7	17 38.2	97 23	136.6	1
2	14 00.1	97 23	136.4	14 29.3	97 23	136.3	14 58.5	97 23	136.2	15 27.8	97 23	136.1	15 57.0	97 23	135.9	16 26.2	97 23	135.8	16 55.4	97 23	135.7	17 24.6	97 23	135.6	2
3	13 46.5	97 23	135.4	14 15.7	97 23	135.3	14 44.9	97 23	135.2	15 14.1	97 23	135.0	15 43.3	97 23	134.9	16 12.5	97 23	134.8	16 41.7	97 23	134.7	17 10.8	97 23	134.6	3
4	13 32.6	97 23	134.4	14 01.8	97 24	134.3	14 31.0	97 24	134.2	15 00.2	97 24	134.0	15 29.3	97 24	133.9	15 58.5	97 24	133.8	16 27.6	97 24	133.7	16 56.8	97 24	133.5	4
45	13 18.6	97 24	133.4	13 47.7	97 24	133.3	14 16.9	97 24	133.2	14 46.0	97 24	133.0	15 15.1	97 24	132.9	15 44.3	97 24	132.8	16 13.4	97 24	132.7	16 42.5	97 24	132.5	45
6	13 04.3	97 24	132.4	13 33.4	97 24	132.3	14 02.5	97 24	132.2	14 31.6	97 24	132.0	15 00.7	97 24	131.9	15 29.8	97 24	131.8	15 58.9	97 25	131.6	16 28.0	97 25	131.5	6
7	12 49.7	97 25	131.4	13 18.8	97 25	131.3	13 47.9	97 25	131.2	14 17.0	97 25	131.0	14 46.1	97 25	130.9	15 15.1	97 25	130.8	15 44.2	97 25	130.6	16 13.3	97 25	130.5	7
8	12 35.0	97 25	130.4	13 04.0	97 25	130.3	13 33.1	97 25	130.2	14 02.1	97 25	130.0	14 31.2	97 25	129.9	15 00.2	97 25	129.8	15 29.3	97 25	129.6	15 58.3	97 25	129.5	8
9	12 20.0	97 25	129.4	12 49.0	97 25	129.3	13 18.0	97 26	129.2	13 47.1	97 25	129.0	14 16.1	97 26	128.9	14 45.1	97 26	128.8	15 14.1	97 26	128.6	15 43.1	97 26	128.5	9
50	12 04.8	97 26	128.4	12 33.8	97 26	128.3	13 02.8	97 26	128.2	13 31.8	97 26	128.0	14 00.8	97 26	127.9	14 29.8	97 26	127.8	14 58.8	97 26	127.6	15 27.7	97 26	127.5	50
1	11 49.4	97 26	127.4	12 18.4	97 26	127.3	12 47.3	97 26	127.2	13 16.3	97 26	127.0	13 45.3	97 26	126.9	14 14.2	97 26	126.8	14 43.2	97 26	126.6	15 12.1	97 26	126.5	1
2	11 33.8	97 26	126.5	12 02.7	96 26	126.3	12 31.7	96 26	126.2	13 00.6	96 26	126.1	13 29.5	96 27	125.9	13 58.5	96 27	125.8	14 27.4	96 27	125.6	14 56.3	96 27	125.5	2
3	11 17.9	96 27	125.5	11 46.9	96 27	125.3	12 15.8	96 27	125.2	12 44.7	96 27	125.1	13 13.6	96 27	124.9	13 42.5	96 27	124.8	14 11.4	96 27	124.6	14 40.3	96 27	124.5	3
4	11 01.9	96 27	124.5	11 30.8	96 27	124.4	11 59.7	96 27	124.2	12 28.6	96 27	124.1	12 57.5	96 27	123.9	13 26.4	96 27	123.8	13 55.3	96 27	123.7	14 24.1	96 27	123.5	4
55	10 45.7	96 27	123.5	11 14.6	96 27	123.4	11 43.5	96 27	123.2	12 12.4	96 27	123.1	12 41.2	96 27	123.0	13 10.1	96 28	122.8	13 38.9	96 28	122.7	14 07.8	96 28	122.5	55
6	10 29.4	96 28	122.5	10 58.2	96 28	122.4	11 27.1	96 28	122.2	11 55.9	96 28	122.1	12 24.7	96 28	122.0	12 53.6	96 28	121.8	13 22.4	96 28	121.7	13 51.2	96 28	121.5	6
7	10 12.8	96 28	121.6	10 41.6	96 28	121.4	11 10.4	96 28	121.3	11 39.3	96 28	121.1	12 08.1	96 28	121.0	12 36.9	96 28	120.8	13 05.7	96 28	120.7	13 34.5	96 28	120.6	7
8	9 56.1	96 28	120.6	10 24.9	96 28	120.4	10 53.7	96 28	120.3	11 22.5	96 28	120.1	11 51.2	96 28	120.0	12 20.0	96 28	119.9	12 48.8	96 28	119.7	13 17.6	96 28	119.6	8
9	9 39.2	96 28	119.6	10 07.9	96 28	119.5	10 36.7	96 29	119.3	11 05.5	96 29	119.2	11 34.2	96 29	119.0	12 03.0	96 29	118.9	12 31.7	96 29	118.7	13 00.5	96 29	118.6	9
60	9 22.1	96 29	118.6	9 50.9	96 29	118.5	10 19.6	96 29	118.3	10 48.3	96 29	118.2	11 17.1	96 29	118.0	11 45.8	96 29	117.9	12 14.5	96 29	117.8	12 43.3	96 29	117.6	60
1	9 04.9	96 29	117.7	9 33.6	96 29	117.5	10 02.3	96 29	117.4	10 31.0	96 29	117.2	10 59.8	96 29	117.1	11 28.5	96 29	116.9	11 57.2	96 29	116.8	12 25.9	96 29	116.6	1
2	8 47.5	96 29	116.7	9 16.2	96 29	116.5	9 44.9	96 29	116.4	10 13.6	96 29	116.2	10 42.3	96 29	116.1	11 11.0	96 29	115.9	11 39.7	96 29	115.8	12 08.3	96 29	115.7	2
3	8 30.0	96 29	115.7	8 58.7	96 30	115.6	9 27.3	96 30	115.4	9 56.0	96 30	115.3	10 24.7	96 30	115.1	10 53.3	96 30	115.0	11 22.0	96 30	114.8	11 50.7	96 30	114.7	3
4	8 12.3	96 30	114.8	8 41.0	96 30	114.6	9 09.6	96 30	114.5	9 38.3	95 30	114.3	10 06.9	95 30	114.2	10 35.6	95 30	114.0	11 04.2	95 30	113.9	11 32.8	95 30	113.7	4
65	7 54.5	95 30	113.8	8 23.1	95 30	113.6	8 51.8	95 30	113.5	9 20.4	95 30	113.3	9 49.0	95 30	113.2	10 17.7	95 30	113.0	10 46.3	95 30	112.9	11 14.9	95 30	112.7	65
6	7 36.6	95 30	112.8	8 05.2	95 30	112.7	8 33.8	95 30	112.5	9 02.4	95 30	112.4	9 31.0	95 30	112.2	9 59.6	95 30	112.1	10 28.2	95 30	111.9	10 56.8	95 30	111.8	6
7	7 18.5	95 30	111.9	7 47.1	95 30	111.7	8 15.7	95 30	111.6	8 44.3	95 30	111.4	9 12.9	95 30	111.3	9 41.4	95 30	111.1	10 10.0	95 30	110.9	10 38.6	95 31	110.8	7
8	7 00.3	95 31	110.9	7 28.9	95 31	110.8	7 57.5	95 31	110.6	8 26.0	95 31	110.4	8 54.6	95 31	110.3	9 23.2	95 31	110.1	9 51.7	95 31	110.0	10 20.3	95 31	109.8	8
9	6 42.0	95 31	109.9	7 10.6	95 31	109.8	7 39.1	95 31	109.6	8 07.7	95 31	109.5	8 36.2	95 31	109.3	9 04.8	95 31	109.2	9 33.3	95 31	109.0	10 01.8	95 31	108.9	9
70	6 23.6	95 31	109.0	6 52.1	95 31	108.8	7 20.7	95 31	108.7	7 49.2	95 31	108.5	8 17.7	95 31	108.4	8 46.3	95 31	108.2	9 14.8	95 31	108.1	9 43.3	95 31	107.9	70
1	6 05.1	95 31	108.0	6 33.6	95 31	107.9	7 02.1	95 31	107.7	7 30.6	95 31	107.6	7 59.2	95 31	107.4	8 27.7	95 31	107.3	8 56.2	95 31	107.1	9 24.7	95 31	106.9	1
2	5 46.4	95 31	107.1	6 15.0	95 31	106.9	6 43.5	95 31	106.8	7 12.0	95 31	106.6	7 40.5	95 31	106.4	8 09.0	95 31	106.3	8 37.5	95 31	106.1	9 05.9	95 31	106.0	2
3	5 27.7	95 31	106.1	5 56.2	95 31	106.0	6 24.7	95 31	105.8	6 53.2	95 31	105.7	7 21.7	95 31	105.5	7 50.2	95 31	105.3	8 18.6	95 32	105.2	8 47.1	95 32	105.0	3
4	5 08.9	95 31	105.2	5 37.4	95 32	105.0	6 05.9	95 32	104.9	6 34.3	95 32	104.7	7 02.8	95 32	104.5	7 31.3	95 32	104.4	7 59.7	95 32	104.2	8 28.2	95 32	104.1	4
75				5 18.5	95 32	104.1	5 46.9	95 32	103.9	6 15.4	95 32	103.7	6 43.9	95 32	103.6	7 12.3	95 32	103.4	7 40.8	95 32	103.3	8 09.2	95 32	103.1	75
6							5 27.9	95 32	102.9	5 56.4	95 32	102.8	6 24.8	95 32	102.6	6 53.3	95 32	102.5	7 21.7	95 32	102.3	7 50.2	95 32	102.1	6
7							5 08.9	95 32	102.0	5 37.3	95 32	101.8	6 05.7	95 32	101.7	6 34.2	95 32	101.5	7 02.6	95 32	101.4	7 31.0	95 32	101.2	7
8										5 18.2	95 32	100.9	5 46.6	95 32	100.7	6 15.0	95 32	100.6	6 43.4	95 32	100.4	7 11.8	95 32	100.2	8
9													5 27.4	95 32	99.8	5 55.8	95 32	99.6	6 24.2	95 32	99.4	6 52.6	95 32	99.3	9
80													5 08.1	95 32	98.8	5 36.5	95 32	98.7	6 04.9	95 32	98.5	6 33.3	95 32	98.3	80
1																5 17.2	95 32	97.7	5 45.5	95 32	97.5	6 13.9	95 32	97.4	1
2																			5 26.2	95 32	96.6	5 54.5	95 32	96.4	2
3																			5 06.7	95 32	95.6	5 35.1	95 32	95.5	3
4																						5 15.7	95 32	94.5	4

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		°
00	19 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	00
1	18 59.8	1.0 01	178.9	18 29.8	1.0 01	178.9	17 59.8	1.0 01	178.9	17 29.8	1.0 01	179.0	16 59.8	1.0 01	179.0	16 29.8	1.0 01	179.0	15 59.8	1.0 01	179.0	15 29.8	1.0 01	179.0	1
2	18 59.3	1.0 02	177.9	18 29.3	1.0 02	177.9	17 59.3	1.0 02	177.9	17 29.3	1.0 01	177.9	16 59.3	1.0 01	177.9	16 29.3	1.0 01	177.9	15 59.3	1.0 01	177.9	15 29.3	1.0 01	177.9	2
3	18 58.4	1.0 02	176.8	18 28.4	1.0 02	176.8	17 58.4	1.0 02	176.8	17 28.4	1.0 02	176.9	16 58.4	1.0 02	176.9	16 28.4	1.0 02	176.9	15 58.4	1.0 02	176.9	15 28.4	1.0 02	176.9	3
4	18 57.1	1.0 03	175.8	18 27.1	1.0 03	175.8	17 57.1	1.0 03	175.8	17 27.1	1.0 03	175.8	16 57.2	1.0 03	175.8	16 27.2	1.0 03	175.8	15 57.2	1.0 03	175.8	15 27.2	1.0 03	175.9	4
05	18 55.5	1.0 03	174.7	18 25.5	1.0 03	174.7	17 55.5	1.0 03	174.7	17 25.5	1.0 03	174.8	16 55.6	1.0 03	174.8	16 25.6	1.0 03	174.8	15 55.6	1.0 03	174.8	15 25.6	1.0 03	174.8	05
6	18 53.5	1.0 04	173.7	18 23.5	1.0 04	173.7	17 53.6	1.0 04	173.7	17 23.6	1.0 04	173.7	16 53.6	1.0 04	173.7	16 23.6	1.0 04	173.8	15 53.6	1.0 04	173.8	15 23.7	1.0 04	173.8	6
7	18 51.2	1.0 04	172.6	18 21.2	1.0 04	172.6	17 51.2	1.0 04	172.6	17 21.3	1.0 04	172.7	16 51.3	1.0 04	172.7	16 21.3	1.0 04	172.7	15 51.3	1.0 04	172.7	15 21.4	1.0 04	172.8	7
8	18 48.5	1.0 05	171.5	18 18.5	1.0 05	171.6	17 48.6	1.0 05	171.6	17 18.6	1.0 05	171.6	16 48.6	1.0 05	171.6	16 18.7	1.0 05	171.7	15 48.7	1.0 05	171.7	15 18.7	1.0 05	171.7	8
9	18 45.4	1.0 06	170.5	18 15.5	1.0 06	170.5	17 45.5	1.0 06	170.5	17 15.6	1.0 06	170.6	16 45.6	1.0 06	170.6	16 15.7	1.0 06	170.6	15 45.7	1.0 06	170.7	15 15.7	1.0 06	170.7	9
10	18 42.0	1.0 06	169.4	18 12.1	1.0 06	169.5	17 42.1	1.0 06	169.5	17 12.2	1.0 06	169.6	16 42.2	1.0 06	169.6	16 12.3	1.0 06	169.6	15 42.3	1.0 06	169.6	15 12.4	1.0 06	169.7	10
1	18 38.3	1.0 07	168.4	18 08.3	1.0 07	168.4	17 38.4	1.0 07	168.5	17 08.5	1.0 07	168.5	16 38.5	1.0 07	168.5	16 08.6	1.0 07	168.6	15 38.7	1.0 07	168.6	15 08.7	1.0 07	168.6	1
2	18 34.2	1.0 07	167.3	18 04.2	1.0 07	167.4	17 34.3	1.0 07	167.4	17 04.4	1.0 07	167.4	16 34.5	1.0 07	167.5	16 04.5	1.0 07	167.5	15 34.6	1.0 07	167.6	15 04.7	1.0 07	167.6	2
3	18 29.7	1.0 08	166.3	17 59.8	1.0 08	166.3	17 29.9	1.0 08	166.4	17 00.0	1.0 08	166.4	16 30.1	1.0 08	166.4	16 00.1	1.0 08	166.5	15 30.2	1.0 08	166.5	15 00.3	1.0 08	166.6	3
4	18 24.9	1.0 09	165.2	17 55.0	1.0 09	165.3	17 25.1	1.0 09	165.3	16 55.2	1.0 08	165.4	16 25.3	1.0 08	165.4	15 55.4	1.0 08	165.4	15 25.5	1.0 08	165.5	14 55.6	1.0 08	165.5	4
15	18 19.7	1.0 09	164.2	17 49.9	1.0 09	164.2	17 20.0	1.0 09	164.3	16 50.1	1.0 09	164.3	16 20.2	1.0 09	164.4	15 50.3	1.0 09	164.4	15 20.4	1.0 09	164.5	14 50.6	1.0 09	164.5	15
6	18 14.2	1.0 10	163.1	17 44.4	1.0 10	163.2	17 14.5	1.0 10	163.2	16 44.6	1.0 10	163.3	16 14.8	1.0 10	163.3	15 44.9	1.0 10	163.4	15 15.0	1.0 10	163.4	14 45.2	1.0 10	163.5	6
7	18 08.4	99 10	162.1	17 38.6	99 10	162.1	17 08.7	1.0 10	162.2	16 38.9	1.0 10	162.2	16 09.0	1.0 10	162.3	15 39.2	1.0 10	162.3	15 09.3	1.0 10	162.4	14 39.4	1.0 10	162.4	7
8	18 02.2	99 11	161.0	17 32.4	99 11	161.1	17 02.6	99 11	161.1	16 32.7	99 11	161.2	16 02.9	99 11	161.3	15 33.1	99 11	161.3	15 03.2	99 11	161.4	14 33.4	99 11	161.4	8
9	17 55.7	99 11	160.0	17 25.9	99 11	160.0	16 56.1	99 11	160.1	16 26.3	99 11	160.2	15 56.5	99 11	160.2	15 26.6	99 11	160.3	14 56.8	99 11	160.3	14 27.0	99 11	160.4	9
20	17 48.9	99 12	158.9	17 19.1	99 12	159.0	16 49.3	99 12	159.1	16 19.5	99 12	159.1	15 49.7	99 12	159.2	15 19.9	99 12	159.2	14 50.1	99 12	159.3	14 20.3	99 12	159.4	20
1	17 41.7	99 13	157.9	17 11.9	99 12	158.0	16 42.1	99 12	158.0	16 12.4	99 12	158.1	15 42.6	99 12	158.2	15 12.8	99 12	158.2	14 43.0	99 12	158.3	14 13.2	99 12	158.3	1
2	17 34.2	99 13	156.9	17 04.4	99 13	156.9	16 34.7	99 13	157.0	16 04.9	99 13	157.1	15 35.1	99 13	157.1	15 05.4	99 13	157.2	14 35.6	99 13	157.3	14 05.9	99 13	157.3	2
3	17 26.3	99 14	155.8	16 56.6	99 14	155.9	16 26.9	99 14	156.0	15 57.1	99 14	156.0	15 27.4	99 13	156.1	14 57.7	99 13	156.2	14 27.9	99 13	156.2	13 58.2	99 13	156.3	3
4	17 18.2	99 14	154.8	16 48.5	99 14	154.9	16 18.7	99 14	154.9	15 49.0	99 14	155.0	15 19.3	99 14	155.1	14 49.6	99 14	155.1	14 19.9	99 14	155.2	13 50.2	99 14	155.3	4
25	17 09.7	99 15	153.7	16 40.0	99 15	153.8	16 10.3	99 15	153.9	15 40.6	99 15	154.0	15 10.9	99 14	154.0	14 41.2	99 14	154.1	14 11.5	99 14	154.2	13 41.8	99 14	154.3	25
6	17 00.9	99 15	152.7	16 31.2	99 15	152.8	16 01.6	99 15	152.9	15 31.9	99 15	152.9	15 02.2	99 15	153.0	14 32.5	99 15	153.1	14 02.9	99 15	153.2	13 33.2	99 15	153.3	6
7	16 51.8	99 16	151.7	16 22.1	99 16	151.8	15 52.5	99 16	151.8	15 22.8	99 16	151.9	14 53.2	99 16	152.0	14 23.6	99 16	152.1	13 53.9	99 15	152.2	13 24.3	99 15	152.2	7
8	16 42.4	99 16	150.6	16 12.7	99 16	150.7	15 43.1	99 16	150.8	15 13.5	99 16	150.9	14 43.9	99 16	151.0	14 14.3	99 16	151.1	13 44.6	99 16	151.1	13 15.0	99 16	151.2	8
9	16 32.6	99 17	149.6	16 03.0	99 17	149.7	15 33.4	99 17	149.8	15 03.8	99 17	149.9	14 34.2	99 17	150.0	14 04.7	99 16	150.0	13 35.0	99 16	150.1	13 05.4	99 16	150.2	9
30	16 22.6	99 17	148.6	15 53.0	99 17	148.7	15 23.5	99 17	148.8	14 53.9	99 17	148.9	14 24.3	99 17	148.9	13 54.7	99 17	149.0	13 25.2	99 17	149.1	12 55.6	99 17	149.2	30
1	16 12.3	98 18	147.6	15 42.7	98 18	147.7	15 13.2	98 18	147.7	14 43.6	98 18	147.8	14 14.1	98 18	147.9	13 44.5	98 18	148.0	13 15.0	99 17	148.1	12 45.4	99 17	148.2	1
2	16 01.6	98 18	146.5	15 32.1	98 18	146.6	15 02.6	98 18	146.7	14 33.1	98 18	146.8	14 03.6	98 18	146.9	13 34.1	98 18	147.0	13 04.5	98 18	147.1	12 35.0	98 18	147.2	2
3	15 50.7	98 19	145.5	15 21.2	98 19	145.6	14 51.8	98 19	145.7	14 22.3	98 19	145.8	13 52.8	98 18	145.9	13 23.3	98 18	146.0	12 53.8	98 18	146.1	12 24.3	98 18	146.2	3
4	15 39.5	98 19	144.5	15 10.1	98 19	144.6	14 40.6	98 19	144.7	14 11.1	98 19	144.8	13 41.7	98 19	144.9	13 12.2	98 19	145.0	12 42.7	98 19	145.1	12 13.3	98 19	145.2	4
35	15 28.0	98 20	143.5	14 58.6	98 20	143.6	14 29.2	98 20	143.7	13 59.7	98 19	143.8	13 30.3	98 19	143.9	13 00.9	98 19	144.0	12 31.4	98 19	144.1	12 02.0	98 19	144.2	35
6	15 16.3	98 20	142.5	14 46.9	98 20	142.6	14 17.5	98 20	142.7	13 48.1	98 20	142.8	13 18.6	98 20	142.9	12 49.2	98 20	143.0	12 19.8	98 20	143.1	11 50.4	98 20	143.2	6
7	15 04.2	98 20	141.4	14 34.9	98 20	141.6	14 05.5	98 20	141.7	13 36.1	98 20	141.8	13 06.7	98 20	141.9	12 37.3	98 20	142.0	12 07.9	98 20	142.1	11 38.5	98 20	142.2	7
8	14 51.9	98 21	140.4	14 22.6	98 21	140.5	13 53.2	98 21	140.6	13 23.9	98 21	140.8	12 54.5	98 21	140.9	12 25.2	98 21	141.0	11 55.8	98 21	141.1	11 26.4	98 21	141.2	8
9	14 39.4	98 21	139.4	14 10.0	98 21	139.5	13 40.7	98 21	139.6	13 11.4	98 21	139.7	12 42.1	98 21	139.9	12 12.7	98 21	140.0	11 43.4	98 21	140.1	11 14.1	98 21	140.2	9
40	14 26.5	98 22	138.4	13 57.2	98 22	138.5	13 27.9	98 22	138.6	12 58.6	98 22	138.7	12 29.3	98 22	138.9	12 00.0	98 22	139.0	11 30.7	98 22	139.1	11 01.4	98 22	139.2	40
1	14 13.4	98 22	137.4	13 44.2	98 22	137.5	13 14.9	98 22	137.6	12 45.6	98 22	137.7	12 16.4	98 22	137.9	11 47.1	98 22	138.0	11 17.8	98 22	138.1	10 48.5	98 22	138.2	1
2	14 00.1	97 23	136.4	13 30.8	97 23	136.5	13 01.6	97 23	136.6	12 32.4	97 23	136.7	12 03.1	97 22	136.9	11 33.9	97 22	137.0	11 04.6	98 22	137.1	10 35.4	98 22	137.2	2
3	13 46.5	97 23	135.4	13 17.3	97 23	135.5	12 48.1	97 23	135.6	12 18.9	97 23	135.7	11 49.6	97 23	135.9	11 20.4	97 23	136.0	10 51.2	97 23	136.1	10 22.0	97 23	136.2	3
4	13 32.6	97 23	134.4	13 03.5	97 23	134.5	12 34.3	97 23	134.6	12 05.1	97 23	134.8	11 35.9	97 23	134.9	11 06.7	97 23	135.0	10 37.5	97 23	135.1	10 08.3	97 23	135.2	4
45	13 18.6	97 24	133.4	12 49.4	97 24	133.5	12 20.3	97 24	133.6	11 51.1	97 24	133.8	11 22.0	97 24	133.9	10 52.8	97 24	134.0	10 23.6	97 24	134.1	9 54.5	97 24	134.2	45
6	13 04.3	97 24	132.4	12 35.1	97 24	132.5	12 06.0	97 24	132.6	11 36.9	97 24	132.8	11 07.8	97 24	132.9	10 38.6	97 24	133.0	10 09.5	97 24	133.1	9 40.3	97 24	133.3	6
7	12 49.7	97 25	131.4	12 20.6	97 25	131.5	11 51.5	97 25	131.7	11 22.4	97 24	131.8	10 53.3	97 24	131.9	10 24.2	97 24	132.0	9 55.1	97 24	132.1	9 26.0	97 24	132.3	7
8	12 35.0	97 25	130.4	12 05.9	97 25	130.5	11 36.8	97 25	130.7	11 07.8	97 25	130.8	10 38.7	97 25	130.9	10 09.6	97 25	131.0	9 40.5	97 25	131.2	9 11.4	97 25	131.3	8
9	12 20.0	97 25	129.4	11 50.9	97 25	129.5	11 21.9	97 25	129.7	10 52.9	97 25	129.8	10 23.8	97 25	129.9	9 54.8	97 25	130.1	9 25.7	97 25	130.2	8 56.6	97 25	130.3	9
50	12 04.8	97 26	128.4	11 35.8	97 26	128.6	11 06.8	97 26	128.7	10 37.7	97 26	128.8	10 08.7	97 26	128.9	9 39.7	97 25	129.1	9 10.7	97 25	129.2	8 41.6	97 25	129.3	50
1	11 49.4	97 26	127.4	11 20.4	97 26	127.6	10 51.4	97 26	127.7	10 22.4	97 26	127.8	9 53.4	97 26	128.0	9 24.4	97 26	128.1	8 55.4	97 26	128.2	8 26.4	97 26	128.4	1
2	11 33.8	97 26	126.5	11 04.8	97 26	126.6	10 35.8	97 26	126.7	10 06.9	97 26	126.9	9 37.9	97 26	127.0	9 09.0	97 26	127.1	8 40.0	97 26	127.2	8 11.0	97 26	127.4	2
3	11 17.9	96 27	125.5	10 49.0	96 27	125.6	10 20.1	96 27	125.7	9 51.2	96 27	125.9	9 22.2	96 26	126.0	8 53.3	96 26	126.1	8 24.3	96 26	126.3	7 55.4	96 26	126.4	3
4	11 01.9	96 27	124.5	10 33.0	96 27	124.6	10 04.1	96 27	124.8	9 35.2	96 27	124.9	9 06.3	96 27	125.0	8 37.4	96 27	125.2	8 08.5	96 27	125.3	7 39.6	96 27	125.4	4
55	10 45.7	96 27	123.5	10 16.9	96 27	123.6	9 48.0	96 27	123.8	9 19.1	96 27	123.9	8 50.2	96 27	124.1	8 21.3	96 27	124.2	7 52.4	96 27	124.3	7 23.6	96 27	124.5	55
6	10 29.4	96 28	122.5	10 00.5	96 28	122.7	9 31.7	96 28	122.8	9 02.8	96 27	122.9	8 34.0	96 27	123.1	8 05.1	96 27	123.2	7 36.2	96 27	123.4	7 07.4	96 27	123.5	6
7	10 12.8	96 28	121.6	9 44.0	96 28	121.7	9 15.2	96 28	121.8	8 46.3	96 28	122.0	8 17.5	96 28	122.1	7 48.7	96 28	122.3	7 19.8	96 28	122.4	6 51.0	96 28	122.5	7
8	9 56.1	96 28	120.6	9 27.3	96 28	120.7	8 58.5	96 28	120.9	8 29.7	96 28	121.0	8 00.9	96 28	121.1	7 32.1	96 28	121.3	7 03.2	96 28	121.4	6 34.4	96 28	121.6	8
9	9 39.2	96 28	119.6	9 10.4	96 28	119.7	8 41.6	96 28	119.9	8 12.8	96 28	120.0	7 44.1	96 28	120.2	7 15.3	96 28	120.3	6 46.5	96 28	120.5	6 17.7	96 28	120.6	9
60	9 22.1	96 29	118.6	8 53.4	96 29	118.8	8 24.6	96 29	118.9	7 55.8	96 29	119.1	7 27.1	96 29	119.2	6 58.3	96 29	119.3	6 29.6	96 28	119.5	6 00.8	96 28	119.6	60
1	9 04.9	96 29	117.7	8 36.2	96 29	117.8	8 07.4	96 29	118.0	7 38.7	96 29	118.1	7 10.0	96 29	118.2	6 41.2	96 29	118.4	6 12.5	96 29	118.5	5 43.7	96 29	118.7	1
2	8 47.5	96 29	116.7	8 18.8	96 29	116.8	7 50.1	96 29	117.0	7 21.4	96 29	117.1	6 52.7	96 29	117.3	6 24.0	96 29	117.4	5 55.2	96 29	117.6	5 26.5	96 29	117.7	2
3	8 30.0	96 29	115.7	8 01.3	96 29	115.9	7 32.6	96 29	116.0	7 03.9	96 29	116.2	6 35.2	96 29	116.3	6 06.5	96 29	116.5	5 37.8	96 29	116.6	5 09.1	96 29	116.8	3
4	8 12.3	96 30	114.8	7 43.7	96 30	114.9	7 15.0	96 30	115.1	6 46.3	96 30	115.2	6 17.7	96 30	115.4	5 49.0	96 30	115.5	5 20.3	96 29	115.6				4
65	7 54.5	96 30	113.8	7 25.9	96 30	113.9	6 57.2	96 30	114.1	6 28.6	96 30	114.2	5 59.9	96 30	114.4	5 31.3	96 30	114.5	5 02.6	96 30	114.7				65
6	7 36.6	96 30	112.8	7 07.9	96 30	113.0	6 39.3	96 30	113.1	6 10.7	96 30	113.3	5 42.1	96 30	113.4	5 13.4	96 30	113.6							6
7	7 18.5	96 30	111.9	6 49.9	96 30	112.0	6 21.3	96 30	112.2	5 52.7	96 30	112.3	5 24.1	96 30	112.5										7
8	7 00.3	96 31	110.9	6 31.7	96 30	111.1	6 03.2	96 30	111.2	5 34.6	96 30	111.4	5 06.0	96 30	111.5										8
9	6 42.0	96 31	109.9	6 13.4	96 31	110.1	5 44.9	96 31	110.3	5 16.3	96 31	110.4													9
70	6 23.6	96 31	109.0	5 55.0	96 31	109.1	5 26.5	96 31	109.3																70
1	6 05.1	96 31	108.0	5 36.5	96 31	108.2	5 08.0	96 31	108.3																1
2	5 46.4	96 31	107.1	5 17.9	96 31	107.2																			2
3	5 27.7	96 31	106.1																						3
4	5 08.9	96 31	105.2																						4

Lat. 71°

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	00
1	22 59.8	1.0 01	178.9	23 29.8	1.0 01	178.9	23 59.8	1.0 01	178.9	24 29.8	1.0 01	178.9	24 59.8	1.0 01	178.9	25 29.8	1.0 01	178.9	25 59.8	1.0 01	178.9	26 29.8	1.0 01	178.9	1
2	22 59.3	1.0 02	177.8	23 29.3	1.0 02	177.8	23 59.3	1.0 02	177.8	24 29.3	1.0 02	177.8	24 59.3	1.0 02	177.8	25 29.2	1.0 02	177.8	25 59.2	1.0 02	177.8	26 29.2	1.0 02	177.8	2
3	22 58.3	1.0 02	176.7	23 28.3	1.0 02	176.7	23 58.3	1.0 02	176.7	24 28.3	1.0 02	176.7	24 58.3	1.0 02	176.7	25 28.3	1.0 02	176.7	25 58.3	1.0 02	176.7	26 28.3	1.0 02	176.7	3
4	22 57.0	1.0 03	175.7	23 27.0	1.0 03	175.7	23 57.0	1.0 03	175.6	24 27.0	1.0 03	175.6	24 57.0	1.0 03	175.6	25 27.0	1.0 03	175.6	25 57.0	1.0 03	175.6	26 27.0	1.0 03	175.6	4
05	22 55.4	1.0 03	174.6	23 25.4	1.0 03	174.6	23 55.4	1.0 03	174.5	24 25.3	1.0 03	174.5	24 55.3	1.0 03	174.5	25 25.3	1.0 03	174.5	25 55.3	1.0 03	174.5	26 25.3	1.0 03	174.5	05
6	22 53.4	1.0 04	173.5	23 23.3	1.0 04	173.5	23 53.3	1.0 04	173.5	24 23.3	1.0 04	173.4	24 53.3	1.0 04	173.4	25 23.3	1.0 04	173.4	25 53.2	1.0 04	173.4	26 23.2	1.0 04	173.4	6
7	22 51.0	1.0 04	172.4	23 20.9	1.0 05	172.4	23 50.9	1.0 05	172.4	24 20.9	1.0 05	172.3	24 50.9	1.0 05	172.3	25 20.8	1.0 05	172.3	25 50.8	1.0 05	172.3	26 20.8	1.0 05	172.3	7
8	22 48.2	1.0 05	171.3	23 18.2	1.0 05	171.3	23 48.1	1.0 05	171.3	24 18.1	1.0 05	171.3	24 48.1	1.0 05	171.2	25 18.0	1.0 05	171.2	25 48.0	1.0 05	171.2	26 17.9	1.0 05	171.1	8
9	22 45.1	1.0 06	170.3	23 15.0	1.0 06	170.2	23 45.0	1.0 06	170.2	24 14.9	1.0 06	170.2	24 44.9	1.0 06	170.1	25 14.8	1.0 06	170.1	25 44.8	1.0 06	170.1	26 14.8	1.0 06	170.0	9
10	22 41.6	1.0 06	169.2	23 11.5	1.0 06	169.1	23 41.5	1.0 06	169.1	24 11.4	1.0 06	169.1	24 41.4	1.0 06	169.0	25 11.3	1.0 06	169.0	25 41.2	1.0 07	169.0	26 11.2	1.0 07	168.9	10
1	22 37.7	1.0 07	168.1	23 07.7	1.0 07	168.1	23 37.6	1.0 07	168.0	24 07.5	1.0 07	168.0	24 37.5	1.0 07	168.0	25 07.4	1.0 07	167.9	25 37.3	1.0 07	167.9	26 07.3	1.0 07	167.8	1
2	22 33.5	1.0 08	167.0	23 03.5	1.0 08	167.0	23 33.4	1.0 08	166.9	24 03.3	1.0 08	166.9	24 33.2	1.0 08	166.9	25 03.1	1.0 08	166.8	25 33.0	1.0 08	166.8	26 03.0	1.0 08	166.7	2
3	22 29.0	1.0 08	165.9	22 58.9	1.0 08	165.9	23 28.8	1.0 08	165.9	23 58.7	1.0 08	165.8	24 28.6	1.0 08	165.8	24 58.5	1.0 08	165.7	25 28.4	1.0 08	165.7	25 58.3	1.0 08	165.6	3
4	22 24.0	1.0 09	164.9	22 53.9	1.0 09	164.8	23 23.8	1.0 09	164.8	23 53.7	1.0 09	164.7	24 23.6	1.0 09	164.7	24 53.5	1.0 09	164.6	25 23.4	1.0 09	164.6	25 53.3	1.0 09	164.5	4
15	22 18.8	1.0 09	163.8	22 48.6	1.0 09	163.7	23 18.5	1.0 09	163.7	23 48.4	1.0 09	163.6	24 18.3	1.0 10	163.6	24 48.1	1.0 10	163.5	25 18.0	1.0 10	163.5	25 47.9	1.0 10	163.4	15
6	22 13.1	1.0 10	162.7	22 43.0	1.0 10	162.7	23 12.9	1.0 10	162.6	23 42.7	1.0 10	162.6	24 12.6	1.0 10	162.5	24 42.4	1.0 10	162.5	25 12.3	1.0 10	162.4	25 42.1	1.0 10	162.3	6
7	22 07.2	99 11	161.6	22 37.0	99 11	161.6	23 06.9	99 11	161.5	23 36.7	99 11	161.5	24 06.5	99 11	161.4	24 36.4	99 11	161.4	25 06.2	99 11	161.3	25 36.0	99 11	161.3	7
8	22 00.8	99 11	160.6	22 30.7	99 11	160.5	23 00.5	99 11	160.5	23 30.3	99 11	160.4	24 00.1	99 11	160.3	24 29.9	99 11	160.3	24 59.8	99 11	160.2	25 29.6	99 11	160.2	8
9	21 54.2	99 12	159.5	22 24.0	99 12	159.4	22 53.8	99 12	159.4	23 23.6	99 12	159.3	23 53.4	99 12	159.3	24 23.2	99 12	159.2	24 53.0	99 12	159.1	25 22.8	99 12	159.1	9
20	21 47.2	99 12	158.4	22 17.0	99 12	158.4	22 46.7	99 12	158.3	23 16.5	99 12	158.2	23 46.3	99 12	158.2	24 16.1	99 12	158.1	24 45.8	99 12	158.0	25 15.6	99 12	158.0	20
1	21 39.8	99 13	157.4	22 09.6	99 13	157.3	22 39.4	99 13	157.2	23 09.1	99 13	157.2	23 38.9	99 13	157.1	24 08.6	99 13	157.0	24 38.4	99 13	157.0	25 08.1	99 13	156.9	1
2	21 32.1	99 13	156.3	22 01.9	99 13	156.2	22 31.6	99 13	156.2	23 01.4	99 13	156.1	23 31.1	99 14	156.0	24 00.8	99 14	156.0	24 30.6	99 14	155.9	25 00.3	99 14	155.8	2
3	21 24.1	99 14	155.3	21 53.9	99 14	155.2	22 23.6	99 14	155.1	22 53.3	99 14	155.0	23 23.0	99 14	155.0	23 52.7	99 14	154.9	24 22.4	99 14	154.8	24 52.1	99 14	154.7	3
4	21 15.8	99 14	154.2	21 45.5	99 14	154.1	22 15.2	99 15	154.0	22 44.9	99 15	154.0	23 14.6	99 15	153.9	23 44.2	99 15	153.8	24 13.9	99 15	153.7	24 43.6	99 15	153.6	4
25	21 07.1	99 15	153.1	21 36.8	99 15	153.1	22 06.5	99 15	153.0	22 36.1	99 15	152.9	23 05.8	99 15	152.8	23 35.5	99 15	152.7	24 05.1	99 15	152.6	24 34.8	99 15	152.6	25
6	20 58.1	99 16	152.1	21 27.8	99 16	152.0	21 57.4	99 16	151.9	22 27.1	99 16	151.8	22 56.7	99 16	151.7	23 26.3	99 16	151.7	23 56.0	99 16	151.6	24 25.6	99 16	151.5	6
7	20 48.8	99 16	151.0	21 18.5	99 16	150.9	21 48.1	99 16	150.9	22 17.7	99 16	150.8	22 47.3	99 16	150.7	23 16.9	99 16	150.6	23 46.5	99 16	150.5	24 16.1	99 16	150.4	7
8	20 39.2	99 17	150.0	21 08.8	99 17	149.9	21 38.4	99 17	149.8	22 08.0	99 17	149.7	22 37.6	99 17	149.6	23 07.2	99 17	149.5	23 36.7	99 17	149.4	24 06.3	99 17	149.3	8
9	20 29.3	99 17	148.9	20 58.8	99 17	148.8	21 28.4	99 17	148.7	21 58.0	99 17	148.6	22 27.5	99 17	148.6	22 57.1	99 17	148.5	23 26.7	99 17	148.4	23 56.2	98 17	148.3	9
30	20 19.0	98 18	147.9	20 48.6	98 18	147.8	21 18.1	98 18	147.7	21 47.7	98 18	147.6	22 17.2	98 18	147.5	22 46.7	98 18	147.4	23 16.3	98 18	147.3	23 45.8	98 18	147.2	30
1	20 08.5	98 18	146.8	20 38.0	98 18	146.7	21 07.5	98 18	146.6	21 37.0	98 18	146.5	22 06.5	98 18	146.4	22 36.0	98 18	146.3	23 05.5	98 18	146.2	23 35.0	98 18	146.1	1
2	19 57.7	98 19	145.8	20 27.2	98 19	145.7	20 56.6	98 19	145.6	21 26.1	98 19	145.5	21 55.6	98 19	145.4	22 25.1	98 19	145.3	22 54.5	98 19	145.2	23 24.0	98 19	145.1	2
3	19 46.5	98 19	144.7	20 16.0	98 19	144.6	20 45.4	98 19	144.5	21 14.9	98 19	144.4	21 44.4	98 19	144.3	22 13.8	98 19	144.2	22 43.2	98 19	144.1	23 12.7	98 19	144.0	3
4	19 35.1	98 20	143.7	20 04.5	98 20	143.6	20 34.0	98 20	143.5	21 03.4	98 20	143.4	21 32.8	98 20	143.3	22 02.2	98 20	143.2	22 31.6	98 20	143.1	23 01.1	98 20	143.0	4
35	19 23.4	98 20	142.7	19 52.8	98 20	142.6	20 22.2	98 20	142.4	20 51.6	98 20	142.3	21 21.0	98 20	142.2	21 50.4	98 20	142.1	22 19.8	98 20	142.0	22 49.1	98 20	141.9	35
6	19 11.4	98 20	141.6	19 40.8	98 20	141.5	20 10.2	98 21	141.4	20 39.5	98 21	141.3	21 08.9	98 21	141.2	21 38.2	98 21	141.1	22 07.6	98 21	141.0	22 37.0	98 21	140.9	6
7	18 59.1	98 21	140.6	19 28.5	98 21	140.5	19 57.8	98 21	140.4	20 27.2	98 21	140.3	20 56.5	98 21	140.1	21 25.8	98 21	140.0	21 55.2	98 21	139.9	22 24.5	98 21	139.8	7
8	18 46.6	98 21	139.6	19 15.9	98 21	139.4	19 45.2	98 21	139.3	20 14.5	98 22	139.2	20 43.9	98 22	139.1	21 13.2	98 22	139.0	21 42.5	98 22	138.9	22 11.7	98 22	138.8	8
9	18 33.8	98 22	138.5	19 03.1	98 22	138.4	19 32.4	98 22	138.3	20 01.7	98 22	138.2	20 30.9	98 22	138.1	21 00.2	98 22	138.0	21 29.5	98 22	137.8	21 58.7	98 22	137.7	9
40	18 20.7	98 22	137.5	18 50.0	98 22	137.4	19 19.3	98 22	137.3	19 48.5	97 22	137.2	20 17.7	97 22	137.0	20 47.0	97 22	136.9	21 16.2	97 23	136.8	21 45.5	97 23	136.7	40
1	18 07.4	97 23	136.5	18 36.6	97 23	136.4	19 05.9	97 23	136.2	19 35.1	97 23	136.1	20 04.3	97 23	136.0	20 33.5	97 23	135.9	21 02.7	97 23	135.8	21 31.9	97 23	135.6	1
2	17 53.8	97 23	135.5	18 23.0	97 23	135.3	18 52.2	97 23	135.2	19 21.4	97 23	135.1	19 50.6	97 23	135.0	20 19.8	97 23	134.8	20 49.0	97 23	134.7	21 18.1	97 23	134.6	2
3	17 40.0	97 23	134.4	18 09.2	97 23	134.3	18 38.3	97 23	134.2	19 07.5	97 24	134.1	19 36.7	97 24	133.9	20 05.8	97 24	133.8	20 35.0	97 24	133.7	21 04.1	97 24	133.6	3
4	17 25.9	97 24	133.4	17 55.1	97 24	133.3	18 24.2	97 24	133.2	18 53.4	97 24	133.0	19 22.5	97 24	132.9	19 51.6	97 24	132.8	20 20.7	97 24	132.7	20 49.8	97 24	132.5	4
45	17 11.6	97 24	132.4	17 40.7	97 24	132.3	18 09.9	97 24	132.2	18 39.0	97 24	132.0	19 08.1	97 24	131.9	19 37.2	97 24	131.8	20 06.2	97 25	131.6	20 35.3	97 25	131.5	45
6	16 57.1	97 25	131.4	17 26.2	97 25	131.3	17 55.3	97 25	131.1	18 24.3	97 25	131.0	18 53.4	97 25	130.9	19 22.5	97 25	130.7	19 51.5	97 25	130.6	20 20.6	97 25	130.5	6
7	16 42.3	97 25	130.4	17 11.4	97 25	130.3	17 40.4	97 25	130.1	18 09.5	97 25	130.0	18 38.5	97 25	129.9	19 07.6	97 25	129.7	19 36.6	97 25	129.6	20 05.6	97 25	129.5	7
8	16 27.3	97 25	129.4	16 56.4	97 25	129.2	17 25.4	97 25	129.1	17 54.4	97 25	129.0	18 23.4	97 26	128.8	18 52.4	97 26	128.7	19 21.4	97 26	128.6	19 50.4	97 26	128.4	8
9	16 12.1	97 26	128.4	16 41.1	97 26	128.2	17 10.1	97 26	128.1	17 39.1	97 26	128.0	18 08.1	97 26	127.8	18 37.1	97 26	127.7	19 06.0	97 26	127.6	19 35.0	97 26	127.4	9
50	15 56.7	97 26	127.4	16 25.7	97 26	127.2	16 54.6	97 26	127.1	17 23.6	97 26	127.0	17 52.6	97 26	126.8	18 21.5	96 26	126.7	18 50.5	96 26	126.5	19 19.4	96 26	126.4	50
1	15 41.1	96 26	126.4	16 10.0	96 26	126.2	16 39.0	96 26	126.1	17 07.9	96 27	126.0	17 36.8	96 27	125.8	18 05.7	96 27	125.7	18 34.7	96 27	125.5	19 03.6	96 27	125.4	1
2	15 25.3	96 27	125.4	15 54.2	96 27	125.2	16 23.1	96 27	125.1	16 52.0	96 27	125.0	17 20.9	96 27	124.8	17 49.8	96 27	124.7	18 18.7	96 27	124.5	18 47.5	96 27	124.4	2
3	15 09.2	96 27	124.4	15 38.1	96 27	124.2	16 07.0	96 27	124.1	16 35.9	96 27	124.0	17 04.7	96 27	123.8	17 33.6	96 27	123.7	18 02.5	96 27	123.5	18 31.3	96 27	123.4	3
4	14 53.0	96 27	123.4	15 21.9	96 27	123.2	15 50.7	96 27	123.1	16 19.6	96 27	123.0	16 48.4	96 28	122.8	17 17.3	96 28	122.7	17 46.1	96 28	122.5	18 14.9	96 28	122.4	4
55	14 36.6	96 28	122.4	15 05.4	96 28	122.2	15 34.3	96 28	122.1	16 03.1	96 28	122.0	16 31.9	96 28	121.8	17 00.7	96 28	121.7	17 29.5	96 28	121.5	17 58.3	96 28	121.4	55
6	14 20.0	96 28	121.4	14 48.8	96 28	121.3	15 17.6	96 28	121.1	15 46.4	96 28	121.0	16 15.2	96 28	120.8	16 44.0	96 28	120.7	17 12.8	96 28	120.5	17 41.6	96 28	120.4	6
7	14 03.3	96 28	120.4	14 32.0	96 28	120.3	15 00.8	96 28	120.1	15 29.6	96 28	120.0	15 58.4	96 28	119.8	16 27.1	96 28	119.7	16 55.9	96 28	119.5	17 24.6	96 29	119.4	7
8	13 46.3	96 28	119.4	14 15.1	96 28	119.3	14 43.8	96 28	119.1	15 12.6	96 28	119.0	15 41.3	96 28	118.8	16 10.1	96 29	118.7	16 38.8	96 29	118.5	17 07.5	96 29	118.4	8
9	13 29.2	96 29	118.4	13 58.0	96 29	118.3	14 26.7	96 29	118.1	14 55.4	96 29	118.0	15 24.1	96 29	117.8	15 52.9	96 29	117.7	16 21.6	96 29	117.5	16 50.3	96 29	117.4	9
60	13 12.0	96 29	117.5	13 40.7	96 29	117.3	14 09.4	96 29	117.2	14 38.1	96 29	117.0	15 06.8	96 29	116.9	15 35.5	96 29	116.7	16 04.2	96 29	116.6	16 32.8	96 29	116.4	60
1	12 54.6	96 29	116.5	13 23.3	96 29	116.3	13 51.9	96 29	116.2	14 20.6	96 29	116.0	14 49.3	96 29	115.9	15 18.0	96 29	115.7	15 46.6	96 30	115.6	16 15.3	96 30	115.4	1
2	12 37.0	96 30	115.5	13 05.7	96 30	115.3	13 34.3	96 30	115.2	14 03.0	96 30	115.0	14 31.6	95 30	114.9	15 00.3	95 30	114.7	15 28.9	95 30	114.6	15 57.6	95 30	114.4	2
3	12 19.3	95 30	114.5	12 47.9	95 30	114.4	13 16.6	95 30	114.2	13 45.2	95 30	114.1	14 13.8	95 30	113.9	14 42.5	95 30	113.8	15 11.1	95 30	113.6	15 39.7	95 30	113.4	3
4	12 01.5	95 30	113.5	12 30.1	95 30	113.4	12 58.7	95 30	113.2	13 27.3	95 30	113.1	13 55.9	95 30	112.9	14 24.5	95 30	112.8	14 53.1	95 30	112.6	15 21.7	95 30	112.5	4
65	11 43.5	95 30	112.6	12 12.1	95 30	112.4	12 40.7	95 30	112.3	13 09.3	95 30	112.1	13 37.9	95 30	112.0	14 06.5	95 30	111.8	14 35.0	95 30	111.6	15 03.6	95 30	111.5	65
6	11 25.4	95 30	111.6	11 54.0	95 30	111.5	12 22.6	95 30	111.3	12 51.1	95 30	111.1	13 19.7	95 30	111.0	13 48.3	95 31	110.8	14 16.8	95 31	110.7	14 45.4	95 31	110.5	6
7	11 07.2	95 31	110.6	11 35.7	95 31	110.5	12 04.3	95 31	110.3	12 32.8	95 31	110.2	13 01.4	95 31	110.0	13 29.9	95 31	109.9	13 58.5	95 31	109.7	14 27.0	95 31	109.5	7
8	10 48.8	95 31	109.7	11 17.4	95 31	109.5	11 45.9	95 31	109.4	12 14.5	95 31	109.2	12 43.0	95 31	109.0	13 11.5	95 31	108.9	13 40.0	95 31	108.7	14 08.5	95 31	108.6	8
9	10 30.4	95 31	108.7	10 58.9	95 31	108.5	11 27.4	95 31	108.4	11 56.0	95 31	108.2	12 24.5	95 31	108.1	12 53.0	95 31	107.9	13 21.5	95 31	107.8	13 50.0	95 31	107.6	9
70	10 11.8	95 31	107.7	10 40.3	95 31	107.6	11 08.8	95 31	107.4	11 37.3	95 31	107.3	12 05.8	95 31	107.1	12 34.3	95 31	106.9	13 02.8	95 31	106.8	13 31.3	95 31	106.6	70
1	9 53.2	95 31	106.8	10 21.7	95 31	106.6	10 50.2	95 31	106.5	11 18.6	95 31	106.3	11 47.1	95 31	106.1	12 15.6	95 31	106.0	12 44.1	95 31	105.8	13 12.5	95 31	105.7	1
2	9 34.4	95 31	105.8	10 02.9	95 31	105.7	10 31.4	95 31	105.5	10 59.9	95 31	105.3	11 28.3	95 32	105.2	11 56.8	95 32	105.0	12 25.2	95 32	104.9	12 53.7	95 32	104.7	2
3	9 15.6	95 32	104.9	9 44.1	95 32	104.7	10 12.5	95 32	104.5	10 41.0	95 32	104.4	11 09.4	95 32	104.2	11 37.9	95 32	104.1	12 06.3	95 32	103.9	12 34.7	95 32	103.7	3
4	8 56.7	95 32	103.9	9 25.1	95 32	103.7	9 53.6	95 32	103.6	10 22.0	95 32	103.4	10 50.4	95 32	103.3	11 18.9	95 32	103.1	11 47.3	95 32	102.9	12 15.7	95 32	102.8	4
75	8 37.7	95 32	102.9	9 06.1	95 32	102.8	9 34.5	95 32	102.6	10 03.0	95 32	102.5	10 31.4	95 32	102.3	10 59.8	95 32	102.1	11 28.2	95 32	102.0	11 56.6	95 32	101.8	75
6	8 18.6	95 32	102.0	8 47.0	95 32	101.8	9 15.4	95 32	101.7	9 43.9	95 32	101.5	10 12.3	95 32	101.3	10 40.7	95 32	101.2	11 09.1	95 32	101.0	11 37.5	95 32	100.8	6
7	7 59.4	95 32	101.0	8 27.9	95 32	100.9	8 56.3	95 32	100.7	9 24.7	95 32	100.5	9 53.1	95 32	100.4	10 21.5	95 32	100.2	10 49.9	95 32	100.1	11 18.3	95 32	99.9	7
8	7 40.2	95 32	100.1	8 08.7	95 32	99.9	8 37.1	95 32	99.8	9 05.5	95 32	99.6	9 33.9	95 32	99.4	10 02.2	95 32	99.3	10 30.6	95 32	99.1	10 59.0	95 32	98.9	8
9	7 21.0	95 32	99.1	7 49.4	95 32	99.0	8 17.8	95 32	98.8	8 46.2	95 32	98.6	9 14.6	95 32	98.5	9 42.9	95 32	98.3	10 11.3	95 32	98.1	10 39.7	95 32	98.0	9
80	7 01.7	95 32	98.2	7 30.1	95 32	98.0	7 58.5	95 32	97.8	8 26.8	95 32	97.7	8 55.2	95 32	97.5	9 23.6	95 32	97.4	9 52.0	95 32	97.2	10 20.3	95 32	97.0	80
1	6 42.3	95 32	97.2	7 10.7	95 32	97.1	7 39.1	95 32	96.9	8 07.5	95 32	96.7	8 35.8	95 32	96.6	9 04.2	95 32	96.4	9 32.6	95 32	96.2	10 00.9	95 32	96.1	1
2	6 22.9	95 32	96.3	6 51.3	95 32	96.1	7 19.7	95 32	95.9	7 48.0	95 32	95.8	8 16.4	95 32	95.6	8 44.8	95 32	95.5	9 13.1	95 32	95.3	9 41.5	94 32	95.1	2
3	6 03.5	95 32	95.3	6 31.9	95 32	95.2	7 00.2	95 32	95.0	7 28.6	95 32	94.8	7 56.9	95 32	94.7	8 25.3	95 32	94.5	8 53.7	94 32	94.3	9 22.0	94 32	94.2	3
4	5 44.0	95 32	94.4	6 12.4	95 32	94.2	6 40.7	95 32	94.0	7 09.1	95 32	93.9	7 37.5	95 32	93.7	8 05.8	95 32	93.6	8 34.2	94 32	93.4	9 02.5	94 32	93.2	4
85	5 24.5	95 33	93.4	5 52.9	95 33	93.3	6 21.3	95 33	93.1	6 49.6	95 33	92.9	7 18.0	95 33	92.8	7 46.3	94 33	92.6	8 14.7	94 33	92.4	8 43.0	94 33	92.3	85
6	5 05.0	95 33	92.5	5 33.4	95 33	92.3	6 01.7	95 33	92.2	6 30.1	95 33	92.0	6 58.4	94 33	91.8	7 26.8	94 33	91.7	7 55.1	94 33	91.5	8 23.5	94 33	91.3	6
7				5 13.9	95 33	91.4	5 42.2	95 33	91.2	6 10.6	95 33	91.0	6 38.9	94 33	90.9	7 07.3	94 33	90.7	7 35.6	94 33	90.5	8 03.9	94 33	90.4	7
8							5 22.7	95 33	90.3	5 51.0	95 33	90.1	6 19.4	94 33	89.9	6 47.7	94 33	89.8	7 16.1	94 33	89.6	7 44.4	94 33	89.4	8
9							5 03.1	95 33	89.3	5 31.5	95 33	89.1	5 59.8	94 33	89.0	6 28.2	94 33	88.8	6 56.5	94 33	88.7	7 24.9	94 33	88.5	9
										5 12.0	95 33	88.2	5 40.3	94 33	88.0	6 08.7	94 33	87.9	6 37.0	94 33	87.7	7 05.4	94 33	87.5	90

Lat. 71°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	15 00.0	1.0	00	180.0	14 30.0	1.0	00	180.0	14 00.0	1.0	00	180.0	13 30.0	1.0	00	180.0	13 00.0	1.0	00	180.0	12 30.0	1.0	00	180.0	12 00.0	1.0	00	180.0	11 30.0	1.0	00	180.0	00
1	14 59.8	1.0	01	179.0	14 29.8	1.0	01	179.0	13 59.8	1.0	01	179.0	13 29.8	1.0	01	179.0	12 59.8	1.0	01	179.0	12 29.8	1.0	01	179.0	11 59.8	1.0	01	179.0	11 29.8	1.0	01	179.0	1
2	14 59.3	1.0	01	177.9	14 29.3	1.0	01	177.9	13 59.3	1.0	01	177.9	13 29.3	1.0	01	178.0	12 59.3	1.0	01	178.0	12 29.3	1.0	01	178.0	11 59.3	1.0	01	178.0	11 29.3	1.0	01	178.0	2
3	14 58.4	1.0	02	176.9	14 28.4	1.0	02	176.9	13 58.4	1.0	02	176.9	13 28.4	1.0	02	176.9	12 58.4	1.0	02	176.9	12 28.4	1.0	02	176.9	11 58.4	1.0	02	177.0	11 28.4	1.0	02	177.0	3
4	14 57.2	1.0	03	175.9	14 27.2	1.0	03	175.9	13 57.2	1.0	03	175.9	13 27.2	1.0	03	175.9	12 57.2	1.0	03	175.9	12 27.2	1.0	03	175.9	11 57.2	1.0	03	175.9	11 27.2	1.0	03	176.0	4
05	14 55.6	1.0	03	174.8	14 25.6	1.0	03	174.9	13 55.6	1.0	03	174.9	13 25.6	1.0	03	174.9	12 55.7	1.0	03	174.9	12 25.7	1.0	03	174.9	11 55.7	1.0	03	174.9	11 25.7	1.0	03	174.9	05
6	14 53.7	1.0	04	173.8	14 23.7	1.0	04	173.8	13 53.7	1.0	04	173.8	13 23.7	1.0	04	173.9	12 53.7	1.0	04	173.9	12 23.8	1.0	04	173.9	11 53.8	1.0	04	173.9	11 23.8	1.0	04	173.9	6
7	14 51.4	1.0	04	172.8	14 21.4	1.0	04	172.8	13 51.4	1.0	04	172.8	13 21.5	1.0	04	172.8	12 51.5	1.0	04	172.9	12 21.5	1.0	04	172.9	11 51.5	1.0	04	172.9	11 21.6	1.0	04	172.9	7
8	14 48.8	1.0	05	171.7	14 18.8	1.0	05	171.8	13 48.8	1.0	05	171.8	13 18.9	1.0	05	171.8	12 48.9	1.0	05	171.8	12 18.9	1.0	05	171.9	11 49.0	1.0	05	171.9	11 19.0	1.0	05	171.9	8
9	14 45.8	1.0	06	170.7	14 15.8	1.0	06	170.7	13 45.9	1.0	06	170.8	13 15.9	1.0	06	170.8	12 45.9	1.0	06	170.8	12 16.0	1.0	05	170.8	11 46.0	1.0	05	170.9	11 16.1	1.0	05	170.9	9
10	14 42.5	1.0	06	169.7	14 12.5	1.0	06	169.7	13 42.6	1.0	06	169.7	13 12.6	1.0	06	169.8	12 42.7	1.0	06	169.8	12 12.7	1.0	06	169.8	11 42.8	1.0	06	169.9	11 12.8	1.0	06	169.9	10
1	14 38.8	1.0	07	168.7	14 08.8	1.0	07	168.7	13 38.9	1.0	07	168.7	13 09.0	1.0	07	168.8	12 39.0	1.0	07	168.8	12 09.1	1.0	07	168.8	11 39.1	1.0	07	168.9	11 09.2	1.0	07	168.9	1
2	14 34.8	1.0	07	167.6	14 04.8	1.0	07	167.7	13 34.9	1.0	07	167.7	13 05.0	1.0	07	167.7	12 35.1	1.0	07	167.8	12 05.1	1.0	07	167.8	11 35.2	1.0	07	167.8	11 05.3	1.0	07	167.9	2
3	14 30.4	1.0	08	166.6	14 00.5	1.0	08	166.6	13 30.6	1.0	08	166.7	13 00.7	1.0	08	166.7	12 30.7	1.0	08	166.8	12 00.8	1.0	08	166.8	11 30.9	1.0	08	166.8	11 01.0	1.0	08	166.9	3
4	14 25.7	1.0	08	165.6	13 55.8	1.0	08	165.6	13 25.9	1.0	08	165.7	12 56.0	1.0	08	165.7	12 26.1	1.0	08	165.7	11 56.2	1.0	08	165.8	11 26.3	1.0	08	165.8	10 56.4	1.0	08	165.9	4
15	14 20.7	1.0	09	164.5	13 50.8	1.0	09	164.6	13 20.9	1.0	09	164.6	12 51.0	1.0	09	164.7	12 21.1	1.0	09	164.7	11 51.2	1.0	09	164.8	11 21.3	1.0	09	164.8	10 51.5	1.0	09	164.9	15
6	14 15.3	1.0	10	163.5	13 45.4	1.0	10	163.6	13 15.6	1.0	09	163.6	12 45.7	1.0	09	163.7	12 15.8	1.0	09	163.7	11 45.9	1.0	09	163.8	11 16.1	1.0	09	163.8	10 46.2	1.0	09	163.8	6
7	14 09.6	1.0	10	162.5	13 39.7	1.0	10	162.5	13 09.9	1.0	10	162.6	12 40.0	1.0	10	162.6	12 10.2	1.0	10	162.7	11 40.3	1.0	10	162.7	11 10.4	1.0	10	162.8	10 40.6	1.0	10	162.8	7
8	14 03.5	99	11	161.5	13 33.7	99	11	161.5	13 03.9	99	11	161.6	12 34.0	99	11	161.6	12 04.2	99	10	161.7	11 34.3	99	10	161.7	11 04.5	99	10	161.8	10 34.7	99	10	161.8	8
9	13 57.2	99	11	160.4	13 27.4	99	11	160.5	12 57.5	99	11	160.6	12 27.7	99	11	160.6	11 57.9	99	11	160.7	11 28.1	99	11	160.7	10 58.2	99	11	160.8	10 28.4	99	11	160.8	9
20	13 50.5	99	12	159.4	13 20.7	99	12	159.5	12 50.9	99	12	159.5	12 21.1	99	12	159.6	11 51.3	99	12	159.7	11 21.5	99	12	159.7	10 51.6	99	12	159.8	10 21.8	99	12	159.8	20
1	13 43.4	99	12	158.4	13 13.7	99	12	158.5	12 43.9	99	12	158.5	12 14.1	99	12	158.6	11 44.3	99	12	158.7	11 14.5	99	12	158.7	10 44.7	99	12	158.8	10 14.9	99	12	158.8	1
2	13 36.1	99	13	157.4	13 06.3	99	13	157.5	12 36.6	99	13	157.5	12 06.8	99	13	157.6	11 37.0	99	13	157.6	11 07.3	99	13	157.7	10 37.5	99	13	157.8	10 07.7	99	13	157.8	2
3	13 28.4	99	13	156.4	12 58.7	99	13	156.4	12 28.9	99	13	156.5	11 59.2	99	13	156.6	11 29.5	99	13	156.6	10 59.7	99	13	156.7	10 30.0	99	13	156.8	10 00.2	99	13	156.8	3
4	13 20.4	99	14	155.4	12 50.7	99	14	155.4	12 21.0	99	14	155.5	11 51.3	99	14	155.6	11 21.5	99	14	155.6	10 51.8	99	14	155.7	10 22.1	99	14	155.8	9 52.4	99	14	155.8	4
25	13 12.1	99	14	154.3	12 42.4	99	14	154.4	12 12.7	99	14	154.5	11 43.0	99	14	154.6	11 13.3	99	14	154.6	10 43.6	99	14	154.7	10 13.9	99	14	154.8	9 44.2	99	14	154.8	25
6	13 03.5	99	15	153.3	12 33.8	99	15	153.4	12 04.2	99	15	153.5	11 34.5	99	15	153.6	11 04.8	99	15	153.6	10 35.1	99	15	153.7	10 05.4	99	15	153.8	9 35.8	99	15	153.8	6
7	12 54.6	99	15	152.3	12 24.9	99	15	152.4	11 55.3	99	15	152.5	11 25.6	99	15	152.5	10 56.0	99	15	152.6	10 26.3	99	15	152.7	9 56.7	99	15	152.8	9 27.0	99	15	152.9	7
8	12 45.4	99	16	151.3	12 15.7	99	16	151.4	11 46.1	99	16	151.5	11 16.5	99	16	151.5	10 46.8	99	16	151.6	10 17.2	99	16	151.7	9 47.6	99	16	151.8	9 17.9	99	16	151.9	8
9	12 35.8	99	16	150.3	12 06.2	99	16	150.4	11 36.6	99	16	150.5	11 07.0	99	16	150.5	10 37.4	99	16	150.6	10 07.8	99	16	150.7	9 38.2	99	16	150.8	9 08.6	99	16	150.9	9
30	12 26.0	99	17	149.3	11 56.4	99	17	149.4	11 26.8	99	17	149.5	10 57.3	99	17	149.5	10 27.7	99	17	149.6	9 58.1	99	17	149.7	9 28.5	99	17	149.8	8 58.9	99	17	149.9	30
1	12 15.9	99	17	148.3	11 46.3	99	17	148.4	11 16.8	99	17	148.5	10 47.2	99	17	148.5	10 17.7	99	17	148.6	9 48.1	99	17	148.7	9 18.5	99	17	148.8	8 49.0	99	17	148.9	1
2	12 05.5	98	18	147.3	11 35.9	98	18	147.4	11 06.4	98	18	147.5	10 36.9	98	18	147.5	10 07.3	98	18	147.6	9 37.8	98	18	147.7	9 08.3	98	18	147.8	8 38.7	98	18	147.9	2
3	11 54.8	98	18	146.3	11 25.3	98	18	146.4	10 55.8	98	18	146.5	10 26.3	98	18	146.5	9 56.7	98	18	146.6	9 27.2	98	18	146.7	8 57.7	98	18	146.8	8 28.2	98	18	146.9	3
4	11 43.8	98	19	145.3	11 14.3	98	19	145.4	10 44.8	98	19	145.5	10 15.3	98	19	145.6	9 45.9	98	19	145.6	9 16.4	98	19	145.7	8 46.9	98	18	145.8	8 17.4	98	18	145.9	4
35	11 32.5	98	19	144.3	11 03.1	98	19	144.4	10 33.6	98	19	144.5	10 04.2	98	19	144.6	9 34.7	98	19	144.7	9 05.2	98	19	144.8	8 35.8	98	19	144.8	8 06.3	98	19	144.9	35
6	11 21.0	98	20	143.3	10 51.5	98	20	143.4	10 22.1	98	20	143.5	9 52.7	98	20	143.6	9 23.3	98	20	143.7	8 53.8	98	19	143.8	8 24.4	98	19	143.9	7 55.0	98	19	144.0	6
7	11 09.1	98	20	142.3	10 39.8	98	20	142.4	10 10.4	98	20	142.5	9 41.0	98	20	142.6	9 11.6	98	20	142.7	8 42.1	98	20	142.8	8 12.7	98	20	142.9	7 43.3	98	20	143.0	7
8	10 57.1	98	21	141.3	10 27.7	98	21	141.4	9 58.3	98	20	141.5	9 28.9	98	20	141.6	8 59.6	98	20	141.7	8 30.2	98	20	141.8	8 00.8	98	20	141.9	7 31.4	98	20	142.0	8
9	10 44.7	98	21	140.3	10 15.4	98	21	140.4	9 46.0	98	21	140.5	9 16.7	98	21	140.6	8 47.3	98	21	140.7	8 18.0	98	21	140.8	7 48.6	98	21	140.9	7 19.3	98	21	141.0	9
40	10 32.1	98	21	139.3	10 02.8	98	21	139.4	9 33.5	98	21	139.5	9 04.2	98	21	139.6	8 34.8	98	21	139.7	8 05.5	98	21	139.8	7 36.2	98	21	139.9	7 06.9	98	21	140.0	40
1	10 19.2	98	22	138.3	9 49.9	98	22	138.4	9 20.7	98	22	138.5	8 51.4	98	22	138.6	8 22.1	98	22	138.7	7 52.8	98	22	138.8	7 23.5	98	22	139.0	6 54.2	98	22	139.1	1
2	10 06.1	98	22	137.3	9 36.9	98	22	137.4	9 07.6	98	22	137.5	8 38.3	98	22	137.6	8 09.1	98	22	137.8	7 39.8	98	22	137.9	7 10.5	98	22	138.0	6 41.3	98	22	138.1	2
3	9 52.7	97	23	136.3	9 23.5	97	23	136.4	8 54.3	97	23	136.6	8 25.1	97	23	136.7	7 55.8	97	22	136.8	7 26.6	97	22	136.9	6 57.3	97	22	137.0	6 28.1	97	22	137.1	3
4	9 39.1	97	23	135.3	9 09.9	97	23	135.5	8 40.7	97	23	135.6	8 11.5	97	23	135.7	7 42.3	97	23	135.8	7 13.1	97	23	135.9	6 43.9	97	23	136.0	6 14.7	97	23	136.1	4
45	9 25.3	97	23	134.4	8 56.1	97	23	134.5	8 26.9	97	23	134.6	7 57.8	97	23	134.7	7 28.6	97	23	134.8	6 59.4	97	23	134.9	6 30.2	97	23	135.1	6 01.0	97	23	135.2	45
6	9 11.2	97	24	133.4	8 42.1	97	24	133.5	8 12.9	97	24	133.6	7 43.8	97	24	133.7	7 14.6	97	24	133.9	6 45.5	97	24	134.0	6 16.3	97	24	134.1	5 47.1	97	24	134.2	6
7	8 56.9	97	24	132.4	8 27.8	97	24	132.5	7 58.7	97	24	132.6	7 29.5	97	24	132.8	7 00.4	97	24	132.9	6 31.3	97	24	133.0	6 02.2	97	24	133.1	5 33.0	97	24	133.2	7
8	8 42.3	97	25	131.4	8 13.3	97	25	131.5	7 44.2	97	24	131.7	7 15.1	97	24	131.8	6 46.0	97	24	131.9	6 16.9	97	24	132.0	5 47.8	97	24	132.1	5 18.7	97	24	132.3	8
9	8 27.6	97	25	130.4	7 58.5	97	25	130.6	7 29.5	97	25	130.7	7 00.4	97	25	130.8	6 31.3	97	25	130.9	6 02.3	97	25	131.1	5 33.2	97	25	131.2	5 04.1	97	25	131.3	9
50	8 12.6	97	25	129.5	7 43.6	97	25	129.6	7 14.5	97	25	129.7	6 45.5	97	25	129.8	6 16.5	97	25	130.0	5 47.4	97	25	130.1	5 18.4	97	25	130.2					50
1	7 57.4	97	26	128.5	7 28.4	97	26	128.6	6 59.4	97	26	128.7	6 30.4	97	26	128.9	6 01.4	97	25	129.0	5 32.4	97	25	129.1	5 03.4	97	25	129.3					1
2	7 42.0	97	26	127.5	7 13.1	97	26	127.6	6 44.1	97	26	127.8	6 15.1	97	26	127.9	5 46.1	97	26	128.0	5 17.1	97	26	128.2									2
3	7 26.4	97	26	126.5	6 57.5	97	26	126.7	6 28.5	97	26	126.8	5 59.6	97	26	126.9	5 30.6	97	26	127.1	5 01.7	97	26	127.2									3
4	7 10.6	96	27	125.6	6 41.7	96	27	125.7	6 12.8	96	27	125.8	5 43.9	96	27	126.0	5 14.9	96	26	126.1													4
55	6 54.7	96	27	124.6	6 25.8	96	27	124.7	5 56.9	96	27	124.9	5 28.0	96	27	125.0																	55
6	6 38.5	96	27	123.6	6 09.6	96	27	123.8	5 40.7	96	27	123.9	5 11.9	96	27	124.0																	6
7	6 22.1	96	28	122.7	5 53.3	96	28	122.8	5 24.4	96	27	122.9																					7
8	6 05.6	96	28	121.7	5 36.8	96	28	121.8	5 08.0	96	28	122.0																					8
9	5 48.9	96	28	120.7	5 20.1	96	28	120.9																									9
60	5 32.0	96	28	119.8	5 03.3	96	28	119.9																									60
1	5 15.0	96	29	118.8																													1

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91																	5 20.8	95	32	87.1	5 49.2	94	32	86.9	6 17.5	94	32	86.8	6 45.8	94	32	86.6	91
2																	5 01.3	95	32	86.2	5 29.7	95	32	86.0	5 58.0	94	32	85.8	6 26.4	94	32	85.7	2
3																					5 10.2	95	32	85.0	5 38.5	95	32	84.9	6 06.9	95	32	84.7	3
4																									5 19.1	95	32	83.9	5 47.5	95	32	83.8	4
95																													5 28.1	95	32	82.8	95
6																													5 08.7	95	32	81.9	6

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	27 00.0	1.0 00	180.0	27 30.0	1.0 00	180.0	28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	00
1	26 59.8	1.0 01	178.9	27 29.8	1.0 01	178.9	27 59.8	1.0 01	178.9	28 29.8	1.0 01	178.9	28 59.8	1.0 01	178.9	29 29.8	1.0 01	178.9	29 59.8	1.0 01	178.9	30 29.8	1.0 01	178.9	1
2	26 59.2	1.0 02	177.8	27 29.2	1.0 02	177.8	27 59.2	1.0 02	177.8	28 29.2	1.0 02	177.8	28 59.2	1.0 02	177.7	29 29.2	1.0 02	177.7	29 59.2	1.0 02	177.7	30 29.2	1.0 02	177.7	2
3	26 58.3	1.0 02	176.7	27 28.3	1.0 02	176.7	27 58.3	1.0 02	176.6	28 28.3	1.0 02	176.6	28 58.3	1.0 02	176.6	29 28.3	1.0 02	176.6	29 58.3	1.0 02	176.6	30 28.3	1.0 02	176.6	3
4	26 57.0	1.0 03	175.6	27 27.0	1.0 03	175.5	27 57.0	1.0 03	175.5	28 26.9	1.0 03	175.5	28 56.9	1.0 03	175.5	29 26.9	1.0 03	175.5	29 56.9	1.0 03	175.5	30 26.9	1.0 03	175.5	4
05	26 55.3	1.0 03	174.4	27 25.3	1.0 03	174.4	27 55.2	1.0 03	174.4	28 25.2	1.0 04	174.4	28 55.2	1.0 04	174.4	29 25.2	1.0 04	174.4	29 55.2	1.0 04	174.3	30 25.2	1.0 04	174.3	05
6	26 53.2	1.0 04	173.3	27 23.2	1.0 04	173.3	27 53.1	1.0 04	173.3	28 23.1	1.0 04	173.3	28 53.1	1.0 04	173.2	29 23.1	1.0 04	173.2	29 53.1	1.0 04	173.2	30 23.0	1.0 04	173.2	6
7	26 50.7	1.0 05	172.2	27 20.7	1.0 05	172.2	27 50.7	1.0 05	172.2	28 20.6	1.0 05	172.2	28 50.6	1.0 05	172.1	29 20.6	1.0 05	172.1	29 50.6	1.0 05	172.1	30 20.5	1.0 05	172.0	7
8	26 47.9	1.0 05	171.1	27 17.9	1.0 05	171.1	27 47.8	1.0 05	171.1	28 17.8	1.0 05	171.0	28 47.7	1.0 05	171.0	29 17.7	1.0 05	171.0	29 47.7	1.0 05	170.9	30 17.6	1.0 05	170.9	8
9	26 44.7	1.0 06	170.0	27 14.7	1.0 06	170.0	27 44.6	1.0 06	169.9	28 14.6	1.0 06	169.9	28 44.5	1.0 06	169.9	29 14.5	1.0 06	169.8	29 44.4	1.0 06	169.8	30 14.4	1.0 06	169.8	9
10	26 41.1	1.0 07	168.9	27 11.1	1.0 07	168.9	27 41.0	1.0 07	168.8	28 10.9	1.0 07	168.8	28 40.9	1.0 07	168.8	29 10.8	1.0 07	168.7	29 40.8	1.0 07	168.7	30 10.7	1.0 07	168.6	10
1	26 37.2	1.0 07	167.8	27 07.1	1.0 07	167.8	27 37.0	1.0 07	167.7	28 07.0	1.0 07	167.7	28 36.9	1.0 07	167.6	29 06.8	1.0 07	167.6	29 36.7	1.0 07	167.6	30 06.7	1.0 07	167.5	1
2	26 32.9	1.0 08	166.7	27 02.8	1.0 08	166.7	27 32.7	1.0 08	166.6	28 02.6	1.0 08	166.6	28 32.5	1.0 08	166.5	29 02.4	1.0 08	166.5	29 32.3	1.0 08	166.4	30 02.3	1.0 08	166.4	2
3	26 28.2	1.0 08	165.6	26 58.1	1.0 08	165.5	27 28.0	1.0 08	165.5	27 57.9	1.0 08	165.5	28 27.8	1.0 08	165.4	28 57.7	1.0 09	165.4	29 27.6	1.0 09	165.3	29 57.5	1.0 09	165.3	3
4	26 23.2	1.0 09	164.5	26 53.0	1.0 09	164.4	27 22.9	1.0 09	164.4	27 52.8	1.0 09	164.3	28 22.7	1.0 09	164.3	28 52.6	1.0 09	164.2	29 22.4	1.0 09	164.2	29 52.3	1.0 09	164.1	4
15	26 17.7	1.0 10	163.4	26 47.6	1.0 10	163.3	27 17.5	1.0 10	163.3	27 47.3	1.0 10	163.2	28 17.2	1.0 10	163.2	28 47.1	1.0 10	163.1	29 16.9	1.0 10	163.1	29 46.8	1.0 10	163.0	15
6	26 12.0	99 10	162.3	26 41.8	99 10	162.2	27 11.7	99 10	162.2	27 41.5	99 10	162.1	28 11.4	99 10	162.1	28 41.2	99 10	162.0	29 11.1	99 10	161.9	29 40.9	99 10	161.9	6
7	26 05.9	99 11	161.2	26 35.7	99 11	161.1	27 05.5	99 11	161.1	27 35.3	99 11	161.0	28 05.2	99 11	161.0	28 35.0	99 11	160.9	29 04.8	99 11	160.8	29 34.6	99 11	160.8	7
8	25 59.4	99 11	160.1	26 29.2	99 11	160.0	26 59.0	99 11	160.0	27 28.8	99 11	159.9	27 58.6	99 12	159.8	28 28.4	99 12	159.8	28 58.2	99 12	159.7	29 28.0	99 12	159.6	8
9	25 52.6	99 12	159.0	26 22.4	99 12	158.9	26 52.1	99 12	158.9	27 21.9	99 12	158.8	27 51.7	99 12	158.7	28 21.5	99 12	158.7	28 51.3	99 12	158.6	29 21.1	99 12	158.5	9
20	25 45.4	99 13	157.9	26 15.2	99 13	157.8	26 44.9	99 13	157.8	27 14.7	99 13	157.7	27 44.5	99 13	157.6	28 14.2	99 13	157.6	28 44.0	99 13	157.5	29 13.7	99 13	157.4	20
1	25 37.9	99 13	156.8	26 07.6	99 13	156.7	26 37.4	99 13	156.7	27 07.1	99 13	156.6	27 36.8	99 13	156.5	28 06.6	99 13	156.5	28 36.3	99 13	156.4	29 06.1	99 13	156.3	1
2	25 30.0	99 14	155.7	25 59.7	99 14	155.7	26 29.5	99 14	155.6	26 59.2	99 14	155.5	27 28.9	99 14	155.4	27 58.6	99 14	155.4	28 28.3	99 14	155.3	28 58.0	99 14	155.2	2
3	25 21.8	99 14	154.6	25 51.5	99 14	154.6	26 21.2	99 14	154.5	26 50.9	99 14	154.4	27 20.6	99 14	154.3	27 50.3	99 14	154.2	28 20.0	99 14	154.2	28 49.7	99 15	154.1	3
4	25 13.3	99 15	153.6	25 43.0	99 15	153.5	26 12.6	99 15	153.4	26 42.3	99 15	153.3	27 12.0	99 15	153.2	27 41.6	99 15	153.1	28 11.3	99 15	153.1	28 41.0	99 15	153.0	4
25	25 04.4	99 15	152.5	25 34.1	99 15	152.4	26 03.7	99 15	152.3	26 33.4	99 15	152.2	27 03.0	99 15	152.1	27 32.6	99 16	152.1	28 02.3	99 16	152.0	28 31.9	99 16	151.9	25
6	24 55.2	99 16	151.4	25 24.9	99 16	151.3	25 54.5	99 16	151.2	26 24.1	99 16	151.1	26 53.7	99 16	151.0	27 23.3	99 16	151.0	27 52.9	99 16	150.9	28 22.5	99 16	150.8	6
7	24 45.7	99 16	150.3	25 15.3	99 16	150.2	25 44.9	99 16	150.1	26 14.5	99 17	150.1	26 44.1	99 17	150.0	27 13.7	99 17	149.9	27 43.3	99 17	149.8	28 12.8	99 17	149.7	7
8	24 35.9	99 17	149.2	25 05.5	99 17	149.2	25 35.0	99 17	149.1	26 04.6	99 17	149.0	26 34.2	99 17	148.9	27 03.7	99 17	148.8	27 33.3	99 17	148.7	28 02.8	98 17	148.6	8
9	24 25.7	98 17	148.2	24 55.3	98 17	148.1	25 24.8	98 18	148.0	25 54.4	98 18	147.9	26 23.9	98 18	147.8	26 53.4	98 18	147.7	27 23.0	98 18	147.6	27 52.5	98 18	147.5	9
30	24 15.3	98 18	147.1	24 44.8	98 18	147.0	25 14.3	98 18	146.9	25 43.8	98 18	146.8	26 13.3	98 18	146.7	26 42.8	98 18	146.6	27 12.3	98 18	146.5	27 41.8	98 18	146.4	30
1	24 04.5	98 18	146.0	24 34.0	98 18	145.9	25 03.5	98 18	145.8	25 33.0	98 19	145.7	26 02.5	98 19	145.6	26 31.9	98 19	145.5	27 01.4	98 19	145.4	27 30.9	98 19	145.3	1
2	23 53.5	98 19	145.0	24 22.9	98 19	144.9	24 52.4	98 19	144.8	25 21.8	98 19	144.7	25 51.3	98 19	144.6	26 20.7	98 19	144.4	26 50.2	98 19	144.3	27 19.6	98 19	144.2	2
3	23 42.1	98 19	143.9	24 11.5	98 19	143.8	24 41.0	98 20	143.7	25 10.4	98 20	143.6	25 39.8	98 20	143.5	26 09.2	98 20	143.4	26 38.6	98 20	143.3	27 08.0	98 20	143.2	3
4	23 30.5	98 20	142.9	23 59.9	98 20	142.7	24 29.3	98 20	142.6	24 58.6	98 20	142.5	25 28.0	98 20	142.4	25 57.4	98 20	142.3	26 26.8	98 20	142.2	26 56.2	98 20	142.1	4
35	23 18.5	98 20	141.8	23 47.9	98 20	141.7	24 17.3	98 20	141.6	24 46.6	98 20	141.5	25 16.0	98 21	141.3	25 45.3	98 21	141.2	26 14.7	98 21	141.1	26 44.0	98 21	141.0	35
6	23 06.3	98 21	140.7	23 35.6	98 21	140.6	24 05.0	98 21	140.5	24 34.3	98 21	140.4	25 03.6	98 21	140.3	25 33.0	98 21	140.2	26 02.3	98 21	140.0	26 31.6	98 22	139.9	6
7	22 53.8	98 21	139.7	23 23.1	98 21	139.6	23 52.4	98 21	139.5	24 21.7	98 21	139.3	24 51.0	98 22	139.2	25 20.3	98 22	139.1	25 49.6	98 22	139.0	26 18.9	98 22	138.9	7
8	22 41.0	98 22	138.6	23 10.3	98 22	138.5	23 39.6	98 22	138.4	24 08.9	98 22	138.3	24 38.1	98 22	138.2	25 07.4	98 22	138.0	25 36.6	97 22	137.9	26 05.9	97 22	137.8	8
9	22 28.0	98 22	137.6	22 57.2	97 22	137.5	23 26.5	97 22	137.4	23 55.7	97 22	137.2	24 25.0	97 22	137.1	24 54.2	97 22	137.0	25 23.4	97 22	136.9	25 52.6	97 23	136.7	9
40	22 14.7	97 23	136.6	22 43.9	97 23	136.4	23 13.1	97 23	136.3	23 42.3	97 23	136.2	24 11.5	97 23	136.1	24 40.7	97 23	135.9	25 09.9	97 23	135.8	25 39.1	97 23	135.7	40
1	22 01.1	97 23	135.5	22 30.3	97 23	135.4	22 59.5	97 23	135.3	23 28.7	97 23	135.1	23 57.8	97 23	135.0	24 27.0	97 23	134.9	24 56.2	97 23	134.7	25 25.3	97 24	134.6	1
2	21 47.3	97 23	134.5	22 16.5	97 24	134.3	22 45.6	97 24	134.2	23 14.8	97 24	134.1	23 43.9	97 24	134.0	24 13.0	97 24	133.8	24 42.2	97 24	133.7	25 11.3	97 24	133.6	2
3	21 33.2	97 24	133.4	22 02.4	97 24	133.3	22 31.5	97 24	133.2	23 00.6	97 24	133.0	23 29.7	97 24	132.9	23 58.8	97 24	132.8	24 27.9	97 24	132.6	24 57.0	97 24	132.5	3
4	21 18.9	97 24	132.4	21 48.0	97 24	132.3	22 17.1	97 24	132.1	22 46.2	97 24	132.0	23 15.3	97 24	131.9	23 44.4	97 24	131.7	24 13.4	97 25	131.6	24 42.5	97 25	131.5	4
45	21 04.4	97 25	131.4	21 33.5	97 25	131.2	22 02.5	97 25	131.1	22 31.6	97 25	131.0	23 00.6	97 25	130.8	23 29.7	97 25	130.7	23 58.7	97 25	130.6	24 27.7	97 25	130.4	45
6	20 49.6	97 25	130.3	21 18.7	97 25	130.2	21 47.7	97 25	130.1	22 16.7	97 25	129.9	22 45.7	97 25	129.8	23 14.8	97 25	129.7	23 43.8	97 25	129.5	24 12.8	97 25	129.4	6
7	20 34.6	97 25	129.3	21 03.6	97 25	129.2	21 32.6	97 25	129.0	22 01.6	97 26	128.9	22 30.6	97 26	128.8	22 59.6	97 26	128.6	23 28.6	97 26	128.5	23 57.5	97 26	128.3	7
8	20 19.4	97 26	128.3	20 48.4	97 26	128.2	21 17.4	97 26	128.0	21 46.3	97 26	127.9	22 15.3	97 26	127.7	22 44.2	96 26	127.6	23 13.2	96 26	127.5	23 42.1	96 26	127.3	8
9	20 04.0	97 26	127.3	20 32.9	96 26	127.1	21 01.9	96 26	127.0	21 30.8	96 26	126.9	21 59.7	96 26	126.7	22 28.7	96 26	126.6	22 57.6	96 26	126.4	23 26.5	96 26	126.3	9
50	19 48.3	96 26	126.3	20 17.2	96 26	126.1	20 46.2	96 27	126.0	21 15.1	96 27	125.8	21 44.0	96 27	125.7	22 12.9	96 27	125.6	22 41.8	96 27	125.4	23 10.6	96 27	125.3	50
1	19 32.5	96 27	125.3	20 01.4	96 27	125.1	20 30.3	96 27	125.0	20 59.1	96 27	124.8	21 28.0	96 27	124.7	21 56.9	96 27	124.5	22 25.7	96 27	124.4	22 54.6	96 27	124.2	1
2	19 16.4	96 27	124.2	19 45.3	96 27	124.1	20 14.1	96 27	124.0	20 43.0	96 27	123.8	21 11.8	96 27	123.7	21 40.7	96 27	123.5	22 09.5	96 27	123.4	22 38.3	96 27	123.2	2
3	19 00.2	96 27	123.2	19 29.0	96 27	123.1	19 57.8	96 27	122.9	20 26.7	96 28	122.8	20 55.5	96 28	122.6	21 24.3	96 28	122.5	21 53.1	96 28	122.3	22 21.9	96 28	122.2	3
4	18 43.7	96 28	122.2	19 12.6	96 28	122.1	19 41.4	96 28	121.9	20 10.2	96 28	121.8	20 38.9	96 28	121.6	21 07.7	96 28	121.5	21 36.5	96 28	121.3	22 05.3	96 28	121.2	4
55	18 27.1	96 28	121.2	18 55.9	96 28	121.1	19 24.7	96 28	120.9	19 53.5	96 28	120.8	20 22.2	96 28	120.6	20 51.0	96 28	120.5	21 19.7	96 28	120.3	21 48.5	96 28	120.2	55
6	18 10.3	96 28	120.2	18 39.1	96 28	120.1	19 07.8	96 28	119.9	19 36.6	96 28	119.8	20 05.3	96 28	119.6	20 34.1	96 28	119.5	21 02.8	96 29	119.3	21 31.5	96 29	119.2	6
7	17 53.4	96 29	119.2	18 22.1	96 29	119.1	18 50.8	96 29	118.9	19 19.6	96 29	118.8	19 48.3	96 29	118.6	20 17.0	96 29	118.5	20 45.7	96 29	118.3	21 14.4	96 29	118.1	7
8	17 36.2	96 29	118.2	18 05.0	96 29	118.1	18 33.7	96 29	117.9	19 02.3	96 29	117.8	19 31.0	96 29	117.6	19 59.7	96 29	117.5	20 28.4	96 29	117.3	20 57.1	96 29	117.1	8
9	17 19.0	96 29	117.2	17 47.6	96 29	117.1	18 16.3	96 29	116.9	18 45.0	96 29	116.8	19 13.7	96 29	116.6	19 42.3	96 29	116.5	20 11.0	96 29	116.3	20 39.6	95 29	116.1	9
60	17 01.5	96 29	116.2	17 30.2	96 29	116.1	17 58.8	96 29	115.9	18 27.5	95 29	115.8	18 56.1	96 29	115.6	19 24.7	95 30	115.5	19 53.4	95 30	115.3	20 22.0	95 30	115.1	60
1	16 43.9	96 30	115.3	17 12.6	95 30	115.1	17 41.2	96 30	114.9	18 09.8	95 30	114.8	18 38.4	95 30	114.6	19 07.0	95 30	114.5	19 35.6	95 30	114.3	20 04.2	95 30	114.2	1
2	16 26.2	95 30	114.3	16 54.8	95 30	114.1	17 23.4	95 30	114.0	17 52.0	95 30	113.8	18 20.6	95 30	113.6	18 49.2	95 30	113.5	19 17.8	95 30	113.3	19 46.3	95 30	113.2	2
3	16 08.3	95 30	113.3	16 36.9	95 30	113.1	17 05.5	95 30	113.0	17 34.1	95 30	112.8	18 02.6	95 30	112.7	18 31.2	95 30	112.5	18 59.8	95 30	112.3	19 28.3	95 30	112.2	3
4	15 50.3	95 30	112.3	16 18.9	95 30	112.1	16 47.4	95 30	112.0	17 16.0	95 30	111.8	17 44.5	95 30	111.7	18 13.1	95 30	111.5	18 41.6	95 30	111.3	19 10.2	95 30	111.2	4
65	15 32.2	95 30	111.3	16 00.7	95 30	111.2	16 29.3	95 30	111.0	16 57.8	95 31	110.8	17 26.3	95 31	110.7	17 54.9	95 31	110.5	18 23.4	95 31	110.4	18 51.9	95 31	110.2	65
6	15 13.9	95 31	110.3	15 42.4	95 31	110.2	16 11.0	95 31	110.0	16 39.5	95 31	109.9	17 08.0	95 31	109.7	17 36.5	95 31	109.5	18 05.0	95 31	109.4	18 33.5	95 31	109.2	6
7	14 55.5	95 31	109.4	15 24.0	95 31	109.2	15 52.6	95 31	109.1	16 21.1	95 31	108.9	16 49.6	95 31	108.7	17 18.0	95 31	108.6	17 46.5	95 31	108.4	18 15.0	95 31	108.2	7
8	14 37.0	95 31	108.4	15 05.5	95 31	108.2	15 34.0	95 31	108.1	16 02.5	95 31	107.9	16 31.0	95 31	107.7	16 59.5	95 31	107.6	17 27.9	95 31	107.4	17 56.4	95 31	107.3	8
9	14 18.5	95 31	107.4	14 46.9	95 31	107.3	15 15.4	95 31	107.1	15 43.9	95 31	106.9	16 12.3	95 31	106.8	16 40.8	95 31	106.6	17 09.2	95 31	106.4	17 37.7	95 31	106.3	9
70	13 59.8	95 31	106.5	14 28.2	95 31	106.3	14 56.7	95 31	106.1	15 25.2	95 31	106.0	15 53.6	95 31	105.8	16 22.0	95 31	105.6	16 50.5	95 31	105.5	17 18.9	95 31	105.3	70
1	13 41.0	95 31	105.5	14 09.4	95 31	105.3	14 37.9	95 31	105.2	15 06.3	95 32	105.0	15 34.8	95 32	104.8	16 03.2	95 32	104.7	16 31.6	95 32	104.5	17 00.0	95 32	104.3	1
2	13 22.1	95 32	104.5	13 50.6	95 32	104.4	14 19.0	95 32	104.2	14 47.4	95 32	104.0	15 15.8	95 32	103.9	15 44.2	95 32	103.7	16 12.6	95 32	103.5	16 41.0	95 32	103.4	2
3	13 03.2	95 32	103.6	13 31.6	95 32	103.4	14 00.0	95 32	103.2	14 28.4	95 32	103.1	14 56.8	95 32	102.9	15 25.2	95 32	102.7	15 53.6	95 32	102.6	16 22.0	95 32	102.4	3
4	12 44.1	95 32	102.6	13 12.6	95 32	102.4	13 41.0	95 32	102.3	14 09.4	95 32	102.1	14 37.8	95 32	101.9	15 06.1	95 32	101.8	15 34.5	95 32	101.6	16 02.9	95 32	101.4	4
75	12 25.1	95 32	101.6	12 53.5	95 32	101.5	13 21.8	95 32	101.3	13 50.2	95 32	101.1	14 18.6	95 32	101.0	14 47.0	95 32	100.8	15 15.3	95 32	100.6	15 43.7	95 32	100.5	75
6	12 05.9	95 32	100.7	12 34.3	95 32	100.5	13 02.7	95 32	100.3	13 31.0	95 32	100.2	13 59.4	95 32	100.0	14 27.8	95 32	99.8	14 56.1	95 32	99.7	15 24.5	94 32	99.5	6
7	11 46.7	95 32	99.7	12 15.0	95 32	99.6	12 43.4	95 32	99.4	13 11.8	95 32	99.2	13 40.1	94 32	99.1	14 08.5	94 32	98.9	14 36.8	94 32	98.7	15 05.2	94 32	98.5	7
8	11 27.4	95 32	98.8	11 55.8	95 32	98.6	12 24.1	95 32	98.4	12 52.5	95 32	98.3	13 20.8	94 32	98.1	13 49.2	94 32	97.9	14 17.5	94 32	97.8	14 45.8	94 32	97.6	8
9	11 08.1	95 32	97.8	11 36.4	95 32	97.6	12 04.8	95 32	97.5	12 33.1	94 32	97.3	13 01.5	94 32	97.1	13 29.8	94 32	97.0	13 58.1	94 32	96.8	14 26.5	94 32	96.6	9
80	10 48.7	95 32	96.9	11 17.0	95 32	96.7	11 45.4	94 32	96.5	12 13.7	94 32	96.4	12 42.1	94 32	96.2	13 10.4	94 32	96.0	13 38.7	94 32	95.9	14 07.0	94 32	95.7	80
1	10 29.3	95 32	95.9	10 57.6	95 32	95.7	11 26.0	94 32	95.6	11 54.3	94 32	95.4	12 22.6	94 32	95.2	12 50.9	94 32	95.1	13 19.3	94 32	94.9	13 47.6	94 32	94.7	1
2	10 09.8	95 32	95.0	10 38.2	94 32	94.8	11 06.5	94 32	94.6	11 34.8	94 32	94.5	12 03.2	94 32	94.3	12 31.5	94 32	94.1	12 59.8	94 32	93.9	13 28.1	94 32	93.8	2
3	9 50.3	94 32	94.0	10 18.7	94 32	93.8	10 47.0	94 32	93.7	11 15.3	94 33	93.5	11 43.7	94 33	93.3	12 12.0	94 33	93.2	12 40.3	94 32	93.0	13 08.6	94 33	92.8	3
4	9 30.8	94 33	93.1	9 59.2	94 33	92.9	10 27.5	94 33	92.7	10 55.8	94 33	92.6	11 24.2	94 33	92.4	11 52.5	94 33	92.2	12 20.8	94 33	92.0	12 49.1	94 33	91.9	4
85	9 11.3	94 33	92.1	9 39.7	94 33	91.9	10 08.0	94 33	91.8	10 36.3	94 33	91.6	11 04.6	94 33	91.4	11 32.9	94 33	91.3	12 01.2	94 33	91.1	12 29.5	94 33	90.9	85
6	8 51.8	94 33	91.2	9 20.1	94 33	91.0	9 48.5	94 33	90.8	10 16.8	94 33	90.7	10 45.1	94 33	90.5	11 13.4	94 33	90.3	11 41.7	94 33	90.2	12 10.0	94 33	90.0	6
7	8 32.3	94 33	90.2	9 00.6	94 33	90.0	9 28.9	94 33	89.9	9 57.3	94 33	89.7	10 25.6	94 33	89.5	10 53.9	94 33	89.4	11 22.2	94 33	89.2	11 50.5	94 33	89.0	7
8	8 12.7	94 33	89.3	8 41.1	94 33	89.1	9 09.4	94 33	88.9	9 37.7	94 33	88.8	10 06.0	94 33	88.6	10 34.3	94 33	88.4	11 02.7	94 33	88.3	11 31.0	94 33	88.1	8
9	7 53.2	94 33	88.3	8 21.5	94 33	88.2	8 49.9	94 33	88.0	9 18.2	94 33	87.8	9 46.5	94 33	87.7	10 14.8	94 33	87.5	10 43.1	94 33	87.3	11 11.4	94 32	87.2	9
90	7 33.7	94 32	87.4	8 02.0	94 33	87.2	8 30.4	94 32	87.0	8 58.7	94 32	86.9	9 27.0	94 32	86.7	9 55.3	94 32	86.5	10 23.6	94 32	86.4	10 51.9	94 32	86.2	90

Lat. 71°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	00
1	10 59.8	1.0 01	179.0	10 29.8	1.0 01	179.0	9 59.8	1.0 01	179.0	9 29.8	1.0 01	179.0	8 59.8	1.0 01	179.0	8 29.8	1.0 01	179.0	7 59.8	1.0 01	179.0	7 29.8	1.0 01	179.0	1
2	10 59.3	1.0 01	178.0	10 29.3	1.0 01	178.0	9 59.3	1.0 01	178.0	9 29.3	1.0 01	178.0	8 59.3	1.0 01	178.0	8 29.3	1.0 01	178.0	7 59.3	1.0 01	178.0	7 29.3	1.0 01	178.0	2
3	10 58.5	1.0 02	177.0	10 28.5	1.0 02	177.0	9 58.5	1.0 02	177.0	9 28.5	1.0 02	177.0	8 58.5	1.0 02	177.0	8 28.5	1.0 02	177.0	7 58.5	1.0 02	177.0	7 28.5	1.0 02	177.0	3
4	10 57.3	1.0 03	176.0	10 27.3	1.0 03	176.0	9 57.3	1.0 03	176.0	9 27.3	1.0 03	176.0	8 57.3	1.0 03	176.0	8 27.3	1.0 03	176.0	7 57.3	1.0 03	176.0	7 27.3	1.0 03	176.0	4
05	10 55.7	1.0 03	175.0	10 25.7	1.0 03	175.0	9 55.7	1.0 03	175.0	9 25.7	1.0 03	175.0	8 55.8	1.0 03	175.0	8 25.8	1.0 03	175.0	7 55.8	1.0 03	175.0	7 25.8	1.0 03	175.1	05
6	10 53.8	1.0 04	173.9	10 23.8	1.0 04	174.0	9 53.9	1.0 04	174.0	9 23.9	1.0 04	174.0	8 53.9	1.0 04	174.0	8 23.9	1.0 04	174.0	7 53.9	1.0 04	174.1	7 23.9	1.0 04	174.1	6
7	10 51.6	1.0 04	172.9	10 21.6	1.0 04	173.0	9 51.6	1.0 04	173.0	9 21.7	1.0 04	173.0	8 51.7	1.0 04	173.0	8 21.7	1.0 04	173.0	7 51.7	1.0 04	173.1	7 21.8	1.0 04	173.1	7
8	10 49.0	1.0 05	171.9	10 19.0	1.0 05	172.0	9 49.1	1.0 05	172.0	9 19.1	1.0 05	172.0	8 49.1	1.0 05	172.0	8 19.2	1.0 05	172.1	7 49.2	1.0 05	172.1	7 19.2	1.0 05	172.1	8
9	10 46.1	1.0 05	170.9	10 16.1	1.0 05	171.0	9 46.2	1.0 05	171.0	9 16.2	1.0 05	171.0	8 46.3	1.0 05	171.0	8 16.3	1.0 05	171.1	7 46.3	1.0 05	171.1	7 16.4	1.0 05	171.1	9
10	10 42.9	1.0 06	169.9	10 12.9	1.0 06	170.0	9 43.0	1.0 06	170.0	9 13.0	1.0 06	170.0	8 43.1	1.0 06	170.0	8 13.1	1.0 06	170.1	7 43.2	1.0 06	170.1	7 13.2	1.0 06	170.1	10
1	10 39.3	1.0 07	168.9	10 09.3	1.0 07	168.9	9 39.4	1.0 06	169.0	9 09.4	1.0 06	169.0	8 39.5	1.0 06	169.0	8 09.6	1.0 06	169.1	7 39.6	1.0 06	169.1	7 09.7	1.0 06	169.1	1
2	10 35.3	1.0 07	167.9	10 05.4	1.0 07	167.9	9 35.5	1.0 07	168.0	9 05.6	1.0 07	168.0	8 35.6	1.0 07	168.0	8 05.7	1.0 07	168.1	7 35.8	1.0 07	168.1	7 05.8	1.0 07	168.2	2
3	10 31.1	1.0 08	166.9	10 01.2	1.0 08	166.9	9 31.3	1.0 08	167.0	9 01.3	1.0 08	167.0	8 31.4	1.0 08	167.1	8 01.5	1.0 08	167.1	7 31.6	1.0 08	167.1	7 01.7	1.0 08	167.2	3
4	10 26.5	1.0 08	165.9	9 56.6	1.0 08	165.9	9 26.7	1.0 08	166.0	8 56.8	1.0 08	166.0	8 26.9	1.0 08	166.1	7 57.0	1.0 08	166.1	7 27.1	1.0 08	166.1	6 57.2	1.0 08	166.2	4
15	10 21.6	1.0 09	164.9	9 51.7	1.0 09	164.9	9 21.8	1.0 09	165.0	8 51.9	1.0 09	165.0	8 22.0	1.0 09	165.1	7 52.1	1.0 09	165.1	7 22.2	1.0 09	165.2	6 52.3	1.0 09	165.2	15
6	10 16.3	1.0 09	163.9	9 46.4	1.0 09	163.9	9 16.6	1.0 09	164.0	8 46.7	1.0 09	164.0	8 16.8	1.0 09	164.1	7 46.9	1.0 09	164.1	7 17.1	1.0 09	164.2	6 47.2	1.0 09	164.2	6
7	10 10.7	1.0 10	162.9	9 40.9	1.0 10	162.9	9 11.0	1.0 10	163.0	8 41.2	1.0 10	163.0	8 11.3	1.0 10	163.1	7 41.4	1.0 10	163.1	7 11.6	1.0 10	163.2	6 41.7	1.0 10	163.2	7
8	10 04.8	99 10	161.9	9 35.0	99 10	161.9	9 05.1	99 10	162.0	8 35.3	99 10	162.0	8 05.4	99 10	162.1	7 35.6	99 10	162.1	7 05.8	99 10	162.2	6 35.9	99 10	162.3	8
9	9 58.6	99 11	160.9	9 28.8	99 11	160.9	8 58.9	99 11	161.0	8 29.1	99 11	161.1	7 59.3	99 11	161.1	7 29.5	99 11	161.2	6 59.6	99 11	161.2	6 29.8	99 11	161.3	9
20	9 52.0	99 11	159.9	9 22.2	99 11	160.0	8 52.4	99 11	160.0	8 22.6	99 11	160.1	7 52.8	99 11	160.1	7 23.0	99 11	160.2	6 53.2	99 11	160.2	6 23.4	99 11	160.3	20
1	9 45.2	99 12	158.9	9 15.4	99 12	159.0	8 45.6	99 12	159.0	8 15.8	99 12	159.1	7 46.0	99 12	159.1	7 16.2	99 12	159.2	6 46.4	99 12	159.3	6 16.6	99 12	159.3	1
2	9 38.0	99 12	157.9	9 08.2	99 12	158.0	8 38.4	99 12	158.0	8 08.7	99 12	158.1	7 38.9	99 12	158.1	7 09.1	99 12	158.2	6 39.3	99 12	158.3	6 09.6	99 12	158.3	2
3	9 30.5	99 13	156.9	9 00.7	99 13	157.0	8 31.0	99 13	157.0	8 01.2	99 13	157.1	7 31.5	99 13	157.2	7 01.7	99 13	157.2	6 32.0	99 13	157.3	6 02.2	99 13	157.4	3
4	9 22.6	99 14	155.9	8 52.9	99 14	156.0	8 23.2	99 13	156.0	7 53.5	99 13	156.1	7 23.7	99 13	156.2	6 54.0	99 13	156.2	6 24.3	99 13	156.3	5 54.5	99 12	156.4	4
25	9 14.5	99 14	154.9	8 44.8	99 14	155.0	8 15.1	99 14	155.1	7 45.4	99 14	155.1	7 15.7	99 14	155.2	6 46.0	99 14	155.3	6 16.3	99 14	155.3	5 46.5	99 14	155.4	25
6	9 06.1	99 15	153.9	8 36.4	99 15	154.0	8 06.7	99 14	154.1	7 37.0	99 14	154.1	7 07.3	99 14	154.2	6 37.6	99 14	154.3	6 08.0	99 14	154.4	5 38.3	99 14	154.4	6
7	8 57.3	99 15	152.9	8 27.7	99 15	153.0	7 58.0	99 15	153.1	7 28.3	99 15	153.2	6 58.7	99 15	153.2	6 29.0	99 15	153.3	5 59.3	99 15	153.4	5 29.7	99 15	153.5	7
8	8 48.3	99 16	151.9	8 18.7	99 16	152.0	7 49.0	99 15	152.1	7 19.4	99 15	152.2	6 49.7	99 15	152.2	6 20.1	99 15	152.3	5 50.4	99 15	152.4	5 20.8	99 15	152.5	8
9	8 39.0	99 16	150.9	8 09.3	99 16	151.0	7 39.7	99 16	151.1	7 10.1	99 16	151.2	6 40.5	99 16	151.3	6 10.9	99 16	151.3	5 41.3	99 16	151.4	5 11.6	99 16	151.5	9
30	8 29.3	99 17	150.0	7 59.7	99 16	150.0	7 30.1	99 16	150.1	7 00.5	99 16	150.2	6 31.0	99 16	150.3	6 01.4	99 16	150.4	5 31.8	99 16	150.5	5 02.2	99 16	150.5	30
1	8 19.4	99 17	149.0	7 49.8	99 17	149.1	7 20.3	99 17	149.1	6 50.7	99 17	149.2	6 21.1	99 17	149.3	5 51.6	99 17	149.4	5 22.0	99 17	149.5				1
2	8 09.2	98 17	148.0	7 39.6	98 17	148.1	7 10.1	98 17	148.2	6 40.6	98 17	148.2	6 11.0	98 17	148.3	5 41.5	98 17	148.4	5 11.9	98 17	148.5				2
3	7 58.7	98 18	147.0	7 29.2	98 18	147.1	6 59.7	98 18	147.2	6 30.1	98 18	147.3	6 00.6	98 18	147.4	5 31.1	98 18	147.5	5 01.6	98 18	147.5				3
4	7 47.9	98 18	146.0	7 18.4	98 18	146.1	6 48.9	98 18	146.2	6 19.4	98 18	146.3	5 49.9	98 18	146.4	5 20.5	98 18	146.5							4
35	7 36.9	98 19	145.0	7 07.4	98 19	145.1	6 37.9	98 19	145.2	6 08.5	98 19	145.3	5 39.0	98 19	145.4	5 09.5	98 19	145.5							35
6	7 25.5	98 19	144.1	6 56.1	98 19	144.2	6 26.7	98 19	144.3	5 57.2	98 19	144.3	5 27.8	98 19	144.4										6
7	7 13.9	98 20	143.1	6 44.5	98 20	143.2	6 15.1	98 20	143.3	5 45.7	98 20	143.4	5 16.3	98 20	143.5										7
8	7 02.1	98 20	142.1	6 32.7	98 20	142.2	6 03.3	98 20	142.3	5 33.9	98 20	142.4	5 04.5	98 20	142.5										8
9	6 49.9	98 21	141.1	6 20.6	98 21	141.2	5 51.2	98 21	141.3	5 21.9	98 21	141.4													9
40	6 37.5	98 21	140.1	6 08.2	98 21	140.3	5 38.9	98 21	140.4	5 09.6	98 21	140.5													40
1	6 24.9	98 22	139.2	5 55.6	98 21	139.3	5 26.3	98 21	139.4																1
2	6 12.0	98 22	138.2	5 42.7	98 22	138.3	5 13.5	98 22	138.4																2
3	5 58.9	97 22	137.2	5 29.6	97 22	137.3	5 00.4	97 22	137.5																3
4	5 45.5	97 23	136.3	5 16.3	97 23	136.4																			4
45	5 31.8	97 23	135.3	5 02.7	97 23	135.4																			45
6	5 18.0	97 23	134.3																						6
7	5 03.9	97 24	133.4																						7

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	7 14.2	94 32	86.4	7 42.5	94 32	86.3	8 10.9	94 32	86.1	8 39.2	94 32	85.9	9 07.5	94 32	85.8	9 35.8	94 32	85.6	10 04.1	94 32	85.4	10 32.5	94 32	85.3	91
2	6 54.7	94 32	85.5	7 23.0	94 32	85.3	7 51.4	94 32	85.2	8 19.7	94 32	85.0	8 48.0	94 32	84.8	9 16.4	94 32	84.7	9 44.7	94 32	84.5	10 13.0	94 32	84.3	2
3	6 35.2	94 32	84.6	7 03.6	94 32	84.4	7 31.9	94 32	84.2	8 00.3	94 32	84.1	8 28.6	94 32	83.9	8 56.9	94 32	83.7	9 25.3	94 32	83.6	9 53.6	94 32	83.4	3
4	6 15.8	95 32	83.6	6 44.2	95 32	83.4	7 12.5	94 32	83.3	7 40.9	94 32	83.1	8 09.2	94 32	83.0	8 37.5	94 32	82.8	9 05.9	94 32	82.6	9 34.2	94 32	82.5	4
95	5 56.4	95 32	82.7	6 24.8	95 32	82.5	6 53.1	95 32	82.3	7 21.5	95 32	82.2	7 49.8	94 32	82.0	8 18.2	94 32	81.8	8 46.5	94 32	81.7	9 14.9	94 32	81.5	95
6	5 37.1	95 32	81.7	6 05.4	95 32	81.6	6 33.8	95 32	81.4	7 02.2	95 32	81.2	7 30.5	95 32	81.1	7 58.9	95 32	80.9	8 27.2	94 32	80.7	8 55.6	94 32	80.6	6
7	5 17.8	95 32	80.8	5 46.1	95 32	80.6	6 14.5	95 32	80.5	6 42.9	95 32	80.3	7 11.2	95 32	80.1	7 39.6	95 32	80.0	8 08.0	95 32	79.8	8 36.3	95 32	79.6	7
8				5 26.9	95 32	79.7	5 55.3	95 32	79.5	6 23.6	95 32	79.4	6 52.0	95 32	79.2	7 20.4	95 32	79.0	7 48.8	95 32	78.9	8 17.1	95 32	78.7	8
9				5 07.7	95 32	78.7	5 36.1	95 32	78.6	6 04.5	95 32	78.4	6 32.9	95 32	78.3	7 01.2	95 32	78.1	7 29.6	95 32	77.9	7 58.0	95 32	77.8	9
100							5 17.0	95 32	77.6	5 45.4	95 32	77.5	6 13.8	95 32	77.3	6 42.2	95 32	77.2	7 10.6	95 32	77.0	7 38.9	95 32	76.8	100
1										5 26.3	95 32	76.5	5 54.8	95 32	76.4	6 23.2	95 32	76.2	6 51.6	95 32	76.1	7 20.0	95 32	75.9	1
2										5 07.4	95 31	75.6	5 35.8	95 31	75.4	6 04.2	95 31	75.3	6 32.6	95 31	75.1	7 01.1	95 31	75.0	2
3													5 16.9	95 31	74.5	5 45.4	95 31	74.3	6 13.8	95 31	74.2	6 42.2	95 31	74.0	3
4																5 26.6	95 31	73.4	5 55.1	95 31	73.3	6 23.5	95 31	73.1	4
105																5 07.9	95 31	72.5	5 36.4	95 31	72.3	6 04.9	95 31	72.2	105
6																			5 17.8	95 31	71.4	5 46.3	95 31	71.2	6
7																						5 27.9	95 31	70.3	7
8																						5 09.5	95 30	69.4	8

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0
1	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9	31 59.8	1.0 01	178.9	32 29.8	1.0 01	178.8
2	30 59.2	1.0 02	177.7	31 29.2	1.0 02	177.7	31 59.2	1.0 02	177.7	32 29.2	1.0 02	177.7
3	30 58.2	1.0 02	176.6	31 28.2	1.0 02	176.6	31 58.2	1.0 02	176.6	32 28.2	1.0 02	176.5
4	30 56.9	1.0 03	175.4	31 26.9	1.0 03	175.4	31 56.9	1.0 03	175.4	32 26.9	1.0 03	175.4
05	30 55.1	1.0 04	174.3	31 25.1	1.0 04	174.3	31 55.1	1.0 04	174.3	32 25.1	1.0 04	174.2
6	30 53.0	1.0 04	173.2	31 23.0	1.0 04	173.1	31 53.0	1.0 04	173.1	32 22.9	1.0 04	173.1
7	30 50.5	1.0 05	172.0	31 20.5	1.0 05	172.0	31 50.4	1.0 05	172.0	32 20.4	1.0 05	171.9
8	30 47.6	1.0 05	170.9	31 17.5	1.0 05	170.9	31 47.5	1.0 06	170.8	32 17.5	1.0 06	170.8
9	30 44.3	1.0 06	169.7	31 14.2	1.0 06	169.7	31 44.2	1.0 06	169.7	32 14.1	1.0 06	169.6
10	30 40.6	1.0 07	168.6	31 10.6	1.0 07	168.6	31 40.5	1.0 07	168.5	32 10.4	1.0 07	168.5
1	30 36.6	1.0 07	167.5	31 06.5	1.0 07	167.4	31 36.4	1.0 07	167.4	32 06.3	1.0 07	167.3
2	30 32.2	1.0 08	166.3	31 02.1	1.0 08	166.3	31 32.0	1.0 08	166.3	32 01.9	1.0 08	166.2
3	30 27.4	1.0 09	165.2	30 57.2	1.0 08	165.2	31 27.1	1.0 08	165.1	31 57.0	1.0 09	165.1
4	30 22.2	1.0 09	164.1	30 52.1	1.0 09	164.0	31 21.9	1.0 09	164.0	31 51.8	1.0 09	163.9
15	30 16.6	1.0 10	163.0	30 46.5	1.0 10	162.9	31 16.4	1.0 10	162.8	31 46.2	1.0 10	162.8
6	30 10.7	99 10	161.8	30 40.6	99 10	161.8	31 10.4	99 10	161.7	31 40.2	99 11	161.6
7	30 04.5	99 11	160.7	30 34.3	99 11	160.6	31 04.1	99 11	160.6	31 33.9	99 11	160.5
8	29 57.8	99 12	159.6	30 27.6	99 12	159.5	30 57.4	99 12	159.4	31 27.2	99 12	159.4
9	29 50.8	99 12	158.5	30 20.6	99 12	158.4	30 50.4	99 12	158.3	31 20.1	99 12	158.2
20	29 43.5	99 13	157.3	30 13.2	99 13	157.3	30 43.0	99 13	157.2	31 12.7	99 13	157.1
1	29 35.8	99 13	156.2	30 05.5	99 13	156.1	30 35.2	99 14	156.1	31 05.0	99 14	156.0
2	29 27.7	99 14	155.1	29 57.4	99 14	155.0	30 27.1	99 14	155.0	30 56.8	99 14	154.9
3	29 19.3	99 15	154.0	29 49.0	99 15	153.9	30 18.7	99 15	153.8	30 48.4	99 15	153.7
4	29 10.6	99 15	152.9	29 40.3	99 15	152.8	30 09.9	99 15	152.7	30 39.6	99 15	152.6
25	29 01.5	99 16	151.8	29 31.2	99 16	151.7	30 00.8	99 16	151.6	30 30.4	99 16	151.5
6	28 52.1	99 16	150.7	29 21.7	99 16	150.6	29 51.3	99 16	150.5	30 20.9	99 16	150.4
7	28 42.4	99 17	149.6	29 12.0	99 17	149.5	29 41.5	99 17	149.4	30 11.1	99 17	149.3
8	28 32.4	98 17	148.5	29 01.9	98 17	148.4	29 31.4	98 17	148.3	30 01.0	98 17	148.2
9	28 22.0	98 18	147.4	28 51.5	98 18	147.3	29 21.0	98 18	147.2	29 50.5	98 18	147.1
30	28 11.3	98 18	146.3	28 40.8	98 18	146.2	29 10.3	98 18	146.1	29 39.7	98 18	146.0
1	28 00.3	98 19	145.2	28 29.8	98 19	145.1	28 59.2	98 19	145.0	29 28.7	98 19	144.9
2	27 49.0	98 19	144.1	28 18.4	98 19	144.0	28 47.9	98 19	143.9	29 17.3	98 20	143.8
3	27 37.4	98 20	143.0	28 06.8	98 20	142.9	28 36.2	98 20	142.8	29 05.6	98 20	142.7
4	27 25.5	98 20	142.0	27 54.9	98 20	141.8	28 24.2	98 20	141.7	28 53.6	98 20	141.6
35	27 13.3	98 21	140.9	27 42.7	98 21	140.8	28 12.0	98 21	140.6	28 41.3	98 21	140.5
6	27 00.9	98 21	139.8	27 30.2	98 21	139.7	27 59.5	98 21	139.6	28 28.8	98 21	139.4
7	26 48.1	98 22	138.7	27 17.4	98 22	138.6	27 46.7	98 22	138.5	28 15.9	97 22	138.4
8	26 35.1	97 22	137.7	27 04.4	97 22	137.5	27 33.6	97 22	137.4	28 02.8	97 22	137.3
9	26 21.8	97 23	136.6	26 51.0	97 23	136.5	27 20.2	97 23	136.3	27 49.4	97 23	136.2
40	26 08.3	97 23	135.5	26 37.4	97 23	135.4	27 06.6	97 23	135.3	27 35.8	97 23	135.1
1	25 54.5	97 23	134.5	26 23.6	97 23	134.4	26 52.7	97 24	134.2	27 21.9	97 24	134.1
2	25 40.4	97 24	133.4	26 09.5	97 24	133.3	26 38.6	97 24	133.2	27 07.7	97 24	133.0
3	25 26.1	97 24	132.4	25 55.2	97 24	132.2	26 24.2	97 24	132.1	26 53.3	97 24	132.0
4	25 11.5	97 25	131.3	25 40.6	97 25	131.2	26 09.6	97 25	131.1	26 38.7	97 25	130.9
45	24 56.8	97 25	130.3	25 25.8	97 25	130.1	25 54.8	97 25	130.0	26 23.8	97 25	129.9
6	24 41.7	97 25	129.2	25 10.7	97 25	129.1	25 39.7	97 26	129.0	26 08.7	97 26	128.8
7	24 26.5	97 26	128.2	24 55.5	96 26	128.1	25 24.4	96 26	127.9	25 53.3	96 26	127.8
8	24 11.1	96 26	127.2	24 40.0	96 26	127.0	25 08.9	96 26	126.9	25 37.8	96 26	126.7
9	23 55.4	96 26	126.1	24 24.3	96 26	126.0	24 53.2	96 27	125.8	25 22.0	96 27	125.7
50	23 39.5	96 27	125.1	24 08.4	96 27	125.0	24 37.2	96 27	124.8	25 06.1	96 27	124.7
1	23 23.4	96 27	124.1	23 52.3	96 27	123.9	24 21.1	96 27	123.8	24 49.9	96 27	123.6
2	23 07.1	96 27	123.1	23 36.0	96 27	122.9	24 04.7	96 28	122.8	24 33.5	96 28	122.6
3	22 50.7	96 28	122.0	23 19.5	96 28	121.9	23 48.2	96 28	121.7	24 17.0	96 28	121.6
4	22 34.0	96 28	121.0	23 02.8	96 28	120.9	23 31.5	96 28	120.7	24 00.3	96 28	120.6
55	22 17.2	96 28	120.0	22 45.9	96 28	119.9	23 14.6	96 28	119.7	23 43.3	96 28	119.5
6	22 00.2	96 29	119.0	22 28.9	96 29	118.8	22 57.6	96 29	118.7	23 26.3	96 29	118.5
7	21 43.0	96 29	118.0	22 11.7	96 29	117.8	22 40.4	96 29	117.7	23 09.0	95 29	117.5
8	21 25.7	96 29	117.0	21 54.4	95 29	116.8	22 23.0	95 29	116.7	22 51.6	95 29	116.5
9	21 08.2	95 29	116.0	21 36.8	95 29	115.8	22 05.5	95 29	115.7	22 34.1	95 30	115.5
60	20 50.6	95 30	115.0	21 19.2	95 30	114.8	21 47.8	95 30	114.7	22 16.4	95 30	114.5
1	20 32.8	95 30	114.0	21 01.4	95 30	113.8	21 30.0	95 30	113.7	21 58.5	95 30	113.5
2	20 14.9	95 30	113.0	20 43.5	95 30	112.8	21 12.0	95 30	112.7	21 40.5	95 30	112.5
3	19 56.9	95 30	112.0	20 25.4	95 30	111.8	20 53.9	95 30	111.7	21 22.4	95 30	111.5
4	19 38.7	95 30	111.0	20 07.2	95 31	110.8	20 35.7	95 31	110.7	21 04.2	95 31	110.5
65	19 20.4	95 31	110.0	19 48.9	95 31	109.9	20 17.4	95 31	109.7	20 45.8	95 31	109.5
6	19 02.0	95 31	109.0	19 30.4	95 31	108.9	19 58.9	95 31	108.7	20 27.4	95 31	108.5
7	18 43.5	95 31	108.1	19 11.9	95 31	107.9	19 40.4	95 31	107.7	20 08.8	95 31	107.6
8	18 24.8	95 31	107.1	18 53.3	95 31	106.9	19 21.7	95 31	106.7	19 50.1	95 31	106.6
9	18 06.1	95 31	106.1	18 34.5	95 31	105.9	19 02.9	95 31	105.8	19 31.3	95 31	105.6
70	17 47.3	95 32	105.1	18 15.7	95 32	105.0	18 44.1	95 32	104.8	19 12.5	95 32	104.6
1	17 28.4	95 32	104.2	17 56.8	95 32	104.0	18 25.2	95 32	103.8	18 53.5	95 32	103.7
2	17 09.4	95 32	103.2	17 37.8	95 32	103.0	18 06.2	95 32	102.9	18 34.5	95 32	102.7
3	16 50.4	95 32	102.2	17 18.7	95 32	102.1	17 47.1	95 32	101.9	18 15.4	94 32	101.7
4	16 31.2	95 32	101.3	16 59.6	94 32	101.1	17 27.9	94 32	100.9	17 56.3	94 32	100.7
75	16 12.1	94 32	100.3	16 40.4	94 32	100.1	17 08.7	94 32	100.0	17 37.1	94 32	99.8
6	15 52.8	94 32	99.3	16 21.1	94 32	99.2	16 49.5	94 32	99.0	17 17.8	94 32	98.8
7	15 33.5	94 32	98.4	16 01.8	94 32	98.2	16 30.1	94 32	98.0	16 58.4	94 32	97.9
8	15 14.2	94 32	97.4	15 42.5	94 32	97.2	16 10.8	94 32	97.1	16 39.1	94 32	96.9
9	14 54.8	94 32	96.5	15 23.1	94 32	96.3	15 51.4	94 32	96.1	16 19.7	94 32	95.9
80	14 35.3	94 32	95.5	15 03.6	94 32	95.3	15 31.9	94 32	95.2	16 00.2	94 32	95.0
1	14 15.9	94 32	94.6	14 44.2	94 32	94.4	15 12.5	94 32	94.2	15 40.7	94 32	94.0
2	13 56.4	94 33	93.6	14 24.7	94 33	93.4	14 53.0	94 33	93.3	15 21.3	94 33	93.1
3	13 36.9	94 33	92.7	14 05.2	94 33	92.5	14 33.5	94 33	92.3	15 01.7	94 33	92.1
4	13 17.4	94 33	91.7	13 45.7	94 33	91.5	14 13.9	94 33	91.4	14 42.2	94 33	91.2
85	12 57.8	94 33	90.8	13 26.1	94 33	90.6	13 54.4	94 33	90.4	14 22.7	94 33	90.2
6	12 38.3	94 33	89.8	13 06.6	94 33	89.6	13 34.9	94 33	89.5	14 03.1	94 33	89.3
7	12 18.8	94 33	88.9	12 47.1	94 33	88.7	13 15.3	94 33	88.5	13 43.6	94 33	88.4
8	11 59.2	94 33	87.9	12 27.5	94 32	87.8	12 55.8	94 32	87.6	13 24.1	94 33	87.4
9	11 39.7	94 32	87.0	12 08.0	94 32	86.8	12 36.3	94 32	86.6	13 04.6	94 32	86.5
90	11 20.2	94 32	86.0	11 48.5	94 32	85.9	12 16.8	94 32	85.7	12 45.1	94 32	85.5

14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	00
32 59.8	1.0 01	178.8	33 29.8	1.0 01	178.8	33 59.8	1.0 01	178.8	34 29.8	1.0 01	178.8	1
32 59.2	1.0 02	177.7	33 29.2	1.0 02	177.7	33 59.2	1.0 02	177.7	34 29.2	1.0 02	177.7	2
32 58.2	1.0 02	176.5	33 28.2	1.0 02	176.5	33 58.2	1.0 02	176.5	34 28.2	1.0 02	176.5	3
32 56.8	1.0 03	175.4	33 26.8	1.0 03	175.4	33 56.8	1.0 03	175.3	34 26.8	1.0 03	175.3	4
32 55.1	1.0 04	174.2	33 25.1	1.0 04	174.2	33 55.0	1.0 04	174.2	34 25.0	1.0 04	174.2	05
32 52.9	1.0 04	173.1	33 22.9	1.0 04	173.0	33 52.9	1.0 04	173.0	34 22.8	1.0 04	173.0	6
32 50.4	1.0 05	171.9	33 20.3	1.0 05	171.9	33 50.3	1.0 05	171.9	34 20.3	1.0 05	171.8	7
32 47.4	1.0 06	170.8	33 17.4	1.0 06	170.7	33 47.3	1.0 06	170.7	34 17.3	1.0 06	170.7	8
32 44.1	1.0 06	169.6	33 14.0	1.0 06	169.6	33 44.0	1.0 06	169.5	34 13.9	1.0 06	169.5	9
32 40.4	1.0 07	168.5	33 10.3	1.0 07	168.4	33 40.2	1.0 07	168.4	34 10.2	1.0 07	168.3	10
32 36.3	1.0 07	167.3	33 06.2	1.0 08	167.3	33 36.1	1.0 08	167.2	34 06.0	1.0 08	167.2	1
32 31.8	1.0 08	166.2	33 01.7	1.0 08	166.1	33 31.6	1.0 08	166.1	34 01.5	1.0 08	166.0	2
32 26.9	1.0 09	165.0	32 56.8	1.0 09	165.0	33 26.7	1.0 09	164.9	33 56.6	1.0 09	164.9	3
32 21.7	1.0 09	163.9	32 51.5	1.0 09	163.8	33 21.4	1.0 09	163.8	33 51.3	1.0 09	163.7	4
32 16.1	1.0 10	162.7	32 45.9	99 10	162.7	33 15.8	99 10	162.6	33 45.6	99 10	162.5	15
32 10.1	99 11	161.6	32 39.9	99 11	161.5	33 09.7	99 11	161.5	33 39.6	99 11	161.4	6
32 03.7	99 11	160.4	32 33.5	99 11	160.4	33 03.3	99 11	160.3	33 33.1	99 11	160.2	7
31 57.0	99 12	159.3	32 26.8	99 12	159.2	32 56.6	99 12	159.2	33 26.4	99 12	159.1	8
31 49.9	99 12	158.2	32 19.7	99 12	158.1	32 49.4	99 12	158.0	33 19.2	99 13	157.9	9
31 42.5	99 13	157.0	32 12.2	99 13	157.0	32 41.9	99 13	156.9	33 11.7	99 13	156.8	20
31 34.7	99 14	155.9	32 04.4	99 14	155.8	32 34.1	99 14	155.7	33 03.8	99 14	155.7	1
31 26.5	99 14	154.8	31 56.2	99 14	154.7	32 25.9	99 14	154.6	32 55.6	99 14	154.5	2
31 18.0	99 15	153.7	31 47.7	99 15	153.6	32 17.4	99 15	153.5	32 47.0	99 15	153.4	3
31 09.2	99 15	152.5	31 38.8	99 15	152.4	32 08.5	99 15	152.4	32 38.1	99 15	152.3	4
31 00.0	99 16	151.4	31 29.6	99 16	151.3	31 59.2	99 16	151.2	32 28.8	99 16	151.1	25
30 50.5	99 16	150.3	31 20.1	99 16	150.2	31 49.7	99 16	150.1	32 19.2	99 17	150.0	6
30 40.7	99 17	149.2	31 10.2	98 17	149.1	31 39.8	98 17	149.0	32 09.3	98 17	148.9	7
30 30.5	98 18	148.1	31 00.0	98 18	148.0	31 29.5	98 18	147.9	31 59.0	98 18	147.8	8
30 20.0	98 18	147.0	30 49.5	98 18	146.9	31 19.0	98 18	146.8	31 48.5	98 18	146.7	9
30 09.2	98 19	145.9	30 38.7	98 19	145.8	31 08.1	98 19	145.7	31 37.6	98 19	145.5	30
29 58.1	98 19	144.8	30 27.5	98 19	144.7	30 56.9	98 19	144.5	31 26.4	98 19	144.4	1
29 46.7	98 20	143.7	30 16.1	98 20	143.6	30 45.5	98 20	143.4	31 14.8	98 20	143.3	2
29 34.9	98 20	142.6	30 04.3	98 20	142.5	30 33.7	98 20	142.3	31 03.0	98 20	142.2	3
29 22.9	98 21	141.5	29 52.3	98 21	141.4	30 21.6	98 21	141.2	30 50.9	98 21	141.1	4
29 10.6	98 21	140.4	29 39.9	98 21	140.3	30 09.2	98 21	140.2	30 38.5	98 21	140.0	35
28 58.0	98 21	139.3	29 27.3	98 22	139.2	29 56.6	98 22	139.1	30 25.8	98 22	138.9	6
28 45.2	97 22	138.2	29 14.4	97 22	138.1	29 43.6	97 22	138.0	30 12.8	97 22	137.8	7
28 32.0	97 22	137.2	29 01.2	97 22	137.0	29 30.4	97 22	136.9	29 59.6	97 23	136.8	8
28 18.6	97 23	136.1	28 47.8	97 23	136.0	29 16.9	97 23	135.8	29 46.1	97 23	135.7	9
28 04.9	97 23	135.0	28 34.1	97 23	134.9	29 03.2	97 23	134.7	29 32.3	97 23	134.6	40
27 51.0	97 24	133.9	28 20.1	97 24	133.8	28 49.2	97 24	133.7	29 18.3	97 24	133.5	1
27 36.8	97 24	132.9	28 05.9	97 24	132.7	28 34.9	97 24	132.6	29 04.0	97 24	132.5	2
27 22.4	97 24	131.8	27 51.4	97 25	131.7	28 20.4	97 25	131.5	28 49.5	97 25	131.4	3
27 07.7	97 25	130.8	27 36.7	97 25	130.6	28 05.7	97 25	130.5	28 34.7	97 25	130.3	4
26 52.8	97 25	129.7	27 21.7	97 25	129.6	27 50.7	97 25	129.4	28 19.7	97 25	129.3	45
26 37.6	97 26	128.7	27 06.6	96 26	128.5	27 35.5	96 26	128.4	28 04.4	96 26	128.2	6
26 22.3	96 26	127.6	26 51.2	96 26	127.5	27 20.1	96 26	127.3	27 49.0	96 26	127.2	7
26 06.7	96 26	126.6	26 35.6	96 26	126.4	27 04.4	96 26	126.3	27 33.3	96 26	126.1	8
25 50.9	96 27	125.5	26 19.8	96 27	125.4	26 48.6	96 27	125.2	27 17.4	96 27	125.1	9
25 34.9	96 27	124.5	26 03.7	96 27	124.4	26 32.5	96 27	124.2	27 01.3	96 27	124.0	50
25 18.7	96 27	123.5	25 47.5	96 27	123.3	26 16.3	96 27	123.2	26 45.1	96 27	123.0	1
25 02.3	96 28	122.4	25 31.1	96 28	122.3	25 59.8	96 28	122.1	26 28.6	96 28	122.0	2
24 45.7	96 28	121.4	25 14.5	96 28	121.3	25 43.2	96 28	121.1	26 11.9	96 28	120.9	3
24 29.0	96 28	120.4	24 57.7	96 28	120.2	25 26.4	96 28	120.1	25 55.1	96 28	119.9	4
24 12.0	96 28	119.4	24 40.7	96 29	119.2	25 09.4	96 29	119.1	25 38.1	96 29	118.9	55
23 54.9	96 29	118.4	24 23.6	96 29	118.2	24 52.2	95 29	118.0	25 20.9	95 29	117.9	6
23 37.7	95 29	117.4	24 06.3	95 29	117.2	24 34.9	95 29	117.0	25 03.5	95 29	116.9	7
23 20.2	95 29	116.3	23 48.8	95 29	116.2	24 17.4	95 29	116.0	24 46.0	95 29	115.8	8
23 02.7	95 30	115.3	23 31.2	95 30	115.2	23 59.8	95 30	115.0	24 28.4	95 30	114.8	9
22 44.9	95 30	114.3	23 13.5	95 30	114.2	23 42.0	95 30	114.0	24 10.6	95 30	113.8	60
22 27.1	95 30	113.3	22 55.6	95 30	113.2	23 24.1	95 30	113.0	23 52.6	95 30	112.8	1
22 09.1	95 30	112.3	22 37.6	95 30	112.2	23 06.1	95 30	112.0	23 34.6	95 30	111.8	2
21 50.9	95 30	111.3	22 19.4	95 30	111.2	22 47.9	95 30	111.0	23 16.4	95 31	110.8	3
21 32.7	95 31	110.3	22 01.1	95 31	110.2	22 29.6	95 31	110.0	22 58.0	95 31	109.8	4
21 14.3	95 31	109.4	21 42.7	95 31	109.2	22 11.2	95 31	109.0	22 39.6	95 31	108.8	65
20 55.8	95 31	108.4	21 24.2	95 31	108.2	21 52.7	95 31	108.0	22 21.1	95 31	107.9	6
20 37.2	95 31	107.4	21 05.6	95 31	107.2	21 34.0	95 31	107.0	22 02.4	95 31	106.9	7
20 18.5	95 31	106.4	20 46.9	95 31	106.2	21 15.3	95 31	106.1	21 43.7	95 31	105.9	8
19 59.7	95 31	105.4	20 28.1	95 31	105.3	20 56.5	95 32	105.1	21 24.9	95 32	104.9	9
19 40.9	95 32	104.5	20 09.2	95 32	104.3	20 37.6	95 32	104.1	21 05.9	94 32	103.9	70
19 21.9	95 32	103.5	19 50.3	94 32	103.3	20 18.6	94 32	103.1	20 46.9	94 32	103.0	1
19 02.9	94 32	102.5	19 31.2	94 32	102.3	19 59.5	94 32	102.2	20 27.8	94 32	102.0	2
18 43.8	94 32	101.5	19 12.1	94 32	101.4	19 40.4	94 32	101.2	20 08.7	94 32	101.0	3
18 24.6	94 32	100.6	18 52.9	94 32	100.4	19 21.2	94 32	100.2	19 49.5	94 32	100.0	4
18 05.4	94 32	99.6	18 33.7	94 32	99.4	19 02.0	94 32	99.3	19 30.3	94 32	99.1	75
17 46.1	94 32	98.6	18 14.4	94 32	98.5	18 42.7	94 32	98.3	19 10.9	94 32	98.1	6
17 26.7	94 32	97.7	17 55.0	94 32	97.5	18 23.3	94 32	97.3	18 51.6	94 32	97.2	7
17 07.4	94 32	96.7	17 35.6	94 32	96.6	18 03.9	94 32	96.4	18 32.2	94 32	96.2	8
16 47.9	94 32	95.8	17 16.2	94 32	95.6	17 44.5	94 32	95.4	18 12.7	94 32	95.2	9
16 28.5	94 32	94.8	16 56.8	94 32	94.6	17 25.0	94 32	94.5	17 53.3	94 32	94.3	80
16 09.0	94 32	93.9	16 37.3	94 32	93.7	17 05.5	94 33	93.5	17 33.8	94 33	93.3	1
15 49.5	94 33	92.9	16 17.8	94 33	92.7	16 46.0	94 33	92.6	17 14.3	94 33	92.4	2
15 30.0	94 33	92.0	15 58.3	94 33	91.8	16 26.5	94 33	91.6	16 54.8	94 33	91.4	3
15 10.5	94 33	91.0	15 38.7	94 33	90.8	16 07.0	94 33	90.7	16 35.2	94 33	90.5	4
14 50.9	94 33	90.1	15 19.2	94 33	89.9	15 47.5	94 33	89.7	16 15.7	94 33	89.5	85
14 31.4	94 33	89.1	14 59.7	94 33	89.0	15 27.9	94 33	88.8	15 56.2	94 33	88.6	6
14 11.9	94 33	88.2	14 40.1	94 32	88.0	15 08.4	94 32	87.8	15 36.6	94 32	87.7	7
13 52.4	94 32	87.2	14 20.6	94 32	87.1	14 48.9	94 32	86.9	15 17.1	94 32	86.7	8
13 32.9	94 32	86.3	14 01.1	94 32	86.1	14 29.4	94 32	86.0	14 57.6	94 32	85.8	9
13 13.4	94 32	85.4	13 41.6	94 32	85.2	14 09.9	94 32	85.0	14 38.2	94 32	84.8	90

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	6 59.8	1.0 01	179.0	6 29.8	1.0 01	179.0	5 59.8	1.0 01	179.0	5 29.8	1.0 01	179.0													1
2	6 59.3	1.0 01	178.0	6 29.3	1.0 01	178.0	5 59.3	1.0 01	178.0	5 29.3	1.0 01	178.0													2
3	6 58.5	1.0 02	177.0	6 28.5	1.0 02	177.1	5 58.5	1.0 02	177.1	5 28.5	1.0 02	177.1													3
4	6 57.3	1.0 03	176.1	6 27.3	1.0 02	176.1	5 57.3	1.0 02	176.1	5 27.3	1.0 02	176.1													4
05	6 55.8	1.0 03	175.1	6 25.8	1.0 03	175.1	5 55.8	1.0 03	175.1	5 25.8	1.0 03	175.1													05
6	6 54.0	1.0 04	174.1	6 24.0	1.0 04	174.1	5 54.0	1.0 04	174.1	5 24.0	1.0 04	174.1													6
7	6 51.8	1.0 04	173.1	6 21.8	1.0 04	173.1	5 51.8	1.0 04	173.1	5 21.9	1.0 04	173.2													7
8	6 49.3	1.0 05	172.1	6 19.3	1.0 05	172.1	5 49.3	1.0 05	172.2	5 19.4	1.0 05	172.2													8
9	6 46.4	1.0 05	171.1	6 16.5	1.0 05	171.2	5 46.5	1.0 05	171.2	5 16.5	1.0 05	171.2													9
10	6 43.2	1.0 06	170.2	6 13.3	1.0 06	170.2	5 43.3	1.0 06	170.2	5 13.4	1.0 06	170.2													10
1	6 39.7	1.0 06	169.2	6 09.8	1.0 06	169.2	5 39.9	1.0 06	169.2	5 09.9	1.0 06	169.3													1
2	6 35.9	1.0 07	168.2	6 06.0	1.0 07	168.2	5 36.0	1.0 07	168.3	5 06.1	1.0 07	168.3													2
3	6 31.7	1.0 08	167.2	6 01.8	1.0 07	167.2	5 31.9	1.0 07	167.3	5 02.0	1.0 07	167.3													3
4	6 27.3	1.0 08	166.2	5 57.3	1.0 08	166.3	5 27.4	1.0 08	166.3																4
15	6 22.4	1.0 09	165.2	5 52.5	1.0 09	165.3	5 22.7	1.0 08	165.3																15
6	6 17.3	1.0 09	164.3	5 47.4	1.0 09	164.3	5 17.5	1.0 09	164.4																6
7	6 11.8	1.0 10	163.3	5 42.0	1.0 10	163.3	5 12.1	1.0 10	163.4																7
8	6 06.1	99 10	162.3	5 36.2	99 10	162.4	5 06.4	99 10	162.4																8
9	6 00.0	99 11	161.3	5 30.1	99 11	161.4	5 00.3	99 11	161.4																9
20	5 53.6	99 11	160.3	5 23.7	99 11	160.4																			20
1	5 46.8	99 12	159.4	5 17.0	99 12	159.4																			1
2	5 39.8	99 12	158.4	5 10.0	99 12	158.5																			2
3	5 32.4	99 13	157.4	5 02.7	99 13	157.5																			3
4	5 24.8	99 13	156.4																						4
25	5 16.8	99 14	155.5																						25
6	5 08.6	99 14	154.5																						6
7	5 00.0	99 15	153.5																						7

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat 76

La 77

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 00.8	94 32	85.1	11 29.1	94 32	84.9	11 57.4	94 32	84.8	12 25.6	94 32	84.6	12 53.9	94 32	84.4	13 22.2	94 32	84.2	13 50.5	94 32	84.1	14 18.7	94 32	83.9	91
2	10 41.3	94 32	84.2	11 09.6	94 32	84.0	11 37.9	94 32	83.8	12 06.2	94 32	83.7	12 34.5	94 32	83.5	13 02.8	94 32	83.3	13 31.1	94 32	83.1	13 59.3	94 32	83.0	2
3	10 21.9	94 32	83.2	10 50.2	94 32	83.1	11 18.5	94 32	82.9	11 46.8	94 32	82.7	12 15.1	94 32	82.5	12 43.4	94 32	82.4	13 11.7	94 32	82.2	13 40.0	94 32	82.0	3
4	10 02.5	94 32	82.3	10 30.8	94 32	82.1	10 59.2	94 32	81.9	11 27.5	94 32	81.8	11 55.8	94 32	81.6	12 24.1	94 32	81.4	12 52.3	94 32	81.3	13 20.6	94 32	81.1	4
95	9 43.2	94 32	81.3	10 11.5	94 32	81.2	10 39.8	94 32	81.0	11 08.2	94 32	80.8	11 36.5	94 32	80.7	12 04.8	94 32	80.5	12 33.1	94 32	80.3	13 01.4	94 32	80.2	95
6	9 23.9	94 32	80.4	9 52.2	94 32	80.2	10 20.6	94 32	80.1	10 48.9	94 32	79.9	11 17.2	94 32	79.7	11 45.5	94 32	79.6	12 13.8	94 32	79.4	12 42.1	94 32	79.2	6
7	9 04.7	94 32	79.5	9 33.0	94 32	79.3	10 01.4	94 32	79.1	10 29.7	94 32	79.0	10 58.0	94 32	78.8	11 26.3	94 32	78.6	11 54.7	94 32	78.5	12 23.0	94 32	78.3	7
8	8 45.5	95 32	78.5	9 13.8	95 32	78.4	9 42.2	94 32	78.2	10 10.5	94 32	78.0	10 38.9	94 32	77.9	11 07.2	94 32	77.7	11 35.6	94 32	77.5	12 03.9	94 32	77.4	8
9	8 26.4	95 32	77.6	8 54.7	95 32	77.4	9 23.1	95 32	77.3	9 51.5	95 32	77.1	10 19.8	95 32	76.9	10 48.2	94 32	76.8	11 16.5	94 32	76.6	11 44.9	94 32	76.4	9
100	8 07.3	95 32	76.7	8 35.7	95 32	76.5	9 04.1	95 32	76.3	9 32.5	95 32	76.2	10 00.8	95 32	76.0	10 29.2	95 32	75.8	10 57.6	95 31	75.7	11 25.9	94 31	75.5	100
1	7 48.4	95 32	75.7	8 16.8	95 31	75.6	8 45.1	95 31	75.4	9 13.5	95 31	75.2	9 41.9	95 31	75.1	10 10.3	95 31	74.9	10 38.7	95 31	74.7	11 07.0	95 31	74.6	1
2	7 29.5	95 31	74.8	7 57.9	95 31	74.6	8 26.3	95 31	74.5	8 54.7	95 31	74.3	9 23.1	95 31	74.1	9 51.5	95 31	74.0	10 19.9	95 31	73.8	10 48.2	95 31	73.7	2
3	7 10.7	95 31	73.9	7 39.1	95 31	73.7	8 07.5	95 31	73.5	8 35.9	95 31	73.4	9 04.3	95 31	73.2	9 32.7	95 31	73.1	10 01.1	95 31	72.9	10 29.5	95 31	72.7	3
4	6 51.9	95 31	72.9	7 20.4	95 31	72.8	7 48.8	95 31	72.6	8 17.3	95 31	72.4	8 45.7	95 31	72.3	9 14.1	95 31	72.1	9 42.5	95 31	72.0	10 10.9	95 31	71.8	4
105	6 33.3	95 31	72.0	7 01.8	95 31	71.8	7 30.2	95 31	71.7	7 58.7	95 31	71.5	8 27.1	95 31	71.4	8 55.6	95 31	71.2	9 24.0	95 31	71.0	9 52.4	95 31	70.9	105
6	6 14.8	95 31	71.1	6 43.3	95 31	70.9	7 11.7	95 31	70.7	7 40.2	95 31	70.6	8 08.7	95 31	70.4	8 37.1	95 31	70.3	9 05.6	95 31	70.1	9 34.0	95 30	69.9	6
7	5 56.4	95 31	70.1	6 24.9	95 30	70.0	6 53.3	95 30	69.8	7 21.8	95 30	69.7	7 50.3	95 30	69.5	8 18.8	95 30	69.3	8 47.3	95 30	69.2	9 15.7	95 30	69.0	7
8	5 38.1	95 30	69.2	6 06.6	95 30	69.0	6 35.1	95 30	68.9	7 03.6	95 30	68.7	7 32.1	95 30	68.6	8 00.6	95 30	68.4	8 29.1	95 30	68.3	8 57.6	95 30	68.1	8
9	5 19.8	95 30	68.3	5 48.4	95 30	68.1	6 16.9	95 30	67.9	6 45.4	95 30	67.8	7 13.9	95 30	67.6	7 42.5	95 30	67.5	8 11.0	95 30	67.3	8 39.5	95 30	67.2	9
110	5 01.8	95 30	67.3	5 30.3	95 30	67.2	5 58.9	95 30	67.0	6 27.4	95 30	66.9	6 55.9	95 30	66.7	7 24.5	95 30	66.6	7 53.0	95 30	66.4	8 21.5	95 30	66.2	110
1				5 12.4	95 30	66.2	5 40.9	95 30	66.1	6 09.5	95 30	65.9	6 38.1	95 30	65.8	7 06.6	95 30	65.6	7 35.2	95 30	65.5	8 03.7	95 29	65.3	1
2							5 23.1	95 29	65.2	5 51.7	95 29	65.0	6 20.3	95 29	64.8	6 48.9	95 29	64.7	7 17.5	95 29	64.5	7 46.1	95 29	64.4	2
3							5 05.5	95 29	64.2	5 34.1	95 29	64.1	6 02.7	95 29	63.9	6 31.3	95 29	63.8	6 59.9	95 29	63.6	7 28.5	95 29	63.5	3
4										5 16.6	95 29	63.1	5 45.2	95 29	63.0	6 13.9	95 29	62.8	6 42.5	95 29	62.7	7 11.1	95 29	62.5	4
115													5 27.9	96 29	62.1	5 56.5	95 29	61.9	6 25.2	95 29	61.8	6 53.8	95 29	61.6	115
6													5 10.7	96 28	61.1	5 39.4	96 28	61.0	6 08.1	96 28	60.8	6 36.7	96 28	60.7	6
7																5 22.4	96 28	60.0	5 51.1	96 28	59.9	6 19.8	96 28	59.8	7
8																5 05.5	96 28	59.1	5 34.3	96 28	59.0	6 03.0	96 28	58.8	8
9																			5 17.6	96 28	58.0	5 46.4	96 27	57.9	9
120																			5 01.1	96 27	57.1	5 29.9	96 27	57.0	120
1																						5 13.6	96 27	56.0	1

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	00
1	34 59.8	1.0 01	178.8	35 29.8	1.0 01	178.8	35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	1
2	34 59.2	1.0 02	177.7	35 29.2	1.0 02	177.6	35 59.2	1.0 02	177.6	36 29.2	1.0 02	177.6	36 59.2	1.0 02	177.6	37 29.2	1.0 02	177.6	37 59.2	1.0 02	177.6	38 29.2	1.0 02	177.6	2
3	34 58.2	1.0 02	176.5	35 28.2	1.0 02	176.5	35 58.2	1.0 02	176.5	36 28.2	1.0 02	176.4	36 58.2	1.0 02	176.4	37 28.2	1.0 02	176.4	37 58.2	1.0 02	176.4	38 28.2	1.0 02	176.4	3
4	34 56.8	1.0 03	175.3	35 26.8	1.0 03	175.3	35 56.8	1.0 03	175.3	36 26.8	1.0 03	175.3	36 56.8	1.0 03	175.2	37 26.7	1.0 03	175.2	37 56.7	1.0 03	175.2	38 26.7	1.0 03	175.2	4
05	34 55.0	1.0 04	174.1	35 25.0	1.0 04	174.1	35 55.0	1.0 04	174.1	36 25.0	1.0 04	174.1	36 54.9	1.0 04	174.0	37 24.9	1.0 04	174.0	37 54.9	1.0 04	174.0	38 24.9	1.0 04	174.0	05
6	34 52.8	1.0 04	173.0	35 22.8	1.0 04	172.9	35 52.8	1.0 04	172.9	36 22.7	1.0 04	172.9	36 52.7	1.0 04	172.9	37 22.7	1.0 04	172.8	37 52.6	1.0 04	172.8	38 22.6	1.0 04	172.8	6
7	34 50.2	1.0 05	171.8	35 20.2	1.0 05	171.8	35 50.1	1.0 05	171.7	36 20.1	1.0 05	171.7	36 50.1	1.0 05	171.7	37 20.0	1.0 05	171.6	37 50.0	1.0 05	171.6	38 20.0	1.0 05	171.6	7
8	34 47.2	1.0 06	170.6	35 17.2	1.0 06	170.6	35 47.1	1.0 06	170.6	36 17.1	1.0 06	170.5	36 47.0	1.0 06	170.5	37 17.0	1.0 06	170.5	37 46.9	1.0 06	170.4	38 16.9	1.0 06	170.4	8
9	34 43.9	1.0 06	169.5	35 13.8	1.0 06	169.4	35 43.7	1.0 06	169.4	36 13.7	1.0 06	169.3	36 43.6	1.0 06	169.3	37 13.6	1.0 06	169.3	37 43.5	1.0 06	169.2	38 13.4	1.0 06	169.2	9
10	34 40.1	1.0 07	168.3	35 10.0	1.0 07	168.2	35 39.9	1.0 07	168.2	36 09.9	1.0 07	168.2	36 39.8	1.0 07	168.1	37 09.7	1.0 07	168.1	37 39.6	1.0 07	168.0	38 09.6	1.0 07	168.0	10
1	34 35.9	1.0 08	167.1	35 05.8	1.0 08	167.1	35 35.8	1.0 08	167.0	36 05.7	1.0 08	167.0	36 35.6	1.0 08	166.9	37 05.5	1.0 08	166.9	37 35.4	1.0 08	166.8	38 05.3	1.0 08	166.8	1
2	34 31.4	1.0 08	166.0	35 01.3	1.0 08	165.9	35 31.2	1.0 08	165.9	36 01.1	1.0 08	165.8	36 31.0	1.0 08	165.8	37 00.9	1.0 08	165.7	37 30.8	1.0 08	165.7	38 00.6	1.0 08	165.6	2
3	34 26.5	1.0 09	164.8	34 56.3	1.0 09	164.7	35 26.2	1.0 09	164.7	35 56.1	1.0 09	164.6	36 26.0	1.0 09	164.6	36 55.8	1.0 09	164.5	37 25.7	1.0 09	164.5	37 55.6	1.0 09	164.4	3
4	34 21.1	1.0 09	163.6	34 51.0	1.0 10	163.6	35 20.9	1.0 10	163.5	35 50.7	1.0 10	163.5	36 20.6	1.0 10	163.4	36 50.4	1.0 10	163.3	37 20.3	1.0 10	163.3	37 50.1	1.0 10	163.2	4
15	34 15.4	99 10	162.5	34 45.3	99 10	162.4	35 15.1	99 10	162.4	35 45.0	99 10	162.3	36 14.8	99 10	162.3	36 44.6	99 10	162.2	37 14.5	99 10	162.1	37 44.3	99 10	162.0	15
6	34 09.4	99 10	161.3	34 39.2	99 11	161.3	35 09.0	99 10	161.2	35 38.8	99 11	161.1	36 08.7	99 11	161.1	36 38.5	99 11	161.0	37 08.3	99 11	160.9	37 38.1	99 11	160.8	6
7	34 02.9	99 11	160.2	34 32.7	99 11	160.1	35 02.5	99 11	160.0	35 32.3	99 11	160.0	36 02.1	99 12	159.9	36 31.9	99 12	159.8	37 01.7	99 12	159.7	37 31.5	99 12	159.7	7
8	33 56.1	99 12	159.0	34 25.9	99 12	158.9	34 55.7	99 12	158.9	35 25.5	99 12	158.8	35 55.2	99 12	158.7	36 25.0	99 12	158.6	36 54.8	99 12	158.6	37 24.5	99 12	158.5	8
9	33 49.0	99 13	157.9	34 18.7	99 13	157.8	34 48.5	99 13	157.7	35 18.2	99 13	157.6	35 48.0	99 13	157.6	36 17.7	99 13	157.5	36 47.4	99 13	157.4	37 17.2	99 13	157.3	9
20	33 41.4	99 13	156.7	34 11.1	99 13	156.6	34 40.9	99 13	156.6	35 10.6	99 13	156.5	35 40.3	99 13	156.4	36 10.0	99 13	156.3	36 39.7	99 13	156.2	37 09.4	99 13	156.1	20
1	33 33.5	99 14	155.6	34 03.2	99 14	155.5	34 32.9	99 14	155.4	35 02.6	99 14	155.3	35 32.3	99 14	155.2	36 02.0	99 14	155.1	36 31.7	99 14	155.1	37 01.4	99 14	155.0	1
2	33 25.3	99 14	154.4	33 54.9	99 14	154.4	34 24.6	99 14	154.3	34 54.3	99 14	154.2	35 23.9	99 15	154.1	35 53.6	99 15	154.0	36 23.3	99 15	153.9	36 52.9	99 15	153.8	2
3	33 16.7	99 15	153.3	33 46.3	99 15	153.2	34 16.0	99 15	153.1	34 45.6	99 15	153.0	35 15.2	99 15	152.9	35 44.9	99 15	152.8	36 14.5	99 15	152.7	36 44.1	99 15	152.6	3
4	33 07.7	99 15	152.2	33 37.3	99 16	152.1	34 07.0	99 16	152.0	34 36.6	99 16	151.9	35 06.2	99 16	151.8	35 35.8	99 16	151.7	36 05.4	99 16	151.6	36 35.0	99 16	151.5	4
25	32 58.4	99 16	151.0	33 28.0	99 16	150.9	33 57.6	99 16	150.8	34 27.2	99 16	150.7	34 56.8	99 16	150.6	35 26.3	99 16	150.5	35 55.9	99 16	150.4	36 25.5	99 16	150.3	25
6	32 48.8	99 16	149.9	33 18.4	99 17	149.8	33 47.9	99 17	149.7	34 17.5	98 17	149.6	34 47.0	98 17	149.5	35 16.6	98 17	149.4	35 46.1	98 17	149.3	36 15.6	98 17	149.2	6
7	32 38.8	98 17	148.8	33 08.4	98 17	148.7	33 37.9	98 17	148.6	34 07.4	98 17	148.5	34 36.9	98 17	148.4	35 06.4	98 17	148.2	35 35.9	98 17	148.1	36 05.4	98 18	148.0	7
8	32 28.6	98 18	147.7	32 58.1	98 18	147.6	33 27.5	98 18	147.4	33 57.0	98 18	147.3	34 26.5	98 18	147.2	34 56.0	98 18	147.1	35 25.5	98 18	147.0	35 54.9	98 18	146.9	8
9	32 17.9	98 18	146.5	32 47.4	98 18	146.4	33 16.9	98 18	146.3	33 46.3	98 18	146.2	34 15.8	98 18	146.1	34 45.2	98 18	146.0	35 14.7	98 19	145.9	35 44.1	98 19	145.7	9
30	32 07.0	98 19	145.4	32 36.5	98 19	145.3	33 05.9	98 19	145.2	33 35.3	98 19	145.1	34 04.7	98 19	145.0	34 34.1	98 19	144.8	35 03.5	98 19	144.7	35 32.9	98 19	144.6	30
1	31 55.8	98 19	144.3	32 25.2	98 19	144.2	32 54.6	98 19	144.1	33 24.0	98 19	144.0	33 53.4	98 19	143.8	34 22.7	98 20	143.7	34 52.1	98 20	143.6	35 21.5	98 20	143.5	1
2	31 44.2	98 20	143.2	32 13.6	98 20	143.1	32 43.0	98 20	143.0	33 12.3	98 20	142.8	33 41.7	98 20	142.7	34 11.0	98 20	142.6	34 40.4	98 20	142.5	35 09.7	98 20	142.3	2
3	31 32.4	98 20	142.1	32 01.7	98 20	142.0	32 31.0	98 20	141.9	33 00.4	98 20	141.7	33 29.7	98 20	141.6	33 59.0	98 21	141.5	34 28.3	98 21	141.3	34 57.6	98 21	141.2	3
4	31 20.2	98 21	141.0	31 49.5	98 21	140.9	32 18.8	98 21	140.7	32 48.1	98 21	140.6	33 17.4	98 21	140.5	33 46.7	98 21	140.4	34 16.0	98 21	140.2	34 45.2	98 21	140.1	4
35	31 07.8	98 21	139.9	31 37.1	98 21	139.8	32 06.3	98 21	139.6	32 35.6	98 21	139.5	33 04.8	97 21	139.4	33 34.1	97 22	139.2	34 03.3	97 22	139.1	34 32.5	97 22	139.0	35
6	30 55.1	97 22	138.8	31 24.3	97 22	138.7	31 53.5	97 22	138.5	32 22.8	97 22	138.4	32 52.0	97 22	138.3	33 21.2	97 22	138.1	33 50.4	97 22	138.0	34 19.6	97 22	137.9	6
7	30 42.1	97 22	137.7	31 11.3	97 22	137.6	31 40.5	97 22	137.4	32 09.7	97 22	137.3	32 38.8	97 22	137.2	33 08.0	97 22	137.0	33 37.2	97 22	136.9	34 06.3	97 23	136.8	7
8	30 28.8	97 23	136.6	30 58.0	97 22	136.5	31 27.1	97 23	136.4	31 56.3	97 23	136.2	32 25.4	97 23	136.1	32 54.6	97 23	135.9	33 23.7	97 23	135.8	33 52.8	97 23	135.7	8
9	30 15.2	97 23	135.5	30 44.4	97 23	135.4	31 13.5	97 23	135.3	31 42.6	97 23	135.1	32 11.7	97 23	135.0	32 40.8	97 23	134.8	33 09.9	97 23	134.7	33 39.0	97 23	134.6	9
40	30 01.4	97 23	134.5	30 30.5	97 24	134.3	30 59.6	97 24	134.2	31 28.7	97 24	134.0	31 57.8	97 24	133.9	32 26.9	97 24	133.8	32 55.9	97 24	133.6	33 25.0	97 24	133.5	40
1	29 47.4	97 24	133.4	30 16.4	97 24	133.2	30 45.5	97 24	133.1	31 14.5	97 24	133.0	31 43.6	97 24	132.8	32 12.6	97 24	132.7	32 41.6	97 24	132.5	33 10.7	97 24	132.4	1
2	29 33.0	97 24	132.3	30 02.1	97 24	132.2	30 31.1	97 24	132.0	31 00.1	97 24	131.9	31 29.1	97 24	131.7	31 58.1	97 24	131.6	32 27.1	97 25	131.4	32 56.1	97 25	131.3	2
3	29 18.5	97 25	131.3	29 47.5	97 25	131.1	30 16.5	97 25	131.0	30 45.5	97 24	130.8	31 14.4	97 25	130.7	31 43.4	97 25	130.5	32 12.4	96 25	130.3	32 41.3	96 25	130.2	3
4	29 03.7	97 25	130.2	29 32.6	97 25	130.0	30 01.6	97 25	129.9	30 30.6	96 25	129.7	30 59.5	96 25	129.6	31 28.4	96 25	129.4	31 57.4	96 25	129.3	32 26.3	96 25	129.1	4
45	28 48.6	96 25	129.1	29 17.6	96 26	129.0	29 46.5	96 26	128.8	30 15.4	96 26	128.7	30 44.3	96 26	128.5	31 13.2	96 26	128.4	31 42.1	96 26	128.2	32 11.0	96 26	128.0	45
6	28 33.4	96 26	128.1	29 02.3	96 26	127.9	29 31.2	96 26	127.8	30 00.1	96 26	127.6	30 28.9	96 26	127.5	30 57.8	96 26	127.3	31 26.7	96 26	127.1	31 55.5	96 26	127.0	6
7	28 17.9	96 26	127.0	28 46.8	96 26	126.9	29 15.6	96 26	126.7	29 44.5	96 26	126.6	30 13.3	96 26	126.4	30 42.1	96 26	126.2	31 11.0	96 26	126.1	31 39.8	96 27	125.9	7
8	28 02.2	96 27	126.0	28 31.0	96 27	125.8	28 59.8	96 27	125.7	29 28.7	96 27	125.5	29 57.5	96 27	125.3	30 26.3	96 27	125.2	30 55.1	96 27	125.0	31 23.9	96 27	124.8	8
9	27 46.3	96 27	124.9	28 15.1	96 27	124.8	28 43.9	96 27	124.6	29 12.7	96 27	124.4	29 41.4	96 27	124.3	30 10.2	96 27	124.1	30 39.0	96 27	124.0	31 07.7	96 27	123.8	9
50	27 30.1	96 27	123.9	27 58.9	96 27	123.7	28 27.7	96 27	123.6	28 56.5	96 27	123.4	29 25.2	96 27	123.2	29 53.9	96 27	123.1	30 22.7	96 27	122.9	30 51.4	96 28	122.7	50
1	27 13.8	96 28	122.8	27 42.6	96 28	122.7	28 11.3	96 28	122.5	28 40.1	96 28	122.4	29 08.8	96 28	122.2	29 37.5	96 28	122.0	30 06.2	96 28	121.9	30 34.9	96 28	121.7	1
2	26 57.3	96 28	121.8	27 26.0	96 28	121.6	27 54.8	96 28	121.5	28 23.5	96 28	121.3	28 52.1	96 28	121.2	29 20.8	96 28	121.0	29 49.5	96 28	120.8	30 18.1	95 28	120.6	2
3	26 40.6	96 28	120.8	27 09.3	96 28	120.6	27 38.0	96 28	120.4	28 06.7	96 28	120.3	28 35.3	96 28	120.1	29 04.0	95 28	119.9	29 32.6	95 28	119.8	30 01.2	95 28	119.6	3
4	26 23.8	96 28	119.8	26 52.4	96 28	119.6	27 21.1	96 28	119.4	27 49.7	95 29	119.3	28 18.4	95 29	119.1	28 47.0	95 29	118.9	29 15.6	95 29	118.7	29 44.2	95 29	118.6	4
55	26 06.7	95 29	118.7	26 35.3	95 29	118.6	27 04.0	95 29	118.4	27 32.6	95 29	118.2	28 01.2	95 29	118.1	28 29.8	95 29	117.9	28 58.4	95 29	117.7	29 26.9	95 29	117.5	55
6	25 49.5	95 29	117.7	26 18.1	95 29	117.5	26 46.7	95 29	117.4	27 15.3	95 29	117.2	27 43.9	95 29	117.0	28 12.4	95 29	116.9	28 41.0	95 29	116.7	29 09.5	95 29	116.5	6
7	25 32.1	95 29	116.7	26 00.7	95 29	116.5	26 29.3	95 29	116.4	26 57.9	95 29	116.2	27 26.4	95 29	116.0	27 54.9	95 29	115.8	28 23.5	95 29	115.7	28 52.0	95 30	115.5	7
8	25 14.6	95 29	115.7	25 43.2	95 30	115.5	26 11.7	95 30	115.3	26 40.2	95 30	115.2	27 08.8	95 30	115.0	27 37.3	95 30	114.8	28 05.8	95 30	114.6	28 34.3	95 30	114.5	8
9	24 56.9	95 30	114.7	25 25.5	95 30	114.5	25 54.0	95 30	114.3	26 22.5	95 30	114.2	26 51.0	95 30	114.0	27 19.5	95 30	113.8	27 48.0	95 30	113.6	28 16.4	95 30	113.4	9
60	24 39.1	95 30	113.7	25 07.6	95 30	113.5	25 36.1	95 30	113.3	26 04.6	95 30	113.1	26 33.1	95 30	113.0	27 01.5	95 30	112.8	27 30.0	95 30	112.6	27 58.4	95 30	112.4	60
1	24 21.1	95 30	112.7	24 49.6	95 30	112.5	25 18.1	95 30	112.3	25 46.6	95 30	112.1	26 15.0	95 30	112.0	26 43.5	95 30	111.8	27 11.9	95 30	111.6	27 40.3	95 30	111.4	1
2	24 03.0	95 30	111.7	24 31.5	95 30	111.5	25 00.0	95 30	111.3	25 28.4	95 30	111.1	25 56.8	95 31	111.0	26 25.3	95 31	110.8	26 53.7	95 31	110.6	27 22.1	95 31	110.4	2
3	23 44.8	95 31	110.7	24 13.3	95 31	110.5	24 41.7	95 31	110.3	25 10.1	95 31	110.1	25 38.5	95 31	110.0	26 06.9	95 31	109.8	26 35.3	95 31	109.6	27 03.7	95 31	109.4	3
4	23 26.5	95 31	109.7	23 54.9	95 31	109.5	24 23.3	95 31	109.3	24 51.7	95 31	109.1	25 20.1	95 31	109.0	25 48.5	95 31	108.8	26 16.9	95 31	108.6	26 45.2	94 31	108.4	4
65	23 08.0	95 31	108.7	23 36.4	95 31	108.5	24 04.8	95 31	108.3	24 33.2	95 31	108.1	25 01.6	95 31	108.0	25 30.0	95 31	107.8	25 58.3	94 31	107.6	26 26.6	94 31	107.4	65
6	22 49.5	95 31	107.7	23 17.9	95 31	107.5	23 46.2	95 31	107.3	24 14.6	95 31	107.1	24 43.0	94 31	107.0	25 11.3	94 31	106.8	25 39.6	94 31	106.6	26 07.9	94 31	106.4	6
7	22 30.8	95 31	106.7	22 59.2	95 31	106.5	23 27.5	95 31	106.3	23 55.9	94 31	106.2	24 24.2	94 31	106.0	24 52.6	94 31	105.8	25 20.9	94 31	105.6	25 49.2	94 31	105.4	7
8	22 12.1	95 31	105.7	22 40.4	94 31	105.5	23 08.8	94 31	105.4	23 37.1	94 32	105.2	24 05.4	94 32	105.0	24 33.7	94 32	104.8	25 02.0	94 32	104.6	25 30.3	94 32	104.4	8
9	21 53.2	94 32	104.7	22 21.5	94 32	104.6	22 49.9	94 32	104.4	23 18.2	94 32	104.2	23 46.5	94 32	104.0	24 14.8	94 32	103.8	24 43.1	94 32	103.7	25 11.3	94 32	103.5	9
70	21 34.3	94 32	103.8	22 02.6	94 32	103.6	22 30.9	94 32	103.4	22 59.2	94 32	103.2	23 27.5	94 32	103.0	23 55.8	94 32	102.9	24 24.0	94 32	102.7	24 52.3	94 32	102.5	70
1	21 15.3	94 32	102.8	21 43.6	94 32	102.6	22 11.9	94 32	102.4	22 40.2	94 32	102.2	23 08.4	94 32	102.1	23 36.7	94 32	101.9	24 04.9	94 32	101.7	24 33.2	94 32	101.5	1
2	20 56.2	94 32	101.8	21 24.5	94 32	101.6	21 52.8	94 32	101.5	22 21.0	94 32	101.3	22 49.3	94 32	101.1	23 17.5	94 32	100.9	23 45.8	94 32	100.7	24 14.0	94 32	100.5	2
3	20 37.0	94 32	100.8	21 05.3	94 32	100.7	21 33.6	94 32	100.5	22 01.8	94 32	100.3	22 30.1	94 32	100.1	22 58.3	94 32	99.9	23 26.6	94 32	99.8	23 54.8	94 32	99.6	3
4	20 17.8	94 32	99.9	20 46.1	94 32	99.7	21 14.3	94 32	99.5	21 42.6	94 32	99.3	22 10.8	94 32	99.2	22 39.1	94 32	99.0	23 07.3	94 32	98.8	23 35.5	94 32	98.6	4
75	19 58.5	94 32	98.9	20 26.8	94 32	98.7	20 55.1	94 32	98.5	21 23.3	94 32	98.4	21 51.5	94 32	98.2	22 19.7	94 32	98.0	22 48.0	94 32	97.8	23 16.1	94 32	97.6	75
6	19 39.2	94 32	97.9	20 07.5	94 32	97.8	20 35.7	94 32	97.6	21 03.9	94 32	97.4	21 32.2	94 32	97.2	22 00.4	94 32	97.0	22 28.6	94 32	96.9	22 56.8	94 32	96.7	6
7	19 19.8	94 32	97.0	19 48.1	94 32	96.8	20 16.3	94 32	96.6	20 44.6	94 32	96.4	21 12.8	94 32	96.3	21 41.0	94 32	96.1	22 09.2	94 32	95.9	22 37.3	94 32	95.7	7
8	19 00.4	94 32	96.0	19 28.7	94 32	95.8	19 56.9	94 32	95.7	20 25.1	94 32	95.5	20 53.3	94 32	95.3	21 21.5	94 32	95.1	21 49.7	94 32	94.9	22 17.9	94 32	94.8	8
9	18 41.0	94 32	95.1	19 09.2	94 32	94.9	19 37.5	94 32	94.7	20 05.7	94 32	94.5	20 33.9	94 32	94.3	21 02.1	94 32	94.2	21 30.2	94 32	94.0	21 58.4	94 32	93.8	9
80	18 21.5	94 32	94.1	18 49.8	94 32	93.9	19 18.0	94 32	93.8	19 46.2	94 32	93.6	20 14.4	94 33	93.4	20 42.6	94 32	93.2	21 10.7	94 33	93.0	21 38.9	94 33	92.8	80
1	18 02.0	94 33	93.2	18 30.3	94 33	93.0	18 58.5	94 33	92.8	19 26.7	94 33	92.6	19 54.9	94 33	92.4	20 23.1	94 33	92.3	20 51.2	94 33	92.1	21 19.4	94 33	91.9	1
2	17 42.5	94 33	92.2	18 10.7	94 33	92.0	18 39.0	94 33	91.9	19 07.2	94 33	91.7	19 35.4	94 33	91.5	20 03.5	94 33	91.3	20 31.7	94 33	91.1	20 59.9	94 33	90.9	2
3	17 23.0	94 33	91.3	17 51.2	94 33	91.1	18 19.4	94 33	90.9	18 47.6	94 33	90.7	19 15.8	94 33	90.5	19 44.0	94 33	90.4	20 12.2	94 33	90.2	20 40.3	94 33	90.0	3
4	17 03.5	94 33	90.3	17 31.7	94 33	90.1	17 59.9	94 33	90.0	18 28.1	94 33	89.8	18 56.3	94 33	89.6	19 24.5	94 33	89.4	19 52.6	94 33	89.2	20 20.8	94 33	89.1	4
85	16 43.9	94 33	89.4	17 12.1	94 33	89.2	17 40.4	94 33	89.0	18 08.6	94 33	88.8	18 36.8	94 33	88.7	19 04.9	94 33	88.5	19 33.1	94 33	88.3	20 01.3	94 33	88.1	85
6	16 24.4	94 33	88.4	16 52.6	94 33	88.2	17 20.8	94 33	88.1	17 49.0	94 33	87.9	18 17.2	94 33	87.7	18 45.4	94 33	87.5	19 13.6	94 33	87.4	19 41.8	94 32	87.2	6
7	16 04.9	94 32	87.5	16 33.1	94 32	87.3	17 01.3	94 32	87.1	17 29.5	94 32	87.0	17 57.7	94 32	86.8	18 25.9	94 32	86.6	18 54.1	94 32	86.4	19 22.3	94 32	86.2	7
8	15 45.4	94 32	86.5	16 13.6	94 32	86.4	16 41.8	94 32	86.2	17 10.0	94 32	86.0	17 38.2	94 32	85.8	18 06.4	94 32	85.7	18 34.6	94 32	85.5	19 02.8	94 32	85.3	8
9	15 25.9	94 32	85.6	15 54.1	94 32	85.4	16 22.3	94 32	85.3	16 50.6	94 32	85.1	17 18.8	94 32	84.9	17 47.0	94 32	84.7	18 15.1	94 32	84.5	18 43.3	94 32	84.4	9
90	15 06.4	94 32	84.7	15 34.7	94 32	84.5	16 02.9	94 32	84.3	16 31.1	94 32	84.1	16 59.3	94 32	84.0	17 27.5	94 32	83.8	17 55.7	94 32	83.6	18 23.9	94 32	83.4	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
91	14 47.0	94 32	83.7	15 15.2	94 32	83.6	15 43.5	94 32	83.4	16 11.7	94 32	83.2	16 39.9	94 32	83.0	17 08.1	94 32	82.8	17 36.3	94 32	82.7	18 04.5	94 32	82.5	91
2	14 27.6	94 32	82.8	14 55.8	94 32	82.6	15 24.1	94 32	82.4	15 52.3	94 32	82.3	16 20.5	94 32	82.1	16 48.8	94 32	81.9	17 17.0	94 32	81.7	17 45.2	94 32	81.6	2
3	14 08.2	94 32	81.9	14 36.5	94 32	81.7	15 04.7	94 32	81.5	15 33.0	94 32	81.3	16 01.2	94 32	81.2	16 29.4	94 32	81.0	16 57.7	94 32	80.8	17 25.9	94 32	80.6	3
4	13 48.9	94 32	80.9	14 17.2	94 32	80.8	14 45.4	94 32	80.6	15 13.7	94 32	80.4	15 41.9	94 32	80.2	16 10.2	94 32	80.1	16 38.4	94 32	79.9	17 06.6	94 32	79.7	4
95	13 29.6	94 32	80.0	13 57.9	94 32	79.8	14 26.2	94 32	79.6	14 54.5	94 32	79.5	15 22.7	94 32	79.3	15 51.0	94 32	79.1	16 19.2	94 32	79.0	16 47.4	94 32	78.8	95
6	13 10.4	94 32	79.1	13 38.7	94 32	78.9	14 07.0	94 32	78.7	14 35.3	94 32	78.5	15 03.5	94 32	78.4	15 31.8	94 32	78.2	16 00.1	94 32	78.0	16 28.3	94 32	77.9	6
7	12 51.3	94 32	78.1	13 19.6	94 32	78.0	13 47.9	94 32	77.8	14 16.2	94 32	77.6	14 44.4	94 32	77.4	15 12.7	94 32	77.3	15 41.0	94 32	77.1	16 09.2	94 32	76.9	7
8	12 32.2	94 32	77.2	13 00.5	94 32	77.0	13 28.8	94 32	76.9	13 57.1	94 32	76.7	14 25.4	94 32	76.5	14 53.7	94 32	76.3	15 22.0	94 32	76.2	15 50.2	94 32	76.0	8
9	12 13.2	94 32	76.3	12 41.5	94 32	76.1	13 09.8	94 32	75.9	13 38.1	94 32	75.8	14 06.5	94 31	75.6	14 34.8	94 31	75.4	15 03.0	94 31	75.3	15 31.3	94 31	75.1	9
100	11 54.3	94 31	75.3	12 22.6	94 31	75.2	12 50.9	94 31	75.0	13 19.3	94 31	74.8	13 47.6	94 31	74.7	14 15.9	94 31	74.5	14 44.2	94 31	74.3	15 12.5	94 31	74.2	100
1	11 35.4	95 31	74.4	12 03.8	95 31	74.2	12 32.1	94 31	74.1	13 00.4	94 31	73.9	13 28.8	94 31	73.7	13 57.1	94 31	73.6	14 25.4	94 31	73.4	14 53.8	94 31	73.2	1
2	11 16.6	95 31	73.5	11 45.0	95 31	73.3	12 13.4	95 31	73.2	12 41.7	95 31	73.0	13 10.1	95 31	72.8	13 38.4	94 31	72.7	14 06.8	94 31	72.5	14 35.1	94 31	72.3	2
3	10 57.9	95 31	72.6	11 26.3	95 31	72.4	11 54.7	95 31	72.2	12 23.1	95 31	72.1	12 51.5	95 31	71.9	13 19.8	95 31	71.7	13 48.2	95 31	71.6	14 16.5	94 31	71.4	3
4	10 39.4	95 31	71.6	11 07.8	95 31	71.5	11 36.2	95 31	71.3	12 04.5	95 31	71.1	12 32.9	95 31	71.0	13 01.3	95 31	70.8	13 29.7	95 31	70.6	13 58.1	95 31	70.5	4
105	10 20.9	95 31	70.7	10 49.3	95 31	70.5	11 17.7	95 31	70.4	11 46.1	95 31	70.2	12 14.5	95 30	70.1	12 42.9	95 30	69.9	13 11.3	95 30	69.7	13 39.7	95 30	69.6	105
6	10 02.5	95 30	69.8	10 30.9	95 30	69.6	10 59.4	95 30	69.5	11 27.8	95 30	69.3	11 56.2	95 30	69.1	12 24.6	95 30	69.0	12 53.1	95 30	68.8	13 21.5	95 30	68.6	6
7	9 44.2	95 30	68.9	10 12.7	95 30	68.7	10 41.1	95 30	68.5	11 09.6	95 30	68.4	11 38.0	95 30	68.2	12 06.5	95 30	68.1	12 34.9	95 30	67.9	13 03.3	95 30	67.7	7
8	9 26.0	95 30	67.9	9 54.5	95 30	67.8	10 23.0	95 30	67.6	10 51.5	95 30	67.5	11 19.9	95 30	67.3	11 48.4	95 30	67.1	12 16.9	95 30	67.0	12 45.3	95 30	66.8	8
9	9 08.0	95 30	67.0	9 36.5	95 30	66.9	10 05.0	95 30	66.7	10 33.5	95 30	66.5	11 02.0	95 30	66.4	11 30.5	95 30	66.2	11 58.9	95 30	66.1	12 27.4	95 30	65.9	9
110	8 50.1	95 30	66.1	9 18.6	95 30	65.9	9 47.1	95 30	65.8	10 15.6	95 30	65.6	10 44.1	95 30	65.5	11 12.7	95 29	65.3	11 41.2	95 29	65.1	12 09.7	95 29	65.0	110
1	8 32.3	95 29	65.2	9 00.8	95 29	65.0	9 29.4	95 29	64.8	9 57.9	95 29	64.7	10 26.4	95 29	64.5	10 55.0	95 29	64.4	11 23.5	95 29	64.2	11 52.0	95 29	64.1	1
2	8 14.6	95 29	64.2	8 43.2	95 29	64.1	9 11.8	95 29	63.9	9 40.3	95 29	63.8	10 08.9	95 29	63.6	10 37.4	95 29	63.5	11 06.0	95 29	63.3	11 34.5	95 29	63.1	2
3	7 57.1	95 29	63.3	8 25.7	95 29	63.2	8 54.3	95 29	63.0	9 22.9	95 29	62.8	9 51.4	95 29	62.7	10 20.0	95 29	62.5	10 48.6	95 29	62.4	11 17.2	95 29	62.2	3
4	7 39.7	95 29	62.4	8 08.3	95 29	62.2	8 37.0	95 29	62.1	9 05.6	95 29	61.9	9 34.2	95 29	61.8	10 02.8	95 29	61.6	10 31.4	95 28	61.5	11 00.0	95 28	61.3	4
115	7 22.5	95 28	61.5	7 51.1	95 28	61.3	8 19.8	95 28	61.2	8 48.4	95 28	61.0	9 17.0	95 28	60.9	9 45.7	95 28	60.7	10 14.3	95 28	60.6	10 42.9	95 28	60.4	115
6	7 05.4	96 28	60.5	7 34.1	96 28	60.4	8 02.7	96 28	60.2	8 31.4	96 28	60.1	9 00.0	96 28	59.9	9 28.7	95 28	59.8	9 57.3	96 28	59.6	10 26.0	95 28	59.5	6
7	6 48.5	96 28	59.6	7 17.2	96 28	59.5	7 45.9	96 28	59.3	8 14.5	96 28	59.2	8 43.2	96 28	59.0	9 11.9	96 28	58.9	9 40.6	96 28	58.7	10 09.2	96 28	58.6	7
8	6 31.7	96 28	58.7	7 00.4	96 28	58.5	7 29.1	96 28	58.4	7 57.8	96 28	58.2	8 26.6	96 28	58.1	8 55.3	96 27	57.9	9 24.0	96 27	57.8	9 52.7	96 27	57.7	8
9	6 15.1	96 27	57.8	6 43.8	96 27	57.6	7 12.6	96 27	57.5	7 41.3	96 27	57.3	8 10.1	96 27	57.2	8 38.8	96 27	57.0	9 07.5	96 27	56.9	9 36.2	96 27	56.7	9
120	5 58.7	96 27	56.8	6 27.4	96 27	56.7	6 56.2	96 27	56.5	7 25.0	96 27	56.4	7 53.7	96 27	56.3	8 22.5	96 27	56.1	8 51.2	96 27	56.0	9 20.0	96 27	55.8	120
1	5 42.4	96 27	55.9	6 11.2	96 27	55.8	6 40.0	96 27	55.6	7 08.8	96 27	55.5	7 37.6	96 27	55.3	8 06.4	96 27	55.2	8 35.1	96 27	55.0	9 03.9	96 26	54.9	1
2	5 26.3	96 26	55.0	5 55.1	96 26	54.8	6 24.0	96 26	54.7	6 52.8	96 26	54.6	7 21.6	96 26	54.4	7 50.4	96 26	54.3	8 19.2	96 26	54.1	8 48.0	96 26	54.0	2
3	5 10.4	96 26	54.0	5 39.3	96 26	53.9	6 08.1	96 26	53.8	6 37.0	96 26	53.6	7 05.8	96 26	53.5	7 34.6	96 26	53.4	8 03.5	96 26	53.2	8 32.3	96 26	53.1	3
4				5 23.6	96 26	53.0	5 52.4	96 26	52.8	6 21.3	96 26	52.7	6 50.2	96 26	52.6	7 19.1	96 26	52.4	7 47.9	96 26	52.3	8 16.8	96 26	52.2	4
125				5 08.1	96 25	52.1	5 37.0	96 25	51.9	6 05.9	96 25	51.8	6 34.8	96 25	51.6	7 03.7	96 25	51.5	7 32.6	96 25	51.4	8 01.5	96 25	51.2	125
6							5 21.7	96 25	51.0	5 50.6	96 25	50.9	6 19.6	96 25	50.7	6 48.5	96 25	50.6	7 17.4	96 25	50.5	7 46.3	96 25	50.3	6
7							5 06.6	97 25	50.1	5 35.6	97 25	49.9	6 04.5	97 25	49.8	6 33.5	97 25	49.7	7 02.4	97 25	49.5	7 31.4	96 25	49.4	7
8										5 20.7	97 24	49.0	5 49.7	97 24	48.9	6 18.7	97 24	48.8	6 47.7	97 24	48.6	7 16.7	97 24	48.5	8
9										5 06.1	97 24	48.1	5 35.1	97 24	48.0	6 04.1	97 24	47.8	6 33.1	97 24	47.7	7 02.1	97 24	47.6	9
130													5 20.7	97 24	47.0	5 49.7	97 24	46.9	6 18.8	97 24	46.8	6 47.8	97 23	46.7	130
1													5 06.5	97 23	46.1	5 35.6	97 23	46.0	6 04.7	97 23	45.9	6 33.7	97 23	45.7	1
2																5 21.6	97 23	45.1	5 50.7	97 23	44.9	6 19.8	97 23	44.8	2
3																5 07.9	97 22	44.1	5 37.1	97 22	44.0	6 06.2	97 22	43.9	3
4																			5 23.6	97 22	43.1	5 52.8	97 22	43.0	4
135																			5 10.4	97 22	42.2	5 39.6	97 22	42.1	135
6																						5 26.6	97 21	41.1	6
7																						5 13.9	97 21	40.2	7
8																						5 01.4	98 20	39.3	8

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat 76°

La 77

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	39 00.0	1.00	180.0	39 30.0	1.00	180.0	40 00.0	1.00	180.0	40 30.0	1.00	180.0	41 00.0	1.00	180.0	41 30.0	1.00	180.0	42 00.0	1.00	180.0	42 30.0	1.00	180.0	00
1	38 59.8	1.00	178.8	39 29.8	1.00	178.8	39 59.8	1.00	178.8	40 29.8	1.00	178.8	40 59.8	1.00	178.8	41 29.8	1.00	178.8	41 59.8	1.00	178.8	42 29.8	1.00	178.8	1
2	38 59.2	1.00	177.6	39 29.2	1.00	177.6	39 59.2	1.00	177.6	40 29.2	1.00	177.6	40 59.2	1.00	177.5	41 29.2	1.00	177.5	41 59.2	1.00	177.5	42 29.2	1.00	177.5	2
3	38 58.1	1.00	176.4	39 28.1	1.00	176.4	39 58.1	1.00	176.3	40 28.1	1.00	176.3	40 58.1	1.00	176.3	41 28.1	1.00	176.3	41 58.1	1.00	176.3	42 28.1	1.00	176.3	3
4	38 56.7	1.00	175.2	39 26.7	1.00	175.1	39 56.7	1.00	175.1	40 26.7	1.00	175.1	40 56.7	1.00	175.1	41 26.6	1.00	175.1	41 56.6	1.00	175.0	42 26.6	1.00	175.0	4
05	38 54.9	1.00	174.0	39 24.8	1.00	173.9	39 54.8	1.00	173.9	40 24.8	1.00	173.9	40 54.8	1.00	173.9	41 24.8	1.00	173.8	41 54.7	1.00	173.8	42 24.7	1.00	173.8	05
6	38 52.6	1.00	172.8	39 22.6	1.00	172.7	39 52.5	1.00	172.7	40 22.5	1.00	172.7	40 52.5	1.00	172.6	41 22.4	1.00	172.6	41 52.4	1.00	172.6	42 22.4	1.00	172.5	6
7	38 49.9	1.00	171.5	39 19.9	1.00	171.5	39 49.8	1.00	171.5	40 19.8	1.00	171.4	40 49.8	1.00	171.4	41 19.7	1.00	171.4	41 49.7	1.00	171.3	42 19.6	1.00	171.3	7
8	38 46.8	1.00	170.3	39 16.8	1.00	170.3	39 46.7	1.00	170.3	40 16.7	1.00	170.2	40 46.6	1.00	170.2	41 16.6	1.00	170.1	41 46.5	1.00	170.1	42 16.5	1.00	170.1	8
9	38 43.4	1.00	169.1	39 13.3	1.00	169.1	39 43.2	1.00	169.1	40 13.2	1.00	169.0	40 43.1	1.00	169.0	41 13.0	1.00	168.9	41 43.0	1.00	168.9	42 12.9	1.00	168.8	9
10	38 39.5	1.00	167.9	39 09.4	1.00	167.9	39 39.3	1.00	167.8	40 09.2	1.00	167.8	40 39.2	1.00	167.7	41 09.1	1.00	167.7	41 39.0	1.00	167.6	42 08.9	1.00	167.6	10
1	38 35.2	1.00	166.7	39 05.1	1.00	166.7	39 35.0	1.00	166.6	40 04.9	1.00	166.6	40 34.8	1.00	166.5	41 04.7	1.00	166.5	41 34.6	1.00	166.4	42 04.5	1.00	166.4	1
2	38 30.5	1.00	165.5	39 00.4	1.00	165.5	39 30.3	1.00	165.4	40 00.2	1.00	165.4	40 30.1	1.00	165.3	40 59.9	1.00	165.3	41 29.8	1.00	165.2	41 59.7	1.00	165.1	2
3	38 25.5	1.00	164.3	38 55.3	1.00	164.3	39 25.2	1.00	164.2	39 55.1	1.00	164.2	40 24.9	1.00	164.1	40 54.8	1.00	164.0	41 24.6	1.00	164.0	41 54.5	1.00	163.9	3
4	38 20.0	99	10 163.2	38 49.8	99	10 163.1	39 19.7	99	10 163.0	39 49.5	99	10 163.0	40 19.4	99	10 162.9	40 49.2	99	10 162.8	41 19.0	99	10 162.8	41 48.9	99	10 162.7	4
15	38 14.1	99	10 162.0	38 44.0	99	10 161.9	39 13.8	99	10 161.8	39 43.6	99	10 161.8	40 13.4	99	11 161.7	40 43.2	99	11 161.6	41 13.0	99	11 161.5	41 42.9	99	11 161.5	15
6	38 07.9	99	11 160.8	38 37.7	99	11 160.7	39 07.5	99	11 160.6	39 37.3	99	11 160.6	40 07.1	99	11 160.5	40 36.9	99	11 160.4	41 06.7	99	11 160.3	41 36.5	99	11 160.2	6
7	38 01.3	99	12 159.6	38 31.0	99	12 159.5	39 00.8	99	12 159.4	39 30.6	99	12 159.4	40 00.4	99	12 159.3	40 30.1	99	12 159.2	40 59.9	99	12 159.1	41 29.7	99	12 159.0	7
8	37 54.3	99	12 158.4	38 24.0	99	12 158.3	38 53.8	99	12 158.2	39 23.5	99	12 158.2	39 53.3	99	12 158.1	40 23.0	99	13 158.0	40 52.7	99	13 157.9	41 22.5	99	13 157.8	8
9	37 46.9	99	13 157.2	38 16.6	99	13 157.1	38 46.3	99	13 157.1	39 16.1	99	13 157.0	39 45.8	99	13 156.9	40 15.5	99	13 156.8	40 45.2	99	13 156.7	41 14.9	99	13 156.6	9
20	37 39.1	99	14 156.0	38 08.8	99	14 156.0	38 38.5	99	14 155.9	39 08.2	99	14 155.8	39 37.9	99	14 155.7	40 07.6	99	14 155.6	40 37.3	99	14 155.5	41 07.0	99	14 155.4	20
1	37 31.0	99	14 154.9	38 00.7	99	14 154.8	38 30.4	99	14 154.7	39 00.0	99	14 154.6	39 29.7	99	14 154.5	39 59.3	99	14 154.4	40 29.0	99	14 154.3	40 58.6	99	14 154.2	1
2	37 22.6	99	15 153.7	37 52.2	99	15 153.6	38 21.8	99	15 153.5	38 51.5	99	15 153.4	39 21.1	99	15 153.3	39 50.7	99	15 153.2	40 20.3	99	15 153.1	40 49.9	99	15 153.0	2
3	37 13.7	99	15 152.5	37 43.3	99	15 152.4	38 13.0	99	15 152.3	38 42.6	99	15 152.2	39 12.1	99	16 152.1	39 41.7	99	16 152.0	40 11.3	99	16 151.9	40 40.9	99	16 151.8	3
4	37 04.5	99	16 151.4	37 34.1	99	16 151.3	38 03.7	99	16 151.2	38 33.3	99	16 151.1	39 02.8	99	16 150.9	39 32.4	99	16 150.8	40 01.9	98	16 150.7	40 31.5	98	16 150.6	4
25	36 55.0	99	16 150.2	37 24.6	98	16 150.1	37 54.1	98	17 150.0	38 23.6	98	17 149.9	38 53.2	98	17 149.8	39 22.7	98	17 149.7	39 52.2	98	17 149.5	40 21.7	98	17 149.4	25
6	36 45.1	98	17 149.1	37 14.7	98	17 148.9	37 44.2	98	17 148.8	38 13.7	98	17 148.7	38 43.2	98	17 148.6	39 12.7	98	17 148.5	39 42.1	98	17 148.4	40 11.6	98	17 148.2	6
7	36 34.9	98	18 147.9	37 04.4	98	18 147.8	37 33.9	98	18 147.7	38 03.4	98	18 147.6	38 32.8	98	18 147.4	39 02.3	98	18 147.3	39 31.7	98	18 147.2	40 01.2	98	18 147.1	7
8	36 24.4	98	18 146.8	36 53.8	98	18 146.6	37 23.3	98	18 146.5	37 52.7	98	18 146.4	38 22.1	98	18 146.3	38 51.6	98	18 146.2	39 21.0	98	18 146.0	39 50.4	98	19 145.9	8
9	36 13.5	98	19 145.6	36 42.9	98	19 145.5	37 12.3	98	19 145.4	37 41.7	98	19 145.2	38 11.1	98	19 145.1	38 40.5	98	19 145.0	39 09.9	98	19 144.9	39 39.3	98	19 144.7	9
30	36 02.3	98	19 144.5	36 31.7	98	19 144.4	37 01.1	98	19 144.2	37 30.4	98	19 144.1	37 59.8	98	19 144.0	38 29.2	98	19 143.8	38 58.5	98	20 143.7	39 27.8	98	20 143.6	30
1	35 50.8	98	20 143.3	36 20.2	98	20 143.2	36 49.5	98	20 143.1	37 18.8	98	20 142.9	37 48.2	98	20 142.8	38 17.5	98	20 142.7	38 46.8	98	20 142.5	39 16.1	98	20 142.4	1
2	35 39.0	98	20 142.2	36 08.3	98	20 142.1	36 37.6	98	20 141.9	37 06.9	98	20 141.8	37 36.2	98	20 141.7	38 05.5	98	20 141.5	38 34.7	98	21 141.4	39 04.0	98	21 141.3	2
3	35 26.9	98	21 141.1	35 56.2	98	21 140.9	36 25.4	98	21 140.8	36 54.7	98	21 140.7	37 23.9	97	21 140.5	37 53.2	97	21 140.4	38 22.4	97	21 140.2	38 51.6	97	21 140.1	3
4	35 14.5	97	21 140.0	35 43.7	97	21 139.8	36 12.9	97	21 139.7	36 42.2	97	21 139.5	37 11.4	97	21 139.4	37 40.6	97	22 139.3	38 09.8	97	22 139.1	38 38.9	97	22 139.0	4
35	35 01.7	97	22 138.8	35 31.0	97	22 138.7	36 00.1	97	22 138.6	36 29.3	97	22 138.4	36 58.5	97	22 138.3	37 27.7	97	22 138.1	37 56.8	97	22 138.0	38 26.0	97	22 137.8	35
6	34 48.7	97	22 137.7	35 17.9	97	22 137.6	35 47.1	97	22 137.4	36 16.2	97	22 137.3	36 45.4	97	22 137.1	37 14.5	97	22 137.0	37 43.6	97	22 136.8	38 12.7	97	23 136.7	6
7	34 35.5	97	23 136.6	35 04.6	97	23 136.5	35 33.7	97	23 136.3	36 02.8	97	23 136.2	36 31.9	97	23 136.0	37 01.0	97	23 135.9	37 30.1	97	23 135.7	37 59.2	97	23 135.6	7
8	34 21.9	97	23 135.5	34 51.0	97	23 135.4	35 20.1	97	23 135.2	35 49.2	97	23 135.1	36 18.2	97	23 134.9	36 47.3	97	23 134.7	37 16.3	97	23 134.6	37 45.3	97	23 134.4	8
9	34 08.1	97	23 134.4	34 37.1	97	24 134.3	35 06.2	97	24 134.1	35 35.2	97	24 133.9	36 04.3	97	24 133.8	36 33.3	97	24 133.6	37 02.3	97	24 133.5	37 31.3	97	24 133.3	9
40	33 54.0	97	24 133.3	34 23.0	97	24 133.2	34 52.0	97	24 133.0	35 21.0	97	24 132.8	35 50.0	97	24 132.7	36 19.0	97	24 132.5	36 48.0	97	24 132.4	37 16.9	96	24 132.2	40
1	33 39.7	97	24 132.2	34 08.6	97	24 132.1	34 37.6	97	24 131.9	35 06.6	97	24 131.7	35 35.5	96	25 131.6	36 04.5	96	25 131.4	36 33.4	96	25 131.3	37 02.3	96	25 131.1	1
2	33 25.1	97	25 131.1	33 54.0	96	25 131.0	34 23.0	96	25 130.8	34 51.9	96	25 130.6	35 20.8	96	25 130.5	35 49.7	96	25 130.3	36 18.6	96	25 130.2	36 47.5	96	25 130.0	2
3	33 10.2	96	26 130.0	33 39.2	96	26 129.9	34 08.1	96	25 129.7	34 37.0	96	25 129.6	35 05.8	96	25 129.4	35 34.7	96	25 129.2	36 03.6	96	25 129.1	36 32.4	96	26 128.9	3
4	32 55.2	96	26 129.0	33 24.0	96	26 128.8	33 52.9	96	26 128.6	34 21.8	96	26 128.5	34 50.6	96	26 128.3	35 19.4	96	26 128.1	35 48.3	96	26 128.0	36 17.1	96	26 127.8	4
45	32 39.9	96	26 127.9	33 08.7	96	26 127.7	33 37.5	96	26 127.6	34 06.4	96	26 127.4	34 35.2	96	26 127.2	35 04.0	96	26 127.0	35 32.8	96	26 126.9	36 01.5	96	26 126.7	45
6	32 24.3	96	26 126.8	32 53.1	96	26 126.6	33 21.9	96	26 126.5	33 50.7	96	26 126.3	34 19.5	96	26 126.1	34 48.3	96	27 126.0	35 17.0	96	27 125.8	35 45.7	96	27 125.6	6
7	32 08.6	96	27 125.7	32 37.4	96	27 125.6	33 06.1	96	27 125.4	33 34.9	96	27 125.2	34 03.6	96	27 125.1	34 32.4	96	27 124.9	35 01.1	96	27 124.7	35 29.8	96	27 124.5	7
8	31 52.6	96	27 124.7	32 21.4	96	27 124.5	32 50.1	96	27 124.3	33 18.8	96	27 124.2	33 47.5	96	27 124.0	34 16.2	96	27 123.8	34 44.9	96	27 123.6	35 13.6	96	27 123.5	8
9	31 36.4	96	27 123.6	32 05.2	96	27 123.5	32 33.9	96	27 123.3	33 02.6	96	27 123.1	33 31.2	96	28 122.9	33 59.9	96	28 122.8	34 28.5	95	28 122.6	34 57.2	95	28 122.4	9
50	31 20.1	96	28 122.6	31 48.8	96	28 122.4	32 17.4	96	28 122.2	32 46.1	96	28 122.0	33 14.7	96	28 121.9	33 43.4	95	28 121.7	34 12.0	95	28 121.5	34 40.6	95	28 121.3	50
1	31 03.5	96	28 121.5	31 32.2	95	28 121.3	32 00.8	96	28 121.2	32 29.4	96	28 121.0	32 58.1	95	28 120.8	33 26.7	95	28 120.6	33 55.2	95	28 120.4	34 23.8	96	28 120.3	1
2	30 46.8	95	28 120.5	31 15.4	95	28 120.3	31 44.0	95	28 120.1	32 12.6	96	28 119.9	32 41.2	95	28 119.8	33 09.8	95	28 119.6	33 38.3	95	28 119.4	34 06.8	95	29 119.2	2
3	30 29.9	95	28 119.4	30 58.4	95	29 119.3	31 27.0	96	29 119.1	31 55.6	95	29 118.9	32 24.1	95	29 118.7	32 52.7	95	29 118.5	33 21.2	95	29 118.3	33 49.7	95	29 118.2	3
4	30 12.8	95	29 118.4	30 41.3	95	29 118.2	31 09.9	95	29 118.0	31 38.4	95	29 117.9	32 06.9	95	29 117.7	32 35.4	95	29 117.5	33 03.9	95	29 117.3	33 32.4	95	29 117.1	4
55	29 55.5	95	29 117.4	30 24.0	95	29 117.2	30 52.5	95	29 117.0	31 21.1	95	29 116.8	31 49.5	95	29 116.6	32 18.0	95	29 116.4	32 46.5	95	29 116.3	33 14.9	95	29 116.1	55
6	29 38.1	95	29 116.3	30 06.6	95	29 116.1	30 35.1	95	29 116.0	31 03.5	95	29 115.8	31 32.0	95	29 115.6	32 00.5	95	30 115.4	32 28.9	95	30 115.2	32 57.3	95	30 115.0	6
7	29 20.5	95	30 115.3	29 49.0	95	30 115.1	30 17.4	95	30 114.9	30 45.9	95	30 114.8	31 14.3	95	30 114.6	31 42.7	95	30 114.4	32 11.1	95	30 114.2	32 39.5	95	30 114.0	7
8	29 02.7	95	30 114.3	29 31.2	95	30 114.1	29 59.6	95	30 113.9	30 28.1	95	30 113.7	30 56.5	95	30 113.5	31 24.9	95	30 113.4	31 53.3	95	30 113.2	32 21.6	95	30 113.0	8
9	28 44.9	95	30 113.3	29 13.3	95	30 113.1	29 41.7	95	30 112.9	30 10.1	95	30 112.7	30 38.5	95	30 112.5	31 06.9	95	30 112.3	31 35.2	94	30 112.1	32 03.6	94	30 111.9	9
60	28 26.9	95	30 112.2	28 55.3	95	30 112.1	29 23.7	95	30 111.9	29 52.0	95	30 111.7	30 20.4	95	30 111.5	30 48.7	94	30 111.3	31 17.1	94	30 111.1	31 45.4	94	31 110.9	60
1	28 08.7	95	30 111.2	28 37.1	95	30 111.1	29 05.5	95	31 110.9	29 33.8	94	31 110.7	30 02.2	94	31 110.5	30 30.5	94	31 110.3	30 58.8	94	31 110.1	31 27.1	94	31 109.9	1
2	27 50.4	95	31 110.2	28 18.8	95	31 110.0	28 47.1	94	31 109.9	29 15.5	94	31 109.7	29 43.8	94	31 109.5	30 12.1	94	31 109.3	30 40.4	94	31 109.1	31 08.6	94	31 108.9	2
3	27 32.1	94	31 109.2	28 00.4	94	31 109.0	28 28.7	94	31 108.9	28 57.0	94	31 108.7	29 25.3	94	31 108.5	29 53.6	94	31 108.3	30 21.9	94	31 108.1	30 50.1	94	31 107.9	3
4	27 13.6	94	31 108.2	27 41.9	94	31 108.0	28 10.2	94	31 107.9	28 38.5	94	31 107.7	29 06.7	94	31 107.5	29 35.0	94	31 107.3	30 03.2	94	31 107.1	30 31.5	94	31 106.9	4
65	26 54.9	94	31 107.2	27 23.2	94	31 107.0	27 51.5	94	31 106.9	28 19.8	94	31 106.7	28 48.1	94	31 106.5	29 16.3	94	31 106.3	29 44.5	94	31 106.1	30 12.7	94	31 105.9	65
6	26 36.2	94	31 106.2	27 04.5	94	31 106.1	27 32.8	94	31 105.9	28 01.0	94	31 105.7	28 29.3	94	31 105.5	28 57.5	94	31 105.3	29 25.7	94	32 105.1	29 53.9	94	32 104.9	6
7	26 17.4	94	31 105.2	26 45.7	94	32 105.1	27 14.0	94	32 104.9	27 42.2	94	32 104.7	28 10.4	94	32 104.5	28 38.6	94	32 104.3	29 06.8	94	32 104.1	29 35.0	94	32 103.9	7
8	25 58.5	94	32 104.3	26 26.8	94	32 104.1	26 55.0	94	32 103.9	27 23.3	94	32 103.7	27 51.5	94	32 103.5	28 19.6	94	32 103.3	28 47.8	94	32 103.1	29 16.0	94	32 102.9	8
9	25 39.6	94	32 103.3	26 07.8	94	32 103.1	26 36.0	94	32 102.9	27 04.2	94	32 102.7	27 32.4	94	32 102.5	28 00.6	94	32 102.3	28 28.8	94	32 102.1	28 56.9	94	32 101.9	9
70	25 20.5	94	32 102.3	25 48.7	94	32 102.1	26 17.0	94	32 101.9	26 45.1	94	32 101.7	27 13.3	94	32 101.5	27 41.5	94	32 101.3	28 09.6	94	32 101.1	28 37.8	94	32 101.0	70
1	25 01.4	94	32 101.3	25 29.6	94	32 101.1	25 57.8	94	32 100.9	26 26.0	94	32 100.8	26 54.2	94	32 100.6	27 22.3	94	32 100.4	27 50.4	94	32 100.2	28 18.5	94	32 100.0	1
2	24 42.2	94	32 100.3	25 10.4	94	32 100.2	25 38.6	94	32 100.0	26 06.8	94	32 99.8	26 34.9	94	32 99.6	27 03.1	94	32 99.4	27 31.2	94	32 99.2	27 59.3	94	32 99.0	2
3	24 23.0	94	32 99.4	24 51.2	94	32 99.2	25 19.3	94	32 99.0	25 47.5	94	32 98.8	26 15.6	94	32 98.6	26 43.8	94	32 98.4	27 11.9	94	32 98.2	27 40.0	94	32 98.0	3
4	24 03.7	94	32 98.4	24 31.9	94	32 98.2	25 00.0	94	32 98.0	25 28.2	94	32 97.8	25 56.3	94	32 97.6	26 24.4	94	32 97.5	26 52.5	94	32 97.3	27 20.6	94	32 97.1	4
75	23 44.3	94	32 97.4	24 12.5	94	32 97.3	24 40.6	94	32 97.1	25 08.8	94	32 96.9	25 36.9	94	32 96.7	26 05.0	94	32 96.5	26 33.1	94	32 96.3	27 01.2	94	32 96.1	75
6	23 24.9	94	32 96.5	23 53.1	94	32 96.3	24 21.2	94	32 96.1	24 49.4	94	32 95.9	25 17.5	94	32 95.7	25 45.6	94	32 95.5	26 13.7	94	32 95.3	26 41.8	94	32 95.1	6
7	23 05.5	94	32 95.5	23 33.7	94	32 95.3	24 01.8	94	32 95.1	24 29.9	94	32 95.0	24 58.0	94	32 94.8	25 26.1	94	32 94.6	25 54.2	94	32 94.4	26 22.3	94	32 94.2	7
8	22 46.1	94	32 94.6	23 14.2	94	32 94.4	23 42.3	94	32 94.2	24 10.5	94	32 94.0	24 38.6	94	32 93.8	25 06.7	94	32 93.6	25 34.7	94	33 93.4	26 02.8	94	32 93.2	8
9	22 26.6	94	32 93.6	22 54.7	94	33 93.4	23 22.8	94	33 93.2	23 51.0	94	32 93.0	24 19.1	94	33 92.9	24 47.1	94	33 92.7	25 15.2	94	33 92.5	25 43.3	93	33 92.3	9
80	22 07.1	94	33 92.7	22 35.2	94	33 92.5	23 03.3	94	33 92.3	23 31.4	94	33 92.1	23 59.5	94	33 91.9	24 27.6	94	33 91.7	24 55.7	94	33 91.5	25 23.8	93	33 91.3	80
1	21 47.5	94	33 91.7	22 15.7	94	33 91.5	22 43.8	94	33 91.3	23 11.9	94	33 91.1	23 40.0	94	33 91.0	24 08.1	94	33 90.8	24 36.2	94	33 90.6	25 04.2	93	33 90.4	1
2	21 28.0	94	33 90.8	21 56.2	94	33 90.6	22 24.3	94	33 90.4	22 52.4	94	33 90.2	23 20.5	94	33 90.0	23 48.6	94	33 89.8	24 16.6	94	33 89.6	24 44.7	93	33 89.4	2
3	21 08.5	94	33 89.8	21 36.6	94	33 89.6	22 04.7	94	33 89.4	22 32.9	94	33 89.2	23 00.9	94	33 89.1	23 29.0	94	33 88.9	23 57.1	94	33 88.7	24 25.2	93	33 88.5	3
4	20 49.0	94	33 88.9	21 17.1	94	33 88.7	21 45.2	94	33 88.5	22 13.3	94	33 88.3	22 41.4	94	33 88.1	23 09.5	94	32 87.9	23 37.6	94	33 87.7	24 05.6	93	32 87.5	4
85	20 29.4	94	33 87.9	20 57.6	94	33 87.7	21 25.7	94	32 87.6	21 53.8	94	32 87.4	22 21.9	94	32 87.2	22 50.0	94	32 87.0	23 18.1	94	32 86.8	23 46.1	94	32 86.6	85
6	20 09.9	94	32 87.0	20 38.0	94	32 86.8	21 06.2	94	32 86.6	21 34.3	94	32 86.4	22 02.4	94	32 86.2	22 30.5	94	32 86.0	22 58.6	94	32 85.9	23 26.6	94	32 85.7	6
7	19 50.4	94	32 86.0	20 18.6	94	32 85.9	20 46.7	94	32 85.7	21 14.8	94	32 85.5	21 42.9	94	32 85.3	22 11.0	94	32 85.1	22 39.1	94	32 84.9	23 07.2	94	32 84.7	7
8	19 30.9	94	32 85.1	19 59.1	94	32 84.9	20 27.2	94	32 84.7	20 55.4	94	32 84.6	21 23.5	94	32 84.4	21 51.6	94	32 84.2	22 19.7	94	32 84.0	22 47.7	94	32 83.8	8
9	19 11.5	94	32 84.2	19 39.6	94	32 84.0	20 07.8	94	32 83.8	20 35.9	94	32 83.6	21 04.0	94	32 83.4	21 32.2	94	32 83.2	22 00.2	94	32 83.1	22 28.3	94	32 82.9	9
90	18 52.1	94	32 83.2	19 20.2	94	32 83.1	19 48.4	94	32 82.9	20 16.5	94	32 82.7	20 44.7	94	32 82.5	21 12.8	94	32 82.3	21 40.9	94	32 82.1	22 09.0	94	32 81.9	90

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	18 32.7	94 32	82.3	19 00.9	94 32	82.1	19 29.0	94 32	81.9	19 57.2	94 32	81.8	20 25.3	94 32	81.6	20 53.4	94 32	81.4	21 21.6	94 32	81.2	21 49.7	94 32	81.0	91
2	18 13.4	94 32	81.4	18 41.5	94 32	81.2	19 09.7	94 32	81.0	19 37.9	94 32	80.8	20 06.0	94 32	80.7	20 34.1	94 32	80.5	21 02.3	94 32	80.3	21 30.4	94 32	80.1	2
3	17 54.1	94 32	80.5	18 22.3	94 32	80.3	18 50.4	94 32	80.1	19 18.6	94 32	79.9	19 46.8	94 32	79.7	20 14.9	94 32	79.5	20 43.0	94 32	79.4	21 11.2	94 32	79.2	3
4	17 34.8	94 32	79.5	18 03.0	94 32	79.3	18 31.2	94 32	79.2	18 59.4	94 32	79.0	19 27.6	94 32	78.8	19 55.7	94 32	78.6	20 23.9	94 32	78.4	20 52.0	94 32	78.2	4
95	17 15.7	94 32	78.6	17 43.9	94 32	78.4	18 12.1	94 32	78.2	18 40.3	94 32	78.1	19 08.4	94 32	77.9	19 36.6	94 32	77.7	20 04.8	94 32	77.5	20 32.9	94 32	77.3	95
6	16 56.5	94 32	77.7	17 24.8	94 32	77.5	17 53.0	94 32	77.3	18 21.2	94 32	77.1	18 49.4	94 32	77.0	19 17.6	94 32	76.8	19 45.7	94 32	76.6	20 13.9	94 32	76.4	6
7	16 37.5	94 32	76.7	17 05.7	94 32	76.6	17 34.0	94 32	76.4	18 02.2	94 32	76.2	18 30.4	94 32	76.0	18 58.6	94 32	75.9	19 26.8	94 31	75.7	19 54.9	94 31	75.5	7
8	16 18.5	94 32	75.8	16 46.8	94 31	75.7	17 15.0	94 31	75.5	17 43.2	94 31	75.3	18 11.5	94 31	75.1	18 39.7	94 31	74.9	19 07.9	94 31	74.8	19 36.1	94 31	74.6	8
9	15 59.6	94 31	74.9	16 27.9	94 31	74.7	16 56.1	94 31	74.6	17 24.4	94 31	74.4	17 52.6	94 31	74.2	18 20.9	94 31	74.0	18 49.1	94 31	73.8	19 17.3	94 31	73.7	9
100	15 40.8	94 31	74.0	16 09.1	94 31	73.8	16 37.3	94 31	73.6	17 05.6	94 31	73.5	17 33.9	94 31	73.3	18 02.1	94 31	73.1	18 30.4	94 31	72.9	18 58.6	94 31	72.8	100
1	15 22.1	94 31	73.1	15 50.4	94 31	72.9	16 18.7	94 31	72.7	16 46.9	94 31	72.5	17 15.2	94 31	72.4	17 43.5	94 31	72.2	18 11.7	94 31	72.0	18 40.0	94 31	71.8	1
2	15 03.4	94 31	72.1	15 31.7	94 31	72.0	16 00.0	94 31	71.8	16 28.3	94 31	71.6	16 56.6	94 31	71.5	17 24.9	94 31	71.3	17 53.2	94 31	71.1	18 21.5	94 31	70.9	2
3	14 44.9	94 31	71.2	15 13.2	94 31	71.1	15 41.5	94 31	70.9	16 09.9	94 31	70.7	16 38.2	94 31	70.5	17 06.5	94 31	70.4	17 34.8	94 31	70.2	18 03.1	94 30	70.0	3
4	14 26.4	95 31	70.3	14 54.8	95 31	70.1	15 23.1	94 30	70.0	15 51.5	94 30	69.8	16 19.8	94 30	69.6	16 48.1	94 30	69.5	17 16.4	94 30	69.3	17 44.7	94 30	69.1	4
105	14 08.1	95 30	69.4	14 36.5	95 30	69.2	15 04.8	95 30	69.1	15 33.2	95 30	68.9	16 01.5	94 30	68.7	16 29.9	94 30	68.5	16 58.2	94 30	68.4	17 26.6	94 30	68.2	105
6	13 49.9	95 30	68.5	14 18.3	95 30	68.3	14 46.6	95 30	68.1	15 15.0	95 30	68.0	15 43.4	95 30	67.8	16 11.8	95 30	67.6	16 40.1	95 30	67.5	17 08.5	94 30	67.3	6
7	13 31.7	95 30	67.6	14 00.2	95 30	67.4	14 28.6	95 30	67.2	14 57.0	95 30	67.1	15 25.4	95 30	66.9	15 53.8	95 30	66.7	16 22.1	95 30	66.6	16 50.5	95 30	66.4	7
8	13 13.8	95 30	66.6	13 42.2	95 30	66.5	14 10.6	95 30	66.3	14 39.1	95 30	66.2	15 07.5	95 30	66.0	15 35.9	95 30	65.8	16 04.3	95 30	65.7	16 32.7	95 30	65.5	8
9	12 55.9	95 30	65.7	13 24.3	95 30	65.6	13 52.8	95 30	65.4	14 21.2	95 29	65.2	14 49.7	95 29	65.1	15 18.1	95 29	64.9	15 46.6	95 29	64.7	16 15.0	95 29	64.6	9
110	12 38.1	95 29	64.8	13 06.6	95 29	64.7	13 35.1	95 29	64.5	14 03.6	95 29	64.3	14 32.0	95 29	64.2	15 00.5	95 29	64.0	15 29.0	95 29	63.8	15 57.4	95 29	63.7	110
1	12 20.5	95 29	63.9	12 49.0	95 29	63.7	13 17.5	95 29	63.6	13 46.0	95 29	63.4	14 14.5	95 29	63.3	14 43.0	95 29	63.1	15 11.5	95 29	62.9	15 40.0	95 29	62.8	1
2	12 03.1	95 29	63.0	12 31.6	95 29	62.8	13 00.1	95 29	62.7	13 28.6	95 29	62.5	13 57.2	95 29	62.4	14 25.7	95 29	62.2	14 54.2	95 29	62.0	15 22.7	95 29	61.9	2
3	11 45.7	95 29	62.1	12 14.3	95 29	61.9	12 42.8	95 29	61.8	13 11.4	95 29	61.6	13 39.9	95 28	61.4	14 08.5	95 28	61.3	14 37.0	95 28	61.1	15 05.5	95 28	61.0	3
4	11 28.5	95 28	61.2	11 57.1	95 28	61.0	12 25.7	95 28	60.8	12 54.3	95 28	60.7	13 22.8	95 28	60.5	13 51.4	95 28	60.4	14 20.0	95 28	60.2	14 48.5	95 28	60.1	4
115	11 11.5	95 28	60.2	11 40.1	95 28	60.1	12 08.7	95 28	59.9	12 37.3	95 28	59.8	13 05.9	95 28	59.6	13 34.5	95 28	59.5	14 03.1	95 28	59.3	14 31.7	95 28	59.2	115
6	10 54.6	95 28	59.3	11 23.3	95 28	59.2	11 51.9	95 28	59.0	12 20.5	95 28	58.9	12 49.1	95 28	58.7	13 17.7	95 28	58.6	13 46.4	95 28	58.4	14 15.0	95 28	58.3	6
7	10 37.9	96 28	58.4	11 06.6	96 28	58.3	11 35.2	96 28	58.1	12 03.9	95 27	58.0	12 32.5	95 27	57.8	13 01.2	95 27	57.7	13 29.8	95 27	57.5	13 58.4	95 27	57.4	7
8	10 21.3	96 27	57.5	10 50.0	96 27	57.4	11 18.7	96 27	57.2	11 47.4	96 27	57.1	12 16.1	96 27	56.9	12 44.7	96 27	56.8	13 13.4	96 27	56.6	13 42.1	96 27	56.5	8
9	10 05.0	96 27	56.6	10 33.7	96 27	56.4	11 02.4	96 27	56.3	11 31.1	96 27	56.1	11 59.8	96 27	56.0	12 28.5	96 27	55.9	12 57.2	96 27	55.7	13 25.9	96 27	55.6	9
120	9 48.7	96 27	55.7	10 17.5	96 27	55.5	10 46.2	96 27	55.4	11 15.0	96 27	55.2	11 43.7	96 27	55.1	12 12.4	96 26	54.9	12 41.1	96 26	54.8	13 09.8	96 26	54.6	120
1	9 32.7	96 26	54.8	10 01.5	96 26	54.6	10 30.2	96 26	54.5	10 59.0	96 26	54.3	11 27.8	96 26	54.2	11 56.5	96 26	54.0	12 25.3	96 26	53.9	12 54.0	96 26	53.7	1
2	9 16.8	96 26	53.8	9 45.6	96 26	53.7	10 14.4	96 26	53.6	10 43.2	96 26	53.4	11 12.0	96 26	53.3	11 40.8	96 26	53.1	12 09.6	96 26	53.0	12 38.3	96 26	52.8	2
3	9 01.1	96 26	52.9	9 30.0	96 26	52.8	9 58.8	96 26	52.7	10 27.6	96 26	52.5	10 56.4	96 26	52.4	11 25.3	96 26	52.2	11 54.1	96 26	52.1	12 22.9	96 25	51.9	3
4	8 45.7	96 26	52.0	9 14.5	96 25	51.9	9 43.4	96 25	51.7	10 12.2	96 25	51.6	10 41.1	96 25	51.5	11 09.9	96 25	51.3	11 38.7	96 25	51.2	12 07.6	96 25	51.0	4
125	8 30.3	96 25	51.1	8 59.2	96 25	51.0	9 28.1	96 25	50.8	9 57.0	96 25	50.7	10 25.9	96 25	50.6	10 54.8	96 25	50.4	11 23.6	96 25	50.3	11 52.5	96 25	50.1	125
6	8 15.2	96 25	50.2	8 44.2	96 25	50.1	9 13.1	96 25	49.9	9 42.0	96 25	49.8	10 10.9	96 25	49.7	10 39.8	96 25	49.5	11 08.7	96 25	49.4	11 37.6	96 24	49.2	6
7	8 00.3	96 24	49.3	8 29.3	96 24	49.1	8 58.2	96 24	49.0	9 27.2	96 24	48.9	9 56.1	96 24	48.7	10 25.0	96 24	48.6	10 54.0	96 24	48.5	11 22.9	96 24	48.3	7
8	7 45.6	97 24	48.4	8 14.6	97 24	48.2	8 43.6	97 24	48.1	9 12.6	97 24	48.0	9 41.5	97 24	47.8	10 10.5	97 24	47.7	10 39.5	97 24	47.6	11 08.4	97 24	47.4	8
9	7 31.1	97 24	47.4	8 00.1	97 24	47.3	8 29.2	97 24	47.2	8 58.2	97 24	47.1	9 27.2	97 24	46.9	9 56.1	97 24	46.8	10 25.1	97 24	46.7	10 54.1	97 23	46.5	9
130	7 16.9	97 23	46.5	7 45.9	97 23	46.4	8 14.9	97 23	46.3	8 44.0	97 23	46.1	9 13.0	97 23	46.0	9 42.0	97 23	45.9	10 11.0	97 23	45.8	10 40.1	97 23	45.6	130
1	7 02.8	97 23	45.6	7 31.9	97 23	45.5	8 00.9	97 23	45.4	8 30.0	97 23	45.2	8 59.0	97 23	45.1	9 28.1	97 23	45.0	9 57.1	97 23	44.9	10 26.2	97 23	44.7	1
2	6 48.9	97 23	44.7	7 18.0	97 23	44.6	7 47.1	97 23	44.4	8 16.2	97 23	44.3	8 45.3	97 23	44.2	9 14.4	97 22	44.1	9 43.5	97 22	44.0	10 12.6	97 22	43.8	2
3	6 35.3	97 22	43.8	7 04.4	97 22	43.7	7 33.6	97 22	43.5	8 02.7	97 22	43.4	8 31.8	97 22	43.3	9 00.9	97 22	43.2	9 30.0	97 22	43.0	9 59.1	97 22	42.9	3
4	6 21.9	97 22	42.9	6 51.1	97 22	42.7	7 20.2	97 22	42.6	7 49.4	97 22	42.5	8 18.5	97 22	42.4	8 47.7	97 22	42.3	9 16.8	97 22	42.1	9 46.0	97 22	42.0	4
135	6 08.7	97 22	41.9	6 37.9	97 22	41.8	7 07.1	97 21	41.7	7 36.3	97 21	41.6	8 05.5	97 21	41.5	8 34.6	97 21	41.4	9 03.8	97 21	41.2	9 33.0	97 21	41.1	135
6	5 55.8	97 21	41.0	6 25.0	97 21	40.9	6 54.2	97 21	40.8	7 23.4	97 21	40.7	7 52.7	97 21	40.6	8 21.9	97 21	40.4	8 51.1	97 21	40.3	9 20.3	97 21	40.2	6
7	5 43.1	97 21	40.1	6 12.4	97 21	40.0	6 41.6	97 21	39.9	7 10.8	97 21	39.8	7 40.1	97 21	39.6	8 09.3	97 20	39.5	8 38.5	97 20	39.4	9 07.8	97 20	39.3	7
8	5 30.6	98 20	39.2	5 59.9	98 20	39.1	6 29.2	98 20	39.0	6 58.5	98 20	38.8	7 27.7	98 20	38.7	7 57.0	98 20	38.6	8 26.3	98 20	38.5	8 55.5	98 20	38.4	8
9	5 18.4	98 20	38.3	5 47.7	98 20	38.1	6 17.0	98 20	38.0	6 46.3	98 20	37.9	7 15.6	98 20	37.8	7 44.9	98 20	37.7	8 14.2	98 20	37.6	8 43.5	98 20	37.5	9
140	5 06.5	98 20	37.3	5 35.8	98 19	37.2	6 05.1	98 19	37.1	6 34.4	98 19	37.0	7 03.8	98 19	36.9	7 33.1	98 19	36.8	8 02.4	98 19	36.7	8 31.7	98 19	36.6	140
1				5 24.1	98 19	36.3	5 53.5	98 19	36.2	6 22.8	98 19	36.1	6 52.2	98 19	36.0	7 21.5	98 19	35.9	7 50.9	98 19	35.8	8 20.2	98 19	35.7	1
2				5 12.7	98 19	35.4	5 42.0	98 19	35.3	6 11.4	98 19	35.2	6 40.8	98 18	35.1	7 10.2	98 18	35.0	7 39.6	98 18	34.9	8 09.0	98 18	34.8	2
3				5 01.5	98 18	34.5	5 30.9	98 18	34.4	6 00.3	98 18	34.3	6 29.7	98 18	34.2	6 59.1	98 18	34.1	7 28.5	98 18	34.0	7 57.9	98 18	33.9	3
4							5 20.0	98 18	33.4	5 49.4	98 18	33.3	6 18.9	98 18	33.3	6 48.3	98 18	33.2	7 17.7	98 18	33.1	7 47.2	98 18	33.0	4
145							5 09.4	98 17	32.5	5 38.8	98 17	32.4	6 08.3	98 17	32.3	6 37.8	98 17	32.2	7 07.2	98 17	32.1	7 36.7	98 17	32.1	145
6										5 28.5	98 17	31.5	5 58.0	98 17	31.4	6 27.5	98 17	31.3	6 57.0	98 17	31.2	7 26.5	98 17	31.1	6
7										5 18.4	98 16	30.6	5 47.9	98 16	30.5	6 17.4	98 16	30.4	6 47.0	98 16	30.3	7 16.5	98 16	30.2	7
8										5 08.6	98 16	29.7	5 38.1	98 16	29.6	6 07.7	98 16	29.5	6 37.2	98 16	29.4	7 06.8	98 16	29.3	8
9													5 28.6	99 15	28.7	5 58.2	99 15	28.6	6 27.8	99 15	28.5	6 57.3	99 15	28.4	9
150													5 19.4	99 15	27.7	5 49.0	99 15	27.7	6 18.6	99 15	27.6	6 48.2	99 15	27.5	150
1													5 10.4	99 14	26.8	5 40.1	99 14	26.8	6 09.7	99 14	26.7	6 39.3	99 14	26.6	1
2													5 01.8	99 14	25.9	5 31.4	99 14	25.8	6 01.1	99 14	25.8	6 30.7	99 14	25.7	2
3																5 23.0	99 13	24.9	5 52.7	99 13	24.8	6 22.4	99 13	24.8	3
4																5 15.0	99 13	24.0	5 44.6	99 13	23.9	6 14.3	99 13	23.9	4
155																5 07.2	99 13	23.1	5 36.9	99 12	23.0	6 06.6	99 12	22.9	155
6																			5 29.4	99 12	22.1	5 59.1	99 12	22.0	6
7																			5 22.2	99 12	21.2	5 51.9	99 12	21.1	7
8																			5 15.3	99 11	20.3	5 45.0	99 11	20.2	8
9																			5 08.6	99 11	19.3	5 38.4	99 11	19.3	9
160																			5 02.3	99 10	18.4	5 32.1	99 10	18.4	160
1																						5 26.1	99 10	17.5	1
2																						5 20.4	99 09	16.5	2
3																						5 15.0	1.0 09	15.6	3
4																						5 09.9	1.0 08	14.7	4
165																						5 05.1	1.0 08	13.8	165
6																						5 00.6	1.0 07	12.9	6

Lat. 71°
Lat. 72°
Lat. 73°
Lat. 74°
Lat. 75°
Lat. 76°
Lat. 77°
Lat. 78°
Lat. 79°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	43 00.0	1.0 00	180.0	43 30.0	1.0 00	180.0	44 00.0	1.0 00	180.0	44 30.0	1.0 00	180.0	45 00.0	1.0 00	180.0	45 30.0	1.0 00	180.0	46 00.0	1.0 00	180.0	46 30.0	1.0 00	180.0	00
1	42 59.8	1.0 01	178.8	43 29.8	1.0 01	178.7	43 59.8	1.0 01	178.7	44 29.8	1.0 01	178.7	44 59.8	1.0 01	178.7	45 29.8	1.0 01	178.7	45 59.8	1.0 01	178.7	46 29.8	1.0 01	178.7	1
2	42 59.1	1.0 02	177.5	43 29.1	1.0 02	177.5	43 59.1	1.0 02	177.5	44 29.1	1.0 02	177.5	44 59.1	1.0 02	177.5	45 29.1	1.0 02	177.4	45 59.1	1.0 02	177.4	46 29.1	1.0 02	177.4	2
3	42 58.1	1.0 02	176.3	43 28.1	1.0 02	176.2	43 58.1	1.0 02	176.2	44 28.1	1.0 03	176.2	44 58.1	1.0 03	176.2	45 28.0	1.0 03	176.2	45 58.0	1.0 03	176.2	46 28.0	1.0 03	176.1	3
4	42 56.6	1.0 03	175.0	43 26.6	1.0 03	175.0	43 56.6	1.0 03	175.0	44 26.6	1.0 03	174.9	44 56.5	1.0 03	174.9	45 26.5	1.0 03	174.9	45 56.5	1.0 03	174.9	46 26.5	1.0 03	174.8	4
05	42 54.7	1.0 04	173.8	43 24.7	1.0 04	173.7	43 54.6	1.0 04	173.7	44 24.6	1.0 04	173.7	44 54.6	1.0 04	173.6	45 24.6	1.0 04	173.6	45 54.5	1.0 04	173.6	46 24.5	1.0 04	173.6	05
6	42 52.4	1.0 05	172.5	43 22.3	1.0 05	172.5	43 52.3	1.0 05	172.4	44 22.3	1.0 05	172.4	44 52.2	1.0 05	172.4	45 22.2	1.0 05	172.3	45 52.1	1.0 05	172.3	46 22.1	1.0 05	172.3	6
7	42 49.6	1.0 05	171.3	43 19.5	1.0 05	171.2	43 49.5	1.0 05	171.2	44 19.5	1.0 05	171.2	44 49.4	1.0 05	171.1	45 19.4	1.0 06	171.1	45 49.3	1.0 05	171.0	46 19.3	1.0 05	171.0	7
8	42 46.4	1.0 06	170.0	43 16.4	1.0 06	170.0	43 46.3	1.0 06	169.9	44 16.2	1.0 06	169.9	44 46.2	1.0 06	169.9	45 16.1	1.0 06	169.8	45 46.1	1.0 06	169.8	46 16.0	1.0 06	169.7	8
9	42 42.8	1.0 07	168.8	43 12.8	1.0 07	168.7	43 42.7	1.0 07	168.7	44 12.6	1.0 07	168.6	44 42.5	1.0 07	168.6	45 12.5	1.0 07	168.5	45 42.4	1.0 07	168.5	46 12.3	1.0 07	168.4	9
10	42 38.8	1.0 07	167.5	43 08.7	1.0 07	167.5	43 38.6	1.0 07	167.4	44 08.5	1.0 07	167.4	44 38.5	1.0 07	167.3	45 08.4	1.0 08	167.3	45 38.3	1.0 08	167.2	46 08.2	1.0 08	167.2	10
1	42 34.4	1.0 08	166.3	43 04.3	1.0 08	166.2	43 34.2	1.0 08	166.2	44 04.1	1.0 08	166.1	44 34.0	1.0 08	166.1	45 03.8	1.0 08	166.0	45 33.7	1.0 08	165.9	46 03.6	1.0 08	165.9	1
2	42 29.6	1.0 09	165.1	42 59.4	1.0 09	165.0	43 29.3	1.0 09	164.9	43 59.2	1.0 09	164.9	44 29.1	1.0 09	164.8	44 58.9	1.0 09	164.7	45 28.8	1.0 09	164.7	45 58.6	1.0 09	164.6	2
3	42 24.3	1.0 09	163.8	42 54.2	99 09	163.8	43 24.0	99 09	163.7	43 53.9	99 10	163.6	44 23.7	99 10	163.6	44 53.6	99 10	163.5	45 23.4	99 10	163.4	45 53.2	99 10	163.3	3
4	42 18.7	99 10	162.6	42 48.5	99 10	162.5	43 18.4	99 10	162.5	43 48.2	99 10	162.4	44 18.0	99 10	162.3	44 47.8	99 10	162.2	45 17.6	99 10	162.2	45 47.4	99 10	162.1	4
15	42 12.7	99 11	161.4	42 42.5	99 11	161.3	43 12.3	99 11	161.2	43 42.1	99 11	161.1	44 11.9	99 11	161.1	44 41.7	99 11	161.0	45 11.4	99 11	160.9	45 41.2	99 11	160.8	15
6	42 06.2	99 11	160.2	42 36.0	99 11	160.1	43 05.8	99 11	160.0	43 35.6	99 12	159.9	44 05.3	99 12	159.8	44 35.1	99 12	159.7	45 04.8	99 12	159.6	45 34.6	99 12	159.6	6
7	41 59.4	99 12	158.9	42 29.2	99 12	158.9	42 58.9	99 12	158.8	43 28.6	99 12	158.7	43 58.4	99 12	158.6	44 28.1	99 12	158.5	44 57.9	99 12	158.4	45 27.6	99 12	158.3	7
8	41 52.2	99 13	157.7	42 21.9	99 13	157.6	42 51.6	99 13	157.5	43 21.3	99 13	157.4	43 51.1	99 13	157.3	44 20.8	99 13	157.3	44 50.5	99 13	157.2	45 20.2	99 13	157.1	8
9	41 44.6	99 13	156.5	42 14.3	99 13	156.4	42 44.0	99 13	156.3	43 13.7	99 13	156.2	43 43.3	99 14	156.1	44 13.0	99 14	156.0	44 42.7	99 14	155.9	45 12.3	99 14	155.8	9
20	41 36.6	99 14	155.3	42 06.3	99 14	155.2	42 35.9	99 14	155.1	43 05.6	99 14	155.0	43 35.2	99 14	154.9	44 04.9	99 14	154.8	44 34.5	99 14	154.7	45 04.1	99 14	154.6	20
1	41 28.3	99 15	154.1	41 57.9	99 15	154.0	42 27.5	99 15	153.9	42 57.2	99 15	153.8	43 26.8	99 15	153.7	43 56.4	99 15	153.6	44 26.0	99 15	153.4	44 55.6	99 15	153.3	1
2	41 19.6	99 15	152.9	41 49.2	99 15	152.8	42 18.7	99 16	152.7	42 48.3	99 15	152.6	43 17.9	99 16	152.5	43 47.5	99 16	152.3	44 17.0	99 16	152.2	44 46.6	99 16	152.1	2
3	41 10.5	99 16	151.7	41 40.0	99 16	151.6	42 09.6	99 16	151.5	42 39.1	98 16	151.3	43 08.7	98 16	151.2	43 38.2	98 16	151.1	44 07.8	98 16	151.0	44 37.3	98 16	150.9	3
4	41 01.0	98 16	150.5	41 30.6	98 16	150.4	42 00.1	98 16	150.3	42 29.6	98 16	150.1	42 59.1	98 17	150.0	43 28.6	98 17	149.9	43 58.1	98 17	149.8	44 27.6	98 17	149.6	4
25	40 51.2	98 17	149.3	41 20.7	98 17	149.2	41 50.2	98 17	149.1	42 19.7	98 17	148.9	42 49.2	98 17	148.8	43 18.6	98 17	148.7	43 48.1	98 17	148.6	44 17.5	98 17	148.4	25
6	40 41.1	98 17	148.1	41 10.5	98 18	148.0	41 40.0	98 18	147.9	42 09.4	98 18	147.7	42 38.9	98 18	147.6	43 08.3	98 18	147.5	43 37.7	98 18	147.3	44 07.1	98 18	147.2	6
7	40 30.6	98 18	146.9	41 00.0	98 18	146.8	41 29.4	98 18	146.7	41 58.8	98 18	146.5	42 28.2	98 18	146.4	42 57.6	98 18	146.3	43 27.0	98 18	146.1	43 56.4	98 18	146.0	7
8	40 19.8	98 19	145.8	40 49.2	98 19	145.6	41 18.5	98 19	145.5	41 47.9	98 19	145.4	42 17.3	98 19	145.2	42 46.6	98 19	145.1	43 16.0	98 19	144.9	43 45.3	98 19	144.8	8
9	40 08.6	98 19	144.6	40 38.0	98 19	144.5	41 07.3	98 19	144.3	41 36.6	98 19	144.2	42 06.0	98 19	144.0	42 35.3	98 19	143.9	43 04.6	98 20	143.7	43 33.9	98 20	143.6	9
30	39 57.1	98 20	143.4	40 26.5	98 20	143.3	40 55.8	98 20	143.1	41 25.0	98 20	143.0	41 54.3	98 20	142.9	42 23.6	98 20	142.7	42 52.9	98 20	142.6	43 22.1	97 20	142.4	30
1	39 45.3	98 20	142.3	40 14.6	98 20	142.1	40 43.9	98 20	142.0	41 13.1	97 20	141.8	41 42.4	97 20	141.7	42 11.6	97 21	141.5	42 40.8	97 21	141.4	43 10.0	97 21	141.2	1
2	39 33.2	97 21	141.1	40 02.5	97 21	141.0	40 31.7	97 21	140.8	41 00.9	97 21	140.7	41 30.1	97 21	140.5	41 59.3	97 21	140.4	42 28.5	97 21	140.2	42 57.6	97 21	140.0	2
3	39 20.8	97 21	140.0	39 50.0	97 21	139.8	40 19.2	97 21	139.7	40 48.4	97 21	139.5	41 17.5	97 21	139.3	41 46.7	97 22	139.2	42 15.8	97 22	139.0	42 44.9	97 22	138.9	3
4	39 08.1	97 22	138.8	39 37.3	97 22	138.7	40 06.4	97 22	138.5	40 35.5	97 22	138.3	41 04.7	97 22	138.2	41 33.8	97 22	138.0	42 02.8	97 22	137.9	42 31.9	97 22	137.7	4
35	38 55.1	97 22	137.7	39 24.2	97 22	137.5	39 53.3	97 22	137.4	40 22.4	97 22	137.2	40 51.5	97 22	137.0	41 20.5	97 22	136.9	41 49.6	97 23	136.7	42 18.6	97 23	136.5	35
6	38 41.8	97 23	136.5	39 10.9	97 23	136.4	39 39.9	97 23	136.2	40 09.0	97 23	136.0	40 38.0	97 23	135.9	41 07.0	97 23	135.7	41 36.1	97 23	135.5	42 05.1	97 23	135.4	6
7	38 28.2	97 23	135.4	38 57.3	97 23	135.2	39 26.3	97 23	135.1	39 55.3	97 23	134.9	40 24.3	97 23	134.7	40 53.3	97 23	134.6	41 22.2	97 23	134.4	41 51.2	96 24	134.2	7
8	38 14.4	97 24	134.3	38 43.4	97 24	134.1	39 12.3	97 24	133.9	39 41.3	97 24	133.8	40 10.3	96 24	133.6	40 39.2	96 24	133.4	41 08.1	96 24	133.3	41 37.1	96 24	133.1	8
9	38 00.2	97 24	133.1	38 29.2	97 24	133.0	38 58.1	96 24	132.8	39 27.1	96 24	132.6	39 56.0	96 24	132.5	40 24.9	96 24	132.3	40 53.8	96 24	132.1	41 22.7	96 24	131.9	9
40	37 45.9	96 24	132.0	38 14.8	96 24	131.9	38 43.7	96 24	131.7	39 12.6	96 25	131.5	39 41.5	96 25	131.3	40 10.3	96 25	131.2	40 39.2	96 25	131.0	41 08.0	96 25	130.8	40
1	37 31.2	96 25	130.9	38 00.1	96 25	130.7	38 29.0	96 25	130.6	38 57.8	96 25	130.4	39 26.7	96 25	130.2	39 55.5	96 25	130.0	40 24.3	96 25	129.9	40 53.1	96 25	129.7	1
2	37 16.3	96 25	129.8	37 45.2	96 25	129.6	38 14.0	96 25	129.5	38 42.8	96 25	129.3	39 11.6	96 25	129.1	39 40.4	96 26	128.9	40 09.2	96 26	128.7	40 37.9	96 26	128.5	2
3	37 01.2	96 26	128.7	37 30.0	96 26	128.5	37 58.8	96 26	128.4	38 27.6	96 26	128.2	38 56.4	96 26	128.0	39 25.1	96 26	127.8	39 53.8	96 26	127.6	40 22.5	96 26	127.4	3
4	36 45.9	96 26	127.6	37 14.6	96 26	127.4	37 43.4	96 26	127.3	38 12.1	96 26	127.1	38 40.8	96 26	126.9	39 09.5	96 26	126.7	39 38.2	96 26	126.5	40 06.9	96 26	126.3	4
45	36 30.3	96 26	126.5	36 59.0	96 26	126.3	37 27.7	96 26	126.2	37 56.4	96 27	126.0	38 25.1	96 27	125.8	38 53.8	96 27	125.6	39 22.4	95 27	125.4	39 51.1	95 27	125.2	45
6	36 14.5	96 27	125.4	36 43.2	96 27	125.3	37 11.8	96 27	125.1	37 40.5	96 27	124.9	38 09.2	95 27	124.7	38 37.8	95 27	124.5	39 06.4	95 27	124.3	39 35.0	95 27	124.1	6
7	35 58.4	96 27	124.4	36 27.1	96 27	124.2	36 55.7	96 27	124.0	37 24.4	95 27	123.8	37 53.0	95 27	123.6	38 21.6	95 27	123.4	38 50.2	95 27	123.2	39 18.7	95 27	123.0	7
8	35 42.2	95 27	123.3	36 10.8	95 27	123.1	36 39.4	95 28	122.9	37 08.0	95 28	122.7	37 36.6	95 28	122.5	38 05.2	95 28	122.3	38 33.7	95 28	122.1	39 02.2	95 28	121.9	8
9	35 25.8	95 28	122.2	35 54.4	95 28	122.0	36 23.0	95 28	121.8	36 51.5	95 28	121.6	37 20.1	95 28	121.4	37 48.6	95 28	121.3	38 17.1	95 28	121.1	38 45.6	95 28	120.9	9
50	35 09.2	95 28	121.1	35 37.7	95 28	121.0	36 06.3	95 28	120.8	36 34.8	95 28	120.6	37 03.3	95 28	120.4	37 31.8	95 28	120.2	38 00.2	95 28	120.0	38 28.7	95 28	119.8	50
1	34 52.3	95 28	120.1	35 20.9	95 28	119.9	35 49.4	95 28	119.7	36 17.9	95 28	119.5	36 46.3	95 29	119.3	37 14.8	95 29	119.1	37 43.2	95 29	118.9	38 11.7	95 29	118.7	1
2	34 35.3	95 29	119.0	35 03.8	95 29	118.8	35 32.3	95 29	118.6	36 00.8	95 29	118.4	36 29.2	95 29	118.2	36 57.6	95 29	118.0	37 26.0	95 29	117.8	37 54.4	95 29	117.6	2
3	34 18.2	95 29	118.0	34 46.6	95 29	117.8	35 15.1	95 29	117.6	35 43.5	95 29	117.4	36 11.9	95 29	117.2	36 40.3	95 29	117.0	37 08.7	95 29	116.8	37 37.0	94 29	116.6	3
4	34 00.8	95 29	116.9	34 29.3	95 29	116.7	34 57.7	95 29	116.5	35 26.1	95 29	116.3	35 54.5	95 29	116.1	36 22.8	94 29	115.9	36 51.2	94 29	115.7	37 19.5	94 30	115.5	4
55	33 43.3	95 29	115.9	34 11.8	95 29	115.7	34 40.1	95 30	115.5	35 08.5	95 30	115.3	35 36.9	94 30	115.1	36 05.2	94 30	114.9	36 33.5	94 30	114.7	37 01.8	94 30	114.5	55
6	33 25.7	95 30	114.8	33 54.1	95 30	114.6	34 22.4	95 30	114.4	34 50.8	94 30	114.2	35 19.1	94 30	114.0	35 47.4	94 30	113.8	36 15.7	94 30	113.6	36 43.9	94 30	113.4	6
7	33 07.9	95 30	113.8	33 36.2	94 30	113.6	34 04.6	94 30	113.4	34 32.9	94 30	113.2	35 01.2	94 30	113.0	35 29.5	94 30	112.8	35 57.7	94 30	112.6	36 25.9	94 30	112.4	7
8	32 50.0	94 30	112.8	33 18.3	94 30	112.6	33 46.6	94 30	112.4	34 14.9	94 30	112.2	34 43.1	94 30	112.0	35 11.4	94 30	111.8	35 39.6	94 30	111.6	36 07.8	94 30	111.4	8
9	32 31.9	94 30	111.8	33 00.2	94 30	111.6	33 28.5	94 30	111.4	33 56.7	94 30	111.2	34 25.0	94 31	111.0	34 53.2	94 31	110.7	35 21.4	94 31	110.5	35 49.6	94 31	110.3	9
60	32 13.7	94 31	110.7	32 41.9	94 31	110.5	33 10.2	94 31	110.3	33 38.4	94 31	110.1	34 06.7	94 31	109.9	34 34.9	94 31	109.7	35 03.0	94 31	109.5	35 31.2	94 31	109.3	60
1	31 55.3	94 31	109.7	32 23.6	94 31	109.5	32 51.8	94 31	109.3	33 20.0	94 31	109.1	33 48.2	94 31	108.9	34 16.4	94 31	108.7	34 44.6	94 31	108.5	35 12.7	94 31	108.3	1
2	31 36.9	94 31	108.7	32 05.1	94 31	108.5	32 33.3	94 31	108.3	33 01.5	94 31	108.1	33 29.7	94 31	107.9	33 57.9	94 31	107.7	34 26.0	94 31	107.5	34 54.1	94 31	107.3	2
3	31 18.3	94 31	107.7	31 46.5	94 31	107.5	32 14.7	94 31	107.3	32 42.9	94 31	107.1	33 11.1	94 31	106.9	33 39.2	94 31	106.7	34 07.3	94 31	106.5	34 35.4	94 31	106.3	3
4	30 59.7	94 31	106.7	31 27.9	94 31	106.5	31 56.0	94 31	106.3	32 24.2	94 31	106.1	32 52.3	94 31	105.9	33 20.4	94 31	105.7	33 48.5	94 31	105.5	34 16.6	94 31	105.2	4
65	30 40.9	94 31	105.7	31 09.1	94 31	105.5	31 37.2	94 31	105.3	32 05.4	94 32	105.1	32 33.5	94 32	104.9	33 01.6	94 32	104.7	33 29.6	94 32	104.5	33 57.7	93 32	104.2	65
6	30 22.1	94 32	104.7	30 50.2	94 32	104.5	31 18.4	94 32	104.3	31 46.5	94 32	104.1	32 14.6	94 32	103.9	32 42.6	94 32	103.7	33 10.7	93 32	103.5	33 38.7	93 32	103.2	6
7	30 03.1	94 32	103.7	30 31.3	94 32	103.5	30 59.4	94 32	103.3	31 27.5	94 32	103.1	31 55.6	94 32	102.9	32 23.6	93 32	102.7	32 51.7	93 32	102.5	33 19.7	93 32	102.3	7
8	29 44.1	94 32	102.7	30 12.2	94 32	102.5	30 40.3	94 32	102.3	31 08.4	94 32	102.1	31 36.5	94 32	101.9	32 04.5	93 32	101.7	32 32.5	93 32	101.5	33 00.5	93 32	101.3	8
9	29 25.0	94 32	101.7	29 53.1	94 32	101.5	30 21.2	94 32	101.3	30 49.3	94 32	101.1	31 17.3	93 32	100.9	31 45.4	93 32	100.7	32 13.4	93 32	100.5	32 41.4	93 32	100.3	9
70	29 05.9	94 32	100.8	29 34.0	94 32	100.6	30 02.0	94 32	100.3	30 30.1	93 32	100.1	30 58.1	93 32	99.9	31 26.1	93 32	99.7	31 54.1	93 32	99.5	32 22.1	93 32	99.3	70
1	28 46.6	94 32	99.8	29 14.7	94 32	99.6	29 42.8	94 32	99.4	30 10.8	93 32	99.2	30 38.9	93 32	99.0	31 06.9	93 32	98.7	31 34.8	93 32	98.5	32 02.8	93 32	98.3	1
2	28 27.4	94 32	98.8	28 55.4	94 32	98.6	29 23.5	93 32	98.4	29 51.5	93 32	98.2	30 19.5	93 32	98.0	30 47.5	93 32	97.8	31 15.5	93 32	97.6	31 43.4	93 32	97.4	2
3	28 08.0	94 32	97.8	28 36.1	94 32	97.6	29 04.1	93 32	97.4	29 32.2	93 32	97.2	30 00.2	93 32	97.0	30 28.1	93 32	96.8	30 56.1	93 32	96.6	31 24.1	93 32	96.4	3
4	27 48.7	94 32	96.9	28 16.7	93 32	96.7	28 44.7	93 32	96.5	29 12.8	93 32	96.3	29 40.8	93 32	96.0	30 08.7	93 32	95.8	30 36.7	93 32	95.6	31 04.6	93 32	95.4	4
75	27 29.3	94 32	95.9	27 57.3	93 32	95.7	28 25.3	93 32	95.5	28 53.3	93 32	95.3	29 21.3	93 32	95.1	29 49.3	93 32	94.9	30 17.2	93 32	94.7	30 45.2	93 32	94.5	75
6	27 09.8	93 32	94.9	27 37.8	93 32	94.7	28 05.9	93 32	94.5	28 33.9	93 32	94.3	29 01.8	93 32	94.1	29 29.8	93 32	93.9	29 57.8	93 32	93.7	30 25.7	93 32	93.5	6
7	26 50.3	93 32	94.0	27 18.4	93 32	93.8	27 46.4	93 33	93.6	28 14.4	93 32	93.4	28 42.4	93 33	93.2	29 10.3	93 33	93.0	29 38.3	93 33	92.8	30 06.2	93 33	92.5	7
8	26 30.8	93 33	93.0	26 58.9	93 33	92.8	27 26.9	93 33	92.6	27 54.9	93 33	92.4	28 22.8	93 33	92.2	28 50.8	93 33	92.0	29 18.7	93 33	91.8	29 46.6	93 33	91.6	8
9	26 11.3	93 33	92.1	26 39.3	93 33	91.9	27 07.4	93 33	91.7	27 35.3	93 33	91.5	28 03.3	93 33	91.3	28 31.3	93 33	91.1	28 59.2	93 33	90.8	29 27.1	93 33	90.6	9
80	25 51.8	93 33	91.1	26 19.8	93 33	90.9	26 47.8	93 33	90.7	27 15.8	93 33	90.5	27 43.8	93 33	90.3	28 11.7	93 33	90.1	28 39.7	93 33	89.9	29 07.6	93 33	89.7	80
1	25 32.3	93 33	90.2	26 00.3	93 33	90.0	26 28.3	93 33	89.8	26 56.3	93 33	89.6	27 24.2	93 33	89.4	27 52.2	93 33	89.2	28 20.1	93 33	89.0	28 48.1	93 33	88.7	1
2	25 12.7	93 33	89.2	25 40.7	93 33	89.0	26 08.8	93 33	88.8	26 36.7	93 33	88.6	27 04.7	93 33	88.4	27 32.7	93 33	88.2	28 00.6	93 33	88.0	28 28.5	93 33	87.8	2
3	24 53.2	93 33	88.3	25 21.2	93 33	88.1	25 49.2	93 33	87.9	26 17.2	93 32	87.7	26 45.2	93 33	87.5	27 13.2	93 32	87.3	27 41.1	93 32	87.1	28 09.0	93 32	86.9	3
4	24 33.7	93 33	87.3	25 01.7	93 32	87.1	25 29.7	93 32	87.0	25 57.7	93 32	86.8	26 25.7	93 32	86.6	26 53.7	93 32	86.3	27 21.6	93 32	86.1	27 49.5	93 32	85.9	4
85	24 14.2	93 32	86.4	24 42.2	93 32	86.2	25 10.2	93 32	86.0	25 38.2	93 32	85.8	26 06.2	93 32	85.6	26 34.2	93 32	85.4	27 02.1	93 32	85.2	27 30.0	93 32	85.0	85
6	23 54.7	93 32	85.5	24 22.7	93 32	85.3	24 50.7	93 32	85.1	25 18.7	93 32	84.9	25 46.7	93 32	84.7	26 14.7	93 32	84.5	26 42.7	93 32	84.3	27 10.6	93 32	84.1	6
7	23 35.2	93 32	84.5	24 03.3	93 32	84.3	24 31.3	93 32	84.2	24 59.3	93 32	84.0	25 27.3	93 32	83.8	25 55.3	93 32	83.6	26 23.2	93 32	83.4	26 51.2	93 32	83.1	7
8	23 15.8	94 32	83.6	23 43.8	93 32	83.4	24 11.9	93 32	83.2	24 39.9	93 32	83.0	25 07.9	93 32	82.8	25 35.9	93 32	82.6	26 03.9	93 32	82.4	26 31.8	93 32	82.2	8
9	22 56.4	94 32	82.7	23 24.5	93 32	82.5	23 52.5	93 32	82.3	24 20.5	93 32	82.1	24 48.5	93 32	81.9	25 16.5	93 32	81.7	25 44.5	93 32	81.5	26 12.5	93 32	81.3	9
90	22 37.0	94 32	81.8	23 05.1	94 32	81.6	23 33.2	93 32	81.4	24 01.2	93 32	81.2	24 29.2	93 32	81.0	24 57.2	93 32	80.8	25 25.2	93 32	80.6	25 53.2	93 32	80.4	90

16—18598

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′		24° 30′		25° 00′		25° 30′		26° 00′		26° 30′		27° 00′		27° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	
91	22 17.7 94 32	80.8	22 45.8 94 32	80.6	23 13.9 94 32	80.4	23 41.9 93 32	80.3	24 10.0 93 32	80.1	24 38.0 93 32	79.9	25 06.0 93 32	79.7	25 34.0 93 32	79.5	91
2	21 58.5 94 32	79.9	22 26.6 94 32	79.7	22 54.6 94 32	79.5	23 22.7 94 32	79.3	23 50.7 93 32	79.1	24 18.8 93 32	78.9	24 46.8 93 32	78.7	25 14.8 93 32	78.5	2
3	21 39.3 94 32	79.0	22 07.4 94 32	78.8	22 35.5 94 32	78.6	23 03.5 94 32	78.4	23 31.6 94 32	78.2	23 59.6 93 32	78.0	24 27.7 93 32	77.8	24 55.7 93 32	77.6	3
4	21 20.1 94 32	78.1	21 48.2 94 32	77.9	22 16.3 94 32	77.7	22 44.4 94 32	77.5	23 12.5 94 32	77.3	23 40.6 94 32	77.1	24 08.6 93 32	76.9	24 36.6 93 32	76.7	4
95	21 01.1 94 32	77.1	21 29.2 94 32	77.0	21 57.3 94 32	76.8	22 25.4 94 32	76.6	22 53.5 94 32	76.4	23 21.6 94 32	76.2	23 49.6 94 32	76.0	24 17.7 93 32	75.8	95
6	20 42.0 94 32	76.2	21 10.2 94 32	76.0	21 38.3 94 32	75.9	22 06.4 94 31	75.7	22 34.5 94 31	75.5	23 02.6 94 31	75.3	23 30.7 94 31	75.1	23 58.8 94 31	74.9	6
7	20 23.1 94 31	75.3	20 51.3 94 31	75.1	21 19.4 94 31	74.9	21 47.5 94 31	74.8	22 15.7 94 31	74.6	22 43.8 94 31	74.4	23 11.9 94 31	74.2	23 39.9 94 31	74.0	7
8	20 04.3 94 31	74.4	20 32.4 94 31	74.2	21 00.6 94 31	74.0	21 28.7 94 31	73.8	21 56.9 94 31	73.7	22 25.0 94 31	73.5	22 53.1 94 31	73.3	23 21.2 94 31	73.1	8
9	19 45.5 94 31	73.5	20 13.7 94 31	73.3	20 41.9 94 31	73.1	21 10.0 94 31	72.9	21 38.2 94 31	72.7	22 06.3 94 31	72.6	22 34.4 94 31	72.4	23 02.6 94 31	72.2	9
100	19 26.8 94 31	72.6	19 55.0 94 31	72.4	20 23.2 94 31	72.2	20 51.4 94 31	72.0	21 19.6 94 31	71.8	21 47.7 94 31	71.7	22 15.9 94 31	71.5	22 44.0 94 31	71.3	100
1	19 08.2 94 31	71.7	19 36.4 94 31	71.5	20 04.7 94 31	71.3	20 32.9 94 31	71.1	21 01.1 94 31	70.9	21 29.2 94 31	70.8	21 57.4 94 31	70.6	22 25.6 94 31	70.4	1
2	18 49.7 94 31	70.8	19 18.0 94 31	70.6	19 46.2 94 31	70.4	20 14.4 94 31	70.2	20 42.6 94 30	70.0	21 10.8 94 30	69.9	21 39.0 94 30	69.7	22 07.2 94 30	69.5	2
3	18 31.3 94 30	69.8	18 59.6 94 30	69.7	19 27.9 94 30	69.5	19 56.1 94 30	69.3	20 24.3 94 30	69.1	20 52.6 94 30	68.9	21 20.8 94 30	68.8	21 49.0 94 30	68.6	3
4	18 13.0 94 30	68.9	18 41.3 94 30	68.8	19 09.6 94 30	68.6	19 37.9 94 30	68.4	20 06.1 94 30	68.2	20 34.4 94 30	68.0	21 02.6 94 30	67.9	21 30.8 94 30	67.7	4
105	17 54.9 94 30	68.0	18 23.2 94 30	67.9	18 51.5 94 30	67.7	19 19.8 94 30	67.5	19 48.1 94 30	67.3	20 16.3 94 30	67.1	20 44.6 94 30	67.0	21 12.8 94 30	66.8	105
6	17 36.8 94 30	67.1	18 05.2 94 30	67.0	18 33.5 94 30	66.8	19 01.8 94 30	66.6	19 30.1 94 30	66.4	19 58.4 94 30	66.3	20 26.7 94 30	66.1	20 54.9 94 30	65.9	6
7	17 18.9 95 30	66.2	17 47.2 95 30	66.0	18 15.6 94 30	65.9	18 43.9 94 30	65.7	19 12.2 94 30	65.5	19 40.6 94 29	65.4	20 08.9 94 29	65.2	20 37.2 94 29	65.0	7
8	17 01.1 95 29	65.3	17 29.4 95 29	65.1	17 57.8 95 29	65.0	18 26.2 95 29	64.8	18 54.5 94 29	64.6	19 22.9 94 29	64.5	19 51.2 94 29	64.3	20 19.5 94 29	64.1	8
9	16 43.4 95 29	64.4	17 11.8 95 29	64.2	17 40.2 95 29	64.1	18 08.6 95 29	63.9	18 36.9 95 29	63.7	19 05.3 95 29	63.6	19 33.7 95 29	63.4	20 02.0 94 29	63.2	9
110	16 25.8 95 29	63.5	16 54.3 95 29	63.3	17 22.7 95 29	63.2	17 51.1 95 29	63.0	18 19.5 95 29	62.8	18 47.9 95 29	62.7	19 16.3 95 29	62.5	19 44.7 95 29	62.3	110
1	16 08.4 95 29	62.6	16 36.9 95 29	62.4	17 05.3 95 29	62.3	17 33.8 95 29	62.1	18 02.2 95 29	61.9	18 30.6 95 29	61.8	18 59.0 95 29	61.6	19 27.4 95 28	61.4	1
2	15 51.1 95 29	61.7	16 19.6 95 28	61.5	16 48.1 95 28	61.4	17 16.6 95 28	61.2	17 45.0 95 28	61.0	18 13.5 95 28	60.9	18 41.9 95 28	60.7	19 10.3 95 28	60.5	2
3	15 34.0 95 28	60.8	16 02.5 95 28	60.6	16 31.0 95 28	60.5	16 59.5 95 28	60.3	17 28.0 95 28	60.2	17 56.5 95 28	60.0	18 25.0 95 28	59.8	18 53.4 95 28	59.7	3
4	15 17.0 95 28	59.9	15 45.6 95 28	59.7	16 14.1 95 28	59.6	16 42.6 95 28	59.4	17 11.1 95 28	59.3	17 39.6 95 28	59.1	18 08.1 95 28	58.9	18 36.6 95 28	58.8	4
115	15 00.2 95 28	59.0	15 28.8 95 28	58.8	15 57.3 95 28	58.7	16 25.9 95 28	58.5	16 54.4 95 28	58.4	17 23.0 95 28	58.2	17 51.5 95 27	58.0	18 20.0 95 27	57.9	115
6	14 43.6 95 28	58.1	15 12.1 95 27	57.9	15 40.7 95 27	57.8	16 09.3 95 27	57.6	16 37.9 95 27	57.5	17 06.4 95 27	57.3	17 35.0 95 27	57.1	18 03.5 95 27	57.0	6
7	14 27.1 95 27	57.2	14 55.7 95 27	57.0	15 24.3 95 27	56.9	15 52.9 95 27	56.7	16 21.5 95 27	56.6	16 50.1 95 27	56.4	17 18.7 95 27	56.3	17 47.2 95 27	56.1	7
8	14 10.7 95 27	56.3	14 39.4 95 27	56.1	15 08.0 95 27	56.0	15 36.6 95 27	55.8	16 05.3 95 27	55.7	16 33.9 95 27	55.5	17 02.5 95 27	55.4	17 31.1 95 27	55.2	8
9	13 54.6 95 27	55.4	14 23.2 95 27	55.2	14 51.9 95 27	55.1	15 20.6 95 26	54.9	15 49.2 95 26	54.8	16 17.9 95 26	54.6	16 46.5 95 26	54.5	17 15.2 95 26	54.3	9
120	13 38.6 96 26	54.5	14 07.3 96 26	54.4	14 36.0 96 26	54.2	15 04.7 96 26	54.1	15 33.4 96 26	53.9	16 02.0 96 26	53.7	16 30.7 96 26	53.6	16 59.4 96 26	53.4	120
1	13 22.7 96 26	53.6	13 51.5 96 26	53.5	14 20.2 96 26	53.3	14 48.9 96 26	53.2	15 17.7 96 26	53.0	15 46.4 96 26	52.9	16 15.1 96 26	52.7	16 43.8 96 26	52.6	1
2	13 07.1 96 26	52.7	13 35.9 96 26	52.6	14 04.6 96 26	52.4	14 33.4 96 26	52.3	15 02.2 96 26	52.1	15 30.9 96 26	52.0	15 59.6 96 25	51.8	16 28.4 96 25	51.7	2
3	12 51.7 96 25	51.8	13 20.5 96 25	51.7	13 49.3 96 25	51.5	14 18.0 96 25	51.4	14 46.8 96 25	51.2	15 15.6 96 25	51.1	15 44.4 96 25	50.9	16 13.1 96 25	50.8	3
4	12 36.4 96 25	50.9	13 05.2 96 25	50.8	13 34.1 96 25	50.6	14 02.9 96 25	50.5	14 31.7 96 25	50.3	15 00.5 96 25	50.2	15 29.3 96 25	50.0	15 58.1 96 25	49.9	4
125	12 21.4 96 25	50.0	12 50.2 96 25	49.9	13 19.1 96 25	49.7	13 47.9 96 25	49.6	14 16.8 96 25	49.4	14 45.6 96 25	49.3	15 14.4 96 24	49.2	15 43.3 96 24	49.0	125
6	12 06.5 96 24	49.1	12 35.4 96 24	49.0	13 04.3 96 24	48.8	13 33.1 96 24	48.7	14 02.0 96 24	48.5	14 30.9 96 24	48.4	14 59.8 96 24	48.3	15 28.6 96 24	48.1	6
7	11 51.8 96 24	48.2	12 20.7 96 24	48.1	12 49.7 96 24	47.9	13 18.6 96 24	47.8	13 47.5 96 24	47.7	14 16.4 96 24	47.5	14 45.3 96 24	47.4	15 14.2 96 24	47.2	7
8	11 37.4 97 24	47.3	12 06.3 96 24	47.2	12 35.3 96 24	47.0	13 04.2 96 24	46.9	13 33.1 96 24	46.8	14 02.1 96 24	46.6	14 31.0 96 23	46.5	14 59.9 96 23	46.4	8
9	11 23.1 97 23	46.4	11 52.1 97 23	46.3	12 21.1 97 23	46.1	12 50.0 97 23	46.0	13 19.0 97 23	45.9	13 48.0 97 23	45.7	14 16.9 97 23	45.6	14 45.9 97 23	45.5	9
130	11 09.1 97 23	45.5	11 38.1 97 23	45.4	12 07.1 97 23	45.2	12 36.1 97 23	45.1	13 05.1 97 23	45.0	13 34.1 97 23	44.8	14 03.1 97 23	44.7	14 32.1 97 23	44.6	130
1	10 55.2 97 23	44.6	11 24.3 97 23	44.5	11 53.3 97 23	44.3	12 22.4 97 23	44.2	12 51.4 97 22	44.1	13 20.4 97 22	44.0	13 49.5 97 22	43.8	14 18.5 97 23	43.7	1
2	10 41.6 97 22	43.7	11 10.7 97 22	43.6	11 39.8 97 22	43.4	12 08.9 97 22	43.3	12 37.9 97 22	43.2	13 07.0 97 22	43.1	13 36.0 97 22	42.9	14 05.1 97 22	42.8	2
3	10 28.3 97 22	42.8	10 57.4 97 22	42.7	11 26.5 97 22	42.6	11 55.6 97 22	42.4	12 24.7 97 22	42.3	12 53.8 97 22	42.2	13 22.8 97 22	42.1	13 51.9 97 22	41.9	3
4	10 15.1 97 22	41.9	10 44.2 97 22	41.8	11 13.4 97 21	41.7	11 42.5 97 21	41.5	12 11.6 97 21	41.4	12 40.7 97 21	41.3	13 09.9 97 21	41.2	13 39.0 97 21	41.0	4
135	10 02.2 97 21	41.0	10 31.3 97 21	40.9	11 00.5 97 21	40.8	11 29.7 97 21	40.6	11 58.8 97 21	40.5	12 28.0 97 21	40.4	12 57.1 97 21	40.3	13 26.3 97 21	40.2	135
6	9 49.5 97 21	40.1	10 18.7 97 21	40.0	10 47.9 97 21	39.9	11 17.1 97 21	39.7	11 46.2 97 21	39.6	12 15.4 97 21	39.5	12 44.6 97 20	39.4	13 13.8 97 20	39.3	6
7	9 37.0 97 20	39.2	10 06.2 97 20	39.1	10 35.5 97 20	39.0	11 04.7 97 20	38.8	11 33.9 97 20	38.7	12 03.1 97 20	38.6	12 32.3 97 20	38.5	13 01.5 97 20	38.4	7
8	9 24.8 98 20	38.3	9 54.0 98 20	38.2	10 23.3 98 20	38.1	10 52.5 98 20	38.0	11 21.8 98 20	37.8	11 51.0 97 20	37.7	12 20.3 97 20	37.6	12 49.5 97 20	37.5	8
9	9 12.8 98 20	37.4	9 42.1 98 20	37.3	10 11.4 98 19	37.2	10 40.7 98 19	37.1	11 09.9 98 19	36.9	11 39.2 98 19	36.8	12 08.5 98 19	36.7	12 37.8 98 19	36.6	9
140	9 01.1 98 19	36.5	9 30.4 98 19	36.4	9 59.7 98 19	36.3	10 29.0 98 19	36.2	10 58.3 98 19	36.1	11 27.6 98 19	35.9	11 56.9 98 19	35.8	12 26.2 98 19	35.7	140
1	8 49.6 98 19	35.6	9 18.9 98 19	35.5	9 48.3 98 19	35.4	10 17.6 98 19	35.3	10 46.9 98 19	35.2	11 16.3 98 18	35.0	11 45.6 98 18	34.9	12 15.0 98 18	34.8	1
2	8 38.3 98 18	34.7	9 07.7 98 18	34.6	9 37.1 98 18	34.5	10 06.5 98 18	34.4	10 35.8 98 18	34.3	11 05.2 98 18	34.2	11 34.6 98 18	34.1	12 03.9 98 18	33.9	2
3	8 27.3 98 18	33.8	8 56.8 98 18	33.7	9 26.2 98 18	33.6	9 55.6 98 18	33.5	10 25.0 98 18	33.4	10 54.4 98 18	33.3	11 23.7 98 18	33.2	11 53.1 98 18	33.1	3
4	8 16.6 98 17	32.9	8 46.0 98 17	32.8	9 15.5 98 17	32.7	9 44.9 98 17	32.6	10 14.3 98 17	32.5	10 43.8 98 17	32.4	11 13.2 98 17	32.3	11 42.6 98 17	32.2	4
145	8 06.1 98 17	32.0	8 35.6 98 17	31.9	9 05.1 98 17	31.8	9 34.5 98 17	31.7	10 04.0 98 17	31.6	10 33.4 98 17	31.5	11 02.9 98 17	31.4	11 32.3 98 17	31.3	145
6	7 55.9 98 17	31.0	8 25.4 98 17	31.0	8 54.9 98 16	30.9	9 24.4 98 16	30.8	9 53.9 98 16	30.7	10 23.4 98 16	30.6	10 52.8 98 16	30.5	11 22.3 98 16	30.4	6
7	7 46.0 98 16	30.1	8 15.5 98 16	30.1	8 45.0 98 16	30.0	9 14.5 98 16	29.9	9 44.1 98 16	29.8	10 13.6 98 16	29.7	10 43.1 98 16	29.6	11 12.6 98 16	29.5	7
8	7 36.3 98 16	29.2	8 05.9 98 16	29.1	8 35.4 98 16	29.1	9 04.9 98 16	29.0	9 34.5 98 16	28.9	10 04.0 98 15	28.8	10 33.6 98 15	28.7	11 03.1 98 15	28.6	8
9	7 26.9 99 15	28.3	7 56.5 99 15	28.2	8 26.1 99 15	28.2	8 55.6 99 15	28.1	9 25.2 99 15	28.0	9 54.7 99 15	27.9	10 24.3 99 15	27.8	10 53.9 99 15	27.7	9
150	7 17.8 99 15	27.4	7 47.4 99 15	27.3	8 17.0 99 15	27.3	8 46.6 99 15	27.2	9 16.2 99 15	27.1	9 45.7 99 15	27.0	10 15.3 99 15	26.9	10 44.9 99 14	26.8	150
1	7 08.9 99 14	26.5	7 38.5 99 14	26.4	8 08.2 99 14	26.4	8 37.8 99 14	26.3	9 07.4 99 14	26.2	9 37.0 99 14	26.1	10 06.6 99 14	26.0	10 36.2 99 14	25.9	1
2	7 00.3 99 14	25.6	7 30.0 99 14	25.5	7 59.6 99 14	25.4	8 29.3 99 14	25.4	8 58.9 99 14	25.3	9 28.5 99 14	25.2	9 58.2 99 14	25.1	10 27.8 99 14	25.1	2
3	6 52.0 99 13	24.7	7 21.7 99 13	24.6	7 51.4 99 13	24.5	8 21.0 99 13	24.5	8 50.7 99 13	24.4	9 20.4 99 13	24.3	9 50.0 99 13	24.2	10 19.7 99 13	24.2	3
4	6 44.0 99 13	23.8	7 13.7 99 13	23.7	7 43.4 99 13	23.6	8 13.1 99 13	23.6	8 42.8 99 13	23.5	9 12.5 99 13	23.4	9 42.1 99 13	23.3	10 11.8 99 13	23.3	4
155	6 36.3 99 12	22.9	7 06.0 99 12	22.8	7 35.7 99 12	22.7	8 05.4 99 12	22.7	8 35.1 99 12	22.6	9 04.8 99 12	22.5	9 34.5 99 12	22.5	10 04.3 99 12	22.4	155
6	6 28.8 99 12	22.0	6 58.6 99 12	21.9	7 28.3 99 12	21.8	7 58.0 99 12	21.8	8 27.8 99 12	21.7	8 57.5 99 12	21.6	9 27.2 99 12	21.6	9 57.0 99 12	21.5	6
7	6 21.7 99 11	21.0	6 51.4 99 11	21.0	7 21.2 99 11	20.9	7 50.9 99 11	20.9	8 20.7 99 11	20.8	8 50.4 99 11	20.7	9 20.2 99 11	20.7	9 49.9 99 11	20.6	7
8	6 14.8 99 11	20.1	6 44.6 99 11	20.1	7 14.4 99 11	20.0	7 44.1 99 11	20.0	8 13.9 99 11	19.9	8 43.7 99 11	19.8	9 13.4 99 11	19.8	9 43.2 99 11	19.7	8
9	6 08.2 99 10	19.2	6 38.0 99 10	19.2	7 07.8 99 10	19.1	7 37.6 99 10	19.0	8 07.4 99 10	19.0	8 37.2 99 10	18.9	9 07.0 99 10	18.9	9 36.8 99 10	18.8	9
160	6 01.9 99 10	18.3	6 31.8 99 10	18.3	7 01.6 99 10	18.2	7 31.4 99 10	18.1	8 01.2 99 10	18.1	8 31.0 99 10	18.0	9 00.8 99 10	18.0	9 30.6 99 10	17.9	160
1	5 56.0 99 10	17.4	6 25.8 99 09	17.3	6 55.6 99 09	17.3	7 25.4 99 09	17.2	7 55.3 99 09	17.2	8 25.1 99 09	17.1	8 54.9 99 09	17.1	9 24.8 99 09	17.0	1
2	5 50.3 99 09	16.5	6 20.1 99 09	16.4	6 50.0 99 09	16.4	7 19.8 99 09	16.3	7 49.6 99 09	16.3	8 19.5 99 09	16.2	8 49.3 99 09	16.2	9 19.2 99 09	16.1	2
3	5 44.9 1.0 08	15.6	6 14.7 1.0 08	15.5	6 44.6 1.0 08	15.5	7 14.5 1.0 08	15.4	7 44.3 1.0 08	15.4	8 14.2 1.0 08	15.3	8 44.0 1.0 08	15.3	9 13.9 1.0 08	15.2	3
4	5 39.8 1.0 08	14.7	6 09.7 1.0 08	14.6	6 39.5 1.0 08	14.6	7 09.4 1.0 08	14.5	7 39.3 1.0 08	14.5	8 09.2 1.0 08	14.4	8 39.0 1.0 08	14.4	9 08.9 1.0 08	14.3	4
165	5 35.0 1.0 07	13.7	6 04.9 1.0 07	13.7	6 34.8 1.0 07	13.7	7 04.7 1.0 07	13.6	7 34.6 1.0 07	13.6	8 04.4 1.0 07	13.5	8 34.3 1.0 07	13.5	9 04.2 1.0 07	13.4	165
6	5 30.5 1.0 07	12.8	6 00.4 1.0 07	12.8	6 30.3 1.0 07	12.7	7 00.2 1.0 07	12.7	7 30.1 1.0 07	12.7	8 00.0 1.0 07	12.6	8 29.9 1.0 07	12.6	8 59.8 1.0 07	12.5	6
7	5 26.3 1.0 06	11.9	5 56.2 1.0 06	11.9	6 26.2 1.0 06	11.8	6 56.1 1.0 06	11.8	7 26.0 1.0 06	11.8	7 55.9 1.0 06	11.7	8 25.8 1.0 06	11.7	8 55.7 1.0 06	11.7	7
8	5 22.4 1.0 06	11.0	5 52.4 1.0 06	11.0	6 22.3 1.0 06	10.9	6 52.2 1.0 06	10.9	7 22.2 1.0 06	10.9	7 52.1 1.0 06	10.8	8 22.0 1.0 06	10.8	8 51.9 1.0 06	10.8	8
9	5 18.9 1.0 05	10.1	5 48.8 1.0 05	10.1	6 18.7 1.0 05	10.0	6 48.7 1.0 05	10.0	7 18.6 1.0 05	10.0	7 48.6 1.0 05	09.9	8 18.5 1.0 05	09.9	8 48.4 1.0 05	09.9	9
170	5 15.6 1.0 05	09.2	5 45.5 1.0 05	09.1	6 15.5 1.0 05	09.1	6 45.5 1.0 05	09.1	7 15.4 1.0 05	09.1	7 45.4 1.0 05	09.0	8 15.3 1.0 05	09.0	8 45.3 1.0 05	09.0	170
1	5 12.6 1.0 04	08.3	5 42.6 1.0 04	08.2	6 12.6 1.0 04	08.2	6 42.5 1.0 04	08.2	7 12.5 1.0 04	08.1	7 42.4 1.0 04	08.1	8 12.4 1.0 04	08.1	8 42.4 1.0 04	08.1	1
2	5 10.0 1.0 04	07.3	5 40.0 1.0 04	07.3	6 09.9 1.0 04	07.3	6 39.9 1.0 04	07.3	7 09.9 1.0 04	07.2	7 39.8 1.0 04	07.2	8 09.8 1.0 04	07.2	8 39.8 1.0 04	07.2	2
3	5 07.7 1.0 03	06.4	5 37.6 1.0 03	06.4	6 07.6 1.0 03	06.4	6 37.6 1.0 03	06.4	7 07.6 1.0 03	06.3	7 37.5 1.0 03	06.3	8 07.5 1.0 03	06.3	8 37.5 1.0 03	06.3	3
4	5 05.6 1.0 03	05.5	5 35.6 1.0 03	05.5	6 05.6 1.0 03	05.5	6 35.6 1.0 03	05.4	7 05.6 1.0 03	05.4	7 35.5 1.0 03	05.4	8 05.5 1.0 03	05.4	8 35.5 1.0 03	05.4	4
175	5 03.9 1.0 02	04.6	5 33.9 1.0 02	04.6	6 03.9 1.0 02	04.6	6 33.9 1.0 02	04.5	7 03.9 1.0 02	04.5	7 33.8 1.0 02	04.5	8 03.8 1.0 02	04.5	8 33.8 1.0 02	04.5	175
6	5 02.5 1.0 02	03.7	5 32.5 1.0 02	03.7	6 02.5 1.0 02	03.6	6 32.5 1.0 02	03.6	7 02.5 1.0 02	03.6	7 32.5 1.0 02	03.6	8 02.5 1.0 02	03.6	8 32.4 1.0 02	03.6	6
7	5 01.4 1.0 01	02.8	5 31.4 1.0 01	02.7	6 01.4 1.0 01	02.7	6 31.4 1.0 01	02.7	7 01.4 1.0 01	02.7	7 31.4 1.0 01	02.7	8 01.4 1.0 01	02.7	8 31.4 1.0 01	02.7	7
8	5 00.6 1.0 01	01.8	5 30.6 1.0 01	01.8	6 00.6 1.0 01	01.8	6 30.6 1.0 01	01.8	7 00.6 1.0 01	01.8	7 30.6 1.0 01	01.8	8 00.6 1.0 01	01.8	8 30.6 1.0 01	01.8	8
9	5 00.2 1.0 00	00.9	5 30.2 1.0 00	00.9	6 00.2 1.0 00	00.9	6 30.2 1.0 00	00.9	7 00.2 1.0 00	00.9	7 30.2 1.0 00	00.9	8 00.2 1.0 00	00.9	8 30.2 1.0 00	00.9	9
180	5 00.0 1.0 00	00.0	5 30.0 1.0 00	00.0	6 00.0 1.0 00	00.0	6 30.0 1.0 00	00.0	7 00.0 1.0 00	00.0	7 30.0 1.0 00	00.0	8 00.0 1.0 00	00.0	8 30.0 1.0 00	00.0	180

Lat. 71°
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H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	47 00.0	1.0 00	180.0	47 30.0	1.0 00	180.0	48 00.0	1.0 00	180.0	49 00.0	1.0 00	180.0	51 00.0	1.0 00	180.0	53 00.0	1.0 00	180.0	53 30.0	1.0 00	180.0	54 30.0	1.0 00	180.0	00
1	46 59.8	1.0 01	178.7	47 29.8	1.0 01	178.7	47 59.8	1.0 01	178.7	48 59.8	1.0 01	178.7	50 59.8	1.0 01	178.7	52 59.8	1.0 01	178.6	53 29.8	1.0 01	178.6	54 29.8	1.0 01	178.6	1
2	46 59.1	1.0 02	177.4	47 29.1	1.0 02	177.4	47 59.1	1.0 02	177.4	48 59.1	1.0 02	177.4	50 59.1	1.0 02	177.3	52 59.1	1.0 02	177.2	53 29.1	1.0 02	177.2	54 29.0	1.0 02	177.2	2
3	46 58.0	1.0 03	176.1	47 28.0	1.0 03	176.1	47 58.0	1.0 03	176.1	48 58.0	1.0 03	176.0	50 57.9	1.0 03	176.0	52 57.9	1.0 03	175.9	53 27.9	1.0 03	175.8	54 27.8	1.0 03	175.8	3
4	46 56.5	1.0 03	174.8	47 26.5	1.0 03	174.8	47 56.4	1.0 03	174.8	48 56.4	1.0 03	174.7	50 56.3	1.0 03	174.6	52 56.2	1.0 04	174.5	53 26.2	1.0 04	174.5	54 26.2	1.0 04	174.4	4
05	46 54.5	1.0 04	173.5	47 24.5	1.0 04	173.5	47 54.4	1.0 04	173.5	48 54.4	1.0 04	173.4	50 54.3	1.0 04	173.3	52 54.1	1.0 04	173.1	53 24.1	1.0 04	173.1	54 24.0	1.0 04	173.0	05
6	46 52.1	1.0 05	172.2	47 22.0	1.0 05	172.2	47 52.0	1.0 05	172.2	48 51.9	1.0 05	172.1	50 51.8	1.0 05	171.9	52 51.6	1.0 05	171.7	53 21.5	1.0 05	171.7	54 21.4	1.0 05	171.6	6
7	46 49.2	1.0 05	171.0	47 19.2	1.0 06	170.9	47 49.1	1.0 06	170.9	48 49.0	1.0 06	170.8	50 48.8	1.0 06	170.6	52 48.5	1.0 06	170.4	53 18.5	1.0 06	170.3	54 18.3	1.0 06	170.2	7
8	46 45.9	1.0 06	169.7	47 15.9	1.0 06	169.6	47 45.8	1.0 06	169.6	48 45.7	1.0 06	169.5	50 45.4	1.0 06	169.2	52 45.0	1.0 07	169.0	53 15.0	1.0 07	168.9	54 14.8	1.0 07	168.8	8
9	46 42.2	1.0 07	168.4	47 12.1	1.0 07	168.3	47 42.0	1.0 07	168.3	48 41.9	1.0 07	168.2	50 41.5	1.0 07	167.9	52 41.1	1.0 07	167.6	53 11.0	1.0 07	167.6	54 10.8	1.0 07	167.4	9
10	46 38.1	1.0 08	167.1	47 08.0	1.0 08	167.0	47 37.9	1.0 08	167.0	48 37.6	1.0 08	166.8	50 37.2	1.0 08	166.6	52 36.7	1.0 08	166.3	53 06.6	1.0 08	166.2	54 06.3	1.0 08	166.0	10
1	46 33.5	1.0 08	165.8	47 03.4	1.0 08	165.8	47 33.2	1.0 08	165.7	48 33.0	1.0 08	165.5	50 32.4	1.0 09	165.2	52 31.8	99 09	164.9	53 01.7	99 09	164.8	54 01.3	99 09	164.7	1
2	46 28.5	1.0 09	164.5	46 58.3	1.0 09	164.5	47 28.2	99 09	164.4	48 27.9	99 09	164.2	50 27.2	99 09	163.9	52 26.5	99 10	163.6	52 56.3	99 10	163.5	53 55.9	99 10	163.3	2
3	46 23.1	99 10	163.3	46 52.9	99 10	163.2	47 22.7	99 10	163.1	48 22.4	99 10	162.9	50 21.6	99 10	162.6	52 20.8	99 10	162.2	52 50.6	99 10	162.1	53 50.1	99 10	161.9	3
4	46 17.2	99 10	162.0	46 47.0	99 10	161.9	47 16.8	99 10	161.8	48 16.4	99 11	161.7	50 15.6	99 11	161.3	52 14.6	99 11	160.9	52 44.3	99 11	160.8	53 43.8	99 11	160.6	4
15	46 11.0	99 11	160.7	46 40.8	99 11	160.6	47 10.5	99 11	160.5	48 10.1	99 11	160.4	50 09.1	99 12	160.0	52 08.0	99 12	159.5	52 37.7	99 12	159.4	53 37.1	99 12	159.2	15
6	46 04.3	99 12	159.5	46 34.1	99 12	159.4	47 03.8	99 12	159.3	48 03.3	99 12	159.1	50 02.2	99 12	158.7	52 00.9	99 12	158.2	52 30.6	99 12	158.1	53 29.9	99 13	157.8	6
7	45 57.3	99 12	158.2	46 27.0	99 12	158.1	46 56.7	99 13	158.0	47 56.1	99 13	157.8	49 54.9	99 13	157.4	51 53.5	99 13	156.9	52 23.1	99 13	156.7	53 22.4	99 13	156.5	7
8	45 49.8	99 13	156.9	46 19.5	99 13	156.8	46 49.2	99 13	156.7	47 48.5	99 13	156.5	49 47.1	99 14	156.1	51 45.6	99 14	155.6	52 15.2	99 14	155.4	53 14.4	99 14	155.1	8
9	45 42.0	99 14	155.7	46 11.6	99 14	155.6	46 41.3	99 14	155.5	47 40.6	99 14	155.2	49 39.0	99 14	154.8	51 37.3	99 14	154.2	52 06.9	98 15	154.1	53 05.9	98 15	153.8	9
20	45 33.8	99 14	154.4	46 03.4	99 14	154.3	46 33.0	99 14	154.2	47 32.2	99 15	154.0	49 30.5	99 15	153.5	51 28.6	98 15	152.9	51 58.1	98 15	152.8	52 57.1	98 15	152.5	20
1	45 25.1	99 15	153.2	45 54.7	99 15	153.1	46 24.3	99 15	153.0	47 23.4	99 15	152.7	49 21.6	98 16	152.2	51 19.5	98 16	151.6	51 49.0	98 16	151.5	52 47.9	98 16	151.1	1
2	45 16.2	98 16	152.0	45 45.7	98 16	151.8	46 15.2	98 16	151.7	47 14.3	98 16	151.5	49 12.2	98 16	150.9	51 10.0	98 16	150.3	51 39.5	98 17	150.2	52 38.3	98 17	149.8	2
3	45 06.8	98 16	150.7	45 36.3	98 16	150.6	46 05.8	98 16	150.5	47 04.8	98 16	150.2	49 02.6	98 17	149.6	51 00.2	98 17	149.0	51 29.6	98 17	148.9	52 28.3	98 17	148.5	3
4	44 57.1	98 17	149.5	45 26.5	98 17	149.4	45 56.0	98 17	149.2	46 54.9	98 17	149.0	48 52.5	98 17	148.4	50 49.9	98 18	147.7	51 19.3	98 18	147.6	52 17.9	98 18	147.2	4
25	44 47.0	98 17	148.3	45 16.4	98 18	148.1	45 45.8	98 18	148.0	46 44.6	98 18	147.7	48 42.1	98 18	147.1	50 39.3	98 18	146.5	51 08.6	98 18	146.3	52 07.1	97 19	145.9	25
6	44 36.5	98 18	147.1	45 05.9	98 18	146.9	45 35.3	98 18	146.8	46 34.0	98 18	146.5	48 31.3	98 19	145.9	50 28.4	97 19	145.2	50 57.6	97 19	145.0	51 56.0	97 19	144.6	6
7	44 25.7	98 19	145.9	44 55.1	98 19	145.7	45 24.4	98 19	145.6	46 23.0	98 19	145.3	48 20.1	97 19	144.6	50 17.0	97 19	143.9	50 46.2	97 20	143.7	51 44.5	97 20	143.4	7
8	44 14.6	98 19	144.6	44 43.9	98 19	144.5	45 13.2	98 19	144.3	46 11.7	98 19	144.0	48 08.7	97 20	143.4	50 05.3	97 20	142.7	50 34.5	97 20	142.5	51 32.7	97 20	142.1	8
9	44 03.1	98 20	143.4	44 32.4	98 20	143.3	45 01.6	97 20	143.1	46 00.1	97 20	142.8	47 56.8	97 20	142.1	49 53.3	97 21	141.4	50 22.4	97 21	141.2	51 20.5	97 21	140.8	9
30	43 51.3	97 20	142.2	44 20.5	97 20	142.1	44 49.8	97 20	141.9	45 48.1	97 20	141.6	47 44.7	97 21	140.9	49 41.0	97 21	140.2	50 10.0	97 21	140.0	51 08.0	97 21	139.6	30
1	43 39.2	97 21	141.1	44 08.4	97 21	140.9	44 37.5	97 21	140.7	45 35.8	97 21	140.4	47 32.2	97 21	139.7	49 28.3	97 22	138.9	49 57.3	97 22	138.7	50 55.2	96 22	138.3	1
2	43 26.8	97 21	139.9	43 55.9	97 21	139.7	44 25.0	97 21	139.5	45 23.2	97 22	139.2	47 19.4	97 22	138.5	49 15.3	96 22	137.7	49 44.2	96 22	137.5	50 42.0	96 22	137.1	2
3	43 14.0	97 22	138.7	43 43.1	97 22	138.5	44 12.2	97 22	138.4	45 10.3	97 22	138.0	47 06.3	97 22	137.3	49 02.0	96 23	136.5	49 30.9	96 23	136.3	50 28.5	96 23	135.8	3
4	43 01.0	97 22	137.5	43 30.0	97 22	137.4	43 59.1	97 22	137.2	44 57.1	97 23	136.8	46 52.9	96 23	136.1	48 48.4	96 23	135.3	49 17.2	96 23	135.0	50 14.8	96 23	134.6	4
35	42 47.7	97 23	136.4	43 16.7	97 23	136.2	43 45.6	97 23	136.0	44 43.6	96 23	135.6	46 39.2	96 23	134.9	48 34.5	96 24	134.1	49 03.3	96 24	133.8	50 00.7	96 24	133.4	35
6	42 34.0	97 23	135.2	43 03.0	97 23	135.0	43 31.9	96 23	134.8	44 29.8	96 23	134.5	46 25.2	96 24	133.7	48 20.3	96 24	132.9	48 49.0	96 24	132.6	49 46.4	96 24	132.2	6
7	42 20.1	96 24	134.0	42 49.0	96 24	133.9	43 17.9	96 24	133.7	44 15.7	96 24	133.3	46 11.0	96 24	132.5	48 05.9	96 25	131.7	48 34.5	96 25	131.4	49 31.8	95 25	131.0	7
8	42 05.9	96 24	132.9	42 34.8	96 24	132.7	43 03.7	96 24	132.5	44 01.3	96 24	132.1	45 56.4	96 25	131.3	47 51.1	95 25	130.5	48 19.8	95 25	130.3	49 16.9	95 25	129.8	8
9	41 51.5	96 24	131.8	42 20.3	96 25	131.6	42 49.2	96 25	131.4	43 46.7	96 25	131.0	45 41.6	96 25	130.2	47 36.2	95 25	129.3	48 04.7	95 25	129.1	49 01.8	95 26	128.6	9
40	41 36.8	96 25	130.6	42 05.6	96 25	130.4	42 34.4	96 25	130.2	43 31.9	96 25	129.8	45 26.6	95 26	129.0	47 20.9	95 26	128.1	47 49.4	95 26	127.9	48 46.4	95 26	127.4	40
1	41 21.8	96 25	129.5	41 50.6	96 25	129.3	42 19.3	96 25	129.1	43 16.7	96 26	128.7	45 11.3	95 26	127.9	47 05.4	95 26	127.0	47 33.9	95 26	126.7	48 30.8	95 26	126.3	1
2	41 06.7	96 26	128.4	41 35.4	96 26	128.2	42 04.1	96 26	128.0	43 01.4	95 26	127.6	44 55.7	95 26	126.7	46 49.7	95 27	125.8	47 18.1	95 27	125.6	48 14.9	94 27	125.1	2
3	40 51.2	96 26	127.2	41 19.9	96 26	127.0	41 48.5	95 26	126.8	42 45.8	95 26	126.4	44 40.0	95 27	125.6	46 33.8	95 27	124.7	47 02.1	95 27	124.4	47 58.8	94 27	124.0	3
4	40 35.6	95 26	126.1	41 04.2	95 27	125.9	41 32.8	95 27	125.7	42 29.9	95 27	125.3	44 24.0	95 27	124.5	46 17.6	94 27	123.5	46 45.9	94 27	123.3	47 42.5	94 28	122.8	4
45	40 19.7	95 27	125.0	40 48.3	95 27	124.8	41 16.8	95 27	124.6	42 13.9	95 27	124.2	44 07.8	95 27	123.3	46 01.2	94 28	122.4	46 29.5	94 28	122.2	47 26.0	94 28	121.7	45
6	40 03.6	95 27	123.9	40 32.1	95 27	123.7	41 00.6	95 27	123.5	41 57.6	95 27	123.1	43 51.3	95 28	122.2	45 44.6	94 28	121.3	46 12.8	94 28	121.0	47 09.2	94 28	120.6	6
7	39 47.2	95 28	122.8	40 15.8	95 28	122.6	40 44.2	95 28	122.4	41 41.2	95 28	122.0	43 34.7	94 28	121.1	45 27.8	94 28	120.2	45 56.0	94 28	119.9	46 52.3	94 28	119.4	7
8	39 30.7	95 28	121.7	39 59.2	95 28	121.5	40 27.7	95 28	121.3	41 24.5	95 28	120.9	43 17.9	94 28	120.0	45 10.8	94 29	119.1	45 39.0	94 29	118.8	46 35.2	94 29	118.3	8
9	39 14.0	95 28	120.6	39 42.5	95 28	120.4	40 10.9	95 28	120.2	41 07.6	95 28	119.8	43 00.9	94 29	118.9	44 53.7	94 29	118.0	45 21.8	94 29	117.7	46 17.9	93 29	117.2	9
50	38 57.1	95 28	119.6	39 25.5	95 29	119.4	39 53.9	95 29	119.2	40 50.6	94 29	118.7	42 43.7	94 29	117.8	44 36.3	94 29	116.9	45 04.4	94 29	116.6	46 00.5	93 29	116.1	50
1	38 40.0	95 29	118.5	39 08.4	95 29	118.3	39 36.8	94 29	118.1	40 33.4	94 29	117.6	42 26.3	94 29	116.7	44 18.8	94 29	115.8	44 46.9	93 30	115.5	45 42.9	93 30	115.0	1
2	38 22.8	94 29	117.4	38 51.1	94 29	117.2	39 19.4	94 29	117.0	40 16.0	94 29	116.6	42 08.8	94 29	115.7	44 01.2	93 30	114.7	44 29.2	93 30	114.5	45 25.1	93 30	113.9	2
3	38 05.4	94 29	116.4	38 33.7	94 29	116.2	39 02.0	94 29	115.9	39 58.4	94 30	115.5	41 51.1	94 30	114.6	43 43.3	93 30	113.6	44 11.3	93 30	113.4	45 07.2	93 30	112.9	3
4	37 47.8	94 30	115.3	38 16.1	94 30	115.1	38 44.3	94 30	114.9	39 40.7	94 30	114.4	41 33.3	94 30	113.5	43 25.4	93 30	112.6	43 53.3	93 30	112.3	44 49.1	93 30	111.8	4
55	37 30.1	94 30	114.3	37 58.3	94 30	114.0	38 26.5	94 30	113.8	39 22.9	94 30	113.4	41 15.3	93 30	112.5	43 07.3	93 30	111.5	43 35.2	93 30	111.3	44 30.9	93 31	110.7	55
6	37 12.2	94 30	113.2	37 40.4	94 30	113.0	38 08.6	94 30	112.8	39 04.9	94 30	112.3	40 57.2	93 30	111.4	42 49.0	93 31	110.4	43 16.9	93 31	110.2	44 12.5	93 31	109.7	6
7	36 54.2	94 30	112.2	37 22.3	94 30	112.0	37 50.5	94 30	111.7	38 46.8	94 30	111.3	40 38.9	93 31	110.4	42 30.7	93 31	109.4	42 58.5	93 31	109.1	43 54.1	93 31	108.6	7
8	36 36.0	94 30	111.1	37 04.2	94 30	110.9	37 32.3	94 31	110.7	38 28.5	94 31	110.3	40 20.6	93 31	109.3	42 12.2	93 31	108.4	42 40.0	93 31	108.1	43 35.5	92 31	107.6	8
9	36 17.7	94 31	110.1	36 45.8	94 31	109.9	37 14.0	94 31	109.7	38 10.1	93 31	109.2	40 02.1	93 31	108.3	41 53.6	93 31	107.3	42 21.4	93 31	107.1	43 16.9	92 31	106.6	9
60	35 59.3	94 31	109.1	36 27.4	94 31	108.9	36 55.5	94 31	108.6	37 51.6	93 31	108.2	39 43.5	93 31	107.3	41 34.9	93 31	106.3	42 02.6	93 31	106.0	42 58.1	92 31	105.5	60
1	35 40.8	94 31	108.1	36 08.9	94 31	107.8	36 36.9	93 31	107.6	37 33.0	93 31	107.2	39 24.8	93 31	106.3	41 16.1	93 32	105.3	41 43.8	92 32	105.0	42 39.2	92 32	104.5	1
2	35 22.2	94 31	107.1	35 50.2	94 31	106.8	36 18.3	93 31	106.6	37 14.3	93 31	106.2	39 06.0	93 31	105.2	40 57.2	92 32	104.3	41 24.9	92 32	104.0	42 20.3	92 32	103.5	2
3	35 03.4	94 31	106.0	35 31.5	93 31	105.8	35 59.5	93 31	105.6	36 55.5	93 32	105.2	38 47.1	93 32	104.2	40 38.2	92 32	103.2	41 05.9	92 32	103.0	42 01.2	92 32	102.5	3
4	34 44.6	93 32	105.0	35 12.7	93 32	104.8	35 40.6	93 32	104.6	36 36.6	93 32	104.1	38 28.1	93 32	103.2	40 19.2	92 32	102.2	40 46.8	92 32	102.0	41 42.1	92 32	101.5	4
65	34 25.7	93 32	104.0	34 53.7	93 32	103.8	35 21.7	93 32	103.6	36 17.6	93 32	103.1	38 09.0	93 32	102.2	40 00.0	92 32	101.2	40 27.7	92 32	101.0	41 22.9	92 32	100.5	65
6	34 06.7	93 32	103.0	34 34.7	93 32	102.8	35 02.7	93 32	102.6	35 58.5	93 32	102.1	37 49.9	93 32	101.2	39 40.8	92 32	100.2	40 08.5	92 32	100.0	41 03.7	92 32	99.5	6
7	33 47.7	93 32	102.0	34 15.6	93 32	101.8	34 43.6	93 32	101.6	35 39.4	93 32	101.2	37 30.7	93 32	100.2	39 21.6	92 32	99.2	39 49.2	92 32	99.0	40 44.4	92 32	98.5	7
8	33 28.5	93 32	101.1	33 56.5	93 32	100.8	34 24.4	93 32	100.6	35 20.2	93 32	100.2	37 11.5	93 32	99.2	39 02.3	92 32	98.3	39 29.9	92 32	98.0	40 25.1	92 32	97.5	8
9	33 09.3	93 32	100.1	33 37.3	93 32	99.8	34 05.2	93 32	99.6	35 00.9	93 32	99.2	36 52.2	93 32	98.3	38 42.9	92 32	97.3	39 10.5	92 32	97.0	40 05.7	92 32	96.5	9
70	32 50.1	93 32	99.1	33 18.0	93 32	98.9	33 45.9	93 32	98.6	34 41.6	93 32	98.2	36 32.8	92 32	97.3	38 23.5	92 32	96.3	38 51.1	92 32	96.1	39 46.2	92 32	95.5	70
1	32 30.7	93 32	98.1	32 58.7	93 32	97.9	33 26.6	93 32	97.7	34 22.3	93 32	97.2	36 13.4	92 32	96.3	38 04.1	92 32	95.3	38 31.7	92 32	95.1	39 26.8	92 32	94.6	1
2	32 11.4	93 32	97.1	32 39.3	93 32	96.9	33 07.2	93 32	96.7	34 02.9	93 32	96.3	35 54.0	92 32	95.3	37 44.6	92 32	94.4	38 12.2	92 32	94.1	39 07.3	92 32	93.6	2
3	31 52.0	93 32	96.2	32 19.9	93 32	95.9	32 47.8	93 32	95.7	33 43.4	93 32	95.3	35 34.5	92 32	94.4	37 25.1	92 33	93.4	37 52.7	92 33	93.2	38 47.8	92 33	92.6	3
4	31 32.5	93 32	95.2	32 00.4	93 32	95.0	32 28.3	93 32	94.8	33 24.0	93 32	94.3	35 15.0	92 32	93.4	37 05.6	92 33	92.4	37 33.2	92 33	92.2	38 28.3	92 33	91.7	4
75	31 13.1	93 32	94.2	31 41.0	93 32	94.0	32 08.8	93 32	93.8	33 04.5	93 32	93.4	34 55.5	92 33	92.4	36 46.1	92 33	91.5	37 13.7	92 33	91.2	38 08.8	92 33	90.7	75
6	30 53.6	93 33	93.3	31 21.5	93 33	93.1	31 49.3	93 33	92.8	32 45.0	93 33	92.4	34 36.0	92 33	91.5	36 26.6	92 33	90.5	36 54.2	92 33	90.3	37 49.2	92 33	89.8	6
7	30 34.1	93 33	92.3	31 02.0	93 33	92.1	31 29.8	93 33	91.9	32 25.5	93 33	91.5	34 16.5	92 33	90.5	36 07.1	92 33	89.6	36 34.6	92 33	89.3	37 29.7	92 33	88.9	7
8	30 14.5	93 33	91.4	30 42.4	93 33	91.2	31 10.3	93 33	90.9	32 05.9	93 33	90.5	33 56.9	92 33	89.6	35 47.5	92 33	88.7	36 15.1	92 33	88.4	37 10.2	92 33	87.9	8
9	29 55.0	93 33	90.4	30 22.9	93 33	90.2	30 50.7	93 33	90.0	31 46.4	93 33	89.6	33 37.4	92 33	88.7	35 28.0	92 33	87.7	35 55.6	92 32	87.5	36 50.6	92 32	87.0	9
80	29 35.5	93 33	89.5	30 03.4	93 33	89.3	30 31.2	93 33	89.1	31 26.9	93 33	88.6	33 17.9	92 32	87.7	35 08.5	92 32	86.8	35 36.1	92 32	86.5	36 31.1	92 32	86.0	80
1	29 16.0	93 33	88.5	29 43.8	93 33	88.3	30 11 7	93 33	88.1	31 07.3	93 32	87.7	32 58.4	92 32	86.8	34 49.0	92 32	85.8	35 16.6	92 32	85.6	36 11.7	92 32	85.1	1
2	28 56.4	93 33	87.6	29 24.3	93 33	87.4	29 52.2	93 32	87.2	30 47.8	93 32	86.7	32 38.9	92 32	85.9	34 29.5	92 32	84.9	34 57.1	92 32	84.7	35 52.2	92 32	84.2	2
3	28 36.9	93 32	86.7	29 04.8	93 32	86.5	29 32.7	93 32	86.2	30 28.3	93 32	85.8	32 19.4	92 32	84.9	34 10.1	92 32	84.0	34 37.7	92 32	83.8	35 32.8	92 32	83.3	3
4	28 17.4	93 32	85.7	28 45.3	93 32	85.5	29 13.2	93 32	85.3	30 08.9	93 32	84.9	32 00.0	92 32	84.0	33 50.7	92 32	83.1	34 18.3	92 32	82.8	35 13.4	92 32	82.4	4
85	27 58.0	93 32	84.8	28 25.9	93 32	84.6	28 53.7	93 32	84.4	29 49.4	93 32	84.0	31 40.5	92 32	83.1	33 31.3	92 32	82.2	33 58.9	92 32	81.9	34 54.1	92 32	81.4	85
6	27 38.5	93 32	83.9	28 06.4	93 32	83.7	28 34.3	93 32	83.5	29 30.0	93 32	83.0	31 21.2	92 32	82.2	33 12.0	92 32	81.2	33 39.6	92 32	81.0	34 34.8	92 32	80.5	6
7	27 19.1	93 32	82.9	27 47.0	93 32	82.7	28 14.9	93 32	82.5	29 10.6	93 32	82.1	31 01.8	93 32	81.2	32 52.7	92 32	80.3	33 20.3	92 32	80.1	34 15.5	92 32	79.6	7
8	26 59.8	93 32	82.0	27 27.7	93 32	81.8	27 55.6	93 32	81.6	28 51.3	93 32	81.2	30 42.6	93 32	80.3	32 33.5	92 32	79.4	33 01.1	92 32	79.2	33 56.4	92 32	78.7	8
9	26 40.4	93 32	81.1	27 08.4	93 32	80.9	27 36.3	93 32	80.7	28 32.0	93 32	80.3	30 23.3	93 32	79.4	32 14.3	92 32	78.5	32 42.0	92 32	78.3	33 37.2	92 32	77.8	9
90	26 21.2	93 32	80.2	26 49.1	93 32	80.0	27 17.0	93 32	79.8	28 12.8	93 32	79.4	30 04.2	93 32	78.5	31 55.2	92 32	77.6	32 22.9	92 32	77.4	33 18.2	92 32	76.9	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	26 01.9	93 32	79.3	26 29.9	93 32	79.1	26 57.8	93 32	78.9	27 53.6	93 32	78.4	29 45.1	93 32	77.6	31 36.1	92 32	76.7	32 03.8	92 32	76.5	32 59.2	92 32	76.0	91
2	25 42.8	93 32	78.3	26 10.7	93 32	78.1	26 38.7	93 32	77.9	27 34.5	93 32	77.5	29 26.0	93 32	76.7	31 17.1	92 32	75.8	31 44.9	92 31	75.6	32 40.3	92 31	75.1	2
3	25 23.7	93 32	77.4	25 51.7	93 32	77.2	26 19.6	93 32	77.0	27 15.5	93 32	76.6	29 07.0	93 32	75.8	30 58.2	93 31	74.9	31 26.0	92 31	74.7	32 21.4	92 31	74.2	3
4	25 04.6	93 32	76.5	25 32.6	93 32	76.3	26 00.6	93 32	76.1	26 56.5	93 32	75.7	28 48.1	93 31	74.9	30 39.4	93 31	74.0	31 07.2	93 31	73.8	32 02.7	92 31	73.4	4
95	24 45.7	93 31	75.6	25 13.7	93 31	75.4	25 41.7	93 31	75.2	26 37.6	93 31	74.8	28 29.3	93 31	74.0	30 20.7	93 31	73.1	30 48.5	93 31	72.9	31 44.0	92 31	72.5	95
6	24 26.8	93 31	74.7	24 54.8	93 31	74.5	25 22.8	93 31	74.3	26 18.8	93 31	73.9	28 10.6	93 31	73.1	30 02.0	93 31	72.2	30 29.9	93 31	72.0	31 25.4	93 31	71.6	6
7	24 08.0	94 31	73.8	24 36.0	93 31	73.6	25 04.1	93 31	73.4	26 00.1	93 31	73.0	27 51.9	93 31	72.2	29 43.5	93 31	71.4	30 11.3	93 31	71.1	31 06.9	93 31	70.7	7
8	23 49.3	94 31	72.9	24 17.4	94 31	72.7	24 45.4	93 31	72.5	25 41.5	93 31	72.1	27 33.4	93 31	71.3	29 25.0	93 31	70.5	29 52.9	93 31	70.3	30 48.5	93 30	69.8	8
9	23 30.7	94 31	72.0	23 58.7	94 31	71.8	24 26.8	94 31	71.6	25 22.9	93 31	71.2	27 14.9	93 31	70.4	29 06.7	93 30	69.6	29 34.5	93 30	69.4	30 30.3	93 30	68.9	9
100	23 12.1	94 31	71.1	23 40.2	94 31	70.9	24 08.3	94 31	70.7	25 04.5	94 31	70.3	26 56.6	93 30	69.5	28 48.4	93 30	68.7	29 16.3	93 30	68.5	30 12.1	93 30	68.1	100
1	22 53.7	94 31	70.2	23 21.8	94 30	70.0	23 49.9	94 30	69.8	24 46.1	94 30	69.4	26 38.3	93 30	68.6	28 30.3	93 30	67.8	28 58.2	93 30	67.6	29 54.0	93 30	67.2	1
2	22 35.4	94 30	69.3	23 03.5	94 30	69.1	23 31.7	94 30	68.9	24 27.9	94 30	68.5	26 20.2	93 30	67.8	28 12.2	93 30	67.0	28 40.2	93 30	66.7	29 36.1	93 30	66.3	2
3	22 17.2	94 30	68.4	22 45.3	94 30	68.2	23 13.5	94 30	68.0	24 09.8	94 30	67.6	26 02.2	94 30	66.9	27 54.3	93 30	66.1	28 22.3	93 30	65.9	29 18.2	93 30	65.5	3
4	21 59.1	94 30	67.5	22 27.3	94 30	67.3	22 55.4	94 30	67.1	23 51.8	94 30	66.8	25 44.3	94 30	66.0	27 36.5	93 29	65.2	28 04.5	93 29	65.0	29 00.5	93 29	64.6	4
105	21 41.1	94 30	66.6	22 09.3	94 30	66.4	22 37.5	94 30	66.2	23 33.9	94 30	65.9	25 26.5	94 29	65.1	27 18.9	94 29	64.3	27 46.9	93 29	64.1	28 42.9	93 29	63.7	105
6	21 23.2	94 30	65.7	21 51.4	94 30	65.5	22 19.7	94 29	65.4	23 16.1	94 29	65.0	25 08.8	94 29	64.2	27 01.3	94 29	63.5	27 29.4	94 29	63.3	28 25.5	93 29	62.9	6
7	21 05.5	94 29	64.8	21 33.7	94 29	64.6	22 02.0	94 29	64.5	22 58.5	94 29	64.1	24 51.3	94 29	63.4	26 43.9	94 29	62.6	27 12.0	94 29	62.4	28 08.2	94 29	62.0	7
8	20 47.8	94 29	63.9	21 16.1	94 29	63.8	21 44.4	94 29	63.6	22 41.0	94 29	63.2	24 33.9	94 29	62.5	26 26.6	94 29	61.7	26 54.8	94 28	61.5	27 51.0	94 28	61.1	8
9	20 30.4	94 29	63.0	20 58.7	94 29	62.9	21 27.0	94 29	62.7	22 23.6	94 29	62.3	24 16.7	94 29	61.6	26 09.5	94 28	60.8	26 37.7	94 28	60.7	27 34.0	94 28	60.3	9
110	20 13.0	95 29	62.2	20 41.4	95 29	62.0	21 09.7	94 29	61.8	22 06.4	94 28	61.4	23 59.6	94 28	60.7	25 52.5	94 28	60.0	26 20.7	94 28	59.8	27 17.1	94 28	59.4	110
1	19 55.8	95 28	61.3	20 24.2	95 28	61.1	20 52.6	95 28	60.9	21 49.3	94 28	60.6	23 42.6	94 28	59.8	25 35.7	94 28	59.1	26 03.9	94 28	58.9	27 00.3	94 28	58.5	1
2	19 38.8	95 28	60.4	20 07.2	95 28	60.2	20 35.6	95 28	60.0	21 32.4	95 28	59.7	23 25.8	94 28	59.0	25 19.0	94 28	58.2	25 47.3	94 28	58.1	26 43.8	94 27	57.7	2
3	19 21.9	95 28	59.5	19 50.3	95 28	59.3	20 18.7	95 28	59.1	21 15.6	95 28	58.8	23 09.1	95 28	58.1	25 02.5	94 27	57.4	25 30.8	94 27	57.2	26 27.3	94 27	56.8	3
4	19 05.1	95 28	58.6	19 33.6	95 28	58.4	20 02.0	95 28	58.3	20 58.9	95 27	57.9	22 52.6	95 27	57.2	24 46.1	94 27	56.5	25 14.4	94 27	56.3	26 11.1	94 27	56.0	4
115	18 48.5	95 27	57.7	19 17.0	95 27	57.5	19 45.5	95 27	57.4	20 42.5	95 27	57.0	22 36.3	95 27	56.4	24 29.9	95 27	55.7	24 58.2	95 27	55.5	25 54.9	94 27	55.1	115
6	18 32.1	95 27	56.8	19 00.6	95 27	56.7	19 29.1	95 27	56.5	20 26.2	95 27	56.2	22 20.1	95 27	55.5	24 13.8	95 26	54.8	24 42.2	95 26	54.6	25 39.0	95 26	54.3	6
7	18 15.8	95 27	55.9	18 44.4	95 27	55.8	19 12.9	95 26	55.6	20 10.0	95 27	55.3	22 04.1	95 26	54.6	23 57.9	95 26	53.9	24 26.4	95 26	53.8	25 23.2	95 26	53.4	7
8	17 59.7	95 27	55.1	18 28.3	95 26	54.9	18 56.9	95 26	54.7	19 54.0	95 26	54.4	21 48.2	95 26	53.8	23 42.2	95 26	53.1	24 10.7	95 26	52.9	25 07.6	95 26	52.6	8
9	17 43.8	95 26	54.2	18 12.4	95 26	54.0	18 41.0	95 26	53.9	19 38.2	95 26	53.5	21 32.6	95 26	52.9	23 26.7	95 26	52.2	23 55.2	95 26	52.0	24 52.2	95 25	51.7	9
120	17 28.0	96 26	53.3	17 56.7	96 26	53.1	18 25.4	95 26	53.0	19 22.6	95 26	52.7	21 17.1	95 26	52.0	23 11.4	95 25	51.4	23 39.9	95 25	51.2	24 37.0	95 25	50.9	120
1	17 12.5	96 26	52.4	17 41.2	96 26	52.2	18 09.8	96 26	52.1	19 07.2	96 25	51.8	21 01.8	95 25	51.2	22 56.2	95 25	50.5	23 24.8	95 25	50.3	24 21.9	95 25	50.0	1
2	16 57.1	96 25	51.5	17 25.8	96 25	51.4	17 54.5	96 25	51.2	18 51.9	96 25	50.9	20 46.6	96 25	50.3	22 41.2	95 25	49.6	23 09.8	95 25	49.5	24 07.1	95 24	49.2	2
3	16 41.9	96 25	50.6	17 10.7	96 25	50.5	17 39.4	96 25	50.3	18 36.9	96 25	50.0	20 31.7	96 25	49.4	22 26.4	96 24	48.8	22 55.1	96 24	48.6	23 52.4	95 24	48.3	3
4	16 26.9	96 25	49.7	16 55.7	96 25	49.6	17 24.5	96 25	49.5	18 22.0	96 24	49.2	20 17.0	96 24	48.6	22 11.8	96 24	47.9	22 40.5	96 24	47.8	23 37.9	96 24	47.5	4
125	16 12.1	96 24	48.9	16 40.9	96 24	48.7	17 09.7	96 24	48.6	18 07.3	96 24	48.3	20 02.4	96 24	47.7	21 57.4	96 24	47.1	22 26.2	96 24	46.9	23 23.6	96 24	46.6	125
6	15 57.5	96 24	48.0	16 26.3	96 24	47.8	16 55.2	96 24	47.7	17 52.8	96 24	47.4	19 48.1	96 24	46.8	21 43.2	96 23	46.2	22 12.0	96 23	46.1	23 09.5	96 23	45.8	6
7	15 43.1	96 24	47.1	16 11.9	96 24	47.0	16 40.8	96 24	46.8	17 38.6	96 23	46.5	19 33.9	96 23	46.0	21 29.2	96 23	45.4	21 58.0	96 23	45.2	22 55.6	96 23	44.9	7
8	15 28.9	96 23	46.2	15 57.8	96 23	46.1	16 26.7	96 23	45.9	17 24.5	96 23	45.7	19 20.0	96 23	45.1	21 15.4	96 23	44.5	21 44.3	96 23	44.4	22 41.9	96 22	44.1	8
9	15 14.9	97 23	45.3	15 43.8	96 23	45.2	16 12.7	96 23	45.1	17 10.6	96 23	44.8	19 06.3	96 23	44.2	21 01.8	96 22	43.7	21 30.7	96 22	43.5	22 28.4	96 22	43.2	9
130	15 01.1	97 23	44.5	15 30.0	97 23	44.3	15 59.0	97 22	44.2	16 57.0	97 22	43.9	18 52.8	96 22	43.4	20 48.5	96 22	42.8	21 17.4	96 22	42.7	22 15.2	96 22	42.4	130
1	14 47.5	97 22	43.6	15 16.5	97 22	43.4	15 45.5	97 22	43.3	16 43.5	97 22	43.0	18 39.5	96 22	42.5	20 35.3	96 22	41.9	21 04.2	96 22	41.8	22 02.1	96 21	41.5	1
2	14 34.1	97 22	42.7	15 03.2	97 22	42.6	15 32.2	97 22	42.4	16 30.3	97 22	42.2	18 26.4	97 21	41.6	20 22.4	97 21	41.1	20 51.3	97 21	40.9	21 49.3	97 21	40.7	2
3	14 21.0	97 22	41.8	14 50.1	97 21	41.7	15 19.2	97 21	41.5	16 17.3	97 21	41.3	18 13.5	97 21	40.8	20 09.6	97 21	40.2	20 38.6	97 21	40.1	21 36.7	97 21	39.8	3
4	14 08.1	97 21	40.9	14 37.2	97 21	40.8	15 06.3	97 21	40.7	16 04.5	97 21	40.4	18 00.9	97 21	39.9	19 57.1	97 20	39.4	20 26.2	97 20	39.2	21 24.3	97 20	39.0	4
135	13 55.4	97 21	40.0	14 24.6	97 21	39.9	14 53.7	97 21	39.8	15 52.0	97 21	39.5	17 48.4	97 20	39.0	19 44.8	97 20	38.5	20 13.9	97 20	38.4	21 12.1	97 20	38.1	135
6	13 43.0	97 20	39.2	14 12.1	97 20	39.0	14 41.3	97 20	38.9	15 39.6	97 20	38.7	17 36.3	97 20	38.2	19 32.8	97 20	37.7	20 01.9	97 20	37.5	21 00.1	97 20	37.3	6
7	13 30.8	97 20	38.3	14 00.0	97 20	38.1	14 29.2	97 20	38.0	15 27.6	97 20	37.8	17 24.3	97 20	37.3	19 21.0	97 20	36.8	19 50.1	97 19	36.7	20 48.4	97 19	36.4	7
8	13 18.8	97 20	37.4	13 48.0	97 20	37.3	14 17.2	97 19	37.2	15 15.7	97 19	36.9	17 12.6	97 19	36.4	19 09.4	97 19	36.0	19 38.6	97 19	35.8	20 36.9	97 19	35.6	8
9	13 07.0	98 19	36.5	13 36.3	98 19	36.4	14 05.6	98 19	36.3	15 04.1	98 19	36.0	17 01.1	97 19	35.6	18 58.0	97 19	35.1	19 27.2	97 18	35.0	20 25.7	97 18	34.7	9
140	12 55.5	98 19	35.6	13 24.8	98 19	35.5	13 54.1	98 19	35.4	14 52.7	98 19	35.2	16 49.8	98 18	34.7	18 46.9	98 18	34.3	19 16.2	98 18	34.1	20 14.7	97 18	33.9	140
1	12 44.3	98 18	34.7	13 13.6	98 18	34.6	13 42.9	98 18	34.5	14 41.6	98 18	34.3	16 38.8	98 18	33.9	18 36.0	98 18	33.4	19 05.3	98 18	33.3	20 03.9	98 18	33.1	1
2	12 33.3	98 18	33.8	13 02.6	98 18	33.7	13 32.0	98 18	33.6	14 30.7	98 18	33.4	16 28.1	98 18	33.0	18 25.4	98 17	32.5	18 54.7	98 17	32.4	19 53.4	98 17	32.2	2
3	12 22.5	98 18	33.0	12 51.9	98 17	32.9	13 21.3	98 17	32.8	14 20.1	98 17	32.5	16 17.6	98 17	32.1	18 15.0	98 17	31.7	18 44.4	98 17	31.6	19 43.1	98 17	31.4	3
4	12 12.0	98 17	32.1	12 41.5	98 17	32.0	13 10.9	98 17	31.9	14 09.7	98 17	31.7	16 07.3	98 17	31.3	18 04.9	98 16	30.8	18 34.3	98 16	30.7	19 33.0	98 16	30.5	4
145	12 01.8	98 17	31.2	12 31.2	98 17	31.1	13 00.7	98 17	31.0	13 59.6	98 16	30.8	15 57.3	98 16	30.4	17 55.0	98 16	30.0	18 24.4	98 16	29.9	19 23.2	98 16	29.7	145
6	11 51.8	98 16	30.3	12 21.3	98 16	30.2	12 50.8	98 16	30.1	13 49.7	98 16	29.9	15 47.5	98 16	29.5	17 45.4	98 16	29.1	18 14.8	98 16	29.0	19 13.7	98 16	28.8	6
7	11 42.1	98 16	29.4	12 11.6	98 16	29.3	12 41.1	98 16	29.2	13 40.1	98 16	29.0	15 38.0	98 15	28.7	17 36.0	98 15	28.3	18 05.5	98 15	28.2	19 04.4	98 15	28.0	7
8	11 32.6	98 15	28.5	12 02.1	98 15	28.4	12 31.7	98 15	28.3	13 30.7	98 15	28.2	15 28.8	98 15	27.8	17 26.9	98 15	27.4	17 56.4	98 15	27.3	18 55.4	98 15	27.1	8
9	11 23.4	99 15	27.6	11 53.0	99 15	27.6	12 22.5	99 15	27.5	13 21.6	99 15	27.3	15 19.8	98 15	26.9	17 18.0	98 14	26.6	17 47.5	98 14	26.5	18 46.6	98 14	26.3	9
150	11 14.5	99 14	26.8	11 44.1	99 14	26.7	12 13.7	99 14	26.6	13 12.8	99 14	26.4	15 11.1	99 14	26.1	17 09.4	99 14	25.7	17 38.9	99 14	25.6	18 38.1	99 14	25.4	150
1	11 05.8	99 14	25.9	11 35.4	99 14	25.8	12 05.1	99 14	25.7	13 04.3	99 14	25.5	15 02.7	99 14	25.2	17 01.0	99 13	24.9	17 30.6	99 13	24.8	18 29.8	99 13	24.6	1
2	10 57.5	99 14	25.0	11 27.1	99 13	24.9	11 56.7	99 13	24.8	12 56.0	99 13	24.7	14 54.5	99 13	24.3	16 53.0	99 13	24.0	17 22.6	99 13	23.9	18 21.8	99 13	23.7	2
3	10 49.3	99 13	24.1	11 19.0	99 13	24.0	11 48.7	99 13	23.9	12 48.0	99 13	23.8	14 46.6	99 13	23.5	16 45.1	99 13	23.1	17 14.8	99 13	23.1	18 14.1	99 12	22.9	3
4	10 41.5	99 13	23.2	11 11.2	99 13	23.1	11 40.9	99 12	23.0	12 40.2	99 12	22.9	14 38.9	99 12	22.6	16 37.6	99 12	22.3	17 07.3	99 12	22.2	18 06.6	99 12	22.1	4
155	10 34.0	99 12	22.3	11 03.7	99 12	22.2	11 33.4	99 12	22.2	12 32.8	99 12	22.0	14 31.6	99 12	21.7	16 30.3	99 12	21.4	17 00.0	99 12	21.4	17 59.4	99 12	21.2	155
6	10 26.7	99 12	21.4	10 56.4	99 12	21.4	11 26.1	99 12	21.3	12 25.6	99 12	21.1	14 24.5	99 11	20.9	16 23.3	99 11	20.6	16 53.0	99 11	20.5	17 52.5	99 11	20.4	6
7	10 19.7	99 11	20.5	10 49.4	99 11	20.5	11 19.2	99 11	20.4	12 18.7	99 11	20.3	14 17.6	99 11	20.0	16 16.6	99 11	19.7	16 46.3	99 11	19.7	17 45.8	99 11	19.5	7
8	10 13.0	99 11	19.6	10 42.8	99 11	19.6	11 12.5	99 11	19.5	12 12.1	99 11	19.4	14 11.1	99 10	19.1	16 10.1	99 10	18.9	16 39.9	99 10	18.8	17 39.4	99 10	18.7	8
9	10 06.6	99 10	18.7	10 36.3	99 11	18.7	11 06.1	99 10	18.6	12 05.7	99 10	18.5	14 04.8	99 10	18.3	16 04.0	99 10	18.0	16 33.7	99 10	17.9	17 33.3	99 10	17.8	9
160	10 00.4	99 10	17.9	10 30.2	99 10	17.8	11 00.0	99 10	17.7	11 59.7	99 10	17.6	13 58.9	99 10	17.4	15 58.1	99 09	17.2	16 27.9	99 09	17.1	17 27.5	99 09	17.0	160
1	9 54.6	99 09	17.0	10 24.4	99 09	16.9	10 54.2	99 09	16.9	11 53.9	99 09	16.7	13 53.2	99 09	16.5	15 52.4	99 09	16.3	16 22.3	99 09	16.2	17 21.9	99 09	16.1	1
2	9 49.0	99 09	16.1	10 18.9	99 09	16.0	10 48.7	99 09	16.0	11 48.4	99 09	15.9	13 47.8	99 09	15.7	15 47.1	99 08	15.4	16 16.9	99 08	15.4	17 16.6	99 08	15.3	2
3	9 43.8	1.0 08	15.2	10 13.6	1.0 08	15.1	10 43.5	1.0 08	15.1	11 43.2	1.0 08	15.0	13 42.6	1.0 08	14.8	15 42.0	1.0 08	14.6	16 11.9	1.0 08	14.5	17 11.6	1.0 08	14.4	3
4	9 38.8	1.0 08	14.3	10 08.7	1.0 08	14.2	10 38.5	1.0 08	14.2	11 38.3	1.0 08	14.1	13 37.8	1.0 08	13.9	15 37.3	1.0 08	13.7	16 07.1	1.0 07	13.7	17 06.9	1.0 07	13.6	4
165	9 34.1	1.0 07	13.4	10 04.0	1.0 07	13.4	10 33.9	1.0 07	13.3	11 33.7	1.0 07	13.2	13 33.2	1.0 07	13.0	15 32.8	1.0 07	12.9	16 02.7	1.0 07	12.8	17 02.4	1.0 07	12.7	165
6	9 29.7	1.0 07	12.5	9 59.6	1.0 07	12.5	10 29.5	1.0 07	12.4	11 29.4	1.0 07	12.3	13 29.0	1.0 07	12.2	15 28.6	1.0 07	12.0	15 58.5	1.0 07	12.0	16 58.3	1.0 06	11.9	6
7	9 25.7	1.0 06	11.6	9 55.6	1.0 06	11.6	10 25.5	1.0 06	11.5	11 25.3	1.0 06	11.5	13 25.0	1.0 06	11.3	15 24.6	1.0 06	11.2	15 54.6	1.0 06	11.1	16 54.4	1.0 06	11.0	7
8	9 21.9	1.0 06	10.7	9 51.8	1.0 06	10.7	10 21.7	1.0 06	10.7	11 21.6	1.0 06	10.6	13 21.3	1.0 06	10.4	15 21.0	1.0 06	10.3	15 50.9	1.0 06	10.3	16 50.8	1.0 06	10.2	8
9	9 18.4	1.0 05	09.8	9 48.3	1.0 05	09.8	10 18.3	1.0 05	09.8	11 18.2	1.0 05	09.7	13 17.9	1.0 05	09.6	15 17.7	1.0 05	09.4	15 47.6	1.0 05	09.4	16 47.5	1.0 05	09.3	9
170	9 15.2	1.0 05	08.9	9 45.2	1.0 05	08.9	10 15.1	1.0 05	08.9	11 15.0	1.0 05	08.8	13 14.8	1.0 05	08.7	15 14.6	1.0 05	08.6	15 44.6	1.0 05	08.6	16 44.4	1.0 05	08.5	170
1	9 12.3	1.0 04	08.0	9 42.3	1.0 04	08.0	10 12.2	1.0 04	08.0	11 12.2	1.0 04	07.9	13 12.0	1.0 04	07.8	15 11.8	1.0 04	07.7	15 41.8	1.0 04	07.7	16 41.7	1.0 04	07.6	1
2	9 09.7	1.0 04	07.2	9 39.7	1.0 04	07.1	10 09.7	1.0 04	07.1	11 09.6	1.0 04	07.1	13 09.5	1.0 04	07.0	15 09.4	1.0 04	06.9	15 39.3	1.0 04	06.8	16 39.3	1.0 04	06.8	2
3	9 07.5	1.0 03	06.3	9 37.4	1.0 03	06.2	10 07.4	1.0 03	06.2	11 07.4	1.0 03	06.2	13 07.3	1.0 03	06.1	15 07.2	1.0 03	06.0	15 37.1	1.0 03	06.0	16 37.1	1.0 03	05.9	3
4	9 05.5	1.0 03	05.4	9 35.5	1.0 03	05.3	10 05.4	1.0 03	05.3	11 05.4	1.0 03	05.3	13 05.3	1.0 03	05.2	15 05.3	1.0 03	05.1	15 35.2	1.0 03	05.1	16 35.2	1.0 03	05.1	4
175	9 03.8	1.0 02	04.5	9 33.8	1.0 02	04.5	10 03.8	1.0 02	04.4	11 03.8	1.0 02	04.4	13 03.7	1.0 02	04.4	15 03.7	1.0 02	04.3	15 33.6	1.0 02	04.3	16 33.6	1.0 02	04.2	175
6	9 02.4	1.0 02	03.6	9 32.4	1.0 02	03.6	10 02.4	1.0 02	03.6	11 02.4	1.0 02	03.5	13 02.4	1.0 02	03.5	15 02.3	1.0 02	03.4	15 32.3	1.0 02	03.4	16 32.3	1.0 02	03.4	6
7	9 01.4	1.0 01	02.7	9 31.4	1.0 01	02.7	10 01.4	1.0 01	02.7	11 01.4	1.0 01	02.6	13 01.3	1.0 01	02.6	15 01.3	1.0 01	02.6	15 31.3	1.0 01	02.6	16 31.3	1.0 01	02.5	7
8	9 00.6	1.0 01	01.8	9 30.6	1.0 01	01.8	10 00.6	1.0 01	01.8	11 00.6	1.0 01	01.8	13 00.6	1.0 01	01.7	15 00.6	1.0 01	01.7	15 30.6	1.0 01	01.7	16 30.6	1.0 01	01.7	8
9	9 00.2	1.0 00	00.9	9 30.2	1.0 00	00.9	10 00.2	1.0 00	00.9	11 00.2	1.0 00	00.9	13 00.1	1.0 00	00.9	15 00.1	1.0 00	00.9	15 30.1	1.0 00	00.9	16 30.1	1.0 00	00.8	9
180	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	11 00.0	1.0 00	00.0	13 00.0	1.0 00	00.0	15 00.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 30.0	1.0 00	00.0	180

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	55 00.0	1.0 00	180.0	56 00.0	1.0 00	180.0	57 30.0	1.0 00	180.0	59 00.0	1.0 00	180.0	61 00.0	1.0 00	180.0	61 30.0	1.0 00	180.0	62 00.0	1.0 00	180.0	64 00.0	1.0 00	180.0	00
1	54 59.8	1.0 01	178.6	55 59.8	1.0 01	178.6	57 29.8	1.0 01	178.5	58 59.7	1.0 01	178.5	60 59.7	1.0 01	178.5	61 29.7	1.0 01	178.5	61 59.7	1.0 01	178.4	63 59.7	1.0 01	178.4	1
2	54 59.0	1.0 02	177.2	55 59.0	1.0 02	177.1	57 29.0	1.0 02	177.1	58 59.0	1.0 02	177.0	60 59.0	1.0 02	176.9	61 28.9	1.0 02	176.9	61 58.9	1.0 02	176.9	63 58.9	1.0 02	176.8	2
3	54 57.8	1.0 03	175.8	55 57.8	1.0 03	175.7	57 27.8	1.0 03	175.6	58 57.7	1.0 03	175.5	60 57.6	1.0 03	175.4	61 27.6	1.0 03	175.4	61 57.6	1.0 03	175.3	63 57.5	1.0 03	175.2	3
4	54 56.2	1.0 04	174.4	55 56.1	1.0 04	174.3	57 26.0	1.0 04	174.2	58 55.9	1.0 04	174.1	60 55.8	1.0 04	173.9	61 25.8	1.0 04	173.8	61 55.8	1.0 04	173.8	63 55.6	1.0 04	173.6	4
05	54 54.0	1.0 04	173.0	55 53.9	1.0 04	172.9	57 23.8	1.0 05	172.7	58 53.7	1.0 05	172.6	60 53.5	1.0 05	172.3	61 23.4	1.0 05	172.3	61 53.4	1.0 05	172.2	63 53.1	1.0 05	172.0	05
6	54 51.4	1.0 05	171.6	55 51.3	1.0 05	171.4	57 21.1	1.0 05	171.3	58 50.9	1.0 05	171.1	60 50.6	1.0 06	170.8	61 20.6	1.0 06	170.8	61 50.5	1.0 06	170.7	63 50.1	1.0 06	170.4	6
7	54 48.3	1.0 06	170.2	55 48.1	1.0 06	170.0	57 17.9	1.0 06	169.8	58 47.6	1.0 06	169.6	60 47.3	1.0 06	169.3	61 17.2	1.0 06	169.2	61 47.0	1.0 07	169.1	63 46.6	1.0 07	168.8	7
8	54 44.7	1.0 07	168.8	55 44.5	1.0 07	168.6	57 14.2	1.0 07	168.4	58 43.9	1.0 07	168.1	60 43.4	1.0 07	167.8	61 13.2	1.0 07	167.7	61 43.1	1.0 07	167.6	63 42.5	99 08	167.2	8
9	54 40.6	1.0 08	167.4	55 40.4	1.0 08	167.2	57 10.0	1.0 08	167.0	58 39.6	1.0 08	166.7	60 39.0	99 08	166.3	61 08.8	99 08	166.2	61 38.7	99 08	166.1	63 37.9	99 09	165.6	9
10	54 36.1	1.0 08	166.0	55 35.8	99 08	165.8	57 05.4	99 09	165.5	58 34.9	99 09	165.2	60 34.1	99 09	164.8	61 03.9	99 09	164.7	61 33.7	99 09	164.5	63 32.8	99 09	164.0	10
1	54 31.2	99 09	164.6	55 30.8	99 09	164.4	57 00.3	99 09	164.1	58 29.6	99 10	163.8	60 28.7	99 10	163.3	60 58.5	99 10	163.1	61 28.2	99 10	163.0	63 27.2	99 10	162.4	1
2	54 25.7	99 10	163.2	55 25.3	99 10	163.0	56 54.7	99 10	162.7	58 23.9	99 10	162.3	60 22.9	99 11	161.8	60 52.6	99 11	161.6	61 22.3	99 11	161.5	63 21.0	99 11	160.9	2
3	54 19.9	99 11	161.8	55 19.4	99 11	161.6	56 48.6	99 11	161.2	58 17.8	99 11	160.9	60 16.5	99 11	160.3	60 46.2	99 11	160.1	61 15.8	99 12	160.0	63 14.4	99 12	159.3	3
4	54 13.6	99 11	160.4	55 13.0	99 11	160.2	56 42.1	99 12	159.8	58 11.1	99 12	159.4	60 09.7	99 12	158.8	60 39.3	99 12	158.7	61 08.9	99 12	158.5	63 07.2	98 13	157.8	4
15	54 06.8	99 12	159.1	55 06.2	99 12	158.8	56 35.1	99 12	158.4	58 04.0	99 13	158.0	60 02.4	99 13	157.3	60 32.0	99 13	157.2	61 01.5	98 13	157.0	62 59.6	98 14	156.2	15
6	53 59.6	99 13	157.7	54 58.9	99 13	157.4	56 27.7	99 13	157.0	57 56.5	99 13	156.6	59 54.7	98 14	155.9	60 24.2	98 14	155.7	60 53.7	98 14	155.5	62 51.5	98 14	154.7	6
7	53 52.0	99 13	156.4	54 51.2	99 14	156.1	56 19.9	99 14	155.6	57 48.5	98 14	155.1	59 46.4	98 14	154.4	60 15.9	98 15	154.2	60 45.3	98 15	154.0	62 42.9	98 15	153.2	7
8	53 43.9	99 14	155.0	54 43.0	98 14	154.7	56 11.6	98 14	154.2	57 40.1	98 15	153.7	59 37.8	98 15	153.0	60 07.2	98 15	152.8	60 36.6	98 15	152.6	62 33.8	98 16	151.7	8
9	53 35.5	98 15	153.7	54 34.5	98 15	153.3	56 02.9	98 15	152.9	57 31.2	98 15	152.3	59 28.7	98 16	151.5	59 58.0	98 16	151.3	60 27.3	98 16	151.1	62 24.4	97 17	150.2	9
20	53 26.6	98 15	152.3	54 25.5	98 16	152.0	55 53.8	98 16	151.5	57 21.9	98 16	150.9	59 19.2	98 17	150.1	59 48.5	98 17	149.9	60 17.7	97 17	149.7	62 14.4	97 17	148.7	20
1	53 17.3	98 16	151.0	54 16.1	98 16	150.7	55 44.3	98 17	150.1	57 12.2	98 17	149.5	59 09.2	97 17	148.7	59 38.5	97 17	148.5	60 07.6	97 17	148.2	62 04.1	97 18	147.2	1
2	53 07.7	98 17	149.7	54 06.4	98 17	149.3	55 34.3	98 17	148.8	57 02.1	97 18	148.2	58 58.9	97 18	147.3	59 28.0	97 18	147.1	59 57.1	97 18	146.8	61 53.3	97 19	145.8	2
3	52 57.6	98 17	148.3	53 56.2	98 18	148.0	55 24.0	97 18	147.4	56 51.6	97 18	146.8	58 48.1	97 19	145.9	59 17.2	97 19	145.7	59 46.3	97 19	145.4	61 42.1	96 19	144.4	3
4	52 47.2	98 18	147.0	53 45.7	97 18	146.7	55 13.3	97 18	146.1	56 40.7	97 19	145.4	58 37.0	97 19	144.5	59 06.0	97 19	144.3	59 35.0	97 19	144.0	61 30.5	96 20	142.9	4
25	52 36.3	97 19	145.7	53 34.7	97 19	145.4	55 02.2	97 19	144.7	56 29.5	97 19	144.1	58 25.5	96 20	143.1	58 54.4	96 20	142.9	59 23.3	96 20	142.6	61 18.6	96 21	141.5	25
6	52 25.2	97 19	144.4	53 23.5	97 19	144.1	54 50.7	97 20	143.4	56 17.8	97 20	142.8	58 13.6	96 20	141.8	58 42.4	96 21	141.5	59 11.3	96 21	141.3	61 06.2	96 21	140.1	6
7	52 13.6	97 20	143.2	53 11.8	97 20	142.8	54 38.9	97 20	142.1	56 05.8	96 21	141.4	58 01.3	96 21	140.4	58 30.1	96 21	140.2	58 58.9	96 21	139.9	60 53.5	95 22	138.7	7
8	52 01.7	97 20	141.9	52 59.8	97 21	141.5	54 26.8	96 21	140.8	55 53.5	96 21	140.1	57 48.7	96 22	139.1	58 17.4	96 22	138.8	58 46.1	96 22	138.5	60 40.4	95 22	137.3	8
9	51 49.5	97 21	140.6	52 47.5	97 21	140.2	54 14.2	96 21	139.5	55 40.8	96 22	138.8	57 35.7	96 22	137.8	58 04.4	95 22	137.5	58 33.0	95 22	137.2	60 27.0	95 23	136.0	9
30	51 36.9	97 21	139.3	52 34.8	96 22	138.9	54 01.4	96 22	138.2	55 27.7	96 22	137.5	57 22.4	95 23	136.4	57 51.0	95 23	136.2	58 19.5	95 23	135.9	60 13.3	94 23	134.6	30
1	51 24.1	96 22	138.1	52 21.8	96 22	137.7	53 48.2	96 22	137.0	55 14.4	96 23	136.2	57 08.8	95 23	135.1	57 37.3	95 23	134.8	58 05.8	95 23	134.5	59 59.2	94 24	133.3	1
2	51 10.9	96 22	136.9	52 08.5	96 23	136.4	53 34.7	96 23	135.7	55 00.7	95 23	134.9	56 54.9	95 24	133.8	57 23.3	95 24	133.5	57 51.7	95 24	133.2	59 44.8	94 24	131.9	2
3	50 57.3	96 23	135.6	51 54.9	96 23	135.2	53 20.9	95 24	134.4	54 46.7	95 24	133.7	56 40.6	95 24	132.5	57 09.0	95 24	132.2	57 37.3	94 24	131.9	59 30.2	94 25	130.6	3
4	50 43.5	96 24	134.4	51 40.9	96 24	133.9	53 06.8	95 24	133.2	54 32.5	95 24	132.4	56 26.1	94 25	131.3	56 54.4	94 25	131.0	57 22.6	94 25	130.7	59 15.2	93 25	129.3	4
35	50 29.4	96 24	133.2	51 26.7	95 24	132.7	52 52.5	95 24	132.0	54 17.9	95 25	131.2	56 11.3	94 25	130.0	56 39.5	94 25	129.7	57 07.7	94 25	129.4	59 00.0	93 26	128.1	35
6	50 15.0	95 24	132.0	51 12.2	95 25	131.5	52 37.8	95 25	130.7	54 03.0	95 25	129.9	55 56.2	94 26	128.8	56 24.3	94 26	128.4	56 52.5	94 26	128.1	58 44.4	93 26	126.8	6
7	50 00.4	95 25	130.8	50 57.5	95 25	130.3	52 22.8	95 25	129.5	53 47.9	94 26	128.7	55 40.8	94 26	127.5	56 08.9	94 26	127.2	56 37.0	93 26	126.9	58 28.7	93 27	125.5	7
8	49 45.4	95 25	129.6	50 42.4	95 25	129.1	52 07.6	95 26	128.3	53 32.5	94 26	127.5	55 25.2	94 26	126.3	55 53.2	93 27	126.0	56 21.2	93 27	125.6	58 12.6	92 27	124.3	8
9	49 30.3	95 26	128.4	50 27.1	95 26	127.9	51 52.2	94 26	127.1	53 16.9	94 26	126.3	55 09.3	93 27	125.1	55 37.3	93 27	124.7	56 05.2	93 27	124.4	57 56.4	92 27	123.0	9
40	49 14.8	95 26	127.2	50 11.6	95 26	126.7	51 36.5	94 27	125.9	53 01.0	94 27	125.1	54 53.2	93 27	123.9	55 21.1	93 27	123.5	55 49.0	93 27	123.2	57 39.9	92 28	121.8	40
1	48 59.1	95 27	126.0	49 55.8	94 27	125.5	51 20.5	94 27	124.7	52 44.9	94 27	123.9	54 36.9	93 28	122.7	55 04.7	93 28	122.3	55 32.5	92 28	122.0	57 23.2	92 28	120.6	1
2	48 43.2	94 27	124.9	49 39.8	94 27	124.4	51 04.4	94 27	123.5	52 28.6	93 28	122.7	54 20.3	93 28	121.5	54 48.1	93 28	121.1	55 15.9	92 28	120.8	57 06.3	92 29	119.4	2
3	48 27.1	94 27	123.7	49 23.6	94 27	123.2	50 48.0	94 28	122.4	52 12.1	93 28	121.5	54 03.5	93 28	120.3	54 31.3	92 28	120.0	54 59.0	92 28	119.6	56 49.2	91 29	118.2	3
4	48 10.7	94 28	122.6	49 07.1	94 28	122.0	50 31.4	93 28	121.2	51 55.3	93 28	120.4	53 46.6	92 29	119.1	54 14.3	92 29	118.8	54 41.9	92 29	118.5	56 31.8	91 29	117.0	4
45	47 54.2	94 28	121.4	48 50.4	94 28	120.9	50 14.6	93 28	120.1	51 38.4	93 29	119.2	53 29.4	92 29	118.0	53 57.1	92 29	117.6	54 24.6	92 29	117.3	56 14.4	91 29	115.9	45
6	47 37.4	94 28	120.3	48 33.6	94 28	119.8	49 57.6	93 29	118.9	51 21.2	93 29	118.1	53 12.1	92 29	116.8	53 39.7	92 29	116.5	54 07.2	92 29	116.2	55 56.7	91 30	114.7	6
7	47 20.4	94 29	119.2	48 16.5	93 29	118.6	49 40.4	93 29	117.8	51 03.9	93 29	116.9	52 54.6	92 29	115.7	53 22.1	92 30	115.4	53 49.6	92 30	115.0	55 38.9	91 30	113.6	7
8	47 03.3	93 29	118.1	47 59.3	93 29	117.5	49 23.0	93 29	116.7	50 46.4	92 29	115.8	52 36.9	92 30	114.6	53 04.4	92 30	114.2	53 31.8	91 30	113.9	55 20.9	90 30	112.5	8
9	46 46.0	93 29	117.0	47 41.9	93 29	116.4	49 05.5	93 30	115.6	50 28.7	92 30	114.7	52 19.0	92 30	113.4	52 46.5	91 30	113.1	53 13.8	91 30	112.8	55 02.8	90 30	111.3	9
50	46 28.5	93 29	115.9	47 24.3	93 30	115.3	48 47.8	93 30	114.5	50 10.9	92 30	113.6	52 01.0	91 30	112.3	52 28.4	91 30	112.0	52 55.8	91 30	111.7	54 44.5	90 31	110.2	50
1	46 10.8	93 30	114.8	47 06.6	93 30	114.2	48 29.9	92 30	113.4	49 52.9	92 30	112.5	51 42.9	91 30	111.2	52 10.2	91 30	110.9	52 37.5	91 31	110.6	54 26.1	90 31	109.1	1
2	45 53.0	93 30	113.7	46 48.7	93 30	113.1	48 11.9	92 30	112.3	49 34.8	92 30	111.4	51 24.6	91 31	110.1	51 51.9	91 31	109.8	52 19.2	91 31	109.5	54 07.6	90 31	108.0	2
3	45 35.0	93 30	112.6	46 30.7	93 30	112.1	47 53.8	92 30	111.2	49 16.6	92 31	110.3	51 06.2	91 31	109.1	51 33.5	91 31	108.7	52 00.7	91 31	108.4	53 49.0	90 31	107.0	3
4	45 16.9	93 30	111.5	46 12.5	92 30	111.0	47 35.5	92 31	110.1	48 58.2	92 31	109.3	50 47.7	91 31	108.0	51 14.9	91 31	107.7	51 42.1	91 31	107.3	53 30.2	90 31	105.9	4
55	44 58.7	93 31	110.5	45 54.2	92 31	109.9	47 17.1	92 31	109.1	48 39.7	91 31	108.2	50 29.1	91 31	106.9	50 56.3	91 31	106.6	51 23.4	90 31	106.2	53 11.4	90 32	104.8	55
6	44 40.3	93 31	109.4	45 35.8	92 31	108.9	46 58.6	92 31	108.0	48 21.1	91 31	107.1	50 10.3	91 31	105.9	50 37.5	90 31	105.5	51 04.6	90 32	105.2	52 52.5	89 32	103.8	6
7	44 21.8	93 31	108.4	45 17.2	92 31	107.8	46 40.0	92 31	107.0	48 02.3	91 31	106.1	49 51.5	91 32	104.8	50 18.6	90 32	104.5	50 45.7	90 32	104.1	52 33.5	89 32	102.7	7
8	44 03.2	92 31	107.3	44 58.6	92 31	106.8	46 21.2	92 31	105.9	47 43.5	91 32	105.0	49 32.5	91 32	103.8	49 59.7	90 32	103.4	50 26.7	90 32	103.1	52 14.4	89 32	101.7	8
9	43 44.5	92 31	106.3	44 39.8	92 31	105.7	46 02.4	92 32	104.9	47 24.6	91 32	104.0	49 13.5	90 32	102.7	49 40.6	90 32	102.4	50 07.7	90 32	102.1	51 55.2	89 32	100.7	9
60	43 25.7	92 31	105.3	44 21.0	92 32	104.7	45 43.5	91 32	103.9	47 05.6	91 32	103.0	48 54.4	90 32	101.7	49 21.5	90 32	101.4	49 48.5	90 32	101.1	51 36.0	89 32	99.6	60
1	43 06.9	92 32	104.2	44 02.0	92 32	103.7	45 24.5	91 32	102.8	46 46.5	91 32	102.0	48 35.3	90 32	100.7	49 02.3	90 32	100.4	49 29.3	90 32	100.0	51 16.7	89 32	98.6	1
2	42 47.9	92 32	103.2	43 43.0	92 32	102.7	45 05.4	91 32	101.8	46 27.4	91 32	100.9	48 16.1	90 32	99.7	48 43.1	90 32	99.4	49 10.1	90 32	99.0	50 57.3	89 32	97.6	2
3	42 28.8	92 32	102.2	43 23.9	92 32	101.7	44 46.2	91 32	100.8	46 08.2	91 32	99.9	47 56.8	90 32	98.7	48 23.8	90 32	98.4	48 50.7	90 32	98.0	50 38.0	89 32	96.6	3
4	42 09.7	92 32	101.2	43 04.8	92 32	100.7	44 27.0	91 32	99.8	45 48.9	91 32	98.9	47 37.4	90 32	97.7	48 04.4	90 32	97.4	48 31.4	90 32	97.0	50 18.5	89 32	95.6	4
65	41 50.5	92 32	100.2	42 45.5	92 32	99.7	44 07.8	91 32	98.8	45 29.6	91 32	97.9	47 18.1	90 32	96.7	47 45.0	90 32	96.4	48 12.0	90 32	96.0	49 59.1	89 32	94.7	65
6	41 31.2	92 32	99.2	42 26.2	92 32	98.7	43 48.4	91 32	97.8	45 10.2	91 32	97.0	46 58.6	90 32	95.7	47 25.6	90 32	95.4	47 52.5	90 32	95.1	49 39.6	89 33	93.7	6
7	41 11.9	92 32	98.2	42 06.9	91 32	97.7	43 29.1	91 32	96.8	44 50.8	91 32	96.0	46 39.2	90 32	94.7	47 06.1	90 32	94.4	47 33.1	90 32	94.1	49 20.1	89 33	92.7	7
8	40 52.6	92 32	97.2	41 47.5	91 32	96.7	43 09.6	91 32	95.9	44 31.4	91 32	95.0	46 19.7	90 32	93.8	46 46.7	90 33	93.4	47 13.6	90 33	93.1	49 00.6	89 33	91.8	8
9	40 33.2	92 32	96.3	41 28.1	91 32	95.7	42 50.2	91 32	94.9	44 11.9	91 32	94.0	46 00.2	90 33	92.8	46 27.2	90 33	92.5	46 54.0	90 33	92.2	48 41.1	89 33	90.8	9
70	40 13.8	92 32	95.3	41 08.7	91 32	94.7	42 30.7	91 32	93.9	43 52.4	91 33	93.1	45 40.7	90 33	91.8	46 07.6	90 33	91.5	46 34.5	90 33	91.2	48 21.5	89 33	89.9	70
1	39 54.3	92 32	94.3	40 49.2	91 32	93.8	42 11.2	91 33	93.0	43 32.9	91 33	92.1	45 21.2	90 33	90.9	45 48.1	90 33	90.6	46 15.0	90 33	90.3	48 02.0	89 33	88.9	1
2	39 34.8	92 33	93.3	40 29.7	91 33	92.8	41 51.7	91 33	92.0	43 13.4	91 33	91.1	45 01.6	90 33	89.9	45 28.6	90 33	89.6	45 55.5	90 33	89.3	47 42.5	89 33	88.0	2
3	39 15.3	92 33	92.4	40 10.2	91 33	91.9	41 32.2	91 33	91.0	42 53.8	91 33	90.2	44 42.1	90 33	89.0	45 09.0	90 33	88.7	45 35.9	90 33	88.4	47 22.9	89 32	87.1	3
4	38 55.8	92 33	91.4	39 50.6	91 33	90.9	41 12.6	91 33	90.1	42 34.3	91 33	89.3	44 22.6	90 33	88.1	44 49.5	90 32	87.8	45 16.4	90 33	87.4	47 03.4	89 32	86.1	4
75	38 36.2	92 33	90.5	39 31.1	91 33	90.0	40 53.1	91 33	89.2	42 14.8	91 33	88.3	44 03.0	90 32	87.1	44 30.0	90 32	86.8	44 56.9	90 32	86.5	46 44.0	89 32	85.2	75
6	38 16.7	92 33	89.5	39 11.6	91 33	89.0	40 33.6	91 33	88.2	41 55.2	91 32	87.4	43 43.5	90 32	86.2	44 10.5	90 32	85.9	44 37.4	90 32	85.6	46 24.5	89 32	84.3	6
7	37 57.2	92 33	88.6	38 52.0	91 33	88.1	40 14.1	91 33	87.3	41 35.7	91 32	86.4	43 24.1	90 32	85.3	43 51.0	90 32	85.0	44 17.9	90 32	84.7	46 05.1	89 32	83.4	7
8	37 37.6	92 33	87.7	38 32.5	91 32	87.1	39 54.6	91 32	86.4	41 16.3	91 32	85.5	43 04.6	90 32	84.4	43 31.6	90 32	84.1	43 58.5	90 32	83.8	45 45.7	89 32	82.5	8
9	37 18.1	92 32	86.7	38 13.0	91 32	86.2	39 35.1	91 32	85.4	40 56.8	91 32	84.6	42 45.2	90 32	83.4	43 12.2	90 32	83.2	43 39.1	90 32	82.8	45 26.4	89 32	81.6	9
80	36 58.6	92 32	85.8	37 53.5	91 32	85.3	39 15.6	91 32	84.5	40 37.4	91 32	83.7	42 25.8	90 32	82.5	42 52.8	90 32	82.2	43 19.8	90 32	81.9	45 07.1	89 32	80.7	80
1	36 39.2	92 32	84.9	37 34.1	91 32	84.4	38 56.2	91 32	83.6	40 18.0	91 32	82.8	42 06.5	90 32	81.6	42 33.5	90 32	81.3	43 00.4	90 32	81.0	44 47.8	89 32	79.8	1
2	36 19.7	92 32	84.0	37 14.7	91 32	83.4	38 36.8	91 32	82.7	39 58.6	91 32	81.9	41 47.1	90 32	80.7	42 14.2	90 32	80.4	42 41.2	90 32	80.1	44 28.6	89 32	78.9	2
3	36 00.3	92 32	83.0	36 55.3	91 32	82.5	38 17.4	91 32	81.8	39 39.3	91 32	81.0	41 27.9	90 32	79.8	41 54.9	90 32	79.5	42 21.9	90 32	79.3	44 09.5	89 32	78.0	3
4	35 41.0	92 32	82.1	36 35.9	92 32	81.6	37 58.1	91 32	80.9	39 20.0	91 32	80.1	41 08.7	90 32	78.9	41 35.8	90 32	78.7	42 02.8	90 32	78.4	43 50.4	89 32	77.2	4
85	35 21.6	92 32	81.2	36 16.6	92 32	80.7	37 38.9	91 32	79.9	39 00.8	91 32	79.2	40 49.6	90 32	78.1	41 16.6	90 32	77.8	41 43.7	90 32	77.5	43 31.4	89 32	76.3	85
6	35 02.3	92 32	80.3	35 57.4	92 32	79.8	37 19.7	91 32	79.0	38 41.7	91 32	78.3	40 30.5	90 32	77.2	40 57.6	90 32	76.9	41 24.6	90 32	76.6	43 12.4	90 31	75.4	6
7	34 43.1	92 32	79.4	35 38.2	92 32	78.9	37 00.5	91 32	78.2	38 22.6	91 32	77.4	40 11.5	90 32	76.3	40 38.6	90 32	76.0	41 05.7	90 31	75.7	42 53.6	90 31	74.5	7
8	34 23.9	92 32	78.5	35 19.0	92 32	78.0	36 41.4	91 32	77.3	38 03.5	91 32	76.5	39 52.5	91 31	75.4	40 19.7	90 31	75.1	40 46.8	90 31	74.8	42 34.8	90 31	73.7	8
9	34 04.8	92 32	77.6	35 00.0	92 32	77.1	36 22.4	91 32	76.4	37 44.6	91 31	75.6	39 33.7	91 31	74.5	40 00.8	91 31	74.3	40 28.0	90 31	74.0	42 16.1	90 31	72.8	9
90	33 45.8	92 32	76.7	34 40.9	92 32	76.2	36 03.5	92 31	75.5	37 25.7	91 31	74.7	39 14.9	91 31	73.7	39 42.1	91 31	73.4	40 09.2	90 31	73.1	41 57.5	90 31	72.0	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	33 26.8	92 32	75.8	34 22.0	92 31	75.3	35 44.6	92 31	74.6	37 06.9	91 31	73.8	38 56.2	91 31	72.8	39 23.4	91 31	72.5	39 50.6	91 31	72.2	41 38.9	90 31	71.1	91
2	33 07.9	92 31	74.9	34 03.2	92 31	74.4	35 25.8	92 31	73.7	36 48.2	91 31	73.0	38 37.5	91 31	71.9	39 04.8	91 31	71.7	39 32.0	91 31	71.4	41 20.5	90 31	70.3	2
3	32 49.1	92 31	74.0	33 44.4	92 31	73.6	35 07.1	92 31	72.8	36 29.5	91 31	72.1	38 19.0	91 31	71.1	38 46.3	91 31	70.8	39 13.6	91 31	70.5	41 02.2	90 31	69.4	3
4	32 30.4	92 31	73.1	33 25.7	92 31	72.7	34 48.5	92 31	72.0	36 11.0	92 31	71.2	38 00.6	91 31	70.2	38 27.9	91 30	69.9	38 55.2	91 30	69.7	40 43.9	90 30	68.6	4
95	32 11.7	92 31	72.2	33 07.1	92 31	71.8	34 29.9	92 31	71.1	35 52.6	92 31	70.4	37 42.3	91 30	69.3	38 09.6	91 30	69.1	38 36.9	91 30	68.8	40 25.8	90 30	67.7	95
6	31 53.2	92 31	71.4	32 48.6	92 31	70.9	34 11.5	92 31	70.2	35 34.2	92 30	69.5	37 24.0	91 30	68.5	37 51.4	91 30	68.2	38 18.8	91 30	68.0	40 07.8	91 30	66.9	6
7	31 34.7	93 31	70.5	32 30.2	92 31	70.0	33 53.2	92 30	69.3	35 16.0	92 30	68.6	37 05.9	91 30	67.6	37 33.3	91 30	67.4	38 00.7	91 30	67.1	39 49.9	91 30	66.1	7
8	31 16.3	93 30	69.6	32 11.9	92 30	69.2	33 35.0	92 30	68.5	34 57.8	92 30	67.8	36 47.9	92 30	66.8	37 15.4	91 30	66.5	37 42.8	91 30	66.3	39 32.1	91 29	65.2	8
9	30 58.1	93 30	68.7	31 53.7	93 30	68.3	33 16.8	92 30	67.6	34 39.8	92 30	66.9	36 30.0	92 30	65.9	36 57.5	92 30	65.7	37 24.9	91 30	65.4	39 14.4	91 29	64.4	9
100	30 39.9	93 30	67.9	31 35.6	93 30	67.4	32 58.8	92 30	66.7	34 21.9	92 30	66.1	36 12.2	92 29	65.1	36 39.8	92 29	64.8	37 07.2	92 29	64.6	38 56.8	91 29	63.6	100
1	30 21.9	93 30	67.0	31 17.6	93 30	66.6	32 40.9	93 30	65.9	34 04.1	92 29	65.2	35 54.6	92 29	64.2	36 22.1	92 29	64.0	36 49.7	92 29	63.8	38 39.4	91 29	62.7	1
2	30 04.0	93 30	66.1	30 59.7	93 30	65.7	32 23.2	93 29	65.0	33 46.4	92 29	64.3	35 37.1	92 29	63.4	36 04.6	92 29	63.2	36 32.2	92 29	62.9	38 22.1	91 29	61.9	2
3	29 46.2	93 29	65.2	30 42.0	93 29	64.8	32 05.5	93 29	64.2	33 28.9	92 29	63.5	35 19.7	92 29	62.6	35 47.3	92 29	62.3	36 14.9	92 29	62.1	38 05.0	92 28	61.1	3
4	29 28.5	93 29	64.4	30 24.4	93 29	64.0	31 48.0	93 29	63.3	33 11.5	93 29	62.6	35 02.4	92 29	61.7	35 30.0	92 28	61.5	35 57.7	92 28	61.2	37 47.9	92 28	60.3	4
105	29 10.9	93 29	63.5	30 06.9	93 29	63.1	31 30.6	93 29	62.5	32 54.2	93 29	61.8	34 45.2	92 28	60.9	35 12.9	92 28	60.7	35 40.6	92 28	60.4	37 31.0	92 28	59.4	105
6	28 53.5	93 29	62.7	29 49.5	93 29	62.2	31 13.4	93 28	61.6	32 37.0	93 28	61.0	34 28.2	93 28	60.1	34 56.0	92 28	59.8	35 23.7	92 28	59.6	37 14.3	92 28	58.6	6
7	28 36.2	94 29	61.8	29 32.3	93 28	61.4	30 56.3	93 28	60.8	32 20.0	93 28	60.1	34 11.4	93 28	59.2	34 39.2	92 28	59.0	35 06.9	92 28	58.8	36 57.7	92 27	57.8	7
8	28 19.1	94 28	60.9	29 15.2	93 28	60.5	30 39.3	93 28	59.9	32 03.2	93 28	59.3	33 54.7	93 28	58.4	34 22.5	93 28	58.2	34 50.3	93 27	57.9	36 41.2	92 27	57.0	8
9	28 02.1	94 28	60.1	28 58.3	94 28	59.7	30 22.5	93 28	59.1	31 46.4	93 28	58.4	33 38.1	93 27	57.6	34 06.0	93 27	57.3	34 33.8	93 27	57.1	36 24.9	92 27	56.2	9
110	27 45.2	94 28	59.2	28 41.5	94 28	58.8	30 05.8	94 28	58.2	31 29.9	93 27	57.6	33 21.7	93 27	56.7	33 49.6	93 27	56.5	34 17.5	93 27	56.3	36 08.8	93 27	55.4	110
1	27 28.5	94 28	58.4	28 24.9	94 27	58.0	29 49.3	94 27	57.4	31 13.5	93 27	56.8	33 05.5	93 27	55.9	33 33.4	93 27	55.7	34 01.3	93 27	55.5	35 52.8	93 26	54.6	1
2	27 12.0	94 27	57.5	28 08.4	94 27	57.1	29 32.9	94 27	56.5	30 57.2	94 27	55.9	32 49.4	93 27	55.1	33 17.3	93 26	54.9	33 45.3	93 26	54.6	35 36.9	93 26	53.8	2
3	26 55.6	94 27	56.6	27 52.1	94 27	56.3	29 16.7	94 27	55.7	30 41.1	94 27	55.1	32 33.4	93 26	54.3	33 01.5	93 26	54.0	33 29.5	93 26	53.8	35 21.3	93 26	52.9	3
4	26 39.4	94 27	55.8	27 35.9	94 27	55.4	29 00.6	94 26	54.8	30 25.2	94 26	54.2	32 17.7	94 26	53.4	32 45.7	94 26	53.2	33 13.8	93 26	53.0	35 05.8	93 26	52.1	4
115	26 23.3	94 26	54.9	27 19.9	94 26	54.6	28 44.7	94 26	54.0	30 09.4	94 26	53.4	32 02.1	94 26	52.6	32 30.2	94 26	52.4	32 58.3	94 26	52.2	34 50.4	93 25	51.3	115
6	26 07.4	95 26	54.1	27 04.1	94 26	53.7	28 29.0	94 26	53.2	29 53.8	94 26	52.6	31 46.6	94 25	51.8	32 14.8	94 25	51.6	32 42.9	94 25	51.4	34 35.3	93 25	50.5	6
7	25 51.6	95 26	53.2	26 48.4	95 26	52.9	28 13.5	94 26	52.3	29 38.4	94 25	51.7	31 31.4	94 25	51.0	31 59.6	94 25	50.8	32 27.7	94 25	50.6	34 20.3	94 25	49.7	7
8	25 36.1	95 26	52.4	26 32.9	95 26	52.0	27 58.1	95 25	51.5	29 23.1	94 25	50.9	31 16.3	94 25	50.1	31 44.5	94 25	49.9	32 12.7	94 25	49.7	34 05.4	94 24	48.9	8
9	25 20.7	95 25	51.5	26 17.6	95 25	51.2	27 42.9	95 25	50.6	29 08.0	95 25	50.1	31 01.4	94 25	49.3	31 29.7	94 24	49.1	31 57.9	94 24	48.9	33 50.8	94 24	48.1	9
120	25 05.5	95 25	50.7	26 02.5	95 25	50.3	27 27.9	95 25	49.8	28 53.2	95 24	49.3	30 46.6	94 24	48.5	31 15.0	94 24	48.3	31 43.3	94 24	48.1	33 36.4	94 24	47.3	120
1	24 50.5	95 25	49.8	25 47.5	95 25	49.5	27 13.1	95 24	49.0	28 38.4	95 24	48.4	30 32.1	95 24	47.7	31 00.5	95 24	47.5	31 28.8	94 24	47.3	33 22.1	94 23	46.5	1
2	24 35.6	95 24	49.0	25 32.8	95 24	48.6	26 58.4	95 24	48.1	28 23.9	95 24	47.6	30 17.7	95 24	46.9	30 46.2	95 24	46.7	31 14.6	95 23	46.5	33 08.0	94 23	45.7	2
3	24 21.0	95 24	48.1	25 18.2	95 24	47.8	26 44.0	95 24	47.3	28 09.6	95 24	46.8	30 03.6	95 23	46.1	30 32.0	95 23	45.9	31 00.5	95 23	45.7	32 54.1	95 23	44.9	3
4	24 06.5	95 24	47.3	25 03.8	95 24	47.0	26 29.7	95 23	46.5	27 55.5	95 23	46.0	29 49.6	95 23	45.2	30 18.1	95 23	45.1	30 46.6	95 23	44.9	32 40.4	95 22	44.1	4
125	23 52.3	96 23	46.4	24 49.7	96 23	46.1	26 15.6	95 23	45.6	27 41.5	95 23	45.1	29 35.8	95 23	44.4	30 04.4	95 23	44.3	30 32.9	95 22	44.1	32 26.9	95 22	43.3	125
6	23 38.2	96 23	45.6	24 35.7	96 23	45.3	26 01.8	96 23	44.8	27 27.8	96 23	44.3	29 22.3	95 22	43.6	29 50.9	95 22	43.4	30 19.4	95 22	43.3	32 13.6	95 22	42.6	6
7	23 24.4	96 23	44.8	24 21.9	96 23	44.4	25 48.1	96 22	44.0	27 14.2	96 22	43.5	29 08.9	95 22	42.8	29 37.5	95 22	42.6	30 06.1	95 22	42.5	32 00.5	95 22	41.8	7
8	23 10.7	96 22	43.9	24 08.3	96 22	43.6	25 34.7	96 22	43.1	27 00.9	96 22	42.7	28 55.7	95 22	42.0	29 24.4	96 22	41.8	29 53.1	96 21	41.7	31 47.6	95 21	41.0	8
9	22 57.3	96 22	43.1	23 55.0	96 22	42.8	25 21.4	96 22	42.3	26 47.8	96 22	41.8	28 42.8	96 21	41.2	29 11.5	96 21	41.0	29 40.2	96 21	40.9	31 34.9	95 21	40.2	9
130	22 44.1	96 22	42.2	23 41.8	96 22	41.9	25 08.4	96 21	41.5	26 34.8	96 21	41.0	28 30.0	96 21	40.4	28 58.8	96 21	40.2	29 27.5	96 21	40.0	31 22.4	96 20	39.4	130
1	22 31.0	96 21	41.4	23 28.9	96 21	41.1	24 55.5	96 21	40.6	26 22.1	96 21	40.2	28 17.4	96 21	39.6	28 46.2	96 20	39.4	29 15.0	96 20	39.2	31 10.1	96 20	38.6	1
2	22 18.2	97 21	40.5	23 16.1	96 21	40.2	24 42.9	96 21	39.8	26 09.6	96 20	39.4	28 05.1	96 20	38.8	28 34.0	96 20	38.6	29 02.8	96 20	38.4	30 58.0	96 20	37.8	2
3	22 05.7	97 21	39.7	23 03.6	97 20	39.4	24 30.5	97 20	39.0	25 57.3	96 20	38.5	27 53.0	96 20	37.9	28 21.9	96 20	37.8	28 50.8	96 20	37.6	30 46.1	96 19	37.0	3
4	21 53.3	97 20	38.8	22 51.3	97 20	38.6	24 18.3	97 20	38.1	25 45.3	97 20	37.7	27 41.1	96 19	37.1	28 10.0	96 19	37.0	28 38.9	96 19	36.8	30 34.5	96 19	36.2	4
135	21 41.1	97 20	38.0	22 39.3	97 20	37.7	24 06.4	97 20	37.3	25 33.4	97 19	36.9	27 29.4	97 19	36.3	27 58.4	97 19	36.2	28 27.3	97 19	36.0	30 23.1	96 19	35.4	135
6	21 29.2	97 19	37.2	22 27.4	97 19	36.9	23 54.7	97 19	36.5	25 21.8	97 19	36.1	27 17.9	97 19	35.5	27 47.0	97 19	35.4	28 16.0	97 19	35.2	30 11.9	97 18	34.6	6
7	21 17.6	97 19	36.3	22 15.8	97 19	36.1	23 43.2	97 19	35.7	25 10.4	97 19	35.3	27 06.7	97 18	34.7	27 35.8	97 18	34.6	28 04.8	97 18	34.4	30 00.9	97 18	33.8	7
8	21 06.1	97 19	35.5	22 04.4	97 19	35.2	23 31.9	97 18	34.8	24 59.3	97 18	34.4	26 55.7	97 18	33.9	27 24.8	97 18	33.8	27 53.9	97 18	33.6	29 50.1	97 18	33.1	8
9	20 54.9	97 18	34.6	21 53.3	97 18	34.4	23 20.8	97 18	34.0	24 48.3	97 18	33.6	26 44.9	97 18	33.1	27 14.0	97 18	33.0	27 43.2	97 17	32.8	29 39.6	97 17	32.3	9
140	20 43.9	97 18	33.8	21 42.4	97 18	33.5	23 10.0	97 18	33.2	24 37.6	97 17	32.8	26 34.4	97 17	32.3	27 03.5	97 17	32.2	27 32.7	97 17	32.0	29 29.2	97 17	31.5	140
1	20 33.2	98 18	32.9	21 31.7	98 17	32.7	22 59.5	97 17	32.3	24 27.2	97 17	32.0	26 24.1	97 17	31.5	26 53.3	97 17	31.3	27 22.4	97 17	31.2	29 19.2	97 16	30.7	1
2	20 22.7	98 17	32.1	21 21.3	98 17	31.9	22 49.1	98 17	31.5	24 17.0	98 17	31.2	26 14.0	97 16	30.7	26 43.2	97 16	30.5	27 12.4	97 16	30.4	29 09.3	97 16	29.9	2
3	20 12.4	98 17	31.3	21 11.1	98 17	31.0	22 39.0	98 16	30.7	24 07.0	98 16	30.3	26 04.1	98 16	29.9	26 33.4	98 16	29.7	27 02.7	98 16	29.6	28 59.7	97 16	29.1	3
4	20 02.4	98 16	30.4	21 01.1	98 16	30.2	22 29.2	98 16	29.9	23 57.2	98 16	29.5	25 54.5	98 16	29.1	26 23.8	98 16	28.9	26 53.1	98 16	28.8	28 50.3	98 15	28.3	4
145	19 52.6	98 16	29.6	20 51.4	98 16	29.4	22 19.6	98 16	29.0	23 47.7	98 15	28.7	25 45.2	98 15	28.2	26 14.5	98 15	28.1	26 43.8	98 15	28.0	28 41.1	98 15	27.5	145
6	19 43.1	98 15	28.7	20 42.0	98 15	28.5	22 10.2	98 15	28.2	23 38.5	98 15	27.9	25 36.0	98 15	27.4	26 05.4	98 15	27.3	26 34.8	98 15	27.2	28 32.2	98 14	26.7	6
7	19 33.9	98 15	27.9	20 32.8	98 15	27.7	22 01.1	98 15	27.4	23 29.5	98 15	27.1	25 27.2	98 14	26.6	25 56.6	98 14	26.5	26 26.0	98 14	26.4	28 23.6	98 14	26.0	7
8	19 24.8	98 15	27.0	20 23.8	98 14	26.8	21 52.3	98 14	26.5	23 20.7	98 14	26.2	25 18.5	98 14	25.8	25 48.0	98 14	25.7	26 17.4	98 14	25.6	28 15.1	98 14	25.2	8
9	19 16.1	98 14	26.2	20 15.1	98 14	26.0	21 43.7	98 14	25.7	23 12.2	98 14	25.4	25 10.1	98 14	25.0	25 39.6	98 14	24.9	26 09.1	98 13	24.8	28 06.9	98 13	24.4	9
150	19 07.6	99 14	25.3	20 06.7	98 14	25.2	21 35.3	98 14	24.9	23 03.9	98 13	24.6	25 02.0	98 13	24.2	25 31.5	98 13	24.1	26 01.0	98 13	24.0	27 59.0	98 13	23.6	150
1	18 59.4	99 13	24.5	19 58.5	99 13	24.3	21 27.2	99 13	24.1	22 55.9	99 13	23.8	24 54.1	98 13	23.4	25 23.7	98 13	23.3	25 53.2	98 13	23.2	27 51.3	98 12	22.8	1
2	18 51.4	99 13	23.7	19 50.6	99 13	23.5	21 19.4	99 13	23.2	22 48.2	99 12	23.0	24 46.5	99 12	22.6	25 16.1	99 12	22.5	25 45.6	99 12	22.4	27 43.8	98 12	22.0	2
3	18 43.7	99 12	22.8	19 43.0	99 12	22.7	21 11.8	99 12	22.4	22 40.7	99 12	22.1	24 39.1	99 12	21.8	25 08.7	99 12	21.7	25 38.3	99 12	21.6	27 36.6	99 12	21.2	3
4	18 36.3	99 12	22.0	19 35.6	99 12	21.8	21 04.5	99 12	21.6	22 33.4	99 12	21.3	24 32.0	99 11	21.0	25 01.6	99 11	20.9	25 31.2	99 11	20.8	27 29.7	99 11	20.5	4
155	18 29.1	99 12	21.1	19 28.4	99 11	21.0	20 57.5	99 11	20.7	22 26.5	99 11	20.5	24 25.1	99 11	20.2	24 54.8	99 11	20.1	25 24.4	99 11	20.0	27 23.0	99 11	19.7	155
6	18 22.2	99 11	20.3	19 21.6	99 11	20.1	20 50.7	99 11	19.9	22 19.8	99 11	19.7	24 18.5	99 11	19.4	24 48.2	99 11	19.3	25 17.9	99 10	19.2	27 16.5	99 10	18.9	6
7	18 15.5	99 11	19.4	19 15.0	99 11	19.3	20 44.2	99 10	19.1	22 13.3	99 10	18.9	24 12.2	99 10	18.6	24 41.9	99 10	18.5	25 11.6	99 10	18:4	27 10.4	99 10	18.1	7
8	18 09.2	99 10	18.6	19 08.7	99 10	18.5	20 37.9	99 10	18.3	22 07.1	99 10	18.0	24 06.1	99 10	17.8	24 35.8	99 10	17.7	25 05.5	99 10	17.6	27 04.4	99 09	17.3	8
9	18 03.1	99 10	17.8	19 02.6	99 10	17.6	20 31.9	99 10	17.4	22 01.2	99 09	17.2	24 00.2	99 09	16.9	24 30.0	99 09	16.9	24 59.7	99 09	16.8	26 58.7	99 09	16.5	9
160	17 57.3	99 09	16.9	18 56.8	99 09	16.8	20 26.2	99 09	16.6	21 55.6	99 09	16.4	23 54.7	99 09	16.1	24 24.5	99 09	16.1	24 54.2	99 09	16.0	26 53.3	99 09	15.7	160
1	17 51.7	99 09	16.1	18 51.3	99 09	15.9	20 20.8	99 09	15.8	21 50.2	99 09	15.6	23 49.4	99 08	15.3	24 19.2	99 08	15.3	24 49.0	99 08	15.2	26 48.1	99 08	14.9	1
2	17 46.4	99 08	15.2	18 46.1	99 08	15.1	20 15.6	99 08	14.9	21 45.1	99 08	14.8	23 44.3	99 08	14.5	24 14.2	99 08	14.5	24 44.0	99 08	14.4	26 43.2	99 08	14.2	2
3	17 41.5	99 08	14.4	18 41.1	99 08	14.3	20 10.7	99 08	14.1	21 40.2	99 08	13.9	23 39.6	99 08	13.7	24 09.4	99 07	13.7	24 39.3	99 07	13.6	26 38.6	99 07	13.4	3
4	17 36.7	1.0 07	13.5	18 36.5	1.0 07	13.4	20 06.1	1.0 07	13.3	21 35.6	1.0 07	13.1	23 35.1	1.0 07	12.9	24 04.9	1.0 07	12.9	24 34.8	1.0 07	12.8	26 34.2	99 07	12.8	4
165	17 32.3	1.0 07	12.7	18 32.1	1.0 07	12.6	20 01.7	1.0 07	12.5	21 31.3	1.0 07	12.3	23 30.8	1.0 07	12.1	24 00.7	1.0 07	12.1	24 30.6	1.0 07	12.0	26 30.1	1.0 06	11.8	165
6	17 28.2	1.0 06	11.8	18 28.0	1.0 06	11.8	19 57.6	1.0 06	11.6	21 27.3	1.0 06	11.5	23 26.9	1.0 06	11.3	23 56.8	1.0 06	11.3	24 26.7	1.0 06	11.2	26 26.2	1.0 06	11.0	6
7	17 24.3	1.0 06	11.0	18 24.1	1.0 06	10.9	19 53.8	1.0 06	10.8	21 23.6	1.0 06	10.7	23 23.2	1.0 06	10.5	23 53.1	1.0 06	10.5	24 23.0	1.0 06	10.4	26 22.6	1.0 06	10.2	7
8	17 20.7	1.0 06	10.1	18 20.6	1.0 05	10.1	19 50.3	1.0 05	10.0	21 20.1	1.0 05	09.8	23 19.8	1.0 05	09.7	23 49.7	1.0 05	09.6	24 19.6	1.0 05	09.6	26 19.3	1.0 05	09.4	8
9	17 17.4	1.0 05	09.3	18 17.3	1.0 05	09.2	19 47.1	1.0 05	09.1	21 16.9	1.0 05	09.0	23 16.6	1.0 05	08.9	23 46.5	1.0 05	08.8	24 16.5	1.0 05	08.8	26 16.2	1.0 05	08.7	9
170	17 14.4	1.0 05	08.5	18 14.3	1.0 04	08.4	19 44.1	1.0 04	08.3	21 14.0	1.0 04	08.2	23 13.7	1.0 04	08.1	23 43.7	1.0 04	08.0	24 13.6	1.0 04	08.0	26 13.4	1.0 04	07.9	170
1	17 11.7	1.0 04	07.6	18 11.6	1.0 04	07.6	19 41.4	1.0 04	07.5	21 11.3	1.0 04	07.4	23 11.1	1.0 04	07.3	23 41.1	1.0 04	07.2	24 11.0	1.0 04	07.2	26 10.8	1.0 04	07.1	1
2	17 09.2	1.0 04	06.8	18 09.2	1.0 04	06.7	19 39.0	1.0 04	06.6	21 08.9	1.0 04	06.6	23 08.8	1.0 03	06.5	23 38.8	1.0 03	06.4	24 08.7	1.0 03	06.4	26 08.6	1.0 03	06.3	2
3	17 07.1	1.0 03	05.9	18 07.0	1.0 03	05.9	19 36.9	1.0 03	05.8	21 06.8	1.0 03	05.7	23 06.7	1.0 03	05.7	23 36.7	1.0 03	05.6	24 06.7	1.0 03	05.6	26 06.6	1.0 03	05.5	3
4	17 05.2	1.0 03	05.1	18 05.1	1.0 03	05.0	19 35.1	1.0 03	05.0	21 05.0	1.0 03	04.9	23 05.0	1.0 03	04.8	23 34.9	1.0 03	04.8	24 04.9	1.0 02	04.8	26 04.8	1.0 02	04.7	4
175	17 03.6	1.0 02	04.2	18 03.6	1.0 02	04.2	19 33.5	1.0 02	04.2	21 03.5	1.0 02	04.1	23 03.4	1.0 02	04.0	23 33.4	1.0 02	04.0	24 03.4	1.0 02	04.0	26 03.4	1.0 02	03.9	175
6	17 02.3	1.0 02	03.4	18 02.3	1.0 02	03.4	19 32.3	1.0 02	03.3	21 02.2	1.0 02	03.3	23 02.2	1.0 02	03.2	23 32.2	1.0 02	03.2	24 02.2	1.0 02	03.2	26 02.1	1.0 02	03.1	6
7	17 01.3	1.0 01	02.5	18 01.3	1.0 01	02.5	19 31.3	1.0 01	02.5	21 01.3	1.0 01	02.5	23 01.2	1.0 01	02.4	23 31.2	1.0 01	02.4	24 01.2	1.0 01	02.4	26 01.2	1.0 01	02.4	7
8	17 00.6	1.0 01	01.7	18 00.6	1.0 01	01.7	19 30.6	1.0 01	01.7	21 00.6	1.0 01	01.6	23 00.6	1.0 01	01.6	23 30.5	1.0 01	01.6	24 00.5	1.0 01	01.6	26 00.5	1.0 01	01.6	8
9	17 00.1	1.0 00	00.8	18 00.1	1.0 00	00.8	19 30.1	1.0 00	00.8	21 00.1	1.0 00	00.8	23 00.1	1.0 00	00.8	23 30.1	1.0 00	00.8	24 00.1	1.0 00	00.8	26 00.1	1.0 00	00.8	9
180	17 00.0	1.0 00	00.0	18 00.0	1.0 00	00.0	19 30.0	1.0 00	00.0	21 00.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	26 00.0	1.0 00	00.0	180

H.A.	46° 00′			47° 00′			48° 30′			49° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	65 00.0	1.0 00	180.0	66 00.0	1.0 00	180.0	67 30.0	1.0 00	180.0	68 30.0	1.0 00	180.0
1	64 59.7	1.0 01	178.4	65 59.7	1.0 01	178.3	67 29.7	1.0 01	178.3	68 29.7	1.0 02	178.2
2	64 58.9	1.0 02	176.7	65 58.9	1.0 02	176.6	67 28.8	1.0 02	176.5	68 28.8	1.0 03	176.4
3	64 57.5	1.0 03	175.1	65 57.4	1.0 03	175.0	67 27.3	1.0 03	174.8	68 27.3	1.0 04	174.7
4	64 55.5	1.0 04	173.4	65 55.4	1.0 04	173.3	67 25.3	1.0 04	173.1	68 25.2	1.0 05	172.9
05	64 53.0	1.0 05	171.8	65 52.9	1.0 05	171.6	67 22.6	1.0 05	171.4	68 22.5	1.0 05	171.2
6	64 50.0	1.0 06	170.2	65 49.8	1.0 06	170.0	67 19.4	1.0 06	169.6	68 19.2	1.0 06	169.4
7	64 46.3	1.0 07	168.5	65 46.1	1.0 07	168.3	67 15.6	99 07	167.9	68 15.3	99 07	167.7
8	64 42.2	99 08	166.9	65 41.8	99 08	166.7	67 11.3	99 08	166.2	68 10.8	99 08	165.9
9	64 37.5	99 09	165.3	65 37.1	99 09	165.0	67 06.3	99 09	164.5	68 05.8	99 09	164.2
10	64 32.3	99 10	163.7	65 31.8	99 10	163.4	67 00.9	99 10	162.9	68 00.2	99 10	162.5
1	64 26.6	99 10	162.1	65 25.9	99 11	161.8	66 54.8	99 11	161.2	67 54.0	99 11	160.8
2	64 20.3	99 11	160.5	65 19.5	99 12	160.1	66 48.3	99 12	159.5	67 47.3	98 12	159.1
3	64 13.5	99 12	158.9	65 12.6	98 12	158.5	66 41.2	98 13	157.9	67 40.1	98 13	157.4
4	64 06.3	98 13	157.4	65 05.2	98 13	156.9	66 33.6	98 14	156.2	67 32.3	98 14	155.7
15	63 58.5	98 14	155.8	64 57.3	98 14	155.4	66 25.4	98 14	154.6	67 24.0	98 15	154.1
6	63 50.2	98 15	154.3	64 48.9	98 15	153.8	66 16.8	97 15	153.0	67 15.2	97 16	152.4
7	63 41.5	98 15	152.7	64 40.1	97 16	152.2	66 07.7	97 16	151.4	67 05.9	97 16	150.8
8	63 32.3	97 16	151.2	64 30.7	97 16	150.7	65 58.1	97 17	149.8	66 56.2	97 17	149.2
9	63 22.7	97 17	149.7	64 20.9	97 17	149.1	65 48.1	97 18	148.2	66 45.9	96 18	147.6
20	63 12.6	97 18	148.2	64 10.7	97 18	147.6	65 37.5	96 18	146.7	66 35.2	96 19	146.0
1	63 02.1	97 18	146.7	64 00.0	96 18	146.1	65 26.6	96 19	145.2	66 24.1	96 19	144.5
2	62 51.2	96 19	145.2	63 48.9	96 19	144.6	65 15.2	96 20	143.6	66 12.5	95 20	142.9
3	62 39.8	96 20	143.8	63 37.4	96 20	143.1	65 03.4	95 20	142.1	66 00.5	95 21	141.4
4	62 28.1	96 20	142.3	63 25.5	96 20	141.7	64 51.2	95 21	140.6	65 48.1	95 21	139.9
25	62 16.0	96 21	140.9	63 13.2	95 21	140.2	64 38.7	95 22	139.2	65 35.4	94 22	138.4
6	62 03.5	95 21	139.5	63 00.5	95 22	138.8	64 25.7	94 22	137.7	65 22.2	94 23	136.9
7	61 50.6	95 22	138.1	62 47.5	95 22	137.4	64 12.4	94 23	136.3	65 08.7	94 23	135.5
8	61 37.4	95 23	136.7	62 34.1	94 23	136.0	63 58.7	94 23	134.8	64 54.8	93 24	134.0
9	61 23.8	94 23	135.3	62 20.3	94 23	134.6	63 44.7	93 24	133.4	64 40.6	93 24	132.6
30	61 09.9	94 24	133.9	62 06.2	94 24	133.2	63 30.3	93 24	132.0	64 26.0	93 25	131.2
1	60 55.6	94 24	132.6	61 51.8	93 25	131.9	63 15.7	93 25	130.7	64 11.2	92 25	129.8
2	60 41.1	94 25	131.2	61 37.1	93 25	130.5	63 00.7	92 25	129.3	63 56.0	92 26	128.4
3	60 26.3	93 25	129.9	61 22.1	93 25	129.2	62 45.4	92 26	128.0	63 40.6	92 26	127.1
4	60 11.2	93 26	128.6	61 06.9	93 26	127.9	62 29.9	92 26	126.6	63 24.9	91 27	125.8
35	59 55.8	93 26	127.3	60 51.3	92 26	126.6	62 14.1	92 27	125.3	63 08.9	91 27	124.4
6	59 40.1	93 27	126.0	60 35.5	92 27	125.3	61 58.0	91 27	124.0	62 52.7	91 27	123.1
7	59 24.2	92 27	124.8	60 19.4	92 27	124.0	61 41.7	91 28	122.8	62 36.2	90 28	121.9
8	59 08.0	92 27	123.5	60 03.1	92 28	122.7	61 25.2	91 28	121.5	62 19.5	90 28	120.6
9	58 51.6	92 28	122.3	59 46.6	91 28	121.5	61 08.4	91 28	120.2	62 02.6	90 29	119.3
40	58 35.0	92 28	121.1	59 29.8	91 28	120.3	60 51.4	90 29	119.0	61 45.4	90 29	118.1
1	58 18.1	91 28	119.8	59 12.8	91 29	119.1	60 34.2	90 29	117.8	61 28.1	89 29	116.9
2	58 01.1	91 29	118.6	58 55.6	91 29	117.8	60 16.9	90 29	116.6	61 10.6	89 30	115.7
3	57 43.9	91 29	117.5	58 38.3	90 29	116.7	59 59.3	90 30	115.4	60 52.9	89 30	114.5
4	57 26.4	91 29	116.3	58 20.7	90 30	115.5	59 41.6	89 30	114.2	60 35.0	89 30	113.3
45	57 08.8	91 30	115.1	58 03.0	90 30	114.3	59 23.7	89 30	113.0	60 17.0	89 30	112.1
6	56 51.1	90 30	114.0	57 45.1	90 30	113.2	59 05.6	89 30	111.9	59 58.8	88 30	111.0
7	56 33.1	90 30	112.8	57 27.1	90 30	112.0	58 47.4	89 31	110.7	59 40.5	88 31	109.8
8	56 15.1	90 30	111.7	57 08.9	90 31	110.9	58 29.1	89 31	109.6	59 22.1	88 31	108.7
9	55 56.8	90 31	110.6	56 50.6	89 31	109.8	58 10.6	88 31	108.5	59 03.5	88 31	107.6
50	55 38.5	90 31	109.5	56 32.2	89 31	108.7	57 52.0	88 31	107.4	58 44.8	88 31	106.5
1	55 20.0	90 31	108.4	56 13.6	89 31	107.6	57 33.3	88 31	106.3	58 26.1	88 31	105.4
2	55 01.4	89 31	107.3	55 54.9	89 31	106.5	57 14.5	88 31	105.2	58 07.2	87 32	104.3
3	54 42.7	89 31	106.2	55 36.1	89 31	105.4	56 55.6	88 32	104.1	57 48.2	87 32	103.2
4	54 23.9	89 32	105.1	55 17.2	89 32	104.3	56 36.7	88 32	103.1	57 29.2	87 32	102.2
55	54 05.0	89 32	104.1	54 58.3	89 32	103.3	56 17.6	88 32	102.0	57 10.0	87 32	101.1
6	53 46.0	89 32	103.0	54 39.2	88 32	102.2	55 58.4	88 32	101.0	56 50.8	87 32	100.1
7	53 26.9	89 32	102.0	54 20.1	88 32	101.2	55 39.2	88 32	99.9	56 31.6	87 32	99.1
8	53 07.8	89 32	100.9	54 00.9	88 32	100.2	55 20.0	87 32	98.9	56 12.2	87 32	98.0
9	52 48.6	89 32	99.9	53 41.6	88 32	99.1	55 00.6	87 32	97.9	55 52.9	87 32	97.0
60	52 29.3	89 32	98.9	53 22.3	88 32	98.1	54 41.3	87 32	96.9	55 33.5	87 32	96.0
1	52 10.0	89 32	97.9	53 03.0	88 32	97.1	54 21.9	87 32	95.9	55 14.0	87 32	95.0
2	51 50.6	89 32	96.9	52 43.6	88 32	96.1	54 02.4	87 32	94.9	54 54.6	87 32	94.1
3	51 31.2	88 32	95.9	52 24.1	88 32	95.1	53 42.9	87 32	93.9	54 35.1	87 33	93.1
4	51 11.7	88 32	94.9	52 04.7	88 32	94.2	53 23.4	87 32	93.0	54 15.5	87 33	92.1
65	50 52.3	88 32	93.9	51 45.2	88 32	93.2	53 03.9	87 33	92.0	53 56.0	87 33	91.2
6	50 32.8	88 33	93.0	51 25.6	88 33	92.2	52 44.4	87 33	91.0	53 36.5	87 33	90.2
7	50 13.3	88 33	92.0	51 06.1	88 33	91.3	52 24.9	87 33	90.1	53 17.0	87 33	89.3
8	49 53.7	88 33	91.1	50 46.6	88 33	90.3	52 05.3	87 33	89.1	52 57.4	87 33	88.3
9	49 34.2	88 33	90.1	50 27.1	88 33	89.4	51 45.8	87 33	88.2	52 37.9	87 33	87.4
70	49 14.7	88 33	89.2	50 07.5	88 33	88.4	51 26.3	87 32	87.3	52 18.4	87 32	86.5
1	48 55.1	88 33	88.2	49 48.0	88 32	87.5	51 06.8	87 32	86.4	51 58.9	87 32	85.6
2	48 35.6	88 33	87.3	49 28.5	88 32	86.6	50 47.3	87 32	85.4	51 39.4	87 32	84.7
3	48 16.1	88 32	86.4	49 09.0	88 32	85.7	50 27.8	87 32	84.5	51 20.0	87 32	83.7
4	47 56.6	88 32	85.4	48 49.5	88 32	84.7	50 08.4	87 32	83.6	51 00.6	87 32	82.9
75	47 37.2	88 32	84.5	48 30.1	88 32	83.8	49 49.0	87 32	82.7	50 41.3	87 32	82.0
6	47 17.7	88 32	83.6	48 10.7	88 32	82.9	49 29.7	87 32	81.8	50 21.9	87 32	81.1
7	46 58.3	89 32	82.7	47 51.3	88 32	82.0	49 10.3	87 32	80.9	50 02.7	87 32	80.2
8	46 39.0	89 32	81.8	47 32.0	88 32	81.1	48 51.1	88 32	80.1	49 43.4	87 32	79.3
9	46 19.7	89 32	80.9	47 12.7	88 32	80.2	48 31.9	88 32	79.2	49 24.3	87 32	78.4
80	46 00.4	89 32	80.0	46 53.5	88 32	79.4	48 12.7	88 32	78.3	49 05.2	87 32	77.6
1	45 41.2	89 32	79.2	46 34.3	88 32	78.5	47 53.6	88 32	77.4	48 46.1	87 32	76.7
2	45 22.0	89 32	78.3	46 15.2	88 32	77.6	47 34.6	88 32	76.6	48 27.1	87 32	75.9
3	45 02.9	89 32	77.4	45 56.2	89 32	76.7	47 15.6	88 31	75.7	48 08.2	87 31	75.0
4	44 43.9	89 32	76.5	45 37.2	89 32	75.9	46 56.7	88 31	74.9	47 49.4	88 31	74.1
85	44 24.9	89 31	75.7	45 18.3	89 31	75.0	46 37.9	88 31	74.0	47 30.7	88 31	73.3
6	44 06.1	89 31	74.8	44 59.5	89 31	74.2	46 19.2	88 31	73.2	47 12.0	88 31	72.5
7	43 47.2	89 31	73.9	44 40.7	89 31	73.3	46 00.5	88 31	72.3	46 53.4	88 31	71.6
8	43 28.5	89 31	73.1	44 22.0	89 31	72.4	45 41.9	88 31	71.5	46 34.9	88 31	70.8
9	43 09.9	89 31	72.2	44 03.5	89 31	71.6	45 23.5	89 31	70.6	46 16.5	88 30	70.0
90	42 51.3	90 31	71.4	43 45.0	89 31	70.8	45 05.1	89 30	69.8	45 58.2	88 30	69.1

50° 30′			51° 30′			52° 30′			54° 00′			H.A.
Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
69 30.0	1.0 01	180.0	70 30.0	1.0 01	180.0	71 30.0	1.0 01	180.0	73 00.0	1.0 01	180.0	00
69 29.7	1.0 02	178.2	70 29.7	1.0 02	178.1	71 29.7	1.0 02	178.1	72 59.7	1.0 02	178.0	1
69 28.8	1.0 03	176.4	70 28.7	1.0 03	176.3	71 28.7	1.0 03	176.2	72 58.6	1.0 03	176.0	2
69 27.2	1.0 04	174.6	70 27.1	1.0 04	174.4	71 27.1	1.0 04	174.3	72 56.9	1.0 04	174.0	3
69 25.1	1.0 05	172.7	70 24.9	1.0 05	172.6	71 24.8	1.0 05	172.3	72 54.5	1.0 05	172.0	4
69 22.3	1.0 06	170.9	70 22.1	1.0 06	170.7	71 21.9	1.0 06	170.4	72 51.5	1.0 06	170.0	05
69 18.9	1.0 07	169.2	70 18.6	99 07	168.8	71 18.3	99 07	168.5	72 47.7	99 07	168.0	6
69 14.9	99 08	167.4	70 14.5	99 08	167.0	71 14.1	99 08	166.7	72 43.4	99 08	166.0	7
69 10.4	99 09	165.6	70 09.9	99 09	165.2	71 09.3	99 09	164.8	72 38.3	99 09	164.1	8
69 05.2	99 10	163.8	70 04.6	99 10	163.4	71 03.9	99 10	162.9	72 32.7	99 10	162.1	9
68 59.5	99 10	162.1	69 58.7	99 11	161.6	70 57.8	98 11	161.1	72 26.4	98 12	160.2	10
68 53.2	99 11	160.3	69 52.2	98 12	159.8	70 51.2	98 12	159.3	72 19.4	98 12	158.3	1
68 46.3	98 12	158.6	69 45.2	98 13	158.0	70 44.0	98 13	157.4	72 11.9	98 14	156.4	2
68 38.9	98 13	156.9	69 37.6	98 13	156.3	70 36.2	98 14	155.6	72 03.8	97 14	154.6	3
68 31.0	98 14	155.2	69 29.5	97 14	154.5	70 27.9	97 15	153.9	71 55.2	97 15	152.7	4
68 22.5	97 15	153.5	69 20.8	97 15	152.8	70 19.0	97 16	152.1	71 45.9	96 16	150.9	15
68 13.5	97 16	151.8	69 11.7	97 16	151.1	70 09.6	96 17	150.4	71 36.2	96 17	149.1	6
68 04.0	97 17	150.1	69 02.0	96 17	149.4	69 59.7	96 17	148.6	71 25.9	95 18	147.3	7
67 54.1	96 17	148.5	68 51.8	96 18	147.8	69 49.3	96 18	147.0	71 15.1	95 19	145.6	8
67 43.6	96 18	146.9	68 41.1	96 19	146.1	69 38.4	95 19	145.3	71 03.8	95 20	143.9	9
67 32.7	96 19	145.3	68 30.0	95 19	144.5	69 27.0	95 20	143.6	70 52.1	94 20	142.2	20
67 21.4	95 20	143.7	68 18.4	95 20	142.9	69 15.2	94 20	142.0	70 39.9	94 21	140.5	1
67 09.6	95 20	142.1	68 06.4	94 21	141.3	69 03.0	94 21	140.4	70 27.2	93 22	138.8	2
66 57.4	95 21	140.6	67 54.0	94 21	139.7	68 50.3	94 22	138.8	70 14.1	93 22	137.2	3
66 44.8	94 22	139.1	67 41.2	94 22	138.2	68 37.3	93 22	137.2	70 00.7	92 23	135.6	4
66 31.8	94 22	137.5	67 28.0	93 23	136.6	68 23.8	93 23	135.7	69 46.8	92 24	134.0	25
66 18.4	93 23	136.1	67 14.4	93 23	135.1	68 10.0	92 24	134.1	69 32.6	91 24	132.5	6
66 04.7	93 23	134.6	67 00.4	93 24	133.7	67 55.8	92 24	132.6	69 18.0	91 25	131.0	7
65 50.6	93 24	133.1	66 46.1	92 24	132.2	67 41.2	92 25	131.2	69 03.1	90 25	129.5	8
65 36.2	92 25	131.7	66 31.5	92 25	130.7	67 26.4	91 25	129.7	68 47.9	90 26	128.0	9
65 21.5	92 25	130.3	66 16.5	91 25	129.3	67 11.2	91 26	128.3	68 32.3	90 26	126.6	30
65 06.4	92 26	128.9	66 01.3	91 26	127.9	66 55.7	90 26	126.9	68 16.5	89 27	125.1	1
64 51.1	91 26	127.5	65 45.7	91 26	126.5	66 39.9	90 27	125.5	68 00.4	89 27	123.7	2
64 35.4	91 26	126.2	65 29.9	90 27	125.2	66 23.9	90 27	124.1	67 44.0	88 28	122.3	3
64 19.5	91 27	124.8	65 13.8	90 27	123.8	66 07.6	89 28	122.7	67 27.4	88 28	121.0	4
64 03.4	90 27	123.5	64 57.4	90 28	122.5	65 51.0	89 28	121.4	67 10.5	88 28	119.6	35
63 46.9	90 28	122.2	64 40.8	89 28	121.2	65 34.2	89 28	120.1	66 53.4	87 29	118.3	6
63 30.3	90 28	120.9	64 24.0	89 28	119.9	65 17.2	88 29	118.8	66 36.1	87 29	117.0	7
63 13.4	90 28	119.6	64 06.9	89 29	118.6	65 00.0	88 29	117.5	66 18.6	87 29	115.8	8
62 56.3	89 29	118.4	63 49.7	89 29	117.4	64 42.6	88 29	116.3	66 01.0	86 30	114.5	9
62 39.0	89 29	117.1	63 32.2	88 29	116.1	64 25.0	87 30	115.0	65 43.1	86 30	113.3	40
62 21.6	89 29	115.9	63 14.6	88 30	114.9	64 07.2	87 30	113.8	65 25.1	86 30	112.0	1
62 03.9	89 30	114.7	62 56.8	88 30	113.7	63 49.2	87 30	112.6	65 06.9	86 31	110.8	2
61 46.1	88 30	113.5	62 38.8	88 30	112.5	63 31.1	87 30	111.4	64 48.6	85 31	109.6	3
61 28.1	88 30	112.3	62 20.7	87 30	111.3	63 12.9	86 31	110.2	64 30.1	85 31	108.5	4
61 09.9	88 30	111.2	62 02.4	87 31	110.1	62 54.5	86 31	109.1	64 11.5	85 31	107.3	45
60 51.7	88 31	110.0	61 44.0	87 31	109.0	62 35.9	86 31	107.9	63 52.8	85 31	106.2	6
60 33.2	87 31	108.9	61 25.5	87 31	107.9	62 17.3	86 31	106.8	63 34.0	84 32	105.1	7
60 14.7	87 31	107.7	61 06.8	87 31	106.7	61 58.5	86 31	105.7	63 15.1	84 32	103.9	8
59 56.0	87 31	106.6	60 48.1	86 31	105.6	61 39.7	86 32	104.6	62 56.1	84 32	102.9	9
59 37.3	87 31	105.5	60 29.2	86 32	104.5	61 20.7	85 32	103.5	62 37.0	84 32	101.8	50
59 18.4	87 32	104.4	60 10.3	86 32	103.4	61 01.7	85 32	102.4	62 17.8	84 32	100.7	1
58 59.4	87 32	103.4	59 51.2	86 32	102.4	60 42.6	85 32	101.3	61 58.6	84 32	99.7	2
58 40.4	87 32	102.3	59 32.1	86 32	101.3	60 23.4	85 32	100.3	61 39.3	84 32	98.6	3
58 21.3	86 32	101.2	59 12.9	86 32	100.3	60 04.1	85 32	99.2	61 20.0	84 32	97.6	4
58 02.1	86 32	100.2	58 53.7	86 32	99.2	59 44.8	85 32	98.2	61 00.6	83 32	96.6	55
57 42.8	86 32	99.2	58 34.4	86 32	98.2	59 25.5	85 32	97.2	60 41.2	83 32	95.6	6
57 23.5	86 32	98.1	58 15.0	85 32	97.2	59 06.1	85 32	96.2	60 21.7	83 32	94.6	7
57 04.1	86 32	97.1	57 55.6	85 32	96.2	58 46.6	85 32	95.2	60 02.2	83 32	93.6	8
56 44.7	86 32	96.1	57 36.2	85 32	95.2	58 27.2	85 32	94.2	59 42.7	83 33	92.6	9
56 25.3	86 32	95.1	57 16.7	85 32	94.2	58 07.7	85 33	93.2	59 23.2	83 33	91.6	60
56 05.8	86 32	94.1	56 57.2	85 32	93.2	57 48.2	85 33	92.2	59 03.7	83 33	90.7	1
55 46.3	86 33	93.2	56 37.7	85 33	92.2	57 28.6	85 33	91.3	58 44.1	83 33	89.7	2
55 26.8	86 33	92.2	56 18.2	85 33	91.3	57 09.1	84 33	90.3	58 24.6	83 33	88.8	3
55 07.3	86 33	91.2	55 58.6	85 33	90.3	56 49.6	84 33	89.4	58 05.1	83 32	87.9	4
54 47.8	86 33	90.3	55 39.1	85 33	89.4	56 30.0	85 33	88.4	57 45.6	83 32	86.9	65
54 28.2	86 33	89.3	55 19.6	85 33	88.4	56 10.5	85 32	87.5	57 26.1	83 32	86.0	6
54 08.7	86 33	88.4	55 00.0	85 32	87.5	55 51.0	85 32	86.6	57 06.6	83 32	85.1	7
53 49.2	86 32	87.5	54 40.5	85 32	86.6	55 31.5	85 32	85.7	56 47.1	83 32	84.2	8
53 29.7	86 32	86.6	54 21.1	85 32	85.7	55 12.0	85 32	84.8	56 27.7	84 32	83.3	9
53 10.2	86 32	85.6	54 01.6	85 32	84.8	54 52.6	85 32	83.9	56 08.3	84 32	82.4	70
52 50.7	86 32	84.7	53 42.1	85 32	83.9	54 33.2	85 32	83.0	55 49.0	84 32	81.6	1
52 31.3	86 32	83.8	53 22.7	85 32	83.0	54 13.8	85 32	82.1	55 29.7	84 32	80.7	2
52 11.9	86 32	82.9	53 03.4	86 32	82.1	53 54.5	85 32	81.2	55 10.4	84 32	79.8	3
51 52.5	86 32	82.0	52 44.0	86 32	81.2	53 35.2	85 32	80.3	54 51.2	84 32	79.0	4
51 33.2	86 32	81.2	52 24.8	86 32	80.3	53 16.0	85 32	79.5	54 32.1	84 32	78.1	75
51 13.9	86 32	80.3	52 05.5	86 32	79.5	52 56.8	85 32	78.6	54 13.0	84 32	77.3	6
50 54.7	86 32	79.4	51 46.4	86 32	78.6	52 37.7	85 32	77.7	53 54.0	84 32	76.4	7
50 35.5	87 32	78.5	51 27.2	86 32	77.7	52 18.6	85 32	76.9	53 35.0	84 31	75.6	8
50 16.4	87 32	77.7	51 08.2	86 32	76.9	51 59.6	85 32	76.0	53 16.2	85 31	74.7	9
49 57.3	87 32	76.8	50 49.2	86 32	76.0	51 40.7	86 31	75.2	52 57.3	85 31	73.9	80
49 38.3	87 32	76.0	50 30.3	86 31	75.2	51 21.9	86 31	74.4	52 38.6	85 31	73.1	1
49 19.4	87 31	75.1	50 11.4	86 31	74.3	51 03.1	86 31	73.5	52 20.0	85 31	72.3	2
49 00.6	87 31	74.3	49 52.7	87 31	73.5	50 44.4	86 31	72.7	52 01.4	85 31	71.5	3
48 41.8	87 31	73.4	49 34.0	87 31	72.7	50 25.8	86 31	71.9	51 42.9	85 31	70.6	4
48 23.2	87 31	72.6	49 15.4	87 31	71.8	50 07.3	86 31	71.1	51 24.5	85 30	69.8	85
48 04.6	87 31	71.7	48 56.8	87 31	71.0	49 48.8	86 31	70.2	51 06.3	86 30	69.0	6
47 46.0	88 31	70.9	48 38.4	87 31	70.2	49 30.5	87 30	69.4	50 48.1	86 30	68.2	7
47 27.6	88 31	70.1	48 20.1	87 30	69.4	49 12.3	87 30	68.6	50 30.0	86 30	67.4	8
47 09.3	88 30	69.3	48 01.9	87 30	68.6	48 54.1	87 30	67.8	50 12.0	86 30	66.7	9
46 51.1	88 30	68.4	47 43.7	88 30	67.7	48 36.1	87 30	67.0	49 54.1	86 30	65.9	90

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°
91	42 32.9	90 31	70.5	43 26.6	89 30	69.9	44 46.8	89 30	69.0
2	42 14.5	90 30	69.7	43 08.3	90 30	69.1	44 28.6	89 30	68.1
3	41 56.2	90 30	68.8	42 50.1	90 30	68.2	44 10.5	89 30	67.3
4	41 38.1	90 30	68.0	42 32.0	90 30	67.4	43 52.6	89 30	66.5
95	41 20.0	90 30	67.2	42 14.0	90 30	66.6	43 34.7	89 30	65.7
6	41 02.1	90 30	66.3	41 56.2	90 30	65.8	43 17.0	89 30	64.9
7	40 44.2	90 30	65.5	41 38.4	90 29	64.9	42 59.4	90 29	64.0
8	40 26.5	91 29	64.7	41 20.8	90 29	64.1	42 41.9	90 29	63.2
9	40 08.9	91 29	63.8	41 03.3	90 29	63.3	42 24.5	90 29	62.4
100	39 51.4	91 29	63.0	40 45.9	91 29	62.5	42 07.2	90 29	61.6
1	39 34.1	91 29	62.2	40 28.6	91 29	61.7	41 50.1	90 29	60.8
2	39 16.9	91 28	61.4	40 11.5	91 28	60.8	41 33.1	90 28	60.0
3	38 59.8	91 28	60.6	39 54.5	91 28	60.0	41 16.3	91 28	59.2
4	38 42.9	91 28	59.7	39 37.6	91 28	59.2	40 59.6	91 28	58.4
105	38 26.0	92 28	58.9	39 20.9	91 28	58.4	40 43.0	91 27	57.6
6	38 09.4	92 28	58.1	39 04.4	92 27	57.6	40 26.6	91 27	56.8
7	37 52.9	92 27	57.3	38 47.9	92 27	56.8	40 10.3	91 27	56.0
8	37 36.5	92 27	56.5	38 31.7	92 27	56.0	39 54.2	91 27	55.2
9	37 20.3	92 27	55.7	38 15.6	92 27	55.2	39 38.2	92 26	54.4
110	37 04.2	92 26	54.9	37 59.6	92 26	54.4	39 22.4	92 26	53.7
1	36 48.3	93 26	54.1	37 43.8	92 26	53.6	39 06.7	92 26	52.9
2	36 32.6	93 26	53.3	37 28.1	92 26	52.8	38 51.2	92 26	52.1
3	36 17.0	93 26	52.5	37 12.7	93 26	52.0	38 35.9	92 25	51.3
4	36 01.6	93 25	51.7	36 57.3	93 25	51.2	38 20.8	93 25	50.5
115	35 46.4	93 25	50.9	36 42.2	93 25	50.4	38 05.8	93 25	49.7
6	35 31.3	93 25	50.1	36 27.2	93 25	49.6	37 50.9	93 24	49.0
7	35 16.4	93 25	49.3	36 12.4	93 25	48.9	37 36.3	93 24	48.2
8	35 01.7	94 24	48.5	35 57.8	93 24	48.1	37 21.8	93 24	47.4
9	34 47.1	94 24	47.7	35 43.4	94 24	47.3	37 07.5	94 24	46.6
120	34 32.8	94 24	46.9	35 29.1	94 23	46.5	36 53.4	94 23	45.8
1	34 18.6	94 23	46.1	35 15.0	94 23	45.7	36 39.5	94 23	45.1
2	34 04.6	94 23	45.3	35 01.1	94 23	44.9	36 25.8	94 23	44.3
3	33 50.8	94 23	44.5	34 47.4	94 22	44.1	36 12.2	94 22	43.5
4	33 37.2	95 22	43.8	34 33.9	94 22	43.4	35 58.9	94 22	42.8
125	33 23.8	95 22	43.0	34 20.6	95 22	42.6	35 45.7	94 22	42.0
6	33 10.6	95 22	42.2	34 07.5	95 22	41.8	35 32.7	95 21	41.2
7	32 57.6	95 21	41.4	33 54.6	95 21	41.0	35 20.0	95 21	40.4
8	32 44.7	95 21	40.6	33 41.9	95 21	40.2	35 07.4	95 21	39.7
9	32 32.1	95 21	39.8	33 29.3	95 20	39.5	34 55.0	95 20	38.9
130	32 19.7	96 20	39.0	33 17.0	95 20	38.7	34 42.9	95 20	38.1
1	32 07.5	96 20	38.2	33 04.9	96 20	37.9	34 30.9	95 20	37.4
2	31 55.5	96 20	37.5	32 53.0	96 19	37.1	34 19.1	96 19	36.6
3	31 43.8	96 19	36.7	32 41.3	96 19	36.3	34 07.6	96 19	35.8
4	31 32.2	96 19	35.9	32 29.9	96 19	35.6	33 56.3	96 19	35.1
135	31 20.9	96 19	35.1	32 18.6	96 18	34.8	33 45.2	96 18	34.3
6	31 09.7	96 18	34.3	32 07.6	96 18	34.0	33 34.3	96 18	33.5
7	30 58.8	97 18	33.5	31 56.8	97 18	33.2	33 23.6	96 17	32.8
8	30 48.2	97 17	32.8	31 46.2	97 17	32.5	33 13.1	97 17	32.0
9	30 37.7	97 17	32.0	31 35.8	97 17	31.7	33 02.9	97 17	31.2
140	30 27.5	97 17	31.2	31 25.6	97 17	30.9	32 52.9	97 16	30.5
1	30 17.5	97 16	30.4	31 15.7	97 16	30.1	32 43.1	97 16	29.7
2	30 07.7	97 16	29.6	31 06.0	97 16	29.4	32 33.5	97 16	28.9
3	29 58.1	97 16	28.9	30 56.6	97 15	28.6	32 24.1	97 15	28.2
4	29 48.8	98 15	28.1	30 47.3	97 15	27.8	32 15.0	97 15	27.4
145	29 39.8	98 15	27.3	30 38.3	98 15	27.0	32 06.2	98 14	26.7
6	29 30.9	98 14	26.5	30 29.6	98 14	26.3	31 57.5	98 14	25.9
7	29 22.3	98 14	25.7	30 21.0	98 14	25.5	31 49.1	98 14	25.1
8	29 14.0	98 14	25.0	30 12.8	98 13	24.7	31 40.9	98 13	24.4
9	29 05.8	98 13	24.2	30 04.7	98 13	23.9	31 33.0	98 13	23.6
150	28 58.0	98 13	23.4	29 56.9	98 13	23.2	31 25.3	98 12	22.8
1	28 50.3	98 12	22.6	29 49.3	98 12	22.4	31 17.8	98 12	22.1
2	28 42.9	99 12	21.8	29 42.0	98 12	21.6	31 10.6	98 12	21.3
3	28 35.8	99 12	21.0	29 34.9	99 11	20.9	31 03.6	99 11	20.6
4	28 28.9	99 11	20.3	29 28.1	99 11	20.1	30 56.9	99 11	19.8
155	28 22.3	99 11	19.5	29 21.5	99 11	19.3	30 50.4	99 10	19.0
6	28 15.9	99 10	18.7	29 15.2	99 10	18.5	30 44.1	99 10	18.3
7	28 09.7	99 10	17.9	29 09.1	99 10	17.8	30 38.1	99 10	17.5
8	28 03.8	99 09	17.2	29 03.3	99 09	17.0	30 32.4	99 09	16.8
9	27 58.2	99 09	16.4	28 57.7	99 09	16.2	30 26.9	99 09	16.0
160	27 52.8	99 09	15.6	28 52.4	99 08	15.4	30 21.6	99 08	15.2
1	27 47.7	99 08	14.8	28 47.3	99 08	14.7	30 16.6	99 08	14.5
2	27 42.8	99 08	14.0	28 42.5	99 08	13.9	30 11.8	99 08	13.7
3	27 38.2	99 07	13.3	28 37.9	99 08	13.1	30 07.3	99 07	12.9
4	27 33.9	99 07	12.5	28 33.6	99 07	12.4	30 03.1	99 07	12.2
165	27 29.8	1.0 06	11.7	28 29.5	1.0 06	11.6	29 59.1	1.0 06	11.4
6	27 26.0	1.0 06	10.9	28 25.7	1.0 06	10.8	29 55.4	1.0 06	10.7
7	27 22.4	1.0 06	10.1	28 22.2	1.0 05	10.0	29 51.9	1.0 05	09.9
8	27 19.1	1.0 05	09.4	28 18.9	1.0 05	09.3	29 48.6	1.0 05	09.1
9	27 16.0	1.0 05	08.6	28 15.9	1.0 05	08.5	29 45.7	1.0 05	08.4
170	27 13.3	1.0 04	07.8	28 13.1	1.0 04	07.7	29 43.0	1.0 04	07.6
1	27 10.8	1.0 04	07.0	28 10.7	1.0 04	07.0	29 40.5	1.0 04	06.9
2	27 08.5	1.0 03	06.2	28 08.4	1.0 03	06.2	29 38.3	1.0 03	06.1
3	27 06.5	1.0 03	05.5	28 06.4	1.0 03	05.4	29 36.4	1.0 03	05.3
4	27 04.8	1.0 02	04.7	28 04.7	1.0 02	04.6	29 34.7	1.0 02	04.6
175	27 03.3	1.0 02	03.9	28 03.3	1.0 02	03.9	29 33.2	1.0 02	03.8
6	27 02.1	1.0 02	03.1	28 02.1	1.0 02	03.1	29 32.1	1.0 02	03.0
7	27 01.2	1.0 01	02.3	28 01.2	1.0 02	02.3	29 31.2	1.0 01	02.3
8	27 00.5	1.0 01	01.6	28 00.5	1.0 01	01.5	29 30.5	1.0 01	01.5
9	27 00.1	1.0 00	00.8	28 00.1	1.0 00	00.8	29 30.1	1.0 00	00.8
180	27 00.0	1.0 00	00.0	28 00.0	1.0 00	00.0	29 30.0	1.0 00	00.0

H.A.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°
91	45 40.0	88 30	68.3	46 33.0	88 30	67.6	47 25.7	88 30	66.9
2	45 21.9	89 30	67.5	46 15.0	88 30	66.8	47 07.8	88 30	66.1
3	45 03.9	89 30	66.7	45 57.1	88 30	66.0	46 50.0	88 30	65.3
4	44 46.0	89 30	65.9	45 39.3	89 29	65.2	46 32.3	88 29	64.5
95	44 28.3	89 29	65.0	45 21.6	89 29	64.4	46 14.7	88 29	63.7
6	44 10.6	89 29	64.2	45 04.0	89 29	63.6	45 57.3	88 29	62.9
7	43 53.1	89 29	63.4	44 46.6	89 29	62.8	45 39.9	89 29	62.1
8	43 35.7	90 29	62.6	44 29.3	89 29	62.0	45 22.7	89 28	61.4
9	43 18.4	90 29	61.8	44 12.1	89 28	61.2	45 05.6	89 28	60.6
100	43 01.2	90 28	61.0	43 55.1	90 28	60.4	44 48.7	89 28	59.8
1	42 44.2	90 28	60.2	43 38.1	90 28	59.6	44 31.9	89 28	59.0
2	42 27.3	90 28	59.4	43 21.4	90 28	58.8	44 15.2	90 28	58.2
3	42 10.6	90 28	58.6	43 04.7	90 28	58.1	43 58.7	90 27	57.4
4	41 54.0	91 27	57.8	42 48.2	90 27	57.3	43 42.3	90 27	56.7
105	41 37.5	91 27	57.1	42 31.9	90 27	56.5	43 26.0	90 27	55.9
6	41 21.2	91 27	56.3	42 15.6	91 27	55.7	43 09.9	90 27	55.1
7	41 05.0	91 27	55.5	41 59.6	91 27	54.9	42 54.0	91 26	54.4
8	40 49.0	91 26	54.7	41 43.7	91 26	54.2	42 38.2	91 26	53.6
9	40 33.1	91 26	53.9	41 27.9	91 26	53.4	42 22.5	91 26	52.8
110	40 17.4	92 26	53.1	41 12.3	91 26	52.6	42 07.0	91 26	52.1
1	40 01.9	92 26	52.4	40 56.9	92 25	51.8	41 51.7	91 25	51.3
2	39 46.5	92 25	51.6	40 41.6	92 25	51.1	41 36.6	91 25	50.5
3	39 31.3	92 25	50.8	40 26.5	92 25	50.3	41 21.6	92 25	49.8
4	39 16.2	92 25	50.0	40 11.5	92 25	49.5	41 06.7	92 24	49.0
115	39 01.3	93 24	49.3	39 56.8	92 24	48.8	40 52.1	92 24	48.3
6	38 46.6	93 24	48.5	39 42.2	92 24	48.0	40 37.6	92 24	47.5
7	38 32.1	93 24	47.7	39 27.7	93 24	47.2	40 23.3	92 24	46.7
8	38 17.7	93 24	46.9	39 13.5	93 23	46.5	40 09.1	93 23	46.0
9	38 03.5	93 23	46.2	38 59.4	93 23	45.7	39 55.2	93 23	45.2
120	37 49.5	93 23	45.4	38 45.5	93 23	44.9	39 41.4	93 23	44.5
1	37 35.7	94 23	44.6	38 31.8	93 23	44.2	39 27.8	93 22	43.7
2	37 22.1	94 22	43.9	38 18.3	94 22	43.4	39 14.4	93 22	43.0
3	37 08.6	94 22	43.1	38 05.0	94 22	42.7	39 01.2	94 22	42.2
4	36 55.4	94 22	42.3	37 51.8	94 22	41.9	38 48.2	94 21	41.5
125	36 42.3	94 21	41.6	37 38.9	94 21	41.2	38 35.3	94 21	40.7
6	36 29.5	94 21	40.8	37 26.1	94 21	40.4	38 22.7	94 21	40.0
7	36 16.8	95 21	40.0	37 13.5	95 21	39.6	38 10.2	94 20	39.2
8	36 04.3	95 20	39.3	37 01.2	95 20	38.9	37 58.0	95 20	38.5
9	35 52.1	95 20	38.5	36 49.0	95 20	38.1	37 45.9	95 20	37.7
130	35 40.0	95 20	37.8	36 37.1	95 20	37.4	37 34.1	95 19	37.0
1	35 28.1	95 19	37.0	36 25.3	95 19	36.6	37 22.4	95 19	36.2
2	35 16.5	96 19	36.2	36 13.8	95 19	35.9	37 11.0	95 19	35.5
3	35 05.0	96 19	35.5	36 02.4	96 19	35.1	36 59.7	95 18	34.8
4	34 53.8	96 18	34.7	35 51.3	96 18	34.4	36 48.7	96 18	34.0
135	34 42.8	96 18	34.0	35 40.4	96 18	33.6	36 37.9	96 18	33.3
6	34 32.0	96 18	33.2	35 29.6	96 18	32.9	36 27.3	96 17	32.5
7	34 21.4	96 17	32.4	35 19.2	96 17	32.1	36 16.9	96 17	31.8
8	34 11.0	96 17	31.7	35 08.9	96 17	31.4	36 06.7	96 17	31.0
9	34 00.9	97 17	30.9	34 58.8	97 16	30.6	35 56.7	96 16	30.3
140	33 50.9	97 16	30.2	34 49.0	97 16	29.9	35 47.0	97 16	29.6
1	33 41.2	97 16	29.4	34 39.4	97 16	29.1	35 37.4	97 16	28.8
2	33 31.8	97 15	28.7	34 30.0	97 15	28.4	35 28.1	97 15	28.1
3	33 22.5	97 15	27.9	34 20.8	97 15	27.6	35 19.1	97 15	27.3
4	33 13.5	97 15	27.2	34 11.9	97 15	26.9	35 10.2	97 14	26.6
145	33 04.7	97 14	26.4	34 03.1	97 14	26.1	35 01.6	97 14	25.9
6	32 56.1	98 14	25.6	33 54.7	98 14	25.4	34 53.2	98 14	25.1
7	32 47.8	98 14	24.9	33 46.4	98 13	24.6	34 45.0	98 13	24.4
8	32 39.7	98 13	24.1	33 38.4	98 13	23.9	34 37.1	98 13	23.6
9	32 31.8	98 13	23.4	33 30.6	98 13	23.1	34 29.3	98 12	22.9
150	32 24.2	98 12	22.6	33 23.0	98 12	22.4	34 21.9	98 12	22.2
1	32 16.8	98 12	21.9	33 15.7	98 12	21.6	34 14.6	98 12	21.4
2	32 09.6	98 12	21.1	33 08.6	98 11	20.9	34 07.6	98 11	20.7
3	32 02.7	98 11	20.4	33 01.8	98 11	20.1	34 00.8	98 11	19.9
4	31 56.0	99 11	19.6	32 55.2	99 11	19.4	33 54.3	99 10	19.2
155	31 49.6	99 10	18.8	32 48.8	99 10	18.7	33 48.0	99 10	18.5
6	31 43.4	99 10	18.1	32 42.7	99 10	17.9	33 41.9	99 10	17.7
7	31 37.5	99 09	17.3	32 36.8	99 09	17.2	33 36.1	99 09	17.0
8	31 31.8	99 09	16.6	32 31.1	99 09	16.4	33 30.5	99 09	16.2
9	31 26.3	99 09	15.8	32 25.7	99 09	15.7	33 25.2	99 09	15.5
160	31 21.1	99 08	15.1	32 20.6	99 08	14.9	33 20.1	99 08	14.8
1	31 16.1	99 08	14.3	32 15.7	99 08	14.2	33 15.2	99 08	14.0
2	31 11.4	99 07	13.6	32 11.0	99 07	13.4	33 10.6	99 07	13.3
3	31 07.0	99 07	12.8	32 06.6	99 07	12.7	33 06.2	99 07	12.5
4	31 02.8	99 07	12.1	32 02.4	99 07	11.9	33 02.1	99 06	11.8
165	30 58.8	1.0 06	11.3	31 58.5	1.0 06	11.2	32 58.2	99 06	11.1
6	30 55.1	1.0 06	10.6	31 54.9	1.0 06	10.4	32 54.6	1.0 06	10.3
7	30 51.7	1.0 05	09.8	31 51.4	1.0 05	09.7	32 51.2	1.0 05	09.6
8	30 48.5	1.0 05	09.0	31 48.3	1.0 05	09.0	32 48.1	1.0 05	08.9
9	30 45.5	1.0 04	08.3	31 45.4	1.0 04	08.2	32 45.2	1.0 04	08.1
170	30 42.8	1.0 04	07.5	31 42.7	1.0 04	07.5	32 42.6	1.0 04	07.4
1	30 40.4	1.0 04	06.8	31 40.3	1.0 04	06.7	32 40.2	1.0 04	06.6
2	30 38.2	1.0 03	06.0	31 38.1	1.0 03	06.0	32 38.0	1.0 03	05.9
3	30 36.3	1.0 03	05.3	31 36.2	1.0 03	05.2	32 36.2	1.0 03	05.2
4	30 34.6	1.0 02	04.5	31 34.6	1.0 02	04.5	32 34.5	1.0 02	04.4
175	30 33.2	1.0 02	03.8	31 33.2	1.0 02	03.7	32 33.1	1.0 02	03.7
6	30 32.1	1.0 02	03.0	31 32.0	1.0 01	03.0	32 32.0	1.0 01	03.0
7	30 31.2	1.0 02	02.3	31 31.1	1.0 01	02.2	32 31.1	1.0 01	02.2
8	30 30.5	1.0 01	01.5	31 30.5	1.0 01	01.5	32 30.5	1.0 01	01.5
9	30 30.1	1.0 00	00.8	31 30.1	1.0 00	00.7	32 30.1	1.0 00	00.7
180	30 30.0	1.0 00	00.0	31 30.0	1.0 00	00.0	32 30.0	1.0 00	00.0

H.A.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°
91	48 18.2	87 30	66.2	49 36.3	86 29	65.1
2	48 00.4	87 30	65.4	49 18.7	87 29	64.3
3	47 42.6	88 29	64.6	49 01.1	87 29	63.5
4	47 25.1	88 29	63.8	48 43.7	87 29	62.7
95	47 07.6	88 29	63.0	48 26.4	87 29	62.0
6	46 50.2	88 29	62.3	48 09.2	87 28	61.2
7	46 33.0	88 28	61.5	47 52.2	88 28	60.4
8	46 15.9	88 28	60.7	47 35.2	88 28	59.7
9	45 58.9	89 28	59.9	47 18.5	88 28	58.9
100	45 42.1	89 28	59.1	47 01.8	88 28	58.1
1	45 25.4	89 28	58.4	46 45.3	88 27	57.4
2	45 08.8	89 27	57.6	46 28.9	89 27	56.6
3	44 52.4	89 27	56.8	46 12.7	89 27	55.9
4	44 36.1	90 27	56.1	45 56.6	89 27	55.1
105	44 20.0	90 27	55.3	45 40.6	89 26	54.3
6	44 04.0	90 26	54.5	45 24.8	90 26	53.6
7	43 48.2	90 26	53.8	45 09.2	90 26	52.9
8	43 32.5	90 26	53.0	44 53.7	90 26	52.1
9	43 17.0	91 26	52.3	44 38.3	90 25	51.4
110	43 01.6	91 25	51.5	44 23.2	90 25	50.6
1	42 46.4	91 25	50.7	44 08.2	91 25	49.9
2	42 31.4	91 25	50.0	43 53.3	91 24	49.1
3	42 16.5	91 24	49.2	43 38.6	91 24	48.4
4	42 01.8	92 24	48.5	43 24.1	91 24	47.7
115	41 47.3	92 24	47.7	43 09.7	91 24	46.9
6	41 32.9	92 24	47.0	42 55.6	92 23	46.2
7	41 18.7	92 23	46.2	42 41.5	92 23	45.4
8	41 04.7	92 23	45.5	42 27.7	92 23	44.7
9	40 50.8	93 23	44.7	42 14.1	92 22	44.0
120	40 37.2	93 22	44.0	42 00.6	93 22	43.2
1	40 23.7	93 22	43.2	41 47.3	93 22	42.5
2	40 10.4	93 22	42.5	41 34.2	93 22	41.8
3	39 57.3	93 22	41.8	41 21.3	93 21	41.0
4	39 44.4	94 21	41.0	41 08.5	93 21	40.3
125	39 31.7	94 21	40.3	40 56.0	94 21	39.6
6	39 19.1	94 21	39.5	40 43.6	94 20	38.9
7	39 06.8	94 20	38.8	40 31.5	94 20	38.1
8	38 54.7	94 20	38.1	40 19.5	94 20	37.4
9	38 42.7	95 20	37.3	40 07.7	94 19	36.7
130	38 31.0	95 19	36.6	39 56.2	95 19	36.0
1	38 19.4	95 19	35.8	39 44.8	95 19	35.2
2	38 08.1	95 19	35.1	39 33.6	95 18	34.5
3	37 57.0	95 18	34.4	39 22.7	95 18	33.8
4	37 46.0	96 18	33.6	39 11.9	95 18	33.1
135	37 35.3	96 18	32.9	39 01.4	96 17	32.3
6	37 24.8	96 17	32.2	38 51.0	96 17	31.6
7	37 14.5	96 17	31.4	38 40.9	96 17	30.9
8	37 04.4	96 16	30.7	38 30.9	96 16	30.2
9	36 54.6	96 16	30.0	38 21.2	96 16	29.5
140	36 44.9	97 16	29.2	38 11.7	96 15	28.7
1	36 35.5	97 15	28.5	38 02.4	97 15	28.0
2	36 26.3	97 15	27.8	37 53.4	97 15	27.3
3	36 17.3	97 15	27.0	37 44.5	97 14	26.6
4	36 08.5	97 14	26.3	37 35.9	97 14	25.9
145	36 00.0	97 14	25.6	37 27.5	97 14	25.1
6	35 51.7	97 14	24.8	37 19.3	97 13	24.4
7	35 43.6	98 13	24.1	37 11.4	97 13	23.7
8	35 35.7	98 13	23.4	37 03.6	98 13	23.0
9	35 28.1	98 12	22.6	36 56.1	98 12	22.3
150	35 20.7	98 12	21.9	36 48.8	98 12	21.5
1	35 13.5	98 11	21.2	36 41.8	98 11	20.8
2	35 06.5	98 11	20.4	36 34.9	98 11	20.1
3	34 59.8	98 11	19.7	36 28.3	98 11	19.4
4	34 53.4	98 10	19.0	36 22.0	98 10	18.7
155	34 47.1	99 10	18.3	36 15.8	99 10	17.9
6	34 41.1	99 10	17.5	36 09.9	99 09	17.2
7	34 35.4	99 09	16.8	36 04.3	99 09	16.5
8	34 29.8	99 09	16.1	35 58.8	99 09	15.8
9	34 24.6	99 08	15.3	35 53.6	99 08	15.1
160	34 19.5	99 08	14.6	35 48.7	99 08	14.4
1	34 14.7	99 08	13.9	35 44.0	99 07	13.6
2	34 10.1	99 07	13.1	35 39.5	99 07	12.9
3	34 05.8	99 07	12.4	35 35.2	99 07	12.2
4	34 01.7	99 06	11.7	35 31.2	99 06	11.5
165	33 57.9	99 06	11.0	35 27.4	99 06	10.8
6	33 54.3	99 06	10.2	35 23.9	1.0 05	10.0
7	33 51.0	1.0 05	09.5	35 20.6	1.0 05	09.3
8	33 47.9	1.0 05	08.8	35 17.6	1.0 05	08.6
9	33 45.0	1.0 04	08.0	35 14.8	1.0 04	07.9
170	33 42.4	1.0 04	07.3	35 12.2	1.0 04	07.2
1	33 40.1	1.0 04	06.6	35 09.9	1.0 03	06.5
2	33 38.0	1.0 03	05.8	35 07.8	1.0 03	05.7
3	33 36.1	1.0 03	05.1	35 06.0	1.0 03	05.0
4	33 34.5	1.0 02	04.4	35 04.4	1.0 02	04.3
175	33 33.1	1.0 02	03.7	35 03.1	1.0 02	03.6
6	33 32.0	1.0 01	02.9	35 02.0	1.0 01	02.9
7	33 31.1	1.0 01	02.2	35 01.1	1.0 01	02.2
8	33 30.5	1.0 01	01.5	35 00.5	1.0 01	01.4
9	33 30.1	1.0 00	00.7	35 00.1	1.0 00	00.7
180	33 30.0	1.0 00	00.0	35 00.0	1.0 00	00.0

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	73 30.0	1.0 01	180.0	74 00.0	1.0 01	180.0	75 00.0	1.0 01	180.0	75 30.0	1.0 01	180.0	76 00.0	1.0 01	180.0	76 30.0	1.0 01	180.0	78 00.0	1.0 01	180.0	78 30.0	1.0 01	180.0	00
1	73 29.6	1.0 02	178.0	73 59.6	1.0 02	177.9	74 59.6	1.0 02	177.8	75 29.6	1.0 02	177.8	75 59.6	1.0 02	177.7	76 29.6	1.0 02	177.7	77 59.6	1.0 02	177.5	78 29.6	1.0 02	177.5	1
2	73 28.6	1.0 03	175.9	73 58.6	1.0 03	175.8	74 58.5	1.0 03	175.7	75 28.5	1.0 03	175.6	75 58.5	1.0 03	175.5	76 28.4	1.0 03	175.4	77 58.3	1.0 04	175.1	78 28.3	1.0 04	174.9	2
3	73 26.9	1.0 04	173.9	73 56.8	1.0 04	173.8	74 56.7	1.0 04	173.5	75 26.6	1.0 04	173.4	75 56.6	1.0 04	173.3	76 26.5	1.0 05	173.1	77 56.2	1.0 05	172.6	78 26.1	1.0 05	172.4	3
4	73 24.4	1.0 05	171.8	73 54.3	1.0 05	171.7	74 54.1	1.0 05	171.4	75 24.0	1.0 06	171.2	75 53.9	1.0 06	171.0	76 23.8	1.0 06	170.8	77 53.3	99 06	170.1	78 23.1	99 06	169.9	4
05	73 21.3	1.0 06	169.8	73 51.2	99 06	169.6	74 50.8	99 07	169.3	75 20.7	99 07	169.0	75 50.5	99 07	168.8	76 20.3	99 07	168.6	77 49.5	99 08	167.7	78 19.2	99 08	167.4	05
6	73 17.5	99 07	167.8	73 47.3	99 08	167.6	74 46.8	99 08	167.1	75 16.6	99 08	166.9	75 46.3	99 08	166.6	76 16.0	99 08	166.3	77 45.0	99 09	165.3	78 14.6	99 09	164.9	6
7	73 13.1	99 09	165.8	73 42.8	99 09	165.6	74 42.1	99 09	165.0	75 11.8	99 09	164.7	75 41.4	99 09	164.4	76 11.0	99 10	164.1	77 39.6	98 10	162.9	78 09.1	98 10	162.5	7
8	73 08.0	99 10	163.8	73 37.6	99 10	163.6	74 36.8	99 10	162.9	75 06.3	98 10	162.6	75 35.8	98 10	162.3	76 05.3	98 11	161.9	77 33.5	98 11	160.6	78 02.8	98 12	160.1	8
9	73 02.2	98 11	161.9	73 31.7	98 11	161.6	74 30.7	98 11	160.9	75 00.1	98 11	160.5	75 29.5	98 12	160.1	75 58.9	98 12	159.7	77 26.6	97 13	158.2	77 55.8	97 13	157.7	9
10	72 55.8	98 12	159.9	73 25.2	98 12	159.6	74 24.0	98 12	158.8	74 53.3	98 13	158.4	75 22.5	97 13	158.0	75 51.8	97 13	157.5	77 19.0	97 14	156.0	77 48.0	96 14	155.4	10
1	72 48.8	98 13	158.0	73 18.1	98 13	157.6	74 16.6	97 13	156.8	74 45.8	97 14	156.4	75 14.9	97 14	155.9	75 44.0	97 14	155.4	77 10.7	96 15	153.7	77 39.5	96 15	153.1	1
2	72 41.2	97 14	156.1	73 10.4	97 14	155.7	74 08.6	97 14	154.8	74 37.6	97 15	154.4	75 06.6	96 15	153.9	75 35.5	96 15	153.3	77 01.7	95 16	151.5	77 30.3	95 16	150.8	2
3	72 32.9	97 15	154.2	73 02.0	97 15	153.8	74 00.0	96 15	152.8	74 28.9	96 16	152.4	74 57.7	96 16	151.8	75 26.4	96 16	151.3	76 52.1	95 17	149.3	77 20.4	94 18	148.6	3
4	72 24.1	97 16	152.3	72 53.1	96 16	151.9	73 50.8	96 16	150.9	74 19.5	96 17	150.4	74 48.2	95 17	149.8	75 16.7	95 17	149.2	76 41.8	94 18	147.2	77 09.9	94 18	146.4	4
15	72 14.8	96 16	150.5	72 43.6	96 17	150.0	73 41.0	95 17	149.0	74 09.6	95 18	148.4	74 38.1	95 18	147.9	75 06.4	94 18	147.2	76 30.9	93 19	145.1	76 58.8	93 19	144.3	15
6	72 04.9	96 17	148.7	72 33.6	95 18	148.2	73 30.6	95 18	147.1	73 59.1	95 18	146.5	74 27.4	94 19	145.9	74 55.6	94 19	145.3	76 19.5	93 20	143.1	76 47.2	92 20	142.3	6
7	71 54.5	95 18	146.9	72 23.0	95 18	146.4	73 19.8	94 19	145.3	73 48.0	94 19	144.7	74 16.2	94 20	144.0	74 44.2	93 20	143.4	76 07.5	92 21	141.1	76 34.9	91 21	140.2	7
8	71 43.5	95 19	145.1	72 11.9	94 19	144.6	73 08.4	94 20	143.4	73 36.5	93 20	142.8	74 04.4	93 20	142.2	74 32.3	93 21	141.5	75 55.0	91 22	139.2	76 22.2	90 22	138.3	8
9	71 32.1	94 20	143.3	72 00.4	94 20	142.8	72 56.5	93 21	141.6	73 24.4	93 21	141.0	73 52.2	92 21	140.3	74 19.9	92 21	139.6	75 42.0	90 22	137.2	76 09.0	90 23	136.4	9
20	71 20.2	94 21	141.6	71 48.3	93 21	141.1	72 44.2	93 21	139.9	73 11.9	92 22	139.2	73 39.5	92 22	138.5	74 07.0	91 22	137.8	75 28.5	90 23	135.4	75 55.2	89 24	134.5	20
1	71 07.9	93 21	139.9	71 35.8	93 22	139.4	72 31.3	92 22	138.1	72 58.9	92 22	137.5	73 26.4	91 23	136.8	73 53.7	91 23	136.0	75 14.5	89 24	133.6	75 41.1	88 24	132.6	1
2	70 55.1	93 22	138.3	71 22.9	92 22	137.7	72 18.1	92 23	136.4	72 45.5	91 23	135.8	73 12.8	91 23	135.1	73 39.9	90 24	134.3	75 00.2	88 25	131.8	75 26.5	87 25	130.9	2
3	70 41.9	92 23	136.7	71 09.5	92 23	136.1	72 04.4	91 23	134.8	72 31.7	91 24	134.1	72 58.8	90 24	133.4	73 25.7	90 24	132.6	74 45.4	88 25	130.1	75 11.5	87 26	129.1	3
4	70 28.3	92 23	135.0	70 55.8	91 24	134.4	71 50.4	91 24	133.1	72 17.4	90 24	132.4	72 44.4	89 25	131.7	73 11.1	89 25	130.9	74 30.3	87 26	128.4	74 56.2	86 26	127.4	4
25	70 14.3	91 24	133.5	70 41.6	91 24	132.8	71 35.9	90 25	131.5	72 02.8	89 25	130.8	72 29.6	89 25	130.1	72 56.2	88 26	129.3	74 14.8	86 26	126.7	74 40.5	85 27	125.7	25
6	69 59.9	91 25	131.9	70 27.1	90 25	131.3	71 21.1	89 25	129.9	71 47.9	89 26	129.2	72 14.5	88 26	128.5	72 40.9	88 26	127.7	73 58.9	86 27	125.1	74 24.5	85 27	124.1	6
7	69 45.2	90 25	130.4	70 12.3	90 25	129.7	71 06.0	89 26	128.4	71 32.6	88 26	127.7	71 59.0	88 26	126.9	72 25.3	87 27	126.1	73 42.8	85 27	123.5	74 08.2	84 28	122.5	7
8	69 30.2	90 26	128.9	69 57.1	90 26	128.2	70 50.5	88 26	126.9	71 17.0	88 27	126.1	71 43.3	87 27	125.4	72 09.4	87 27	124.6	73 26.4	84 28	122.0	73 51.6	84 28	121.0	8
9	69 14.8	90 26	127.4	69 41.6	89 26	126.7	70 34.7	88 27	125.4	71 01.0	87 27	124.7	71 27.2	87 27	123.9	71 53.1	86 28	123.1	73 09.7	84 28	120.5	73 34.7	83 29	119.5	9
30	68 59.1	89 27	125.9	69 25.8	89 27	125.3	70 18.7	88 27	123.9	70 44.8	87 27	123.2	71 10.8	86 28	122.4	71 36.6	86 28	121.6	72 52.7	83 29	119.0	73 17.6	82 29	118.0	30
1	68 43.2	89 27	124.5	69 09.7	88 27	123.9	70 02.3	87 28	122.5	70 28.4	87 28	121.7	70 54.2	86 28	121.0	71 19.9	85 28	120.2	72 35.5	83 29	117.5	73 00.2	82 29	116.6	1
2	68 27.0	88 28	123.1	68 53.4	88 28	122.4	69 45.7	87 28	121.1	70 11.6	86 28	120.3	70 37.3	85 28	119.6	71 02.9	85 29	118.8	72 18.1	82 29	116.1	72 42.6	81 30	115.2	2
3	68 10.5	88 28	121.7	68 36.8	87 28	121.1	69 28.8	86 28	119.7	69 54.6	86 29	118.9	70 20.2	85 29	118.2	70 45.6	84 29	117.4	72 00.4	82 30	114.8	72 24.9	81 30	113.8	3
4	67 53.7	88 28	120.4	68 19.9	87 28	119.7	69 11.8	86 29	118.3	69 37.4	85 29	117.6	70 02.9	85 29	116.8	70 28.2	84 29	116.0	71 42.6	81 30	113.4	72 06.9	81 30	112.5	4
35	67 36.7	87 29	119.0	68 02.8	87 29	118.4	68 54.5	85 29	117.0	69 20.0	85 29	116.2	69 45.4	84 30	115.5	70 10.5	83 30	114.7	71 24.6	81 30	112.1	71 48.8	80 30	111.1	35
6	67 19.6	87 29	117.7	67 45.5	86 29	117.0	68 36.9	85 30	115.7	69 02.4	84 30	114.9	69 27.6	84 30	114.2	69 52.7	83 30	113.4	71 06.4	81 31	110.8	71 30.5	80 31	109.9	6
7	67 02.2	86 29	116.4	67 28.0	86 29	115.7	68 19.2	85 30	114.4	68 44.6	84 30	113.6	69 09.7	83 30	112.9	69 34.7	83 30	112.1	70 48.1	80 31	109.5	71 12.0	79 31	108.6	7
8	66 44.6	86 30	115.1	67 10.3	86 30	114.5	68 01.4	84 30	113.1	68 26.6	84 30	112.4	68 51.6	83 30	111.6	69 16.5	82 31	110.8	70 29.6	80 31	108.3	70 53.4	79 31	107.4	8
9	66 26.8	86 30	113.9	66 52.5	85 30	113.2	67 43.3	84 30	111.8	68 08.5	83 30	111.1	68 33.4	83 31	110.4	68 58.1	82 31	109.6	70 11.0	80 31	107.0	70 34.7	79 31	106.1	9
40	66 08.8	86 30	112.6	66 34.4	85 30	112.0	67 25.1	84 31	110.6	67 50.2	83 31	109.9	68 15.0	83 31	109.1	68 39.7	82 31	108.4	69 52.2	79 31	105.8	70 15.9	78 32	104.9	40
1	65 50.7	85 30	111.4	66 16.2	85 31	110.8	67 06.7	84 31	109.4	67 31.7	83 31	108.7	67 56.5	82 31	107.9	68 21.1	82 31	107.2	69 33.4	79 32	104.7	69 57.0	78 32	103.8	1
2	65 32.5	85 31	110.2	65 57.9	84 31	109.6	66 48.2	83 31	108.2	67 13.1	83 31	107.5	67 37.8	82 31	106.7	68 02.3	81 31	106.0	69 14.4	79 32	103.5	69 38.0	78 32	102.6	2
3	65 14.1	85 31	109.0	65 39.4	84 31	108.4	66 29.6	83 31	107.0	66 54.5	82 31	106.3	67 19.1	82 31	105.6	67 43.5	81 32	104.8	68 55.4	79 32	102.4	69 18.9	78 32	101.5	3
4	64 55.5	85 31	107.9	65 20.8	84 31	107.2	66 10.9	83 31	105.9	66 35.7	82 32	105.2	67 00.2	82 32	104.4	67 24.6	81 32	103.7	68 36.3	78 32	101.3	68 59.7	78 32	100.4	4
45	64 36.9	84 31	106.7	65 02.1	84 31	106.1	65 52.1	83 32	104.7	66 16.8	82 32	104.0	66 41.3	81 32	103.3	67 05.6	81 32	102.6	68 17.1	78 32	100.2	68 40.5	77 32	99.3	45
6	64 18.1	84 31	105.6	64 43.3	84 32	104.9	65 33.1	82 32	103.6	65 57.8	82 32	102.9	66 22.2	81 32	102.2	66 46.4	80 32	101.5	67 57.8	78 32	99.1	68 21.1	77 32	98.2	6
7	63 59.3	84 32	104.4	64 24.4	83 32	103.8	65 14.1	82 32	102.5	65 38.7	82 32	101.8	66 03.1	81 32	101.1	66 27.3	80 32	100.4	67 38.5	78 32	98.0	68 01.8	77 32	97.2	7
8	63 40.3	84 32	103.3	64 05.4	83 32	102.7	64 55.0	82 32	101.4	65 19.5	81 32	100.7	65 43.9	81 32	100.0	66 08.0	80 32	99.3	67 19.2	78 32	97.0	67 42.4	77 32	96.1	8
9	63 21.2	84 32	102.3	63 46.3	83 32	101.6	64 35.8	82 32	100.3	65 00.3	81 32	99.7	65 24.6	81 32	99.0	65 48.7	80 32	98.2	66 59.7	78 32	95.9	67 22.9	77 32	95.1	9
50	63 02.1	84 32	101.2	63 27.1	83 32	100.6	64 16.5	82 32	99.3	64 41.0	81 32	98.6	65 05.3	81 32	97.9	65 29.4	80 32	97.2	66 40.3	78 32	94.9	67 03.5	77 32	94.1	50
1	62 42.9	83 32	100.1	63 07.9	83 32	99.5	63 57.2	82 32	98.2	64 21.7	81 32	97.6	64 45.9	80 32	96.9	65 10.0	80 32	96.2	66 20.8	78 32	93.9	66 44.0	77 33	93.1	1
2	62 23.7	83 32	99.1	62 48.6	83 32	98.5	63 37.9	82 32	97.2	64 02.3	81 32	96.5	64 26.5	80 32	95 9	64 50.5	80 32	95.2	66 01.3	78 33	92.9	66 24.5	77 33	92.1	2
3	62 04.3	83 32	98.0	62 29.2	83 32	97.4	63 18.5	82 32	96.2	63 42.9	81 32	95.5	64 07.0	80 32	94.8	64 31.0	80 32	94.2	65 41.8	78 33	91.9	66 04.9	77 33	91.2	3
4	61 45.0	83 32	97.0	62 09.8	83 32	96.4	62 59.0	81 32	95.2	63 23.4	81 32	94.5	63 47.6	80 32	93.8	64 11.6	80 33	93.2	65 22.3	77 33	91.0	65 45.4	77 33	90.2	4
55	61 25.6	83 32	96.0	61 50.4	83 32	95.4	62 39.6	81 32	94.2	63 03.9	81 33	93.5	63 28.1	80 33	92.9	63 52.0	80 33	92.2	65 02.7	77 33	90.0	65 25.9	77 33	89.3	55
6	61 06.1	83 32	95.0	61 30.9	82 32	94.4	62 20.1	81 33	93.2	62 44.4	81 33	92.5	63 08.6	80 33	91.9	63 32.5	80 33	91.2	64 43.2	77 33	89.1	65 06.3	77 33	88.3	6
7	60 46.6	83 32	94.0	61 11.4	82 32	93.4	62 00.6	81 33	92.2	62 24.9	81 33	91.6	62 49.0	80 33	90.9	63 13.0	80 33	90.3	64 23.7	78 33	88.2	64 46.8	77 33	87.4	7
8	60 27.1	83 33	93.0	60 51.9	82 33	92.4	61 41.0	81 33	91.2	62 05.4	81 33	90.6	62 29.5	80 33	90.0	62 53.4	80 33	89.3	64 04.2	78 32	87.2	64 27.3	77 32	86.5	8
9	60 07.6	83 33	92.0	60 32.4	82 33	91.5	61 21.5	81 33	90.3	61 45.8	81 33	89.7	62 10.0	80 33	89.0	62 33.9	80 33	88.4	63 44.7	78 32	86.3	64 07.8	77 32	85.6	9
60	59 48.1	83 33	91.1	60 12.9	82 33	90.5	61 02.0	81 33	89.3	61 26.3	81 33	88.7	61 50.4	80 33	88.1	62 14.4	80 32	87.5	63 25.2	78 32	85.4	63 48.4	77 32	84.7	60
1	59 28.6	83 33	90.1	59 53.3	82 33	89.6	60 42.4	81 33	88.4	61 06.8	81 33	87.8	61 30.9	80 32	87.2	61 54.9	80 32	86.6	63 05.7	78 32	84.5	63 28.9	77 32	83.8	1
2	59 09.0	83 33	89.2	59 33.8	82 33	88.6	60 22.9	81 32	87.5	60 47.2	81 32	86.9	61 11.4	80 32	86.3	61 35.4	80 32	85.7	62 46.3	78 32	83.7	63 09.5	77 32	83.0	2
3	58 49.5	83 33	88.3	59 14.3	82 32	87.7	60 03.4	81 32	86.6	60 27.8	81 32	86.0	60 51.9	80 32	85.4	61 15.9	80 32	84.8	62 26.9	78 32	82.8	62 50.2	77 32	82.1	3
4	58 30.0	83 33	87.3	58 54.8	82 32	86.8	59 43.9	81 32	85.7	60 08.3	81 32	85.1	60 32.5	80 32	84.5	60 56.5	80 32	83.9	62 07.5	78 32	81.9	62 30.8	77 32	81.3	4
65	58 10.5	83 32	86.4	58 35.3	82 32	85.9	59 24.5	81 32	84.8	59 48.8	81 32	84.2	60 13.0	80 32	83.6	60 37.1	80 32	83.0	61 48.2	78 32	81.1	62 11.5	77 32	80.4	65
6	57 51.0	83 32	85.5	58 15.8	82 32	85.0	59 05.0	82 32	83.9	59 29.4	81 32	83.3	59 53.6	81 32	82.7	60 17.7	80 32	82.1	61 28.9	78 32	80.2	61 52.3	78 32	79.6	6
7	57 31.5	83 32	84.6	57 56.4	83 32	84.1	58 45.6	82 32	83.0	59 10.0	81 32	82.4	59 34.3	81 32	81.8	59 58.4	80 32	81.3	61 09.7	78 32	79.4	61 33.1	78 32	78.7	7
8	57 12.1	83 32	83.7	57 37.0	83 32	83.2	58 26.2	82 32	82.1	58 50.7	81 32	81.6	59 15.0	81 32	81.0	59 39.1	80 32	80.4	60 50.5	78 32	78.6	61 14.0	78 32	77.9	8
9	56 52.7	83 32	82.8	57 17.6	83 32	82.3	58 06.9	82 32	81.2	58 31.4	81 32	80.7	58 55.7	81 32	80.1	59 19.9	80 32	79.5	60 31.4	79 32	77.7	60 54.9	78 32	77.1	9
70	56 33.3	83 32	81.9	56 58.2	83 32	81.4	57 47.6	82 32	80.4	58 12.1	81 32	79.8	58 36.5	81 32	79.3	59 00.7	80 32	78.7	60 12.4	79 32	76.9	60 35.9	78 32	76.3	70
1	56 14.0	83 32	81.1	56 38.9	83 32	80.6	57 28.4	82 32	79.5	57 52.9	82 32	79.0	58 17.3	81 32	78.4	58 41.6	81 32	77.9	59 53.4	79 32	76.1	60 17.0	78 31	75.5	1
2	55 54.8	83 32	80.2	56 19.7	83 32	79.7	57 09.2	82 32	78.7	57 33.8	82 32	78.1	57 58.2	81 32	77.6	58 22.5	81 32	77.0	59 34.4	79 31	75.3	59 58.1	79 31	74.7	2
3	55 35.5	83 32	79.3	56 00.5	83 32	78.8	56 50.1	82 32	77.8	57 14.7	82 32	77.3	57 39.2	81 32	76.8	58 03.5	81 32	76.2	59 15.6	79 31	74.5	59 39.3	79 31	73.9	3
4	55 16.4	84 32	78.5	55 41.4	83 32	78.0	56 31.0	82 32	77.0	56 55.7	82 32	76.5	57 20.2	81 32	75.9	57 44.6	81 31	75.4	58 56.8	79 31	73.7	59 20.6	79 31	73.1	4
75	54 57.3	84 32	77.6	55 22.3	83 32	77.2	56 12.0	82 32	76.2	56 36.7	82 31	75.6	57 01.3	82 31	75.1	57 25.7	81 31	74.6	58 38.1	80 31	72.9	59 01.9	79 31	72.3	75
6	54 38.2	84 32	76.8	55 03.3	83 32	76.3	55 53.1	83 31	75.3	56 17.8	82 31	74.8	56 42.4	82 31	74.3	57 06.9	81 31	73.8	58 19.5	80 31	72.1	58 43.3	79 31	71.5	6
7	54 19.2	84 32	76.0	54 44.3	84 31	75.5	55 34.2	83 31	74.5	55 59.0	82 31	74.0	56 23.7	82 31	73.5	56 48.2	82 31	73.0	58 00.9	80 31	71.3	58 24.9	80 31	70.8	7
8	54 00.3	84 31	75.1	54 25.5	84 31	74.7	55 15.5	83 31	73.7	55 40.3	83 31	73.2	56 05.0	82 31	72.7	56 29.5	82 31	72.2	57 42.4	80 31	70.6	58 06.5	80 30	70.0	8
9	53 41.5	84 31	74.3	54 06.7	84 31	73.8	54 56.7	83 31	72.9	55 21.6	83 31	72.4	55 46.4	82 31	71.9	56 11.0	82 31	71.4	57 24.1	81 30	69.8	57 48.1	80 30	69.2	9
80	53 22.7	84 31	73.5	53 47.9	84 31	73.0	54 38.1	83 31	72.1	55 03.0	83 31	71.6	55 27.8	82 31	71.1	55 52.5	82 31	70.6	57 05.8	81 30	69.0	57 29.9	80 30	68.5	80
1	53 04.0	84 31	72.7	53 29.3	84 31	72.2	54 19.6	83 31	71.3	54 44.5	83 31	70.8	55 09.4	83 31	70.3	55 34.1	82 30	69.8	56 47.6	81 30	68.3	57 11.8	80 30	67.7	1
2	52 45.4	85 31	71.8	53 10.7	84 31	71.4	54 01.1	84 31	70.5	54 26.1	83 30	70.0	54 51.1	83 30	69.5	55 15.8	82 30	69.0	56 29.5	81 30	67.5	56 53.8	81 30	67.0	2
3	52 26.9	85 31	71.0	52 52.3	84 31	70.6	53 42.7	84 30	69.7	54 07.8	83 30	69.2	54 32.8	83 30	68.7	54 57.7	83 30	68.3	56 11.5	81 30	66.7	56 35.8	81 30	66.2	3
4	52 08.5	85 31	70.2	52 33.9	85 30	69.8	53 24.5	84 30	68.9	53 49.6	84 30	68.4	54 14.6	83 30	68.0	54 39.6	83 30	67.5	55 53.6	82 30	66.0	56 18.0	81 30	65.5	4
85	51 50.1	85 30	69.4	52 15.6	85 30	69.0	53 06.3	84 30	68.1	53 31.5	84 30	67.7	53 56.6	83 30	67.2	54 21.6	83 30	66.7	55 35.8	82 29	65.2	56 00.3	81 29	64.7	85
6	51 31.9	85 30	68.6	51 57.4	85 30	68.2	52 48.2	84 30	67.3	53 13.5	84 30	66.9	53 38.6	84 30	66.4	54 03.7	83 30	66.0	55 18.1	82 29	64.5	55 42.7	82 29	64.0	6
7	51 13.7	85 30	67.8	51 39.3	85 30	67.4	52 30.3	85 30	66.5	52 55.6	84 30	66.1	53 20.8	84 30	65.7	53 45.9	84 29	65.2	55 00.5	82 29	63.8	55 25.2	82 29	63.3	7
8	50 55.7	86 30	67.0	51 21.4	85 30	66.6	52 12.4	85 30	65.8	52 37.8	84 30	65.3	53 03.0	84 29	64.9	53 28.2	84 29	64.4	54 43.1	83 29	63.0	55 07.8	82 29	62.5	8
9	50 37.8	86 30	66.3	51 03.5	86 30	65.8	51 54.6	85 29	65.0	52 20.1	85 29	64.6	52 45.4	84 29	64.1	53 10.6	84 29	63.7	54 25.7	83 29	62.3	54 50.5	82 29	61.8	9
90	50 19.9	86 30	65.5	50 45.7	86 29	65.1	51 37.0	85 29	64.2	52 02.5	85 29	63.8	52 27.9	85 29	63.4	52 53.2	84 29	62.9	54 08.5	83 29	61.5	54 33.4	83 28	61.1	90

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	50 02.2	86 29	64.7	50 28.1	86 29	64.3	51 19.4	85 29	63.5	51 45.0	85 29	63.0	52 10.5	85 29	62.6	52 35.9	84 29	62.2	53 51.4	83 28	60.8	54 16.3	83 28	60.3	91
2	49 44.6	86 29	63.9	50 10.5	86 29	63.5	51 02.0	86 29	62.7	51 27.7	85 29	62.3	51 53.2	85 29	61.9	52 18.6	85 28	61.4	53 34.4	84 28	60.1	53 59.4	83 28	59.6	2
3	49 27.1	87 29	63.1	49 53.1	86 29	62.7	50 44.7	86 29	61.9	51 10.4	86 28	61.5	51 36.0	85 28	61.1	52 01.5	85 28	60.7	53 17.5	84 28	59.4	53 42.6	84 28	58.9	3
4	49 09.8	87 29	62.4	49 35.8	87 29	62.0	50 27.6	86 28	61.2	50 53.3	86 28	60.8	51 19.0	85 28	60.4	51 44.6	85 28	60.0	53 00.8	84 28	58.6	53 26.0	84 28	58.2	4
95	48 52.5	87 29	61.6	49 18.6	87 28	61.2	50 10.5	86 28	60.4	50 36.3	86 28	60.0	51 02.1	86 28	59.6	51 27.7	85 28	59.2	52 44.2	84 27	57.9	53 09.4	84 27	57.5	95
6	48 35.4	87 28	60.8	49 01.5	87 28	60.5	49 53.6	86 28	59.7	50 19.5	86 28	59.3	50 45.3	86 28	58.9	51 11.0	86 28	58.5	52 27.7	85 27	57.2	52 53.0	84 27	56.8	6
7	48 18.4	87 28	60.1	48 44.6	87 28	59.7	49 36.8	87 28	58.9	50 02.7	86 28	58.5	50 28.6	86 28	58.2	50 54.4	86 27	57.7	52 11.3	85 27	56.5	52 36.8	85 27	56.1	7
8	48 01.6	88 28	59.3	48 27.8	87 28	58.9	49 20.1	87 28	58.2	49 46.1	87 27	57.8	50 12.1	86 27	57.4	50 38.0	86 27	57.0	51 55.1	85 27	55.8	52 20.6	85 27	55.4	8
9	47 44.8	88 28	58.5	48 11.2	88 28	58.2	49 03.6	87 27	57.4	49 29.7	87 27	57.1	49 55.7	87 27	56.7	50 21.7	86 27	56.3	51 39.0	86 27	55.1	52 04.6	85 26	54.7	9
100	47 28.2	88 27	57.8	47 54.6	88 27	57.4	48 47.2	87 27	56.7	49 13.3	87 27	56.3	49 39.4	87 27	55.9	50 05.5	87 27	55.6	51 23.1	86 26	54.4	51 48.8	86 26	53.9	100
1	47 11.8	88 27	57.0	47 38.2	88 27	56.7	48 30.9	88 27	56.0	48 57.2	87 27	55.6	49 23.3	87 27	55.2	49 49.4	87 26	54.8	51 07.3	86 26	53.7	51 33.0	86 26	53.2	1
2	46 55.5	88 27	56.3	47 22.0	88 27	55.9	48 14.8	88 27	55.2	48 41.1	88 26	54.9	49 07.4	87 26	54.5	49 33.5	87 26	54.1	50 51.6	86 26	52.9	51 17.5	86 26	52.5	2
3	46 39.3	89 27	55.5	47 05.9	88 27	55.2	47 58.8	88 26	54.5	48 25.2	88 26	54.1	48 51.5	88 26	53.8	49 17.8	87 26	53.4	50 36.1	86 26	52.2	51 02.0	86 25	51.8	3
4	46 23.3	89 26	54.8	46 49.9	89 26	54.4	47 43.0	88 26	53.8	48 09.5	88 26	53.4	48 35.8	88 26	53.0	49 02.2	88 26	52.7	50 20.7	87 25	51.5	50 46.7	87 25	51.2	4
105	46 07.4	89 26	54.0	46 34.1	89 26	53.7	47 27.3	89 26	53.0	47 53.8	88 26	52.7	48 20.3	88 26	52.3	48 46.7	88 26	52.0	50 05.5	87 25	50.8	50 31.6	87 25	50.5	105
6	45 51.6	89 26	53.3	46 18.4	89 26	53.0	47 11.8	89 26	52.3	47 38.4	89 26	51.9	48 04.9	88 25	51.6	48 31.4	88 25	51.2	49 50.4	87 25	50.1	50 16.6	87 25	49.8	6
7	45 36.1	90 26	52.5	46 02.9	89 26	52.2	46 56.4	89 25	51.6	47 23.1	89 25	51.2	47 49.7	89 25	50.9	48 16.2	88 25	50.5	49 35.5	88 25	49.4	50 01.8	87 24	49.1	7
8	45 20.6	90 25	51.8	45 47.5	89 25	51.5	46 41.2	89 25	50.8	47 07.9	89 25	50.5	47 34.6	89 25	50.2	48 01.2	89 25	49.8	49 20.7	88 24	48.8	49 47.1	88 24	48.4	8
9	45 05.4	90 25	51.1	45 32.3	90 25	50.7	46 26.1	89 25	50.1	46 52.9	89 25	49.8	47 19.7	89 25	49.4	47 46.4	89 24	49.1	49 06.1	88 24	48.1	49 32.6	88 24	47.7	9
110	44 50.3	90 25	50.3	45 17.3	90 25	50.0	46 11.2	90 25	49.4	46 38.1	90 24	49.1	47 04.9	89 24	48.7	47 31.7	89 24	48.4	48 51.7	89 24	47.4	49 18.2	88 24	47.0	110
1	44 35.3	90 25	49.6	45 02.4	90 25	49.3	45 56.5	90 24	48.7	46 23.4	90 24	48.3	46 50.3	90 24	48.0	47 17.2	89 24	47.7	48 37.4	89 24	46.7	49 04.0	89 23	46.3	1
2	44 20.5	91 24	48.8	44 47.7	91 24	48.5	45 41.9	90 24	47.9	46 08.9	90 24	47.6	46 35.9	90 24	47.3	47 02.8	90 24	47.0	48 23.3	89 23	46.0	48 49.9	89 23	45.6	2
3	44 05.9	91 24	48.1	44 33.1	91 24	47.8	45 27.5	90 24	47.2	45 54.6	90 24	46.9	46 21.6	90 24	46.6	46 48.6	90 23	46.3	48 09.3	89 23	45.3	48 36.1	89 23	44.9	3
4	43 51.4	91 24	47.4	44 18.7	91 24	47.1	45 13.2	91 23	46.5	45 40.4	90 23	46.2	46 07.5	90 23	45.9	46 34.6	90 23	45.6	47 55.5	90 23	44.6	48 22.3	89 23	44.3	4
115	43 37.1	91 24	46.6	44 04.5	91 23	46.4	44 59.1	91 23	45.8	45 26.4	91 23	45.5	45 53.6	91 23	45.2	46 20.7	90 23	44.9	47 41.9	90 22	43.9	48 08.8	90 22	43.6	115
6	43 23.0	92 23	45.9	43 50.5	91 23	45.6	44 45.2	91 23	45.1	45 12.5	91 23	44.8	45 39.8	91 23	44.5	46 07.0	91 23	44.2	47 28.4	90 22	43.2	47 55.4	90 22	42.9	6
7	43 09.1	92 23	45.2	43 36.6	92 23	44.9	44 31.5	91 23	44.3	44 58.9	91 22	44.0	45 26.2	91 22	43.8	45 53.5	91 22	43.5	47 15.1	90 22	42.5	47 42.2	90 22	42.2	7
8	42 55.3	92 23	44.4	43 22.9	92 23	44.2	44 17.9	92 22	43.6	44 45.4	91 22	43.3	45 12.8	91 22	43.0	45 40.2	91 22	42.8	47 02.0	91 22	41.9	47 29.2	91 21	41.5	8
9	42 41.7	92 22	43.7	43 09.4	92 22	43.4	44 04.5	92 22	42.9	44 32.1	92 22	42.6	44 59.5	92 22	42.3	45 27.0	91 22	42.1	46 49.0	91 21	41.2	47 16.3	91 21	40.9	9
120	42 28.3	92 22	43.0	42 56.0	92 22	42.7	43 51.3	92 22	42.2	44 18.9	92 22	41.9	44 46.5	92 22	41.6	45 14.0	92 21	41.4	46 36.3	91 21	40.5	47 03.6	91 21	40.2	120
1	42 15.1	93 22	42.3	42 42.9	93 22	42.0	43 38.3	92 21	41.5	44 06.0	92 21	41.2	44 33.6	92 21	40.9	45 01.2	92 21	40.7	46 23.7	91 21	39.8	46 51.1	91 21	39.5	1
2	42 02.1	93 21	41.5	42 29.9	93 21	41.3	43 25.5	92 21	40.8	43 53.2	92 21	40.5	44 20.9	92 21	40.2	44 48.5	92 21	40.0	46 11.3	92 20	39.1	46 38.7	92 20	38.8	2
3	41 49.2	93 21	40.8	42 17.1	93 21	40.6	43 12.8	93 21	40.1	43 40.6	93 21	39.8	44 08.4	92 21	39.5	44 36.1	92 20	39.3	45 59.0	92 20	38.4	46 26.6	92 20	38.2	3
4	41 36.5	93 21	40.1	42 04.5	93 21	39.8	43 00.3	93 20	39.3	43 28.2	93 20	39.1	43 56.0	93 20	38.8	44 23.8	93 20	38.6	45 47.0	92 20	37.8	46 14.6	92 20	37.5	4
125	41 24.0	93 20	39.4	41 52.1	93 20	39.1	42 48.0	93 20	38.6	43 16.0	93 20	38.4	43 43.9	93 20	38.1	44 11.7	93 20	37.9	45 35.1	92 19	37.1	46 02.8	92 19	36.8	125
6	41 11.8	94 20	38.6	41 39.8	94 20	38.4	42 35.9	93 20	37.9	43 03.9	93 20	37.7	43 31.9	93 20	37.4	43 59.8	93 20	37.2	45 23.4	93 19	36.4	45 51.2	93 19	36.1	6
7	40 59.7	94 20	37.9	41 27.8	94 20	37.7	42 24.0	94 20	37.2	42 52.1	93 19	37.0	43 20.1	93 19	36.7	43 48.1	93 19	36.5	45 11.9	93 19	35.7	45 39.8	93 19	35.5	7
8	40 47.8	94 20	37.2	41 16.0	94 19	37.0	42 12.3	94 19	36.5	42 40.4	94 19	36.3	43 08.5	94 19	36.0	43 36.6	94 19	35.8	45 00.6	93 19	35.0	45 28.6	93 18	34.8	8
9	40 36.0	94 19	36.5	41 04.3	94 19	36.2	42 00.8	94 19	35.8	42 29.0	94 19	35.6	42 57.1	94 19	35.3	43 25.3	94 19	35.1	44 49.5	93 18	34.4	45 17.5	93 18	34.1	9
130	40 24.5	94 19	35.7	40 52.9	94 19	35.5	41 49.5	94 19	35.1	42 17.7	94 18	34.9	42 45.9	94 18	34.6	43 14.1	94 18	34.4	44 38.6	94 18	33.7	45 06.6	94 18	33.4	130
1	40 13.2	95 19	35.0	40 41.6	95 18	34.8	41 38.3	94 18	34.4	42 06.6	94 18	34.2	42 34.9	94 18	33.9	43 03.2	94 18	33.7	44 27.8	94 18	33.0	44 56.0	94 17	32.8	1
2	40 02.1	95 18	34.3	40 30.6	95 18	34.1	41 27.4	95 18	33.7	41 55.8	95 18	33.5	42 24.1	94 18	33.2	42 52.5	94 18	33.0	44 17.3	94 17	32.3	44 45.5	94 17	32.1	2
3	39 51.2	95 18	33.6	40 19.7	95 18	33.4	41 16.7	95 18	33.0	41 45.1	95 18	32.8	42 13.5	95 17	32.5	42 41.9	95 17	32.3	44 06.9	94 17	31.6	44 35.2	94 17	31.4	3
4	39 40.5	95 18	32.9	40 09.1	95 17	32.7	41 06.1	95 17	32.3	41 34.6	95 17	32.1	42 03.1	95 17	31.8	42 31.6	95 17	31.6	43 56.8	95 17	31.0	44 25.2	94 16	30.7	4
135	39 30.0	95 17	32.2	39 58.6	95 17	32.0	40 55.8	95 17	31.6	41 24.4	95 17	31.4	41 52.9	95 17	31.1	42 21.4	95 17	30.9	43 46.8	95 16	30.3	44 15.3	95 16	30.1	135
6	39 19.7	96 17	31.4	39 48.4	96 17	31.2	40 45.7	95 17	30.9	41 14.3	95 16	30.7	41 42.9	95 16	30.5	42 11.5	95 16	30.2	43 37.1	95 16	29.6	44 05.6	95 16	29.4	6
7	39 09.6	96 16	30.7	39 38.4	96 16	30.5	40 35.8	96 16	30.1	41 04.4	96 16	30.0	41 33.1	95 16	29.8	42 01.7	95 16	29.6	43 27.5	95 16	28.9	43 56.1	95 15	28.7	7
8	38 59.7	96 16	30.0	39 28.5	96 16	29.8	40 26.1	96 16	29.4	40 54.8	96 16	29.3	41 23.5	96 16	29.1	41 52.2	96 16	28.9	43 18.2	95 15	28.3	43 46.8	95 15	28.1	8
9	38 50.1	96 16	29.3	39 18.9	96 16	29.1	40 16.6	96 15	28.7	40 45.4	96 15	28.6	41 14.1	96 15	28.4	41 42.9	96 15	28.2	43 09.0	96 15	27.6	43 37.7	96 15	27.4	9
140	38 40.6	96 15	28.6	39 09.5	96 15	28.4	40 07.3	96 15	28.0	40 36.1	96 15	27.9	41 05.0	96 15	27.7	41 33.8	96 15	27.5	43 00.1	96 15	26.9	43 28.8	96 14	26.7	140
1	38 31.4	97 15	27.8	39 00.4	96 15	27.7	39 58.2	96 15	27.3	40 27.1	96 15	27.2	40 56.0	96 15	27.0	41 24.9	96 14	26.8	42 51.3	96 14	26.2	43 20.1	96 14	26.0	1
2	38 22.4	97 15	27.1	38 51.4	97 15	27.0	39 49.3	97 14	26.6	40 18.3	96 14	26.5	40 47.2	96 14	26.3	41 16.2	96 14	26.1	42 42.8	96 14	25.6	43 11.7	96 14	25.4	2
3	38 13.6	97 14	26.4	38 42.6	97 14	26.3	39 40.7	97 14	25.9	40 09.7	97 14	25.8	40 38.7	97 14	25.6	41 07.7	97 14	25.4	42 34.5	96 14	24.9	43 03.4	96 13	24.7	3
4	38 05.0	97 14	25.7	38 34.1	97 14	25.5	39 32.3	97 14	25.2	40 01.3	97 14	25.1	40 30.4	97 14	24.9	40 59.4	97 13	24.7	42 26.4	97 13	24.2	42 55.3	97 13	24.0	4
145	37 56.7	97 14	25.0	38 25.8	97 14	24.8	39 24.0	97 13	24.5	39 53.1	97 13	24.4	40 22.2	97 13	24.2	40 51.3	97 13	24.0	42 18.5	97 13	23.5	42 47.5	97 13	23.4	145
6	37 48.5	97 13	24.3	38 17.7	97 13	24.1	39 16.0	97 13	23.8	39 45.2	97 13	23.7	40 14.3	97 13	23.5	40 43.5	97 13	23.4	42 10.8	97 12	22.9	42 39.8	97 12	22.7	6
7	37 40.6	97 13	23.6	38 09.8	97 13	23.4	39 08.3	97 13	23.1	39 37.5	97 13	23.0	40 06.6	97 12	22.8	40 35.8	97 12	22.7	42 03.7	97 12	22.2	42 32.4	97 12	22.0	7
8	37 32.9	98 12	22.8	38 02.2	98 12	22.7	39 00.7	98 12	22.4	39 29.9	97 12	22.3	39 59.2	97 12	22.1	40 28.4	97 12	22.0	41 56.0	97 12	21.5	42 25.2	97 12	21.4	8
9	37 25.4	98 12	22.1	37 54.8	98 12	22.0	38 53.4	98 12	21.7	39 22.7	98 12	21.6	39 51.9	98 12	21.4	40 21.2	98 12	21.3	41 48.9	97 11	20.8	42 18.2	97 11	20.7	9
150	37 18.2	98 12	21.4	37 47.5	98 12	21.3	38 46.2	98 12	21.0	39 15.6	98 11	20.9	39 44.9	98 11	20.7	40 14.2	98 11	20.6	41 42.1	98 11	20.2	42 11.4	98 11	20.0	150
1	37 11.2	98 11	20.7	37 40.6	98 11	20.6	38 39.4	98 11	20.3	39 08.7	98 11	20.2	39 38.1	98 11	20.1	40 07.5	98 11	19.9	41 35.5	98 11	19.5	42 04.8	98 11	19.4	1
2	37 04.4	98 11	20.0	37 33.8	98 11	19.9	38 32.7	98 11	19.6	39 02.1	98 11	19.5	39 31.5	98 11	19.4	40 00.9	98 11	19.2	41 29.1	98 10	18.8	41 58.4	98 10	18.7	2
3	36 57.8	98 11	19.3	37 27.3	98 11	19.1	38 26.2	98 10	18.9	38 55.7	98 10	18.8	39 25.1	98 10	18.7	39 54.6	98 10	18.5	41 22.9	98 10	18.2	41 52.3	98 10	18.0	3
4	36 51.5	98 10	18.6	37 21.0	98 10	18.4	38 20.0	98 10	18.2	38 49.5	98 10	18.1	39 19.0	98 10	18.0	39 48.5	98 10	17.9	41 16.9	98 10	17.5	41 46.3	98 10	17.4	4
155	36 45.4	99 10	17.8	37 14.9	98 10	17.7	38 14.0	98 10	17.5	38 43.6	98 10	17.4	39 13.1	98 09	17.3	39 42.6	98 09	17.2	41 11.1	98 09	16.8	41 40.6	98 09	16.7	155
6	36 39.5	99 09	17.1	37 09.1	99 09	17.0	38 08.3	99 09	16.8	38 37.8	99 09	16.7	39 07.4	99 09	16.6	39 37.0	99 09	16.5	41 05.6	98 09	16.1	41 35.1	98 09	16.0	6
7	36 33.9	99 09	16.4	37 03.5	99 09	16.3	38 02.7	99 09	16.1	38 32.3	99 09	16.0	39 01.9	99 09	15.9	39 31.5	99 09	15.8	41 00.3	99 08	15.5	41 29.8	99 08	15.4	7
8	36 28.5	99 09	15.7	36 58.1	99 09	15.6	37 57.4	99 08	15.4	38 27.1	99 08	15.3	38 56.7	99 08	15.2	39 26.3	99 08	15.1	40 55.2	99 08	14.8	41 24.8	99 08	14.7	8
9	36 23.3	99 08	15.0	36 53.0	99 08	14.9	37 52.4	99 08	14.7	38 22.0	99 08	14.6	38 51.7	99 08	14.5	39 21.3	99 08	14.4	40 50.3	99 08	14.1	41 19.9	99 08	14.0	9
160	36 18.4	99 08	14.3	36 48.1	99 08	14.2	37 47.5	99 08	14.0	38 17.2	99 08	13.9	38 46.9	99 08	13.8	39 16.6	99 08	13.7	40 45.6	99 07	13.4	41 15.3	99 07	13.4	160
1	36 13.7	99 07	13.6	36 43.4	99 07	13.5	37 42.9	99 07	13.3	38 12.6	99 07	13.2	38 42.3	99 07	13.1	39 12.1	99 07	13.0	40 41.2	99 07	12.8	41 10.9	99 07	12.7	1
2	36 09.2	99 07	12.8	36 39.0	99 07	12.8	37 38.5	99 07	12.6	38 08.3	99 07	12.5	38 38.0	99 07	12.4	39 07.8	99 07	12.4	40 37.0	99 07	12.1	41 06.7	99 07	12.0	2
3	36 05.0	99 07	12.1	36 34.8	99 07	12.1	37 34.4	99 06	11.9	38 04.2	99 06	11.8	38 33.9	99 06	11.8	39 03.7	99 06	11.7	40 33.0	99 06	11.4	41 02.8	99 06	11.3	3
4	36 01.0	99 06	11.4	36 30.8	99 06	11.3	37 30.5	99 06	11.2	38 00.3	99 06	11.1	38 30.1	99 06	11.1	38 59.9	99 06	11.0	40 29.3	99 06	10.8	40 59.0	99 06	10.7	4
165	35 57.3	99 06	10.7	36 27.1	99 06	10.6	37 26.8	99 06	10.5	37 56.6	99 06	10.4	38 26.4	99 06	10.4	38 56.3	99 06	10.3	40 25.7	99 06	10.1	40 55.5	99 05	10.0	165
6	35 53.8	1.0 05	10.0	36 23.6	1.0 05	09.9	37 23.3	1.0 05	09.8	37 53.2	1.0 05	09.7	38 23.0	99 05	09.7	38 52.9	99 05	09.6	40 22.4	99 05	09.4	40 52.3	99 05	09.3	6
7	35 50.5	1.0 05	09.3	36 20.4	1.0 05	09.2	37 20.1	1.0 05	09.1	37 50.0	1.0 05	09.0	38 19.9	1.0 05	09.0	38 49.7	1.0 05	08.9	40 19.3	1.0 05	08.7	40 49.2	1.0 05	08.7	7
8	35 47.5	1.0 05	08.6	36 17.4	1.0 05	08.5	37 17.2	1.0 05	08.4	37 47.0	1.0 05	08.3	38 16.9	1.0 04	08.3	38 46.8	1.0 04	08.2	40 16.5	1.0 04	08.1	40 46.4	1.0 04	08.0	8
9	35 44.7	1.0 04	07.8	36 14.6	1.0 04	07.8	37 14.4	1.0 04	07.7	37 44.3	1.0 04	07.7	38 14.2	1.0 04	07.6	38 44.1	1.0 04	07.6	40 13.8	1.0 04	07.4	40 43.7	1.0 04	07.3	9
170	35 42.1	1.0 04	07.1	36 12.1	1.0 04	07.1	37 11.9	1.0 04	07.0	37 41.8	1.0 04	07.0	38 11.8	1.0 04	06.9	38 41.7	1.0 04	06.9	40 11.4	1.0 04	06.7	40 41.4	1.0 04	06.7	170
1	35 39.8	1.0 03	06.4	36 09.8	1.0 03	06.4	37 09.7	1.0 03	06.3	37 39.6	1.0 03	06.3	38 09.5	1.0 03	06.2	38 39.5	1.0 03	06.2	40 09.3	1.0 03	06.1	40 39.2	1.0 03	06.0	1
2	35 37.8	1.0 03	05.7	36 07.7	1.0 03	05.7	37 07.6	1.0 03	05.6	37 37.6	1.0 03	05.6	38 07.5	1.0 03	05.5	38 37.5	1.0 03	05.5	40 07.3	1.0 03	05.4	40 37.3	1.0 03	05.3	2
3	35 36.0	1.0 03	05.0	36 05.9	1.0 03	05.0	37 05.8	1.0 03	04.9	37 35.8	1.0 03	04.9	38 05.8	1.0 03	04.8	38 35.7	1.0 03	04.8	40 05.6	1.0 02	04.7	40 35.6	1.0 02	04.7	3
4	35 34.4	1.0 02	04.3	36 04.3	1.0 02	04.3	37 04.3	1.0 02	04.2	37 34.3	1.0 02	04.2	38 04.2	1.0 02	04.1	38 34.2	1.0 02	04.1	40 04.1	1.0 02	04.0	40 34.1	1.0 02	04.0	4
175	35 33.0	1.0 02	03.6	36 03.0	1.0 02	03.5	37 03.0	1.0 02	03.5	37 33.0	1.0 02	03.5	38 02.9	1.0 02	03.5	38 32.9	1.0 02	03.4	40 02.9	1.0 02	03.4	40 32.8	1.0 02	03.3	175
6	35 31.9	1.0 01	02.9	36 01.9	1.0 01	02.8	37 01.9	1.0 01	02.8	37 31.9	1.0 01	02.8	38 01.9	1.0 01	02.8	38 31.9	1.0 01	02.7	40 01.8	1.0 01	02.7	40 31.8	1.0 01	02.7	6
7	35 31.1	1.0 01	02.1	36 01.1	1.0 01	02.1	37 01.1	1.0 01	02.1	37 31.1	1.0 01	02.1	38 01.1	1.0 01	02.1	38 31.1	1.0 01	02.1	40 01.0	1.0 01	02.0	40 31.0	1.0 01	02.0	7
8	35 30.5	1.0 01	01.4	36 00.5	1.0 01	01 4	37 00.5	1.0 01	01.4	37 30.5	1.0 01	01.4	38 00.5	1.0 01	01.4	38 30.5	1.0 01	01.4	40 00.5	1.0 01	01.3	40 30.5	1.0 01	01.3	8
9	35 30.1	1.0 00	00.7	36 00.1	1.0 00	00.7	37 00.1	1.0 00	00.7	37 30.1	1.0 00	00.7	38 00.1	1.0 00	00.7	38 30.1	1.0 00	00.7	40 00.1	1.0 00	00.7	40 30.1	1.0 00	00.7	9
180	35 30.0	1.0 00	00.0	36 00.0	1.0 00	00.0	37 00.0	1.0 00	00.0	37 30.0	1.0 00	00.0	38 00.0	1.0 00	00.0	38 30.0	1.0 00	00.0	40 00.0	1.0 00	00.0	40 30.0	1.0 00	00.0	180

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	79 00.0	1.0 01	180.0	79 30.0	1.0 01	180.0	81 00.0	1.0 01	180.0	81 30.0	1.0 01	180.0	82 00.0	1.0 01	180.0	88 00.0	1.0 03	180.0	88 30.0	1.0 04	180.0	86 30.0	1.0 01	00.0	00
1	78 59.6	1.0 02	177.4	79 29.5	1.0 02	177.3	80 59.5	1.0 03	177.0	81 29.5	1.0 03	176.9	81 59.4	1.0 03	176.7	87 58.2	99 08	169.8	88 27.7	98 11	166.8	86 29.3	1.0 04	04.4	1
2	78 58.2	1.0 04	174.8	79 28.2	1.0 04	174.6	80 58.0	1.0 04	174.0	81 27.9	1.0 04	173.8	81 57.8	1.0 05	173.5	87 53.2	95 13	160.2	88 21.3	92 17	154.8	86 27.0	98 06	08.7	2
3	78 56.0	1.0 05	172.2	79 25.9	1.0 05	171.9	80 55.4	99 06	171.0	81 25.2	99 06	170.7	81 55.0	99 06	170.3	87 45.2	90 17	151.4	88 11.4	84 21	144.5	86 23.4	96 08	12.8	3
4	78 52.9	99 07	169.6	79 22.7	99 07	169.3	80 51.9	99 08	168.1	81 21.6	99 08	167.6	81 51.2	99 08	167.1	87 34.7	84 21	143.7	87 58.9	76 24	136.1	86 18.4	94 10	16.8	4
05	78 48.9	99 08	167.0	79 18.6	99 08	166.6	80 47.4	98 09	165.2	81 16.9	98 09	164.6	81 46.3	98 10	164.0	87 22.2	79 23	137.1	87 44.5	69 26	129.2	86 12.1	90 12	20.6	05
6	78 44.1	98 09	164.5	79 13.6	98 10	164.0	80 41.9	98 11	162.3	81 11.2	98 11	161.6	81 40.4	97 11	160.9	87 08.2	73 25	131.4	87 28.8	63 28	123.6	86 04.7	87 14	24.1	6
7	78 38.5	98 11	162.0	79 07.8	98 11	161.4	80 35.5	97 12	159.5	81 04.6	97 13	158.7	81 33.5	96 13	157.9	86 53.0	68 27	126.5	87 12.1	58 29	119.1	85 56.2	83 16	27.4	7
8	78 32.0	97 12	159.5	79 01.2	97 12	158.9	80 28.2	96 14	156.8	80 57.0	96 14	155.9	81 25.7	95 15	154.9	86 36.9	64 28	122.4	86 54.7	54 30	115.2	85 46.8	79 17	30.4	8
9	78 24.8	97 13	157.1	78 53.8	96 14	156.4	80 20.1	95 15	154.1	80 48.6	95 15	153.1	81 17.0	94 16	152.1	86 20.1	60 29	118.7	86 36.8	51 30	112.0	85 36.5	75 18	33.1	9
10	78 16.8	96 14	154.7	78 45.6	96 15	154.0	80 11.2	94 16	151.4	80 39.4	94 17	150.4	81 07.4	93 17	149.3	86 02.7	57 30	115.6	86 18.5	48 31	109.2	85 25.5	71 19	35.6	10
1	78 08.1	95 16	152.4	78 36.7	95 16	151.6	80 01.4	93 17	148.9	80 29.3	93 18	147.8	80 57.0	92 19	146.6	85 44.9	55 30	112.8	85 59.9	46 31	106.7	85 13.8	66 20	37.8	1
2	77 58.7	95 17	150.1	78 27.0	94 17	149.2	79 51.0	92 19	146.4	80 18.6	92 19	145.2	80 45.9	91 20	144.0	85 26.7	52 31	110.3	85 41.1	44 32	104.6	85 01.5	62 21	39.8	2
3	77 48.6	94 18	147.8	78 16.7	93 18	147.0	79 39.8	91 20	143.9	80 07.1	90 20	142.8	80 34.1	89 21	141.5	85 08.2	50 31	108.0	85 22.1	42 32	102.7	84 48.8	59 22	41.7	3
4	77 37.9	93 19	145.6	78 05.7	92 19	144.7	79 28.0	90 21	141.6	79 54.9	89 21	140.4	80 21.6	88 22	139.0	84 49.6	49 31	106.0	85 03.0	41 32	100.9	84 35.6	55 23	43.3	4
15	77 26.6	92 20	143.5	77 54.2	92 20	142.5	79 15.6	89 22	139.3	79 42.2	88 22	138.0	80 08.5	87 23	136.7	84 30.7	47 32	104.1	84 43.8	40 32	99.3	84 22.0	51 23	44.8	15
6	77 14.7	91 21	141.4	77 42.0	91 21	140.4	79 02.5	88 23	137.1	79 28.8	87 23	135.8	79 54.8	86 24	134.4	84 11.7	46 32	102.4	84 24.5	39 32	97.9	84 08.1	48 24	46.1	6
7	77 02.2	91 22	139.3	77 29.3	90 22	138.4	78 49.0	87 23	135.0	79 14.9	86 24	133.6	79 40.6	85 24	132.2	83 52.5	45 32	100.9	84 05.1	38 32	96.5	83 53.8	45 24	47.3	7
8	76 49.2	90 22	137.3	77 16.0	89 23	136.3	78 34.9	86 24	132.9	79 00.6	85 25	131.5	79 25.8	84 25	130.1	83 33.3	44 32	99.4	83 45.6	38 32	95.3	83 39.4	41 24	48.4	8
9	76 35.7	89 23	135.4	77 02.3	88 24	134.4	78 20.4	85 25	130.9	78 45.7	84 25	129.5	79 10.7	83 26	128.1	83 14.0	44 32	98.0	83 26.2	37 32	94.1	83 24.7	38 25	49.3	9
20	76 21.8	88 24	133.5	76 48.1	87 24	132.5	78 05.4	84 26	128.9	78 30.4	83 26	127.6	78 55.1	82 27	126.1	82 54.6	43 32	96.7	83 06.7	37 33	93.0	83 09.8	35 25	50.2	20
1	76 07.4	87 25	131.7	76 33.5	86 25	130.6	77 50.0	83 26	127.0	78 14.8	82 27	125.7	78 39.1	81 27	124.2	82 35.2	43 32	95.5	82 47.2	37 33	91.9	82 54.7	33 25	50.9	1
2	75 52.6	87 25	129.9	76 18.5	86 26	128.8	77 34.2	82 27	125.2	77 58.7	81 27	123.9	78 22.8	80 28	122.4	82 15.7	42 32	94.4	82 27.6	37 33	90.9	82 39.4	30 26	51.6	2
3	75 37.4	86 26	128.1	76 03.1	85 26	127.0	77 18.0	82 27	123.4	77 42.3	80 28	122.1	78 06.2	79 28	120.6	81 56.3	42 32	93.3	82 08.1	37 33	89.9	82 24.1	27 26	52.2	3
4	75 21.9	85 26	126.4	75 47.3	84 27	125.3	77 01.6	81 28	121.7	77 25.6	79 28	120.4	77 49.2	78 29	118.9	81 36.7	42 33	92.2	81 48.6	37 33	89.0	82 08.6	25 26	52.7	4
25	75 06.0	84 27	124.7	75 31.2	83 27	123.7	76 44.8	80 28	120.1	77 08.6	79 29	118.7	77 32.0	77 29	117.3	81 17.2	42 33	91.2	81 29.0	37 33	88.1	81 53.0	22 26	53.1	25
6	74 49.8	84 28	123.1	75 14.8	83 28	122.0	76 27.8	79 29	118.5	76 51.4	78 29	117.1	77 14.5	76 30	115.7	80 57.7	42 33	90.2	81 09.5	37 32	87.3	81 37.4	20 26	53.5	6
7	74 33.3	83 28	121.5	74 58.1	82 28	120.5	76 10.5	79 29	116.9	76 33.8	77 30	115.6	76 56.8	76 30	114.1	80 38.2	42 33	89.3	80 50.0	37 32	86.4	81 21.6	18 26	53.9	7
8	74 16.5	83 28	120.0	74 41.1	82 29	118.9	75 52.9	78 30	115.4	76 16.1	77 30	114.0	76 38.8	75 30	112.6	80 18.6	42 33	88.4	80 30.5	38 32	85.6	81 05.8	16 26	54.2	8
9	73 59.4	82 29	118.5	74 23.9	81 29	117.4	75 35.2	77 30	113.9	75 58.2	76 30	112.6	76 20.7	74 30	111.2	79 59.1	42 32	87.5	80 11.1	38 32	84.8	80 49.9	14 26	54.4	9
30	73 42.2	81 29	117.0	74 06.4	80 29	116.0	75 17.2	77 30	112.4	75 40.0	75 30	111.1	76 02.4	74 31	109.8	79 39.6	42 32	86.6	79 51.6	38 32	84.1	80 34.0	12 27	54.6	30
1	73 24.6	81 30	115.6	73 48.8	80 30	114.5	74 59.1	76 31	111.0	75 21.7	75 31	109.8	75 44.0	73 31	108.4	79 20.1	42 32	85.8	79 32.2	38 32	83.3	80 18.1	10 27	54.8	1
2	73 06.9	80 30	114.2	73 30.9	79 30	113.1	74 40.8	76 31	109.7	75 03.3	74 31	108.4	75 25.4	73 31	107.1	79 00.6	43 32	85.0	79 12.8	39 32	82.6	80 02.1	08 27	54.9	2
3	72 49.0	80 30	112.8	73 12.8	79 30	111.8	74 22.3	75 31	108.4	74 44.7	74 31	107.1	75 06.6	72 31	105.8	78 41.2	43 32	84.2	78 53.5	39 32	81.9	79 46.1	06 27	55.0	3
4	72 30.9	80 30	111.5	72 54.6	78 31	110.4	74 03.7	75 31	107.1	74 26.0	73 31	105.8	74 47.8	72 32	104.5	78 21.8	43 32	83.4	78 34.2	40 32	81.2	79 30.1	04 27	55.1	4
35	72 12.7	79 31	110.2	72 36.2	78 31	109.1	73 45.0	74 31	105.8	74 07.1	73 32	104.6	74 28.8	72 32	103.3	78 02.4	43 32	82.7	78 14.9	40 32	80.5	79 14.1	02 27	55.1	35
6	71 54.2	79 31	108.9	72 17.7	78 31	107.9	73 26.1	74 32	104.6	73 48.1	73 32	103.4	74 09.8	71 32	102.1	77 43.0	44 32	81.9	77 55.6	40 32	79.8	78 58.0	01 27	55.2	6
7	71 35.7	78 31	107.6	71 59.1	77 31	106.6	73 07.2	74 32	103.4	73 29.1	72 32	102.2	73 50.6	71 32	100.9	77 23.7	44 32	81.2	77 36.4	41 32	79.1	78 42.0	01 27	55.2	7
8	71 17.0	78 31	106.4	71 40.3	77 32	105.4	72 48.1	74 32	102.2	73 10.0	72 32	101.0	73 31.4	71 32	99.8	77 04.4	44 32	80.5	77 17.3	41 32	78.5	78 26.0	03 27	55.1	8
9	70 58.2	78 32	105.2	71 21.4	77 32	104.2	72 29.0	73 32	101.0	72 50.7	72 32	99.9	73 12.1	71 32	98.7	76 45.2	45 32	79.8	76 58.1	42 32	77.8	78 10.0	04 27	55.1	9
40	70 39.3	78 32	104.0	71 02.4	76 32	103.0	72 09.8	73 32	99.9	72 31.5	72 32	98.7	72 52.8	70 32	97.6	76 26.0	45 32	79.1	76 39.1	42 32	77.2	77 53.9	06 27	55.0	40
1	70 20.3	77 32	102.9	70 43.3	76 32	101.9	71 50.5	73 32	98.8	72 12.1	72 32	97.7	72 33.4	70 32	96.5	76 06.8	46 32	78.4	76 20.0	43 32	76.5	77 37.9	07 27	54.9	1
2	70 01.2	77 32	101.7	70 24.2	76 32	100.8	71 31.1	73 32	97.7	71 52.8	71 32	96.6	72 14.0	70 32	95.4	75 47.7	46 32	77.7	76 01.1	43 32	75.9	77 22.0	09 27	54.8	2
3	69 42.1	77 32	100.6	70 05.0	76 32	99.7	71 11.8	72 32	96.6	71 33.3	71 32	95.5	71 54.5	70 32	94.4	75 28.6	46 32	77.1	75 42.2	44 31	75.3	77 06.0	10 27	54.7	3
4	69 22.8	77 32	99.5	69 45.7	76 32	98.6	70 52.3	72 32	95.6	71 13.9	71 32	94.5	71 35.0	70 33	93.4	75 09.6	47 32	76.4	75 23.3	44 31	74.7	76 50.1	12 26	54.6	4
45	69 03.5	76 32	98.4	69 26.3	76 32	97.5	70 32.9	72 32	94.6	70 54.4	71 33	93.5	71 15.5	70 33	92.4	74 50.6	47 32	75.8	75 04.5	45 31	74.0	76 34.2	13 26	54.4	45
6	68 44.2	76 32	97.4	69 07.0	75 32	96.5	70 13.4	72 33	93.5	70 34.9	71 33	92.5	70 56.0	70 33	91.4	74 31.7	48 31	75.1	74 45.7	45 31	73.4	76 18.3	15 26	54.3	6
7	68 24.8	76 32	96.3	68 47.5	75 32	95.4	69 53.9	72 33	92.5	70 15.4	71 33	91.5	70 36.4	70 33	90.5	74 12.9	48 31	74.5	74 27.0	46 31	72.8	76 02.4	16 26	54.1	7
8	68 05.4	76 32	95.3	68 28.1	75 32	94.4	69 34.4	72 33	91.6	69 55.8	71 33	90.6	70 16.9	70 33	89.5	73 54.1	49 31	73.8	74 08.4	46 31	72.2	75 46.6	17 26	53.9	8
9	67 45.9	76 32	94.3	68 08.6	75 32	93.4	69 14.8	72 33	90.6	69 36.3	71 33	89.6	69 57.4	70 33	88.6	73 35.4	49 31	73.2	73 49.8	47 31	71.6	75 30.9	19 26	53.7	9
50	67 26.4	76 32	93.3	67 49.1	75 33	92.4	68 55.3	72 33	89.7	69 16.8	71 33	88.7	69 37.9	70 33	87.7	73 16.7	50 31	72.6	73 31.3	48 31	71.1	75 15.1	20 26	53.5	50
1	67 06.9	76 33	92.3	67 29.5	75 33	91.4	68 35.8	72 33	88.7	68 57.2	71 33	87.8	69 18.3	70 32	86.8	72 58.1	50 31	72.0	73 12.9	48 31	70.5	74 59.4	21 26	53.3	1
2	66 47.4	76 33	91.3	67 10.0	75 33	90.5	68 16.2	72 33	87.8	68 37.7	71 32	86.9	68 58.9	70 32	85.9	72 39.6	51 31	71.3	72 54.5	49 30	69.9	74 43.8	23 26	53.1	2
3	66 27.8	76 33	90.4	66 50.5	75 33	89.5	67 56.7	72 32	86.9	68 18.2	71 32	86.0	68 39.4	70 32	85.0	72 21.1	51 31	70.7	72 36.2	49 30	69.3	74 28.2	24 26	52.9	3
4	66 08.3	76 33	89.4	66 30.9	75 33	88.6	67 37.2	72 32	86.0	67 58.7	71 32	85.1	68 19.9	70 32	84.1	72 02.7	52 31	70.1	72 18.0	50 30	68.7	74 12.7	25 26	52.6	4
55	65 48.8	76 33	88.5	66 11.4	75 32	87.7	67 17.8	72 32	85.1	67 39.3	71 32	84.2	68 00.5	70 32	83.3	71 44.3	53 30	69.5	71 59.8	51 30	68.2	73 57.2	26 26	52.4	55
6	65 29.2	76 33	87.6	65 51.9	75 32	86.8	66 58.3	72 32	84.2	67 19.9	71 32	83.3	67 41.1	70 32	82.4	71 26.1	53 30	68.9	71 41.7	51 30	67.6	73 41.7	28 26	52.1	6
7	65 09.7	76 32	86.7	65 32.4	75 32	85.9	66 38.9	72 32	83.4	67 00.5	72 32	82.5	67 21.8	70 32	81.6	71 07.9	54 30	68.3	71 23.7	52 30	67.0	73 26.3	29 26	51.8	7
8	64 50.2	76 32	85.8	65 12.9	75 32	85.0	66 19.5	73 32	82.5	66 41.1	72 32	81.7	67 02.5	71 32	80.8	70 49.8	54 30	67.7	71 05.7	52 30	66.4	73 11.0	30 25	51.6	8
9	64 30.8	76 32	84.9	64 53.5	75 32	84.1	66 00.2	73 32	81.7	66 21.8	72 32	80.8	66 43.2	71 32	79.9	70 31.7	55 30	67.2	70 47.9	53 30	65.9	72 55.7	31 25	51.3	9
60	64 11.3	76 32	84.0	64 34.1	75 32	83.2	65 40.9	73 32	80.8	66 02.6	72 32	80.0	66 24.0	71 32	79.1	70 13.8	55 30	66.6	70 30.1	54 30	65.3	72 40.5	32 25	51.0	60
1	63 51.9	76 32	83.1	64 14.7	76 32	82.4	65 21.6	73 32	80.0	65 43.4	72 32	79.2	66 04.9	71 32	78.3	69 55.9	56 30	66.0	70 12.4	54 29	64.8	72 25.4	33 25	50.7	1
2	63 32.6	76 32	82.3	63 55.4	76 32	81.5	65 02.4	73 32	79.2	65 24.2	72 32	78.4	65 45.8	71 32	77.5	69 38.1	56 30	65.4	69 54.7	55 29	64.2	72 10.3	34 25	50.4	2
3	63 13.2	77 32	81.4	63 36.1	76 32	80.7	64 43.2	73 32	78.4	65 05.1	73 32	77.6	65 26.7	72 32	76.8	69 20.4	57 29	64.8	69 37.2	55 29	63.6	71 55.3	36 25	50.1	3
4	62 53.9	77 32	80.6	63 16.8	76 32	79.8	64 24.1	74 32	77.6	64 46.1	73 32	76.8	65 07.7	72 32	76.0	69 02.7	57 29	64.2	69 19.7	56 29	63.1	71 40.3	37 25	49.8	4
65	62 34.7	77 32	79.7	62 57.6	76 32	79.0	64 05.1	74 32	76.8	64 27.1	73 32	76.0	64 48.8	72 31	75.2	68 45.2	58 29	63.7	69 02.4	57 29	62.5	71 25.4	38 25	49.5	65
6	62 15.5	77 32	78.9	62 38.5	76 32	78.2	63 46.1	74 32	76.0	64 08.1	73 31	75.2	64 30.0	72 31	74.4	68 27.7	59 29	63.1	68 45.1	57 29	62.0	71 10.6	39 25	49.2	6
7	61 56.3	77 32	78.1	62 19.4	76 32	77.4	63 27.2	74 31	75.2	63 49.3	73 31	74.5	64 11.2	73 31	73.7	68 10.3	59 29	62.5	68 27.9	58 28	61.4	70 55.9	40 24	48.8	7
8	61 37.3	77 32	77.3	62 00.3	77 32	76.6	63 08.3	74 31	74.4	63 30.5	74 31	73.7	63 52.5	73 31	72.9	67 53.0	60 29	62.0	68 10.8	58 28	60.9	70 41.2	41 24	48.5	8
9	61 18.2	77 32	76.4	61 41.4	77 32	75.8	62 49.5	75 31	73.7	63 11.8	74 31	72.9	63 33.8	73 31	72.2	67 35.9	60 28	61.4	67 53.7	59 28	60.3	70 26.6	42 24	48.2	9
70	60 59.3	78 31	75.6	61 22.5	77 31	75.0	62 30.8	75 31	72.9	62 53.2	74 31	72.2	63 15.3	73 31	71.4	67 18.8	61 28	60.8	67 36.8	60 28	59.8	70 12.1	43 24	47.8	70
1	60 40.4	78 31	74.8	61 03.6	77 31	74.2	62 12.2	75 31	72.2	62 34.6	74 31	71.4	62 56.8	74 31	70.7	67 01.7	61 28	60.3	67 20.0	60 28	59.2	69 57.6	44 24	47.5	1
2	60 21.6	78 31	74.1	60 44.9	77 31	73.4	61 53.6	75 31	71.4	62 16.1	75 31	70.7	62 38.4	74 30	70.0	66 44.8	62 28	59.7	67 03.2	61 28	58.7	69 43.3	45 24	47.2	2
3	60 02.8	78 31	73.3	60 26.2	78 31	72.6	61 35.2	76 31	70.6	61 57.7	75 31	70.0	62 20.1	74 30	69.2	66 28.0	63 28	59.1	66 46.6	61 28	58.1	69 29.0	46 24	46.8	3
4	59 44.2	78 31	72.5	60 07.6	78 31	71.9	61 16.8	76 30	69.9	61 39.4	75 30	69.2	62 01.9	74 30	68.5	66 11.3	63 28	58.6	66 30.1	62 27	57.6	69 14.8	47 24	46.5	4
75	59 25.6	79 31	71.7	59 49.1	78 31	71.1	60 58.5	76 30	69.2	61 21.2	75 30	68.5	61 43.7	75 30	67.8	65 54.7	64 28	58.0	66 13.6	63 27	57.1	69 00.7	48 23	46.1	75
6	59 07.1	79 31	70.9	59 30.6	78 31	70.3	60 40.2	76 30	68.4	61 03.1	76 30	67.8	61 25.7	75 30	67.1	65 38.2	64 27	57.4	65 57.3	63 27	56.5	68 46.6	49 23	45.8	6
7	58 48.6	79 31	70.2	59 12.3	78 30	69.6	60 22.1	77 30	67.7	60 45.0	76 30	67.0	61 07.8	75 30	66.4	65 21.8	65 27	56.9	65 41.0	64 27	56.0	68 32.7	50 23	45.4	7
8	58 30.3	79 30	69.4	58 54.0	79 30	68.8	60 04.1	77 30	67.0	60 27.1	76 30	66.3	60 49.9	76 30	65.7	65 05.4	65 27	56.3	65 24.9	64 27	55.4	68 18.8	51 23	45.0	8
9	58 12.1	80 30	68.7	58 35.8	79 30	68.1	59 46.2	77 30	66.3	60 09.3	77 30	65.6	60 32.2	76 29	65.0	64 49.2	66 27	55.8	65 08.9	65 27	54.9	68 05.0	52 23	44.7	9
80	57 53.9	80 30	67.9	58 17.8	79 30	67.3	59 28.3	78 30	65.5	59 51.5	77 29	64.9	60 14.5	76 29	64.3	64 33.1	67 27	55.2	64 53.0	66 26	54.3	67 51.4	53 23	44.3	80
1	57 35.9	80 30	67.2	57 59.8	79 30	66.6	59 10.6	78 29	64.8	59 33.9	77 29	64.2	59 57.0	77 29	63.6	64 17.1	67 26	54.7	64 37.1	66 26	53.8	67 37.8	53 22	43.9	1
2	57 17.9	80 30	66.4	57 41.9	80 30	65.9	58 53.0	78 29	64.1	59 16.4	78 29	63.5	59 39.5	77 29	62.9	64 01.3	68 26	54.1	64 21.4	67 26	53.3	67 24.3	54 22	43.5	2
3	57 00.1	80 30	65.7	57 24.1	80 29	65.1	58 35.5	78 29	63.4	58 58.9	78 29	62.8	59 22.2	77 29	62.2	63 45.5	68 26	53.6	64 05.8	67 26	52.7	67 10.8	55 22	43.2	3
4	56 42.3	81 29	64.9	57 06.5	80 29	64.4	58 18.1	79 29	62.7	58 41.6	78 29	62.1	59 05.0	78 29	61.5	63 29.8	69 26	53.0	63 50.3	68 26	52.2	66 57.5	56 22	42.8	4
85	56 24.7	81 29	64.2	56 48.9	81 29	63.7	58 00.8	79 29	62.0	58 24.4	79 28	61.4	58 47.9	78 28	60.8	63 14.3	69 26	52.5	63 35.0	68 25	51.6	66 44.3	57 22	42.4	85
6	56 07.1	81 29	63.5	56 31.5	81 29	62.9	57 43.6	79 28	61.3	58 07.3	79 28	60.7	58 30.9	78 28	60.1	62 58.9	70 26	51.9	63 19.7	69 25	51.1	66 31.2	58 22	42.0	6
7	55 49.7	82 29	62.7	56 14.1	81 29	62.2	57 26.5	80 28	60.6	57 50.3	79 28	60.0	58 14.0	79 28	59.4	62 43.6	70 25	51.3	63 04.6	70 25	50.6	66 18.2	59 22	41.6	7
8	55 32.4	82 29	62.0	55 56.9	81 29	61.5	57 09.5	80 28	59.9	57 33.5	80 28	59.3	57 57.2	79 28	58.8	62 28.4	71 25	50.8	62 49.5	70 25	50.0	66 05.3	60 21	41.2	8
9	55 15.2	82 28	61.3	55 39.8	82 28	60.8	56 52.7	80 28	59.2	57 16.7	80 28	58.7	57 40.6	79 28	58.1	62 13.3	72 25	50.2	62 34.6	71 25	49.5	65 52.4	60 21	40.8	9
90	54 58.1	82 28	60.6	55 22.8	82 28	60.1	56 36.0	81 28	58.5	57 00.1	80 28	58.0	57 24.1	80 27	57.4	61 58.3	72 25	49.7	62 19.8	71 24	49.0	65 39.7	61 21	40.4	90

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
91	54 41.2	83 28	59.9	55 05.9	82 28	59.4	56 19.4	81 27	57.8	56 43.6	80 27	57.3	57 07.7	80 27	56.8	61 43.5	73 25	49.1	62 05.2	72 24	48.4	65 27.1	62 21	40.0
2	54 24.4	83 28	59.2	54 49.2	83 28	58.7	56 02.9	81 27	57.2	56 27.2	81 27	56.6	56 51.4	80 27	56.1	61 28.8	73 24	48.6	61 50.6	72 24	47.9	65 14.6	63 21	39.6
3	54 07.7	83 28	58.4	54 32.6	83 28	58.0	55 46.6	82 27	56.5	56 11.0	81 27	55.9	56 35.2	81 27	55.4	61 14.2	74 24	48.0	61 36.2	73 24	47.3	65 02.2	64 20	39.2
4	53 51.1	83 27	57.7	54 16.1	83 27	57.3	55 30.3	82 27	55.8	55 54.8	81 27	55.3	56 19.2	81 26	54.8	60 59.7	74 24	47.5	61 21.9	74 24	46.8	64 49.9	65 20	38.8
95	53 34.6	84 27	57.0	53 59.7	83 27	56.6	55 14.2	82 27	55.1	55 38.9	82 26	54.6	56 03.3	81 26	54.1	60 45.4	75 24	47.0	61 07.7	74 23	46.3	64 37.7	65 20	38.4
6	53 18.3	84 27	56.3	53 43.5	84 27	55.9	54 58.3	83 26	54.4	55 23.0	82 26	53.9	55 47.6	82 26	53.4	60 31.2	75 23	46.4	60 53.7	75 23	45.7	64 25.6	66 20	38.0
7	53 02.1	84 27	55.6	53 27.4	84 27	55.2	54 42.5	83 26	53.8	55 07.3	83 26	53.3	55 32.0	82 26	52.8	60 17.1	76 23	45.9	60 39.7	75 23	45.2	64 13.6	67 20	37.6
8	52 46.1	85 27	54.9	53 11.4	84 26	54.5	54 26.8	83 26	53.1	54 51.7	83 26	52.6	55 16.5	82 26	52.1	60 03.1	76 23	45.3	60 25.9	76 23	44.7	64 01.8	68 20	37.2
9	52 30.1	85 26	54.2	52 55.6	85 26	53.8	54 11.2	84 26	52.4	54 36.2	83 26	51.9	55 01.1	83 25	51.5	59 49.3	77 23	44.8	60 12.3	76 23	44.1	63 50.0	68 19	36.8
100	52 14.4	85 26	53.5	52 39.9	85 26	53.1	53 55.8	84 25	51.7	54 20.9	84 25	51.3	54 45.9	83 25	50.8	59 35.6	77 23	44.2	59 58.7	77 22	43.6	63 38.4	69 19	36.4
1	51 58.7	85 26	52.8	52 24.3	85 26	52.4	53 40.6	84 25	51.1	54 05.8	84 25	50.6	54 30.9	83 25	50.1	59 22.1	78 22	43.7	59 45.3	77 22	43.0	63 26.9	70 19	35.9
2	51 43.2	86 26	52.1	52 08.9	85 25	51.7	53 25.4	85 25	50.4	53 50.7	84 25	50.0	54 15.9	84 25	49.5	59 08.6	78 22	43.1	59 32.1	78 22	42.5	63 15.5	71 19	35.5
3	51 27.9	86 25	51.4	51 53.7	86 25	51.0	53 10.4	85 25	49.7	53 35.9	85 25	49.3	54 01.2	84 24	48.8	58 55.4	79 22	42.6	59 18.9	78 22	42.0	63 04.2	71 19	35.1
4	51 12.7	86 25	50.8	51 38.5	86 25	50.3	52 55.6	85 24	49.1	53 21.1	85 24	48.6	53 46.5	85 24	48.2	58 42.2	79 22	42.0	59 06.0	79 21	41.4	62 53.0	72 18	34.7
105	50 57.6	87 25	50.1	51 23.6	86 25	49.7	52 40.9	85 24	48.4	53 06.5	85 24	48.0	53 32.0	85 24	47.5	58 29.2	80 21	41.5	58 53.1	79 21	40.9	62 42.0	73 18	34.2
6	50 42.7	87 25	49.4	51 08.8	87 24	49.0	52 26.4	86 24	47.8	52 52.1	86 24	47.3	53 17.7	85 24	46.9	58 16.3	80 21	40.9	58 40.4	80 21	40.4	62 31.0	73 18	33.8
7	50 28.0	87 24	48.7	50 54.1	87 24	48.3	52 12.0	86 24	47.1	52 37.8	86 24	46.7	53 03.5	86 23	46.3	58 03.6	80 21	40.4	58 27.8	80 21	39.8	62 20.2	74 18	33.4
8	50 13.4	88 24	48.0	50 39.6	87 24	47.6	51 57.8	86 23	46.4	52 23.7	86 23	46.0	52 49.5	86 23	45.6	57 51.0	81 21	39.8	58 15.4	81 20	39.3	62 09.5	75 18	33.0
9	49 58.9	88 24	47.3	50 25.2	88 24	46.9	51 43.7	87 23	45.8	52 09.7	86 23	45.4	52 35.6	86 23	45.0	57 38.6	82 20	39.3	58 03.1	81 20	38.7	61 59.0	76 17	32.5
110	49 44.7	88 24	46.6	50 11.0	88 23	46.3	51 29.8	87 23	45.1	51 55.9	87 23	44.7	52 21.9	87 23	44.3	57 26.3	82 20	38.7	57 50.9	82 20	38.2	61 48.5	76 17	32.1
1	49 30.5	88 23	46.0	49 57.0	88 23	45.6	51 16.0	87 23	44.5	51 42.2	87 23	44.1	52 08.3	87 22	43.7	57 14.2	83 20	38.2	57 38.9	82 20	37.7	61 38.2	77 17	31.7
2	49 16.6	89 23	45.3	49 43.1	88 23	44.9	51 02.4	88 22	43.8	51 28.7	87 22	43.4	51 54.9	87 22	43.0	57 02.1	83 20	37.6	57 27.0	83 20	37.1	61 28.0	78 17	31.2
3	49 02.8	89 23	44.6	49 29.4	89 23	44.3	50 49.0	88 22	43.2	51 15.3	88 22	42.8	51 41.6	88 22	42.4	56 50.3	84 20	37.1	57 15.3	83 19	36.6	61 17.9	78 17	30.8
4	48 49.1	89 22	43.9	49 15.9	89 22	43.6	50 35.7	88 22	42.5	51 02.2	88 22	42.1	51 28.6	88 22	41.8	56 38.6	84 19	36.5	57 03.8	84 19	36.0	61 08.0	79 16	30.4
115	48 35.7	89 22	43.2	49 02.5	89 22	42.9	50 22.6	89 22	41.8	50 49.1	88 21	41.5	51 15.6	88 21	41.1	56 27.0	85 19	36.0	56 52.3	84 19	35.5	60 58.2	79 16	29.9
6	48 22.4	90 22	42.5	48 49.3	90 22	42.2	50 09.6	89 21	41.2	50 36.3	89 21	40.8	51 02.9	89 21	40.5	56 15.6	85 19	35.4	56 41.1	85 19	35.0	60 48.5	80 16	29.5
7	48 09.2	90 22	41.9	48 36.2	90 21	41.6	49 56.8	89 21	40.5	50 23.6	89 21	40.2	50 50.3	89 21	39.8	56 04.4	85 18	34.9	56 30.0	85 18	34.4	60 38.9	81 16	29.1
8	47 56.3	90 21	41.2	48 23.4	90 21	40.9	49 44.2	90 21	39.9	50 11.1	89 21	39.5	50 37.8	89 20	39.2	55 53.3	86 18	34.3	56 19.0	86 18	33.9	60 29.5	81 15	28.6
9	47 43.5	91 21	40.5	48 10.6	90 21	40.2	49 31.8	90 20	39.2	49 58.7	90 20	38.9	50 25.6	89 20	38.6	55 42.3	86 18	33.8	56 08.2	86 18	33.3	60 20.2	82 15	28.2
120	47 30.9	91 21	39.9	47 58.1	91 21	39.6	49 19.5	90 20	38.6	49 46.5	90 20	38.3	50 13.5	90 20	37.9	55 31.5	87 18	33.2	55 57.5	86 18	32.8	60 11.1	82 15	27.7
1	47 18.4	91 20	39.2	47 45.8	91 20	38.9	49 07.4	90 20	37.9	49 34.5	90 20	37.6	50 01.6	90 20	37.3	55 20.9	87 17	32.7	55 47.0	87 17	32.3	60 02.0	83 15	27.3
2	47 06.2	91 20	38.5	47 33.6	91 20	38.2	48 55.5	91 20	37.3	49 22.7	91 19	37.0	49 49.8	90 19	36.6	55 10.4	88 17	32.2	55 36.7	87 17	31.7	59 53.1	83 15	26.9
3	46 54.1	92 20	37.9	47 21.6	92 20	37.6	48 43.7	91 19	36.6	49 11.0	91 19	36.3	49 38.3	91 19	36.0	55 00.1	88 17	31.6	55 26.5	88 17	31.2	59 44.4	84 14	26.4
4	46 42.2	92 20	37.2	47 09.8	92 19	36.9	48 32.2	91 19	36.0	48 59.5	91 19	35.7	49 26.9	91 19	35.4	54 50.0	88 17	31.1	55 16.4	88 16	30.6	59 35.8	85 14	26.0
125	46 30.5	92 19	36.5	46 58.1	92 19	36.2	48 20.8	92 19	35.4	48 48.2	91 19	35.0	49 15.6	91 18	34.7	54 40.0	89 16	30.5	55 06.6	88 16	30.1	59 27.3	85 14	25.5
6	46 19.0	92 19	35.9	46 46.7	92 19	35.6	48 09.6	92 18	34.7	48 37.1	92 18	34.4	49 04.6	92 18	34.1	54 30.1	89 16	30.0	54 56.8	89 16	29.6	59 18.9	86 14	25.1
7	46 07.6	93 19	35.2	46 35.4	93 18	34.9	47 58.5	92 18	34.1	48 26.2	92 18	33.8	48 53.7	92 18	33.5	54 20.5	90 16	29.4	54 47.3	89 16	29.0	59 10.7	86 13	24.6
8	45 56.5	93 18	34.5	46 24.3	93 18	34.2	47 47.7	92 18	33.4	48 15.4	92 18	33.1	48 43.0	92 18	32.8	54 11.0	90 15	28.9	54 37.9	90 15	28.5	59 02.7	87 13	24.2
9	45 45.5	93 18	33.8	46 13.4	93 18	33.6	47 37.0	93 17	32.8	48 04.8	93 17	32.5	48 32.5	92 17	32.2	54 01.6	90 15	28.3	54 28.7	90 15	27.9	58 54.7	87 13	23.7
130	45 34.7	93 18	33.2	46 02.7	93 18	32.9	47 26.5	93 17	32.1	47 54.4	93 17	31.8	48 22.2	93 17	31.6	53 52.4	91 15	27.8	54 19.6	90 15	27.4	58 46.9	88 13	23.3
1	45 24.1	94 17	32.5	45 52.2	94 17	32.3	47 16.2	93 17	31.5	47 44.2	93 17	31.2	48 12.1	93 17	30.9	53 43.4	91 15	27.2	54 10.7	91 15	26.8	58 39.3	88 12	22.8
2	45 13.7	94 17	31.8	45 41.9	94 17	31.6	47 06.1	93 17	30.8	47 34.2	93 16	30.6	48 02.1	93 16	30.3	53 34.6	91 14	26.6	54 01.9	91 14	26.3	58 31.8	89 12	22.4
3	45 03.5	94 17	31.2	45 31.7	94 17	30.9	46 56.2	94 16	30.2	47 24.3	93 16	29.9	47 52.4	93 16	29.7	53 25.9	91 14	26.1	53 53.4	91 14	25.8	58 24.4	89 12	21.9
4	44 53.5	94 16	30.5	45 21.8	94 16	30.3	46 46.5	94 16	29.5	47 14.7	94 16	29.3	47 42.8	94 16	29.0	53 17.4	92 14	25.5	53 45.0	92 14	25.2	58 17.2	90 12	21.5
135	44 43.7	95 16	29.8	45 12.0	95 16	29.6	46 37.0	94 16	28.9	47 05.2	94 15	28.7	47 33.4	94 15	28.4	53 09.1	92 14	25.0	53 36.7	92 13	24.7	58 10.2	90 12	21.0
6	44 34.0	95 16	29.2	45 02.5	95 16	29.0	46 27.6	94 15	28.3	46 55.9	94 15	28.0	47 24.2	94 15	27.8	53 00.9	93 13	24.4	53 28.7	92 13	24.1	58 03.2	90 11	20.5
7	44 24.6	95 15	28.5	44 53.1	95 15	28.3	46 18.5	95 15	27.6	46 46.9	95 15	27.4	47 15.2	94 15	27.1	52 52.9	93 13	23.9	53 20.8	93 13	23.6	57 56.4	91 11	20.1
8	44 15.4	95 15	27.8	44 44.0	95 15	27.6	46 09.5	95 15	27.0	46 38.0	95 14	26.7	47 06.4	95 14	26.5	52 45.1	93 13	23.3	53 13.0	93 13	23.0	57 49.8	91 11	19.6
9	44 06.4	95 15	27.2	44 35.0	95 15	27.0	46 00.7	95 14	26.3	46 29.3	95 14	26.1	46 57.8	95 14	25.9	52 37.4	94 12	22.8	53 05.5	93 12	22.5	57 43.3	92 11	19.2
140	43 57.5	96 14	26.5	44 26.2	96 14	26.3	45 52.2	95 14	25.7	46 20.8	95 14	25.5	46 49.4	95 14	25.2	52 29.9	94 12	22.2	52 58.1	94 12	21.9	57 37.0	92 10	18.7
1	43 48.9	96 14	25.9	44 17.7	96 14	25.7	45 43.8	96 14	25.0	46 12.5	96 14	24.8	46 41.1	95 13	24.6	52 22.6	94 12	21.7	52 50.9	94 12	21.4	57 30.8	92 10	18.2
2	43 40.5	96 14	25.2	44 09.3	96 14	25.0	45 35.6	96 13	24.4	46 04.4	96 13	24.2	46 33.1	96 13	24.0	52 15.5	94 12	21.1	52 43.8	94 11	20.9	57 24.8	93 10	17.8
3	43 32.3	96 13	24.5	44 01.2	96 13	24.3	45 27.7	96 13	23.8	45 56.5	96 13	23.6	46 25.2	96 13	23.3	52 08.5	95 11	20.6	52 37.0	95 11	20.3	57 18.9	93 10	17.3
4	43 24.3	96 13	23.9	43 53.2	96 13	23.7	45 19.9	96 13	23.1	45 48.8	96 13	22.9	46 17.6	96 12	22.7	52 01.8	95 11	20.0	52 30.3	95 11	19.8	57 13.1	94 09	16.9
145	43 16.5	97 13	23.2	43 45.5	97 13	23.0	45 12.3	96 12	22.5	45 41.3	96 12	22.3	46 10.2	96 12	22.1	51 55.2	95 11	19.5	52 23.7	95 11	19.2	57 07.5	94 09	16.4
6	43 08.9	97 12	22.5	43 37.9	97 12	22.4	45 05.0	97 12	21.8	45 34.0	97 12	21.6	46 02.9	96 12	21.5	51 48.7	96 10	18.9	52 17.4	95 10	18.7	57 02.1	94 09	15.9
7	43 01.5	97 12	21.9	43 30.6	97 12	21.7	44 57.8	97 12	21.2	45 26.8	97 12	21.0	45 55.9	97 11	20.8	51 42.5	96 10	18.4	52 11.2	96 10	18.1	56 56.8	95 09	15.5
8	42 54.3	97 12	21.2	43 23.5	97 12	21.0	44 50.9	97 11	20.5	45 19.9	97 11	20.4	45 49.0	97 11	20.2	51 36.4	96 10	17.8	52 05.2	96 10	17.6	56 51.7	95 08	15.0
9	42 47.4	97 11	20.5	43 16.6	97 11	20.4	44 44.1	97 11	19.9	45 13.2	97 11	19.7	45 42.4	97 11	19.6	51 30.6	96 10	17.3	51 59.4	96 09	17.0	56 46.7	95 08	14.5
150	42 40.6	98 11	19.9	43 09.9	97 11	19.7	44 37.6	97 11	19.3	45 06.8	97 10	19.1	45 35.9	97 10	18.9	51 24.9	97 09	16.7	51 53.8	96 09	16.5	56 41.8	96 08	14.1
1	42 34.1	98 11	19.2	43 03.4	98 10	19.1	44 31.2	98 10	18.6	45 00.5	97 10	18.5	45 29.7	97 10	18.3	51 19.3	97 09	16.1	51 48.4	97 09	15.9	56 37.2	96 08	13.6
2	42 27.8	98 10	18.6	42 57.1	98 10	18.4	44 25.1	98 10	18.0	44 54.4	98 10	17.8	45 23.7	98 10	17.7	51 14.0	97 09	15.6	51 43.1	97 08	15.4	56 32.6	96 07	13.2
3	42 21.7	98 10	17.9	42 51.1	98 10	17.8	44 19.2	98 10	17.3	44 48.5	98 09	17.2	45 17.8	98 09	17.0	51 08.8	97 08	15.0	51 38.0	97 08	14.8	56 28.3	96 07	12.7
4	42 15.8	98 09	17.2	42 45.2	98 09	17.1	44 13.4	98 09	16.7	44 42.8	98 09	16.5	45 12.2	98 09	16.4	51 03.9	97 08	14.5	51 33.1	97 08	14.3	56 24.1	97 07	12.2
155	42 10.1	98 09	16.6	42 39.6	98 09	16.4	44 07.9	98 09	16.0	44 37.4	98 09	15.9	45 06.8	98 09	15.8	50 59.1	98 08	13.9	51 28.3	98 08	13.7	56 20.0	97 06	11.8
6	42 04.6	98 09	15.9	42 34.2	98 09	15.8	44 02.6	98 08	15.4	44 32.1	98 08	15.3	45 01.6	98 08	15.1	50 54.5	98 07	13.4	51 23.8	98 07	13.2	56 16.1	97 06	11.3
7	41 59.4	98 08	15.2	42 28.9	99 08	15.1	43 57.6	98 08	14.8	44 27.1	98 08	14.6	44 56.6	98 08	14.5	50 50.0	98 07	12.8	51 19.4	98 07	12.6	56 12.4	97 06	10.8
8	41 54.4	99 08	14.6	42 24.0	99 08	14.5	43 52.7	99 08	14.1	44 22.3	99 08	14.0	44 51.8	99 08	13.9	50 45.8	98 07	12.3	51 15.2	98 07	12.1	56 08.8	98 06	10.4
9	41 49.6	99 08	13.9	42 19.2	99 08	13.8	43 48.0	99 07	13.5	44 17.6	99 07	13.4	44 47.2	99 07	13.3	50 41.7	98 06	11.7	51 11.2	98 06	11.6	56 05.3	98 05	09.9
160	41 45.0	99 07	13.3	42 14.6	99 07	13.2	43 43.6	99 07	12.8	44 13.2	99 07	12.7	44 42.9	99 07	12.6	50 37.9	98 06	11.1	51 07.4	98 06	11.0	56 02.1	98 05	09.4
1	41 40.6	99 07	12.6	42 10.3	99 07	12.5	43 39.4	99 07	12.2	44 09.0	99 07	12.1	44 38.7	99 07	12.0	50 34.2	99 06	10.6	51 03.8	98 06	10.5	55 58.9	98 05	08.9
2	41 36.5	99 07	11.9	42 06.2	99 06	11.8	43 35.3	99 06	11.6	44 05.0	99 06	11.5	44 34.7	99 06	11.4	50 30.7	99 06	10.0	51 00.3	98 05	09.9	55 56.0	98 05	08.5
3	41 32.5	99 06	11.3	42 02.3	99 06	11.2	43 31.5	99 06	10.9	44 01.3	99 06	10.8	44 31.0	99 06	10.7	50 27.4	99 05	09.5	50 57.1	99 05	09.4	55 53.2	99 04	08.0
4	41 28.8	99 06	10.6	41 58.6	99 06	10.5	43 27.9	99 06	10.3	43 57.7	99 06	10.2	44 27.5	99 06	10.1	50 24.3	99 05	08.9	50 54.0	99 05	08.8	55 50.5	99 04	07.5
165	41 25.3	99 05	09.9	41 55.2	99 05	09.9	43 24.6	99 05	09.6	43 54.4	99 05	09.5	44 24.2	99 05	09.5	50 21.3	99 05	08.4	50 51.1	99 05	08.3	55 48.1	99 04	07.1
6	41 22.1	99 05	09.3	41 51.9	99 05	09.2	43 21.4	99 05	09.0	43 51.2	99 05	08.9	44 21.0	99 05	08.8	50 18.6	99 04	07.8	50 48.4	99 04	07.7	55 45.7	99 04	06.6
7	41 19.1	1.0 05	08.6	41 48.9	1.0 05	08.5	43 18.5	99 05	08.3	43 48.3	99 04	08.3	44 18.2	99 04	08.2	50 16.0	99 04	07.2	50 45.8	99 04	07.2	55 43.6	99 03	06.1
8	41 16.2	1.0 04	08.0	41 46.1	1.0 04	07.9	43 15.7	1.0 04	07.7	43 45.6	1.0 04	07.6	44 15.5	1.0 04	07.6	50 13.7	99 04	06.7	50 43.5	99 04	06.6	55 41.6	99 03	05.7
9	41 13.7	1.0 04	07.3	41 43.5	1.0 04	07.2	43 13.2	1.0 04	07.1	43 43.1	1.0 04	07.0	44 13.0	1.0 04	06.9	50 11.5	1.0 03	06.1	50 41.3	1.0 03	06.1	55 39.7	99 03	05.2
170	41 11.3	1.0 04	06.6	41 41.2	1.0 04	06.6	43 10.9	1.0 03	06.4	43 40.8	1.0 03	06.4	44 10.7	1.0 03	06.3	50 09.5	1.0 03	05.6	50 39.4	1.0 03	05.5	55 38.0	99 03	04.7
1	41 09.1	1.0 03	06.0	41 39.1	1.0 03	05.9	43 08.9	1.0 03	05.8	43 38.8	1.0 03	05.7	44 08.7	1.0 03	05.7	50 07.7	1.0 03	05.0	50 37.6	1.0 03	05.0	55 36.5	1.0 02	04.2
2	41 07.2	1.0 03	05.3	41 37.2	1.0 03	05.3	43 07.0	1.0 03	05.1	43 36.9	1.0 03	05.1	44 06.9	1.0 03	05.0	50 06.1	1.0 02	04.5	50 36.0	1.0 02	04.4	55 35.1	1.0 02	03.8
3	41 05.5	1.0 02	04.6	41 35.5	1.0 02	04.6	43 05.4	1.0 02	04.5	43 35.3	1.0 02	04.5	44 05.3	1.0 02	04.4	50 04.7	1.0 02	03.9	50 34.6	1.0 02	03.9	55 33.9	1.0 02	03.3
4	41 04.1	1.0 02	04.0	41 34.0	1.0 02	03.9	43 03.9	1.0 02	03.9	43 33.9	1.0 02	03.8	44 03.9	1.0 02	03.8	50 03.4	1.0 02	03.3	50 33.4	1.0 02	03.3	55 32.9	1.0 01	02.8
175	41 02.8	1.0 02	03.3	41 32.8	1.0 02	03.3	43 02.7	1.0 02	03.2	43 32.7	1.0 02	03.2	44 02.7	1.0 02	03.2	50 02.4	1.0 01	02.8	50 32.3	1.0 01	02.8	55 32.0	1.0 01	02.4
6	41 01.8	1.0 01	02.6	41 31.8	1.0 01	02.6	43 01.8	1.0 01	02.6	43 31.7	1.0 02	02.5	44 01.7	1.0 01	02.5	50 01.5	1.0 01	02.2	50 31.5	1.0 01	02.2	55 31.3	1.0 01	01.9
7	41 01.0	1.0 01	02.0	41 31.0	1.0 01	02.0	43 01.0	1.0 01	01.9	43 31.0	1.0 01	01.9	44 01.0	1.0 01	01.9	50 00.9	1.0 01	01.7	50 30.8	1.0 01	01.7	55 30.7	1.0 01	01.4
8	41 00.5	1.0 01	01.3	41 30.4	1.0 01	01.3	43 00.4	1.0 01	01.3	43 30.4	1.0 01	01.3	44 00.4	1.0 01	01.3	50 00.4	1.0 00	01.1	50 30.4	1.0 00	01.1	55 30.3	1.0 00	00.9
9	41 00.1	1.0 00	00.7	41 30.1	1.0 00	00.7	43 00.1	1.0 00	00.6	43 30.1	1.0 00	00.6	44 00.1	1.0 00	00.6	50 00.1	1.0 00	00.6	50 30.1	1.0 00	00.6	55 30.1	1.0 00	00.5
180	41 00.0	1.0 00	00.0	41 30.0	1.0 00	00.0	43 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0	44 00.0	1.0 00	00.0	50 00.0	1.0 00	00.0	50 30.0	1.0 00	00.0	55 30.0	1.0 00	00.0

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	23	180	27	180	31	180	35	180	39	180	43	180	47	180	51	180	55	180	59	180	63	180	00
4	23	176	27	176	31	175	35	175	39	175	43	175	47	175	51	175	55	174	59	174	63	174	4
8	23	171	27	171	31	171	35	171	39	170	43	170	47	170	51	169	55	169	59	168	63	167	8
12	23	167	27	167	31	166	35	166	39	166	42	165	46	165	50	164	54	163	58	162	62	161	12
16	22	163	26	162	30	162	34	161	38	161	42	160	46	159	50	159	54	158	58	157	62	155	16
20	22	158	26	158	30	157	34	157	38	156	42	155	46	154	50	153	53	152	57	151	61	149	20
24	21	154	25	154	29	153	33	152	37	151	41	150	45	150	49	148	53	147	57	145	61	143	24
28	21	150	25	149	29	148	32	148	36	147	40	146	44	145	48	143	52	142	56	140	60	138	28
32	20	146	24	145	28	144	32	143	36	142	40	141	43	140	47	138	51	137	55	135	59	133	32
36	19	142	23	141	27	140	31	139	35	138	39	137	43	135	46	134	50	132	54	130	58	127	36
40	18	138	22	137	26	136	30	134	34	133	38	132	42	131	45	129	49	127	53	125	57	123	40
44	17	133	21	132	25	131	29	130	33	129	37	128	41	126	44	124	48	123	52	120	56	118	44
48	16	129	20	128	24	127	28	126	32	125	36	123	40	122	43	120	47	118	51	116	54	113	48
52	15	125	19	124	23	123	27	122	31	120	35	119	38	117	42	116	46	114	50	111	53	109	52
56	14	121	18	120	22	119	26	118	30	116	33	115	37	113	41	111	45	109	48	107	52	104	56
60	13	117	17	116	21	115	25	114	28	112	32	111	36	109	40	107	43	105	47	103	51	100	60
64	12	114	16	112	20	111	23	110	27	108	31	107	35	105	38	103	42	101	46	99	49	96	64
68	11	110	15	108	18	107	22	106	26	104	30	103	33	101	37	99	41	97	45	95	48	92	68
72	10	106	13	105	17	103	21	102	25	100	28	99	32	97	36	95	40	93	43	91	47	89	72
76	08	102	12	101	16	99	20	98	23	96	27	95	31	93	35	91	38	90	42	87	46	85	76
80	07	98	11	97	15	96	18	94	22	93	26	91	30	89	33	88	37	86	41	84	44	81	80
84	06	94	10	93	13	92	17	90	21	89	25	87	28	86	32	84	36	82	39	80	43	78	84
88	04	91	08	89	12	88	16	87	20	85	23	84	27	82	31	80	34	78	38	76	42	74	88
92	03	87	07	85	11	84	14	83	18	81	22	80	26	78	29	77	33	75	37	73	40	71	92
96	02	83	06	82	09	80	13	79	17	78	21	76	24	75	28	73	32	71	36	69	39	67	96
100	01	79	04	78	08	77	12	75	16	74	19	73	23	71	27	70	31	68	34	66	38	64	100
104	*01*	75	03	74	07	73	11	72	14	70	18	69	22	68	26	66	29	64	33	63	37	61	104
108	*02*	72	02	70	06	69	09	68	13	67	17	65	21	64	25	62	28	61	32	59	36	57	108
112	*03*	68	01	67	04	65	08	64	12	63	16	62	20	60	23	59	27	57	31	56	35	54	112
116	*04*	64	*01*	63	03	62	07	61	11	59	15	58	19	57	22	55	26	54	30	53	34	51	116
120	*06*	60	*02*	59	02	58	06	57	10	56	14	55	17	53	21	52	25	51	29	49	33	48	120
124	*07*	56	*03*	55	01	54	05	53	09	52	13	51	16	50	20	49	24	47	28	46	32	45	124
128	*08*	52	*04*	51	00	50	04	49	08	48	12	47	15	46	19	45	23	44	27	43	31	41	128
132	*09*	49	*05*	48	*01*	47	03	46	07	45	11	44	15	43	18	42	22	41	26	39	30	38	132
136	*10*	45	*06*	44	*02*	43	02	42	06	41	10	40	14	39	18	38	21	37	25	36	29	35	136
140	*11*	41	*07*	40	*03*	39	01	38	05	37	09	36	13	36	17	35	21	34	25	33	29	32	140
144	*11*	37	*07*	36	*04*	35	00	34	04	34	08	33	12	32	16	31	20	30	24	30	28	29	144
148	*12*	33	*08*	32	*04*	31	*00*	31	04	30	08	29	12	29	15	28	19	27	23	26	27	25	148
152	*13*	29	*09*	28	*05*	27	*01*	27	03	26	07	26	11	25	15	24	19	24	23	23	27	22	152
156	*13*	25	*09*	24	*05*	24	*01*	23	03	22	06	22	10	21	14	21	18	20	22	20	26	19	156
160	*14*	21	*10*	20	*06*	20	*02*	19	02	19	06	18	10	18	14	17	18	17	22	16	26	16	160
164	*14*	16	*10*	16	*06*	16	*02*	15	02	15	06	15	10	14	14	14	18	14	22	13	26	13	164
168	*15*	12	*11*	12	*07*	12	*03*	12	01	11	05	11	09	11	13	10	17	10	21	10	25	10	168
172	*15*	08	*11*	08	*07*	08	*03*	08	01	08	05	07	09	07	13	07	17	07	21	07	25	06	172
176	*15*	04	*11*	04	*07*	04	*03*	04	01	04	05	04	09	04	13	03	17	03	21	03	25	03	176
180	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

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FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	00
4	67	173	71	172	75	171	79	170	83	166	87	153	88	50	85	11	81	04	77	02	73	00	4
8	67	166	71	165	75	163	79	160	82	153	86	133	87	65	85	21	81	09	77	04	73	01	8
12	66	160	70	158	74	155	78	150	82	141	85	120	86	70	84	29	81	13	77	05	73	01	12
16	66	153	70	151	74	147	77	141	81	131	84	111	85	71	83	35	80	16	77	07	73	02	16
20	65	147	69	144	73	140	76	134	80	123	82	104	84	72	83	39	80	20	76	09	73	02	20
24	64	141	68	138	72	133	75	126	79	116	81	98	82	71	82	43	79	22	76	10	73	03	24
28	64	135	67	132	71	127	74	120	77	110	80	94	81	70	81	45	79	25	76	12	73	03	28
32	63	130	66	126	70	121	73	114	76	104	79	90	80	69	80	46	78	27	76	13	73	04	32
36	62	124	65	121	69	116	72	109	75	99	77	86	79	68	79	47	78	29	75	14	73	04	36
40	60	119	64	116	67	111	71	104	74	95	76	83	78	67	78	48	77	30	75	15	72	04	40
44	59	115	63	111	66	106	69	99	72	91	75	80	76	65	77	48	76	31	75	16	72	05	44
48	58	110	62	106	65	101	68	95	71	87	73	77	75	64	76	48	76	31	74	17	72	05	48
52	57	106	60	102	64	97	67	91	70	84	72	74	74	62	75	47	75	32	74	17	72	05	52
56	56	101	59	98	62	93	65	88	68	80	71	72	73	60	74	47	74	32	74	18	72	05	56
60	54	97	58	94	61	89	64	84	67	77	70	69	72	59	73	46	74	32	73	18	72	06	60
64	53	93	56	90	60	86	63	81	66	74	68	66	71	57	72	45	73	32	73	19	72	06	64
68	52	90	55	86	58	82	62	77	65	71	67	64	70	55	71	44	72	32	72	19	72	06	68
72	50	86	54	83	57	79	60	74	63	68	66	62	68	53	70	43	72	31	72	19	72	06	72
76	49	82	53	79	56	75	59	71	62	66	65	59	67	51	69	42	71	31	72	19	71	06	76
80	48	79	51	76	55	72	58	68	61	63	64	57	66	50	69	41	70	30	71	19	71	06	80
84	47	75	50	72	53	69	57	65	60	60	63	55	65	48	68	39	70	30	71	18	71	06	84
88	45	72	49	69	52	66	56	62	59	58	62	52	65	46	67	38	69	29	70	18	71	06	88
92	44	68	48	66	51	63	54	59	58	55	61	50	64	44	66	37	68	28	70	18	71	06	92
96	43	65	46	63	50	60	53	56	57	52	60	48	63	42	65	35	68	27	70	17	71	06	96
100	42	62	45	59	49	57	52	54	56	50	59	45	62	40	65	34	67	26	69	17	71	06	100
104	41	59	44	56	48	54	51	51	55	47	58	43	61	38	64	32	67	25	69	16	70	06	104
108	39	55	43	53	47	51	50	48	54	45	57	41	60	36	63	31	66	24	68	16	70	06	108
112	38	52	42	50	46	48	49	45	53	42	56	39	59	34	63	29	66	23	68	15	70	05	112
116	37	49	41	47	45	45	48	43	52	40	55	36	59	32	62	28	65	22	68	14	70	05	116
120	36	46	40	44	44	42	48	40	51	37	55	34	58	30	61	26	65	20	67	14	70	05	120
124	36	43	39	41	43	39	47	37	50	35	54	32	57	28	61	24	64	19	67	13	70	05	124
128	35	40	38	38	42	37	46	35	50	32	53	30	57	26	60	23	64	18	67	12	70	05	128
132	34	37	38	35	41	34	45	32	49	30	53	27	56	24	60	21	63	17	67	11	70	04	132
136	33	34	37	32	41	31	45	29	48	27	52	25	56	22	59	19	63	15	66	10	70	04	136
140	32	31	36	29	40	28	44	27	48	25	52	23	55	20	59	18	63	14	66	10	69	04	140
144	32	28	36	26	39	25	43	24	47	22	51	21	55	18	59	16	62	13	66	09	69	03	144
148	31	24	35	24	39	22	43	21	47	20	51	18	54	16	58	14	62	11	66	08	69	03	148
152	31	21	35	21	39	20	42	19	46	17	50	16	54	14	58	12	62	10	66	07	69	03	152
156	30	18	34	18	38	17	42	16	46	15	50	14	54	12	58	11	62	09	65	06	69	02	156
160	30	15	34	15	38	14	42	13	46	12	50	11	54	10	58	09	61	07	65	05	69	02	160
164	30	12	34	12	38	11	41	11	45	10	49	09	53	08	57	07	61	06	65	04	69	02	164
168	29	09	33	09	37	08	41	08	45	07	49	07	53	06	57	05	61	04	65	03	69	01	168
172	29	06	33	06	37	06	41	05	45	05	49	05	53	04	57	04	61	03	65	02	69	01	172
176	29	03	33	03	37	03	41	03	45	02	49	02	53	02	57	02	61	01	65	01	69	00	176
180	29	00	33	00	37	00	41	00	45	00	49	00	53	00	57	00	61	00	65	00	69	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 71°

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat 76

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FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	18 00.0 1.0 00	180.0	18 30.0 1.0 00	180.0	19 00.0 1.0 00	180.0	19 30.0 1.0 00	180.0	20 00.0 1.0 00	180.0	20 30.0 1.0 00	180.0	21 00.0 1.0 00	180.0	21 30.0 1.0 00	180.0	00
1	17 59.8 1.0 01	178.9	18 29.8 1.0 01	178.9	18 59.8 1.0 01	178.9	19 29.8 1.0 01	178.9	19 59.8 1.0 01	178.9	20 29.8 1.0 01	178.9	20 59.8 1.0 01	178.9	21 29.8 1.0 01	178.9	1
2	17 59.3 1.0 01	177.9	18 29.3 1.0 01	177.9	18 59.3 1.0 01	177.9	19 29.3 1.0 01	177.9	19 59.3 1.0 01	177.9	20 29.3 1.0 01	177.9	20 59.3 1.0 01	177.9	21 29.3 1.0 01	177.9	2
3	17 58.5 1.0 02	176.8	18 28.5 1.0 02	176.8	18 58.5 1.0 02	176.8	19 28.5 1.0 02	176.8	19 58.5 1.0 02	176.8	20 28.4 1.0 02	176.8	20 58.4 1.0 02	176.8	21 28.4 1.0 02	176.8	3
4	17 57.3 1.0 03	175.8	18 27.3 1.0 03	175.8	18 57.3 1.0 03	175.8	19 27.3 1.0 03	175.8	19 57.2 1.0 03	175.7	20 27.2 1.0 03	175.7	20 57.2 1.0 03	175.7	21 27.2 1.0 03	175.7	4
05	17 55.7 1.0 03	174.7	18 25.7 1.0 03	174.7	18 55.7 1.0 03	174.7	19 25.7 1.0 03	174.7	19 55.7 1.0 03	174.7	20 25.7 1.0 03	174.7	20 55.7 1.0 03	174.7	21 25.7 1.0 03	174.6	05
6	17 53.9 1.0 04	173.7	18 23.9 1.0 04	173.7	18 53.8 1.0 04	173.7	19 23.8 1.0 04	173.6	19 53.8 1.0 04	173.6	20 23.8 1.0 04	173.6	20 53.8 1.0 04	173.6	21 23.8 1.0 04	173.6	6
7	17 51.7 1.0 04	172.6	18 21.7 1.0 04	172.6	18 51.6 1.0 04	172.6	19 21.6 1.0 04	172.6	19 51.6 1.0 04	172.6	20 21.6 1.0 04	172.5	20 51.5 1.0 04	172.5	21 21.5 1.0 04	172.5	7
8	17 49.1 1.0 05	171.6	18 19.1 1.0 05	171.6	18 49.1 1.0 05	171.5	19 19.0 1.0 05	171.5	19 49.0 1.0 05	171.5	20 19.0 1.0 05	171.5	20 48.9 1.0 05	171.4	21 18.9 1.0 05	171.4	8
9	17 46.3 1.0 05	170.5	18 16.2 1.0 05	170.5	18 46.2 1.0 05	170.5	19 16.1 1.0 05	170.5	19 46.1 1.0 05	170.4	20 16.1 1.0 05	170.4	20 46.0 1.0 05	170.4	21 16.0 1.0 05	170.4	9
10	17 43.0 1.0 06	169.5	18 13.0 1.0 06	169.5	18 42.9 1.0 06	169.4	19 12.9 1.0 06	169.4	19 42.9 1.0 06	169.4	20 12.8 1.0 06	169.3	20 42.8 1.0 06	169.3	21 12.7 1.0 05	169.3	10
1	17 39.5 1.0 06	168.4	18 09.4 1.0 06	168.4	18 39.4 1.0 06	168.4	19 09.3 1.0 06	168.4	19 39.3 1.0 07	168.3	20 09.2 1.0 07	168.3	20 39.1 1.0 07	168.3	21 09.1 1.0 07	168.2	1
2	17 35.6 1.0 07	167.4	18 05.6 1.0 07	167.4	18 35.5 1.0 07	167.3	19 05.4 1.0 07	167.3	19 35.3 1.0 07	167.3	20 05.3 1.0 07	167.2	20 35.2 1.0 07	167.2	21 05.1 1.0 07	167.1	2
3	17 31.4 1.0 08	166.4	18 01.3 1.0 08	166.3	18 31.2 1.0 08	166.3	19 01.2 1.0 08	166.2	19 31.1 1.0 08	166.2	20 01.0 1.0 08	166.2	20 30.9 1.0 08	166.1	21 00.8 1.0 08	166.1	3
4	17 26.9 1.0 08	165.3	17 56.8 1.0 08	165.3	18 26.7 1.0 08	165.2	18 56.6 1.0 08	165.2	19 26.5 1.0 08	165.1	19 56.4 1.0 08	165.1	20 26.3 1.0 08	165.1	20 56.2 1.0 08	165.0	4
15	17 22.0 1.0 09	164.3	17 51.9 1.0 09	164.2	18 21.8 1.0 09	164.2	18 51.7 1.0 09	164.1	19 21.6 1.0 09	164.1	19 51.5 1.0 09	164.0	20 21.4 1.0 09	164.0	20 51.3 1.0 09	164.0	15
6	17 16.8 1.0 09	163.2	17 46.7 1.0 09	163.2	18 16.6 1.0 09	163.1	18 46.5 1.0 09	163.1	19 16.3 1.0 09	163.0	19 46.2 1.0 09	163.0	20 16.1 1.0 09	162.9	20 46.0 1.0 09	162.9	6
7	17 11.3 1.0 10	162.2	17 41.2 1.0 10	162.1	18 11.0 1.0 10	162.1	18 40.9 1.0 10	162.0	19 10.8 1.0 10	162.0	19 40.6 1.0 10	161.9	20 10.5 1.0 10	161.9	20 40.3 1.0 10	161.8	7
8	17 05.5 99 10	161.1	17 35.3 99 10	161.1	18 05.2 99 10	161.0	18 35.0 99 10	161.0	19 04.9 99 10	160.9	19 34.7 99 10	160.9	20 04.6 99 10	160.8	20 34.4 99 10	160.8	8
9	16 59.3 99 11	160.1	17 29.1 99 11	160.0	17 59.0 99 11	160.0	18 28.8 99 11	159.9	18 58.6 99 11	159.9	19 28.5 99 11	159.8	19 58.3 99 11	159.8	20 28.1 99 11	159.7	9
20	16 52.8 99 11	159.1	17 22.7 99 11	159.0	17 52.5 99 11	158.9	18 22.3 99 11	158.9	18 52.1 99 11	158.8	19 21.9 99 11	158.8	19 51.7 99 12	158.7	20 21.5 99 12	158.6	20
1	16 46.1 99 12	158.0	17 15.9 99 12	158.0	17 45.7 99 12	157.9	18 15.5 99 12	157.8	18 45.2 99 12	157.8	19 15.0 99 12	157.7	19 44.8 99 12	157.7	20 14.6 99 12	157.6	1
2	16 39.0 99 12	157.0	17 08.7 99 12	156.9	17 38.5 99 12	156.9	18 08.3 99 12	156.8	18 38.1 99 12	156.7	19 07.9 99 12	156.7	19 37.6 99 13	156.6	20 07.4 99 13	156.5	2
3	16 31.6 99 13	155.9	17 01.3 99 13	155.9	17 31.1 99 13	155.8	18 00.8 99 13	155.7	18 30.6 99 13	155.7	19 00.4 99 13	155.6	19 30.1 99 13	155.5	19 59.9 99 13	155.5	3
4	16 23.9 99 13	154.9	16 53.6 99 13	154.8	17 23.3 99 13	154.8	17 53.1 99 13	154.7	18 22.8 99 14	154.6	18 52.5 99 14	154.6	19 22.3 99 14	154.5	19 52.0 99 14	154.4	4
25	16 15.8 99 14	153.9	16 45.6 99 14	153.8	17 15.3 99 14	153.7	17 45.0 99 14	153.7	18 14.7 99 14	153.6	18 44.4 99 14	153.5	19 14.1 99 14	153.4	19 43.9 99 14	153.4	25
6	16 07.5 99 14	152.8	16 37.2 99 14	152.8	17 06.9 99 14	152.7	17 36.6 99 14	152.6	18 06.3 99 14	152.6	18 36.0 99 15	152.5	19 05.7 99 15	152.4	19 35.4 99 15	152.3	6
7	15 58.9 99 15	151.8	16 28.6 99 15	151.7	16 58.3 99 15	151.7	17 28.0 99 15	151.6	17 57.6 99 15	151.5	18 27.3 99 15	151.4	18 57.0 99 15	151.4	19 26.6 99 15	151.3	7
8	15 50.0 99 15	150.8	16 19.7 99 15	150.7	16 49.3 99 15	150.6	17 19.0 99 15	150.6	17 48.6 99 15	150.5	18 18.3 99 16	150.4	18 47.9 99 16	150.3	19 17.6 99 16	150.2	8
9	15 40.8 99 16	149.8	16 10.5 99 16	149.7	16 40.1 99 16	149.6	17 09.7 99 16	149.5	17 39.4 99 16	149.4	18 09.0 99 16	149.4	18 38.6 99 16	149.3	19 08.2 99 16	149.2	9
30	15 31.3 99 16	148.7	16 01.0 99 16	148.7	16 30.6 99 16	148.6	17 00.2 99 16	148.5	17 29.8 99 16	148.4	17 59.4 99 16	148.3	18 29.0 99 16	148.2	18 58.6 99 17	148.1	30
1	15 21.6 99 17	147.7	15 51.2 99 17	147.6	16 20.8 99 17	147.5	16 50.3 99 17	147.5	17 19.9 99 17	147.4	17 49.5 99 17	147.3	18 19.1 99 17	147.2	18 48.7 99 17	147.1	1
2	15 11.5 99 17	146.7	15 41.1 99 17	146.6	16 10.7 99 17	146.5	16 40.2 99 17	146.4	17 09.8 99 17	146.3	17 39.3 99 17	146.2	18 08.9 99 17	146.2	18 38.4 98 18	146.1	2
3	15 01.2 98 18	145.7	15 30.8 98 18	145.6	16 00.3 98 18	145.5	16 29.8 98 18	145.4	16 59.4 98 18	145.3	17 28.9 98 18	145.2	17 58.4 98 18	145.1	18 28.0 98 18	145.0	3
4	14 50.6 98 18	144.7	15 20.2 98 18	144.6	15 49.7 98 18	144.5	16 19.2 98 18	144.4	16 48.7 98 18	144.3	17 18.2 98 18	144.2	17 47.7 98 18	144.1	18 17.2 98 18	144.0	4
35	14 39.8 98 19	143.6	15 09.3 98 19	143.5	15 38.8 98 19	143.4	16 08.2 98 19	143.4	16 37.7 98 19	143.3	17 07.2 98 19	143.2	17 36.7 98 19	143.1	18 06.2 98 19	143.0	35
6	14 28.6 98 19	142.6	14 58.1 98 19	142.5	15 27.6 98 19	142.4	15 57.0 98 19	142.3	16 26.5 98 19	142.2	16 56.0 98 19	142.1	17 25.4 98 19	142.0	17 54.9 98 19	141.9	6
7	14 17.3 98 19	141.6	14 46.7 98 19	141.5	15 16.1 98 20	141.4	15 45.6 98 20	141.3	16 15.0 98 20	141.2	16 44.4 98 20	141.1	17 13.9 98 20	141.0	17 43.3 98 20	140.9	7
8	14 05.6 98 20	140.6	14 35.0 98 20	140.5	15 04.5 98 20	140.4	15 33.9 98 20	140.3	16 03.3 98 20	140.2	16 32.7 98 20	140.1	17 02.1 98 20	140.0	17 31.5 98 20	139.9	8
9	13 53.7 98 20	139.6	14 23.1 98 20	139.5	14 52.5 98 20	139.4	15 21.9 98 20	139.3	15 51.3 98 20	139.2	16 20.7 98 20	139.1	16 50.0 98 20	139.0	17 19.4 98 21	138.9	9
40	13 41.6 98 21	138.6	14 10.9 98 21	138.5	14 40.3 98 21	138.4	15 09.7 98 21	138.3	15 39.0 98 21	138.2	16 08.4 98 21	138.0	16 37.7 98 21	137.9	17 07.1 98 21	137.8	40
1	13 29.2 98 21	137.6	13 58.5 98 21	137.5	14 27.9 98 21	137.4	14 57.2 98 21	137.2	15 26.5 98 21	137.1	15 55.9 98 21	137.0	16 25.2 98 21	136.9	16 54.5 98 21	136.8	1
2	13 16.6 98 21	136.6	13 45.9 98 21	136.5	14 15.2 98 22	136.3	14 44.5 98 22	136.2	15 13.8 98 22	136.1	15 43.1 98 22	136.0	16 12.4 98 22	135.9	16 41.7 98 22	135.8	2
3	13 03.7 98 22	135.6	13 33.0 98 22	135.5	14 02.3 98 22	135.3	14 31.6 98 22	135.2	15 00.8 98 22	135.1	15 30.1 98 22	135.0	15 59.4 98 22	134.9	16 28.7 98 22	134.8	3
4	12 50.6 98 22	134.6	13 19.9 98 22	134.4	13 49.1 98 22	134.3	14 18.4 98 22	134.2	14 47.6 98 22	134.1	15 16.9 97 22	134.0	15 46.1 97 22	133.9	16 15.4 97 23	133.8	4
45	12 37.3 97 23	133.6	13 06.5 97 23	133.4	13 35.8 97 23	133.3	14 05.0 97 23	133.2	14 34.2 97 23	133.1	15 03.4 97 23	133.0	15 32.7 97 23	132.9	16 01.9 97 23	132.7	45
6	12 23.7 97 23	132.6	12 53.0 97 23	132.4	13 22.2 97 23	132.3	13 51.4 97 23	132.2	14 20.6 97 23	132.1	14 49.8 97 23	132.0	15 19.0 97 23	131.9	15 48.1 97 23	131.7	6
7	12 10.0 97 23	131.6	12 39.2 97 23	131.5	13 08.3 97 23	131.3	13 37.5 97 23	131.2	14 06.7 97 23	131.1	14 35.9 97 24	131.0	15 05.0 97 24	130.9	15 34.2 97 24	130.7	7
8	11 56.0 97 24	130.6	12 25.2 97 24	130.5	12 54.3 97 24	130.3	13 23.5 97 24	130.2	13 52.6 97 24	130.1	14 21.8 97 24	130.0	14 50.9 97 24	129.8	15 20.0 97 24	129.7	8
9	11 41.8 97 24	129.6	12 10.9 97 24	129.5	12 40.1 97 24	129.3	13 09.2 97 24	129.2	13 38.3 97 24	129.1	14 07.5 97 24	129.0	14 36.6 97 24	128.8	15 05.7 97 24	128.7	9
50	11 27.4 97 24	128.6	11 56.5 97 24	128.5	12 25.6 97 24	128.3	12 54.7 97 24	128.2	13 23.8 97 24	128.1	13 52.9 97 25	128.0	14 22.0 97 25	127.8	14 51.1 97 25	127.7	50
1	11 12.8 97 25	127.6	11 41.9 97 25	127.5	12 11.0 97 25	127.4	12 40.1 97 25	127.2	13 09.1 97 25	127.1	13 38.2 97 25	127.0	14 07.3 97 25	126.8	14 36.4 97 25	126.7	1
2	10 58.0 97 25	126.6	11 27.1 97 25	126.5	11 56.2 97 25	126.4	12 25.2 97 25	126.2	12 54.3 97 25	126.1	13 23.3 97 25	126.0	13 52.4 97 25	125.8	14 21.4 97 25	125.7	2
3	10 43.1 97 25	125.6	11 12.1 97 25	125.5	11 41.1 97 25	125.4	12 10.2 97 25	125.2	12 39.2 97 25	125.1	13 08.2 97 25	125.0	13 37.2 97 26	124.9	14 06.2 97 26	124.7	3
4	10 27.9 97 26	124.6	10 56.9 97 26	124.5	11 25.9 97 26	124.4	11 54.9 97 26	124.3	12 23.9 97 26	124.1	12 52.9 97 26	124.0	13 21.9 97 26	123.9	13 50.9 97 26	123.7	4
55	10 12.6 97 26	123.7	10 41.5 97 26	123.5	11 10.5 97 26	123.4	11 39.5 97 26	123.3	12 08.5 97 26	123.1	12 37.5 97 26	123.0	13 06.4 97 26	122.9	13 35.4 97 26	122.7	55
6	9 57.0 97 26	122.7	10 26.0 97 26	122.5	10 55.0 97 26	122.4	11 23.9 97 26	122.3	11 52.9 97 26	122.1	12 21.8 96 26	122.0	12 50.8 96 26	121.9	13 19.7 96 26	121.7	6
7	9 41.3 96 26	121.7	10 10.3 96 26	121.6	10 39.2 96 26	121.4	11 08.2 96 27	121.3	11 37.1 96 27	121.2	12 06.0 96 27	121.0	12 35.0 96 27	120.9	13 03.9 96 27	120.8	7
8	9 25.5 96 27	120.7	9 54.4 96 27	120.6	10 23.3 96 27	120.5	10 52.2 96 27	120.3	11 21.2 96 27	120.2	11 50.1 96 27	120.0	12 19.0 96 27	119.9	12 47.9 96 27	119.8	8
9	9 09.5 96 27	119.7	9 38.4 96 27	119.6	10 07.3 96 27	119.5	10 36.2 96 27	119.3	11 05.0 96 27	119.2	11 33.9 96 27	119.1	12 02.8 96 27	118.9	12 31.7 96 27	118.8	9
60	8 53.3 96 27	118.8	9 22.2 96 27	118.6	9 51.0 96 27	118.5	10 19.9 96 27	118.4	10 48.8 96 27	118.2	11 17.6 96 27	118.1	11 46.5 96 27	117.9	12 15.4 96 27	117.8	60
1	8 37.0 96 27	117.8	9 05.8 96 28	117.7	9 34.7 96 28	117.5	10 03.5 96 28	117.4	10 32.4 96 28	117.2	11 01.2 96 28	117.1	11 30.1 96 28	117.0	11 58.9 96 28	116.8	1
2	8 20.5 96 28	116.8	8 49.3 96 28	116.7	9 18.2 96 28	116.5	9 47.0 96 28	116.4	10 15.8 96 28	116.3	10 44.6 96 28	116.1	11 13.5 96 28	116.0	11 42.3 96 28	115.8	2
3	8 03.9 96 28	115.9	8 32.7 96 28	115.7	9 01.5 96 28	115.6	9 30.3 96 28	115.4	9 59.1 96 28	115.3	10 27.9 96 28	115.1	10 56.7 96 28	115.0	11 25.5 96 28	114.9	3
4	7 47.1 96 28	114.9	8 15.9 96 28	114.7	8 44.7 96 28	114.6	9 13.5 96 28	114.5	9 42.3 96 28	114.3	10 11.1 96 28	114.2	10 39.9 96 28	114.0	11 08.6 96 28	113.9	4
65	7 30.2 96 28	113.9	7 59.0 96 28	113.8	8 27.8 96 28	113.6	8 56.6 96 28	113.5	9 25.3 96 28	113.3	9 54.1 96 28	113.2	10 22.9 96 29	113.1	10 51.6 96 29	112.9	65
6	7 13.2 96 29	112.9	7 42.0 96 29	112.8	8 10.7 96 29	112.7	8 39.5 96 29	112.5	9 08.2 96 29	112.4	9 37.0 96 29	112.2	10 05.7 96 29	112.1	10 34.5 96 29	111.9	6
7	6 56.1 96 29	112.0	7 24.8 96 29	111.8	7 53.6 96 29	111.7	8 22.3 96 29	111.5	8 51.0 96 29	111.4	9 19.8 96 29	111.3	9 48.5 96 29	111.1	10 17.2 96 29	111.0	7
8	6 38.8 96 29	111.0	7 07.6 96 29	110.9	7 36.3 96 29	110.7	8 05.0 96 29	110.6	8 33.7 96 29	110.4	9 02.4 96 29	110.3	9 31.1 96 29	110.1	9 59.8 96 29	110.0	8
9	6 21.5 96 29	110.1	6 50.2 96 29	109.9	7 18.9 96 29	109.8	7 47.6 96 29	109.6	8 16.3 96 29	109.5	8 45.0 96 29	109.3	9 13.7 96 29	109.2	9 42.4 96 29	109.0	9
70	6 04.0 96 29	109.1	6 32.7 96 29	108.9	7 01.4 96 29	108.8	7 30.1 96 29	108.7	7 58.8 96 29	108.5	8 27.4 96 29	108.4	8 56.1 96 29	108.2	9 24.8 96 29	108.1	70
1	5 46.4 96 29	108.1	6 15.1 96 29	108.0	6 43.8 96 30	107.8	7 12.5 96 30	107.7	7 41.1 96 30	107.5	8 09.8 96 30	107.4	8 38.5 96 30	107.2	9 07.1 96 30	107.1	1
2	5 28.8 96 30	107.2	5 57.4 96 30	107.0	6 26.1 96 30	106.9	6 54.8 96 30	106.7	7 23.4 96 30	106.6	7 52.1 96 30	106.4	8 20.7 96 30	106.3	8 49.4 96 30	106.1	2
3	5 11.0 96 30	106.2	5 39.7 96 30	106.1	6 08.3 96 30	105.9	6 37.0 96 30	105.8	7 05.6 96 30	105.6	7 34.2 96 30	105.5	8 02.9 96 30	105.3	8 31.5 96 30	105.2	3
4			5 21.8 96 30	105.1	5 50.4 96 30	105.0	6 19.1 96 30	104.8	6 47.7 96 30	104.7	7 16.3 96 30	104.5	7 44.9 96 30	104.4	8 13.6 96 30	104.2	4
75			5 03.9 96 30	104.1	5 32.5 96 30	104.0	6 01.1 96 30	103.8	6 29.7 96 30	103.7	6 58.3 96 30	103.5	7 26.9 96 30	103.4	7 55.5 96 30	103.2	75
6					5 14.5 96 30	103.0	5 43.1 96 30	102.9	6 11.7 96 30	102.7	6 40.3 96 30	102.6	7 08.9 96 30	102.4	7 37.5 96 30	102.3	6
7							5 25.0 96 30	101.9	5 53.6 96 30	101.8	6 22.1 96 30	101.6	6 50.7 96 30	101.5	7 19.3 96 30	101.3	7
8							5 06.8 96 30	101.0	5 35.4 96 30	100.8	6 04.0 96 30	100.7	6 32.5 96 30	100.5	7 01.1 96 30	100.4	8
9									5 17.1 96 30	99.9	5 45.7 96 30	99.7	6 14.3 96 30	99.6	6 42.8 96 31	99.4	9
80											5 27.4 96 31	98.8	5 56.0 96 31	98.6	6 24.5 96 31	98.4	80
1											5 09.1 96 31	97.8	5 37.6 96 31	97.6	6 06.2 96 31	97.5	1
2													5 19.2 96 31	96.7	5 47.8 96 31	96.5	2
3													5 00.8 96 31	95.7	5 29.3 96 31	95.6	3
4															5 10.9 96 31	94.6	4

Lat. 72°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	18 00.0 1.0 00	180.0	17 30.0 1.0 00	180.0	17 00.0 1.0 00	180.0	16 30.0 1.0 00	180.0	16 00.0 1.0 00	180.0	15 30.0 1.0 00	180.0	15 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	00
1	17 59.8 1.0 01	178.9	17 29.8 1.0 01	179.0	16 59.8 1.0 01	179.0	16 29.8 1.0 01	179.0	15 59.8 1.0 01	179.0	15 29.8 1.0 01	179.0	14 59.8 1.0 01	179.0	14 29.8 1.0 01	179.0	1
2	17 59.3 1.0 01	177.9	17 29.3 1.0 01	177.9	16 59.3 1.0 01	177.9	16 29.3 1.0 01	177.9	15 59.3 1.0 01	177.9	15 29.3 1.0 01	177.9	14 59.3 1.0 01	177.9	14 29.3 1.0 01	177.9	2
3	17 58.5 1.0 02	176.8	17 28.5 1.0 02	176.9	16 58.5 1.0 02	176.9	16 28.5 1.0 02	176.9	15 58.5 1.0 02	176.9	15 28.5 1.0 02	176.9	14 58.5 1.0 02	176.9	14 28.5 1.0 02	176.9	3
4	17 57.3 1.0 03	175.8	17 27.3 1.0 03	175.8	16 57.3 1.0 03	175.8	16 27.3 1.0 03	175.8	15 57.3 1.0 03	175.8	15 27.3 1.0 03	175.9	14 57.3 1.0 03	175.9	14 27.3 1.0 02	175.9	4
05	17 55.7 1.0 03	174.7	17 25.8 1.0 03	174.8	16 55.8 1.0 03	174.8	16 25.8 1.0 03	174.8	15 55.8 1.0 03	174.8	15 25.8 1.0 03	174.8	14 55.8 1.0 03	174.8	14 25.8 1.0 03	174.8	05
6	17 53.9 1.0 04	173.7	17 23.9 1.0 04	173.7	16 53.9 1.0 04	173.7	16 23.9 1.0 04	173.7	15 54.0 1.0 04	173.8	15 24.0 1.0 04	173.8	14 54.0 1.0 04	173.8	14 24.0 1.0 04	173.8	6
7	17 51.7 1.0 04	172.6	17 21.7 1.0 04	172.7	16 51.7 1.0 04	172.7	16 21.7 1.0 04	172.7	15 51.8 1.0 04	172.7	15 21.8 1.0 04	172.7	14 51.8 1.0 04	172.8	14 21.8 1.0 04	172.8	7
8	17 49.1 1.0 05	171.6	17 19.2 1.0 05	171.6	16 49.2 1.0 05	171.6	16 19.2 1.0 05	171.7	15 49.3 1.0 05	171.7	15 19.3 1.0 05	171.7	14 49.3 1.0 05	171.7	14 19.3 1.0 05	171.8	8
9	17 46.3 1.0 05	170.5	17 16.3 1.0 05	170.6	16 46.3 1.0 05	170.6	16 16.4 1.0 05	170.6	15 46.4 1.0 05	170.7	15 16.4 1.0 05	170.7	14 46.5 1.0 05	170.7	14 16.5 1.0 05	170.7	9
10	17 43.0 1.0 06	169.5	17 13.1 1.0 06	169.5	16 43.1 1.0 06	169.6	16 13.2 1.0 06	169.6	15 43.2 1.0 06	169.6	15 13.3 1.0 06	169.6	14 43.3 1.0 06	169.7	14 13.4 1.0 06	169.7	10
1	17 39.5 1.0 06	168.4	17 09.6 1.0 06	168.5	16 39.6 1.0 06	168.5	16 09.7 1.0 06	168.5	15 39.7 1.0 06	168.6	15 09.8 1.0 06	168.6	14 39.8 1.0 06	168.6	14 09.9 1.0 06	168.7	1
2	17 35.6 1.0 07	167.4	17 05.7 1.0 07	167.4	16 35.8 1.0 07	167.5	16 05.8 1.0 07	167.5	15 35.9 1.0 07	167.5	15 06.0 1.0 07	167.6	14 36.0 1.0 07	167.6	14 06.1 1.0 07	167.6	2
3	17 31.4 1.0 08	166.4	17 01.5 1.0 08	166.4	16 31.6 1.0 08	166.4	16 01.6 1.0 08	166.5	15 31.7 1.0 08	166.5	15 01.8 1.0 07	166.5	14 31.9 1.0 07	166.6	14 02.0 1.0 07	166.6	3
4	17 26.9 1.0 08	165.3	16 57.0 1.0 08	165.4	16 27.1 1.0 08	165.4	15 57.1 1.0 08	165.4	15 27.2 1.0 08	165.5	14 57.3 1.0 08	165.5	14 27.4 1.0 08	165.6	13 57.5 1.0 08	165.6	4
15	17 22.0 1.0 09	164.3	16 52.1 1.0 09	164.3	16 22.2 1.0 09	164.4	15 52.3 1.0 09	164.4	15 22.4 1.0 09	164.4	14 52.5 1.0 09	164.5	14 22.6 1.0 09	164.5	13 52.7 1.0 08	164.6	15
6	17 16.8 1.0 09	163.2	16 46.9 1.0 09	163.3	16 17.1 1.0 09	163.3	15 47.2 1.0 09	163.4	15 17.3 1.0 09	163.4	14 47.4 1.0 09	163.5	14 17.5 1.0 09	163.5	13 47.6 1.0 09	163.5	6
7	17 11.3 1.0 10	162.2	16 41.4 1.0 10	162.2	16 11.6 1.0 10	162.3	15 41.7 1.0 10	162.3	15 11.8 1.0 10	162.4	14 42.0 1.0 10	162.4	14 12.1 1.0 10	162.5	13 42.2 1.0 10	162.5	7
8	17 05.5 99 10	161.1	16 35.6 1.0 10	161.2	16 05.8 1.0 10	161.2	15 35.9 1.0 10	161.3	15 06.1 1.0 10	161.3	14 36.2 1.0 10	161.4	14 06.4 1.0 10	161.4	13 36.5 1.0 10	161.5	8
9	16 59.3 99 11	160.1	16 29.5 99 11	160.2	15 59.6 99 11	160.2	15 29.8 99 11	160.3	15 00.0 99 11	160.3	14 30.1 99 11	160.4	14 00.3 99 11	160.4	13 30.5 99 11	160.5	9
20	16 52.8 99 11	159.1	16 23.0 99 11	159.1	15 53.2 99 11	159.2	15 23.4 99 11	159.2	14 53.6 99 11	159.3	14 23.8 99 11	159.3	13 53.9 99 11	159.4	13 24.1 99 11	159.5	20
1	16 46.1 99 12	158.0	16 16.3 99 12	158.1	15 46.5 99 12	158.1	15 16.7 99 12	158.2	14 46.9 99 12	158.3	14 17.1 99 12	158.3	13 47.3 99 12	158.4	13 17.4 99 12	158.4	1
2	16 39.0 99 12	157.0	16 09.2 99 12	157.0	15 39.4 99 12	157.1	15 09.6 99 12	157.2	14 39.8 99 12	157.2	14 10.1 99 12	157.3	13 40.3 99 12	157.4	13 10.5 99 12	157.4	2
3	16 31.6 99 13	155.9	16 01.8 99 13	156.0	15 32.0 99 13	156.1	15 02.3 99 13	156.1	14 32.5 99 13	156.2	14 02.7 99 13	156.3	13 33.0 99 13	156.3	13 03.2 99 13	156.4	3
4	16 23.9 99 13	154.9	15 54.1 99 13	155.0	15 24.4 99 13	155.0	14 54.6 99 13	155.1	14 24.9 99 13	155.2	13 55.1 99 13	155.3	13 25.4 99 13	155.3	12 55.6 99 13	155.4	4
25	16 15.8 99 14	153.9	15 46.1 99 14	154.0	15 16.4 99 14	154.0	14 46.7 99 14	154.1	14 16.9 99 14	154.2	13 47.2 99 14	154.2	13 17.5 99 14	154.3	12 47.8 99 14	154.4	25
6	16 07.5 99 14	152.8	15 37.8 99 14	152.9	15 08.1 99 14	153.0	14 38.4 99 14	153.1	14 08.7 99 14	153.1	13 39.0 99 14	153.2	13 09.3 99 14	153.3	12 39.6 99 14	153.4	6
7	15 58.9 99 15	151.8	15 29.2 99 15	151.9	14 59.6 99 15	152.0	14 29.9 99 15	152.0	14 00.2 99 15	152.1	13 30.5 99 15	152.2	13 00.8 99 15	152.3	12 31.1 99 15	152.3	7
8	15 50.0 99 15	150.8	15 20.4 99 15	150.9	14 50.7 99 15	150.9	14 21.0 99 15	151.0	13 51.4 99 15	151.1	13 21.7 99 15	151.2	12 52.1 99 15	151.3	12 22.4 99 15	151.3	8
9	15 40.8 99 16	149.8	15 11.2 99 16	149.8	14 41.6 99 16	149.9	14 11.9 99 16	150.0	13 42.3 99 16	150.1	13 12.6 99 16	150.2	12 43.0 99 16	150.2	12 13.3 99 16	150.3	9
30	15 31.3 99 16	148.7	15 01.7 99 16	148.8	14 32.1 99 16	148.9	14 02.5 99 16	149.0	13 32.9 99 16	149.1	13 03.3 99 16	149.2	12 33.6 99 16	149.2	12 04.0 99 16	149.3	30
1	15 21.6 99 17	147.7	14 52.0 99 17	147.8	14 22.4 99 17	147.9	13 52.8 99 17	148.0	13 23.2 99 17	148.1	12 53.6 99 17	148.1	12 24.0 99 16	148.2	11 54.4 99 16	148.3	1
2	15 11.5 99 17	146.7	14 42.0 99 17	146.8	14 12.4 99 17	146.9	13 42.8 99 17	147.0	13 13.3 99 17	147.0	12 43.7 99 17	147.1	12 14.1 99 17	147.2	11 44.5 99 17	147.3	2
3	15 01.2 98 18	145.7	14 31.7 98 18	145.8	14 02.1 98 18	145.9	13 32.6 98 18	145.9	13 03.0 98 18	146.0	12 33.5 99 17	146.1	12 03.9 99 17	146.2	11 34.4 99 17	146.3	3
4	14 50.6 98 18	144.7	14 21.1 98 18	144.7	13 51.6 98 18	144.8	13 22.1 98 18	144.9	12 52.6 98 18	145.0	12 23.0 98 18	145.1	11 53.5 98 18	145.2	11 24.0 98 18	145.3	4
35	14 39.8 98 19	143.6	14 10.3 98 18	143.7	13 40.8 98 18	143.8	13 11.3 98 18	143.9	12 41.8 98 18	144.0	12 12.3 98 18	144.1	11 42.8 98 18	144.2	11 13.3 98 18	144.3	35
6	14 28.6 98 19	142.6	13 59.2 98 19	142.7	13 29.7 98 19	142.8	13 00.2 98 19	142.9	12 30.8 98 19	143.0	12 01.3 98 19	143.1	11 31.8 98 19	143.2	11 02.3 98 19	143.3	6
7	14 17.3 98 19	141.6	13 47.8 98 19	141.7	13 18.4 98 19	141.8	12 48.9 98 19	141.9	12 19.5 98 19	142.0	11 50.0 98 19	142.1	11 20.6 98 19	142.2	10 51.1 98 19	142.3	7
8	14 05.6 98 20	140.6	13 36.2 98 20	140.7	13 06.8 98 20	140.8	12 37.4 98 20	140.9	12 07.9 98 20	141.0	11 38.5 98 20	141.1	11 09.1 98 20	141.2	10 39.6 98 20	141.3	8
9	13 53.7 98 20	139.6	13 24.3 98 20	139.7	12 54.9 98 20	139.8	12 25.5 98 20	139.9	11 56.1 98 20	140.0	11 26.7 98 20	140.1	10 57.3 98 20	140.2	10 27.9 98 20	140.3	9
40	13 41.6 98 21	138.6	13 12.2 98 21	138.7	12 42.8 98 21	138.8	12 13.5 98 20	138.9	11 44.1 98 20	139.0	11 14.7 98 20	139.1	10 45.3 98 20	139.2	10 16.0 98 20	139.3	40
1	13 29.2 98 21	137.6	12 59.9 98 21	137.7	12 30.5 98 21	137.8	12 01.2 98 21	137.9	11 31.8 98 21	138.0	11 02.5 98 21	138.1	10 33.1 98 21	138.2	10 03.8 98 21	138.3	1
2	13 16.6 98 21	136.6	12 47.3 98 21	136.7	12 17.9 98 21	136.8	11 48.6 98 21	136.9	11 19.3 98 21	137.0	10 50.0 98 21	137.1	10 20.6 98 21	137.2	9 51.3 98 21	137.3	2
3	13 03.7 98 22	135.6	12 34.4 98 22	135.7	12 05.1 98 22	135.8	11 35.8 98 22	135.9	11 06.5 98 22	136.0	10 37.2 98 22	136.1	10 07.9 98 22	136.2	9 38.6 98 22	136.3	3
4	12 50.6 98 22	134.6	12 21.3 98 22	134.7	11 52.1 98 22	134.8	11 22.8 98 22	134.9	10 53.5 98 22	135.0	10 24.3 98 22	135.1	9 55.0 98 22	135.2	9 25.7 98 22	135.3	4
45	12 37.3 97 23	133.6	12 08.0 97 23	133.7	11 38.8 97 22	133.8	11 09.6 97 22	133.9	10 40.3 97 22	134.0	10 11.1 98 22	134.1	9 41.8 98 22	134.2	9 12.6 98 22	134.4	45
6	12 23.7 97 23	132.6	11 54.5 97 23	132.7	11 25.3 97 23	132.8	10 56.1 97 23	132.9	10 26.9 97 23	133.0	9 57.6 97 23	133.1	9 28.4 97 23	133.3	8 59.2 97 23	133.4	6
7	12 10.0 97 23	131.6	11 40.8 97 23	131.7	11 11.6 97 23	131.8	10 42.4 97 23	131.9	10 13.2 97 23	132.0	9 44.0 97 23	132.2	9 14.8 97 23	132.3	8 45.6 97 23	132.4	7
8	11 56.0 97 24	130.6	11 26.8 97 24	130.7	10 57.7 97 24	130.8	10 28.5 97 24	130.9	9 59.3 97 24	131.1	9 30.2 97 23	131.2	9 01.0 97 23	131.3	8 31.8 97 23	131.4	8
9	11 41.8 97 24	129.6	11 12.7 97 24	129.7	10 43.5 97 24	129.8	10 14.4 97 24	129.9	9 45.2 97 24	130.1	9 16.1 97 24	130.2	8 46.9 97 24	130.3	8 17.8 97 24	130.4	9
50	11 27.4 97 24	128.6	10 58.3 97 24	128.7	10 29.2 97 24	128.8	10 00.1 97 24	129.0	9 30.9 97 24	129.1	9 01.8 97 24	129.2	8 32.7 97 24	129.3	8 03.6 97 24	129.4	50
1	11 12.8 97 25	127.6	10 43.7 97 25	127.7	10 14.6 97 25	127.9	9 45.6 97 25	128.0	9 16.5 97 24	128.1	8 47.4 97 24	128.2	8 18.3 97 24	128.3	7 49.2 97 24	128.5	1
2	10 58.0 97 25	126.6	10 29.0 97 25	126.7	9 59.9 97 25	126.9	9 30.8 97 25	127.0	9 01.8 97 25	127.1	8 32.7 97 25	127.2	8 03.6 97 25	127.4	7 34.5 97 25	127.5	2
3	10 43.1 97 25	125.6	10 14.0 97 25	125.8	9 45.0 97 25	125.9	9 15.9 97 25	126.0	8 46.9 97 25	126.1	8 17.8 97 25	126.3	7 48.8 97 25	126.4	7 19.7 97 25	126.5	3
4	10 27.9 97 26	124.6	9 58.9 97 26	124.8	9 29.9 97 26	124.9	9 00.8 97 25	125.0	8 31.8 97 25	125.2	8 02.8 97 25	125.3	7 33.8 97 25	125.4	7 04.7 97 25	125.5	4
55	10 12.6 97 26	123.7	9 43.6 97 26	123.8	9 14.6 97 26	123.9	8 45.6 97 26	124.1	8 16.6 97 26	124.2	7 47.6 97 26	124.3	7 18.6 97 26	124.4	6 49.6 97 26	124.6	55
6	9 57.0 97 26	122.7	9 28.1 97 26	122.8	8 59.1 97 26	122.9	8 30.1 97 26	123.1	8 01.1 97 26	123.2	7 32.2 97 26	123.3	7 03.2 97 26	123.5	6 34.2 97 26	123.6	6
7	9 41.3 96 26	121.7	9 12.4 96 26	121.8	8 43.5 97 26	122.0	8 14.5 97 26	122.1	7 45.5 97 26	122.2	7 16.6 97 26	122.4	6 47.6 97 26	122.5	6 18.7 97 26	122.6	7
8	9 25.5 96 27	120.7	8 56.6 96 27	120.9	8 27.6 96 27	121.0	7 58.7 96 27	121.1	7 29.8 96 27	121.3	7 00.8 96 27	121.4	6 31.9 96 26	121.5	6 03.0 96 26	121.7	8
9	9 09.5 96 27	119.7	8 40.6 96 27	119.9	8 11.7 96 27	120.0	7 42.8 96 27	120.2	7 13.9 96 27	120.3	6 44.9 96 27	120.4	6 16.0 96 27	120.6	5 47.1 96 27	120.7	9
60	8 53.3 96 27	118.8	8 24.4 96 27	118.9	7 55.5 96 27	119.0	7 26.6 96 27	119.2	6 57.8 96 27	119.3	6 28.9 96 27	119.5	6 00.0 96 27	119.6	5 31.1 96 27	119.7	60
1	8 37.0 96 27	117.8	8 08.1 96 27	117.9	7 39.3 96 27	118.1	7 10.4 96 27	118.2	6 41.5 96 27	118.3	6 12.7 96 27	118.5	5 43.8 96 27	118.6	5 14.9 96 27	118.8	1
2	8 20.5 96 28	116.8	7 51.7 96 28	117.0	7 22.8 96 28	117.1	6 54.0 96 28	117.2	6 25.1 96 28	117.4	5 56.3 96 28	117.5	5 27.4 96 28	117.7			2
3	8 03.9 96 28	115.9	7 35.1 96 28	116.0	7 06.2 96 28	116.1	6 37.4 96 28	116.3	6 08.6 96 28	116.4	5 39.8 96 28	116.6	5 10.9 96 28	116.7			3
4	7 47.1 96 28	114.9	7 18.3 96 28	115.0	6 49.5 96 28	115.2	6 20.7 96 28	115.3	5 51.9 96 28	115.4	5 23.1 96 28	115.6					4
65	7 30.2 96 28	113.9	7 01.5 96 28	114.1	6 32.7 96 28	114.2	6 03.9 96 28	114.3	5 35.1 96 28	114.5	5 06.3 96 28	114.6					65
6	7 13.2 96 29	112.9	6 44.5 96 29	113.1	6 15.7 96 28	113.2	5 46.9 96 28	113.4	5 18.2 96 28	113.5							6
7	6 56.1 96 29	112.0	6 27.4 96 29	112.1	5 58.6 96 29	112.3	5 29.9 96 29	112.4	5 01.1 96 29	112.6							7
8	6 38.8 96 29	111.0	6 10.1 96 29	111.2	5 41.4 96 29	111.3	5 12.7 96 29	111.5									8
9	6 21.5 96 29	110.1	5 52.8 96 29	110.2	5 24.1 96 29	110.3											9
70	6 04.0 96 29	109.1	5 35.3 96 29	109.2	5 06.6 96 29	109.4											70
1	5 46.4 96 29	108.1	5 17.8 96 29	108.3													1
2	5 28.8 96 30	107.2	5 00.1 96 30	107.3													2
3	5 11.0 95 30	106.2															3

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0
1	21 59.8	1.0 01	178.9	22 29.8	1.0 01	178.9	22 59.8	1.0 01	178.9	23 29.8	1.0 01	178.9
2	21 59.3	1.0 01	177.8	22 29.3	1.0 01	177.8	22 59.3	1.0 01	177.8	23 29.3	1.0 01	177.8
3	21 58.4	1.0 02	176.8	22 28.4	1.0 02	176.8	22 58.4	1.0 02	176.8	23 28.4	1.0 02	176.7
4	21 57.2	1.0 03	175.7	22 27.2	1.0 03	175.7	22 57.2	1.0 03	175.7	23 27.2	1.0 03	175.7
05	21 55.7	1.0 03	174.6	22 25.6	1.0 03	174.6	22 55.6	1.0 03	174.6	23 25.6	1.0 03	174.6
6	21 53.7	1.0 04	173.5	22 23.7	1.0 04	173.5	22 53.7	1.0 04	173.5	23 23.7	1.0 04	173.5
7	21 51.5	1.0 04	172.5	22 21.5	1.0 04	172.5	22 51.4	1.0 04	172.4	23 21.4	1.0 04	172.4
8	21 48.9	1.0 05	171.4	22 18.9	1.0 05	171.4	22 48.8	1.0 05	171.3	23 18.8	1.0 05	171.3
9	21 45.9	1.0 05	170.3	22 15.9	1.0 06	170.3	22 45.9	1.0 06	170.3	23 15.8	1.0 06	170.2
10	21 42.7	1.0 06	169.3	22 12.6	1.0 06	169.2	22 42.6	1.0 06	169.2	23 12.5	1.0 06	169.2
1	21 39.0	1.0 07	168.2	22 09.0	1.0 07	168.1	22 38.9	1.0 07	168.1	23 08.8	1.0 07	168.1
2	21 35.1	1.0 07	167.1	22 05.0	1.0 07	167.1	22 34.9	1.0 07	167.0	23 04.8	1.0 07	167.0
3	21 30.8	1.0 08	166.0	22 00.7	1.0 08	166.0	22 30.6	1.0 08	166.0	23 00.5	1.0 08	165.9
4	21 26.1	1.0 08	165.0	21 56.0	1.0 08	164.9	22 25.9	1.0 08	164.9	22 55.8	1.0 08	164.8
15	21 21.1	1.0 09	163.9	21 51.0	1.0 09	163.9	22 20.9	1.0 09	163.8	22 50.8	1.0 09	163.8
6	21 15.8	1.0 09	162.8	21 45.7	1.0 09	162.8	22 15.6	1.0 09	162.7	22 45.5	1.0 09	162.7
7	21 10.2	1.0 10	161.8	21 40.1	1.0 10	161.7	22 09.9	1.0 10	161.7	22 39.8	1.0 10	161.6
8	21 04.2	99 10	160.7	21 34.1	99 10	160.7	22 03.9	99 11	160.6	22 33.8	99 11	160.5
9	20 58.0	99 11	159.6	21 27.8	99 11	159.6	21 57.6	99 11	159.5	22 27.4	99 11	159.5
20	20 51.3	99 12	158.6	21 21.2	99 12	158.5	21 51.0	99 12	158.5	22 20.8	99 12	158.4
1	20 44.4	99 12	157.5	21 14.2	99 12	157.5	21 44.0	99 12	157.4	22 13.8	99 12	157.3
2	20 37.2	99 13	156.5	21 06.9	99 13	156.4	21 36.7	99 13	156.3	22 06.5	99 13	156.3
3	20 29.6	99 13	155.4	20 59.4	99 13	155.3	21 29.1	99 13	155.3	21 58.9	99 13	155.2
4	20 21.7	99 14	154.4	20 51.5	99 14	154.3	21 21.2	99 14	154.2	21 50.9	99 14	154.1
25	20 13.6	99 14	153.3	20 43.3	99 14	153.2	21 13.0	99 14	153.2	21 42.7	99 14	153.1
6	20 05.1	99 15	152.2	20 34.8	99 15	152.2	21 04.4	99 15	152.1	21 34.1	99 15	152.0
7	19 56.3	99 15	151.2	20 26.0	99 15	151.1	20 55.6	99 15	151.0	21 25.3	99 15	151.0
8	19 47.2	99 16	150.2	20 16.9	99 16	150.1	20 46.5	99 16	150.0	21 16.1	99 16	149.9
9	19 37.8	99 16	149.1	20 07.5	99 16	149.0	20 37.1	99 16	148.9	21 06.7	99 16	148.8
30	19 28.2	99 17	148.1	19 57.8	99 17	148.0	20 27.4	99 17	147.9	20 56.9	99 17	147.8
1	19 18.2	99 17	147.0	19 47.8	99 17	146.9	20 17.4	99 17	146.8	20 46.9	99 17	146.7
2	19 08.0	98 18	146.0	19 37.5	98 18	145.9	20 07.1	98 18	145.8	20 36.6	98 18	145.7
3	18 57.5	98 18	144.9	19 27.0	98 18	144.8	19 56.5	98 18	144.7	20 26.0	98 18	144.7
4	18 46.7	98 18	143.9	19 16.2	98 18	143.8	19 45.7	98 19	143.7	20 15.2	98 19	143.6
35	18 35.6	98 19	142.9	19 05.1	98 19	142.8	19 34.6	98 19	142.7	20 04.0	98 19	142.6
6	18 24.3	98 19	141.8	18 53.7	98 19	141.7	19 23.2	98 19	141.6	19 52.6	98 19	141.5
7	18 12.7	98 20	140.8	18 42.1	98 20	140.7	19 11.5	98 20	140.6	19 41.0	98 20	140.5
8	18 00.9	98 20	139.8	18 30.3	98 20	139.7	18 59.7	98 20	139.6	19 29.0	98 20	139.5
9	17 48.8	98 21	138.7	18 18.1	98 21	138.6	18 47.5	98 21	138.5	19 16.9	98 21	138.4
40	17 36.4	98 21	137.7	18 05.8	98 21	137.6	18 35.1	98 21	137.5	19 04.4	98 21	137.4
1	17 23.8	98 21	136.7	17 53.1	98 21	136.6	18 22.4	98 21	136.5	18 51.8	98 22	136.4
2	17 11.0	98 22	135.7	17 40.3	98 22	135.6	18 09.6	98 22	135.5	18 38.8	98 22	135.3
3	16 57.9	98 22	134.7	17 27.2	98 22	134.5	17 56.4	98 22	134.4	18 25.7	98 22	134.3
4	16 44.6	97 23	133.6	17 13.8	97 23	133.5	17 43.1	97 23	133.4	18 12.3	97 23	133.3
45	16 31.1	97 23	132.6	17 00.3	97 23	132.5	17 29.5	97 23	132.4	17 58.7	97 23	132.3
6	16 17.3	97 23	131.6	16 46.5	97 23	131.5	17 15.7	97 23	131.4	17 44.9	97 23	131.3
7	16 03.4	97 24	130.6	16 32.5	97 24	130.5	17 01.7	97 24	130.4	17 30.8	97 24	130.2
8	15 49.2	97 24	129.6	16 18.3	97 24	129.5	16 47.4	97 24	129.4	17 16.6	97 24	129.2
9	15 34.8	97 24	128.6	16 03.9	97 24	128.5	16 33.0	97 24	128.3	17 02.1	97 24	128.2
50	15 20.2	97 25	127.6	15 49.3	97 25	127.5	16 18.4	97 25	127.3	16 47.4	97 25	127.2
1	15 05.4	97 25	126.6	15 34.5	97 25	126.5	16 03.5	97 25	126.3	16 32.6	97 25	126.2
2	14 50.4	97 25	125.6	15 19.5	97 25	125.5	15 48.5	97 25	125.3	16 17.5	97 25	125.2
3	14 35.3	97 26	124.6	15 04.3	97 26	124.5	15 33.3	97 26	124.3	16 02.3	97 26	124.2
4	14 19.9	97 26	123.6	14 48.9	97 26	123.5	15 17.9	97 26	123.3	15 46.8	97 26	123.2
55	14 04.4	97 26	122.6	14 33.3	97 26	122.5	15 02.3	97 26	122.3	15 31.2	96 26	122.2
6	13 48.7	96 26	121.6	14 17.6	96 26	121.5	14 46.5	96 27	121.3	15 15.5	96 27	121.2
7	13 32.8	96 27	120.6	14 01.7	96 27	120.5	14 30.6	96 27	120.3	14 59.5	96 27	120.2
8	13 16.8	96 27	119.6	13 45.6	96 27	119.5	14 14.5	96 27	119.4	14 43.4	96 27	119.2
9	13 00.6	96 27	118.6	13 29.4	96 27	118.5	13 58.3	96 27	118.4	14 27.2	96 27	118.2
60	12 44.2	96 28	117.7	13 13.1	96 28	117.5	13 41.9	96 28	117.4	14 10.7	96 28	117.2
1	12 27.7	96 28	116.7	12 56.5	96 28	116.5	13 25.4	96 28	116.4	13 54.2	96 28	116.3
2	12 11.1	96 28	115.7	12 39.9	96 28	115.6	13 08.7	96 28	115.4	13 37.5	96 28	115.3
3	11 54.3	96 28	114.7	12 23.1	96 28	114.6	12 51.9	96 28	114.4	13 20.6	96 28	114.3
4	11 37.4	96 28	113.7	12 06.2	96 28	113.6	12 34.9	96 28	113.5	13 03.7	96 28	113.3
65	11 20.4	96 29	112.8	11 49.1	96 29	112.6	12 17.9	96 29	112.5	12 46.6	96 29	112.3
6	11 03.2	96 29	111.8	11 31.9	96 29	111.6	12 00.7	96 29	111.5	12 29.4	96 29	111.3
7	10 45.9	96 29	110.8	11 14.6	96 29	110.7	11 43.4	96 29	110.5	12 12.1	96 29	110.4
8	10 28.5	96 29	109.8	10 57.2	96 29	109.7	11 25.9	96 29	109.5	11 54.6	96 29	109.4
9	10 11.1	96 29	108.9	10 39.7	96 29	108.7	11 08.4	96 29	108.6	11 37.1	96 29	108.4
70	9 53.5	96 30	107.9	10 22.1	96 30	107.8	10 50.8	96 30	107.6	11 19.4	96 30	107.5
1	9 35.8	96 30	106.9	10 04.4	95 30	106.8	10 33.1	95 30	106.6	11 01.7	95 30	106.5
2	9 18.0	95 30	106.0	9 46.6	95 30	105.8	10 15.3	95 30	105.7	10 43.9	95 30	105.5
3	9 00.1	95 30	105.0	9 28.7	95 30	104.9	9 57.4	95 30	104.7	10 26.0	95 30	104.6
4	8 42.2	95 30	104.0	9 10.8	95 30	103.9	9 39.4	95 30	103.7	10 08.0	95 30	103.6
75	8 24.2	95 30	103.1	8 52.8	95 30	102.9	9 21.3	95 30	102.8	9 49.9	95 30	102.6
6	8 06.1	95 30	102.1	8 34.6	95 30	102.0	9 03.2	95 30	101.8	9 31.8	95 30	101.7
7	7 47.9	95 30	101.2	8 16.5	95 30	101.0	8 45.1	95 30	100.9	9 13.6	95 30	100.7
8	7 29.7	95 30	100.2	7 58.3	95 30	100.1	8 26.8	95 30	99.9	8 55.4	95 30	99.7
9	7 11.4	95 31	99.2	7 40.0	95 31	99.1	8 08.5	95 31	98.9	8 37.1	95 31	98.8
80	6 53.1	95 31	98.3	7 21.6	95 31	98.1	7 50.2	95 31	98.0	8 18.7	95 31	97.8
1	6 34.7	95 31	97.3	7 03.3	95 31	97.2	7 31.8	95 31	97.0	8 00.3	95 31	96.9
2	6 16.3	95 31	96.4	6 44.8	95 31	96.2	7 13.4	95 31	96.1	7 41.9	95 31	95.9
3	5 57.9	95 31	95.4	6 26.4	95 31	95.3	6 54.9	95 31	95.1	7 23.5	95 31	95.0
4	5 39.4	95 31	94.5	6 07.9	95 31	94.3	6 36.5	95 31	94.2	7 05.0	95 31	94.0
85	5 20.9	95 31	93.5	5 49.4	95 31	93.4	6 18.0	95 31	93.2	6 46.5	95 31	93.1
6	5 02.4	95 31	92.6	5 30.9	95 31	92.4	5 59.4	95 31	92.3	6 28.0	95 31	92.1
7				5 12.4	95 31	91.5	5 40.9	95 31	91.3	6 09.4	95 31	91.1
8							5 22.4	95 31	90.4	5 50.9	95 31	90.2
9							5 03.8	95 31	89.4	5 32.3	95 31	89.2
90										5 13.8	95 31	88.3

6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	00
23 59.8	1.0 01	178.9	24 29.8	1.0 01	178.9	24 59.8	1.0 01	178.9	25 29.8	1.0 01	178.9	1
23 59.3	1.0 01	177.8	24 29.3	1.0 01	177.8	24 59.3	1.0 01	177.8	25 29.3	1.0 01	177.8	2
23 58.4	1.0 02	176.7	24 28.4	1.0 02	176.7	24 58.4	1.0 02	176.7	25 28.4	1.0 02	176.7	3
23 57.2	1.0 03	175.6	24 27.2	1.0 03	175.6	24 57.2	1.0 03	175.6	25 27.2	1.0 03	175.6	4
23 55.6	1.0 03	174.6	24 25.6	1.0 03	174.5	24 55.6	1.0 03	174.5	25 25.6	1.0 03	174.5	05
23 53.7	1.0 04	173.5	24 23.6	1.0 04	173.5	24 53.6	1.0 04	173.4	25 23.6	1.0 04	173.4	6
23 51.4	1.0 04	172.4	24 21.4	1.0 04	172.4	24 51.3	1.0 04	172.3	25 21.3	1.0 04	172.3	7
23 48.8	1.0 05	171.3	24 18.7	1.0 05	171.3	24 48.7	1.0 05	171.2	25 18.7	1.0 05	171.2	8
23 45.8	1.0 06	170.2	24 15.7	1.0 06	170.2	24 45.7	1.0 06	170.2	25 15.6	1.0 06	170.1	9
23 42.4	1.0 06	169.1	24 12.4	1.0 06	169.1	24 42.3	1.0 06	169.1	25 12.3	1.0 06	169.0	10
23 38.8	1.0 07	168.0	24 08.7	1.0 07	168.0	24 38.7	1.0 07	168.0	25 08.6	1.0 07	167.9	1
23 34.8	1.0 07	167.0	24 04.7	1.0 07	166.9	24 34.6	1.0 07	166.9	25 04.5	1.0 07	166.8	2
23 30.4	1.0 08	165.9	24 00.3	1.0 08	165.8	24 30.2	1.0 08	165.8	25 00.2	1.0 08	165.8	3
23 25.7	1.0 08	164.8	23 55.6	1.0 08	164.8	24 25.5	1.0 08	164.7	24 55.4	1.0 08	164.7	4
23 20.7	1.0 09	163.7	23 50.6	1.0 09	163.7	24 20.5	1.0 09	163.6	24 50.3	1.0 09	163.6	15
23 15.3	1.0 10	162.6	23 45.2	1.0 10	162.6	24 15.1	1.0 10	162.5	24 44.9	1.0 10	162.5	6
23 09.6	1.0 10	161.6	23 39.5	1.0 10	161.5	24 09.3	1.0 10	161.5	24 39.2	1.0 10	161.4	7
23 03.6	99 11	160.5	23 33.4	99 11	160.4	24 03.3	99 11	160.4	24 33.1	99 11	160.3	8
22 57.2	99 11	159.4	23 27.1	99 11	159.4	23 56.9	99 11	159.3	24 26.7	99 11	159.2	9
22 50.6	99 12	158.3	23 20.4	99 12	158.3	23 50.2	99 12	158.2	24 20.0	99 12	158.2	20
22 43.6	99 12	157.3	23 13.3	99 12	157.2	23 43.1	99 12	157.1	24 12.9	99 12	157.1	1
22 36.2	99 13	156.2	23 06.0	99 13	156.1	23 35.8	99 13	156.1	24 05.5	99 13	156.0	2
22 28.6	99 13	155.1	22 58.3	99 13	155.1	23 28.1	99 13	155.0	23 57.8	99 13	154.9	3
22 20.6	99 14	154.1	22 50.4	99 14	154.0	23 20.1	99 14	153.9	23 49.8	99 14	153.8	4
22 12.4	99 14	153.0	22 42.1	99 14	152.9	23 11.8	99 14	152.8	23 41.5	99 14	152.8	25
22 03.8	99 15	151.9	22 33.5	99 15	151.9	23 03.2	99 15	151.8	23 32.8	99 15	151.7	6
21 54.9	99 15	150.9	22 24.6	99 15	150.8	22 54.2	99 15	150.7	23 23.9	99 15	150.6	7
21 45.8	99 16	149.8	22 15.4	99 16	149.7	22 45.0	99 16	149.6	23 14.6	99 16	149.6	8
21 36.3	99 16	148.8	22 05.9	99 16	148.7	22 35.5	99 16	148.6	23 05.1	99 16	148.5	9
21 26.5	99 17	147.7	21 56.1	99 17	147.6	22 25.7	99 17	147.5	22 55.3	99 17	147.4	30
21 16.5	99 17	146.7	21 46.0	99 17	146.6	22 15.6	99 17	146.5	22 45.1	98 17	146.4	1
21 06.2	98 18	145.6	21 35.7	98 18	145.5	22 05.2	98 18	145.4	22 34.7	98 18	145.3	2
20 55.5	98 18	144.6	21 25.0	98 18	144.5	21 54.6	98 18	144.4	22 24.1	98 18	144.3	3
20 44.7	98 19	143.5	21 14.1	98 19	143.4	21 43.6	98 19	143.3	22 13.1	98 19	143.2	4
20 33.5	98 19	142.5	21 02.9	98 19	142.4	21 32.4	98 19	142.3	22 01.8	98 19	142.2	35
20 22.1	98 20	141.4	20 51.5	98 20	141.3	21 20.9	98 20	141.2	21 50.3	98 20	141.1	6
20 10.4	98 20	140.4	20 39.8	98 20	140.3	21 09.2	98 20	140.2	21 38.6	98 20	140.1	7
19 58.4	98 20	139.3	20 27.8	98 20	139.2	20 57.2	98 20	139.1	21 26.5	98 20	139.0	8
19 46.2	98 21	138.3	20 15.6	98 21	138.2	20 44.9	98 21	138.1	21 14.2	98 21	138.0	9
19 33.8	98 21	137.3	20 03.1	98 21	137.2	20 32.4	98 21	137.1	21 01.7	98 21	136.9	40
19 21.1	98 22	136.2	19 50.4	98 22	136.1	20 19.6	98 22	136.0	20 48.9	98 22	135.9	1
19 08.1	98 22	135.2	19 37.4	98 22	135.1	20 06.7	98 22	135.0	20 35.9	98 22	134.9	2
18 54.9	97 22	134.2	19 24.2	97 22	134.1	19 53.4	97 22	134.0	20 22.7	97 22	133.8	3
18 41.5	97 23	133.2	19 10.7	97 23	133.1	19 40.0	97 23	132.9	20 09.2	97 23	132.8	4
18 27.9	97 23	132.1	18 57.1	97 23	132.0	19 26.3	97 23	131.9	19 55.5	97 23	131.8	45
18 14.0	97 23	131.1	18 43.2	97 24	131.0	19 12.4	97 24	130.9	19 41.5	97 24	130.8	6
18 00.0	97 24	130.1	18 29.1	97 24	130.0	18 58.2	97 24	129.9	19 27.4	97 24	129.7	7
17 45.7	97 24	129.1	18 14.8	97 24	129.0	18 43.9	97 24	128.8	19 13.0	97 24	128.7	8
17 31.2	97 24	128.1	18 00.3	97 25	128.0	18 29.4	97 25	127.8	18 58.4	97 25	127.7	9
17 16.5	97 25	127.1	17 45.6	97 25	126.9	18 14.6	97 25	126.8	18 43.7	97 25	126.7	50
17 01.6	97 25	126.1	17 30.6	97 25	125.9	17 59.7	97 25	125.8	18 28.7	97 25	125.7	1
16 46.5	97 25	125.1	17 15.5	97 26	124.9	17 44.5	97 26	124.8	18 13.5	97 26	124.7	2
16 31.3	97 26	124.1	17 00.2	97 26	123.9	17 29.2	97 26	123.8	17 58.2	97 26	123.7	3
16 15.8	97 26	123.1	16 44.8	97 26	122.9	17 13.7	97 26	122.8	17 42.7	96 26	122.6	4
16 00.2	96 26	122.1	16 29.1	96 26	121.9	16 58.0	96 26	121.8	17 27.0	96 26	121.6	55
15 44.4	96 27	121.1	16 13.3	96 27	120.9	16 42.2	96 27	120.8	17 11.1	96 27	120.6	6
15 28.4	96 27	120.1	15 57.3	96 27	119.9	16 26.2	96 27	119.8	16 55.1	96 27	119.6	7
15 12.3	96 27	119.1	15 41.2	96 27	118.9	16 10.0	96 27	118.8	16 38.9	96 27	118.6	8
14 56.0	96 27	118.1	15 24.9	96 27	117.9	15 53.7	96 27	117.8	16 22.5	96 28	117.7	9
14 39.6	96 28	117.1	15 08.4	96 28	117.0	15 37.2	96 28	116.8	16 06.0	96 28	116.7	60
14 23.0	96 28	116.1	14 51.8	96 28	116.0	15 20.6	96 28	115.8	15 49.4	96 28	115.7	1
14 06.3	96 28	115.1	14 35.1	96 28	115.0	15 03.8	96 28	114.8	15 32.6	96 28	114.7	2
13 49.4	96 28	114.1	14 18.2	96 28	114.0	14 46.9	96 28	113.8	15 15.7	96 28	113.7	3
13 32.4	96 28	113.2	14 01.2	96 29	113.0	14 29.9	96 29	112.9	14 58.7	96 29	112.7	4
13 15.3	96 29	112.2	13 44.1	96 29	112.0	14 12.8	96 29	111.9	14 41.5	96 29	111.7	65
12 58.1	96 29	111.2	13 26.8	96 29	111.1	13 55.5	96 29	110.9	14 24.2	96 29	110.8	6
12 40.8	96 29	110.2	13 09.5	96 29	110.1	13 38.1	96 29	109.9	14 06.8	96 29	109.8	7
12 23.3	96 29	109.3	12 52.0	96 29	109.1	13 20.7	96 29	108.9	13 49.3	96 29	108.8	8
12 05.8	96 29	108.3	12 34.4	96 29	108.1	13 03.1	96 29	108.0	13 31.7	95 30	107.8	9
11 48.1	95 30	107.3	12 16.7	95 30	107.2	12 45.4	95 30	107.0	13 14.0	95 30	106.8	70
11 30.3	95 30	106.3	11 59.0	95 30	106.2	12 27.6	95 30	106.0	12 56.2	95 30	105.9	1
11 12.5	95 30	105.4	11 41.1	95 30	105.2	12 09.7	95 30	105.1	12 38.4	95 30	104.9	2
10 54.6	95 30	104.4	11 23.2	95 30	104.2	11 51.8	95 30	104.1	12 20.4	95 30	103.9	3
10 36.6	95 30	103.4	11 05.2	95 30	103.3	11 33.8	95 30	103.1	12 02.4	95 30	103.0	4
10 18.5	95 30	102.5	10 47.1	95 30	102.3	11 15.7	95 30	102.2	11 44.3	95 30	102.0	75
10 00.4	95 30	101.5	10 29.0	95 30	101.4	10 57.5	95 30	101.2	11 26.1	95 30	101.0	6
9 42.2	95 30	100.5	10 10.8	95 30	100.4	10 39.3	95 30	100.2	11 07.9	95 30	100.1	7
9 23.9	95 30	99.6	9 52.5	95 31	99.4	10 21.0	95 31	99.3	10 49.6	95 31	99.1	8
9 05.6	95 31	98.6	9 34.2	95 31	98.5	10 02.7	95 31	98.3	10 31.3	95 31	98.2	9
8 47.3	95 31	97.7	9 15.8	95 31	97.5	9 44.4	95 31	97.4	10 12.9	95 31	97.2	80
8 28.9	95 31	96.7	8 57.4	95 31	96.6	9 25.9	95 31	96.4	9 54.5	95 31	96.2	1
8 10.4	95 31	95.8	8 39.0	95 31	95.6	9 07.5	95 31	95.4	9 36.0	95 31	95.3	2
7 52.0	95 31	94.8	8 20.5	95 31	94.6	8 49.0	95 31	94.5	9 17.6	95 31	94.3	3
7 33.5	95 31	93.9	8 02.0	95 31	93.7	8 30.5	95 31	93.5	8 59.1	95 31	93.4	4
7 15.0	95 31	92.9	7 43.5	95 31	92.7	8 12.0	95 31	92.6	8 40.5	95 31	92.4	85
6 56.5	95 31	91.9	7 25.0	95 31	91.8	7 53.5	95 31	91.6	8 22.0	95 31	91.5	6
6 37.9	95 31	91.0	7 06.5	95 31	90.8	7 35.0	95 31	90.7	8 03.5	95 31	90.5	7
6 19.4	95 31	90.0	6 47.9	95 31	89.9	7 16.4	95 31	89.7	7 44.9	95 31	89.6	8
6 00.9	95 31	89.1	6 29.4	95 31	88.9	6 57.9	95 31	88.8	7 26.4	95 31	88.6	9
5 42.3	95 31	88.1	6 10.8	95 31	88.0	6 39.3	95 31	87.8	7 07.9	95 31	87.7	90

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	11 00.0 1.0 00	180.0	10 30.0 1.0 00	180.0	00
1	13 59.8 1.0 01	179.0	13 29.8 1.0 01	179.0	12 59.8 1.0 01	179.0	12 29.8 1.0 01	179.0	11 59.8 1.0 01	179.0	11 29.8 1.0 01	179.0	10 59.8 1.0 01	179.0	10 29.8 1.0 01	179.0	1
2	13 59.3 1.0 01	177.9	13 29.3 1.0 01	177.9	12 59.3 1.0 01	178.0	12 29.3 1.0 01	178.0	11 59.3 1.0 01	178.0	11 29.3 1.0 01	178.0	10 59.3 1.0 01	178.0	10 29.3 1.0 01	178.0	2
3	13 58.5 1.0 02	176.9	13 28.5 1.0 02	176.9	12 58.5 1.0 02	176.9	12 28.5 1.0 02	176.9	11 58.5 1.0 02	177.0	11 28.5 1.0 02	177.0	10 58.5 1.0 02	177.0	10 28.5 1.0 02	177.0	3
4	13 57.3 1.0 02	175.9	13 27.3 1.0 02	175.9	12 57.4 1.0 02	175.9	12 27.4 1.0 02	175.9	11 57.4 1.0 02	175.9	11 27.4 1.0 02	175.9	10 57.4 1.0 02	176.0	10 27.4 1.0 02	176.0	4
05	13 55.8 1.0 03	174.9	13 25.9 1.0 03	174.9	12 55.9 1.0 03	174.9	12 25.9 1.0 03	174.9	11 55.9 1.0 03	174.9	11 25.9 1.0 03	174.9	10 55.9 1.0 03	174.9	10 25.9 1.0 03	175.0	05
6	13 54.0 1.0 04	173.8	13 24.0 1.0 04	173.9	12 54.1 1.0 04	173.9	12 24.1 1.0 04	173.9	11 54.1 1.0 04	173.9	11 24.1 1.0 04	173.9	10 54.1 1.0 04	173.9	10 24.1 1.0 04	174.0	6
7	13 51.9 1.0 04	172.8	13 21.9 1.0 04	172.8	12 51.9 1.0 04	172.8	12 21.9 1.0 04	172.9	11 52.0 1.0 04	172.9	11 22.0 1.0 04	172.9	10 52.0 1.0 04	172.9	10 22.0 1.0 04	172.9	7
8	13 49.4 1.0 05	171.8	13 19.4 1.0 05	171.8	12 49.4 1.0 05	171.8	12 19.5 1.0 05	171.8	11 49.5 1.0 05	171.9	11 19.5 1.0 05	171.9	10 49.5 1.0 05	171.9	10 19.6 1.0 05	171.9	8
9	13 46.6 1.0 05	170.8	13 16.6 1.0 05	170.8	12 46.6 1.0 05	170.8	12 16.7 1.0 05	170.8	11 46.7 1.0 05	170.9	11 16.7 1.0 05	170.9	10 46.8 1.0 05	170.9	10 16.8 1.0 05	170.9	9
10	13 43.4 1.0 06	169.7	13 13.5 1.0 06	169.8	12 43.5 1.0 06	169.8	12 13.6 1.0 06	169.8	11 43.6 1.0 06	169.8	11 13.6 1.0 06	169.9	10 43.7 1.0 06	169.9	10 13.7 1.0 06	169.9	10
1	13 39.9 1.0 06	168.7	13 10.0 1.0 06	168.7	12 40.1 1.0 06	168.8	12 10.1 1.0 06	168.8	11 40.2 1.0 06	168.8	11 10.2 1.0 06	168.9	10 40.3 1.0 06	168.9	10 10.3 1.0 06	168.9	1
2	13 36.2 1.0 07	167.7	13 06.2 1.0 07	167.7	12 36.3 1.0 07	167.7	12 06.4 1.0 07	167.8	11 36.4 1.0 07	167.8	11 06.5 1.0 07	167.8	10 36.5 1.0 07	167.9	10 06.6 1.0 07	167.9	2
3	13 32.0 1.0 07	166.7	13 02.1 1.0 07	166.7	12 32.2 1.0 07	166.7	12 02.3 1.0 07	166.8	11 32.3 1.0 07	166.8	11 02.4 1.0 07	166.8	10 32.5 1.0 07	166.9	10 02.6 1.0 07	166.9	3
4	13 27.6 1.0 08	165.6	12 57.7 1.0 08	165.7	12 27.8 1.0 08	165.7	11 57.9 1.0 08	165.8	11 27.9 1.0 08	165.8	10 58.0 1.0 08	165.8	10 28.1 1.0 08	165.9	9 58.2 1.0 08	165.9	4
15	13 22.8 1.0 08	164.6	12 52.9 1.0 08	164.7	12 23.0 1.0 08	164.7	11 53.1 1.0 08	164.7	11 23.2 1.0 08	164.8	10 53.3 1.0 08	164.8	10 23.4 1.0 08	164.9	9 53.5 1.0 08	164.9	15
6	13 17.8 1.0 09	163.6	12 47.9 1.0 09	163.6	12 18.0 1.0 09	163.7	11 48.1 1.0 09	163.7	11 18.2 1.0 09	163.8	10 48.3 1.0 09	163.8	10 18.4 1.0 09	163.9	9 48.6 1.0 09	163.9	6
7	13 12.4 1.0 10	162.6	12 42.5 1.0 10	162.6	12 12.6 1.0 09	162.7	11 42.7 1.0 09	162.7	11 12.9 1.0 09	162.8	10 43.0 1.0 09	162.8	10 13.1 1.0 09	162.9	9 43.3 1.0 09	162.9	7
8	13 06.6 1.0 10	161.5	12 36.8 1.0 10	161.6	12 06.9 1.0 10	161.6	11 37.1 1.0 10	161.7	11 07.2 1.0 10	161.7	10 37.4 1.0 10	161.8	10 07.5 1.0 10	161.8	9 37.6 1.0 10	161.9	8
9	13 00.6 99 11	160.5	12 30.8 99 11	160.6	12 00.9 99 10	160.6	11 31.1 99 10	160.7	11 01.3 99 10	160.7	10 31.4 99 10	160.8	10 01.6 99 10	160.8	9 31.7 99 10	160.9	9
20	12 54.3 99 11	159.5	12 24.5 99 11	159.6	11 54.6 99 11	159.6	11 24.8 99 11	159.7	10 55.0 99 11	159.7	10 25.2 99 11	159.8	9 55.3 99 11	159.8	9 25.5 99 11	159.9	20
1	12 47.6 99 12	158.5	12 17.8 99 12	158.6	11 48.0 99 12	158.6	11 18.2 99 11	158.7	10 48.4 99 11	158.7	10 18.6 99 11	158.8	9 48.8 99 11	158.8	9 19.0 99 11	158.9	1
2	12 40.7 99 12	157.5	12 10.9 99 12	157.5	11 41.1 99 12	157.6	11 11.3 99 12	157.7	10 41.5 99 12	157.7	10 11.7 99 12	157.8	9 42.0 99 12	157.8	9 12.2 99 12	157.9	2
3	12 33.4 99 13	156.5	12 03.7 99 13	156.5	11 33.9 99 13	156.6	11 04.1 99 12	156.7	10 34.4 99 12	156.7	10 04.6 99 12	156.8	9 34.8 99 12	156.8	9 05.0 99 12	156.9	3
4	12 25.9 99 13	155.5	11 56.1 99 13	155.5	11 26.4 99 13	155.6	10 56.6 99 13	155.6	10 26.9 99 13	155.7	9 57.1 99 13	155.8	9 27.4 99 13	155.8	8 57.6 99 13	155.9	4
25	12 18.0 99 14	154.4	11 48.3 99 14	154.5	11 18.6 99 14	154.6	10 48.8 99 13	154.6	10 19.1 99 13	154.7	9 49.4 99 13	154.8	9 19.6 99 13	154.8	8 49.9 99 13	154.9	25
6	12 09.9 99 14	153.4	11 40.2 99 14	153.5	11 10.5 99 14	153.6	10 40.7 99 14	153.6	10 11.0 99 14	153.7	9 41.3 99 14	153.8	9 11.6 99 14	153.8	8 41.9 99 14	153.9	6
7	12 01.4 99 15	152.4	11 31.8 99 14	152.5	11 02.1 99 14	152.6	10 32.4 99 14	152.6	10 02.7 99 14	152.7	9 33.0 99 14	152.8	9 03.3 99 14	152.9	8 33.6 99 14	152.9	7
8	11 52.7 99 15	151.4	11 23.0 99 15	151.5	10 53.4 99 15	151.6	10 23.7 99 15	151.6	9 54.0 99 15	151.7	9 24.4 99 15	151.8	8 54.7 99 15	151.9	8 25.0 99 15	151.9	8
9	11 43.7 99 16	150.4	11 14.1 99 15	150.5	10 44.4 99 15	150.6	10 14.8 99 15	150.6	9 45.1 99 15	150.7	9 15.5 99 15	150.8	8 45.8 99 15	150.9	8 16.1 99 15	150.9	9
30	11 34.4 99 16	149.4	11 04.8 99 16	149.5	10 35.1 99 16	149.6	10 05.5 99 16	149.6	9 35.9 99 16	149.7	9 06.3 99 16	149.8	8 36.6 99 16	149.9	8 07.0 99 16	150.0	30
1	11 24.8 99 16	148.4	10 55.2 99 16	148.5	10 25.6 99 16	148.6	9 56.0 99 16	148.6	9 26.4 99 16	148.7	8 56.8 99 16	148.8	8 27.2 99 16	148.9	7 57.6 99 16	149.0	1
2	11 15.0 99 17	147.4	10 45.4 99 17	147.5	10 15.8 99 17	147.6	9 46.2 99 17	147.6	9 16.6 99 17	147.7	8 47.1 99 17	147.8	8 17.5 99 17	147.9	7 47.9 99 17	148.0	2
3	11 04.8 99 17	146.4	10 35.3 99 17	146.5	10 05.7 99 17	146.6	9 36.2 99 17	146.6	9 06.6 99 17	146.7	8 37.0 99 17	146.8	8 07.5 99 17	146.9	7 37.9 99 17	147.0	3
4	10 54.4 98 18	145.4	10 24.9 98 18	145.5	9 55.4 98 18	145.6	9 25.8 98 18	145.7	8 56.3 98 18	145.7	8 26.8 98 18	145.8	7 57.2 98 18	145.9	7 27.7 98 18	146.0	4
35	10 43.8 98 18	144.4	10 14.3 98 18	144.5	9 44.8 98 18	144.6	9 15.2 98 18	144.7	8 45.7 98 18	144.7	8 16.2 98 18	144.8	7 46.7 98 18	144.9	7 17.2 98 18	145.0	35
6	10 32.8 98 19	143.4	10 03.4 98 19	143.5	9 33.9 98 19	143.6	9 04.4 98 19	143.7	8 34.9 98 18	143.8	8 05.4 98 18	143.9	7 35.9 98 18	143.9	7 06.4 98 18	144.0	6
7	10 21.7 98 19	142.4	9 52.2 98 19	142.5	9 22.7 98 19	142.6	8 53.3 98 19	142.7	8 23.8 98 19	142.8	7 54.3 98 19	142.9	7 24.9 98 19	143.0	6 55.4 98 19	143.1	7
8	10 10.2 98 20	141.4	9 40.8 98 19	141.5	9 11.3 98 19	141.6	8 41.9 98 19	141.7	8 12.5 98 19	141.8	7 43.0 98 19	141.9	7 13.6 98 19	142.0	6 44.1 98 19	142.1	8
9	9 58.5 98 20	140.4	9 29.1 98 20	140.5	8 59.7 98 20	140.6	8 30.3 98 20	140.7	8 00.9 98 20	140.8	7 31.5 98 20	140.9	7 02.0 98 20	141.0	6 32.6 98 20	141.1	9
40	9 46.6 98 20	139.4	9 17.2 98 20	139.5	8 47.8 98 20	139.6	8 18.4 98 20	139.7	7 49.0 98 20	139.8	7 19.6 98 20	139.9	6 50.2 98 20	140.0	6 20.8 98 20	140.1	40
1	9 34.4 98 21	138.4	9 05.0 98 21	138.5	8 35.7 98 21	138.6	8 06.3 98 21	138.7	7 36.9 98 21	138.8	7 07.6 98 20	138.9	6 38.2 98 20	139.0	6 08.8 98 20	139.1	1
2	9 22.0 98 21	137.4	8 52.6 98 21	137.5	8 23.3 98 21	137.6	7 54.0 98 21	137.7	7 24.6 98 21	137.9	6 55.3 98 21	138.0	6 25.9 98 21	138.1	5 56.6 98 21	138.2	2
3	9 09.3 98 21	136.4	8 40.0 98 21	136.5	8 10.7 98 21	136.7	7 41.4 98 21	136.8	7 12.1 98 21	136.9	6 42.7 98 21	137.0	6 13.4 98 21	137.1	5 44.1 98 21	137.2	3
4	8 56.4 98 22	135.5	8 27.1 98 22	135.6	7 57.8 98 22	135.7	7 28.6 98 22	135.8	6 59.3 98 22	135.9	6 30.0 98 22	136.0	6 00.7 98 22	136.1	5 31.4 98 22	136.2	4
45	8 43.3 98 22	134.5	8 14.0 98 22	134.6	7 44.8 98 22	134.7	7 15.5 98 22	134.8	6 46.2 98 22	134.9	6 17.0 98 22	135.0	5 47.7 98 22	135.1	5 18.4 98 22	135.2	45
6	8 30.0 97 23	133.5	8 00.7 97 23	133.6	7 31.5 97 23	133.7	7 02.2 97 22	133.8	6 33.0 97 22	133.9	6 03.8 97 22	134.0	5 34.5 97 22	134.2	5 05.3 97 22	134.3	6
7	8 16.4 97 23	132.5	7 47.2 97 23	132.6	7 18.0 97 23	132.7	6 48.8 97 23	132.8	6 19.5 97 23	133.0	5 50.3 97 23	133.1	5 21.1 97 23	133.2			7
8	8 02.6 97 23	131.5	7 33.4 97 23	131.6	7 04.2 97 23	131.8	6 35.1 97 23	131.9	6 05.9 97 23	132.0	5 36.7 97 23	132.1	5 07.5 97 23	132.2			8
9	7 48.6 97 24	130.5	7 19.5 97 24	130.7	6 50.3 97 24	130.8	6 21.2 97 24	130.9	5 52.0 97 23	131.0	5 22.8 97 23	131.1					9
50	7 34.4 97 24	129.6	7 05.3 97 24	129.7	6 36.2 97 24	129.8	6 07.0 97 24	129.9	5 37.9 97 24	130.0	5 08.8 97 24	130.2					50
1	7 20.0 97 24	128.6	6 50.9 97 24	128.7	6 21.8 97 24	128.8	5 52.7 97 24	129.0	5 23.6 97 24	129.1							1
2	7 05.5 97 25	127.6	6 36.4 97 25	127.7	6 07.3 97 25	127.9	5 38.2 97 25	128.0	5 09.1 97 24	128.1							2
3	6 50.7 97 25	126.6	6 21.6 97 25	126.8	5 52.6 97 25	126.9	5 23.5 97 25	127.0									3
4	6 35.7 97 25	125.7	6 06.7 97 25	125.8	5 37.6 97 25	125.9	5 08.6 97 25	126.0									4
55	6 20.5 97 26	124.7	5 51.5 97 26	124.8	5 22.5 97 25	125.0											55
6	6 05.2 97 26	123.7	5 36.2 97 26	123.9	5 07.2 97 26	124.0											6
7	5 49.7 97 26	122.8	5 20.7 97 26	122.9													7
8	5 34.0 96 26	121.8	5 05.1 96 26	121.9													8
9	5 18.2 96 27	120.8															9
60	5 02.2 96 27	119.9															60

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91									5 23.8 95 31	87.2	5 52.3 95 31	87.0	6 20.8 95 31	86.9	6 49.3 95 31	86.7	91
2									5 05.3 95 31	86.2	5 33.8 95 31	86.1	6 02.3 95 31	85.9	6 30.8 95 31	85.8	2
3											5 15.3 95 31	85.1	5 43.8 95 31	85.0	6 12.4 95 31	84.8	3
4													5 25.4 95 31	84.0	5 53.9 95 31	83.9	4
95													5 07.0 95 31	83.1	5 35.5 95 31	82.9	95
6															5 17.1 95 30	82.0	6

H.A.	8° 00′ Alt.		Az.	8° 30′ Alt.		Az.	9° 00′ Alt.		Az.	9° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	27 00.0	1.0 00	180.0	27 30.0	1.0 00	180.0
1	25 59.8	1.0 01	178.9	26 29.8	1.0 01	178.9	26 59.8	1.0 01	178.9	27 29.8	1.0 01	178.9
2	25 59.3	1.0 01	177.8	26 29.3	1.0 02	177.8	26 59.3	1.0 02	177.8	27 29.3	1.0 02	177.8
3	25 58.4	1.0 02	176.7	26 28.4	1.0 02	176.7	26 58.4	1.0 02	176.7	27 28.4	1.0 02	176.7
4	25 57.1	1.0 03	175.6	26 27.1	1.0 03	175.6	26 57.1	1.0 03	175.6	27 27.1	1.0 03	175.6
05	25 55.5	1.0 03	174.5	26 25.5	1.0 03	174.5	26 55.5	1.0 03	174.5	27 25.5	1.0 03	174.4
6	25 53.6	1.0 04	173.4	26 23.6	1.0 04	173.4	26 53.6	1.0 04	173.4	27 23.5	1.0 04	173.3
7	25 51.3	1.0 04	172.3	26 21.3	1.0 04	172.3	26 51.2	1.0 04	172.2	27 21.2	1.0 04	172.2
8	25 48.6	1.0 05	171.2	26 18.6	1.0 05	171.2	26 48.5	1.0 05	171.1	27 18.5	1.0 05	171.1
9	25 45.6	1.0 06	170.1	26 15.6	1.0 06	170.1	26 45.5	1.0 05	170.0	27 15.5	1.0 06	170.0
10	25 42.2	1.0 06	169.0	26 12.2	1.0 06	169.0	26 42.1	1.0 06	168.9	27 12.1	1.0 06	168.9
1	25 38.5	1.0 07	167.9	26 08.5	1.0 07	167.9	26 38.4	1.0 07	167.8	27 08.3	1.0 07	167.8
2	25 34.5	1.0 07	166.8	26 04.4	1.0 07	166.8	26 34.3	1.0 07	166.7	27 04.2	1.0 07	166.7
3	25 30.1	1.0 08	165.7	26 00.0	1.0 08	165.7	26 29.9	1.0 08	165.6	26 59.8	1.0 08	165.6
4	25 25.3	1.0 08	164.6	25 55.2	1.0 08	164.6	26 25.1	1.0 09	164.5	26 55.0	1.0 09	164.5
15	25 20.2	1.0 09	163.5	25 50.1	1.0 09	163.5	26 20.0	1.0 09	163.4	26 49.9	1.0 09	163.4
6	25 14.8	1.0 10	162.4	25 44.7	1.0 10	162.4	26 14.5	1.0 10	162.3	26 44.4	1.0 10	162.3
7	25 09.0	1.0 10	161.3	25 38.9	99 10	161.3	26 08.7	99 10	161.2	26 38.6	99 10	161.2
8	25 02.9	99 11	160.3	25 32.8	99 11	160.2	26 02.6	99 11	160.1	26 32.4	99 11	160.1
9	24 56.5	99 11	159.2	25 26.3	99 11	159.1	25 56.1	99 11	159.0	26 26.0	99 11	159.0
20	24 49.8	99 12	158.1	25 19.6	99 12	158.0	25 49.3	99 12	158.0	26 19.1	99 12	157.9
1	24 42.7	99 12	157.0	25 12.5	99 12	156.9	25 42.2	99 12	156.9	26 12.0	99 12	156.8
2	24 35.3	99 13	155.9	25 05.0	99 13	155.9	25 34.8	99 13	155.8	26 04.5	99 13	155.7
3	24 27.6	99 13	154.8	24 57.3	99 13	154.8	25 27.0	99 13	154.7	25 56.7	99 14	154.6
4	24 19.5	99 14	153.8	24 49.2	99 13	153.7	25 18.9	99 14	153.6	25 48.6	99 14	153.5
25	24 11.2	99 14	152.7	24 40.9	99 14	152.6	25 10.5	99 14	152.5	25 40.2	99 15	152.5
6	24 02.5	99 15	151.6	24 32.2	99 15	151.5	25 01.8	99 15	151.5	25 31.5	99 15	151.4
7	23 53.5	99 15	150.5	24 23.2	99 15	150.5	24 52.8	99 16	150.4	25 22.5	99 15	150.3
8	23 44.3	99 16	149.5	24 13.9	99 16	149.4	24 43.5	99 16	149.3	25 13.1	99 16	149.2
9	23 34.7	99 16	148.4	24 04.3	99 16	148.3	24 33.9	99 16	148.2	25 03.5	99 17	148.1
30	23 24.8	99 17	147.3	23 54.4	99 17	147.3	24 24.0	99 17	147.2	24 53.5	99 17	147.1
1	23 14.7	98 17	146.3	23 44.2	98 17	146.2	24 13.8	98 17	146.1	24 43.3	98 18	146.0
2	23 04.3	98 18	145.2	23 33.8	98 18	145.1	24 03.3	98 18	145.0	24 32.8	98 18	144.9
3	22 53.5	98 18	144.2	23 23.0	98 18	144.1	23 52.5	98 18	144.0	24 22.0	98 18	143.9
4	22 42.6	98 19	143.1	23 12.0	98 19	143.0	23 41.5	98 19	142.9	24 10.9	98 18	142.8
35	22 31.3	98 19	142.1	23 00.7	98 19	142.0	23 30.2	98 19	141.8	23 59.6	98 19	141.7
6	22 19.8	98 20	141.0	22 49.2	98 20	140.9	23 18.6	98 20	140.8	23 48.0	98 20	140.7
7	22 08.0	98 20	140.0	22 37.3	98 20	139.8	23 06.7	98 20	139.7	23 36.1	98 20	139.6
8	21 55.9	98 21	138.9	22 25.3	98 21	138.8	22 54.6	98 21	138.7	23 24.0	98 21	138.6
9	21 43.6	98 21	137.9	22 12.9	98 21	137.8	22 42.2	98 21	137.6	23 11.6	98 21	137.5
40	21 31.0	98 21	136.8	22 00.3	98 21	136.7	22 29.6	98 21	136.6	22 58.9	98 22	136.5
1	21 18.2	98 22	135.8	21 47.5	98 22	135.7	22 16.8	98 22	135.6	22 46.0	98 22	135.4
2	21 05.2	98 22	134.8	21 34.4	97 22	134.6	22 03.7	97 22	134.5	22 32.9	97 22	134.4
3	20 51.9	97 23	133.7	21 21.1	97 23	133.6	21 50.3	97 23	133.5	22 19.5	97 23	133.4
4	20 38.4	97 23	132.7	21 07.6	97 23	132.6	21 36.8	97 23	132.4	22 05.9	97 23	132.3
45	20 24.6	97 23	131.7	20 53.8	97 23	131.5	21 23.0	97 23	131.4	21 52.1	97 23	131.3
6	20 10.7	97 24	130.6	20 39.8	97 24	130.5	21 08.9	97 24	130.4	21 38.1	97 24	130.2
7	19 56.5	97 24	129.6	20 25.6	97 24	129.5	20 54.7	97 24	129.4	21 23.8	97 24	129.2
8	19 42.1	97 24	128.6	20 11.2	97 24	128.5	20 40.3	97 24	128.3	21 09.4	97 24	128.2
9	19 27.5	97 25	127.6	19 56.6	97 25	127.4	20 25.6	97 25	127.3	20 54.7	97 25	127.2
50	19 12.7	97 25	126.6	19 41.7	97 25	126.4	20 10.8	97 25	126.3	20 39.8	97 25	126.1
1	18 57.7	97 25	125.5	19 26.7	97 25	125.4	19 55.7	97 25	125.3	20 24.7	97 25	125.1
2	18 42.5	97 26	124.5	19 11.5	97 26	124.4	19 40.5	97 26	124.3	20 09.5	97 26	124.1
3	18 27.2	97 26	123.5	18 56.1	97 26	123.4	19 25.1	97 26	123.2	19 54.0	96 26	123.1
4	18 11.6	96 26	122.5	18 40.6	96 26	122.4	19 09.5	96 26	122.2	19 38.4	96 26	122.1
55	17 55.9	96 26	121.5	18 24.8	96 27	121.4	18 53.7	96 27	121.2	19 22.6	96 27	121.1
6	17 40.0	96 27	120.5	18 08.9	96 27	120.4	18 37.8	96 27	120.2	19 06.7	96 27	120.1
7	17 23.9	96 27	119.5	17 52.8	96 27	119.4	18 21.7	96 27	119.2	18 50.5	96 27	119.1
8	17 07.7	96 27	118.5	17 36.6	96 27	118.4	18 05.4	96 27	118.2	18 34.3	96 27	118.1
9	16 51.4	96 28	117.5	17 20.2	96 28	117.4	17 49.0	96 28	117.2	18 17.8	96 28	117.1
60	16 34.8	96 28	116.5	17 03.6	96 28	116.4	17 32.4	96 28	116.2	18 01.2	96 28	116.1
1	16 18.2	96 28	115.5	16 47.0	96 28	115.4	17 15.7	96 28	115.2	17 44.5	96 28	115.1
2	16 01.4	96 28	114.5	16 30.1	96 28	114.4	16 58.9	96 28	114.2	17 27.7	96 28	114.1
3	15 44.5	96 28	113.5	16 13.2	96 28	113.4	16 41.9	96 28	113.3	17 10.7	96 29	113.1
4	15 27.4	96 29	112.6	15 56.1	96 29	112.4	16 24.8	96 29	112.3	16 53.5	96 29	112.1
65	15 10.2	96 29	111.6	15 38.9	96 29	111.4	16 07.6	96 29	111.3	16 36.3	96 29	111.1
6	14 52.9	96 29	110.6	15 21.6	96 29	110.4	15 50.3	96 29	110.3	16 19.0	96 29	110.1
7	14 35.5	96 29	109.6	15 04.2	96 29	109.5	15 32.8	96 29	109.3	16 01.5	96 29	109.2
8	14 18.0	96 29	108.6	14 46.6	96 29	108.5	15 15.3	95 29	108.3	15 43.9	95 29	108.2
9	14 00.4	95 30	107.7	14 29.0	95 30	107.5	14 57.6	95 30	107.4	15 26.3	95 30	107.2
70	13 42.7	95 30	106.7	14 11.3	95 30	106.5	14 39.9	95 30	106.4	15 08.5	95 30	106.2
1	13 24.9	95 30	105.7	13 53.5	95 30	105.6	14 22.1	95 30	105.4	14 50.7	95 30	105.3
2	13 07.0	95 30	104.8	13 35.6	95 30	104.6	14 04.2	95 30	104.4	14 32.7	95 30	104.3
3	12 49.0	95 30	103.8	13 17.6	95 30	103.6	13 46.2	95 30	103.5	14 14.7	95 30	103.3
4	12 30.9	95 30	102.8	12 59.5	95 30	102.7	13 28.1	95 30	102.5	13 56.7	95 30	102.3
75	12 12.8	95 30	101.9	12 41.4	95 30	101.7	13 10.0	95 30	101.5	13 38.5	95 30	101.4
6	11 54.7	95 30	100.9	12 23.2	95 30	100.7	12 51.8	95 30	100.6	13 20.3	95 30	100.4
7	11 36.4	95 30	99.9	12 05.0	95 30	99.8	12 33.5	95 30	99.6	13 02.0	95 31	99.5
8	11 18.1	95 31	99.0	11 46.7	95 31	98.8	12 15.2	95 31	98.6	12 43.7	95 31	98.5
9	10 59.8	95 31	98.0	11 28.3	95 31	97.8	11 56.9	95 31	97.7	12 25.4	95 31	97.5
80	10 41.4	95 31	97.0	11 09.9	95 31	96.9	11 38.5	95 31	96.7	12 07.0	95 31	96.6
1	10 23.0	95 31	96.1	10 51.5	95 31	95.9	11 20.0	95 31	95.8	11 48.5	95 31	95.6
2	10 04.5	95 31	95.1	10 33.1	95 31	95.0	11 01.6	95 31	94.8	11 30.1	95 31	94.7
3	9 46.1	95 31	94.2	10 14.6	95 31	94.0	10 43.1	95 31	93.9	11 11.6	95 31	93.7
4	9 27.6	95 31	93.2	9 56.1	95 31	93.1	10 24.6	95 31	92.9	10 53.1	95 31	92.7
85	9 09.0	95 31	92.3	9 37.5	95 31	92.1	10 06.0	95 31	92.0	10 34.5	95 31	91.8
6	8 50.5	95 31	91.3	9 19.0	95 31	91.2	9 47.5	95 31	91.0	10 16.0	95 31	90.8
7	8 32.0	95 31	90.4	9 00.5	95 31	90.2	9 29.0	95 31	90.0	9 57.5	95 31	89.9
8	8 13.4	95 31	89.4	8 41.9	95 31	89.3	9 10.4	95 31	89.1	9 38.9	95 31	88.9
9	7 54.9	95 31	88.5	8 23.4	95 31	88.3	8 51.9	95 31	88.1	9 20.4	95 31	88.0
90	7 36.4	95 31	87.5	8 04.9	95 31	87.4	8 33.4	95 31	87.2	9 01.9	95 31	87.0

10° 00′ Alt.		Az.	10° 30′ Alt.		Az.	11° 00′ Alt.		Az.	11° 30′ Alt.		Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	00
27 59.8	1.0 01	178.9	28 29.8	1.0 01	178.9	28 59.8	1.0 01	178.9	29 29.8	1.0 01	178.9	1
27 59.3	1.0 02	177.8	28 29.3	1.0 02	177.8	28 59.3	1.0 02	177.8	29 29.3	1.0 02	177.7	2
27 58.4	1.0 02	176.7	28 28.4	1.0 02	176.6	28 58.4	1.0 02	176.6	29 28.4	1.0 02	176.6	3
27 57.1	1.0 03	175.6	28 27.1	1.0 03	175.5	28 57.1	1.0 03	175.5	29 27.1	1.0 03	175.5	4
27 55.5	1.0 03	174.4	28 25.5	1.0 03	174.4	28 55.5	1.0 03	174.4	29 25.4	1.0 03	174.4	05
27 53.5	1.0 04	173.3	28 23.5	1.0 04	173.3	28 53.5	1.0 04	173.3	29 23.5	1.0 04	173.2	6
27 51.2	1.0 04	172.2	28 21.1	1.0 04	172.2	28 51.1	1.0 05	172.1	29 21.1	1.0 05	172.1	7
27 48.5	1.0 05	171.1	28 18.4	1.0 05	171.1	28 48.4	1.0 05	171.0	29 18.4	1.0 05	171.0	8
27 45.4	1.0 06	170.0	28 15.4	1.0 05	169.9	28 45.3	1.0 06	169.9	29 15.3	1.0 06	169.9	9
27 42.0	1.0 06	168.9	28 12.0	1.0 06	168.8	28 41.9	1.0 06	168.8	29 11.9	1.0 06	168.8	10
27 38.3	1.0 07	167.8	28 08.2	1.0 07	167.7	28 38.1	1.0 07	167.7	29 08.1	1.0 07	167.6	1
27 34.2	1.0 07	166.6	28 04.1	1.0 07	166.6	28 34.0	1.0 07	166.6	29 03.9	1.0 08	166.5	2
27 29.7	1.0 08	165.5	27 59.6	1.0 08	165.5	28 29.5	1.0 08	165.4	28 59.4	1.0 08	165.4	3
27 24.9	1.0 09	164.4	27 54.8	1.0 09	164.4	28 24.7	1.0 09	164.3	28 54.6	1.0 09	164.3	4
27 19.8	1.0 09	163.3	27 49.6	1.0 09	163.3	28 19.5	1.0 09	163.2	28 49.4	1.0 09	163.2	15
27 14.3	1.0 10	162.2	27 44.1	1.0 10	162.2	28 14.0	1.0 10	162.1	28 43.8	1.0 10	162.1	6
27 08.4	99 10	161.1	27 38.3	99 10	161.1	28 08.1	99 10	161.0	28 38.0	99 10	160.9	7
27 02.3	99 11	160.0	27 32.1	99 11	160.0	28 01.9	99 11	159.9	28 31.7	99 11	159.8	8
26 55.8	99 11	158.9	27 25.6	99 11	158.9	27 55.4	99 11	158.8	28 25.2	99 12	158.7	9
26 48.9	99 12	157.8	27 18.7	99 12	157.8	27 48.5	99 12	157.7	28 18.3	99 12	157.6	20
26 41.8	99 12	156.7	27 11.5	99 12	156.7	27 41.3	99 13	156.6	28 11.1	99 13	156.5	1
26 34.3	99 13	155.6	27 04.0	99 13	155.6	27 33.8	99 13	155.5	28 03.5	99 13	155.4	2
26 26.5	99 14	154.5	26 56.2	99 14	154.5	27 25.9	99 14	154.4	27 55.6	99 14	154.3	3
26 18.3	99 14	153.5	26 48.0	99 14	153.4	27 17.7	99 14	153.3	27 47.4	99 14	153.2	4
26 09.9	99 15	152.4	26 39.6	99 15	152.3	27 09.3	99 15	152.2	27 38.9	99 15	152.1	25
26 01.2	99 15	151.3	26 30.8	99 15	151.2	27 00.5	99 15	151.1	27 30.1	99 15	151.0	6
25 52.1	99 16	150.2	26 21.7	99 16	150.1	26 51.4	99 16	150.0	27 21.0	99 16	149.9	7
25 42.7	99 16	149.1	26 12.3	99 16	149.0	26 41.9	99 16	148.9	27 11.5	99 16	148.9	8
25 33.1	99 17	148.0	26 02.6	99 17	148.0	26 32.2	99 17	147.9	27 01.8	99 17	147.8	9
25 23.1	99 17	147.0	25 52.7	99 17	146.9	26 22.2	99 17	146.8	26 51.8	98 17	146.7	30
25 12.9	98 18	145.9	25 42.4	98 18	145.8	26 11.9	98 18	145.7	26 41.4	98 18	145.6	1
25 02.3	98 18	144.8	25 31.8	98 18	144.7	26 01.3	98 18	144.6	26 30.8	98 18	144.5	2
24 51.5	98 18	143.8	25 21.0	98 19	143.7	25 50.4	98 19	143.6	26 19.9	98 19	143.5	3
24 40.4	98 19	142.7	25 09.8	98 19	142.6	25 39.3	98 19	142.5	26 08.7	98 19	142.4	4
24 29.0	98 19	141.6	24 58.5	98 19	141.5	25 27.9	98 20	141.4	25 57.3	98 20	141.3	35
24 17.4	98 20	140.6	24 46.8	98 20	140.5	25 16.2	98 20	140.4	25 45.6	98 20	140.2	6
24 05.5	98 20	139.5	24 34.8	98 20	139.4	25 04.2	98 20	139.3	25 33.6	98 20	139.2	7
23 53.3	98 21	138.5	24 22.7	98 21	138.3	24 52.0	98 21	138.2	25 21.3	98 21	138.1	8
23 40.9	98 21	137.4	24 10.2	98 21	137.3	24 39.5	98 21	137.2	25 08.8	98 21	137.1	9
23 28.2	98 22	136.4	23 57.5	98 22	136.2	24 26.8	98 22	136.1	24 56.1	98 22	136.0	40
23 15.3	98 22	135.3	23 44.6	98 22	135.2	24 13.8	97 22	135.1	24 43.1	97 22	134.9	1
23 02.1	97 22	134.3	23 31.4	97 22	134.1	24 00.6	97 22	134.0	24 29.8	97 22	133.9	2
22 48.7	97 23	133.2	23 18.0	97 23	133.1	23 47.1	97 23	133.0	24 16.3	97 23	132.9	3
22 35.1	97 23	132.2	23 04.3	97 23	132.1	23 33.5	97 23	131.9	24 02.6	97 23	131.8	4
22 21.3	97 23	131.2	22 50.4	97 23	131.0	23 19.6	97 24	130.9	23 48.7	97 24	130.8	45
22 07.2	97 24	130.1	22 36.3	97 24	130.0	23 05.4	97 24	129.8	23 34.5	97 24	129.7	6
21 52.9	97 24	129.1	22 22.0	97 24	129.0	22 51.1	97 24	128.8	23 20.2	97 24	128.7	7
21 38.4	97 24	128.1	22 07.5	97 25	127.9	22 36.6	97 25	127.8	23 05.6	97 25	127.7	8
21 23.7	97 25	127.0	21 52.8	97 25	126.9	22 21.8	97 25	126.8	22 50.8	97 25	126.6	9
21 08.8	97 25	126.0	21 37.8	97 25	125.9	22 06.8	97 25	125.7	22 35.8	97 25	125.6	50
20 53.7	97 25	125.0	21 22.7	97 26	124.9	21 51.7	97 26	124.7	22 20.7	97 26	124.6	1
20 38.5	97 26	124.0	21 07.4	97 26	123.8	21 36.4	97 26	123.7	22 05.3	96 26	123.6	2
20 23.0	96 26	123.0	20 51.9	96 26	122.8	21 20.9	96 26	122.7	21 49.8	96 26	122.5	3
20 07.3	96 26	121.9	20 36.3	96 26	121.8	21 05.2	96 26	121.7	21 34.1	96 26	121.5	4
19 51.5	96 27	120.9	20 20.4	96 27	120.8	20 49.3	96 27	120.7	21 18.2	96 27	120.5	55
19 35.5	96 27	119.9	20 04.4	96 27	119.8	20 33.3	96 27	119.6	21 02.1	96 27	119.5	6
19 19.4	96 27	118.9	19 48.2	96 27	118.8	20 17.1	96 27	118.6	20 45.9	96 27	118.5	7
19 03.1	96 27	117.9	19 31.9	96 27	117.8	20 00.7	96 28	117.6	20 29.5	96 28	117.5	8
18 46.6	96 28	116.9	19 15.4	96 28	116.8	19 44.2	96 28	116.6	20 13.0	96 28	116.5	9
18 30.0	96 28	115.9	18 58.8	96 28	115.8	19 27.6	96 28	115.6	19 56.3	96 28	115.5	60
18 13.3	96 28	114.9	18 42.0	96 28	114.8	19 10.8	96 28	114.6	19 39.5	96 28	114.5	1
17 56.4	96 28	113.9	18 25.1	96 28	113.8	18 53.9	96 28	113.6	19 22.6	96 28	113.5	2
17 39.4	96 29	112.9	18 08.1	96 29	112.8	18 36.8	96 29	112.6	19 05.5	96 29	112.5	3
17 22.3	96 29	112.0	17 50.9	96 29	111.8	18 19.6	96 29	111.7	18 48.3	96 29	111.5	4
17 05.0	96 29	111.0	17 33.7	96 29	110.8	18 02.3	96 29	110.7	18 31.0	96 29	110.5	65
16 47.6	96 29	110.0	17 16.3	96 29	109.8	17 44.9	96 29	109.7	18 13.6	95 29	109.5	6
16 30.2	95 29	109.0	16 58.8	95 29	108.9	17 27.4	95 29	108.7	17 56.1	95 29	108.5	7
16 12.6	95 29	108.0	16 41.2	95 30	107.9	17 09.8	95 30	107.7	17 38.4	95 30	107.6	8
15 54.9	95 30	107.1	16 23.5	95 30	106.9	16 52.1	95 30	106.7	17 20.7	95 30	106.6	9
15 37.1	95 30	106.1	16 05.7	95 30	105.9	16 34.3	95 30	105.8	17 02.9	95 30	105.6	70
15 19.3	95 30	105.1	15 47.8	95 30	104.9	16 16.4	95 30	104.8	16 45.0	95 30	104.6	1
15 01.3	95 30	104.1	15 29.9	95 30	104.0	15 58.5	95 30	103.8	16 27.0	95 30	103.7	2
14 43.3	95 30	103.2	15 11.9	95 30	103.0	15 40.4	95 30	102.8	16 09.0	95 30	102.7	3
14 25.2	95 30	102.2	14 53.8	95 30	102.0	15 22.3	95 30	101.9	15 50.8	95 30	101.7	4
14 07.1	95 30	101.2	14 35.6	95 30	101.1	15 04.1	95 30	100.9	15 32.7	95 30	100.7	75
13 48.8	95 30	100.3	14 17.4	95 30	100.1	14 45.9	95 30	99.9	15 14.4	95 30	99.8	6
13 30.6	95 31	99.3	13 59.1	95 31	99.1	14 27.6	95 31	99.0	14 56.1	95 31	98.8	7
13 12.2	95 31	98.3	13 40.8	95 31	98.2	14 09.3	95 31	98.0	14 37.8	95 31	97.9	8
12 53.9	95 31	97.4	13 22.4	95 31	97.2	13 50.9	95 31	97.1	14 19.4	95 31	96.9	9
12 35.5	95 31	96.4	13 04.0	95 31	96.3	13 32.5	95 31	96.1	14 01.0	95 31	95.9	80
12 17.0	95 31	95.5	12 45.5	95 31	95.3	13 14.0	95 31	95.1	13 42.5	95 31	95.0	1
11 58.6	95 31	94.5	12 27.1	95 31	94.3	12 55.5	95 31	94.2	13 24.0	95 31	94.0	2
11 40.1	95 31	93.5	12 08.6	95 31	93.4	12 37.0	95 31	93.2	13 05.5	95 31	93.1	3
11 21.6	95 31	92.6	11 50.0	95 31	92.4	12 18.5	95 31	92.3	12 47.0	95 31	92.1	4
11 03.0	95 31	91.6	11 31.5	95 31	91.5	12 00.0	95 31	91.3	12 28.5	95 31	91.2	85
10 44.5	95 31	90.7	11 13.0	95 31	90.5	11 41.4	95 31	90.4	12 09.9	95 31	90.2	6
10 25.9	95 31	89.7	10 54.4	95 31	89.6	11 22.9	95 31	89.4	11 51.4	95 31	89.2	7
10 07.4	95 31	88.8	10 35.9	95 31	88.6	11 04.4	95 31	88.5	11 32.8	95 31	88.3	8
9 48.9	95 31	87.8	10 17.4	95 31	87.7	10 45.8	95 31	87.5	11 14.3	95 31	87.4	9
9 30.4	95 31	86.9	9 58.8	95 31	86.7	10 27.3	95 31	86.6	10 55.8	95 31	86.4	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 72°

H.A.	8° 00′		8° 30′		9° 00′		9° 30′		10° 00′		10° 30′		11° 00′		11° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	10 00.0 1.0 00	180.0	9 30.0 1.0 00	180.0	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	7 30.0 1.0 00	180.0	7 00.0 1.0 00	180.0	6 30.0 1.0 00	180.0	00
1	9 59.8 1.0 01	179.0	9 29.8 1.0 01	179.0	8 59.8 1.0 01	179.0	8 29.8 1.0 01	179.0	7 59.8 1.0 01	179.0	7 29.8 1.0 01	179.0	6 59.8 1.0 01	179.0	6 29.8 1.0 01	179.0	1
2	9 59.3 1.0 01	178.0	9 29.4 1.0 01	178.0	8 59.4 1.0 01	178.0	8 29.4 1.0 01	178.0	7 59.4 1.0 01	178.0	7 29.4 1.0 01	178.0	6 59.4 1.0 01	178.0	6 29.4 1.0 01	178.0	2
3	9 58.5 1.0 02	177.0	9 28.5 1.0 02	177.0	8 58.5 1.0 02	177.0	8 28.5 1.0 02	177.0	7 58.6 1.0 02	177.0	7 28.6 1.0 02	177.0	6 58.6 1.0 02	177.0	6 28.6 1.0 02	177.0	3
4	9 57.4 1.0 02	176.0	9 27.4 1.0 02	176.0	8 57.4 1.0 02	176.0	8 27.4 1.0 02	176.0	7 57.4 1.0 02	176.0	7 27.4 1.0 02	176.0	6 57.4 1.0 02	176.0	6 27.4 1.0 02	176.1	4
05	9 55.9 1.0 03	175.0	9 25.9 1.0 03	175.0	8 56.0 1.0 03	175.0	8 26.0 1.0 03	175.0	7 56.0 1.0 03	175.0	7 26.0 1.0 03	175.0	6 56.0 1.0 03	175.1	6 26.0 1.0 03	175.1	05
6	9 54.1 1.0 04	174.0	9 24.2 1.0 04	174.0	8 54.2 1.0 04	174.0	8 24.2 1.0 04	174.0	7 54.2 1.0 03	174.0	7 24.2 1.0 03	174.1	6 54.2 1.0 03	174.1	6 24.3 1.0 03	174.1	6
7	9 52.0 1.0 04	173.0	9 22.1 1.0 04	173.0	8 52.1 1.0 04	173.0	8 22.1 1.0 04	173.0	7 52.1 1.0 04	173.0	7 22.1 1.0 04	173.1	6 52.2 1.0 04	173.1	6 22.2 1.0 04	173.1	7
8	9 49.6 1.0 05	172.0	9 19.6 1.0 05	172.0	8 49.7 1.0 05	172.0	8 19.7 1.0 05	172.0	7 49.7 1.0 05	172.0	7 19.7 1.0 05	172.1	6 49.8 1.0 05	172.1	6 19.8 1.0 04	172.1	8
9	9 46.9 1.0 05	171.0	9 16.9 1.0 05	171.0	8 46.9 1.0 05	171.0	8 17.0 1.0 05	171.0	7 47.0 1.0 05	171.1	7 17.0 1.0 05	171.1	6 47.1 1.0 05	171.1	6 17.1 1.0 05	171.1	9
10	9 43.8 1.0 06	170.0	9 13.8 1.0 06	170.0	8 43.9 1.0 06	170.0	8 13.9 1.0 06	170.0	7 44.0 1.0 06	170.1	7 14.0 1.0 06	170.1	6 44.0 1.0 06	170.1	6 14.1 1.0 06	170.1	10
1	9 40.4 1.0 06	168.9	9 10.4 1.0 06	169.0	8 40.5 1.0 06	169.0	8 10.5 1.0 06	169.0	7 40.6 1.0 06	169.1	7 10.7 1.0 06	169.1	6 40.7 1.0 06	169.1	6 10.8 1.0 06	169.2	1
2	9 36.7 1.0 07	167.9	9 06.7 1.0 07	168.0	8 36.8 1.0 07	168.0	8 06.9 1.0 07	168.0	7 36.9 1.0 07	168.1	7 07.0 1.0 07	168.1	6 37.1 1.0 07	168.1	6 07.1 1.0 07	168.2	2
3	9 32.6 1.0 07	166.9	9 02.7 1.0 07	167.0	8 32.8 1.0 07	167.0	8 02.9 1.0 07	167.1	7 32.9 1.0 07	167.1	7 03.0 1.0 07	167.1	6 33.1 1.0 07	167.2	6 03.2 1.0 07	167.2	3
4	9 28.3 1.0 08	165.9	8 58.4 1.0 08	166.0	8 28.5 1.0 08	166.0	7 58.6 1.0 08	166.1	7 28.6 1.0 08	166.1	6 58.7 1.0 08	166.1	6 28.8 1.0 08	166.2	5 58.9 1.0 08	166.2	4
15	9 23.6 1.0 08	164.9	8 53.7 1.0 08	165.0	8 23.8 1.0 08	165.0	7 53.9 1.0 08	165.1	7 24.0 1.0 08	165.1	6 54.1 1.0 08	165.1	6 24.2 1.0 08	165.2	5 54.3 1.0 08	165.2	15
6	9 18.7 1.0 09	163.9	8 48.8 1.0 09	164.0	8 18.9 1.0 09	164.0	7 49.0 1.0 09	164.1	7 19.1 1.0 09	164.1	6 49.2 1.0 09	164.2	6 19.3 1.0 09	164.2	5 49.4 1.0 09	164.2	6
7	9 13.4 1.0 09	162.9	8 43.5 1.0 09	163.0	8 13.6 1.0 09	163.0	7 43.8 1.0 09	163.1	7 13.9 1.0 09	163.1	6 44.0 1.0 09	163.2	6 14.1 1.0 09	163.2	5 44.3 1.0 09	163.3	7
8	9 07.8 1.0 10	161.9	8 37.9 1.0 10	162.0	8 08.1 1.0 10	162.0	7 38.2 1.0 10	162.1	7 08.3 1.0 10	162.1	6 38.5 1.0 10	162.2	6 08.6 1.0 10	162.2	5 38.8 1.0 10	162.3	8
9	9 01.9 99 10	160.9	8 32.0 99 10	161.0	8 02.2 99 10	161.0	7 32.4 99 10	161.1	7 02.5 99 10	161.2	6 32.7 99 10	161.2	6 02.8 99 10	161.3	5 33.0 99 10	161.3	9
20	8 55.7 99 11	159.9	8 25.9 99 11	160.0	7 56.0 99 11	160.1	7 26.2 99 11	160.1	6 56.4 99 11	160.2	6 26.5 99 11	160.2	5 56.7 99 11	160.3	5 26.9 99 11	160.3	20
1	8 49.2 99 11	159.0	8 19.4 99 11	159.0	7 49.6 99 11	159.1	7 19.7 99 11	159.1	6 49.9 99 11	159.2	6 20.1 99 11	159.2	5 50.3 99 11	159.3	5 20.5 99 11	159.3	1
2	8 42.4 99 12	158.0	8 12.6 99 12	158.0	7 42.8 99 12	158.1	7 13.0 99 12	158.1	6 43.2 99 12	158.2	6 13.4 99 12	158.3	5 43.6 99 12	158.3	5 13.8 99 12	158.4	2
3	8 35.3 99 12	157.0	8 05.5 99 12	157.0	7 35.7 99 12	157.1	7 05.9 99 12	157.1	6 36.2 99 12	157.2	6 06.4 99 12	157.3	5 36.6 99 12	157.3	5 06.8 99 12	157.4	3
4	8 27.9 99 13	156.0	7 58.1 99 13	156.0	7 28.3 99 13	156.1	6 58.6 99 13	156.2	6 28.8 99 13	156.2	5 59.1 99 13	156.3	5 29.3 99 13	156.4			4
25	8 20.2 99 13	155.0	7 50.4 99 13	155.0	7 20.7 99 13	155.1	6 50.9 99 13	155.2	6 21.2 99 13	155.2	5 51.5 99 13	155.3	5 21.7 99 13	155.4			25
6	8 12.2 99 14	154.0	7 42.5 99 14	154.1	7 12.7 99 14	154.1	6 43.0 99 14	154.2	6 13.3 99 14	154.3	5 43.6 99 14	154.3	5 13.9 99 14	154.4			6
7	8 03.9 99 14	153.0	7 34.2 99 14	153.1	7 04.5 99 14	153.1	6 34.8 99 14	153.2	6 05.1 99 14	153.3	5 35.4 99 14	153.4	5 05.7 99 14	153.4			7
8	7 55.3 99 15	152.0	7 25.7 99 15	152.1	6 56.0 99 15	152.2	6 26.3 99 15	152.2	5 56.6 99 15	152.3	5 26.9 99 15	152.4					8
9	7 46.5 99 15	151.0	7 16.8 99 15	151.1	6 47.2 99 15	151.2	6 17.5 99 15	151.2	5 47.9 99 15	151.3	5 18.2 99 15	151.4					9
30	7 37.4 99 16	150.0	7 07.7 99 16	150.1	6 38.1 99 16	150.2	6 08.5 99 16	150.3	5 38.8 99 16	150.3	5 09.2 99 15	150.4					30
1	7 28.0 99 16	149.0	6 58.4 99 16	149.1	6 28.7 99 16	149.2	5 59.1 99 16	149.3	5 29.5 99 16	149.4							1
2	7 18.3 99 17	148.1	6 48.7 99 17	148.1	6 19.1 99 16	148.2	5 49.5 99 16	148.3	5 19.9 99 16	148.4							2
3	7 08.3 99 17	147.1	6 38.8 99 17	147.2	6 09.2 99 17	147.2	5 39.7 99 17	147.3	5 10.1 99 17	147.4							3
4	6 58.1 98 17	146.1	6 28.6 98 17	146.2	5 59.1 98 17	146.3	5 29.5 98 17	146.4	5 00.0 98 17	146.4							4
35	6 47.7 98 18	145.1	6 18.1 98 18	145.2	5 48.6 98 18	145.3	5 19.1 98 18	145.4									35
6	6 36.9 98 18	144.1	6 07.4 98 18	144.2	5 37.9 98 18	144.3	5 08.4 98 18	144.4									6
7	6 25.9 98 19	143.1	5 56.5 98 19	143.2	5 27.0 98 19	143.3											7
8	6 14.7 98 19	142.2	5 45.2 98 19	142.3	5 15.8 98 19	142.4											8
9	6 03.2 98 20	141.2	5 33.8 98 20	141.3	5 04.4 98 20	141.4											9
40	5 51.5 98 20	140.2	5 22.1 98 20	140.3													40
1	5 39.5 98 20	139.2	5 10.1 98 20	139.3													1
2	5 27.2 98 21	138.3															2
3	5 14.8 98 21	137.3															3
4	5 02.1 98 22	136.3															4

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

DECLINATION SAME NAME AS LATITUDE

Lat. 77°

H.A.	8° 00′		8° 30′		9° 00′		9° 30′		10° 00′		10° 30′		11° 00′		11° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	7 17.8 95 31	86.6	7 46.4 95 31	86.4	8 14.9 95 31	86.2	8 43.4 95 31	86.1	9 11.9 95 31	85.9	9 40.3 95 31	85.8	10 08.8 95 31	85.6	10 37.3 95 31	85.5	91
2	6 59.4 95 31	85.6	7 27.9 95 31	85.5	7 56.4 95 31	85.3	8 24.9 95 31	85.1	8 53.4 95 31	85.0	9 21.9 95 31	84.8	9 50.4 95 31	84.7	10 18.8 95 31	84.5	2
3	6 40.9 95 31	84.7	7 09.4 95 31	84.5	7 37.9 95 31	84.4	8 06.4 95 31	84.2	8 34.9 95 31	84.0	9 03.4 95 31	83.9	9 31.9 95 31	83.7	10 00.4 95 31	83.6	3
4	6 22.4 95 31	83.7	6 51.0 95 31	83.6	7 19.5 95 31	83.4	7 48.0 95 31	83.3	8 16.5 95 31	83.1	8 45.0 95 31	82.9	9 13.5 95 31	82.8	9 42.0 95 31	82.6	4
95	6 04.0 95 31	82.8	6 32.5 95 31	82.6	7 01.1 95 31	82.5	7 29.6 95 31	82.3	7 58.1 95 31	82.1	8 26.6 95 31	82.0	8 55.1 95 31	81.8	9 23.6 95 31	81.7	95
6	5 45.6 95 31	81.8	6 14.2 95 31	81.7	6 42.7 95 31	81.5	7 11.2 95 31	81.4	7 39.8 95 30	81.2	8 08.3 95 30	81.0	8 36.8 95 30	80.9	9 05.3 95 30	80.7	6
7	5 27.3 95 30	80.9	5 55.9 95 30	80.7	6 24.4 95 30	80.6	6 52.9 95 30	80.4	7 21.5 95 30	80.3	7 50.0 95 30	80.1	8 18.5 95 30	79.9	8 47.0 95 30	79.8	7
8	5 09.0 95 30	79.9	5 37.6 95 30	79.8	6 06.1 95 30	79.6	6 34.7 95 30	79.5	7 03.2 95 30	79.3	7 31.7 95 30	79.2	8 00.3 95 30	79.0	8 28.8 95 30	78.8	8
9			5 19.4 95 30	78.8	5 47.9 95 30	78.7	6 16.5 95 30	78.5	6 45.0 95 30	78.4	7 13.6 95 30	78.2	7 42.1 95 30	78.1	8 10.6 95 30	77.9	9
100			5 01.2 95 30	77.9	5 29.8 95 30	77.7	5 58.3 95 30	77.6	6 26.9 95 30	77.4	6 55.4 95 30	77.3	7 24.0 95 30	77.1	7 52.6 95 30	77.0	100
1					5 11.7 95 30	76.8	5 40.3 95 30	76.6	6 08.8 95 30	76.5	6 37.4 95 30	76.3	7 06.0 95 30	76.2	7 34.5 95 30	76.0	1
2							5 22.3 95 30	75.7	5 50.8 95 30	75.5	6 19.4 95 30	75.4	6 48.0 95 30	75.2	7 16.6 95 30	75.1	2
3							5 04.3 95 30	74.8	5 32.9 95 30	74.6	6 01.5 95 30	74.4	6 30.1 95 30	74.3	6 58.7 95 30	74.1	3
4									5 15.1 95 30	73.7	5 43.7 95 30	73.5	6 12.3 95 30	73.4	6 40.9 95 30	73.2	4
105											5 26.0 95 29	72.6	5 54.6 95 29	72.4	6 23.2 95 29	72.3	105
6											5 08.3 95 29	71.6	5 37.0 95 29	71.5	6 05.6 95 29	71.3	6
7													5 19.4 95 29	70.5	5 48.1 95 29	70.4	7
8													5 02.0 95 29	69.6	5 30.7 95 29	69.4	8
9															5 13.3 95 29	68.5	9

Lat. 78°

H.A. °	12° 00′ Alt. ° ′	Δd Δt	Az. °	12° 30′ Alt. ° ′	Δd Δt	Az. °	13° 00′ Alt. ° ′	Δd Δt	Az. °	13° 30′ Alt. ° ′	Δd Δt	Az. °
00	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0
1	29 59.8	1.0 01	178.9	30 29.8	1.0 01	178.9	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9
2	29 59.3	1.0 02	177.7	30 29.3	1.0 02	177.7	30 59.3	1.0 02	177.7	31 29.3	1.0 02	177.7
3	29 58.4	1.0 02	176.6	30 28.4	1.0 02	176.6	30 58.3	1.0 02	176.6	31 28.3	1.0 02	176.6
4	29 57.1	1.0 03	175.5	30 27.1	1.0 03	175.5	30 57.1	1.0 03	175.5	31 27.0	1.0 03	175.4
05	29 55.4	1.0 03	174.4	30 25.4	1.0 03	174.3	30 55.4	1.0 03	174.3	31 25.4	1.0 03	174.3
6	29 53.4	1.0 04	173.2	30 23.4	1.0 04	173.2	30 53.4	1.0 04	173.2	31 23.4	1.0 04	173.2
7	29 51.1	1.0 05	172.1	30 21.0	1.0 05	172.1	30 51.0	1.0 05	172.0	31 21.0	1.0 05	172.0
8	29 48.3	1.0 05	171.0	30 18.3	1.0 05	170.9	30 48.3	1.0 05	170.9	31 18.2	1.0 05	170.9
9	29 45.2	1.0 06	169.8	30 15.2	1.0 06	169.8	30 45.2	1.0 06	169.8	31 15.1	1.0 06	169.8
10	29 41.8	1.0 06	168.7	30 11.7	1.0 06	168.7	30 41.7	1.0 06	168.7	31 11.6	1.0 06	168.6
1	29 38.0	1.0 07	167.6	30 07.9	1.0 07	167.6	30 37.9	1.0 07	167.5	31 07.8	1.0 07	167.5
2	29 33.8	1.0 08	166.5	30 03.8	1.0 08	166.4	30 33.7	1.0 08	166.4	31 03.6	1.0 08	166.3
3	29 29.3	1.0 08	165.4	29 59.2	1.0 08	165.3	30 29.1	1.0 08	165.3	30 59.0	1.0 08	165.2
4	29 24.5	1.0 09	164.2	29 54.4	1.0 09	164.2	30 24.2	1.0 09	164.1	30 54.1	1.0 09	164.1
15	29 19.3	1.0 09	163.1	29 49.1	1.0 09	163.1	30 19.0	1.0 09	163.0	30 48.9	1.0 09	163.0
6	29 13.7	1.0 10	162.0	29 43.6	1.0 10	161.9	30 13.4	1.0 10	161.9	30 43.3	1.0 10	161.8
7	29 07.8	99 10	160.9	29 37.6	99 10	160.8	30 07.5	99 10	160.8	30 37.3	99 10	160.7
8	29 01.6	99 11	159.8	29 31.4	99 11	159.7	30 01.2	99 11	159.7	30 31.0	99 11	159.6
9	28 55.0	99 12	158.7	29 24.8	99 12	158.6	29 54.6	99 12	158.5	30 24.4	99 12	158.5
20	28 48.1	99 12	157.6	29 17.8	99 12	157.5	29 47.6	99 12	157.4	30 17.4	99 12	157.3
1	28 40.8	99 13	156.4	29 10.6	99 13	156.4	29 40.3	99 13	156.3	30 10.1	99 13	156.2
2	28 33.3	99 13	155.3	29 03.0	99 13	155.3	29 32.7	99 13	155.2	30 02.5	99 13	155.1
3	28 25.4	99 14	154.2	28 55.1	99 14	154.2	29 24.8	99 14	154.1	29 54.5	99 14	154.0
4	28 17.1	99 14	153.1	28 46.8	99 14	153.1	29 16.5	99 14	153.0	29 46.2	99 14	152.9
25	28 08.6	99 15	152.0	28 38.3	99 15	152.0	29 07.9	99 15	151.9	29 37.6	99 15	151.8
6	27 59.8	99 15	150.9	28 29.4	99 15	150.9	28 59.0	99 15	150.8	29 28.7	99 15	150.7
7	27 50.6	99 16	149.9	28 20.2	99 16	149.8	28 49.8	99 16	149.7	29 19.4	99 16	149.6
8	27 41.1	99 16	148.8	28 10.7	99 16	148.7	28 40.3	99 16	148.6	29 09.9	99 16	148.5
9	27 31.4	99 17	147.7	28 00.9	99 17	147.6	28 30.5	99 17	147.5	29 00.1	99 17	147.4
30	27 21.3	98 17	146.6	27 50.8	98 17	146.5	28 20.4	98 17	146.4	28 49.9	98 17	146.3
1	27 11.0	98 18	145.5	27 40.5	98 18	145.4	28 10.0	98 18	145.3	28 39.5	98 18	145.2
2	27 00.3	98 18	144.4	27 29.8	98 18	144.3	27 59.3	98 18	144.2	28 28.8	98 18	144.1
3	26 49.4	98 19	143.3	27 18.8	98 19	143.2	27 48.3	98 19	143.1	28 17.7	98 19	143.0
4	26 38.2	98 19	142.3	27 07.6	98 19	142.2	27 37.0	98 19	142.1	28 06.5	98 19	141.9
35	26 26.7	98 20	141.2	26 56.1	98 20	141.1	27 25.5	98 20	141.0	27 54.9	98 20	140.9
6	26 14.9	98 20	140.1	26 44.3	98 20	140.0	27 13.7	98 20	139.9	27 43.0	98 20	139.8
7	26 02.9	98 20	139.1	26 32.3	98 20	138.9	27 01.6	98 21	138.8	27 30.9	98 21	138.7
8	25 50.6	98 21	138.0	26 20.0	98 21	137.9	26 49.3	98 21	137.8	27 18.6	98 21	137.6
9	25 38.1	98 21	136.9	26 07.4	98 21	136.8	26 36.7	98 21	136.7	27 06.0	98 21	136.6
40	25 25.3	98 22	135.9	25 54.6	98 22	135.8	26 23.8	98 22	135.6	26 53.1	97 22	135.5
1	25 12.3	97 22	134.8	25 41.5	97 22	134.7	26 10.8	97 22	134.6	26 40.0	97 22	134.4
2	24 59.0	97 23	133.8	25 28.2	97 23	133.6	25 57.4	97 23	133.5	26 26.6	97 23	133.4
3	24 45.5	97 23	132.7	25 14.7	97 23	132.6	25 43.9	97 23	132.5	26 13.0	97 23	132.3
4	24 31.8	97 23	131.7	25 00.9	97 23	131.5	25 30.1	97 23	131.4	25 59.2	97 23	131.3
45	24 17.8	97 24	130.6	24 46.9	97 24	130.5	25 16.1	97 24	130.4	25 45.2	97 24	130.2
6	24 03.6	97 24	129.6	24 32.7	97 24	129.5	25 01.8	97 24	129.3	25 30.9	97 24	129.2
7	23 49.3	97 24	128.6	24 18.3	97 24	128.4	24 47.4	97 24	128.3	25 16.4	97 24	128.1
8	23 34.7	97 25	127.5	24 03.7	97 25	127.4	24 32.7	97 25	127.2	25 01.7	97 25	127.1
9	23 19.8	97 25	126.5	23 48.9	97 25	126.4	24 17.9	97 25	126.2	24 46.9	97 25	126.1
50	23 04.8	97 25	125.5	23 33.8	97 25	125.3	24 02.8	97 25	125.2	24 31.8	97 25	125.0
1	22 49.6	97 26	124.4	23 18.6	97 26	124.3	23 47.6	96 26	124.2	24 16.5	96 26	124.0
2	22 34.3	96 26	123.4	23 03.2	96 26	123.3	23 32.1	96 26	123.1	24 01.0	96 26	123.0
3	22 18.7	96 26	122.4	22 47.6	96 26	122.2	23 16.5	96 26	122.1	23 45.4	96 26	122.0
4	22 02.9	96 27	121.4	22 31.8	96 27	121.2	23 00.7	96 27	121.1	23 29.6	96 27	120.9
55	21 47.0	96 27	120.4	22 15.9	96 27	120.2	22 44.7	96 27	120.1	23 13.6	96 27	119.9
6	21 31.0	96 27	119.3	21 59.8	96 27	119.2	22 28.6	96 27	119.1	22 57.4	96 27	118.9
7	21 14.7	96 27	118.3	21 43.5	96 27	118.2	22 12.3	96 27	118.0	22 41.1	96 27	117.9
8	20 58.3	96 28	117.3	21 27.1	96 28	117.2	21 55.9	96 28	117.0	22 24.7	96 28	116.9
9	20 41.8	96 28	116.3	21 10.5	96 28	116.2	21 39.3	96 28	116.0	22 08.1	96 28	115.9
60	20 25.1	96 28	115.3	20 53.8	96 28	115.2	21 22.6	96 28	115.0	21 51.3	96 28	114.9
1	20 08.3	96 28	114.3	20 37.0	96 28	114.2	21 05.7	96 28	114.0	21 34.4	96 28	113.9
2	19 51.3	96 28	113.3	20 20.0	96 28	113.2	20 48.7	96 29	113.0	21 17.4	96 29	112.9
3	19 34.2	96 29	112.3	20 02.9	96 29	112.2	20 31.6	96 29	112.0	21 00.2	96 29	111.9
4	19 17.0	96 29	111.3	19 45.7	96 29	111.2	20 14.3	96 29	111.0	20 43.0	95 29	110.9
65	18 59.7	96 29	110.4	19 28.3	95 29	110.2	19 57.0	95 29	110.0	20 25.6	95 29	109.9
6	18 42.2	95 29	109.4	19 10.9	95 29	109.2	19 39.5	95 29	109.1	20 08.1	95 29	108.9
7	18 24.7	95 29	108.4	18 53.3	95 29	108.2	19 21.9	95 29	108.1	19 50.5	95 30	107.9
8	18 07.0	95 30	107.4	18 35.6	95 30	107.2	19 04.2	95 30	107.1	19 32.8	95 30	106.9
9	17 49.3	95 30	106.4	18 17.9	95 30	106.3	18 46.5	95 30	106.1	19 15.0	95 30	105.9
70	17 31.5	95 30	105.4	18 00.1	95 30	105.3	18 28.6	95 30	105.1	18 57.2	95 30	105.0
1	17 13.6	95 30	104.5	17 42.1	95 30	104.3	18 10.7	95 30	104.1	18 39.2	95 30	104.0
2	16 55.6	95 30	103.5	17 24.1	95 30	103.3	17 52.7	95 30	103.2	18 21.2	95 30	103.0
3	16 37.5	95 30	102.5	17 06.0	95 30	102.4	17 34.6	95 30	102.2	18 03.1	95 30	102.0
4	16 19.4	95 30	101.6	16 47.9	95 30	101.4	17 16.4	95 30	101.2	17 44.9	95 30	101.1
75	16 01.2	95 30	100.6	16 29.7	95 30	100.4	16 58.2	95 30	100.3	17 26.7	95 30	100.1
6	15 42.9	95 31	99.6	16 11.4	95 31	99.5	16 39.9	95 31	99.3	17 08.4	95 31	99.1
7	15 24.6	95 31	98.7	15 53.1	95 31	98.5	16 21.6	95 31	98.3	16 50.1	95 31	98.2
8	15 06.3	95 31	97.7	15 34.8	95 31	97.5	16 03.2	95 31	97.4	16 31.7	95 31	97.2
9	14 47.9	95 31	96.7	15 16.4	95 31	96.6	15 44.8	95 31	96.4	16 13.3	95 31	96.2
80	14 29.4	95 31	95.8	14 57.9	95 31	95.6	15 26.4	95 31	95.4	15 54.9	95 31	95.3
1	14 11.0	95 31	94.8	14 39.5	95 31	94.6	15 07.9	95 31	94.5	15 36.4	95 31	94.3
2	13 52.5	95 31	93.9	14 21.0	95 31	93.7	14 49.4	95 31	93.5	15 17.9	95 31	93.4
3	13 34.0	95 31	92.9	14 02.5	95 31	92.7	14 30.9	95 31	92.6	14 59.4	95 31	92.4
4	13 15.5	95 31	91.9	13 43.9	95 31	91.8	14 12.4	95 31	91.6	14 40.8	95 31	91.5
85	12 56.9	95 31	91.0	13 25.4	95 31	90.8	13 53.8	95 31	90.7	14 22.3	95 31	90.5
6	12 38.4	95 31	90.0	13 06.8	95 31	89.9	13 35.3	95 31	89.7	14 03.7	95 31	89.5
7	12 19.8	95 31	89.1	12 48.3	95 31	88.9	13 16.8	95 31	88.8	13 45.2	95 31	88.6
8	12 01.3	95 31	88.1	12 29.8	95 31	88.0	12 58.2	95 31	87.8	13 26.7	95 31	87.7
9	11 42.8	95 31	87.2	12 11.2	95 31	87.0	12 39.7	95 31	86.9	13 08.2	95 31	86.7
90	11 24.3	95 31	86.2	11 52.7	95 31	86.1	12 21.2	95 31	85.9	12 49.7	95 31	85.8

H.A. °	14° 00′ Alt. ° ′	Δd Δt	Az. °	14° 30′ Alt. ° ′	Δd Δt	Az. °	15° 00′ Alt. ° ′	Δd Δt	Az. °	15° 30′ Alt. ° ′	Δd Δt	Az. °
00	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0
1	31 59.8	1.0 01	178.9	32 29.8	1.0 01	178.9	32 59.8	1.0 01	178.8	33 29.8	1.0 01	178.8
2	31 59.3	1.0 02	177.7	32 29.3	1.0 02	177.7	32 59.3	1.0 02	177.7	33 29.3	1.0 02	177.7
3	31 58.3	1.0 02	176.6	32 28.3	1.0 02	176.6	32 58.3	1.0 02	176.5	33 28.3	1.0 02	176.5
4	31 57.0	1.0 03	175.4	32 27.0	1.0 03	175.4	32 57.0	1.0 03	175.4	33 27.0	1.0 03	175.4
05	31 55.4	1.0 03	174.3	32 25.4	1.0 03	174.3	32 55.3	1.0 03	174.2	33 25.3	1.0 03	174.2
6	31 53.3	1.0 04	173.1	32 23.3	1.0 04	173.1	32 53.3	1.0 04	173.1	33 23.3	1.0 04	173.1
7	31 50.9	1.0 05	172.0	32 20.9	1.0 05	172.0	32 50.9	1.0 05	171.9	33 20.9	1.0 05	171.9
8	31 48.2	1.0 05	170.9	32 18.1	1.0 05	170.8	32 48.1	1.0 05	170.8	33 18.1	1.0 05	170.8
9	31 45.1	1.0 06	169.7	32 15.0	1.0 06	169.7	32 45.0	1.0 06	169.6	33 14.9	1.0 06	169.6
10	31 41.6	1.0 06	168.6	32 11.5	1.0 06	168.5	32 41.4	1.0 06	168.5	33 11.4	1.0 06	168.5
1	31 37.7	1.0 07	167.4	32 07.6	1.0 07	167.4	32 37.6	1.0 07	167.4	33 07.5	1.0 07	167.3
2	31 33.5	1.0 08	166.3	32 03.4	1.0 08	166.3	32 33.3	1.0 08	166.2	33 03.2	1.0 08	166.2
3	31 28.9	1.0 08	165.2	31 58.8	1.0 08	165.1	32 28.7	1.0 08	165.1	32 58.6	1.0 08	165.0
4	31 24.0	1.0 09	164.0	31 53.9	1.0 09	164.0	32 23.8	1.0 09	163.9	32 53.7	1.0 09	163.9
15	31 18.7	1.0 09	162.9	31 48.6	1.0 09	162.9	32 18.5	1.0 09	162.8	32 48.3	1.0 09	162.7
6	31 13.1	1.0 10	161.8	31 43.0	99 10	161.7	32 12.8	99 10	161.7	32 42.7	99 10	161.6
7	31 07.1	99 11	160.6	31 37.0	99 11	160.6	32 06.8	99 11	160.5	32 36.6	99 11	160.5
8	31 00.8	99 11	159.5	31 30.6	99 11	159.5	32 00.4	99 11	159.4	32 30.3	99 11	159.3
9	30 54.2	99 12	158.4	31 24.0	99 12	158.3	31 53.8	99 12	158.3	32 23.5	99 12	158.2
20	30 47.2	99 12	157.3	31 16.9	99 12	157.2	31 46.7	99 12	157.1	32 16.5	99 12	157.1
1	30 39.8	99 13	156.2	31 09.6	99 13	156.1	31 39.3	99 13	156.0	32 09.1	99 13	155.9
2	30 32.2	99 13	155.0	31 01.9	99 13	155.0	31 31.6	99 13	154.9	32 01.4	99 13	154.8
3	30 24.2	99 14	153.9	30 53.9	99 14	153.8	31 23.6	99 14	153.8	31 53.3	99 14	153.7
4	30 15.9	99 14	152.8	30 45.6	99 14	152.7	31 15.2	99 14	152.6	31 44.9	99 15	152.6
25	30 07.3	99 15	151.7	30 36.9	99 15	151.6	31 06.6	99 15	151.5	31 36.2	99 15	151.4
6	29 58.3	99 15	150.6	30 27.9	99 15	150.5	30 57.6	99 16	150.4	31 27.2	99 16	150.3
7	29 49.0	99 16	149.5	30 18.7	99 16	149.4	30 48.3	99 16	149.3	31 17.8	99 16	149.2
8	29 39.5	99 16	148.4	30 09.1	99 16	148.3	30 38.6	99 17	148.2	31 08.2	99 17	148.1
9	29 29.6	99 17	147.3	29 59.2	98 17	147.2	30 28.7	98 17	147.1	30 58.2	98 17	147.0
30	29 19.4	98 17	146.2	29 49.0	98 17	146.1	30 18.5	98 18	146.0	30 48.0	98 18	145.9
1	29 09.0	98 18	145.1	29 38.5	98 18	145.0	30 08.0	98 18	144.9	30 37.5	98 18	144.8
2	28 58.2	98 18	144.0	29 27.7	98 18	143.9	29 57.2	98 18	143.8	30 26.6	98 19	143.7
3	28 47.2	98 19	142.9	29 16.6	98 19	142.8	29 46.1	98 19	142.7	30 15.5	98 19	142.6
4	28 35.9	98 19	141.8	29 05.3	98 19	141.7	29 34.7	98 19	141.6	30 04.1	98 19	141.5
35	28 24.3	98 20	140.7	28 53.7	98 20	140.6	29 23.0	98 20	140.5	29 52.4	98 20	140.4
6	28 12.4	98 20	139.7	28 41.8	98 20	139.6	29 11.1	98 20	139.4	29 40.4	98 20	139.3
7	28 00.3	98 21	138.6	28 29.6	98 21	138.5	28 58.9	98 21	138.4	29 28.2	98 21	138.2
8	27 47.9	98 21	137.5	28 17.2	98 21	137.4	28 46.5	98 21	137.3	29 15.7	98 21	137.2
9	27 35.2	98 22	136.5	28 04.5	98 22	136.3	28 33.8	98 22	136.2	29 03.0	97 22	136.1
40	27 22.3	97 22	135.4	27 51.6	97 22	135.3	28 20.8	97 22	135.1	28 50.0	97 22	135.0
1	27 09.2	97 22	134.3	27 38.4	97 22	134.2	28 07.6	97 22	134.1	28 36.8	97 22	133.9
2	26 55.8	97 23	133.3	27 25.0	97 23	133.1	27 54.2	97 23	133.0	28 23.3	97 23	132.9
3	26 42.2	97 23	132.2	27 11.3	97 23	132.1	27 40.5	97 23	131.9	28 09.6	97 23	131.8
4	26 28.3	97 23	131.2	26 57.5	97 24	131.0	27 26.6	97 24	130.9	27 55.7	97 24	130.7
45	26 14.3	97 24	130.1	26 43.4	97 24	130.0	27 12.4	97 24	129.8	27 41.5	97 24	129.7
6	26 00.0	97 24	129.1	26 29.0	97 24	128.9	26 58.1	97 24	128.8	27 27.1	97 24	128.6
7	25 45.5	97 25	128.0	26 14.5	97 25	127.9	26 43.5	97 25	127.7	27 12.6	97 25	127.6
8	25 30.8	97 25	127.0	25 59.8	97 25	126.8	26 28.8	97 25	126.7	26 57.8	97 25	126.5
9	25 15.9	97 25	125.9	25 44.8	97 25	125.8	26 13.8	97 25	125.6	26 42.8	97 25	125.5
50	25 00.7	97 26	124.9	25 29.7	96 26	124.7	25 58.6	96 26	124.6	26 27.6	96 26	124.5
1	24 45.4	96 26	123.9	25 14.4	96 26	123.7	25 43.3	96 26	123.6	26 12.2	96 26	123.4
2	24 30.0	96 26	122.8	24 58.9	96 26	122.7	25 27.7	96 26	122.5	25 56.6	96 26	122.4
3	24 14.3	96 26	121.8	24 43.2	96 26	121.7	25 12.0	96 26	121.5	25 40.9	96 27	121.4
4	23 58.4	96 27	120.8	24 27.3	96 27	120.6	24 56.1	96 27	120.5	25 25.0	96 27	120.3
55	23 42.4	96 27	119.8	24 11.3	96 27	119.6	24 40.1	96 27	119.5	25 08.9	96 27	119.3
6	23 26.3	96 27	118.7	23 55.1	96 27	118.6	24 23.8	96 27	118.4	24 52.6	96 27	118.3
7	23 09.9	96 27	117.7	23 38.7	96 28	117.6	24 07.5	96 28	117.4	24 36.2	96 28	117.3
8	22 53.4	96 28	116.7	23 22.2	96 28	116.6	23 50.9	96 28	116.4	24 19.7	96 28	116.3
9	22 36.8	96 28	115.7	23 05.5	96 28	115.6	23 34.3	96 28	115.4	24 03.0	96 28	115.2
60	22 20.0	96 28	114.7	22 48.7	96 28	114.6	23 17.4	96 28	114.4	23 46.1	96 28	114.2
1	22 03.1	96 28	113.7	22 31.8	96 28	113.5	23 00.5	96 28	113.4	23 29.2	96 29	113.2
2	21 46.1	96 29	112.7	22 14.7	96 29	112.5	22 43.4	96 29	112.4	23 12.1	95 29	112.2
3	21 28.9	96 29	111.7	21 57.6	95 29	111.5	22 26.2	95 29	111.4	22 54.8	95 29	111.2
4	21 11.6	95 29	110.7	21 40.3	95 29	110.6	22 08.9	95 29	110.4	22 37.5	95 29	110.2
65	20 54.2	95 29	109.7	21 22.8	95 29	109.6	21 51.4	95 29	109.4	22 20.0	95 29	109.2
6	20 36.7	95 29	108.7	21 05.3	95 29	108.6	21 33.9	95 29	108.4	22 02.5	95 29	108.2
7	20 19.1	95 30	107.7	20 47.7	95 30	107.6	21 16.3	95 30	107.4	21 44.8	95 30	107.3
8	20 01.4	95 30	106.8	20 30.0	95 30	106.6	20 58.5	95 30	106.4	21 27.1	95 30	106.3
9	19 43.6	95 30	105.8	20 12.2	95 30	105.6	20 40.7	95 30	105.5	21 09.2	95 30	105.3
70	19 25.7	95 30	104.8	19 54.3	95 30	104.6	20 22.8	95 30	104.5	20 51.3	95 30	104.3
1	19 07.8	95 30	103.8	19 36.3	95 30	103.7	20 04.8	95 30	103.5	20 33.3	95 30	103.3
2	18 49.7	95 30	102.8	19 18.2	95 30	102.7	19 46.7	95 30	102.5	20 15.2	95 30	102.3
3	18 31.6	95 30	101.9	19 00.1	95 30	101.7	19 28.6	95 30	101.5	19 57.1	95 30	101.4
4	18 13.4	95 30	100.9	18 41.9	95 30	100.7	19 10.4	95 30	100.6	19 38.9	95 30	100.4
75	17 55.2	95 30	99.9	18 23.7	95 30	99.8	18 52.1	95 30	99.6	19 20.6	95 31	99.4
6	17 36.9	95 31	99.0	18 05.4	95 31	98.8	18 33.8	95 31	98.6	19 02.3	95 31	98.5
7	17 18.6	95 31	98.0	17 47.0	95 31	97 8	18 15.5	95 31	97.7	18 43.9	95 31	97.5
8	17 00.2	95 31	97.0	17 28.6	95 31	96.9	17 57.1	95 31	96.7	18 25.5	95 31	96.5
9	16 41.8	95 31	96.1	17 10.2	95 31	95.9	17 38.7	95 31	95.7	18 07.1	95 31	95.6
80	16 23.3	95 31	95.1	16 51.8	95 31	94.9	17 20.2	95 31	94.8	17 48.6	95 31	94.6
1	16 04.8	95 31	94.2	16 33.3	95 31	94.0	17 01.7	95 31	93.8	17 30.1	95 31	93.7
2	15 46.3	95 31	93.2	16 14.8	95 31	93.0	16 43.2	95 31	92.9	17 11.6	95 31	92.7
3	15 27.8	95 31	92.2	15 56.2	95 31	92.1	16 24.7	95 31	91.9	16 53.1	95 31	91.7
4	15 09.3	95 31	91.3	15 37.7	95 31	91.1	16 06.1	95 31	91.0	16 34.6	95 31	90.8
85	14 50.7	95 31	90.3	15 19.2	95 31	90.2	15 47.6	95 31	90.0	16 16.0	95 31	89.8
6	14 32.2	95 31	89.4	15 00.6	95 31	89.2	15 29.1	95 31	89.1	15 57.5	95 31	88.9
7	14 13.7	95 31	88.4	14 42.1	95 31	88.3	15 10.5	95 31	88.1	15 38.9	95 31	87.9
8	13 55.1	95 31	87.5	14 23.6	95 31	87.3	14 52.0	95 31	87.2	15 20.4	95 31	87.0
9	13 36.6	95 31	86.5	14 05.0	95 31	86.4	14 33.5	95 31	86.2	15 01.9	95 31	86.0
90	13 18.1	95 31	85.6	13 46.6	95 31	85.4	14 15.0	95 31	85.3	14 43.4	95 31	85.1

Lat. 72°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0																00
1	5 59.8	1.0 01	179.0	5 29.8	1.0 01	179.0																			1
2	5 59.4	1.0 01	178.0	5 29.4	1.0 01	178.0																			2
3	5 58.6	1.0 02	177.0	5 28.6	1.0 02	177.1																			3
4	5 57.5	1.0 02	176.1	5 27.5	1.0 02	176.1																			4
05	5 56.0	1.0 03	175.1	5 26.0	1.0 03	175.1																			05
6	5 54.3	1.0 03	174.1	5 24.3	1.0 03	174.1																			6
7	5 52.2	1.0 04	173.1	5 22.2	1.0 04	173.1																			7
8	5 49.8	1.0 04	172.1	5 19.9	1.0 04	172.2																			8
9	5 47.1	1.0 05	171.2	5 17.2	1.0 05	171.2																			9
10	5 44.1	1.0 06	170.2	5 14.2	1.0 06	170.2																			10
1	5 40.8	1.0 06	169.2	5 10.9	1.0 06	169.2																			1
2	5 37.2	1.0 07	168.2	5 07.2	1.0 07	168.2																			2
3	5 33.2	1.0 07	167.2	5 03.3	1.0 07	167.3																			3
4	5 29.0	1.0 08	166.2																						4
15	5 24.4	1.0 08	165.3																						15
6	5 19.5	1.0 09	164.3																						6
7	5 14.4	1.0 09	163.3																						7
8	5 08.9	1.0 10	162.3																						8
9	5 03.1	99 10	161.4																						9

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	11 05.8	95 31	85.3	11 34.3	95 31	85.1	12 02.7	95 31	85.0	12 31.2	95 31	84.8	12 59.6	95 31	84.6	13 28.1	95 31	84.5	13 56.5	95 31	84.3	14 25.0	95 31	84.2	91
2	10 47.3	95 31	84.4	11 15.8	95 31	84.2	11 44.3	95 31	84.0	12 12.7	95 31	83.9	12 41.2	95 31	83.7	13 09.6	95 31	83.5	13 38.1	95 31	83.4	14 06.5	95 31	83.2	2
3	10 28.9	95 31	83.4	10 57.4	95 31	83.2	11 25.8	95 31	83.1	11 54.3	95 31	82.9	12 22.8	95 31	82.8	12 51.2	95 31	82.6	13 19.7	95 31	82.4	13 48.1	95 31	82.3	3
4	10 10.5	95 31	82.5	10 39.0	95 31	82.3	11 07.5	95 31	82.1	11 35.9	95 31	82.0	12 04.4	95 31	81.8	12 32.9	95 31	81.7	13 01.3	95 31	81.5	13 29.8	95 31	81.3	4
95	9 52.1	95 30	81.5	10 20.6	95 30	81.4	10 49.1	95 30	81.2	11 17.6	95 30	81.0	11 46.1	95 30	80.9	12 14.6	95 30	80.7	12 43.0	95 30	80.6	13 11.5	95 30	80.4	95
6	9 33.8	95 30	80.6	10 02.3	95 30	80.4	10 30.8	95 30	80.3	10 59.3	95 30	80.1	11 27.8	95 30	79.9	11 56.3	95 30	79.8	12 24.8	95 30	79.6	12 53.2	95 30	79.5	6
7	9 15.5	95 30	79.6	9 44.1	95 30	79.5	10 12.6	95 30	79.3	10 41.1	95 30	79.2	11 09.6	95 30	79.0	11 38.1	95 30	78.8	12 06.5	95 30	78.7	12 35.0	95 30	78.5	7
8	8 57.3	95 30	78.7	9 25.9	95 30	78.5	9 54.4	95 30	78.4	10 22.9	95 30	78.2	10 51.4	95 30	78.1	11 19.9	95 30	77.9	11 48.4	95 30	77.7	12 16.9	95 30	77.6	8
9	8 39.2	95 30	77.7	9 07.7	95 30	77.6	9 36.2	95 30	77.4	10 04.8	95 30	77.3	10 33.3	95 30	77.1	11 01.8	95 30	77.0	11 30.3	95 30	76.8	11 58.8	95 30	76.6	9
100	8 21.1	95 30	76.8	8 49.6	95 30	76.7	9 18.2	95 30	76.5	9 46.7	95 30	76.3	10 15.2	95 30	76.2	10 43.8	95 30	76.0	11 12.3	95 30	75.9	11 40.8	95 30	75.7	100
1	8 03.1	95 30	75.9	8 31.6	95 30	75.7	9 00.2	95 30	75.6	9 28.7	95 30	75.4	9 57.3	95 30	75.2	10 25.8	95 30	75.1	10 54.4	95 30	74.9	11 22.9	95 30	74.8	1
2	7 45.1	95 30	74.9	8 13.7	95 30	74.8	8 42.3	95 30	74.6	9 10.8	95 30	74.5	9 39.4	95 30	74.3	10 07.9	95 30	74.2	10 36.5	95 30	74.0	11 05.0	95 30	73.8	2
3	7 27.3	95 30	74.0	7 55.9	95 30	73.8	8 24.4	95 30	73.7	8 53.0	95 30	73.5	9 21.6	95 30	73.4	9 50.2	95 30	73.2	10 18.7	95 30	73.1	10 47.3	95 29	72.9	3
4	7 09.5	95 29	73.0	7 38.1	95 29	72.9	8 06.7	95 29	72.7	8 35.3	95 29	72.6	9 03.9	95 29	72.4	9 32.4	95 29	72.3	10 01.0	95 29	72.1	10 29.6	95 29	72.0	4
105	6 51.8	95 29	72.1	7 20.4	95 29	72.0	7 49.0	95 29	71.8	8 17.6	95 29	71.7	8 46.2	95 29	71.5	9 14.8	95 29	71.3	9 43.4	95 29	71.2	10 12.0	95 29	71.0	105
6	6 34.2	95 29	71.2	7 02.8	95 29	71.0	7 31.5	95 29	70.9	8 00.1	95 29	70.7	8 28.7	95 29	70.6	8 57.3	95 29	70.4	9 25.9	95 29	70.3	9 54.5	95 29	70.1	6
7	6 16.7	95 29	70.2	6 45.4	95 29	70.1	7 14.0	95 29	69.9	7 42.6	95 29	69.8	8 11.3	95 29	69.6	8 39.9	95 29	69.5	9 08.5	95 29	69.3	9 37.1	95 29	69.2	7
8	5 59.3	96 29	69.3	6 28.0	96 29	69.1	6 56.6	96 29	69.0	7 25.3	96 29	68.8	7 53.9	95 29	68.7	8 22.6	95 29	68.5	8 51.2	95 29	68.4	9 19.9	95 29	68.2	8
9	5 42.0	96 29	68.4	6 10.7	96 29	68.2	6 39.4	96 29	68.1	7 08.1	96 29	67.9	7 36.7	96 28	67.8	8 05.4	96 28	67.6	8 34.0	96 28	67.5	9 02.7	96 28	67.3	9
110	5 24.9	96 28	67.4	5 53.5	96 28	67.3	6 22.2	96 28	67.1	6 50.9	96 28	67.0	7 19.6	96 28	66.8	7 48.3	96 28	66.7	8 17.0	96 28	66.5	8 45.7	96 28	66.4	110
1	5 07.8	96 28	66.5	5 36.5	96 28	66.3	6 05.2	96 28	66.2	6 33.9	96 28	66.0	7 02.6	96 28	65.9	7 31.3	96 28	65.7	8 00.0	96 28	65.6	8 28.7	96 28	65.4	1
2				5 19.6	96 28	65.4	5 48.3	96 28	65.2	6 17.0	96 28	65.1	6 45.8	96 28	65.0	7 14.5	96 28	64.8	7 43.2	96 28	64.7	8 11.9	96 28	64.5	2
3				5 02.8	96 28	64.4	5 31.5	96 28	64.3	6 00.3	96 28	64.2	6 29.0	96 28	64.0	6 57.8	96 28	63.9	7 26.5	96 28	63.7	7 55.3	96 28	63.6	3
4							5 14.9	96 28	63.4	5 43.7	96 27	63.2	6 12.4	96 27	63.1	6 41.2	96 27	62.9	7 10.0	96 27	62.8	7 38.7	96 27	62.6	4
115										5 27.2	96 27	62.3	5 56.0	96 27	62.1	6 24.8	96 27	62.0	6 53.5	96 27	61.9	7 22.3	96 27	61.7	115
6										5 10.8	96 27	61.3	5 39.7	96 27	61.2	6 08.5	96 27	61.1	6 37.3	96 27	60.9	7 06.1	96 27	60.8	6
7													5 23.5	96 27	60.3	5 52.3	96 27	60.1	6 21.1	96 27	60.0	6 50.0	96 27	59.9	7
8													5 07.5	96 26	59.3	5 36.3	96 26	59.2	6 05.2	96 26	59.1	6 34.0	96 26	58.9	8
9																5 20.5	96 26	58.3	5 49.3	96 26	58.1	6 18.2	96 26	58.0	9
120																5 04.8	96 26	57.3	5 33.7	96 26	57.2	6 02.6	96 26	57.1	120
1																			5 18.2	96 26	56.3	5 47.1	96 26	56.1	1
2																			5 02.8	96 25	55.3	5 31.8	96 25	55.2	2
3																						5 16.6	97 25	54.3	3
4																						5 01.7	97 25	53.3	4

Lat. 72°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′		
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0
1	33 59.8	1.0 01	178.8	34 29.8	1.0 01	178.8	34 59.8	1.0 01	178.8	35 29.8	1.0 01	178.8
2	33 59.2	1.0 02	177.7	34 29.2	1.0 02	177.7	34 59.2	1.0 02	177.7	35 29.2	1.0 02	177.7
3	33 58.3	1.0 02	176.5	34 28.3	1.0 02	176.5	34 58.3	1.0 02	176.5	35 28.3	1.0 02	176.5
4	33 57.0	1.0 03	175.4	34 27.0	1.0 03	175.3	34 57.0	1.0 03	175.3	35 27.0	1.0 03	175.3
05	33 55.3	1.0 03	174.2	34 25.3	1.0 03	174.2	34 55.3	1.0 03	174.2	35 25.3	1.0 03	174.1
6	33 53.3	1.0 04	173.0	34 23.2	1.0 04	173.0	34 53.2	1.0 04	173.0	35 23.2	1.0 04	173.0
7	33 50.8	1.0 05	171.9	34 20.8	1.0 05	171.9	34 50.8	1.0 05	171.8	35 20.7	1.0 05	171.8
8	33 48.0	1.0 05	170.7	34 18.0	1.0 05	170.7	34 47.9	1.0 05	170.7	35 17.9	1.0 05	170.6
9	33 44.9	1.0 06	169.6	34 14.8	1.0 06	169.5	34 44.8	1.0 06	169.5	35 14.7	1.0 06	169.5
10	33 41.3	1.0 06	168.4	34 11.3	1.0 06	168.4	34 41.2	1.0 07	168.3	35 11.1	1.0 07	168.3
1	33 37.4	1.0 07	167.3	34 07.3	1.0 07	167.2	34 37.3	1.0 07	167.2	35 07.2	1.0 07	167.1
2	33 33.2	1.0 08	166.1	34 03.1	1.0 08	166.1	34 33.0	1.0 08	166.0	35 02.9	1.0 08	166.0
3	33 28.5	1.0 08	165.0	33 58.4	1.0 08	164.9	34 28.3	1.0 08	164.9	34 58.2	1.0 08	164.8
4	33 23.5	1.0 09	163.8	33 53.4	1.0 09	163.8	34 23.3	1.0 09	163.7	34 53.2	1.0 09	163.7
15	33 18.2	1.0 10	162.7	33 48.1	1.0 10	162.6	34 17.9	1.0 10	162.6	34 47.8	1.0 10	162.5
6	33 12.5	99 10	161.5	33 42.3	99 10	161.5	34 12.2	99 10	161.4	34 42.0	99 10	161.4
7	33 06.5	99 11	160.4	33 36.3	99 11	160.3	34 06.1	99 11	160.3	34 35.9	99 11	160.2
8	33 00.1	99 11	159.3	33 29.9	99 11	159.2	33 59.7	99 11	159.1	34 29.5	99 11	159.0
9	32 53.3	99 12	158.1	33 23.1	99 12	158.0	33 52.9	99 12	158.0	34 22.7	99 12	157.9
20	32 46.2	99 12	157.0	33 16.0	99 12	156.9	33 45.8	99 12	156.8	34 15.5	99 12	156.8
1	32 38.8	99 13	155.8	33 08.6	99 13	155.8	33 38.3	99 13	155.7	34 08.0	99 13	155.6
2	32 31.1	99 13	154.7	33 00.8	99 14	154.6	33 30.5	99 14	154.6	34 00.2	99 14	154.5
3	32 23.0	99 14	153.6	32 52.7	99 14	153.5	33 22.4	99 14	153.4	33 52.1	99 14	153.3
4	32 14.6	99 15	152.5	32 44.2	99 15	152.4	33 13.9	99 15	152.3	33 43.6	99 15	152.2
25	32 05.9	99 15	151.3	32 35.5	99 15	151.3	33 05.1	99 15	151.2	33 34.8	99 15	151.1
6	31 56.8	99 16	150.2	32 26.4	99 16	150.1	32 56.0	99 16	150.0	33 25.6	99 16	149.9
7	31 47.4	99 16	149.1	32 17.0	99 16	149.0	32 46.6	99 16	148.9	33 16.2	99 16	148.8
8	31 37.8	99 17	148.0	32 07.3	99 17	147.9	32 36.9	99 17	147.8	33 06.4	98 17	147.7
9	31 27.8	98 17	146.9	31 57.3	98 17	146.8	32 26.8	98 17	146.7	32 56.4	98 17	146.6
30	31 17.5	98 18	145.8	31 47.0	98 18	145.7	32 16.5	98 18	145.6	32 46.0	98 18	145.5
1	31 06.9	98 18	144.7	31 36.4	98 18	144.6	32 05.9	98 18	144.5	32 35.3	98 18	144.3
2	30 56.1	98 19	143.6	31 25.5	98 19	143.5	31 54.9	98 19	143.3	32 24.4	98 19	143.2
3	30 44.9	98 19	142.5	31 14.3	98 19	142.4	31 43.7	98 19	142.2	32 13.1	98 19	142.1
4	30 33.5	98 20	141.4	31 02.9	98 20	141.3	31 32.2	98 20	141.1	32 01.6	98 20	141.0
35	30 21.8	98 20	140.3	30 51.1	98 20	140.2	31 20.5	98 20	140.0	31 49.8	98 20	139.9
6	30 09.8	98 20	139.2	30 39.1	98 20	139.1	31 08.4	98 21	138.9	31 37.7	98 21	138.8
7	29 57.5	98 21	138.1	30 26.8	98 21	138.0	30 56.1	98 21	137.9	31 25.4	98 21	137.7
8	29 45.0	98 21	137.0	30 14.3	98 21	136.9	30 43.6	98 21	136.8	31 12.8	97 21	136.6
9	29 32.3	97 22	135.9	30 01.5	97 22	135.8	30 30.7	97 22	135.7	30 59.9	97 22	135.6
40	29 19.2	97 22	134.9	29 48.4	97 22	134.7	30 17.6	97 22	134.6	30 46.8	97 22	134.5
1	29 06.0	97 22	133.8	29 35.2	97 23	133.7	30 04.3	97 23	133.5	30 33.5	97 23	133.4
2	28 52.5	97 23	132.7	29 21.6	97 23	132.6	29 50.8	97 23	132.5	30 19.9	97 23	132.3
3	28 38.7	97 23	131.7	29 07.9	97 23	131.5	29 37.0	97 23	131.4	30 06.1	97 23	131.3
4	28 24.8	97 24	130.6	28 53.9	97 24	130.5	29 22.9	97 24	130.3	29 52.0	97 24	130.2
45	28 10.6	97 24	129.5	28 39.7	97 24	129.4	29 08.7	97 24	129.3	29 37.7	97 24	129.1
6	27 56.2	97 24	128.5	28 25.2	97 24	128.4	28 54.2	97 24	128.2	29 23.3	97 24	128.1
7	27 41.6	97 25	127.4	28 10.6	97 25	127.3	28 39.6	97 25	127.2	29 08.5	97 25	127.0
8	27 26.7	97 25	126.4	27 55.7	97 25	126.2	28 24.7	97 25	126.1	28 53.6	96 25	126.0
9	27 11.7	97 25	125.3	27 40.7	96 25	125.2	28 09.6	96 25	125.1	28 38.5	96 26	124.9
50	26 56.5	96 26	124.3	27 25.4	96 26	124.2	27 54.3	96 26	124.0	28 23.2	96 26	123.9
1	26 41.1	96 26	123.3	27 10.0	96 26	123.1	27 38.9	96 26	123.0	28 07.7	96 26	122.8
2	26 25.5	96 26	122.2	26 54.4	96 26	122.1	27 23.2	96 26	121.9	27 52.1	96 26	121.8
3	26 09.7	96 27	121.2	26 38.6	96 27	121.1	27 07.4	96 27	120.9	27 36.2	96 27	120.7
4	25 53.8	96 27	120.2	26 22.6	96 27	120.0	26 51.4	96 27	119.9	27 20.2	96 27	119.7
55	25 37.7	96 27	119.2	26 06.5	96 27	119.0	26 35.2	96 27	118.8	27 04.0	96 27	118.7
6	25 21.4	96 27	118.1	25 50.2	96 27	118.0	26 18.9	96 27	117.8	26 47.7	96 28	117.7
7	25 05.0	96 28	117.1	25 33.7	96 28	117.0	26 02.4	96 28	116.8	26 31.2	96 28	116.6
8	24 48.4	96 28	116.1	25 17.1	96 28	115.9	25 45.8	96 28	115.8	26 14.5	96 28	115.6
9	24 31.7	96 28	115.1	25 00.4	96 28	114.9	25 29.1	96 28	114.8	25 57.7	96 28	114.6
60	24 14.8	96 28	114.1	24 43.5	96 28	113.9	25 12.2	96 28	113.8	25 40.8	95 28	113.6
1	23 57.8	96 29	113.1	24 26.5	96 29	112.9	24 55.1	95 29	112.7	25 23.7	95 29	112.6
2	23 40.7	96 29	112.1	24 09.3	95 29	111.9	24 38.0	95 29	111.7	25 06.6	95 29	111.6
3	23 23.5	95 29	111.1	23 52.1	95 29	110.9	24 20.7	95 29	110.7	24 49.3	95 29	110.6
4	23 06.1	95 29	110.1	23 34.7	95 29	109.9	24 03.3	95 29	109.7	24 31.8	95 29	109.6
65	22 48.6	95 29	109.1	23 17.2	95 29	108.9	23 45.8	95 29	108.7	24 14.3	95 29	108.6
6	22 31.1	95 29	108.1	22 59.6	95 30	107.9	23 28.2	95 30	107.7	23 56.7	95 30	107.6
7	22 13.4	95 30	107.1	22 41.9	95 30	106.9	23 10.5	95 30	106.8	23 39.0	95 30	106.6
8	21 55.6	95 30	106.1	22 24.1	95 30	105.9	22 52.7	95 30	105.8	23 21.2	95 30	105.6
9	21 37.8	95 30	105.1	22 06.3	95 30	105.0	22 34.8	95 30	104.8	23 03.3	95 30	104.6
70	21 19.8	95 30	104.1	21 48.3	95 30	104.0	22 16.8	95 30	103.8	22 45.3	95 30	103.6
1	21 01.8	95 30	103.2	21 30.3	95 30	103.0	21 58.8	95 30	102.8	22 27.2	95 30	102.6
2	20 43.7	95 30	102.2	21 12.2	95 30	102.0	21 40.6	95 30	101.8	22 09.1	95 30	101.7
3	20 25.6	95 30	101.2	20 54.0	95 30	101.0	21 22.5	95 30	100.9	21 50.9	95 30	100.7
4	20 07.3	95 30	100.2	20 35.8	95 30	100.1	21 04.2	95 30	99.9	21 32.7	95 30	99.7
75	19 49.1	95 31	99.3	20 17.5	95 31	99.1	20 45.9	95 31	98.9	21 14.4	95 31	98.8
6	19 30.7	95 31	98.3	19 59.2	95 31	98.1	20 27.6	95 31	98.0	20 56.0	95 31	97.8
7	19 12.4	95 31	97.3	19 40.8	95 31	97.2	20 09.2	95 31	97.0	20 37.6	95 31	96.8
8	18 54.0	95 31	96.4	19 22.4	95 31	96.2	19 50.8	95 31	96.0	20 19.2	95 31	95.9
9	18 35.5	95 31	95.4	19 03.9	95 31	95.2	19 32.3	95 31	95.1	20 00.7	95 31	94.9
80	18 17.0	95 31	94.4	18 45.5	95 31	94.3	19 13.9	95 31	94.1	19 42.3	95 31	93.9
1	17 58.5	95 31	93.5	18 27.0	95 31	93.3	18 55.4	95 31	93.1	19 23.7	95 31	93.0
2	17 40.0	95 31	92.5	18 08.4	95 31	92.4	18 36.8	95 31	92.2	19 05.2	95 31	92.0
3	17 21.5	95 31	91.6	17 49.9	95 31	91.4	18 18.3	95 31	91.2	18 46.7	95 31	91.1
4	17 03.0	95 31	90.6	17 31.4	95 31	90.5	17 59.8	95 31	90.3	18 28.2	95 31	90.1
85	16 44.4	95 31	89.7	17 12.8	95 31	89.5	17 41.2	95 31	89.3	18 09.6	95 31	89.2
6	16 25.9	95 31	88.7	16 54.3	95 31	88.6	17 22.7	95 31	88.4	17 51.1	95 31	88.2
7	16 07.4	95 31	87.8	16 35.8	95 31	87.6	17 04.2	95 31	87.4	17 32.5	95 31	87.3
8	15 48.8	95 31	86.8	16 17.2	95 31	86.7	16 45.6	95 31	86.5	17 14.0	95 31	86.3
9	15 30.3	95 31	85.9	15 58.7	95 31	85.7	16 27.1	95 31	85.5	16 55.5	95 31	85.4
90	15 11.8	95 31	84.9	15 40.3	95 31	84.8	16 08.7	95 31	84.6	16 37.1	95 31	84.4

18° 00′			18° 30′			19° 00′			19° 30′			H.A.
Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
° ′		°	° ′		°	° ′		°	° ′		°	°
36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	00
35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8	1
35 59.2	1.0 02	177.6	36 29.2	1.0 02	177.6	36 59.2	1.0 02	177.6	37 29.2	1.0 02	177.6	2
35 58.3	1.0 02	176.5	36 28.3	1.0 02	176.5	36 58.3	1.0 02	176.4	37 28.3	1.0 02	176.4	3
35 57.0	1.0 03	175.3	36 26.9	1.0 03	175.3	36 56.9	1.0 03	175.3	37 26.9	1.0 03	175.2	4
35 55.2	1.0 03	174.1	36 25.2	1.0 04	174.1	36 55.2	1.0 04	174.1	37 25.2	1.0 04	174.1	05
35 53.2	1.0 04	173.0	36 23.1	1.0 04	172.9	36 53.1	1.0 04	172.9	37 23.1	1.0 04	172.9	6
35 50.7	1.0 05	171.8	36 20.7	1.0 05	171.8	36 50.6	1.0 05	171.7	37 20.6	1.0 05	171.7	7
35 47.9	1.0 05	170.6	36 17.8	1.0 05	170.6	36 47.8	1.0 05	170.5	37 17.7	1.0 05	170.5	8
35 44.6	1.0 06	169.4	36 14.6	1.0 06	169.4	36 44.5	1.0 06	169.4	37 14.5	1.0 06	169.3	9
35 41.1	1.0 07	168.3	36 11.0	1.0 07	168.2	36 40.9	1.0 07	168.2	37 10.9	1.0 07	168.1	10
35 37.1	1.0 07	167.1	36 07.0	1.0 07	167.1	36 37.0	1.0 07	167.0	37 06.9	1.0 07	167.0	1
35 32.8	1.0 08	165.9	36 02.7	1.0 08	165.9	36 32.6	1.0 08	165.8	37 02.5	1.0 08	165.8	2
35 28.1	1.0 08	164.8	35 58.0	1.0 08	164.7	36 27.9	1.0 08	164.7	36 57.8	1.0 08	164.6	3
35 23.0	1.0 09	163.6	35 52.9	1.0 09	163.6	36 22.8	1.0 09	163.5	36 52.7	1.0 09	163.4	4
35 17.6	1.0 10	162.4	35 47.5	1.0 10	162.4	36 17.3	1.0 10	162.3	36 47.2	1.0 10	162.3	15
35 11.9	99 10	161.3	35 41.7	99 10	161.2	36 11.5	99 10	161.2	36 41.4	99 10	161.1	6
35 05.7	99 11	160.1	35 35.6	99 11	160.1	36 05.4	99 11	160.0	36 35.2	99 11	159.9	7
34 59.3	99 11	159.0	35 29.1	99 11	158.9	35 58.8	99 11	158.8	36 28.6	99 11	158.8	8
34 52.4	99 12	157.8	35 22.2	99 12	157.8	35 52.0	99 12	157.7	36 21.7	99 12	157.6	9
34 45.3	99 12	156.7	35 15.0	99 13	156.6	35 44.8	99 13	156.5	36 14.5	99 13	156.4	20
34 37.8	99 13	155.5	35 07.5	99 13	155.4	35 37.2	99 13	155.4	36 06.9	99 13	155.3	1
34 29.9	99 14	154.4	34 59.6	99 14	154.3	35 29.3	99 14	154.2	35 59.0	99 14	154.1	2
34 21.7	99 14	153.2	34 51.4	99 14	153.2	35 21.1	99 14	153.1	35 50.7	99 14	153.0	3
34 13.2	99 15	152.1	34 42.9	99 15	152.0	35 12.5	99 15	151.9	35 42.2	99 15	151.8	4
34 04.4	99 15	151.0	34 34.0	99 15	150.9	35 03.6	99 15	150.8	35 33.2	99 15	150.7	25
33 55.2	99 16	149.8	34 24.8	99 16	149.7	34 54.4	99 16	149.6	35 24.0	99 16	149.5	6
33 45.8	99 16	148.7	34 15.3	99 16	148.6	34 44.9	99 16	148.5	35 14.4	99 16	148.4	7
33 36.0	98 17	147.6	34 05.5	98 17	147.5	34 35.0	98 17	147.4	35 04.6	98 17	147.3	8
33 25.9	98 17	146.5	33 55.4	98 17	146.4	34 24.9	98 17	146.2	34 54.4	98 17	146.1	9
33 15.5	98 18	145.3	33 45.0	98 18	145.2	34 14.4	98 18	145.1	34 43.9	98 18	145.0	30
33 04.8	98 18	144.2	33 34.2	98 18	144.1	34 03.7	98 18	144.0	34 33.1	98 18	143.9	1
32 53.8	98 19	143.1	33 23.2	98 19	143.0	33 52.6	98 19	142.9	34 22.1	98 19	142.8	2
32 42.5	98 19	142.0	33 11.9	98 19	141.9	33 41.3	98 19	141.8	34 10.7	98 19	141.6	3
32 31.0	98 20	140.9	33 00.3	98 20	140.8	33 29.7	98 20	140.7	33 59.0	98 20	140.5	4
32 19.2	98 20	139.8	32 48.5	98 20	139.7	33 17.8	98 20	139.5	33 47.1	98 20	139.4	35
32 07.0	98 21	138.7	32 36.3	98 21	138.6	33 05.6	98 21	138.4	33 34.9	98 21	138.3	6
31 54.7	98 21	137.6	32 23.9	98 21	137.5	32 53.2	98 21	137.3	33 22.5	97 21	137.2	7
31 42.0	97 21	136.5	32 11.3	97 22	136.4	32 40.5	97 22	136.2	33 09.7	97 22	136.1	8
31 29.2	97 22	135.4	31 58.4	97 22	135.3	32 27.6	97 22	135.2	32 56.8	97 22	135.0	9
31 16.0	97 22	134.3	31 45.2	97 22	134.2	32 14.4	97 22	134.1	32 43.5	97 22	133.9	40
31 02.6	97 23	133.3	31 31.8	97 23	133.1	32 00.9	97 23	133.0	32 30.0	97 23	132.8	1
30 49.0	97 23	132.2	31 18.1	97 23	132.0	31 47.2	97 23	131.9	32 16.3	97 23	131.8	2
30 35.2	97 23	131.1	31 04.2	97 24	131.0	31 33.3	97 24	130.8	32 02.4	97 24	130.7	3
30 21.1	97 24	130.0	30 50.1	97 24	129.9	31 19.2	97 24	129.7	31 48.2	97 24	129.6	4
30 06.8	97 24	129.0	30 35.8	97 24	128.8	31 04.8	97 24	128.7	31 33.8	97 24	128.5	45
29 52.3	97 25	127.9	30 21.2	97 25	127.8	30 50.2	97 25	127.6	31 19.2	97 25	127.5	6
29 37.5	96 25	126.9	30 06.5	97 25	126.7	30 35.4	96 25	126.6	31 04.4	96 25	126.4	7
29 22.6	96 25	125.8	29 51.5	96 25	125.6	30 20.4	96 25	125.5	30 49.4	96 25	125.3	8
29 07.4	96 26	124.7	29 36.4	96 26	124.6	30 05.3	96 26	124.4	30 34.1	96 26	124.3	9
28 52.1	96 26	123.7	29 21.0	96 26	123.5	29 49.9	96 26	123.4	30 18.7	96 26	123.2	50
28 36.6	96 26	122.7	29 05.5	96 26	122.5	29 34.3	96 26	122.3	30 03.1	96 26	122.2	1
28 20.9	96 26	121.7	28 49.7	96 26	121.5	29 18.5	96 27	121.3	29 47.3	96 27	121.1	2
28 05.0	96 27	120.6	28 33.8	96 27	120.4	29 02.6	96 27	120.3	29 31.4	96 27	120.1	3
27 49.0	96 27	119.5	28 17.7	96 27	119.4	28 46.5	96 27	119.2	29 15.3	96 27	119.1	4
27 32.8	96 27	118.5	28 01.5	96 27	118.4	28 30.2	96 27	118.2	28 59.0	96 27	118.0	55
27 16.4	96 28	117.5	27 45.1	96 28	117.3	28 13.8	96 28	117.2	28 42.5	96 28	117.0	6
26 59.9	96 28	116.5	27 28.6	96 28	116.3	27 57.3	96 28	116.1	28 25.9	96 28	116.0	7
26 43.2	96 28	115.4	27 11.9	96 28	115.3	27 40.5	96 28	115.1	28 09.2	95 28	115.0	8
26 26.4	96 28	114.4	26 55.0	95 28	114.3	27 23.7	95 28	114.1	27 52.3	95 28	113.9	9
26 09.4	95 28	113.4	26 38.1	95 28	113.3	27 06.7	95 29	113.1	27 35.3	95 29	112.9	60
25 52.4	95 29	112.4	26 21.0	95 29	112.2	26 49.6	95 29	112.1	27 18.2	95 29	111.9	1
25 35.2	95 29	111.4	26 03.8	95 29	111.2	26 32.3	95 29	111.1	27 00.9	95 29	110.9	2
25 17.8	95 29	110.4	25 46.4	95 29	110.2	26 15.0	95 29	110.1	26 43.5	95 29	109.9	3
25 00.4	95 29	109.4	25 29.0	95 29	109.2	25 57.5	95 29	109.1	26 26.0	95 29	108.9	4
24 42.9	95 29	108.4	25 11.4	95 29	108.2	25 39.9	95 29	108.1	26 08.4	95 30	107.9	65
24 25.2	95 30	107.4	24 53.7	95 30	107.2	25 22.2	95 30	107.1	25 50.7	95 30	106.9	6
24 07.5	95 30	106.4	24 36.0	95 30	106.2	25 04.5	95 30	106.1	25 33.0	95 30	105.9	7
23 49.7	95 30	105.4	24 18.1	95 30	105.3	24 46.6	95 30	105.1	25 15.1	95 30	104.9	8
23 31.7	95 30	104.4	24 00.2	95 30	104.3	24 28.7	95 30	104.1	24 57.1	95 30	103.9	9
23 13.8	95 30	103.5	23 42.2	95 30	103.3	24 10.7	95 30	103.1	24 39.1	95 30	102.9	70
22 55.7	95 30	102.5	23 24.1	95 30	102.3	23 52.6	95 30	102.1	24 21.0	95 30	102.0	1
22 37.5	95 30	101.5	23 06.0	95 30	101.3	23 34.4	95 30	101.2	24 02.8	95 30	101.0	2
22 19.3	95 30	100.5	22 47.8	95 30	100.4	23 16.2	95 30	100.2	23 44.6	95 30	100.0	3
22 01.1	95 30	99.6	22 29.5	95 31	99.4	22 57.9	95 31	99.2	23 26.3	95 31	99.0	4
21 42.8	95 31	98.6	22 11.2	95 31	98.4	22 39.6	95 31	98.2	23 08.0	95 31	98.1	75
21 24.4	95 31	97.6	21 52.8	95 31	97.4	22 21.2	95 31	97.3	22 49.6	95 31	97.1	6
21 06.0	95 31	96.6	21 34.4	95 31	96.5	22 02.8	95 31	96.3	22 31.2	95 31	96.1	7
20 47.6	95 31	95.7	21 16.0	95 31	95.5	21 44.3	95 31	95.3	22 12.7	95 31	95.2	8
20 29.1	95 31	94.7	20 57.5	95 31	94.5	21 25.9	95 31	94.4	21 54.2	95 31	94.2	9
20 10.6	95 31	93.8	20 39.0	95 31	93.6	21 07.4	95 31	93.4	21 35.7	94 31	93.2	80
19 52.1	95 31	92.8	20 20.5	95 31	92.6	20 48.9	95 31	92.5	21 17.2	94 31	92.3	1
19 33.6	95 31	91.8	20 02.0	95 31	91.7	20 30.3	95 31	91.5	20 58.7	94 31	91.3	2
19 15.1	95 31	90.9	19 43.4	95 31	90.7	20 11.8	95 31	90.5	20 40.1	94 31	90.4	3
18 56.5	95 31	89.9	19 24.9	95 31	89.8	19 53.3	95 31	89.6	20 21.6	94 31	89.4	4
18 38.0	95 31	89.0	19 06.4	95 31	88.8	19 34.7	95 31	88.6	20 03.1	94 31	88.5	85
18 19.5	95 31	88.0	18 47.8	95 31	87.9	19 16.2	95 31	87.7	19 44.5	94 31	87.5	6
18 00.9	95 31	87.1	18 29.3	95 31	86.9	18 57.7	95 31	86.8	19 26.0	94 31	86.6	7
17 42.4	95 31	86.2	18 10.8	95 31	86.0	18 39.2	95 31	85.8	19 07.5	95 31	85.6	8
17 23.9	95 31	85.2	17 52.3	95 31	85.0	18 20.7	95 31	84.9	18 49.0	95 31	84.7	9
17 05.5	95 31	84.3	17 33.9	95 31	84.1	18 02.2	95 31	83.9	18 30.6	95 31	83.8	90

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	14 53.4	95	31	84.0	15 21.8	95	31	83.8	15 50.2	95	31	83.7	16 18.6	95	31	83.5	16 47.0	95	31	83.3	17 15.4	95	31	83.2	17 43.8	95	31	83.0	18 12.2	95	31	82.8	91
2	14 35.0	95	31	83.1	15 03.4	95	31	82.9	15 31.8	95	31	82.7	16 00.2	95	31	82.6	16 28.6	95	31	82.4	16 57.0	95	31	82.2	17 25.4	95	31	82.0	17 53.8	95	31	81.9	2
3	14 16.6	95	31	82.1	14 45.0	95	31	81.9	15 13.4	95	31	81.8	15 41.9	95	31	81.6	16 10.3	95	31	81.4	16 38.7	95	30	81.3	17 07.1	95	30	81.1	17 35.5	95	30	80.9	3
4	13 58.2	95	30	81.2	14 26.7	95	30	81.0	14 55.1	95	30	80.8	15 23.6	95	30	80.7	15 52.0	95	30	80.5	16 20.4	95	30	80.3	16 48.8	95	30	80.2	17 17.2	95	30	80.0	4
95	13 39.9	95	30	80.2	14 08.4	95	30	80.1	14 36.8	95	30	79.9	15 05.3	95	30	79.7	15 33.7	95	30	79.6	16 02.1	95	30	79.4	16 30.5	95	30	79.2	16 59.0	95	30	79.1	95
6	13 21.7	95	30	79.3	13 50.2	95	30	79.1	14 18.6	95	30	79.0	14 47.1	95	30	78.8	15 15.5	95	30	78.6	15 43.9	95	30	78.5	16 12.4	95	30	78.3	16 40.8	95	30	78.1	6
7	13 03.5	95	30	78.4	13 32.0	95	30	78.2	14 00.4	95	30	78.0	14 28.9	95	30	77.9	14 57.4	95	30	77.7	15 25.8	95	30	77.5	15 54.2	95	30	77.4	16 22.7	95	30	77.2	7
8	12 45.4	95	30	77.4	13 13.9	95	30	77.3	13 42.3	95	30	77.1	14 10.8	95	30	76.9	14 39.3	95	30	76.8	15 07.7	95	30	76.6	15 36.2	95	30	76.4	16 04.6	95	30	76.3	8
9	12 27.3	95	30	76.5	12 55.8	95	30	76.3	13 24.3	95	30	76.2	13 52.8	95	30	76.0	14 21.3	95	30	75.8	14 49.7	95	30	75.7	15 18.2	95	30	75.5	15 46.6	95	30	75.3	9
100	12 09.3	95	30	75.6	12 37.8	95	30	75.4	13 06.3	95	30	75.2	13 34.8	95	30	75.1	14 03.3	95	30	74.9	14 31.8	95	30	74.7	15 00.3	95	30	74.6	15 28.7	95	30	74.4	100
1	11 51.4	95	30	74.6	12 19.9	95	30	74.5	12 48.4	95	30	74.3	13 17.0	95	30	74.1	13 45.5	95	30	74.0	14 14.0	95	30	73.8	14 42.4	95	30	73.7	15 10.9	95	30	73.5	1
2	11 33.6	95	30	73.7	12 02.1	95	30	73.5	12 30.6	95	30	73.4	12 59.2	95	30	73.2	13 27.7	95	30	73.0	13 56.2	95	29	72.9	14 24.7	95	29	72.7	14 53.2	95	29	72.6	2
3	11 15.8	95	29	72.8	11 44.4	95	29	72.6	12 12.9	95	29	72.4	12 41.5	95	29	72.3	13 10.0	95	29	72.1	13 38.5	95	29	72.0	14 07.0	95	29	71.8	14 35.6	95	29	71.6	3
4	10 58.2	95	29	71.8	11 26.7	95	29	71.7	11 55.3	95	29	71.5	12 23.8	95	29	71.3	12 52.4	95	29	71.2	13 20.9	95	29	71.0	13 49.5	95	29	70.9	14 18.0	95	29	70.7	4
105	10 40.6	95	29	70.9	11 09.2	95	29	70.7	11 37.8	95	29	70.6	12 06.3	95	29	70.4	12 34.9	95	29	70.3	13 03.4	95	29	70.1	13 32.0	95	29	69.9	14 00.6	95	29	69.8	105
6	10 23.1	95	29	70.0	10 51.7	95	29	69.8	11 20.3	95	29	69.6	11 48.9	95	29	69.5	12 17.5	95	29	69.3	12 46.1	95	29	69.2	13 14.6	95	29	69.0	13 43.2	95	29	68.9	6
7	10 05.8	95	29	69.0	10 34.4	95	29	68.9	11 03.0	95	29	68.7	11 31.6	95	29	68.6	12 00.2	95	29	68.4	12 28.8	95	29	68.3	12 57.4	95	29	68.1	13 26.0	95	29	67.9	7
8	9 48.5	95	29	68.1	10 17.1	95	29	67.9	10 45.8	95	28	67.8	11 14.4	95	28	67.6	11 43.0	95	28	67.5	12 11.6	95	28	67.3	12 40.2	95	28	67.2	13 08.8	95	28	67.0	8
9	9 31.4	96	28	67.2	10 00.0	95	28	67.0	10 28.7	95	28	66.9	10 57.3	95	28	66.7	11 25.9	95	28	66.6	11 54.6	95	28	66.4	12 23.2	95	28	66.3	12 51.8	95	28	66.1	9
110	9 14.3	96	28	66.2	9 43.0	96	28	66.1	10 11.7	96	28	65.9	10 40.3	96	28	65.8	11 09.0	96	28	65.6	11 37.6	96	28	65.5	12 06.3	95	28	65.3	12 34.9	95	28	65.2	110
1	8 57.4	96	28	65.3	9 26.1	96	28	65.1	9 54.8	96	28	65.0	10 23.5	96	28	64.9	10 52.2	96	28	64.7	11 20.8	96	28	64.6	11 49.5	96	28	64.4	12 18.2	96	28	64.3	1
2	8 40.6	96	28	64.4	9 09.4	96	28	64.2	9 38.1	96	28	64.1	10 06.8	96	28	63.9	10 35.5	96	28	63.8	11 04.2	96	28	63.6	11 32.9	96	28	63.5	12 01.5	96	28	63.3	2
3	8 24.0	96	28	63.4	8 52.7	96	28	63.3	9 21.5	96	27	63.1	9 50.2	96	27	63.0	10 18.9	96	27	62.9	10 47.6	96	27	62.7	11 16.3	96	27	62.6	11 45.0	96	27	62.4	3
4	8 07.5	96	27	62.5	8 36.2	96	27	62.4	9 05.0	96	27	62.2	9 33.7	96	27	62.1	10 02.5	96	27	61.9	10 31.2	96	27	61.8	10 59.9	96	27	61.6	11 28.7	96	27	61.5	4
115	7 51.1	96	27	61.6	8 19.9	96	27	61.4	8 48.6	96	27	61.3	9 17.4	96	27	61.1	9 46.2	96	27	61.0	10 14.9	96	27	60.9	10 43.7	96	27	60.7	11 12.5	96	27	60.6	115
6	7 34.9	96	27	60.6	8 03.7	96	27	60.5	8 32.5	96	27	60.4	9 01.3	96	27	60.2	9 30.0	96	27	60.1	9 58.8	96	27	59.9	10 27.6	96	27	59.8	10 56.4	96	27	59.6	6
7	7 18.8	96	27	59.7	7 47.6	96	27	59.6	8 16.4	96	26	59.4	8 45.2	96	26	59.3	9 14.0	96	26	59.2	9 42.9	96	26	59.0	10 11.7	96	26	58.9	10 40.5	96	26	58.7	7
8	7 02.8	96	26	58.8	7 31.7	96	26	58.6	8 00.5	96	26	58.5	8 29.4	96	26	58.4	8 58.2	96	26	58.2	9 27.0	96	26	58.1	9 55.9	96	26	57.9	10 24.7	96	26	57.8	8
9	6 47.1	96	26	57.9	7 15.9	96	26	57.7	7 44.8	96	26	57.6	8 13.7	96	26	57.4	8 42.5	96	26	57.3	9 11.4	96	26	57.2	9 40.2	96	26	57.0	10 09.1	96	26	56.9	9
120	6 31.5	96	26	56.9	7 00.3	96	26	56.8	7 29.2	96	26	56.6	7 58.1	96	26	56.5	8 27.0	96	26	56.4	8 55.9	96	26	56.2	9 24.8	96	26	56.1	9 53.6	96	25	56.0	120
1	6 16.0	96	25	56.0	6 44.9	96	25	55.9	7 13.8	96	25	55.7	7 42.7	96	25	55.6	8 11.6	96	25	55.4	8 40.5	96	25	55.3	9 09.5	96	25	55.2	9 38.3	96	25	55.0	1
2	6 00.7	96	25	55.1	6 29.7	96	25	54.9	6 58.6	96	25	54.8	7 27.5	96	25	54.7	7 56.5	96	25	54.5	8 25.4	96	25	54.4	8 54.3	96	25	54.3	9 23.2	96	25	54.1	2
3	5 45.6	97	25	54.1	6 14.6	97	25	54.0	6 43.5	97	25	53.9	7 12.5	97	25	53.7	7 41.4	97	25	53.6	8 10.4	97	25	53.5	8 39.4	97	25	53.3	9 08.3	96	25	53.2	3
4	5 30.7	97	25	53.2	5 59.7	97	25	53.1	6 28.6	97	24	52.9	6 57.6	97	24	52.8	7 26.6	97	24	52.7	7 55.6	97	24	52.5	8 24.6	97	24	52.4	8 53.5	97	24	52.3	4
125	5 15.9	97	24	52.3	5 44.9	97	24	52.1	6 13.9	97	24	52.0	6 43.0	97	24	51.9	7 12.0	97	24	51.7	7 41.0	97	24	51.6	8 10.0	97	24	51.5	8 39.0	97	24	51.4	125
6	5 01.4	97	24	51.3	5 30.4	97	24	51.2	5 59.4	97	24	51.1	6 28.5	97	24	50.9	6 57.5	97	24	50.8	7 26.5	97	24	50.7	7 55.6	97	24	50.6	8 24.6	97	24	50.4	6
7					5 16.0	97	24	50.3	5 45.1	97	24	50.1	6 14.2	97	24	50.0	6 43.2	97	23	49.9	7 12.3	97	23	49.8	7 41.3	97	23	49.6	8 10.4	97	23	49.5	7
8					5 01.9	97	23	49.3	5 31.0	97	23	49.2	6 00.1	97	23	49.1	6 29.1	97	23	49.0	6 58.2	97	23	48.8	7 27.3	97	23	48.7	7 56.4	97	23	48.6	8
9									5 17.0	97	23	48.3	5 46.1	97	23	48.2	6 15.3	97	23	48.0	6 44.4	97	23	47.9	7 13.5	97	23	47.8	7 42.6	97	23	47.7	9
130									5 03.3	97	23	47.3	5 32.4	97	23	47.2	6 01.6	97	22	47.1	6 30.7	97	22	47.0	6 59.8	97	22	46.9	7 29.0	97	22	46.7	130
1													5 18.9	97	22	46.3	5 48.1	97	22	46.2	6 17.3	97	22	46.1	6 46.4	97	22	45.9	7 15.6	97	22	45.8	1
2													5 05.6	97	22	45.4	5 34.8	97	22	45.2	6 04.0	97	22	45.1	6 33.2	97	22	45.0	7 02.4	97	22	44.9	2
3																	5 21.8	97	21	44.3	5 51.0	97	21	44.2	6 20.2	97	21	44.1	6 49.4	97	21	44.0	3
4																	5 08.9	97	21	43.4	5 38.2	97	21	43.3	6 07.4	97	21	43.2	6 36.6	97	21	43.0	4
135																					5 25.6	98	21	42.3	5 54.8	98	21	42.2	6 24.1	98	21	42.1	135
6																					5 13.2	98	20	41.4	5 42.5	98	20	41.3	6 11.8	98	20	41.2	6
7																					5 01.0	98	20	40.5	5 30.3	98	20	40.4	5 59.7	98	20	40.3	7
8																									5 18.4	98	19	39.5	5 47.8	98	19	39.3	8
9																									5 06.8	98	19	38.5	5 36.2	98	19	38.4	9
140																													5 24.8	98	19	37.5	140
1																													5 13.6	98	18	36.6	1
2																													5 02.7	98	18	35.6	2

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat 77

L 7

Lat. 72°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0
1	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8
2	37 59.2	1.0 02	177.6	38 29.2	1.0 02	177.6	38 59.2	1.0 02	177.6	39 29.2	1.0 02	177.6
3	37 58.3	1.0 02	176.4	38 28.3	1.0 02	176.4	38 58.3	1.0 02	176.4	39 28.2	1.0 02	176.4
4	37 56.9	1.0 03	175.2	38 26.9	1.0 03	175.2	38 56.9	1.0 03	175.2	39 26.9	1.0 03	175.2
05	37 55.2	1.0 04	174.0	38 25.2	1.0 04	174.0	38 55.1	1.0 04	174.0	39 25.1	1.0 04	174.0
6	37 53.1	1.0 04	172.9	38 23.0	1.0 04	172.8	38 53.0	1.0 04	172.8	39 23.0	1.0 04	172.8
7	37 50.6	1.0 05	171.7	38 20.5	1.0 05	171.6	38 50.5	1.0 05	171.6	39 20.5	1.0 05	171.6
8	37 47.7	1.0 05	170.5	38 17.6	1.0 05	170.4	38 47.6	1.0 05	170.4	39 17.6	1.0 05	170.4
9	37 44.4	1.0 06	169.3	38 14.4	1.0 06	169.2	38 44.3	1.0 06	169.2	39 14.3	1.0 06	169.2
10	37 40.8	1.0 07	168.1	38 10.7	1.0 07	168.1	38 40.7	1.0 07	168.0	39 10.6	1.0 07	168.0
1	37 36.8	1.0 07	166.9	38 06.7	1.0 07	166.9	38 36.6	1.0 07	166.8	39 06.5	1.0 07	166.8
2	37 32.4	1.0 08	165.7	38 02.3	1.0 08	165.7	38 32.2	1.0 08	165.6	39 02.1	1.0 08	165.6
3	37 27.6	1.0 09	164.6	37 57.5	1.0 09	164.5	38 27.4	1.0 09	164.4	38 57.3	1.0 09	164.4
4	37 22.5	1.0 09	163.4	37 52.4	1.0 09	163.3	38 22.3	1.0 09	163.3	38 52.1	1.0 09	163.2
15	37 17.0	99 10	162.2	37 46.9	99 10	162.1	38 16.7	99 10	162.1	38 46.6	99 10	162.0
6	37 11.2	99 10	161.0	37 41.0	99 10	161.0	38 10.8	99 10	160.9	38 40.7	99 10	160.8
7	37 05.0	99 11	159.9	37 34.8	99 11	159.8	38 04.6	99 11	159.7	38 34.4	99 11	159.6
8	36 58.4	99 12	158.7	37 28.2	99 12	158.6	37 58.0	99 12	158.5	38 27.8	99 12	158.5
9	36 51.5	99 12	157.5	37 21.3	99 12	157.4	37 51.0	99 12	157.4	38 20.8	99 12	157.3
20	36 44.2	99 13	156.4	37 14.0	99 13	156.3	37 43.7	99 13	156.2	38 13.4	99 13	156.1
1	36 36.6	99 13	155.2	37 06.4	99 13	155.1	37 36.1	99 13	155.0	38 05.8	99 13	154.9
2	36 28.7	99 14	154.0	36 58.4	99 14	153.9	37 28.1	99 14	153.9	37 57.7	99 14	153.8
3	36 20.4	99 14	152.9	36 50.1	99 14	152.8	37 19.7	99 14	152.7	37 49.4	99 14	152.6
4	36 11.8	99 15	151.7	36 41.4	99 15	151.6	37 11.1	99 15	151.5	37 40.7	99 15	151.4
25	36 02.8	99 15	150.6	36 32.4	99 16	150.5	37 02.0	99 16	150.4	37 31.6	99 16	150.3
6	35 53.6	99 16	149.4	36 23.2	99 16	149.3	36 52.7	99 16	149.2	37 22.3	99 16	149.1
7	35 44.0	98 16	148.3	36 13.5	98 17	148.2	36 43.1	98 17	148.1	37 12.6	98 17	148.0
8	35 34.1	98 17	147.2	36 03.6	98 17	147.0	36 33.1	98 17	146.9	37 02.6	98 17	146.8
9	35 23.9	98 18	146.0	35 53.4	98 18	145.9	36 22.8	98 18	145.8	36 52.3	98 18	145.7
30	35 13.4	98 18	144.9	35 42.8	98 18	144.8	36 12.3	98 18	144.7	36 41.7	98 18	144.5
1	35 02.6	98 18	143.8	35 32.0	98 19	143.6	36 01.4	98 19	143.5	36 30.8	98 19	143.4
2	34 51.5	98 19	142.6	35 20.8	98 19	142.5	35 50.2	98 19	142.4	36 19.6	98 19	142.3
3	34 40.1	98 19	141.5	35 09.4	98 20	141.4	35 38.8	98 20	141.3	36 08.1	98 20	141.1
4	34 28.4	98 20	140.4	34 57.7	98 20	140.3	35 27.0	98 20	140.1	35 56.3	98 20	140.0
35	34 16.4	98 20	139.3	34 45.7	98 20	139.2	35 15.0	98 20	139.0	35 44.3	98 21	138.9
6	34 04.2	98 21	138.2	34 33.5	98 21	138.0	35 02.7	98 21	137.9	35 32.0	97 21	137.8
7	33 51.7	97 21	137.1	34 20.9	97 21	136.9	34 50.2	97 21	136.8	35 19.4	97 21	136.7
8	33 38.9	97 22	136.0	34 08.1	97 22	135.8	34 37.3	97 22	135.7	35 06.5	97 22	135.6
9	33 25.9	97 22	134.9	33 55.1	97 22	134.7	34 24.3	97 22	134.6	34 53.4	97 22	134.5
40	33 12.7	97 22	133.8	33 41.8	97 23	133.6	34 10.9	97 23	133.5	34 40.0	97 23	133.4
1	32 59.2	97 23	132.7	33 28.3	97 23	132.6	33 57.4	97 23	132.4	34 26.4	97 23	132.3
2	32 45.4	97 23	131.6	33 14.5	97 23	131.5	33 43.6	97 23	131.3	34 12.6	97 23	131.2
3	32 31.4	97 24	130.5	33 00.5	97 24	130.4	33 29.5	97 24	130.2	33 58.5	97 24	130.1
4	32 17.2	97 24	129.5	32 46.2	97 24	129.3	33 15.2	97 24	129.1	33 44.2	97 24	129.0
45	32 02.8	97 24	128.4	32 31.8	97 24	128.2	33 00.7	97 24	128.1	33 29.7	97 25	127.9
6	31 48.2	97 25	127.3	32 17.1	96 25	127.2	32 46.1	96 25	127.0	33 15.0	96 25	126.8
7	31 33.3	96 25	126.2	32 02.2	96 25	126.1	32 31.1	96 25	125.9	33 00.0	96 25	125.8
8	31 18.3	96 25	125.2	31 47.1	96 25	125.0	32 16.0	96 26	124.9	32 44.9	96 26	124.7
9	31 03.0	96 26	124.1	31 31.9	96 26	124.0	32 00.7	96 26	123.8	32 29.6	96 26	123.6
50	30 47.6	96 26	123.1	31 16.4	96 26	122.9	31 45.2	96 26	122.7	32 14.0	96 26	122.6
1	30 31.9	96 26	122.0	31 00.7	96 26	121.9	31 29.5	96 26	121.7	31 58.3	96 26	121.5
2	30 16.1	96 27	121.0	30 44.9	96 27	120.8	31 13.7	96 27	120.6	31 42.4	96 27	120.5
3	30 00.1	96 27	119.9	30 28.9	96 27	119.8	30 57.6	96 27	119.6	31 26.4	96 27	119.4
4	29 44.0	96 27	118.9	30 12.7	96 27	118.7	30 41.4	96 27	118.6	31 10.1	96 27	118.4
55	29 27.7	96 27	117.9	29 56.4	96 28	117.7	30 25.1	96 28	117.5	30 53.7	96 28	117.4
6	29 11.2	96 28	116.8	29 39.9	96 28	116.7	30 08.5	96 28	116.5	30 37.2	95 28	116.3
7	28 54.6	96 28	115.8	29 23.2	95 28	115.6	29 51.9	95 28	115.5	30 20.5	95 28	115.3
8	28 37.8	96 28	114.8	29 06.5	95 28	114.6	29 35.1	95 28	114.4	30 03.7	95 28	114.3
9	28 20.9	95 28	113.8	28 49.5	95 28	113.6	29 18.1	95 28	113.4	29 46.7	95 28	113.2
60	28 03.9	95 29	112.7	28 32.5	95 29	112.6	29 01.0	95 29	112.4	29 29.6	95 29	112.2
1	27 46.7	95 29	111.7	28 15.3	95 29	111.6	28 43.8	95 29	111.4	29 12.4	95 29	111.2
2	27 29.4	95 29	110.7	27 58.0	95 29	110.5	28 26.5	95 29	110.4	28 55.0	95 29	110.2
3	27 12.0	95 29	109.7	27 40.6	95 29	109.5	28 09.1	95 29	109.4	28 37.6	95 29	109.2
4	26 54.5	95 29	108.7	27 23.0	95 29	108.5	27 51.5	95 29	108.4	28 20.0	95 29	108.2
65	26 36.9	95 30	107.7	27 05.4	95 30	107.5	27 33.9	95 30	107.4	28 02.3	95 30	107.2
6	26 19.2	95 30	106.7	26 47.7	95 30	106.5	27 16.1	95 30	106.4	27 44.6	95 30	106.2
7	26 01.4	95 30	105.7	26 29.9	95 30	105.5	26 58.3	95 30	105.4	27 26.7	95 30	105.2
8	25 43.5	95 30	104.7	26 12.0	95 30	104.6	26 40.4	95 30	104.4	27 08.8	95 30	104.2
9	25 25.6	95 30	103.7	25 54.0	95 30	103.6	26 22.4	95 30	103.4	26 50.8	95 30	103.2
70	25 07.5	95 30	102.8	25 35.9	95 30	102.6	26 04.3	95 30	102.4	26 32.7	95 30	102.2
1	24 49.4	95 30	101.8	25 17.8	95 30	101.6	25 46.2	95 30	101.4	26 14.5	95 30	101.2
2	24 31.2	95 30	100.8	24 59.6	95 30	100.6	25 28.0	95 30	100.4	25 56.3	95 30	100.3
3	24 13.0	95 30	99.8	24 41.3	95 31	99.6	25 09.7	95 31	99.5	25 38.1	94 31	99.3
4	23 54.7	95 31	98.9	24 23.0	95 31	98.7	24 51.4	94 31	98.5	25 19.7	94 31	98.3
75	23 36.3	95 31	97.9	24 04.7	95 31	97.7	24 33.0	94 31	97.5	25 01.4	94 31	97.3
6	23 17.9	95 31	96.9	23 46.3	94 31	96.7	24 14.6	94 31	96.6	24 43.0	94 31	96.4
7	22 59.5	94 31	95.9	23 27.9	94 31	95.8	23 56.2	94 31	95.6	24 24.5	94 31	95.4
8	22 41.1	94 31	95.0	23 09.4	94 31	94.8	23 37.7	94 31	94.6	24 06.0	94 31	94.4
9	22 22.6	94 31	94.0	22 50.9	94 31	93.8	23 19.2	94 31	93.7	23 47.5	94 31	93.5
80	22 04.1	94 31	93.1	22 32.4	94 31	92.9	23 00.7	94 31	92.7	23 29.0	94 31	92.5
1	21 45.5	94 31	92.1	22 13.9	94 31	91.9	22 42.2	94 31	91.7	23 10.5	94 31	91.6
2	21 27.0	94 31	91.2	21 55.3	94 31	91.0	22 23.7	94 31	90.8	22 52.0	94 31	90.6
3	21 08.5	94 31	90.2	21 36.8	94 31	90.0	22 05.1	94 31	89.8	22 33.4	94 31	89.7
4	20 49.9	94 31	89.2	21 18.3	94 31	89.1	21 46.6	94 31	88.9	22 14.9	94 31	88.7
85	20 31.4	94 31	88.3	20 59.7	94 31	88.1	21 28.0	94 31	87.9	21 56.4	94 31	87.8
6	20 12.9	94 31	87.4	20 41.2	94 31	87.2	21 09.5	94 31	87.0	21 37.8	94 31	86.8
7	19 54.4	94 31	86.4	20 22.7	94 31	86.2	20 51.0	94 31	86.1	21 19.3	94 31	85.9
8	19 35.9	94 31	85.5	20 04.2	94 31	85.3	20 32.5	94 31	85.1	21 00.8	94 31	84.9
9	19 17.4	94 31	84.5	19 45.7	94 31	84.3	20 14.1	94 31	84.2	20 42.4	94 31	84.0
90	18 59.0	95 31	83.6	19 27.3	94 31	83.4	19 55.6	94 31	83.2	20 24.0	94 31	83.1

H.A.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	41 00.0	1.0 00	180.0	41 30.0	1.0 00	180.0	00
1	39 59.8	1.0 01	178.8	40 29.8	1.0 01	178.8	40 59.8	1.0 01	178.8	41 29.8	1.0 01	178.8	1
2	39 59.2	1.0 02	177.6	40 29.2	1.0 02	177.6	40 59.2	1.0 02	177.6	41 29.2	1.0 02	177.6	2
3	39 58.2	1.0 02	176.4	40 28.2	1.0 02	176.4	40 58.2	1.0 02	176.3	41 28.2	1.0 02	176.3	3
4	39 56.9	1.0 03	175.2	40 26.9	1.0 03	175.1	40 56.8	1.0 03	175.1	41 26.8	1.0 03	175.1	4
05	39 55.1	1.0 04	174.0	40 25.1	1.0 04	173.9	40 55.1	1.0 04	173.9	41 25.1	1.0 04	173.9	05
6	39 53.0	1.0 04	172.7	40 22.9	1.0 04	172.7	40 52.9	1.0 04	172.7	41 22.9	1.0 04	172.7	6
7	39 50.4	1.0 05	171.5	40 20.4	1.0 05	171.5	40 50.4	1.0 05	171.5	41 20.3	1.0 05	171.4	7
8	39 47.5	1.0 06	170.3	40 17.5	1.0 06	170.3	40 47.4	1.0 06	170.3	41 17.4	1.0 06	170.2	8
9	39 44.2	1.0 06	169.1	40 14.1	1.0 06	169.1	40 44.1	1.0 06	169.0	41 14.0	1.0 06	169.0	9
10	39 40.5	1.0 07	167.9	40 10.4	1.0 07	167.9	40 40.4	1.0 07	167.8	41 10.3	1.0 07	167.8	10
1	39 36.4	1.0 07	166.7	40 06.4	1.0 07	166.7	40 36.3	1.0 07	166.6	41 06.2	1.0 07	166.6	1
2	39 32.0	1.0 08	165.5	40 01.9	1.0 08	165.5	40 31.8	1.0 08	165.4	41 01.7	1.0 08	165.4	2
3	39 27.2	1.0 09	164.3	39 57.1	1.0 09	164.3	40 26.9	1.0 09	164.2	40 56.8	1.0 09	164.1	3
4	39 22.0	1.0 09	163.1	39 51.8	1.0 09	163.1	40 21.7	1.0 09	163.0	40 51.6	1.0 09	162.9	4
15	39 16.4	99 10	161.9	39 46.3	99 10	161.9	40 16.1	99 10	161.8	40 45.9	99 10	161.7	15
6	39 10.5	99 10	160.8	39 40.3	99 11	160.7	40 10.1	99 11	160.6	40 39.9	99 11	160.5	6
7	39 04.2	99 11	159.6	39 34.0	99 11	159.5	40 03.8	99 11	159.4	40 33.6	99 11	159.3	7
8	38 57.5	99 12	158.4	39 27.3	99 12	158.3	39 57.1	99 12	158.2	40 26.8	99 11	158.1	8
9	38 50.5	99 12	157.2	39 20.3	99 12	157.1	39 50.0	99 12	157.0	40 19.8	99 12	156.9	9
20	38 43.2	99 13	156.0	39 12.9	99 13	155.9	39 42.6	99 13	155.8	40 12.3	99 13	155.8	20
1	38 35.5	99 13	154.8	39 05.2	99 13	154.8	39 34.8	99 14	154.7	40 04.5	99 14	154.6	1
2	38 27.4	99 14	153.7	38 57.1	99 14	153.6	39 26.7	99 14	153.5	39 56.4	99 14	153.4	2
3	38 19.0	99 15	152.5	38 48.7	99 15	152.4	39 18.3	99 15	152.3	39 47.9	99 15	152.2	3
4	38 10.3	99 15	151.3	38 39.9	99 15	151.2	39 09.5	99 15	151.1	39 39.1	99 15	151.0	4
25	38 01.2	99 16	150.2	38 30.8	99 16	150.1	39 00.4	99 16	150.0	39 30.0	99 16	149.8	25
6	37 51.8	99 16	149.0	38 21.4	98 16	148.9	38 50.9	98 16	148.8	39 20.5	98 16	148.7	6
7	37 42.1	98 17	147.9	38 11.7	98 17	147.7	38 41.2	98 17	147.6	39 10.7	98 17	147.5	7
8	37 32.1	98 17	146.7	38 01.6	98 17	146.6	38 31.1	98 17	146.5	39 00.6	98 17	146.4	8
9	37 21.8	98 18	145.6	37 51.2	98 18	145.4	38 20.7	98 18	145.3	38 50.1	98 18	145.2	9
30	37 11.1	98 18	144.4	37 40.6	98 18	144.3	38 10.0	98 18	144.2	38 39.4	98 18	144.0	30
1	37 00.2	98 19	143.3	37 29.6	98 19	143.2	37 59.0	98 19	143.0	38 28.4	98 19	142.9	1
2	36 49.0	98 19	142.1	37 18.3	98 19	142.0	37 47.7	98 19	141.9	38 17.0	98 19	141.7	2
3	36 37.5	98 20	141.0	37 06.8	98 20	140.9	37 36.1	98 20	140.7	38 05.4	98 20	140.6	3
4	36 25.6	98 20	139.9	36 54.9	98 20	139.7	37 24.2	98 20	139.6	37 53.5	98 20	139.5	4
35	36 13.6	98 21	138.8	36 42.8	98 21	138.6	37 12.1	97 21	138.5	37 41.3	97 21	138.3	35
6	36 01.2	97 21	137.6	36 30.4	97 21	137.5	36 59.6	97 21	137.4	37 28.9	97 21	137.2	6
7	35 48.6	97 22	136.5	36 17.8	97 22	136.4	36 47.0	97 22	136.2	37 16.1	97 22	136.1	7
8	35 35.7	97 22	135.4	36 04.9	97 22	135.3	36 34.0	97 22	135.1	37 03.1	97 22	135.0	8
9	35 22.5	97 22	134.3	35 51.7	97 22	134.2	36 20.8	97 22	134.0	36 49.9	97 22	133.9	9
40	35 09.2	97 23	133.2	35 38.2	97 23	133.1	36 07.3	97 23	132.9	36 36.4	97 23	132.7	40
1	34 55.5	97 23	132.1	35 24.6	97 23	132.0	35 53.6	97 23	131.8	36 22.7	97 23	131.6	1
2	34 41.6	97 24	131.0	35 10.7	97 24	130.9	35 39.7	97 24	130.7	36 08.7	97 24	130.5	2
3	34 27.5	97 24	129.9	34 56.5	97 24	129.8	35 25.5	97 24	129.6	35 54.5	97 24	129.4	3
4	34 13.2	97 24	128.8	34 42.2	97 24	128.7	35 11.1	96 24	128.5	35 40.1	96 24	128.4	4
45	33 58.7	96 25	127.8	34 27.6	96 25	127.6	34 56.5	96 25	127.4	35 25.4	96 25	127.3	45
6	33 43.9	96 25	126.7	34 12.8	96 25	126.5	34 41.7	96 25	126.4	35 10.6	96 25	126.2	6
7	33 28.9	96 25	125.6	33 57.8	96 25	125.4	34 26.6	96 25	125.3	34 55.5	96 25	125.1	7
8	33 13.7	96 26	124.5	33 42.6	96 26	124.4	34 11.4	96 26	124.2	34 40.2	96 26	124.0	8
9	32 58.4	96 26	123.5	33 27.2	96 26	123.3	33 56.0	96 26	123.1	34 24.8	96 26	123.0	9
50	32 42.8	96 26	122.4	33 11.6	96 26	122.2	33 40.4	96 26	122.1	34 09.1	96 26	121.9	50
1	32 27.1	96 27	121.4	32 55.8	96 27	121.2	33 24.6	96 27	121.0	33 53.3	96 27	120.8	1
2	32 11.2	96 27	120.3	32 39.9	96 27	120.1	33 08.6	96 27	120.0	33 37.3	96 27	119.8	2
3	31 55.1	96 27	119.3	32 23.8	96 27	119.1	32 52.4	96 27	118.9	33 21.1	96 27	118.7	3
4	31 38.8	96 27	118.2	32 07.5	96 27	118.0	32 36.1	95 27	117.9	33 04.8	95 28	117.7	4
55	31 22.4	96 28	117.2	31 51.0	95 28	117.0	32 19.7	95 28	116.8	32 48.3	95 28	116.7	55
6	31 05.8	95 28	116.1	31 34.4	95 28	116.0	32 03.0	95 28	115.8	32 31.6	95 28	115.6	6
7	30 49.1	95 28	115.1	31 17.7	95 28	114.9	31 46.3	95 28	114.8	32 14.8	95 28	114.6	7
8	30 32.2	95 28	114.1	31 00.8	95 28	113.9	31 29.4	95 28	113.7	31 57.9	95 28	113.5	8
9	30 15.3	95 29	113.1	30 43.8	95 29	112.9	31 12.3	95 29	112.7	31 40.9	95 29	112.5	9
60	29 58.1	95 29	112.0	30 26.7	95 29	111.9	30 55.2	95 29	111.7	31 23.7	95 29	111.5	60
1	29 40.9	95 29	111.0	30 09.4	95 29	110.8	30 37.9	95 29	110.7	31 06.4	95 29	110.5	1
2	29 23.5	95 29	110.0	29 52.0	95 29	109.8	30 20.5	95 29	109.7	30 48.9	95 29	109.5	2
3	29 06.0	95 29	109.0	29 34.5	95 29	108.8	30 03.0	95 29	108.6	30 31.4	95 29	108.5	3
4	28 48.5	95 29	108.0	29 16.9	95 30	107.8	29 45.3	95 30	107.6	30 13.8	95 30	107.5	4
65	28 30.8	95 30	107.0	28 59.2	95 30	106.8	29 27.6	95 30	106.6	29 56.0	95 30	106.4	65
6	28 13.0	95 30	106.0	28 41.4	95 30	105.8	29 09.8	95 30	105.6	29 38.2	95 30	105.4	6
7	27 55.1	95 30	105.0	28 23.5	95 30	104.8	28 51.9	95 30	104.6	29 20.3	95 30	104.5	7
8	27 37.2	95 30	104.0	28 05.6	95 30	103.8	28 33.9	95 30	103.6	29 02.3	94 30	103.5	8
9	27 19.2	95 30	103.0	27 47.5	95 30	102.8	28 15.9	94 30	102.7	28 44.2	94 30	102.5	9
70	27 01.1	95 30	102.0	27 29.4	94 30	101.9	27 57.8	94 30	101.7	28 26.1	94 30	101.5	70
1	26 42.9	94 30	101.1	27 11.2	94 30	100.9	27 39.6	94 30	100.7	28 07.9	94 30	100.5	1
2	26 24.7	94 30	100.1	26 53.0	94 30	99.9	27 21.3	94 30	99.7	27 49.6	94 30	99.5	2
3	26 06.4	94 31	99.1	26 34.7	94 31	98.9	27 03.0	94 31	98.7	27 31.3	94 31	98.5	3
4	25 48.1	94 31	98.1	26 16.4	94 31	97.9	26 44.7	94 31	97.8	27 13.0	94 31	97.6	4
75	25 29.7	94 31	97.2	25 58.0	94 31	97.0	26 26.3	94 31	96.8	26 54.6	94 31	96.6	75
6	25 11.3	94 31	96.2	25 39.6	94 31	96.0	26 07.8	94 31	95.8	26 36.1	94 31	95.6	6
7	24 52.8	94 31	95.2	25 21.1	94 31	95.0	25 49.4	94 31	94.9	26 17.7	94 31	94.7	7
8	24 34.3	94 31	94.3	25 02.6	94 31	94.1	25 30.9	94 31	93.9	25 59.2	94 31	93.7	8
9	24 15.8	94 31	93.3	24 44.1	94 31	93.1	25 12.4	94 31	92.9	25 40.7	94 31	92.7	9
80	23 57.3	94 31	92.3	24 25.6	94 31	92.2	24 53.9	94 31	92.0	25 22.1	94 31	91.8	80
1	23 38.8	94 31	91.4	24 07.1	94 31	91.2	24 35.3	94 31	91.0	25 03.6	94 31	90.8	1
2	23 20.2	94 31	90.4	23 48.5	94 31	90.3	24 16.8	94 31	90.1	24 45.0	94 31	89.9	2
3	23 01.7	94 31	89.5	23 30.0	94 31	89.3	23 58.3	94 31	89.1	24 26.5	94 31	88.9	3
4	22 43.2	94 31	88.5	23 11.5	94 31	88.4	23 39.7	94 31	88.2	24 08.0	94 31	88.0	4
85	22 24.6	94 31	87.6	22 52.9	94 31	87.4	23 21.2	94 31	87.2	23 49.5	94 31	87.0	85
6	22 06.1	94 31	86.6	22 34.4	94 31	86.5	23 02.7	94 31	86.3	23 30.9	94 31	86.1	6
7	21 47.6	94 31	85.7	22 15.9	94 31	85.5	22 44.2	94 31	85.3	23 12.5	94 31	85.2	7
8	21 29.1	94 31	84.8	21 57.4	94 31	84.6	22 25.7	94 31	84.4	22 54.0	94 31	84.2	8
9	21 10.7	94 31	83.8	21 39.0	94 31	83.6	22 07.3	94 31	83.5	22 35.6	94 31	83.3	9
90	20 52.3	94 31	82.9	21 20.6	94 31	82.7	21 48.9	94 31	82.5	22 17.2	94 31	82.3	90

Lat. 72°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	18 40.5	95	31	82.6	19 08.9	95	31	82.5	19 37.2	94	31	82.3	20 05.6	94	31	82.1	20 33.9	94	31	81.9	21 02.2	94	31	81.8	21 30.5	94	31	81.6	21 58.8	94	31	81.4	91
2	18 22.2	95	31	81.7	18 50.5	95	31	81.5	19 18.9	94	31	81.4	19 47.2	94	30	81.2	20 15.6	94	30	81.0	20 43.9	94	30	80.8	21 12.2	94	30	80.7	21 40.5	94	30	80.5	2
3	18 03.9	95	30	80.8	18 32.2	95	30	80.6	19 00.6	95	30	80.4	19 28.9	94	30	80.3	19 57.3	94	30	80.1	20 25.6	94	30	79.9	20 53.9	94	30	79.7	21 22.2	94	30	79.6	3
4	17 45.6	95	30	79.8	18 14.0	95	30	79.7	18 42.3	95	30	79.5	19 10.7	95	30	79.3	19 39.0	94	30	79.2	20 07.4	94	30	79.0	20 35.7	94	30	78.8	21 04.0	94	30	78.6	4
95	17 27.4	95	30	78.9	17 55.7	95	30	78.7	18 24.1	95	30	78.6	18 52.5	95	30	78.4	19 20.9	95	30	78.2	19 49.2	94	30	78.0	20 17.6	94	30	77.9	20 45.9	94	30	77.7	95
6	17 09.2	95	30	78.0	17 37.6	95	30	77.8	18 06.0	95	30	77.6	18 34.4	95	30	77.5	19 02.7	95	30	77.3	19 31.1	95	30	77.1	19 59.5	95	30	76.9	20 27.8	94	30	76.8	6
7	16 51.1	95	30	77.0	17 19.5	95	30	76.9	17 47.9	95	30	76.7	18 16.3	95	30	76.5	18 44.7	95	30	76.4	19 13.1	95	30	76.2	19 41.4	95	30	76.0	20 09.8	95	30	75.8	7
8	16 33.1	95	30	76.1	17 01.5	95	30	75.9	17 29.9	95	30	75.8	17 58.3	95	30	75.6	18 26.7	95	30	75.4	18 55.1	95	30	75.3	19 23.5	95	30	75.1	19 51.9	95	30	74.9	8
9	16 15.1	95	30	75.2	16 43.5	95	30	75.0	17 12.0	95	30	74.9	17 40.4	95	30	74.7	18 08.8	95	30	74.5	18 37.2	95	30	74.3	19 05.6	95	30	74.2	19 34.0	95	30	74.0	9
100	15 57.2	95	30	74.3	16 25.7	95	30	74.1	16 54.1	95	30	73.9	17 22.5	95	30	73.8	17 51.0	95	30	73.6	18 19.4	95	30	73.4	18 47.8	95	30	73.3	19 16.2	95	30	73.1	100
1	15 39.4	95	30	73.3	16 07.9	95	30	73.2	16 36.3	95	29	73.0	17 04.8	95	29	72.8	17 33.2	95	29	72.7	18 01.7	95	29	72.5	18 30.1	95	29	72.3	18 58.5	95	29	72.2	1
2	15 21.7	95	29	72.4	15 50.2	95	29	72.2	16 18.6	95	29	72.1	16 47.1	95	29	71.9	17 15.6	95	29	71.7	17 44.0	95	29	71.6	18 12.5	95	29	71.4	18 40.9	95	29	71.2	2
3	15 04.1	95	29	71.5	15 32.6	95	29	71.3	16 01.1	95	29	71.2	16 29.5	95	29	71.0	16 58.0	95	29	70.8	17 26.5	95	29	70.7	17 55.0	95	29	70.5	18 23.4	95	29	70.3	3
4	14 46.5	95	29	70.6	15 15.0	95	29	70.4	15 43.6	95	29	70.2	16 12.1	95	29	70.1	16 40.6	95	29	69.9	17 09.0	95	29	69.7	17 37.5	95	29	69.6	18 06.0	95	29	69.4	4
105	14 29.1	95	29	69.6	14 57.6	95	29	69.5	15 26.2	95	29	69.3	15 54.7	95	29	69.2	16 23.2	95	29	69.0	16 51.7	95	29	68.8	17 20.2	95	29	68.7	17 48.7	95	29	68.5	105
6	14 11.8	95	29	68.7	14 40.3	95	29	68.5	15 08.9	95	29	68.4	15 37.4	95	29	68.2	16 05.9	95	29	68.1	16 34.5	95	29	67.9	17 03.0	95	28	67.7	17 31.5	95	28	67.6	6
7	13 54.5	95	29	67.8	14 23.1	95	28	67.6	14 51.7	95	28	67.5	15 20.2	95	28	67.3	15 48.8	95	28	67.2	16 17.3	95	28	67.0	16 45.9	95	28	66.8	17 14.4	95	28	66.7	7
8	13 37.4	95	28	66.9	14 06.0	95	28	66.7	14 34.6	95	28	66.6	15 03.2	95	28	66.4	15 31.8	95	28	66.2	16 00.3	95	28	66.1	16 28.9	95	28	65.9	16 57.4	95	28	65.8	8
9	13 20.4	95	28	65.9	13 49.1	95	28	65.8	14 17.7	95	28	65.6	14 46.3	95	28	65.5	15 14.9	95	28	65.3	15 43.4	95	28	65.2	16 12.0	95	28	65.0	16 40.6	95	28	64.8	9
110	13 03.6	95	28	65.0	13 32.2	95	28	64.9	14 00.8	95	28	64.7	14 29.5	95	28	64.6	14 58.1	95	28	64.4	15 26.7	95	28	64.2	15 55.3	95	28	64.1	16 23.9	95	28	63.9	110
1	12 46.8	96	28	64.1	13 15.5	96	28	63.9	13 44.1	95	28	63.8	14 12.8	95	28	63.6	14 41.4	95	28	63.5	15 10.0	95	28	63.3	15 38.7	95	27	63.2	16 07.3	95	27	63.0	1
2	12 30.2	96	27	63.2	12 58.9	96	27	63.0	13 27.6	96	27	62.9	13 56.2	96	27	62.7	14 24.9	96	27	62.6	14 53.5	96	27	62.4	15 22.2	95	27	62.3	15 50.8	95	27	62.1	2
3	12 13.7	96	27	62.3	12 42.4	96	27	62.1	13 11.1	96	27	62.0	13 39.8	96	27	61.8	14 08.5	96	27	61.7	14 37.2	96	27	61.5	15 05.9	96	27	61.4	15 34.5	96	27	61.2	3
4	11 57.4	96	27	61.3	12 26.1	96	27	61.2	12 54.8	96	27	61.0	13 23.6	96	27	60.9	13 52.3	96	27	60.7	14 21.0	96	27	60.6	14 49.7	96	27	60.4	15 18.3	96	27	60.3	4
115	11 41.2	96	27	60.4	12 09.9	96	27	60.3	12 38.7	96	27	60.1	13 07.4	96	27	60.0	13 36.2	96	27	59.8	14 04.9	96	27	59.7	14 33.6	96	27	59.5	15 02.3	96	26	59.4	115
6	11 25.2	96	26	59.5	11 53.9	96	26	59.4	12 22.7	96	26	59.2	12 51.4	96	26	59.1	13 20.2	96	26	58.9	13 48.9	96	26	58.8	14 17.7	96	26	58.6	14 46.4	96	26	58.5	6
7	11 09.3	96	26	58.6	11 38.0	96	26	58.4	12 06.8	96	26	58.3	12 35.6	96	26	58.2	13 04.4	96	26	58.0	13 33.2	96	26	57.9	14 01.9	96	26	57.7	14 30.7	96	26	57.6	7
8	10 53.5	96	26	57.7	11 22.3	96	26	57.5	11 51.1	96	26	57.4	12 19.9	96	26	57.2	12 48.7	96	26	57.1	13 17.5	96	26	56.9	13 46.3	96	26	56.8	14 15.1	96	26	56.7	8
9	10 37.9	96	26	56.7	11 06.8	96	26	56.6	11 35.6	96	26	56.5	12 04.4	96	26	56.3	12 33.3	96	26	56.2	13 02.1	96	25	56.0	13 30.9	96	25	55.9	13 59.7	96	25	55.8	9
120	10 22.5	96	25	55.8	10 51.4	96	25	55.7	11 20.2	96	25	55.5	11 49.1	96	25	55.4	12 17.9	96	25	55.3	12 46.8	96	25	55.1	13 15.6	96	25	55.0	13 44.5	96	25	54.8	120
1	10 07.2	96	25	54.9	10 36.1	96	25	54.8	11 05.0	96	25	54.6	11 33.9	96	25	54.5	12 02.8	96	25	54.4	12 31.7	96	25	54.2	13 00.5	96	25	54.1	13 29.4	96	25	53.9	1
2	9 52.2	96	25	54.0	10 21.1	96	25	53.9	10 50.0	96	25	53.7	11 18.9	96	25	53.6	11 47.8	96	25	53.4	12 16.7	96	25	53.3	12 45.6	96	25	53.2	13 14.5	96	25	53.0	2
3	9 37.3	96	25	53.1	10 06.2	96	25	52.9	10 35.1	96	24	52.8	11 04.1	96	24	52.7	11 33.0	96	24	52.5	12 01.9	96	24	52.4	12 30.9	96	24	52.3	12 59.8	96	24	52.1	3
4	9 22.5	97	24	52.1	9 51.5	97	24	52.0	10 20.5	97	24	51.9	10 49.4	97	24	51.8	11 18.4	97	24	51.6	11 47.3	97	24	51.5	12 16.3	97	24	51.4	12 45.2	96	24	51.2	4
125	9 08.0	97	24	51.2	9 37.0	97	24	51.1	10 06.0	97	24	51.0	10 35.0	97	24	50.8	11 03.9	97	24	50.7	11 32.9	97	24	50.6	12 01.9	97	24	50.4	12 30.9	97	24	50.3	125
6	8 53.6	97	24	50.3	9 22.6	97	24	50.2	9 51.7	97	24	50.1	10 20.7	97	23	49.9	10 49.7	97	23	49.8	11 18.7	97	23	49.7	11 47.7	97	23	49.5	12 16.7	97	23	49.4	6
7	8 39.4	97	23	49.4	9 08.5	97	23	49.3	9 37.5	97	23	49.1	10 06.6	97	23	49.0	10 35.6	97	23	48.9	11 04.7	97	23	48.8	11 33.7	97	23	48.6	12 02.7	97	23	48.5	7
8	8 25.5	97	23	48.5	8 54.5	97	23	48.3	9 23.6	97	23	48.2	9 52.7	97	23	48.1	10 21.8	97	23	48.0	10 50.8	97	23	47.8	11 19.9	97	23	47.7	11 48.9	97	23	47.6	8
9	8 11.7	97	23	47.5	8 40.8	97	23	47.4	9 09.9	97	23	47.3	9 39.0	97	22	47.2	10 08.1	97	22	47.1	10 37.2	97	22	46.9	11 06.3	97	22	46.8	11 35.3	97	22	46.7	9
130	7 58.1	97	22	46.6	8 27.2	97	22	46.5	8 56.4	97	22	46.4	9 25.5	97	22	46.3	9 54.6	97	22	46.1	10 23.7	97	22	46.0	10 52.8	97	22	45.9	11 22.0	97	22	45.8	130
1	7 44.7	97	22	45.7	8 13.9	97	22	45.6	8 43.0	97	22	45.5	9 12.2	97	22	45.3	9 41.3	97	22	45.2	10 10.5	97	22	45.1	10 39.6	97	22	45.0	11 08.8	97	22	44.9	1
2	7 31.6	97	22	44.8	8 00.7	97	22	44.7	8 29.9	97	22	44.5	8 59.1	97	21	44.4	9 28.3	97	21	44.3	9 57.5	97	21	44.2	10 26.6	97	21	44.1	10 55.8	97	21	44.0	2
3	7 18.6	97	21	43.9	7 47.8	97	21	43.7	8 17.0	97	21	43.6	8 46.2	97	21	43.5	9 15.4	97	21	43.4	9 44.6	97	21	43.3	10 13.8	97	21	43.2	10 43.0	97	21	43.0	3
4	7 05.9	97	21	42.9	7 35.1	97	21	42.8	8 04.3	97	21	42.7	8 33.6	97	21	42.6	9 02.8	97	21	42.5	9 32.0	97	21	42.4	10 01.3	97	21	42.3	10 30.5	97	21	42.1	4
135	6 53.4	98	20	42.0	7 22.6	98	20	41.9	7 51.9	98	20	41.8	8 21.1	98	20	41.7	8 50.4	98	20	41.6	9 19.7	98	20	41.5	9 48.9	98	20	41.3	10 18.2	98	20	41.2	135
6	6 41.1	98	20	41.1	7 10.3	98	20	41.0	7 39.6	98	20	40.9	8 08.9	98	20	40.8	8 38.2	98	20	40.7	9 07.5	98	20	40.5	9 36.8	98	20	40.4	10 06.1	98	20	40.3	6
7	6 29.0	98	20	40.2	6 58.3	98	20	40.1	7 27.6	98	20	40.0	7 56.9	98	20	39.8	8 26.2	98	20	39.7	8 55.6	98	20	39.6	9 24.9	98	20	39.5	9 54.2	98	19	39.4	7
8	6 17.1	98	19	39.2	6 46.5	98	19	39.1	7 15.8	98	19	39.0	7 45.2	98	19	38.9	8 14.5	98	19	38.8	8 43.8	98	19	38.7	9 13.2	98	19	38.6	9 42.5	98	19	38.5	8
9	6 05.5	98	19	38.3	6 34.9	98	19	38.2	7 04.3	98	19	38.1	7 33.6	98	19	38.0	8 03.0	98	19	37.9	8 32.4	98	19	37.8	9 01.7	98	19	37.7	9 31.1	98	19	37.6	9
140	5 54.2	98	19	37.4	6 23.5	98	19	37.3	6 52.9	98	18	37.2	7 22.3	98	18	37.1	7 51.7	98	18	37.0	8 21.1	98	18	36.9	8 50.5	98	18	36.8	9 19.9	98	18	36.7	140
1	5 43.0	98	18	36.5	6 12.4	98	18	36.4	6 41.9	98	18	36.3	7 11.3	98	18	36.2	7 40.7	98	18	36.1	8 10.1	98	18	36.0	8 39.5	98	18	35.9	9 08.9	98	18	35.8	1
2	5 32.1	98	18	35.5	6 01.6	98	18	35.4	6 31.0	98	18	35.3	7 00.4	98	18	35.2	7 29.9	98	18	35.2	7 59.3	98	18	35.1	8 28.8	98	18	35.0	8 58.2	98	17	34.9	2
3	5 21.5	98	17	34.6	5 50.9	98	17	34.5	6 20.4	98	17	34.4	6 49.9	98	17	34.3	7 19.3	98	17	34.2	7 48.8	98	17	34.1	8 18.3	98	17	34.0	8 47.7	98	17	33.9	3
4	5 11.1	98	17	33.7	5 40.5	98	17	33.6	6 10.0	98	17	33.5	6 39.5	98	17	33.4	7 09.0	98	17	33.3	7 38.5	98	17	33.2	8 08.0	98	17	33.1	8 37.5	98	17	33.0	4
145	5 00.9	98	16	32.8	5 30.4	98	16	32.7	5 59.9	98	16	32.6	6 29.5	98	16	32.5	6 59.0	98	16	32.4	7 28.5	98	16	32.3	7 58.0	98	16	32.2	8 27.5	98	16	32.1	145
6					5 20.5	98	16	31.7	5 50.1	98	16	31.7	6 19.6	98	16	31.6	6 49.2	98	16	31.5	7 18.7	98	16	31.4	7 48.2	98	16	31.3	8 17.8	98	16	31.2	6
7					5 10.9	99	16	30.8	5 40.5	99	16	30.7	6 10.0	99	16	30.6	6 39.6	99	16	30.6	7 09.2	99	15	30.5	7 38.7	99	15	30.4	8 08.3	99	15	30.3	7
8					5 01.5	99	15	29.9	5 31.1	99	15	29.8	6 00.7	99	15	29.7	6 30.3	99	15	29.6	6 59.9	99	15	29.6	7 29.5	99	15	29.5	7 59.1	99	15	29.4	8
9									5 22.0	99	15	28.9	5 51.7	99	15	28.8	6 21.3	99	15	28.7	6 50.9	99	15	28.6	7 20.5	99	15	28.6	7 50.1	99	14	28.5	9
150									5 13.2	99	14	28.0	5 42.9	99	14	27.9	6 12.5	99	14	27.8	6 42.1	99	14	27.7	7 11.8	99	14	27.6	7 41.4	99	14	27.6	150
1									5 04.7	99	14	27.0	5 34.3	99	14	27.0	6 04.0	99	14	26.9	6 33.6	99	14	26.8	7 03.3	99	14	26.7	7 33.0	99	14	26.6	1
2													5 26.1	99	13	26.0	5 55.7	99	13	26.0	6 25.4	99	13	25.9	6 55.1	99	13	25.8	7 24.8	99	13	25.7	2
3													5 18.1	99	13	25.1	5 47.8	99	13	25.0	6 17.5	99	13	25.0	6 47.2	99	13	24.9	7 16.9	99	13	24.8	3
4													5 10.3	99	12	24.2	5 40.0	99	12	24.1	6 09.8	99	12	24.0	6 39.5	99	12	24.0	7 09.2	99	12	23.9	4
155													5 02.9	99	12	23.3	5 32.6	99	12	23.2	6 02.3	99	12	23.1	6 32.1	99	12	23.1	7 01.8	99	12	23.0	155
6																	5 25.4	99	11	22.3	5 55.2	99	11	22.2	6 25.0	99	11	22.1	6 54.7	99	11	22.1	6
7																	5 18.6	99	11	21.3	5 48.3	99	11	21.3	6 18.1	99	11	21.2	6 47.9	99	11	21.2	7
8																	5 12.0	99	11	20.4	5 41.8	99	10	20.4	6 11.5	99	10	20.3	6 41.3	99	10	20.2	8
9																	5 05.6	99	10	19.5	5 35.4	99	10	19.4	6 05.3	99	10	19.4	6 35.1	99	10	19.3	9
160																					5 29.4	99	10	18.5	5 59.2	99	10	18.5	6 29.1	99	10	18.4	160
1																					5 23.7	99	09	17.6	5 53.5	99	09	17.5	6 23.4	99	09	17.5	1
2																					5 18.2	1.00	09	16.7	5 48.1	1.00	9	16.6	6 17.9	1.00	9	16.6	2
3																					5 13.0	1.00	8	15.7	5 42.9	1.00	8	15.7	6 12.8	1.00	8	15.6	3
4																					5 08.2	1.00	8	14.8	5 38.0	1.00	8	14.8	6 07.9	1.00	8	14.7	4
165																					5 03.6	1.00	7	13.9	5 33.5	1.00	7	13.8	6 03.4	1.00	7	13.8	165
6																									5 29.2	1.00	7	12.9	5 59.1	1.00	7	12.9	6
7																									5 25.2	1.00	6	12.0	5 55.1	1.00	6	12.0	7
8																									5 21.5	1.00	6	11.1	5 51.4	1.00	6	11.1	8
9																									5 18.0	1.00	6	10.2	5 48.0	1.00	6	10.1	9
170																									5 14.9	1.00	5	09.2	5 44.9	1.00	5	09.2	170
1																									5 12.1	1.00	4	08.3	5 42.1	1.00	4	08.3	1
2																									5 09.6	1.00	4	07.4	5 39.5	1.00	4	07.4	2
3																									5 07.3	1.00	3	06.5	5 37.3	1.00	3	06.4	3
4																									5 05.4	1.00	3	05.5	5 35.4	1.00	3	05.5	4
175																									5 03.7	1.00	2	04.6	5 33.7	1.00	2	04.6	175
6																									5 02.4	1.00	2	03.7	5 32.4	1.00	2	03.7	6
7																									5 01.3	1.00	1	02.8	5 31.3	1.00	1	02.8	7
8																									5 00.6	1.00	1	01.8	5 30.6	1.00	1	01.8	8
9																									5 00.1	1.00	0	00.9	5 30.1	1.00	0	00.9	9
180																									5 00.0	1.00	0	00.0	5 30.0	1.00	0	00.0	180

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 7

Lat. 72°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	42 00.0	1.0 00	180.0	42 30.0	1.0 00	180.0	43 00.0	1.0 00	180.0	43 30.0	1.0 00	180.0	44 00.0	1.0 00	180.0	44 30.0	1.0 00	180.0	45 00.0	1.0 00	180.0	45 30.0	1.0 00	180.0	00
1	41 59.8	1.0 01	178.8	42 29.8	1.0 01	178.8	42 59.8	1.0 01	178.8	43 29.8	1.0 01	178.8	43 59.8	1.0 01	178.8	44 29.8	1.0 01	178.7	44 59.8	1.0 01	178.7	45 29.8	1.0 01	178.7	1
2	41 59.2	1.0 02	177.5	42 29.2	1.0 02	177.5	42 59.2	1.0 02	177.5	43 29.2	1.0 02	177.5	43 59.2	1.0 02	177.5	44 29.2	1.0 02	177.5	44 59.2	1.0 02	177.5	45 29.2	1.0 02	177.5	2
3	41 58.2	1.0 02	176.3	42 28.2	1.0 02	176.3	42 58.2	1.0 02	176.3	43 28.2	1.0 02	176.3	43 58.2	1.0 02	176.3	44 28.2	1.0 02	176.2	44 58.2	1.0 02	176.2	45 28.2	1.0 02	176.2	3
4	41 56.8	1.0 03	175.1	42 26.8	1.0 03	175.1	42 56.8	1.0 03	175.0	43 26.8	1.0 03	175.0	43 56.8	1.0 03	175.0	44 26.8	1.0 03	175.0	44 56.7	1.0 03	175.0	45 26.7	1.0 03	174.9	4
05	41 55.0	1.0 04	173.9	42 25.0	1.0 04	173.8	42 55.0	1.0 04	173.8	43 25.0	1.0 04	173.8	43 55.0	1.0 04	173.8	44 24.9	1.0 04	173.7	44 54.9	1.0 04	173.7	45 24.9	1.0 04	173.7	05
6	41 52.9	1.0 04	172.6	42 22.8	1.0 04	172.6	42 52.8	1.0 04	172.6	43 22.8	1.0 04	172.5	43 52.7	1.0 04	172.5	44 22.7	1.0 04	172.5	44 52.7	1.0 04	172.4	45 22.6	1.0 04	172.4	6
7	41 50.3	1.0 05	171.4	42 20.2	1.0 05	171.4	42 50.2	1.0 05	171.3	43 20.2	1.0 05	171.3	43 50.1	1.0 05	171.3	44 20.1	1.0 05	171.2	44 50.0	1.0 05	171.2	45 20.0	1.0 05	171.2	7
8	41 47.3	1.0 06	170.2	42 17.3	1.0 06	170.1	42 47.2	1.0 06	170.1	43 17.2	1.0 06	170.1	43 47.1	1.0 06	170.0	44 17.1	1.0 06	170.0	44 47.0	1.0 06	169.9	45 16.9	1.0 06	169.9	8
9	41 44.0	1.0 06	169.0	42 13.9	1.0 06	168.9	42 43.8	1.0 06	168.9	43 13.8	1.0 06	168.8	43 43.7	1.0 06	168.8	44 13.6	1.0 06	168.7	44 43.6	1.0 06	168.7	45 13.5	1.0 06	168.6	9
10	41 40.2	1.0 07	167.7	42 10.1	1.0 07	167.7	42 40.1	1.0 07	167.6	43 10.0	1.0 07	167.6	43 39.9	1.0 07	167.5	44 09.8	1.0 07	167.5	44 39.7	1.0 07	167.4	45 09.6	1.0 07	167.4	10
1	41 36.1	1.0 08	166.5	42 06.0	1.0 08	166.5	42 35.9	1.0 08	166.4	43 05.8	1.0 08	166.4	43 35.7	1.0 08	166.3	44 05.6	1.0 08	166.2	44 35.5	1.0 08	166.2	45 05.4	1.0 08	166.1	1
2	41 31.6	1.0 08	165.3	42 01.5	1.0 08	165.2	42 31.3	1.0 08	165.2	43 01.2	1.0 08	165.1	43 31.1	1.0 08	165.1	44 01.0	1.0 08	165.0	44 30.9	1.0 08	164.9	45 00.7	1.0 08	164.9	2
3	41 26.7	1.0 09	164.1	41 56.5	1.0 09	164.0	42 26.4	1.0 09	164.0	42 56.3	1.0 09	163.9	43 26.1	1.0 09	163.8	43 56.0	1.0 09	163.8	44 25.9	1.0 09	163.7	44 55.7	1.0 09	163.6	3
4	41 21.4	1.0 09	162.9	41 51.3	99 09	162.8	42 21.1	99 09	162.7	42 50.9	99 10	162.7	43 20.8	99 10	162.6	43 50.6	99 10	162.5	44 20.5	99 10	162.5	44 50.3	99 10	162.4	4
15	41 15.8	99 10	161.7	41 45.6	99 10	161.6	42 15.4	99 10	161.5	42 45.2	99 10	161.4	43 15.1	99 10	161.4	43 44.9	99 10	161.3	44 14.7	99 10	161.2	44 44.5	99 10	161.1	15
6	41 09.7	99 11	160.5	41 39.5	99 11	160.4	42 09.3	99 11	160.3	42 39.1	99 11	160.2	43 08.9	99 11	160.1	43 38.7	99 11	160.1	44 08.5	99 11	160.0	44 38.3	99 11	159.9	6
7	41 03.4	99 11	159.3	41 33.1	99 11	159.2	42 02.9	99 11	159.1	42 32.7	99 11	159.0	43 02.5	99 11	158.9	43 32.2	99 11	158.8	44 02.0	99 12	158.8	44 31.8	99 12	158.7	7
8	40 56.6	99 12	158.1	41 26.4	99 12	158.0	41 56.1	99 12	157.9	42 25.9	99 12	157.8	42 55.6	99 12	157.7	43 25.4	99 12	157.6	43 55.1	99 12	157.5	44 24.8	99 12	157.4	8
9	40 49.5	99 12	156.9	41 19.2	99 12	156.8	41 49.0	99 13	156.7	42 18.7	99 13	156.6	42 48.4	99 13	156.5	43 18.1	99 13	156.4	43 47.8	99 13	156.3	44 17.5	99 13	156.2	9
20	40 42.0	99 13	155.7	41 11.7	99 13	155.6	41 41.4	99 13	155.5	42 11.1	99 13	155.4	42 40.8	99 13	155.3	43 10.5	99 13	155.2	43 40.2	99 13	155.1	44 09.9	99 13	155.0	20
1	40 34.2	99 14	154.5	41 03.9	99 14	154.4	41 33.6	99 14	154.3	42 03.2	99 14	154.2	42 32.9	99 14	154.1	43 02.6	99 14	154.0	43 32.2	99 14	153.9	44 01.8	99 14	153.8	1
2	40 26.1	99 14	153.3	40 55.7	99 14	153.2	41 25.3	99 14	153.1	41 55.0	99 14	153.0	42 24.6	99 14	152.9	42 54.2	99 14	152.8	43 23.9	99 14	152.7	43 53.5	99 15	152.5	2
3	40 17.5	99 15	152.1	40 47.2	99 15	152.0	41 16.8	99 15	151.9	41 46.4	99 15	151.8	42 16.0	99 16	151.7	42 45.6	99 15	151.6	43 15.2	99 15	151.4	43 44.8	99 15	151.3	3
4	40 08.7	99 15	150.9	40 38.3	99 15	150.8	41 07.9	99 15	150.7	41 37.4	99 15	150.6	42 07.0	99 16	150.5	42 36.6	99 16	150.4	43 06.1	99 16	150.2	43 35.7	98 16	150.1	4
25	39 59.5	99 16	149.7	40 29.1	99 16	149.6	40 58.6	98 16	149.5	41 28.2	98 16	149.4	41 57.7	98 16	149.3	42 27.2	98 16	149.2	42 56.8	98 16	149.0	43 26.3	98 16	148.9	25
6	39 50.0	98 16	148.6	40 19.5	98 16	148.5	40 49.1	98 16	148.3	41 18.6	98 17	148.2	41 48.1	98 17	148.1	42 17.6	98 16	148.0	42 47.1	98 17	147.8	43 16.5	98 17	147.7	6
7	39 40.2	98 17	147.4	40 09.7	98 17	147.3	40 39.2	98 17	147.2	41 08.6	98 17	147.0	41 38.1	98 17	146.9	42 07.6	98 17	146.8	42 37.0	98 17	146.7	43 06.5	98 17	146.5	7
8	39 30.0	98 17	146.2	39 59.5	98 17	146.1	40 29.0	98 18	146.0	40 58.4	98 18	145.9	41 27.8	98 18	145.7	41 57.3	98 18	145.6	42 26.7	98 18	145.5	42 56.1	98 18	145.3	8
9	39 19.6	98 18	145.1	39 49.0	98 18	144.9	40 18.4	98 18	144.8	40 47.8	98 18	144.7	41 17.2	98 18	144.6	41 46.6	98 18	144.4	42 16.0	98 18	144.3	42 45.4	98 19	144.1	9
30	39 08.8	98 18	143.9	39 38.2	98 18	143.8	40 07.6	98 19	143.7	40 37.0	98 19	143.5	41 06.3	98 19	143.4	41 35.7	98 19	143.3	42 05.0	98 19	143.1	42 34.4	98 19	143.0	30
1	38 57.7	98 19	142.8	39 27.1	98 19	142.6	39 56.4	98 19	142.5	40 25.8	98 19	142.4	40 55.1	98 19	142.2	41 24.4	98 19	142.1	41 53.8	98 19	141.9	42 23.1	98 19	141.8	1
2	38 46.4	98 19	141.6	39 15.7	98 20	141.5	39 45.0	98 20	141.3	40 14.3	98 20	141.2	40 43.6	98 20	141.1	41 12.9	98 20	140.9	41 42.2	98 20	140.8	42 11.4	98 20	140.6	2
3	38 34.7	98 20	140.5	39 04.0	98 20	140.3	39 33.3	98 20	140.2	40 02.6	98 20	140.1	40 31.8	98 20	139.9	41 01.1	97 20	139.8	41 30.3	97 20	139.6	41 59.5	97 21	139.5	3
4	38 22.8	98 20	139.3	38 52.0	98 20	139.2	39 21.3	97 20	139.0	39 50.5	97 21	138.9	40 19.7	97 21	138.8	40 49.0	97 21	138.6	41 18.2	97 21	138.5	41 47.3	97 21	138.3	4
35	38 10.6	97 21	138.2	38 39.8	97 21	138.1	39 09.0	97 21	137.9	39 38.2	97 21	137.8	40 07.4	97 21	137.6	40 36.6	97 21	137.5	41 05.7	97 21	137.3	41 34.9	97 21	137.1	35
6	37 58.1	97 21	137.1	38 27.2	97 21	136.9	38 56.4	97 21	136.8	39 25.6	97 21	136.6	39 54.7	97 22	136.5	40 23.9	97 22	136.3	40 53.0	97 22	136.2	41 22.1	97 22	136.0	6
7	37 45.3	97 22	135.9	38 14.4	97 22	135.8	38 43.6	97 22	135.6	39 12.7	97 22	135.5	39 41.8	97 22	135.3	40 10.9	97 22	135.2	40 40.0	97 22	135.0	41 09.1	97 22	134.9	7
8	37 32.3	97 22	134.8	38 01.4	97 22	134.7	38 30.5	97 22	134.5	38 59.6	97 22	134.4	39 28.7	97 22	134.2	39 57.7	97 22	134.0	40 26.8	97 22	133.9	40 55.8	97 23	133.7	8
9	37 19.0	97 23	133.7	37 48.1	97 22	133.6	38 17.2	97 22	133.4	38 46.2	97 23	133.2	39 15.3	97 23	133.1	39 44.3	97 23	132.9	40 13.3	97 23	132.7	40 42.3	97 23	132.6	9
40	37 05.5	97 23	132.6	37 34.5	97 23	132.4	38 03.6	97 23	132.3	38 32.6	97 23	132.1	39 01.6	97 23	132.0	39 30.6	97 23	131.8	39 59.6	97 23	131.6	40 28.5	97 23	131.4	40
1	36 51.7	97 23	131.5	37 20.7	97 23	131.3	37 49.7	97 23	131.2	38 18.7	97 24	131.0	38 47.7	97 24	130.8	39 16.6	97 24	130.7	39 45.6	96 24	130.5	40 14.5	96 24	130.3	1
2	36 37.7	97 24	130.4	37 06.7	97 24	130.2	37 35.6	97 24	130.1	38 04.6	96 24	129.9	38 33.5	96 24	129.7	39 02.5	96 24	129.6	39 31.4	96 24	129.4	40 00.3	96 24	129.2	2
3	36 23.5	97 24	129.3	36 52.4	96 24	129.1	37 21.3	96 24	129.0	37 50.3	96 24	128.8	38 19.2	96 24	128.6	38 48.0	96 24	128.4	39 16.9	96 24	128.3	39 45.8	96 24	128.1	3
4	36 09.0	96 24	128.2	36 37.9	96 24	128.0	37 06.8	96 25	127.9	37 35.7	96 25	127.7	38 04.6	96 25	127.5	38 33.4	96 25	127.3	39 02.3	96 25	127.2	39 31.1	96 25	127.0	4
45	35 54.3	96 25	127.1	36 23.2	96 25	126.9	36 52.1	96 25	126.8	37 20.9	96 25	126.6	37 49.8	96 25	126.4	38 18.6	96 25	126.2	38 47.4	96 25	126.1	39 16.2	96 25	125.9	45
6	35 39.4	96 25	126.0	36 08.3	96 25	125.9	36 37.1	96 25	125.7	37 05.9	96 25	125.5	37 34.7	96 25	125.3	38 03.5	96 25	125.2	38 32.3	96 25	125.0	39 01.0	96 26	124.8	6
7	35 24.3	96 25	124.9	35 53.1	96 26	124.8	36 21.9	96 26	124.6	36 50.7	96 26	124.4	37 19.5	96 26	124.2	37 48.3	96 26	124.1	38 17.0	96 26	123.9	38 45.7	96 26	123.7	7
8	35 09.0	96 26	123.9	35 37.8	96 26	123.7	36 06.6	96 26	123.5	36 35.3	96 26	123.3	37 04.1	96 26	123.2	37 32.8	96 26	123.0	38 01.5	96 26	122.8	38 30.2	96 26	122.6	8
9	34 53.5	96 26	122.8	35 22.3	96 26	122.6	35 51.0	96 26	122.4	36 19.8	96 26	122.3	36 48.5	96 26	122.1	37 17.2	96 26	121.9	37 45.8	96 26	121.7	38 14.5	96 26	121.5	9
50	34 37.9	96 26	121.7	35 06.6	96 26	121.6	35 35.3	96 27	121.4	36 04.0	96 27	121.2	36 32.7	96 27	121.0	37 01.3	96 27	120.8	37 30.0	95 27	120.6	37 58.6	95 27	120.5	50
1	34 22.0	96 27	120.7	34 50.7	96 27	120.5	35 19.4	96 27	120.3	35 48.0	96 27	120.1	36 16.7	95 27	120.0	36 45.3	95 27	119.8	37 13.9	95 27	119.6	37 42.5	95 27	119.4	1
2	34 06.0	96 27	119.6	34 34.6	96 27	119.4	35 03.3	95 27	119.3	35 31.9	95 27	119.1	36 00.5	95 27	118.9	36 29.1	95 27	118.7	36 57.7	95 27	118.5	37 26.3	95 27	118.3	2
3	33 49.8	95 27	118.6	34 18.4	95 27	118.4	34 47.0	95 27	118.2	35 15.6	95 27	118.0	35 44.2	95 27	117.8	36 12.8	95 28	117.6	36 41.3	95 28	117.5	37 09.9	95 28	117.3	3
4	33 33.4	95 28	117.5	34 02.0	95 28	117.3	34 30.6	95 28	117.2	34 59.2	95 28	117.0	35 27.7	95 28	116.8	35 56.3	95 28	116.6	36 24.8	95 28	116.4	36 53.3	95 28	116.2	4
55	33 16.9	95 28	116.5	33 45.5	95 28	116.3	34 14.0	95 28	116.1	34 42.6	95 28	115.9	35 11.1	95 28	115.7	35 39.6	95 28	115.5	36 08.1	95 28	115.3	36 36.6	95 28	115.2	55
6	33 00.2	95 28	115.4	33 28.8	95 28	115.2	33 57.3	95 28	115.1	34 25.8	95 28	114.9	34 54.3	95 28	114.7	35 22.8	95 28	114.5	35 51.3	95 28	114.3	36 19.8	95 28	114.1	6
7	32 43.4	95 28	114.4	33 11.9	95 28	114.2	33 40.4	95 28	114.0	34 08.9	95 28	113.8	34 37.4	95 28	113.7	35 05.9	95 28	113.5	35 34.3	95 28	113.3	36 02.8	95 29	113.1	7
8	32 26.4	95 28	113.4	32 55.0	95 28	113.2	33 23.4	95 29	113.0	33 51.9	95 29	112.8	34 20.4	95 29	112.6	34 48.8	95 29	112.4	35 17.2	95 29	112.2	35 45.6	95 29	112.0	8
9	32 09.4	95 29	112.3	32 37.8	95 29	112.2	33 06.3	95 29	112.0	33 34.8	95 29	111.8	34 03.2	95 29	111.6	34 31.6	95 29	111.4	35 00.0	95 29	111.2	35 28.4	95 29	111.0	9
60	31 52.1	95 29	111.3	32 20.6	95 29	111.1	32 49.1	95 29	110.9	33 17.5	95 29	110.8	33 45.9	95 29	110.6	34 14.3	95 29	110.4	34 42.7	95 29	110.2	35 11.0	94 29	110.0	60
1	31 34.8	95 29	110.3	32 03.3	95 29	110.1	32 31.7	95 29	109.9	33 00.1	95 29	109.7	33 28.5	95 29	109.5	33 56.9	95 29	109.3	34 25.2	94 29	109.1	34 53.5	94 29	108.9	1
2	31 17.4	95 29	109.3	31 45.8	95 29	109.1	32 14.2	95 29	108.9	32 42.6	95 29	108.7	33 11.0	95 29	108.5	33 39.3	94 29	108.3	34 07.6	94 29	108.1	34 36.0	94 29	107.9	2
3	30 59.8	95 29	108.3	31 28.2	95 29	108.1	31 56.6	95 30	107.9	32 25.0	95 30	107.7	32 53.3	94 30	107.5	33 21.7	94 30	107.3	33 50.0	94 30	107.1	34 18.3	94 30	106.9	3
4	30 42.2	95 30	107.3	31 10.5	95 30	107.1	31 38.9	95 30	106.9	32 07.3	94 30	106.7	32 35.6	94 30	106.5	33 03.9	94 30	106.3	33 32.2	94 30	106.1	34 00.5	94 30	105.9	4
65	30 24.4	95 30	106.3	30 52.8	95 30	106.1	31 21.1	94 30	105.9	31 49.5	94 30	105.7	32 17.8	94 30	105.5	32 46.1	94 30	105.3	33 14.3	94 30	105.1	33 42.6	94 30	104.9	65
6	30 06.6	95 30	105.3	30 34.9	94 30	105.1	31 03.2	94 30	104.9	31 31.6	94 30	104.7	31 59.9	94 30	104.5	32 28.1	94 30	104.3	32 56.4	94 30	104.1	33 24.6	94 30	103.9	6
7	29 48.6	94 30	104.3	30 17.0	94 30	104.1	30 45.3	94 30	103.9	31 13.6	94 30	103.7	31 41.9	94 30	103.5	32 10.1	94 30	103.3	32 38.4	94 30	103.1	33 06.6	94 30	102.9	7
8	29 30.6	94 30	103.3	29 58.9	94 30	103.1	30 27.2	94 30	102.9	30 55.5	94 30	102.7	31 23.8	94 30	102.5	31 52.1	94 30	102.3	32 20.3	94 30	102.1	32 48.5	94 30	101.9	8
9	29 12.5	94 30	102.3	29 40.8	94 30	102.1	30 09.1	94 30	101.9	30 37.4	94 30	101.7	31 05.7	94 30	101.5	31 33.9	94 30	101.3	32 02.1	94 30	101.1	32 30.3	94 30	100.9	9
70	28 54.4	94 30	101.3	29 22.7	94 30	101.1	29 51.0	94 30	100.9	30 19.2	94 30	100.7	30 47.5	94 30	100.5	31 15.7	94 30	100.3	31 43.9	94 30	100.1	32 12.1	94 30	99.9	70
1	28 36.2	94 30	100.3	29 04.5	94 30	100.1	29 32.7	94 30	99.9	30 01.0	94 30	99.7	30 29.2	94 31	99.5	30 57.4	94 31	99.3	31 25.6	94 31	99.1	31 53.8	94 31	98.9	1
2	28 17.9	94 31	99.3	28 46.2	94 31	99.1	29 14.4	94 31	99.0	29 42.7	94 31	98.8	30 10.9	94 31	98.6	30 39.1	94 31	98.4	31 07.3	94 31	98.2	31 35.5	94 31	98.0	2
3	27 59.6	94 31	98.4	28 27.9	94 31	98.2	28 56.1	94 31	98.0	29 24.3	94 31	97.8	29 52.5	94 31	97.6	30 20.7	94 31	97.4	30 48.9	94 31	97.2	31 17.1	94 31	97.0	3
4	27 41.2	94 31	97.4	28 09.5	94 31	97.2	28 37.7	94 31	97.0	29 05.9	94 31	96.8	29 34.1	94 31	96.6	30 02.3	94 31	96.4	30 30.5	94 31	96.2	30 58.7	94 31	96.0	4
75	27 22.8	94 31	96.4	27 51.1	94 31	96.2	28 19.3	94 31	96.0	28 47.5	94 31	95.8	29 15.7	94 31	95.6	29 43.9	94 31	95.4	30 12.1	94 31	95.2	30 40.2	94 31	95.0	75
6	27 04.4	94 31	95.4	27 32.6	94 31	95.3	28 00.8	94 31	95.1	28 29.0	94 31	94.9	28 57.2	94 31	94.7	29 25.4	94 31	94.5	29 53.6	94 31	94.3	30 21.7	94 31	94.1	6
7	26 45.9	94 31	94.5	27 14.1	94 31	94.3	27 42.4	94 31	94.1	28 10.6	94 31	93.9	28 38.8	94 31	93.7	29 06.9	94 31	93.5	29 35.1	94 31	93.3	30 03.2	94 31	93.1	7
8	26 27.4	94 31	93.5	26 55.6	94 31	93.3	27 23.9	94 31	93.1	27 52.1	94 31	92.9	28 20.2	94 31	92.8	28 48.4	94 31	92.6	29 16.6	94 31	92.4	29 44.7	94 31	92.2	8
9	26 08.9	94 31	92.6	26 37.1	94 31	92.4	27 05.3	94 31	92.2	27 33.5	94 31	92.0	28 01.7	94 31	91.8	28 29.9	94 31	91.6	28 58.0	94 31	91.4	29 26.2	94 31	91.2	9
80	25 50.4	94 31	91.6	26 18.6	94 31	91.4	26 46.8	94 31	91.2	27 15.0	94 31	91.0	27 43.2	94 31	90.8	28 11.3	94 31	90.6	28 39.5	94 31	90.4	29 07.6	94 31	90.2	80
1	25 31.8	94 31	90.6	26 00.1	94 31	90.5	26 28.3	94 31	90.3	26 56.5	94 31	90.1	27 24.6	94 31	89.9	27 52.8	94 31	89.7	28 20.9	94 31	89.5	28 49.1	94 31	89.3	1
2	25 13.3	94 31	89.7	25 41.5	94 31	89.5	26 09.7	94 31	89.3	26 37.9	94 31	89.1	27 06.1	94 31	88.9	27 34.3	94 31	88.7	28 02.4	94 31	88.5	28 30.5	94 31	88.4	2
3	24 54.7	94 31	88.7	25 23.0	94 31	88.6	25 51.2	94 31	88.4	26 19.4	94 31	88.2	26 47.6	94 31	88.0	27 15.7	94 31	87.8	27 43.9	94 31	87.6	28 12.0	94 31	87.4	3
4	24 36.2	94 31	87.8	25 04.4	94 31	87.6	25 32.7	94 31	87.4	26 00.9	94 31	87.2	26 29.0	94 31	87.0	26 57.2	94 31	86.9	27 25.4	94 31	86.7	27 53.5	94 31	86.5	4
85	24 17.7	94 31	86.9	24 45.9	94 31	86.7	25 14.1	94 31	86.5	25 42.3	94 31	86.3	26 10.5	94 31	86.1	26 38.7	94 31	85.9	27 06.9	94 31	85.7	27 35.0	94 31	85.5	85
6	23 59.2	94 31	85.9	24 27.4	94 31	85.7	24 55.6	94 31	85.5	25 23.9	94 31	85.4	25 52.0	94 31	85.2	26 20.2	94 31	85.0	26 48.4	94 31	84.8	27 16.5	94 31	84.6	6
7	23 40.7	94 31	85.0	24 08.9	94 31	84.8	24 37.2	94 31	84.6	25 05.4	94 31	84.4	25 33.6	94 31	84.2	26 01.8	94 31	84.0	26 29.9	94 31	83.8	26 58.1	94 31	83.7	7
8	23 22.3	94 31	84.0	23 50.5	94 31	83.9	24 18.7	94 31	83.7	24 46.9	94 31	83.5	25 15.2	94 31	83.3	25 43.3	94 31	83.1	26 11.5	94 31	82.9	26 39.7	94 31	82.7	8
9	23 03.8	94 31	83.1	23 32.1	94 31	82.9	24 00.3	94 31	82.7	24 28.5	94 31	82.5	24 56.8	94 31	82.4	25 25.0	94 31	82.2	25 53.1	94 31	82.0	26 21.3	94 31	81.8	9
90	22 45.4	94 31	82.2	23 13.7	94 31	82.0	23 41.9	94 31	81.8	24 10.2	94 31	81.6	24 38.4	94 31	81.4	25 06.6	94 30	81.2	25 34.8	94 30	81.1	26 03.0	94 30	80.9	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.	
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.		
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°	
91	22 27.1	94 30	81.2	22 55.4	94 30	81.1	23 23.6	94 30	80.9	23 51.9	94 30	80.7	24 20.1	94 30	80.5	24 48.3	94 30	80.3	25 16.5	94 30	80.1	25 44.7	94 30	79.9	91	Lat. 72°
2	22 08.8	94 30	80.3	22 37.1	94 30	80.1	23 05.3	94 30	79.9	23 33.6	94 30	79.8	24 01.8	94 30	79.6	24 30.1	94 30	79.4	24 58.3	94 30	79.2	25 26.5	94 30	79.0	2	
3	21 50.5	94 30	79.4	22 18.8	94 30	79.2	22 47.1	94 30	79.0	23 15.4	94 30	78.8	23 43.6	94 30	78.6	24 11.9	94 30	78.5	24 40.1	94 30	78.3	25 08.3	94 30	78.1	3	
4	21 32.4	94 30	78.4	22 00.6	94 30	78.3	22 28.9	94 30	78.1	22 57.2	94 30	77.9	23 25.5	94 30	77.7	23 53.7	94 30	77.5	24 22.0	94 30	77.4	24 50.2	94 30	77.2	4	
95	21 14.2	94 30	77.5	21 42.5	94 30	77.3	22 10.8	94 30	77.2	22 39.1	94 30	77.0	23 07.4	94 30	76.8	23 35.7	94 30	76.6	24 03.9	94 30	76.4	24 32.1	94 30	76.3	95	
6	20 56.1	94 30	76.6	21 24.5	94 30	76.4	21 52.8	94 30	76.2	22 21.1	94 30	76.1	22 49.4	94 30	75.9	23 17.6	94 30	75.7	23 45.9	94 30	75.5	24 14.2	94 30	75.3	6	
7	20 38.1	94 30	75.7	21 06.5	94 30	75.5	21 34.8	94 30	75.3	22 03.1	94 30	75.1	22 31.4	94 30	75.0	22 59.7	94 30	74.8	23 28.0	94 30	74.6	23 56.3	94 30	74.4	7	
8	20 20.2	95 30	74.8	20 48.6	94 30	74.6	21 16.9	94 30	74.4	21 45.2	94 30	74.2	22 13.6	94 30	74.0	22 41.9	94 30	73.9	23 10.2	94 30	73.7	23 38.5	94 30	73.5	8	
9	20 02.4	95 30	73.8	20 30.7	95 30	73.7	20 59.1	95 30	73.5	21 27.4	94 30	73.3	21 55.8	94 30	73.1	22 24.1	94 29	73.0	22 52.4	94 29	72.8	23 20.7	94 29	72.6	9	
100	19 44.6	95 29	72.9	20 13.0	95 29	72.7	20 41.4	95 29	72.6	21 09.7	95 29	72.4	21 38.1	94 29	72.2	22 06.4	94 29	72.0	22 34.7	94 29	71.9	23 03.1	94 29	71.7	100	
1	19 26.9	95 29	72.0	19 55.3	95 29	71.8	20 23.7	95 29	71.7	20 52.1	95 29	71.5	21 20.5	95 29	71.3	21 48.8	95 29	71.1	22 17.2	94 29	71.0	22 45.5	94 29	70.8	1	
2	19 09.3	95 29	71.1	19 37.8	96 29	70.9	20 06.2	95 29	70.7	20 34.6	95 29	70.6	21 03.0	95 29	70.4	21 31.3	95 29	70.2	21 59.7	95 29	70.0	22 28.1	94 29	69.9	2	
3	18 51.9	95 29	70.2	19 20.3	95 29	70.0	19 48.7	95 29	69.8	20 17.1	95 29	69.7	20 45.5	95 29	69.5	21 13.9	95 29	69.3	21 42.3	95 29	69.1	22 10.7	95 29	69.0	3	
4	18 34.5	95 29	69.2	19 02.9	95 29	69.1	19 31.4	95 29	68.9	19 59.8	95 29	68.7	20 28.2	95 29	68.6	20 56.6	95 29	68.4	21 25.0	95 29	68.2	21 53.4	95 29	68.1	4	
105	18 17.2	95 29	68.3	18 45.6	95 29	68.2	19 14.1	95 29	68.0	19 42.6	95 28	67.8	20 11.0	95 28	67.7	20 39.5	95 28	67.5	21 07.9	95 28	67.3	21 36.3	95 28	67.2	105	
6	18 00.0	95 28	67.4	18 28.5	95 28	67.3	18 57.0	95 28	67.1	19 25.5	95 28	66.9	19 53.9	95 28	66.8	20 22.4	95 28	66.6	20 50.8	95 28	66.4	21 19.3	95 28	66.2	6	
7	17 42.9	95 28	66.5	18 11.5	95 28	66.3	18 40.0	95 28	66.2	19 08.5	95 28	66.0	19 36.9	95 28	65.9	20 05.4	95 28	65.7	20 33.9	95 28	65.5	21 02.4	95 28	65.3	7	
8	17 26.0	95 28	65.6	17 54.5	95 28	65.4	18 23.1	95 28	65.3	18 51.6	95 28	65.1	19 20.1	96 28	64.9	19 48.6	95 28	64.8	20 17.1	95 28	64.6	20 45.6	95 28	64.4	8	
9	17 09.2	95 28	64.7	17 37.7	95 28	64.5	18 06.3	95 28	64.4	18 34.8	95 28	64.2	19 03.4	95 28	64.0	19 31.9	95 28	63.9	20 00.4	95 28	63.7	20 28.9	95 28	63.5	9	
110	16 52.5	95 28	63.8	17 21.1	95 28	63.6	17 49.6	95 28	63.5	18 18.2	95 28	63.3	18 46.8	95 27	63.1	19 15.3	95 27	63.0	19 43.8	95 27	62.8	20 12.4	95 27	62.6	110	
1	16 35.9	96 27	62.9	17 04.5	95 27	62.7	17 33.1	95 27	62.6	18 01.7	95 27	62.4	18 30.3	95 27	62.2	18 58.9	96 27	62.1	19 27.4	96 27	61.9	19 56.0	95 27	61.7	1	
2	16 19.5	95 27	62.0	16 48.1	95 27	61.8	17 16.7	95 27	61.6	17 45.3	95 27	61.5	18 13.9	95 27	61.3	18 42.5	95 27	61.2	19 11.1	95 27	61.0	19 39.7	95 27	60.8	2	
3	16 03.2	96 27	61.1	16 31.8	95 27	60.9	17 00.5	95 27	60.7	17 29.1	95 27	60.6	17 57.7	96 27	60.4	18 26.4	95 27	60.3	18 55.0	95 27	60.1	19 23.6	95 27	60.0	3	
4	15 47.0	96 27	60.1	16 15.7	96 27	60.0	16 44.4	96 27	59.8	17 13.0	96 27	59.7	17 41.7	96 27	59.5	18 10.3	96 26	59.4	18 39.0	95 26	59.2	19 07.6	95 26	59.1	4	
115	15 31.0	96 26	59.2	15 59.7	96 26	59.1	16 28.4	96 26	58.9	16 57.1	96 26	58.8	17 25.8	96 26	58.6	17 54.5	96 26	58.5	18 23.1	96 26	58.3	18 51.8	96 26	58.2	115	
6	15 15.2	96 26	58.3	15 43.9	96 26	58.2	16 12.6	96 26	58.0	16 41.3	96 26	57.9	17 10.0	96 26	57.7	17 38.7	96 26	57.6	18 07.4	96 26	57.4	18 36.1	96 26	57.3	6	
7	14 59.5	96 26	57.4	15 28.2	96 26	57.3	15 57.0	96 26	57.1	16 25.7	96 26	57.0	16 54.4	96 26	56.8	17 23.2	96 26	56.7	17 51.9	96 26	56.5	18 20.6	96 26	56.4	7	
8	14 43.9	96 26	56.5	15 12.7	96 26	56.4	15 41.5	96 26	56.2	16 10.2	96 26	56.1	16 39.0	96 25	55.9	17 07.8	96 25	55.8	17 36.5	96 25	55.6	18 05.2	96 25	55.5	8	
9	14 28.5	96 25	55.6	14 57.3	96 25	55.5	15 26.1	96 25	55.3	15 54.9	96 25	55.2	16 23.7	96 25	55.0	16 52.5	96 25	54.9	17 21.3	96 25	54.7	17 50.0	96 25	54.6	9	
120	14 13.3	96 25	54.7	14 42.1	96 25	54.6	15 11.0	96 25	54.4	15 39.8	96 25	54.3	16 08.6	96 25	54.1	16 37.4	96 25	54.0	17 06.2	96 25	53.8	17 35.0	96 25	53.7	120	
1	13 58.3	96 25	53.8	14 27.1	96 26	53.7	14 56.0	96 25	53.5	15 24.8	96 25	53.4	15 53.7	96 25	53.2	16 22.5	96 25	53.1	16 51.3	96 24	52.9	17 20.2	96 24	52.8	1	
2	13 43.4	96 24	52.9	14 12.3	96 24	52.8	14 41.2	96 24	52.6	15 10.0	96 24	52.5	15 38.9	96 24	52.3	16 07.8	96 24	52.2	16 36.6	96 24	52.0	17 05.5	96 24	51.9	2	
3	13 28.7	96 24	52.0	13 57.6	96 24	51.8	14 26.5	96 24	51.7	14 55.4	96 24	51.6	15 24.3	96 24	51.4	15 53.2	96 24	51.3	16 22.1	96 24	51.2	16 51.0	96 24	51.0	3	
4	13 14.2	96 24	51.1	13 43.1	96 24	50.9	14 12.1	96 24	50.8	14 41.0	96 24	50.7	15 09.9	96 24	50.5	15 38.8	96 24	50.4	16 07.8	96 24	50.3	16 36.7	96 24	50.1	4	Lat. 73°
125	12 59.8	97 24	50.2	13 28.8	97 24	50.0	13 57.8	97 23	49.9	14 26.7	97 23	49.8	14 55.7	97 23	49.6	15 24.6	96 23	49.5	15 53.6	96 23	49.4	16 22.5	96 23	49.2	125	
6	12 45.7	97 23	49.3	13 14.7	97 23	49.1	13 43.7	97 23	49.0	14 12.7	97 23	48.9	14 41.7	97 23	48.7	15 10.6	97 23	48.6	15 39.6	97 23	48.5	16 08.6	97 23	48.3	6	
7	12 31.7	97 23	48.4	13 00.8	97 23	48.2	13 29.8	97 23	48.1	13 58.8	97 23	48.0	14 27.8	97 23	47.8	14 56.8	97 23	47.7	15 25.8	97 23	47.6	15 54.8	97 23	47.4	7	
8	12 18.0	97 23	47.5	12 47.0	97 23	47.3	13 16.1	97 22	47.2	13 45.1	97 22	47.1	14 14.2	97 22	46.9	14 43.2	97 22	46.8	15 12.2	97 22	46.7	15 41.3	97 22	46.6	8	
9	12 04.4	97 22	46.6	12 33.5	97 22	46.4	13 02.6	97 22	46.3	13 31.7	97 22	46.2	14 00.7	97 22	46.0	14 29.8	97 22	45.9	14 58.9	97 22	45.8	15 27.9	97 22	45.7	9	
130	11 51.1	97 22	45.6	12 20.2	97 22	45.5	12 49.3	97 22	45.4	13 18.4	97 22	45.3	13 47.5	97 22	45.2	14 16.6	97 22	45.0	14 45.7	97 22	44.9	15 14.7	97 22	44.8	130	
1	11 37.9	97 22	44.7	12 07.0	97 22	44.6	12 36.2	97 21	44.5	13 05.3	97 21	44.4	13 34.4	97 21	44.3	14 03.6	97 21	44.1	14 32.7	97 21	44.0	15 01.8	97 21	43.9	1	
2	11 25.0	97 21	43.8	11 54.1	97 21	43.7	12 23.3	97 21	43.6	12 52.4	97 21	43.5	13 21.6	97 21	43.4	13 50.8	97 21	43.2	14 19.9	97 21	43.1	14 49.0	97 21	43.0	2	Lat. 74°
3	11 12.2	97 21	42.9	11 41.4	97 21	42.8	12 10.6	97 21	42.7	12 39.8	97 21	42.6	13 09.0	97 21	42.5	13 38.2	97 21	42.3	14 07.3	97 21	42.2	14 36.5	97 21	42.1	3	
4	10 59.7	97 20	42.0	11 28.9	97 20	41.9	11 58.1	97 20	41.8	12 27.4	97 20	41.7	12 56.6	97 20	41.6	13 25.8	97 20	41.4	13 55.0	97 20	41.3	14 24.2	97 20	41.2	4	
135	10 47.4	97 20	41.1	11 16.7	97 20	41.0	11 45.9	97 20	40.9	12 15.1	97 20	40.8	12 44.4	97 20	40.7	13 13.6	97 20	40.5	13 42.9	97 20	40.4	14 12.1	97 20	40.3	135	
6	10 35.3	98 20	40.2	11 04.6	98 20	40.1	11 33.9	98 20	40.0	12 03.1	98 20	39.9	12 32.4	98 20	39.8	13 01.7	98 20	39.7	13 30.9	98 19	39.5	14 00.2	98 19	39.4	6	
7	10 23.5	98 19	39.3	10 52.8	98 19	39.2	11 22.1	98 19	39.1	11 51.4	98 19	39.0	12 20.7	98 19	38.9	12 50.0	98 19	38.8	13 19.2	98 19	38.6	13 48.5	98 19	38.5	7	
8	10 11.8	98 19	38.4	10 41.2	98 19	38.3	11 10.5	98 19	38.2	11 39.8	98 19	38.1	12 09.1	98 19	38.0	12 38.5	98 19	37.9	13 07.8	98 19	37.7	13 37.1	98 19	37.6	8	
9	10 00.4	98 19	37.5	10 29.8	98 19	37.4	10 59.2	98 19	37.3	11 28.5	98 18	37.2	11 57.9	98 18	37.1	12 27.2	98 18	37.0	12 56.5	98 18	36.9	13 25.9	98 18	36.7	9	
140	9 49.3	98 18	36.6	10 18.7	98 18	36.5	10 48.0	98 18	36.4	11 17.4	98 18	36.3	11 46.8	98 18	36.2	12 16.2	98 18	36.1	12 45.5	98 18	36.0	13 14.9	98 18	35.9	140	
1	9 38.3	98 18	35.7	10 07.8	98 18	35.6	10 37.2	98 18	35.5	11 06.6	98 18	35.4	11 36.0	98 18	35.3	12 05.4	98 18	35.2	12 34.8	98 18	35.1	13 04.2	98 18	35.0	1	Lat. 75°
2	9 27.6	98 17	34.8	9 57.1	98 17	34.7	10 26.5	98 17	34.6	10 56.0	98 17	34.5	11 25.4	98 17	34.4	11 54.8	98 17	34.3	12 24.2	98 17	34.2	12 53.7	98 17	34.1	2	
3	9 17.2	98 17	33.9	9 46.7	98 17	33.8	10 16.1	98 17	33.7	10 45.6	98 17	33.6	11 15.0	98 17	33.5	11 44.5	98 17	33.4	12 13.9	98 17	33.3	12 43.4	98 17	33.2	3	
4	9 07.0	98 17	32.9	9 36.5	98 17	32.9	10 06.0	98 17	32.8	10 35.5	98 16	32.7	11 04.9	98 16	32.6	11 34.4	98 16	32.5	12 03.9	98 16	32.4	12 33.4	98 16	32.3	4	
145	8 57.0	98 16	32.0	9 26.5	98 16	31.9	9 56.1	98 16	31.9	10 25.6	98 16	31.8	10 55.1	98 16	31.7	11 24.6	98 16	31.6	11 54.1	98 16	31.5	12 23.6	98 16	31.4	145	
6	8 47.3	98 16	31.1	9 16.9	98 16	31.0	9 46.4	98 16	30.9	10 15.9	98 16	30.9	10 45.5	98 16	30.8	11 15.0	98 16	30.7	11 44.5	98 16	30.6	12 14.1	98 15	30.5	6	
7	8 37.9	99 15	30.2	9 07.4	99 15	30.1	9 37.0	99 15	30.0	10 06.5	99 15	30.0	10 36.1	99 15	29.9	11 05.7	99 15	29.8	11 35.2	99 15	29.7	12 04.8	99 15	29.6	7	
8	8 28.7	99 15	29.3	8 58.2	99 15	29.2	9 27.8	99 15	29.1	9 57.4	99 15	29.1	10 27.0	99 15	29.0	10 56.6	99 15	28.9	11 26.2	99 15	28.8	11 55.7	99 15	28.7	8	
9	8 19.7	99 14	28.4	8 49.3	99 14	28.3	9 18.9	99 14	28.2	9 48.5	99 14	28.1	10 18.1	99 14	28.1	10 47.7	99 14	28.0	11 17.4	99 14	27.9	11 47.0	99 14	27.8	9	
150	8 11.0	99 14	27.5	8 40.7	99 14	27.4	9 10.3	99 14	27.3	9 39.9	99 14	27.2	10 09.6	99 14	27.2	10 39.2	99 14	27.1	11 08.8	99 14	27.0	11 38.4	99 14	26.9	150	
1	8 02.6	99 14	26.6	8 32.3	99 14	26.5	9 01.9	99 14	26.4	9 31.6	99 14	26.3	10 01.2	99 13	26.3	10 30.9	99 13	26.2	11 00.5	99 13	26.1	11 30.2	99 13	26.0	1	Lat. 76°
2	7 54.4	99 13	25.7	8 24.1	99 13	25.6	8 53.8	99 13	25.5	9 23.5	99 13	25.4	9 53.1	99 13	25.4	10 22.8	99 13	25.3	10 52.5	99 13	25.2	11 22.2	99 13	25.1	2	
3	7 46.5	99 13	24.7	8 16.2	99 13	24.7	8 45.9	99 13	24.6	9 15.6	99 13	24.5	9 45.3	99 13	24.5	10 15.0	99 13	24.4	10 44.7	99 12	24.3	11 14.4	99 12	24.2	3	
4	7 38.9	99 12	23.8	8 08.6	99 12	23.8	8 38.4	99 12	23.7	9 08.1	99 12	23.6	9 37.8	99 12	23.6	10 07.5	99 12	23.5	10 37.2	99 12	23.4	11 06.9	99 12	23.3	4	
155	7 31.6	99 12	22.9	8 01.3	99 12	22.9	8 31.0	99 12	22.8	9 00.8	99 12	22.7	9 30.5	99 12	22.7	10 00.3	99 12	22.6	10 30.0	99 12	22.5	10 59.7	99 12	22.5	155	
6	7 24.5	99 11	22.0	7 54.2	99 11	21.9	8 24.0	99 11	21.9	8 53.8	99 11	21.8	9 23.5	99 11	21.7	9 53.3	99 11	21.7	10 23.0	99 11	21.6	10 52.8	99 11	21.6	6	
7	7 17.7	99 11	21.1	7 47.4	99 11	21.0	8 17.2	99 11	21.0	8 47.0	99 11	20.9	9 16.8	99 11	20.8	9 46.5	99 11	20.8	10 16.3	99 11	20.7	10 46.1	99 11	20.7	7	
8	7 11.1	99 10	20.2	7 40.9	99 10	20.1	8 10.7	99 10	20.1	8 40.5	99 10	20.0	9 10.3	99 10	19.9	9 40.1	99 10	19.9	10 09.9	99 10	19.8	10 39.7	99 10	19.8	8	Lat. 77
9	7 04.9	99 10	19.3	7 34.7	99 10	19.2	8 04.5	99 10	19.2	8 34.3	99 10	19.1	9 04.1	99 10	19.0	9 33.9	99 10	19.0	10 03.7	99 10	18.9	10 33.6	99 10	18.9	9	
160	6 58.9	99 09	18.3	7 28.7	99 09	18.3	7 58.6	99 09	18.2	8 28.4	99 09	18.2	8 58.2	99 09	18.1	9 28.0	99 09	18.1	9 57.9	99 09	18.0	10 27.7	99 09	18.0	160	
1	6 53.2	99 09	17.4	7 23.1	99 09	17.4	7 52.9	99 09	17.3	8 22.7	99 09	17.3	8 52.6	99 09	17.2	9 22.4	99 09	17.2	9 52.3	99 09	17.1	10 22.1	99 09	17.1	1	
2	6 47.8	1.0 09	16.5	7 17.7	1.0 08	16.5	7 47.5	1.0 08	16.4	8 17.4	1.0 08	16.4	8 47.2	1.0 08	16.3	9 17.1	1.0 08	16.3	9 47.0	1.0 08	16.2	10 16.8	1.0 08	16.2	2	
3	6 42.7	1.0 08	15.6	7 12.5	1.0 08	15.6	7 42.4	1.0 08	15.5	8 12.3	1.0 08	15.5	8 42.2	1.0 08	15.4	9 12.0	1.0 08	15.4	9 41.9	1.0 08	15.3	10 11.8	1.0 08	15.3	3	
4	6 37.8	1.0 08	14.7	7 07.7	1.0 08	14.6	7 37.6	1.0 08	14.6	8 07.5	1.0 08	14.6	8 37.4	1.0 08	14.5	9 07.3	1.0 07	14.5	9 37.2	1.0 07	14.4	10 07.0	1.0 07	14.4	4	
165	6 33.3	1.0 07	13.8	7 03.2	1.0 07	13.7	7 33.1	1.0 07	13.7	8 03.0	1.0 07	13.6	8 32.9	1.0 07	13.6	9 02.8	1.0 07	13.6	9 32.7	1.0 07	13.5	10 02.6	1.0 07	13.5	165	
6	6 29.0	1.0 07	12.9	6 58.9	1.0 07	12.8	7 28.8	1.0 07	12.8	7 58.7	1.0 07	12.7	8 28.7	1.0 07	12.7	8 58.6	1.0 07	12.7	9 28.5	1.0 06	12.6	9 58.4	1.0 06	12.6	6	
7	6 25.0	1.0 06	11.9	6 54.9	1.0 06	11.9	7 24.9	1.0 06	11.9	7 54.8	1.0 06	11.8	8 24.7	1.0 06	11.8	8 54.7	1.0 06	11.8	9 24.6	1.0 06	11.7	9 54.5	1.0 06	11.7	7	L 7
8	6 21.3	1.0 06	11.0	6 51.3	1.0 06	11.0	7 21.2	1.0 06	11.0	7 51.1	1.0 06	10.9	8 21.1	1.0 06	10.9	8 51.0	1.0 06	10.9	9 21.0	1.0 06	10.8	9 50.9	1.0 06	10.8	8	
9	6 17.9	1.0 05	10.1	6 47.9	1.0 05	10.1	7 17.8	1.0 05	10.0	7 47.8	1.0 05	10.0	8 17.7	1.0 05	10.0	8 47.7	1.0 05	10.0	9 17.6	1.0 05	09.9	9 47.6	1.0 05	09.9	9	
170	6 14.8	1.0 05	09.2	6 44.8	1.0 05	09.2	7 14.7	1.0 05	09.1	7 44.7	1.0 05	09.1	8 14.7	1.0 05	09.1	8 44.6	1.0 05	09.0	9 14.6	1.0 05	09.0	9 44.5	1.0 05	09.0	170	
1	6 12.0	1.0 04	08.3	6 42.0	1.0 04	08.2	7 11.9	1.0 04	08.2	7 41.9	1.0 04	08.2	8 11.9	1.0 04	08.2	8 41.8	1.0 04	08.1	9 11.8	1.0 04	08.1	9 41.8	1.0 04	08.1	1	
2	6 09.5	1.0 04	07.3	6 39.5	1.0 04	07.3	7 09.4	1.0 04	07.3	7 39.4	1.0 04	07.3	8 09.4	1.0 04	07.3	8 39.4	1.0 04	07.2	9 09.3	1.0 04	07.2	9 39.3	1.0 04	07.2	2	
3	6 07.3	1.0 03	06.4	6 37.3	1.0 03	06.4	7 07.2	1.0 03	06.4	7 37.2	1.0 03	06.4	8 07.2	1.0 03	06.4	8 37.2	1.0 03	06.3	9 07.1	1.0 03	06.3	9 37.1	1.0 03	06.3	3	
4	6 05.3	1.0 03	05.5	6 35.3	1.0 03	05.5	7 05.3	1.0 03	05.5	7 35.3	1.0 03	05.5	8 05.3	1.0 03	05.4	8 35.3	1.0 03	05.4	9 05.3	1.0 03	05.4	9 35.2	1.0 03	05.4	4	
175	6 03.7	1.0 02	04.6	6 33.7	1.0 02	04.6	7 03.7	1.0 02	04.6	7 33.7	1.0 02	04.6	8 03.7	1.0 02	04.5	8 33.7	1.0 02	04.5	9 03.6	1.0 02	04.5	9 33.6	1.0 02	04.5	175	
6	6 02.4	1.0 02	03.7	6 32.4	1.0 02	03.7	7 02.4	1.0 02	03.7	7 32.4	1.0 02	03.6	8 02.3	1.0 02	03.6	8 32.3	1.0 02	03.6	9 02.3	1.0 02	03.6	9 32.3	1.0 02	03.6	6	
7	6 01.3	1.0 01	02.8	6 31.3	1.0 01	02.7	7 01.3	1.0 01	02.7	7 31.3	1.0 01	02.7	8 01.3	1.0 01	02.7	8 31.3	1.0 01	02.7	9 01.3	1.0 01	02.7	9 31.3	1.0 01	02.7	7	
8	6 00.6	1.0 01	01 8	6 30.6	1.0 01	01.8	7 00.6	1.0 01	01.8	7 30.6	1.0 01	01.8	8 00.6	1.0 01	01.8	8 30.6	1.0 01	01.8	9 00.6	1.0 01	01.8	9 30.6	1.0 01	01.8	8	
9	6 00.1	1.0 00	00.9	6 30.1	1.0 00	00.9	7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9	9	
180	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	180	

Lat. 72°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	46 00.0	1.0 00	180.0	46 30.0	1.0 00	180.0	47 00.0	1.0 00	180.0	48 00.0	1.0 00	180.0	50 00.0	1.0 00	180.0	52 00.0	1.0 00	180.0	52 30.0	1.0 00	180.0	53 30.0	1.0 00	180.0	00
1	45 59.8	1.0 01	178.7	46 29.8	1.0 01	178.7	46 59.8	1.0 01	178.7	47 59.8	1.0 01	178.7	49 59.8	1.0 01	178.7	51 59.8	1.0 01	178.7	52 29.8	1.0 01	178.6	53 29.8	1.0 01	178.6	1
2	45 59.2	1.0 02	177.5	46 29.2	1.0 02	177.4	46 59.2	1.0 02	177.4	47 59.2	1.0 02	177.4	49 59.1	1.0 02	177.4	51 59.1	1.0 02	177.3	52 29.1	1.0 02	177.3	53 29.1	1.0 02	177.3	2
3	45 58.2	1.0 02	176.2	46 28.1	1.0 02	176.2	46 58.1	1.0 02	176.2	47 58.1	1.0 02	176.1	49 58.1	1.0 02	176.0	51 58.0	1.0 03	176.0	52 28.0	1.0 03	175.9	53 28.0	1.0 03	175.9	3
4	45 56.7	1.0 03	174.9	46 26.7	1.0 03	174.9	46 56.7	1.0 03	174.9	47 56.7	1.0 03	174.8	49 56.6	1.0 03	174.7	51 56.5	1.0 03	174.6	52 26.5	1.0 03	174.6	53 26.5	1.0 03	174.5	4
05	45 54.9	1.0 04	173.6	46 24.8	1.0 04	173.6	46 54.8	1.0 04	173.6	47 54.8	1.0 04	173.5	49 54.7	1.0 04	173.4	51 54.6	1.0 04	173.3	52 24.5	1.0 04	173.2	53 24.5	1.0 04	173.2	05
6	45 52.6	1.0 04	172.4	46 22.6	1.0 04	172.3	46 52.5	1.0 04	172.3	47 52.5	1.0 05	172.2	49 52.3	1.0 05	172.1	51 52.2	1.0 05	171.9	52 22.1	1.0 05	171.9	53 22.0	1.0 05	171.8	6
7	45 50.0	1.0 05	171.1	46 19.9	1.0 05	171.1	46 49.9	1.0 05	171.0	47 49.8	1.0 05	171.0	49 49.6	1.0 05	170.8	51 49.4	1.0 05	170.6	52 19.3	1.0 05	170.5	53 19.2	1.0 06	170.4	7
8	45 46.9	1.0 06	169.9	46 16.8	1.0 06	169.8	46 46.8	1.0 06	169.8	47 46.6	1.0 06	169.7	49 46.4	1.0 06	169.5	51 46.1	1.0 06	169.3	52 16.0	1.0 06	169.2	53 15.9	1.0 06	169.1	8
9	45 43.4	1.0 06	168.6	46 13.3	1.0 06	168.5	46 43.3	1.0 06	168.5	47 43.1	1.0 07	168.4	49 42.8	1.0 07	168.2	51 42.4	1.0 07	167.9	52 12.4	1.0 07	167.9	53 12.2	1.0 07	167.7	9
10	45 39.5	1.0 07	167.3	46 09.5	1.0 07	167.3	46 39.4	1.0 07	167.2	47 39.2	1.0 07	167.1	49 38.8	1.0 07	166.9	51 38.4	1.0 08	166.6	52 08.2	1.0 08	166.5	53 08.0	1.0 08	166.4	10
1	45 35.3	1.0 08	166.1	46 05.2	1.0 08	166.0	46 35.1	1.0 08	165.9	47 34.8	1.0 08	165.8	49 34.4	1.0 08	165.6	51 33.8	1.0 08	165.3	52 03.7	1.0 08	165.2	53 03.4	1.0 08	165.0	1
2	45 30.6	1.0 08	164.8	46 00.5	1.0 08	164.7	46 30.4	1.0 08	164.7	47 30.1	1.0 09	164.5	49 29.5	1.0 09	164.2	51 28.9	99 09	163.9	51 58.8	99 09	163.8	52 58.4	99 09	163.7	2
3	45 25.6	1.0 09	163.6	45 55.4	99 09	163.5	46 25.3	99 09	163.4	47 25.0	99 09	163.3	49 24.3	99 09	163.0	51 23.6	99 10	162.6	51 53.4	99 10	162.5	52 53.0	99 10	162.3	3
4	45 20.1	99 10	162.3	45 50.0	99 10	162.2	46 19.8	99 09	162.2	47 19.4	99 10	162.0	49 18.7	99 10	161.7	51 17.8	99 10	161.3	51 47.6	99 10	161.2	52 47.2	99 11	161.0	4
15	45 14.3	99 10	161.1	45 44.1	99 10	161.0	46 13.9	99 10	160.9	47 13.5	99 11	160.7	49 12.6	99 11	160.4	51 11.7	99 11	160.0	51 41.4	99 11	159.9	52 40.9	99 11	159.7	15
6	45 08.1	99 11	159.8	45 37.9	99 11	159.7	46 07.6	99 11	159.6	47 07.2	99 11	159.5	49 06.2	99 11	159.1	51 05.1	99 12	158.7	51 34.9	99 12	158.6	52 34.3	99 12	158.3	6
7	45 01.5	99 12	158.6	45 31.3	99 12	158.5	46 01.0	99 12	158.4	47 00.5	99 12	158.2	48 59.4	99 12	157.8	50 58.2	99 12	157.4	51 27.9	99 12	157.2	52 27.2	99 12	157.0	7
8	44 54.6	99 12	157.3	45 24.3	99 12	157.2	45 54.0	99 12	157.1	46 53.4	99 12	156.9	48 52.2	99 13	156.5	50 50.9	99 13	156.1	51 20.5	99 13	155.9	52 19.8	99 13	155.7	8
9	44 47.2	99 13	156.1	45 16.9	99 13	156.0	45 46.6	99 13	155.9	46 46.0	99 13	155.7	48 44.6	99 13	155.2	50 43.2	99 13	154.8	51 12.8	99 14	154.6	52 12.0	99 14	154.4	9
20	44 39.5	99 13	154.9	45 09.2	99 13	154.8	45 38.9	99 14	154.7	46 38.2	99 14	154.4	48 36.7	99 14	154.0	50 35.1	99 14	153.5	51 04.6	99 14	153.3	52 03.8	99 14	153.1	20
1	44 31.5	99 14	153.7	45 01.1	99 14	153.5	45 30.7	99 14	153.4	46 30.0	99 14	153.2	48 28.4	99 14	152.7	50 26.6	98 15	152.2	50 56.1	98 15	152.1	51 55.2	98 15	151.8	1
2	44 23.1	99 15	152.4	44 52.7	99 15	152.3	45 22.3	99 15	152.2	46 21.4	99 15	152.0	48 19.7	98 15	151.5	50 17.8	98 15	150.9	50 47.3	98 15	150.8	51 46.2	98 16	150.5	2
3	44 14.3	99 15	151.2	44 43.9	99 15	151.1	45 13.5	99 15	151.0	46 12.5	98 15	150.7	48 10.6	98 16	150.2	50 08.6	98 16	149.6	50 38.0	98 16	149.5	51 36.9	98 16	149.2	3
4	44 05.2	98 16	150.0	44 34.8	98 16	149.9	45 04.3	98 16	149.8	46 03.3	98 16	149.5	48 01.2	98 16	149.0	49 59.0	98 16	148.4	50 28.4	98 17	148.2	51 27.2	98 17	147.9	4
25	43 55.8	98 16	148.8	44 25.3	98 16	148.7	44 54.8	98 16	148.5	45 53.7	98 17	148.3	47 51.5	98 17	147.7	49 49.1	98 17	147.1	50 18.5	98 17	147.0	51 17.2	98 17	146.6	25
6	43 46.0	98 17	147.6	44 15.5	98 17	147.5	44 44.9	98 17	147.3	45 43.8	98 17	147.1	47 41.4	98 17	146.5	49 38.9	98 18	145.9	50 08.2	98 18	145.7	51 06.8	98 18	145.4	6
7	43 35.9	98 17	146.4	44 05.3	98 17	146.3	44 34.8	98 18	146.1	45 33.6	98 18	145.8	47 31.0	98 18	145.2	49 28.3	98 18	144.6	49 57.6	98 18	144.4	50 56.1	97 18	144.1	7
8	43 25.5	98 18	145.2	43 54.9	98 18	145.1	44 24.3	98 18	144.9	45 23.0	98 18	144.6	47 20.3	98 18	144.0	49 17.4	97 19	143.4	49 46.7	97 19	143.2	50 45.1	97 19	142.8	8
9	43 14.8	98 18	144.0	43 44.1	98 18	143.9	44 13.4	98 19	143.7	45 12.1	98 19	143.4	47 09.3	98 19	142.8	49 06.2	97 19	142.1	49 35.4	97 19	142.0	50 33.7	97 19	141.6	9
30	43 03.7	98 19	142.8	43 33.0	98 19	142.7	44 02.3	98 19	142.5	45 00.9	98 19	142.2	46 57.9	97 19	141.6	48 54.7	97 20	140.9	49 23.8	97 20	140.7	50 22.1	97 20	140.3	30
1	42 52.3	98 19	141.6	43 21.6	98 20	141.5	43 50.9	98 20	141.3	44 49.4	97 20	141.0	46 46.2	97 20	140.4	48 42.8	97 20	139.7	49 11.9	97 20	139.5	50 10.1	97 20	139.1	1
2	42 40.7	97 20	140.5	43 09.9	97 20	140.3	43 39.2	97 20	140.2	44 37.6	97 20	139.8	46 34.2	97 20	139.2	48 30.7	97 21	138.5	48 59.7	97 21	138.3	49 57.8	97 21	137.9	2
3	42 28.7	97 20	139.3	42 58.0	97 20	139.2	43 27.1	97 20	139.0	44 25.5	97 21	138.7	46 22.0	97 21	138.0	48 18.2	97 21	137.3	48 47.2	97 21	137.1	49 45.2	97 21	136.7	3
4	42 16.5	97 21	138.1	42 45.7	97 21	138.0	43 14.8	97 21	137.8	44 13.1	97 21	137.5	46 09.4	97 21	136.8	48 05.5	97 22	136.0	48 34.5	97 22	135.9	49 32.3	96 22	135.5	4
35	42 04.0	97 21	137.0	42 33.1	97 21	136.8	43 02.2	97 21	136.7	44 00.4	97 22	136.3	45 56.6	97 22	135.6	47 52.5	96 22	134.9	48 21.4	96 22	134.7	49 19.2	96 22	134.2	35
6	41 51.2	97 22	135.8	42 20.3	97 22	135.7	42 49.4	97 22	135.5	43 47.5	97 22	135.2	45 43.5	97 22	134.4	47 39.2	96 23	133.7	48 08.1	96 23	133.5	49 05.8	96 23	133.0	6
7	41 38.2	97 22	134.7	42 07.2	97 22	134.5	42 36.3	97 22	134.3	43 34.3	97 22	134.0	45 30.1	96 23	133.3	47 25.7	96 23	132.5	47 54.5	96 23	132.3	48 52.1	96 23	131.9	7
8	41 24.9	97 23	133.5	41 53.9	97 23	133.4	42 22.9	97 23	133.2	43 20.8	97 23	132.8	45 16.5	96 23	132.1	47 11.9	96 23	131.3	47 40.6	96 24	131.1	48 38.2	96 24	130.7	8
9	41 11.3	97 23	132.4	41 40.3	97 23	132.2	42 09.2	96 23	132.1	43 07.1	96 23	131.7	45 02.6	96 24	130.9	46 57.8	96 24	130.1	47 26.6	96 24	129.9	48 24.0	96 24	129.5	9
40	40 57.5	96 23	131.3	41 26.4	96 23	131.1	41 55.3	96 24	130.9	42 53.1	96 24	130.6	44 48.5	96 24	129.8	46 43.5	96 24	129.0	47 12.2	96 24	128.8	48 09.5	95 24	128.3	40
1	40 43.4	96 24	130.2	41 12.3	96 24	130.0	41 41.2	96 24	129.8	42 38.9	96 24	129.4	44 34.1	96 24	128.7	46 29.0	96 25	127.8	46 57.6	96 25	127.6	47 54.9	95 25	127.2	1
2	40 29.1	96 24	129.0	40 58.0	96 24	128.9	41 26.8	96 24	128.7	42 24.5	96 24	128.3	44 19.5	96 25	127.5	46 14.2	95 25	126.7	46 42.8	95 25	126.5	47 40.0	95 25	126.0	2
3	40 14.6	96 25	127.9	40 43.5	96 25	127.7	41 12.3	96 25	127.6	42 09.8	96 25	127.2	44 04.7	96 25	126.4	45 59.2	95 25	125.5	46 27.8	95 25	125.3	47 24.9	95 26	124.9	3
4	39 59.9	96 25	126.8	40 28.7	96 25	126.6	40 57.4	96 25	126.4	41 54.9	96 25	126.1	43 49.7	95 25	125.3	45 44.1	95 26	124.4	46 12.6	95 26	124.2	47 09.6	95 26	123.7	4
45	39 44.9	96 25	125.7	40 13.7	96 25	125.5	40 42.4	96 25	125.3	41 39.8	96 26	124.9	43 34.4	95 26	124.1	45 28.7	95 26	123.3	45 57.1	95 26	123.1	46 54.0	95 26	122.6	45
6	39 29.8	96 26	124.6	39 58.5	96 26	124.4	40 27.2	96 26	124.2	41 24.5	96 26	123.8	43 19.0	95 26	123.0	45 13.1	95 26	122.2	45 41.5	95 26	121.9	46 38.3	95 27	121.5	6
7	39 14.4	96 26	123.5	39 43.1	96 26	123.3	40 11.8	96 26	123.1	41 09.0	95 26	122.7	43 03.3	95 26	121.9	44 57.3	95 27	121.0	45 25.7	95 27	120.8	46 22.4	94 27	120.3	7
8	38 58.9	96 26	122.4	39 27.5	95 26	122.2	39 56.1	95 26	122.0	40 53.4	95 26	121.6	42 47.5	95 27	120.8	44 41.3	95 27	119.9	45 09.7	95 27	119.7	46 06.3	94 27	119.2	8
9	38 43.1	95 27	121.3	39 11.7	95 27	121.2	39 40.3	95 27	121.0	40 37.5	95 27	120.6	42 31.5	95 27	119.7	44 25.1	95 27	118.8	44 53.5	94 27	118.6	45 50.1	94 27	118.1	9
50	38 27.2	95 27	120.3	38 55.8	95 27	120.1	39 24.3	95 27	119.9	40 21.4	95 27	119.5	42 15.3	95 27	118.6	44 08.8	94 27	117.7	44 37.1	94 28	117.5	45 33.6	94 28	117.0	50
1	38 11.1	95 27	119.2	38 39.6	95 27	119.0	39 08.2	95 27	118.8	40 05.2	95 27	118.4	41 59.0	95 28	117.6	43 52.3	94 28	116.7	44 20.6	94 28	116.4	45 17.0	94 28	115.9	1
2	37 54.8	95 27	118.1	38 23.4	95 27	117.9	38 51.9	95 27	117.7	39 48.8	95 28	117.3	41 42.4	95 28	116.5	43 35.7	94 28	115.6	44 03.9	94 28	115.3	45 00.3	94 28	114.9	2
3	37 38.4	95 28	117.1	38 06.9	95 28	116.9	38 35.4	95 28	116.7	39 32.3	95 28	116.3	41 25.8	94 28	115.4	43 18.9	94 28	114.5	43 47.1	94 28	114.3	44 43.4	94 28	113.8	3
4	37 21.8	95 28	116.0	37 50.3	95 28	115.8	38 18.7	95 28	115.6	39 15.6	95 28	115.2	41 08.9	94 28	114.3	43 01.9	94 28	113.4	43 30.1	94 29	113.2	44 26.4	94 29	112.7	4
55	37 05.1	95 28	115.0	37 33.5	95 28	114.8	38 01.9	95 28	114.6	38 58.7	95 28	114.1	40 52.0	94 28	113.3	42 44.8	94 29	112.4	43 13.0	94 29	112.1	44 09.2	94 29	111.6	55
6	36 48.2	95 28	113.9	37 16.6	95 28	113.7	37 45.0	95 28	113.5	38 41.7	94 29	113.1	40 34.9	94 29	112.2	42 27.6	94 29	111.3	42 55.7	94 29	111.1	43 51.9	93 29	110.6	6
7	36 31.2	95 29	112.9	36 59.6	95 29	112.7	37 27.9	95 29	112.5	38 24.6	94 29	112.0	40 17.6	94 29	111.2	42 10.3	94 29	110.3	42 38.4	94 29	110.0	43 34.5	93 29	109.5	7
8	36 14.0	95 29	111.8	36 42.4	95 29	111.6	37 10.7	94 29	111.4	38 07.3	94 29	111.0	40 00.3	94 29	110.1	41 52.8	94 29	109.2	42 20.9	94 29	109.0	43 17.0	93 29	108.5	8
9	35 56.8	94 29	110.8	36 25.1	94 29	110.6	36 53.4	94 29	110.4	37 50.0	94 29	110.0	39 42.8	94 29	109.1	41 35.3	94 29	108.2	42 03.3	93 29	107.9	42 59.3	93 30	107.4	9
60	35 39.4	94 29	109.8	36 07.7	94 29	109.6	36 36.0	94 29	109.4	37 32.5	94 29	108.9	39 25.3	94 29	108.1	41 17.6	93 30	107.1	41 45.6	93 30	106.9	42 41.6	93 30	106.4	60
1	35 21.9	94 29	108.7	35 50.1	94 29	108.5	36 18.4	94 29	108.3	37 14.9	94 29	107.9	39 07.6	94 30	107.0	40 59.8	93 30	106.1	41 27.8	93 30	105.9	42 23.7	93 30	105.4	1
2	35 04.2	94 30	107.7	35 32.5	94 30	107.5	36 00.8	94 30	107.3	36 57.2	94 30	106.9	38 49.8	94 30	106.0	40 42.0	93 30	105.1	41 10.0	93 30	104.9	42 05.8	93 30	104.4	2
3	34 46.5	94 30	106.7	35 14.8	94 30	106.5	35 43.0	94 30	106.3	36 39.4	94 30	105.9	38 31.9	94 30	105.0	40 24.0	93 30	104.1	40 52.0	93 30	103.8	41 47.8	93 30	103.3	3
4	34 28.7	94 30	105.7	34 57.0	94 30	105.5	35 25.2	94 30	105.3	36 21.5	94 30	104.9	38 14.0	94 30	104.0	40 06.0	93 30	103.1	40 34.0	93 30	102.8	41 29.7	93 30	102.3	4
65	34 10.8	94 30	104.7	34 39.1	94 30	104.5	35 07.3	94 30	104.3	36 03.6	94 30	103.9	37 56.0	93 30	103.0	39 47.9	93 30	102.1	40 15.8	93 30	101.8	41 11.6	93 30	101.3	65
6	33 52.9	94 30	103.7	34 21.1	94 30	103.5	34 49.2	94 30	103.3	35 45.5	94 30	102.9	37 37.9	93 30	102.0	39 29.8	93 30	101.0	39 57.7	93 30	100.8	40 53.4	93 30	100.3	6
7	33 34.8	94 30	102.7	34 03.0	94 30	102.5	34 31.2	94 30	102.3	35 27.4	94 30	101.9	37 19.7	93 30	101.0	39 11.5	93 30	100.1	39 39.4	93 30	99.8	40 35.1	93 31	99.3	7
8	33 16.7	94 30	101.7	33 44.9	94 30	101.5	34 13.0	94 30	101.3	35 09.3	94 30	100.9	37 01.5	93 30	100.0	38 53.3	93 31	99.1	39 21.1	93 31	98.8	40 16.8	93 31	98.3	8
9	32 58.5	94 30	100.7	33 26.7	94 30	100.5	33 54.8	94 30	100.3	34 51.0	94 30	99.9	36 43.2	93 31	99.0	38 34.9	93 31	98.1	39 02.8	93 31	97.8	39 58.4	93 31	97.4	9
70	32 40.3	94 30	99.7	33 08.4	94 31	99.5	33 36.5	94 31	99.3	34 32.7	94 31	98.9	36 24.8	93 31	98.0	38 16.5	93 31	97.1	38 44.4	93 31	96.9	39 40.0	93 31	96.4	70
1	32 22.0	94 31	98.7	32 50.1	94 31	98.5	33 18.2	94 31	98.3	34 14.4	94 31	97.9	36 06.4	93 31	97.0	37 58.1	93 31	96.1	38 26.0	93 31	95.9	39 21.6	93 31	95.4	1
2	32 03.6	94 31	97.8	32 31.7	94 31	97.6	32 59.8	94 31	97.3	33 56.0	94 31	96.9	35 48.0	93 31	96.1	37 39.7	93 31	95.1	38 07.5	93 31	94.9	39 03.1	93 31	94.4	2
3	31 45.2	94 31	96.8	32 13.3	94 31	96.6	32 41.4	94 31	96.4	33 37.6	93 31	95.9	35 29.6	93 31	95.1	37 21.2	93 31	94.2	37 49.0	93 31	93.9	38 44.6	93 31	93.5	3
4	31 26.8	94 31	95.8	31 54.9	94 31	95.6	32 23.0	94 31	95.4	33 19.1	93 31	95.0	35 11.1	93 31	94.1	37 02.7	93 31	93.2	37 30.5	93 31	93.0	38 26.1	93 31	92.5	4
75	31 08.3	94 31	94.8	31 36.4	94 31	94.6	32 04.5	94 31	94.4	33 00.6	93 31	94.0	34 52.6	93 31	93.1	36 44.2	93 31	92.2	37 12.0	93 31	92.0	38 07.6	93 31	91.5	75
6	30 49.8	94 31	93.9	31 17.9	94 31	93.7	31 46.0	94 31	93.5	32 42.1	93 31	93.0	34 34.1	93 31	92.2	36 25.6	93 31	91.3	36 53.5	93 31	91.0	37 49.0	93 31	90.6	6
7	30 31.3	94 31	92.9	30 59.4	94 31	92.7	31 27.5	94 31	92.5	32 23.6	93 31	92.1	34 15.5	93 31	91.2	36 07.1	93 31	90.3	36 34.9	93 31	90.1	37 30.5	93 31	89.6	7
8	30 12.8	94 31	92.0	30 40.9	94 31	91.8	31 09.0	94 31	91.5	32 05.1	93 31	91.1	33 57.0	93 31	90.3	35 48.6	93 31	89.4	36 16.4	93 31	89.1	37 11.9	93 31	88.7	8
9	29 54.3	94 31	91.0	30 22.4	94 31	90.8	30 50.4	94 31	90.6	31 46.5	93 31	90.2	33 38.5	93 31	89.3	35 30.0	93 31	88.4	35 57.8	93 31	88.2	36 53.4	93 31	87.7	9
80	29 35.7	94 31	90.0	30 03.8	94 31	89.8	30 31.9	94 31	89.6	31 28.0	93 31	89.2	33 19.9	93 31	88.4	35 11.5	93 31	87.5	35 39.3	93 31	87.3	36 34.9	93 31	86.8	80
1	29 17.2	94 31	89.1	29 45.3	94 31	88.9	30 13.4	94 31	88.7	31 09.5	93 31	88.3	33 01.4	93 31	87.4	34 53.0	93 31	86.5	35 20.8	93 31	86.3	36 16.4	93 31	85.9	1
2	28 58.6	94 31	88.2	29 26.7	94 31	88.0	29 54.8	94 31	87.7	30 50.9	93 31	87.3	32 42.9	93 31	86.5	34 34.5	93 31	85.6	35 02.3	93 31	85.4	35 57.9	93 31	84.9	2
3	28 40.1	94 31	87.2	29 08.2	94 31	87.0	29 36.3	94 31	86.8	30 32.4	93 31	86.4	32 24.4	93 31	85.6	34 16.0	93 31	84.7	34 43.8	93 31	84.4	35 39.5	93 31	84.0	3
4	28 21.6	94 31	86.3	28 49.7	94 31	86.1	29 17.8	94 31	85.9	30 13.9	93 31	85.5	32 05.9	93 31	84.6	33 57.6	93 31	83.7	34 25.4	93 31	83.5	35 21.0	93 31	83.1	4
85	28 03.1	94 31	85.3	28 31.2	94 31	85.1	28 59.3	94 31	84.9	29 55.4	93 31	84.5	31 47.5	93 31	83.7	33 39.1	93 31	82.8	34 07.0	93 31	82.6	35 02.6	93 31	82.1	85
6	27 44.7	94 31	84.4	28 12.8	94 31	84.2	28 40.9	94 31	84.0	29 37.0	93 31	83.6	31 29.1	93 31	82.8	33 20.8	93 31	81.9	33 48.6	93 30	81.7	34 44.3	93 30	81.2	6
7	27 26.2	94 31	83.5	27 54.3	94 31	83.3	28 22.4	94 31	83.1	29 18.6	94 31	82.7	31 10.7	93 31	81.8	33 02.4	93 30	81.0	33 30.3	93 30	80.8	34 26.0	93 30	80.3	7
8	27 07.8	94 31	82.5	27 35.9	94 31	82.3	28 04.1	94 31	82.1	29 00.2	94 31	81.7	30 52.3	93 30	80.9	32 44.1	93 30	80.1	33 12.0	93 30	79.8	34 07.8	93 30	79.4	8
9	26 49.5	94 31	81.6	27 17.6	94 31	81.4	27 45.7	94 30	81.2	28 41.9	94 30	80.8	30 34.1	93 30	80.0	32 25.9	93 30	79.1	32 53.8	93 30	78.9	33 49.6	93 30	78.5	9
90	26 31.1	94 30	80.7	26 59.3	94 30	80.5	27 27.4	94 30	80.3	28 23.6	94 30	79.9	30 15.8	93 30	79.1	32 07.7	93 30	78.2	32 35.6	93 30	78.0	33 31.4	93 30	77.6	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	26 12.9	94 30	79.7	26 41.0	94 30	79.6	27 09.2	94 30	79.4	28 05.4	94 30	79.0	29 57.7	93 30	78.2	31 49.6	93 30	77.3	32 17.5	93 30	77.1	33 13.3	93 30	76.7	91
2	25 54.6	94 30	78.8	26 22.8	94 30	78.6	26 51.0	94 30	78.4	27 47.2	94 30	78.0	29 39.5	93 30	77.2	31 31.6	93 30	76.4	31 59.5	93 30	76.2	32 55.3	93 30	75.8	2
3	25 36.5	94 30	77.9	26 04.7	94 30	77.7	26 32.8	94 30	77.5	27 29.1	94 30	77.1	29 21.5	94 30	76.3	31 13.6	93 30	75.5	31 41.5	93 30	75.3	32 37.4	93 30	74.9	3
4	25 18.4	94 30	77.0	25 46.6	94 30	76.8	26 14.8	94 30	76.6	27 11.1	94 30	76.2	29 03.5	94 30	75.4	30 55.7	93 30	74.6	31 23.6	93 30	74.4	32 19.5	93 30	74.0	4
95	25 00.4	94 30	76.1	25 28.6	94 30	75.9	25 56.8	94 30	75.7	26 53.1	94 30	75.3	28 45.6	94 30	74.5	30 37.8	93 30	73.7	31 05.8	93 30	73.5	32 01.8	93 30	73.1	95
6	24 42.4	94 30	75.1	25 10.6	94 30	75.0	25 38.8	94 30	74.8	26 35.2	94 30	74.4	28 27.8	94 30	73.6	30 20.1	93 29	72.8	30 48.1	93 29	72.6	31 44.1	93 29	72.2	6
7	24 24.5	94 30	74.2	24 52.8	94 30	74.0	25 21.0	94 30	73.9	26 17.4	94 30	73.5	28 10.0	94 29	72.7	30 02.4	94 29	71.9	30 30.4	93 29	71.7	31 26.5	93 29	71.3	7
8	24 06.7	94 30	73.3	24 35.0	94 30	73.1	25 03.2	94 29	73.0	25 59.7	94 30	72.6	27 52.4	94 29	71.8	29 44.8	94 29	71.0	30 12.9	93 29	70.8	31 09.0	93 29	70.4	8
9	23 49.0	94 30	72.4	24 17.3	94 29	72.2	24 45.5	94 29	72.0	25 42.0	94 29	71.7	27 34.8	94 29	70.9	29 27.3	94 29	70.1	29 55.4	94 29	69.9	30 51.5	93 29	69.5	9
100	23 31.4	94 29	71.5	23 59.7	94 29	71.3	24 27.9	94 29	71.1	25 24.5	94 29	70.8	27 17.3	94 29	70.0	29 09.9	94 29	69.2	29 38.1	94 29	69.0	30 34.2	94 29	68.6	100
1	23 13.8	94 29	70.6	23 42.1	94 29	70.4	24 10.4	94 29	70.2	25 07.0	94 29	69.9	27 00.0	94 29	69.1	28 52.7	94 29	68.3	29 20.8	94 29	68.1	30 17.0	94 29	67.7	1
2	22 56.4	94 29	69.7	23 24.7	94 29	69.5	23 53.0	94 29	69.3	24 49.6	94 29	69.0	26 42.7	94 29	68.2	28 35.5	94 28	67.4	29 03.6	94 28	67.3	29 59.9	94 28	66.9	2
3	22 39.1	95 29	68.8	23 07.4	94 29	68.6	23 35.8	94 29	68.4	24 32.4	94 29	68.1	26 25.5	94 28	67.3	28 18.4	94 28	66.6	28 46.6	94 28	66.4	29 42.9	94 28	66.0	3
4	22 21.8	95 29	67.9	22 50.2	95 28	67.7	23 18.6	95 28	67.5	24 15.3	94 28	67.2	26 08.5	94 28	66.4	28 01.5	94 28	65.7	28 29.7	94 28	65.5	29 26.0	94 28	65.1	4
105	22 04.7	95 28	67.0	22 33.1	95 28	66.8	23 01.5	95 28	66.6	23 58.2	95 28	66.3	25 51.5	94 28	65.5	27 44.6	94 28	64.8	28 12.9	94 28	64.6	29 09.3	94 28	64.2	105
6	21 47.7	95 28	66.1	22 16.1	95 28	65.9	22 44.5	95 28	65.7	23 41.3	95 28	65.4	25 34.7	94 28	64.7	27 27.9	94 28	63.9	27 56.2	94 28	63.7	28 52.6	94 28	63.3	6
7	21 30.8	95 28	65.2	21 59.3	95 28	65.0	22 27.7	95 28	64.8	23 24.5	95 28	64.5	25 18.0	95 28	63.8	27 11.3	94 27	63.0	27 39.6	94 27	62.8	28 36.1	94 27	62.5	7
8	21 14.0	95 28	64.3	21 42.5	95 28	64.1	22 11.0	95 28	63.9	23 07.8	95 28	63.6	25 01.5	95 27	62.9	26 54.9	94 27	62.2	27 23.2	94 27	62.0	28 19.8	94 27	61.6	8
9	20 57.4	95 28	63.4	21 25.9	95 27	63.2	21 54.4	95 27	63.0	22 51.3	95 27	62.7	24 45.0	95 27	62.0	26 38.5	95 27	61.3	27 06.9	94 27	61.1	28 03.5	94 27	60.7	9
110	20 40.9	95 27	62.5	21 09.4	95 27	62.3	21 37.9	95 27	62.1	22 34.9	95 27	61.8	24 28.7	95 27	61.1	26 22.3	95 27	60.4	26 50.7	95 27	60.2	27 47.4	94 27	59.9	110
1	20 24.5	95 27	61.6	20 53.1	95 27	61.4	21 21.6	95 27	61.3	22 18.6	95 27	60.9	24 12.5	95 27	60.2	26 06.3	95 26	59.5	26 34.7	95 26	59.4	27 31.5	95 26	59.0	1
2	20 08.3	95 27	60.7	20 36.8	95 27	60.5	21 05.4	95 27	60.4	22 02.5	95 27	60.0	23 56.5	95 26	59.4	25 50.4	95 26	58.7	26 18.8	95 26	58.5	27 15.6	95 26	58.1	2
3	19 52.2	95 27	59.8	20 20.8	95 27	59.6	20 49.4	95 26	59.5	21 46.5	95 26	59.1	23 40.6	95 26	58.5	25 34.6	95 26	57.8	26 03.1	95 26	57.6	27 00.0	95 26	57.3	3
4	19 36.2	95 26	58.9	20 04.9	95 26	58.7	20 33.5	95 26	58.6	21 30.7	95 26	58.3	23 24.9	95 26	57.6	25 19.0	95 26	56.9	25 47.5	95 26	56.7	26 44.5	95 26	56.4	4
115	19 20.4	95 26	58.0	19 49.1	95 26	57.8	20 17.7	95 26	57.7	21 15.0	95 26	57.4	23 09.3	95 26	56.7	25 03.6	95 26	56.0	25 32.1	95 25	55.9	26 29.1	95 25	55.5	115
6	19 04.8	96 26	57.1	19 33.5	96 26	57.0	20 02.1	96 26	56.8	20 59.4	95 26	56.5	22 53.9	95 25	55.8	24 48.3	95 25	55.2	25 16.8	95 25	55.0	26 13.9	95 25	54.7	6
7	18 49.3	96 26	56.2	19 18.0	96 26	56.1	19 46.7	96 25	55.9	20 44.1	96 25	55.6	22 38.7	95 25	55.0	24 33.1	95 25	54.3	25 01.7	95 25	54.1	25 58.8	95 25	53.8	7
8	18 34.0	96 25	55.3	19 02.7	96 25	55.2	19 31.4	96 25	55.0	20 28.8	96 25	54.7	22 23.6	96 25	54.1	24 18.1	95 25	53.4	24 46.8	95 25	53.3	25 44.0	95 25	52.9	8
9	18 18.8	96 25	54.4	18 47.6	96 25	54.3	19 16.3	96 25	54.1	20 13.8	96 25	53.8	22 08.6	96 25	53.2	24 03.3	96 24	52.6	24 32.0	95 24	52.4	25 29.3	95 24	52.1	9
120	18 03.8	96 25	53.5	18 32.6	96 25	53.4	19 01.4	96 25	53.2	19 58.9	96 24	52.9	21 53.9	96 24	52.3	23 48.7	96 24	51.7	24 17.4	96 24	51.5	25 14.7	96 24	51.2	120
1	17 49.0	96 24	52.7	18 17.8	96 24	52.5	18 46.6	96 24	52.4	19 44.2	96 24	52.1	21 39.3	96 24	51.5	23 34.2	96 24	50.8	24 02.9	96 24	50.7	25 00.3	96 24	50.4	1
2	17 34.3	96 24	51.8	18 03.2	96 24	51.6	18 32.0	96 24	51.5	19 29.7	96 24	51.2	21 24.9	96 24	50.6	23 19.9	96 24	50.0	23 48.7	96 23	49.8	24 46.2	96 23	49.5	2
3	17 19.9	96 24	50.9	17 48.7	96 24	50.7	18 17.6	96 24	50.6	19 15.3	96 24	50.3	21 10.6	96 23	49.7	23 05.8	96 23	49.1	23 34.6	96 23	48.9	24 32.2	96 23	48.6	3
4	17 05.6	96 24	50.0	17 34.5	96 23	49.8	18 03.4	96 23	49.7	19 01.1	96 23	49.4	20 56.6	96 23	48.8	22 51.9	96 23	48.2	23 20.7	96 23	48.1	24 18.3	96 23	47.8	4
125	16 51.5	96 23	49.1	17 20.4	96 23	49.0	17 49.3	96 23	48.8	18 47.1	96 23	48.5	20 42.7	96 23	48.0	22 38.2	96 23	47.4	23 07.0	96 23	47.2	24 04.7	96 22	46.9	125
6	16 37.5	97 23	48.2	17 06.5	97 23	48.1	17 35.5	96 23	47.9	18 33.3	96 23	47.7	20 29.0	96 22	47.1	22 24.6	96 22	46.5	22 53.5	96 22	46.4	23 51.2	96 22	46.1	6
7	16 23.8	97 23	47.3	16 52.8	97 22	47.2	17 21.8	97 22	47.0	18 19.7	97 22	46.8	20 15.6	96 22	46.2	22 11.3	96 22	45.6	22 40.2	96 22	45.5	23 38.0	96 22	45.2	7
8	16 10.3	97 22	46.4	16 39.3	97 22	46.3	17 08.3	97 22	46.2	18 06.3	97 22	45.9	20 02.3	97 22	45.3	21 58.1	96 22	44.8	22 27.1	96 22	44.6	23 24.9	96 21	44.4	8
9	15 57.0	97 22	45.5	16 26.0	97 22	45.4	16 55.0	97 22	45.3	17 53.1	97 22	45.0	19 49.2	97 21	44.5	21 45.2	97 21	43.9	22 14.1	96 22	43.8	23 12.1	96 21	43.5	9
130	15 43.8	97 22	44.6	16 12.9	97 22	44.5	16 42.0	97 21	44.4	17 40.1	97 21	44.1	19 36.3	97 21	43.6	21 32.4	97 21	43.1	22 01.4	97 21	42.9	22 59.4	97 21	42.6	130
1	15 30.9	97 21	43.8	16 00.0	97 21	43.6	16 29.1	97 21	43.5	17 27.3	97 21	43.2	19 23.6	97 21	42.7	21 19.8	97 21	42.2	21 48.9	97 21	42.1	22 46.9	97 20	41.8	1
2	15 18.2	97 21	42.9	15 47.3	97 21	42.7	16 16.4	97 21	42.6	17 14.7	97 21	42.4	19 11.1	97 20	41.9	21 07.5	97 20	41.3	21 36.6	97 20	41.2	22 34.7	97 20	40.9	2
3	15 05.7	97 20	42.0	15 34.8	97 20	41.9	16 04.0	97 20	41.7	17 02.3	97 20	41.5	18 58.9	97 20	41.0	20 55.4	97 20	40.5	21 24.5	97 20	40.3	22 22.7	97 20	40.1	3
4	14 53.4	97 20	41.1	15 22.6	97 20	41.0	15 51.8	97 20	40.8	16 50.1	97 20	40.6	18 46.8	97 20	40.1	20 43.4	97 20	39.6	21 12.6	97 19	39.5	22 10.8	97 19	39.2	4
135	14 41.3	97 20	40.2	15 10.5	97 20	40.1	15 39.7	97 20	40.0	16 38.2	97 20	39.7	18 35.0	97 19	39.2	20 31.7	97 19	38.8	21 00.9	97 19	38.6	21 59.2	97 19	38.4	135
6	14 29.5	98 19	39.3	14 58.7	97 19	39.2	15 28.0	97 19	39.1	16 26.4	97 19	38.8	18 23.4	97 19	38.4	20 20.2	97 19	37.9	20 49.4	97 19	37.8	21 47.8	97 19	37.5	6
7	14 17.8	98 19	38.4	14 47.1	98 19	38.3	15 16.4	98 19	38.2	16 14.9	98 19	38.0	18 12.0	98 19	37.5	20 08.9	97 18	37.0	20 38.2	97 18	36.9	21 36.6	97 18	36.7	7
8	14 06.4	98 19	37.5	14 35.7	98 19	37.4	15 05.0	98 19	37.3	16 03.6	98 18	37.1	18 00.8	98 18	36.6	19 57.9	98 18	36.2	20 27.1	98 18	36.1	21 25.7	98 18	35.8	8
9	13 55.2	98 18	36.6	14 24.6	98 18	36.5	14 53.9	98 18	36.4	15 52.6	98 18	36.2	17 49.8	98 18	35.8	19 47.0	98 18	35.3	20 16.3	98 18	35.2	21 14.9	98 18	35.0	9
140	13 44.3	98 18	35.8	14 13.6	98 18	35.6	14 43.0	98 18	35.5	15 41.7	98 18	35.3	17 39.1	98 18	34.9	19 36.4	98 17	34.5	20 05.8	98 17	34.3	21 04.4	98 17	34.1	140
1	13 33.6	98 17	34.9	14 03.0	98 17	34.8	14 32.3	98 17	34.7	15 31.1	98 17	34.4	17 28.6	98 17	34.0	19 26.1	98 17	33.6	19 55.4	98 17	33.5	20 54.1	98 17	33.3	1
2	13 23.1	98 17	34.0	13 52.5	98 17	33.9	14 21.9	98 17	33.8	15 20.7	98 17	33.6	17 18.4	98 17	33.2	19 15.9	98 17	32.7	19 45.3	98 16	32.6	20 44.1	98 16	32.4	2
3	13 12.8	98 17	33.1	13 42.3	98 17	33.0	14 11.7	98 17	32.9	15 10.6	98 16	32.7	17 08.3	98 16	32.3	19 06.0	98 16	31.9	19 35.4	98 16	31.8	20 34.2	98 16	31.6	3
4	13 02.8	98 16	32.2	13 32.3	98 16	32.1	14 01.8	98 16	32.0	15 00.7	98 16	31.8	16 58.6	98 16	31.4	18 56.4	98 16	31.0	19 25.8	98 16	30.9	20 24.7	98 16	30.7	4
145	12 53.1	98 16	31.3	13 22.6	98 16	31.2	13 52.1	98 16	31.1	14 51.1	98 16	30.9	16 49.0	98 16	30.5	18 46.9	98 15	30.1	19 16.4	98 15	30.1	20 15.3	98 15	29.9	145
6	12 43.6	98 15	30.4	13 13.1	98 15	30.3	13 42.6	98 15	30.2	14 41.7	98 15	30.0	16 39.7	98 15	29.7	18 37.7	98 15	29.3	19 07.2	98 15	29.2	20 06.2	98 15	29.0	6
7	12 34.3	99 15	29.5	13 03.9	98 15	29.4	13 33.4	98 15	29.3	14 32.5	98 15	29.2	16 30.7	98 15	28.8	18 28.8	98 15	28.4	18 58.3	98 14	28.3	19 57.3	98 14	28.1	7
8	12 25.3	99 15	28.6	12 54.9	98 15	28.5	13 24.5	98 14	28.5	14 23.6	98 14	28.3	16 21.9	99 14	27.9	18 20.1	99 14	27.6	18 49.6	98 14	27.5	19 48.7	98 14	27.3	8
9	12 16.6	99 14	27.7	12 46.2	99 14	27.7	13 15.7	99 14	27.6	14 14.9	99 14	27.4	16 13.3	99 14	27.1	18 11.6	99 14	26.7	18 41.2	99 14	26.6	19 40.3	99 14	26.4	9
150	12 08.1	99 14	26.8	12 37.7	99 14	26.8	13 07.3	99 14	26.7	14 06.5	99 14	26.5	16 05.0	99 13	26.2	18 03.4	99 13	25.8	18 33.0	99 13	25.8	19 32.2	99 13	25.6	150
1	11 59.8	99 13	26.0	12 29.5	99 13	25.9	12 59.1	99 13	25.8	13 58.4	99 13	25.6	15 56.9	99 13	25.3	17 55.5	99 13	25.0	18 25.1	99 13	24.9	19 24.3	99 13	24.7	1
2	11 51.8	99 13	25.1	12 21.5	99 13	25.0	12 51.2	99 13	24.9	13 50.5	99 13	24.8	15 49.1	99 13	24.4	17 47.7	99 12	24.1	18 17.4	99 12	24.0	19 16.7	99 12	23.9	2
3	11 44.1	99 12	24.2	12 13.8	99 12	24.1	12 43.5	99 12	24.0	13 42.9	99 12	23.9	15 41.6	99 12	23.6	17 40.3	99 12	23.3	18 10.0	99 12	23.2	19 09.3	99 12	23.0	3
4	11 36.6	99 12	23.3	12 06.4	99 12	23.2	12 36.1	99 12	23.1	13 35.5	99 12	23.0	15 34.3	99 12	22.7	17 33.1	99 12	22.4	18 02.8	99 12	22.3	19 02.2	99 11	22.2	4
155	11 29.5	99 12	22.4	11 59.2	99 12	22.3	12 28.9	99 11	22.2	13 28.4	99 11	22.1	15 27.3	99 11	21.8	17 26.2	99 11	21.5	17 55.9	99 11	21.5	18 55.3	99 11	21.3	155
6	11 22.5	99 11	21.5	11 52.3	99 11	21.4	12 22.0	99 11	21.4	13 21.5	99 11	21.2	15 20.5	99 11	21.0	17 19.5	99 11	20.7	17 49.2	99 11	20.6	18 48.7	99 11	20.5	6
7	11 15.9	99 11	20.6	11 45.6	99 11	20.5	12 15.4	99 11	20.5	13 14.9	99 11	20.3	15 14.0	99 10	20.1	17 13.1	99 10	19.8	17 42.8	99 10	19.8	18 42.3	99 10	19.6	7
8	11 09.5	99 10	19.7	11 39.3	99 10	19.6	12 09.1	99 10	19.6	13 08.6	99 10	19.5	15 07.8	99 10	19.2	17 06.9	99 10	19.0	17 36.7	99 10	18.9	18 36.2	99 10	18.8	8
9	11 03.4	99 10	18.8	11 33.2	99 10	18.8	12 03.0	99 10	18.7	13 02.6	99 10	18.6	15 01.8	99 10	18.3	17 01.0	99 09	18.1	17 30.8	99 09	18.0	18 30.4	99 09	17.9	9
160	10 57.5	99 09	17.9	11 27.4	99 09	17.9	11 57.2	99 09	17.8	12 56.8	99 09	17.7	14 56.1	99 09	17.5	16 55.4	99 09	17.2	17 25.2	99 09	17.2	18 24.8	99 09	17.1	160
1	10 52.0	99 09	17.0	11 21.8	99 09	17.0	11 51.6	99 09	16.9	12 51.3	99 09	16.8	14 50.7	99 09	16.6	16 50.0	99 08	16.4	17 19.9	99 08	16.3	18 19.5	99 08	16.2	1
2	10 46.7	1.0 08	16.1	11 16.5	1.0 08	16.1	11 46.4	1.0 08	16.0	12 46.1	1.0 08	15.9	14 45.5	1.0 08	15.7	16 44.9	1.0 08	15.5	17 14.8	99 08	15.5	18 14.5	99 08	15.4	2
3	10 41.7	1.0 08	15.2	11 11.5	1.0 08	15.2	11 41.4	1.0 08	15.1	12 41.2	1.0 08	15.0	14 40.6	1.0 08	14.9	16 40.1	1.0 08	14.7	17 10.0	1.0 08	14.6	18 09.7	1.0 08	14.5	3
4	10 36.9	1.0 07	14.3	11 06.8	1.0 07	14.3	11 36.7	1.0 07	14.2	12 36.5	1.0 07	14.2	14 36.0	1.0 07	14.0	16 35.5	1.0 07	13.8	17 05.4	1.0 07	13.7	18 05.2	1.0 07	13.7	4
165	10 32.5	1.0 07	13.4	11 02.4	1.0 07	13.4	11 32.3	1.0 07	13.4	12 32.1	1.0 07	13.3	14 31.7	1.0 07	13.1	16 31.3	1.0 07	12.9	17 01.2	1.0 07	12.9	18 00.9	1.0 07	12.8	165
6	10 28.4	1.0 06	12.5	10 58.2	1.0 06	12.5	11 28.1	1.0 06	12.5	12 28.0	1.0 06	12.4	14 27.6	1.0 06	12.2	16 27.2	1.0 06	12.1	16 57.2	1.0 06	12.0	17 57.0	1.0 06	11.9	6
7	10 24.7	1.0 06	11.7	10 54.4	1.0 06	11.6	11 24.3	1.0 06	11.6	12 24.1	1.0 06	11.5	14 23.8	1.0 06	11.4	16 23.5	1.0 06	11.2	16 53.4	1.0 06	11.2	17 53.3	1.0 06	11.1	7
8	10 20.8	1.0 06	10.8	10 50.8	1.0 06	10.7	11 20.7	1.0 06	10.7	12 20.6	1.0 06	10.6	14 20.3	1.0 05	10.5	16 20.0	1.0 05	10.3	16 50.0	1.0 05	10.3	17 49.8	1.0 05	10.2	8
9	10 17.5	1.0 05	09.9	10 47.5	1.0 05	09.8	11 17.4	1.0 05	09.8	12 17.3	1.0 05	09.7	14 17.1	1.0 05	09.6	16 16.8	1.0 05	09.5	16 46.8	1.0 05	09.5	17 46.7	1.0 05	09.4	9
170	10 14.5	1.0 05	09.0	10 44.4	1.0 05	08.9	11 14.4	1.0 05	08.9	12 14.3	1.0 05	08.9	14 14.1	1.0 04	08.7	16 13.9	1.0 04	08.6	16 43.9	1.0 04	08.6	17 43.8	1.0 04	08.5	170
1	10 11.7	1.0 04	08.1	10 41.7	1.0 04	08.0	11 11.7	1.0 04	08.0	12 11.6	1.0 04	08.0	14 11.4	1.0 04	07.9	16 11.3	1.0 04	07.8	16 41.2	1.0 04	07.7	17 41.2	1.0 04	07.7	1
2	10 09.3	1.0 04	07.2	10 39.2	1.0 04	07.1	11 09.2	1.0 04	07.1	12 09.2	1.0 04	07.1	14 09.0	1.0 04	07.0	16 08.9	1.0 03	06.9	16 38.9	1.0 03	06.9	17 38.8	1.0 03	06.8	2
3	10 07.1	1.0 03	06.3	10 37.1	1.0 03	06.3	11 07.1	1.0 03	06.2	12 07.0	1.0 03	06.2	14 06.9	1.0 03	06.1	16 06.8	1.0 03	06.0	16 36.8	1.0 03	06.0	17 36.8	1.0 03	06.0	3
4	10 05.2	1.0 03	05.4	10 35.2	1.0 03	05.4	11 05.2	1.0 03	05.3	12 05.2	1.0 03	05.3	14 05.1	1.0 03	05.2	16 05.0	1.0 03	05.2	16 35.0	1.0 03	05.2	17 35.0	1.0 03	05.1	4
175	10 03.6	1.0 02	04.5	10 33.6	1.0 02	04.5	11 03.6	1.0 02	04.5	12 03.6	1.0 02	04.4	14 03.5	1.0 02	04.4	16 03.5	1.0 02	04.3	16 33.5	1.0 02	04.3	17 33.5	1.0 02	04.3	175
6	10 02.3	1.0 02	03.6	10 32.3	1.0 02	03.6	11 02.3	1.0 02	03.6	12 02.3	1.0 02	03.5	14 02.3	1.0 02	03.5	16 02.2	1.0 02	03.4	16 32.2	1.0 02	03.4	17 32.2	1.0 02	03.4	6
7	10 01.3	1.0 01	02.7	10 31.3	1.0 01	02.7	11 01.3	1.0 01	02.7	12 01.3	1.0 01	02.7	14 01.3	1.0 01	02.6	16 01.3	1.0 01	02.6	16 31.3	1.0 01	02.6	17 31.2	1.0 01	02.6	7
8	10 00.6	1.0 01	01.8	10 30.6	1.0 01	01.8	11 00.6	1.0 01	01.8	12 00.6	1.0 01	01.8	14 00.6	1.0 01	01.7	16 00.6	1.0 01	01.7	16 30.6	1.0 01	01.7	17 30.6	1.0 01	01.7	8
9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	12 00.1	1.0 00	00.9	14 00.1	1.0 00	00.9	16 00.1	1.0 00	00.9	16 30.1	1.0 00	00.9	17 30.1	1.0 00	00.9	9
180	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	12 00.0	1.0 00	00.0	14 00.0	1.0 00	00.0	16 00.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 30.0	1.0 00	00.0	180

Lat. 72°
Lat. 73°
Lat. 74°
Lat. 75°
Lat. 76°
Lat 77
La 78

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	54 00.0	1.0 00	180.0	55 00.0	1.0 00	180.0	56 30.0	1.0 00	180.0	58 00.0	1.0 00	180.0
1	53 59.8	1.0 01	178.6	54 59.8	1.0 01	178.6	56 29.8	1.0 01	178.6	57 59.8	1.0 01	178.6
2	53 59.1	1.0 02	177.2	54 59.1	1.0 02	177.2	56 29.1	1.0 02	177.2	57 59.1	1.0 02	177.1
3	53 58.0	1.0 03	175.9	54 58.0	1.0 03	175.8	56 27.9	1.0 03	175.7	57 57.9	1.0 03	175.7
4	53 56.4	1.0 03	174.5	54 56.4	1.0 03	174.4	56 26.3	1.0 03	174.3	57 56.3	1.0 04	174.2
05	53 54.4	1.0 04	173.1	54 54.4	1.0 04	173.0	56 24.3	1.0 04	172.9	57 54.2	1.0 04	172.8
6	53 52.0	1.0 05	171.8	54 51.9	1.0 05	171.7	56 21.8	1.0 05	171.5	57 51.6	1.0 05	171.3
7	53 49.1	1.0 06	170.4	54 49.0	1.0 06	170.3	56 18.8	1.0 06	170.1	57 48.6	1.0 06	169.9
8	53 45.8	1.0 06	169.0	54 45.6	1.0 06	168.9	56 15.4	1.0 06	168.7	57 45.1	1.0 07	168.5
9	53 42.1	1.0 07	167.7	54 41.9	1.0 07	167.5	56 11.5	1.0 07	167.3	57 41.2	1.0 07	167.0
10	53 37.9	1.0 08	166.3	54 37.6	1.0 08	166.1	56 07.2	1.0 08	165.9	57 36.8	99 08	165.6
1	53 33.3	1.0 08	164.9	54 33.0	99 08	164.8	56 02.5	99 09	164.5	57 32.0	99 09	164.2
2	53 28.3	99 09	163.6	54 27.9	99 09	163.4	55 57.3	99 09	163.1	57 26.7	99 10	162.8
3	53 22.8	99 10	162.2	54 22.4	99 10	162.0	55 51.7	99 10	161.7	57 21.0	99 10	161.4
4	53 16.9	99 10	160.9	54 16.5	99 11	160.7	55 45.7	99 11	160.3	57 14.9	99 11	160.0
15	53 10.7	99 11	159.6	54 10.1	99 11	159.3	55 39.2	99 11	159.0	57 08.3	99 12	158.6
6	53 04.0	99 12	158.2	54 03.4	99 12	158.0	55 32.4	99 12	157.6	57 01.3	99 12	157.2
7	52 56.9	99 12	156.9	53 56.2	99 13	156.6	55 25.1	99 13	156.2	56 53.9	99 13	155.8
8	52 49.4	99 13	155.6	53 48.7	99 13	155.3	55 17.4	99 13	154.9	56 46.1	98 14	154.4
9	52 41.6	99 14	154.2	53 40.7	99 14	154.0	55 09.4	98 14	153.5	56 37.9	98 14	153.0
20	52 33.3	98 14	152.9	53 32.4	98 15	152.6	55 00.9	98 15	152.2	56 29.3	98 15	151.7
1	52 24.7	98 15	151.6	53 23.7	98 15	151.3	54 52.0	98 15	150.8	56 20.3	98 16	150.3
2	52 15.7	98 16	150.3	53 14.6	98 16	150.0	54 42.8	98 16	149.5	56 10.9	98 16	149.0
3	52 06.3	98 16	149.0	53 05.1	98 16	148.7	54 33.2	98 17	148.2	56 01.2	98 17	147.6
4	51 56.6	98 17	147.7	52 55.3	98 17	147.4	54 23.3	98 17	146.9	55 51.1	97 17	146.3
25	51 46.5	98 17	146.5	52 45.2	98 18	146.1	54 13.0	97 18	145.6	55 40.6	97 18	145.0
6	51 36.1	98 18	145.2	52 34.6	97 18	144.8	54 02.3	97 18	144.3	55 29.8	97 19	143.6
7	51 25.4	97 18	143.9	52 23.8	97 19	143.5	53 51.3	97 19	143.0	55 18.6	97 19	142.3
8	51 14.3	97 19	142.7	52 12.6	97 19	142.3	53 40.0	97 19	141.7	55 07.1	97 20	141.0
9	51 02.9	97 20	141.4	52 01.1	97 20	141.0	53 28.3	97 20	140.4	54 55.3	97 20	139.7
30	50 51.2	97 20	140.2	51 49.3	97 20	139.8	53 16.3	97 20	139.1	54 43.2	96 21	138.5
1	50 39.1	97 21	138.9	51 37.2	97 21	138.5	53 04.0	96 21	137.9	54 30.7	96 21	137.2
2	50 26.8	97 21	137.7	51 24.7	96 21	137.3	52 51.5	96 21	136.6	54 18.0	96 22	135.9
3	50 14.2	96 22	136.5	51 12.0	96 22	136.0	52 38.6	96 22	135.4	54 04.9	96 22	134.7
4	50 01.2	96 22	135.2	50 59.0	96 22	134.8	52 25.4	96 22	134.1	53 51.6	96 23	133.4
35	49 48.0	96 22	134.0	50 45.7	96 23	133.6	52 12.0	96 23	132.9	53 38.0	95 23	132.2
6	49 34.6	96 23	132.8	50 32.1	96 23	132.4	51 58.3	96 23	131.7	53 24.1	95 24	131.0
7	49 20.9	96 23	131.6	50 18.3	96 23	131.2	51 44.3	95 24	130.5	53 10.0	95 24	129.7
8	49 06.9	96 24	130.5	50 04.2	96 24	130.0	51 30.1	96 24	129.3	52 55.6	95 24	128.5
9	48 52.6	96 24	129.3	49 49.9	95 24	128.8	51 15.6	95 25	128.1	52 41.0	95 25	127.3
40	48 38.2	95 24	128.1	49 35.3	95 25	127.6	51 00.9	95 25	126.9	52 26.1	95 25	126.1
1	48 23.5	95 25	126.9	49 20.5	95 25	126.5	50 45.9	95 25	125.7	52 11.0	94 26	124.9
2	48 08.5	95 26	125.8	49 05.5	95 26	125.3	50 30.8	95 26	124.6	51 55.7	94 26	123.8
3	47 53.4	95 26	124.6	48 50.3	95 26	124.2	50 15.4	94 26	123.4	51 40.2	94 26	122.6
4	47 38.0	95 26	123.5	48 34.8	95 26	123.0	49 59.8	94 26	122.3	51 24.5	94 27	121.4
45	47 22.5	95 26	122.4	48 19.2	94 26	121.9	49 44.0	94 27	121.1	51 08.6	94 27	120.3
6	47 06.7	95 27	121.2	48 03.3	94 27	120.7	49 28.1	94 27	120.0	50 52.5	94 27	119.2
7	46 50.8	94 27	120.1	47 47.3	94 27	119.6	49 11.9	94 27	118.8	50 36.2	93 27	118.0
8	46 34.6	94 27	119.0	47 31.1	94 27	118.5	48 55.6	94 28	117.7	50 19.7	93 28	116.9
9	46 18.3	94 27	117.9	47 14.7	94 28	117.4	48 39.1	94 28	116.6	50 03.1	93 28	115.8
50	46 01.9	94 28	116.8	46 58.2	94 28	116.3	48 22.4	93 28	115.5	49 46.4	93 28	114.7
1	45 45.2	94 28	115.7	46 41.5	94 28	115.2	48 05.6	93 28	114.4	49 29.4	93 28	113.6
2	45 28.4	94 28	114.6	46 24.6	94 28	114.1	47 48.7	93 28	113.3	49 12.4	93 29	112.5
3	45 11.5	94 28	113.5	46 07.6	93 29	113.0	47 31.6	93 29	112.2	48 55.2	93 29	111.4
4	44 54.4	94 29	112.5	45 50.5	93 29	112.0	47 14.4	93 29	111.2	48 37.9	93 29	110.3
55	44 37.2	93 29	111.4	45 33.3	93 29	110.9	46 57.0	93 29	110.1	48 20.4	92 29	109.3
6	44 19.9	93 29	110.3	45 15.9	93 29	109.8	46 39.5	93 29	109.0	48 02.9	92 29	108.2
7	44 02.5	93 29	109.3	44 58.4	93 29	108.8	46 22.0	93 29	108.0	47 45.2	92 30	107.1
8	43 44.9	93 29	108.2	44 40.8	93 30	107.7	46 04.3	93 30	106.9	47 27.4	92 30	106.1
9	43 27.3	93 30	107.2	44 23.1	93 30	106.7	45 46.5	93 30	105.9	47 09.6	92 30	105.1
60	43 09.5	93 30	106.2	44 05.2	93 30	105.7	45 28.6	92 30	104.9	46 51.6	92 30	104.0
1	42 51.6	93 30	105.1	43 47.4	93 30	104.6	45 10.0	92 30	103.8	46 33.6	92 30	103.0
2	42 33.7	93 30	104.1	43 29.4	93 30	103.6	44 52.6	92 30	102.8	46 15.5	92 30	102.0
3	42 15.7	93 30	103.1	43 11.3	93 30	102.6	44 34.5	92 30	101.8	45 57.3	92 30	101.0
4	41 57.6	93 30	102.1	42 53.2	93 30	101.6	44 16.3	92 30	100.8	45 39.1	92 30	99.9
65	41 39.4	93 30	101.1	42 35.0	92 30	100.6	43 58.1	92 30	99.8	45 20.8	92 31	98.9
6	41 21.2	93 30	100.1	42 16.7	92 31	99.6	43 39.8	92 31	98.8	45 02.4	92 31	97.9
7	41 02.9	93 31	99.1	41 58.4	92 31	98.6	43 21.4	92 31	97.8	44 44.1	92 31	97.0
8	40 44.6	93 31	98.1	41 40.1	92 31	97.6	43 03.0	92 31	96.8	44 25.6	92 31	96.0
9	40 26.2	93 31	97.1	41 21.7	92 31	96.6	42 44.6	92 31	95.8	44 07.2	92 31	95.0
70	40 07.8	93 31	96.1	41 03.2	92 31	95.6	42 26.1	92 31	94.8	43 48.7	92 31	94.0
1	39 49.3	92 31	95.1	40 44.8	92 31	94.6	42 07.0	92 31	93.9	43 30.2	92 31	93.0
2	39 30.9	92 31	94.2	40 26.3	92 31	93.7	41 49.1	92 31	92.9	43 11.7	92 31	92.1
3	39 12.4	92 31	93.2	40 07.8	92 31	92.7	41 30.6	92 31	91.9	42 53.1	92 31	91.1
4	38 53.8	92 31	92.2	39 49.2	92 31	91.7	41 12.1	92 31	91.0	42 34.6	92 31	90.2
75	38 35.3	92 31	91.3	39 30.7	92 31	90.8	40 53.5	92 31	90.0	42 16.1	92 31	89.2
6	38 16.8	92 31	90.3	39 12.2	92 31	89.8	40 35.0	92 31	89.1	41 57.5	92 31	88.3
7	37 58.2	92 31	89.4	38 53.0	92 31	88.9	40 16.5	92 31	88.1	41 39.0	92 31	87.3
8	37 39.7	92 31	88.4	38 35.1	92 31	87.9	39 57.9	92 31	87.2	41 20.5	92 31	86.4
9	37 21.2	92 31	87.5	38 16.6	92 31	87.0	39 39.4	92 31	86.3	41 02.0	92 31	85.5
80	37 02.6	92 31	86.6	37 58.1	92 31	86.1	39 20.9	92 31	85.3	40 43.5	92 31	84.5
1	36 44.1	92 31	85.6	37 39.6	92 31	85.1	39 02.5	92 31	84.4	40 25.1	92 31	83.6
2	36 25.7	92 31	84.7	37 21.1	92 31	84.2	38 44.0	92 31	83.5	40 06.7	92 31	82.7
3	36 07.2	93 31	83.8	37 02.7	92 31	83.3	38 25.6	92 31	82.5	39 48.3	92 31	81.8
4	35 48.8	93 31	82.8	36 44.3	92 31	82.4	38 07.3	92 31	81.6	39 30.0	92 30	80.9
85	35 30.4	93 31	81.9	36 25.9	92 31	81.4	37 48.9	92 30	80.7	39 11.7	92 30	80.0
6	35 12.1	93 30	81.0	36 07.6	92 30	80.5	37 30.7	92 30	79.8	38 53.5	92 30	79.1
7	34 53.8	93 30	80.1	35 49.4	92 30	79.6	37 12.5	92 30	78.9	38 35.3	92 30	78.2
8	34 35.6	93 30	79.2	35 31.1	93 30	78.7	36 54.3	92 30	78.0	38 17.2	92 30	77.3
9	34 17.4	93 30	78.3	35 13.0	93 30	77.8	36 36.2	92 30	77.1	37 59.1	92 30	76.4
90	33 59.3	93 30	77.3	34 54.9	93 30	76.9	36 18.1	92 30	76.2	37 41.1	92 30	75.5

H.A.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	60 00.0	1.0 00	180.0	60 30.0	1.0 00	180.0	61 00.0	1.0 00	180.0	63 00.0	1.0 00	180.0
1	59 59.8	1.0 01	178.5	60 29.8	1.0 01	178.5	60 59.8	1.0 01	178.5	62 59.7	1.0 01	178.4
2	59 59.0	1.0 02	177.0	60 29.0	1.0 02	177.0	60 59.0	1.0 02	177.0	62 59.0	1.0 02	176.9
3	59 57.8	1.0 03	175.5	60 27.8	1.0 03	175.5	60 57.8	1.0 03	175.5	62 57.7	1.0 03	175.3
4	59 56.2	1.0 04	174.1	60 26.1	1.0 04	174.0	60 56.1	1.0 04	174.0	62 56.0	1.0 04	173.8
05	59 54.0	1.0 04	172.6	60 24.0	1.0 04	172.5	60 53.9	1.0 04	172.5	62 53.7	1.0 05	172.2
6	59 51.4	1.0 05	171.1	60 21.3	1.0 05	171.0	60 51.2	1.0 05	171.0	62 51.0	1.0 05	170.7
7	59 48.3	1.0 06	169.6	60 18.2	1.0 06	169.6	60 48.1	1.0 06	169.5	62 47.7	1.0 06	169.1
8	59 44.7	1.0 07	168.2	60 14.6	1.0 07	168.1	60 44.5	1.0 07	168.0	62 44.0	1.0 07	167.6
9	59 40.7	1.0 08	166.7	60 10.5	1.0 08	166.6	60 40.4	1.0 08	166.5	62 39.7	99 08	166.1
10	59 36.2	99 08	165.2	60 06.0	99 08	165.1	60 35.8	99 08	165.0	62 35.0	99 09	164.5
1	59 31.2	99 09	163.8	60 01.0	99 09	163.7	60 30.8	99 09	163.5	62 29.9	99 09	163.0
2	59 25.8	99 10	162.3	59 55.5	99 10	162.2	60 25.3	99 10	162.1	62 24.2	99 10	161.5
3	59 19.9	99 10	160.9	59 49.7	99 11	160.7	60 19.4	99 11	160.6	62 18.1	99 11	160.0
4	59 13.6	99 11	159.4	59 43.3	99 11	159.3	60 13.0	99 11	159.1	62 11.5	99 12	158.5
15	59 06.9	99 12	158.0	59 36.5	99 12	157.8	60 06.2	99 12	157.7	62 04.5	99 12	157.0
6	58 59.7	99 13	156.6	59 29.3	99 13	156.4	59 58.9	99 13	156.2	61 57.0	98 13	155.5
7	58 52.2	98 13	155.1	59 21.7	98 13	155.0	59 51.2	98 14	154.8	61 49.1	98 14	154.0
8	58 44.2	98 14	153.7	59 13.6	98 14	153.6	59 43.1	98 14	153.4	61 40.8	98 15	152.6
9	58 35.8	98 15	152.3	59 05.2	98 15	152.1	59 34.6	98 15	152.0	61 32.1	98 15	151.1
20	58 26.9	98 15	150.9	58 56.3	98 15	150.7	59 25.7	98 16	150.5	61 22.9	98 16	149.7
1	58 17.7	98 16	149.6	58 47.1	98 16	149.3	59 16.4	98 16	149.1	61 13.3	97 17	148.2
2	58 08.2	98 17	148.2	58 37.4	97 17	148.0	59 06.7	97 17	147.7	61 03.4	97 17	146.8
3	57 58.2	97 17	146.8	58 27.4	97 17	146.6	58 56.6	97 17	146.4	60 53.0	97 18	145.4
4	57 47.9	97 18	145.4	58 17.0	97 18	145.2	58 46.1	97 18	145.0	60 42.3	97 18	144.0
25	57 37.2	97 18	144.1	58 06.2	97 19	143.9	58 35.3	97 19	143.6	60 31.2	96 19	142.6
6	57 26.1	97 19	142.8	57 55.1	97 19	142.5	58 24.1	97 19	142.3	60 19.8	96 20	141.2
7	57 14.7	97 20	141.4	57 43.7	96 20	141.2	58 12.6	96 20	140.9	60 08.0	96 20	139.9
8	57 03.0	96 20	140.1	57 31.9	96 20	139.9	58 00.8	96 20	139.6	59 55.9	96 21	138.5
9	56 50.9	96 21	138.8	57 19.8	96 21	138.5	57 48.6	96 21	138.3	59 43.5	96 21	137.2
30	56 38.6	96 21	137.5	57 07.3	96 21	137.2	57 36.1	96 21	137.0	59 30.7	95 22	135.8
1	56 25.9	96 22	136.2	56 54.6	96 22	135.9	57 23.3	96 22	135.7	59 17.6	95 22	134.5
2	56 12.9	96 22	134.9	56 41.6	95 22	134.6	57 10.2	95 22	134.4	59 04.3	95 23	133.2
3	55 59.6	95 23	133.6	56 28.2	95 23	133.4	56 56.8	95 23	133.1	58 50.6	95 23	131.9
4	55 46.1	95 23	132.4	56 14.6	95 23	132.1	56 43.1	95 23	131.8	58 36.7	94 24	130.6
35	55 32.2	95 24	131.1	56 00.7	95 24	130.8	56 29.1	95 24	130.6	58 22.4	94 24	129.3
6	55 18.1	95 24	129.9	55 46.6	95 24	129.6	56 14.9	95 24	129.3	58 08.0	94 25	128.1
7	55 03.8	95 24	128.7	55 32.1	94 24	128.4	56 00.5	94 25	128.1	57 53.3	94 25	126.8
8	54 49.2	94 25	127.4	55 17.5	94 25	127.1	55 45.7	94 25	126.8	57 38.3	93 25	125.6
9	54 34.3	94 25	126.2	55 02.6	94 25	125.9	55 30.8	94 25	125.6	57 23.1	93 26	124.3
40	54 19.3	94 26	125.0	54 47.5	94 26	124.7	55 15.6	94 26	124.4	57 07.7	93 26	123.1
1	54 04.0	94 26	123.8	54 32.1	94 26	123.5	55 00.2	94 26	123.2	56 52.0	93 26	121.9
2	53 48.5	94 26	122.6	54 16.5	94 26	122.3	54 44.6	93 26	122.0	56 36.2	93 27	120.7
3	53 32.7	93 27	121.5	54 00.8	93 27	121.2	54 28.8	93 27	120.9	56 20.2	92 27	119.5
4	53 16.8	93 27	120.3	53 44.8	93 27	120.0	54 12.7	93 27	119.7	56 04.0	92 27	118.4
45	53 00.7	93 27	119.1	53 28.7	93 27	118.8	53 56.5	93 27	118.5	55 47.5	92 28	117.2
6	52 44.5	93 27	118.0	53 12.3	93 28	117.7	53 40.2	93 28	117.4	55 31.0	92 28	116.1
7	52 28.0	93 28	116.9	52 55.8	93 28	116.6	53 23.6	93 28	116.2	55 14.2	92 28	114.9
8	52 11.4	93 28	115.7	52 39.2	93 28	115.4	53 06.9	92 28	115.1	54 57.3	92 28	113.8
9	51 54.6	93 28	114.6	52 22.3	92 28	114.3	52 50.0	92 28	114.0	54 40.3	92 29	112.7
50	51 37.7	92 28	113.5	52 05.4	92 29	113.2	52 33.0	92 29	112.9	54 23.1	91 29	111.5
1	51 20.6	92 29	112.4	51 48.3	92 29	112.1	52 15.9	92 29	111.8	54 05.8	91 29	110.4
2	51 03.4	92 29	111.3	51 31.0	92 29	111.0	51 58.6	92 29	110.7	53 48.4	91 29	109.3
3	50 46.0	92 29	110.2	51 13.6	92 29	109.9	51 41.2	92 29	109.6	53 30.8	91 29	108.2
4	50 28.6	92 29	109.1	50 56.1	92 29	108.8	51 23.7	92 29	108.5	53 13.2	91 30	107.2
55	50 11.0	92 29	108.1	50 38.5	92 30	107.8	51 06.0	92 30	107.4	52 55.4	91 30	106.1
6	49 53.3	92 30	107.0	50 20.8	92 30	106.7	50 48.3	91 30	106.4	52 37.5	91 30	105.0
7	49 35.6	92 30	106.0	50 03.0	91 30	105.6	50 30.4	91 30	105.3	52 19.6	91 30	104.0
8	49 17.7	92 30	104.9	49 45.1	91 30	104.6	50 12.5	91 30	104.3	52 01.6	90 30	102.9
9	48 59.7	91 30	103.9	49 27.1	91 30	103.6	49 54.5	91 30	103.2	51 43.5	90 30	101.9
60	48 41.7	91 30	102.8	49 09.1	91 30	102.5	49 36.4	91 30	102.2	51 25.3	90 30	100.9
1	48 23.6	91 30	101.8	48 50.9	91 30	101.5	49 18.3	91 30	101.2	51 07.0	90 30	99.9
2	48 05.4	91 30	100.8	48 32.7	91 30	100.5	49 00.1	91 30	100.2	50 48.7	90 31	98.9
3	47 47.1	91 30	99.8	48 14.5	91 31	99.5	48 41.8	91 31	99.2	50 30.4	90 31	97.8
4	47 28.8	91 31	98.8	47 56.2	91 31	98.5	48 23.4	91 31	98.2	50 12.0	90 31	96.8
65	47 10.5	91 31	97.8	47 37.8	91 31	97.5	48 05.1	91 31	97.2	49 53.6	90 31	95.9
6	46 52.1	91 31	96.8	47 19.4	91 31	96.5	47 46.7	91 31	96.2	49 35.1	90 31	94.9
7	46 33.7	91 31	95.8	47 01.0	91 31	95.5	47 28.2	91 31	95.2	49 16.6	90 31	93.9
8	46 15.2	91 31	94.8	46 42.5	91 31	94.5	47 09.7	91 31	94.2	48 58.1	90 31	92.9
9	45 56.7	91 31	93.8	46 24.0	91 31	93.5	46 51.2	91 31	93.2	48 39.6	90 31	92.0
70	45 38.2	91 31	92.9	46 05.5	91 31	92.6	46 32.7	91 31	92.3	48 21.1	90 31	91.0
1	45 19.7	91 31	91.9	45 47.0	91 31	91.6	46 14.2	91 31	91.3	48 02.5	90 31	90.0
2	45 01.2	91 31	90.9	45 28.4	91 31	90.6	45 55.6	91 31	90.3	47 44.0	90 31	89.1
3	44 42.6	91 31	90.0	45 09.9	91 31	89.7	45 37.1	91 31	89.4	47 25.5	90 31	88.1
4	44 24.1	91 31	89.0	44 51.3	91 31	88.7	45 18.6	91 31	88.4	47 06.9	90 31	87.2
75	44 05.5	91 31	88.1	44 32.8	91 31	87.8	45 00.0	91 31	87.5	46 48.4	90 31	86.3
6	43 47.0	91 31	87.2	44 14.3	91 31	86.9	44 41.5	91 31	86.6	46 29.9	90 31	85.3
7	43 28.5	91 31	86.2	43 55.8	91 31	85.9	44 23.0	91 31	85.6	46 11.5	90 31	84.4
8	43 10.0	91 31	85.3	43 37.3	91 31	85.0	44 04.5	91 31	84.7	45 53.0	90 31	83.5
9	42 51.6	91 31	84.4	43 18.8	91 31	84.1	43 46.1	91 31	83.8	45 34.6	90 31	82.6
80	42 33.1	91 31	83.4	43 00.4	91 31	83.2	43 27.7	91 31	82.9	45 16.3	90 31	81.7
1	42 14.7	91 31	82.5	42 42.0	91 31	82.3	43 09.3	91 31	82.0	44 57.9	90 30	80.8
2	41 56.3	91 31	81.6	42 23.7	91 30	81.3	42 51.0	91 30	81.1	44 39.6	90 30	79.9
3	41 38.0	91 30	80.7	42 05.4	91 30	80.4	42 32.7	91 30	80.2	44 21.4	90 30	79.0
4	41 19.8	91 30	79.8	41 47.1	91 30	79.5	42 14.4	91 30	79.3	44 03.3	90 30	78.1
85	41 01.5	91 30	78.9	41 28.9	91 30	78.6	41 56.2	91 30	78.4	43 45.1	90 30	77.2
6	40 43.4	91 30	78.0	41 10.8	91 30	77.7	41 38.1	91 30	77.5	43 27.1	91 30	76.3
7	40 25.3	91 30	77.1	40 52.7	91 30	76.8	41 20.0	91 30	76.6	43 09.1	91 30	75.4
8	40 07.2	91 30	76.2	40 34.6	91 30	76.0	41 02.0	91 30	75.7	42 51.2	91 30	74.6
9	39 49.2	92 30	75.3	40 16.7	91 30	75.1	40 44.1	91 30	74.8	42 33.4	91 30	73.7
90	39 31.3	92 30	74.5	39 58.8	92 30	74.2	40 26.3	91 30	73.9	42 15.6	91 29	72.8

H.A.	36° 00′ Alt.		Az.	37° 00′ Alt.		Az.	38° 30′ Alt.		Az.	40° 00′ Alt.		Az.	42° 00′ Alt.		Az.	42° 30′ Alt.		Az.	43° 00′ Alt.		Az.	45° 00′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	33 41.2	93 30	76.4	34 36.9	93 30	76.0	36 00.2	92 30	75.3	37 23.2	92 30	74.6	39 13.5	92 30	73.6	39 41.0	92 30	73.3	40 08.5	91 30	73.0	41 57.9	91 29	72.0	91
2	33 23.2	93 30	75.5	34 18.9	93 30	75.1	35 42.3	92 30	74.4	37 05.4	92 30	73.7	38 55.8	92 29	72.7	39 23.3	92 29	72.4	39 50.8	92 29	72.2	41 40.4	91 29	71.1	2
3	33 05.3	93 30	74.6	34 01.0	93 30	74.2	35 24.5	93 30	73.5	36 47.6	92 29	72.8	38 38.1	92 29	71.8	39 05.7	92 29	71.6	39 33.2	92 29	71.3	41 22.9	91 29	70.2	3
4	32 47.5	93 30	73.7	33 43.2	93 30	73.3	35 06.7	93 29	72.6	36 30.0	92 29	71.9	38 20.6	92 29	70.9	38 48.1	92 29	70.7	39 15.7	92 29	70.4	41 05.5	91 29	69.4	4
95	32 29.7	93 29	72.9	33 25.5	93 29	72.4	34 49.1	93 29	71.7	36 12.4	92 29	71.0	38 03.1	92 29	70.1	38 30.7	92 29	69.8	38 58.2	92 29	69.6	40 48.2	91 29	68.5	95
6	32 12.0	93 29	72.0	33 07.9	93 29	71.5	34 31.5	93 29	70.9	35 54.9	93 29	70.2	37 45.7	92 29	69.2	38 13.3	92 29	69.0	38 40.9	92 29	68.7	40 31.0	91 28	67.7	6
7	31 54.4	93 29	71.1	32 50.4	93 29	70.6	34 14.0	93 29	70.0	35 37.5	93 29	69.3	37 28.4	92 29	68.3	37 56.1	92 29	68.1	38 23.7	92 29	67.8	40 13.9	92 28	66.8	7
8	31 37.0	93 29	70.2	32 32.9	93 29	69.8	33 56.7	93 29	69.1	35 20.2	93 29	68.4	37 11.2	92 28	67.5	37 38.9	92 28	67.2	38 06.6	92 28	67.0	39 56.9	92 28	66.0	8
9	31 19.6	93 29	69.3	32 15.6	93 29	68.9	33 39.4	93 29	68.2	35 03.0	93 28	67.6	36 54.2	92 28	66.6	37 21.9	92 28	66.4	37 49.6	92 28	66.1	39 40.0	92 28	65.1	9
100	31 02.3	93 29	68.4	31 58.3	93 29	68.0	33 22.2	93 28	67.3	34 45.9	93 28	66.7	36 37.2	93 28	65.8	37 04.9	92 28	65.5	37 32.7	92 28	65.3	39 23.2	92 28	64.3	100
1	30 45.1	94 28	67.5	31 41.2	93 28	67.1	33 05.2	93 28	66.5	34 29.0	93 28	65.8	36 20.3	93 28	64.9	36 48.1	93 28	64.7	37 15.9	92 28	64.4	39 06.6	92 28	63.4	1
2	30 28.0	94 28	66.7	31 24.2	94 28	66.2	32 48.2	93 28	65.6	34 12.1	93 28	65.0	36 03.6	93 28	64.1	36 31.4	93 28	63.8	36 59.2	93 28	63.6	38 50.0	92 27	62.6	2
3	30 11.0	94 28	65.8	31 07.2	94 28	65.4	32 31.4	93 28	64.7	33 55.4	93 28	64.1	35 47.0	93 27	63.2	36 14.8	93 27	63.0	36 42.7	93 27	62.7	38 33.6	92 27	61.8	3
4	29 54.2	94 28	64.9	30 50.5	94 28	64.5	32 14.7	94 28	63.9	33 38.8	93 27	63.2	35 30.5	93 27	62.4	35 58.4	93 27	62.1	36 26.2	93 27	61.9	38 17.4	92 27	60.9	4
105	29 37.5	94 28	64.0	30 33.8	94 28	63.6	31 58.1	94 27	63.0	33 22.3	93 27	62.4	35 14.2	93 27	61.5	35 42.1	93 27	61.3	36 10.0	93 27	61.1	38 01.2	93 27	60.1	105
6	29 20.9	94 27	63.1	30 17.2	94 27	62.8	31 41.7	94 27	62.1	33 05.9	94 27	61.5	34 57.9	93 27	60.7	35 25.9	93 27	60.4	35 53.8	93 27	60.2	37 45.2	93 26	59.3	6
7	29 04.4	94 27	62.3	30 00.8	94 27	61.9	31 25.3	94 27	61.3	32 49.7	94 27	60.7	34 41.8	93 27	59.8	35 09.8	93 27	59.6	35 37.8	93 26	59.4	37 29.4	93 26	58.5	7
8	28 48.0	94 27	61.4	29 44.5	94 27	61.0	31 09.1	94 27	60.4	32 33.6	94 27	59.8	34 25.9	93 26	59.0	34 53.9	93 26	58.8	35 21.9	93 26	58.5	37 13.6	93 26	57.6	8
9	28 31.8	94 27	60.5	29 28.4	94 27	60.2	30 53.1	94 27	59.6	32 17.6	94 26	59.0	34 10.1	94 26	58.1	34 38.1	93 26	57.9	35 06.1	93 26	57.7	36 58.0	93 26	56.8	9
110	28 15.8	94 27	59.7	29 12.4	94 26	59.3	30 37.2	94 26	58.7	32 01.8	94 26	58.1	33 54.4	94 26	57.3	34 22.5	94 26	57.1	34 50.5	94 26	56.9	36 42.6	93 26	56.0	110
1	27 59.8	95 26	58.8	28 56.5	94 26	58.4	30 21.4	94 26	57.9	31 46.1	94 26	57.3	33 38.9	94 26	56.5	34 07.0	94 26	56.2	34 35.1	94 26	56.0	36 27.3	93 25	55.2	1
2	27 44.0	95 26	57.9	28 40.8	95 26	57.6	30 05.8	94 26	57.0	31 30.6	94 26	56.4	33 23.5	94 25	55.6	33 51.6	94 25	55.4	34 19.8	94 25	55.2	36 12.2	93 25	54.3	2
3	27 28.4	95 26	57.1	28 25.2	95 26	56.7	29 50.3	94 26	56.1	31 15.2	94 25	55.6	33 08.3	94 25	54.8	33 36.5	94 25	54.6	34 04.6	94 25	54.4	35 57.2	94 25	53.5	3
4	27 12.9	95 26	56.2	28 09.8	95 25	55.8	29 35.0	95 25	55.3	31 00.0	94 25	54.7	32 53.2	94 25	53.9	33 21.4	94 25	53.7	33 49.7	94 25	53.5	35 42.3	94 24	52.7	4
115	26 57.6	95 25	55.3	27 54.5	95 25	55.0	29 19.8	95 25	54.4	30 45.0	95 25	53.9	32 38.3	94 25	53.1	33 06.6	94 25	52.9	33 34.8	94 24	52.7	35 27.7	94 24	51.9	115
6	26 42.4	95 25	54.5	27 39.4	95 25	54.1	29 04.8	95 25	53.6	30 30.1	95 25	53.0	32 23.5	94 24	52.3	32 51.9	94 24	52.1	33 20.2	94 24	51.9	35 13.2	94 24	51.1	6
7	26 27.4	95 25	53.6	27 24.5	95 25	53.3	28 50.0	95 24	52.7	30 15.3	95 24	52.2	32 08.9	95 24	51.4	32 37.3	95 24	51.3	33 05.6	94 24	51.1	34 58.8	94 24	50.3	7
8	26 12.5	95 24	52.8	27 09.7	95 24	52.4	28 35.3	95 24	51.9	30 00.8	95 24	51.4	31 54.5	95 24	50.6	32 22.9	95 24	50.4	32 51.3	95 24	50.2	34 44.7	94 23	49.4	8
9	25 57.9	95 24	51.9	26 55.1	95 24	51.6	28 20.8	95 24	51.1	29 46.4	95 24	50.5	31 40.3	95 23	49.8	32 08.7	95 23	49.6	32 37.1	95 23	49.4	34 30.7	94 23	48.6	9
120	25 43.4	95 24	51.1	26 40.6	95 24	50.7	28 06.4	95 24	50.2	29 32.1	95 23	49.7	31 26.2	95 23	49.0	31 54.7	95 23	48.8	32 23.2	95 23	48.6	34 16.8	95 23	47.8	120
1	25 29.0	96 24	50.2	26 26.4	96 23	49.9	27 52.3	95 23	49.4	29 18.1	95 23	48.8	31 12.3	95 23	48.1	31 40.8	95 23	48.0	32 09.3	95 23	47.8	34 03.2	95 22	47.0	1
2	25 14.9	96 23	49.3	26 12.3	96 23	49.0	27 38.3	96 23	48.5	29 04.2	95 23	48.0	30 58.6	95 23	47.3	31 27.2	95 22	47.1	31 55.7	95 22	47.0	33 49.7	95 22	46.2	2
3	25 00.9	96 23	48.5	25 58.4	96 23	48.2	27 24.5	96 23	47.7	28 50.5	96 22	47.2	30 45.1	95 22	46.5	31 13.7	95 22	46.3	31 42.2	95 22	46.1	33 36.4	95 22	45.4	3
4	24 47.1	96 23	47.6	25 44.7	96 23	47.3	27 10.9	96 22	46.8	28 37.0	96 22	46.3	30 31.7	95 22	45.7	31 00.3	95 22	45.5	31 29.0	95 22	45.3	33 23.3	95 22	44.6	4
125	24 33.5	96 22	46.8	25 31.1	96 22	46.5	26 57.5	96 22	46.0	28 23.7	96 22	45.5	30 18.5	96 22	44.8	30 47.2	96 22	44.7	31 15.9	96 22	44.5	33 10.4	95 21	43.8	125
6	24 20.1	96 22	45.9	25 17.8	96 22	45.6	26 44.2	96 22	45.1	28 10.6	96 22	44.7	30 05.6	96 21	44.0	30 34.3	96 21	43.8	31 03.0	96 21	43.7	32 57.6	96 21	43.0	6
7	24 06.9	96 22	45.1	25 04.6	96 22	44.8	26 31.2	96 21	44.3	27 57.6	96 21	43.8	29 52.8	96 21	43.2	30 21.5	96 21	43.0	30 50.3	96 21	42.9	32 45.1	96 21	42.2	7
8	23 53.8	96 21	44.2	24 51.7	96 21	43.9	26 18.3	96 21	43.5	27 44.9	96 21	43.0	29 40.2	96 21	42.4	30 09.0	96 21	42.2	30 37.7	96 21	42.0	32 32.7	96 20	41.4	8
9	23 41.0	97 21	43.4	24 38.9	96 21	43.1	26 05.7	96 21	42.6	27 32.3	96 21	42.2	29 27.8	96 20	41.6	29 56.6	96 20	41.4	30 25.4	96 20	41.2	32 20.6	96 20	40.6	9
130	23 28.4	97 21	42.5	24 26.3	97 21	42.2	25 53.2	96 20	41.8	27 20.0	96 20	41.3	29 15.6	96 20	40.7	29 44.4	96 20	40.6	30 13.3	96 20	40.4	32 08.6	96 20	39.8	130
1	23 16.0	97 20	41.7	24 14.0	97 20	41.4	25 41.0	97 20	40.9	27 07.9	97 20	40.5	29 03.6	96 20	39.9	29 32.5	96 20	39.8	30 01.4	96 20	39.6	31 56.9	96 19	39.0	1
2	23 03.7	97 20	40.8	24 01.8	97 20	40.5	25 28.9	97 20	40.1	26 55.9	97 20	39.7	28 51.8	97 19	39.1	29 20.7	96 19	38.9	29 49.7	96 19	38.8	31 45.3	96 19	38.2	2
3	22 51.7	97 20	40.0	23 49.9	97 20	39.7	25 17.1	97 19	39.3	26 44.2	97 19	38.9	28 40.2	97 19	38.3	29 09.2	97 19	38.1	29 38.2	97 19	38.0	31 33.9	96 19	37.4	3
4	22 39.9	97 19	39.1	23 38.2	97 19	38.8	25 05.4	97 19	38.4	26 32.6	97 19	38.0	28 28.8	97 19	37.5	28 57.8	97 19	37.3	29 26.8	97 18	37.2	31 22.8	97 18	36.6	4
135	22 28.4	97 19	38.2	23 26.6	97 19	38.0	24 54.0	97 19	37.6	26 21.3	97 18	37.2	28 17.6	97 18	36.6	28 46.7	97 18	36.5	29 15.8	97 18	36.4	31 11.9	97 18	35.8	135
6	22 17.0	97 19	37.4	23 15.3	97 18	37.1	24 42.8	97 18	36.8	26 10.2	97 18	36.4	28 06.7	97 18	35.8	28 35.8	97 18	35.7	29 04.9	97 18	35.5	31 01.1	97 18	35.0	6
7	22 05.8	97 18	36.5	23 04.2	97 18	36.3	24 31.8	97 18	35.9	25 59.3	97 18	35.5	27 55.9	97 18	35.0	28 25.1	97 17	34.9	28 54.2	97 17	34.7	30 50.6	97 17	34.2	7
8	21 54.9	97 18	35.7	22 53.4	97 18	35.5	24 21.1	97 18	35.1	25 48.7	97 17	34.7	27 45.4	97 17	34.2	28 14.6	97 17	34.1	28 43.7	97 17	33.9	30 40.3	97 17	33.4	8
9	21 44.2	98 17	34.8	22 42.7	98 17	34.6	24 10.5	97 17	34.2	25 38.2	97 17	33.9	27 35.1	97 17	33.4	28 04.3	97 17	33.2	28 33.5	97 17	33.1	30 30.2	97 16	32.6	9
140	21 33.7	98 17	34.0	22 32.3	98 17	33.8	24 00.2	98 17	33.4	25 28.0	98 17	33.1	27 25.0	97 16	32.6	27 54.3	97 16	32.4	28 23.5	97 16	32.3	30 20.3	97 16	31.8	140
1	21 23.5	98 17	33.1	22 22.1	98 17	32.9	23 50.1	98 16	32.6	25 18.0	98 16	32.2	27 15.2	98 16	31.7	27 44.4	98 16	31.6	28 13.7	98 16	31.5	30 10.7	97 16	31.0	1
2	21 13.4	98 16	32.3	22 12.2	98 16	32.1	23 40.2	98 16	31.7	25 08.2	98 16	31.4	27 05.5	98 16	30.9	27 34.8	98 16	30.8	28 04.1	98 16	30.7	30 01.2	98 15	30.2	2
3	21 03.6	98 16	31.4	22 02.4	98 16	31.2	23 30.6	98 16	30.9	24 58.7	98 16	30.6	26 56.1	98 15	30.1	27 25.4	98 15	30.0	27 54.8	98 15	29.9	29 52.0	98 15	29.4	3
4	20 54.1	98 16	30.6	21 52.9	98 15	30.4	23 21.2	98 15	30.1	24 49.4	98 15	29.7	26 46.9	98 15	29.3	27 16.3	98 15	29.2	27 45.6	98 15	29.1	29 43.0	98 15	28.6	4
145	20 44.8	98 15	29.7	21 43.7	98 15	29.5	23 12.0	98 15	29.2	24 40.3	98 15	28.9	26 38.0	98 15	28.5	27 07.4	98 14	28.4	27 36.8	98 14	28.3	29 34.3	98 14	27.8	145
6	20 35.7	98 15	28.9	21 34.7	98 15	28.7	23 03.1	98 14	28.4	24 31.4	98 14	28.1	26 29.2	98 14	27.7	26 58.7	98 14	27.6	27 28.1	98 14	27.4	29 25.7	98 14	27.0	6
7	20 26.9	98 14	28.1	21 25.9	98 14	27.9	22 54.4	98 14	27.6	24 22.8	98 14	27.3	26 20.7	98 14	26.9	26 50.2	98 14	26.7	27 19.7	98 14	26.6	29 17.4	98 13	26.2	7
8	20 18.3	98 14	27.2	21 17.3	98 14	27.0	22 45.9	98 14	26.7	24 14.5	98 14	26.4	26 12.5	98 13	26.0	26 42.0	98 13	25.9	27 11.5	98 13	25.8	29 09.4	98 13	25.4	8
9	20 09.9	99 14	26.4	21 09.0	99 13	26.2	22 37.7	99 13	25.9	24 06.3	98 13	25.6	26 04.5	98 13	25.2	26 34.0	98 13	25.1	27 03.5	98 13	25.0	29 01.5	98 13	24.6	9
150	20 01.8	99 13	25.5	21 01.0	99 13	25.3	22 29.7	99 13	25.1	23 58.4	99 13	24.8	25 56.7	99 13	24.4	26 26.2	98 13	24.3	26 55.8	98 12	24.2	28 53.9	98 12	23.8	150
1	19 53.9	99 13	24.7	20 53.2	99 13	24.5	22 22.0	99 12	24.2	23 50.8	99 12	24.0	25 49.1	99 12	23.6	26 18.7	99 12	23.5	26 48.3	99 12	23.4	28 46.6	99 12	23.0	1
2	19 46.3	99 12	23.8	20 45.6	99 12	23.6	22 14.5	99 12	23.4	23 43.4	99 12	23.1	25 41.8	99 12	22.8	26 11.4	99 12	22.7	26 41.1	99 12	22.6	28 39.4	99 12	22.2	2
3	19 39.0	99 12	23.0	20 38.3	99 12	22.8	22 07.3	99 12	22.6	23 36.2	99 12	22.3	25 34.8	99 11	22.0	26 04.4	99 11	21.9	26 34.0	99 11	21.8	28 32.5	99 11	21.4	3
4	19 31.9	99 11	22.1	20 31.2	99 11	22.0	22 00.3	99 11	21.7	23 29.3	99 11	21.5	25 28.0	99 11	21.2	25 57.6	99 11	21.1	26 27.3	99 11	21.0	28 25.9	99 11	20.6	4
155	19 25.0	99 11	21.3	20 24.4	99 11	21.1	21 53.5	99 11	20.9	23 22.6	99 11	20.7	25 21.4	99 11	20.3	25 51.1	99 10	20.3	26 20.8	99 10	20.2	28 19.5	99 10	19.8	155
6	19 18.4	99 11	20.4	20 17.9	99 10	20.3	21 47.1	99 10	20.0	23 16.2	99 10	19.8	25 15.1	99 10	19.5	25 44.8	99 10	19.4	26 14.5	99 10	19.4	28 13.3	99 10	19.1	6
7	19 12.1	99 10	19.6	20 11.6	99 10	19.4	21 40.8	99 10	19.2	23 10.1	99 10	19.0	25 09.0	99 10	18.7	25 38.7	99 10	18.6	26 08.5	99 10	18.6	28 07.4	99 10	18.3	7
8	19 06.0	99 10	18.7	20 05.6	99 10	18.6	21 34.9	99 10	18.4	23 04.2	99 09	18.2	25 03.2	99 09	17.9	25 32.9	99 09	17.8	26 02.7	99 09	17.8	28 01.7	99 09	17.5	8
9	19 00.2	99 09	17.9	19 59.8	99 09	17.7	21 29.1	99 09	17.5	22 58.5	99 09	17.3	24 57.6	99 09	17.1	25 27.4	99 09	17.0	25 57.2	99 09	16.9	27 56.2	99 09	16.7	9
160	18 54.6	99 09	17.0	19 54.3	99 09	16.9	21 23.7	99 09	16.7	22 53.1	99 09	16.5	24 52.3	99 08	16.3	25 22.1	99 08	16.2	25 51.9	99 08	16.1	27 51.0	99 08	15.9	160
1	18 49.3	99 08	16.2	19 49.0	99 08	16.0	21 18.5	99 08	15.9	22 48.0	99 08	15.7	24 47.2	99 08	15.5	25 17.0	99 08	15.4	25 46.9	99 08	15.3	27 46.1	99 08	15.1	1
2	18 44.3	99 08	15.3	19 44.0	99 08	15.2	21 13.5	99 08	15.0	22 43.1	99 08	14.9	24 42.4	99 08	14.6	25 12.2	99 08	14.6	25 42.1	99 08	14.5	27 41.4	99 07	14.3	2
3	18 39.6	1.0 08	14.5	19 39.3	1.0 07	14.4	21 08.9	1.0 07	14.2	22 38.4	1.0 07	14.0	24 37.9	1.0 07	13.8	25 07.7	1.0 07	13.8	25 37.6	99 07	13.7	27 36.9	99 07	13.5	3
4	18 35.1	1.0 07	13.6	19 34.8	1.0 07	13.5	21 04.4	1.0 07	13.4	22 34.1	1.0 07	13.2	24 33.5	1.0 07	13.0	25 03.4	1.0 07	13.0	25 33.3	1.0 07	12.9	27 32.7	1.0 07	12.7	4
165	18 30.8	1.0 07	12.8	19 30.6	1.0 07	12.7	21 00.3	1.0 06	12.5	22 30.0	1.0 06	12.4	24 29.5	1.0 06	12.2	24 59.4	1.0 06	12.2	25 29.3	1.0 06	12.1	27 28.8	1.0 06	11.9	165
6	18 26.9	1.0 06	11.9	19 26.7	1.0 06	11.8	20 56.4	1.0 06	11.7	22 26.1	1.0 06	11.6	24 25.7	1.0 06	11.4	24 55.6	1.0 06	11.3	25 25.5	1.0 06	11.3	27 25.1	1.0 06	11.1	6
7	18 23.2	1.0 06	11.1	19 23.0	1.0 06	11.0	20 52.8	1.0 06	10.9	22 22.5	1.0 06	10.7	24 22.2	1.0 05	10.6	24 52.1	1.0 05	10.5	25 22.0	1.0 05	10.5	27 21.7	1.0 05	10.3	7
8	18 19.8	1.0 05	10.2	19 19.6	1.0 05	10.1	20 49.4	1.0 05	10.0	22 19.2	1.0 05	09.9	24 18.9	1.0 05	09.8	24 48.8	1.0 05	09.7	25 18.8	1.0 05	09.7	27 18.4	1.0 05	09.5	8
9	18 16.6	1.0 05	09.4	19 16.5	1.0 05	09.3	20 46.3	1.0 05	09.2	22 16.1	1.0 05	09.1	24 15.9	1.0 05	08.9	24 45.8	1.0 05	08.9	25 15.8	1.0 05	08.9	27 15.5	1.0 04	08.7	9
170	18 13.7	1.0 04	08.5	19 13.6	1.0 04	08.4	20 43.5	1.0 04	08.4	22 13.3	1.0 04	08.3	24 13.1	1.0 04	08.1	24 43.1	1.0 04	08.1	25 13.0	1.0 04	08.1	27 12.8	1.0 04	07.9	170
1	18 11.1	1.0 04	07.7	19 11.1	1.0 04	07.6	20 40.9	1.0 04	07.5	22 10.8	1.0 04	07.4	24 10.6	1.0 04	07.3	24 40.6	1.0 04	07.3	25 10.6	1.0 04	07.3	27 10.4	1.0 04	07.1	1
2	18 08.8	1.0 03	06.8	19 08.7	1.0 03	06.8	20 38.6	1.0 03	06.7	22 08.5	1.0 03	06.6	24 08.4	1.0 03	06.5	24 38.4	1.0 03	06.5	25 08.3	1.0 03	06.5	27 08.2	1.0 03	06.3	2
3	18 06.7	1.0 03	06.0	19 06.7	1.0 03	05.9	20 36.6	1.0 03	05.8	22 06.5	1.0 03	05.8	24 06.4	1.0 03	05.7	24 36.4	1.0 03	05.7	25 06.4	1.0 03	05.6	27 06.3	1.0 03	05.6	3
4	18 05.0	1.0 03	05.1	19 04.9	1.0 02	05.1	20 34.9	1.0 02	05.0	22 04.8	1.0 02	05.0	24 04.7	1.0 02	04.9	24 34.7	1.0 02	04.9	25 04.7	1.0 02	04.8	27 04.6	1.0 02	04.8	4
175	18 03.4	1.0 02	04.3	19 03.4	1.0 02	04.2	20 33.4	1.0 02	04.2	22 03.3	1.0 02	04.1	24 03.3	1.0 02	04.1	24 33.3	1.0 02	04.1	25 03.3	1.0 02	04.0	27 03.2	1.0 02	04.0	175
6	18 02.2	1.0 02	03.4	19 02.2	1.0 02	03.4	20 32.2	1.0 02	03.3	22 02.1	1.0 02	03.3	24 02.1	1.0 02	03.3	24 32.1	1.0 02	03.2	25 02.1	1.0 02	03.2	27 02.1	1.0 02	03.2	6
7	18 01.2	1.0 01	02.6	19 01.2	1.0 01	02.5	20 31.2	1.0 01	02.5	22 01.2	1.0 01	02.5	24 01.2	1.0 01	02.4	24 31.2	1.0 01	02.4	25 01.2	1.0 01	02.4	27 01.2	1.0 01	02.4	7
8	18 00.6	1.0 01	01.7	19 00.5	1.0 01	01.7	20 30.5	1.0 01	01.7	22 00.5	1.0 01	01.7	24 00.5	1.0 01	01.6	24 30.5	1.0 01	01.6	25 00.5	1.0 01	01.6	27 00.5	1.0 01	01.6	8
9	18 00.1	1.0 00	00.9	19 00.1	1.0 00	00.8	20 30.1	1.0 00	00.8	22 00.1	1.0 00	00.8	24 00.1	1.0 00	00.8	24 30.1	1.0 00	00.8	25 00.1	1.0 00	00.8	27 00.1	1.0 00	00.8	9
180	18 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	22 00.0	1.0 00	00.0	24 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	25 00.0	1.0 00	00.0	27 00.0	1.0 00	00.0	180

Lat. 72°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	64 00.0	1.0 00	180.0	65 00.0	1.0 00	180.0	66 30.0	1.0 00	180.0	67 30.0	1.0 00	180.0	68 30.0	1.0 00	180.0	69 30.0	1.0 00	180.0	70 30.0	1.0 00	180.0	72 00.0	1.0 00	180.0	00
1	63 59.7	1.0 01	178.4	64 59.7	1.0 01	178.4	66 29.7	1.0 01	178.3	67 29.7	1.0 01	178.3	68 29.7	1.0 01	178.3	69 29.7	1.0 01	178.2	70 29.7	1.0 01	178.2	71 59.7	1.0 02	178.1	1
2	63 59.0	1.0 02	176.8	64 59.0	1.0 02	176.8	66 28.9	1.0 02	176.7	67 28.9	1.0 02	176.6	68 28.9	1.0 02	176.5	69 28.8	1.0 02	176.4	70 28.8	1.0 02	176.4	71 58.8	1.0 03	176.2	2
3	63 57.7	1.0 03	175.2	64 57.7	1.0 03	175.2	66 27.6	1.0 03	175.0	67 27.5	1.0 03	174.9	68 27.5	1.0 03	174.8	69 27.4	1.0 03	174.7	70 27.3	1.0 03	174.5	71 57.2	1.0 04	174.3	3
4	63 55.9	1.0 04	173.7	64 55.8	1.0 04	173.6	66 25.7	1.0 04	173.4	67 25.6	1.0 04	173.2	68 25.5	1.0 04	173.1	69 25.4	1.0 04	172.9	70 25.3	1.0 04	172.7	71 55.1	1.0 05	172.4	4
05	63 53.6	1.0 05	172.1	64 53.5	1.0 05	171.9	66 23.3	1.0 05	171.7	67 23.2	1.0 05	171.5	68 23.0	1.0 05	171.3	69 22.8	1.0 05	171.1	70 22.6	1.0 05	170.9	71 52.3	1.0 06	170.5	05
6	63 50.8	1.0 06	170.5	64 50.6	1.0 06	170.3	66 20.4	1.0 06	170.1	67 20.2	1.0 06	169.9	68 19.9	1.0 06	169.6	69 19.7	1.0 06	169.4	70 19.4	1.0 06	169.1	71 49.0	99 07	168.6	6
7	63 47.5	1.0 06	168.9	64 47.3	1.0 06	168.7	66 16.9	1.0 07	168.4	67 16.6	1.0 07	168.2	68 16.3	99 07	167.9	69 16.0	99 07	167.6	70 15.6	99 07	167.3	71 45.0	99 08	166.8	7
8	63 43.7	1.0 07	167.4	64 43.4	99 07	167.2	66 12.9	99 08	166.8	67 12.6	99 08	166.5	68 12.2	99 08	166.2	69 11.8	99 08	165.9	70 11.3	99 08	165.5	71 40.5	99 08	164.9	8
9	63 39.4	99 08	165.8	64 39.0	99 08	165.6	66 08.4	99 08	165.2	67 08.0	99 08	164.8	68 07.5	99 09	164.5	69 07.0	99 09	164.1	70 06.4	99 09	163.7	71 35.4	99 09	163.1	9
10	63 34.6	99 09	164.3	64 34.2	99 09	164.0	66 03.4	99 09	163.5	67 02.9	99 09	163.2	68 02.3	99 10	162.8	69 01.6	99 10	162.4	70 00.9	99 10	162.0	71 29.7	99 10	161.2	10
1	63 29.4	99 10	162.7	64 28.8	99 10	162.4	65 57.9	99 10	161.9	66 57.3	99 10	161.5	67 56.5	99 10	161.1	68 55.8	99 11	160.7	69 54.9	99 11	160.2	71 23.5	98 11	159.4	1
2	63 23.6	99 10	161.2	64 23.0	99 11	160.9	65 51.9	99 11	160.3	66 51.1	99 11	159.9	67 50.3	99 11	159.5	68 49.4	98 12	159.0	69 48.4	98 12	158.5	71 16.7	98 12	157.6	2
3	63 17.4	99 11	159.7	64 16.6	99 11	159.3	65 45.4	99 12	158.7	66 44.5	98 12	158.3	67 43.5	98 12	157.8	68 42.5	98 12	157.3	69 41.3	98 13	156.8	71 09.4	98 12	155.8	3
4	63 10.7	99 12	158.1	64 09.9	99 12	157.8	65 38.4	98 12	157.1	66 37.4	98 13	156.7	67 36.3	98 13	156.2	68 35.1	98 13	155.6	69 33.7	98 13	155.1	71 01.5	97 14	154.1	4
15	63 03.6	98 13	156.6	64 02.6	98 13	156.2	65 31.0	98 13	155.6	66 29.8	98 13	155.1	67 28.6	98 14	154.5	68 27.2	98 14	154.0	69 25.7	97 14	153.4	70 53.1	97 15	152.3	15
6	62 56.0	98 13	155.1	63 54.9	98 13	154.7	65 23.1	98 14	154.0	66 21.8	98 14	153.5	67 20.4	98 14	152.9	68 18.8	97 15	152.3	69 17.1	97 15	151.7	70 44.3	97 16	150.6	6
7	62 48.0	98 14	153.6	63 46.8	98 14	153.2	65 14.8	98 15	152.4	66 13.3	97 15	151.9	67 11.7	97 15	151.3	68 10.0	97 16	150.7	69 08.1	97 16	150.0	70 34.9	96 16	148.9	7
8	62 39.5	98 15	152.1	63 38.2	98 15	151.7	65 06.0	97 15	150.9	66 04.3	97 16	150.3	67 02.6	97 16	149.7	68 00.7	97 16	149.1	68 58.6	96 17	148.4	70 25.1	96 17	147.2	8
9	62 30.7	98 15	150.7	63 29.2	97 16	150.2	64 56.7	97 16	149.4	65 54.9	97 16	148.8	66 53.0	97 17	148.2	67 50.9	96 17	147.5	68 48.7	96 17	146.7	70 14.8	95 18	145.5	9
20	62 21.4	97 16	149.2	63 19.7	97 16	148.7	64 47.1	97 17	147.9	65 45.1	97 17	147.3	66 43.0	96 17	146.6	67 40.7	96 18	145.9	68 38.3	96 18	145.1	70 04.1	96 19	143.9	20
1	62 11.7	97 17	147.7	63 09.9	97 17	147.2	64 37.0	97 17	146.4	65 34.9	96 18	145.7	66 32.6	96 18	145.1	67 30.1	96 18	144.3	68 27.5	96 19	143.5	69 53.0	96 19	142.2	1
2	62 01.6	97 17	146.3	62 59.7	97 18	145.8	64 26.5	96 18	144.9	65 24.2	96 18	144.2	66 21.8	96 19	143.5	67 19.1	96 19	142.8	68 16.2	96 19	142.0	69 41.4	94 20	140.6	2
3	61 51.1	97 18	144.9	62 49.0	96 18	144.3	64 15.7	96 19	143.4	65 13.2	96 19	142.7	66 10.6	95 19	142.0	67 07.7	95 20	141.3	68 04.6	95 20	140.4	69 29.5	94 21	139.0	3
4	61 40.2	96 19	143.5	62 38.0	96 19	142.9	64 04.4	96 19	141.9	65 01.8	96 20	141.3	65 59.0	95 20	140.5	66 55.9	95 20	139.7	67 52.6	94 21	138.9	69 17.1	93 21	137.5	4
25	61 29.0	96 19	142.1	62 26.7	96 20	141.5	63 52.8	95 20	140.5	64 50.0	95 20	139.8	65 47.0	95 21	139.1	66 43.8	94 21	138.2	67 40.2	94 21	137.4	69 04.4	93 22	135.9	25
6	61 17.4	96 20	140.7	62 14.9	96 20	140.1	63 40.8	95 21	139.1	64 37.9	95 21	138.4	65 34.7	94 21	137.6	66 31.2	94 21	136.8	67 27.5	94 22	135.9	68 51.3	93 22	134.4	6
7	61 05.5	96 20	139.3	62 02.9	95 21	138.7	63 28.5	95 21	137.7	64 25.4	95 21	136.9	65 22.0	94 22	136.1	66 18.4	94 22	135.3	67 14.4	93 22	134.4	68 37.9	92 23	132.9	7
8	60 53.3	95 21	137.9	61 50.4	95 21	137.3	63 15.9	95 22	136.3	64 12.5	94 22	135.5	65 09.0	94 22	134.7	66 05.2	93 23	133.9	67 01.0	93 23	132.9	68 24.2	92 23	131.4	8
9	60 40.7	95 22	136.6	61 37.7	95 22	135.9	63 02.9	94 22	134.9	63 59.4	94 22	134.1	64 55.7	94 23	133.3	65 51.6	93 23	132.4	66 47.3	92 23	131.5	68 10.1	92 24	130.0	9
30	60 27.8	95 22	135.2	61 24.6	95 22	134.6	62 49.6	94 23	133.5	63 45.9	94 23	132.7	64 42.0	93 23	131.9	65 37.8	93 24	131.0	66 33.3	92 24	130.1	67 55.8	91 24	128.5	30
1	60 14.5	95 23	133.9	61 11.3	94 23	133.2	62 36.0	94 23	132.1	63 32.2	93 23	131.4	64 28.1	93 24	130.5	65 23.7	92 24	129.6	66 18.9	92 24	128.7	67 41.1	91 25	127.1	1
2	60 01.0	94 23	132.6	60 57.6	94 23	131.9	62 22.1	94 24	130.8	63 18.1	93 24	130.0	64 13.8	93 24	129.2	65 09.2	92 24	128.3	66 04.3	91 25	127.3	67 26.2	90 25	125.7	2
3	59 47.2	94 23	131.2	60 43.7	94 24	130.6	62 07.9	93 24	129.5	63 03.8	93 24	128.7	63 59.3	92 25	127.8	64 54.6	92 25	126.9	65 49.4	91 25	125.9	67 11.0	90 26	124.4	3
4	59 33.2	94 24	130.0	60 29.5	94 24	129.3	61 53.5	93 25	128.1	62 49.1	93 25	127.3	63 44.5	92 25	126.5	64 39.6	91 25	125.6	65 34.3	91 26	124.6	66 55.6	90 26	123.0	4
35	59 18.8	94 24	128.7	60 15.0	93 25	128.0	61 38.8	93 25	126.8	62 34.3	92 25	126.0	63 29.5	92 26	125.2	64 24.4	91 26	124.3	65 18.9	91 26	123.3	66 39.9	89 26	121.7	35
6	59 04.2	94 25	127.4	60 00.2	93 25	126.7	61 23.8	93 25	125.6	62 19.2	92 26	124.7	63 14.2	92 26	123.9	64 09.0	91 26	122.9	65 03.3	90 26	122.0	66 24.0	89 27	120.3	6
7	58 49.4	93 25	126.1	59 45.2	93 25	125.4	61 08.6	92 26	124.3	62 03.8	92 26	123.5	62 58.7	91 26	122.6	63 53.3	91 26	121.7	64 47.5	90 27	120.7	66 07.9	89 27	119.0	7
8	58 34.3	93 26	124.9	59 30.0	93 26	124.2	60 53.2	92 26	123.0	61 48.2	92 26	122.2	62 43.0	91 27	121.3	63 37.4	90 27	120.4	64 31.4	90 27	119.4	65 51.6	89 28	117.8	8
9	58 18.9	93 26	123.7	59 14.6	92 26	122.9	60 37.5	92 26	121.8	61 32.4	91 27	120.9	62 27.0	91 27	120.1	63 21.3	90 27	119.1	64 15.2	89 27	118.1	65 35.1	88 28	116.5	9
40	58 03.4	93 26	122.4	58 58.9	92 26	121.7	60 21.6	92 27	120.5	61 16.4	91 27	119.7	62 10.9	90 27	118.8	63 05.0	90 27	117.9	63 58.7	89 28	116.9	65 18.4	88 28	115.3	40
1	57 47.7	92 27	121.2	58 43.0	92 27	120.5	60 05.6	91 27	119.3	61 00.2	91 27	118.5	61 54.6	90 28	117.6	62 48.5	90 28	116.7	63 42.1	89 28	115.7	65 01.6	88 28	114.0	1
2	57 31.7	92 27	120.0	58 26.9	92 27	119.3	59 49.3	91 27	118.1	60 43.8	91 28	117.3	61 38.0	90 28	116.4	62 31.9	89 28	115.4	63 25.3	89 28	114.4	64 44.6	87 29	112.8	2
3	57 15.6	92 27	118.8	58 10.7	92 27	118.1	59 32.9	91 28	116.9	60 27.3	90 28	116.1	61 21.3	90 28	115.2	62 15.0	89 28	114.2	63 08.3	88 29	113.2	64 27.4	87 29	111.6	3
4	56 59.2	92 28	117.7	57 54.2	91 28	116.9	59 16.2	91 28	115.7	60 10.5	90 28	114.9	61 04.5	90 28	114.0	61 58.1	89 29	113.1	62 51.2	88 29	112.1	64 10.1	87 29	110.4	4
45	56 42.7	92 28	116.5	57 37.6	91 28	115.8	58 59.5	91 28	114.6	59 53.6	90 28	113.7	60 47.5	89 29	112.8	61 40.9	89 29	111.9	62 34.0	88 29	110.9	63 52.7	87 29	109.3	45
6	56 26.0	92 28	115.3	57 20.8	91 28	114.6	58 42.5	90 28	113.4	59 36.6	90 29	112.6	60 30.3	89 29	111.7	61 23.6	89 29	110.7	62 16.6	88 29	109.7	63 35.1	87 29	108.1	6
7	56 09.2	91 28	114.2	57 03.9	91 28	113.4	58 25.4	90 29	112.3	59 19.4	90 29	111.4	60 13.0	89 29	110.5	61 06.2	88 29	109.6	61 59.1	88 29	108.6	63 17.4	86 30	107.0	7
8	55 52.2	91 29	113.1	56 46.8	91 29	112.3	58 08.2	90 29	111.1	59 02.1	89 29	110.3	59 55.6	89 29	109.4	60 48.7	88 29	108.4	61 41.4	87 30	107.5	62 59.6	86 30	105.9	8
9	55 35.1	91 29	111.9	56 29.6	91 29	111.2	57 50.8	90 29	110.0	58 44.6	89 29	109.2	59 38.0	89 29	108.3	60 31.1	88 30	107.3	61 23.7	87 30	106.3	62 41.8	86 30	104.7	9
50	55 17.8	91 29	110.8	56 12.3	90 29	110.1	57 33.4	90 29	108.9	58 27.0	89 29	108.0	59 20.4	89 30	107.2	60 13.3	88 30	106.2	61 05.9	87 30	105.2	62 23.8	86 30	103.6	50
1	55 00.4	91 29	109.7	55 54.8	90 29	109.0	57 15.8	90 30	107.8	58 09.4	89 30	106.9	59 02.6	88 30	106.1	59 55.5	88 30	105.1	60 47.9	87 30	104.1	62 05.7	86 30	102.6	1
2	54 42.9	91 29	108.6	55 37.2	90 30	107.9	56 58.1	89 30	106.7	57 51.6	89 30	105.8	58 44.7	88 30	105.0	59 37.5	88 30	104.0	60 29.9	87 30	103.1	61 47.6	86 30	101.5	2
3	54 25.3	91 30	107.5	55 19.5	90 30	106.8	56 40.2	89 30	105.6	57 33.7	89 30	104.8	58 26.8	88 30	103.9	59 19.5	88 30	103.0	60 11.8	87 30	102.0	61 29.4	86 30	100.4	3
4	54 07.6	90 30	106.5	55 01.7	90 30	105.7	56 22.3	89 30	104.5	57 15.7	89 30	103.7	58 08.7	88 30	102.8	59 01.4	87 30	101.9	59 53.6	87 30	100.9	61 11.1	85 31	99.4	4
55	53 49.7	90 30	105.4	54 43.8	90 30	104.6	56 04.4	89 30	103.5	56 57.7	89 30	102.6	57 50.6	88 30	101.8	58 43.2	87 30	100.9	59 35.4	87 30	99.9	60 52.8	85 31	98.3	55
6	53 31.8	90 30	104.3	54 25.8	90 30	103.6	55 46.3	89 30	102.4	56 39.5	88 30	101.6	57 32.4	88 30	100.7	58 25.0	87 30	99.8	59 17.1	87 31	98.9	60 34.4	85 31	97.3	6
7	53 13.8	90 30	103.3	54 07.8	90 30	102.5	55 28.1	89 30	101.4	56 21.3	88 30	100.5	57 14.2	88 30	99.7	58 06.7	87 31	98.8	58 58.8	86 31	97.8	60 16.0	85 31	96.3	7
8	52 55.7	90 30	102.2	53 49.6	90 30	101.5	55 09.9	89 30	100.3	56 03.1	88 31	99.5	56 55.9	88 31	98.7	57 48.3	87 31	97.8	58 40.4	86 31	96.8	59 57.6	85 31	95.3	8
9	52 37.6	90 30	101.2	53 31.4	90 30	100.5	54 51.7	89 31	99.3	55 44.8	88 31	98.5	56 37.5	88 31	97.6	57 29.9	87 31	96.7	58 21.9	86 31	95.8	59 39.1	85 31	94.3	9
60	52 19.3	90 30	100.2	53 13.2	89 31	99.5	54 33.3	89 31	98.3	55 26.4	88 31	97.5	56 19.1	88 31	96.6	57 11.5	87 31	95.7	58 03.5	86 31	94.8	59 20.6	85 31	93.3	60
1	52 01.1	90 31	99.2	52 54.8	89 31	98.4	54 15.0	89 31	97.3	55 08.0	88 31	96.5	56 00.7	88 31	95.6	56 53.0	87 31	94.7	57 45.0	86 31	93.8	59 02.1	85 31	92.3	1
2	51 42.7	90 31	98.2	52 36.5	89 31	97.4	53 56.6	89 31	96.3	54 49.6	88 31	95.5	55 42.2	87 31	94.6	56 34.6	87 31	93.8	57 26.5	86 31	92.8	58 43.6	85 31	91.4	2
3	51 24.4	90 31	97.1	52 18.1	89 31	96.4	53 38.1	89 31	95.3	54 31.1	88 31	94.5	55 23.7	87 31	93.7	56 16.0	87 31	92.8	57 07.9	86 31	91.9	58 25.0	85 31	90.4	3
4	51 06.0	90 31	96.2	51 59.6	89 31	95.4	53 19.6	88 31	94.3	54 12.6	88 31	93.5	55 05.2	87 31	92.7	55 57.5	87 31	91.8	56 49.4	86 31	90.9	58 06.5	85 31	89.5	4
65	50 47.5	90 31	95.2	51 41.2	89 31	94.5	53 01.1	89 31	93.3	53 54.1	88 31	92.5	54 46.7	87 31	91.7	55 39.0	87 31	90.8	56 30.9	86 31	90.0	57 47.9	85 31	88.5	65
6	50 29.0	90 31	94.2	51 22.7	89 31	93.5	52 42.6	88 31	92.4	53 35.6	88 31	91.6	54 28.2	87 31	90.8	55 20.4	87 31	89.9	56 12.3	86 31	89.0	57 29.4	85 31	87.6	6
7	50 10.5	90 31	93.2	51 04.2	89 31	92.5	52 24.1	88 31	91.4	53 17.0	88 31	90.6	54 09.6	87 31	89.8	55 01.9	87 31	88.9	55 53.8	86 31	88.1	57 10.9	85 31	86.7	7
8	49 52.0	90 31	92.2	50 45.6	89 31	91.5	52 05.6	88 31	90.4	52 58.5	88 31	89.7	53 51.1	87 31	88.9	54 43.4	87 31	88.0	55 35.3	86 31	87.1	56 52.4	85 31	85.7	8
9	49 33.5	90 31	91.3	50 27.1	89 31	90.6	51 47.0	88 31	89.5	52 39.9	88 31	88.7	53 32.6	87 31	87.9	54 24.8	87 31	87.1	55 16.8	86 31	86.2	56 33.9	85 31	84.8	9
70	49 14.9	90 31	90.3	50 08.5	89 31	89.6	51 28.5	88 31	88.5	52 21.4	88 31	87.8	53 14.0	87 31	87.0	54 06.3	87 31	86.2	54 58.3	86 31	85.3	56 15.5	85 31	83.9	70
1	48 56.4	90 31	89.4	49 50.0	89 31	88.7	51 09.9	88 31	87.6	52 02.9	88 31	86.8	52 55.5	87 31	86.1	53 47.8	87 31	85.2	54 39.8	86 31	84.4	55 57.0	85 31	83.0	1
2	48 37.8	90 31	88.4	49 31.5	89 31	87.7	50 51.4	88 31	86.7	51 44.4	88 31	85.9	52 37.0	88 31	85.1	53 29.4	87 31	84.3	54 21.4	86 31	83.5	55 38.7	85 31	82.1	2
3	48 19.3	90 31	87.5	49 13.0	89 31	86.8	50 32.9	89 31	85.7	51 25.9	88 31	85.0	52 18.6	88 31	84.2	53 10.9	87 31	83.4	54 03.0	86 31	82.6	55 20.3	86 30	81.2	3
4	48 00.8	90 31	86.6	48 54.4	89 31	85.9	50 14.4	88 31	84.8	51 07.4	88 31	84.1	52 00.2	88 31	83.3	52 52.5	87 31	82.5	53 44.6	86 31	81.7	55 02.0	86 30	80.4	4
75	47 42.3	90 31	85.6	48 36.0	89 31	85.0	49 56.0	89 31	83.9	50 49.0	88 31	83.2	51 41.8	88 31	82.4	52 34.2	87 31	81.6	53 26.3	87 30	80.8	54 43.8	86 30	79.5	75
6	47 23.8	90 31	84.7	48 17.5	89 31	84.0	49 37.6	89 31	83.0	50 30.6	88 31	82.3	51 23.4	88 31	81.5	52 15.9	87 30	80.7	53 08.0	87 30	79.9	54 25.5	86 30	78.6	6
7	47 05.4	90 31	83.8	47 59.1	89 31	83.1	49 19.2	89 31	82.1	50 12.3	88 30	81.4	51 05.1	88 30	80.6	51 57.6	87 30	79.8	52 49.8	87 30	79.0	54 07.4	86 30	77.8	7
8	46 47.0	90 31	82.9	47 40.7	89 31	82.2	49 00.8	89 30	81.2	49 54.0	88 30	80.5	50 46.8	88 30	79.7	51 39.4	87 30	79.0	52 31.6	87 30	78.2	53 49.3	86 30	76.9	8
9	46 28.6	90 31	82.0	47 22.3	89 31	81.3	48 42.5	89 30	80.3	49 35.7	88 30	79.6	50 28.6	88 30	78.9	51 21.2	87 30	78.1	52 13.5	87 30	77.3	53 31.3	86 30	76.0	9
80	46 10.3	90 30	81.1	47 04.0	89 30	80.4	48 24.3	89 30	79.4	49 17.5	88 30	78.7	50 10.4	88 30	78.0	51 03.1	88 30	77.2	51 55.4	87 30	76.4	53 13.3	86 30	75.2	80
1	45 52.0	90 30	80.2	46 45.8	90 30	79.5	48 06.1	89 30	78.5	48 59.3	88 30	77.8	49 52.3	88 30	77.1	50 45.0	88 30	76.4	51 37.4	87 30	75.6	52 55.4	86 30	74.4	1
2	45 33.7	90 30	79.3	46 27.6	90 30	78.6	47 48.0	89 30	77.6	48 41.2	89 30	77.0	49 34.3	88 30	76.2	50 27.0	88 30	75.5	51 19.5	87 30	74.7	52 37.6	86 30	73.5	2
3	45 15.5	90 30	78.4	46 09.4	90 30	77.8	47 29.9	89 30	76.8	48 23.2	89 30	76.1	49 16.3	88 30	75.4	50 09.1	88 30	74.6	51 01.7	87 30	73.9	52 19.9	86 29	72.7	3
4	44 57.4	90 30	77.5	45 51.3	90 30	76.9	47 11.9	89 30	75.9	48 05.3	89 30	75.2	48 58.4	88 30	74.5	49 51.3	88 30	73.8	50 43.9	87 29	73.0	52 02.2	86 29	71.9	4
85	44 39.3	90 30	76.6	45 33.3	90 30	76.0	46 53.9	89 30	75.0	47 47.4	89 30	74.4	48 40.6	88 30	73.7	49 33.5	88 29	72.9	50 26.2	88 29	72.2	51 44.6	87 29	71.0	85
6	44 21.3	90 30	75.7	45 15.4	90 30	75.1	46 36.0	89 30	74.2	47 29.5	89 30	73.5	48 22.8	89 29	72.8	49 15.8	88 29	72.1	50 08.6	88 29	71.4	51 27.1	87 29	70.2	6
7	44 03.4	90 30	74.9	44 57.5	90 30	74.3	46 18.2	89 30	73.3	47 11.8	89 30	72.6	48 05.1	89 29	72.0	48 58.2	88 29	71.3	49 51.1	88 29	70.5	51 09.7	87 29	69.4	7
8	43 45.5	90 30	74.0	44 39.7	90 30	73.4	46 00.5	90 29	72.4	46 54.2	89 29	71.8	47 47.6	89 29	71.1	48 40.7	88 29	70.4	49 33.6	88 29	69.7	50 52.4	87 29	68.6	8
9	43 27.7	90 30	73.1	44 21.9	90 29	72.5	45 42.9	90 29	71.6	46 36.6	89 29	71.0	47 30.1	89 29	70.3	48 23.3	88 29	69.6	49 16.3	88 29	68.9	50 35.2	87 28	67.8	9
90	43 10.0	91 29	72.3	44 04.3	90 29	71.7	45 25.3	90 29	70.7	46 19.1	89 29	70.1	47 12.7	89 29	69.5	48 06.0	89 29	68.8	48 59.0	88 29	68.1	50 18.1	88 28	67.0	90

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	42 52.4	91 29	71.4	43 46.8	90 29	70.8	45 07.9	90 29	69.9	46 01.7	90 29	69.3
2	42 34.9	91 29	70.5	43 29.3	90 29	70.0	44 50.5	90 29	69.1	45 44.4	90 29	68.4
3	42 17.5	91 29	69.7	43 11.9	91 29	69.1	44 33.2	90 29	68.2	45 27.2	90 28	67.6
4	42 00.1	91 29	68.8	42 54.6	91 29	68.3	44 16.1	90 28	67.4	45 10.1	90 28	66.8
95	41 42.9	91 29	68.0	42 37.5	91 28	67.4	43 59.0	90 28	66.5	44 53.2	90 28	65.9
6	41 25.8	91 28	67.1	42 20.4	91 28	66.6	43 42.1	91 28	65.7	44 36.3	90 28	65.1
7	41 08.7	91 28	66.3	42 03.4	91 28	65.7	43 25.2	91 28	64.9	44 19.5	90 28	64.3
8	40 51.8	91 28	65.4	41 46.6	91 28	64.9	43 08.5	91 28	64.1	44 02.9	90 28	63.5
9	40 35.0	92 28	64.6	41 29.9	91 28	64.1	42 51.9	91 27	63.2	43 46.3	91 27	62.7
100	40 18.3	92 28	63.8	41 13.2	91 28	63.2	42 35.4	91 27	62.4	43 29.9	91 27	61.8
1	40 01.7	92 27	62.9	40 56.8	92 27	62.4	42 19.0	91 27	61.6	43 13.6	91 27	61.0
2	39 45.3	92 27	62.1	40 40.4	92 27	61.6	42 02.8	91 27	60.8	42 57.5	91 27	60.2
3	39 29.0	92 27	61.3	40 24.1	92 27	60.8	41 46.6	91 27	60.0	42 41.5	91 26	59.4
4	39 12.8	92 27	60.5	40 08.0	92 27	59.9	41 30.7	92 26	59.2	42 25.6	91 26	58.6
105	38 56.7	92 27	59.6	39 52.0	92 26	59.1	41 14.8	92 26	58.3	42 09.8	92 26	57.8
6	38 40.8	92 26	58.8	39 36.2	92 26	58.3	40 59.1	92 26	57.5	41 54.2	92 26	57.0
7	38 25.0	93 26	58.0	39 20.5	92 26	57.5	40 43.5	92 26	56.7	41 38.7	92 26	56.2
8	38 09.3	93 26	57.2	39 04.9	93 26	56.7	40 28.1	92 25	55.9	41 23.4	92 25	55.4
9	37 53.8	93 26	56.3	38 49.5	93 25	55.9	40 12.8	92 25	55.1	41 08.2	92 25	54.6
110	37 38.5	93 25	55.5	38 34.2	93 25	55.1	39 57.7	93 25	54.3	40 53.1	92 25	53.8
1	37 23.3	93 25	54.7	38 19.1	93 25	54.2	39 42.7	93 25	53.5	40 38.2	92 25	53.0
2	37 08.2	93 25	53.9	38 04.1	93 25	53.4	39 27.8	93 24	52.7	40 23.5	93 24	52.2
3	36 53.3	93 25	53.1	37 49.3	93 24	52.6	39 13.2	93 24	51.9	40 08.9	93 24	51.5
4	36 38.6	94 24	52.3	37 34.7	93 24	51.8	38 58.7	93 24	51.1	39 54.5	93 24	50.7
115	36 24.0	94 24	51.5	37 20.2	94 24	51.0	38 44.3	93 24	50.3	39 40.2	93 23	49.9
6	36 09.6	94 24	50.7	37 05.8	94 24	50.2	38 30.1	93 23	49.6	39 26.1	93 23	49.1
7	35 55.3	94 23	49.8	36 51.7	94 23	49.4	38 16.1	94 23	48.8	39 12.2	93 23	48.3
8	35 41.2	94 23	49.0	36 37.7	94 23	48.6	38 02.2	94 23	48.0	38 58.5	94 23	47.5
9	35 27.3	94 23	48.2	36 23.9	94 23	47.8	37 48.5	94 23	47.2	38 44.9	94 22	46.7
120	35 13.6	94 23	47.4	36 10.2	94 22	47.0	37 35.0	94 22	46.4	38 31.4	94 22	46.0
1	35 00.0	95 22	46.6	35 56.7	94 22	46.2	37 21.7	94 22	45.6	38 18.2	94 22	45.2
2	34 46.6	95 22	45.8	35 43.4	95 22	45.4	37 08.5	94 22	44.8	38 05.1	94 21	44.4
3	34 33.4	95 22	45.0	35 30.3	95 22	44.6	36 55.5	95 21	44.0	37 52.3	94 21	43.6
4	34 20.4	95 21	44.2	35 17.4	95 21	48.8	36 42.7	95 21	43.3	37 39.6	95 21	42.9
125	34 07.5	95 21	43.4	35 04.6	95 21	43.1	36 30.1	95 21	42.5	37 27.0	95 21	42.1
6	33 54.9	95 21	42.6	34 52.1	95 21	42.3	36 17.7	95 20	41.7	37 14.7	95 20	41.3
7	33 42.4	95 20	41.8	34 39.7	95 20	41.5	36 05.5	95 20	40.9	37 02.6	95 20	40.5
8	33 30.2	96 20	41.0	34 27.5	96 20	40.7	35 53.4	95 20	40.1	36 50.6	95 20	39.8
9	33 18.1	96 20	40.2	34 15.5	96 20	39.9	35 41.6	96 19	39.4	36 38.9	95 19	39.0
130	33 06.2	96 19	39.4	34 03.7	96 19	39.1	35 29.9	96 19	38.6	36 27.3	96 19	38.2
1	32 54.5	96 19	38.6	33 52.1	96 19	38.3	35 18.4	96 19	37.8	36 15.9	96 19	37.4
2	32 43.0	96 19	37.8	33 40.7	96 19	37.5	35 07.2	96 18	37.0	36 04.7	96 18	36.7
3	32 31.8	96 18	37.1	33 29.6	96 18	36.7	34 56.1	96 18	36.2	35 53.8	96 18	35.9
4	32 20.7	96 18	36.3	33 18.6	96 18	35.9	34 45.3	96 18	35.5	35 43.0	96 18	35.1
135	32 09.8	97 18	35.5	33 07.8	97 18	35.2	34 34.6	96 17	34.7	35 32.4	96 17	34.4
6	31 59.2	97 17	34.7	32 57.2	97 17	34.4	34 24.2	97 17	33.9	35 22.1	96 17	33.6
7	31 48.7	97 17	33.9	32 46.8	97 17	33.6	34 13.9	97 17	33.1	35 11.9	97 17	32.8
8	31 38.5	97 17	33.1	32 36.7	97 17	32.8	34 03.9	97 16	32.4	35 02.0	97 16	32.1
9	31 28.5	97 16	32.3	32 26.8	97 16	32.0	33 54.1	97 16	31.6	34 52.2	97 16	31.3
140	31 18.7	97 16	31.5	32 17.0	97 16	31.2	33 44.5	97 16	30.8	34 42.7	97 16	30.5
1	31 09.1	97 16	30.7	32 07.5	97 15	30.5	33 35.1	97 15	30.0	34 33.4	97 15	29.8
2	30 59.8	98 15	29.9	31 58.2	97 15	29.7	33 25.9	97 15	29.3	34 24.3	97 15	29.0
3	30 50.6	98 15	29.1	31 49.2	98 15	28.9	33 17.0	97 15	28.5	34 15.4	97 14	28.2
4	30 41.7	98 14	28.3	31 40.3	98 14	28.1	33 08.2	98 14	27.7	34 06.8	98 14	27.5
145	30 33.0	98 14	27.6	31 31.7	98 14	27.3	32 59.7	98 14	26.9	33 58.3	98 14	26.7
6	30 24.5	98 14	26.8	31 23.3	98 14	26.5	32 51.4	98 13	26.2	33 50.1	98 13	25.9
7	30 16.3	98 13	26.0	31 15.1	98 13	25.8	32 43.4	98 13	25.4	33 42.1	98 13	25.2
8	30 08.3	98 13	25.2	31 07.2	98 13	25.0	32 35.5	98 13	24.6	33 34.4	98 13	24.4
9	30 00.5	98 13	24.4	30 59.5	98 12	24.2	32 27.9	98 12	23.9	33 26.8	98 12	23.6
150	29 53.0	98 12	23.6	30 52.0	98 12	23.4	32 20.5	98 12	23.1	33 19.5	98 12	22.9
1	29 45.7	98 12	22.8	30 44.8	98 12	22.6	32 13.4	98 12	22.3	33 12.4	98 11	22.1
2	29 38.6	99 11	22.0	30 37.7	99 11	21.8	32 06.4	99 11	21.5	33 05.5	98 11	21.3
3	29 31.8	99 11	21.3	30 31.0	99 11	21.1	31 59.7	99 11	20.8	32 58.9	99 11	20.6
4	29 25.2	99 11	20.5	30 24.4	99 10	20.3	31 53.3	99 10	20.0	32 52.5	99 10	19.8
155	29 18.8	99 10	19.7	30 18.1	99 10	19.5	31 47.1	99 10	19.2	32 46.3	99 10	19.1
6	29 12.7	99 10	18.9	30 12.0	99 10	18.7	31 41.1	99 10	18.5	32 40.4	99 10	18.3
7	29 06.8	99 09	18.1	30 06.2	99 09	17.9	31 35.3	99 09	17.7	32 34.7	99 09	17.5
8	29 01.2	99 09	17.3	30 00.6	99 09	17.2	31 29.8	99 09	16.9	32 29.2	99 09	16.8
9	28 55.8	99 09	16.5	29 55.3	99 08	16.4	31 24.5	99 08	16.2	32 24.0	99 08	16.0
160	28 50.6	99 08	15.7	29 50.2	99 08	15.6	31 19.5	99 08	15.4	32 19.0	99 08	15.2
1	28 45.7	99 08	15.0	29 45.3	99 08	14.8	31 14.7	99 08	14.6	32 14.3	99 08	14.5
2	28 41.0	99 07	14.2	29 40.7	99 07	14.0	31 10.1	99 07	13.8	32 09.7	99 07	13.7
3	28 36.6	99 07	13.4	29 36.3	99 07	13.3	31 05.8	99 07	13.1	32 05.5	99 07	13.0
4	28 32.5	1.0 07	12.6	29 32.2	1.0 06	12.5	31 01.7	1.0 06	12.3	32 01.4	99 06	12.2
165	28 28.5	1.0 06	11.8	29 28.3	1.0 06	11.7	30 57.9	1.0 06	11.5	31 57.6	1.0 06	11.4
6	28 24.9	1.0 06	11.0	29 24.7	1.0 06	10.9	30 54.3	1.0 06	10.8	31 54.1	1.0 06	10.7
7	28 21.5	1.0 05	10.2	29 21.3	1.0 05	10.1	30 51.0	1.0 05	10.0	31 50.8	1.0 05	09.9
8	28 18.3	1.0 05	09.4	29 18.1	1.0 05	09.4	30 47.9	1.0 05	09.2	31 47.7	1.0 05	09.1
9	28 15.4	1.0 04	08.7	29 15.2	1.0 04	08.6	30 45.0	1.0 04	08.5	31 44.9	1.0 04	08.4
170	28 12.7	1.0 04	07.9	29 12.6	1.0 04	07.8	30 42.4	1.0 04	07.7	31 42.3	1.0 04	07.6
1	28 10.3	1.0 04	07.1	29 10.2	1.0 04	07.0	30 40.1	1.0 04	06.9	31 40.0	1.0 03	06.9
2	28 08.1	1.0 03	06.3	29 08.1	1.0 03	06.2	30 38.0	1.0 03	06.2	31 37.9	1.0 03	06.1
3	28 06.2	1.0 03	05.5	29 06.2	1.0 03	05.5	30 36.1	1.0 03	05.4	31 36.0	1.0 03	05.3
4	28 04.6	1.0 02	04.7	29 04.5	1.0 02	04.7	30 34.5	1.0 02	04.6	31 34.4	1.0 02	04.6
175	28 03.2	1.0 02	03.9	29 03.2	1.0 02	03.9	30 33.1	1.0 02	03.8	31 33.1	1.0 02	03.8
6	28 02.0	1.0 01	03.1	29 02.0	1.0 01	03.1	30 32.0	1.0 01	03.1	31 32.0	1.0 01	03.0
7	28 01.1	1.0 01	02.4	29 01.1	1.0 01	02.3	30 31.1	1.0 01	02.3	31 31.1	1.0 01	02.3
8	28 00.5	1.0 01	01.6	29 00.5	1.0 01	01.6	30 30.5	1.0 01	01.5	31 30.5	1.0 01	01.5
9	28 00.1	1.0 00	00.8	29 00.1	1.0 00	00.8	30 30.1	1.0 00	00.8	31 30.1	1.0 00	00.8
180	28 00.0	1.0 00	00.0	29 00.0	1.0 00	00.0	30 30.0	1.0 00	00.0	31 30.0	1.0 00	00.0

H.A.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	46 55.3	89 29	68.6	47 48.7	89 29	67.9	48 41.9	88 28	67.2	50 01.1	88 28	66.2
2	46 38.1	89 29	67.8	47 31.6	89 28	67.1	48 24.8	89 28	66.4	49 44.2	88 28	65.4
3	46 21.0	89 28	67.0	47 14.6	89 28	66.3	48 07.9	89 28	65.6	49 27.4	88 28	64.6
4	46 04.0	90 28	66.1	46 57.6	89 28	65.5	47 51.1	89 28	64.8	49 10.7	88 28	63.8
95	45 47.1	90 28	65.3	46 40.8	89 28	64.7	47 34.3	89 28	64.0	48 54.1	88 27	63.0
6	45 30.3	90 28	64.5	46 24.1	90 28	63.9	47 17.7	89 27	63.2	48 37.7	89 27	62.2
7	45 13.6	90 28	63.7	46 07.5	90 27	63.1	47 01.2	89 27	62.4	48 21.3	89 27	61.4
8	44 57.1	90 27	62.9	45 51.1	90 27	62.3	46 44.9	89 27	61.6	48 05.1	89 27	60.6
9	44 40.6	90 27	62.1	45 34.7	90 27	61.5	46 28.6	90 27	60.8	47 49.0	89 27	59.8
100	44 24.3	90 27	61.3	45 18.5	90 27	60.7	46 12.5	90 27	60.0	47 33.1	89 26	59.1
1	44 08.1	91 27	60.5	45 02.4	90 27	59.9	45 56.5	90 26	59.2	47 17.2	89 26	58.3
2	43 52.0	91 27	59.7	44 46.4	90 26	59.1	45 40.6	90 26	58.5	47 01.5	90 26	57.5
3	43 36.1	91 26	58.9	44 30.6	91 26	58.3	45 24.9	90 26	57.7	46 46.0	90 26	56.7
4	43 20.3	91 26	58.1	44 14.9	91 26	57.5	45 09.3	91 26	56.9	46 30.5	90 25	56.0
105	43 04.6	91 26	57.3	43 59.3	91 26	56.7	44 53.8	91 26	56.1	46 15.2	90 25	55.2
6	42 49.1	91 26	56.5	43 43.9	91 25	55.9	44 38.5	91 25	55.3	46 00.1	90 25	54.4
7	42 33.7	92 25	55.7	43 28.6	91 25	55.1	44 23.3	91 25	54.6	45 45.1	91 25	53.7
8	42 18.5	92 25	54.9	43 13.5	92 25	54.3	44 08.3	91 25	53.8	45 30.2	91 24	52.9
9	42 03.4	92 25	54.1	42 58.5	92 25	53.6	43 53.4	91 25	53.0	45 15.5	91 24	52.1
110	41 48.5	92 25	53.3	42 43.6	92 24	52.8	43 38.7	92 24	52.2	45 00.9	91 24	51.4
1	41 33.7	92 24	52.5	42 29.0	92 24	52.0	43 24.1	92 24	51.5	44 46.5	91 24	50.6
2	41 19.0	92 24	51.7	42 14.4	92 24	51.2	43 09.7	92 24	50.7	44 32.3	92 24	49.9
3	41 04.5	93 24	51.0	42 00.0	92 24	50.5	42 55.4	92 24	49.9	44 18.2	92 23	49.1
4	40 50.2	93 24	50.2	41 45.8	93 23	49.7	42 41.3	92 23	49.2	44 04.2	92 23	48.4
115	40 36.1	93 23	49.4	41 31.8	93 23	48.9	42 27.4	93 23	48.4	43 50.5	92 23	47.6
6	40 22.1	93 23	48.6	41 17.9	93 23	48.1	42 13.6	93 23	47.6	43 36.8	92 22	46.9
7	40 08.2	93 23	47.8	41 04.2	93 23	47.4	42 00.0	93 22	46.9	43 23.4	93 22	46.1
8	39 54.6	93 22	47.1	40 50.6	93 22	46.6	41 46.5	93 22	46.1	43 10.1	93 22	45.4
9	39 41.1	94 22	46.3	40 37.2	93 22	45.8	41 33.2	93 22	45.4	42 57.0	93 22	44.6
120	39 27.8	94 22	45.5	40 24.0	94 22	45.1	41 20.1	93 22	44.6	42 44.1	93 21	43.9
1	39 14.6	94 22	44.7	40 11.0	94 21	44.3	41 07.2	94 21	43.8	42 31.3	93 21	43.1
2	39 01.7	94 21	44.0	39 58.1	94 21	43.5	40 54.4	94 21	43.1	42 18.7	94 21	42.4
3	38 48.9	94 21	43.2	39 45.4	94 21	42.8	40 41.9	94 21	42.3	42 06.3	94 20	41.6
4	38 36.3	94 21	42.4	39 32.9	94 21	42.0	40 29.5	94 20	41.6	41 54.1	94 20	40.9
125	38 23.9	95 20	41.7	39 20.6	94 20	41.3	40 17.3	94 20	40.8	41 42.0	94 20	40.2
6	38 11.6	95 20	40.9	39 08.5	95 20	40.5	40 05.2	95 20	40.1	41 30.2	94 19	39.4
7	37 59.6	95 20	40.1	38 56.5	95 20	39.7	39 53.4	95 19	39.3	41 18.5	94 19	38.7
8	37 47.7	95 19	39.4	38 44.8	95 19	39.0	39 41.7	95 19	38.6	41 07.0	95 19	37.9
9	37 36.1	95 19	38.6	38 33.2	95 19	38.2	39 30.3	95 19	37.8	40 55.7	95 19	37.2
130	37 24.6	95 19	37.8	38 21.8	95 19	37.5	39 19.0	95 18	37.1	40 44.6	95 18	36.5
1	37 13.3	96 18	37.1	38 10.7	95 18	36.7	39 07.9	95 18	36.3	40 33.7	95 18	35.7
2	37 02.2	96 18	36.3	37 59.7	96 18	35.9	38 57.0	96 18	35.6	40 22.9	95 18	35.0
3	36 51.4	96 18	35.5	37 48.9	96 18	35.2	38 46.3	96 18	34.8	40 12.4	96 17	34.3
4	36 40.7	96 17	34.8	37 38.3	96 17	34.4	38 35.9	96 17	34.1	40 02.1	96 17	33.5
135	36 30.2	96 17	34.0	37 27.9	96 17	33.7	38 25.6	96 17	33.3	39 51.9	96 17	32.8
6	36 19.9	96 17	33.3	37 17.7	96 17	32.9	38 15.5	96 16	32.6	39 42.0	96 16	32.1
7	36 09.9	97 16	32.5	37 07.8	96 16	32.2	38 05.6	96 16	31.8	39 32.2	96 16	31.3
8	36 00.0	97 16	31.7	36 58.0	97 16	31.4	37 55.9	97 16	31.1	39 22.7	96 16	30.6
9	35 50.4	97 16	31.0	36 48.4	97 16	30.7	37 46.4	97 15	30.3	39 13.4	97 15	29.9
140	35 40.9	97 15	30.2	36 39.1	97 15	29.9	37 37.2	97 15	29.6	39 04.2	97 15	29.1
1	35 31.7	97 15	29.5	36 29.9	97 15	29.2	37 28.1	97 15	28.9	38 55.3	97 15	28.4
2	35 22.7	97 15	28.7	36 21.0	97 15	28.4	37 19.3	97 14	28.1	38 46.6	97 14	27.7
3	35 13.9	97 14	27.9	36 12.3	97 14	27.7	37 10.7	97 14	27.4	38 38.1	97 14	26.9
4	35 05.3	98 14	27.2	36 03.8	97 14	26.9	37 02.2	97 14	26.6	38 29.8	97 13	26.2
145	34 56.9	98 14	26.4	35 55.5	98 13	26.2	36 54.0	98 13	25.9	38 21.7	97 13	25.5
6	34 48.8	98 13	25.7	35 47.4	98 13	25.4	36 46.0	98 13	25.1	38 13.9	98 13	24.7
7	34 40.9	98 13	24.9	35 39.6	98 13	24.7	36 38.3	98 13	24.4	38 06.2	98 12	24.0
8	34 33.2	98 12	24.2	35 32.0	98 12	23.9	36 30.7	98 12	23.7	37 58.8	98 12	23.3
9	34 25.7	98 12	23.4	35 24.6	98 12	23.2	36 23.4	98 12	22.9	37 51.6	98 12	22.5
150	34 18.4	98 12	22.6	35 17.4	98 12	22.4	36 16.3	98 12	22.2	37 44.6	98 11	21.8
1	34 11.4	98 11	21.9	35 10.4	98 11	21.7	36 09.4	98 11	21.4	37 37.8	98 11	21.1
2	34 04.6	98 11	21.1	35 03.7	98 11	20.9	36 02.7	98 11	20.7	37 31.2	98 11	20.4
3	33 58.1	99 11	20.4	34 57.2	99 10	20.2	35 56.3	98 10	20.0	37 24.9	98 10	19.6
4	33 51.7	99 10	19.6	34 50.9	99 10	19.4	35 50.1	99 10	19.2	37 18.8	99 10	18.9
155	33 45.6	99 10	18.9	34 44.8	99 10	18.7	35 44.1	99 10	18.5	37 12.9	99 09	18.2
6	33 39.7	99 09	18.1	34 39.0	99 09	17.9	35 38.3	99 09	17.7	37 07.2	99 09	17.4
7	33 34.1	99 09	17.4	34 33.4	99 09	17.2	35 32.8	99 09	17.0	37 01.8	99 09	16.7
8	33 28.7	99 09	16.6	34 28.1	99 09	16.4	35 27.5	99 08	16.3	36 56.5	99 08	16.0
9	33 23.5	99 08	15.8	34 22.9	99 08	15.7	35 22.4	99 08	15.5	36 51.5	99 08	15.3
160	33 18.5	99 08	15.1	34 18.0	99 08	14.9	35 17.6	99 08	14.8	36 46.8	99 08	14.5
1	33 13.8	99 07	14.3	34 13.4	99 07	14.2	35 12.9	99 07	14.0	36 42.2	99 07	13.8
2	33 09.4	99 07	13.6	34 09.0	99 07	13.4	35 08.6	99 07	13.3	36 37.9	99 07	13.1
3	33 05.1	99 07	12.8	34 04.8	99 07	12.7	35 04.4	99 07	12.6	36 33.8	99 06	12.4
4	33 01.1	99 06	12.1	34 00.8	99 06	11.9	35 00.5	99 06	11.8	36 30.0	99 06	11.6
165	32 57.4	1.0 06	11.3	33 57.1	1.0 06	11.2	34 56.8	1.0 06	11.1	36 26.4	1.0 06	10.9
6	32 53.9	1.0 05	10.6	33 53.6	1.0 05	10.5	34 53.4	1.0 05	10.3	36 23.0	1.0 05	10.2
7	32 50.6	1.0 05	09.8	33 50.4	1.0 05	09.7	34 50.2	1.0 05	09.6	36 19.8	1.0 05	09.4
8	32 47.5	1.0 05	09.1	33 47.4	1.0 05	09.0	34 47.2	1.0 05	08.9	36 16.9	1.0 04	08.7
9	32 44.7	1.0 04	08.3	33 44.6	1.0 04	08.2	34 44.4	1.0 04	08.1	36 14.2	1.0 04	08.0
170	32 42.2	1.0 04	07.5	33 42.1	1.0 04	07.5	34 41.9	1.0 04	07.4	36 11.7	1.0 04	07.3
1	32 39.9	1.0 03	06.8	33 39.8	1.0 03	06.7	34 39.7	1.0 03	06.6	36 09.5	1.0 03	06.5
2	32 37.8	1.0 03	06.0	33 37.7	1.0 03	06.0	34 37.6	1.0 03	05.9	36 07.5	1.0 03	05.8
3	32 36.0	1.0 03	05.3	33 35.9	1.0 03	05.2	34 35.9	1.0 03	05.2	36 05.8	1.0 03	05.1
4	32 34.4	1.0 02	04.5	33 34.3	1.0 02	04.5	34 34.3	1.0 02	04.4	36 04.2	1.0 02	04.4
175	32 33.0	1.0 02	03.8	33 33.0	1.0 02	03.7	34 33.0	1.0 02	03.7	36 02.9	1.0 02	03.6
6	32 32.0	1.0 01	03.0	33 31.9	1.0 01	03.0	34 31.9	1.0 01	03.0	36 01.9	1.0 01	02.9
7	32 31.1	1.0 01	02.3	33 31.1	1.0 01	02.2	34 31.1	1.0 01	02.2	36 01.1	1.0 01	02.2
8	32 30.5	1.0 01	01.5	33 30.5	1.0 01	01.5	34 30.5	1.0 01	01.5	36 00.5	1.0 01	01.5
9	32 30.1	1.0 00	00.8	33 30.1	1.0 00	00.7	34 30.1	1.0 00	00.7	36 00.1	1.0 00	00.7
180	32 30.0	1.0 00	00.0	33 30.0	1.0 00	00.0	34 30.0	1.0 00	00.0	36 00.0	1.0 00	00.0

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	72 30.0	1.0 01	180.0	73 00.0	1.0 01	180.0	74 00.0	1.0 01	180.0	74 30.0	1.0 01	180.0	75 00.0	1.0 01	180.0	75 30.0	1.0 01	180.0	77 00.0	1.0 01	180.0	77 30.0	1.0 01	180.0	00
1	72 29.7	1.0 02	178.1	72 59.7	1.0 02	178.0	73 59.7	1.0 02	178.0	74 29.7	1.0 02	177.9	74 59.7	1.0 02	177.9	75 29.7	1.0 02	177.9	76 59.6	1.0 02	177.7	77 29.6	1.0 02	177.7	1
2	72 28.8	1.0 03	176.1	72 58.7	1.0 03	176.1	73 58.7	1.0 03	175.9	74 28.7	1.0 03	175.9	74 58.6	1.0 03	175.8	75 28.6	1.0 03	175.7	76 58.5	1.0 03	175.4	77 28.5	1.0 03	175.3	2
3	72 27.2	1.0 04	174.2	72 57.1	1.0 04	174.1	73 57.0	1.0 04	173.9	74 27.0	1.0 04	173.8	74 56.9	1.0 04	173.7	75 26.9	1.0 04	173.6	76 56.7	1.0 04	173.1	77 26.6	1.0 04	173.0	3
4	72 25.0	1.0 05	172.3	72 54.9	1.0 05	172.2	73 54.8	1.0 05	171.9	74 24.7	1.0 05	171.8	74 54.6	1.0 05	171.6	75 24.5	1.0 05	171.4	76 54.1	1.0 06	170.9	77 24.0	1.0 06	170.7	4
05	72 22.2	1.0 06	170.4	72 52.1	1.0 06	170.2	73 51.8	1.0 06	169.9	74 21.7	99 06	169.7	74 51.5	99 06	169.5	75 21.4	99 06	169.3	76 50.8	99 07	168.6	77 20.6	99 07	168.4	05
6	72 18.8	99 07	168.5	72 48.6	99 07	168.3	73 48.3	99 07	167.9	74 18.1	99 07	167.7	74 47.8	99 07	167.5	75 17.6	99 07	167.2	76 46.8	99 08	166.4	77 16.5	99 08	166.1	6
7	72 14.8	99 08	166.6	72 44.6	99 08	166.4	73 44.1	99 08	165.9	74 13.8	99 08	165.7	74 43.5	99 08	165.4	75 13.2	99 08	165.1	76 42.1	99 09	164.2	77 11.6	99 09	163.8	7
8	72 10.2	99 09	164.7	72 39.9	99 09	164.5	73 39.2	99 09	163.9	74 08.9	99 09	163.7	74 38.5	99 09	163.4	75 08.1	99 10	163.1	76 36.7	98 10	162.0	77 06.1	98 10	161.6	8
9	72 05.0	99 10	162.8	72 34.6	99 10	162.6	73 33.8	99 10	162.0	74 03.4	98 10	161.7	74 32.9	98 10	161.4	75 02.4	98 11	161.0	76 30.6	98 11	159.8	76 59.9	98 11	159.3	9
10	71 59.3	98 11	161.0	72 28.8	98 11	160.7	73 27.8	98 11	160.1	73 57.2	98 11	159.7	74 26.6	98 11	159.4	74 56.0	98 12	159.0	76 23.9	97 12	157.6	76 53.0	97 13	157.1	10
1	71 52.9	98 11	159.1	72 22.4	98 12	158.8	73 21.2	98 12	158.1	73 50.5	98 12	157.8	74 19.8	98 12	157.4	74 49.1	97 13	157.0	76 16.5	97 13	155.5	76 45.5	97 14	155.0	1
2	71 46.1	98 12	157.3	72 15.4	98 13	157.0	73 14.0	97 13	156.2	73 43.2	97 13	155.8	74 12.4	97 13	155.4	74 41.5	97 14	155.0	76 08.5	96 14	153.4	76 37.4	96 15	152.9	2
3	71 38.6	98 13	155.5	72 07.9	97 13	155.1	73 06.2	97 14	154.4	73 35.3	97 14	153.9	74 04.4	97 14	153.5	74 33.4	97 14	153.0	75 59.9	96 15	151.4	76 28.6	95 16	150.8	3
4	71 30.7	97 14	153.7	71 59.8	97 14	153.3	72 57.9	97 15	152.5	73 26.9	96 15	152.0	73 55.8	96 15	151.6	74 24.7	96 15	151.1	75 50.8	95 16	149.4	76 19.3	96 17	148.7	4
15	71 22.2	97 15	151.9	71 51.2	97 15	151.5	72 49.1	96 16	150.7	73 18.0	96 16	150.2	73 46.7	96 16	149.7	74 15.4	96 16	149.2	75 41.0	95 17	147.4	76 09.4	94 17	146.7	15
6	71 13.2	96 16	150.2	71 42.1	96 16	149.8	72 39.8	96 16	148.9	73 08.5	96 17	148.4	73 37.1	95 17	147.8	74 05.7	96 17	147.3	75 30.8	94 18	145.4	75 58.9	94 18	144.7	6
7	71 03.8	96 17	148.5	71 32.6	96 17	148.0	72 29.9	95 17	147.1	72 58.5	95 17	146.6	73 27.0	95 18	146.0	73 55.4	95 18	145.4	75 20.0	93 19	143.5	75 48.0	93 19	142.8	7
8	70 53.8	96 17	146.7	71 22.5	95 18	146.3	72 19.6	95 18	145.3	72 48.0	95 18	144.8	73 16.4	94 18	144.2	73 44.6	94 19	143.6	75 08.7	93 20	141.6	75 36.5	92 20	140.9	8
9	70 43.5	95 18	145.1	71 12.0	95 18	144.6	72 08.8	94 19	143.6	72 37.1	94 19	143.0	73 05.3	94 19	142.4	73 33.4	93 19	141.8	74 57.0	92 20	139.8	75 24.6	92 21	139.0	9
20	70 32.6	95 19	143.4	71 01.0	95 19	142.9	71 57.6	94 19	141.9	72 25.7	94 20	141.3	72 53.8	93 20	140.7	73 21.7	93 20	140.1	74 44.8	92 21	138.0	75 12.2	91 21	137.2	20
1	70 21.3	94 19	141.8	70 49.6	94 20	141.3	71 45.9	94 20	140.2	72 13.9	93 20	139.6	72 41.8	93 21	139.0	73 09.6	92 21	138.3	74 32.2	91 22	136.2	74 59.4	90 22	135.4	1
2	70 09.7	94 20	140.1	70 37.8	94 20	139.6	71 33.9	93 21	138.5	72 01.7	93 21	137.9	72 29.5	92 21	137.3	72 57.1	92 22	136.6	74 19.1	90 22	134.5	74 46.2	90 23	133.6	2
3	69 57.6	94 21	138.5	70 25.6	93 21	138.0	71 21.4	93 21	136.9	71 49.1	92 22	136.3	72 16.7	92 22	135.6	72 44.2	91 22	135.0	74 05.7	90 23	132.7	74 32.5	89 23	131.9	3
4	69 45.1	93 21	137.0	70 13.0	93 22	136.4	71 08.5	92 22	135.3	71 36.1	92 22	134.7	72 03.6	91 23	134.0	72 30.9	91 23	133.3	73 51.9	89 24	131.1	74 18.6	89 24	130.2	4
25	69 32.3	93 22	135.4	70 00.1	92 22	134.9	70 55.3	92 23	133.7	71 22.7	91 23	133.1	71 50.0	91 23	132.4	72 17.2	90 23	131.7	73 37.8	89 24	129.4	74 04.2	88 24	128.6	25
6	69 19.1	92 23	133.9	69 46.7	92 23	133.3	70 41.7	91 23	132.1	71 09.0	91 23	131.5	71 36.2	90 24	130.8	72 03.2	90 24	130.1	73 23.3	88 25	127.8	73 49.6	87 25	127.0	6
7	69 05.6	92 23	132.4	69 33.1	92 23	131.8	70 27.8	91 24	130.6	70 55.0	90 24	130.0	71 22.0	90 24	129.3	71 48.9	89 24	128.6	73 08.5	88 25	126.3	73 34.6	87 25	125.4	7
8	68 51.7	92 24	130.9	69 19.1	91 24	130.3	70 13.6	90 24	129.1	70 40.6	90 24	128.5	71 07.5	89 25	127.8	71 34.2	89 25	127.1	72 53.4	87 26	124.7	73 19.4	86 26	123.9	8
9	68 37.5	91 24	129.4	69 04.8	91 24	128.8	69 59.0	90 25	127.6	70 25.9	89 25	127.0	70 52.7	89 25	126.3	71 19.3	88 25	125.6	72 38.0	86 26	123.2	73 03.8	86 26	122.4	9
30	68 23.1	91 25	128.0	68 50.2	90 25	127.4	69 44.2	89 25	126.2	70 11.0	89 25	125.5	70 37.6	88 26	124.8	71 04.1	88 26	124.1	72 22.4	86 26	121.7	72 48.1	85 27	120.9	30
1	68 08.3	90 25	126.6	68 35.4	90 25	126.0	69 29.1	89 26	124.7	69 55.8	89 26	124.1	70 22.3	88 26	123.4	70 48.6	87 26	122.7	72 06.5	86 27	120.3	72 32.0	85 27	119.4	1
2	67 53.3	90 25	125.2	68 20.2	90 26	124.6	69 13.7	89 26	123.3	69 40.3	88 26	122.7	70 06.6	88 26	122.0	70 32.9	87 27	121.2	71 50.4	85 27	118.9	72 15.8	84 27	118.0	2
3	67 38.0	90 26	123.8	68 04.8	89 26	123.2	68 58.1	88 26	121.9	69 24.5	88 27	121.3	69 50.8	87 27	120.6	70 16.9	87 27	119.9	71 34.0	85 28	117.5	71 59.3	84 28	116.6	3
4	67 22.5	89 26	122.4	67 49.2	89 26	121.8	68 42.3	88 27	120.6	69 08.6	87 27	119.9	69 34.7	87 27	119.2	70 00.7	86 27	118.5	71 17.5	84 28	116.1	71 42.6	83 28	115.3	4
35	67 06.7	89 27	121.1	67 33.3	89 27	120.5	68 26.2	88 27	119.2	68 52.4	87 27	118.6	69 18.4	87 27	117.9	69 44.3	86 28	117.1	71 00.7	84 28	114.8	71 25.8	83 28	113.9	35
6	66 50.7	89 27	119.8	67 17.2	88 27	119.2	68 09.9	87 27	117.9	68 36.0	87 28	117.2	69 01.9	86 28	116.5	69 27.7	86 28	115.8	70 43.8	83 28	113.5	71 08.7	83 29	112.6	6
7	66 34.5	88 27	118.5	67 01.0	88 28	117.9	67 53.4	87 28	116.6	68 19.4	86 28	115.9	68 45.3	86 28	115.2	69 10.9	85 28	114.5	70 26.7	83 29	112.2	70 51.5	82 29	111.3	7
8	66 18.1	88 28	117.2	66 44.5	88 28	116.6	67 36.8	87 28	115.3	68 02.7	86 28	114.7	68 28.4	86 28	114.0	68 54.0	85 29	113.2	70 09.5	83 29	110.9	70 34.2	82 29	110.1	8
9	66 01.5	88 28	115.9	66 27.8	87 28	115.3	67 19.9	86 28	114.1	67 45.7	86 28	113.4	68 11.4	85 29	112.7	68 36.9	85 29	112.0	69 52.1	83 29	109.7	70 16.7	82 29	108.8	9
40	65 44.8	88 28	114.7	66 11.0	87 28	114.1	67 02.9	86 29	112.8	67 28.6	86 29	112.2	67 54.2	85 29	111.5	68 19.6	84 29	110.7	69 34.5	82 29	108.4	69 59.1	81 30	107.6	40
1	65 27.8	87 28	113.4	65 54.0	87 29	112.8	66 45.7	86 29	111.6	67 11.4	85 29	110.9	67 36.9	85 29	110.2	68 02.2	84 29	109.5	69 16.9	82 30	107.2	69 41.4	81 30	106.4	1
2	65 10.8	87 29	112.2	65 36.8	87 29	111.6	66 28.4	86 29	110.4	66 54.0	85 29	109.7	67 19.4	84 29	109.0	67 44.6	84 29	108.3	68 59.1	82 30	106.0	69 23.5	81 30	105.2	2
3	64 53.5	87 29	111.0	65 19.5	86 29	110.4	66 11.0	85 29	109.2	66 36.5	85 29	108.5	67 01.8	84 30	107.9	67 27.0	84 30	107.2	68 41.3	81 30	104.9	69 05.6	81 30	104.1	3
4	64 36.1	87 29	109.9	65 02.0	86 29	109.3	65 53.4	85 29	108.0	66 18.8	85 30	107.4	66 44.1	84 30	106.7	67 09.2	83 30	106.0	68 23.3	81 30	103.7	68 47.6	80 30	102.9	4
45	64 18.6	86 29	108.7	64 44.5	86 29	108.1	65 35.7	85 30	106.9	66 01.1	84 30	106.2	66 26.3	84 30	105.5	66 51.3	83 30	104.8	68 05.2	81 30	102.6	68 29.5	80 30	101.8	45
6	64 01.0	86 30	107.5	64 26.8	86 30	107.0	65 17.9	85 30	105.7	65 43.2	84 30	105.1	66 08.4	84 30	104.4	66 33.4	83 30	103.7	67 47.1	81 30	101.5	68 11.3	80 30	100.7	6
7	63 43.3	86 30	106.4	64 09.0	86 30	105.8	65 00.0	85 30	104.6	65 25.3	84 30	104.0	65 50.4	83 30	103.3	66 15.3	83 30	102.6	67 28.9	81 30	100.4	67 53.0	80 30	99.6	7
8	63 25.5	86 30	105.3	63 51.1	85 30	104.7	64 42.0	84 30	103.5	65 07.3	84 30	102.8	65 32.3	83 30	102.2	65 57.2	83 30	101.5	67 10.6	81 31	99.3	67 34.7	80 31	98.6	8
9	63 07.5	86 30	104.2	63 33.2	85 30	103.6	64 24.0	84 30	102.4	64 49.1	84 30	101.8	65 14.2	83 30	101.1	65 39.0	82 30	100.4	66 52.3	80 31	98.3	67 16.4	80 31	97.5	9
50	62 49.5	86 30	103.1	63 15.1	85 30	102.5	64 05.8	84 30	101.3	64 31.0	84 30	100.7	64 55.9	83 30	100.0	65 20.7	82 31	99.4	66 34.0	80 31	97.2	66 57.9	80 31	96.5	50
1	62 31.4	85 30	102.0	62 57.0	85 30	101.4	63 47.6	84 30	100.2	64 12.7	83 30	99.6	64 37.6	83 31	99.0	65 02.4	82 31	98.3	66 15.5	80 31	96.2	66 39.5	80 31	95.4	1
2	62 13.2	85 30	100.9	62 38.7	85 30	100.4	63 29.3	84 31	99.2	63 54.4	83 31	98.6	64 19.3	83 31	97.9	64 44.0	82 31	97.3	65 57.1	80 31	95.2	66 21.0	79 31	94.4	2
3	61 55.0	85 30	99.9	62 20.5	85 31	99.3	63 11.0	84 31	98.1	63 36.0	83 31	97.5	64 00.9	83 31	96.9	64 25.6	82 31	96.2	65 38.6	80 31	94.2	66 02.5	79 31	93.4	3
4	61 36.7	85 31	98.8	62 02.2	85 31	98.3	62 52.6	84 31	97.1	63 17.6	83 31	96.5	63 42.5	83 31	95.9	64 07.2	82 31	95.2	65 20.1	80 31	93.2	65 44.0	79 31	92.4	4
55	61 18.4	85 31	97.8	61 43.8	85 31	97.2	62 34.2	84 31	96.1	62 59.2	83 31	95.5	63 24.0	82 31	94.9	63 48.7	82 31	94.2	65 01.6	80 31	92.2	65 25.5	79 31	91.5	55
6	61 00.0	85 31	96.8	61 25.4	84 31	96.2	62 15.8	83 31	95.1	62 40.7	83 31	94.5	63 05.5	82 31	93.9	63 30.2	82 31	93.2	64 43.0	80 31	91.2	65 07.0	79 31	90.5	6
7	60 41.5	85 31	95.8	61 06.9	84 31	95.2	61 57.3	83 31	94.1	62 22.2	83 31	93.5	62 47.0	82 31	92.9	63 11.7	82 31	92.2	64 24.5	80 31	90.3	64 48.4	79 31	89.5	7
8	60 23.1	85 31	94.8	60 48.4	84 31	94.2	61 38.8	83 31	93.1	62 03.7	83 31	92.5	62 28.5	82 31	91.9	62 53.1	82 31	91.3	64 06.0	80 31	89.3	64 29.9	79 31	88.6	8
9	60 04.6	85 31	93.8	60 29.9	84 31	93.2	61 20.2	83 31	92.1	61 45.2	83 31	91.5	62 10.0	82 31	90.9	62 34.6	82 31	90.3	63 47.4	80 31	88.4	64 11.3	79 31	87.7	9
60	59 46.1	85 31	92.8	60 11.4	84 31	92.3	61 01.7	83 31	91.2	61 26.6	83 31	90.6	61 51.4	82 31	90.0	62 16.1	82 31	89.4	63 28.9	80 31	87.4	63 52.8	79 31	86.8	60
1	59 27.6	85 31	91.8	59 52.9	84 31	91.3	60 43.2	83 31	90.2	61 08.1	83 31	89.6	61 32.9	82 31	89.0	61 57.5	82 31	88.4	63 10.4	80 31	86.5	63 34.3	79 31	85.8	1
2	59 09.0	85 31	90.9	59 34.4	84 31	90.3	60 24.6	83 31	89.2	60 49.6	83 31	88.7	61 14.4	82 31	88.1	61 39.0	82 31	87.5	62 51.9	80 31	85.6	63 15.8	80 31	84.9	2
3	58 50.5	85 31	89.9	59 15.8	84 31	89.4	60 06.1	83 31	88.3	60 31.0	83 31	87.7	60 55.8	82 31	87.2	61 20.5	82 31	86.6	62 33.4	80 31	84.7	62 57.4	80 31	84.1	3
4	58 31.9	85 31	89.0	58 57.3	84 31	88.4	59 47.6	83 31	87.4	60 12.5	83 31	86.8	60 37.3	82 31	86.2	61 02.0	82 31	85.7	62 15.0	80 31	83.8	62 39.0	80 31	83.2	4
65	58 13.4	85 31	88.0	58 38.7	84 31	87.5	59 29.1	83 31	86.5	59 54.0	83 31	85.9	60 18.8	82 31	85.3	60 43.5	82 31	84.8	61 56.6	80 31	82.9	62 20.6	80 31	82.3	65
6	57 54.9	85 31	87.1	58 20.2	84 31	86.6	59 10.6	83 31	85.5	59 35.5	83 31	85.0	60 00.4	83 31	84.4	60 25.0	82 31	83.9	61 38.2	80 31	82.1	62 02.2	80 31	81.4	6
7	57 36.4	85 31	86.2	58 01.7	84 31	85.7	58 52.1	84 31	84.6	59 17.1	83 31	84.1	59 41.9	83 31	83.5	60 06.6	82 31	83.0	61 19.8	81 30	81.2	61 43.9	80 30	80.6	7
8	57 17.9	85 31	85.3	57 43.3	84 31	84.8	58 33.6	84 31	83.7	58 58.6	83 31	83.2	59 23.5	83 31	82.7	59 48.2	82 31	82.1	61 01.5	81 30	80.3	61 25.6	80 30	79.7	8
9	56 59.4	85 31	84.3	57 24.8	84 31	83.9	58 15.2	84 31	82.8	58 40.3	83 31	82.3	59 05.1	83 31	81.8	59 29.9	82 30	81.2	60 43.3	81 30	79.5	61 07.4	80 30	78.9	9
70	56 41.0	85 31	83.4	57 06.4	85 31	83.0	57 56.9	84 31	82.0	58 21.9	83 31	81.4	58 46.8	83 30	80.9	59 11.6	82 30	80.3	60 25.1	81 30	78.6	60 49.3	80 30	78.0	70
1	56 22.6	85 31	82.6	56 48.0	85 31	82.1	57 38.5	84 30	81.1	58 03.6	83 30	80.6	58 28.5	83 30	80.0	58 53.3	82 30	79.5	60 06.9	81 30	77.8	60 31.1	80 30	77.2	1
2	56 04.2	85 31	81.7	56 29.7	85 30	81.2	57 20.2	84 30	80.2	57 45.3	83 30	79.7	58 10.3	83 30	79.2	58 35.1	83 30	78.6	59 48.8	81 30	77.0	60 13.1	81 30	76.4	2
3	55 45.9	85 30	80.8	56 11.4	85 30	80.3	57 02.0	84 30	79.3	57 27.1	84 30	78.8	57 52.1	83 30	78.3	58 17.0	83 30	77.8	59 30.8	81 30	76.1	59 55.1	81 30	75.5	3
4	55 27.6	85 30	79.9	55 53.1	85 30	79.4	56 43.8	84 30	78.5	57 08.9	84 30	78.0	57 34.0	83 30	77.5	57 58.9	83 30	76.9	59 12.8	81 30	75.3	59 37.2	81 30	74.7	4
75	55 09.4	85 30	79.0	55 34.9	85 30	78.6	56 25.6	84 30	77.6	56 50.8	84 30	77.1	57 15.9	83 30	76.6	57 40.9	83 30	76.1	58 54.9	82 30	74.5	59 19.3	81 30	73.9	75
6	54 51.2	85 30	78.2	55 16.8	85 30	77.7	56 07.6	84 30	76.8	56 32.8	84 30	76.3	56 57.9	84 30	75.8	57 22.9	83 30	75.3	58 37.1	82 30	73.7	59 01.6	81 30	73.1	6
7	54 33.1	85 30	77.3	54 58.7	85 30	76.9	55 49.5	84 30	75.9	56 14.8	84 30	75.4	56 40.0	84 30	75.0	57 05.0	83 30	74.4	58 19.3	82 29	72.9	58 43.9	81 29	72.3	7
8	54 15.0	86 30	76.5	54 40.7	85 30	76.0	55 31.6	85 30	75.1	55 56.9	84 30	74.6	56 22.1	84 30	74.1	56 47.2	83 30	73.6	58 01.7	82 29	72.1	58 26.2	82 29	71.5	8
9	53 57.0	86 30	75.6	54 22.7	85 30	75.2	55 13.7	85 30	74.3	55 39.1	84 30	73.8	56 04.3	84 30	73.3	56 29.4	84 29	72.8	57 44.1	82 29	71.3	58 08.7	82 29	70.7	9
80	53 39.1	86 30	74.8	54 04.8	85 30	74.3	54 55.9	85 30	73.4	55 21.3	84 30	73.0	55 46.6	84 29	72.5	56 11.8	84 29	72.0	57 26.6	82 29	70.5	57 51.2	82 29	69.9	80
1	53 21.3	86 30	73.9	53 47.0	86 30	73.5	54 38.2	85 29	72.6	55 03.6	85 29	72.1	55 28.9	84 29	71.7	55 54.2	84 29	71.2	57 09.1	83 29	69.7	57 33.8	82 29	69.2	1
2	53 03.5	86 29	73.1	53 29.2	86 29	72.7	54 20.5	85 29	71.8	54 46.0	85 29	71.3	55 11.4	84 29	70.9	55 36.6	84 29	70.4	56 51.8	83 29	68.9	57 16.6	82 29	68.4	2
3	52 45.8	86 29	72.3	53 11.6	86 29	71.8	54 02.9	85 29	71.0	54 28.5	85 29	70.5	54 53.9	85 29	70.1	55 19.2	84 29	69.6	56 34.5	83 29	68.1	56 59.4	83 28	67.6	3
4	52 28.2	86 29	71.4	52 54.0	86 29	71.0	53 45.5	85 29	70.2	54 11.0	85 29	69.7	54 36.5	85 29	69.3	55 01.9	84 29	68.8	56 17.4	83 28	67.4	56 42.3	83 28	66.9	4
85	52 10.6	86 29	70.6	52 36.5	86 29	70.2	53 28.1	86 29	69.4	53 53.7	85 29	68.9	54 19.2	85 29	68.5	54 44.7	85 29	68.0	56 00.3	83 28	66.6	56 25.3	83 28	66.1	85
6	51 53.2	87 29	69.8	52 19.1	86 29	69.4	53 10.8	86 29	68.6	53 36.4	85 29	68.1	54 02.0	85 29	67.7	54 27.5	85 28	67.2	55 43.3	84 28	65.8	56 08.4	83 28	65.3	6
7	51 35.8	87 29	69.0	52 01.8	87 29	68.6	52 53.6	86 29	67.8	53 19.3	86 28	67.3	53 44.9	85 28	66.9	54 10.5	85 28	66.4	55 26.5	84 28	65.1	55 51.6	84 28	64.6	7
8	51 18.6	87 29	68.2	51 44.6	87 29	67.8	52 36.4	86 28	67.0	53 02.2	86 28	66.5	53 27.9	85 28	66.1	53 53.5	85 28	65.7	55 09.7	84 28	64.3	55 34.9	84 28	63.8	8
9	51 01.4	87 28	67.4	51 27.5	87 28	67.0	52 19.4	86 28	66.2	52 45.3	86 28	65.8	53 11.0	86 28	65.3	53 36.7	85 28	64.9	54 53.1	84 28	63.5	55 18.3	84 27	63.1	9
90	50 44.3	87 28	66.6	51 10.5	87 28	66.2	52 02.5	86 28	65.4	52 28.4	86 28	65.0	52 54.2	86 28	64.6	53 19.9	86 28	64.1	54 36.5	85 27	62.8	55 01.8	84 27	62.3	90

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	50 27.4	87 28	65.8	50 53.6	87 28	65.4	51 45.7	87 28	64.6	52 11.7	86 28	64.2	52 37.5	86 28	63.8	53 03.3	86 28	63.4	54 20.1	85 27	62.0	54 45.5	84 27	61.6	91
2	50 10.5	88 28	65.0	50 36.8	87 28	64.6	51 29.0	87 28	63.8	51 55.0	87 28	63.4	52 21.0	86 27	63.0	52 46.8	86 27	62.6	54 03.8	85 27	61.3	54 29.2	85 27	60.8	2
3	49 53.8	88 28	64.2	50 20.1	88 28	63.8	51 12.4	87 27	63.0	51 38.5	87 27	62.6	52 04.5	86 27	62.2	52 30.4	86 27	61.8	53 47.6	85 27	60.5	54 13.1	85 27	60.1	3
4	49 37.1	88 28	63.4	50 03.5	88 27	63.0	50 56.0	87 27	62.3	51 22.1	87 27	61.9	51 48.1	87 27	61.5	52 14.1	86 27	61.1	53 31.5	86 27	59.8	53 57.1	85 26	59.4	4
95	49 20.6	88 27	62.6	49 47.0	88 27	62.2	50 39.6	87 27	61.5	51 05.8	87 27	61.1	51 31.9	87 27	60.7	51 57.9	87 27	60.3	53 15.5	86 26	59.1	53 41.2	85 26	58.6	95
6	49 04.2	88 27	61.8	49 30.7	88 27	61.5	50 23.4	88 27	60.7	50 49.6	87 27	60.3	51 15.8	87 27	60.0	51 41.9	87 27	59.6	52 59.7	86 26	58.3	53 25.4	86 26	57.9	6
7	48 47.9	88 27	61.0	49 14.4	88 27	60.7	50 07.3	88 27	60.0	50 33.6	88 27	59.6	50 59.8	87 26	59.2	51 26.0	87 26	58.8	52 44.0	86 26	57.6	53 09.8	86 26	57.2	7
8	48 31.8	89 27	60.3	48 58.3	88 27	59.9	49 51.3	88 26	59.2	50 17.7	88 26	58.8	50 44.0	88 26	58.4	51 10.2	87 26	58.1	52 28.4	86 26	56.9	52 54.3	86 26	56.4	8
9	48 15.7	89 27	59.5	48 42.4	89 26	59.1	49 35.4	88 26	58.4	50 01.9	88 26	58.1	50 28.2	88 26	57.7	50 54.5	88 26	57.3	52 12.9	87 26	56.1	52 38.9	86 25	55.7	9
100	47 59.8	89 26	58.7	48 26.5	89 26	58.4	49 19.7	88 26	57.7	49 46.2	88 26	57.3	50 12.6	88 26	56.9	50 39.0	88 26	56.6	51 57.6	87 25	55.4	52 23.6	87 25	55.0	100
1	47 44.0	89 26	57.9	48 10.8	89 26	57.6	49 04.1	89 26	56.9	49 30.6	88 26	56.6	49 57.1	88 26	56.2	50 23.6	88 25	55.8	51 42.4	87 25	54.7	52 08.5	87 25	54.3	1
2	47 28.4	89 26	57.2	47 55.2	89 26	56.8	48 48.6	89 26	56.2	49 15.2	89 25	55.8	49 41.8	88 25	55.4	50 08.3	88 25	55.1	51 27.3	87 25	53.9	51 53.5	87 25	53.6	2
3	47 12.9	90 26	56.4	47 39.7	89 26	56.1	48 33.3	89 25	55.4	49 00.0	89 25	55.1	49 26.6	89 25	54.7	49 53.2	88 25	54.3	51 12.4	88 25	53.2	51 38.7	87 25	52.8	3
4	46 57.5	90 25	55.6	47 24.4	90 25	55.3	48 18.1	89 25	54.7	48 44.8	89 25	54.3	49 11.5	89 25	54.0	49 38.2	89 25	53.6	50 57.6	88 24	52.5	51 24.0	88 24	52.1	4
105	46 42.3	90 25	54.9	47 09.2	90 25	54.6	48 03.0	89 25	53.9	48 29.9	89 25	53.6	48 56.6	89 25	53.2	49 23.3	89 24	52.9	50 43.0	88 24	51.8	51 09.4	88 24	51.4	105
6	46 27.2	90 25	54.1	46 54.2	90 25	53.8	47 48.1	90 25	53.2	48 15.0	89 24	52.8	48 41.8	89 24	52.5	49 08.6	89 24	52.1	50 28.5	88 24	51.1	50 55.0	88 24	50.7	6
7	46 12.2	90 25	53.4	46 39.3	90 25	53.0	47 33.4	90 24	52.4	48 00.3	90 24	52.1	48 27.2	90 24	51.7	48 54.0	89 24	51.4	50 14.1	89 24	50.4	50 40.7	88 24	50.0	7
8	45 57.4	91 24	52.6	46 24.6	90 24	52.3	47 18.8	90 24	51.7	47 45.8	90 24	51.3	48 12.7	90 24	51.0	48 39.6	90 24	50.7	49 59.9	89 23	49.6	50 26.6	89 23	49.3	8
9	45 42.8	91 24	51.8	46 10.0	91 24	51.5	47 04.3	90 24	50.9	47 31.4	90 24	50.6	47 58.4	90 24	50.3	48 25.3	90 24	50.0	49 45.9	89 23	48.9	50 12.6	89 23	48.6	9
110	45 28.3	91 24	51.1	45 55.5	91 24	50.8	46 50.0	91 24	50.2	47 17.1	90 24	49.9	47 44.2	90 23	49.6	48 11.2	90 23	49.2	49 32.0	89 23	48.2	49 58.8	89 23	47.9	110
1	45 13.9	91 24	50.3	45 41.3	91 24	50.0	46 35.8	91 23	49.4	47 03.0	91 23	49.1	47 30.2	90 23	48.8	47 57.3	90 23	48.5	49 18.2	90 23	47.5	49 45.1	89 23	47.2	1
2	44 59.7	91 23	49.6	45 27.1	91 23	49.3	46 21.8	91 23	48.7	46 49.1	91 23	48.4	47 16.3	91 23	48.1	47 43.5	90 23	47.8	49 04.6	90 22	46.8	49 31.6	90 22	46.5	2
3	44 45.7	92 23	48.8	45 13.1	91 23	48.6	46 07.9	91 23	48.0	46 35.3	91 23	47.7	47 02.6	91 23	47.4	47 29.8	91 22	47.1	48 51.2	90 22	46.1	49 18.2	90 22	45.8	3
4	44 31.8	92 23	48.1	44 59.3	92 23	47.8	45 54.3	91 23	47.2	46 21.7	91 22	46.9	46 49.0	91 22	46.6	47 16.3	91 22	46.3	48 37.9	90 22	45.4	49 05.0	90 22	45.1	4
115	44 18.1	92 23	47.3	44 45.7	92 22	47.1	45 40.7	92 22	46.5	46 08.2	91 22	46.2	46 35.6	91 22	45.9	47 03.0	91 22	45.6	48 24.8	91 22	44.7	48 52.0	90 21	44.4	115
6	44 04.5	92 22	46.6	44 32.2	92 22	46.3	45 27.4	92 22	45.8	45 54.9	92 22	45.5	46 22.4	92 22	45.2	46 49.8	91 22	44.9	48 11.8	91 21	44.0	48 39.1	91 21	43.7	6
7	43 51.1	92 22	45.8	44 18.9	92 22	45.6	45 14.2	92 22	45.0	45 41.7	92 22	44.8	46 09.3	92 22	44.5	46 36.8	92 21	44.2	47 59.0	91 21	43.3	48 26.4	91 21	43.0	7
8	43 37.9	93 22	45.1	44 05.7	93 22	44.8	45 01.1	92 21	44.3	45 28.8	92 21	44.0	45 56.4	92 21	43.8	46 24.0	92 21	43.5	47 46.4	91 21	42.6	48 13.8	91 21	42.3	8
9	43 24.9	93 21	44.4	43 52.7	93 21	44.1	44 48.3	92 21	43.6	45 16.0	92 21	43.3	45 43.7	92 21	43.0	46 11.3	92 21	42.8	47 34.0	92 20	41.9	48 01.4	91 20	41.6	9
120	43 12.0	93 21	43.6	43 39.9	93 21	43.4	44 35.6	93 21	42.8	45 03.3	93 21	42.6	45 31.1	92 21	42.3	45 58.8	92 21	42.0	47 21.7	92 20	41.2	47 49.2	92 20	40.9	120
1	42 59.3	93 21	42.9	43 27.2	93 21	42.6	44 23.0	93 21	42.1	44 50.9	93 20	41.9	45 18.7	93 20	41.6	45 46.5	93 20	41.3	47 09.5	92 20	40.5	47 37.1	92 20	40.2	1
2	42 46.8	93 21	42.1	43 14.8	93 20	41.9	44 10.7	93 20	41.4	44 38.6	93 20	41.1	45 06.5	93 20	40.9	45 34.3	93 20	40.6	46 57.6	92 20	39.8	47 25.3	92 20	39.5	2
3	42 34.4	94 20	41.4	43 02.5	94 20	41.2	43 58.5	93 20	40.7	44 26.5	93 20	40.4	44 54.4	93 20	40.2	45 22.3	93 20	39.9	46 45.8	93 19	39.1	47 13.6	92 19	38.8	3
4	42 22.2	94 20	40.7	42 50.4	94 20	40.4	43 46.5	93 20	39.9	44 14.6	93 20	39.7	44 42.6	93 19	39.4	45 10.5	93 19	39.2	46 34.2	93 19	38.4	47 02.0	93 19	38.1	4
125	42 10.2	94 20	39.9	42 38.4	94 20	39.7	43 34.7	94 19	39.2	44 02.8	94 19	39.0	44 30.9	93 19	38.7	44 58.9	93 19	38.5	46 22.8	93 19	37.7	46 50.7	93 19	37.4	125
6	41 58.4	94 19	39.2	42 26.7	94 19	39.0	43 23.1	94 19	38.5	43 51.2	94 19	38.3	44 19.4	94 19	38.0	44 47.4	94 19	37.8	46 11.5	93 18	37.0	46 39.5	93 18	36.7	6
7	41 46.8	94 19	38.5	42 15.1	94 19	38.2	43 11.6	94 19	37.8	43 39.8	94 19	37.5	44 08.0	94 19	37.3	44 36.2	94 18	37.1	46 00.5	93 18	36.3	46 28.5	93 18	36.1	7
8	41 35.4	95 19	37.7	42 03.7	94 19	37.5	43 00.4	94 18	37.1	43 28.6	94 18	36.8	43 56.9	94 18	36.6	44 25.1	94 18	36.4	45 49.6	94 18	35.6	46 17.7	94 18	35.4	8
9	41 24.1	95 18	37.0	41 52.5	95 18	36.8	42 49.3	94 18	36.3	43 17.6	94 18	36.1	43 45.9	94 18	35.9	44 14.2	94 18	35.6	45 38.9	94 18	34.9	46 07.0	94 17	34.7	9
130	41 13.1	95 18	36.3	41 41.5	95 18	36.0	42 38.4	95 18	35.6	43 06.8	95 18	35.4	43 35.1	95 18	35.2	44 03.5	94 18	34.9	45 28.3	94 17	34.2	45 56.6	94 17	34.0	130
1	41 02.2	95 18	35.5	41 30.7	95 18	35.3	42 27.7	95 18	34.9	42 56.1	95 17	34.7	43 24.6	95 17	34.5	43 53.0	95 17	34.2	45 18.0	94 17	33.5	45 46.3	94 17	33.3	1
2	40 51.5	95 17	34.8	41 20.1	95 17	34.6	42 17.2	95 17	34.2	42 45.7	95 17	34.0	43 14.2	95 17	33.7	43 42.6	95 17	33.5	45 07.8	95 17	32.9	45 36.2	94 16	32.6	2
3	40 41.0	95 17	34.1	41 09.7	95 17	33.9	42 06.9	95 17	33.5	42 35.4	95 17	33.2	43 04.0	95 17	33.0	43 32.5	95 17	32.8	44 57.9	95 16	32.2	45 26.3	95 16	31.9	3
4	40 30.8	96 17	33.3	40 59.4	96 17	33.1	41 56.7	95 17	32.7	42 25.4	95 16	32.5	42 53.9	95 16	32.3	43 22.5	95 16	32.1	44 48.1	95 16	31.5	45 16.6	95 16	31.3	4
135	40 20.7	96 16	32.6	40 49.4	96 16	32.4	41 46.8	96 16	32.0	42 15.5	96 16	31.8	42 44.1	95 16	31.6	43 12.8	95 16	31.4	44 38.5	95 16	30.8	45 07.1	95 16	30.6	135
6	40 10.8	96 16	31.9	40 39.6	96 16	31.7	41 37.1	96 16	31.3	42 05.8	96 16	31.1	42 34.5	96 16	30.9	43 03.2	96 16	30.7	44 29.1	95 15	30.1	44 57.7	95 15	29.9	6
7	40 01.1	96 16	31.1	40 29.9	96 16	31.0	41 27.5	96 16	30.6	41 56.3	96 15	30.4	42 25.1	96 15	30.2	42 53.8	96 15	30.0	44 19.9	96 15	29.4	44 48.6	95 15	29.2	7
8	39 51.6	96 15	30.4	40 20.5	96 15	30.2	41 18.2	96 15	29.9	41 47.0	96 15	29.7	42 15.8	96 15	29.5	42 44.6	96 15	29.3	44 10.9	96 15	28.7	44 39.6	96 15	28.5	8
9	39 42.3	96 15	29.7	40 11.3	96 15	29.5	41 09.1	96 15	29.2	41 38.0	96 15	29.0	42 06.8	96 15	28.8	42 35.7	96 15	28.6	44 02.1	96 14	28.0	44 30.9	96 14	27.8	9
140	39 33.2	97 15	29.0	40 02.2	97 15	28.8	41 00.1	96 15	28.4	41 29.1	96 14	28.3	41 58.0	96 14	28.1	42 26.9	96 14	27.9	43 53.5	96 14	27.3	44 22.3	96 14	27.2	140
1	39 24.4	97 14	28.2	39 53.4	97 14	28.1	40 51.4	97 14	27.7	41 20.4	97 14	27.6	41 49.4	97 14	27.4	42 18.3	96 14	27.2	43 45.1	96 14	26.7	44 14.0	96 14	26.5	1
2	39 15.7	97 14	27.5	39 44.8	97 14	27.3	40 42.9	97 14	27.0	41 11.9	97 14	26.8	41 40.9	97 14	26.7	42 09.9	97 14	26.5	43 36.8	96 13	26.0	44 05.8	96 13	25.8	2
3	39 07.2	97 14	26.8	39 36.4	97 14	26.6	40 34.6	97 14	26.3	41 03.6	97 13	26.1	41 32.7	97 13	26.0	42 01.8	97 13	25.8	43 28.8	97 13	25.3	43 57.8	97 13	25.1	3
4	38 59.0	97 13	26.0	39 28.2	97 13	25.9	40 26.5	97 13	25.6	40 55.6	97 13	25.4	41 24.7	97 13	25.3	41 53.8	97 13	25.1	43 21.0	97 13	24.6	43 50.1	97 13	24.4	4
145	38 51.0	97 13	25.3	39 20.2	97 13	25.2	40 18.6	97 13	24.9	40 47.7	97 13	24.7	41 16.9	97 13	24.6	41 46.0	97 13	24.4	43 13.4	97 12	23.9	43 42.5	97 12	23.7	145
6	38 43.1	98 13	24.6	39 12.4	97 13	24.5	40 10.9	97 12	24.2	40 40.1	97 12	24.0	41 09.3	97 12	23.9	41 38.5	97 12	23.7	43 06.0	97 12	23.2	43 35.1	97 12	23.1	6
7	38 35.5	98 12	23.9	39 04.8	98 12	23.7	40 03.4	98 12	23.4	40 32.6	98 12	23.3	41 01.9	97 12	23.2	41 31.1	97 12	23.0	42 58.8	97 12	22.5	43 28.0	97 12	22.4	7
8	38 28.1	98 12	23.1	38 57.5	98 12	23.0	39 56.1	98 12	22.7	40 25.4	98 12	22.6	40 54.7	98 12	22.5	41 24.0	98 12	22.3	42 51.8	97 11	21.9	43 21.0	97 11	21.7	8
9	38 21.0	98 12	22.4	38 50.3	98 12	22.3	39 49.0	98 11	22.0	40 18.4	98 11	21.9	40 47.7	98 11	21.7	41 17.0	98 11	21.6	42 45.0	98 11	21.2	43 14.2	98 11	21.0	9
150	38 14.0	98 11	21.7	38 43.4	98 11	21.6	39 42.2	98 11	21.3	40 11.6	98 11	21.2	40 41.0	98 11	21.0	41 10.3	98 11	20.9	42 38.4	98 11	20.5	43 07.7	98 11	20.3	150
1	38 07.3	98 11	21.0	38 36.7	98 11	20.8	39 35.6	98 11	20.6	40 05.0	98 10	20.5	40 34.4	98 11	20.3	41 03.8	98 10	20.2	42 32.0	98 10	19.8	43 01.3	98 10	19.7	1
2	38 00.7	98 10	20.2	38 30.2	98 10	20.1	39 29.2	98 10	19.9	39 58.6	98 10	19.8	40 28.1	98 10	19.6	40 57.5	98 10	19.5	42 25.8	98 10	19.1	42 55.2	98 10	19.0	2
3	37 54.4	98 10	19.5	38 23.9	98 10	19.4	39 23.0	98 10	19.2	39 52.5	98 10	19.1	40 21.9	98 10	18.9	40 51.4	98 10	18.8	42 19.8	98 10	18.4	42 49.3	98 10	18.3	3
4	37 48.3	99 10	18.8	38 17.9	98 10	18.7	39 17.0	98 10	18.5	39 46.5	98 10	18.3	40 16.0	98 10	18.2	40 45.6	98 09	18.1	42 14.1	98 09	17.8	42 43.6	98 09	17.6	4
155	37 42.5	99 09	18.1	38 12.1	99 09	18.0	39 11.2	99 09	17.8	39 40.8	99 09	17.6	40 10.3	99 09	17.5	40 39.9	99 09	17.4	42 08.5	98 09	17.1	42 38.0	98 09	17.0	155
6	37 36.8	99 09	17.3	38 06.4	99 09	17.2	39 05.7	99 09	17.0	39 35.3	99 09	16.9	40 04.9	99 09	16.8	40 34.5	99 09	16.7	42 03.2	99 09	16.4	42 32.7	99 08	16.3	6
7	37 31.4	99 09	16.6	38 01.1	99 09	16.5	39 00.3	99 09	16.3	39 30.0	99 08	16.2	39 59.6	99 08	16.1	40 29.2	99 08	16.0	41 58.1	99 08	15.7	42 27.7	99 08	15.6	7
8	37 26.2	99 08	15.9	37 55.9	99 08	15.8	38 55.2	99 08	15.6	39 24.9	99 08	15.5	39 54.6	99 08	15.4	40 24.2	99 08	15.3	41 53.1	99 08	15.0	42 22.8	99 08	14.9	8
9	37 21.3	99 08	15.2	37 51.0	99 08	15.1	38 50.4	99 08	14.9	39 20.1	99 08	14.8	39 49.7	99 08	14.7	40 19.4	99 08	14.6	41 48.4	99 07	14.3	42 18.1	99 07	14.2	9
160	37 16.5	99 08	14.5	37 46.2	99 08	14.4	38 45.7	99 07	14.2	39 15.4	99 07	14.1	39 45.1	99 07	14.0	40 14.9	99 07	13.9	41 44.0	99 07	13.7	42 13.7	99 07	13.6	160
1	37 12.0	99 07	13.7	37 41.8	99 07	13.7	38 41.3	99 07	13.5	39 11.0	99 07	13.4	39 40.8	99 07	13.3	40 10.5	99 07	13.2	41 39.7	99 07	13.0	42 09.4	99 07	12.9	1
2	37 07.7	99 07	13.0	37 37.5	99 07	12.9	38 37.1	99 07	12.8	39 06.8	99 07	12.7	39 36.6	99 07	12.6	40 06.4	99 07	12.5	41 35.6	99 06	12.3	42 05.4	99 06	12.2	2
3	37 03.7	99 06	12.3	37 33.5	99 06	12.2	38 33.1	99 06	12.1	39 02.9	99 06	12.0	39 32.7	99 06	11.9	40 02.4	99 06	11.8	41 31.8	99 06	11.6	42 01.6	99 06	11.5	3
4	36 59.8	99 06	11.6	37 29.7	99 06	11.5	38 29.3	99 06	11.4	38 59.1	99 06	11.3	39 28.9	99 06	11.2	39 58.8	99 06	11.1	41 28.2	99 06	10.9	41 58.0	99 06	10.8	4
165	36 56.2	99 06	10.8	37 26.1	99 06	10.8	38 25.8	99 06	10.6	38 55.6	99 05	10.6	39 25.4	99 05	10.5	39 55.3	99 05	10.4	41 24.8	99 05	10.2	41 54.6	99 05	10.2	165
6	36 52.9	1.0 05	10.1	37 22.7	1.0 05	10.1	38 22.4	1.0 05	09.9	38 52.3	1.0 05	09.9	39 22.2	1.0 05	09.8	39 52.0	1.0 05	09.8	41 21.6	1.0 05	09.6	41 51.4	99 05	09.5	6
7	36 49.7	1.0 05	09.4	37 19.6	1.0 05	09.3	38 19.4	1.0 05	09.2	38 49.2	1.0 05	09.2	39 19.1	1.0 05	09.1	39 49.0	1.0 05	09.1	41 18.6	1.0 05	08.9	41 48.5	1.0 05	08.8	7
8	36 46.8	1.0 04	08.7	37 16.7	1.0 04	08.6	38 16.5	1.0 04	08.5	38 46.4	1.0 04	08.5	39 16.3	1.0 04	08.4	39 46.2	1.0 04	08.4	41 15.9	1.0 04	08.2	41 45.8	1.0 04	08.1	8
9	36 44.1	1.0 04	07.9	37 14.0	1.0 04	07.9	38 13.9	1.0 04	07.8	38 43.8	1.0 04	07.8	39 13.7	1.0 04	07.7	39 43.6	1.0 04	07.7	41 13.3	1.0 04	07.5	41 43.2	1.0 04	07.5	9
170	36 41.7	1.0 04	07.2	37 11.6	1.0 04	07.2	38 11.5	1.0 04	07.1	38 41.4	1.0 04	07.1	39 11.3	1.0 04	07.0	39 41.3	1.0 04	07.0	41 11.0	1.0 04	06.8	41 41.0	1.0 03	06.8	170
1	36 39.5	1.0 03	06.5	37 09.4	1.0 03	06.5	38 09.3	1.0 03	06.4	38 39.2	1.0 03	06.3	39 09.2	1.0 03	06.3	39 39.1	1.0 03	06.3	41 08.9	1.0 03	06.1	41 38.9	1.0 03	06.1	1
2	36 37.5	1.0 03	05.8	37 07.4	1.0 03	05.7	38 07.3	1.0 03	05.7	38 37.3	1.0 03	05.6	39 07.3	1.0 03	05.6	39 37.2	1.0 03	05.6	41 07.1	1.0 03	05.5	41 37.0	1.0 03	05.4	2
3	36 35.7	1.0 03	05.1	37 05.7	1.0 02	05.0	38 05.6	1.0 02	04.9	38 35.6	1.0 02	04.9	39 05.6	1.0 02	04.9	39 35.5	1.0 02	04.9	41 05.4	1.0 02	04.8	41 35.4	1.0 02	04.7	3
4	36 34.2	1.0 02	04.3	37 04.2	1.0 02	04.3	38 04.1	1.0 02	04.3	38 34.1	1.0 02	04.2	39 04.1	1.0 02	04.2	39 34.1	1.0 02	04.2	41 04.0	1.0 02	04.1	41 33.9	1.0 02	04.1	4
175	36 32.9	1.0 02	03.6	37 02.9	1.0 02	03.6	38 02.9	1.0 02	03.5	38 32.9	1.0 02	03.5	39 02.8	1.0 02	03.5	39 32.8	1.0 02	03.5	41 02.8	1.0 02	03.4	41 32.7	1.0 02	03.4	175
6	36 31.9	1.0 01	02.9	37 01.9	1.0 01	02.9	38 01.8	1.0 01	02.8	38 31.8	1.0 01	02.8	39 01.8	1.0 01	02.8	39 31.8	1.0 01	02.8	41 01.8	1.0 01	02.7	41 31.8	1.0 01	02.7	6
7	36 31.1	1.0 01	02.2	37 01.0	1.0 01	02.2	38 01.0	1.0 01	02.1	38 31.0	1.0 01	02.1	39 01.0	1.0 01	02.1	39 31.0	1.0 01	02.1	41 01.0	1.0 01	02.0	41 31.0	1.0 01	02.0	7
8	36 30.5	1.0 01	01.4	37 00.5	1.0 01	01.4	38 00.5	1.0 01	01.4	38 30.5	1.0 01	01.4	39 00.5	1.0 01	01.4	39 30.4	1.0 01	01.4	41 00.4	1.0 01	01.4	41 30.4	1.0 01	01.4	8
9	36 30.1	1.0 00	00.7	37 00.1	1.0 00	00.7	38 00.1	1.0 00	00.7	38 30.1	1.0 00	00.7	39 00.1	1.0 00	00.7	39 30.1	1.0 00	00.7	41 00.1	1.0 00	00.7	41 30.1	1.0 00	00.7	9
180	36 30.0	1.0 00	00.0	37 00.0	1.0 00	00.0	38 00.0	1.0 00	00.0	38 30.0	1.0 00	00.0	39 00.0	1.0 00	00.0	39 30.0	1.0 00	00.0	41 00.0	1.0 00	00.0	41 30.0	1.0 00	00.0	180

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	78 00.0	1.0 01	180.0	78 30.0	1.0 01	180.0	80 00.0	1.0 01	180.0	80 30.0	1.0 01	180.0	81 00.0	1.0 01	180.0	87 00.0	1.0 02	180.0	87 30.0	1.0 02	180.0	87 30.0	1.0 02	00.0	00
1	77 59.6	1.0 02	177.6	78 29.6	1.0 02	177.5	79 59.6	1.0 02	177.3	80 29.5	1.0 02	177.2	80 59.5	1.0 02	177.1	86 58.9	99 05	173.2	87 28.7	99 06	172.0	87 29.0	99 05	06.1	1
2	77 58.4	1.0 03	175.2	78 28.4	1.0 03	175.1	79 58.2	1.0 04	174.6	80 28.2	1.0 04	174.4	80 58.1	1.0 04	174.2	86 55.6	98 09	166.5	87 24.9	97 10	164.3	87 26.1	97 08	12.0	2
3	77 56.5	1.0 04	172.8	78 26.4	1.0 05	172.6	79 56.1	1.0 05	171.9	80 25.9	1.0 05	171.6	80 55.8	99 05	171.3	86 50.3	96 12	160.1	87 18.7	94 14	157.0	87 21.3	94 11	17.6	3
4	77 53.8	99 06	170.4	78 23.6	99 06	170.2	79 53.0	99 06	169.3	80 22.8	99 07	168.9	80 52.5	99 07	168.5	86 43.1	93 15	154.1	87 10.5	90 17	150.3	87 14.9	89 13	22.8	4
05	77 50.3	99 07	168.1	78 20.1	99 07	167.7	79 49.2	99 08	166.6	80 18.8	99 08	166.2	80 48.4	99 08	165.7	86 34.2	89 17	148.5	87 00.4	86 19	144.2	87 07.0	84 15	27.6	05
6	77 46.1	99 08	165.7	78 15.8	99 08	165.3	79 44.5	98 09	164.0	80 13.9	98 09	163.5	80 43.4	98 10	162.9	86 23.8	86 19	143.4	86 48.9	81 21	138.8	86 57.8	79 17	31.8	6
7	77 41.2	98 09	163.4	78 10.7	98 10	163.0	79 39.0	98 10	161.4	80 08.3	98 11	160.8	80 37.5	97 11	160.1	86 12.1	82 21	138.7	86 36.1	77 23	133.9	86 47.5	74 19	35.6	7
8	77 35.5	98 11	161.1	78 04.9	98 11	160.6	79 32.7	97 12	158.9	80 01.8	97 12	158.2	80 30.8	97 12	157.5	85 59.4	79 23	134.5	86 22.3	73 24	129.6	86 36.3	69 20	38.9	8
9	77 29.2	97 12	158.8	77 58.4	97 12	158.3	79 25.6	96 13	156.4	79 54.5	96 13	155.7	80 23.3	96 14	154.8	85 45.7	76 24	130.7	86 07.6	70 26	125.8	86 24.3	64 21	41.8	9
10	77 22.2	97 13	156.6	77 51.2	97 13	156.0	79 17.8	96 14	154.0	79 46.5	95 15	153.1	80 15.0	96 15	152.3	85 31.3	73 25	127.2	85 52.2	67 27	122.4	86 11.6	59 22	44.3	10
1	77 14.5	96 14	154.4	77 43.3	96 14	153.8	79 09.3	95 15	151.6	79 37.8	94 16	150.7	80 06.0	94 16	149.7	85 16.2	70 26	124.0	85 36.3	64 27	119.3	85 58.4	54 23	46.6	1
2	77 06.2	96 15	152.2	77 34.8	96 15	151.6	79 00.2	94 16	149.2	79 28.4	94 17	148.3	79 56.3	93 17	147.3	85 00.6	67 27	121.1	85 19.9	61 28	116.5	85 44.7	50 23	48.5	2
3	76 57.2	95 16	150.1	77 25.7	95 16	149.4	78 50.4	93 17	146.9	79 18.3	93 18	146.0	79 46.0	92 18	144.9	84 44.5	65 27	118.4	85 03.2	59 28	114.0	85 30.6	46 24	50.2	3
4	76 47.7	94 17	148.0	77 16.0	94 17	147.3	78 40.0	92 18	144.7	79 07.6	92 19	143.7	79 35.0	91 19	142.6	84 28.0	63 28	116.0	84 46.1	57 29	111.7	85 16.2	42 24	51.6	4
15	76 37.6	94 18	146.0	77 05.7	93 18	145.2	78 29.0	92 19	142.5	78 56.3	91 20	141.5	79 23.5	90 20	140.3	84 11.2	61 29	113.7	84 28.7	56 29	109.6	85 01.6	39 25	52.9	15
6	76 26.9	93 19	144.0	76 54.8	93 19	143.2	78 17.4	91 20	140.4	78 44.5	90 21	139.3	79 11.4	89 21	138.1	83 54.0	60 29	111.6	84 11.2	54 30	107.7	84 46.7	35 25	54.0	6
7	76 15.8	92 19	142.0	76 43.4	92 20	141.2	78 05.3	90 21	138.3	78 32.2	89 21	137.2	78 58.8	88 22	136.0	83 36.7	58 29	109.7	83 53.4	53 30	105.8	84 31.6	32 25	55.0	7
8	76 04.1	92 20	140.1	76 31.6	91 21	139.2	77 52.8	89 22	136.3	78 19.3	88 22	135.2	78 45.6	87 23	134.0	83 19.1	57 30	107.8	83 35.5	52 30	104.2	84 16.3	29 26	55.8	8
9	75 52.0	91 21	138.2	76 19.2	90 21	137.3	77 39.7	88 22	134.3	78 06.0	87 23	133.2	78 32.1	86 23	132.0	83 01.4	56 30	106.1	83 17.5	51 30	102.6	84 00.9	26 26	56.6	9
20	75 39.4	90 22	136.3	76 06.4	90 22	135.5	77 26.2	87 23	132.4	77 52.3	86 24	131.3	78 18.1	85 24	130.0	82 43.5	55 30	104.5	82 59.3	50 30	101.1	83 45.4	24 26	57.2	20
1	75 26.4	90 22	134.5	75 53.2	89 23	133.6	77 12.4	87 24	130.6	77 38.2	86 24	129.4	78 03.7	84 25	128.1	82 25.5	54 30	103.0	82 41.1	49 31	99.7	83 29.7	21 26	57.7	1
2	75 13.0	89 23	132.8	75 39.6	88 23	131.9	76 58.1	86 24	128.7	77 23.7	85 25	127.6	77 48.9	84 25	126.3	82 07.4	54 30	101.6	82 22.8	49 31	98.4	83 14.0	19 26	58.2	2
3	74 59.2	88 24	131.0	75 25.6	88 24	130.1	76 43.4	85 25	127.0	77 08.8	84 25	125.8	77 33.8	83 26	124.5	81 49.2	53 30	100.2	82 04.4	48 31	97.1	82 58.2	16 26	58.6	3
4	74 45.0	88 24	129.4	75 11.3	87 24	128.4	76 28.5	84 26	125.3	76 53.6	83 26	124.1	77 18.4	82 26	122.8	81 30.9	52 31	98.9	81 46.0	48 31	95.9	82 42.4	14 26	58.9	4
25	74 30.5	87 25	127.7	74 56.6	86 25	126.8	76 13.2	84 26	123.6	76 38.1	83 26	122.4	77 02.7	81 27	121.2	81 12.6	52 31	97.7	81 27.5	48 31	94.8	82 26.5	12 27	59.2	25
6	74 15.7	87 25	126.1	74 41.6	86 26	125.1	75 57.6	83 26	122.0	76 22.3	82 27	120.8	76 46.7	81 27	119.5	80 54.2	52 31	96.5	81 09.0	47 31	93.7	82 10.6	10 27	59.4	6
7	74 00.6	86 26	124.5	74 26.3	85 26	123.6	75 41.7	82 27	120.4	76 06.2	81 27	119.2	76 30.4	80 28	118.0	80 35.7	51 31	95.3	80 50.5	47 31	92.6	81 54.6	08 27	59.6	7
8	73 45.2	86 26	123.0	74 10.7	85 26	122.0	75 25.6	82 27	118.8	75 49.9	81 28	117.7	76 13.9	79 28	116.4	80 17.3	51 31	94.2	80 32.0	47 31	91.6	81 38.6	06 27	59.7	8
9	73 29.5	85 27	121.5	73 54.8	84 27	120.5	75 09.2	81 28	117.3	75 33.4	80 28	116.2	75 57.2	79 28	114.9	79 58.8	51 31	93.2	80 13.4	47 31	90.6	81 22.6	04 27	59.8	9
30	73 13.5	84 27	120.0	73 38.7	84 27	119.0	74 52.7	81 28	115.9	75 16.7	79 28	114.7	75 40.3	78 28	113.5	79 40.2	51 31	92.1	79 54.9	47 31	89.7	81 06.5	02 27	59.8	30
1	72 57.3	84 27	118.5	73 22.4	83 28	117.6	74 35.9	80 28	114.4	74 59.7	79 29	113.3	75 23.2	78 29	112.1	79 21.7	51 31	91.1	79 36.4	47 31	88.7	80 50.5	01 27	59.9	1
2	72 40.9	84 28	117.1	73 05.9	83 28	116.2	74 18.9	80 29	113.0	74 42.6	78 29	111.9	75 05.9	77 29	110.7	79 03.2	51 31	90.2	79 17.8	47 31	87.8	80 34.5	01 27	59.9	2
3	72 24.3	83 28	115.7	72 49.1	82 28	114.8	74 01.8	79 29	111.7	74 25.3	78 29	110.5	74 48.5	77 29	109.3	78 44.6	51 31	89.2	78 59.3	47 31	87.0	80 18.4	03 27	59.8	3
4	72 07.5	83 28	114.4	72 32.2	82 28	113.4	73 44.5	79 29	110.3	74 07.9	77 29	109.2	74 30.9	76 30	108.0	78 26.1	51 31	88.3	78 40.8	47 31	86.1	80 02.4	04 27	59.8	4
35	71 50.6	82 29	113.0	72 15.1	81 29	112.1	73 27.0	78 29	109.0	73 50.3	77 30	107.9	74 13.3	76 30	106.7	78 07.6	51 31	87.4	78 22.3	48 31	85.3	79 46.4	06 27	59.7	35
6	71 33.4	82 29	111.7	71 57.8	81 29	110.8	73 09.4	78 30	107.8	73 32.6	77 30	106.7	73 55.4	75 30	105.5	77 49.0	51 31	86.5	78 03.8	48 31	84.5	79 30.4	07 27	59.6	6
7	71 16.1	82 29	110.4	71 40.4	81 29	109.5	72 51.7	78 30	106.5	73 14.8	76 30	105.4	73 37.5	75 30	104.3	77 30.5	51 31	85.7	77 45.4	48 31	83.7	79 14.4	09 27	59.5	7
8	70 58.7	81 29	109.2	71 22.9	80 29	108.3	72 33.9	77 30	105.3	72 56.9	76 30	104.2	73 19.5	75 30	103.1	77 12.1	51 31	84.8	77 27.0	48 31	82.9	78 58.5	10 27	59.3	8
9	70 41.1	81 30	108.0	71 05.2	80 30	107.0	72 15.9	77 30	104.1	72 38.8	76 30	103.0	73 01.4	75 30	101.9	76 53.6	51 31	84.0	77 08.6	49 31	82.1	78 42.5	12 27	59.2	9
40	70 23.4	81 30	106.7	70 47.5	80 30	105.8	71 57.9	77 30	102.9	72 20.7	76 30	101.9	72 43.2	74 30	100.8	76 35.2	52 31	83.2	76 50.3	49 30	81.3	78 26.6	13 26	59.0	40
1	70 05.6	80 30	105.5	70 29.6	79 30	104.7	71 39.8	76 30	101.8	72 02.6	75 30	100.7	72 25.0	74 30	99.6	76 16.8	52 31	82.4	76 32.0	49 30	80.6	78 10.7	14 26	58.9	1
2	69 47.7	80 30	104.4	70 11.6	79 30	103.5	71 21.6	76 30	100.6	71 44.3	75 31	99.6	72 06.7	74 31	98.5	75 58.4	52 31	81.6	76 13.7	50 30	79.9	77 54.9	16 26	58.7	2
3	69 29.7	80 30	103.2	69 53.5	79 30	102.4	71 03.3	76 31	99.5	71 26.0	75 31	98.5	71 48.3	74 31	97.4	75 40.1	52 30	80.9	75 55.5	50 30	79.1	77 39.1	17 26	58.5	3
4	69 11.6	80 30	102.1	69 35.4	79 30	101.2	70 45.0	76 31	98.4	71 07.6	75 31	97.4	71 29.9	74 31	96.4	75 21.8	53 30	80.1	75 37.3	50 30	78.4	77 23.3	18 26	58.2	4
45	68 53.4	79 30	101.0	69 17.1	79 30	100.1	70 26.7	76 31	97.4	70 49.2	75 31	96.4	71 11.5	74 31	95.3	75 03.6	53 30	79.4	75 19.1	51 30	77.7	77 07.5	20 26	58.0	45
6	68 35.2	79 30	99.9	68 58.9	78 31	99.0	70 08.2	76 31	96.3	70 30.8	75 31	95.3	70 53.0	73 31	94.3	74 45.4	53 30	78.7	75 01.0	51 30	77.0	76 51.8	21 26	57.8	6
7	68 16.9	79 31	98.8	68 40.5	78 31	98.0	69 49.8	76 31	95.3	70 12.3	74 31	94.3	70 34.5	73 31	93.3	74 27.2	54 30	77.9	74 43.0	51 30	76.3	76 36.2	22 26	57.5	7
8	67 58.5	79 31	97.8	68 22.1	78 31	96.9	69 31.3	75 31	94.2	69 53.8	74 31	93.3	70 16.0	73 31	92.3	74 09.1	54 30	77.2	74 25.0	52 30	75.6	76 20.6	23 26	57.3	8
9	67 40.2	79 31	96.7	68 03.7	78 31	95.9	69 12.8	75 31	93.2	69 35.3	74 31	92.3	69 57.4	73 31	91.3	73 51.1	54 30	76.5	74 07.1	52 30	75.0	76 05.0	24 26	57.0	9
50	67 21.7	79 31	95.7	67 45.3	78 31	94.9	68 54.3	75 31	92.3	69 16.8	74 31	91.3	69 38.9	73 31	90.4	73 33.0	55 30	75.8	73 49.2	53 30	74.3	75 49.5	26 26	56.7	50
1	67 03.3	79 31	94.7	67 26.8	78 31	93.9	68 35.8	75 31	91.3	68 58.2	74 31	90.4	69 20.3	73 31	89.4	73 15.1	55 30	75.1	73 31.4	53 30	73.7	75 34.0	27 26	56.4	1
2	66 44.8	79 31	93.7	67 08.3	78 31	92.9	68 17.2	75 31	90.3	68 39.7	74 31	89.4	69 01.8	73 31	88.5	72 57.2	56 30	74.4	73 13.6	54 30	73.0	75 18.6	28 26	56.1	2
3	66 26.3	79 31	92.7	66 49.7	78 31	91.9	67 58.7	75 31	89.4	68 21.1	74 31	88.5	68 43.3	73 31	87.6	72 39.4	56 30	73.8	72 55.9	54 29	72.3	75 03.2	29 26	55.8	3
4	66 07.7	79 31	91.7	66 31.2	78 31	90.9	67 40.2	75 31	88.4	68 02.6	74 31	87.6	68 24.8	73 31	86.6	72 21.6	57 30	73.1	72 38.3	55 29	71.7	74 47.9	30 25	55.5	4
55	65 49.2	79 31	90.7	66 12.7	78 31	90.0	67 21.6	75 31	87.5	67 44.1	74 31	86.6	68 06.3	73 31	85.7	72 03.9	57 29	72.4	72 20.7	55 29	71.1	74 32.6	31 25	55.2	55
6	65 30.6	79 31	89.8	65 54.1	78 31	89.0	67 03.1	75 31	86.6	67 25.6	74 31	85.7	67 47.8	74 31	84.9	71 46.3	57 29	71.8	72 03.2	56 29	70.4	74 17.4	32 25	54.9	6
7	65 12.1	79 31	88.8	65 35.6	78 31	88.1	66 44.6	75 31	85.7	67 07.1	75 31	84.8	67 29.3	74 31	84.0	71 28.7	58 29	71.1	71 45.8	56 29	69.8	74 02.3	33 25	54.6	7
8	64 53.6	79 31	87.9	65 17.1	78 31	87.2	66 26.1	76 31	84.8	66 48.7	75 31	84.0	67 10.9	74 31	83.1	71 11.2	58 29	70.5	71 28.4	57 29	69.2	73 47.2	35 25	54.3	8
9	64 35.1	79 31	87.0	64 58.6	78 31	86.2	66 07.7	76 31	83.9	66 30.2	75 31	83.1	66 52.5	74 31	82.3	70 53.7	59 29	69.8	71 11.1	57 29	68.6	73 32.2	36 25	53.9	9
60	64 16.5	79 31	86.1	64 40.1	78 31	85.3	65 49.3	76 31	83.0	66 11.8	75 31	82.2	66 34.2	74 31	81.4	70 36.4	59 29	69.2	70 53.9	58 29	67.9	73 17.2	37 25	53.6	60
1	63 58.1	79 31	85.2	64 21.6	78 31	84.4	65 30.9	76 31	82.2	65 53.5	75 31	81.4	66 15.9	74 30	80.6	70 19.1	60 29	68.5	70 36.7	58 28	67.3	73 02.3	38 25	53.2	1
2	63 39.6	79 31	84.3	64 03.2	78 31	83.6	65 12.5	76 31	81.3	65 35.2	75 30	80.5	65 57.6	74 30	79.7	70 01.9	60 29	67.9	70 19.7	59 28	66.7	72 47.5	39 25	52.9	2
3	63 21.2	79 31	83.4	63 44.7	78 31	82.7	64 54.2	76 30	80.5	65 16.9	75 30	79.7	65 39.4	74 30	78.9	69 44.7	61 28	67.3	70 02.7	59 28	66.1	72 32.8	40 24	52.5	3
4	63 02.8	79 31	82.5	63 26.4	78 31	81.8	64 36.0	76 30	79.6	64 58.7	75 30	78.9	65 21.2	75 30	78.1	69 27.7	61 28	66.6	69 45.8	60 28	65.5	72 18.1	41 24	52.2	4
65	62 44.4	79 31	81.6	63 08.0	78 30	81.0	64 17.7	76 30	78.8	64 40.5	76 30	78.1	65 03.1	75 30	77.3	69 10.7	62 28	66.0	69 28.9	60 28	64.9	72 03.5	42 24	51.8	65
6	62 26.1	79 30	80.8	62 49.8	79 30	80.1	63 59.6	77 30	78.0	64 22.4	76 30	77.2	64 45.0	75 30	76.5	68 53.8	62 28	65.4	69 12.2	61 28	64.3	71 48.9	43 24	51.5	6
7	62 07.8	79 30	79.9	62 31.5	79 30	79.3	63 41.5	77 30	77.2	64 04.4	76 30	76.4	64 27.0	75 30	75.7	68 37.0	63 28	64.8	68 55.5	61 28	63.7	71 34.5	44 24	51.1	7
8	61 49.6	79 30	79.1	62 13.3	79 30	78.4	63 23.4	77 30	76.4	63 46.4	76 30	75.6	64 09.1	75 30	74.9	68 20.2	63 28	64.2	68 38.9	62 28	63.1	71 20.1	45 24	50.7	8
9	61 31.4	80 30	78.2	61 55.2	79 30	77.6	63 05.4	77 30	75.6	63 28.4	76 30	74.8	63 51.2	76 30	74.1	68 03.6	64 28	63.6	68 22.5	62 27	62.5	71 05.7	46 24	50.4	9
70	61 13.3	80 30	77.4	61 37.1	79 30	76.8	62 47.5	77 30	74.8	63 10.6	77 30	74.1	63 33.4	76 30	73.3	67 47.0	64 27	63.0	68 06.0	63 27	61.9	70 51.5	46 24	50.0	70
1	60 55.2	80 30	76.6	61 19.1	79 30	76.0	62 29.7	77 30	74.0	62 52.8	77 30	73.3	63 15.7	76 29	72.6	67 30.6	65 27	62.3	67 49.7	63 27	61.3	70 37.3	47 23	49.6	1
2	60 37.2	80 30	75.8	61 01.1	80 30	75.1	62 11.9	78 30	73.2	62 35.1	77 29	72.5	62 58.1	76 29	71.8	67 14.2	65 27	61.7	67 33.5	64 27	60.8	70 23.3	48 23	49.2	2
3	60 19.3	80 30	74.9	60 43.2	80 30	74.3	61 54.2	78 29	72.4	62 17.4	77 29	71.7	62 40.5	77 29	71.0	66 57.9	66 27	61.1	67 17.4	64 27	60.2	70 09.3	49 23	48.8	3
4	60 01.4	80 30	74.1	60 25.4	80 30	73.5	61 36.5	78 29	71.6	61 59.9	77 29	71.0	62 23.0	77 29	70.3	66 41.7	66 27	60.5	67 01.3	65 27	59.6	69 55.4	50 23	48.4	4
75	59 43.6	81 30	73.3	60 07.7	80 29	72.7	61 19.0	78 29	70.9	61 42.4	78 29	70.2	62 05.6	77 29	69.5	66 25.6	67 27	59.9	66 45.4	65 26	59.0	69 41.5	51 23	48.1	75
6	59 25.9	81 29	72.5	59 50.0	80 29	72.0	61 01.5	79 29	70.1	61 25.0	78 29	69.5	61 48.2	77 29	68.8	66 09.6	67 26	59.4	66 29.6	66 26	58.4	69 27.8	52 23	47.7	6
7	59 08.2	81 29	71.8	59 32.4	80 29	71.2	60 44.1	79 29	69.3	61 07.6	78 29	68.7	61 31.0	78 29	68.1	65 53.7	68 26	58.8	66 13.8	66 26	57.8	69 14.1	53 23	47.3	7
8	58 50.6	81 29	71.0	59 14.9	81 29	70.4	60 26.8	79 29	68.6	60 50.4	78 29	68.0	61 13.8	78 28	67.3	65 37.9	68 26	58.2	65 58.2	67 26	57.3	69 00.5	54 22	46.9	8
9	58 33.2	81 29	70.2	58 57.5	81 29	69.6	60 09.6	79 29	67.8	60 33.3	79 28	67.2	60 56.8	78 28	66.6	65 22.2	69 26	57.6	65 42.6	68 26	56.7	68 47.1	55 22	46.5	9
80	58 15.8	82 29	69.4	58 40.2	81 29	68.8	59 52.4	80 28	67.1	60 16.2	79 28	66.5	60 39.8	78 28	65.9	65 06.6	69 26	57.0	65 27.2	68 26	56.1	68 33.7	55 22	46.1	80
1	57 58.5	82 29	68.6	58 22.9	81 29	68.1	59 35.4	80 28	66.4	59 59.3	79 28	65.8	60 22.9	79 28	65.1	64 51.1	70 26	56.4	65 11.8	69 25	55.5	68 20.4	56 22	45.7	1
2	57 41.2	82 29	67.9	58 05.8	82 28	67.3	59 18.5	80 28	65.6	59 42.4	79 28	65.0	60 06.2	79 28	64.4	64 35.7	70 25	55.8	64 56.6	69 25	55.0	68 07.1	57 22	45.2	2
3	57 24.1	82 28	67.1	57 48.7	82 28	66.6	59 01.6	80 28	64.9	59 25.7	80 28	64.3	59 49.5	79 28	63.7	64 20.4	71 25	55.2	64 41.5	70 25	54.4	67 54.0	58 22	44.8	3
4	57 07.1	82 28	66.3	57 31.7	82 28	65.8	58 44.9	81 28	64.2	59 09.0	80 28	63.6	59 32.9	80 27	63.0	64 05.3	71 25	54.6	64 26.5	70 25	53.8	67 41.0	59 22	44.4	4
85	56 50.1	83 28	65.6	57 14.9	82 28	65.1	58 28.3	81 28	63.4	58 52.4	80 27	62.9	59 16.5	80 27	62.3	63 50.2	72 25	54.1	64 11.5	71 25	53.3	67 28.1	60 21	44.0	85
6	56 33.3	83 28	64.8	56 58.1	82 28	64.3	58 11.7	81 27	62.7	58 36.0	81 27	62.1	59 00.1	80 27	61.6	63 35.2	72 25	53.5	63 56.7	71 24	52.7	67 15.2	60 21	43.6	6
7	56 16.6	83 28	64.1	56 41.5	83 28	63.6	57 55.3	81 27	62.0	58 19.7	81 27	61.4	58 43.9	80 27	60.9	63 20.4	73 25	52.9	63 42.0	72 24	52.1	67 02.5	61 21	43.2	7
8	56 00.0	83 28	63.3	56 24.9	83 27	62.8	57 39.0	82 27	61.3	58 03.4	81 27	60.7	58 27.7	81 27	60.2	63 05.7	73 24	52.3	63 27.5	72 24	51.6	66 49.9	62 21	42.8	8
9	55 43.4	84 27	62.6	56 08.5	83 27	62.1	57 22.8	82 27	60.5	57 47.3	81 27	60.0	58 11.7	81 27	59.5	62 51.0	74 24	51.7	63 13.0	73 24	51.0	66 37.3	63 21	42.3	9
90	55 27.0	84 27	61.8	55 52.1	83 27	61.4	57 06.7	82 27	59.8	57 31.3	82 26	59.3	57 55.8	81 26	58.8	62 36.5	74 24	51.2	62 58.6	73 24	50.4	66 24.9	64 21	41.9	90

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	55 10.8 84 27	61.1	55 35.9 84 27	60.6	56 50.7 83 26	59.1	57 15.4 82 26	58.6	57 40.0 82 26	58.1	62 22.2 75 24	50.6	62 44.4 74 24	49.9	66 12.6 64 20	41.5	91
2	54 54.6 84 27	60.4	55 19.8 84 27	59.9	56 34.9 83 26	58.4	56 59.7 82 26	57.9	57 24.3 82 26	57.4	62 07.9 75 24	50.0	62 30.3 74 23	49.3	66 00.3 65 20	41.1	2
3	54 38.5 85 27	59.6	55 03.8 84 26	59.2	56 19.2 83 26	57.7	56 44.0 83 26	57.2	57 08.8 82 26	56.7	61 53.7 76 23	49.4	62 16.3 75 23	48.7	65 48.2 66 20	40.6	3
4	54 22.6 85 26	58.9	54 48.0 84 26	58.4	56 03.5 83 26	57.0	56 28.5 83 26	56.5	56 53.3 83 26	56.0	61 39.7 76 23	48.9	62 02.4 75 23	48.2	65 36.2 67 20	40.2	4
95	54 06.8 85 26	58.2	54 32.2 85 26	57.7	55 48.1 84 26	56.3	56 13.1 83 25	55.8	56 38.0 83 25	55.3	61 25.8 77 23	48.3	61 48.7 76 23	47.6	65 24.3 67 20	39.8	95
6	53 51.1 85 26	57.5	54 16.6 85 26	57.0	55 32.7 84 25	55.6	55 57.8 84 25	55.1	56 22.8 83 25	54.6	61 12.0 77 23	47.7	61 35.0 76 23	47.0	65 12.5 68 20	39.3	6
7	53 35.5 86 26	56.7	54 01.1 85 26	56.3	55 17.4 84 25	54.9	55 42.7 84 25	54.4	56 07.8 83 25	54.0	60 58.4 77 23	47.1	61 21.5 77 22	46.5	65 00.8 69 19	38.9	7
8	53 20.1 86 26	56.0	53 45.8 86 25	55.6	55 02.3 85 25	54.2	55 27.7 84 25	53.8	55 52.9 84 25	53.3	60 44.9 78 22	46.6	61 08.2 77 22	45.9	64 49.2 69 19	38.5	8
9	53 04.8 86 25	55.3	53 30.6 86 25	54.9	54 47.4 85 25	53.5	55 12.8 84 25	53.1	55 38.1 84 24	52.6	60 31.5 78 22	46.0	60 54.9 78 22	45.4	64 37.7 70 19	38.0	9
100	52 49.6 86 25	54.6	53 15.5 86 25	54.2	54 32.5 85 24	52.8	54 58.0 85 24	52.4	55 23.4 84 24	51.9	60 18.2 79 22	45.4	60 41.8 78 22	44.8	64 26.3 71 19	37.6	100
1	52 34.5 87 25	53.9	53 00.5 86 25	53.5	54 17.8 85 24	52.2	54 43.4 85 24	51.7	55 08.9 85 24	51.2	60 05.0 79 22	44.9	60 28.8 79 21	44.2	64 15.1 72 19	37.1	1
2	52 19.6 87 25	53.2	52 45.7 87 24	52.7	54 03.2 86 24	51.5	54 28.9 85 24	51.0	54 54.5 85 24	50.6	59 52.0 80 21	44.3	60 15.9 79 21	43.7	64 04.0 72 18	36.7	2
3	52 04.9 87 24	52.4	52 31.0 87 24	52.0	53 48.8 86 24	50.8	54 14.6 86 24	50.3	54 40.2 85 24	49.9	59 39.1 80 21	43.7	60 03.2 80 21	43.1	63 52.9 73 18	36.3	3
4	51 50.2 87 24	51.7	52 16.4 87 24	51.3	53 34.5 86 24	50.1	54 00.4 86 23	49.7	54 26.1 86 23	49.2	59 26.4 81 21	43.1	59 50.5 80 21	42.6	63 42.0 74 18	35.8	4
105	51 35.8 88 24	51.0	52 02.0 87 24	50.6	53 20.4 87 23	49.4	53 46.3 86 23	49.0	54 12.1 86 23	48.6	59 13.8 81 21	42.6	59 38.1 81 21	42.0	63 31.2 74 18	35.4	105
6	51 21.4 88 24	50.3	51 47.8 88 24	49.9	53 06.3 87 23	48.7	53 32.4 87 23	48.3	53 58.3 86 23	47.9	59 01.3 82 21	42.0	59 25.7 81 20	41.4	63 20.6 75 18	34.9	6
7	51 07.2 88 23	49.6	51 33.6 88 23	49.2	52 52.5 87 23	48.1	53 18.6 87 23	47.7	53 44.6 87 23	47.2	58 49.0 82 20	41.4	59 13.5 82 20	40.9	63 10.0 76 17	34.5	7
8	50 53.2 88 23	48.9	51 19.7 88 23	48.5	52 38.8 87 23	47.4	53 05.0 87 22	47.0	53 31.1 87 22	46.6	58 36.8 83 20	40.9	59 01.5 82 20	40.3	62 59.6 76 17	34.0	8
9	50 39.3 89 23	48.2	51 05.9 89 23	47.9	52 25.2 88 22	46.7	52 51.5 88 22	46.3	53 17.7 87 22	45.9	58 24.7 83 20	40.3	58 49.5 83 20	39.8	62 49.2 77 17	33.6	9
110	50 25.5 89 23	47.5	50 52.2 89 23	47.2	52 11.8 88 22	46.0	52 38.2 88 22	45.6	53 04.5 88 22	45.2	58 12.8 83 20	39.7	58 37.7 83 19	39.2	62 39.0 77 17	33.1	110
1	50 11.9 89 22	46.8	50 38.7 89 22	46.5	51 58.5 88 22	45.4	52 25.0 88 22	45.0	52 51.4 88 22	44.6	58 01.0 84 19	39.2	58 26.1 83 19	38.7	62 29.0 78 17	32.7	1
2	49 58.5 90 22	46.1	50 25.3 89 22	45.8	51 45.4 89 22	44.7	52 11.9 88 21	44.3	52 38.4 88 21	43.9	57 49.4 84 19	38.6	58 14.6 84 19	38.1	62 19.0 79 16	32.2	2
3	49 45.2 90 22	45.4	50 12.1 90 22	45.1	51 32.4 89 21	44.0	51 59.1 89 21	43.6	52 25.6 88 21	43.3	57 37.9 85 19	38.0	58 03.2 84 19	37.5	62 09.2 79 16	31.8	3
4	49 32.1 90 22	44.7	49 59.0 90 22	44.4	51 19.6 89 21	43.3	51 46.4 89 21	43.0	52 13.0 89 21	42.6	57 26.5 85 19	37.5	57 52.0 85 18	37.0	61 59.5 80 16	31.3	4
115	49 19.1 90 21	44.0	49 46.2 90 21	43.7	51 07.0 89 21	42.7	51 33.8 89 21	42.3	52 00.5 89 21	41.9	57 15.3 86 18	36.9	57 40.9 85 18	36.4	61 49.9 80 16	30.9	115
6	49 06.3 91 21	43.3	49 33.4 90 21	43.0	50 54.5 90 21	42.0	51 21.4 90 20	41.7	51 48.2 89 20	41.3	57 04.2 86 18	36.3	57 30.0 86 18	35.9	61 40.5 81 16	30.4	6
7	48 53.6 91 21	42.7	49 20.9 91 21	42.3	50 42.2 90 20	41.3	51 09.2 90 20	41.0	51 36.1 90 20	40.6	56 53.3 86 18	35.8	57 19.2 86 18	35.3	61 31.1 82 15	30.0	7
8	48 41.2 91 21	42.0	49 08.4 91 20	41.7	50 30.0 90 20	40.7	50 57.1 90 20	40.3	51 24.1 90 20	40.0	56 42.6 87 18	35.2	57 08.5 86 18	34.7	61 22.0 82 15	29.5	8
9	48 28.8 91 20	41.3	48 56.2 91 20	41.0	50 18.0 91 20	40.0	50 45.2 90 20	39.7	51 12.2 90 19	39.3	56 32.0 87 17	34.6	56 58.1 87 17	34.2	61 12.9 83 15	29.0	9
120	48 16.7 92 20	40.6	48 44.1 91 20	40.3	50 06.2 91 19	39.3	50 33.4 91 19	39.0	51 00.6 91 19	38.7	56 21.5 88 17	34.1	56 47.7 87 17	33.6	61 04.0 83 15	28.6	120
1	48 04.7 92 20	39.9	48 32.2 92 20	39.6	49 54.5 91 19	38.7	50 21.8 91 19	38.3	50 49.1 91 19	38.0	56 11.2 88 17	33.5	56 37.5 88 17	33.1	60 55.1 84 14	28.1	1
2	47 52.9 92 19	39.2	48 20.5 92 19	38.9	49 43.0 91 19	38.0	50 10.4 91 19	37.7	50 37.7 91 19	37.4	56 01.0 88 17	32.9	56 27.5 88 16	32.5	60 46.5 84 14	27.7	2
3	47 41.3 92 19	38.5	48 08.9 92 19	38.2	49 31.7 92 19	37.3	49 59.1 92 18	37.0	50 26.6 91 18	36.7	55 51.0 89 16	32.4	56 17.6 88 16	32.0	60 37.9 85 14	27.2	3
4	47 29.8 93 19	37.8	47 57.5 92 19	37.6	49 20.5 92 18	36.7	49 48.1 92 18	36.4	50 15.6 92 18	36.1	55 41.2 89 16	31.8	56 07.8 89 16	31.4	60 29.5 85 14	26.7	4
125	47 18.5 93 19	37.2	47 46.3 93 18	36.9	49 09.5 92 18	36.0	49 37.1 92 18	35.7	50 04.7 92 18	35.4	55 31.5 89 16	31.2	55 58.3 89 16	30.8	60 21.3 86 14	26.3	125
6	47 07.4 93 18	36.5	47 35.3 93 18	36.2	48 58.7 92 18	35.4	49 26.4 92 18	35.1	49 54.1 92 17	34.8	55 21.9 90 16	30.7	55 48.8 90 15	30.3	60 13.1 86 13	25.8	6
7	46 56.5 93 18	35.8	47 24.4 93 18	35.5	48 48.1 93 17	34.7	49 15.8 93 17	34.4	49 43.6 92 17	34.1	55 12.6 90 15	30.1	55 39.6 90 15	29.7	60 05.1 87 13	25.3	7
8	46 45.7 93 18	35.1	47 13.7 93 18	34.8	48 37.6 93 17	34.0	49 05.5 93 17	33.8	49 33.3 93 17	33.5	55 03.3 91 15	29.5	55 30.5 90 15	29.2	59 57.2 87 13	24.9	8
9	46 35.1 94 17	34.4	47 03.2 94 17	34.2	48 27.3 93 17	33.4	48 55.2 93 17	33.1	49 23.1 93 17	32.8	54 54.3 91 15	29.0	55 21.5 91 15	28.6	59 49.5 88 13	24.4	9
130	46 24.8 94 17	33.7	46 52.9 94 17	33.5	48 17.2 93 17	32.7	48 45.2 93 16	32.4	49 13.2 93 16	32.2	54 45.4 91 15	28.4	55 12.7 91 14	28.0	59 41.9 88 12	23.9	130
1	46 14.5 94 17	33.1	46 42.8 94 17	32.8	48 07.3 94 16	32.1	48 35.3 94 16	31.8	49 03.4 93 16	31.5	54 36.6 92 14	27.8	55 04.1 91 14	27.5	59 34.5 89 12	23.5	1
2	46 04.5 94 16	32.4	46 32.8 94 16	32.1	47 57.5 94 16	31.4	48 25.7 94 16	31.1	48 53.8 94 16	30.9	54 28.1 92 14	27.3	54 55.6 92 14	26.9	59 27.2 89 12	23.0	2
3	45 54.7 95 16	31.7	46 23.0 94 16	31.5	47 47.9 94 16	30.7	48 16.2 94 16	30.5	48 44.4 94 15	30.2	54 19.6 92 14	26.7	54 47.3 92 14	26.4	59 20.0 90 12	22.5	3
4	45 45.0 95 16	31.0	46 13.5 95 16	30.8	47 38.6 94 15	30.1	48 06.9 94 15	29.8	48 35.1 94 15	29.6	54 11.4 93 13	26.1	54 39.1 92 13	25.8	59 12.9 90 12	22.1	4
135	45 35.6 95 15	30.3	46 04.1 95 15	30.1	47 29.4 95 15	29.4	47 57.7 95 15	29.2	48 26.1 94 15	28.9	54 03.3 93 13	25.6	54 31.1 93 13	25.3	59 06.1 90 11	21.6	135
6	45 26.3 95 15	29.7	45 54.8 95 15	29.4	47 20.3 95 15	28.8	47 48.8 95 15	28.5	48 17.2 95 14	28.3	53 55.4 93 13	25.0	54 23.3 93 13	24.7	58 59.3 91 11	21.1	6
7	45 17.2 95 15	29.0	45 45.8 95 15	28.8	47 11.5 95 14	28.1	47 40.0 95 14	27.9	48 08.5 95 14	27.6	53 47.6 93 13	24.4	54 15.6 93 12	24.1	58 52.7 91 11	20.6	7
8	45 08.3 96 14	28.3	45 37.0 96 14	28.1	47 02.9 95 14	27.5	47 31.4 95 14	27.2	48 00.0 95 14	27.0	53 40.0 94 12	23.9	54 08.1 94 12	23.6	58 46.2 92 11	20.2	8
9	44 59.6 96 14	27.6	45 28.4 96 14	27.4	46 54.4 95 14	26.8	47 23.0 95 14	26.6	47 51.7 95 14	26.4	53 32.6 94 12	23.3	54 00.8 94 12	23.0	58 39.9 92 10	19.7	9
140	44 51.1 96 14	27.0	45 19.9 96 14	26.8	46 46.1 96 13	26.1	47 14.8 96 13	25.9	47 43.5 96 13	25.7	53 25.4 94 12	22.7	53 53.6 94 12	22.5	58 33.7 92 10	19.2	140
1	44 42.8 96 14	26.3	45 11.7 96 13	26.1	46 38.1 96 13	25.5	47 06.8 96 13	25.3	47 35.6 96 13	25.1	53 18.3 95 12	22.2	53 46.6 94 11	21.9	58 27.7 93 10	18.8	1
2	44 34.7 96 13	25.6	45 03.6 96 13	25.4	46 30.2 96 13	24.8	46 59.0 96 13	24.6	47 27.8 96 13	24.4	53 11.4 95 11	21.6	53 39.8 95 11	21.3	58 21.8 93 10	18.3	2
3	44 26.8 97 13	24.9	44 55.7 96 13	24.7	46 22.5 96 12	24.2	46 51.4 96 12	24.0	47 20.2 96 12	23.8	53 04.6 95 11	21.0	53 33.1 95 11	20.8	58 16.1 94 09	17.8	3
4	44 19.1 97 13	24.3	44 48.1 97 12	24.1	46 15.0 96 12	23.5	46 43.9 96 12	23.3	47 12.9 96 12	23.1	52 58.1 95 11	20.5	53 26.6 95 11	20.2	58 10.5 94 09	17.3	4
145	44 11.6 97 12	23.6	44 40.6 97 12	23.4	46 07.7 97 12	22.9	46 36.7 97 12	22.7	47 05.7 97 12	22.5	52 51.7 96 10	19.9	53 20.3 95 10	19.7	58 05.0 94 09	16.9	145
6	44 04.2 97 12	22.9	44 33.4 97 12	22.7	46 00.6 97 12	22.2	46 29.6 97 11	22.0	46 58.7 97 11	21.8	52 45.4 96 10	19.3	53 14.2 96 10	19.1	57 59.7 95 09	16.4	6
7	43 57.1 97 12	22.2	44 26.3 97 11	22.1	45 53.7 97 11	21.6	46 22.8 97 11	21.4	46 51.9 97 11	21.2	52 39.4 96 10	18.8	53 08.2 96 10	18.5	57 54.6 95 08	15.9	7
8	43 50.2 97 11	21.6	44 19.4 97 11	21.4	45 47.0 97 11	20.9	46 16.1 97 11	20.7	46 45.3 97 11	20.6	52 33.5 96 10	18.2	53 02.4 96 09	18.0	57 49.6 95 08	15.4	8
9	43 43.5 98 11	20.9	44 12.8 98 11	20.7	45 40.5 97 11	20.2	46 09.7 97 10	20.1	46 38.9 97 10	19.9	52 27.8 97 09	17.6	52 56.7 96 09	17.4	57 44.7 95 08	14.9	9
150	43 37.0 98 10	20.2	44 06.3 98 10	20.1	45 34.1 98 10	19.6	46 03.4 97 10	19.4	46 32.6 97 10	19.3	52 22.3 97 09	17.1	52 51.3 97 09	16.9	57 40.0 96 08	14.5	150
1	43 30.7 98 10	19.5	44 00.1 98 10	19.4	45 28.0 98 10	18.9	45 57.3 98 10	18.8	46 26.6 98 10	18.6	52 16.9 97 09	16.5	52 46.0 97 09	16.3	57 35.4 96 07	14.0	1
2	43 24.6 98 10	18.9	43 54.0 98 10	18.7	45 22.1 98 10	18.3	45 51.5 98 09	18.1	46 20.8 98 09	18.0	52 11.7 97 08	15.9	52 40.9 97 08	15.7	57 31.0 96 07	13.5	2
3	43 18.7 98 09	18.2	43 48.2 98 09	18.0	45 16.4 98 09	17.6	45 45.8 98 09	17.5	46 15.2 98 09	17.3	52 06.7 97 08	15.4	52 35.9 97 08	15.2	57 26.8 97 07	13.0	3
4	43 13.0 98 09	17.5	43 42.5 98 09	17.4	45 10.9 98 09	17.0	45 40.3 98 09	16.8	46 09.7 98 09	16.7	52 01.9 98 08	14.8	52 31.2 97 08	14.6	57 22.7 97 07	12.6	4
155	43 07.6 98 09	16.8	43 37.1 98 09	16.7	45 05.6 98 09	16.3	45 35.0 98 08	16.2	46 04.5 98 08	16.1	51 57.3 98 07	14.2	52 26.6 98 07	14.1	57 18.7 97 06	12.1	155
6	43 02.3 99 08	16.2	43 31.9 98 08	16.0	45 00.5 98 08	15.7	45 30.0 98 08	15.5	45 59.5 98 08	15.4	51 52.8 98 07	13.7	52 22.2 98 07	13.5	57 14.9 97 06	11.6	6
7	42 57.3 99 08	15.5	43 26.8 99 08	15.4	44 55.6 99 08	15.0	45 25.1 99 08	14.9	45 54.7 98 08	14.8	51 48.5 98 07	13.1	52 17.9 98 07	12.9	57 11.3 97 06	11.1	7
8	42 52.4 99 08	14.8	43 22.0 99 08	14.7	44 50.8 99 08	14.4	45 20.4 99 07	14.2	45 50.0 99 07	14.1	51 44.4 98 07	12.5	52 13.9 98 06	12.4	57 07.8 98 06	10.6	8
9	42 47.8 99 07	14.1	43 17.4 99 07	14.0	44 46.4 99 07	13.7	45 16.0 99 07	13.6	45 45.6 99 07	13.5	51 40.5 98 06	12.0	52 10.0 98 06	11.8	57 04.4 98 05	10.1	9
160	42 43.4 99 07	13.5	43 13.0 99 07	13.4	44 42.1 99 07	13.1	45 11.7 99 07	13.0	45 41.4 99 07	12.8	51 36.7 99 06	11.4	52 06.3 99 06	11.2	57 01.2 98 05	09.7	160
1	42 39.1 99 07	12.8	43 08.9 99 07	12.7	44 38.0 99 06	12.4	45 07.7 99 06	12.3	45 37.4 99 06	12.2	51 33.2 99 06	10.8	52 02.8 99 06	10.7	56 58.2 98 05	09.2	1
2	42 35.1 99 06	12.1	43 04.9 99 06	12.0	44 34.1 99 06	11.7	45 03.8 99 06	11.7	45 33.5 99 06	11.6	51 29.8 99 05	10.2	51 59.4 99 05	10.1	56 55.3 98 05	08.7	2
3	42 31.4 99 06	11.4	43 01.1 99 06	11.4	44 30.4 99 06	11.1	45 00.2 99 06	11.0	45 29.9 99 06	10.9	51 26.6 99 05	09.7	51 56.2 99 05	09.6	56 52.6 99 04	08.2	3
4	42 27.8 99 06	10.8	42 57.6 99 06	10.7	44 27.0 99 05	10.4	44 56.7 99 05	10.4	45 26.5 99 05	10.3	51 23.5 99 05	09.1	51 53.2 99 05	09.0	56 50.0 99 04	07.7	4
165	42 24.4 99 05	10.1	42 54.3 99 05	10.0	44 23.7 99 05	09.8	44 53.5 99 05	09.7	45 23.3 99 05	09.6	51 20.7 99 04	08.5	51 50.4 99 04	08.4	56 47.6 99 04	07.3	165
6	42 21.3 99 05	09.4	42 51.1 99 05	09.4	44 20.7 99 05	09.1	44 50.5 99 05	09.1	45 20.3 99 05	09.0	51 18.0 99 04	08.0	51 47.8 99 04	07.9	56 45.3 99 04	06.8	6
7	42 18.4 1.0 05	08.7	42 48.2 1.0 04	08.7	44 17.8 1.0 04	08.5	44 47.7 1.0 04	08.4	45 17.5 1.0 04	08.3	51 15.6 99 04	07.4	51 45.4 99 04	07.3	56 43.2 99 03	06.3	7
8	42 15.6 1.0 04	08.1	42 45.5 1.0 04	08.0	44 15.2 1.0 04	07.8	44 45.1 1.0 04	07.8	45 14.9 1.0 04	07.7	51 13.2 99 04	06.8	51 43.1 99 03	06.7	56 41.3 99 03	05.8	8
9	42 13.2 1.0 04	07.4	42 43.1 1.0 04	07.3	44 12.8 1.0 04	07.2	44 42.7 1.0 04	07.1	45 12.6 1.0 04	07.1	51 11.1 1.0 03	06.3	51 41.0 1.0 03	06.2	56 39.5 99 03	05.3	9
170	42 10.9 1.0 03	06.7	42 40.8 1.0 03	06.7	44 10.5 1.0 03	06.5	44 40.5 1.0 03	06.5	45 10.4 1.0 03	06.4	51 09.2 1.0 03	05.7	51 39.1 1.0 03	05.6	56 37.8 1.0 02	04.8	170
1	42 08.8 1.0 03	06.1	42 38.7 1.0 03	06.0	44 08.5 1.0 03	05.9	44 38.5 1.0 03	05.8	45 08.4 1.0 03	05.8	51 07.5 1.0 03	05.1	51 37.4 1.0 03	05.1	56 36.3 1.0 02	04.4	1
2	42 07.0 1.0 03	05.4	42 36.9 1.0 03	05.3	44 06.8 1.0 03	05.2	44 36.7 1.0 03	05.2	45 06.6 1.0 03	05.1	51 05.9 1.0 02	04.6	51 35.8 1.0 02	04.5	56 35.0 1.0 02	03.9	2
3	42 05.3 1.0 02	04.7	42 35.3 1.0 02	04.7	44 05.2 1.0 02	04.6	44 35.1 1.0 02	04.5	45 05.1 1.0 02	04.5	51 04.5 1.0 02	04.0	51 34.5 1.0 02	03.9	56 33.8 1.0 02	03.4	3
4	42 03.9 1.0 02	04.0	42 33.9 1.0 02	04.0	44 03.8 1.0 02	03.9	44 33.8 1.0 02	03.9	45 03.7 1.0 02	03.9	51 03.3 1.0 02	03.4	51 33.3 1.0 02	03.4	56 32.8 1.0 01	02.9	4
175	42 02.7 1.0 02	03.4	42 32.7 1.0 02	03.3	44 02.6 1.0 02	03.3	44 32.6 1.0 02	03.2	45 02.6 1.0 02	03.2	51 02.3 1.0 01	02.8	51 32.3 1.0 01	02.8	56 32.0 1.0 01	02.4	175
6	42 01.7 1.0 01	02.7	42 31.7 1.0 01	02.7	44 01.7 1.0 01	02.6	44 31.7 1.0 01	02.6	45 01.7 1.0 01	02.6	51 01.5 1.0 01	02.3	51 31.5 1.0 01	02.3	56 31.3 1.0 01	01.9	6
7	42 01.0 1.0 01	02.0	42 31.0 1.0 01	02.0	44 01.0 1.0 01	02.0	44 30.9 1.0 01	01.9	45 00.9 1.0 01	01.9	51 00.8 1.0 01	01.7	51 30.8 1.0 01	01.7	56 30.7 1.0 01	01.5	7
8	42 00.4 1.0 01	01.3	42 30.4 1.0 01	01.3	44 00.4 1.0 01	01.3	44 30.4 1.0 01	01.3	45 00.4 1.0 01	01.3	51 00.4 1.0 00	01.1	51 30.4 1.0 00	01.1	56 30.3 1.0 00	01.0	8
9	42 00.1 1.0 00	00.7	42 30.1 1.0 00	00.7	44 00.1 1.0 00	00.7	44 30.1 1.0 00	00.6	45 00.1 1.0 00	00.6	51 00.1 1.0 00	00.6	51 30.1 1.0 00	00.6	56 30.1 1.0 00	00.5	9
180	42 00.0 1.0 00	00.0	42 30.0 1.0 00	00.0	44 00.0 1.0 00	00.0	44 30.0 1.0 00	00.0	45 00.0 1.0 00	00.0	51 00.0 1.0 00	00.0	51 30.0 1.0 00	00.0	56 30.0 1.0 00	00.0	180

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79°

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	22	180	26	180	30	180	34	180	38	180	42	180	46	180	50	180	54	180	58	180	62	180	00
4	22	176	26	176	30	175	34	175	38	175	42	175	46	175	50	175	54	174	58	174	62	174	4
8	22	171	26	171	30	171	34	171	38	170	42	170	46	170	50	169	54	169	58	168	62	168	8
12	22	167	26	167	30	166	34	166	38	166	42	165	46	165	49	164	53	164	57	163	61	162	12
16	21	163	25	162	29	162	33	162	37	161	41	160	45	160	49	159	53	158	57	157	61	156	16
20	21	159	25	158	29	158	33	157	37	156	41	156	45	155	49	154	53	153	56	152	60	150	20
24	20	154	24	154	28	153	32	152	36	152	40	151	44	150	48	149	52	148	56	146	60	145	24
28	20	150	24	149	28	149	32	148	36	147	40	146	43	145	47	144	51	143	55	141	59	139	28
32	19	146	23	145	27	144	31	144	35	143	39	142	43	140	47	139	50	138	54	136	58	134	32
36	18	142	22	141	26	140	30	139	34	138	38	137	42	136	46	134	50	133	53	131	57	129	36
40	18	138	22	137	25	136	29	135	33	134	37	133	41	131	45	130	49	128	52	126	56	124	40
44	17	134	21	133	25	132	28	131	32	129	36	128	40	127	44	125	48	123	51	121	55	119	44
48	16	130	20	129	24	128	27	126	31	125	35	124	39	122	43	121	47	119	50	117	54	114	48
52	15	126	19	125	23	123	26	122	30	121	34	120	38	118	42	116	45	115	49	112	53	110	52
56	14	122	18	121	22	119	25	118	29	117	33	115	37	114	41	112	44	110	48	108	52	106	56
60	13	118	17	117	20	115	24	114	28	113	32	111	36	110	39	108	43	106	47	104	51	102	60
64	12	114	15	113	19	111	23	110	27	109	31	107	34	106	38	104	42	102	46	100	49	98	64
68	10	110	14	109	18	107	22	106	26	105	30	103	33	102	37	100	41	98	44	96	48	94	68
72	09	106	13	105	17	103	21	102	25	101	28	99	32	98	36	96	40	94	43	92	47	90	72
76	08	102	12	101	16	100	20	98	23	97	27	95	31	94	35	92	38	90	42	88	46	86	76
80	07	98	11	97	14	96	18	94	22	93	26	92	30	90	33	88	37	87	41	85	44	82	80
84	06	94	09	93	13	92	17	91	21	89	25	88	28	86	32	85	36	83	40	81	43	79	84
88	04	91	08	89	12	88	16	87	20	85	23	84	27	83	31	81	35	79	38	77	42	75	88
92	03	87	07	86	11	84	15	83	18	82	22	80	26	79	30	77	33	76	37	74	41	72	92
96	02	83	06	82	10	81	13	79	17	78	21	77	25	75	28	74	32	72	36	70	40	68	96
100	01	79	05	78	08	77	12	76	16	74	20	73	24	72	27	70	31	68	35	67	38	65	100
104	*00*	75	03	74	07	73	11	72	15	71	19	69	22	68	26	66	30	65	34	63	37	61	104
108	*02*	72	02	70	06	69	10	68	14	67	17	66	21	64	25	63	29	61	33	60	36	58	108
112	*03*	68	01	67	05	66	09	64	13	63	16	62	20	61	24	59	28	58	32	56	35	55	112
116	*04*	64	*00*	63	04	62	08	61	11	60	15	58	19	57	23	56	27	54	31	53	34	51	116
120	*05*	60	*01*	59	03	58	07	57	10	56	14	55	18	54	22	52	26	51	30	50	33	48	120
124	*06*	56	*02*	55	02	54	06	53	09	52	13	51	17	50	21	49	25	48	29	46	32	45	124
128	*07*	52	*03*	51	01	50	05	49	08	48	12	47	16	46	20	45	24	44	28	43	32	42	128
132	*08*	48	*04*	48	*00*	47	04	46	08	45	11	44	15	43	19	42	23	41	27	40	31	38	132
136	*09*	45	*05*	44	*01*	43	03	42	07	41	11	40	14	39	18	38	22	37	26	36	30	35	136
140	*10*	41	*06*	40	*02*	39	02	38	06	37	10	37	14	36	18	35	22	34	25	33	29	32	140
144	*11*	37	*07*	36	*03*	35	01	34	05	34	09	33	13	32	17	31	21	31	25	30	29	29	144
148	*11*	33	*07*	32	*03*	31	01	31	05	30	08	29	12	29	16	28	20	27	24	26	28	26	148
152	*12*	29	*08*	28	*04*	27	*00*	27	04	26	08	26	12	25	16	24	20	24	24	23	28	22	152
156	*12*	25	*08*	24	*04*	24	*01*	23	03	23	07	22	11	21	15	21	19	20	23	20	27	19	156
160	*13*	20	*09*	20	*05*	20	*01*	19	03	19	07	18	11	18	15	17	19	17	23	17	27	16	160
164	*13*	16	*09*	16	*05*	16	*01*	15	03	15	07	15	11	14	15	14	19	14	23	13	27	13	164
168	*14*	12	*10*	12	*06*	12	*02*	12	02	11	06	11	10	11	14	10	18	10	22	10	26	10	168
172	*14*	08	*10*	08	*06*	08	*02*	08	02	08	06	07	10	07	14	07	18	07	22	07	26	06	172
176	*14*	04	*10*	04	*06*	04	*02*	04	02	04	06	04	10	04	14	03	18	03	22	03	26	03	176
180	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	26	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18366

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	66	180	70	180	74	180	78	180	82	180	86	180	90	. . .	86	00	82	00	78	00	74	00	00
4	66	173	70	173	74	172	78	170	82	168	86	159	89	88	86	13	82	05	78	02	74	01	4
8	66	167	70	166	74	164	78	161	81	156	85	142	88	86	85	25	82	10	78	04	74	01	8
12	65	160	69	159	73	156	77	152	81	145	84	129	86	84	85	34	82	14	78	06	74	02	12
16	65	154	69	152	73	149	76	144	80	136	83	118	85	82	84	40	81	18	78	08	74	02	16
20	64	148	68	146	72	142	76	136	79	127	82	111	84	80	83	45	81	22	77	09	74	02	20
24	64	142	67	139	71	135	75	129	78	120	81	104	83	79	82	48	80	25	77	11	74	03	24
28	63	137	67	133	70	129	74	123	77	114	80	99	81	77	81	50	80	27	77	13	74	03	28
32	62	131	66	128	69	123	73	117	76	108	79	94	80	75	80	51	79	29	77	14	74	04	32
36	61	126	65	122	68	118	72	112	75	103	77	90	79	73	80	51	79	31	76	15	74	04	36
40	60	121	64	117	67	113	70	107	73	98	76	87	78	71	79	52	78	32	76	16	73	05	40
44	59	116	62	113	66	108	69	102	72	94	75	83	77	69	78	51	77	33	76	17	73	05	44
48	58	112	61	108	65	103	68	98	71	90	74	80	76	67	77	51	77	34	75	18	73	05	48
52	57	107	60	104	63	99	67	94	70	87	72	77	74	65	76	50	76	34	75	19	73	05	52
56	55	103	59	99	62	95	66	90	69	83	71	74	73	63	75	50	75	34	75	19	73	06	56
60	54	99	58	95	61	91	64	86	67	80	70	72	72	61	74	49	74	34	74	19	73	06	60
64	53	95	56	91	60	87	63	83	66	76	69	69	71	59	73	48	74	34	74	20	73	06	64
68	52	91	55	88	59	84	62	79	65	73	68	66	70	57	72	46	73	34	73	20	73	06	68
72	50	87	54	84	57	80	61	76	64	70	67	64	69	55	71	45	72	33	73	20	73	06	72
76	49	83	53	80	56	77	59	73	63	67	65	61	68	53	70	44	72	33	72	20	72	06	76
80	48	80	51	77	55	73	58	69	61	65	64	59	67	51	69	43	71	32	72	20	72	06	80
84	47	76	50	73	54	70	57	66	60	62	63	56	66	49	69	41	70	31	72	19	72	06	84
88	46	73	49	70	53	67	56	63	59	59	62	54	65	47	68	40	70	30	71	19	72	06	88
92	44	69	48	67	51	64	55	60	58	56	61	51	64	45	67	38	69	29	71	19	72	06	92
96	43	66	47	64	50	61	54	57	57	54	60	49	63	43	66	37	69	28	70	18	72	06	96
100	42	63	46	60	49	58	53	55	56	51	60	47	63	41	65	35	68	27	70	18	72	06	100
104	41	59	45	57	48	55	52	52	55	48	59	44	62	39	65	33	67	26	70	17	71	06	104
108	40	56	44	54	47	52	51	49	54	46	58	42	61	37	64	32	67	25	69	16	71	06	108
112	39	53	43	51	46	49	50	46	54	43	57	40	60	35	63	30	66	24	69	16	71	06	112
116	38	50	42	48	45	46	49	43	53	41	56	37	60	33	63	28	66	23	69	15	71	06	116
120	37	47	41	45	45	43	48	41	52	38	55	35	59	31	62	27	65	21	68	14	71	05	120
124	36	43	40	42	44	40	47	38	51	35	55	33	58	29	62	25	65	20	68	13	71	05	124
128	35	40	39	39	43	37	47	35	50	33	54	30	58	27	61	23	65	19	68	13	71	05	128
132	35	37	38	36	42	34	46	32	50	30	54	28	57	25	61	22	64	17	68	12	71	04	132
136	34	34	38	33	42	31	45	30	49	28	53	26	57	23	60	20	64	16	67	11	71	04	136
140	33	31	37	30	41	28	45	27	49	25	52	23	56	21	60	18	64	15	67	10	70	04	140
144	33	28	37	27	40	26	44	24	48	23	52	21	56	19	60	16	63	13	67	09	70	03	144
148	32	25	36	24	40	23	44	22	48	20	52	19	55	17	59	15	63	12	67	08	70	03	148
152	32	22	36	21	39	20	43	19	47	18	51	16	55	15	59	13	63	10	67	07	70	03	152
156	31	19	35	18	39	17	43	16	47	15	51	14	55	13	59	11	63	09	66	06	70	02	156
160	31	15	35	15	39	14	43	13	47	13	51	12	55	11	58	09	62	07	66	05	70	02	160
164	31	12	35	12	38	11	42	11	46	10	50	09	54	08	58	07	62	06	66	04	70	02	164
168	30	09	34	09	38	09	42	08	46	08	50	07	54	06	58	05	62	04	66	03	70	01	168
172	30	06	34	06	38	06	42	05	46	05	50	05	54	04	58	04	62	03	66	02	70	01	172
176	30	03	34	03	38	03	42	03	46	03	50	02	54	02	58	02	62	01	66	01	70	00	176
180	30	00	34	00	38	00	42	00	46	00	50	00	54	00	58	00	62	00	66	00	70	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 72°

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79

16—18606

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 73°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	17 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	00
1	16 59.8	1.0 01	179.0	17 29.8	1.0 01	179.0	17 59.8	1.0 01	178.9	18 29.8	1.0 01	178.9	18 59.8	1.0 01	178.9	19 29.8	1.0 01	178.9	19 59.8	1.0 01	178.9	20 29.8	1.0 01	178.9	1
2	16 59.4	1.0 01	177.9	17 29.4	1.0 01	177.9	17 59.4	1.0 01	177.9	18 29.4	1.0 01	177.9	18 59.4	1.0 01	177.9	19 29.4	1.0 01	177.9	19 59.4	1.0 01	177.9	20 29.3	1.0 01	177.9	2
3	16 58.6	1.0 02	176.9	17 28.6	1.0 02	176.9	17 58.6	1.0 02	176.8	18 28.5	1.0 02	176.8	18 58.5	1.0 02	176.8	19 28.5	1.0 02	176.8	19 58.5	1.0 02	176.8	20 28.5	1.0 02	176.8	3
4	16 57.4	1.0 02	175.8	17 27.4	1.0 02	175.8	17 57.4	1.0 02	175.8	18 27.4	1.0 02	175.8	18 57.4	1.0 02	175.8	19 27.4	1.0 02	175.8	19 57.4	1.0 02	175.8	20 27.4	1.0 02	175.7	4
05	16 56.0	1.0 03	174.8	17 26.0	1.0 03	174.8	17 56.0	1.0 03	174.7	18 26.0	1.0 03	174.7	18 56.0	1.0 03	174.7	19 25.9	1.0 03	174.7	19 55.9	1.0 03	174.7	20 25.9	1.0 03	174.7	05
6	16 54.2	1.0 03	173.7	17 24.2	1.0 03	173.7	17 54.2	1.0 03	173.7	18 24.2	1.0 04	173.7	18 54.2	1.0 04	173.7	19 24.2	1.0 04	173.6	19 54.2	1.0 04	173.6	20 24.1	1.0 04	173.6	6
7	16 52.2	1.0 04	172.7	17 22.1	1.0 04	172.7	17 52.1	1.0 04	172.6	18 22.1	1.0 04	172.6	18 52.1	1.0 04	172.6	19 22.1	1.0 04	172.6	19 52.0	1.0 04	172.6	20 22.0	1.0 04	172.5	7
8	16 49.8	1.0 05	171.6	17 19.7	1.0 05	171.6	17 49.7	1.0 05	171.6	18 19.7	1.0 05	171.6	18 49.7	1.0 05	171.5	19 19.6	1.0 05	171.5	19 49.6	1.0 05	171.5	20 19.6	1.0 05	171.5	8
9	16 47.1	1.0 05	170.6	17 17.0	1.0 05	170.6	17 47.0	1.0 05	170.5	18 17.0	1.0 05	170.5	18 46.9	1.0 05	170.5	19 16.9	1.0 05	170.5	19 46.9	1.0 05	170.4	20 16.8	1.0 05	170.4	9
10	16 44.0	1.0 06	169.6	17 14.0	1.0 06	169.5	17 44.0	1.0 06	169.5	18 13.9	1.0 06	169.5	18 43.9	1.0 06	169.4	19 13.8	1.0 06	169.4	19 43.8	1.0 06	169.4	20 13.7	1.0 06	169.4	10
1	16 40.7	1.0 06	168.5	17 10.7	1.0 06	168.5	17 40.6	1.0 06	168.4	18 10.6	1.0 06	168.4	18 40.5	1.0 06	168.4	19 10.4	1.0 06	168.4	19 40.4	1.0 06	168.3	20 10.3	1.0 06	168.3	1
2	16 37.1	1.0 07	167.5	17 07.0	1.0 07	167.4	17 36.9	1.0 07	167.4	18 06.9	1.0 07	167.4	18 36.8	1.0 07	167.3	19 06.7	1.0 07	167.3	19 36.7	1.0 07	167.3	20 06.6	1.0 07	167.2	2
3	16 33.1	1.0 07	166.4	17 03.0	1.0 07	166.4	17 33.0	1.0 07	166.4	18 02.9	1.0 07	166.3	18 32.8	1.0 07	166.3	19 02.7	1.0 07	166.2	19 32.7	1.0 07	166.2	20 02.6	1.0 07	166.2	3
4	16 28.8	1.0 08	165.4	16 58.7	1.0 08	165.3	17 28.7	1.0 08	165.3	17 58.6	1.0 08	165.3	18 28.5	1.0 08	165.2	18 58.4	1.0 08	165.2	19 28.3	1.0 08	165.2	19 58.2	1.0 08	165.1	4
15	16 24.2	1.0 08	164.3	16 54.1	1.0 08	164.3	17 24.1	1.0 08	164.3	17 54.0	1.0 08	164.2	18 23.9	1.0 08	164.2	18 53.8	1.0 08	164.1	19 23.7	1.0 08	164.1	19 53.6	1.0 08	164.1	15
6	16 19.4	1.0 09	163.3	16 49.3	1.0 09	163.3	17 19.1	1.0 09	163.2	17 49.0	1.0 09	163.2	18 18.9	1.0 09	163.1	18 48.8	1.0 09	163.1	19 18.7	1.0 09	163.0	19 48.6	1.0 09	163.0	6
7	16 14.2	1.0 09	162.3	16 44.0	1.0 09	162.2	17 13.9	1.0 09	162.2	17 43.8	1.0 09	162.1	18 13.7	1.0 09	162.1	18 43.6	1.0 09	162.0	19 13.4	1.0 09	162.0	19 43.3	1.0 09	161.9	7
8	16 08.7	1.0 10	161.2	16 38.5	1.0 10	161.2	17 08.4	1.0 10	161.1	17 38.3	1.0 10	161.1	18 08.1	1.0 10	161.0	18 38.0	1.0 10	161.0	19 07.9	1.0 10	160.9	19 37.7	1.0 10	160.9	8
9	16 02.9	1.0 10	160.2	16 32.7	1.0 10	160.1	17 02.6	1.0 10	160.1	17 32.4	1.0 10	160.0	18 02.3	99 10	160.0	18 32.1	99 10	159.9	19 02.0	99 10	159.9	19 31.8	99 10	159.8	9
20	15 56.8	99 11	159.2	16 26.6	99 11	159.1	16 56.5	99 11	159.1	17 26.3	99 11	159.0	17 56.1	99 11	158.9	18 26.0	99 11	158.9	18 55.8	99 11	158.8	19 25.6	99 11	158.8	20
1	15 50.4	99 11	158.1	16 20.2	99 11	158.1	16 50.0	99 11	158.0	17 19.9	99 11	158.0	17 49.7	99 11	157.9	18 19.5	99 11	157.8	18 49.3	99 11	157.8	19 19.1	99 11	157.7	1
2	15 43.7	99 12	157.1	16 13.5	99 12	157.0	16 43.3	99 12	157.0	17 13.1	99 12	156.9	17 42.9	99 12	156.9	18 12.7	99 12	156.8	18 42.5	99 12	156.7	19 12.3	99 12	156.7	2
3	15 36.7	99 12	156.1	16 06.5	99 12	156.0	16 36.3	99 12	155.9	17 06.1	99 12	155.9	17 35.9	99 12	155.8	18 05.7	99 12	155.8	18 35.5	99 12	155.7	19 05.2	99 12	155.6	3
4	15 29.5	99 13	155.0	15 59.3	99 13	155.0	16 29.0	99 13	154.9	16 58.8	99 13	154.8	17 28.6	99 13	154.8	17 58.3	99 13	154.7	18 28.1	99 13	154.6	18 57.9	99 13	154.6	4
25	15 21.9	99 13	154.0	15 51.7	99 13	153.9	16 21.4	99 13	153.9	16 51.2	99 13	153.8	17 20.9	99 13	153.7	17 50.7	99 13	153.7	18 20.4	99 13	153.6	18 50.2	99 13	153.5	25
6	15 14.1	99 14	153.0	15 43.8	99 14	152.9	16 13.6	99 14	152.8	16 43.3	99 14	152.8	17 13.0	99 14	152.7	17 42.8	99 14	152.6	18 12.5	99 14	152.6	18 42.2	99 14	152.5	6
7	15 06.0	99 14	152.0	15 35.7	99 14	151.9	16 05.4	99 14	151.8	16 35.1	99 14	151.7	17 04.9	99 14	151.7	17 34.6	99 14	151.6	18 04.3	99 14	151.5	18 34.0	99 14	151.4	7
8	14 57.6	99 14	150.9	15 27.3	99 14	150.9	15 57.0	99 14	150.8	16 26.7	99 15	150.7	16 56.4	99 15	150.6	17 26.1	99 15	150.6	17 55.8	99 15	150.5	18 25.4	99 15	150.4	8
9	14 49.0	99 15	149.9	15 18.6	99 15	149.8	15 48.3	99 15	149.7	16 18.0	99 15	149.7	16 47.6	99 15	149.6	17 17.3	99 15	149.5	17 47.0	99 15	149.4	18 16.6	99 15	149.4	9
30	14 40.0	99 15	148.9	15 09.7	99 15	148.8	15 39.3	99 15	148.7	16 09.0	99 15	148.6	16 38.6	99 15	148.6	17 08.3	99 16	148.5	17 37.9	99 16	148.4	18 07.6	99 16	148.3	30
1	14 30.8	99 16	147.9	15 00.5	99 16	147.8	15 30.1	99 16	147.7	15 59.7	99 16	147.6	16 29.3	99 16	147.5	16 59.0	99 16	147.5	17 28.6	99 16	147.4	17 58.2	99 16	147.3	1
2	14 21.4	99 16	146.8	14 51.0	99 16	146.8	15 20.6	99 16	146.7	15 50.2	99 16	146.6	16 19.8	99 16	146.5	16 49.4	99 16	146.4	17 19.0	99 16	146.3	17 48.6	99 16	146.3	2
3	14 11.6	99 17	145.8	14 41.2	99 17	145.7	15 10.8	99 17	145.7	15 40.4	99 17	145.6	16 10.0	99 17	145.5	16 39.6	99 17	145.4	17 09.2	99 17	145.3	17 38.7	99 17	145.2	3
4	14 01.6	99 17	144.8	14 31.2	99 17	144.7	15 00.8	99 17	144.6	15 30.4	99 17	144.5	15 59.9	99 17	144.5	16 29.5	99 17	144.4	16 59.0	99 17	144.3	17 28.6	99 17	144.2	4
35	13 51.4	98 18	143.8	14 21.0	98 18	143.7	14 50.5	98 18	143.6	15 20.0	98 18	143.5	15 49.6	98 18	143.4	16 19.1	98 18	143.3	16 48.7	98 18	143.2	17 18.2	98 18	143.2	35
6	13 40.9	98 18	142.8	14 10.4	98 18	142.7	14 40.0	98 18	142.6	15 09.5	98 18	142.5	15 39.0	98 18	142.4	16 08.5	98 18	142.3	16 38.0	98 18	142.2	17 07.6	98 18	142.1	6
7	13 30.2	98 18	141.8	13 59.7	98 18	141.7	14 29.2	98 18	141.6	14 58.7	98 18	141.5	15 28.2	98 18	141.4	15 57.7	98 18	141.3	16 27.2	98 19	141.2	16 56.7	98 19	141.1	7
8	13 19.2	98 19	140.8	13 48.7	98 19	140.7	14 18.2	98 19	140.6	14 47.6	98 19	140.5	15 17.1	98 19	140.4	15 46.6	98 19	140.3	16 16.1	98 19	140.2	16 45.5	98 19	140.1	8
9	13 08.0	98 19	139.7	13 37.4	98 19	139.6	14 06.9	98 19	139.5	14 36.4	98 19	139.4	15 05.8	98 19	139.4	15 35.3	98 19	139.3	16 04.7	98 19	139.2	16 34.2	98 19	139.1	9
40	12 56.5	98 19	138.7	13 26.0	98 20	138.6	13 55.4	98 20	138.5	14 24.8	98 20	138.4	14 54.3	98 20	138.3	15 23.7	98 20	138.2	15 53.1	98 20	138.1	16 22.5	98 20	138.0	40
1	12 44.9	98 20	137.7	13 14.3	98 20	137.6	13 43.7	98 20	137.5	14 13.1	98 20	137.4	14 42.5	98 20	137.3	15 11.9	98 20	137.2	15 41.3	98 20	137.1	16 10.7	98 20	137.0	1
2	12 32.9	98 20	136.7	13 02.3	98 20	136.6	13 31.7	98 20	136.5	14 01.1	98 20	136.4	14 30.5	98 20	136.3	14 59.9	98 20	136.2	15 29.2	98 20	136.1	15 58.6	98 20	136.0	2
3	12 20.8	98 21	135.7	12 50.2	98 21	135.6	13 19.5	98 21	135.5	13 48.9	98 21	135.4	14 18.3	98 21	135.3	14 47.6	98 21	135.2	15 17.0	98 21	135.1	15 46.3	98 21	135.0	3
4	12 08.4	98 21	134.7	12 37.8	98 21	134.6	13 07.1	98 21	134.5	13 36.5	98 21	134.4	14 05.8	98 21	134.3	14 35.1	98 21	134.2	15 04.5	98 21	134.1	15 33.8	98 21	134.0	4
45	11 55.9	98 21	133.7	12 25.2	98 21	133.6	12 54.5	98 21	133.5	13 23.8	98 21	133.4	13 53.1	98 21	133.3	14 22.5	98 22	133.2	14 51.8	98 22	133.1	15 21.1	98 22	133.0	45
6	11 43.1	98 22	132.7	12 12.4	98 22	132.6	12 41.7	98 22	132.5	13 11.0	98 22	132.4	13 40.3	98 22	132.3	14 09.6	98 22	132.2	14 38.8	98 22	132.1	15 08.1	98 22	131.9	6
7	11 30.1	98 22	131.7	11 59.4	98 22	131.6	12 28.7	98 22	131.5	12 57.9	98 22	131.4	13 27.2	98 22	131.3	13 56.5	98 22	131.2	14 25.7	98 22	131.1	14 55.0	98 22	130.9	7
8	11 16.9	98 22	130.7	11 46.2	98 22	130.6	12 15.4	97 22	130.5	12 44.7	97 22	130.4	13 13.9	97 22	130.3	13 43.1	97 22	130.2	14 12.4	97 23	130.0	14 41.6	97 23	129.9	8
9	11 03.5	97 23	129.7	11 32.7	97 23	129.6	12 02.0	97 23	129.5	12 31.2	97 23	129.4	13 00.4	97 23	129.3	13 29.6	97 23	129.2	13 58.9	97 23	129.0	14 28.1	97 23	128.9	9
50	10 49.9	97 23	128.7	11 19.1	97 23	128.6	11 48.3	97 23	128.5	12 17.5	97 23	128.4	12 46.7	97 23	128.3	13 15.9	97 23	128.2	13 45.1	97 23	128.0	14 14.3	97 23	127.9	50
1	10 36.2	97 23	127.8	11 05.3	97 23	127.6	11 34.5	97 23	127.5	12 03.7	97 23	127.4	12 32.9	97 23	127.3	13 02.1	97 23	127.2	13 31.2	97 24	127.0	14 00.4	97 24	126.9	1
2	10 22.2	97 24	126.8	10 51.4	97 24	126.6	11 20.5	97 24	126.5	11 49.7	97 24	126.4	12 18.8	97 24	126.3	12 48.0	97 24	126.2	13 17.1	97 24	126.0	13 46.3	97 24	125.9	2
3	10 08.0	97 24	125.8	10 37.2	97 24	125.7	11 06.3	97 24	125.5	11 35.5	97 24	125.4	12 04.6	97 24	125.3	12 33.7	97 24	125.2	13 02.9	97 24	125.0	13 32.0	97 24	124.9	3
4	9 53.7	97 24	124.8	10 22.9	97 24	124.7	10 52.0	97 24	124.5	11 21.1	97 24	124.4	11 50.2	97 24	124.3	12 19.3	97 24	124.2	12 48.4	97 24	124.1	13 17.5	97 24	123.9	4
55	9 39.2	97 24	123.8	10 08.3	97 24	123.7	10 37.4	97 24	123.6	11 06.5	97 25	123.4	11 35.6	97 25	123.3	12 04.7	97 25	123.2	12 33.8	97 25	123.1	13 02.9	97 25	122.9	55
6	9 24.6	97 25	122.8	9 53.7	97 25	122.7	10 22.7	97 25	122.6	10 51.8	97 25	122.4	11 20.9	97 25	122.3	11 49.9	97 25	122.2	12 19.0	97 25	122.1	12 48.1	97 25	121.9	6
7	9 09.8	97 25	121.8	9 38.8	97 25	121.7	10 07.9	97 25	121.6	10 36.9	97 25	121.5	11 06.0	97 25	121.3	11 35.0	97 25	121.2	12 04.1	97 25	121.1	12 33.1	97 25	121.0	7
8	8 54.8	97 26	120.9	9 23.8	97 25	120.7	9 52.8	97 25	120.6	10 21.9	97 25	120.5	10 50.9	97 25	120.4	11 19.9	97 25	120.2	11 49.0	97 25	120.1	12 18.0	97 25	120.0	8
9	8 39.6	97 26	119.9	9 08.7	97 26	119.8	9 37.7	97 26	119.6	10 06.7	97 26	119.5	10 35.7	97 26	119.4	11 04.7	97 26	119.2	11 33.7	97 26	119.1	12 02.7	97 26	119.0	9
60	8 24.4	97 26	118.9	8 53.4	97 26	118.8	9 22.4	97 26	118.6	9 51.3	97 26	118.5	10 20.3	97 26	118.4	10 49.3	97 26	118.3	11 18.3	97 26	118.1	11 47.3	97 26	118.0	60
1	8 08.9	97 26	117.9	8 37.9	97 26	117.8	9 06.9	97 26	117.7	9 35.9	97 26	117.5	10 04.8	97 26	117.4	10 33.8	97 26	117.3	11 02.8	97 26	117.1	11 31.7	97 26	117.0	1
2	7 53.4	97 26	117.0	8 22.3	97 26	116.8	8 51.3	97 26	116.7	9 20.2	97 26	116.6	9 49.2	97 26	116.4	10 18.1	96 26	116.3	10 47.1	96 26	116.2	11 16.0	96 26	116.0	2
3	7 37.7	96 26	116.0	8 06.6	96 26	115.8	8 35.5	96 26	115.7	9 04.5	96 26	115.6	9 33.4	96 26	115.4	10 02.3	96 27	115.3	10 31.3	96 27	115.2	11 00.2	96 27	115.0	3
4	7 21.8	96 27	115.0	7 50.7	96 27	114.9	8 19.7	96 27	114.7	8 48.6	96 27	114.6	9 17.5	96 27	114.5	9 46.4	96 27	114.3	10 15.3	96 27	114.2	10 44.2	96 27	114.1	4
65	7 05.9	96 27	114.0	7 34.8	96 27	113.9	8 03.7	96 27	113.8	8 32.6	96 27	113.6	9 01.5	96 27	113.5	9 30.4	96 27	113.4	9 59.3	96 27	113.2	10 28.2	96 27	113.1	65
6	6 49.8	96 27	113.1	7 18.7	96 27	112.9	7 47.6	96 27	112.8	8 16.5	96 27	112.7	8 45.3	96 27	112.5	9 14.2	96 27	112.4	9 43.1	96 27	112.2	10 12.0	96 27	112.1	6
7	6 33.6	96 27	112.1	7 02.5	96 27	112.0	7 31.3	96 27	111.8	8 00.2	96 27	111.7	8 29.1	96 27	111.5	8 57.9	96 27	111.4	9 26.8	96 27	111.3	9 55.7	96 27	111.1	7
8	6 17.3	96 27	111.1	6 46.1	96 27	111.0	7 15.0	96 27	110.9	7 43.9	96 27	110.7	8 12.7	96 27	110.6	8 41.6	96 27	110.4	9 10.4	96 28	110.3	9 39.3	96 28	110.2	8
9	6 00.9	96 28	110.2	6 29.7	96 28	110.0	6 58.5	96 28	109.9	7 27.4	96 28	109.7	7 56.2	96 28	109.6	8 25.1	96 28	109.5	8 53.9	96 28	109.3	9 22.7	96 28	109.2	9
70	5 44.3	96 28	109.2	6 13.2	96 28	109.1	6 42.0	96 28	108.9	7 10.8	96 28	108.8	7 39.7	96 28	108.6	8 08.5	96 28	108.5	8 37.3	96 28	108.4	9 06.1	96 28	108.2	70
1	5 27.7	96 28	108.2	5 56.5	96 28	108.1	6 25.4	96 28	107.9	6 54.2	96 28	107.8	7 23.0	96 28	107.7	7 51.8	96 28	107.5	8 20.6	96 28	107.4	8 49.4	96 28	107.2	1
2	5 11.0	96 28	107.3	5 39.8	96 28	107.1	6 08.6	96 28	107.0	6 37.4	96 28	106.8	7 06.2	96 28	106.7	7 35.0	96 28	106.6	8 03.8	96 28	106.4	8 32.6	96 28	106.3	2
3				5 23.0	96 28	106.2	5 51.8	96 28	106.0	6 20.6	96 28	105.9	6 49.4	96 28	105.7	7 18.2	96 28	105.6	7 47.0	96 28	105.4	8 15.7	96 28	105.3	3
4				5 06.1	96 28	105.2	5 34.9	96 28	105.1	6 03.7	96 28	104.9	6 32.5	96 28	104.8	7 01.2	96 28	104.6	7 30.0	96 28	104.5	7 58.8	96 28	104.3	4
75							5 17.9	96 28	104.1	5 46.7	96 28	103.9	6 15.5	96 28	103.8	6 44.2	96 28	103.7	7 13.0	96 28	103.5	7 41.7	96 28	103.4	75
6							5 00.9	96 29	103.1	5 29.6	96 29	103.0	5 58.4	96 29	102.8	6 27.1	96 29	102.7	6 55.9	96 29	102.6	7 24.6	96 29	102.4	6
7										5 12.5	96 29	102.0	5 41.3	96 29	101.9	6 10.0	96 29	101.7	6 38.7	96 29	101.6	7 07.5	96 29	101.4	7
8													5 24.1	96 29	100.9	5 52.8	96 29	100.8	6 21.5	96 29	100.6	6 50.3	96 29	100.5	8
9													5 06.8	96 29	100.0	5 35.5	96 29	99.8	6 04.3	96 29	99.7	6 33.0	96 29	99.5	9
80																5 18.2	96 29	98.8	5 46.9	96 29	98.7	6 15.7	96 29	98.6	80
1																5 00.9	96 29	97.9	5 29.6	96 29	97.7	5 58.3	96 29	97.6	1
2																			5 12.2	96 29	96.8	5 40.9	96 29	96.6	2
3																						5 23.4	96 29	95.7	3
4																						5 06.0	96 29	94.7	4

Lat. 73°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	17 00.0	1.00	00	180.0	16 30.0	1.00	00	180.0	16 00.0	1.00	00	180.0	15 30.0	1.00	00	180.0	15 00.0	1.00	00	180.0	14 30.0	1.00	00	180.0	14 00.0	1.00	00	180.0	13 30.0	1.00	00	180.0	00
1	16 59.8	1.00	01	179.0	16 29.8	1.00	01	179.0	15 59.8	1.00	01	179.0	15 29.8	1.00	01	179.0	14 59.8	1.00	01	179.0	14 29.8	1.00	01	179.0	13 59.8	1.00	01	179.0	13 29.8	1.00	01	179.0	1
2	16 59.4	1.00	01	177.9	16 29.4	1.00	01	177.9	15 59.4	1.00	01	177.9	15 29.4	1.00	01	177.9	14 59.4	1.00	01	177.9	14 29.4	1.00	01	177.9	13 59.4	1.00	01	177.9	13 29.4	1.00	01	177.9	2
3	16 58.6	1.00	02	176.9	16 28.6	1.00	02	176.9	15 58.6	1.00	02	176.9	15 28.6	1.00	02	176.9	14 58.6	1.00	02	176.9	14 28.6	1.00	02	176.9	13 58.6	1.00	02	176.9	13 28.6	1.00	02	176.9	3
4	16 57.4	1.00	02	175.8	16 27.4	1.00	02	175.8	15 57.5	1.00	02	175.8	15 27.5	1.00	02	175.9	14 57.5	1.00	02	175.9	14 27.5	1.00	02	175.9	13 57.5	1.00	02	175.9	13 27.5	1.00	02	175.9	4
05	16 56.0	1.00	03	174.8	16 26.0	1.00	03	174.8	15 56.0	1.00	03	174.8	15 26.0	1.00	03	174.8	14 56.0	1.00	03	174.8	14 26.1	1.00	03	174.8	13 56.1	1.00	03	174.9	13 26.1	1.00	03	174.9	05
6	16 54.2	1.00	03	173.7	16 24.3	1.00	03	173.7	15 54.3	1.00	03	173.8	15 24.3	1.00	03	173.8	14 54.3	1.00	03	173.8	14 24.3	1.00	03	173.8	13 54.3	1.00	03	173.8	13 24.3	1.00	03	173.8	6
7	16 52.2	1.00	04	172.7	16 22.2	1.00	04	172.7	15 52.2	1.00	04	172.7	15 22.2	1.00	04	172.7	14 52.3	1.00	04	172.8	14 22.3	1.00	04	172.8	13 52.3	1.00	04	172.8	13 22.3	1.00	04	172.8	7
8	16 49.8	1.00	05	171.6	16 19.8	1.00	04	171.7	15 49.8	1.00	04	171.7	15 19.9	1.00	04	171.7	14 49.9	1.00	04	171.7	14 19.9	1.00	04	171.7	13 49.9	1.00	04	171.8	13 20.0	1.00	04	171.8	8
9	16 47.1	1.00	05	170.6	16 17.1	1.00	05	170.6	15 47.1	1.00	05	170.6	15 17.2	1.00	05	170.7	14 47.2	1.00	05	170.7	14 17.2	1.00	05	170.7	13 47.3	1.00	06	170.7	13 17.3	1.00	05	170.8	9
10	16 44.0	1.00	06	169.6	16 14.1	1.00	06	169.6	15 44.1	1.00	06	169.6	15 14.2	1.00	06	169.6	14 44.2	1.00	06	169.7	14 14.3	1.00	06	169.7	13 44.3	1.00	06	169.7	13 14.3	1.00	05	169.7	10
1	16 40.7	1.00	06	168.5	16 10.8	1.00	06	168.5	15 40.8	1.00	06	168.6	15 10.9	1.00	06	168.6	14 40.9	1.00	06	168.6	14 11.0	1.00	06	168.7	13 41.0	1.00	06	168.7	13 11.1	1.00	06	168.7	1
2	16 37.1	1.00	07	167.5	16 07.1	1.00	07	167.5	15 37.2	1.00	07	167.5	15 07.2	1.00	07	167.6	14 37.3	1.00	07	167.6	14 07.4	1.00	06	167.6	13 37.4	1.00	06	167.7	13 07.5	1.00	06	167.7	2
3	16 33.1	1.00	07	166.4	16 03.2	1.00	07	166.5	15 33.2	1.00	07	166.5	15 03.3	1.00	07	166.5	14 33.4	1.00	07	166.6	14 03.4	1.00	07	166.6	13 33.5	1.00	07	166.6	13 03.6	1.00	07	166.7	3
4	16 28.8	1.00	08	165.4	15 58.9	1.00	08	165.4	15 29.0	1.00	08	165.5	14 59.1	1.00	08	165.5	14 29.1	1.00	08	165.5	13 59.2	1.00	08	165.6	13 29.3	1.00	08	165.6	12 59.4	1.00	08	165.7	4
15	16 24.2	1.00	08	164.3	15 54.3	1.00	08	164.4	15 24.4	1.00	08	164.4	14 54.5	1.00	08	164.5	14 24.6	1.00	08	164.5	13 54.7	1.00	08	164.6	13 24.8	1.00	08	164.6	12 54.9	1.00	08	164.6	15
6	16 19.4	1.00	09	163.3	15 49.5	1.00	09	163.4	15 19.6	1.00	09	163.4	14 49.7	1.00	09	163.4	14 19.8	1.00	09	163.5	13 49.9	1.00	09	163.5	13 20.0	1.00	09	163.6	12 50.1	1.00	08	163.6	6
7	16 14.2	1.00	09	162.3	15 44.3	1.00	09	162.3	15 14.4	1.00	09	162.4	14 44.5	1.00	09	162.4	14 14.6	1.00	09	162.5	13 44.8	1.00	09	162.5	13 14.9	1.00	09	162.5	12 45.0	1.00	09	162.6	7
8	16 08.7	1.00	10	161.2	15 38.8	1.00	10	161.3	15 08.9	1.00	10	161.3	14 39.1	1.00	10	161.4	14 09.2	1.00	10	161.4	13 39.3	1.00	10	161.5	13 09.5	1.00	10	161.5	12 39.6	1.00	09	161.6	8
9	16 02.9	1.00	10	160.2	15 33.0	1.00	10	160.2	15 03.2	1.00	10	160.3	14 33.3	1.00	10	160.4	14 03.5	1.00	10	160.4	13 33.6	1.00	10	160.5	13 03.8	1.00	10	160.5	12 33.9	1.00	10	160.6	9
20	15 56.8	99	11	159.2	15 27.0	99	11	159.2	14 57.1	99	11	159.3	14 27.3	99	11	159.3	13 57.4	99	11	159.4	13 27.6	99	11	159.4	12 57.8	99	10	159.5	12 27.9	99	10	159.5	20
1	15 50.4	99	11	158.1	15 20.6	99	11	158.2	14 50.8	99	11	158.2	14 20.9	99	11	158.3	13 51.1	99	11	158.4	13 21.3	99	11	158.4	12 51.5	99	11	158.5	12 21.6	99	11	158.5	1
2	15 43.7	99	12	157.1	15 13.9	99	12	157.2	14 44.1	99	12	157.2	14 14.3	99	12	157.3	13 44.5	99	12	157.3	13 14.7	99	11	157.4	12 44.9	99	11	157.4	12 15.1	99	11	157.5	2
3	15 36.7	99	12	156.1	15 07.0	99	12	156.1	14 37.2	99	12	156.2	14 07.4	99	12	156.2	13 37.6	99	12	156.3	13 07.8	99	12	156.4	12 38.0	99	12	156.4	12 08.2	99	12	156.5	3
4	15 29.5	99	13	155.0	14 59.7	99	13	155.1	14 29.9	99	13	155.2	14 00.2	99	12	155.2	13 30.4	99	12	155.3	13 00.6	99	12	155.4	12 30.8	99	12	155.4	12 01.1	99	12	155.5	4
25	15 21.9	99	13	154.0	14 52.2	99	13	154.1	14 22.4	99	13	154.1	13 52.7	99	13	154.2	13 22.9	99	13	154.3	12 53.2	99	13	154.3	12 23.4	99	13	154.4	11 53.6	99	13	154.5	25
6	15 14.1	99	14	153.0	14 44.4	99	14	153.0	14 14.6	99	13	153.1	13 44.9	99	13	153.2	13 15.2	99	13	153.3	12 45.4	99	13	153.3	12 15.7	99	13	153.4	11 45.9	99	13	153.5	6
7	15 06.0	99	14	152.0	14 36.3	99	14	152.0	14 06.6	99	14	152.1	13 36.9	99	14	152.2	13 07.1	99	14	152.2	12 37.4	99	14	152.3	12 07.7	99	14	152.4	11 38.0	99	14	152.4	7
8	14 57.6	99	14	150.9	14 27.9	99	14	151.0	13 58.2	99	14	151.1	13 28.5	99	14	151.1	12 58.8	99	14	151.2	12 29.1	99	14	151.3	11 59.4	99	14	151.4	11 29.7	99	14	151.4	8
9	14 49.0	99	15	149.9	14 19.3	99	15	150.0	13 49.6	99	15	150.1	13 19.9	99	15	150.1	12 50.2	99	15	150.2	12 20.6	99	15	150.3	11 50.9	99	15	150.4	11 21.2	99	15	150.4	9
30	14 40.0	99	15	148.9	14 10.4	99	15	149.0	13 40.7	99	15	149.0	13 11.0	99	15	149.1	12 41.4	99	15	149.2	12 11.7	99	15	149.3	11 42.1	99	15	149.3	11 12.4	99	15	149.4	30
1	14 30.8	99	16	147.9	14 01.2	99	16	147.9	13 31.5	99	16	148.0	13 01.9	99	16	148.1	12 32.3	99	16	148.2	12 02.6	99	16	148.3	11 33.0	99	16	148.3	11 03.3	99	16	148.4	1
2	14 21.4	99	16	146.8	13 51.7	99	16	146.9	13 22.1	99	16	147.0	12 52.5	99	16	147.1	12 22.9	99	16	147.2	11 53.3	99	16	147.2	11 23.6	99	16	147.3	10 54.0	99	16	147.4	2
3	14 11.6	99	17	145.8	13 42.0	99	17	145.9	13 12.4	99	17	146.0	12 42.8	99	17	146.1	12 13.2	99	16	146.2	11 43.6	99	16	146.2	11 14.0	99	16	146.3	10 44.4	99	16	146.4	3
4	14 01.6	99	17	144.8	13 32.1	99	17	144.9	13 02.5	99	17	145.0	12 32.9	99	17	145.1	12 03.4	99	17	145.1	11 33.8	99	17	145.2	11 04.2	99	17	145.3	10 34.6	99	17	145.4	4
35	13 51.4	98	18	143.8	13 21.9	99	17	143.9	12 52.3	99	17	144.0	12 22.8	99	17	144.1	11 53.2	99	17	144.1	11 23.6	99	17	144.2	10 54.1	99	17	144.3	10 24.5	99	17	144.4	35
6	13 40.9	98	18	142.8	13 11.4	98	18	142.9	12 41.9	98	18	143.0	12 12.3	98	18	143.0	11 42.8	98	18	143.1	11 13.3	98	18	143.2	10 43.7	98	18	143.3	10 14.2	98	18	143.4	6
7	13 30.2	98	18	141.8	13 00.7	98	18	141.9	12 31.2	98	18	141.9	12 01.7	98	18	142.0	11 32.2	98	18	142.1	11 02.6	98	18	142.2	10 33.1	98	18	142.3	10 03.6	98	18	142.4	7
8	13 19.2	98	19	140.8	12 49.7	98	19	140.8	12 20.2	98	19	140.9	11 50.8	98	19	141.0	11 21.3	98	19	141.1	10 51.8	98	18	141.2	10 22.3	98	18	141.3	9 52.8	98	18	141.4	8
9	13 08.0	98	19	139.7	12 38.5	98	19	139.8	12 09.1	98	19	139.9	11 39.6	98	19	140.0	11 10.1	98	19	140.1	10 40.7	98	19	140.2	10 11.2	98	19	140.3	9 41.7	98	19	140.4	9
40	12 56.5	98	19	138.7	12 27.1	98	19	138.8	11 57.7	98	19	138.9	11 28.2	98	19	139.0	10 58.8	98	19	139.1	10 29.3	98	19	139.2	9 59.9	98	19	139.3	9 30.4	98	19	139.4	40
1	12 44.9	98	20	137.7	12 15.4	98	20	137.8	11 46.0	98	20	137.9	11 16.6	98	20	138.0	10 47.2	98	20	138.1	10 17.8	98	20	138.2	9 48.3	98	20	138.3	9 18.9	98	20	138.4	1
2	12 32.9	98	20	136.7	12 03.5	98	20	136.8	11 34.2	98	20	136.9	11 04.8	98	20	137.0	10 35.4	98	20	137.1	10 06.0	98	20	137.2	9 36.6	98	20	137.3	9 07.1	98	20	137.4	2
3	12 20.8	98	21	135.7	11 51.4	98	21	135.8	11 22.1	98	21	135.9	10 52.7	98	20	136.0	10 23.3	98	20	136.1	9 53.9	98	20	136.2	9 24.6	98	20	136.3	8 55.2	98	20	136.4	3
4	12 08.4	98	21	134.7	11 39.1	98	21	134.8	11 09.8	98	21	134.9	10 40.4	98	21	135.0	10 11.0	98	21	135.1	9 41.7	98	21	135.2	9 12.3	98	21	135.4	8 43.0	98	21	135.5	4
45	11 55.9	98	21	133.7	11 26.6	98	21	133.8	10 57.2	98	21	133.9	10 27.9	98	21	134.0	9 58.6	98	21	134.2	9 29.2	98	21	134.3	8 59.9	98	21	134.4	8 30.6	98	21	134.5	45
6	11 43.1	98	22	132.7	11 13.8	98	22	132.8	10 44.5	98	22	132.9	10 15.2	98	22	133.0	9 45.9	98	22	133.2	9 16.6	98	21	133.3	8 47.3	98	21	133.4	8 17.9	98	21	133.5	6
7	11 30.1	98	22	131.7	11 00.8	98	22	131.8	10 31.5	98	22	131.9	10 02.3	98	22	132.1	9 33.0	98	22	132.2	9 03.7	98	22	132.3	8 34.4	98	22	132.4	8 05.1	98	22	132.5	7
8	11 16.9	98	22	130.7	10 47.7	98	22	130.8	10 18.4	98	22	131.0	9 49.1	98	22	131.1	9 19.9	98	22	131.2	8 50.6	98	22	131.3	8 21.3	98	22	131.4	7 52.1	98	22	131.5	8
9	11 03.5	97	23	129.7	10 34.3	97	23	129.9	10 05.0	97	23	130.0	9 35.8	97	23	130.1	9 06.6	97	22	130.2	8 37.3	97	22	130.3	8 08.1	97	22	130.4	7 38.8	97	22	130.5	9
50	10 49.9	97	23	128.7	10 20.7	97	23	128.9	9 51.5	97	23	129.0	9 22.3	97	23	129.1	8 53.1	97	23	129.2	8 23.9	97	23	129.3	7 54.6	97	23	129.4	7 25.4	97	23	129.5	50
1	10 36.2	97	23	127.8	10 07.0	97	23	127.9	9 37.8	97	23	128.0	9 08.6	97	23	128.1	8 39.4	97	23	128.2	8 10.2	97	23	128.3	7 41.0	97	23	128.5	7 11.8	97	23	128.6	1
2	10 22.2	97	24	126.8	9 53.0	97	24	126.9	9 23.9	97	24	127.0	8 54.7	97	23	127.1	8 25.5	97	23	127.2	7 56.3	97	23	127.4	7 27.2	97	23	127.5	6 58.0	97	23	127.6	2
3	10 08.0	97	24	125.8	9 38.9	97	24	125.9	9 09.8	97	24	126.0	8 40.6	97	24	126.1	8 11.5	97	24	126.3	7 42.3	97	24	126.4	7 13.1	97	24	126.5	6 44.0	97	24	126.6	3
4	9 53.7	97	24	124.8	9 24.6	97	24	124.9	8 55.5	97	24	125.0	8 26.4	97	24	125.2	7 57.2	97	24	125.3	7 28.1	97	24	125.4	6 59.0	97	24	125.5	6 29.8	97	24	125.6	4
55	9 39.2	97	24	123.8	9 10.1	97	24	123.9	8 41.0	97	24	124.1	8 11.9	97	24	124.2	7 42.8	97	24	124.3	7 13.7	97	24	124.4	6 44.6	97	24	124.5	6 15.5	97	24	124.7	55
6	9 24.6	97	25	122.8	8 55.5	97	25	122.9	8 26.4	97	25	123.1	7 57.3	97	25	123.2	7 28.2	97	25	123.3	6 59.1	97	25	123.4	6 30.1	97	24	123.6	6 01.0	97	24	123.7	6
7	9 09.8	97	25	121.8	8 40.7	97	25	122.0	8 11.6	97	25	122.1	7 42.6	97	25	122.2	7 13.5	97	25	122.3	6 44.4	97	25	122.5	6 15.4	97	25	122.6	5 46.3	97	25	122.7	7
8	8 54.8	97	25	120.9	8 25.7	97	25	121.0	7 56.7	97	25	121.1	7 27.6	97	25	121.2	6 58.6	97	25	121.4	6 29.5	97	25	121.5	6 00.5	97	25	121.6	5 31.4	97	25	121.7	8
9	8 39.6	97	26	119.9	8 10.6	97	25	120.0	7 41.6	97	25	120.1	7 12.6	97	25	120.3	6 43.5	97	25	120.4	6 14.5	97	25	120.5	5 45.5	97	25	120.6	5 16.4	97	25	120.8	9
60	8 24.4	97	26	118.9	7 55.4	97	26	119.0	7 26.4	97	26	119.2	6 57.3	97	26	119.3	6 28.3	97	26	119.4	5 59.3	97	26	119.5	5 30.3	97	26	119.7	5 01.3	97	26	119.8	60
1	8 08.9	97	26	117.9	7 39.9	97	26	118.1	7 11.0	97	26	118.2	6 42.0	97	26	118.3	6 13.0	97	26	118.4	5 44.0	97	26	118.6	5 15.0	97	26	118.7					1
2	7 53.4	97	26	117.0	7 24.4	97	26	117.1	6 55.4	97	26	117.2	6 26.5	97	26	117.3	5 57.5	97	26	117.5	5 28.5	97	26	117.6									2
3	7 37.7	97	26	116.0	7 08.7	97	26	116.1	6 39.8	97	26	116.2	6 10.8	97	26	116.4	5 41.9	97	26	116.5	5 12.9	97	26	116.6									3
4	7 21.8	97	26	115.0	6 52.9	97	26	115.1	6 24.0	97	27	115.3	5 55.0	97	27	115.4	5 26.1	97	26	115.5													4
65	7 05.9	97	27	114.0	6 37.0	97	27	114.2	6 08.0	97	27	114.3	5 39.1	97	27	114.4	5 10.2	97	27	114.6													65
6	6 49.8	97	27	113.1	6 20.9	97	27	113.2	5 52.0	97	27	113.3	5 23.1	97	27	113.5																	6
7	6 33.6	97	27	112.1	6 04.7	97	27	112.2	5 35.8	97	27	112.4	5 06.9	97	27	112.5																	7
8	6 17.3	97	27	111.1	5 48.4	97	27	111.3	5 19.5	97	27	111.4																					8
9	6 00.9	98	28	110.2	5 32.0	98	28	110.3	5 03.2	98	28	110.4																					9
70	5 44.3	98	28	109.2	5 15.5	98	28	109.3																									70
1	5 27.7	98	28	108.2																													1
2	5 11.0	98	28	107.3																													2

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	00
1	20 59.8	1.0 01	178.9	21 29.8	1.0 01	178.9	21 59.8	1.0 01	178.9	22 29.8	1.0 01	178.9	22 59.8	1.0 01	178.9	23 29.8	1.0 01	178.9	23 59.8	1.0 01	178.9	24 29.8	1.0 01	178.9	1
2	20 59.3	1.0 01	177.9	21 29.3	1.0 01	177.9	21 59.3	1.0 01	177.8	22 29.3	1.0 01	177.8	22 59.3	1.0 01	177.8	23 29.3	1.0 01	177.8	23 59.3	1.0 01	177.8	24 29.3	1.0 01	177.8	2
3	20 58.5	1.0 02	176.8	21 28.5	1.0 02	176.8	21 58.5	1.0 02	176.8	22 28.5	1.0 02	176.8	22 58.5	1.0 02	176.8	23 28.5	1.0 02	176.8	23 58.5	1.0 02	176.7	24 28.5	1.0 02	176.7	3
4	20 57.4	1.0 02	175.7	21 27.4	1.0 02	175.7	21 57.4	1.0 02	175.7	22 27.4	1.0 02	175.7	22 57.4	1.0 02	175.7	23 27.3	1.0 02	175.7	23 57.3	1.0 02	175.7	24 27.3	1.0 02	175.6	4
05	20 55.9	1.0 03	174.7	21 25.9	1.0 03	174.6	21 55.9	1.0 03	174.6	22 25.9	1.0 03	174.6	22 55.9	1.0 03	174.6	23 25.9	1.0 03	174.6	23 55.8	1.0 03	174.6	24 25.8	1.0 03	174.6	05
6	20 54.1	1.0 04	173.6	21 24.1	1.0 04	173.6	21 54.1	1.0 04	173.6	22 24.1	1.0 04	173.5	22 54.1	1.0 04	173.5	23 24.0	1.0 04	173.5	23 54.0	1.0 04	173.5	24 24.0	1.0 04	173.5	6
7	20 52.0	1.0 04	172.5	21 22.0	1.0 04	172.5	21 52.0	1.0 04	172.5	22 21.9	1.0 04	172.5	22 51.9	1.0 04	172.4	23 21.9	1.0 04	172.4	23 51.9	1.0 04	172.4	24 21.8	1.0 04	172.4	7
8	20 49.6	1.0 05	171.5	21 19.5	1.0 05	171.4	21 49.5	1.0 05	171.4	22 19.5	1.0 05	171.4	22 49.4	1.0 05	171.4	23 19.4	1.0 05	171.3	23 49.4	1.0 05	171.3	24 19.4	1.0 05	171.3	8
9	20 46.8	1.0 05	170.4	21 16.8	1.0 05	170.4	21 46.7	1.0 05	170.3	22 16.7	1.0 05	170.3	22 46.6	1.0 05	170.3	23 16.6	1.0 05	170.3	23 46.6	1.0 05	170.2	24 16.5	1.0 05	170.2	9
10	20 43.7	1.0 06	169.3	21 13.7	1.0 06	169.3	21 43.6	1.0 06	169.3	22 13.6	1.0 06	169.2	22 43.5	1.0 06	169.2	23 13.5	1.0 06	169.2	23 43.4	1.0 06	169.1	24 13.4	1.0 06	169.1	10
1	20 40.3	1.0 06	168.3	21 10.2	1.0 06	168.2	21 40.2	1.0 06	168.2	22 10.1	1.0 06	168.2	22 40.1	1.0 06	168.1	23 10.0	1.0 06	168.1	23 40.0	1.0 06	168.1	24 09.9	1.0 06	168.0	1
2	20 36.6	1.0 07	167.2	21 06.5	1.0 07	167.2	21 36.4	1.0 07	167.1	22 06.4	1.0 07	167.1	22 36.3	1.0 07	167.1	23 06.2	1.0 07	167.0	23 36.2	1.0 07	167.0	24 06.1	1.0 07	166.9	2
3	20 32.5	1.0 07	166.1	21 02.4	1.0 07	166.1	21 32.4	1.0 07	166.1	22 02.3	1.0 07	166.0	22 32.2	1.0 07	166.0	23 02.1	1.0 07	165.9	23 32.1	1.0 07	165.9	24 02.0	1.0 07	165.9	3
4	20 28.2	1.0 08	165.1	20 58.1	1.0 08	165.0	21 28.0	1.0 08	165.0	21 57.9	1.0 08	165.0	22 27.8	1.0 08	164.9	22 57.7	1.0 08	164.9	23 27.6	1.0 08	164.8	23 57.5	1.0 08	164.8	4
15	20 23.5	1.0 08	164.0	20 53.4	1.0 08	164.0	21 23.3	1.0 08	163.9	21 53.2	1.0 08	163.9	22 23.1	1.0 08	163.8	22 53.0	1.0 08	163.8	23 22.9	1.0 08	163.7	23 52.8	1.0 08	163.7	15
6	20 18.5	1.0 09	163.0	20 48.4	1.0 09	162.9	21 18.3	1.0 09	162.9	21 48.2	1.0 09	162.8	22 18.0	1.0 09	162.8	22 47.9	1.0 09	162.7	23 17.8	1.0 09	162.7	23 47.7	1.0 09	162.6	6
7	20 13.2	1.0 09	161.9	20 43.1	1.0 09	161.8	21 12.9	1.0 09	161.8	21 42.8	1.0 09	161.7	22 12.7	1.0 09	161.7	22 42.6	1.0 09	161.6	23 12.4	1.0 10	161.6	23 42.3	1.0 10	161.5	7
8	20 07.6	1.0 10	160.8	20 37.4	1.0 10	160.8	21 07.3	1.0 10	160.7	21 37.2	1.0 10	160.7	22 07.0	1.0 10	160.6	22 36.9	1.0 10	160.6	23 06.7	1.0 10	160.5	23 36.6	1.0 10	160.5	8
9	20 01.7	99 10	159.8	20 31.5	99 10	159.7	21 01.4	99 10	159.7	21 31.2	99 10	159.6	22 01.0	99 10	159.6	22 30.9	99 10	159.5	23 00.7	99 11	159.4	23 30.6	99 11	159.4	9
20	19 55.5	99 11	158.7	20 25.3	99 11	158.7	20 55.1	99 11	158.6	21 24.9	99 11	158.5	21 54.8	99 11	158.5	22 24.6	99 11	158.4	22 54.4	99 11	158.4	23 24.2	99 11	158.3	20
1	19 48.9	99 11	157.7	20 18.8	99 11	157.6	20 48.6	99 11	157.5	21 18.4	99 11	157.5	21 48.2	99 11	157.4	22 18.0	99 12	157.4	22 47.8	99 12	157.3	23 17.6	99 12	157.2	1
2	19 42.1	99 12	156.6	20 11.9	99 12	156.6	20 41.7	99 12	156.5	21 11.5	99 12	156.4	21 41.3	99 12	156.4	22 11.1	99 12	156.3	22 40.9	99 12	156.2	23 10.7	99 12	156.2	2
3	19 35.0	99 12	155.6	20 04.8	99 12	155.5	20 34.6	99 12	155.4	21 04.3	99 12	155.4	21 34.1	99 12	155.3	22 03.9	99 12	155.2	22 33.7	99 13	155.2	23 03.4	99 13	155.1	3
4	19 27.6	99 13	154.5	19 57.4	99 13	154.4	20 27.1	99 13	154.4	20 56.9	99 13	154.3	21 26.6	99 13	154.2	21 56.4	99 13	154.2	22 26.1	99 13	154.1	22 55.9	99 13	154.0	4
25	19 19.9	99 13	153.5	19 49.7	99 13	153.4	20 19.4	99 13	153.3	20 49.1	99 13	153.3	21 18.9	99 13	153.2	21 48.6	99 13	153.1	22 18.3	99 13	153.0	22 48.1	99 14	153.0	25
6	19 11.9	99 14	152.4	19 41.7	99 14	152.3	20 11.4	99 14	152.3	20 41.1	99 14	152.2	21 10.8	99 14	152.1	21 40.5	99 14	152.1	22 10.2	99 14	152.0	22 40.0	99 14	151.9	6
7	19 03.7	99 14	151.4	19 33.4	99 14	151.3	20 03.1	99 14	151.2	20 32.8	99 14	151.1	21 02.5	99 14	151.1	21 32.2	99 14	151.0	22 01.9	99 14	150.9	22 31.5	99 14	150.8	7
8	18 55.1	99 15	150.3	19 24.8	99 15	150.2	19 54.5	99 15	150.2	20 24.2	99 15	150.1	20 53.8	99 15	150.0	21 23.5	99 15	149.9	21 53.2	99 15	149.9	22 22.9	99 15	149.8	8
9	18 46.3	99 15	149.3	19 16.0	99 15	149.2	19 45.6	99 15	149.1	20 15.3	99 15	149.0	20 44.9	99 15	149.0	21 14.6	99 15	148.9	21 44.2	99 15	148.8	22 13.9	99 15	148.7	9
30	18 37.2	99 16	148.2	19 06.9	99 16	148.2	19 36.5	99 16	148.1	20 06.1	99 16	148.0	20 35.8	99 16	147.9	21 05.4	99 16	147.8	21 35.0	99 16	147.7	22 04.6	99 16	147.7	30
1	18 27.8	99 16	147.2	18 57.5	99 16	147.1	19 27.1	99 16	147.0	19 56.7	99 16	146.9	20 26.3	99 16	146.9	20 55.9	99 16	146.8	21 25.5	99 16	146.7	21 55.1	99 16	146.6	1
2	18 18.2	99 16	146.2	18 47.8	99 17	146.1	19 17.4	99 17	146.0	19 47.0	99 17	145.9	20 16.6	99 17	145.8	20 46.2	99 17	145.7	21 15.7	99 17	145.6	21 45.3	99 17	145.6	2
3	18 08.3	99 17	145.1	18 37.9	99 17	145.0	19 07.5	99 17	145.0	19 37.0	99 17	144.9	20 06.6	99 17	144.8	20 36.2	99 17	144.7	21 05.7	99 17	144.6	21 35.3	99 17	144.5	3
4	17 58.2	99 17	144.1	18 27.7	99 17	144.0	18 57.3	98 17	143.9	19 26.8	98 17	143.8	19 56.3	98 18	143.7	20 25.9	98 18	143.6	20 55.4	98 18	143.5	21 25.0	98 18	143.4	4
35	17 47.7	98 18	143.1	18 17.3	98 18	143.0	18 46.8	98 18	142.9	19 16.3	98 18	142.8	19 45.8	98 18	142.7	20 15.4	98 18	142.6	20 44.9	98 18	142.5	21 14.4	98 18	142.4	35
6	17 37.1	98 18	142.0	18 06.6	98 18	141.9	18 36.1	98 18	141.8	19 05.6	98 18	141.7	19 35.1	98 18	141.6	20 04.6	98 18	141.6	20 34.1	98 18	141.5	21 03.6	98 18	141.4	6
7	17 26.2	98 19	141.0	17 55.6	98 19	140.9	18 25.1	98 19	140.8	18 54.6	98 19	140.7	19 24.1	98 19	140.6	19 53.5	98 19	140.5	20 23.0	98 19	140.4	20 52.5	98 19	140.3	7
8	17 15.0	98 19	140.0	17 44.5	98 19	139.9	18 13.9	98 19	139.8	18 43.4	98 19	139.7	19 12.8	98 19	139.6	19 42.3	98 19	139.5	20 11.7	98 19	139.4	20 41.2	98 19	139.3	8
9	17 03.6	98 19	139.0	17 33.0	98 19	138.9	18 02.5	98 19	138.8	18 31.9	98 20	138.6	19 01.3	98 20	138.5	19 30.7	98 20	138.4	20 00.2	98 20	138.3	20 29.6	98 20	138.2	9
40	16 52.0	98 20	137.9	17 21.4	98 20	137.8	17 50.8	98 20	137.7	18 20.2	98 20	137.6	18 49.6	98 20	137.5	19 19.0	98 20	137.4	19 48.4	98 20	137.3	20 17.8	98 20	137.2	40
1	16 40.1	98 20	136.9	17 09.5	98 20	136.8	17 38.9	98 20	136.7	18 08.2	98 20	136.6	18 37.6	98 20	136.5	19 07.0	98 20	136.4	19 36.4	98 20	136.3	20 05.7	98 20	136.2	1
2	16 28.0	98 21	135.9	16 57.4	98 21	135.8	17 26.7	98 21	135.7	17 56.1	98 21	135.6	18 25.4	98 21	135.5	18 54.8	98 21	135.3	19 24.1	98 21	135.2	19 53.5	98 21	135.1	2
3	16 15.7	98 21	134.9	16 45.0	98 21	134.8	17 14.3	98 21	134.7	17 43.7	98 21	134.5	18 13.0	98 21	134.4	18 42.4	98 21	134.3	19 11.7	98 21	134.2	19 41.0	98 21	134.1	3
4	16 03.1	98 21	133.9	16 32.4	98 21	133.7	17 01.8	98 21	133.6	17 31.1	98 21	133.5	18 00.4	98 21	133.4	18 29.7	98 21	133.3	18 59.0	98 22	133.2	19 28.3	98 22	133.1	4
45	15 50.4	98 22	132.8	16 19.7	98 22	132.7	16 49.0	98 22	132.6	17 18.2	98 22	132.5	17 47.5	98 22	132.4	18 16.8	98 22	132.3	18 46.1	98 22	132.2	19 15.4	98 22	132.0	45
6	15 37.4	98 22	131.8	16 06.7	98 22	131.7	16 35.9	98 22	131.6	17 05.2	98 22	131.5	17 34.5	98 22	131.4	18 03.7	98 22	131.3	18 33.0	98 22	131.2	19 02.2	97 22	131.0	6
7	15 24.2	98 22	130.8	15 53.5	97 22	130.7	16 22.7	97 22	130.6	16 52.0	97 22	130.5	17 21.2	97 22	130.4	17 50.4	97 22	130.2	18 19.7	97 22	130.1	18 48.9	97 23	130.0	7
8	15 10.9	97 23	129.8	15 40.1	97 23	129.7	16 09.3	97 23	129.6	16 38.5	97 23	129.5	17 07.7	97 23	129.3	17 37.0	97 23	129.2	18 06.2	97 23	129.1	18 35.4	97 23	129.0	8
9	14 57.3	97 23	128.8	15 26.5	97 23	128.7	15 55.7	97 23	128.6	16 24.9	97 23	128.4	16 54.1	97 23	128.3	17 23.3	97 23	128.2	17 52.5	97 23	128.1	18 21.6	97 23	128.0	9
50	14 43.5	97 23	127.8	15 12.7	97 23	127.7	15 41.9	97 23	127.6	16 11.0	97 23	127.4	16 40.2	97 23	127.3	17 09.4	97 23	127.2	17 38.5	97 23	127.1	18 07.7	97 24	127.0	50
1	14 29.6	97 24	126.8	14 58.7	97 24	126.7	15 27.9	97 24	126.6	15 57.0	97 24	126.4	16 26.2	97 24	126.3	16 55.3	97 24	126.2	17 24.5	97 24	126.1	17 53.6	97 24	125.9	1
2	14 15.4	97 24	125.8	14 44.6	97 24	125.7	15 13.7	97 24	125.6	15 42.8	97 24	125.4	16 11.9	97 24	125.3	16 41.1	97 24	125.2	17 10.2	97 24	125.1	17 39.3	97 24	124.9	2
3	14 01.1	97 24	124.8	14 30.2	97 24	124.7	14 59.3	97 24	124.6	15 28.4	97 24	124.4	15 57.5	97 24	124.3	16 26.6	97 24	124.2	16 55.7	97 24	124.0	17 24.8	97 24	123.9	3
4	13 46.6	97 24	123.8	14 15.7	97 24	123.7	14 44.8	97 25	123.6	15 13.9	97 25	123.4	15 43.0	97 25	123.3	16 12.0	97 25	123.2	16 41.1	97 25	123.0	17 10.2	97 25	122.9	4
55	13 32.0	97 25	122.8	14 01.0	97 25	122.7	14 30.1	97 25	122.6	14 59.2	97 25	122.4	15 28.2	97 25	122.3	15 57.3	97 25	122.2	16 26.3	97 25	122.0	16 55.4	97 25	121.9	55
6	13 17.1	97 25	121.8	13 46.2	97 25	121.7	14 15.2	97 25	121.6	14 44.3	97 25	121.4	15 13.3	97 25	121.3	15 42.3	97 25	121.2	16 11.4	97 25	121.0	16 40.4	97 25	120.9	6
7	13 02.1	97 25	120.8	13 31.2	97 25	120.7	14 00.2	97 25	120.6	14 29.2	97 25	120.4	14 58.2	97 25	120.3	15 27.3	97 25	120.2	15 56.3	97 25	120.0	16 25.3	97 25	119.9	7
8	12 47.0	97 26	119.8	13 16.0	97 26	119.7	13 45.0	97 26	119.6	14 14.0	97 26	119.4	14 43.0	97 26	119.3	15 12.0	97 26	119.2	15 41.0	97 26	119.0	16 10.0	97 26	118.9	8
9	12 31.7	97 26	118.8	13 00.7	97 26	118.7	13 29.7	97 26	118.6	13 58.7	97 26	118.4	14 27.7	97 26	118.3	14 56.6	97 26	118.2	15 25.6	97 26	118.0	15 54.6	97 26	117.9	9
60	12 16.3	97 26	117.9	12 45.2	97 26	117.7	13 14.2	97 26	117.6	13 43.2	97 26	117.5	14 12.1	97 26	117.3	14 41.1	97 26	117.2	15 10.0	96 26	117.1	15 39.0	96 26	116.9	60
1	12 00.7	97 26	116.9	12 29.6	97 26	116.7	12 58.6	96 26	116.6	13 27.5	96 26	116.5	13 56.5	96 26	116.3	14 25.4	96 26	116.2	14 54.4	96 26	116.1	15 23.3	96 26	115.9	1
2	11 45.0	96 26	115.9	12 13.9	96 26	115.8	12 42.8	96 26	115.6	13 11.8	96 26	115.5	13 40.7	96 27	115.3	14 09.6	96 27	115.2	14 38.5	96 27	115.1	15 07.4	96 27	114.9	2
3	11 29.1	96 27	114.9	11 58.0	96 27	114.8	12 27.0	96 27	114.6	12 55.9	96 27	114.5	13 24.8	96 27	114.4	13 53.7	96 27	114.2	14 22.6	96 27	114.1	14 51.5	96 27	113.9	3
4	11 13.2	96 27	113.9	11 42.1	96 27	113.8	12 11.0	96 27	113.7	12 39.8	96 27	113.5	13 08.7	96 27	113.4	13 37.6	96 27	113.2	14 06.5	96 27	113.1	14 35.4	96 27	113.0	4
65	10 57.1	96 27	112.9	11 25.9	96 27	112.8	11 54.8	96 27	112.7	12 23.7	96 27	112.5	12 52.6	96 27	112.4	13 21.4	96 27	112.3	13 50.3	96 27	112.1	14 19.2	96 27	112.0	65
6	10 40.8	96 27	112.0	11 09.7	96 27	111.8	11 38.6	96 27	111.7	12 07.4	96 27	111.6	12 36.3	96 27	111.4	13 05.2	96 27	111.3	13 34.0	96 27	111.1	14 02.8	96 27	111.0	6
7	10 24.5	96 27	111.0	10 53.4	96 27	110.9	11 22.2	96 27	110.7	11 51.1	96 27	110.6	12 19.9	96 28	110.4	12 48.8	96 28	110.3	13 17.6	96 28	110.2	13 46.4	96 28	110.0	7
8	10 08.1	96 28	110.0	10 36.9	96 28	109.9	11 05.8	96 28	109.7	11 34.6	96 28	109.6	12 03.4	96 28	109.5	12 32.2	96 28	109.3	13 01.1	96 28	109.2	13 29.9	96 28	109.0	8
9	9 51.6	96 28	109.0	10 20.4	96 28	108.9	10 49.2	96 28	108.8	11 18.0	96 28	108.6	11 46.8	96 28	108.5	12 15.6	96 28	108.3	12 44.4	96 28	108.2	13 13.2	96 28	108.0	9
70	9 34.9	96 28	108.1	10 03.7	96 28	107.9	10 32.5	96 28	107.8	11 01.3	96 28	107.6	11 30.1	96 28	107.5	11 58.9	96 28	107.4	12 27.7	96 28	107.2	12 56.5	96 28	107.1	70
1	9 18.2	96 28	107.1	9 47.0	96 28	107.0	10 15.8	96 28	106.8	10 44.6	96 28	106.7	11 13.4	96 28	106.5	11 42.2	96 28	106.4	12 10.9	96 28	106.2	12 39.7	96 28	106.1	1
2	9 01.4	96 28	106.1	9 30.2	96 28	106.0	9 59.0	96 28	105.8	10 27.7	96 28	105.7	10 56.5	96 28	105.6	11 25.3	96 28	105.4	11 54.1	96 28	105.3	12 22.8	96 28	105.1	2
3	8 44.5	96 28	105.2	9 13.3	96 28	105.0	9 42.0	96 28	104.9	10 10.8	96 28	104.7	10 39.6	96 28	104.6	11 08.3	96 28	104.4	11 37.1	96 28	104.3	12 05.8	96 28	104.2	3
4	8 27.5	96 28	104.2	8 56.3	96 28	104.1	9 25.1	96 28	103.9	9 53.8	96 28	103.8	10 22.6	96 28	103.6	10 51.3	96 28	103.5	11 20.1	96 28	103.3	11 48.8	96 29	103.2	4
75	8 10.5	96 29	103.2	8 39.2	96 29	103.1	9 08.0	96 29	102.9	9 36.7	96 29	102.8	10 05.5	96 29	102.6	10 34.2	96 29	102.5	11 03.0	96 29	102.4	11 31.7	96 29	102.2	75
6	7 53.4	96 29	102.3	8 22.1	96 29	102.1	8 50.9	96 29	102.0	9 19.6	96 29	101.8	9 48.3	96 29	101.7	10 17.1	96 29	101.5	10 45.8	96 29	101.4	11 14.5	96 29	101.2	6
7	7 36.2	96 29	101.3	8 04.9	96 29	101.2	8 33.7	96 29	101.0	9 02.4	96 29	100.9	9 31.1	96 29	100.7	9 59.8	96 29	100.6	10 28.6	96 29	100.4	10 57.3	96 29	100.3	7
8	7 19.0	96 29	100.3	7 47.7	96 29	100.2	8 16.4	96 29	100.0	8 45.1	96 29	99.9	9 13.9	96 29	99.8	9 42.6	96 29	99.6	10 11.3	96 29	99.5	10 40.0	96 29	99.3	8
9	7 01.7	96 29	99.4	7 30.4	96 29	99.2	7 59.1	96 29	99.1	8 27.8	96 29	98.9	8 56.5	96 29	98.8	9 25.3	96 29	98.6	9 54.0	96 29	98.5	10 22.6	96 29	98.3	9
80	6 44.4	96 29	98.4	7 13.1	96 29	98.3	7 41.8	96 29	98.1	8 10.5	96 29	98.0	8 39.2	96 29	97.8	9 07.9	96 29	97.7	9 36.6	96 29	97.5	10 05.3	96 29	97.4	80
1	6 27.0	96 29	97.4	6 55.7	96 29	97.3	7 24.4	96 29	97.2	7 53.1	96 29	97.0	8 21.8	96 29	96.9	8 50.5	96 29	96.7	9 19.2	96 29	96.6	9 47.9	96 29	96.4	1
2	6 09.6	96 29	96.5	6 38.3	96 29	96.3	7 07.0	96 29	96.2	7 35.7	96 29	96.0	8 04.4	96 29	95.9	8 33.0	96 29	95.8	9 01.7	96 29	95.6	9 30.4	96 29	95.5	2
3	5 52.1	96 29	95.5	6 20.8	96 29	95.4	6 49.5	96 29	95.2	7 18.2	96 29	95.1	7 46.9	96 29	94.9	8 15.6	96 29	94.8	8 44.3	96 29	94.6	9 12.9	96 29	94.5	3
4	5 34.7	96 29	94.6	6 03.4	96 29	94.4	6 32.0	96 29	94.3	7 00.7	96 29	94.1	7 29.4	96 29	94.0	7 58.1	96 29	93.8	8 26.8	96 29	93.7	8 55.4	96 29	93.5	4
85	5 17.2	96 29	93.6	5 45.9	96 29	93.5	6 14.5	96 29	93.3	6 43.2	96 29	93.2	7 11.9	96 29	93.0	7 40.6	96 29	92.9	8 09.2	96 29	92.7	8 37.9	96 29	92.6	85
6				5 28.3	96 29	92.5	5 57.0	96 29	92.4	6 25.7	96 29	92.2	6 54.4	96 29	92.1	7 23.0	96 29	91.9	7 51.7	96 29	91.8	8 20.4	96 29	91.6	6
7				5 10.8	96 29	91.6	5 39.5	96 29	91.4	6 08.2	96 29	91.3	6 36.8	96 29	91.1	7 05.5	96 29	91.0	7 34.2	96 29	90.8	8 02.8	96 29	90.7	7
8							5 21.9	96 29	90.4	5 50.6	96 29	90.3	6 19.3	96 29	90.2	6 48.0	96 29	90.0	7 16.6	96 29	89.9	7 45.3	96 29	89.7	8
9							5 04.4	96 29	89.5	5 33.1	96 29	89.3	6 01.8	96 29	89.2	6 30.4	96 29	89.0	6 59.1	96 29	88.9	7 27.8	96 29	88.8	9
90										5 15.5	96 29	88.4	5 44.2	96 29	88.2	6 12.9	96 29	88.1	6 41.6	96 29	87.9	7 10.2	96 29	87.8	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	00
1	12 59.8	1.0 01	179.0	12 29.8	1.0 01	179.0	11 59.8	1.0 01	179.0	11 29.8	1.0 01	179.0	10 59.8	1.0 01	179.0	10 29.8	1.0 01	179.0	9 59.8	1.0 01	179.0	9 29.8	1.0 01	179.0	
2	12 59.4	1.0 01	178.0	12 29.4	1.0 01	178.0	11 59.4	1.0 01	178.0	11 29.4	1.0 01	178.0	10 59.4	1.0 01	178.0	10 29.4	1.0 01	178.0	9 59.4	1.0 01	178.0	9 29.4	1.0 01	178.0	
3	12 58.6	1.0 02	176.9	12 28.6	1.0 02	176.9	11 58.6	1.0 02	176.9	11 28.6	1.0 02	177.0	10 58.6	1.0 02	177.0	10 28.6	1.0 02	177.0	9 58.6	1.0 02	177.0	9 28.6	1.0 02	177.0	
4	12 57.5	1.0 02	175.9	12 27.5	1.0 02	175.9	11 57.5	1.0 02	175.9	11 27.5	1.0 02	175.9	10 57.5	1.0 02	175.9	10 27.5	1.0 02	176.0	9 57.5	1.0 02	176.0	9 27.5	1.0 02	176.0	
05	12 56.1	1.0 03	174.9	12 26.1	1.0 03	174.9	11 56.1	1.0 03	174.9	11 26.1	1.0 03	174.9	10 56.1	1.0 03	174.9	10 26.1	1.0 03	174.9	9 56.1	1.0 03	175.0	9 26.2	1.0 03	175.0	05
6	12 54.4	1.0 03	173.9	12 24.4	1.0 03	173.9	11 54.4	1.0 03	173.9	11 24.4	1.0 03	173.9	10 54.4	1.0 03	173.9	10 24.4	1.0 03	173.9	9 54.5	1.0 03	174.0	9 24.5	1.0 03	174.0	
7	12 52.3	1.0 04	172.8	12 22.4	1.0 04	172.9	11 52.4	1.0 04	172.9	11 22.4	1.0 04	172.9	10 52.4	1.0 04	172.9	10 22.4	1.0 04	172.9	9 52.5	1.0 04	172.9	9 22.5	1.0 04	173.0	
8	12 50.0	1.0 04	171.8	12 20.0	1.0 04	171.8	11 50.0	1.0 04	171.9	11 20.1	1.0 04	171.9	10 50.1	1.0 04	171.9	10 20.1	1.0 04	171.9	9 50.1	1.0 04	171.9	9 20.2	1.0 04	172.0	
9	12 47.3	1.0 05	170.8	12 17.4	1.0 05	170.8	11 47.4	1.0 05	170.8	11 17.4	1.0 05	170.9	10 47.5	1.0 05	170.9	10 17.5	1.0 05	170.9	9 47.5	1.0 05	170.9	9 17.6	1.0 05	171.0	
10	12 44.4	1.0 05	169.8	12 14.4	1.0 05	169.8	11 44.5	1.0 05	169.8	11 14.5	1.0 05	169.8	10 44.5	1.0 05	169.9	10 14.6	1.0 05	169.9	9 44.6	1.0 05	169.9	9 14.7	1.0 05	170.0	10
1	12 41.1	1.0 06	168.7	12 11.2	1.0 06	168.8	11 41.2	1.0 06	168.8	11 11.3	1.0 06	168.8	10 41.3	1.0 06	168.9	10 11.3	1.0 06	168.9	9 41.4	1.0 06	168.9	9 11.4	1.0 06	169.0	
2	12 37.5	1.0 06	167.7	12 07.6	1.0 06	167.8	11 37.6	1.0 06	167.8	11 07.7	1.0 06	167.8	10 37.8	1.0 06	167.9	10 07.8	1.0 06	167.9	9 37.9	1.0 06	167.9	9 07.9	1.0 06	167.9	
3	12 33.6	1.0 07	166.7	12 03.7	1.0 07	166.7	11 33.8	1.0 07	166.8	11 03.9	1.0 07	166.8	10 33.9	1.0 07	166.8	10 04.0	1.0 07	166.9	9 34.1	1.0 07	166.9	9 04.1	1.0 07	166.9	
4	12 29.5	1.0 07	165.7	11 59.5	1.0 07	165.7	11 29.6	1.0 07	165.8	10 59.7	1.0 07	165.8	10 29.8	1.0 07	165.8	9 59.9	1.0 07	165.9	9 29.9	1.0 07	165.9	9 00.0	1.0 07	165.9	
15	12 25.0	1.0 08	164.7	11 55.1	1.0 08	164.7	11 25.2	1.0 08	164.7	10 55.2	1.0 08	164.8	10 25.3	1.0 08	164.8	9 55.4	1.0 08	164.9	9 25.5	1.0 08	164.9	8 55.6	1.0 08	164.9	15
6	12 20.2	1.0 08	163.7	11 50.3	1.0 08	163.7	11 20.4	1.0 08	163.7	10 50.5	1.0 08	163.8	10 20.6	1.0 08	163.8	9 50.7	1.0 08	163.9	9 20.8	1.0 08	163.9	8 50.9	1.0 08	163.9	
7	12 15.1	1.0 09	162.6	11 45.2	1.0 09	162.7	11 15.3	1.0 09	162.7	10 45.4	1.0 09	162.8	10 15.6	1.0 09	162.8	9 45.7	1.0 09	162.9	9 15.8	1.0 09	162.9	8 45.9	1.0 09	162.9	
8	12 09.7	1.0 09	161.6	11 39.8	1.0 09	161.7	11 10.0	1.0 09	161.7	10 40.1	1.0 09	161.8	10 10.2	1.0 09	161.8	9 40.4	1.0 09	161.9	9 10.5	1.0 09	161.9	8 40.6	1.0 09	161.9	
9	12 04.0	1.0 10	160.6	11 34.2	1.0 10	160.7	11 04.3	1.0 10	160.7	10 34.5	1.0 10	160.8	10 04.6	1.0 10	160.8	9 34.7	1.0 10	160.8	9 04.9	1.0 10	160.9	8 35.0	1.0 10	160.9	
20	11 58.1	99 10	159.6	11 28.2	99 10	159.6	10 58.4	99 10	159.7	10 28.5	99 10	159.7	9 58.7	99 10	159.8	9 28.8	99 10	159.8	8 59.0	99 10	159.9	8 29.2	99 10	159.9	20
1	11 51.8	99 11	158.6	11 22.0	99 11	158.6	10 52.1	99 11	158.7	10 22.3	99 11	158.7	9 52.5	99 11	158.8	9 22.7	99 11	158.8	8 52.8	99 11	158.9	8 23.0	99 11	159.0	
2	11 45.3	99 11	157.6	11 15.4	99 11	157.6	10 45.6	99 11	157.7	10 15.8	99 11	157.7	9 46.0	99 11	157.8	9 16.2	99 11	157.8	8 46.4	99 11	157.9	8 16.6	99 11	158.0	
3	11 38.4	99 12	156.5	11 08.6	99 12	156.6	10 38.8	99 12	156.7	10 09.0	99 12	156.7	9 39.2	99 12	156.8	9 09.4	99 12	156.8	8 39.6	99 12	156.9	8 09.8	99 12	157.0	
4	11 31.3	99 12	155.5	11 01.5	99 12	155.6	10 31.7	99 12	155.7	10 02.0	99 12	155.7	9 32.2	99 12	155.8	9 02.4	99 12	155.8	8 32.6	99 12	155.9	8 02.8	99 12	156.0	
25	11 23.9	99 13	154.5	10 54.1	99 13	154.6	10 24.4	99 13	154.7	9 54.6	99 13	154.7	9 24.8	99 13	154.8	8 55.1	99 13	154.8	8 25.3	99 13	154.9	7 55.5	99 13	155.0	25
6	11 16.2	99 13	153.5	10 46.5	99 13	153.6	10 16.7	99 13	153.7	9 47.0	99 13	153.7	9 17.2	99 13	153.8	8 47.5	99 13	153.8	8 17.7	99 13	153.9	7 48.0	99 13	154.0	
7	11 08.2	99 14	152.5	10 38.5	99 14	152.6	10 08.8	99 14	152.6	9 39.1	99 14	152.7	9 09.3	99 14	152.8	8 39.6	99 14	152.9	8 09.9	99 14	152.9	7 40.2	99 14	153.0	
8	11 00.0	99 14	151.5	10 30.3	99 14	151.6	10 00.6	99 14	151.6	9 30.9	99 14	151.7	9 01.2	99 14	151.8	8 31.5	99 14	151.9	8 01.8	99 14	151.9	7 32.0	99 14	152.0	
9	10 51.5	99 15	150.5	10 21.8	99 15	150.6	9 52.1	99 15	150.6	9 22.4	99 15	150.7	8 52.8	99 14	150.8	8 23.1	99 14	150.9	7 53.4	99 14	150.9	7 23.7	99 14	151.0	
30	10 42.7	99 15	149.5	10 13.1	99 15	149.6	9 43.4	99 15	149.6	9 13.7	99 15	149.7	8 44.1	99 15	149.8	8 14.4	99 15	149.9	7 44.7	99 15	149.9	7 15.0	99 15	150.0	30
1	10 33.7	99 16	148.5	10 04.0	99 15	148.6	9 34.4	99 15	148.6	9 04.8	99 15	148.7	8 35.1	99 15	148.8	8 05.5	99 15	148.9	7 35.8	99 15	149.0	7 06.1	99 15	149.0	
2	10 24.4	99 16	147.5	9 54.8	99 16	147.6	9 25.1	99 16	147.6	8 55.5	99 16	147.7	8 25.9	99 16	147.8	7 56.3	99 16	147.9	7 26.6	99 16	148.0	6 57.0	99 16	148.0	
3	10 14.8	99 16	146.5	9 45.2	99 16	146.6	9 15.6	99 16	146.7	8 46.0	99 16	146.7	8 16.4	99 16	146.8	7 46.8	99 16	146.9	7 17.2	99 16	147.0	6 47.6	99 16	147.1	
4	10 05.0	99 17	145.5	9 35.4	99 17	145.6	9 05.9	99 17	145.7	8 36.3	99 17	145.7	8 06.7	99 17	145.8	7 37.1	99 17	145.9	7 07.5	99 17	146.0	6 37.9	99 17	146.1	
35	9 55.0	99 17	144.5	9 25.4	99 17	144.6	8 55.8	99 17	144.7	8 26.3	99 17	144.7	7 56.7	99 17	144.8	7 27.1	99 17	144.9	6 57.6	99 17	145.0	6 28.0	99 17	145.1	35
6	9 44.6	98 18	143.5	9 15.1	98 18	143.6	8 45.6	98 18	143.7	8 16.0	98 17	143.8	7 46.5	98 17	143.8	7 16.9	98 17	143.9	6 47.4	98 17	144.0	6 17.8	98 17	144.1	
7	9 34.1	98 18	142.5	9 04.6	98 18	142.6	8 35.1	98 18	142.7	8 05.5	98 18	142.8	7 36.0	98 18	142.9	7 06.5	98 18	142.9	6 37.0	98 18	143.0	6 07.4	98 18	143.1	
8	9 23.3	98 18	141.5	8 53.8	98 18	141.6	8 24.3	98 18	141.7	7 54.8	98 18	141.8	7 25.3	98 18	141.9	6 55.8	98 18	142.0	6 26.3	98 18	142.1	5 56.8	98 18	142.1	
9	9 12.3	98 19	140.5	8 42.8	98 19	140.6	8 13.3	98 19	140.7	7 43.8	98 19	140.8	7 14.3	98 19	140.9	6 44.9	98 19	141.0	6 15.4	98 19	141.1	5 45.9	98 19	141.2	
40	9 01.0	98 19	139.5	8 31.5	98 19	139.6	8 02.1	98 19	139.7	7 32.6	98 19	139.8	7 03.2	98 19	139.9	6 33.7	98 19	140.0	6 04.2	98 19	140.1	5 34.8	98 19	140.2	40
1	8 49.5	98 20	138.5	8 20.0	98 20	138.6	7 50.6	98 19	138.7	7 21.2	98 19	138.8	6 51.7	98 19	138.9	6 22.3	98 19	139.0	5 52.9	98 19	139.1	5 23.4	98 19	139.2	
2	8 37.7	98 20	137.5	8 08.3	98 20	137.6	7 38.9	98 20	137.7	7 09.5	98 20	137.8	6 40.1	98 20	137.9	6 10.7	98 20	138.0	5 41.3	98 20	138.1	5 11.9	98 20	138.2	
3	8 25.8	98 20	136.5	7 56.4	98 20	136.6	7 27.0	98 20	136.7	6 57.6	98 20	136.9	6 28.2	98 20	137.0	5 58.9	98 20	137.1	5 29.5	98 20	137.2	5 00.1	98 20	137.3	
4	8 13.6	98 21	135.6	7 44.3	98 21	135.7	7 14.9	98 21	135.8	6 45.5	98 21	135.9	6 16.2	98 20	136.0	5 46.8	98 20	136.1	5 17.4	98 20	136.2				
45	8 01.2	98 21	134.6	7 31.9	98 21	134.7	7 02.5	98 21	134.8	6 33.2	98 21	134.9	6 03.9	98 21	135.0	5 34.5	98 21	135.1	5 05.2	98 21	135.2				45
6	7 48.6	98 21	133.6	7 19.3	98 21	133.7	6 50.0	98 21	133.8	6 20.7	98 21	133.9	5 51.3	98 21	134.0	5 22.0	98 21	134.1							
7	7 35.8	98 22	132.6	7 06.5	98 22	132.7	6 37.2	98 22	132.8	6 07.9	98 22	132.9	5 38.6	98 22	133.0	5 09.3	98 21	133.1							
8	7 22.8	98 22	131.6	6 53.5	98 22	131.7	6 24.3	98 22	131.8	5 55.0	98 22	132.0	5 25.7	98 22	132.1										
9	7 09.6	97 22	130.6	6 40.3	98 22	130.8	6 11.1	98 22	130.9	5 41.8	98 22	131.0	5 12.6	98 22	131.1										
50	6 56.2	97 23	129.7	6 27.0	97 23	129.8	5 57.7	97 23	129.9	5 28.5	97 23	130.0													50
1	6 42.6	97 23	128.7	6 13.4	97 23	128.8	5 44.2	97 23	128.9	5 15.0	97 23	129.0													
2	6 28.8	97 23	127.7	5 59.6	97 23	127.8	5 30.4	97 23	127.9	5 01.2	97 23	128.1													
3	6 14.8	97 24	126.7	5 45.7	97 24	126.8	5 16.5	97 24	127.0																
4	6 00.7	97 24	125.8	5 31.5	97 24	125.9	5 02.4	97 24	126.0																
55	5 46.4	97 24	124.8	5 17.2	97 24	124.9																			55
6	5 31.9	97 24	123.8	5 02.8	97 24	123.9																			
7	5 17.2	97 25	122.8																						
8	5 02.4	97 25	121.9																						

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91													5 26.7	96 29	87.3	5 55.4	96 29	87.1	6 24.0	96 29	87.0	6 52.7	96 29	86.8	90
2													5 09.2	96 29	86.3	5 37.9	96 29	86.2	6 06.5	96 29	86.0	6 35.2	96 29	85.9	
3																5 20.4	96 29	85.2	5 49.0	96 29	85.1	6 17.7	96 29	84.9	
4																5 02.9	96 29	84.3	5 31.6	96 29	84.1	6 00.3	96 29	84.0	
95																			5 14.1	96 29	83.2	5 42.8	96 29	83.0	85
6																						5 25.4	96 29	82.1	
7																						5 08.1	96 29	81.1	

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	25 00.0	1.00	180.0	25 30.0	1.00	180.0	26 00.0	1.00	180.0	26 30.0	1.00	180.0	27 00.0	1.00	180.0	27 30.0	1.00	180.0	28 00.0	1.00	180.0	28 30.0	1.00	180.0	00
1	24 59.8	1.00	178.9	25 29.8	1.00	178.9	25 59.8	1.00	178.9	26 29.8	1.00	178.9	26 59.8	1.00	178.9	27 29.8	1.00	178.9	27 59.8	1.00	178.9	28 29.8	1.00	178.9	1
2	24 59.3	1.00	177.8	25 29.3	1.00	177.8	25 59.3	1.00	177.8	26 29.3	1.00	177.8	26 59.3	1.00	177.8	27 29.3	1.00	177.8	27 59.3	1.00	177.8	28 29.3	1.00	177.8	2
3	24 58.5	1.00	176.7	25 28.5	1.00	176.7	25 58.5	1.00	176.7	26 28.5	1.00	176.7	26 58.5	1.00	176.7	27 28.5	1.00	176.7	27 58.5	1.00	176.7	28 28.5	1.00	176.7	3
4	24 57.3	1.00	175.6	25 27.3	1.00	175.6	25 57.3	1.00	175.6	26 27.3	1.00	175.6	26 57.3	1.00	175.6	27 27.3	1.00	175.6	27 57.3	1.00	175.6	28 27.3	1.00	175.5	4
05	24 55.8	1.00	174.5	25 25.8	1.00	174.5	25 55.8	1.00	174.5	26 25.8	1.00	174.5	26 55.8	1.00	174.5	27 25.8	1.00	174.5	27 55.8	1.00	174.4	28 25.7	1.00	174.4	05
6	24 54.0	1.00	173.4	25 24.0	1.00	173.4	25 54.0	1.00	173.4	26 23.9	1.00	173.4	26 53.9	1.00	173.4	27 23.9	1.00	173.4	27 53.9	1.00	173.3	28 23.9	1.00	173.3	6
7	24 51.8	1.00	172.4	25 21.8	1.00	172.3	25 51.8	1.00	172.3	26 21.7	1.00	172.3	26 51.7	1.00	172.3	27 21.7	1.00	172.2	27 51.7	1.00	172.2	28 21.7	1.00	172.2	7
8	24 49.3	1.00	171.3	25 19.3	1.00	171.2	25 49.3	1.00	171.2	26 19.2	1.00	171.2	26 49.2	1.00	171.2	27 19.2	1.00	171.1	27 49.1	1.00	171.1	28 19.1	1.00	171.1	8
9	24 46.5	1.00	170.2	25 16.5	1.00	170.1	25 46.4	1.00	170.1	26 16.4	1.00	170.1	26 46.3	1.00	170.1	27 16.3	1.00	170.0	27 46.3	1.00	170.0	28 16.2	1.00	170.0	9
10	24 43.3	1.00	169.1	25 13.3	1.00	169.1	25 43.2	1.00	169.0	26 13.2	1.00	169.0	26 43.1	1.00	169.0	27 13.1	1.00	168.9	27 43.0	1.00	168.9	28 13.0	1.00	168.9	10
1	24 39.9	1.00	168.0	25 09.8	1.00	168.0	25 39.7	1.00	167.9	26 09.7	1.00	167.9	26 39.6	1.00	167.9	27 09.6	1.00	167.8	27 39.5	1.00	167.8	28 09.4	1.00	167.8	1
2	24 36.0	1.00	166.9	25 06.0	1.00	166.9	25 35.9	1.00	166.8	26 05.8	1.00	166.8	26 35.8	1.00	166.8	27 05.7	1.00	166.7	27 35.6	1.00	166.7	28 05.6	1.00	166.6	2
3	24 31.9	1.00	165.8	25 01.8	1.00	165.8	25 31.7	1.00	165.7	26 01.7	1.00	165.7	26 31.6	1.00	165.7	27 01.5	1.00	165.6	27 31.4	1.00	165.6	28 01.3	1.00	165.5	3
4	24 27.4	1.00	164.7	24 57.4	1.00	164.7	25 27.3	1.00	164.7	25 57.2	1.00	164.6	26 27.1	1.00	164.6	26 57.0	1.00	164.5	27 26.9	1.00	164.5	27 56.8	1.00	164.4	4
15	24 22.7	1.00	163.7	24 52.6	1.00	163.6	25 22.5	1.00	163.6	25 52.4	1.00	163.5	26 22.3	1.00	163.5	26 52.1	1.00	163.4	27 22.0	1.00	163.4	27 51.9	1.00	163.3	15
6	24 17.6	1.00	162.6	24 47.5	1.00	162.5	25 17.3	1.00	162.5	25 47.2	1.00	162.4	26 17.1	1.00	162.4	26 47.0	1.00	162.3	27 16.9	1.00	162.3	27 46.7	1.00	162.2	6
7	24 12.2	1.01	161.5	24 42.0	1.01	161.4	25 11.9	1.01	161.4	25 41.8	1.01	161.3	26 11.6	1.01	161.3	26 41.5	1.01	161.2	27 11.4	1.01	161.2	27 41.2	1.01	161.1	7
8	24 06.4	1.01	160.4	24 36.3	1.01	160.4	25 06.1	1.01	160.3	25 36.0	99	160.2	26 05.8	99	160.2	26 35.7	99	160.1	27 05.5	99	160.1	27 35.4	99	160.0	8
9	24 00.4	99	159.3	24 30.2	99	159.3	25 00.1	99	159.2	25 29.9	99	159.2	25 59.7	99	159.1	26 29.6	99	159.0	26 59.4	99	159.0	27 29.2	99	158.9	9
20	23 54.1	99	158.3	24 23.9	99	158.2	24 53.7	99	158.1	25 23.5	99	158.1	25 53.3	99	158.0	26 23.1	99	158.0	26 53.0	99	157.9	27 22.8	99	157.8	20
1	23 47.4	99	157.2	24 17.2	99	157.1	24 47.0	99	157.1	25 16.8	99	157.0	25 46.6	99	156.9	26 16.4	99	156.9	26 46.2	99	156.8	27 16.0	99	156.7	1
2	23 40.5	99	156.1	24 10.2	99	156.0	24 40.0	99	156.0	25 09.8	99	155.9	25 39.6	99	155.8	26 09.4	99	155.8	26 39.1	99	155.7	27 08.9	99	155.6	2
3	23 33.2	99	155.0	24 03.0	99	155.0	24 32.7	99	154.9	25 02.5	99	154.8	25 32.2	99	154.8	26 02.0	99	154.7	26 31.8	99	154.6	27 01.5	99	154.5	3
4	23 25.6	99	154.0	23 55.4	99	153.9	24 25.1	99	153.8	24 54.9	99	153.7	25 24.6	99	153.7	25 54.4	99	153.6	26 24.1	99	153.5	26 53.8	99	153.5	4
25	23 17.8	99	152.9	23 47.5	99	152.8	24 17.2	99	152.7	24 47.0	99	152.7	25 16.7	99	152.6	25 46.4	99	152.5	26 16.1	99	152.4	26 45.8	99	152.4	25
6	23 09.7	99	151.8	23 39.4	99	151.7	24 09.1	99	151.7	24 38.8	99	151.6	25 08.5	99	151.5	25 38.2	99	151.4	26 07.9	99	151.4	26 37.6	99	151.3	6
7	23 01.2	99	150.8	23 30.9	99	150.7	24 00.6	99	150.6	24 30.3	99	150.5	25 00.0	99	150.4	25 29.6	99	150.4	25 59.3	99	150.3	26 29.0	99	150.2	7
8	22 52.5	99	149.7	23 22.2	99	149.6	23 51.8	99	149.5	24 21.5	99	149.5	24 51.2	99	149.4	25 20.8	99	149.3	25 50.5	99	149.2	26 20.1	99	149.1	8
9	22 43.5	99	148.6	23 13.2	99	148.6	23 42.8	99	148.5	24 12.5	99	148.4	24 42.1	99	148.3	25 11.7	99	148.2	25 41.3	99	148.1	26 11.0	99	148.0	9
30	22 34.3	99	147.6	23 03.9	99	147.5	23 33.5	99	147.4	24 03.1	99	147.3	24 32.7	99	147.2	25 02.3	99	147.1	25 31.9	99	147.0	26 01.5	99	147.0	30
1	22 24.7	99	146.5	22 54.3	99	146.4	23 23.9	99	146.3	23 53.5	99	146.2	24 23.1	99	146.2	24 52.7	99	146.1	25 22.3	99	146.0	25 51.8	99	145.9	1
2	22 14.9	99	145.5	22 44.5	99	145.4	23 14.1	99	145.3	23 43.6	99	145.2	24 13.2	99	145.1	24 42.8	99	145.0	25 12.3	99	144.9	25 41.9	99	144.8	2
3	22 04.8	99	144.4	22 34.4	99	144.3	23 03.9	98	144.2	23 33.5	98	144.1	24 03.0	98	144.0	24 32.6	98	143.9	25 02.1	98	143.8	25 31.6	98	143.7	3
4	21 54.5	98	143.4	22 24.0	98	143.3	22 53.5	98	143.2	23 23.1	98	143.1	23 52.6	98	143.0	24 22.1	98	142.9	24 51.6	98	142.8	25 21.1	98	142.7	4
35	21 43.9	98	142.3	22 13.4	98	142.2	22 42.9	98	142.1	23 12.4	98	142.0	23 41.9	98	141.9	24 11.4	98	141.8	24 40.9	98	141.7	25 10.4	98	141.6	35
6	21 33.0	98	141.3	22 02.5	98	141.2	22 32.0	98	141.1	23 01.5	98	141.0	23 30.9	98	140.9	24 00.4	98	140.8	24 29.9	98	140.6	24 59.3	98	140.5	6
7	21 21.9	98	140.2	21 51.4	98	140.1	22 20.8	98	140.0	22 50.3	98	139.9	23 19.7	98	139.8	23 49.2	98	139.7	24 18.6	98	139.6	24 48.1	98	139.5	7
8	21 10.6	98	139.2	21 40.0	98	139.1	22 09.5	98	139.0	22 38.9	98	138.9	23 08.3	98	138.8	23 37.7	98	138.6	24 07.1	98	138.5	24 36.5	98	138.4	8
9	20 59.0	98	138.1	21 28.4	98	138.0	21 57.8	98	137.9	22 27.2	98	137.8	22 56.6	98	137.7	23 26.0	98	137.6	23 55.4	98	137.5	24 24.8	98	137.4	9
40	20 47.2	98	137.1	21 16.6	98	137.0	21 45.9	98	136.9	22 15.3	98	136.8	22 44.7	98	136.7	23 14.1	98	136.5	23 43.4	98	136.4	24 12.8	98	136.3	40
1	20 35.1	98	136.1	21 04.5	98	135.9	21 33.8	98	135.8	22 03.2	98	135.7	22 32.5	98	135.6	23 01.9	98	135.5	23 31.2	98	135.4	24 00.5	98	135.3	1
2	20 22.8	98	135.0	20 52.2	98	134.9	21 21.5	98	134.8	21 50.8	98	134.7	22 20.1	98	134.6	22 49.5	98	134.5	23 18.8	98	134.3	23 48.1	98	134.2	2
3	20 10.3	98	134.0	20 39.6	98	133.9	21 08.9	98	133.8	21 38.2	98	133.6	22 07.5	98	133.5	22 36.8	98	133.4	23 06.1	98	133.3	23 35.4	98	133.2	3
4	19 57.6	98	133.0	20 26.9	98	132.8	20 56.2	98	132.7	21 25.4	98	132.6	21 54.7	98	132.5	22 24.0	98	132.4	22 53.2	98	132.3	23 22.5	98	132.1	4
45	19 44.6	98	131.9	20 13.9	98	131.8	20 43.2	98	131.7	21 12.4	98	131.6	21 41.7	97	131.5	22 10.9	97	131.3	22 40.2	97	131.2	23 09.4	97	131.1	45
6	19 31.5	97	130.9	20 00.7	97	130.8	20 30.0	97	130.7	20 59.2	97	130.5	21 28.4	97	130.4	21 57.6	97	130.3	22 26.9	97	130.2	22 56.1	97	130.1	6
7	19 18.1	97	129.9	19 47.3	97	129.8	20 16.6	97	129.6	20 45.8	97	129.5	21 15.0	97	129.4	21 44.2	97	129.3	22 13.4	97	129.1	22 42.5	97	129.0	7
8	19 04.6	97	128.9	19 33.8	97	128.7	20 02.9	97	128.6	20 32.1	97	128.5	21 01.3	97	128.4	21 30.5	97	128.2	21 59.6	97	128.1	22 28.8	97	128.0	8
9	18 50.8	97	127.8	19 20.0	97	127.7	19 49.1	97	127.6	20 18.3	97	127.5	20 47.5	97	127.3	21 16.6	97	127.2	21 45.8	97	127.1	22 14.9	97	127.0	9
50	18 36.9	97	126.8	19 06.0	97	126.7	19 35.1	97	126.6	20 04.3	97	126.4	20 33.4	97	126.3	21 02.5	97	126.2	21 31.7	97	126.1	22 00.8	97	125.9	50
1	18 22.7	97	125.8	18 51.8	97	125.7	19 21.0	97	125.6	19 50.1	97	125.4	20 19.2	97	125.3	20 48.3	97	125.2	21 17.4	97	125.0	21 46.5	97	124.9	1
2	18 08.4	97	124.8	18 37.5	97	124.7	19 06.6	97	124.5	19 35.7	97	124.4	20 04.8	97	124.3	20 33.9	97	124.2	21 02.9	97	124.0	21 32.0	97	123.9	2
3	17 53.9	97	123.8	18 23.0	97	123.7	18 52.1	97	123.5	19 21.1	97	123.4	19 50.2	97	123.3	20 19.3	97	123.1	20 48.3	97	123.0	21 17.4	97	122.9	3
4	17 39.3	97	122.8	18 08.3	97	122.7	18 37.4	97	122.5	19 06.4	97	122.4	19 35.5	97	122.3	20 04.5	97	122.1	20 33.5	97	122.0	21 02.5	97	121.9	4
55	17 24.4	97	121.8	17 53.5	97	121.6	18 22.5	97	121.5	18 51.5	97	121.4	19 20.5	97	121.2	19 49.5	97	121.1	20 18.6	97	121.0	20 47.6	97	120.8	55
6	17 09.4	97	120.8	17 38.4	97	120.6	18 07.5	97	120.5	18 36.5	97	120.4	19 05.5	97	120.2	19 34.5	97	120.1	20 03.4	97	120.0	20 32.4	97	119.8	6
7	16 54.3	97	119.8	17 23.3	97	119.6	17 52.3	97	119.5	18 21.2	97	119.4	18 50.2	97	119.2	19 19.2	97	119.1	19 48.2	97	119.0	20 17.1	97	118.8	7
8	16 39.0	97	118.8	17 07.9	97	118.6	17 36.9	97	118.5	18 05.9	97	118.4	18 34.8	97	118.2	19 03.8	96	118.1	19 32.7	96	117.9	20 01.7	96	117.8	8
9	16 23.5	97	117.8	16 52.5	97	117.6	17 21.4	96	117.5	17 50.4	96	117.4	18 19.3	96	117.2	18 48.2	96	117.1	19 17.2	96	116.9	19 46.1	96	116.8	9
60	16 07.9	96	116.8	16 36.9	96	116.6	17 05.8	96	116.5	17 34.7	96	116.4	18 03.6	96	116.2	18 32.6	96	116.1	19 01.5	96	115.9	19 30.4	96	115.8	60
1	15 52.2	96	115.8	16 21.1	96	115.6	16 50.0	96	115.5	17 18.9	96	115.4	17 47.8	96	115.2	18 16.7	96	115.1	18 45.6	96	114.9	19 14.5	96	114.8	1
2	15 36.3	96	114.8	16 05.2	96	114.7	16 34.1	96	114.5	17 03.0	96	114.4	17 31.9	96	114.2	18 00.8	96	114.1	18 29.7	96	113.9	18 58.5	96	113.8	2
3	15 20.4	96	113.8	15 49.2	96	113.7	16 18.1	96	113.5	16 47.0	96	113.4	17 15.9	96	113.2	17 44.7	96	113.1	18 13.6	96	113.0	18 42.4	96	112.8	3
4	15 04.2	96	112.8	15 33.1	96	112.7	16 02.0	96	112.5	16 30.8	96	112.4	16 59.7	96	112.2	17 28.5	96	112.1	17 57.4	96	112.0	18 26.2	96	111.8	4
65	14 48.0	96	111.8	15 16.9	96	111.7	15 45.7	96	111.5	16 14.5	96	111.4	16 43.4	96	111.3	17 12.2	96	111.1	17 41.0	96	111.0	18 09.8	96	110.8	65
6	14 31.7	96	110.8	15 00.5	96	110.7	15 29.3	96	110.6	15 58.2	96	110.4	16 27.0	96	110.3	16 55.8	96	110.1	17 24.6	96	110.0	17 53.4	96	109.8	6
7	14 15.2	96	109.9	14 44.1	96	109.7	15 12.9	96	109.6	15 41.7	96	109.4	16 10.5	96	109.3	16 39.3	96	109.1	17 08.1	96	109.0	17 36.8	96	108.8	7
8	13 58.7	96	108.9	14 27.5	96	108.7	14 56.3	96	108.6	15 25.1	96	108.4	15 53.9	96	108.3	16 22.6	96	108.2	16 51.4	96	108.0	17 20.2	96	107.9	8
9	13 42.0	96	107.9	14 10.8	96	107.8	14 39.6	96	107.6	15 08.4	96	107.5	15 37.2	96	107.3	16 05.9	96	107.2	16 34.7	96	107.0	17 03.4	96	106.9	9
70	13 25.3	96	106.9	13 54.1	96	106.8	14 22.8	96	106.6	14 51.6	96	106.5	15 20.4	96	106.3	15 49.1	96	106.2	16 17.9	96	106.0	16 46.6	96	105.9	70
1	13 08.5	96	106.0	13 37.2	96	105.8	14 06.0	96	105.7	14 34.7	96	105.5	15 03.5	96	105.4	15 32.2	96	105.2	16 01.0	96	105.1	16 29.7	96	104.9	1
2	12 51.6	96	105.0	13 20.3	96	104.8	13 49.1	96	104.7	14 17.8	96	104.5	14 46.5	96	104.4	15 15.3	96	104.2	15 44.0	96	104.1	16 12.7	96	103.9	2
3	12 34.6	96	104.0	13 03.3	96	103.9	13 32.1	96	103.7	14 00.8	96	103.6	14 29.5	96	103.4	14 58.2	96	103.3	15 26.9	96	103.1	15 55.7	96	103.0	3
4	12 17.5	96	103.0	12 46.3	96	102.9	13 15.0	96	102.7	13 43.7	96	102.6	14 12.4	96	102.4	14 41.1	96	102.3	15 09.8	96	102.1	15 38.5	96	102.0	4
75	12 00.4	96	102.1	12 29.1	96	101.9	12 57.8	96	101.8	13 26.6	96	101.6	13 55.3	96	101.5	14 24.0	96	101.3	14 52.6	96	101.2	15 21.3	96	101.0	75
6	11 43.2	96	101.1	12 11.9	96	100.9	12 40.6	96	100.8	13 09.3	96	100.6	13 38.0	96	100.5	14 06.7	96	100.3	14 35.4	96	100.2	15 04.1	96	100.0	6
7	11 26.0	96	100.1	11 54.7	96	100.0	12 23.4	96	99.8	12 52.1	96	99.7	13 20.8	96	99.5	13 49.4	96	99.4	14 18.1	96	99.2	14 46.8	96	99.1	7
8	11 08.7	96	99.2	11 37.4	96	99.0	12 06.1	96	98.9	12 34.8	96	98.7	13 03.4	96	98.6	13 32.1	96	98.4	14 00.8	96	98.3	14 29.4	96	98.1	8
9	10 51.3	96	98.2	11 20.0	96	98.0	11 48.7	96	97.9	12 17.4	96	97.7	12 46.1	96	97.6	13 14.7	96	97.4	13 43.4	96	97.3	14 12.1	96	97.1	9
80	10 34.0	96	97.2	11 02.6	96	97.1	11 31.3	96	96.9	12 00.0	96	96.8	12 28.7	96	96.6	12 57.3	96	96.5	13 26.0	96	96.3	13 54.6	96	96.2	80
1	10 16.5	96	96.3	10 45.2	96	96.1	11 13.9	96	96.0	11 42.6	96	95.8	12 11.2	96	95.7	12 39.9	96	95.5	13 08.5	96	95.4	13 37.2	96	95.2	1
2	9 59.1	96	95.3	10 27.8	96	95.2	10 56.4	96	95.0	11 25.1	96	94.9	11 53.7	96	94.7	12 22.4	96	94.6	12 51.1	96	94.4	13 19.7	96	94.3	2
3	9 41.6	96	94.3	10 10.3	96	94.2	10 38.9	96	94.0	11 07.6	96	93.9	11 36.3	96	93.7	12 04.9	96	93.6	12 33.6	96	93.4	13 02.2	96	93.3	3
4	9 24.1	96	93.4	9 52.8	96	93.2	10 21.4	96	93.1	10 50.1	96	92.9	11 18.7	96	92.8	11 47.4	96	92.6	12 16.0	96	92.5	12 44.7	96	92.3	4
85	9 06.6	96	92.4	9 35.2	96	92.3	10 03.9	96	92.1	10 32.6	96	92.0	11 01.2	96	91.8	11 29.9	95	91.7	11 58.5	95	91.5	12 27.1	95	91.4	85
6	8 49.1	96	91.5	9 17.7	96	91.3	9 46.4	96	91.2	10 15.0	96	91.0	10 43.7	95	90.9	11 12.3	95	90.7	11 41.0	95	90.6	12 09.6	95	90.4	6
7	8 31.5	96	90.5	9 00.2	96	90.4	9 28.8	96	90.2	9 57.5	96	90.1	10 26.1	95	89.9	10 54.8	95	89.8	11 23.4	95	89.6	11 52.1	95	89.5	7
8	8 14.0	96	89.6	8 42.6	96	89.4	9 11.3	96	89.3	9 39.9	96	89.1	10 08.6	95	89.0	10 37.2	95	88.8	11 05.9	95	88.7	11 34.5	95	88.5	8
9	7 56.4	96	88.6	8 25.1	96	88.5	8 53.8	96	88.3	9 22.4	96	88.2	9 51.1	95	88.0	10 19.7	95	87.9	10 48.3	95	87.7	11 17.0	95	87.5	9
90	7 38.9	96	87.6	8 07.6	96	87.5	8 36.2	96	87.3	9 04.9	96	87.2	9 33.5	96	87.0	10 02.2	95	86.9	10 30.8	95	86.7	10 59.5	95	86.6	90

Lat. 73°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	00
1	8 59.8	1.0 01	179.0	8 29.8	1.0 01	179.0	7 59.8	1.0 01	179.0	7 29.8	1.0 01	179.0	6 59.8	1.0 01	179.0	6 29.8	1.0 01	179.0	5 59.8	1.0 01	179.0	5 29.8	1.0 01	179.0	1
2	8 59.4	1.0 01	178.0	8 29.4	1.0 01	178.0	7 59.4	1.0 01	178.0	7 29.4	1.0 01	178.0	6 59.4	1.0 01	178.0	6 29.4	1.0 01	178.0	5 59.4	1.0 01	178.0	5 29.4	1.0 01	178.0	2
3	8 58.6	1.0 02	177.0	8 28.6	1.0 02	177.0	7 58.6	1.0 02	177.0	7 28.6	1.0 02	177.0	6 58.6	1.0 02	177.0	6 28.6	1.0 02	177.0	5 58.6	1.0 02	177.0	5 28.6	1.0 02	177.0	3
4	8 57.5	1.0 02	176.0	8 27.6	1.0 02	176.0	7 57.6	1.0 02	176.0	7 27.6	1.0 02	176.0	6 57.6	1.0 02	176.0	6 27.6	1.0 02	176.0	5 57.6	1.0 02	176.1	5 27.6	1.0 02	176.1	4
05	8 56.2	1.0 03	175.0	8 26.2	1.0 03	175.0	7 56.2	1.0 03	175.0	7 26.2	1.0 03	175.0	6 56.2	1.0 03	175.0	6 26.2	1.0 03	175.1	5 56.2	1.0 03	175.1	5 26.2	1.0 03	175.1	05
6	8 54.5	1.0 03	174.0	8 24.5	1.0 03	174.0	7 54.5	1.0 03	174.0	7 24.5	1.0 03	174.0	6 54.5	1.0 03	174.0	6 24.6	1.0 03	174.1	5 54.6	1.0 03	174.1	5 24.6	1.0 03	174.1	6
7	8 52.5	1.0 04	173.0	8 22.5	1.0 04	173.0	7 52.5	1.0 04	173.0	7 22.5	1.0 04	173.0	6 52.6	1.0 04	173.1	6 22.6	1.0 04	173.1	5 52.6	1.0 04	173.1	5 22.6	1.0 04	173.1	7
8	8 50.2	1.0 04	172.0	8 20.2	1.0 04	172.0	7 50.2	1.0 04	172.0	7 20.3	1.0 04	172.0	6 50.3	1.0 04	172.1	6 20.3	1.0 04	172.1	5 50.3	1.0 04	172.1	5 20.4	1.0 04	172.1	8
9	8 47.6	1.0 05	171.0	8 17.6	1.0 05	171.0	7 47.7	1.0 05	171.0	7 17.7	1.0 06	171.1	6 47.7	1.0 05	171.1	6 17.8	1.0 05	171.1	5 47.8	1.0 05	171.1	5 17.8	1.0 05	171.1	9
10	8 44.7	1.0 05	170.0	8 14.7	1.0 05	170.0	7 44.8	1.0 06	170.0	7 14.8	1.0 05	170.1	6 44.9	1.0 05	170.1	6 14.9	1.0 05	170.1	5 44.9	1.0 06	170.1	5 15.0	1.0 06	170.2	10
1	8 41.5	1.0 06	169.0	8 11.5	1.0 06	169.0	7 41.6	1.0 06	169.0	7 11.6	1.0 06	169.1	6 41.7	1.0 06	169.1	6 11.7	1.0 06	169.1	5 41.8	1.0 06	169.2	5 11.8	1.0 06	169.2	1
2	8 38.0	1.0 06	168.0	8 08.0	1.0 06	168.0	7 38.1	1.0 06	168.0	7 08.2	1.0 06	168.1	6 38.2	1.0 06	168.1	6 08.3	1.0 06	168.1	5 38.3	1.0 06	168.2	5 08.4	1.0 06	168.2	2
3	8 34.2	1.0 07	167.0	8 04.3	1.0 07	167.0	7 34.3	1.0 07	167.0	7 04.4	1.0 07	167.1	6 34.5	1.0 07	167.1	6 04.5	1.0 07	167.1	5 34.6	1.0 07	167.2	5 04.6	1.0 07	167.2	3
4	8 30.1	1.0 07	166.0	8 00.2	1.0 07	166.0	7 30.2	1.0 07	166.1	7 00.3	1.0 07	166.1	6 30.4	1.0 07	166.1	6 00.5	1.0 07	166.2	5 30.5	1.0 07	166.2	5 00.6	1.0 07	166.2	4
15	8 25.7	1.0 08	165.0	7 55.8	1.0 08	165.0	7 25.9	1.0 08	165.1	6 56.0	1.0 08	165.1	6 26.0	1.0 08	165.1	5 56.1	1.0 08	165.2	5 26.2	1.0 08	165.2				15
6	8 21.0	1.0 08	164.0	7 51.1	1.0 08	164.0	7 21.2	1.0 08	164.1	6 51.3	1.0 08	164.1	6 21.4	1.0 08	164.1	5 51.5	1.0 08	164.2	5 21.6	1.0 08	164.2				6
7	8 16.0	1.0 09	163.0	7 46.1	1.0 09	163.0	7 16.2	1.0 09	163.1	6 46.3	1.0 09	163.1	6 16.5	1.0 09	163.2	5 46.6	1.0 09	163.2	5 16.7	1.0 09	163.2				7
8	8 10.7	1.0 09	162.0	7 40.9	1.0 09	162.0	7 11.0	1.0 09	162.1	6 41.1	1.0 09	162.1	6 11.2	1.0 09	162.2	5 41.4	1.0 09	162.2	5 11.5	1.0 09	162.3				8
9	8 05.2	1.0 10	161.0	7 35.3	1.0 10	161.0	7 05.4	1.0 10	161.1	6 35.6	1.0 10	161.1	6 05.7	1.0 10	161.2	5 35.9	1.0 10	161.2	5 06.0	1.0 10	161.3				9
20	7 59.3	99 10	160.0	7 29.5	99 10	160.1	6 59.6	99 10	160.1	6 29.8	99 10	160.2	5 59.9	99 10	160.2	5 30.1	99 10	160.3	5 00.2	99 10	160.3				20
1	7 53.2	99 11	159.0	7 23.3	99 11	159.1	6 53.5	99 11	159.1	6 23.7	99 11	159.2	5 53.8	99 11	159.2	5 24.0	99 11	159.3							1
2	7 46.7	99 11	158.0	7 16.9	99 11	158.1	6 47.1	99 11	158.1	6 17.3	99 11	158.2	5 47.5	99 11	158.2	5 17.7	99 11	158.3							2
3	7 40.0	99 12	157.0	7 10.2	99 12	157.1	6 40.4	99 12	157.1	6 10.6	99 12	157.2	5 40.8	99 12	157.3	5 11.0	99 12	157.3							3
4	7 33.0	99 12	156.0	7 03.3	99 12	156.1	6 33.5	99 12	156.1	6 03.7	99 12	156.2	5 33.9	99 12	156.3	5 04.1	99 12	156.3							4
25	7 25.8	99 13	155.0	6 56.0	99 13	155.1	6 26.2	99 13	155.2	5 56.5	99 12	155.2	5 26.7	99 12	155.3										25
6	7 18.2	99 13	154.0	6 48.5	99 13	154.1	6 18.7	99 13	154.2	5 49.0	99 13	154.2	5 19.2	99 13	154.3										6
7	7 10.4	99 13	153.1	6 40.7	99 13	153.1	6 11.0	99 13	153.2	5 41.2	99 13	153.3	5 11.5	99 13	153.3										7
8	7 02.3	99 14	152.1	6 32.6	99 14	152.1	6 02.9	99 14	152.2	5 33.2	99 14	152.3	5 03.5	99 14	152.3										8
9	6 54.0	99 14	151.1	6 24.3	99 14	151.2	5 54.6	99 14	151.2	5 24.9	99 14	151.3													9
30	6 45.4	99 15	150.1	6 15.7	99 15	150.2	5 46.0	99 15	150.2	5 16.4	99 15	150.3													30
1	6 36.5	99 15	149.1	6 06.8	99 15	149.2	5 37.2	99 15	149.3	5 07.5	99 15	149.3													1
2	6 27.4	99 16	148.1	5 57.7	99 16	148.2	5 28.1	99 16	148.3																2
3	6 18.0	99 16	147.1	5 48.4	99 16	147.2	5 18.7	99 16	147.3																3
4	6 08.3	99 16	146.2	5 38.7	99 16	146.2	5 09.1	99 16	146.3																4
35	5 58.4	99 17	145.2	5 28.9	99 17	145.3																			35
6	5 48.3	98 17	144.2	5 18.7	98 17	144.3																			6
7	5 37.9	98 18	143.2	5 08.4	98 18	143.3																			7
8	5 27.3	98 18	142.2																						8
9	5 16.4	98 18	141.3																						9
40	5 05.3	98 19	140.3																						40

Lat. 74°

Lat. 75°

Lat. 76°

DECLINATION SAME NAME AS LATITUDE

Lat. 77°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	7 21.4	96 29	86.7	7 50.0	96 29	86.5	8 18.7	96 29	86.4	8 47.4	96 29	86.2	9 16.0	96 29	86.1	9 44.7	96 29	85.9	10 13.3	96 29	85.8	10 42.0	96 29	85.6	91
2	7 03.9	96 29	85.7	7 32.5	96 29	85.6	8 01.2	96 29	85.4	8 29.9	96 29	85.3	8 58.5	96 29	85.1	9 27.2	96 29	85.0	9 55.8	96 29	84.8	10 24.5	96 29	84.7	2
3	6 46.4	96 29	84.8	7 15.1	96 29	84.6	7 43.7	96 29	84.5	8 12.4	96 29	84.3	8 41.1	96 29	84.2	9 09.7	96 29	84.0	9 38.4	96 29	83.9	10 07.0	96 29	83.7	3
4	6 28.9	96 29	83.8	6 57.6	96 29	83.7	7 26.3	96 29	83.5	7 55.0	96 29	83.4	8 23.6	96 29	83.2	8 52.3	96 29	83.1	9 21.0	96 29	82.9	9 49.6	96 29	82.8	4
95	6 11.5	96 29	82.9	6 40.2	96 29	82.7	7 08.9	96 29	82.6	7 37.5	96 29	82.4	8 06.2	96 29	82.3	8 34.9	96 29	82.1	9 03.6	96 29	82.0	9 32.2	96 29	81.8	95
6	5 54.1	96 29	81.9	6 22.8	96 29	81.8	6 51.5	96 29	81.6	7 20.2	96 29	81.5	7 48.9	96 29	81.3	8 17.5	96 29	81.2	8 46.2	96 29	81.0	9 14.9	96 29	80.9	6
7	5 36.8	96 29	81.0	6 05.5	96 29	80.8	6 34.2	96 29	80.7	7 02.9	96 29	80.5	7 31.5	96 29	80.4	8 00.2	96 29	80.2	8 28.9	96 29	80.1	8 57.6	96 29	79.9	7
8	5 19.5	96 29	80.0	5 48.2	96 29	79.9	6 16.9	96 29	79.7	6 45.6	96 29	79.6	7 14.3	96 29	79.4	7 43.0	96 29	79.3	8 11.7	96 29	79.1	8 40.3	96 29	79.0	8
9	5 02.2	96 29	79.1	5 30.9	96 29	78.9	5 59.6	96 29	78.8	6 28.3	96 29	78.6	6 57.1	96 29	78.5	7 25.8	96 29	78.3	7 54.5	96 29	78.2	8 23.1	96 29	78.0	9
100				5 13.7	96 29	78.0	5 42.5	96 29	77.8	6 11.2	96 29	77.7	6 39.9	96 28	77.5	7 08.6	96 28	77.4	7 37.3	96 28	77.2	8 06.0	96 28	77.1	100
1							5 25.3	96 28	76.9	5 54.1	96 28	76.7	6 22.8	96 28	76.6	6 51.5	96 28	76.4	7 20.2	96 28	76.3	7 48.9	96 28	76.2	1
2							5 08.3	96 28	75.9	5 37.0	96 28	75.8	6 05.8	96 28	75.6	6 34.5	96 28	75.5	7 03.2	96 28	75.4	7 32.0	96 28	75.2	2
3										5 20.1	96 28	74.8	5 48.8	96 28	74.7	6 17.6	96 28	74.6	6 46.3	96 28	74.4	7 15.0	96 28	74.3	3
4										5 03.2	96 28	73.9	5 31.9	96 28	73.7	6 00.7	96 28	73.6	6 29.4	96 28	73.5	6 58.2	96 28	73.3	4
105													5 15.1	96 28	72.8	5 43.9	96 28	72.7	6 12.7	96 28	72.5	6 41.4	96 28	72.4	105
6																5 27.2	96 28	71.7	5 56.0	96 28	71.6	6 24.8	96 28	71.4	6
7																5 10.6	96 28	70.8	5 39.4	96 28	70.6	6 08.2	96 27	70.5	7
8																			5 22.9	96 27	69.7	5 51.7	96 27	69.5	8
9																			5 06.5	96 27	68.7	5 35.3	96 27	68.6	9
110																						5 19.0	96 27	67.6	110
1																						5 02.9	96 27	66.7	1

Lat. 78°

Lat. 79

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	00
1	28 59.8	1.0 01	178.9	29 29.8	1.0 01	178.9	29 59.8	1.0 01	178.9	30 29.8	1.0 01	178.9	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9	31 59.8	1.0 01	178.9	32 29.8	1.0 01	178.9	1
2	28 59.3	1.0 01	177.8	29 29.3	1.0 01	177.8	29 59.3	1.0 01	177.8	30 29.3	1.0 01	177.7	30 59.3	1.0 01	177.7	31 29.3	1.0 01	177.7	31 59.3	1.0 01	177.7	32 29.3	1.0 01	177.7	2
3	28 58.5	1.0 02	176.6	29 28.5	1.0 02	176.6	29 58.5	1.0 02	176.6	30 28.4	1.0 02	176.6	30 58.4	1.0 02	176.6	31 28.4	1.0 02	176.6	31 58.4	1.0 02	176.6	32 28.4	1.0 02	176.6	3
4	28 57.3	1.0 03	175.5	29 27.3	1.0 03	175.5	29 57.2	1.0 03	175.5	30 27.2	1.0 03	175.5	30 57.2	1.0 03	175.5	31 27.2	1.0 03	175.5	31 57.2	1.0 03	175.4	32 27.2	1.0 03	175.4	4
05	28 55.7	1.0 03	174.4	29 25.7	1.0 03	174.4	29 55.7	1.0 03	174.4	30 25.7	1.0 03	174.4	30 55.7	1.0 03	174.3	31 25.7	1.0 03	174.3	31 55.6	1.0 03	174.3	32 25.6	1.0 03	174.3	05
6	28 53.8	1.0 04	173.3	29 23.8	1.0 04	173.3	29 53.8	1.0 04	173.3	30 23.8	1.0 04	173.2	30 53.8	1.0 04	173.2	31 23.8	1.0 04	173.2	31 53.7	1.0 04	173.2	32 23.7	1.0 04	173.1	6
7	28 51.6	1.0 04	172.2	29 21.6	1.0 04	172.2	29 51.6	1.0 04	172.1	30 21.6	1.0 04	172.1	30 51.5	1.0 04	172.1	31 21.5	1.0 04	172.1	31 51.5	1.0 04	172.0	32 21.4	1.0 04	172.0	7
8	28 49.1	1.0 05	171.1	29 19.0	1.0 05	171.0	29 49.0	1.0 05	171.0	30 19.0	1.0 05	171.0	30 48.9	1.0 05	171.0	31 18.9	1.0 05	170.9	31 48.9	1.0 05	170.9	32 18.8	1.0 05	170.9	8
9	28 46.2	1.0 05	169.9	29 16.1	1.0 05	169.9	29 46.1	1.0 05	169.9	30 16.1	1.0 05	169.9	30 46.0	1.0 05	169.8	31 16.0	1.0 05	169.8	31 45.9	1.0 05	169.8	32 15.9	1.0 06	169.7	9
10	28 42.9	1.0 06	168.8	29 12.9	1.0 06	168.8	29 42.8	1.0 06	168.8	30 12.8	1.0 06	168.7	30 42.7	1.0 06	168.7	31 12.7	1.0 06	168.7	31 42.6	1.0 06	168.6	32 12.6	1.0 06	168.6	10
1	28 39.4	1.0 06	167.7	29 09.3	1.0 06	167.7	29 39.3	1.0 07	167.6	30 09.2	1.0 07	167.6	30 39.1	1.0 07	167.6	31 09.1	1.0 07	167.5	31 39.0	1.0 07	167.5	32 08.9	1.0 07	167.5	1
2	28 35.5	1.0 07	166.6	29 05.4	1.0 07	166.6	29 35.3	1.0 07	166.5	30 05.3	1.0 07	166.5	30 35.2	1.0 07	166.4	31 05.1	1.0 07	166.4	31 35.0	1.0 07	166.4	32 05.0	1.0 07	166.3	2
3	28 31.3	1.0 08	165.5	29 01.2	1.0 08	165.5	29 31.1	1.0 08	165.4	30 01.0	1.0 08	165.4	30 30.9	1.0 08	165.3	31 00.8	1.0 08	165.3	31 30.7	1.0 08	165.2	32 00.6	1.0 08	165.2	3
4	28 26.7	1.0 08	164.4	28 56.6	1.0 08	164.3	29 26.5	1.0 08	164.3	29 56.4	1.0 08	164.2	30 26.3	1.0 08	164.2	30 56.2	1.0 08	164.2	31 26.1	1.0 08	164.1	31 56.0	1.0 08	164.1	4
15	28 21.8	1.0 09	163.3	28 51.7	1.0 09	163.2	29 21.6	1.0 09	163.2	29 51.5	1.0 09	163.1	30 21.4	1.0 09	163.1	30 51.2	1.0 09	163.0	31 21.1	1.0 09	163.0	31 51.0	1.0 09	162.9	15
6	28 16.6	1.0 09	162.2	28 46.5	1.0 09	162.1	29 16.4	1.0 09	162.1	29 46.2	1.0 09	162.0	30 16.1	1.0 09	162.0	30 46.0	1.0 09	161.9	31 15.8	1.0 09	161.9	31 45.7	1.0 09	161.8	6
7	28 11.1	1.0 10	161.1	28 40.9	1.0 10	161.0	29 10.8	1.0 10	161.0	29 40.6	1.0 10	160.9	30 10.5	1.0 10	160.8	30 40.3	1.0 10	160.8	31 10.2	99 10	160.7	31 40.0	99 10	160.7	7
8	28 05.2	99 10	160.0	28 35.1	99 10	159.9	29 04.9	99 10	159.8	29 34.7	99 10	159.8	30 04.6	99 10	159.7	30 34.4	99 10	159.7	31 04.2	99 10	159.6	31 34.1	99 10	159.5	8
9	27 59.1	99 11	158.9	28 28.9	99 11	158.8	28 58.7	99 11	158.7	29 28.5	99 11	158.7	29 58.3	99 11	158.6	30 28.2	99 11	158.5	30 58.0	99 11	158.5	31 27.8	99 11	158.4	9
20	27 52.6	99 11	157.8	28 22.4	99 11	157.7	28 52.2	99 11	157.6	29 22.0	99 11	157.6	29 51.8	99 11	157.5	30 21.6	99 11	157.4	30 51.4	99 12	157.4	31 21.2	99 12	157.3	20
1	27 45.8	99 12	156.7	28 15.6	99 12	156.6	28 45.4	99 12	156.5	29 15.1	99 12	156.5	29 44.9	99 12	156.4	30 14.7	99 12	156.3	30 44.5	99 12	156.2	31 14.2	99 12	156.2	1
2	27 38.7	99 12	155.6	28 08.4	99 12	155.5	28 38.2	99 12	155.4	29 08.0	99 12	155.4	29 37.7	99 12	155.3	30 07.5	99 13	155.2	30 37.3	99 13	155.1	31 07.0	99 13	155.1	2
3	27 31.3	99 13	154.5	28 01.0	99 13	154.4	28 30.8	99 13	154.3	29 00.5	99 13	154.3	29 30.2	99 13	154.2	30 00.0	99 13	154.1	30 29.7	99 13	154.0	30 59.5	99 13	153.9	3
4	27 23.6	99 13	153.4	27 53.3	99 13	153.3	28 23.0	99 13	153.2	28 52.7	99 13	153.1	29 22.5	99 13	153.1	29 52.2	99 14	153.0	30 21.9	99 14	152.9	30 51.6	99 14	152.8	4
25	27 15.5	99 14	152.3	27 45.3	99 14	152.2	28 15.0	99 14	152.1	28 44.7	99 14	152.1	29 14.4	99 14	152.0	29 44.1	99 14	151.9	30 13.7	99 14	151.8	30 43.4	99 14	151.7	25
6	27 07.2	99 14	151.2	27 36.9	99 14	151.1	28 06.6	99 14	151.0	28 36.3	99 14	151.0	29 06.0	99 14	150.9	29 35.6	99 14	150.8	30 05.3	99 15	150.7	30 35.0	99 15	150.6	6
7	26 58.6	99 15	150.1	27 28.3	99 15	150.0	27 58.0	99 15	149.9	28 27.6	99 15	149.9	28 57.3	99 15	149.8	29 26.9	99 15	149.7	29 56.6	99 15	149.6	30 26.2	99 15	149.5	7
8	26 49.8	99 15	149.0	27 19.4	99 15	148.9	27 49.0	99 15	148.9	28 18.7	99 15	148.8	28 48.3	99 15	148.7	29 17.9	99 15	148.6	29 47.6	99 16	148.5	30 17.2	99 16	148.4	8
9	26 40.6	99 16	147.9	27 10.2	99 16	147.9	27 39.8	99 16	147.8	28 09.4	99 16	147.7	28 39.0	99 16	147.6	29 08.6	99 16	147.5	29 38.2	99 16	147.4	30 07.8	99 16	147.3	9
30	26 31.1	99 16	146.9	27 00.7	99 16	146.8	27 30.3	99 16	146.7	27 59.9	99 16	146.6	28 29.5	99 16	146.5	28 59.1	99 16	146.4	29 28.7	99 16	146.3	29 58.2	99 16	146.2	30
1	26 21.4	99 17	145.8	26 51.0	99 17	145.7	27 20.6	99 17	145.6	27 50.1	99 17	145.5	28 19.7	99 17	145.4	28 49.2	99 17	145.3	29 18.8	98 17	145.2	29 48.3	98 17	145.1	1
2	26 11.4	98 17	144.7	26 41.0	98 17	144.6	27 10.5	98 17	144.5	27 40.0	98 17	144.4	28 09.6	98 17	144.3	28 39.1	98 17	144.2	29 08.6	98 17	144.1	29 38.2	98 17	144.0	2
3	26 01.2	98 18	143.6	26 30.7	98 18	143.5	27 00.2	98 18	143.4	27 29.7	98 18	143.3	27 59.2	98 18	143.2	28 28.7	98 18	143.1	28 58.2	98 18	143.0	29 27.7	98 18	142.9	3
4	25 50.6	98 18	142.6	26 20.1	98 18	142.5	26 49.6	98 18	142.4	27 19.1	98 18	142.3	27 48.6	98 18	142.2	28 18.1	98 18	142.1	28 47.5	98 18	142.0	29 17.0	98 18	141.8	4
35	25 39.8	98 18	141.5	26 09.3	98 18	141.4	26 38.8	98 18	141.3	27 08.2	98 19	141.2	27 37.7	98 19	141.1	28 07.2	98 19	141.0	28 36.6	98 19	140.9	29 06.0	98 19	140.8	35
6	25 28.8	98 19	140.4	25 58.2	98 19	140.3	26 27.7	98 19	140.2	26 57.1	98 19	140.1	27 26.6	98 19	140.0	27 56.0	98 19	139.9	28 25.4	98 19	139.8	28 54.8	98 19	139.7	6
7	25 17.5	98 19	139.4	25 46.9	98 19	139.3	26 16.3	98 19	139.2	26 45.7	98 19	139.1	27 15.2	98 19	138.9	27 44.6	98 19	138.8	28 14.0	98 20	138.7	28 43.3	98 20	138.6	7
8	25 05.9	98 20	138.3	25 35.3	98 20	138.2	26 04.7	98 20	138.1	26 34.1	98 20	138.0	27 03.5	98 20	137.9	27 32.9	98 20	137.8	28 02.3	98 20	137.6	28 31.6	98 20	137.5	8
9	24 54.2	98 20	137.3	25 23.5	98 20	137.1	25 52.9	98 20	137.0	26 22.3	98 20	136.9	26 51.6	98 20	136.8	27 21.0	98 20	136.7	27 50.3	98 20	136.6	28 19.7	98 20	136.5	9
40	24 42.1	98 20	136.2	25 11.5	98 20	136.1	25 40.8	98 21	136.0	26 10.2	98 21	135.9	26 39.5	98 21	135.7	27 08.8	98 21	135.6	27 38.1	98 21	135.5	28 07.5	98 21	135.4	40
1	24 29.9	98 21	135.2	24 59.2	98 21	135.0	25 28.5	98 21	134.9	25 57.8	98 21	134.8	26 27.1	98 21	134.7	26 56.4	98 21	134.6	27 25.7	98 21	134.4	27 55.0	98 21	134.3	1
2	24 17.4	98 21	134.1	24 46.7	98 21	134.0	25 16.0	98 21	133.9	25 45.3	98 21	133.7	26 14.6	98 21	133.6	26 43.8	98 21	133.5	27 13.1	98 21	133.4	27 42.4	98 21	133.3	2
3	24 04.7	98 22	133.1	24 34.0	98 22	132.9	25 03.2	98 22	132.8	25 32.5	98 22	132.7	26 01.7	98 22	132.6	26 31.0	97 22	132.4	27 00.2	97 22	132.3	27 29.5	97 22	132.2	3
4	23 51.8	98 22	132.0	24 21.0	97 22	131.9	24 50.2	97 22	131.8	25 19.5	97 22	131.6	25 48.7	97 22	131.5	26 17.9	97 22	131.4	26 47.2	97 22	131.3	27 16.4	97 22	131.1	4
45	23 38.6	97 22	131.0	24 07.8	97 22	130.8	24 37.1	97 22	130.7	25 06.3	97 22	130.6	25 35.5	97 22	130.5	26 04.7	97 22	130.3	26 33.9	97 22	130.2	27 03.0	97 23	130.1	45
6	23 25.3	97 23	129.9	23 54.5	97 23	129.8	24 23.7	97 23	129.7	24 52.8	97 23	129.6	25 22.0	97 23	129.4	25 51.2	97 23	129.3	26 20.4	97 23	129.2	26 49.5	97 23	129.0	6
7	23 11.7	97 23	128.9	23 40.9	97 23	128.8	24 10.1	97 23	128.6	24 39.2	97 23	128.5	25 08.4	97 23	128.4	25 37.5	97 23	128.3	26 06.7	97 23	128.1	26 35.8	97 23	128.0	7
8	22 58.0	97 23	127.9	23 27.1	97 23	127.7	23 56.3	97 23	127.6	24 25.4	97 23	127.5	24 54.5	97 23	127.3	25 23.6	97 23	127.2	25 52.8	97 24	127.1	26 21.9	97 24	126.9	8
9	22 44.0	97 24	126.8	23 13.1	97 24	126.7	23 42.3	97 24	126.6	24 11.4	97 24	126.4	24 40.5	97 24	126.3	25 09.6	97 24	126.2	25 38.7	97 24	126.0	26 07.8	97 24	125.9	9
50	22 29.9	97 24	125.8	22 59.0	97 24	125.7	23 28.1	97 24	125.5	23 57.2	97 24	125.4	24 26.3	97 24	125.3	24 55.3	97 24	125.1	25 24.4	97 24	125.0	25 53.5	97 24	124.9	50
1	22 15.6	97 24	124.8	22 44.6	97 24	124.6	23 13.7	97 24	124.5	23 42.8	97 24	124.4	24 11.8	97 24	124.2	24 40.9	97 24	124.1	25 09.9	97 24	124.0	25 39.0	97 24	123.8	1
2	22 01.1	97 24	123.8	22 30.1	97 24	123.6	22 59.2	97 24	123.5	23 28.2	97 25	123.3	23 57.3	97 25	123.2	24 26.3	97 25	123.1	24 55.3	97 25	122.9	25 24.3	97 25	122.8	2
3	21 46.4	97 25	122.7	22 15.4	97 25	122.6	22 44.5	97 25	122.5	23 13.5	97 25	122.3	23 42.5	97 25	122.2	24 11.5	97 25	122.0	24 40.5	97 25	121.9	25 09.5	97 25	121.8	3
4	21 31.6	97 25	121.7	22 00.6	97 25	121.6	22 29.6	97 25	121.4	22 58.6	97 25	121.3	23 27.6	97 25	121.2	23 56.5	97 25	121.0	24 25.5	97 25	120.9	24 54.5	97 25	120.7	4
55	21 16.6	97 25	120.7	21 45.5	97 25	120.6	22 14.5	97 26	120.4	22 43.5	97 25	120.3	23 12.5	97 25	120.1	23 41.4	97 25	120.0	24 10.4	96 26	119.9	24 39.3	96 26	119.7	55
6	21 01.4	97 26	119.7	21 30.4	97 26	119.5	21 59.3	97 26	119.4	22 28.3	96 26	119.3	22 57.2	96 26	119.1	23 26.2	96 26	119.0	23 55.1	96 26	118.8	24 24.0	96 26	118.7	6
7	20 46.1	97 26	118.7	21 15.0	96 26	118.5	21 44.0	96 26	118.4	22 12.9	96 26	118.3	22 41.8	96 26	118.1	23 10.7	96 26	118.0	23 39.6	96 26	117.8	24 08.5	96 26	117.7	7
8	20 30.6	96 26	117.7	20 59.5	96 26	117.5	21 28.5	96 26	117.4	21 57.4	96 26	117.2	22 26.3	96 26	117.1	22 55.2	96 26	116.9	23 24.1	96 26	116.8	23 52.9	96 26	116.7	8
9	20 15.0	96 26	116.7	20 43.9	96 26	116.5	21 12.8	96 26	116.4	21 41.7	96 26	116.2	22 10.6	96 26	116.1	22 39.5	96 26	115.9	23 08.3	96 26	115.8	23 37.2	96 26	115.6	9
60	19 59.3	96 26	115.7	20 28.1	96 26	115.5	20 57.0	96 27	115.4	21 25.9	96 27	115.2	21 54.8	96 27	115.1	22 23.6	96 27	114.9	22 52.5	96 27	114.8	23 21.3	96 27	114.6	60
1	19 43.4	96 27	114.7	20 12.3	96 27	114.5	20 41.1	96 27	114.4	21 10.0	96 27	114.2	21 38.8	96 27	114.1	22 07.7	96 27	113.9	22 36.5	96 27	113.8	23 05.3	96 27	113.6	1
2	19 27.4	96 27	113.7	19 56.2	96 27	113.5	20 25.1	96 27	113.4	20 53.9	96 27	113.2	21 22.7	96 27	113.1	21 51.6	96 27	112.9	22 20.4	96 27	112.8	22 49.2	96 27	112.6	2
3	19 11.2	96 27	112.7	19 40.1	96 27	112.5	20 08.9	96 27	112.4	20 37.7	96 27	112.2	21 06.5	96 27	112.1	21 35.3	96 27	111.9	22 04.1	96 27	111.8	22 32.9	96 27	111.6	3
4	18 55.0	96 27	111.7	19 23.8	96 27	111.5	19 52.6	96 27	111.4	20 21.4	96 27	111.2	20 50.2	96 27	111.1	21 19.0	96 27	110.9	21 47.8	96 27	110.8	22 16.6	96 27	110.6	4
65	18 38.6	96 27	110.7	19 07.4	96 27	110.5	19 36.2	96 28	110.4	20 05.0	96 28	110.2	20 33.8	96 28	110.1	21 02.6	96 28	109.9	21 31.3	96 28	109.8	22 00.1	96 28	109.6	65
6	18 22.2	96 28	109.7	18 51.0	96 28	109.5	19 19.7	96 28	109.4	19 48.5	96 28	109.2	20 17.3	96 28	109.1	20 46.0	96 28	108.9	21 14.8	96 28	108.8	21 43.5	96 28	108.6	6
7	18 05.6	96 28	108.7	18 34.4	96 28	108.5	19 03.1	96 28	108.4	19 31.9	96 28	108.2	20 00.6	96 28	108.1	20 29.4	96 28	107.9	20 58.1	96 28	107.8	21 26.8	96 28	107.6	7
8	17 48.9	96 28	107.7	18 17.7	96 28	107.6	18 46.5	96 28	107.4	19 15.2	96 28	107.3	19 43.9	96 28	107.1	20 12.6	96 28	107.0	20 41.4	96 28	106.8	21 10.1	96 28	106.6	8
9	17 32.2	96 28	106.7	18 00.9	96 28	106.6	18 29.7	96 28	106.4	18 58.4	96 28	106.3	19 27.1	96 28	106.1	19 55.8	96 28	106.0	20 24.5	96 28	105.8	20 53.2	96 28	105.7	9
70	17 15.3	96 28	105.7	17 44.1	96 28	105.6	18 12.8	96 28	105.4	18 41.5	96 28	105.3	19 10.2	96 28	105.1	19 38.9	96 28	105.0	20 07.6	96 28	104.8	20 36.3	96 28	104.7	70
1	16 58.4	96 28	104.8	17 27.1	96 28	104.6	17 55.9	96 28	104.5	18 24.6	96 28	104.3	18 53.2	96 28	104.2	19 21.9	96 28	104.0	19 50.6	96 28	103.8	20 19.3	96 28	103.7	1
2	16 41.4	96 28	103.8	17 10.1	96 28	103.6	17 38.8	96 28	103.5	18 07.5	96 28	103.3	18 36.2	96 29	103.2	19 04.9	96 29	103.0	19 33.5	96 29	102.9	20 02.2	96 29	102.7	2
3	16 24.4	96 29	102.8	16 53.0	96 29	102.7	17 21.7	96 29	102.5	17 50.4	96 29	102.4	18 19.1	96 29	102.2	18 47.8	96 29	102.0	19 16.4	96 29	101.9	19 45.1	96 29	101.7	3
4	16 07.2	96 29	101.8	16 35.9	96 29	101.7	17 04.6	96 29	101.5	17 33.2	96 29	101.4	18 01.9	96 29	101.2	18 30.6	96 29	101.1	18 59.2	95 29	100.9	19 27.9	95 29	100.8	4
75	15 50.0	96 29	100.9	16 18.7	96 29	100.7	16 47.4	96 29	100.6	17 16.0	96 29	100.4	17 44.7	96 29	100.2	18 13.3	95 29	100.1	18 42.0	95 29	99.9	19 10.6	95 29	99.8	75
6	15 32.8	96 29	99.9	16 01.4	96 29	99.7	16 30.1	96 29	99.6	16 58.7	95 29	99.4	17 27.4	95 29	99.3	17 56.0	95 29	99.1	18 24.7	95 29	99.0	18 53.3	95 29	98.8	6
7	15 15.5	96 29	98.9	15 44.1	96 29	98.8	16 12.8	95 29	98.6	16 41.4	95 29	98.5	17 10.1	95 29	98.3	17 38.7	95 29	98.1	18 07.3	95 29	98.0	18 35.9	95 29	97.8	7
8	14 58.1	96 29	98.0	15 26.8	96 29	97.8	15 55.4	95 29	97.6	16 24.0	95 29	97.5	16 52.7	95 29	97.3	17 21.3	95 29	97.2	17 49.9	95 29	97.0	18 18.5	95 29	96.9	8
9	14 40.7	95 29	97.0	15 09.4	95 29	96.8	15 38.0	95 29	96.7	16 06.6	95 29	96.5	16 35.3	95 29	96.4	17 03.9	95 29	96.2	17 32.5	95 29	96.1	18 01.1	95 29	95.9	9
80	14 23.3	95 29	96.0	14 51.9	95 29	95.9	15 20.6	95 29	95.7	15 49.2	95 29	95.6	16 17.8	95 29	95.4	16 46.4	95 29	95.2	17 15.0	95 29	95.1	17 43.6	95 29	94.9	80
1	14 05.8	95 29	95.1	14 34.5	95 29	94.9	15 03.1	95 29	94.8	15 31.7	95 29	94.6	16 00.3	95 29	94.4	16 28.9	95 29	94.3	16 57.5	95 29	94.1	17 26.1	95 29	94.0	1
2	13 48.3	96 29	94.1	14 17.0	95 29	93.9	14 45.6	95 29	93.8	15 14.2	95 29	93.6	15 42.8	95 29	93.5	16 11.4	95 29	93.3	16 40.0	95 29	93.2	17 08.6	95 29	93.0	2
3	13 30.8	96 29	93.1	13 59.5	95 29	93.0	14 28.1	95 29	92.8	14 56.7	95 29	92.7	15 25.3	95 29	92.5	15 53.9	95 29	92.4	16 22.5	95 29	92.2	16 51.1	95 29	92.0	3
4	13 13.3	96 29	92.2	13 41.9	95 29	92.0	14 10.6	95 29	91.9	14 39.2	95 29	91.7	15 07.8	95 29	91.6	15 36.4	95 29	91.4	16 05.0	95 29	91.2	16 33.6	95 29	91.1	4
85	12 55.8	96 29	91.2	13 24.4	95 29	91.1	13 53.0	95 29	90.9	14 21.6	95 29	90.8	14 50.2	95 29	90.6	15 18.8	95 29	90.4	15 47.4	95 29	90.3	16 16.0	95 29	90.1	85
6	12 38.2	96 29	90.3	13 06.9	95 29	90.1	13 35.5	95 29	90.0	14 04.1	95 29	89.8	14 32.7	95 29	89.6	15 01.3	95 29	89.5	15 29.9	95 29	89.3	15 58.5	95 29	89.2	6
7	12 20.7	96 29	89.3	12 49.3	95 29	89.2	13 17.9	95 29	89.0	13 46.5	95 29	88.8	14 15.2	95 29	88.7	14 43.8	95 29	88.5	15 12.4	95 29	88.4	15 41.0	95 29	88.2	7
8	12 03.1	96 29	88.4	12 31.8	95 29	88.2	13 00.4	95 29	88.0	13 29.0	95 29	87.9	13 57.6	95 29	87.7	14 26.2	95 29	87.6	14 54.8	95 29	87.4	15 23.4	95 29	87.3	8
9	11 45.6	95 29	87.4	12 14.2	95 29	87.2	12 42.9	95 29	87.1	13 11.5	95 29	86.9	13 40.1	95 29	86.8	14 08.7	95 29	86.6	14 37.3	95 29	86.5	15 05.9	95 29	86.3	9
[illegible]	11 28.1	95 29	86.4	11 56.7	95 29	86.3	12 25.4	95 29	86.1	12 54.0	95 29	86.0	13 22.6	95 29	85.8	13 51.2	95 29	85.7	14 19.8	95 29	85.5	14 48.4	95 29	85.4	90

Lat. 73°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	d	°	′	d	°	′	d	°	′	d	°	′	d	°	′	d	°	′	d	°	′	d	°	
91	11 10.6	95 29	85.5	11 39.2	96 29	85.3	12 07.9	96 29	85.2	12 36.5	96 29	85.0	13 05.1	96 29	84.9	13 33.7	96 29	84.7	14 02.3	96 29	84.6	14 30.9	96 29	84.4	91
2	10 53.1	95 29	84.5	11 21.8	96 29	84.4	11 50.4	96 29	84.2	12 19.0	96 29	84.1	12 47.7	96 29	83.9	13 16.3	96 29	83.8	13 44.9	96 29	83.6	14 13.5	96 29	83.5	2
3	10 35.7	95 29	83.6	11 04.3	96 29	83.4	11 33.0	96 29	83.3	12 01.6	96 29	83.1	12 30.2	96 29	83.0	12 58.9	96 29	82.8	13 27.5	96 29	82.7	13 56.1	96 29	82.5	3
4	10 18.3	96 29	82.6	10 46.9	96 29	82.5	11 15.6	95 29	82.3	11 44.2	95 29	82.2	12 12.8	95 29	82.0	12 41.5	95 29	81.9	13 10.1	95 29	81.7	13 38.7	96 29	81.6	4
95	10 00.9	96 29	81.7	10 29.5	96 29	81.5	10 58.2	96 29	81.4	11 26.8	96 29	81.2	11 55.5	96 29	81.1	12 24.1	96 29	80.9	12 52.8	96 29	80.8	13 21.4	96 29	80.6	95
6	9 43.5	96 29	80.7	10 12.2	96 29	80.6	10 40.9	96 29	80.4	11 09.5	96 29	80.3	11 38.2	96 29	80.1	12 06.8	96 29	80.0	12 35.5	96 29	79.8	13 04.1	96 29	79.7	6
7	9 26.3	96 29	79.8	9 54.9	96 29	79.6	10 23.6	96 29	79.5	10 52.3	96 29	79.3	11 20.9	96 29	79.2	11 49.6	96 29	79.0	12 18.2	96 29	78.9	12 46.9	96 29	78.7	7
8	9 09.0	96 29	78.8	9 37.7	96 29	78.7	10 06.4	96 29	78.5	10 35.0	96 29	78.4	11 03.7	96 29	78.2	11 32.4	96 29	78.1	12 01.0	96 29	77.9	12 29.7	96 29	77.8	8
9	8 51.8	96 29	77.9	9 20.5	96 29	77.8	9 49.2	96 28	77.6	10 17.9	96 28	77.5	10 46.6	96 28	77.3	11 15.2	96 28	77.2	11 43.9	96 28	77.0	12 12.6	96 28	76.9	9
100	8 34.7	96 28	77.0	9 03.4	96 28	76.8	9 32.1	96 28	76.7	10 00.8	96 28	76.5	10 29.5	96 28	76.4	10 58.2	96 28	76.2	11 26.9	96 28	76.1	11 55.5	96 28	75.9	100
1	8 17.7	96 28	76.0	8 46.4	96 28	75.9	9 15.1	96 28	75.7	9 43.8	96 28	75.6	10 12.5	96 28	75.4	10 41.2	96 28	75.3	11 09.9	96 28	75.1	11 38.5	96 28	75.0	1
2	8 00.7	96 28	75.1	8 29.4	96 28	74.9	8 58.1	96 28	74.8	9 26.8	96 28	74.6	9 55.5	96 28	74.5	10 24.2	96 28	74.3	10 52.9	96 28	74.2	11 21.6	96 28	74.0	2
3	7 43.8	96 28	74.1	8 12.5	96 28	74.0	8 41.2	96 28	73.8	9 10.0	96 28	73.7	9 38.7	96 28	73.5	10 07.4	96 28	73.4	10 36.1	96 28	73.2	11 04.8	96 28	73.1	3
4	7 26.9	96 28	73.2	7 55.7	96 28	73.0	8 24.4	96 28	72.9	8 53.2	96 28	72.7	9 21.9	96 28	72.6	9 50.6	96 28	72.4	10 19.4	96 28	72.3	10 48.1	96 28	72.2	4
105	7 10.2	96 28	72.2	7 38.9	96 28	72.1	8 07.7	96 28	71.9	8 36.4	96 28	71.8	9 05.2	96 28	71.6	9 33.9	96 28	71.5	10 02.7	96 28	71.4	10 31.4	96 28	71.2	105
6	6 53.5	96 28	71.3	7 22.3	96 28	71.1	7 51.1	96 28	71.0	8 19.8	96 28	70.9	8 48.6	96 28	70.7	9 17.4	96 27	70.6	9 46.1	96 27	70.4	10 14.9	96 27	70.3	6
7	6 37.0	96 27	70.3	7 05.7	96 27	70.2	7 34.5	96 27	70.1	8 03.3	96 27	69.9	8 32.1	96 27	69.8	9 00.9	96 27	69.6	9 29.6	96 27	69.5	9 58.4	96 27	69.3	7
8	6 20.5	96 27	69.4	6 49.3	96 27	69.2	7 18.1	96 27	69.1	7 46.9	96 27	69.0	8 15.7	96 27	68.8	8 44.5	96 27	68.7	9 13.3	96 27	68.5	9 42.0	96 27	68.4	8
9	6 04.1	96 27	68.4	6 32.9	96 27	68.3	7 01.7	96 27	68.2	7 30.6	96 27	68.0	7 59.4	96 27	67.9	8 28.2	96 27	67.7	8 57.0	96 27	67.6	9 25.8	96 27	67.5	9
110	5 47.9	96 27	67.5	6 16.7	96 27	67.4	6 45.5	96 27	67.2	7 14.3	96 27	67.1	7 43.2	96 27	66.9	8 12.0	96 27	66.8	8 40.8	96 27	66.7	9 09.6	96 27	66.5	110
1	5 31.7	96 27	66.6	6 00.6	96 27	66.4	6 29.4	96 27	66.3	6 58.2	96 27	66.1	7 27.1	96 27	66.0	7 55.9	96 27	65.9	8 24.8	96 27	65.7	8 53.6	96 27	65.6	1
2	5 15.7	96 27	65.6	5 44.5	96 26	65.5	6 13.4	96 26	65.3	6 42.3	96 26	65.2	7 11.1	96 26	65.1	7 40.0	96 26	64.9	8 08.8	96 26	64.8	8 37.7	96 26	64.6	2
3				5 28.6	96 26	64.5	5 57.5	96 26	64.4	6 26.4	96 26	64.3	6 55.3	96 26	64.1	7 24.2	96 26	64.0	7 53.0	96 26	63.8	8 21.9	96 26	63.7	3
4				5 12.9	96 26	63.6	5 41.8	96 26	63.5	6 10.7	96 26	63.3	6 39.6	96 26	63.2	7 08.5	96 26	63.0	7 37.3	96 26	62.9	8 06.2	96 26	62.8	4
115							5 26.1	96 26	62.5	5 55.1	96 26	62.4	6 24.0	96 26	62.2	6 52.9	96 26	62.1	7 21.8	96 26	62.0	7 50.7	96 26	61.8	115
6							5 10.6	96 26	61.6	5 39.6	96 26	61.4	6 08.5	96 26	61.3	6 37.4	96 26	61.2	7 06.4	96 26	61.0	7 35.3	96 26	60.9	6
7										5 24.2	97 25	60.5	5 53.2	97 25	60.4	6 22.1	97 25	60.2	6 51.1	96 26	60.1	7 20.0	96 26	60.0	7
8										5 09.0	97 25	59.5	5 38.0	97 25	59.4	6 07.0	97 25	59.3	6 36.0	97 25	59.2	7 04.9	97 25	59.0	8
9													5 23.0	97 25	58.5	5 52.0	97 25	58.3	6 21.0	97 25	58.2	6 50.0	97 25	58.1	9
120													5 08.1	97 25	57.5	5 37.1	97 24	57.4	6 06.1	97 24	57.3	6 35.2	97 24	57.1	120
1																5 22.4	97 24	56.5	5 51.5	97 24	56.3	6 20.5	97 24	56.2	1
2																5 07.9	97 24	55.5	5 36.9	97 24	55.4	6 06.0	97 24	55.3	2
3																			5 22.6	97 24	54.5	5 51.7	97 24	54.3	3
4																			5 08.4	97 23	53.5	5 37.5	97 23	53.4	4
125																						5 23.5	97 23	52.5	125
6																						5 09.7	97 23	51.5	6

Lat. 74°

Lat. 75°

Lat. 76°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′		
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0
1	32 59.8	1.0 01	178.9	33 29.8	1.0 01	178.9	33 59.8	1.0 01	178.8	34 29.8	1.0 01	178.8
2	32 59.3	1.0 01	177.7	33 29.3	1.0 01	177.7	33 59.3	1.0 01	177.7	34 29.3	1.0 01	177.7
3	32 58.4	1.0 02	176.6	33 28.4	1.0 02	176.6	33 58.4	1.0 02	176.5	34 28.4	1.0 02	176.5
4	32 57.2	1.0 03	175.4	33 27.2	1.0 03	175.4	33 57.2	1.0 03	175.4	34 27.2	1.0 03	175.4
05	32 55.6	1.0 03	174.3	33 25.6	1.0 03	174.3	33 55.6	1.0 03	174.2	34 25.6	1.0 03	174.2
6	32 53.7	1.0 04	173.1	33 23.7	1.0 04	173.1	33 53.7	1.0 04	173.1	34 23.6	1.0 04	173.1
7	32 51.4	1.0 04	172.0	33 21.4	1.0 04	172.0	33 51.4	1.0 04	171.9	34 21.3	1.0 04	171.9
8	32 48.8	1.0 05	170.8	33 18.8	1.0 05	170.8	33 48.7	1.0 05	170.8	34 18.7	1.0 05	170.8
9	32 45.8	1.0 06	169.7	33 15.8	1.0 06	169.7	33 45.7	1.0 06	169.6	34 15.7	1.0 06	169.6
10	32 42.5	1.0 06	168.6	33 12.5	1.0 06	168.5	33 42.4	1.0 06	168.5	34 12.4	1.0 06	168.4
1	32 38.9	1.0 07	167.4	33 08.8	1.0 07	167.4	33 38.7	1.0 07	167.3	34 08.7	1.0 07	167.3
2	32 34.9	1.0 07	166.3	33 04.8	1.0 07	166.2	33 34.7	1.0 07	166.2	34 04.6	1.0 07	166.1
3	32 30.6	1.0 08	165.1	33 00.5	1.0 08	165.1	33 30.4	1.0 08	165.0	34 00.3	1.0 08	165.0
4	32 25.9	1.0 08	164.0	32 55.8	1.0 08	164.0	33 25.7	1.0 08	163.9	33 55.6	1.0 08	163.9
15	32 20.9	1.0 09	162.9	32 50.8	1.0 09	162.8	33 20.6	1.0 09	162.8	33 50.5	1.0 09	162.7
6	32 15.6	1.0 09	161.7	32 45.4	1.0 09	161.7	33 15.3	1.0 10	161.6	33 45.1	1.0 10	161.6
7	32 09.9	99 10	160.6	32 39.7	99 10	160.5	33 09.6	99 10	160.5	33 39.4	99 10	160.4
8	32 03.9	99 11	159.5	32 33.7	99 11	159.4	33 03.6	99 11	159.4	33 33.4	99 11	159.3
9	31 57.6	99 11	158.4	32 27.4	99 11	158.3	32 57.2	99 11	158.2	33 27.0	99 11	158.2
20	31 51.0	99 12	157.2	32 20.8	99 12	157.2	32 50.5	99 12	157.1	33 20.3	99 12	157.0
1	31 44.0	99 12	156.1	32 13.8	99 12	156.0	32 43.6	99 12	156.0	33 13.3	99 12	155.9
2	31 36.8	99 13	155.0	32 06.5	99 13	154.9	32 36.3	99 13	154.8	33 06.0	99 13	154.8
3	31 29.2	99 13	153.9	31 58.9	99 13	153.8	32 28.6	99 13	153.7	32 58.4	99 13	153.6
4	31 21.3	99 14	152.8	31 51.0	99 14	152.7	32 20.7	99 14	152.6	32 50.4	99 14	152.5
25	31 13.1	99 14	151.6	31 42.8	99 14	151.6	32 12.5	99 14	151.5	32 42.2	99 14	151.4
6	31 04.6	99 15	150.5	31 34.3	99 15	150.4	32 04.0	99 15	150.4	32 33.6	99 15	150.3
7	30 55.9	99 15	149.4	31 25.5	99 15	149.3	31 55.1	99 15	149.2	32 24.8	99 15	149.1
8	30 46.8	99 16	148.3	31 16.4	99 16	148.2	31 46.0	99 16	148.1	32 15.6	99 16	148.0
9	30 37.4	99 16	147.2	31 07.0	99 16	147.1	31 36.6	99 16	147.0	32 06.2	99 16	146.9
30	30 27.8	99 17	146.1	30 57.4	99 17	146.0	31 26.9	99 17	145.9	31 56.5	99 17	145.8
1	30 17.9	98 17	145.0	30 47.4	98 17	144.9	31 16.9	98 17	144.8	31 46.5	98 17	144.7
2	30 07.7	98 17	143.9	30 37.2	98 18	143.8	31 06.7	98 18	143.7	31 36.2	98 18	143.6
3	29 57.2	98 18	142.8	30 26.7	98 18	142.7	30 56.2	98 18	142.6	31 25.7	98 18	142.5
4	29 46.5	98 18	141.7	30 15.9	98 18	141.6	30 45.4	98 18	141.5	31 14.8	98 18	141.4
35	29 35.5	98 19	140.6	30 04.9	98 19	140.5	30 34.4	98 19	140.4	31 03.8	98 19	140.3
6	29 24.2	98 19	139.6	29 53.6	98 19	139.5	30 23.0	98 19	139.3	30 52.4	98 19	139.2
7	29 12.7	98 20	138.5	29 42.1	98 20	138.4	30 11.5	98 20	138.3	30 40.9	98 20	138.1
8	29 01.0	98 20	137.4	29 30.3	98 20	137.3	29 59.7	98 20	137.2	30 29.0	98 20	137.1
9	28 49.0	98 20	136.3	29 18.3	98 20	136.2	29 47.6	98 20	136.1	30 17.0	98 20	136.0
40	28 36.8	98 21	135.3	29 06.1	98 21	135.1	29 35.4	98 21	135.0	30 04.6	98 21	134.9
1	28 24.3	98 21	134.2	28 53.6	98 21	134.1	29 22.8	98 21	133.9	29 52.1	98 21	133.8
2	28 11.6	98 22	133.1	28 40.9	97 22	133.0	29 10.1	97 22	132.9	29 39.3	97 22	132.7
3	27 58.7	97 22	132.1	28 27.9	97 22	131.9	28 57.1	97 22	131.8	29 26.3	97 22	131.7
4	27 45.6	97 22	131.0	28 14.8	97 22	130.9	28 44.0	97 22	130.7	29 13.1	97 22	130.6
45	27 32.2	97 23	130.0	28 01.4	97 23	129.8	28 30.6	97 23	129.7	28 59.7	97 23	129.6
6	27 18.7	97 23	128.9	27 47.8	97 23	128.8	28 17.0	97 23	128.6	28 46.1	97 23	128.5
7	27 04.9	97 23	127.9	27 34.0	97 23	127.7	28 03.2	97 23	127.6	28 32.3	97 23	127.4
8	26 51.0	97 24	126.8	27 20.1	97 24	126.7	27 49.2	97 24	126.5	28 18.2	97 24	126.4
9	26 36.8	97 24	125.8	27 05.9	97 24	125.6	27 35.0	97 24	125.5	28 04.0	97 24	125.3
50	26 22.5	97 24	124.7	26 51.6	97 24	124.6	27 20.6	97 24	124.4	27 49.6	97 24	124.3
1	26 08.0	97 24	123.7	26 37.0	97 24	123.5	27 06.0	97 25	123.4	27 35.0	97 25	123.3
2	25 53.3	97 25	122.7	26 22.3	97 25	122.5	26 51.3	97 25	122.4	27 20.3	97 25	122.2
3	25 38.5	97 25	121.6	26 07.4	97 25	121.5	26 36.4	97 25	121.3	27 05.3	96 25	121.2
4	25 23.4	97 25	120.6	25 52.4	96 25	120.4	26 21.3	96 25	120.3	26 50.3	96 25	120.2
55	25 08.3	96 26	119.6	25 37.2	96 26	119.4	26 06.1	96 26	119.3	26 35.0	96 26	119.1
6	24 52.9	96 26	118.5	25 21.8	96 26	118.4	25 50.7	96 26	118.2	26 19.6	96 26	118.1
7	24 37.4	96 26	117.5	25 06.3	96 26	117.4	25 35.2	96 26	117.2	26 04.1	96 26	117.1
8	24 21.8	96 26	116.5	24 50.7	96 26	116.4	25 19.5	96 26	116.2	25 48.4	96 26	116.1
9	24 06.0	96 26	115.5	24 34.9	96 27	115.3	25 03.7	96 27	115.2	25 32.5	96 27	115.0
60	23 50.1	96 27	114.5	24 19.0	96 27	114.3	24 47.8	96 27	114.2	25 16.6	96 27	114.0
1	23 34.1	96 27	113.5	24 02.9	96 27	113.3	24 31.7	96 27	113.2	25 00.5	96 27	113.0
2	23 18.0	96 27	112.5	23 46.8	96 27	112.3	24 15.5	96 27	112.2	24 44.3	96 27	112.0
3	23 01.7	96 27	111.5	23 30.5	96 27	111.3	23 59.2	96 27	111.2	24 28.0	96 27	111.0
4	22 45.3	96 27	110.5	23 14.1	96 28	110.3	23 42.8	96 28	110.2	24 11.5	96 28	110.0
65	22 28.8	96 28	109.5	22 57.6	96 28	109.3	23 26.3	96 28	109.2	23 55.0	96 28	109.0
6	22 12.2	96 28	108.5	22 41.0	96 28	108.3	23 09.7	96 28	108.2	23 38.4	96 28	108.0
7	21 55.6	96 28	107.5	22 24.3	96 28	107.3	22 53.0	96 28	107.2	23 21.6	96 28	107.0
8	21 38.8	96 28	106.5	22 07.5	96 28	106.3	22 36.1	96 28	106.2	23 04.8	96 28	106.0
9	21 21.9	96 28	105.5	21 50.6	96 28	105.3	22 19.3	96 28	105.2	22 47.9	96 28	105.0
70	21 05.0	96 28	104.5	21 33.6	96 28	104.4	22 02.3	96 28	104.2	22 30.9	95 28	104.0
1	20 47.9	96 28	103.5	21 16.6	95 28	103.4	21 45.2	95 29	103.2	22 13.9	95 29	103.1
2	20 30.9	96 29	102.5	20 59.5	95 29	102.4	21 28.1	95 29	102.2	21 56.8	95 29	102.1
3	20 13.7	96 29	101.6	20 42.3	95 29	101.4	21 11.0	95 29	101.2	21 39.6	95 29	101.1
4	19 56.5	95 29	100.6	20 25.1	95 29	100.4	20 53.7	95 29	100.3	21 22.3	95 29	100.1
75	19 39.2	95 29	99.6	20 07.8	95 29	99.5	20 36.4	95 29	99.3	21 05.0	95 29	99.1
6	19 21.9	95 29	98.6	19 50.5	95 29	98.5	20 19.1	95 29	98.3	20 47.7	95 29	98.2
7	19 04.5	95 29	97.7	19 33.1	95 29	97.5	20 01.7	95 29	97.4	20 30.3	95 29	97.2
8	18 47.1	95 29	96.7	19 15.7	95 29	96.5	19 44.3	95 29	96.4	20 12.9	95 29	96.2
9	18 29.7	95 29	95.7	18 58.3	95 29	95.6	19 26.9	95 29	95.4	19 55.4	95 29	95.3
80	18 12.2	95 29	94.8	18 40.8	95 29	94.6	19 09.4	95 29	94.5	19 38.0	95 29	94.3
1	17 54.7	95 29	93.8	18 23.3	95 29	93.6	18 51.9	95 29	93.5	19 20.4	95 29	93.3
2	17 37.2	95 29	92.8	18 05.8	95 29	92.7	18 34.4	95 29	92.5	19 02.9	95 29	92.4
3	17 19.7	95 29	91.9	17 48.3	95 29	91.7	18 16.8	95 29	91.6	18 45.4	95 29	91.4
4	17 02.2	95 29	90.9	17 30.7	95 29	90.8	17 59.3	95 29	90.6	18 27.9	95 29	90.4
85	16 44.6	95 29	90.0	17 13.2	95 29	89.8	17 41.8	95 29	89.7	18 10.3	95 29	89.5
6	16 27.1	95 29	89.0	16 55.6	95 29	88.9	17 24.2	95 29	88.7	17 52.8	95 29	88.5
7	16 09.5	95 29	88.1	16 38.1	95 29	87.9	17 06.7	95 29	87.7	17 35.2	95 29	87.6
8	15 52.0	95 29	87.1	16 20.6	95 29	87.0	16 49.2	95 29	86.8	17 17.7	95 29	86.6
9	15 34.5	95 29	86.2	16 03.1	95 29	86.0	16 31.7	95 29	85.8	17 00.2	95 29	85.7
90	15 17.0	95 29	85.2	15 45.6	95 29	85.1	16 14.2	95 29	84.9	16 42.7	95 29	84.7

18° 00′			18° 30′			19° 00′			19° 30′			H.A.
Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
° ′		°	° ′		°	° ′		°	° ′		°	°
35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	00
34 59.8	1.0 01	178.8	35 29.8	1.0 01	178.8	35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	1
34 59.3	1.0 01	177.7	35 29.3	1.0 01	177.7	35 59.3	1.0 01	177.7	36 29.3	1.0 02	177.7	2
34 58.4	1.0 02	176.5	35 28.4	1.0 02	176.5	35 58.4	1.0 02	176.5	36 28.4	1.0 02	176.5	3
34 57.2	1.0 03	175.4	35 27.1	1.0 03	175.3	35 57.1	1.0 03	175.3	36 27.1	1.0 03	175.3	4
34 55.6	1.0 03	174.2	35 25.5	1.0 03	174.2	35 55.5	1.0 03	174.2	36 25.5	1.0 03	174.1	05
34 53.6	1.0 04	173.0	35 23.6	1.0 04	173.0	35 53.6	1.0 04	173.0	36 23.5	1.0 04	173.0	6
34 51.3	1.0 04	171.9	35 21.3	1.0 04	171.9	35 51.3	1.0 04	171.8	36 21.2	1.0 04	171.8	7
34 48.7	1.0 05	170.7	35 18.6	1.0 05	170.7	35 48.6	1.0 05	170.7	36 18.5	1.0 05	170.6	8
34 45.7	1.0 06	169.6	35 15.6	1.0 06	169.5	35 45.6	1.0 06	169.5	36 15.5	1.0 06	169.5	9
34 42.3	1.0 06	168.4	35 12.2	1.0 06	168.4	35 42.2	1.0 06	168.3	36 12.1	1.0 06	168.3	10
34 38.6	1.0 07	167.3	35 08.5	1.0 07	167.2	35 38.5	1.0 07	167.2	36 08.4	1.0 07	167.1	1
34 34.6	1.0 07	166.1	35 04.5	1.0 07	166.1	35 34.4	1.0 07	166.0	36 04.3	1.0 07	166.0	2
34 30.2	1.0 08	165.0	35 00.1	1.0 08	164.9	35 30.0	1.0 08	164.9	35 59.9	1.0 08	164.8	3
34 25.5	1.0 08	163.8	34 55.3	1.0 08	163.8	35 25.2	1.0 08	163.7	35 55.1	1.0 08	163.6	4
34 20.4	1.0 09	162.7	34 50.3	1.0 09	162.6	35 20.1	1.0 09	162.5	35 50.0	1.0 09	162.5	15
34 15.0	1.0 10	161.5	34 44.9	1.0 10	161.5	35 14.7	1.0 10	161.4	35 44.6	1.0 10	161.3	6
34 09.3	99 10	160.4	34 39.1	99 10	160.3	35 08.9	99 10	160.2	35 38.8	99 10	160.2	7
34 03.2	99 11	159.2	34 33.0	99 11	159.2	35 02.8	99 11	159.1	35 32.7	99 11	159.0	8
33 56.8	99 11	158.1	34 26.6	99 11	158.0	34 56.4	99 11	157.9	35 26.2	99 11	157.9	9
33 50.1	99 12	156.9	34 19.9	99 12	156.9	34 49.7	99 12	156.8	35 19.5	99 12	156.7	20
33 43.1	99 12	155.8	34 12.8	99 12	155.7	34 42.6	99 12	155.7	35 12.4	99 12	155.6	1
33 35.7	99 13	154.7	34 05.5	99 13	154.6	34 35.2	99 13	154.5	35 04.9	99 13	154.4	2
33 28.1	99 13	153.5	33 57.8	99 13	153.5	34 27.5	99 13	153.4	34 57.2	99 13	153.3	3
33 20.1	99 14	152.4	33 49.8	99 14	152.3	34 19.5	99 14	152.2	34 49.2	99 14	152.2	4
33 11.8	99 14	151.3	33 41.5	99 14	151.2	34 11.2	99 14	151.1	34 40.8	99 14	151.0	25
33 03.3	99 15	150.2	33 32.9	99 15	150.1	34 02.5	99 15	150.0	34 32.2	99 15	149.9	6
32 54.4	99 15	149.1	33 24.0	99 15	149.0	33 53.6	99 15	148.9	34 23.2	99 15	148.8	7
32 45.2	99 16	147.9	33 14.8	99 16	147.8	33 44.4	99 16	147.7	34 14.0	99 16	147.6	8
32 35.8	99 16	146.8	33 05.3	99 16	146.7	33 34.9	99 16	146.6	34 04.5	99 16	146.5	9
32 26.0	98 17	145.7	32 55.6	98 17	145.6	33 25.1	98 17	145.5	33 54.6	98 17	145.4	30
32 16.0	98 17	144.6	32 45.5	98 17	144.5	33 15.0	98 17	144.4	33 44.5	98 17	144.3	1
32 05.7	98 18	143.5	32 35.2	98 18	143.4	33 04.7	98 18	143.3	33 34.2	98 18	143.2	2
31 55.1	98 18	142.4	32 24.6	98 18	142.3	32 54.1	98 18	142.2	33 23.5	98 18	142.1	3
31 44.3	98 18	141.3	32 13.7	98 19	141.2	32 43.2	98 19	141.1	33 12.6	98 19	140.9	4
31 33.2	98 19	140.2	32 02.6	98 19	140.1	32 32.0	98 19	140.0	33 01.4	98 19	139.8	35
31 21.8	98 19	139.1	31 51.2	98 19	139.0	32 20.6	98 19	138.9	32 50.0	98 20	138.7	6
31 10.2	98 20	138.0	31 39.6	98 20	137.9	32 08.9	98 20	137.8	32 38.3	98 20	137.6	7
30 58.4	98 20	136.9	31 27.7	98 20	136.8	31 57.0	98 20	136.7	32 26.3	98 20	136.6	8
30 46.3	98 21	135.8	31 15.6	98 21	135.7	31 44.9	98 21	135.6	32 14.1	98 21	135.5	9
30 33.9	98 21	134.8	31 03.2	98 21	134.6	31 32.5	98 21	134.5	32 01.7	98 21	134.4	40
30 21.4	97 21	133.7	30 50.6	97 21	133.6	31 19.8	97 21	133.4	31 40.1	97 21	133.3	1
30 08.6	97 22	132.6	30 37.8	97 22	132.5	31 07.0	97 22	132.4	31 36.2	97 22	132.2	2
29 55.5	97 22	131.5	30 24.7	97 22	131.4	30 53.9	97 22	131.3	31 23.1	97 22	131.1	3
29 42.3	97 22	130.5	30 11.5	97 22	130.3	30 40.6	97 22	130.2	31 09.8	97 23	130.1	4
29 28.9	97 23	129.4	29 58.0	97 23	129.3	30 27.1	97 23	129.1	30 56.2	97 23	129.0	45
29 15.2	97 23	128.4	29 44.3	97 23	128.2	30 13.4	97 23	128.1	30 42.5	97 23	127.9	6
29 01.3	97 23	127.3	29 30.4	97 23	127.2	29 59.5	97 24	127.0	30 28.6	97 24	126.9	7
28 47.3	97 24	126.3	29 16.4	97 24	126.1	29 45.4	97 24	126.0	30 14.4	97 24	125.8	8
28 33.1	97 24	125.2	29 02.1	97 24	125.1	29 31.1	97 24	124.9	30 00.1	97 24	124.8	9
28 18.6	97 24	124.2	28 47.6	97 24	124.0	29 16.6	97 24	123.9	29 45.6	97 24	123.7	50
28 04.0	97 25	123.1	28 33.0	97 25	123.0	29 02.0	97 25	122.8	29 30.9	97 25	122.7	1
27 49.2	97 25	122.1	28 18.2	97 25	121.9	28 47.2	96 25	121.8	29 16.1	96 25	121.6	2
27 34.3	96 25	121.0	28 03.2	96 25	120.9	28 32.2	96 25	120.7	29 01.1	96 25	120.6	3
27 19.2	96 25	120.0	27 48.1	96 26	119.8	28 17.0	96 26	119.7	28 45.9	96 26	119.5	4
27 03.9	96 26	119.0	27 32.8	96 26	118.8	28 01.7	96 26	118.7	28 30.6	96 26	118.5	55
26 48.5	96 26	117.9	27 17.4	96 26	117.8	27 46.2	96 26	117.6	28 15.1	96 26	117.5	6
26 32.9	96 26	116.9	27 01.8	96 26	116.8	27 30.6	96 26	116.6	27 59.4	96 26	116.5	7
26 17.2	96 26	115.9	26 46.0	96 26	115.7	27 14.8	96 26	115.6	27 43.7	96 26	115.4	8
26 01.4	96 27	114.9	26 30.2	96 27	114.7	26 59.0	96 27	114.6	27 27.7	96 27	114.4	9
25 45.4	96 27	113.9	26 14.2	96 27	113.7	26 42.9	96 27	113.6	27 11.7	96 27	113.4	60
25 29.3	96 27	112.9	25 58.0	96 27	112.7	76 26.8	96 27	112.5	26 55.5	96 27	112.4	1
25 13.1	96 27	111.8	25 41.8	96 27	111.7	26 10.5	96 27	111.5	26 39.3	96 27	111.4	2
24 56.7	96 27	110.8	25 25.4	96 27	110.7	25 54.2	96 27	110.5	26 22.9	96 28	110.4	3
24 40.3	96 28	109.8	25 09.0	96 28	109.7	25 37.7	96 28	109.5	26 06.4	96 28	109.4	4
24 23.7	96 28	108.8	24 52.4	96 28	108.7	25 21.1	96 28	108.5	25 49.8	96 28	108.4	65
24 07.1	96 28	107.8	24 35.7	96 28	107.7	25 04.4	96 28	107.5	25 33.1	96 28	107.4	6
23 50.3	96 28	106.8	24 19.0	96 28	106.7	24 47.6	96 28	106.5	25 16.3	95 28	106.4	7
23 33.5	96 28	105.9	24 02.1	95 28	105.7	24 30.8	95 28	105.5	24 59.4	95 28	105.4	8
23 16.6	95 28	104.9	23 45.2	95 28	104.7	24 13.8	95 28	104.5	24 42.5	95 28	104.4	9
22 59.6	95 28	103.9	23 28.2	95 28	103.7	23 56.8	95 28	103.5	24 25.4	95 28	103.4	70
22 42.5	95 29	102.9	23 11.1	95 29	102.7	23 39.7	95 29	102.6	24 08.3	95 29	102.4	1
22 25.4	95 29	101.9	22 54.0	95 29	101.7	23 22.6	95 29	101.6	23 51.2	95 29	101.4	2
22 08.2	95 29	100.9	22 36.8	95 29	100.8	23 05.4	95 29	100.6	23 33.9	95 29	100.4	3
21 50.9	95 29	99.9	22 19.5	95 29	99.8	22 48.1	95 29	99.6	23 16.7	95 29	99.5	4
21 33.6	95 29	99.0	22 02.2	95 29	98.8	22 30.8	95 29	98.6	22 59.3	95 29	98.5	75
21 16.3	95 29	98.0	21 44.8	95 29	97.8	22 13.4	95 29	97.7	22 42.0	95 29	97.5	6
20 58.9	95 29	97.0	21 27.4	95 29	96.9	21 56.0	95 29	96.7	22 24.5	95 29	96.5	7
20 41.5	95 29	96.1	21 10.0	95 29	95.9	21 38.6	95 29	95.7	22 07.1	95 29	95.6	8
20 24.0	95 29	95.1	20 52.6	95 29	94.9	21 21.1	95 29	94.8	21 49.6	95 29	94.6	9
20 06.5	95 29	94.1	20 35.1	95 29	94.0	21 03.6	95 29	93.8	21 32.1	95 29	93.6	80
19 49.0	95 29	93.2	20 17.6	95 29	93.0	20 46.1	95 29	92.8	21 14.6	95 29	92.7	1
19 31.5	95 29	92.2	20 00.0	95 29	92.0	20 28.6	95 29	91.9	20 57.1	95 29	91.7	2
19 13.9	95 29	91.2	19 42.5	95 29	91.1	20 11.0	95 29	90.9	20 39.6	95 29	90.8	3
18 56.4	95 29	90.3	19 25.0	95 29	90.1	19 53.5	95 29	90.0	20 22.0	95 29	89.8	4
18 38.9	95 29	89.3	19 07.4	95 29	89.2	19 35.9	95 29	89.0	20 04.5	95 29	88.8	85
18 21.3	95 29	88.4	18 49.9	95 29	88.2	19 18.4	95 29	88.0	19 46.9	95 29	87.9	6
18 03.8	95 29	87.4	18 32.3	95 29	87.3	19 00.9	95 29	87.1	19 29.4	95 29	86.9	7
17 46.3	95 29	86.5	18 14.8	95 29	86.3	18 43.4	95 29	86.1	19 11.9	95 29	86.0	8
17 28.8	95 29	85.5	17 57.3	95 29	85.4	18 25.9	95 29	85.2	18 54.4	95 29	85.0	9
17 11.3	95 29	84.6	17 39.9	95 29	84.4	18 08.4	95 29	84.3	18 36.9	95 29	84.1	90

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′		
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°
91	14 59.5	95 29	84.3	15 28.1	95 29	84.1	15 56.7	95 29	83.9	16 25.3	95 29	83.8	16 53.9	95 29	83.6	17 22.4	95 29	83.5	17 51.0	95 29	83.3	18 19.5	95 29	83.1
2	14 42.1	95 29	83.3	15 10.7	95 29	83.2	15 39.3	95 29	83.0	16 07.9	95 29	82.8	16 36.4	95 29	82.7	17 05.0	95 29	82.5	17 33.6	95 29	82.4	18 02.1	95 29	82.2
3	14 24.7	95 29	82.4	14 53.3	95 29	82.2	15 21.9	95 29	82.1	15 50.5	95 29	81.9	16 19.1	95 29	81.7	16 47.6	95 29	81.6	17 16.2	95 29	81.4	17 44.8	95 29	81.3
4	14 07.3	95 29	81.4	14 35.9	95 29	81.3	15 04.5	95 29	81.1	15 33.1	95 29	81.0	16 01.7	95 29	80.8	16 30.3	95 29	80.6	16 58.9	95 29	80.5	17 27.4	95 29	80.3
95	13 50.0	95 29	80.5	14 18.6	95 29	80.3	14 47.2	95 29	80.2	15 15.8	95 29	80.0	15 44.4	95 29	79.9	16 13.0	95 29	79.7	16 41.6	95 29	79.5	17 10.2	95 29	79.4
6	13 32.7	95 29	79.5	14 01.3	95 29	79.4	14 30.0	95 29	79.2	14 58.6	95 29	79.1	15 27.2	95 29	78.9	15 55.8	95 29	78.8	16 24.4	95 29	78.6	16 53.0	95 29	78.4
7	13 15.5	95 29	78.6	13 44.1	95 29	78.4	14 12.8	95 29	78.3	14 41.4	95 29	78.1	15 10.0	95 29	78.0	15 38.6	95 29	77.8	16 07.2	95 29	77.7	16 35.8	95 28	77.5
8	12 58.3	95 28	77.6	13 27.0	95 28	77.5	13 55.6	95 28	77.3	14 24.2	95 28	77.2	14 52.9	95 28	77.0	15 21.5	95 28	76.9	15 50.1	95 28	76.7	16 18.7	95 28	76.6
9	12 41.2	95 28	76.7	13 09.9	95 28	76.6	13 38.5	95 28	76.4	14 07.2	95 28	76.2	14 35.8	95 28	76.1	15 04.4	95 28	75.9	15 33.1	95 28	75.8	16 01.7	95 28	75.6
100	12 24.2	95 28	75.8	12 52.9	95 28	75.6	13 21.5	95 28	75.5	13 50.2	95 28	75.3	14 18.8	95 28	75.2	14 47.5	95 28	75.0	15 16.1	95 28	74.8	15 44.7	95 28	74.7
1	12 07.2	95 28	74.8	12 35.9	95 28	74.7	13 04.6	95 28	74.5	13 33.2	95 28	74.4	14 01.9	95 28	74.2	14 30.6	95 28	74.1	14 59.2	95 28	73.9	15 27.8	95 28	73.8
2	11 50.3	95 28	73.9	12 19.0	95 28	73.7	12 47.7	95 28	73.6	13 16.4	95 28	73.4	13 45.1	95 28	73.3	14 13.7	95 28	73.1	14 42.4	95 28	73.0	15 11.0	95 28	72.8
3	11 33.5	95 28	72.9	12 02.2	95 28	72.8	12 30.9	95 28	72.6	12 59.6	95 28	72.5	13 28.3	95 28	72.3	13 57.0	95 28	72.2	14 25.7	95 28	72.0	14 54.3	95 28	71.9
4	11 16.8	95 28	72.0	11 45.5	95 28	71.9	12 14.2	95 28	71.7	12 42.9	95 28	71.6	13 11.6	95 28	71.4	13 40.3	95 28	71.3	14 09.0	95 28	71.1	14 37.7	95 28	71.0
105	11 00.2	95 28	71.1	11 28.9	95 28	70.9	11 57.6	95 28	70.8	12 26.3	95 28	70.6	12 55.0	95 27	70.5	13 23.8	95 27	70.3	13 52.5	95 27	70.2	14 21.2	95 27	70.0
6	10 43.6	95 27	70.1	11 12.4	95 27	70.0	11 41.1	95 27	69.8	12 09.8	95 27	69.7	12 38.6	95 27	69.5	13 07.3	95 27	69.4	13 36.0	95 27	69.2	14 04.7	95 27	69.1
7	10 27.2	95 27	69.2	10 55.9	95 27	69.0	11 24.7	95 27	68.9	11 53.4	95 27	68.8	12 22.2	95 27	68.6	12 50.9	95 27	68.5	13 19.7	95 27	68.3	13 48.4	95 27	68.2
8	10 10.8	95 27	68.3	10 39.6	95 27	68.1	11 08.4	95 27	68.0	11 37.1	95 27	67.8	12 05.9	95 27	67.7	12 34.7	95 27	67.5	13 03.4	95 27	67.4	13 32.2	95 27	67.2
9	9 54.6	95 27	67.3	10 23.4	95 27	67.2	10 52.2	95 27	67.0	11 20.9	95 27	66.9	11 49.7	95 27	66.7	12 18.5	95 27	66.6	12 47.3	95 27	66.5	13 16.0	95 27	66.3
110	9 38.4	95 27	66.4	10 07.3	95 27	66.2	10 36.1	95 27	66.1	11 04.9	95 27	66.0	11 33.7	95 27	65.8	12 02.5	95 27	65.7	12 31.2	95 27	65.5	13 00.0	95 26	65.4
1	9 22.4	95 26	65.4	9 51.3	95 26	65.3	10 20.1	95 26	65.2	10 48.9	95 26	65.0	11 17.7	95 26	64.9	11 46.5	95 26	64.7	12 15.3	95 26	64.6	12 44.1	95 26	64.5
2	9 06.5	95 26	64.5	9 35.4	95 26	64.4	10 04.2	95 26	64.2	10 33.1	95 26	64.1	11 01.9	95 26	64.0	11 30.7	95 26	63.8	11 59.6	95 26	63.7	12 28.4	95 26	63.5
3	8 50.8	95 26	63.6	9 19.6	95 26	63.4	9 48.5	95 26	63.3	10 17.3	95 26	63.2	10 46.2	95 26	63.0	11 15.0	95 26	62.9	11 43.9	95 26	62.7	12 12.7	95 26	62.6
4	8 35.1	95 26	62.6	9 04.0	95 26	62.5	9 32.9	95 26	62.4	10 01.8	95 26	62.2	10 30.6	95 26	62.1	10 59.5	95 26	61.9	11 28.4	95 26	61.8	11 57.2	95 26	61.7
115	8 19.6	95 26	61.7	8 48.5	95 26	61.6	9 17.4	95 26	61.4	9 46.3	95 26	61.3	10 15.2	95 26	61.2	10 44.1	95 25	61.0	11 13.0	95 25	60.9	11 41.9	95 25	60.7
6	8 04.2	95 25	60.8	8 33.2	95 25	60.6	9 02.1	95 25	60.5	9 31.0	95 25	60.4	9 59.9	95 25	60.2	10 28.8	95 25	60.1	10 57.7	95 25	60.0	11 26.6	95 25	59.8
7	7 49.0	95 25	59.8	8 17.9	95 25	59.7	8 46.9	95 25	59.6	9 15.8	95 25	59.4	9 44.7	95 25	59.3	10 13.7	95 25	59.2	10 42.6	95 25	59.0	11 11.5	95 25	58.9
8	7 33.9	97 25	58.9	8 02.9	97 25	58.8	8 31.8	97 25	58.6	9 00.8	97 25	58.5	9 29.7	97 25	58.4	9 58.7	97 25	58.2	10 27.6	95 25	58.1	10 56.6	95 25	58.0
9	7 19.0	97 25	58.0	7 47.9	97 25	57.8	8 16.9	97 25	57.7	8 45.9	97 25	57.6	9 14.9	97 25	57.4	9 43.9	97 24	57.3	10 12.8	97 24	57.2	10 41.8	97 24	57.0
120	7 04.2	97 24	57.0	7 33.2	97 24	56.9	8 02.2	97 24	56.8	8 31.2	97 24	56.6	9 00.2	97 24	56.5	9 29.2	97 24	56.4	9 58.2	97 24	56.2	10 27.2	97 24	56.1
1	6 49.5	97 24	56.1	7 18.6	97 24	56.0	7 47.6	97 24	55.8	8 16.6	97 24	55.7	8 45.6	97 24	55.6	9 14.6	97 24	55.4	9 43.7	97 24	55.3	10 12.7	97 24	55.2
2	6 35.0	97 24	55.1	7 04.1	97 24	55.0	7 33.1	97 24	54.9	8 02.2	97 24	54.8	8 31.2	97 24	54.6	9 00.3	97 24	54.5	9 29.3	97 24	54.4	9 58.3	97 24	54.3
3	6 20.7	97 24	54.2	6 49.8	97 24	54.1	7 18.9	97 24	54.0	7 47.9	97 23	53.8	8 17.0	97 23	53.7	8 46.1	97 23	53.6	9 15.1	97 23	53.5	9 44.2	97 23	53.3
4	6 06.6	97 23	53.3	6 35.7	97 23	53.1	7 04.8	97 23	53.0	7 33.9	97 23	52.9	8 03.0	97 23	52.8	8 32.0	97 23	52.7	9 01.1	97 23	52.5	9 30.2	97 23	52.4
125	5 52.6	97 23	52.3	6 21.7	97 23	52.2	6 50.8	97 23	52.1	7 20.0	97 23	52.0	7 49.1	97 23	51.8	8 18.2	97 23	51.7	8 47.3	97 23	51.6	9 16.4	97 23	51.5
6	5 38.8	97 23	51.4	6 08.0	97 23	51.3	6 37.1	97 23	51.2	7 06.2	97 23	51.0	7 35.4	97 23	50.9	8 04.5	97 22	50.8	8 33.6	97 22	50.7	9 02.8	97 22	50.6
7	5 25.2	97 22	50.5	5 54.4	97 22	50.3	6 23.5	97 22	50.2	6 52.7	97 22	50.1	7 21.8	97 22	50.0	7 51.0	97 22	49.9	8 20.1	97 22	49.7	8 49.3	97 22	49.6
8	5 11.8	97 22	49.5	5 41.0	97 22	49.4	6 10.1	97 22	49.3	6 39.3	97 22	49.2	7 08.5	97 22	49.1	7 37.7	97 22	48.9	8 06.9	97 22	48.8	8 36.0	97 22	48.7
9				5 27.7	97 22	48.5	5 56.9	97 22	48.3	6 26.1	97 22	48.2	6 55.3	97 22	48.1	7 24.5	97 22	48.0	7 53.7	97 22	47.9	8 22.9	97 22	47.8
130				5 14.7	97 21	47.5	5 43.9	97 21	47.4	6 13.1	97 21	47.3	6 42.4	97 21	47.2	7 11.6	97 21	47.1	7 40.8	97 21	47.0	8 10.1	97 21	46.8
1				5 01.8	98 21	46.6	5 31.1	98 21	46.5	6 00.4	98 21	46.4	6 29.6	98 21	46.3	6 58.9	97 21	46.1	7 28.1	97 21	46.0	7 57.4	97 21	45.9
2							5 18.5	98 21	45.5	5 47.8	98 21	45.4	6 17.0	98 21	45.3	6 46.3	98 21	45.2	7 15.6	98 21	45.1	7 44.8	98 20	45.0
3							5 06.1	98 20	44.6	5 35.4	98 20	44.5	6 04.7	98 20	44.4	6 34.0	98 20	44.3	7 03.3	98 20	44.2	7 32.5	98 20	44.1
4										5 23.2	98 20	43.6	5 52.5	98 20	43.5	6 21.8	98 20	43.3	6 51.1	98 20	43.2	7 20.5	98 20	43.1
135										5 11.2	98 20	42.6	5 40.5	98 20	42.5	6 09.9	98 20	42.4	6 39.2	98 20	42.3	7 08.6	98 19	42.2
6													5 28.8	98 19	41.6	5 58.2	98 19	41.5	6 27.5	98 19	41.4	6 56.9	98 19	41.3
7													5 17.2	98 19	40.6	5 46.6	98 19	40.5	6 16.0	98 19	40.4	6 45.4	98 19	40.3
8																5 35.3	98 18	39.6	6 04.8	98 18	39.5	6 34.2	98 18	39.4
9													5 05.9	98 18	39.7	5 24.3	98 18	38.7	5 53.7	98 18	38.6	6 23.1	98 18	38.5
140																5 13.4	98 18	37.7	5 42.9	98 18	37.6	6 12.3	98 18	37.6
1																5 02.8	98 17	36.8	5 32.3	98 17	36.7	6 01.8	98 17	36.6
2																			5 21.9	98 17	35.8	5 51.4	98 17	35.7
3																			5 11.8	98 16	34.8	5 41.3	98 16	34.8
4																			5 01.9	99 16	33.9	5 31.4	98 16	33.8
145																						5 21.8	99 16	32.9
6																						5 12.4	99 15	32.0
7																						5 03.2	99 15	31.0

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	00
1	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8	39 59.8	1.0 01	178.8	40 29.8	1.0 01	178.8	1
2	36 59.3	1.0 02	177.6	37 29.3	1.0 02	177.6	37 59.3	1.0 02	177.6	38 29.3	1.0 02	177.6	38 59.3	1.0 02	177.6	39 29.3	1.0 02	177.6	39 59.3	1.0 02	177.6	40 29.3	1.0 02	177.6	2
3	36 58.4	1.0 02	176.5	37 28.4	1.0 02	176.5	37 58.4	1.0 02	176.4	38 28.4	1.0 02	176.4	38 58.4	1.0 02	176.4	39 28.4	1.0 02	176.4	39 58.3	1.0 02	176.4	40 28.3	1.0 02	176.4	3
4	36 57.1	1.0 03	175.3	37 27.1	1.0 03	175.3	37 57.1	1.0 03	175.3	38 27.1	1.0 03	175.2	38 57.1	1.0 03	175.2	39 27.1	1.0 03	175.2	39 57.1	1.0 03	175.2	40 27.0	1.0 03	175.2	4
05	36 55.5	1.0 03	174.1	37 25.5	1.0 03	174.1	37 55.5	1.0 03	174.1	38 25.5	1.0 03	174.1	38 55.4	1.0 03	174.0	39 25.4	1.0 03	174.0	39 55.4	1.0 03	174.0	40 25.4	1.0 03	174.0	05
6	36 53.5	1.0 04	172.9	37 23.5	1.0 04	172.9	37 53.5	1.0 04	172.9	38 23.5	1.0 04	172.9	38 53.4	1.0 04	172.8	39 23.4	1.0 04	172.8	39 53.4	1.0 04	172.8	40 23.4	1.0 04	172.8	6
7	36 51.2	1.0 04	171.8	37 21.2	1.0 04	171.7	37 51.1	1.0 04	171.7	38 21.1	1.0 05	171.7	38 51.1	1.0 05	171.7	39 21.0	1.0 05	171.6	39 51.0	1.0 05	171.6	40 21.0	1.0 05	171.6	7
8	36 48.5	1.0 05	170.6	37 18.5	1.0 05	170.6	37 48.4	1.0 05	170.5	38 18.4	1.0 05	170.5	38 48.3	1.0 05	170.5	39 18.3	1.0 05	170.4	39 48.3	1.0 05	170.4	40 18.2	1.0 05	170.4	8
9	36 45.5	1.0 06	169.4	37 15.4	1.0 06	169.4	37 45.4	1.0 06	169.4	38 15.3	1.0 06	169.3	38 45.3	1.0 06	169.3	39 15.2	1.0 06	169.2	39 45.2	1.0 06	169.2	40 15.1	1.0 06	169.2	9
10	36 42.1	1.0 06	168.3	37 12.0	1.0 06	168.2	37 41.9	1.0 06	168.2	38 11.9	1.0 06	168.1	38 41.8	1.0 06	168.1	39 11.8	1.0 06	168.1	39 41.7	1.0 06	168.0	40 11.6	1.0 06	168.0	10
1	36 38.3	1.0 07	167.1	37 08.2	1.0 07	167.0	37 38.2	1.0 07	167.0	38 08.1	1.0 07	167.0	38 38.0	1.0 07	166.9	39 07.9	1.0 07	166.9	39 37.9	1.0 07	166.8	40 07.8	1.0 07	166.8	1
2	36 34.2	1.0 07	165.9	37 04.1	1.0 07	165.9	37 34.1	1.0 07	165.8	38 04.0	1.0 07	165.8	38 33.9	1.0 07	165.7	39 03.8	1.0 08	165.7	39 33.7	1.0 08	165.6	40 03.6	1.0 08	165.6	2
3	36 29.8	1.0 08	164.8	36 59.7	1.0 08	164.7	37 29.6	1.0 08	164.7	37 59.5	1.0 08	164.6	38 29.4	1.0 08	164.5	38 59.3	1.0 08	164.5	39 29.2	1.0 08	164.4	39 59.1	1.0 08	164.4	3
4	36 25.0	1.0 09	163.6	36 54.9	1.0 09	163.5	37 24.8	1.0 09	163.5	37 54.6	1.0 09	163.4	38 24.5	1.0 09	163.4	38 54.4	1.0 09	163.3	39 24.3	1.0 09	163.2	39 54.2	1.0 09	163.2	4
15	36 19.9	1.0 09	162.4	36 49.7	1.0 09	162.4	37 19.6	1.0 09	162.3	37 49.5	1.0 09	162.2	38 19.3	1.0 09	162.2	38 49.2	1.0 09	162.1	39 19.0	1.0 09	162.1	39 48.9	1.0 09	162.0	15
6	36 14.4	99 10	161.3	36 44.3	99 10	161.2	37 14.1	99 10	161.1	37 44.0	99 10	161.1	38 13.8	99 10	161.0	38 43.6	99 10	160.9	39 13.5	99 10	160.9	39 43.3	99 10	160.8	6
7	36 08.6	99 10	160.1	36 38.4	99 10	160.0	37 08.3	99 10	160.0	37 38.1	99 10	159.9	38 07.9	99 10	159.8	38 37.7	99 10	159.8	39 07.6	99 10	159.7	39 37.4	99 10	159.6	7
8	36 02.5	99 11	159.0	36 32.3	99 11	158.9	37 02.1	99 11	158.8	37 31.9	99 11	158.7	38 01.7	99 11	158.7	38 31.5	99 11	158.6	39 01.3	99 11	158.5	39 31.1	99 11	158.4	8
9	35 56.0	99 11	157.8	36 25.8	99 11	157.7	36 55.6	99 11	157.7	37 25.4	99 11	157.6	37 55.2	99 11	157.5	38 24.9	99 12	157.4	38 54.7	99 12	157.3	39 24.5	99 12	157.3	9
20	35 49.2	99 12	156.6	36 19.0	99 12	156.6	36 48.8	99 12	156.5	37 18.5	99 12	156.4	37 48.3	99 12	156.3	38 18.0	99 12	156.3	38 47.8	99 12	156.2	39 17.5	99 12	156.1	20
1	35 42.1	99 12	155.5	36 11.9	99 12	155.4	36 41.6	99 12	155.3	37 11.3	99 13	155.3	37 41.1	99 13	155.2	38 10.8	99 13	155.1	38 40.5	99 13	155.0	39 10.3	99 13	154.9	1
2	35 34.7	99 13	154.4	36 04.4	99 13	154.3	36 34.1	99 13	154.2	37 03.8	99 13	154.1	37 33.6	99 13	154.0	38 03.3	99 13	153.9	38 33.0	99 13	153.8	39 02.7	99 13	153.7	2
3	35 26.9	99 13	153.2	35 56.6	99 14	153.1	36 26.3	99 14	153.0	36 56.0	99 14	152.9	37 25.7	99 14	152.9	37 55.4	99 13	152.8	38 25.1	99 14	152.7	38 54.8	99 14	152.6	3
4	35 18.9	99 14	152.1	35 48.5	99 14	152.0	36 18.2	99 14	151.9	36 47.9	99 14	151.8	37 17.6	99 14	151.7	37 47.2	99 14	151.6	38 16.9	99 14	151.5	38 46.5	99 14	151.4	4
25	35 10.5	99 14	150.9	35 40.1	99 14	150.8	36 09.8	99 15	150.7	36 39.4	99 15	150.6	37 09.1	99 15	150.6	37 38.7	99 15	150.5	38 08.3	99 15	150.4	38 38.0	99 15	150.3	25
6	35 01.8	99 15	149.8	35 31.4	99 15	149.7	36 01.1	99 15	149.6	36 30.7	99 15	149.5	37 00.3	99 15	149.4	37 29.9	99 15	149.3	37 59.5	99 15	149.2	38 29.1	99 15	149.1	6
7	34 52.8	99 15	148.7	35 22.4	99 16	148.6	35 52.0	99 16	148.5	36 21.6	99 16	148.4	36 51.2	99 16	148.3	37 20.8	99 16	148.2	37 50.4	99 16	148.1	38 20.0	99 16	147.9	7
8	34 43.6	99 16	147.5	35 13.2	99 16	147.4	35 42.7	99 16	147.3	36 12.3	99 16	147.2	36 41.8	99 16	147.1	37 11.4	99 16	147.0	37 40.9	98 16	146.9	38 10.5	98 16	146.8	8
9	34 34.0	99 16	146.4	35 03.6	98 16	146.3	35 33.1	98 16	146.2	36 02.6	98 17	146.1	36 32.2	98 17	146.0	37 01.7	98 17	145.9	37 31.2	98 17	145.8	38 00.7	98 17	145.6	9
30	34 24.2	98 17	145.3	34 53.7	98 17	145.2	35 23.2	98 17	145.1	35 52.7	98 17	145.0	36 22.2	98 17	144.8	36 51.7	98 17	144.7	37 21.2	98 17	144.6	37 50.7	98 17	144.5	30
1	34 14.0	98 17	144.2	34 43.5	98 17	144.1	35 13.0	98 17	143.9	35 42.5	98 17	143.8	36 12.0	98 18	143.7	36 41.4	98 18	143.6	37 10.9	98 18	143.5	37 40.4	98 18	143.4	1
2	34 03.6	98 18	143.1	34 33.1	98 18	142.9	35 02.6	98 18	142.8	35 32.0	98 18	142.7	36 01.5	98 18	142.6	36 30.9	98 18	142.5	37 00.3	98 18	142.4	37 29.8	98 18	142.2	2
3	33 53.0	98 18	141.9	34 22.4	98 18	141.8	34 51.8	98 18	141.7	35 21.2	98 18	141.6	35 50.7	98 18	141.5	36 20.1	98 18	141.3	36 49.5	98 19	141.2	37 18.9	98 19	141.1	3
4	33 42.0	98 19	140.8	34 11.4	98 19	140.7	34 40.8	98 19	140.6	35 10.2	98 19	140.5	35 39.6	98 19	140.3	36 09.0	98 19	140.2	36 38.4	98 19	140.1	37 07.7	98 19	140.0	4
35	33 30.8	98 19	139.7	34 00.2	98 19	139.6	34 29.6	98 19	139.5	34 58.9	98 19	139.4	35 28.3	98 19	139.2	35 57.6	98 19	139.1	36 27.0	98 19	139.0	36 56.3	98 19	138.8	35
6	33 19.3	98 20	138.6	33 48.7	98 20	138.5	34 18.0	98 20	138.4	34 47.4	98 20	138.2	35 16.7	98 20	138.1	35 46.0	98 20	138.0	36 15.3	98 20	137.9	36 44.6	98 20	137.7	6
7	33 07.6	98 20	137.5	33 36.9	98 20	137.4	34 06.2	98 20	137.3	34 35.6	98 20	137.1	35 04.9	98 20	137.0	35 34.2	98 20	136.9	36 03.4	98 20	136.7	36 32.7	98 20	136.6	7
8	32 55.6	98 20	136.4	33 24.9	98 20	136.3	33 54.2	98 20	136.2	34 23.5	98 20	136.0	34 52.8	98 21	135.9	35 22.0	98 21	135.8	35 51.3	98 21	135.6	36 20.5	97 21	135.5	8
9	32 43.4	98 21	135.3	33 12.7	98 21	135.2	33 42.0	98 21	135.1	34 11.2	97 21	134.9	34 40.4	97 21	134.8	35 09.7	97 21	134.7	35 38.9	97 21	134.5	36 08.1	97 21	134.4	9
40	32 31.0	97 21	134.2	33 00.2	97 21	134.1	33 29.4	97 21	134.0	33 58.7	97 21	133.8	34 27.9	97 21	133.7	34 57.1	97 21	133.6	35 26.3	97 21	133.4	35 55.5	97 21	133.3	40
1	32 18.3	97 21	133.2	32 47.5	97 21	133.0	33 16.7	97 21	132.9	33 45.9	97 22	132.8	34 15.1	97 22	132.6	34 44.3	97 22	132.5	35 13.4	97 22	132.3	35 42.6	97 22	132.2	1
2	32 05.4	97 22	132.1	32 34.6	97 22	131.9	33 03.7	97 22	131.8	33 32.9	97 22	131.7	34 02.1	97 22	131.5	34 31.2	97 22	131.4	35 00.4	97 22	131.2	35 29.5	97 22	131.1	2
3	31 52.3	97 22	131.0	32 21.4	97 22	130.9	32 50.6	97 22	130.7	33 19.7	97 22	130.6	33 48.8	97 22	130.4	34 17.9	97 22	130.3	34 47.1	97 23	130.1	35 16.1	97 23	130.0	3
4	31 38.9	97 23	129.9	32 08.0	97 23	129.8	32 37.2	97 23	129.6	33 06.3	97 23	129.5	33 35.4	97 23	129.4	34 04.5	97 23	129.2	34 33.5	97 23	129.1	35 02.6	97 23	128.9	4
45	31 25.4	97 23	128.9	31 54.5	97 23	128.7	32 23.5	97 23	128.6	32 52.6	97 23	128.4	33 21.7	97 23	128.3	33 50.8	97 23	128.1	34 19.8	97 23	128.0	34 48.9	97 23	127.8	45
6	31 11.6	97 23	127.8	31 40.7	97 23	127.7	32 09.7	97 23	127.5	32 38.8	97 23	127.4	33 07.8	97 23	127.2	33 36.9	97 24	127.1	34 05.9	97 24	126.9	34 34.9	97 24	126.8	6
7	30 57.6	97 24	126.7	31 26.7	97 24	126.6	31 55.7	97 24	126.4	32 24.7	97 24	126.3	32 53.8	97 24	126.1	33 22.8	97 24	126.0	33 51.8	97 24	125.8	34 20.7	97 24	125.7	7
8	30 43.5	97 24	125.7	31 12.5	97 24	125.5	31 41.5	97 24	125.4	32 10.5	97 24	125.2	32 39.5	97 24	125.1	33 08.5	97 24	124.9	33 37.4	97 24	124.8	34 06.4	96 24	124.6	8
9	30 29.1	97 24	124.6	30 58.1	97 24	124.5	31 27.1	97 24	124.2	31 56.1	97 24	124.2	32 25.0	97 24	124.0	32 54.0	96 24	123.9	33 22.9	96 24	123.7	33 51.9	96 25	123.5	9
50	30 14.6	97 24	123.6	30 43.6	97 25	123.4	31 12.5	97 25	123.3	31 41.5	96 25	123.1	32 10.4	96 25	123.0	32 39.3	96 25	122.8	33 08.3	96 25	122.6	33 37.2	96 25	122.5	50
1	29 59.9	96 25	122.5	30 28.8	96 25	122.4	30 57.8	96 25	122.2	31 26.7	96 25	122.1	31 55.6	96 25	121.9	32 24.5	96 25	121.7	32 53.4	96 25	121.6	33 22.3	96 25	121.4	1
2	29 45.0	96 25	121.5	30 13.9	96 25	121.3	30 42.8	96 25	121.2	31 11.7	96 25	121.0	31 40.6	96 25	120.8	32 09.5	96 25	120.7	32 38.4	96 25	120.5	33 07.2	96 25	120.4	2
3	29 30.0	96 25	120.4	29 58.9	96 25	120.3	30 27.8	96 25	120.1	30 56.6	96 25	120.0	31 25.5	96 26	119.8	31 54.3	96 26	119.6	32 23.2	96 26	119.5	32 52.0	96 26	119.3	3
4	29 14.8	96 26	119.4	29 43.6	96 26	119.2	30 12.5	96 26	119.1	30 41.4	96 26	118.9	31 10.2	96 26	118.8	31 39.0	96 26	118.6	32 07.8	96 26	118.4	32 36.6	96 26	118.3	4
55	28 59.4	96 26	118.4	29 28.3	96 26	118.2	29 57.1	96 26	118.0	30 25.9	96 26	117.9	30 54.7	96 26	117.7	31 23.5	96 26	117.6	31 52.3	96 26	117.4	32 21.1	96 26	117.2	55
6	28 43.9	96 26	117.3	29 12.7	96 26	117.2	29 41.5	96 26	117.0	30 10.3	96 26	116.8	30 39.1	96 26	116.7	31 07.9	96 26	116.5	31 36.7	96 26	116.4	32 05.4	96 26	116.2	6
7	28 28.2	96 26	116.3	28 57.0	96 26	116.1	29 25.8	96 26	116.0	29 54.6	96 26	115.8	30 23.4	96 26	115.7	30 52.1	96 27	115.5	31 20.9	96 27	115.3	31 49.6	96 27	115.1	7
8	28 12.4	96 27	115.3	28 41.2	96 27	115.1	29 10.0	96 27	114.9	29 38.8	96 27	114.8	30 07.5	96 27	114.6	30 36.2	96 27	114.5	31 05.0	96 27	114.3	31 33.7	96 27	114.1	8
9	27 56.5	96 27	114.3	28 25.3	96 27	114.1	28 54.0	96 27	113.9	29 22.8	96 27	113.8	29 51.5	96 27	113.6	30 20.2	96 27	113.4	30 48.9	96 27	113.3	31 17.6	96 27	113.1	9
60	27 40.5	96 27	113.2	28 09.2	96 27	113.1	28 37.9	96 27	112.9	29 06.6	96 27	112.7	29 35.4	96 27	112.6	30 04.1	96 27	112.4	30 32.7	96 27	112.2	31 01.4	96 27	112.1	60
1	27 24.3	96 27	112.2	27 53.0	96 27	112.1	28 21.7	96 27	111.9	28 50.4	96 27	111.7	29 19.1	96 27	111.6	29 47.8	96 27	111.4	30 16.4	96 27	111.2	30 45.1	95 27	111.0	1
2	27 08.0	96 27	111.2	27 36.7	96 27	111.0	28 05.4	96 27	110.9	28 34.1	96 27	110.7	29 02.7	96 27	110.5	29 31.4	95 28	110.4	30 00.0	95 28	110.2	30 28.7	95 28	110.0	2
3	26 51.6	96 28	110.2	27 20.3	96 28	110.0	27 48.9	96 28	109.9	28 17.6	96 28	109.7	28 46.2	95 28	109.5	29 14.9	95 28	109.4	29 43.5	95 28	109.2	30 12.1	95 28	109.0	3
4	26 35.1	96 28	109.2	27 03.7	96 28	109.0	27 32.4	96 28	108.9	28 01.0	95 28	108.7	28 29.7	95 28	108.5	28 58.3	95 28	108.3	29 26.9	95 28	108.2	29 55.5	95 28	108.0	4
65	26 18.4	96 28	108.2	26 47.1	95 28	108.0	27 15.7	95 28	107.9	27 44.4	95 28	107.7	28 13.0	95 28	107.5	28 41.6	95 28	107.3	29 10.2	95 28	107.2	29 38.8	95 28	107.0	65
6	26 01.7	95 28	107.2	26 30.4	95 28	107.0	26 59.0	95 28	106.9	27 27.6	95 28	106.7	27 56.2	95 28	106.5	28 24.8	95 28	106.3	28 53.4	95 28	106.2	29 21.9	95 28	106.0	6
7	25 44.9	95 28	106.2	26 13.5	95 28	106.0	26 42.2	95 28	105.9	27 10.8	95 28	105.7	27 39.3	95 28	105.5	28 07.9	95 28	105.3	28 36.5	95 28	105.2	29 05.0	95 28	105.0	7
8	25 28.0	95 28	105.2	25 56.6	95 28	105.0	26 25.2	95 28	104.9	26 53.8	95 28	104.7	27 22.4	95 28	104.5	27 51.0	95 28	104.3	28 19.5	95 28	104.2	28 48.0	95 28	104.0	8
9	25 11.1	95 28	104.2	25 39.7	95 28	104.0	26 08.2	95 28	103.9	26 36.8	95 28	103.7	27 05.4	95 28	103.5	27 33.9	95 28	103.4	28 02.5	95 29	103.2	28 31.0	95 29	103.0	9
70	24 54.0	95 28	103.2	25 22.6	95 29	103.0	25 51.2	95 29	102.9	26 19.7	95 29	102.7	26 48.3	95 29	102.5	27 16.8	95 29	102.4	27 45.4	95 29	102.2	28 13.9	95 29	102.0	70
1	24 36.9	95 29	102.2	25 05.5	95 29	102.1	25 34.0	95 29	101.9	26 02.6	95 29	101.7	26 31.1	95 29	101.5	26 59.7	95 29	101.4	27 28.2	95 29	101.2	27 56.7	95 29	101.0	1
2	24 19.7	95 29	101.2	24 48.3	95 29	101.1	25 16.9	95 29	100.9	25 45.4	95 29	100.7	26 13.9	95 29	100.6	26 42.4	95 29	100.4	27 10.9	95 29	100.2	27 39.4	95 29	100.0	2
3	24 02.5	96 29	100.3	24 31.1	95 29	100.1	24 59.6	95 29	99.9	25 28.1	95 29	99.8	25 56.6	95 29	99.6	26 25.2	95 29	99.4	26 53.6	95 29	99.2	27 22.1	95 29	99.1	3
4	23 45.2	95 29	99.3	24 13.8	95 29	99.1	24 42.3	95 29	98.9	25 10.8	95 29	98.8	25 39.3	95 29	98.6	26 07.8	95 29	98.4	26 36.3	95 29	98.3	27 04.8	95 29	98.1	4
75	23 27.9	95 29	98.3	23 56.4	95 29	98.1	24 24.9	95 29	98.0	24 53.5	95 29	97.8	25 22.0	95 29	97.6	25 50.5	95 29	97.5	26 18.9	95 29	97.3	26 47.4	95 29	97.1	75
6	23 10.5	95 29	97.3	23 39.0	95 29	97.2	24 07.6	95 29	97.0	24 36.1	95 29	96.8	25 04.6	95 29	96.7	25 33.0	95 29	96.5	26 01.5	95 29	96.3	26 30.0	95 29	96.1	6
7	22 53.1	95 29	96.4	23 21.6	95 29	96.2	23 50.1	95 29	96.0	24 18.6	95 29	95.9	24 47.1	95 29	95.7	25 15.6	95 29	95.5	25 44.1	95 29	95.3	26 12.5	95 29	95.2	7
8	22 35.6	95 29	95.4	23 04.2	95 29	95.2	23 32.7	95 29	95.1	24 01.2	95 29	94.9	24 29.6	95 29	94.7	24 58.1	95 29	94.5	25 26.6	95 29	94.4	25 55.0	95 29	94.2	8
9	22 18.2	95 29	94.4	22 46.7	95 29	94.3	23 15.2	95 29	94.1	23 43.7	95 29	93.9	24 12.2	95 29	93.8	24 40.6	95 29	93.6	25 09.1	95 29	93.4	25 37.5	95 29	93.2	9
80	22 00.7	95 29	93.5	22 29.2	95 29	93.3	22 57.7	95 29	93.1	23 26.2	95 29	93.0	23 54.6	95 29	92.8	24 23.1	95 29	92.6	24 51.6	95 29	92.4	25 20.0	95 29	92.3	80
1	21 43.1	95 29	92.5	22 11.7	95 29	92.3	22 40.1	95 29	92.2	23 08.6	95 29	92.0	23 37.1	95 29	91.8	24 05.6	95 29	91.7	24 34.0	95 29	91.5	25 02.5	95 29	91.3	1
2	21 25.6	95 29	91.5	21 54.1	95 29	91.4	22 22.6	95 29	91.2	22 51.1	95 29	91.0	23 19.6	95 29	90.9	23 48.0	95 29	90.7	24 16.5	95 29	90.5	24 44.9	95 29	90.3	2
3	21 08.1	95 29	90.6	21 36.6	95 29	90.4	22 05.1	95 29	90.2	22 33.6	95 29	90.1	23 02.0	95 29	89.9	23 30.5	95 29	89.7	23 58.9	95 29	89.6	24 27.4	95 29	89.4	3
4	20 50.5	95 29	89.6	21 19.0	95 29	89.5	21 47.5	95 29	89.3	22 16.0	95 29	89.1	22 44.5	95 29	89.0	23 13.0	95 29	88.8	23 41.4	95 29	88.6	24 09.8	95 29	88.4	4
85	20 33.0	95 29	88.7	21 01.5	95 29	88.5	21 30.0	95 29	88.3	21 58.5	95 29	88.2	22 27.0	95 29	88.0	22 55.4	95 29	87.8	23 23.9	95 29	87.7	23 52.3	95 29	87.5	85
6	20 15.5	95 29	87.7	20 44.0	95 29	87.6	21 12.5	95 29	87.4	21 40.9	95 29	87.2	22 09.4	95 29	87.0	22 37.9	95 29	86.9	23 06.4	95 29	86.7	23 34.8	95 29	86.5	6
7	19 57.9	95 29	86.8	20 26.4	95 29	86.6	20 54.9	95 29	86.4	21 23.4	95 29	86.3	21 51.9	95 29	86.1	22 20.4	95 29	85.9	22 48.8	95 29	85.8	23 17.3	95 29	85.6	7
8	19 40.4	95 29	85.8	20 08.9	95 29	85.7	20 37.4	95 29	85.5	21 05.9	95 29	85.3	21 34.4	95 29	85.2	22 02.9	95 29	85.0	22 31.4	95 29	84.8	22 59.8	95 29	84.6	8
9	19 22.9	95 29	84.9	19 51.5	95 29	84.7	20 20.0	95 29	84.5	20 48.5	95 29	84.4	21 17.0	95 29	84.2	21 45.4	95 29	84.0	22 13.9	95 29	83.9	22 42.4	95 29	83.7	9
90	19 05.5	95 29	83.9	19 34.0	95 29	83.8	20 02.5	95 29	83.6	20 31.0	95 29	83.4	20 59.5	95 29	83.3	21 28.0	95 29	83.1	21 56.5	95 29	83.0	22 24.9	95 29	82.8	90

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	18 48.1	95 29	83.0	19 16.6	95 29	82.8	19 45.1	95 29	82.7	20 13.6	95 29	82.5	20 42.1	95 29	82.3	21 10.6	95 29	82.2	21 39.1	95 29	82.0	22 07.6	95 29	81.8	91
2	18 30.7	95 29	82.0	18 59.2	95 29	81.9	19 27.7	95 29	81.7	19 56.2	95 29	81.5	20 24.8	95 29	81.4	20 53.3	95 29	81.2	21 21.7	95 29	81.0	21 50.2	95 29	80.9	2
3	18 13.3	95 29	81.1	18 41.9	95 29	80.9	19 10.4	95 29	80.8	19 38.9	95 29	80.6	20 07.4	95 29	80.4	20 35.9	95 29	80.3	21 04.4	95 29	80.1	21 32.9	95 29	79.9	3
4	17 56.0	95 29	80.2	18 24.6	95 29	80.0	18 53.1	95 29	79.8	19 21.6	95 29	79.7	19 50.2	95 29	79.5	20 18.7	95 29	79.3	20 47.2	95 29	79.2	21 15.7	95 29	79.0	4
95	17 38.7	95 29	79.2	18 07.3	95 29	79.1	18 35.9	95 29	78.9	19 04.4	95 29	78.7	19 32.9	95 29	78.6	20 01.5	95 29	78.4	20 30.0	95 29	78.2	20 58.5	95 29	78.1	95
6	17 21.5	95 29	78.3	17 50.1	95 29	78.1	18 18.7	95 29	78.0	18 47.2	95 28	77.8	19 15.8	95 28	77.6	19 44.3	95 28	77.5	20 12.8	95 28	77.3	20 41.4	95 28	77.1	6
7	17 04.4	95 28	77.3	17 33.0	95 28	77.2	18 01.5	95 28	77.0	18 30.1	95 28	76.9	18 58.7	95 28	76.7	19 27.2	95 28	76.5	19 55.8	95 28	76.4	20 24.3	95 28	76.2	7
8	16 47.3	95 28	76.4	17 15.9	95 28	76.2	17 44.5	95 28	76.1	18 13.1	95 28	75.9	18 41.6	95 28	75.8	19 10.2	95 28	75.6	19 38.7	95 28	75.4	20 07.3	95 28	75.3	8
9	16 30.3	95 28	75.5	16 58.9	95 28	75.3	17 27.5	95 28	75.2	17 56.1	95 28	75.0	18 24.7	95 28	74.8	18 53.2	95 28	74.7	19 21.8	95 28	74.5	19 50.4	95 28	74.3	9
100	16 13.3	95 28	74.5	16 42.0	95 28	74.4	17 10.6	95 28	74.2	17 39.2	95 28	74.1	18 07.8	95 28	73.9	18 36.4	95 28	73.7	19 04.9	95 28	73.6	19 33.5	95 28	73.4	100
1	15 56.5	95 28	73.6	16 25.1	95 28	73.4	16 53.7	95 28	73.3	17 22.3	95 28	73.1	17 51.0	95 28	73.0	18 19.6	95 28	72.8	18 48.1	95 28	72.7	19 16.7	95 28	72.5	1
2	15 39.7	95 28	72.7	16 08.3	95 28	72.5	16 37.0	95 28	72.4	17 05.6	95 28	72.2	17 34.2	95 28	72.0	18 02.8	95 28	71.9	18 31.4	95 28	71.7	19 00.0	95 28	71.6	2
3	15 23.0	95 28	71.7	15 51.6	95 28	71.6	16 20.3	95 28	71.4	16 48.9	95 28	71.3	17 17.6	95 28	71.1	17 46.2	95 28	71.0	18 14.8	95 28	70.8	18 43.4	95 28	70.6	3
4	15 06.4	96 28	70.8	15 35.0	96 28	70.7	16 03.7	96 27	70.5	16 32.4	96 27	70.3	17 01.0	95 27	70.2	17 29.7	95 27	70.0	17 58.3	95 27	69.9	18 26.9	95 27	69.7	4
105	14 49.9	96 27	69.9	15 18.5	96 27	69.7	15 47.2	96 27	69.6	16 15.9	96 27	69.4	16 44.6	96 27	69.3	17 13.2	96 27	69.1	17 41.9	96 27	69.0	18 10.5	95 27	68.8	105
6	14 33.4	96 27	68.9	15 02.1	96 27	68.8	15 30.8	96 27	68.6	15 59.5	96 27	68.5	16 28.2	96 27	68.3	16 56.9	96 27	68.2	17 25.6	96 27	68.0	17 54.2	96 27	67.9	6
7	14 17.1	96 27	68.0	14 45.8	96 27	67.9	15 14.6	96 27	67.7	15 43.3	96 27	67.6	16 12.0	96 27	67.4	16 40.7	96 27	67.3	17 09.4	96 27	67.1	17 38.0	96 27	67.0	7
8	14 00.9	96 27	67.1	14 29.6	96 27	66.9	14 58.4	96 27	66.8	15 27.1	96 27	66.6	15 55.8	96 27	66.5	16 24.5	96 27	66.3	16 53.2	96 27	66.2	17 21.9	96 27	66.0	8
9	13 44.8	96 27	66.2	14 13.6	96 27	66.0	14 42.3	96 27	65.9	15 11.1	96 27	65.7	15 39.8	96 27	65.6	16 08.5	96 26	65.4	16 37.3	96 26	65.3	17 06.0	96 26	65.1	9
110	13 28.8	96 26	65.2	13 57.6	96 26	65.1	14 26.4	96 26	64.9	14 55.1	96 26	64.8	15 23.9	96 26	64.6	15 52.6	96 26	64.5	16 21.4	96 26	64.4	16 50.1	96 26	64.2	110
1	13 12.9	96 26	64.3	13 41.7	96 26	64.2	14 10.5	96 26	64.0	14 39.3	96 26	63.9	15 08.1	96 26	63.7	15 36.9	96 26	63.6	16 05.6	96 26	63.4	16 34.4	96 26	63.3	1
2	12 57.2	96 26	63.4	13 26.0	96 26	63.2	13 54.8	96 26	63.1	14 23.6	96 26	63.0	14 52.4	96 26	62.8	15 21.2	96 26	62.7	15 50.0	96 26	62.5	16 18.8	96 26	62.4	2
3	12 41.6	96 26	62.5	13 10.4	96 26	62.3	13 39.2	96 26	62.2	14 08.1	96 26	62.0	14 36.9	96 26	61.9	15 05.7	96 26	61.7	15 34.5	96 26	61.6	16 03.3	96 26	61.5	3
4	12 26.1	96 26	61.5	12 54.9	96 26	61.4	13 23.8	96 26	61.2	13 52.6	96 25	61.1	14 21.5	96 25	61.0	14 50.3	96 25	60.8	15 19.1	96 25	60.7	15 48.0	96 25	60.5	4
115	12 10.7	96 25	60.6	12 39.6	96 25	60.5	13 08.5	96 25	60.3	13 37.3	96 25	60.2	14 06.2	96 25	60.0	14 35.1	96 25	59.9	15 03.9	96 25	59.8	15 32.8	96 25	59.6	115
6	11 55.5	96 25	59.7	12 24.4	96 25	59.5	12 53.3	96 25	59.4	13 22.2	96 25	59.3	13 51.1	96 25	59.1	14 20.0	96 25	59.0	14 48.8	96 25	58.8	15 17.7	96 25	58.7	6
7	11 40.5	96 25	58.8	12 09.4	96 25	58.6	12 38.3	96 25	58.5	13 07.2	96 25	58.3	13 36.1	96 25	58.2	14 05.0	96 25	58.1	14 33.9	96 25	57.9	15 02.8	96 25	57.8	7
8	11 25.5	96 25	57.8	11 54.5	96 25	57.7	12 23.4	96 25	57.6	12 52.3	96 24	57.4	13 21.3	96 24	57.3	13 50.2	96 24	57.2	14 19.1	96 24	57.0	14 48.0	96 24	56.9	8
9	11 10.8	97 24	56.9	11 39.7	97 24	56.8	12 08.7	97 24	56.6	12 37.6	97 24	56.5	13 06.6	96 24	56.4	13 35.5	96 24	56.2	14 04.5	96 24	56.1	14 33.4	96 24	56.0	9
120	10 56.1	97 24	56.0	11 25.1	97 24	55.8	11 54.1	97 24	55.7	12 23.1	97 24	55.6	12 52.0	97 24	55.5	13 21.0	97 24	55.3	13 50.0	97 24	55.2	14 18.9	97 24	55.0	120
1	10 41.7	97 24	55.1	11 10.7	97 24	54.9	11 39.7	97 24	54.8	12 08.7	97 24	54.7	12 37.7	97 24	54.5	13 06.7	97 24	54.4	13 35.7	97 24	54.3	14 04.6	97 24	54.1	1
2	10 27.4	97 24	54.1	10 56.4	97 24	54.0	11 25.4	97 23	53.9	11 54.5	97 23	53.7	12 23.5	97 23	53.6	12 52.5	97 23	53.5	13 21.5	97 23	53.4	13 50.5	97 23	53.2	2
3	10 13.2	97 23	53.2	10 42.3	97 23	53.1	11 11.3	97 23	53.0	11 40.4	97 23	52.8	12 09.4	97 23	52.7	12 38.5	97 23	52.6	13 07.5	97 23	52.4	13 36.5	97 23	52.3	3
4	9 59.3	97 23	52.3	10 28.4	97 23	52.2	10 57.4	97 23	52.0	11 26.5	97 23	51.9	11 55.6	97 23	51.8	12 24.6	97 23	51.7	12 53.7	97 23	51.5	13 22.7	97 23	51.4	4
125	9 45.5	97 23	51.4	10 14.6	97 23	51.2	10 43.7	97 23	51.1	11 12.8	97 23	51.0	11 41.9	97 23	50.9	12 11.0	97 22	50.7	12 40.0	97 22	50.6	13 09.1	97 22	50.5	125
6	9 31.9	97 22	50.4	10 01.0	97 22	50.3	10 30.1	97 22	50.2	10 59.2	97 22	50.1	11 28.4	97 22	49.9	11 57.5	97 22	49.8	12 26.6	97 22	49.7	12 55.7	97 22	49.6	6
7	9 18.4	97 22	49.5	9 47.6	97 22	49.4	10 16.7	97 22	49.3	10 45.9	97 22	49.1	11 15.0	97 22	49.0	11 44.2	97 22	48.9	12 13.3	97 22	48.8	12 42.4	97 22	48.7	7
8	9 05.2	97 22	48.6	9 34.4	97 22	48.5	10 03.5	97 22	48.3	10 32.7	97 22	48.2	11 01.9	97 22	48.1	11 31.0	97 22	48.0	12 00.2	97 22	47.9	12 29.3	97 22	47.7	8
9	8 52.1	97 21	47.7	9 21.3	97 21	47.5	9 50.5	97 21	47.4	10 19.7	97 21	47.3	10 48.9	97 21	47.2	11 18.1	97 21	47.1	11 47.3	97 21	47.0	12 16.5	97 21	46.8	9
130	8 39.3	97 21	46.7	9 08.5	97 21	46.6	9 37.7	97 21	46.5	10 06.9	97 21	46.4	10 36.1	97 21	46.3	11 05.3	97 21	46.2	11 34.6	97 21	46.0	12 03.8	97 21	45.9	130
1	8 26.6	97 21	45.8	8 55.8	97 21	45.7	9 25.1	97 21	45.6	9 54.3	97 21	45.5	10 23.6	97 21	45.4	10 52.8	97 21	45.2	11 22.0	97 21	45.1	11 51.2	97 20	45.0	1
2	8 14.1	98 20	44.9	8 43.4	98 20	44.8	9 12.7	98 20	44.7	9 41.9	98 20	44.5	10 11.2	98 20	44.4	10 40.4	98 20	44.3	11 09.7	98 20	44.2	11 38.9	98 20	44.1	2
3	8 01.8	98 20	44.0	8 31.1	98 20	43.8	9 00.4	98 20	43.7	9 29.7	98 20	43.6	9 59.0	98 20	43.5	10 28.3	98 20	43.4	10 57.6	98 20	43.3	11 26.8	98 20	43.2	3
4	7 49.8	98 20	43.0	8 19.1	98 20	42.9	8 48.4	98 20	42.8	9 17.7	98 20	42.7	9 47.0	98 20	42.6	10 16.3	98 20	42.5	10 45.6	98 20	42.4	11 14.9	98 20	42.3	4
135	7 37.9	98 19	42.1	8 07.2	98 19	42.0	8 36.6	98 19	41.9	9 05.9	98 19	41.8	9 35.3	98 19	41.7	10 04.6	98 19	41.6	10 33.9	98 19	41.5	11 03.2	98 19	41.4	135
6	7 26.2	98 19	41.2	7 55.6	98 19	41.1	8 25.0	98 19	41.0	8 54.3	98 19	40.9	9 23.7	98 19	40.8	9 53.0	98 19	40.7	10 22.4	98 19	40.5	10 51.8	98 19	40.4	6
7	7 14.8	98 19	40.2	7 44.2	98 19	40.1	8 13.6	98 19	40.0	8 43.0	98 19	39.9	9 12.3	98 19	39.8	9 41.7	98 19	39.7	10 11.1	98 18	39.6	10 40.5	98 18	39.5	7
8	7 03.6	98 18	39.3	7 33.0	98 18	39.2	8 02.4	98 18	39.1	8 31.8	98 18	39.0	9 01.2	98 18	38.9	9 30.6	98 18	38.8	10 00.0	98 18	38.7	10 29.4	98 18	38.6	8
9	6 52.6	98 18	38.4	7 22.0	98 18	38.3	7 51.4	98 18	38.2	8 20.9	98 18	38.1	8 50.3	98 18	38.0	9 19.7	98 18	37.9	9 49.2	98 18	37.8	10 18.6	98 18	37.7	9
140	6 41.8	98 18	37.5	7 11.3	98 18	37.4	7 40.7	98 18	37.3	8 10.2	98 17	37.2	8 39.6	98 17	37.1	9 09.1	98 17	37.0	9 38.5	98 17	36.9	10 08.0	98 17	36.8	140
1	6 31.2	98 17	36.5	7 00.7	98 17	36.4	7 30.2	98 17	36.3	7 59.7	98 17	36.2	8 29.2	98 17	36.2	8 58.6	98 17	36.1	9 28.1	98 17	36.0	9 57.6	98 17	35.9	1
2	6 20.9	98 17	35.6	6 50.4	98 17	35.5	7 19.9	98 17	35.4	7 49.4	98 17	35.3	8 18.9	98 17	35.2	8 48.4	98 17	35.1	9 17.9	98 17	35.0	9 47.4	98 17	35.0	2
3	6 10.8	98 16	34.7	6 40.3	98 16	34.6	7 09.9	98 16	34.5	7 39.4	98 16	34.4	8 08.9	98 16	34.3	8 38.4	98 16	34.2	9 08.0	98 16	34.1	9 37.5	98 16	34.0	3
4	6 01.0	98 16	33.7	6 30.5	98 16	33.7	7 00.1	98 16	33.6	7 29.6	98 16	33.5	7 59.1	98 16	33.4	8 28.7	98 16	33.3	8 58.2	98 16	33.2	9 27.8	98 16	33.1	4
145	5 51.3	99 16	32.8	6 20.9	99 16	32.7	6 50.5	99 16	32.6	7 20.0	99 16	32.6	7 49.6	99 16	32.5	8 19.2	99 15	32.4	8 48.7	99 15	32.3	9 18.3	99 15	32.2	145
6	5 42.0	99 15	31.9	6 11.5	99 15	31.8	6 41.1	99 15	31.7	7 10.7	99 15	31.6	7 40.3	99 15	31.5	8 09.9	99 15	31.5	8 39.5	99 15	31.4	9 09.1	99 15	31.3	6
7	5 32.8	99 15	30.9	6 02.4	99 15	30.9	6 32.0	99 15	30.8	7 01.6	99 15	30.7	7 31.3	99 15	30.6	8 00.9	99 15	30.5	8 30.5	99 15	30.5	9 00.1	99 15	30.4	7
8	5 23.9	99 14	30.0	5 53.5	99 14	29.9	6 23.2	99 14	29.9	6 52.8	99 14	29.8	7 22.4	99 14	29.7	7 52.1	99 14	29.6	8 21.7	99 14	29.5	8 51.3	99 14	29.5	8
9	5 15.3	99 14	29.1	5 44.9	99 14	29.0	6 14.6	99 14	28.9	6 44.2	99 14	28.9	7 13.9	99 14	28.8	7 43.5	99 14	28.7	8 13.2	99 14	28.6	8 42.8	99 14	28.5	9
150	5 06.9	99 14	28.1	5 36.5	99 14	28.1	6 06.2	99 14	28.0	6 35.9	99 13	27.9	7 05.6	99 13	27.9	7 35.2	99 13	27.8	8 04.9	99 13	27.7	8 34.6	99 13	27.6	150
1				5 28.4	99 13	27.1	5 58.1	99 13	27.1	6 27.8	99 13	27.0	6 57.5	99 13	26.9	7 27.2	99 13	26.9	7 56.9	99 13	26.8	8 26.6	99 13	26.7	1
2				5 20.5	99 13	26.2	5 50.2	99 13	26.1	6 20.0	99 13	26.1	6 49.7	99 13	26.0	7 19.4	99 13	25.9	7 49.1	99 13	25.9	8 18.8	99 12	25.8	2
3				5 12.9	99 12	25.3	5 42.6	99 12	25.2	6 12.4	99 12	25.1	6 42.1	99 12	25.1	7 11.8	99 12	25.0	7 41.6	99 12	24.9	8 11.3	99 12	24.9	3
4				5 05.6	99 12	24.3	5 35.3	99 12	24.3	6 05.1	99 12	24.2	6 34.8	99 12	24.2	7 04.6	99 12	24.1	7 34.3	99 12	24.0	8 04.0	99 12	24.0	4
155							5 28.2	99 11	23.4	5 58.0	99 11	23.3	6 27.8	99 11	23.2	6 57.5	99 11	23.2	7 27.3	99 11	23.1	7 57.1	99 11	23.0	155
6							5 21.4	99 11	22.4	5 51.2	99 11	22.4	6 21.0	99 11	22.3	6 50.8	99 11	22.2	7 20.5	99 11	22.2	7 50.3	99 11	22.1	6
7							5 14.8	99 10	21.5	5 44.6	99 10	21.4	6 14.4	99 10	21.4	6 44.2	99 10	21.3	7 14.0	99 10	21.3	7 43.8	99 10	21.2	7
8							5 08.5	99 10	20.6	5 38.4	99 10	20.5	6 08.2	99 10	20.4	6 38.0	99 10	20.4	7 07.8	99 10	20.3	7 37.6	99 10	20.3	8
9							5 02.5	99 10	19.6	5 32.4	99 10	19.6	6 02.2	99 10	19.5	6 32.0	99 10	19.5	7 01.9	99 10	19.4	7 31.7	99 09	19.4	9
160										5 26.6	99 09	18.6	5 56.5	99 09	18.6	6 26.3	99 09	18.5	6 56.2	99 09	18.5	7 26.0	99 09	18.4	160
1										5 21.1	1 00	17.7	5 51.0	1 00	17.7	6 20.9	1 00	17.6	6 50.7	1 00	17.6	7 20.6	1 00	17.5	1
2										5 15.9	1 00	16.8	5 45.8	1 00	16.7	6 15.7	1 00	16.7	6 45.6	1 00	16.6	7 15.4	1 00	16.6	2
3										5 11.0	1 00	15.9	5 40.9	1 00	15.8	6 10.8	1 00	15.8	6 40.7	1 00	15.7	7 10.6	1 00	15.7	3
4										5 06.4	1 00	14.9	5 36.3	1 00	14.9	6 06.2	1 00	14.8	6 36.1	1 00	14.8	7 06.0	1 00	14.8	4
165										5 02.0	1 00	14.0	5 31.9	1 00	14.0	6 01.8	1 00	13.9	6 31.7	1 00	13.9	7 01.6	1 00	13.8	165
6													5 27.8	1 00	13.0	5 57.7	1 00	13.0	6 27.6	1 00	13.0	6 57.6	1 00	12.9	6
7													5 24.0	1 00	12.1	5 53.9	1 00	12.1	6 23.9	1 00	12.0	6 53.8	1 00	12.0	7
8													5 20.4	1 00	11.2	5 50.4	1 00	11.1	6 20.3	1 00	11.1	6 50.3	1 00	11.1	8
9													5 17.2	1 00	10.2	5 47.1	1 00	10.2	6 17.1	1 00	10.2	6 47.0	1 00	10.1	9
170													5 14.2	1 00	09.3	5 44.2	1 00	09.3	6 14.1	1 00	09.3	6 44.1	1 00	09.2	170
1													5 11.5	1 00	08.4	5 41.5	1 00	08.4	6 11.5	1 00	08.3	6 41.4	1 00	08.3	1
2													5 09.1	1 00	07.4	5 39.1	1 00	07.4	6 09.1	1 00	07.4	6 39.0	1 00	07.4	2
3													5 07.0	1 00	06.5	5 37.0	1 00	06.5	6 06.9	1 00	06.5	6 36.9	1 00	06.5	3
4													5 05.1	1 00	05.6	5 35.1	1 00	05.6	6 05.1	1 00	05.6	6 35.1	1 00	05.5	4
175													5 03.6	1 00	04.7	5 33.5	1 00	04.6	6 03.5	1 00	04.6	6 33.5	1 00	04.6	175
6													5 02.3	1 00	03.7	5 32.3	1 00	03.7	6 02.3	1 00	03.7	6 32.3	1 00	03.7	6
7													5 01.3	1 00	02.8	5 31.3	1 00	02.8	6 01.3	1 00	02.8	6 31.3	1 00	02.8	7
8													5 00.6	1 00	01.9	5 30.6	1 00	01.9	6 00.6	1 00	01.9	6 30.6	1 00	01.8	8
9													5 00.1	1 00	00.9	5 30.1	1 00	00.9	6 00.1	1 00	00.9	6 30.1	1 00	00.9	9
180													5 00.0	1 00	00.0	5 30.0	1 00	00.0	6 00.0	1 00	00.0	6 30.0	1 00	00.0	180

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
00	41 00.0	1.0 00	180.0	41 30.0	1.0 00	180.0	42 00.0	1.0 00	180.0	42 30.0	1.0 00	180.0	43 00.0	1.0 00	180.0	43 30.0	1.0 00	180.0	44 00.0	1.0 00	180.0	44 30.0	1.0 00	180.0	00
1	40 59.8	1.0 01	178.8	41 29.8	1.0 01	178.8	41 59.8	1.0 01	178.8	42 29.8	1.0 01	178.8	42 59.8	1.0 01	178.8	43 29.8	1.0 01	178.8	43 59.8	1.0 01	178.8	44 29.8	1.0 01	178.8	1
2	40 59.3	1.0 02	177.6	41 29.3	1.0 01	177.6	41 59.3	1.0 02	177.6	42 29.3	1.0 01	177.6	42 59.2	1.0 01	177.5	43 29.2	1.0 02	177.5	43 59.2	1.0 02	177.5	44 29.2	1.0 02	177.5	2
3	40 58.3	1.0 02	176.4	41 28.3	1.0 02	176.4	41 58.3	1.0 02	176.3	42 28.3	1.0 02	176.3	42 58.3	1.0 02	176.3	43 28.3	1.0 02	176.3	43 58.3	1.0 02	176.3	44 28.3	1.0 02	176.3	3
4	40 57.0	1.0 03	175.2	41 27.0	1.0 03	175.1	41 57.0	1.0 03	175.1	42 27.0	1.0 03	175.1	42 57.0	1.0 03	175.1	43 27.0	1.0 03	175.1	43 57.0	1.0 03	175.0	44 27.0	1.0 03	175.0	4
05	40 55.4	1.0 03	174.0	41 25.4	1.0 03	173.9	41 55.3	1.0 03	173.9	42 25.3	1.0 03	173.9	42 55.3	1.0 03	173.9	43 25.3	1.0 03	173.8	43 55.3	1.0 03	173.8	44 25.2	1.0 03	173.8	05
6	40 53.3	1.0 04	172.7	41 23.3	1.0 04	172.7	41 53.3	1.0 04	172.7	42 23.3	1.0 04	172.7	42 53.2	1.0 04	172.6	43 23.2	1.0 04	172.6	43 53.2	1.0 04	172.6	44 23.2	1.0 04	172.5	6
7	40 50.9	1.0 05	171.5	41 20.9	1.0 05	171.5	41 50.9	1.0 05	171.5	42 20.8	1.0 05	171.4	42 50.8	1.0 05	171.4	43 20.8	1.0 05	171.4	43 50.7	1.0 05	171.3	44 20.7	1.0 05	171.3	7
8	40 48.2	1.0 05	170.3	41 18.1	1.0 05	170.3	41 48.1	1.0 05	170.3	42 18.0	1.0 05	170.2	42 48.0	1.0 05	170.2	43 18.0	1.0 05	170.1	43 47.9	1.0 05	170.1	44 17.9	1.0 05	170.1	8
9	40 45.0	1.0 06	169.1	41 15.0	1.0 06	169.1	41 44.9	1.0 06	169.0	42 14.9	1.0 06	169.0	42 44.8	1.0 06	169.0	43 14.8	1.0 06	168.9	43 44.7	1.0 06	168.9	44 14.6	1.0 06	168.8	9
10	40 41.6	1.0 06	167.9	41 11.5	1.0 06	167.9	41 41.4	1.0 06	167.8	42 11.4	1.0 06	167.8	42 41.3	1.0 07	167.7	43 11.2	1.0 07	167.7	43 41.1	1.0 07	167.6	44 11.1	1.0 07	167.6	10
1	40 37.7	1.0 07	166.7	41 07.6	1.0 07	166.7	41 37.5	1.0 07	166.6	42 07.5	1.0 07	166.6	42 37.4	1.0 07	166.5	43 07.3	1.0 07	166.5	43 37.2	1.0 07	166.4	44 07.1	1.0 07	166.4	1
2	40 33.5	1.0 08	165.5	41 03.4	1.0 08	165.5	41 33.3	1.0 08	165.4	42 03.2	1.0 08	165.4	42 33.1	1.0 08	165.3	43 03.0	1.0 08	165.2	43 32.9	1.0 08	165.2	44 02.8	1.0 08	165.1	2
3	40 28.9	1.0 08	164.3	40 58.8	1.0 08	164.3	41 28.7	1.0 08	164.2	41 58.6	1.0 08	164.2	42 28.5	1.0 08	164.1	42 58.4	1.0 08	164.0	43 28.2	1.0 08	164.0	43 58.1	1.0 08	163.9	3
4	40 24.0	1.0 09	163.1	40 53.9	1.0 08	163.1	41 23.8	1.0 08	163.0	41 53.6	1.0 09	162.9	42 23.5	1.0 09	162.9	42 53.4	1.0 09	162.8	43 23.2	1.0 09	162.7	43 53.1	1.0 09	162.7	4
15	40 18.8	1.0 09	161.9	40 48.6	99 09	161.9	41 18.5	99 09	161.8	41 48.3	99 09	161.7	42 18.1	99 10	161.7	42 48.0	99 10	161.6	43 17.8	99 10	161.5	43 47.7	99 10	161.5	15
6	40 13.1	99 10	160.7	40 43.0	99 10	160.7	41 12.8	99 10	160.6	41 42.6	99 10	160.5	42 12.5	99 10	160.5	42 42.3	99 10	160.4	43 12.1	99 10	160.3	43 41.9	99 10	160.2	6
7	40 07.2	99 10	159.6	40 37.0	99 11	159.5	41 06.8	99 11	159.4	41 36.6	99 11	159.3	42 06.4	99 11	159.3	42 36.2	99 11	159.2	43 06.0	99 11	159.1	43 35.8	99 11	159.0	7
8	40 00.9	99 11	158.4	40 30.7	99 11	158.3	41 00.5	99 11	158.2	41 30.2	99 11	158.1	42 00.0	99 11	158.1	42 29.8	99 11	158.0	42 59.6	99 11	157.9	43 29.3	99 11	157.8	8
9	39 54.3	99 12	157.2	40 24.0	99 12	157.1	40 53.8	99 12	157.0	41 23.5	99 12	156.9	41 53.3	99 12	156.9	42 23.1	99 12	156.8	42 52.8	99 12	156.7	43 22.5	99 12	156.6	9
20	39 47.3	99 12	156.0	40 17.0	99 12	155.9	40 46.8	99 12	155.8	41 16.5	99 12	155.7	41 46.2	99 12	155.7	42 16.0	99 12	155.6	42 45.7	99 12	155.5	43 15.4	99 12	155.4	20
1	39 40.0	99 13	154.8	40 09.7	99 13	154.7	40 39.4	99 13	154.7	41 09.1	99 13	154.6	41 38.8	99 13	154.5	42 08.5	99 13	154.4	42 38.2	99 13	154.3	43 07.9	99 13	154.2	1
2	39 32.4	99 13	153.7	40 02.1	99 13	153.6	40 31.8	99 13	153.5	41 01.4	99 13	153.4	41 31.1	99 13	153.3	42 00.8	99 13	153.2	42 30.5	99 13	153.1	43 00.1	99 14	153.0	2
3	39 24.4	99 14	152.5	39 54.1	99 14	152.4	40 23.8	99 14	152.3	40 53.4	99 14	152.2	41 23.1	99 14	152.1	41 52.7	99 14	152.0	42 22.4	99 14	151.9	42 52.0	99 14	151.8	3
4	39 16.2	99 14	151.3	39 45.8	99 14	151.2	40 15.4	99 14	151.1	40 45.1	99 14	151.0	41 14.7	99 15	150.9	41 44.3	99 15	150.8	42 13.9	99 15	150.7	42 43.5	99 15	150.6	4
25	39 07.6	99 15	150.2	39 37.2	99 15	150.0	40 06.8	99 15	149.9	40 36.4	99 15	149.8	41 06.0	99 15	149.7	41 35.6	99 15	149.6	42 05.2	99 15	149.5	42 34.8	99 15	149.4	25
6	38 58.7	99 15	149.0	39 28.3	99 15	148.9	39 57.9	99 15	148.8	40 27.4	99 15	148.7	40 57.0	99 16	148.6	41 26.6	99 16	148.4	41 56.1	99 16	148.3	42 25.7	98 16	148.2	6
7	38 49.5	99 16	147.8	39 19.1	99 16	147.7	39 48.6	98 16	147.6	40 18.2	98 16	147.5	40 47.7	98 16	147.4	41 17.2	98 16	147.3	41 46.8	98 16	147.2	42 16.3	98 16	147.0	7
8	38 40.0	98 16	146.7	39 09.6	98 16	146.6	39 39.1	98 16	146.5	40 08.6	98 16	146.3	40 38.1	98 16	146.2	41 07.6	98 17	146.1	41 37.1	98 17	146.0	42 06.6	98 17	145.9	8
9	38 30.2	98 17	145.5	38 59.7	98 17	145.4	39 29.2	98 17	145.3	39 58.7	98 17	145.2	40 28.2	98 17	145.1	40 57.7	98 17	144.9	41 27.1	98 17	144.8	41 56.6	98 17	144.7	9
30	38 20.2	98 17	144.4	38 49.6	98 17	144.3	39 19.1	98 17	144.1	39 48.6	98 17	144.0	40 18.0	98 17	143.9	40 47.5	98 18	143.8	41 16.9	98 18	143.6	41 46.3	98 18	143.5	30
1	38 09.8	98 18	143.2	38 39.3	98 18	143.1	39 08.7	98 18	143.0	39 38.1	98 18	142.9	40 07.5	98 18	142.7	40 36.9	98 18	142.6	41 06.3	98 18	142.5	41 35.7	98 18	142.3	1
2	37 59.2	98 18	142.1	38 28.6	98 18	142.0	38 58.0	98 18	141.9	39 27.4	98 18	141.7	39 56.8	98 18	141.6	40 26.1	98 18	141.5	40 55.5	98 18	141.3	41 24.9	98 19	141.2	2
3	37 48.3	98 19	141.0	38 17.6	98 19	140.8	38 47.0	98 19	140.7	39 16.4	98 18	140.6	39 45.7	98 19	140.4	40 15.1	98 19	140.3	40 44.4	98 19	140.2	41 13.7	98 19	140.0	3
4	37 37.1	98 19	139.8	38 06.4	98 19	139.7	38 35.8	98 19	139.6	39 05.1	98 19	139.4	39 34.4	98 19	139.3	40 03.7	98 19	139.2	40 33.0	98 19	139.0	41 02.3	98 19	138.9	4
35	37 25.6	98 20	138.7	37 55.0	98 20	138.6	38 24.3	98 20	138.4	38 53.6	98 20	138.3	39 22.9	98 20	138.2	39 52.1	98 20	138.0	40 21.4	98 20	137.9	40 50.7	98 20	137.7	35
6	37 13.9	98 20	137.6	37 43.2	98 20	137.5	38 12.5	98 20	137.3	38 41.8	98 20	137.2	39 11.0	98 20	137.0	39 40.3	97 20	136.9	40 09.5	97 20	136.7	40 38.7	97 20	136.6	6
7	37 02.0	98 20	136.5	37 31.2	98 20	136.3	38 00.5	97 20	136.2	38 29.7	97 20	136.0	38 59.0	97 20	135.9	39 28.2	97 21	135.8	39 57.4	97 21	135.6	40 26.6	97 21	135.5	7
8	36 49.8	97 21	135.4	37 19.0	97 21	135.2	37 48.2	97 21	135.1	38 17.4	97 21	134.9	38 46.6	97 21	134.8	39 15.8	97 21	134.6	39 45.0	97 21	134.5	40 14.1	97 21	134.3	8
9	36 37.3	97 21	134.2	37 06.5	97 21	134.1	37 35.7	97 21	134.0	38 04.9	97 21	133.8	38 34.1	97 21	133.7	39 03.2	97 21	133.5	39 32.3	97 21	133.4	40 01.5	97 22	133.2	9
40	36 24.6	97 22	133.1	36 53.8	97 22	133.0	37 23.0	97 22	132.8	37 52.1	97 22	132.7	38 21.2	97 22	132.5	38 50.4	97 22	132.4	39 19.5	97 22	132.2	39 48.6	97 22	132.1	40
1	36 11.7	97 22	132.0	36 40.9	97 22	131.9	37 10.0	97 22	131.7	37 39.1	97 22	131.6	38 08.2	97 22	131.4	38 37.3	97 22	131.3	39 06.4	97 22	131.1	39 35.4	97 22	131.0	1
2	35 58.6	97 22	130.9	36 27.7	97 22	130.8	36 56.8	97 22	130.6	37 25.9	97 22	130.5	37 54.9	97 23	130.3	38 24.0	97 23	130.2	38 53.0	97 23	130.0	39 22.1	97 23	129.8	2
3	35 45.2	97 23	129.8	36 14.3	97 23	129.7	36 43.4	97 23	129.5	37 12.4	97 23	129.4	37 41.5	97 23	129.2	38 10.5	97 23	129.1	38 39.5	97 23	128.9	39 08.5	97 23	128.7	3
4	35 31.7	97 23	128.8	36 00.7	97 23	128.6	36 29.7	97 23	128.5	36 58.8	97 23	128.3	37 27.8	97 23	128.1	37 56.8	97 23	128.0	38 25.7	97 23	127.8	38 54.7	97 23	127.6	4
45	35 17.9	97 23	127.7	35 46.9	97 23	127.5	36 15.9	97 23	127.4	36 44.9	97 23	127.2	37 13.9	97 24	127.0	37 42.8	97 24	126.9	38 11.8	96 24	126.7	38 40.7	96 24	126.5	45
6	35 03.9	97 24	126.6	35 32.9	97 24	126.4	36 01.9	97 24	126.3	36 30.8	97 24	126.1	36 59.8	96 24	126.0	37 28.7	96 24	125.8	37 57.6	96 24	125.6	38 26.5	96 24	125.4	6
7	34 49.7	97 24	125.5	35 18.7	97 24	125.4	35 47.6	96 24	125.2	36 16.5	96 24	125.0	36 45.5	96 24	124.9	37 14.4	96 24	124.7	37 43.3	96 24	124.5	38 12.1	96 24	124.4	7
8	34 35.3	96 24	124.4	35 04.3	96 24	124.3	35 33.2	96 24	124.1	36 02.1	96 24	124.0	36 31.0	96 24	123.8	36 59.9	96 24	123.6	37 28.7	96 25	123.4	37 57.6	96 25	123.3	8
9	34 20.8	96 25	123.4	34 49.7	96 25	123.2	35 18.6	96 25	123.1	35 47.4	96 25	122.9	36 16.3	96 25	122.7	36 45.2	96 25	122.5	37 14.0	96 25	122.4	37 42.8	96 25	122.2	9
50	34 06.0	96 25	122.3	34 34.9	96 25	122.1	35 03.8	96 25	122.0	35 32.6	96 25	121.8	36 01.5	96 25	121.6	36 30.3	96 25	121.5	36 59.1	96 25	121.3	37 27.9	96 25	121.1	50
1	33 51.1	96 25	121.3	34 20.0	96 25	121.1	34 48.8	96 25	120.9	35 17.6	96 25	120.8	35 46.4	96 25	120.6	36 15.2	96 25	120.4	36 44.0	96 25	120.2	37 12.8	96 25	120.1	1
2	33 36.1	96 26	120.2	34 04.9	96 26	120.0	34 33.7	96 26	119.9	35 02.5	96 26	119.7	35 31.3	96 26	119.5	36 00.0	96 26	119.3	36 28.8	96 26	119.2	36 57.5	96 26	119.0	2
3	33 20.8	96 26	119.1	33 49.6	96 26	119.0	34 18.4	96 26	118.8	34 47.2	96 26	118.6	35 15.9	96 26	118.5	35 44.7	96 26	118.3	36 13.4	96 26	118.1	36 42.1	96 26	117.9	3
4	33 05.4	96 26	118.1	33 34.2	96 26	117.9	34 02.9	96 26	117.8	34 31.7	96 26	117.6	35 00.4	96 26	117.4	35 29.1	96 26	117.2	35 57.8	96 26	117.1	36 26.5	96 26	116.9	4
55	32 49.9	96 26	117.1	33 18.6	96 26	116.9	33 47.3	96 26	116.7	34 16.1	96 26	116.5	34 44.8	96 26	116.4	35 13.5	96 26	116.2	35 42.1	96 26	116.0	36 10.8	95 26	115.8	55
6	32 34.2	96 26	116.0	33 02.9	96 26	115.8	33 31.6	96 26	115.7	34 00.3	96 26	115.5	34 29.0	96 27	115.3	34 57.6	96 27	115.1	35 26.3	95 27	115.0	35 54.9	95 27	114.8	6
7	32 18.3	96 27	115.0	32 47.0	96 27	114.8	33 15.7	96 27	114.6	33 44.4	96 27	114.5	34 13.1	96 27	114.3	34 41.7	95 27	114.1	35 10.3	95 27	113.9	35 38.9	95 27	113.7	7
8	32 02.4	96 27	113.9	32 31.0	96 27	113.8	32 59.7	96 27	113.6	33 28.4	95 27	113.4	33 57.0	95 27	113.2	34 25.6	95 27	113.1	34 54.2	95 27	112.9	35 22.8	95 27	112.7	8
9	31 46.3	96 27	112.9	32 14.9	96 27	112.7	32 43.6	95 27	112.6	33 12.2	95 27	112.4	33 40.8	95 27	112.2	34 09.4	95 27	112.0	34 38.0	95 27	111.8	35 06.6	95 27	111.7	9
60	31 30.1	95 27	111.9	31 58.7	95 27	111.7	32 27.3	95 27	111.5	32 55.9	95 27	111.4	33 24.5	95 27	111.2	33 53.1	95 27	111.0	34 21.7	95 27	110.8	34 50.2	95 27	110.6	60
1	31 13.7	95 27	110.9	31 42.3	95 27	110.7	32 10.9	95 28	110.5	32 39.5	95 28	110.3	33 08.1	95 28	110.2	33 36.7	95 28	110.0	34 05.2	95 28	109.8	34 33.7	95 28	109.6	1
2	30 57.3	95 28	109.9	31 25.9	95 28	109.7	31 54.5	95 28	109.5	32 23.0	95 28	109.3	32 51.6	95 28	109.1	33 20.1	95 28	109.0	33 48.7	95 28	108.8	34 17.2	95 28	108.6	2
3	30 40.7	95 28	108.8	31 09.3	95 28	108.7	31 37.9	95 28	108.5	32 06.4	95 28	108.3	32 35.0	95 28	108.1	33 03.5	95 28	107.9	33 32.0	95 28	107.7	34 00.5	95 28	107.6	3
4	30 24.1	95 28	107.8	30 52.6	95 28	107.6	31 21.2	95 28	107.5	31 49.7	95 28	107.3	32 18.2	95 28	107.1	32 46.8	95 28	106.9	33 15.2	95 28	106.7	33 43.7	95 28	106.5	4
65	30 07.3	95 28	106.8	30 35.9	95 28	106.6	31 04.4	95 28	106.5	31 32.9	95 28	106.3	32 01.4	95 28	106.1	32 29.9	95 28	105.9	32 58.4	95 28	105.7	33 26.9	95 28	105.5	65
6	29 50.5	95 28	105.8	30 19.0	95 28	105.6	30 47.5	95 28	105.5	31 16.0	95 28	105.3	31 44.5	95 28	105.1	32 13.0	95 28	104.9	32 41.5	95 28	104.7	33 09.9	95 28	104.5	6
7	29 33.6	95 28	104.8	30 02.1	95 28	104.6	30 30.6	95 28	104.5	30 59.1	95 28	104.3	31 27.6	95 28	104.1	31 56.0	95 28	103.9	32 24.5	95 28	103.7	32 52.9	95 28	103.5	7
8	29 16.6	95 28	103.8	29 45.1	95 28	103.6	30 13.6	95 28	103.5	30 42.0	95 29	103.3	31 10.5	95 29	103.1	31 39.0	95 29	102.9	32 07.4	95 28	102.7	32 35.8	95 29	102.5	8
9	28 59.5	95 29	102.8	29 28.0	95 29	102.6	29 56.5	95 29	102.5	30 24.9	95 29	102.3	30 53.4	95 29	102.1	31 21.8	95 29	101.9	31 50.2	95 29	101.7	32 18.6	95 29	101.5	9
70	28 42.4	95 29	101.8	29 10.8	95 29	101.7	29 39.3	95 29	101.5	30 07.8	95 29	101.3	30 36.2	95 29	101.1	31 04.6	95 29	100.9	31 33.0	95 29	100.7	32 01.4	95 29	100.5	70
1	28 25.2	95 29	100.8	28 53.6	95 29	100.7	29 22.1	95 29	100.5	29 50.5	95 29	100.3	30 19.0	95 29	100.1	30 47.4	95 29	99.9	31 15.8	95 29	99.7	31 44.2	95 29	99.6	1
2	28 07.9	95 29	99.9	28 36.4	95 29	99.7	29 04.8	95 29	99.5	29 33.3	95 29	99.3	30 01.7	95 29	99.1	30 30.1	95 29	98.9	30 58.5	95 29	98.8	31 26.8	95 29	98.6	2
3	27 50.6	95 29	98.9	28 19.1	95 29	98.7	28 47.5	95 29	98.5	29 15.9	95 29	98.3	29 44.3	95 29	98.2	30 12.7	95 29	98.0	30 41.1	95 29	97.8	31 09.5	95 29	97.6	3
4	27 33.2	95 29	97.9	28 01.7	95 29	97.7	28 30.1	95 29	97.5	28 58.5	95 29	97.4	29 26.9	95 29	97.2	29 55.3	95 29	97.0	30 23.7	95 29	96.8	30 52.1	94 29	96.6	4
75	27 15.8	95 29	96.9	27 44.3	95 29	96.7	28 12.7	95 29	96.6	28 41.1	95 29	96.4	29 09.5	95 29	96.2	29 37.9	95 29	96.0	30 06.3	95 29	95.8	30 34.6	94 29	95.6	75
6	26 58.4	95 29	96.0	27 26.8	95 29	95.8	27 55.3	95 29	95.6	28 23.7	95 29	95.4	28 52.1	95 29	95.2	29 20.4	95 29	95.0	29 48.8	95 29	94.9	30 17.1	94 29	94.7	6
7	26 41.0	95 29	95.0	27 09.4	95 29	94.8	27 37.8	95 29	94.6	28 06.2	95 29	94.4	28 34.6	95 29	94.3	29 03.0	95 29	94.1	29 31.3	94 29	93.9	29 59.6	94 29	93.7	7
8	26 23.5	95 29	94.0	26 51.9	95 29	93.8	27 20.3	95 29	93.7	27 48.7	95 29	93.5	28 17.1	95 29	93.3	28 45.4	95 29	93.1	29 13.8	94 29	92.9	29 42.1	94 29	92.7	8
9	26 06.0	95 29	93.1	26 34.4	95 29	92.9	27 02.8	95 29	92.7	27 31.2	95 29	92.5	27 59.6	95 29	92.3	28 27.9	95 29	92.1	28 56.3	94 29	92.0	29 24.6	94 29	91.8	9
80	25 48.4	95 29	92.1	26 16.9	95 29	91.9	26 45.3	95 29	91.7	27 13.6	95 29	91.5	27 42.0	95 29	91.4	28 10.4	95 29	91.2	28 38.7	94 29	91.0	29 07.1	94 29	90.8	80
1	25 30.9	95 29	91.1	25 59.3	95 29	90.9	26 27.7	95 29	90.8	26 56.1	95 29	90.6	27 24.5	95 29	90.4	27 52.8	95 29	90.2	28 21.2	94 29	90.0	28 49.5	94 29	89.8	1
2	25 13.4	95 29	90.2	25 41.8	95 29	90.0	26 10.2	95 29	89.8	26 38.6	95 29	89.6	27 06.9	95 29	89.5	27 35.3	95 29	89.3	28 03.6	94 29	89.1	28 32.0	94 29	88.9	2
3	24 55.8	95 29	89.2	25 24.2	95 29	89.0	25 52.6	95 29	88.9	26 21.0	95 29	88.7	26 49.4	95 29	88.5	27 17.8	95 29	88.3	27 46.1	94 29	88.1	28 14.4	94 29	87.9	3
4	24 38.3	95 29	88.3	25 06.7	95 29	88.1	25 35.1	95 29	87.9	26 03.5	95 29	87.7	26 31.9	95 29	87.5	27 00.2	95 29	87.4	27 28.6	94 29	87.2	27 56.9	94 29	87.0	4
85	24 20.7	95 29	87.3	24 49.2	95 29	87.1	25 17.6	95 29	87.0	25 46.0	95 29	86.8	26 14.4	95 29	86.6	26 42.7	95 29	86.4	27 11.1	94 29	86.2	27 39.4	94 29	86.0	85
6	24 03.2	95 29	86.4	24 31.7	95 29	86.2	25 00.1	95 29	86.0	25 28.5	95 29	85.8	25 56.8	95 29	85.6	26 25.2	95 29	85.5	26 53.6	95 29	85.3	27 21.9	94 29	85.1	6
7	23 45.7	95 29	85.4	24 14.2	95 29	85.2	24 42.6	95 29	85.1	25 11.0	95 29	84.9	25 39.4	95 29	84.7	26 07.7	95 29	84.5	26 36.1	95 29	84.3	27 04.5	94 29	84.2	7
8	23 28.3	95 29	84.5	23 56.7	95 29	84.3	24 25.1	95 29	84.1	24 53.5	95 29	83.9	25 21.9	95 29	83.8	25 50.3	95 29	83.6	26 18.7	95 29	83.4	26 47.0	94 29	83.2	8
9	23 10.8	95 29	83.5	23 39.3	95 29	83.4	24 07.7	95 29	83.2	24 36.1	95 29	83.0	25 04.5	95 29	82.8	25 32.9	95 29	82.6	26 01.3	95 29	82.5	26 29.6	95 29	82.3	9
90	22 53.4	95 29	82.6	23 21.8	95 29	82.4	23 50.3	95 29	82.2	24 18.7	95 29	82.1	24 47.1	95 29	81.9	25 15.5	95 29	81.7	25 43.9	95 29	81.5	26 12.3	95 29	81.3	90

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	22 36.0	95 29	81.6	23 04.5	95 29	81.5	23 32.9	95 29	81.3	24 01.3	95 29	81.1
2	22 18.7	95 29	80.7	22 47.2	95 29	80.5	23 15.6	95 29	80.4	23 44.0	95 29	80.2
3	22 01.4	95 29	79.8	22 29.9	95 29	79.6	22 58.3	95 29	79.4	23 26.8	95 29	79.3
4	21 44.2	95 29	78.8	22 12.6	95 29	78.7	22 41.1	95 29	78.5	23 09.6	95 29	78.3
95	21 27.0	95 29	77.9	21 55.5	95 28	77.7	22 24.0	95 28	77.6	22 52.4	95 28	77.4
6	21 09.9	95 28	77.0	21 38.4	95 28	76.8	22 06.9	95 28	76.6	22 35.3	95 28	76.5
7	20 52.8	95 28	76.0	21 21.3	95 28	75.9	21 49.8	95 28	75.7	22 18.3	95 28	75.5
8	20 35.8	95 28	75.1	21 04.3	95 28	74.9	21 32.9	95 28	74.8	22 01.4	95 28	74.6
9	20 18.9	95 28	74.2	20 47.4	95 28	74.0	21 16.0	95 28	73.9	21 44.5	95 28	73.7
100	20 02.1	95 28	73.3	20 30.6	95 28	73.1	20 59.2	95 28	72.9	21 27.7	95 28	72.8
1	19 45.3	95 28	72.3	20 13.9	95 28	72.2	20 42.4	95 28	72.0	21 11.0	95 28	71.8
2	19 28.6	95 28	71.4	19 57.2	95 28	71.2	20 25.8	95 28	71.1	20 54.4	95 28	70.9
3	19 12.1	95 27	70.5	19 40.7	95 27	70.3	20 09.2	95 27	70.2	20 37.8	95 27	70.0
4	18 55.6	95 27	69.6	19 24.2	95 27	69.4	19 52.8	95 27	69.2	20 21.4	95 27	69.1
105	18 39.2	96 27	68.6	19 07.8	96 27	68.5	19 36.4	96 27	68.3	20 05.0	96 27	68.2
6	18 22.9	96 27	67.7	18 51.5	96 27	67.6	19 20.2	96 27	67.4	19 48.8	96 27	67.3
7	18 06.7	96 27	66.8	18 35.4	96 27	66.6	19 04.0	96 27	66.5	19 32.7	96 27	66.3
8	17 50.6	96 27	65.9	18 19.3	96 27	65.7	18 48.0	96 27	65.6	19 16.7	96 26	65.4
9	17 34.7	96 26	65.0	18 03.4	96 26	64.8	18 32.1	96 26	64.7	19 00.8	96 26	64.5
110	17 18.9	96 26	64.1	17 47.6	96 26	63.9	18 16.3	96 26	63.8	18 45.0	96 26	63.6
1	17 03.1	96 26	63.1	17 31.9	96 26	63.0	18 00.6	96 26	62.8	18 29.4	96 26	62.7
2	16 47.6	96 26	62.2	17 16.3	96 26	62.1	17 45.1	96 26	61.9	18 13.8	96 26	61.8
3	16 32.1	96 26	61.3	17 00.9	96 26	61.2	17 29.7	96 25	61.0	17 58.5	96 25	60.9
4	16 16.8	96 25	60.4	16 45.6	96 25	60.2	17 14.4	96 25	60.1	17 43.2	96 25	60.0
115	16 01.6	96 25	59.5	16 30.4	96 25	59.3	16 59.3	96 25	59.2	17 28.1	96 25	59.0
6	15 46.6	96 25	58.6	16 15.4	96 25	58.4	16 44.3	96 25	58.3	17 13.1	96 25	58.1
7	15 31.7	96 25	57.7	16 00.5	96 25	57.5	16 29.4	96 24	57.4	16 58.3	96 24	57.2
8	15 16.9	96 24	56.7	15 45.8	96 24	56.6	16 14.7	96 24	56.5	16 43.6	96 24	56.3
9	15 02.3	96 24	55.8	15 31.3	96 24	55.7	16 00.2	96 24	55.6	16 29.1	96 24	55.4
120	14 47.9	97 24	54.9	15 16.8	96 24	54.8	15 45.8	96 24	54.6	16 14.7	96 24	54.5
1	14 33.6	97 24	54.0	15 02.6	97 23	53.9	15 31.6	97 23	53.7	16 00.5	97 23	53.6
2	14 19.5	97 23	53.1	14 48.5	97 23	53.0	15 17.5	97 23	52.8	15 46.5	97 23	52.7
3	14 05.6	97 23	52.2	14 34.6	97 23	52.0	15 03.6	97 23	51.9	15 32.6	97 23	51.8
4	13 51.8	97 23	51.3	14 20.8	97 23	51.1	14 49.9	97 23	51.0	15 18.9	97 23	50.9
125	13 38.2	97 22	50.4	14 07.3	97 22	50.2	14 36.3	97 22	50.1	15 05.4	97 22	50.0
6	13 24.8	97 22	49.4	13 53.9	97 22	49.3	14 23.0	97 22	49.2	14 52.1	97 22	49.1
7	13 11.5	97 22	48.5	13 40.7	97 22	48.4	14 09.8	97 22	48.3	14 38.9	97 22	48.2
8	12 58.5	97 21	47.6	13 27.6	97 21	47.5	13 56.8	97 21	47.4	14 25.9	97 21	47.3
9	12 45.6	97 21	46.7	13 14.8	97 21	46.6	13 44.0	97 21	46.5	14 13.1	97 21	46.4
130	12 33.0	97 21	45.8	13 02.2	97 21	45.7	13 31.3	97 21	45.6	14 00.5	97 21	45.4
1	12 20.5	97 20	44.9	12 49.7	97 20	44.8	13 18.9	97 20	44.7	13 48.1	97 20	44.5
2	12 08.2	97 20	44.0	12 37.4	97 20	43.9	13 06.7	97 20	43.8	13 35.9	97 20	43.6
3	11 56.1	98 20	43.1	12 25.4	98 20	43.0	12 54.7	98 20	42.8	13 23.9	98 20	42.7
4	11 44.2	98 19	42.2	12 13.5	98 19	42.0	12 42.8	98 19	41.9	13 12.1	98 19	41.8
135	11 32.6	98 19	41.2	12 01.9	98 19	41.1	12 31.2	98 19	41.0	13 00.5	98 19	40.9
6	11 21.1	98 19	40.3	11 50.5	98 19	40.2	12 19.8	98 19	40.1	12 49.1	98 19	40.0
7	11 09.9	98 18	39.4	11 39.2	98 18	39.3	12 08.6	98 18	39.2	12 38.0	98 18	39.1
8	10 58.8	98 18	38.5	11 28.2	98 18	38.4	11 57.6	98 18	38.3	12 27.0	98 18	38.2
9	10 48.0	98 18	37.6	11 17.4	98 18	37.5	11 46.9	98 18	37.4	12 16.3	98 18	37.3
140	10 37.4	98 17	36.7	11 06.9	98 17	36.6	11 36.3	98 17	36.5	12 05.8	98 17	36.4
1	10 27.1	98 17	35.8	10 56.5	98 17	35.7	11 26.0	98 17	35.6	11 55.5	98 17	35.5
2	10 16.9	98 17	34.9	10 46.4	98 16	34.8	11 15.9	98 16	34.7	11 45.4	98 16	34.6
3	10 07.0	98 16	34.0	10 36.5	98 16	33.9	11 06.0	98 16	33.8	11 35.5	98 16	33.7
4	9 57.3	98 16	33.0	10 26.9	98 16	32.9	10 56.4	98 16	32.9	11 25.9	98 16	32.8
145	9 47.9	99 15	32.1	10 17.4	99 15	32.0	10 47.0	99 15	32.0	11 16.6	99 15	31.9
6	9 38.7	99 15	31.2	10 08.2	99 15	31.1	10 37.8	99 15	31.0	11 07.4	99 15	31.0
7	9 29.7	99 15	30.3	9 59.3	99 14	30.2	10 28.9	99 14	30.1	10 58.5	99 14	30.0
8	9 21.0	99 14	29.4	9 50.6	99 14	29.3	10 20.2	99 14	29.2	10 49.8	99 14	29.1
9	9 12.5	99 14	28.5	9 42.1	99 14	28.4	10 11.8	99 14	28.3	10 41.4	99 14	28.2
150	9 04.2	99 13	27.6	9 33.9	99 13	27.5	10 03.6	99 13	27.4	10 33.2	99 13	27.3
1	8 56.3	99 13	26.6	9 25.9	99 13	26.6	9 55.6	99 13	26.5	10 25.3	99 13	26.4
2	8 48.5	99 12	25.7	9 18.2	99 12	25.7	9 47.9	99 12	25.6	10 17.6	99 12	25.5
3	8 41.0	99 12	24.8	9 10.8	99 12	24.7	9 40.5	99 12	24.7	10 10.2	99 12	24.6
4	8 33.8	99 12	23.9	9 03.5	99 12	23.8	9 33.3	99 12	23.8	10 03.0	99 12	23.7
155	8 26.8	99 11	23.0	8 56.6	99 11	22.9	9 26.3	99 11	22.8	9 56.1	99 11	22.8
6	8 20.1	99 11	22.1	8 49.9	99 11	22.0	9 19.7	99 11	21.9	9 49.4	99 11	21.9
7	8 13.6	99 10	21.1	8 43.4	99 10	21.1	9 13.2	99 10	21.0	9 43.0	99 10	21.0
8	8 07.4	99 10	20.2	8 37.3	99 10	20.2	9 07.1	99 10	20.1	9 36.9	99 10	20.1
9	8 01.5	99 09	19.3	8 31.3	99 09	19.3	9 01.2	99 09	19.2	9 31.0	99 09	19.1
160	7 55.8	99 09	18.4	8 25.7	99 09	18.3	8 55.5	99 09	18.3	9 25.4	99 09	18.2
1	7 50.4	1.0 09	17.5	8 20.3	1.0 09	17.4	8 50.2	1.0 08	17.4	9 20.0	1.0 08	17.3
2	7 45.3	1.0 08	16.6	8 15.2	1.0 08	16.5	8 45.1	1.0 08	16.5	9 14.9	1.0 08	16.4
3	7 40.5	1.0 08	15.6	8 10.3	1.0 08	15.6	8 40.2	1.0 08	15.5	9 10.1	1.0 08	15.5
4	7 35.9	1.0 07	14.7	8 05.8	1.0 07	14.7	8 35.7	1.0 07	14.6	9 05.6	1.0 07	14.6
165	7 31.5	1.0 07	13.8	8 01.5	1.0 07	13.8	8 31.4	1.0 07	13.7	9 01.3	1.0 07	13.7
6	7 27.5	1.0 06	12.9	7 57.4	1.0 06	12.8	8 27.3	1.0 06	12.8	8 57.3	1.0 06	12.8
7	7 23.7	1.0 06	12.0	7 53.7	1.0 06	11.9	8 23.6	1.0 06	11.9	8 53.5	1.0 06	11.9
8	7 20.2	1.0 05	11.0	7 50.2	1.0 05	11.0	8 20.1	1.0 05	11.0	8 50.1	1.0 05	10.9
9	7 17.0	1.0 05	10.1	7 47.0	1.0 05	10.1	8 16.9	1.0 05	10.1	8 46.9	1.0 05	10.0
170	7 14.1	1.0 04	09.2	7 44.0	1.0 04	09.2	8 14.0	1.0 04	09.2	8 43.9	1.0 04	09.1
1	7 11.4	1.0 04	08.3	7 41.4	1.0 04	08.3	8 11.3	1.0 04	08.2	8 41.3	1.0 04	08.2
2	7 09.0	1.0 04	07.4	7 39.0	1.0 04	07.3	8 09.0	1.0 04	07.3	8 38.9	1.0 04	07.3
3	7 06.9	1.0 03	06.4	7 36.9	1.0 03	06.4	8 06.9	1.0 03	06.4	8 36.8	1.0 03	06.4
4	7 05.1	1.0 03	05.5	7 35.1	1.0 03	05.5	8 05.0	1.0 03	05.5	8 35.0	1.0 03	05.5
175	7 03.5	1.0 02	04.6	7 33.5	1.0 02	04.6	8 03.5	1.0 02	04.6	8 33.5	1.0 02	04.6
6	7 02.3	1.0 02	03.7	7 32.2	1.0 02	03.7	8 02.2	1.0 02	03.7	8 32.2	1.0 02	03.7
7	7 01.3	1.0 01	02.8	7 31.3	1.0 01	02.8	8 01.3	1.0 01	02.7	8 31.3	1.0 01	02.7
8	7 00.6	1.0 01	01.8	7 30.6	1.0 01	01.8	8 00.6	1.0 01	01.8	8 30.6	1.0 01	01.8
9	7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9
180	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0

26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.	
° ′		°	° ′		°	° ′		°	° ′		°	°	
24 29.8	95 29	80.9	24 58.2	95 29	80.8	25 26.6	95 29	80.6	25 54.9	95 29	80.4	91	Lat. 73°
24 12.5	95 29	80.0	24 40.9	95 29	79.8	25 09.3	95 29	79.7	25 37.7	95 29	79.5	2	
23 55.2	95 29	79.1	24 23.6	95 29	78.9	24 52.0	95 29	78.7	25 20.4	95 29	78.6	3	
23 38.0	95 29	78.2	24 06.4	95 29	78.0	24 34.9	95 29	77.8	25 03.3	95 29	77.6	4	
23 20.9	95 28	77.2	23 49.3	95 28	77.0	24 17.8	95 28	76.9	24 46.2	95 28	76.7	95	
23 03.8	95 28	76.3	23 32.3	95 28	76.1	24 00.7	95 28	75.9	24 29.1	95 28	75.8	6	
22 46.8	95 28	75.4	23 15.3	95 28	75.2	23 43.7	95 28	75.0	24 12.2	95 28	74.9	7	
22 29.9	95 28	74.4	22 58.3	95 28	74.3	23 26.8	95 28	74.1	23 55.3	95 28	73.9	8	
22 13.0	95 28	73.5	22 41.5	95 28	73.4	23 10.0	95 28	73.2	23 38.5	95 28	73.0	9	
21 56.2	95 28	72.6	22 24.7	95 28	72.4	22 53.2	95 28	72.3	23 21.7	95 28	72.1	100	
21 39.5	95 28	71.7	22 08.0	95 28	71.5	22 36.6	95 28	71.3	23 05.1	95 28	71.2	1	
21 22.9	95 28	70.8	21 51.5	95 28	70.6	22 20.0	95 27	70.4	22 48.5	95 27	70.3	2	
21 06.4	95 27	69.8	21 35.0	95 27	69.7	22 03.5	95 27	69.5	22 32.1	95 27	69.3	3	
20 50.0	95 27	68.9	21 18.6	95 27	68.8	21 47.1	95 27	68.6	22 15.7	95 27	68.4	4	
20 33.7	96 27	68.0	21 02.3	96 27	67.8	21 30.8	96 27	67.7	21 59.4	96 27	67.5	105	
20 17.4	96 27	67.1	20 46.1	96 27	66.9	21 14.7	96 27	66.8	21 43.3	96 27	66.6	6	
20 01.3	96 27	66.2	20 30.0	96 27	66.0	20 58.6	96 27	65.9	21 27.2	96 27	65.7	7	
19 45.3	96 26	65.3	20 14.0	96 26	65.1	20 42.7	96 26	65.0	21 11.3	96 26	64.8	8	
19 29.5	96 26	64.4	19 58.2	96 26	64.2	20 26.8	96 26	64.0	20 55.5	96 26	63.9	9	
19 13.7	96 26	63.4	19 42.4	96 26	63.3	20 11.1	96 26	63.1	20 39.8	96 26	63.0	110	
18 58.1	96 26	62.5	19 26.8	96 26	62.4	19 55.5	96 26	62.2	20 24.2	96 26	62.1	1	
18 42.6	96 26	61.6	19 11.3	96 26	61.5	19 40.1	96 26	61.3	20 08.8	96 26	61.2	2	
18 27.2	96 25	60.7	18 56.0	96 25	60.6	19 24.7	96 25	60.4	19 53.5	96 25	60.3	3	
18 12.0	96 25	59.8	18 40.8	96 25	59.7	19 09.6	96 25	59.5	19 38.3	96 25	59.4	4	
17 56.9	96 25	58.9	18 25.7	96 25	58.8	18 54.5	96 25	58.6	19 23.3	96 25	58.5	115	
17 42.0	96 25	58.0	18 10.8	96 25	57.8	18 39.6	96 25	57.7	19 08.4	96 25	57.6	6	
17 27.2	96 24	57.1	17 56.0	96 24	56.9	18 24.9	96 24	56.8	18 53.7	96 24	56.7	7	
17 12.5	96 24	56.2	17 41.4	96 24	56.0	18 10.3	96 24	55.9	18 39.1	96 24	55.8	8	
16 58.0	96 24	55.3	17 26.9	96 24	55.1	17 55.8	96 24	55.0	18 24.7	96 24	54.9	9	
16 43.7	96 24	54.4	17 12.6	96 24	54.2	17 41.5	96 24	54.1	18 10.4	96 24	54.0	120	
16 29.5	97 23	53.5	16 58.4	97 23	53.3	17 27.4	96 23	53.2	17 56.3	96 23	53.1	1	
16 15.5	97 23	52.6	16 44.5	97 23	52.4	17 13.4	97 23	52.3	17 42.4	97 23	52.2	2	
16 01.6	97 23	51.7	16 30.6	97 23	51.5	16 59.6	97 23	51.4	17 28.6	97 23	51.3	3	
15 48.0	97 22	50.7	16 17.0	97 22	50.6	16 46.0	97 22	50.5	17 15.0	97 22	50.4	4	
15 34.5	97 22	49.8	16 03.5	97 22	49.7	16 32.6	97 22	49.6	17 01.6	97 22	49.5	125	
15 21.2	97 22	48.9	15 50.2	97 22	48.8	16 19.3	97 22	48.7	16 48.4	97 22	48.6	6	
15 08.0	97 22	48.0	15 37.1	97 22	47.9	16 06.2	97 21	47.8	16 35.3	97 21	47.7	7	
14 55.1	97 21	47.1	15 24.2	97 21	47.0	15 53.3	97 21	46.9	16 22.4	97 21	46.8	8	
14 42.3	97 21	46.2	15 11.5	97 21	46.1	15 40.6	97 21	46.0	16 09.8	97 21	45.9	9	
14 29.7	97 21	45.3	14 58.9	97 21	45.2	15 28.1	97 21	45.1	15 57.3	97 20	45.0	130	
14 17.4	97 20	44.4	14 46.6	97 20	44.3	15 15.8	97 20	44.2	15 45.0	97 20	44.1	1	Lat. 74°
14 05.2	97 20	43.5	14 34.4	97 20	43.4	15 03.6	97 20	43.3	15 32.9	97 20	43.2	2	
13 53.2	98 20	42.6	14 22.5	98 20	42.5	14 51.7	98 20	42.4	15 21.0	98 20	42.3	3	
13 41.4	98 19	41.7	14 10.7	98 19	41.6	14 40.0	98 19	41.5	15 09.3	98 19	41.4	4	
13 29.8	98 19	40.8	13 59.2	98 19	40.7	14 28.5	98 19	40.6	14 57.8	98 19	40.5	135	
13 18.5	98 19	39.9	13 47.8	98 19	39.8	14 17.2	98 18	39.7	14 46.5	98 18	39.6	6	
13 07.3	98 18	39.0	13 36.7	98 18	38.9	14 06.1	98 18	38.8	14 35.4	98 18	38.7	7	
12 56.4	98 18	38.1	13 25.8	98 18	38.0	13 55.2	98 18	37.9	14 24.6	98 18	37.8	8	
12 45.7	98 17	37.2	13 15.1	98 17	37.1	13 44.5	98 17	37.0	14 13.9	98 17	36.9	9	
12 35.2	98 17	36.3	13 04.6	98 17	36.2	13 34.1	98 17	36.1	14 03.5	98 17	36.0	140	
12 24.9	98 17	35.4	12 54.4	98 17	35.3	13 23.8	98 17	35.2	13 53.3	98 17	35.1	1	Lat. 75°
12 14.9	98 16	34.5	12 44.4	98 16	34.4	13 13.8	98 16	34.3	13 43.3	98 16	34.2	2	
12 05.1	98 16	33.6	12 34.6	98 16	33.5	13 04.1	98 16	33.4	13 33.6	98 16	33.3	3	
11 55.5	98 16	32.7	12 25.0	98 16	32.6	12 54.5	98 16	32.5	13 24.1	98 16	32.4	4	
11 46.1	99 15	31.8	12 15.7	99 15	31.7	12 45.2	99 15	31.6	13 14.8	99 15	31.5	145	
11 37.0	99 15	30.9	12 06.6	99 15	30.8	12 36.1	99 15	30.7	13 05.7	99 15	30.6	6	
11 28.1	99 14	30.0	11 57.7	99 14	29.9	12 27.3	99 14	29.8	12 56.9	99 14	29.7	7	
11 19.5	99 14	29.1	11 49.1	99 14	29.0	12 18.7	99 14	28.9	12 48.3	99 14	28.8	8	
11 11.1	99 14	28.2	11 40.7	99 14	28.1	12 10.4	99 14	28.0	12 40.0	99 14	27.9	9	
11 02.9	99 13	27.3	11 32.6	99 13	27.2	12 02.2	99 13	27.1	12 31.9	99 13	27.0	150	
10 55.0	99 13	26.3	11 24.7	99 13	26.3	11 54.4	99 13	26.2	12 24.1	99 13	26.1	1	Lat. 76°
10 47.3	99 12	25.4	11 17.0	99 12	25.4	11 46.8	99 12	25.3	12 16.5	99 12	25.2	2	
10 39.9	99 12	24.5	11 09.7	99 12	24.5	11 39.4	99 12	24.4	12 09.1	99 12	24.3	3	
10 32.8	99 12	23.6	11 02.5	99 11	23.6	11 32.3	99 11	23.5	12 02.0	99 11	23.4	4	
10 25.9	99 11	22.7	10 55.6	99 11	22.7	11 25.4	99 11	22.6	11 55.2	99 11	22.5	155	
10 19.2	99 11	21.8	10 49.0	99 11	21.8	11 18.8	99 11	21.7	11 48.6	99 11	21.6	6	
10 12.8	99 10	20.9	10 42.6	99 10	20.8	11 12.4	99 10	20.8	11 42.2	99 10	20.7	7	
10 06.7	99 10	20.0	10 36.5	99 10	19.9	11 06.3	99 10	19.9	11 36.1	99 10	19.8	8	Lat. 77°
10 00.8	99 09	19.1	10 30.7	99 09	19.0	11 00.5	99 09	19.0	11 30.3	99 09	18.9	9	
9 55.2	99 09	18.2	10 25.1	99 09	18.1	10 54.9	99 09	18.1	11 24.8	99 09	18.0	160	
9 49.9	1.0 08	17.3	10 19.7	1.0 08	17.2	10 49.6	1.0 08	17.2	11 19.5	1.0 08	17.1	1	
9 44.8	1.0 08	16.4	10 14.7	1.0 08	16.3	10 44.6	1.0 08	16.3	11 14.4	1.0 08	16.2	2	
9 40.0	1.0 08	15.5	10 09.9	1.0 08	15.4	10 39.8	1.0 08	15.4	11 09.7	1.0 08	15.3	3	
9 35.5	1.0 07	14.6	10 05.4	1.0 07	14.5	10 35.3	1.0 07	14.5	11 05.2	1.0 07	14.4	4	
9 31.2	1.0 07	13.6	10 01.1	1.0 07	13.6	10 31.0	1.0 07	13.6	11 00.9	1.0 07	13.5	165	
9 27.2	1.0 06	12.7	9 57.1	1.0 06	12.7	10 27.0	1.0 06	12.7	10 57.0	1.0 06	12.6	6	
9 23.5	1.0 06	11.8	9 53.4	1.0 06	11.8	10 23.3	1.0 06	11.8	10 53.3	1.0 06	11.7	7	Lat. 78°
9 20.0	1.0 05	10.9	9 49.9	1.0 05	10.9	10 19.9	1.0 05	10.9	10 49.8	1.0 05	10.8	8	
9 16.8	1.0 05	10.0	9 46.8	1.0 05	10.0	10 16.7	1.0 05	10.0	10 46.7	1.0 05	09.9	9	
9 13.9	1.0 04	09.1	9 43.9	1.0 04	09.1	10 13.8	1.0 04	09.0	10 43.8	1.0 04	09.0	170	
9 11.3	1.0 04	08.2	9 41.2	1.0 04	08.2	10 11.2	1.0 04	08.1	10 41.2	1.0 04	08.1	1	
9 08.9	1.0 03	07.3	9 38.9	1.0 03	07.3	10 08.9	1.0 03	07.2	10 38.8	1.0 03	07.2	2	
9 06.8	1.0 03	06.4	9 36.8	1.0 03	06.4	10 06.8	1.0 03	06.3	10 36.8	1.0 03	06.3	3	
9 05.0	1.0 03	05.5	9 35.0	1.0 03	05.4	10 05.0	1.0 03	05.4	10 35.0	1.0 03	05.4	4	
9 03.5	1.0 02	04.5	9 33.5	1.0 02	04.5	10 03.5	1.0 02	04.5	10 33.5	1.0 02	04.5	175	
9 02.2	1.0 02	03.6	9 32.2	1.0 02	03.6	10 02.2	1.0 02	03.6	10 32.2	1.0 02	03.6	6	La
9 01.3	1.0 01	02.7	9 31.2	1.0 01	02.7	10 01.2	1.0 01	02.7	10 31.2	1.0 01	02.7	7	79
9 00.6	1.0 01	01.8	9 30.6	1.0 01	01.8	10 00.6	1.0 01	01.8	10 30.6	1.0 01	01.8	8	
9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	9	
9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	180	

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	45 00.0	1.0 00	180.0	45 30.0	1.0 00	180.0	46 00.0	1.0 00	180.0	47 00.0	1.0 00	180.0	49 00.0	1.0 00	180.0	51 00.0	1.0 00	180.0	51 30.0	1.0 00	180.0	52 30.0	1.0 00	180.0	00
1	44 59.8	1.0 01	178.8	45 29.8	1.0 01	178.7	45 59.8	1.0 01	178.7	46 59.8	1.0 01	178.7	48 59.8	1.0 01	178.7	50 59.8	1.0 01	178.7	51 29.8	1.0 01	178.7	52 29.8	1.0 01	178.7	1
2	44 59.2	1.0 02	177.5	45 29.2	1.0 02	177.5	45 59.2	1.0 02	177.5	46 59.2	1.0 02	177.5	48 59.2	1.0 02	177.4	50 59.2	1.0 02	177.4	51 29.2	1.0 02	177.4	52 29.2	1.0 02	177.3	2
3	44 58.3	1.0 02	176.3	45 28.3	1.0 02	176.2	45 58.3	1.0 02	176.2	46 58.3	1.0 02	176.2	48 58.2	1.0 02	176.1	50 58.2	1.0 02	176.0	51 28.2	1.0 02	176.0	52 28.2	1.0 02	176.0	3
4	44 56.9	1.0 03	175.0	45 26.9	1.0 03	175.0	45 56.9	1.0 03	175.0	46 56.9	1.0 03	174.9	48 56.8	1.0 03	174.8	50 56.8	1.0 03	174.7	51 26.8	1.0 03	174.7	52 26.7	1.0 03	174.7	4
05	44 55.2	1.0 04	173.8	45 25.2	1.0 04	173.7	45 55.2	1.0 04	173.7	46 55.1	1.0 04	173.7	48 55.1	1.0 04	173.5	50 55.0	1.0 04	173.4	51 24.9	1.0 04	173.4	52 24.9	1.0 04	173.3	05
6	44 53.1	1.0 04	172.5	45 23.1	1.0 04	172.5	45 53.1	1.0 04	172.5	46 53.0	1.0 04	172.4	48 52.9	1.0 04	172.3	50 52.8	1.0 04	172.1	51 22.7	1.0 04	172.1	52 22.6	1.0 04	172.0	6
7	44 50.7	1.0 05	171.3	45 20.6	1.0 05	171.2	45 50.6	1.0 05	171.2	46 50.5	1.0 05	171.1	48 50.3	1.0 05	171.0	50 50.1	1.0 05	170.8	51 20.1	1.0 05	170.7	52 20.0	1.0 05	170.7	7
8	44 47.8	1.0 05	170.0	45 17.8	1.0 05	170.0	45 47.7	1.0 05	169.9	46 47.6	1.0 05	169.9	48 47.4	1.0 06	169.7	50 47.1	1.0 06	169.5	51 17.1	1.0 06	169.4	52 17.0	1.0 06	169.3	8
9	44 44.6	1.0 06	168.8	45 14.5	1.0 06	168.7	45 44.5	1.0 06	168.7	46 44.3	1.0 06	168.6	48 44.0	1.0 06	168.4	50 43.7	1.0 06	168.2	51 13.7	1.0 06	168.1	52 13.5	1.0 06	168.0	9
10	44 41.0	1.0 07	167.5	45 10.9	1.0 07	167.5	45 40.8	1.0 07	167.4	46 40.7	1.0 07	167.3	48 40.3	1.0 07	167.1	50 40.0	1.0 07	166.9	51 09.9	1.0 07	166.8	52 09.7	1.0 07	166.7	10
1	44 37.0	1.0 07	166.3	45 06.9	1.0 07	166.3	45 36.8	1.0 07	166.2	46 36.6	1.0 07	166.1	48 36.2	1.0 07	165.8	50 35.8	1.0 08	165.6	51 05.7	1.0 08	165.5	52 05.4	1.0 08	165.4	1
2	44 32.7	1.0 08	165.1	45 02.6	1.0 08	165.0	45 32.5	1.0 08	165.0	46 32.2	1.0 08	164.8	48 31.7	1.0 08	164.6	50 31.2	1.0 08	164.3	51 01.1	1.0 08	164.2	52 00.8	1.0 08	164.0	2
3	44 28.0	1.0 08	163.8	44 57.9	1.0 08	163.8	45 27.7	1.0 08	163.7	46 27.5	1.0 09	163.6	48 26.9	1.0 09	163.3	50 26.3	99 09	163.0	50 56.1	99 09	162.9	51 55.8	99 09	162.7	3
4	44 22.9	1.0 09	162.6	44 52.8	1.0 09	162.5	45 22.6	99 09	162.5	46 22.3	99 09	162.3	48 21.7	99 09	162.0	50 20.9	99 10	161.7	50 50.8	99 10	161.6	51 50.4	99 10	161.4	4
15	44 17.5	99 10	161.4	44 47.3	99 10	161.3	45 17.2	99 10	161.2	46 16.8	99 10	161.1	48 16.1	99 10	160.7	50 15.2	99 10	160.4	50 45.0	99 10	160.3	51 44.6	99 10	160.1	15
6	44 11.7	99 10	160.2	44 41.5	99 10	160.1	45 11.3	99 10	160.0	46 10.9	99 10	159.8	48 10.1	99 10	159.5	50 09.2	99 11	159.1	50 38.9	99 11	159.0	51 38.4	99 11	158.8	6
7	44 05.6	99 11	158.9	44 35.4	99 11	158.9	45 05.2	99 11	158.8	46 04.7	99 11	158.6	48 03.8	99 11	158.2	50 02.7	99 11	157.8	50 32.5	99 11	157.7	51 31.9	99 11	157.5	7
8	43 59.1	99 11	157.7	44 28.9	99 11	157.6	44 58.6	99 11	157.5	45 58.1	99 12	157.4	47 57.1	99 12	157.0	49 55.9	99 12	156.5	50 25.6	99 12	156.4	51 25.0	99 12	156.2	8
9	43 52.3	99 12	156.5	44 22.0	99 12	156.4	44 51.8	99 12	156.3	45 51.2	99 12	156.1	47 50.0	99 12	155.7	49 48.8	99 13	155.3	50 18.4	99 13	155.2	51 17.8	99 13	154.9	9
20	43 45.1	99 12	155.3	44 14.8	99 13	155.2	44 44.5	99 13	155.1	45 43.9	99 13	154.9	47 42.6	99 13	154.5	49 41.3	99 13	154.0	50 10.9	99 13	153.9	51 10.1	99 13	153.6	20
1	43 37.6	99 13	154.1	44 07.3	99 13	154.0	44 37.0	99 13	153.9	45 36.3	99 13	153.7	47 34.9	99 13	153.2	49 33.4	99 14	152.7	50 03.0	99 14	152.6	51 02.2	99 14	152.4	1
2	43 29.8	99 14	152.9	43 59.4	99 14	152.8	44 29.1	99 14	152.7	45 28.4	99 14	152.4	47 26.8	99 14	152.0	49 25.2	99 14	151.5	49 54.8	99 14	151.4	50 53.9	98 14	151.1	2
3	43 21.6	99 14	151.7	43 51.2	99 14	151.6	44 20.9	99 14	151.5	45 20.1	99 14	151.2	47 18.4	99 15	150.7	49 16.6	99 15	150.2	49 46.2	98 15	150.1	50 45.2	98 15	149.8	3
4	43 13.1	99 15	150.5	43 42.7	99 15	150.4	44 12.3	99 15	150.2	45 11.5	99 15	150.0	47 09.7	98 15	149.5	49 07.8	98 15	149.0	49 37.3	98 15	148.8	50 36.2	98 16	148.6	4
25	43 04.3	99 15	149.3	43 33.9	99 15	149.2	44 03.5	99 15	149.0	45 02.5	98 15	148.8	47 00.6	98 16	148.3	48 58.6	98 16	147.7	49 28.0	98 16	147.6	50 26.9	98 16	147.3	25
6	42 55.2	98 16	148.1	43 24.8	98 16	148.0	43 54.3	98 16	147.9	44 53.3	98 16	147.6	46 51.3	98 16	147.1	48 49.0	98 16	146.5	49 18.5	98 16	146.4	50 17.3	98 17	146.0	6
7	42 45.8	98 16	146.9	43 15.3	98 16	146.8	43 44.8	98 16	146.7	44 43.7	98 16	146.4	46 41.6	98 17	145.9	48 39.2	98 17	145.3	49 08.6	98 17	145.1	50 07.3	98 17	144.8	7
8	42 36.1	98 17	145.7	43 05.5	98 17	145.6	43 35.0	98 17	145.5	44 33.9	98 17	145.2	46 31.6	98 17	144.6	48 29.1	98 17	144.0	48 58.4	98 17	143.9	49 57.0	98 18	143.6	8
9	42 26.0	98 17	144.6	42 55.5	98 17	144.4	43 24.9	98 17	144.3	44 23.7	98 17	144.0	46 21.3	98 18	143.4	48 18.6	98 18	142.8	48 47.9	98 18	142.7	49 46.5	98 18	142.3	9
30	42 15.7	98 18	143.4	42 45.1	98 18	143.2	43 14.5	98 18	143.1	44 13.3	98 18	142.8	46 10.7	98 18	142.2	48 07.9	98 18	141.6	48 37.1	98 18	141.4	49 35.6	97 19	141.1	30
1	42 05.1	98 18	142.2	42 34.5	98 18	142.1	43 03.8	98 18	141.9	44 02.5	98 18	141.6	45 59.8	98 19	141.0	47 56.8	97 19	140.4	48 26.0	97 19	140.2	49 24.4	97 19	139.9	1
2	41 54.2	98 19	141.0	42 23.6	98 19	140.9	42 52.9	98 19	140.8	43 51.5	98 19	140.5	45 48.6	97 19	139.9	47 45.5	97 19	139.2	48 14.7	97 19	139.0	49 13.0	97 20	138.7	2
3	41 43.1	98 19	139.9	42 12.4	98 19	139.7	42 41.7	98 19	139.6	43 40.2	98 19	139.3	45 37.2	97 20	138.7	47 33.9	97 20	138.0	48 03.0	97 20	137.8	49 01.3	97 20	137.5	3
4	41 31.6	98 20	138.7	42 00.9	98 20	138.6	42 30.2	98 20	138.4	43 28.6	97 20	138.1	45 25.4	97 20	137.5	47 22.0	97 20	136.8	47 51.1	97 20	136.6	48 49.3	97 20	136.3	4
35	41 19.9	97 20	137.6	41 49.2	97 20	137.4	42 18.4	97 20	137.3	43 16.8	97 20	137.0	45 13.5	97 20	136.3	47 09.9	97 21	135.6	47 38.9	97 21	135.4	48 37.0	97 21	135.1	35
6	41 08.0	97 20	136.4	41 37.2	97 20	136.3	42 06.4	97 20	136.1	43 04.7	97 21	135.8	45 01.2	97 21	135.2	46 57.5	97 21	134.4	47 26.5	97 21	134.3	48 24.5	97 21	133.9	6
7	40 55.7	97 21	135.3	41 24.9	97 21	135.2	41 54.1	97 21	135.0	42 52.3	97 21	134.7	44 48.7	97 21	134.0	46 44.8	97 22	133.3	47 13.8	97 22	133.1	48 11.7	96 22	132.7	7
8	40 43.3	97 21	134.2	41 12.4	97 21	134.0	41 41.5	97 21	133.9	42 39.7	97 21	133.5	44 36.0	97 22	132.8	46 31.9	97 22	132.1	47 00.9	96 22	131.9	47 58.7	96 22	131.5	8
9	40 30.6	97 22	133.0	40 59.7	97 22	132.9	41 28.8	97 22	132.7	42 26.9	97 22	132.4	44 23.0	97 22	131.7	46 18.8	96 22	130.9	46 47.7	96 22	130.8	47 45.5	96 22	130.3	9
40	40 17.6	97 22	131.9	40 46.7	97 22	131.8	41 15.8	97 22	131.6	42 13.8	97 22	131.3	44 09.8	97 22	130.5	46 05.4	96 23	129.8	46 34.3	96 23	129.6	47 32.0	96 23	129.2	40
1	40 04.5	97 22	130.8	40 33.5	97 22	130.6	41 02.5	97 23	130.5	42 00.5	97 23	130.1	43 56.3	96 23	129.4	45 51.8	96 23	128.6	46 20.7	96 23	128.4	47 18.3	96 23	128.0	1
2	39 51.1	97 23	129.7	40 20.1	97 23	129.5	40 49.1	97 23	129.3	41 47.0	96 23	129.0	43 42.7	96 23	128.3	45 38.0	96 23	127.5	46 06.8	96 23	127.3	47 04.3	96 24	126.9	2
3	39 37.5	97 23	128.6	40 06.5	97 23	128.4	40 35.4	96 23	128.2	41 33.3	96 23	127.9	43 28.8	96 24	127.1	45 24.0	96 24	126.4	45 52.8	96 24	126.2	46 50.2	96 24	125.7	3
4	39 23.7	96 23	127.5	39 52.6	96 23	127.3	40 21.5	96 23	127.1	41 19.3	96 24	126.8	43 14.7	96 24	126.0	45 09.8	96 24	125.2	45 38.5	96 24	125.0	46 35.9	96 24	124.6	4
45	39 09.6	96 24	126.4	39 38.5	96 24	126.2	40 07.4	96 24	126.0	41 05.2	96 24	125.7	43 00.4	96 24	124.9	44 55.4	96 24	124.1	45 24.0	96 24	123.9	46 21.3	95 25	123.5	45
6	38 55.4	96 24	125.3	39 24.1	96 24	125.1	39 53.1	96 24	124.9	40 50.8	96 24	124.6	42 45.9	96 24	123.8	44 40.7	96 25	123.0	45 09.4	95 25	122.8	46 06.6	95 25	122.4	6
7	38 41.0	96 24	124.2	39 09.8	96 24	124.0	39 38.7	96 24	123.8	40 36.3	96 25	123.5	42 31.3	96 25	122.7	44 25.9	96 25	121.9	44 54.6	95 25	121.7	45 51.7	95 25	121.2	7
8	38 26.4	96 25	123.1	38 55.2	96 25	122.9	39 24.0	96 25	122.7	40 21.6	96 25	122.4	42 16.4	96 25	121.6	44 11.0	95 25	120.8	44 39.5	95 25	120.6	45 36.6	95 25	120.1	8
9	38 11.6	96 25	122.0	38 40.4	96 25	121.8	39 09.2	96 25	121.7	40 06.6	96 25	121.3	42 01.4	95 25	120.5	43 55.8	95 26	119.7	44 24.3	95 26	119.5	45 21.4	95 26	119.0	9
50	37 56.6	96 25	120.9	38 25.4	96 25	120.8	38 54.1	96 25	120.6	39 51.6	96 25	120.2	41 46.2	95 26	119.4	43 40.5	95 26	118.6	44 09.0	95 26	118.4	45 05.9	95 26	117.9	50
1	37 41.5	96 26	119.9	38 10.2	96 26	119.7	38 39.0	96 26	119.5	39 36.3	96 26	119.1	41 30.8	95 26	118.3	43 25.0	95 26	117.5	43 53.5	95 26	117.3	44 50.4	95 26	116.8	1
2	37 26.2	96 26	118.8	37 54.9	96 26	118.6	38 23.6	96 26	118.4	39 20.9	96 26	118.1	41 15.3	95 26	117.3	43 09.4	95 26	116.4	43 37.8	95 26	116.2	44 34.6	95 26	115.8	2
3	37 10.8	96 26	117.7	37 39.5	96 26	117.6	38 08.1	96 26	117.4	39 05.4	95 26	117.0	40 59.6	95 26	116.2	42 53.6	95 27	115.3	43 22.0	95 27	115.1	44 18.8	95 27	114.7	3
4	36 55.2	96 26	116.7	37 23.8	96 26	116.5	37 52.5	96 26	116.3	38 49.7	95 26	115.9	40 43.8	95 27	115.1	42 37.7	95 27	114.3	43 06.1	95 27	114.1	44 02.8	94 27	113.6	4
55	36 39.4	96 26	115.6	37 08.1	96 26	115.4	37 36.7	96 27	115.3	38 33.8	95 27	114.9	40 27.9	95 27	114.1	42 21.6	95 27	113.2	42 50.0	95 27	113.0	43 46.6	94 27	112.5	55
6	36 23.5	96 27	114.6	36 52.1	96 27	114.4	37 20.7	95 27	114.2	38 17.8	95 27	113.8	40 11.8	95 27	113.0	42 05.4	95 27	112.2	42 33.8	94 27	111.9	43 30.4	94 27	111.5	6
7	36 07.5	96 27	113.5	36 36.1	96 27	113.4	37 04.7	95 27	113.2	38 01.7	95 27	112.8	39 55.6	95 27	112.0	41 49.1	94 27	111.1	42 17.4	94 27	110.9	43 14.0	94 28	110.4	7
8	35 51.4	96 27	112.5	36 19.9	95 27	112.3	36 48.5	95 27	112.1	37 45.5	95 27	111.7	39 39.3	95 27	110.9	41 32.7	94 28	110.1	42 01.0	94 28	109.8	42 57.5	94 28	109.4	8
9	35 35.1	95 27	111.5	36 03.6	95 27	111.3	36 32.2	95 27	111.1	37 29.1	95 27	110.7	39 22.8	95 28	109.9	41 16.2	94 28	109.0	41 44.4	94 28	108.8	42 40.9	94 28	108.3	9
60	35 18.7	95 27	110.4	35 47.2	95 28	110.2	36 15.7	95 28	110.1	37 12.7	95 28	109.7	39 06.3	95 28	108.8	40 59.5	94 28	108.0	41 27.8	94 28	107.8	42 24.2	94 28	107.3	60
1	35 02.2	95 28	109.4	35 30.7	95 28	109.2	35 59.2	95 28	109.0	36 56.1	95 28	108.6	38 49.6	94 28	107.8	40 42.8	94 28	106.9	41 11.0	94 28	106.7	42 07.4	94 28	106.3	1
2	34 45.6	95 28	108.4	35 14.1	95 28	108.2	35 42.6	95 28	108.0	36 39.4	95 28	107.6	38 32.9	94 28	106.8	40 26.0	94 28	105.9	40 54.2	94 28	105.7	41 50.5	94 28	105.2	2
3	34 29.0	95 28	107.4	34 57.4	95 28	107.2	35 25.8	95 28	107.0	36 22.7	95 28	106.6	38 16.0	94 28	105.8	40 09.0	94 28	104.9	40 37.2	94 28	104.7	41 33.5	94 28	104.2	3
4	34 12.2	95 28	106.4	34 40.6	95 28	106.2	35 09.0	95 28	106.0	36 05.8	95 28	105.6	37 59.1	94 28	104.7	39 52.0	94 28	103.9	40 20.2	94 28	103.7	41 16.5	94 29	103.2	4
65	33 55.3	95 28	105.3	34 23.7	95 28	105.2	34 52.1	95 28	105.0	35 48.9	95 28	104.6	37 42.1	94 28	103.7	39 35.0	94 29	102.9	40 03.1	94 29	102.6	40 59.4	94 29	102.2	65
6	33 38.3	95 28	104.3	34 06.7	95 28	104.1	34 35.1	95 28	103.9	35 31.8	94 28	103.6	37 25.0	94 29	102.7	39 17.8	94 29	101.9	39 46.0	94 29	101.6	40 42.2	94 29	101.2	6
7	33 21.3	95 28	103.3	33 49.7	95 29	103.1	34 18.1	95 29	102.9	35 14.8	94 29	102.5	37 07.9	94 29	101.7	39 00.6	94 29	100.9	39 28.8	94 29	100.6	40 25.0	94 29	100.2	7
8	33 04.2	95 29	102.3	33 32.6	95 29	102.1	34 00.9	95 29	101.9	34 57.6	94 29	101.5	36 50.7	94 29	100.7	38 43.4	94 29	99.9	39 11.5	94 29	99.6	40 07.7	94 29	99.2	8
9	32 47.0	95 29	101.3	33 15.4	94 29	101.1	33 43.7	94 29	101.0	34 40.4	94 29	100.6	36 33.4	94 29	99.7	38 26.1	94 29	98.9	38 54.2	94 29	98.6	39 50.3	94 29	98.2	9
70	32 29.8	95 29	100.4	32 58.2	94 29	100.2	33 26.5	94 29	100.0	34 23.1	94 29	99.6	36 16.1	94 29	98.7	38 08.7	94 29	97.9	38 36.8	94 29	97.6	39 32.9	93 29	97.2	70
1	32 12.5	95 29	99.4	32 40.9	94 29	99.2	33 09.2	94 29	99.0	34 05.8	94 29	98.6	35 58.7	94 29	97.7	37 51.3	94 29	96.9	38 19.4	94 29	96.7	39 15.5	93 29	96.2	1
2	31 55.2	94 29	98.4	32 23.5	94 29	98.2	32 51.8	94 29	98.0	33 48.4	94 29	97.6	35 41.3	94 29	96.8	37 33.9	94 29	95.9	38 02.0	94 29	95.7	38 58.1	93 29	95.2	2
3	31 37.8	94 29	97.4	32 06.1	94 29	97.2	32 34.4	94 29	97.0	33 31.0	94 29	96.6	35 23.9	94 29	95.8	37 16.4	94 29	94.9	37 44.5	94 29	94.7	38 40.6	93 29	94.2	3
4	31 20.4	94 29	96.4	31 48.7	94 29	96.2	32 17.0	94 29	96.0	33 13.6	94 29	95.6	35 06.4	94 29	94.8	36 58.9	94 29	94.0	37 27.0	94 29	93.7	38 23.1	93 29	93.3	4
75	31 02.9	94 29	95.4	31 31.3	94 29	95.3	31 59.6	94 29	95.1	32 56.1	94 29	94.7	34 48.9	94 29	93.8	36 41.4	94 29	93.0	37 09.5	94 29	92.8	38 05.6	93 29	92.3	75
6	30 45.5	94 29	94.5	31 13.8	94 29	94.3	31 42.1	94 29	94.1	32 38.6	94 29	93.7	34 31.4	94 29	92.9	36 23.9	94 29	92.0	36 52.0	94 29	91.8	37 48.0	93 29	91.3	6
7	30 28.0	94 29	93.5	30 56.3	94 29	93.3	31 24.6	94 29	93.1	32 21.1	94 29	92.7	34 13.9	94 29	91.9	36 06.4	94 29	91.1	36 34.4	93 29	90.8	37 30.5	93 29	90.4	7
8	30 10.4	94 29	92.5	30 38.8	94 29	92.3	31 07.0	94 29	92.2	32 03.6	94 29	91.8	33 56.4	94 29	90.9	35 48.8	94 29	90.1	36 16.9	93 29	89.9	37 12.9	93 29	89.4	8
9	29 52.9	94 29	91.6	30 21.2	94 29	91.4	30 49.5	94 29	91.2	31 46.0	94 29	90.8	33 38.8	94 29	90.0	35 31.3	94 29	89.1	35 59.4	93 29	88.9	36 55.4	93 29	88.5	9
80	29 35.4	94 29	90.6	30 03.7	94 29	90.4	30 32.0	94 29	90.2	31 28.5	94 29	89.8	33 21.3	94 29	89.0	35 13.8	94 29	88.2	35 41.8	94 29	88.0	36 37.9	93 29	87.5	80
1	29 17.8	94 29	89.7	29 46.1	94 29	89.5	30 14.4	94 29	89.3	31 10.9	94 29	88.9	33 03.7	94 29	88.1	34 56.2	94 29	87.2	35 24.3	94 29	87.0	36 20.4	93 29	86.6	1
2	29 00.3	94 29	88.7	29 28.6	94 29	88.5	29 56.9	94 29	88.3	30 53.4	94 29	87.9	32 46.2	94 29	87.1	34 38.7	94 29	86.3	35 06.8	94 29	86.1	36 02.8	93 29	85.6	2
3	28 42.8	94 29	87.8	29 11.1	94 29	87.6	29 39.4	94 29	87.4	30 35.9	94 29	87.0	32 28.7	94 29	86.2	34 21.2	94 29	85.4	34 49.3	94 29	85.1	35 45.4	93 29	84.7	3
4	28 25.2	94 29	86.8	28 53.5	94 29	86.6	29 21.8	94 29	86.4	30 18.4	94 29	86.0	32 11.2	94 29	85.2	34 03.7	94 29	84.4	34 31.8	94 29	84.2	35 27.9	93 29	83.8	4
85	28 07.7	94 29	85.9	28 36.0	94 29	85.7	29 04.3	94 29	85.5	30 00.9	94 29	85.1	31 53.7	94 29	84.3	33 46.3	94 29	83.5	34 14.4	94 29	83.3	35 10.5	93 29	82.8	85
6	27 50.2	94 29	84.9	28 18.6	94 29	84.7	28 46.9	94 29	84.5	29 43.4	94 29	84.2	31 36.3	94 29	83.4	33 28.9	94 29	82.5	33 57.0	94 29	82.3	34 53.1	93 29	81.9	6
7	27 32.8	94 29	84.0	28 01.1	94 29	83.8	28 29.4	94 29	83.6	29 26.0	94 29	83.2	31 18.9	94 29	82.4	33 11.5	94 29	81.6	33 39.6	94 29	81.4	34 35.8	93 29	81.0	7
8	27 15.4	94 29	83.0	27 43.7	94 29	82.8	28 12.0	94 29	82.7	29 08.6	94 29	82.3	31 01.5	94 29	81.5	32 54.2	94 29	80.7	33 22.3	94 29	80.5	34 18.5	94 29	80.1	8
9	26 58.0	94 29	82.1	27 26.3	94 29	81.9	27 54.6	94 29	81.7	28 51.2	94 29	81.4	30 44.2	94 29	80.6	32 36.9	94 29	79.8	33 05.0	94 29	79.6	34 01.2	94 29	79.1	9
90	26 40.6	94 29	81.2	27 09.0	94 29	81.0	27 37.3	94 29	80.8	28 33.9	94 29	80.4	30 26.9	94 29	79.6	32 19.7	94 29	78.8	32 47.8	94 29	78.6	33 44.0	94 29	78.2	90

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	26 23.3	95 29	80.2	26 51.6	94 29	80.0	27 20.0	94 29	79.9	28 16.6	94 29	79.5
2	26 06.0	95 29	79.3	26 34.4	94 29	79.1	27 02.7	94 29	78.9	27 59.4	94 29	78.6
3	25 48.8	95 29	78.4	26 17.2	95 29	78.2	26 45.6	95 29	78.0	27 42.2	94 28	77.6
4	25 31.7	95 28	77.4	26 00.1	95 28	77.3	26 28.4	95 28	77.1	27 25.1	94 28	76.7
95	25 14.6	95 28	76.5	25 43.0	95 28	76.3	26 11.4	95 28	76.2	27 08.1	94 28	75.8
6	24 57.6	95 28	75.6	25 26.0	95 28	75.4	25 54.4	95 28	75.2	26 51.1	95 28	74.9
7	24 40.6	95 28	74.7	25 09.0	95 28	74.5	25 37.4	95 28	74.3	26 34.2	95 28	74.0
8	24 23.7	95 28	73.8	24 52.2	95 28	73.6	25 20.6	95 28	73.4	26 17.4	95 28	73.0
9	24 06.9	95 28	72.8	24 35.4	95 28	72.7	25 03.8	95 28	72.5	26 00.7	95 28	72.1
100	23 50.2	95 28	71.9	24 18.7	95 28	71.7	24 47.1	95 28	71.6	25 44.0	95 28	71.2
1	23 33.6	95 28	71.0	24 02.1	95 28	70.8	24 30.5	95 28	70.7	25 27.4	95 27	70.3
2	23 17.0	95 27	70.1	23 45.5	95 27	69.9	24 14.0	95 27	69.7	25 11.0	95 27	69.4
3	23 00.6	95 27	69.2	23 29.1	95 27	69.0	23 57.6	95 27	68.8	24 54.6	95 27	68.5
4	22 44.2	95 27	68.3	23 12.8	95 27	68.1	23 41.3	95 27	67.9	24 38.3	95 27	67.6
105	22 28.0	95 27	67.4	22 56.6	95 27	67.2	23 25.1	95 27	67.0	24 22.2	95 27	66.7
6	22 11.9	95 27	66.4	22 40.4	95 27	66.3	23 09.0	95 27	66.1	24 06.1	95 27	65.8
7	21 55.8	95 27	65.5	22 24.4	95 26	65.4	22 53.0	95 26	65.2	23 50.2	95 26	64.9
8	21 39.9	95 26	64.6	22 08.5	95 26	64.5	22 37.2	95 26	64.3	23 34.3	95 26	64.0
9	21 24.1	95 26	63.7	21 52.8	95 26	63.6	22 21.4	95 26	63.4	23 18.6	95 26	63.1
110	21 08.5	96 26	62.8	21 37.1	96 26	62.7	22 05.8	96 26	62.5	23 03.1	96 26	62.2
1	20 52.9	96 26	61.9	21 21.6	96 26	61.8	21 50.3	96 26	61.6	22 47.6	96 26	61.3
2	20 37.5	96 25	61.0	21 06.2	96 25	60.9	21 34.9	96 25	60.7	22 32.3	96 25	60.4
3	20 22.2	96 25	60.1	20 51.0	96 25	60.0	21 19.7	96 25	59.8	22 17.1	96 25	59.5
4	20 07.1	96 25	59.2	20 35.9	96 25	59.1	21 04.6	96 25	58.9	22 02.1	96 25	58.6
115	19 52.1	96 25	58.3	20 20.9	96 25	58.2	20 49.7	96 25	58.0	21 47.2	96 25	57.7
6	19 37.2	96 25	57.4	20 06.1	96 24	57.3	20 34.8	96 24	57.1	21 32.4	96 24	56.8
7	19 22.5	96 24	56.5	19 51.4	96 24	56.4	20 20.2	96 24	56.2	21 17.8	96 24	55.9
8	19 08.0	96 24	55.6	19 36.8	96 24	55.5	20 05.7	96 24	55.3	21 03.4	96 24	55.0
9	18 53.6	96 24	54.7	19 22.5	96 24	54.6	19 51.3	96 24	54.4	20 49.1	96 24	54.1
120	18 39.4	96 23	53.8	19 08.3	96 23	53.7	19 37.2	96 23	53.5	20 34.9	96 23	53.2
1	18 25.3	96 23	52.9	18 54.2	96 23	52.8	19 23.1	96 23	52.6	20 21.0	96 23	52.3
2	18 11.4	97 23	52.0	18 40.3	97 23	51.9	19 09.3	96 23	51.7	20 07.2	96 23	51.5
3	17 57.6	97 23	51.1	18 26.6	97 23	51.0	18 55.6	97 23	50.8	19 53.5	97 22	50.6
4	17 44.1	97 22	50.2	18 13.1	97 22	50.1	18 42.1	97 22	50.0	19 40.1	97 22	49.7
125	17 30.7	97 22	49.3	17 59.7	97 22	49.2	18 28.7	97 22	49.1	19 26.8	97 22	48.8
6	17 17.4	97 22	48.4	17 46.5	97 22	48.3	18 15.6	97 22	48.2	19 13.7	97 22	47.9
7	17 04.4	97 21	47.5	17 33.5	97 21	47.4	18 02.6	97 21	47.3	19 00.7	97 21	47.0
8	16 51.6	97 21	46.6	17 20.7	97 21	46.5	17 49.8	97 21	46.4	18 48.0	97 21	46.1
9	16 38.9	97 21	45.7	17 08.1	97 21	45.6	17 37.2	97 21	45.5	18 35.4	97 21	45.2
130	16 26.4	97 20	44.8	16 55.6	97 20	44.7	17 24.8	97 20	44.6	18 23.1	97 20	44.4
1	16 14.2	97 20	44.0	16 43.4	97 20	43.8	17 12.6	97 20	43.7	18 10.9	97 20	43.5
2	16 02.1	97 20	43.1	16 31.3	97 20	42.9	17 00.5	97 20	42.8	17 59.0	97 20	42.6
3	15 50.2	97 19	42.2	16 19.5	97 19	42.0	16 48.7	97 19	41.9	17 47.2	97 19	41.7
4	15 38.5	98 19	41.3	16 07.8	98 19	41.2	16 37.1	98 19	41.0	17 35.6	98 19	40.8
135	15 27.1	98 19	40.4	15 56.4	98 19	40.3	16 25.7	98 19	40.1	17 24.3	98 19	39.9
6	15 15.8	98 18	39.5	15 45.1	98 18	39.4	16 14.5	98 18	39.3	17 13.1	98 18	39.0
7	15 04.8	98 18	38.6	15 34.1	98 18	38.5	16 03.5	98 18	38.4	17 02.2	98 18	38.2
8	14 53.9	98 18	37.7	15 23.3	98 18	37.6	15 52.7	98 18	37.5	16 51.4	98 18	37.3
9	14 43.3	98 17	36.8	15 12.7	98 17	36.7	15 42.1	98 17	36.6	16 40.9	98 17	36.4
140	14 32.9	98 17	35.9	15 02.4	98 17	35.8	15 31.8	98 17	35.7	16 30.6	98 17	35.5
1	14 22.8	98 17	35.0	14 52.2	98 17	34.9	15 21.7	98 16	34.8	16 20.5	98 16	34.6
2	14 12.8	98 16	34.1	14 42.3	98 16	34.0	15 11.8	98 16	33.9	16 10.7	98 16	33.7
3	14 03.1	98 16	33.2	14 32.6	98 16	33.1	15 02.1	98 16	33.0	16 01.1	98 16	32.8
4	13 53.6	98 15	32.3	14 23.1	98 15	32.2	14 52.6	98 15	32.1	15 51.7	98 15	32.0
145	13 44.3	98 15	31.4	14 13.9	98 15	31.3	14 43.4	98 15	31.2	15 42.5	98 15	31.1
6	13 35.3	99 15	30.5	14 04.9	99 15	30.4	14 34.4	99 15	30.4	15 33.6	99 14	30.2
7	13 26.5	99 14	29.6	13 56.1	99 14	29.5	14 25.7	99 14	29.5	15 24.9	99 14	29.3
8	13 17.9	99 14	28.7	13 47.6	99 14	28.7	14 17.2	99 14	28.6	15 16.4	99 14	28.4
9	13 09.6	99 13	27.8	13 39.3	99 13	27.8	14 08.9	99 13	27.7	15 08.2	99 13	27.5
150	13 01.6	99 13	26.9	13 31.2	99 13	26.9	14 00.9	99 13	26.8	15 00.2	99 13	26.6
1	12 53.7	99 13	26.0	13 23.4	99 13	26.0	13 53.1	99 13	25.9	14 52.5	99 12	25.7
2	12 46.2	99 12	25.2	13 15.9	99 12	25.1	13 45.6	99 12	25.0	14 45.0	99 12	24.9
3	12 38.8	99 12	24.3	13 08.5	99 12	24.2	13 38.3	99 12	24.1	14 37.7	99 12	24.0
4	12 31.7	99 11	23.4	13 01.5	99 11	23.3	13 31.2	99 11	23.2	14 30.7	99 11	23.1
155	12 24.9	99 11	22.5	12 54.7	99 11	22.4	13 24.4	99 11	22.3	14 23.9	99 11	22.2
6	12 18.3	99 11	21.6	12 48.1	99 10	21.5	13 17.9	99 10	21.4	14 17.4	99 10	21.3
7	12 12.0	99 10	20.7	12 41.8	99 10	20.6	13 11.6	99 10	20.5	14 11.2	99 10	20.4
8	12 06.0	99 10	19.8	12 35.8	99 10	19.7	13 05.6	99 10	19.7	14 05.2	99 10	19.5
9	12 00.2	99 09	18.9	12 30.0	99 09	18.8	12 59.8	99 09	18.8	13 59.5	99 09	18.7
100	11 54.6	99 09	18.0	12 24.5	99 09	17.9	12 54.3	99 09	17.9	13 54.0	99 09	17.8
1	11 40.3	1.0 08	17.1	12 19.2	1.0 08	17.0	12 49.0	1.0 08	17.0	13 48.8	1.0 08	16.9
2	11 44.3	1.0 08	16.2	12 14.2	1.0 08	16.1	12 44.0	1.0 08	16.1	13 43.8	1.0 08	16.0
3	11 39.5	1.0 08	15.3	12 09.4	1.0 07	15.2	12 39.3	1.0 07	15.2	13 39.1	1.0 07	15.1
4	11 35.1	1.0 07	14.4	12 05.0	1.0 07	14.3	12 34.9	1.0 07	14.3	13 34.6	1.0 07	14.2
165	11 30.8	1.0 07	13.5	12 00.7	1.0 07	13.4	12 30.7	1.0 07	13.4	13 30.5	1.0 06	13.3
6	11 26.9	1.0 06	12.6	11 56.8	1.0 06	12.6	12 26.7	1.0 06	12.5	13 26.6	1.0 06	12.4
7	11 23.2	1.0 06	11.7	11 53.1	1.0 06	11.7	12 23.1	1.0 06	11.6	13 22.9	1.0 06	11.6
8	11 19.8	1.0 05	10.8	11 49.7	1.0 05	10.8	12 19.7	1.0 05	10.7	13 19.5	1.0 05	10.7
9	11 16.6	1.0 05	09.9	11 46.6	1.0 05	09.9	12 16.5	1.0 05	09.8	13 16.4	1.0 05	09.8
170	11 13.7	1.0 04	09.0	11 43.7	1.0 04	09.0	12 13.7	1.0 04	08.9	13 13.6	1.0 04	08.9
1	11 11.1	1.0 04	08.1	11 41.1	1.0 04	08.1	12 11.1	1.0 04	08.0	13 11.0	1.0 04	08.0
2	11 08.8	1.0 03	07.2	11 38.8	1.0 03	07.2	12 08.7	1.0 03	07.2	13 08.7	1.0 03	07.1
3	11 06.7	1.0 03	06.3	11 36.7	1.0 03	06.3	12 06.7	1.0 03	06.3	13 06.7	1.0 03	06.2
4	11 05.0	1.0 03	05.4	11 34.9	1.0 02	05.4	12 04.9	1.0 02	05.4	13 04.9	1.0 02	05.3
175	11 03.4	1.0 02	04.5	11 33.4	1.0 02	04.5	12 03.4	1.0 02	04.5	13 03.4	1.0 02	04.4
6	11 02.2	1.0 02	03.6	11 32.2	1.0 02	03.6	12 02.2	1.0 02	03.6	13 02.2	1.0 02	03.6
7	11 01.2	1.0 01	02.7	11 31.2	1.0 01	02.7	12 01.2	1.0 01	02.7	13 01.2	1.0 01	02.7
8	11 00.6	1.0 01	01.8	11 30.5	1.0 01	01.8	12 00.5	1.0 01	01.8	13 00.5	1.0 01	01.8
9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	12 00.1	1.0 00	00.9	13 00.1	1.0 00	00.9
180	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 00.0	1.0 00	00.0	13 00.0	1.0 00	00.0

32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
30 09.7	94 29	78.7	32 02.5	94 29	77.9	32 30.6	94 28	77.7	33 26.9	94 28	77.3	91
29 52.5	94 29	77.8	31 45.3	94 28	77.0	32 13.5	94 28	76.8	33 00.8	94 28	76.4	2
29 35.4	94 28	76.9	31 28.3	94 28	76.1	31 56.5	94 28	75.9	32 52.8	94 28	75.5	3
29 18.3	94 28	76.0	31 11.3	94 28	75.2	31 39.5	94 28	75.0	32 35.8	94 28	74.6	4
29 01.4	94 28	75.0	30 54.4	94 28	74.3	31 22.6	94 28	74.1	32 18.9	94 28	73.7	95
28 44.4	94 28	74.1	30 37.5	94 28	73.4	31 05.7	94 28	73.2	32 02.1	94 28	72.8	6
28 27.6	94 28	73.2	30 20.8	94 28	72.5	30 49.0	94 28	72.3	31 45.4	94 28	71.9	7
28 10.9	94 28	72.3	30 04.1	94 28	71.6	30 32.3	94 28	71.4	31 28.8	94 28	71.0	8
27 54.2	95 28	71.4	29 47.5	94 28	70.7	30 15.8	94 27	70.5	31 12.3	94 27	70.1	9
27 37.6	95 27	70.5	29 31.0	94 27	69.8	29 59.3	94 27	69.6	30 55.8	94 27	69.2	100
27 21.1	95 27	69.6	29 14.6	94 27	68.9	29 42.9	94 27	68.7	30 39.5	94 27	68.3	1
27 04.7	95 27	68.7	28 58.2	95 27	68.0	29 26.6	94 27	67.8	30 23.2	94 27	67.4	2
26 48.4	95 27	67.8	28 42.0	95 27	67.1	29 10.4	95 27	66.9	30 07.1	94 27	66.5	3
26 32.2	95 27	66.9	28 25.9	95 27	66.2	28 54.3	95 27	66.0	29 51.1	94 27	65.6	4
26 16.2	95 27	66.0	28 09.9	95 26	65.3	28 38.4	95 26	65.1	29 35.1	95 26	64.7	105
26 00.2	95 26	65.1	27 54.1	95 26	64.4	28 22.5	95 26	64.2	29 19.3	95 26	63.8	6
25 44.3	95 26	64.2	27 38.3	95 26	63.5	28 06.8	95 26	63.3	29 03.6	95 26	63.0	7
25 28.6	95 26	63.3	27 22.7	95 26	62.6	27 51.2	95 26	62.4	28 48.1	95 26	62.1	8
25 13.0	95 26	62.4	27 07.2	95 26	61.7	27 35.7	95 26	61.6	28 32.6	95 26	61.2	9
24 57.5	95 26	61.5	26 51.8	95 25	60.8	27 20.3	95 25	60.7	28 17.3	95 25	60.3	110
24 42.2	95 25	60.6	26 36.5	95 25	60.0	27 05.1	95 25	59.8	28 02.2	95 25	59.4	1
24 26.9	95 25	59.7	26 21.4	95 25	59.1	26 50.0	95 25	58.9	27 47.1	95 26	58.6	2
24 11.9	95 25	58.9	26 06.4	95 25	58.2	26 35.0	95 25	58.0	27 32.2	95 25	57.7	3
23 56.9	95 25	58.0	25 51.6	95 24	57.3	26 20.2	95 24	57.1	27 17.5	95 24	56.8	4
23 42.1	96 24	57.1	25 36.9	96 24	56.4	26 05.6	96 24	56.3	27 02.9	96 24	55.9	115
23 27.5	96 24	56.2	25 22.4	96 24	55.6	25 51.1	96 24	55.4	26 48.4	96 24	55.1	6
23 13.0	96 24	55.3	25 08.0	96 24	54.7	25 36.7	96 24	54.5	26 34.1	96 24	54.2	7
22 58.6	96 24	54.4	24 53.7	96 23	53.8	25 22.5	96 23	53.6	26 20.0	96 23	53.3	8
22 44.4	96 23	53.5	24 39.7	96 23	52.9	25 08.4	96 23	52.8	26 06.0	96 23	52.5	9
22 30.4	96 23	52.7	24 25.7	96 23	52.1	24 54.6	96 23	51.9	25 52.1	96 23	51.6	120
22 16.5	96 23	51.8	24 12.0	96 23	51.2	24 40.8	96 23	51.0	25 38.5	96 22	50.7	1
22 02.8	96 23	50.9	23 58.4	96 22	50.3	24 27.3	96 22	50.2	25 25.0	96 22	49.9	2
21 49.3	96 22	50.0	23 45.0	96 22	49.4	24 13.9	96 22	49.3	25 11.7	96 22	49.0	3
21 36.0	97 22	49.1	23 31.8	96 22	48.6	24 00.7	96 22	48.4	24 58.5	96 22	48.1	4
21 22.8	97 22	48.2	23 18.7	97 21	47.7	23 47.7	97 21	47.5	24 45.5	96 21	47.3	125
21 09.8	97 21	47.4	23 05.8	97 21	46.8	23 34.8	97 21	46.7	24 32.8	97 21	46.4	6
20 57.0	97 21	46.5	22 53.1	97 21	45.9	23 22.1	97 21	45.8	24 20.1	97 21	45.5	7
20 44.3	97 21	45.6	22 40.6	97 21	45.1	23 09.6	97 20	44.9	24 07.7	97 20	44.7	8
20 31.9	97 20	44.7	22 28.3	97 20	44.2	22 57.3	97 20	44.1	23 55.5	97 20	43.8	9
20 19.7	97 20	43.9	22 16.1	97 20	43.3	22 45.2	97 20	43.2	23 43.4	97 20	42.9	130
20 07.6	97 20	43.0	22 04.2	97 20	42.5	22 33.3	97 20	42.3	23 31.6	97 19	42.1	1
19 55.7	97 19	42.1	21 52.5	97 19	41.6	22 21.6	97 19	41.5	23 19.9	97 19	41.2	2
19 44.1	97 19	41.2	21 40.9	97 19	40.7	22 10.1	97 19	40.6	23 08.5	97 19	40.4	3
19 32.6	97 19	40.3	21 29.6	97 19	39.9	21 58.8	97 19	39.7	22 57.2	97 18	39.5	4
19 21.4	98 18	39.5	21 18.4	98 18	39.0	21 47.7	97 18	38.9	22 46.2	97 18	38.6	135
19 10.3	98 18	38.6	21 07.5	98 18	38.1	21 36.8	98 18	38.0	22 35.3	98 18	37.8	6
18 59.5	98 18	37.7	20 56.8	98 18	37.3	21 26.1	98 17	37.1	22 24.7	98 17	36.9	7
18 48.9	98 17	36.8	20 46.2	98 17	36.4	21 15.6	98 17	36.3	22 14.2	98 17	36.1	8
18 38.5	98 17	36.0	20 35.9	98 17	35.5	21 05.3	98 17	35.4	22 04.0	98 17	35.2	9
18 28.3	98 17	35.1	20 25.9	98 16	34.7	20 55.3	98 16	34.6	21 54.0	98 16	34.3	140
18 18.3	98 16	34.2	20 16.0	98 16	33.8	20 45.4	98 16	33.7	21 44.2	98 16	33.5	1
18 08.5	98 16	33.3	20 06.4	98 16	32.9	20 35.8	98 16	32.8	21 34.7	98 16	32.6	2
17 59.0	98 16	32.5	19 56.9	98 15	32.1	20 26.4	98 15	32.0	21 25.3	98 15	31.8	3
17 49.7	98 15	31.6	19 47.7	98 15	31.2	20 17.2	98 15	31.1	21 16.2	98 15	30.9	4
17 40.7	98 15	30.7	19 38.8	98 15	30.3	20 08.3	98 15	30.2	21 07.3	98 14	30.0	145
17 31.8	99 14	29.8	19 30.0	98 14	29.5	19 59.6	98 14	29.4	20 58.6	98 14	29.2	6
17 23.2	99 14	28.9	19 21.5	99 14	28.6	19 51.1	99 14	28.5	20 50.2	99 14	28.3	7
17 14.8	99 14	28.1	19 13.2	99 13	27.7	19 42.8	99 13	27.6	20 42.0	99 13	27.5	8
17 06.7	99 13	27.2	19 05.2	99 13	26.9	19 34.8	99 13	26.8	20 34.0	99 13	26.6	9
16 58.8	99 13	26.3	18 57.4	99 13	26.0	19 27.0	99 13	25.9	20 26.3	99 12	25.7	150
16 51.1	99 12	25.4	18 49.8	99 12	25.1	19 19.5	99 12	25.0	20 18.8	99 12	24.9	1
16 43.7	99 12	24.6	18 42.5	99 12	24.3	19 12.2	99 12	24.2	20 11.5	99 12	24.0	2
16 36.6	99 12	23.7	18 35.4	99 11	23.4	19 05.1	99 11	23.3	20 04.5	99 11	23.2	3
16 29.6	99 11	22.8	18 28.5	99 11	22.5	18 58.3	99 11	22.5	19 57.7	99 11	22.3	4
16 23.0	99 11	21.9	18 21.9	99 11	21.7	18 51.7	99 11	21.6	19 51.2	99 10	21.5	155
16 16.5	99 10	21.1	18 15.6	99 10	20.8	18 45.4	99 10	20.7	19 44.9	99 10	20.6	6
16 10.3	99 10	20.2	18 09.5	99 10	19.9	18 39.3	99 10	19.9	19 38.8	99 10	19.7	7
16 04.4	99 09	19.3	18 03.6	99 09	19.1	18 33.4	99 09	19.0	19 33.0	99 09	18.9	8
15 58.7	99 09	18.4	17 58.0	99 09	18.2	18 27.8	99 09	18.1	19 27.5	99 09	18.0	9
15 53.3	99 09	17.6	17 52.7	99 08	17.3	18 22.5	99 08	17.3	19 22.2	99 08	17.2	160
15 48.2	1.0 08	16.7	17 47.6	99 08	16.5	18 17.4	99 08	16.4	19 17.1	99 08	16.3	1
15 43.3	1.0 08	15.8	17 42.7	1.0 08	15.6	18 12.6	1.0 08	15.6	19 12.3	1.0 08	15.5	2
15 38.6	1.0 07	14.9	17 38.1	1.0 07	14.7	18 08.0	1.0 07	14.7	19 07.8	1.0 07	14.6	3
15 34.2	1.0 07	14.0	17 33.8	1.0 07	13.9	18 03.7	1.0 07	13.8	19 03.5	1.0 07	13.7	4
15 30.1	1.0 06	13.2	17 29.7	1.0 06	13.0	17 59.6	1.0 06	13.0	18 59.4	1.0 06	12.9	165
15 26.2	1.0 06	12.3	17 25.9	1.0 06	12.1	17 55.8	1.0 06	12.1	18 55.7	1.0 06	12.0	6
15 22.6	1.0 06	11.4	17 22.4	1.0 06	11.3	17 52.3	1.0 05	11.2	18 52.1	1.0 06	11.2	7
15 19.3	1.0 05	10.5	17 19.1	1.0 05	10.4	17 49.0	1.0 05	10.4	18 48.9	1.0 05	10.3	8
15 16.2	1.0 05	09.7	17 16.0	1.0 05	09.5	17 46.0	1.0 05	09.5	18 45.9	1.0 05	09.4	9
15 13.4	1.0 04	08.8	17 13.2	1.0 04	08.7	17 43.2	1.0 04	08.6	18 43.1	1.0 04	08.6	170
15 10.9	1.0 04	07.9	17 10.7	1.0 04	07.8	17 40.7	1.0 04	07.8	18 40.6	1.0 04	07.7	1
15 08.6	1.0 03	07.0	17 08.5	1.0 03	06.9	17 38.5	1.0 03	06.9	18 38.4	1.0 03	06.9	2
15 06.6	1.0 03	06.1	17 06.5	1.0 03	06.1	17 36.5	1.0 03	06.0	18 36.4	1.0 03	06.0	3
15 04.8	1.0 02	05.3	17 04.8	1.0 02	05.2	17 34.8	1.0 02	05.2	18 34.7	1.0 02	05.2	4
15 03.4	1.0 02	04.4	17 03.3	1.0 02	04.3	17 33.3	1.0 02	04.3	18 33.3	1.0 02	04.3	175
15 02.1	1.0 02	03.5	17 02.1	1.0 02	03.5	17 32.1	1.0 02	03.5	18 32.1	1.0 02	03.4	6
15 01.2	1.0 01	02.6	17 01.2	1.0 01	02.6	17 31.2	1.0 01	02.6	18 31.2	1.0 01	02.6	7
15 00.5	1.0 01	01.8	17 00.5	1.0 01	01.7	17 30.5	1.0 01	01.7	18 30.5	1.0 01	01.7	8
15 00.1	1.0 00	00.9	17 00.1	1.0 00	00.9	17 30.1	1.0 00	00.9	18 30.1	1.0 00	00.9	9
15 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 30.0	1.0 00	00.0	180

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	53 00.0	1.0 00	180.0	54 00.0	1.0 00	180.0	55 30.0	1.0 00	180.0	57 00.0	1.0 00	180.0	59 00.0	1.0 00	180.0	59 30.0	1.0 00	180.0	60 00.0	1.0 00	180.0	62 00.0	1.0 00	180.0	00
1	52 59.8	1.0 01	178.7	53 59.8	1.0 01	178.6	55 29.8	1.0 01	178.6	56 59.8	1.0 01	178.6	58 59.8	1.0 01	178.6	59 29.8	1.0 01	178.5	59 59.8	1.0 01	178.5	61 59.8	1.0 01	178.5	1
2	52 59.2	1.0 02	177.3	53 59.2	1.0 02	177.3	55 29.2	1.0 02	177.2	56 59.1	1.0 02	177.2	58 59.1	1.0 02	177.1	59 29.1	1.0 02	177.1	59 59.1	1.0 02	177.1	61 59.1	1.0 02	177.0	2
3	52 58.2	1.0 02	176.0	53 58.1	1.0 02	175.9	55 28.1	1.0 02	175.9	56 58.1	1.0 02	175.8	58 58.0	1.0 03	175.7	59 28.0	1.0 03	175.6	59 58.0	1.0 03	175.6	61 57.9	1.0 03	175.5	3
4	52 56.7	1.0 03	174.6	53 56.7	1.0 03	174.6	55 26.6	1.0 03	174.5	56 56.6	1.0 03	174.4	58 56.5	1.0 03	174.2	59 26.4	1.0 03	174.2	59 56.4	1.0 03	174.2	61 56.3	1.0 03	174.0	4
05	52 54.9	1.0 04	173.3	53 54.8	1.0 04	173.2	55 24.7	1.0 04	173.1	56 54.6	1.0 04	173.0	58 54.5	1.0 04	172.8	59 24.5	1.0 04	172.7	59 54.4	1.0 04	172.7	61 54.2	1.0 04	172.5	05
6	52 52.6	1.0 04	171.9	53 52.5	1.0 04	171.9	55 22.4	1.0 05	171.7	56 52.3	1.0 05	171.6	58 52.1	1.0 05	171.4	59 22.0	1.0 05	171.3	59 52.0	1.0 05	171.2	61 51.7	1.0 05	171.0	6
7	52 49.9	1.0 05	170.6	53 49.8	1.0 05	170.5	55 19.7	1.0 05	170.3	56 49.5	1.0 05	170.2	58 49.2	1.0 05	169.9	59 19.1	1.0 06	169.9	59 49.1	1.0 06	169.8	61 48.8	1.0 06	169.5	7
8	52 46.9	1.0 06	169.3	53 46.7	1.0 06	169.2	55 16.5	1.0 06	169.0	56 46.3	1.0 06	168.8	58 45.9	1.0 06	168.5	59 15.8	1.0 06	168.4	59 45.7	1.0 06	168.3	61 45.3	1.0 06	168.0	8
9	52 43.4	1.0 06	167.9	53 43.2	1.0 06	167.8	55 13.0	1.0 07	167.6	56 42.7	1.0 07	167.4	58 42.2	1.0 07	167.1	59 12.1	1.0 07	167.0	59 42.0	1.0 07	166.9	61 41.5	1.0 07	166.5	9
10	52 39.6	1.0 07	166.6	53 39.3	1.0 07	166.5	55 09.0	1.0 07	166.2	56 38.6	1.0 07	166.0	58 38.1	1.0 08	165.6	59 07.9	1.0 08	165.6	59 37.8	99 08	165.5	61 37.1	99 08	165.0	10
1	52 35.3	1.0 08	165.3	53 35.0	1.0 08	165.1	55 04.6	1.0 08	164.9	56 34.2	99 08	164.6	58 33.5	99 08	164.2	59 03.4	99 08	164.1	59 33.2	99 08	164.0	61 32.4	99 09	163.6	1
2	52 30.6	1.0 08	164.0	53 30.3	99 08	163.8	54 59.8	99 09	163.5	56 29.3	99 08	163.2	58 28.5	99 09	162.8	58 58.3	99 09	162.7	59 28.1	99 09	162.6	61 27.2	99 09	162.1	2
3	52 25.6	99 09	162.6	53 25.2	99 09	162.5	54 54.7	99 09	162.2	56 24.1	99 09	161.9	58 23.2	99 10	161.4	58 52.9	99 10	161.3	59 22.7	99 10	161.2	61 21.6	99 10	160.6	3
4	52 20.2	99 10	161.3	53 19.8	99 10	161.1	54 49.1	99 10	160.8	56 18.4	99 10	160.5	58 17.4	99 10	160.0	58 47.1	99 10	159.9	59 16.8	99 10	159.7	61 15.6	99 11	159.2	4
15	52 14.4	99 10	160.0	53 13.9	99 10	159.8	54 43.1	99 11	159.5	56 12.3	99 11	159.1	58 11.2	99 11	158.6	58 40.8	99 11	158.5	59 10.5	99 11	158.3	61 09.1	99 11	157.7	15
6	52 08.2	99 11	158.7	53 07.6	99 11	158.5	54 36.8	99 11	158.1	56 05.9	99 11	157.8	58 04.6	99 12	157.2	58 34.2	99 12	157.1	59 03.8	99 12	156.9	61 02.3	99 12	156.3	6
7	52 01.6	99 12	157.4	53 01.0	99 12	157.2	54 30.1	99 12	166.8	55 59.1	99 12	156.4	57 57.6	99 12	155.8	58 27.2	99 12	155.7	58 56.8	99 12	155.5	60 55.0	98 13	154.8	7
8	51 54.7	99 12	156.1	52 54.0	99 12	155.8	54 23.0	99 12	155.5	55 51.8	99 13	155.0	57 50.2	99 13	154.4	58 19.8	99 13	154.3	58 49.3	98 13	154.1	60 47.3	98 13	153.4	8
9	51 47.4	99 13	154.8	52 46.7	99 13	154.5	54 15.5	99 13	154.1	55 44.3	99 13	153.7	57 42.4	98 14	153.1	58 12.0	98 14	152.9	58 41.5	98 14	152.7	60 39.3	98 14	152.0	9
20	51 39.8	99 13	153.5	52 38.9	99 13	153.2	54 07.7	99 14	152.8	55 36.3	98 14	152.4	57 34.3	98 14	151.7	58 03.8	98 14	151.5	58 33.2	98 14	151.3	60 30.9	98 15	150.6	20
1	51 31.8	99 14	152.2	52 30.9	99 14	151.9	53 59.5	98 14	151.5	55 28.0	98 15	151.0	57 25.8	98 15	150.3	57 55.2	98 15	150.2	58 24.6	98 15	150.0	60 22.1	98 16	149.2	1
2	51 23.4	98 14	150.9	52 22.4	98 15	150.7	53 50.9	98 15	150.2	55 19.3	98 15	149.7	57 17.0	98 15	149.0	57 46.3	98 15	148.8	58 15.7	98 16	148.6	60 12.9	98 16	147.8	2
3	51 14.7	98 15	149.7	52 13.7	98 15	149.4	53 42.0	98 15	148.9	55 10.3	98 16	148.4	57 07.7	98 16	147.7	57 37.1	98 16	147.5	58 06.4	98 16	147.3	60 03.4	97 16	146.4	3
4	51 05.7	98 16	148.4	52 04.6	98 16	148.1	53 32.8	98 16	147.6	55 00.9	98 16	147.1	56 58.2	98 16	146.3	57 27.5	98 17	146.1	57 56.7	97 17	145.9	59 53.5	97 17	145.0	4
25	50 56.3	98 16	147.1	51 55.1	98 16	146.8	53 23.3	98 16	146.3	54 51.2	98 17	145.8	56 48.3	97 17	145.0	57 17.5	97 17	144.8	57 46.7	97 17	144.6	59 43.2	97 18	143.7	25
6	50 46.7	98 17	145.9	51 45.4	98 17	145.6	53 13.4	98 17	145.0	54 41.2	98 17	144.5	56 38.1	97 18	143.7	57 07.2	97 18	143.5	57 36.4	97 18	143.2	59 32.7	97 18	142.3	6
7	50 36.7	98 17	144.6	51 35.3	98 17	144.3	53 03.2	98 18	143.8	54 30.9	97 18	143.2	56 27.5	97 18	142.4	56 56.6	97 18	142.1	57 25.7	97 18	141.9	59 21.8	97 19	141.0	7
8	50 26.3	98 18	143.4	51 24.9	98 18	143.0	52 52.6	97 18	142.5	54 20.2	97 18	141.9	56 16.6	97 19	141.1	56 45.7	97 19	140.8	57 14.7	97 19	140.6	59 10.6	96 19	139.6	8
9	50 15.7	98 18	142.2	51 14.2	97 18	141.8	52 41.8	97 19	141.2	54 09.2	97 19	140.6	56 05.5	97 19	139.8	56 34.5	97 19	139.5	57 03.4	97 19	139.3	58 59.1	96 20	138.3	9
30	50 04.8	97 19	140.9	51 03.2	97 19	140.6	52 30.7	97 19	140.0	53 57.9	97 19	139.4	55 54.0	97 20	138.5	56 22.9	96 20	138.3	56 51.9	96 20	138.0	58 47.2	96 20	137.0	30
1	49 53.6	97 19	139.7	50 51.9	97 19	139.3	52 19.2	97 20	138.7	53 46.4	97 20	138.1	55 42.2	96 20	137.2	56 11.1	96 20	137.0	56 40.0	96 20	136.7	58 35.1	96 21	135.7	1
2	49 42.1	97 20	138.5	50 40.4	97 20	138.1	52 07.5	97 20	137.5	53 34.5	97 20	136.9	55 30.2	96 21	135.9	55 59.0	96 21	135.7	56 27.8	96 21	135.5	58 22.7	96 21	134.4	2
3	49 30.4	97 20	137.3	50 28.5	97 20	136.9	51 55.5	97 20	136.3	53 22.4	96 21	135.6	55 17.8	96 21	134.7	55 46.6	96 21	134.4	56 15.4	96 21	134.2	58 10.1	96 22	133.1	3
4	49 18.3	97 20	136.1	50 16.4	97 21	135.7	51 43.3	96 21	135.1	53 10.0	96 21	134.4	55 05.2	96 21	133.4	55 34.0	96 22	133.2	56 02.7	96 22	132.9	57 57.1	96 22	131.8	4
35	49 06.0	97 21	134.9	50 04.0	97 21	134.5	51 30.8	96 21	133.8	52 57.3	96 22	133.2	54 52.4	96 22	132.2	55 21.0	96 22	131.9	55 49.7	96 22	131.7	57 43.9	95 22	130.6	35
6	48 53.5	97 21	133.7	49 51.3	96 22	133.3	51 18.0	96 22	132.6	52 44.4	96 22	132.0	54 39.2	95 22	131.0	55 07.9	96 22	130.7	55 36.5	95 22	130.4	57 30.5	95 23	129.3	6
7	48 40.7	96 22	132.5	49 38.4	96 22	132.1	51 05.0	96 22	131.4	52 31.2	96 22	130.7	54 25.9	95 23	129.7	54 54.4	95 23	129.5	55 23.0	95 23	129.2	57 16.8	95 23	128.1	7
8	48 27.6	96 22	131.3	49 25.3	96 22	130.9	50 51.7	96 23	130.2	52 17.8	96 23	129.5	54 12.3	95 23	128.5	54 40.8	95 23	123.3	55 09.3	95 23	128.0	57 02.8	94 24	126.8	8
9	48 14.3	96 23	130.1	49 11.9	96 23	129.7	50 38.2	96 23	129.1	52 04.2	95 23	128.3	53 58.4	95 23	127.3	54 26.9	95 24	127.1	54 55.3	95 24	126.8	56 48.7	94 24	125.6	9
40	48 00.8	96 23	129.0	48 58.3	96 23	128.6	50 24.4	96 23	127.9	51 50.3	95 23	127.2	53 44.4	95 24	126.1	54 12.8	95 24	125.9	54 41.2	95 24	125.6	56 34.3	94 24	124.4	40
1	47 47.0	96 23	127.8	48 44.5	96 24	127.4	50 10.5	95 24	126.7	51 36.2	95 24	126.0	53 30.1	95 24	124.9	53 58.5	95 24	124.7	54 26.8	94 24	124.4	56 19.8	94 25	123.2	1
2	47 33.1	96 24	126.7	48 30.4	96 24	126.2	49 56.3	95 24	125.5	51 21.9	95 24	124.8	53 15.6	95 24	123.8	53 43.9	94 25	123.5	54 12.2	94 25	123.2	56 05.0	94 25	122.0	2
3	47 18.9	96 24	125.5	48 16.2	96 24	125.1	49 41.9	95 24	124.4	51 07.4	95 25	123.7	53 00.9	95 25	122.6	53 29.2	94 25	122.3	53 57.5	94 25	122.0	55 50.0	93 26	120.8	3
4	47 04.5	95 24	124.4	48 01.7	95 24	123.9	49 27.4	95 25	123.2	50 52.7	95 25	122.5	52 46.1	94 25	121.4	53 14.3	94 25	121.2	53 42.5	94 25	120.9	55 34.8	93 26	119.7	4
45	46 49.9	95 25	123.3	47 47.1	95 25	122.8	49 12.6	95 25	122.1	50 37.8	95 25	121.4	52 31.0	94 25	120.3	52 59.2	94 25	120.0	53 27.3	94 26	119.7	55 19.5	93 26	118.5	45
6	46 35.2	95 25	122.1	47 32.3	95 25	121.7	48 57.6	95 25	121.0	50 22.8	94 25	120.2	52 15.8	94 26	119.1	52 43.9	94 26	118.9	53 12.0	94 26	118.6	55 04.0	93 26	117.3	6
7	46 20.2	95 25	121.0	47 17.2	95 25	120.6	48 42.5	95 26	119.8	50 07.5	94 26	119.1	52 00.4	94 26	118.0	52 28.5	94 26	117.7	52 56.5	93 26	117.4	54 48.4	93 26	116.2	7
8	46 05.1	95 25	119.9	47 02.0	95 26	119.4	48 27.2	94 26	118.7	49 52.1	94 26	118.0	51 44.8	94 26	116.9	52 12.9	94 26	116.6	52 40.9	93 26	116.3	54 32.5	93 27	115.1	8
9	45 49.8	95 26	118.8	46 46.7	95 26	118.3	48 11.8	94 26	117.6	49 36.5	94 26	116.9	51 29.1	94 26	115.8	51 57.1	93 27	115.5	52 25.1	93 27	115.2	54 16.6	93 27	113.9	9
50	45 34.4	95 26	117.7	46 31.2	95 26	117.2	47 56.1	94 26	116.5	49 20.8	94 26	115.7	51 13.2	93 27	114.6	51 41.2	93 27	114.4	52 09.1	93 27	114.1	54 00.5	92 27	112.8	50
1	45 18.8	95 26	116.6	46 15.5	94 26	116.1	47 40.4	94 27	115.4	49 04.9	94 27	114.6	50 57.2	93 27	113.5	51 25.1	93 27	113.3	51 53.0	93 27	113.0	53 44.2	92 27	111.7	1
2	45 03.0	95 26	115.5	45 59.7	94 27	115.1	47 24.4	94 27	114.3	48 48.9	94 27	113.5	50 41.0	93 27	112.4	51 08.9	93 27	112.2	51 36.8	93 27	111.9	53 27.9	92 27	110.6	2
3	44 47.1	94 27	114.4	45 43.7	94 27	114.0	47 08.4	94 27	113.2	48 32.8	94 27	112.5	50 24.7	93 27	111.4	50 52.6	93 27	111.1	51 20.5	93 27	110.8	53 11.4	92 28	109.5	3
4	44 31.1	94 27	113.4	45 27.6	94 27	112.9	46 52.2	94 27	112.2	48 16.5	93 27	111.4	50 08.4	93 28	110.3	50 36.2	93 28	110.0	51 04.0	93 28	109.7	52 54.8	92 28	108.4	4
55	44 14.9	94 27	112.3	45 11.4	94 27	111.8	46 35.9	94 27	111.1	48 00.1	93 28	110.3	49 51.8	93 28	109.2	50 19.7	93 28	108.9	50 47.5	93 28	108.6	52 38.1	92 28	107.4	55
6	43 58.6	94 27	111.2	44 55.1	94 27	110.8	46 19.5	94 28	110.0	47 43.6	93 28	109.2	49 35.2	93 28	108.1	50 03.0	93 28	107.8	50 30.8	92 28	107.5	52 21.3	92 28	106.3	6
7	43 42.2	94 28	110.2	44 38.6	94 28	109.7	46 02.9	94 28	109.0	47 27.0	93 28	108.2	49 18.5	93 28	107.1	49 46.3	93 28	106.8	50 14.0	92 28	106.5	52 04.5	92 28	105.2	7
8	43 25.7	94 28	109.1	44 22.0	94 28	108.7	45 46.3	93 28	107.9	47 10.3	93 28	107.1	49 01.7	93 28	106.0	49 29.4	92 28	105.7	49 57.1	92 28	105.4	51 47.5	92 29	104.2	8
9	43 09.1	94 28	108.1	44 05.4	94 28	107.6	45 29.6	93 28	106.9	46 53.5	93 28	106.1	48 44.8	92 28	105.0	49 12.5	92 28	104.7	49 40.2	92 28	104.4	51 30.4	92 29	103.1	9
60	42 52.3	94 28	107.1	43 48.6	94 28	106.6	45 12.7	93 28	105.8	46 36.6	93 28	105.0	48 27.8	92 28	103.9	48 55.5	92 28	103.6	49 23.2	92 28	103.3	51 13.3	91 29	102.1	60
1	42 35.5	94 28	106.0	43 31.7	94 28	105.5	44 55.8	93 28	104.8	46 19.6	93 28	104.0	48 10.7	92 29	102.9	48 38.4	92 29	102.6	49 06.1	92 29	102.3	50 56.1	91 29	101.1	1
2	42 18.6	94 28	105.0	43 14.8	94 28	104.5	44 38.8	93 28	103.8	46 02.5	93 29	103.0	47 53.6	92 29	101.9	48 21.3	92 29	101.6	48 48.9	92 29	101.3	50 38.9	91 29	100.1	2
3	42 01.6	94 28	104.0	42 57.8	93 28	103.5	44 21.7	93 29	102.7	45 45.4	93 29	102.0	47 36.4	92 29	100.9	48 04.0	92 29	100.6	48 31.7	92 29	100.3	50 21.6	91 29	99.0	3
4	41 44.6	94 29	103.0	42 40.7	93 28	102.5	44 04.6	93 29	101.7	45 28.2	93 29	100.9	47 19.1	92 29	99.8	47 46.8	92 29	99.6	48 14.4	92 29	99.3	50 04.2	91 29	98.0	4
65	41 27.5	94 29	101.9	42 23.5	93 29	101.5	43 47.4	93 29	100.7	45 10.9	93 29	99.9	47 01.8	92 29	98.8	47 29.5	92 29	98.5	47 57.0	92 29	98.3	49 46.9	91 29	97.0	65
6	41 10.3	93 29	100.9	42 06.3	93 29	100.5	43 30.1	93 29	99.7	44 53.6	93 29	98.9	46 44.5	92 29	97.8	47 12.1	92 29	97.5	47 39.6	92 29	97.3	49 29.4	91 29	96.0	6
7	40 53.0	93 29	99.9	41 49.0	93 29	99.5	43 12.8	93 29	98.7	44 36.3	93 29	97.9	46 27.1	92 29	96.8	46 54.7	92 29	96.6	47 22.2	92 29	96.3	49 12.0	91 29	95.0	7
8	40 35.7	93 29	98.9	41 31.7	93 29	98.5	42 55.4	93 29	97.7	44 18.9	93 29	96.9	46 09.6	92 29	95.8	46 37.2	92 29	95.6	47 04.8	92 29	95.3	48 54.5	91 29	94.1	8
9	40 18.4	93 29	97.9	41 14.3	93 29	97.5	42 38.0	93 29	96.7	44 01.5	93 29	96.0	45 52.2	92 29	94.9	46 19.8	92 29	94.6	46 47.3	92 29	94.3	48 37.0	91 29	93.1	9
70	40 01.0	93 29	97.0	40 56.9	93 29	96.5	42 20.6	93 29	95.7	43 44.0	92 29	95.0	45 34.7	92 29	93.9	46 02.3	92 29	93.6	46 29.8	92 29	93.3	48 19.4	91 29	92.1	70
1	39 43.5	93 29	96.0	40 39.5	93 29	95.5	42 03.1	93 29	94.8	43 26.5	92 29	94.0	45 17.2	92 29	92.9	45 44.7	92 29	92.6	46 12.3	92 29	92.3	48 01.9	91 29	91.1	1
2	39 26.1	93 29	95.0	40 22.0	93 29	94.5	41 45.6	93 29	93.8	43 09.0	92 29	93.0	44 59.6	92 29	91.9	45 27.2	92 29	91.7	45 54.7	92 29	91.4	47 44.4	91 29	90.2	2
3	39 08.6	93 29	94.0	40 04.5	93 29	93.5	41 28.1	93 29	92.8	42 51.5	92 29	92.1	44 42.1	92 29	91.0	45 09.7	92 29	90.7	45 37.2	92 29	90.4	47 26.8	91 29	89.2	3
4	38 51.1	93 29	93.0	39 47.0	93 29	92.6	41 10.6	93 29	91.8	42 33.9	92 29	91.1	44 24.6	92 29	90.0	44 52.1	92 29	89.7	45 19.6	92 29	89.5	47 09.3	91 29	88.3	4
75	38 33.5	93 29	92.1	39 29.4	93 29	91.6	40 53.1	93 29	90.9	42 16.4	92 29	90.1	44 07.0	92 29	89.1	44 34.6	92 29	88.8	45 02.1	92 29	88.5	46 51.8	91 29	87.3	75
6	38 16.0	93 29	91.1	39 11.9	93 29	90.7	40 35.5	93 29	89.9	41 58.9	92 29	89.2	43 49.5	92 29	88.1	44 17.1	92 29	87.8	44 44.6	92 29	87.6	46 34.2	91 29	86.4	6
7	37 58.5	93 29	90.2	38 54.4	93 29	89.7	40 18.0	93 29	89.0	41 41.3	92 29	88.2	43 32.0	92 29	87.2	43 59.5	92 29	86.9	44 27.1	92 29	86.6	46 16.7	91 29	85.5	7
8	37 40.9	93 29	89.2	38 36.8	93 29	88.7	40 00.4	93 29	88.0	41 23.8	92 29	87.3	43 14.5	92 29	86.2	43 42.0	92 29	86.0	44 09.6	92 29	85.7	45 59.3	91 29	84.5	8
9	37 23.4	93 29	88.3	38 19.3	93 29	87.8	39 42.9	93 29	87.1	41 06.3	92 29	86.3	42 57.0	92 29	85.3	43 24.5	92 29	85.0	43 52.1	92 29	84.8	45 41.8	91 29	83.6	9
80	37 05.9	93 29	87.3	38 01.8	93 29	86.8	39 25.4	93 29	86.1	40 48.8	92 29	85.4	42 39.5	92 29	84.4	43 07.1	92 29	84.1	43 34.6	92 29	83.8	45 24.4	91 29	82.7	80
1	36 48.3	93 29	86.4	37 44.3	93 29	85.9	39 07.9	93 29	85.2	40 31.3	93 29	84.5	42 22.0	92 29	83.4	42 49.6	92 29	83.2	43 17.2	92 29	82.9	45 07.0	91 29	81.8	1
2	36 30.8	93 29	85.4	37 26.8	93 29	85.0	38 50.4	93 29	84.3	40 13.9	93 29	83.5	42 04.6	92 29	82.5	42 32.2	92 29	82.2	42 59.8	92 29	82.0	44 49.7	91 29	80.9	2
3	36 13.4	93 29	84.5	37 09.3	93 29	84.0	38 33.0	93 29	83.3	39 56.4	93 29	82.6	41 47.3	92 29	81.6	42 14.9	92 29	81.3	42 42.5	92 29	81.1	44 32.4	91 29	80.0	3
4	35 55.9	93 29	83.5	36 51.9	93 29	83.1	38 15.6	93 29	82.4	39 39.1	93 29	81.7	41 29.9	92 29	80.7	41 57.6	92 29	80.4	42 25.2	92 29	80.1	44 15.1	91 29	79.1	4
85	35 38.5	93 29	82.6	36 34.5	93 29	82.2	37 58.2	93 29	81.5	39 21.7	93 29	80.8	41 12.6	92 29	79.8	41 40.3	92 29	79.5	42 07.9	92 29	79.2	43 57.9	91 29	78.2	85
6	35 21.1	93 29	81.7	36 17.1	93 29	81.2	37 40.9	93 29	80.6	39 04.4	93 29	79.8	40 55.4	92 29	78.9	41 23.1	92 29	78.6	41 50.7	92 29	78.3	43 40.8	92 28	77.3	6
7	35 03.8	93 29	80.8	35 59.8	93 29	80.3	37 23.6	93 29	79.6	38 47.2	93 29	78.9	40 38.2	92 29	77.9	41 05.9	92 29	77.7	41 33.5	92 28	77.4	43 23.7	92 28	76.4	7
8	34 46.5	93 29	79.8	35 42.5	93 29	79.4	37 06.4	93 29	78.7	38 30.0	93 29	78.0	40 21.1	92 28	77.0	40 48.8	92 28	76.8	41 16.4	92 28	76.5	43 06.7	92 28	75.5	8
9	34 29.3	94 29	78.9	35 25.3	93 29	78.5	36 49.2	93 29	77.8	38 12.9	93 28	77.1	40 04.0	92 28	76.1	40 31.7	92 28	75.9	40 59.4	92 28	75.6	42 49.8	92 28	74.6	9
90	34 12.1	94 29	78.0	35 08.2	93 28	77.6	36 32.1	93 28	76.9	37 55.8	93 28	76.2	39 47.0	92 28	75.3	40 14.8	92 28	75.0	40 42.5	92 28	74.7	42 32.9	92 28	73.7	90

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	33 54.9	94 28	77.1	34 51.1	93 28	76.7	36 15.0	93 28	76.0	37 38.8	93 28	75.3
2	33 37.9	94 28	76.2	34 34.0	93 28	75.8	35 58.1	93 28	75.1	37 21.9	93 28	74.4
3	33 20.9	94 28	75.3	34 17.1	94 28	74.9	35 41.1	93 28	74.2	37 05.0	93 28	73.5
4	33 03.9	94 28	74.4	34 00.2	94 28	73.9	35 24.3	93 28	73.3	36 48.2	93 28	72.6
95	32 47.1	94 28	73.5	33 43.3	94 28	73.0	35 07.5	93 28	72.4	36 31.5	93 28	71.7
6	32 30.3	94 28	72.6	33 26.6	94 28	72.2	34 50.9	94 28	71.5	36 14.9	93 28	70.9
7	32 13.6	94 28	71.7	33 09.9	94 28	71.3	34 34.3	94 28	70.6	35 58.4	93 27	70.0
8	31 57.0	94 28	70.8	32 53.4	94 27	70.4	34 17.8	94 27	69.7	35 42.0	93 27	69.1
9	31 40.5	94 27	69.9	32 36.9	94 27	69.5	34 01.4	94 27	68.8	35 25.6	94 27	68.2
100	31 24.1	94 27	69.0	32 20.5	94 27	68.6	33 45.0	94 27	68.0	35 09.4	94 27	67.3
1	31 07.7	94 27	68.1	32 04.2	94 27	67.7	33 28.8	94 27	67.1	34 53.2	94 27	66.5
2	30 51.5	94 27	67.2	31 48.1	94 27	66.8	33 12.7	94 27	66.2	34 37.2	94 27	65.6
3	30 35.4	94 27	66.3	31 32.0	94 27	65.9	32 56.7	94 26	65.3	34 21.3	94 26	64.7
4	30 19.4	94 26	65.4	31 16.0	94 26	65.0	32 40.9	94 26	64.4	34 05.5	94 26	63.8
105	30 03.5	95 26	64.5	31 00.2	94 26	64.2	32 25.1	94 26	63.6	33 49.8	94 26	63.0
6	29 47.7	95 26	63.7	30 44.5	95 26	63.3	32 09.4	94 26	62.7	33 34.2	94 26	62.1
7	29 32.1	95 26	62.8	30 28.9	95 26	62.4	31 53.9	94 26	61.8	33 18.8	94 26	61.2
8	29 16.5	95 26	61.9	30 13.4	95 26	61.5	31 38.5	95 25	61.0	33 03.5	94 25	60.4
9	29 01.1	95 25	61.0	29 58.0	95 25	60.7	31 23.2	95 25	60.1	32 48.3	94 25	59.5
110	28 45.8	95 25	60.1	29 42.8	95 25	59.8	31 08.1	95 25	59.2	32 33.3	95 25	58.7
1	28 30.7	95 25	59.3	29 27.7	95 25	58.9	30 53.1	95 25	58.4	32 18.3	95 25	57.8
2	28 15.7	95 25	58.4	29 12.7	95 25	58.0	30 38.2	95 25	57.5	32 03.6	95 24	56.9
3	28 00.8	95 25	57.5	28 57.9	95 24	57.2	30 23.5	95 24	56.6	31 48.9	95 24	56.1
4	27 46.1	95 24	56.6	28 43.3	95 24	56.3	30 08.9	95 24	55.8	31 34.5	95 24	55.2
115	27 31.5	95 24	55.8	28 28.7	95 24	55.4	29 54.5	95 24	54.9	31 20.1	95 24	54.4
6	27 17.1	96 24	54.9	28 14.4	95 24	54.6	29 40.2	95 24	54.1	31 05.9	95 23	53.5
7	27 02.8	96 24	54.0	28 00.2	96 23	53.7	29 26.1	95 23	53.2	30 51.9	95 23	52.7
8	26 48.7	96 23	53.2	27 46.1	96 23	52.8	29 12.1	96 23	52.3	30 38.0	95 23	51.8
9	26 34.7	96 23	52.3	27 32.2	96 23	52.0	28 58.3	96 23	51.5	30 24.3	96 23	51.0
120	26 20.9	96 23	51.4	27 18.5	96 23	51.1	28 44.7	96 22	50.6	30 10.8	96 22	50.1
1	26 07.3	96 22	50.6	27 04.9	96 22	50.3	28 31.2	96 22	49.8	29 57.4	96 22	49.3
2	25 53.8	96 22	49.7	26 51.5	96 22	49.4	28 17.9	96 22	48.9	29 44.2	96 22	48.4
3	25 40.5	96 22	48.8	26 38.3	96 22	48.5	28 04.8	96 22	48.1	29 31.2	96 21	47.6
4	25 27.4	96 22	48.0	26 25.2	96 21	47.7	27 51.8	96 21	47.2	29 18.3	96 21	46.7
125	25 14.5	96 21	47.1	26 12.3	96 21	46.8	27 39.0	96 21	46.4	29 05.6	96 21	45.9
6	25 01.7	97 21	46.2	25 59.6	96 21	46.0	27 26.4	96 21	45.5	28 53.1	96 21	45.1
7	24 49.1	97 21	45.4	25 47.1	97 21	45.1	27 14.0	96 20	44.7	28 40.8	96 20	44.2
8	24 36.7	97 20	44.5	25 34.8	97 20	44.2	27 01.7	97 20	43.8	28 28.6	97 20	43.4
9	24 24.5	97 20	43.7	25 22.6	97 20	43.4	26 49.7	97 20	43.0	28 16.7	97 20	42.5
130	24 12.5	97 20	42.8	25 10.7	97 20	42.5	26 37.8	97 19	42.1	28 04.9	97 19	41.7
1	24 00.7	97 19	41.9	24 58.9	97 19	41.7	26 26.2	97 19	41.3	27 53.4	97 19	40.9
2	23 49.1	97 19	41.1	24 47.3	97 19	40.8	26 14.7	97 19	40.4	27 42.0	97 19	40.0
3	23 37.6	97 19	40.2	24 36.0	97 19	40.0	26 03.4	97 18	39.6	27 30.8	97 18	39.2
4	23 26.4	97 18	39.4	24 24.8	97 18	39.1	25 52.3	97 18	38.7	27 19.8	97 18	38.3
135	23 15.4	97 18	38.5	24 13.8	97 18	38.3	25 41.5	97 18	37.9	27 09.0	97 18	37.5
6	23 04.6	98 18	37.7	24 03.1	97 18	37.4	25 30.8	97 17	37.0	26 58.5	97 17	36.7
7	22 54.0	98 17	36.8	23 52.5	98 17	36.6	25 20.3	98 17	36.2	26 48.1	97 17	35.8
8	22 43.6	98 17	35.9	23 42.2	98 17	35.7	25 10.1	98 17	35.4	26 37.9	98 17	35.0
9	22 33.4	98 17	35.1	23 32.0	98 17	34.9	25 00.0	98 16	34.5	26 28.0	98 16	34.2
140	22 23.4	98 16	34.2	23 22.1	98 16	34.0	24 50.2	98 16	33.7	26 18.2	98 16	33.3
1	22 13.6	98 16	33.4	23 12.4	98 16	33.2	24 40.6	98 16	32.8	26 08.7	98 16	32.5
2	22 04.1	98 16	32.5	23 02.9	98 15	32.3	24 31.2	98 15	32.0	25 59.4	98 15	31.6
3	21 54.8	98 15	31.7	22 53.7	98 15	31.4	24 22.0	98 15	31.1	25 50.3	98 15	30.8
4	21 45.7	98 15	30.8	22 44.6	98 15	30.6	24 13.0	98 15	30.3	25 41.4	98 14	30.0
145	21 36.8	98 14	29.9	22 35.8	98 14	29.7	24 04.3	98 14	29.4	25 32.8	98 14	29.1
6	21 28.2	98 14	29.1	22 27.2	98 14	28.9	23 55.8	98 14	28.6	25 24.3	98 14	28.3
7	21 19.8	99 14	28.2	22 18.9	99 14	28.0	23 47.5	98 13	27.8	25 16.1	98 13	27.5
8	21 11.6	99 13	27.4	22 10.7	99 13	27.2	23 39.5	99 13	26.9	25 08.1	99 13	26.6
9	21 03.6	99 13	26.5	22 02.8	99 13	26.3	23 31.6	99 13	26.1	25 00.4	99 13	25.8
150	20 55.9	99 12	25.7	21 55.2	99 12	25.5	23 24.0	99 12	25.2	24 52.9	99 12	25.0
1	20 48.4	99 12	24.8	21 47.7	99 12	24.6	23 16.7	99 12	24.4	24 45.6	99 12	24.1
2	20 41.2	99 12	24.0	21 40.5	99 12	23.8	23 09.5	99 11	23.6	24 38.5	99 11	23.3
3	20 34.2	99 11	23.1	21 33.6	99 11	22.9	23 02.6	99 11	22.7	24 31.7	99 11	22.5
4	20 27.4	99 11	22.2	21 26.9	99 11	22.1	22 56.0	99 11	21.9	24 25.1	99 11	21.6
155	20 20.9	99 10	21.4	21 20.4	99 10	21.2	22 49.6	99 10	21.0	24 18.8	99 10	20.8
6	20 14.6	99 10	20.5	21 14.1	99 10	20.4	22 43.4	99 10	20.2	24 12.6	99 10	20.0
7	20 08.6	99 10	19.7	21 08.2	99 10	19.5	22 37.5	99 09	19.3	24 06.8	99 09	19.1
8	20 02.8	99 09	18.8	21 02.4	99 09	18.7	22 31.8	99 09	18.5	24 01.8	99 09	18.3
9	19 57.3	99 09	18.0	20 56.9	99 09	17.8	22 26.3	99 09	17.7	23 55.8	99 09	17.5
160	19 52.0	99 08	17.1	20 51.7	99 08	17.0	22 21.1	99 08	16.8	23 50.6	99 08	16.6
1	19 47.0	99 08	16.3	20 46.7	99 08	16.1	22 16.2	99 08	16.0	23 45.7	99 08	15.8
2	19 42.2	1.0 08	15.4	20 41.9	1.0 08	15.3	22 11.5	1.0 07	15.1	23 41.0	1.0 07	15.0
3	19 37.6	1.0 07	14.5	20 37.4	1.0 07	14.4	22 07.0	1.0 07	14.3	23 36.6	1.0 07	14.1
4	19 33.4	1.0 07	13.7	20 33.1	1.0 07	13.6	22 02.8	1.0 07	13.5	23 32.5	1.0 07	13.3
165	19 29.3	1.0 06	12.8	20 29.2	1.0 06	12.7	21 58.9	1.0 06	12.6	23 28.6	1.0 06	12.5
6	19 25.6	1.0 06	12.0	20 25.4	1.0 06	11.9	21 55.1	1.0 06	11.8	23 24.9	1.0 06	11.7
7	19 22.1	1.0 05	11.1	20 21.9	1.0 05	11.0	21 51.7	1.0 05	10.9	23 21.5	1.0 05	10.8
8	19 18.8	1.0 05	10.3	20 18.7	1.0 05	10.2	21 48.5	1.0 05	10.1	23 18.3	1.0 05	10.0
9	19 15.8	1.0 05	09.4	20 15.7	1.0 05	09.3	21 45.5	1.0 04	09.3	23 15.4	1.0 04	09.2
170	19 13.1	1.0 04	08.6	20 13.0	1.0 04	08.5	21 42.9	1.0 04	08.4	23 12.7	1.0 04	08.3
1	19 10.6	1.0 04	07.7	20 10.5	1.0 04	07.6	21 40.4	1.0 04	07.6	23 10.3	1.0 04	07.5
2	19 08.4	1.0 03	06.8	20 08.3	1.0 03	06.8	21 38.2	1.0 03	06.7	23 08.1	1.0 03	06.7
3	19 06.4	1.0 03	06.0	20 06.4	1.0 03	05.9	21 36.3	1.0 03	05.9	23 06.2	1.0 03	05.8
4	19 04.7	1.0 02	05.1	20 04.7	1.0 02	05.1	21 34.6	1.0 02	05.0	23 04.6	1.0 02	05.0
175	19 03.3	1.0 02	04.3	20 03.3	1.0 02	04.2	21 33.2	1.0 02	04.2	23 03.2	1.0 02	04.2
6	19 02.1	1.0 02	03.4	20 02.1	1.0 02	03.4	21 32.1	1.0 02	03.4	23 02.0	1.0 01	03.3
7	19 01.2	1.0 01	02.6	20 01.2	1.0 01	02.5	21 31.2	1.0 01	02.5	23 01.1	1.0 01	02.5
8	19 00.5	1.0 01	01.7	20 00.5	1.0 01	01.7	21 30.5	1.0 01	01.7	23 00.5	1.0 01	01.7
9	19 00.1	1.0 00	00.9	20 00.1	1.0 00	00.8	21 30.1	1.0 00	00.8	23 00.1	1.0 00	00.8
180	19 00.0	1.0 00	00.0	20 00.0	1.0 00	00.0	21 30.0	1.0 00	00.0	23 00.0	1.0 00	00.0

H.A.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.	
°	° ′		°	° ′		°	° ′		°	° ′		°	°	Lat. 73°
91	39 30.1	93 28	74.4	39 57.8	92 28	74.1	40 25.6	92 28	73.9	42 16.1	92 28	72.8	91	
2	39 13.2	93 28	73.5	39 41.0	93 28	73.2	40 08.8	92 28	73.0	41 59.4	92 28	71.9	2	
3	38 56.5	93 28	72.6	39 24.3	93 28	72.3	39 52.0	92 28	72.1	41 42.7	92 28	71.1	3	
4	38 39.8	93 28	71.7	39 07.6	93 28	71.5	39 35.4	93 28	71.2	41 26.2	92 27	70.2	4	
95	38 23.2	93 28	70.8	38 51.0	93 28	70.6	39 18.8	93 27	70.3	41 09.7	92 27	69.3	95	
6	38 06.6	93 27	69.9	38 34.5	93 27	69.7	39 02.3	93 27	69.5	40 53.4	92 27	68.5	6	
7	37 50.2	93 27	69.1	38 18.1	93 27	68.8	38 46.0	93 27	68.6	40 37.1	92 27	67.6	7	
8	37 33.9	93 27	68.2	38 01.8	93 27	68.0	38 29.7	93 27	67.7	40 20.9	93 27	66.7	8	
9	37 17.6	93 27	67.3	37 45.6	93 27	67.1	38 13.5	93 27	66.9	40 04.9	93 27	65.9	9	
100	37 01.5	93 27	66.4	37 29.5	93 27	66.2	37 57.4	93 27	66.0	39 48.9	93 26	65.0	100	
1	36 45.5	93 27	65.6	37 13.5	93 26	65.4	37 41.4	93 26	65.1	39 33.0	93 26	64.2	1	
2	36 29.6	93 26	64.7	36 57.6	93 26	64.5	37 25.6	93 26	64.3	39 17.3	93 26	63.3	2	
3	36 13.8	94 26	63.9	36 41.8	93 26	63.6	37 09.8	93 26	63.4	39 01.7	93 26	62.5	3	
4	35 58.1	94 26	63.0	36 26.1	94 26	62.8	36 54.2	93 26	62.6	38 46.2	93 26	61.6	4	
105	35 42.5	94 26	62.1	36 10.6	94 26	61.9	36 38.7	94 26	61.7	38 30.8	93 26	60.8	105	
6	35 27.0	94 26	61.3	35 55.2	94 26	61.1	36 23.3	94 25	60.8	38 15.6	93 25	60.0	6	
7	35 11.7	94 25	60.4	35 39.9	94 25	60.2	36 08.1	94 25	60.0	38 00.5	93 25	59.1	7	
8	34 56.5	94 25	59.6	35 24.7	94 25	59.4	35 52.9	94 25	59.1	37 45.5	94 25	58.3	8	
9	34 41.5	94 25	58.7	35 09.7	94 25	58.5	35 37.9	94 25	58.3	37 30.6	94 25	57.4	9	
110	34 26.6	94 25	57.9	34 54.8	94 25	57.7	35 23.1	94 25	57.5	37 15.9	94 24	56.6	110	
1	34 11.8	94 24	57.0	34 40.1	94 24	56.8	35 08.4	94 24	56.6	37 01.3	94 24	55.8	1	
2	33 57.1	95 24	56.2	34 25.5	94 24	56.0	34 53.8	94 24	55.8	36 46.9	94 24	54.9	2	
3	33 42.6	95 24	55.3	34 11.0	95 24	55.1	34 39.4	94 24	54.9	36 32.6	94 24	54.1	3	
4	33 28.3	95 24	54.5	33 56.7	95 24	54.3	34 25.1	95 24	54.1	36 18.5	94 23	53.3	4	
115	33 14.1	95 23	53.6	33 42.5	95 23	53.4	34 11.0	95 23	53.2	36 04.5	94 23	52.5	115	
6	33 00.0	95 23	52.8	33 28.5	95 23	52.6	33 57.0	95 23	52.4	35 50.6	95 23	51.6	6	
7	32 46.1	95 23	51.9	33 14.7	95 23	51.8	33 43.1	95 23	51.6	35 37.0	95 23	50.8	7	
8	32 32.4	95 23	51.1	33 01.0	95 23	50.9	33 29.5	95 22	50.7	35 23.5	95 22	50.0	8	
9	32 18.8	95 22	50.3	32 47.4	95 22	50.1	33 16.0	95 22	49.9	35 10.1	95 22	49.2	9	
120	32 05.4	95 22	49.4	32 34.0	95 22	49.3	33 02.6	95 22	49.1	34 56.9	95 22	48.3	120	
1	31 52.2	96 22	48.6	32 20.8	95 22	48.4	32 49.5	95 22	48.2	34 43.9	95 21	47.5	1	
2	31 39.1	96 22	47.8	32 07.8	96 21	47.6	32 36.5	96 21	47.4	34 31.0	95 21	46.7	2	
3	31 26.2	96 21	46.9	31 54.9	96 21	46.8	32 23.6	96 21	46.6	34 18.4	95 21	45.9	3	
4	31 13.5	96 21	46.1	31 42.2	96 21	45.9	32 11.0	96 21	45.8	34 05.9	96 21	45.1	4	
125	31 00.9	96 21	45.3	31 29.7	96 21	45.1	31 58.5	96 20	44.9	33 53.5	96 20	44.2	125	
6	30 48.6	96 20	44.4	31 17.4	96 20	44.3	31 46.2	96 20	44.1	33 41.4	96 20	43.4	6	
7	30 36.4	96 20	43.6	31 05.2	96 20	43.4	31 34.1	96 20	43.3	33 29.4	96 20	42.6	7	
8	30 24.4	96 20	42.8	30 53.3	96 20	42.6	31 22.2	96 20	42.5	33 17.6	96 19	41.8	8	
9	30 12.5	96 19	41.9	30 41.5	96 19	41.8	31 10.4	96 19	41.6	33 06.0	96 19	41.0	9	
130	30 00.9	97 19	41.1	30 29.9	97 19	41.0	30 58.9	97 19	40.8	32 54.6	96 19	40.2	130	
1	29 49.5	97 19	40.3	30 18.5	97 19	40.1	30 47.5	97 19	40.0	32 43.4	96 18	39.4	1	
2	29 38.2	97 18	39.4	30 07.3	97 18	39.3	30 36.3	97 18	39.2	32 32.3	97 18	38.6	2	
3	29 27.2	97 18	38.6	29 56.3	97 18	38.5	30 25.3	97 18	38.3	32 21.5	97 18	37.7	3	Lat. 74°
4	29 16.3	97 18	37.8	29 45.5	97 18	37.7	30 14.6	97 18	37.5	32 10.9	97 17	36.9	4	
135	29 05.7	97 17	37.0	29 34.8	97 17	36.8	30 04.0	97 17	36.7	32 00.4	97 17	36.1	135	
6	28 55.2	97 17	36.1	29 24.4	97 17	36.0	29 53.6	97 17	35.9	31 50.2	97 17	35.3	6	
7	28 45.0	97 17	35.3	29 14.2	97 17	35.2	29 43.4	97 17	35.1	31 40.1	97 16	34.5	7	
8	28 35.0	97 16	34.5	29 04.2	97 16	34.4	29 33.4	97 16	34.2	31 30.3	97 16	33.7	8	
9	28 25.1	98 16	33.7	28 54.4	98 16	33.5	29 23.7	98 16	33.4	31 20.7	97 16	32.9	9	
140	28 15.5	98 16	32.8	28 44.8	98 16	32.7	29 14.1	98 16	32.6	31 11.2	98 15	32.1	140	
1	28 06.1	98 15	32.0	28 35.4	98 15	31.9	29 04.8	98 15	31.8	31 02.0	98 15	31.3	1	
2	27 56.9	98 15	31.2	28 26.3	98 15	31.1	28 55.6	98 15	31.0	30 53.0	98 15	30.5	2	Lat. 75°
3	27 47.9	98 15	30.4	28 17.3	98 15	30.3	28 46.7	98 14	30.1	30 44.2	98 14	29.7	3	
4	27 39.2	98 14	29.5	28 08.6	98 14	29.4	28 38.0	98 14	29.3	30 35.7	98 14	28.9	4	
145	27 30.6	98 14	28.7	28 00.1	98 14	28.6	28 29.5	98 14	28.5	30 27.3	98 14	28.1	145	
6	27 22.3	98 14	27.9	27 51.8	98 13	27.8	28 21.3	98 13	27.7	30 19.1	98 13	27.3	6	
7	27 14.2	98 13	27.1	27 43.7	98 13	27.0	28 13.2	98 13	26.9	30 11.2	98 13	26.5	7	
8	27 06.3	98 13	26.3	27 35.9	98 13	26.2	28 05.4	98 13	26.1	30 03.5	98 12	25.7	8	
9	26 58.7	99 12	25.4	27 28.3	99 12	25.3	27 57.8	99 12	25.2	29 56.0	98 12	24.8	9	
150	26 51.3	99 12	24 6	27 20.9	99 12	24.5	27 50.5	99 12	24.4	29 48.8	99 12	24.0	150	
1	26 44.1	99 12	23.8	27 13.7	99 12	23.7	27 43.3	99 12	23.6	29 41.7	99 11	23.2	1	Lat. 76°
2	26 37.1	99 11	23.0	27 06.8	99 11	22.9	27 36.4	99 11	22.8	29 34.9	99 11	22.4	2	
3	26 30.4	99 11	22.1	27 00.1	99 11	22.1	27 29.7	99 11	22.0	29 28.3	99 11	21.6	3	
4	26 23.9	99 10	21.3	26 53.6	99 10	21.2	27 23.3	99 10	21.2	29 22.0	99 10	20.8	4	
155	26 17.6	99 10	20.5	26 47.3	99 10	20.4	27 17.1	99 10	20.4	29 15.9	99 10	20.0	155	
6	26 11.6	99 10	19.7	26 41.3	99 10	19.6	27 11.1	99 10	19.5	29 10.0	99 09	19.2	6	
7	26 05.8	99 09	18.9	26 35.6	99 09	18.8	27 05.3	99 09	18.7	29 04.3	99 09	18.4	7	
8	26 00.3	99 09	18.0	26 30.0	99 09	18.0	26 59.8	99 09	17.9	28 58.9	99 09	17.6	8	
9	25 54.9	99 08	17.2	26 24.7	99 08	17.2	26 54.5	99 08	17.1	28 53.7	99 08	16.8	9	Lat. 77°
160	25 49.9	99 08	16.4	26 19.7	99 08	16.3	26 49.5	99 08	16.3	28 48.7	99 08	16.0	160	
1	25 45.0	99 08	15.6	26 14.9	99 08	15.5	26 44.7	99 08	15.5	28 44.0	99 07	15.2	1	
2	25 40.4	99 07	14.8	26 10.3	99 07	14.7	26 40.1	99 07	14.6	28 39.5	99 07	14.4	2	
3	25 36.1	1.0 07	13.9	26 06.0	1.0 07	13.9	26 35.8	1.0 07	13.8	28 35.3	1.0 07	13.6	3	
4	25 32.0	1.0 06	13.1	26 01.9	1.0 06	13.1	26 31.8	1.0 06	13.0	28 31.3	1.0 06	12.8	4	
165	25 28.1	1.0 06	12.3	25 58.0	1.0 06	12.3	26 27.9	1.0 06	12.2	28 27.5	1.0 06	12.0	165	
6	25 24.5	1.0 06	11.5	25 54.4	1.0 06	11.4	26 24.3	1.0 06	11.4	28 24.0	1.0 05	11.2	6	
7	25 21.2	1.0 05	10.7	25 51.1	1.0 05	10.6	26 21.0	1.0 05	10.6	28 20.7	1.0 05	10.4	7	
8	25 18.0	1.0 05	09.8	25 48.0	1.0 05	09.8	26 17.9	1.0 05	09.8	28 17.6	1.0 05	09.6	8	Lat. 78°
9	25 15.2	1.0 04	09.0	25 45.1	1.0 04	09.0	26 15.0	1.0 04	09.0	28 14.8	1.0 04	08.8	9	
170	25 12.5	1.0 04	08.2	25 42.5	1.0 04	08.2	26 12.4	1.0 04	08.1	28 12.2	1.0 04	08.0	170	
1	25 10.2	1.0 04	07.4	25 40.1	1.0 04	07.4	26 10.1	1.0 04	07.3	28 09.9	1.0 03	07.2	1	
2	25 08.0	1.0 03	06.6	25 38.0	1.0 03	06.5	26 08.0	1.0 03	06.5	28 07.8	1.0 03	06.4	2	
3	25 06.1	1.0 03	05.7	25 36.1	1.0 03	05.7	26 06.1	1.0 03	05.7	28 06.0	1.0 03	05.6	3	
4	25 04.5	1.0 02	04.9	25 34.5	1.0 02	04.9	26 04.5	1.0 02	04.9	28 04.4	1.0 02	04.8	4	
175	25 03.1	1.0 02	04.1	25 33.1	1.0 02	04.1	26 03.1	1.0 02	04.1	28 03.1	1.0 02	04.0	175	
6	25 02.0	1.0 01	03.3	25 32.0	1.0 01	03.3	26 02.0	1.0 01	03.3	28 02.0	1.0 01	03.2	6	
7	25 01.1	1.0 01	02.5	25 31.1	1.0 01	02.5	26 01.1	1.0 01	02.4	28 01.1	1.0 01	02.4	7	Lat. 79°
8	25 00.5	1.0 01	01.6	25 30.5	1.0 01	01.6	26 00.5	1.0 01	01.6	28 00.5	1.0 01	01.6	8	
9	25 00.1	1.0 00	00.8	25 30.1	1.0 00	00.8	26 00.1	1.0 00	00.8	28 00.1	1.0 00	00.8	9	
180	25 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	28 00.0	1.0 00	00.0	180	

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	
	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	
00	63 00.0	1.0	180.0	64 00.0	1.0	180.0	65 30.0	1.0	180.0	66 30.0	1.0	180.0	67 30.0	1.0	180.0	68 30.0	1.0	180.0	69 30.0	1.0	180.0	71 00.0	1.0	180.0	00
1	62 59.8	1.0	178.5	63 59.8	1.0	178.4	65 29.8	1.0	178.4	66 29.7	1.0	178.4	67 29.7	1.0	178.3	68 29.7	1.0	178.3	69 29.7	1.0	178.3	70 59.7	1.0	178.2	1
2	62 59.1	1.0	176.9	63 59.0	1.0	176.9	65 29.0	1.0	176.8	66 29.0	1.0	176.7	67 29.0	1.0	176.7	68 29.0	1.0	176.6	69 28.9	1.0	176.5	70 58.9	1.0	176.4	2
3	62 57.9	1.0	175.4	63 57.9	1.0	175.3	65 27.8	1.0	175.2	66 27.8	1.0	175.1	67 27.7	1.0	175.0	68 27.7	1.0	174.9	69 27.6	1.0	174.8	70 57.5	1.0	174.6	3
4	62 56.3	1.0	173.9	63 56.2	1.0	173.8	65 26.1	1.0	173.6	66 26.0	1.0	173.5	67 25.9	1.0	173.4	68 25.8	1.0	173.2	69 25.8	1.0	173.1	70 55.6	1.0	172.8	4
05	62 54.2	1.0	172.4	63 54.1	1.0	172.2	65 23.9	1.0	172.0	66 23.8	1.0	171.9	67 23.7	1.0	171.7	68 23.5	1.0	171.5	69 23.4	1.0	171.3	70 53.1	1.0	171.0	05
6	62 51.6	1.0	170.8	63 51.5	1.0	170.7	65 21.2	1.0	170.4	66 21.1	1.0	170.3	67 20.9	1.0	170.1	68 20.7	1.0	169.8	69 20.5	1.0	169.6	70 50.1	1.0	169.2	6
7	62 48.6	1.0	169.3	63 48.4	1.0	169.1	65 18.1	1.0	168.9	66 17.8	1.0	168.6	67 17.6	1.0	168.4	68 17.3	1.0	168.2	69 17.0	99	167.9	70 46.6	99	167.4	7
8	62 45.1	1.0	167.8	63 44.9	1.0	167.6	65 14.4	1.0	167.3	66 14.2	99	167.0	67 13.8	99	166.8	68 13.5	99	166.5	69 13.1	99	166.2	70 42.5	99	165.7	8
9	62 41.2	1.0	166.3	63 40.9	99	166.1	65 10.4	99	165.7	66 10.0	99	165.4	67 09.6	99	165.1	68 09.1	99	164.8	69 08.7	99	164.5	70 37.9	99	163.9	9
10	62 36.8	99	164.8	63 36.4	99	164.5	65 05.8	99	164.1	66 05.3	99	163.8	67 04.8	99	163.5	68 04.3	99	163.2	69 03.7	99	162.8	70 32.7	99	162.2	10
1	62 32.0	99	163.3	63 31.5	99	163.0	65 00.8	99	162.6	66 00.2	99	162.3	66 59.6	99	161.9	67 59.0	99	161.5	68 58.3	99	161.1	70 27.1	99	160.4	1
2	62 26.7	99	161.8	63 26.2	99	161.5	64 55.3	99	161.0	65 54.6	99	160.7	66 53.9	99	160.3	67 53.2	99	159.9	68 52.4	99	159.4	70 21.0	98	158.7	2
3	62 21.0	99	160.3	63 20.4	99	160.0	64 49.4	99	159.5	65 48.6	99	159.1	66 47.8	99	158.7	67 46.9	98	158.3	68 46.0	98	157.8	70 14.4	98	157.0	3
4	62 14.9	99	158.8	63 14.2	99	158.5	64 43.0	99	158.0	65 42.1	99	157.6	66 41.2	98	157.1	67 40.2	98	156.6	68 39.1	98	156.1	70 07.3	98	155.3	4
15	62 08.4	99	157.4	63 07.5	99	157.0	64 36.2	98	156.4	65 35.2	98	156.0	66 34.2	98	155.5	67 33.0	98	155.0	68 31.8	98	154.5	69 59.7	98	153.6	15
6	62 01.4	99	155.9	63 00.5	98	155.5	64 29.0	98	154.9	65 27.9	98	154.5	66 26.7	98	154.0	67 25.4	98	153.5	68 24.0	98	152.9	69 51.7	97	151.9	6
7	61 54.0	98	154.5	62 53.0	98	154.1	64 21.3	98	153.4	65 20.1	98	152.9	66 18.8	98	152.4	67 17.3	98	151.9	68 15.8	97	151.3	69 43.2	97	150.3	7
8	61 46.3	98	153.0	62 45.1	98	152.6	64 13.3	98	151.9	65 11.9	98	151.4	66 10.4	97	150.9	67 08.9	97	150.3	68 07.2	97	149.7	69 34.3	97	148.6	8
9	61 38.1	98	151.6	62 36.9	98	151.1	64 04.8	98	150.4	65 03.3	97	149.9	66 01.7	97	149.4	67 00.0	97	148.8	67 58.1	97	148.1	69 24.9	96	147.0	9
20	61 29.6	98	150.1	62 28.2	98	149.7	63 56.0	97	149.0	64 54.3	97	148.4	65 52.6	97	147.8	66 50.7	97	147.2	67 48.6	96	146.5	69 15.2	96	145.4	20
1	61 20.7	98	148.7	62 19.2	97	148.3	63 46.7	97	147.5	64 44.9	97	146.9	65 43.0	97	146.3	66 41.0	96	145.7	67 38.7	96	145.0	69 05.0	96	143.8	1
2	61 11.4	97	147.3	62 09.7	97	146.8	63 37.1	97	146.0	64 35.2	97	145.5	65 33.1	96	144.8	66 30.9	96	144.2	67 28.5	96	143.5	68 54.5	96	142.3	2
3	61 01.7	97	145.9	62 00.0	97	145.4	63 27.1	97	144.6	64 25.1	96	144.0	65 22.8	96	143.4	66 20.5	96	142.7	67 17.9	96	142.0	68 43.6	96	140.7	3
4	60 51.7	97	144.5	61 49.8	97	144.0	63 16.8	96	143.2	64 14.6	96	142.6	65 12.2	96	141.9	66 09.6	96	141.2	67 06.9	95	140.5	68 32.3	95	139.2	4
25	60 41.4	97	143.2	61 39.4	97	142.6	63 06.1	96	141.8	64 03.7	96	141.1	65 01.2	96	140.5	65 58.5	95	139.7	66 55.5	95	139.0	68 20.6	94	137.7	25
6	60 30.7	97	141.8	61 28.5	96	141.2	62 55.1	96	140.4	63 52.6	96	139.7	64 49.9	95	139.0	65 47.0	95	138.3	66 43.8	95	137.5	68 08.7	94	136.2	6
7	60 19.7	96	140.4	61 17.4	96	139.9	62 43.7	96	139.0	63 41.1	96	138.3	64 38.2	96	137.6	65 35.1	96	136.9	66 31.8	94	136.1	67 56.4	94	134.7	7
8	60 08.3	96	139.1	61 05.9	96	138.5	62 32.0	95	137.6	63 29.2	95	136.9	64 26.2	95	136.2	65 23.0	94	135.4	66 19.5	94	134.6	67 43.8	93	133.3	8
9	59 56.7	96	137.7	60 54.2	96	137.2	62 20.1	95	136.2	63 17.1	95	135.5	64 13.9	95	134.8	65 10.5	94	134.0	66 06.9	94	133.2	67 30.8	93	131.8	9
30	59 44.7	96	136.4	60 42.1	95	135.8	62 07.8	95	134.9	63 04.7	95	134.2	64 01.3	94	133.4	64 57.8	94	132.7	65 53.9	93	131.8	67 17.6	93	130.4	30
1	59 32.5	96	135.1	60 29.7	95	134.5	61 55.2	95	133.5	62 51.9	94	132.8	63 48.5	94	132.1	64 44.7	94	131.3	65 40.7	93	130.4	67 04.1	92	129.0	1
2	59 20.0	96	133.8	60 17.1	95	133.2	61 42.3	95	132.2	62 38.9	94	131.5	63 35.3	94	130.7	64 31.4	93	129.9	65 27.2	93	129.1	66 50.4	92	127.6	2
3	59 07.2	95	132.5	60 04.1	95	131.9	61 29.2	94	130.9	62 25.7	94	130.2	63 21.9	93	129.4	64 17.8	93	128.6	65 13.5	92	127.7	66 36.3	92	126.3	3
4	58 54.1	95	131.2	59 50.9	95	130.6	61 15.8	94	129.6	62 12.1	94	128.9	63 08.2	93	128.1	64 04.0	93	127.3	64 59.5	92	126.4	66 22.1	91	124.9	4
35	58 40.8	95	130.0	59 37.5	94	129.3	61 02.2	94	128.3	61 58.3	93	127.6	62 54.3	93	126.8	63 49.9	92	125.9	64 45.2	92	125.0	66 07.6	91	123.6	35
6	58 27.2	94	128.7	59 23.8	94	128.1	60 48.3	94	127.0	61 44.3	93	126.3	62 40.1	93	125.5	63 35.6	92	124.6	64 30.8	92	123.7	65 52.9	91	122.3	6
7	58 13.4	94	127.5	59 09.9	94	126.8	60 34.2	93	125.8	61 30.1	93	125.0	62 25.7	92	124.2	63 21.0	92	123.4	64 16.1	91	122.5	65 37.9	90	121.0	7
8	57 59.4	94	126.2	58 55.7	94	125.6	60 19.8	93	124.5	61 15.6	93	123.7	62 11.1	92	122.9	63 06.3	92	122.1	64 01.2	91	121.2	65 22.8	90	119.7	8
9	57 45.1	94	125.0	58 41.3	94	124.3	60 05.2	93	123.3	61 00.9	93	122.5	61 56.3	92	121.7	62 51.3	92	120.8	63 46.0	91	119.9	65 07.4	90	118.4	9
40	57 30.6	94	123.8	58 26.7	93	123.1	59 50.5	93	122.0	60 46.0	92	121.3	61 41.2	92	120.5	62 36.2	91	119.6	63 30.8	91	118.7	64 51.9	90	117.2	40
1	57 16.0	93	122.6	58 11.9	93	121.9	59 35.5	93	120.8	60 30.9	92	120.0	61 26.0	92	119.2	62 20.8	91	118.4	63 15.3	90	117.4	64 36.2	89	116.0	1
2	57 01.1	93	121.4	57 57.0	93	120.7	59 20.3	92	119.6	60 15.6	92	118.8	61 10.6	91	118.0	62 05.3	91	117.1	62 59.6	90	116.2	64 20.4	89	114.7	2
3	56 46.0	93	120.2	57 41.8	93	119.5	59 05.0	92	118.4	60 00.2	92	117.6	60 55.0	91	116.8	61 49.6	91	115.9	62 43.8	90	115.0	64 04.4	89	113.5	3
4	56 30.7	93	119.0	57 26.4	93	118.3	58 49.5	92	117.2	59 44.5	92	116.5	60 39.3	91	115.6	61 33.7	90	114.8	62 27.8	90	113.8	63 48.2	89	112.3	4
45	56 15.3	93	117.8	57 10.9	92	117.2	58 33.8	92	116.1	59 28.8	91	115.3	60 23.4	91	114.5	61 17.7	90	113.6	62 11.7	90	112.7	63 31.9	89	111.2	45
6	55 59.7	93	116.7	56 55.2	92	116.0	58 18.0	92	114.9	59 12.8	91	114.1	60 07.4	91	113.3	61 01.6	90	112.4	61 55.5	89	111.5	63 15.5	88	110.0	6
7	55 44.0	93	115.5	56 39.4	92	114.8	58 02.0	91	113.7	58 56.7	91	113.0	59 51.2	90	112.1	60 45.3	90	111.3	61 30.1	89	110.3	62 59.0	88	108.9	7
8	55 28.1	92	114.4	56 23.4	92	113.7	57 45.9	91	112.6	58 40.5	91	111.8	59 34.9	90	111.0	60 28.9	90	110.1	61 22.6	89	109.2	62 42.3	88	107.7	8
9	55 12.0	92	113.3	56 07.2	92	112.6	57 29.6	91	111.5	58 24.2	91	110.7	59 18.4	90	109.9	60 12.4	90	109.0	61 05.9	89	108.1	62 25.5	88	106.6	9
50	54 55.8	92	112.2	55 51.0	92	111.5	57 13.2	91	110.4	58 07.7	91	109.6	59 01.9	90	108.8	59 55.7	89	107.9	60 49.2	89	107.0	62 08.7	88	105.5	50
1	54 39.5	92	111.0	55 34.6	92	110.4	56 56.7	91	109.2	57 51.1	90	108.5	58 45.2	90	107.6	59 39.0	89	106.8	60 32.4	89	105.9	61 51.7	88	104.4	1
2	54 23.1	92	109.9	55 18.1	91	109.3	56 40.1	91	108.1	57 34.4	90	107.4	58 28.4	90	106.5	59 22.1	89	105.7	60 15.5	89	104.8	61 34.7	88	103.3	2
3	54 06.6	92	108.9	55 01.5	91	108.2	56 23.4	91	107.1	57 17.6	90	106.3	58 11.6	90	105.5	59 05.2	89	104.6	59 58.5	88	103.7	61 17.6	87	102.2	3
4	53 49.9	92	107.8	54 44.8	91	107.1	56 06.6	91	106.0	57 00.7	90	105.2	57 54.6	90	104.4	58 48.2	89	103.5	59 41.4	88	102.6	61 00.4	87	101.2	4
55	53 33.1	92	106.7	54 27.9	91	106.0	55 49.6	90	104.9	56 43.8	90	104.1	57 37.6	89	103.3	58 31.1	89	102.5	59 24.2	88	101.6	60 43.2	87	100.1	55
6	53 16.3	91	105.6	54 11.0	91	104.9	55 32.7	90	103.8	56 26.7	90	103.1	57 20.5	89	102.3	58 13.9	89	101.4	59 07.0	88	100.5	60 25.9	87	99.1	6
7	52 59.4	91	104.6	53 54.0	91	103.9	55 15.6	90	102.8	56 09.6	90	102.0	57 03.3	89	101.2	57 56.7	89	100.4	58 49.7	88	99.5	60 08.5	87	98.0	7
8	52 42.3	91	103.5	53 37.0	91	102.8	54 58.4	90	01.7	55 52.4	90	101.0	56 46.1	89	100.2	57 39.4	89	99.3	58 32.4	88	98.4	59 51.1	87	97.0	8
9	52 25.3	91	102.5	53 19.8	91	101.8	54 41.2	90	100.7	55 35.2	90	99.9	56 28.8	89	99.1	57 22.1	89	98.3	58 15.0	88	97.4	59 33.7	87	96.0	9
60	52 08.1	91	101.4	53 02.6	91	100.8	54 24.0	90	99.7	55 17.9	90	98.9	56 11.4	89	98.1	57 04.7	88	97.3	57 57.6	88	96.4	59 16.3	87	95.0	60
1	51 50.9	91	100.4	52 45.4	91	99.7	54 06.7	90	98.7	55 00.5	90	97.9	55 54.1	89	97.1	56 47.3	88	96.3	57 40.2	88	95.4	58 58.8	87	94.0	1
2	51 33.6	91	99.4	52 28.1	91	98.7	53 49.3	90	97.6	54 43.1	89	96.9	55 36.6	89	96.1	56 29.8	88	95.3	57 22.7	88	94.4	58 41.3	87	93.0	2
3	51 16.3	91	98.4	52 10.7	91	97.7	53 31.9	90	96.6	54 25.7	89	95.9	55 19.2	89	95.1	56 12.3	88	94.3	57 05.2	88	93.4	58 23.7	87	92.0	3
4	50 58.9	91	97.4	51 53.3	90	96.7	53 14.4	90	95.6	54 08.2	89	94.9	55 01.7	89	94.1	55 54.8	88	93.3	56 47.7	88	92.4	58 06.2	87	91.1	4
65	50 41.5	91	96.4	51 35.8	90	95.7	52 57.0	90	94.6	53 50.7	89	93.9	54 44.2	89	93.1	55 37.3	88	92.3	56 30.1	88	91.5	57 48.7	87	90.1	65
6	50 24.0	91	95.4	51 18.4	90	94.7	52 39.5	90	93.7	53 33.2	89	92.9	54 26.7	89	92.1	55 19.8	88	91.3	56 12.6	88	90.5	57 31.1	87	89.2	6
7	50 06.5	91	94.4	51 00.9	90	93.7	52 22.0	90	92.7	53 15.7	89	92.0	54 09.1	89	91.2	55 02.3	88	90.4	55 55.1	88	89.5	57 13.6	87	88.2	7
8	49 49.0	91	93.4	50 43.4	90	92.8	52 04.4	90	91.7	52 58.1	89	91.0	53 51.6	89	90.2	54 44.7	88	89.4	55 37.5	88	88.6	56 56.0	87	87.3	8
9	49 31.5	91	92.5	50 25.8	90	91.8	51 46.9	90	90.8	52 40.6	89	90.0	53 34.0	89	89.3	54 27.2	88	88.5	55 20.0	88	87.6	56 38.5	87	86.3	9
70	49 14.0	91	91.5	50 08.3	90	90.8	51 29.3	90	89.8	52 23.1	89	89.1	53 16.5	89	88.3	54 09.6	88	87.5	55 02.5	88	86.7	56 21.0	87	85.4	70
1	48 56.4	91	90.5	49 50.8	90	89.9	51 11.8	90	88.8	52 05.5	89	88.1	52 59.0	89	87.4	53 52.1	88	86.6	54 45.0	88	85.8	56 03.6	87	84.5	1
2	48 38.9	91	89.6	49 33.2	90	88.9	50 54.3	90	87.9	51 48.0	89	87.2	52 41.4	89	86.4	53 34.6	88	85.7	54 27.5	88	84.9	55 46.1	87	83.6	2
3	48 21.4	91	88.6	49 15.7	90	88.0	50 36.7	90	87.0	51 30.5	89	86.2	52 24.0	89	85.5	53 17.1	88	84.7	54 10.0	88	83.9	55 28.7	87	82.7	3
4	48 03.8	91	87.7	48 58.2	90	87.0	50 19.2	90	86.0	51 13.0	89	85.3	52 06.5	89	84.6	52 59.7	88	83.8	53 52.6	88	83.0	55 11.3	87	81.8	4
75	47 46.3	91	86.7	48 40.6	90	86.1	50 01.7	90	85.1	50 55.5	89	84.4	51 49.0	89	83.7	52 42.3	88	82.9	53 35.2	88	82.1	54 54.0	87	80.9	75
6	47 28.8	91	85.8	48 23.2	90	85.2	49 44.3	90	84.2	50 38.1	89	83.5	51 31.6	89	82.8	52 24.9	88	82.0	53 17.8	88	81.2	54 36.7	87	80.0	6
7	47 11.3	91	84.9	48 05.7	90	84.2	49 26.8	90	83.2	50 20.7	89	82.6	51 14.2	89	81.8	52 07.5	88	81.1	53 00.5	88	80.3	54 19.4	87	79.1	7
8	46 53.9	91	83.9	47 48.3	90	83.3	49 09.4	90	82.3	50 03.3	89	81.7	50 56.9	89	80.9	51 50.2	89	80.2	52 43.2	88	79.4	54 02.2	87	78.2	8
9	46 36.4	91	83.0	47 30.8	91	82.4	48 52.1	90	81.4	49 45.9	90	80.8	50 39.6	89	80.1	51 32.9	89	79.3	52 26.0	88	78.6	53 45.1	87	77.4	9
80	46 19.0	91	82.1	47 13.5	91	81.5	48 34.8	90	80.5	49 28.7	90	79.9	50 22.3	89	79.2	51 15.7	89	78.4	52 08.9	88	77.7	53 28.0	88	76.5	80
1	46 01.7	91	81.2	46 56.2	91	80.6	48 17.5	90	79.6	49 11.4	90	79.0	50 05.1	89	78.3	50 58.6	89	77.6	51 51.7	88	76.8	53 11.0	88	75.6	1
2	45 44.4	91	80.3	46 38.9	91	79.7	48 00.2	90	78.7	48 54.2	90	78.1	49 48.0	89	77.4	50 41.5	89	76.7	51 34.7	88	75.9	52 54.0	88	74.8	2
3	45 27.1	91	79.4	46 21.6	91	78.8	47 43.1	90	77.8	48 37.1	90	77.2	49 30.9	89	76.5	50 24.4	89	75.8	51 17.7	89	75.1	52 37.1	88	73.9	3
4	45 09.9	91	78.5	46 04.5	91	77.9	47 25.9	90	77.0	48 20.0	90	76.3	49 13.9	90	75.6	50 07.5	89	74.9	51 00.8	89	74.2	52 20.3	88	73.1	4
85	44 52.7	91	77.6	45 47.3	91	77.0	47 08.9	90	76.1	48 03.0	90	75.4	48 56.9	90	74.8	49 50.6	89	74.1	50 44.0	89	73.4	52 03.5	88	72.2	85
6	44 35.6	91	76.7	45 30.3	91	76.1	46 51.9	90	75.2	47 46.1	90	74.6	48 40.0	90	73.9	49 33.7	89	73.2	50 27.2	89	72.5	51 46.9	88	71.4	6
7	44 18.6	91	75.8	45 13.3	91	75.2	46 35.0	91	74.3	47 29.2	90	73.7	48 23.2	90	73.0	49 17.0	89	72.4	50 10.5	89	71.7	51 30.3	88	70.6	7
8	44 01.6	91	74.9	44 56.4	91	74.3	46 18.1	91	73.4	47 12.4	90	72.8	48 06.4	90	72.2	49 00.3	90	71.5	49 53.9	89	70.8	51 13.8	88	69.7	8
9	43 44.7	91	74.0	44 39.5	91	73.5	46 01.3	91	72.6	46 55.7	90	72.0	47 49.8	90	71.3	48 43.7	90	70.7	49 37.4	89	70.0	50 57.4	89	68.9	9
90	43 27.9	92	73.2	44 22.7	91	72.6	45 44.6	91	71.7	46 39.0	90	71.1	47 33.2	90	70.5	48 27.2	90	69.8	49 20.9	89	69.1	50 41.1	89	68.1	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.	
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.		
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°	
91	43 11.1	92 28	72.3	44 06.0	91 28	71.7	45 28.0	91 28	70.9	46 22.5	91 27	70.2	47 16.7	90 27	69.6	48 10.8	90 27	69.0	49 04.6	89 27	68.3	50 24.8	89 27	67.3	91	Lat. 73°
2	42 54.5	92 28	71.4	43 49.4	91 28	70.9	45 11.5	91 27	70.0	46 06.0	91 27	69.4	47 00.3	90 27	68.8	47 54.4	90 27	68.1	48 48.3	90 27	67.5	50 08.7	89 27	66.4	2	
3	42 37.9	92 28	70.5	43 32.9	92 27	70.0	44 55.1	91 27	69.1	45 49.6	91 27	68.6	46 44.0	90 27	67.9	47 38.2	90 27	67.3	48 32.2	90 27	66.7	49 52.7	89 27	65.6	3	
4	42 21.4	92 27	69.7	43 16.4	92 27	69.1	44 38.7	91 27	68.3	45 33.4	91 27	67.7	46 27.8	91 27	67.1	47 22.1	90 27	66.5	48 16.1	90 27	65.8	49 36.7	89 26	64.8	4	
95	42 05.0	92 27	68.8	43 00.1	92 27	68.3	44 22.5	91 27	67.4	45 17.2	91 27	66.9	46 11.7	91 27	66.3	47 06.0	90 27	65.6	48 00.2	90 26	65.0	49 20.9	89 26	64.0	95	
6	41 48.7	92 27	68.0	42 43.8	92 27	67.4	44 06.3	91 27	66.6	45 01.1	91 27	66.0	45 55.7	91 26	65.4	46 50.1	91 26	64.8	47 44.3	90 26	64.2	49 05.2	90 26	63.2	6	
7	41 32.5	92 27	67.1	42 27.7	92 27	66.6	43 50.3	92 27	65.8	44 45.1	91 26	65.2	45 39.8	91 26	64.6	46 34.3	91 26	64.0	47 28.6	90 26	63.4	48 49.6	90 26	62.4	7	
8	41 16.4	92 27	66.2	42 11.7	92 27	65.7	43 34.3	92 26	64.9	44 29.2	91 26	64.4	45 24.0	91 26	63.8	46 18.6	91 26	63.2	47 12.9	90 26	62.6	48 34.1	90 26	61.6	8	
9	41 00.4	92 26	65.4	41 55.7	92 26	64.9	43 18.5	92 26	64.1	44 13.5	92 26	63.5	45 08.3	91 26	63.0	46 03.0	91 26	62.4	46 57.4	91 26	61.8	48 18.8	90 25	60.8	9	
100	40 44.5	92 26	64.5	41 39.9	92 26	64.0	43 02.8	92 26	63.2	43 57.8	92 26	62.7	44 52.8	91 26	62.1	45 47.5	91 26	61.5	46 42.0	91 25	60.9	48 03.5	90 25	60.0	100	
1	40 28.7	93 26	63.7	41 24.2	92 26	63.2	42 47.2	92 26	62.4	43 42.3	92 26	61.9	44 37.3	92 26	61.3	45 32.1	91 25	60.7	46 26.8	91 25	60.1	47 48.4	90 25	59.2	1	
2	40 13.0	93 26	62.9	41 08.6	93 26	62.4	42 31.7	92 26	61.6	43 26.9	92 25	61.0	44 22.0	92 25	60.5	45 16.9	91 25	59.9	46 11.6	91 25	59.3	47 33.4	91 25	58.4	2	
3	39 57.5	93 26	62.0	40 53.1	93 26	61.5	42 16.3	92 25	60.8	43 11.6	92 25	60.2	44 06.8	92 25	59.7	45 01.8	92 25	59.1	45 56.6	91 25	58.5	47 18.5	91 25	57.6	3	
4	39 42.0	93 26	61.2	40 37.7	93 25	60.7	42 01.1	92 25	59.9	42 56.5	92 25	59.4	43 51.7	92 25	58.9	44 46.8	92 25	58.3	45 41.7	91 25	57.7	47 03.7	91 24	56.8	4	
105	39 26.7	93 25	60.3	40 22.5	93 25	59.9	41 46.0	93 25	59.1	42 41.4	92 25	58.6	43 36.7	92 25	58.1	44 31.9	92 25	57.5	45 26.9	92 24	56.9	46 49.1	91 24	56.1	105	
6	39 11.5	93 25	59.5	40 07.4	93 25	59.0	41 31.0	93 25	58.3	42 26.5	92 25	57.8	43 21.9	92 24	57.3	44 17.2	92 24	56.7	45 12.3	92 24	56.2	46 34.6	91 24	55.3	6	
7	38 56.5	93 25	58.7	39 52.4	93 25	58.2	41 16.1	93 25	57.5	42 11.7	93 24	57.0	43 07.2	92 24	56.4	44 02.6	92 24	55.9	44 57.8	92 24	55.4	46 20.3	91 24	54.5	7	
8	38 41.6	93 25	57.8	39 37.6	93 24	57.4	41 01.4	93 24	56.6	41 57.1	93 24	56.2	42 52.7	93 24	55.6	43 48.1	92 24	55.1	44 43.4	92 24	54.6	46 06.1	92 23	53.7	8	
9	38 26.8	94 24	57.0	39 22.9	93 24	56.5	40 46.8	93 24	55.8	41 42.6	93 24	55.3	42 38.3	93 24	54.8	43 33.8	92 24	54.3	44 29.2	92 23	53.8	45 52.0	92 23	53.0	9	
110	38 12.2	94 24	56.2	39 08.3	94 24	55.7	40 32.4	93 24	55.0	41 28.2	93 24	54.5	42 24.0	93 24	54.0	43 19.6	93 23	53.5	44 15.1	92 23	53.0	45 38.1	92 23	52.2	110	
1	37 57.7	94 24	55.3	38 53.9	94 24	54.9	40 18.1	93 24	54.2	41 14.0	93 23	53.7	42 09.9	93 23	53.2	43 05.6	93 23	52.7	44 01.2	93 23	52.2	45 24.3	92 23	51.4	1	
2	37 43.3	94 24	54.5	38 39.6	94 24	54.1	40 03.9	94 23	53.4	41 00.0	93 23	52.9	41 55.9	93 23	52.4	42 51.7	93 23	51.9	43 47.4	93 23	51.4	45 10.6	92 22	50.6	2	
3	37 29.1	94 23	53.7	38 25.5	94 23	53.3	39 49.9	94 23	52.6	40 46.0	93 23	52.1	41 42.1	93 23	51.6	42 38.0	93 23	51.2	43 33.7	93 22	50.7	44 57.1	92 22	49.9	3	
4	37 15.0	94 23	52.9	38 11.5	94 23	52.4	39 36.0	94 23	51.8	40 32.3	94 23	51.3	41 28.4	93 23	50.9	42 24.4	93 22	50.4	43 20.3	93 22	49.9	44 43.8	93 22	49.1	4	
115	37 01.1	94 23	52.0	37 57.7	94 23	51.6	39 22.3	94 23	51.0	40 18.6	94 22	50.5	41 14.9	94 22	50.1	42 10.9	93 22	49.6	43 06.9	93 22	49.1	44 30.6	93 22	48.3	115	
6	36 47.4	94 23	51.2	37 44.0	94 23	50.8	39 08.8	94 22	50.2	40 05.2	94 22	49.7	41 01.5	94 22	49.3	41 57.7	94 22	48.8	42 53.7	93 22	48.3	44 17.6	93 21	47.6	6	
7	36 33.8	95 22	50.4	37 30.5	94 22	50.0	38 55.4	94 22	49.4	39 51.9	94 22	48.9	40 48.3	94 22	48.5	41 44.5	94 22	48.0	42 40.7	94 21	47.5	44 04.7	93 21	46.8	7	
8	36 20.3	95 22	49.6	37 17.1	95 22	49.2	38 42.2	94 22	48.6	39 38.7	94 22	48.1	40 35.2	94 22	47.7	41 31.6	94 21	47.2	42 27.9	94 21	46.8	43 52.0	93 21	46.0	8	
9	36 07.1	95 22	48.8	37 03.9	95 22	48.4	38 29.1	95 22	47.8	39 25.8	94 21	47.3	40 22.3	94 21	46.9	41 18.8	94 21	46.5	42 15.1	94 21	46.0	43 39.5	94 21	45.3	9	
120	35 53.9	95 22	48.0	36 50.9	95 21	47.6	38 16.2	95 21	47.0	39 12.9	95 21	46.5	40 09.6	94 21	46.1	41 06.2	94 21	45.7	42 02.6	94 21	45.2	43 27.1	94 20	44.5	120	
1	35 41.0	95 21	47.1	36 38.0	95 21	46.8	38 03.4	95 21	46.2	39 00.3	95 21	45.8	39 57.0	95 21	45.3	40 53.7	94 20	44.9	41 50.2	94 20	44.5	43 14.9	94 20	43.8	1	
2	35 28.2	95 21	46.3	36 25.3	95 21	46.0	37 50.9	95 21	45.4	38 47.8	95 21	45.0	39 44.6	95 20	44.6	40 41.4	95 20	44.1	41 38.0	94 20	43.7	43 02.8	94 20	43.0	2	
3	35 15.6	95 21	45.5	36 12.8	95 21	45.1	37 38.5	95 20	44.6	38 35.5	95 20	44.2	39 32.4	95 20	43.8	40 29.3	95 20	43.4	41 26.0	95 20	42.9	42 50.9	94 20	42.3	3	
4	35 03.2	96 20	44.7	36 00.5	95 20	44.3	37 26.3	95 20	43.8	38 23.4	95 20	43.4	39 20.4	95 20	43.0	40 17.3	95 20	42.6	41 14.1	95 19	42.2	42 39.2	94 19	41.5	4	
125	34 50.9	96 20	43.9	35 48.3	96 20	43.5	37 14.2	95 20	43.0	38 11.4	95 20	42.6	39 08.5	95 20	42.2	40 05.5	95 19	41.8	41 02.5	95 19	41.4	42 27.7	95 19	40.7	125	
6	34 38.9	96 20	43.1	35 36.3	96 20	42.7	37 02.3	96 19	42.2	37 59.6	95 19	41.8	38 56.8	95 19	41.4	39 53.9	95 19	41.0	40 51.0	95 19	40.6	42 16.3	95 19	40.0	6	
7	34 27.0	96 20	42.3	35 24.5	96 19	41.9	36 50.6	96 19	41.4	37 48.0	96 19	41.0	38 45.3	95 19	40.6	39 42.5	95 19	40.3	40 39.6	95 19	39.9	42 05.2	95 18	39.2	7	
8	34 15.3	96 19	41.5	35 12.9	96 19	41.1	36 39.1	96 19	40.6	37 36.6	96 19	40.2	38 33.9	96 19	39.9	39 31.2	95 18	39.5	40 28.5	95 18	39.1	41 54.1	95 18	38.5	8	
9	34 03.7	96 19	40.7	35 01.4	96 19	40.3	36 27.8	96 19	39.8	37 25.3	96 18	39.5	38 22.8	96 18	39.1	39 20.2	96 18	38.7	40 17.5	95 18	38.3	41 43.3	95 18	37.7	9	
130	33 52.4	96 19	39.9	34 50.2	96 18	39.5	36 16.7	96 18	39.0	37 14.3	96 18	38.7	38 11.8	96 18	38.3	39 09.3	96 18	37.9	40 06.7	96 18	37.6	41 32.7	95 17	37.0	130	
1	33 41.3	96 18	39.1	34 39.1	96 18	38.7	36 05.7	96 18	38.2	37 03.4	96 18	37.9	38 01.0	96 18	37.5	38 58.6	96 18	37.2	39 56.1	96 17	36.8	41 22.2	96 17	36.2	1	Lat. 74°
2	33 30.3	97 18	38.3	34 28.2	96 18	37.9	35 55.0	96 18	37.4	36 52.7	96 17	37.1	37 50.4	96 17	36.8	38 48.1	96 17	36.4	39 45.7	96 17	36.1	41 11.9	96 17	35.5	2	
3	33 19.5	97 18	37.4	34 17.5	97 18	37.1	35 44.4	96 17	36.7	36 42.2	96 17	36.3	37 40.0	96 17	36.0	38 37.8	96 17	35.6	39 35.5	96 17	35.3	41 01.8	96 16	34.7	3	
4	33 09.0	97 17	36.6	34 07.0	97 17	36.3	35 34.0	97 17	35.9	36 31.9	97 17	35.6	37 29.8	96 17	35.2	38 27.7	96 17	34.9	39 25.4	96 16	34.5	40 51.9	96 16	34.0	4	
135	32 58.6	97 17	35.8	33 56.7	97 17	35.5	35 23.8	97 17	35.1	36 21.8	97 17	34.8	37 19.8	97 16	34.4	38 17.7	96 16	34.1	39 15.6	96 16	33.8	40 42.2	96 16	33.2	135	
6	32 48.4	97 17	35.0	33 46.6	97 16	34.7	35 13.8	97 16	34.3	36 11.9	97 16	34.0	37 10.0	97 16	33.7	38 08.0	97 16	33.4	39 05.9	97 16	33.0	40 32.7	96 16	32.5	6	
7	32 38.5	97 16	34.2	33 36.7	97 16	34.0	35 04.1	97 16	33.5	36 02.2	97 16	33.2	37 00.4	97 16	32.9	37 58.4	97 16	32.6	38 56.5	97 15	32.3	40 23.4	97 15	31.8	7	
8	32 28.7	97 16	33.4	33 27.0	97 16	33.2	34 54.5	97 16	32.7	35 52.7	97 16	32.4	36 50.9	97 15	32.1	37 49.1	97 15	31.8	38 47.2	97 15	31.5	40 14.2	97 15	31.0	8	
9	32 19.1	97 16	32.6	33 17.5	97 15	32.4	34 45.1	97 15	31.9	35 43.4	97 15	31.7	36 41.7	97 15	31.4	37 39.9	97 15	31.1	38 38.1	97 15	30.7	40 05.3	97 15	30.3	9	
140	32 09.8	98 15	31.8	33 08.2	97 15	31.6	34 35.9	97 15	31.2	35 34.3	97 15	30.9	36 32.7	97 15	30.6	37 31.0	97 15	30.3	38 29.2	97 14	30.0	39 56.6	97 14	29.5	140	Lat. 75°
1	32 00.6	98 15	31.0	32 59.2	98 15	30.8	34 26.9	97 15	30.4	35 25.4	97 14	30.1	36 23.8	97 14	29.8	37 22.2	97 14	29.5	38 20.6	97 14	29.2	39 48.0	97 14	28.8	1	
2	31 51.7	98 15	30.2	32 50.3	98 14	30.0	34 18.2	98 14	29.6	35 16.7	98 14	29.3	36 15.2	97 14	29.1	37 13.7	97 14	28.8	38 12.1	97 14	28.5	39 39.7	97 14	28.0	2	
3	31 42.9	98 14	29.4	32 41.6	98 14	29.2	34 09.6	98 14	28.8	35 08.2	98 14	28.6	36 06.8	98 14	28.3	37 05.3	98 14	28.0	38 03.8	97 13	27.7	39 31.5	97 13	27.3	3	
4	31 34.4	98 14	28.6	32 33.2	98 14	28.4	34 01.3	98 14	28.0	34 59.9	98 13	27.8	35 58.6	98 13	27.5	36 57.2	98 13	27.3	37 55.8	98 13	27.0	39 23.6	97 13	26.6	4	
145	31 26.1	98 13	27.8	32 25.0	98 13	27.6	33 53.1	98 13	27.2	34 51.9	98 13	27.0	35 50.6	98 13	26.7	36 49.3	98 13	26.5	37 47.9	98 13	26.2	39 15.8	98 13	25.8	145	
6	31 18.1	98 13	27.0	32 16.9	98 13	26.8	33 45.2	98 13	26.5	34 44.0	98 13	26.2	35 42.8	98 13	26.0	36 41.6	98 13	25.7	37 40.3	98 12	25.5	39 08.3	98 12	25.1	6	
7	31 10.2	98 13	26.2	32 09.1	98 13	26.0	33 37.5	98 12	25.7	34 36.4	98 12	25.5	35 35.2	98 12	25.2	36 34.0	98 12	25.0	37 32.8	98 12	24.7	39 01.0	98 12	24.3	7	
8	31 02.5	98 12	25.4	32 01.5	98 12	25.2	33 30.0	98 12	24.9	34 28.9	98 12	24.7	35 27.9	98 12	24.4	36 26.7	98 12	24.2	37 25.6	98 12	24.0	38 53.8	98 12	23.6	8	
9	30 55.1	98 12	24.6	31 54.2	98 12	24.4	33 22.7	98 12	24.1	34 21.7	98 12	23.9	35 20.7	98 12	23.7	36 19.7	98 11	23.5	37 18.6	98 11	23.2	38 46.9	98 11	22.9	9	Lat. 76°
150	30 47.9	99 12	23.9	31 47.0	99 12	23.7	33 15.7	98 11	23.3	34 14.7	98 11	23.1	35 13.8	98 11	22.9	36 12.8	98 11	22.7	37 11.8	98 11	22.5	38 40.2	98 11	22.1	150	
1	30 40.9	99 11	23.1	31 40.1	99 11	22.9	33 08.8	99 11	22.6	34 07.9	99 11	22.4	35 07.0	98 11	22.1	36 06.1	98 11	21.9	37 05.2	98 11	21.7	38 33.7	98 10	21.4	1	
2	30 34.2	99 11	22.3	31 33.4	99 11	22.1	33 02.2	99 11	21.8	34 01.4	99 11	21.6	35 00.5	99 10	21.4	35 59.7	99 10	21.2	36 58.8	99 10	21.0	38 27.4	98 10	20.6	2	
3	30 27.6	99 10	21.5	31 26.9	99 10	21.3	32 55.8	99 10	21.0	33 55.0	99 10	20.8	34 54.3	99 10	20.6	35 53.5	99 10	20.4	36 52.6	99 10	20.2	38 21.4	99 10	19.9	3	
4	30 21.3	99 10	20.7	31 20.7	99 10	20.5	32 49.6	99 10	20.2	33 48.9	99 10	20.0	34 48.2	99 10	19.9	35 47.4	99 10	19.7	36 46.7	99 10	19.5	38 15.5	99 09	19.2	4	
155	30 15.3	99 10	19.9	31 14.6	99 10	19.7	32 43.7	99 10	19.4	33 43.0	99 09	19.3	34 42.3	99 09	19.1	35 41.7	99 09	18.9	36 40.9	99 09	18.7	38 09.8	99 09	18.4	155	
6	30 09.4	99 09	19.1	31 08.8	99 09	18.9	32 37.9	99 09	18.7	33 37.3	99 09	18.5	34 36.7	99 09	18.3	35 36.1	99 09	18.1	36 35.4	99 09	18.0	38 04.4	99 09	17.7	6	
7	30 03.8	99 09	18.3	31 03.3	99 09	18.1	32 32.4	99 09	17.9	33 31.9	99 09	17.7	34 31.3	99 09	17.6	35 30.7	99 09	17.4	36 30.1	99 08	17.2	37 59.2	99 08	16.9	7	
8	29 58.4	99 09	17.5	30 57.9	99 09	17.3	32 27.2	99 08	17.1	33 26.7	99 08	17.0	34 26.1	99 08	16.8	35 25.6	99 08	16.6	36 25.0	99 08	16.5	37 54.2	99 08	16.2	8	Lat. 77°
9	29 53.3	99 08	16.7	30 52.8	99 08	16.5	32 22.1	99 08	16.3	33 21.7	99 08	16.2	34 21.2	99 08	16.0	35 20.7	99 08	15.9	36 20.2	99 08	15.7	37 49.4	99 08	15.5	9	
160	29 48.3	99 08	15.9	30 47.9	99 08	15.8	32 17.3	99 08	15.6	33 16.9	99 08	15.4	34 16.4	99 08	15.3	35 16.0	99 07	15.1	36 15.5	99 07	15.0	37 44.8	99 07	14.7	160	
1	29 43.6	99 07	15.1	30 43.3	99 07	15.0	32 12.7	99 07	14.8	33 12.3	99 07	14.6	34 11.9	99 07	14.5	35 11.5	99 07	14.4	36 11.1	99 07	14.2	37 40.5	99 07	14.0	1	
2	29 39.2	99 07	14.3	30 38.9	99 07	14.2	32 08.4	99 07	14.0	33 08.0	99 07	13.9	34 07.7	99 07	13.7	35 07.3	99 07	13.6	36 06.9	99 07	13.5	37 36.4	99 07	13.3	2	
3	29 35.0	1.0 07	13.5	30 34.7	1.0 07	13.4	32 04.2	99 06	13.2	33 03.9	99 06	13.1	34 03.6	99 06	13.0	35 03.3	99 06	12.8	36 03.0	99 06	12.7	37 32.4	99 06	12.5	3	
4	29 31.0	1.0 06	12.7	30 30.7	1.0 06	12.6	32 00.3	1.0 06	12.4	33 00.1	1.0 06	12.3	33 59.8	1.0 06	12.2	34 59.5	1.0 06	12.1	35 59.2	1.0 06	12.0	37 28.7	99 06	11.8	4	
165	29 27.3	1.0 06	11.9	30 27.0	1.0 06	11.8	31 56.7	1.0 06	11.7	32 56.4	1.0 06	11.6	33 56.2	1.0 06	11.4	34 55.9	1.0 06	11.3	35 55.7	1.0 06	11.2	37 25.3	1.0 05	11.0	165	
6	29 23.8	1.0 05	11.1	30 23.6	1.0 05	11.0	31 53.3	1.0 05	10.9	32 53.0	1.0 05	10.8	33 52.8	1.0 05	10.7	34 52.6	1.0 05	10.6	35 52.4	1.0 05	10.5	37 22.0	1.0 05	10.3	6	
7	29 20.5	1.0 05	10.3	30 20.3	1.0 05	10.2	31 50.1	1.0 05	10.1	32 49.9	1.0 05	10.0	33 49.7	1.0 05	09.9	34 49.5	1.0 05	09.8	35 49.3	1.0 05	09.7	37 19.0	1.0 05	09.6	7	Lat. 78°
8	29 17.5	1.0 05	09.5	30 17.3	1.0 05	09.5	31 47.1	1.0 05	09.3	32 46.9	1.0 04	09.2	33 46.8	1.0 04	09.2	34 46.6	1.0 04	09.1	35 46.5	1.0 04	09.0	37 16.2	1.0 04	08.8	8	
9	29 14.7	1.0 04	08.7	30 14.6	1.0 04	08.7	31 44.4	1.0 04	08.6	32 44.2	1.0 04	08.5	33 44.1	1.0 04	08.4	34 44.0	1.0 04	08.3	35 43.8	1.0 04	08.2	37 13.6	1.0 04	08.1	9	
170	29 12.1	1.0 04	07.9	30 12.0	1.0 04	07.9	31 41.9	1.0 04	07.8	32 41.8	1.0 04	07.7	33 41.7	1.0 04	07.6	34 41.5	1.0 04	07.6	35 41.4	1.0 04	07.5	37 11.3	1.0 04	07.4	170	
1	29 09.8	1.0 03	07.1	30 09.8	1.0 03	07.1	31 39.6	1.0 03	07.0	32 39.5	1.0 03	06.9	33 39.4	1.0 03	06.9	34 39.4	1.0 03	06.8	35 39.3	1.0 03	06.7	37 09.1	1.0 03	06.6	1	
2	29 07.8	1.0 03	06.4	30 07.7	1.0 03	06.3	31 37.6	1.0 03	06.2	32 37.5	1.0 03	06.2	33 37.5	1.0 03	06.1	34 37.4	1.0 03	06.0	35 37.3	1.0 03	06.0	37 07.2	1.0 03	05.9	2	
3	29 06.0	1.0 03	05.6	30 05.9	1.0 03	05.5	31 35.8	1.0 03	05.4	32 35.8	1.0 03	05.4	33 35.7	1.0 03	05.3	34 35.7	1.0 02	05.3	35 35.6	1.0 02	05.2	37 05.5	1.0 02	05.2	3	
4	29 04.4	1.0 02	04.8	30 04.3	1.0 02	04.7	31 34.3	1.0 02	04.7	32 34.2	1.0 02	04.6	33 34.2	1.0 02	04.6	34 34.2	1.0 02	04.5	35 34.1	1.0 02	04.5	37 04.1	1.0 02	04.4	4	
175	29 03.0	1.0 02	04.0	30 03.0	1.0 02	03.9	31 33.0	1.0 02	03.9	32 32.9	1.0 02	03.9	33 32.9	1.0 02	03.8	34 32.9	1.0 02	03.8	35 32.9	1.0 02	03.7	37 02.8	1.0 02	03.7	175	
6	29 01.9	1.0 01	03.2	30 01.9	1.0 01	03.2	31 31.9	1.0 01	03.1	32 31.9	1.0 01	03.1	33 31.9	1.0 01	03.1	34 31.8	1.0 01	03.0	35 31.8	1.0 01	03.0	37 01.8	1.0 01	02.9	6	Lat. 79°
7	29 01.1	1.0 01	02.4	30 01.1	1.0 01	02.4	31 31.1	1.0 01	02.3	32 31.1	1.0 01	02.3	33 31.1	1.0 01	02.3	34 31.0	1.0 01	02.3	35 31.0	1.0 01	02.2	37 01.0	1.0 01	02.2	7	
8	29 00.5	1.0 01	01.6	30 00.5	1.0 01	01.6	31 30.5	1.0 01	01.6	32 30.5	1.0 01	01.5	33 30.5	1.0 01	01.5	34 30.5	1.0 01	01.5	35 30.5	1.0 01	01.5	37 00.4	1.0 01	01.5	8	
9	29 00.1	1.0 00	00.8	30 00.1	1.0 00	00.8	31 30.1	1.0 00	00.8	32 30.1	1.0 00	00.8	33 30.1	1.0 00	00.8	34 30.1	1.0 00	00.8	35 30.1	1.0 00	00.7	37 00.1	1.0 00	00.7	9	
180	29 00.0	1.0 00	00.0	30 00.0	1.0 00	00.0	31 30.0	1.0 00	00.0	32 30.0	1.0 00	00.0	33 30.0	1.0 00	00.0	34 30.0	1.0 00	00.0	35 30.0	1.0 00	00.0	37 00.0	1.0 00	00.0	180	

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	71 30.0	1.0	00	180.0	72 00.0	1.0	00	180.0	73 00.0	1.0	00	180.0	73 30.0	1.0	00	180.0
1	71 29.7	1.0	01	178.2	71 59.7	1.0	01	178.1	72 59.7	1.0	01	178.1	73 29.7	1.0	01	178.1
2	71 28.9	1.0	02	176.3	71 58.9	1.0	02	176.3	72 58.8	1.0	02	176.2	73 28.8	1.0	02	176.1
3	71 27.5	1.0	03	174.5	71 57.4	1.0	03	174.4	72 57.4	1.0	03	174.3	73 27.3	1.0	03	174.2
4	71 25.5	1.0	04	172.7	71 55.5	1.0	04	172.6	72 55.3	1.0	04	172.4	73 25.3	1.0	04	172.2
05	71 23.0	1.0	05	170.9	71 52.9	1.0	05	170.7	72 52.7	1.0	05	170.5	73 22.6	1.0	05	170.3
6	71 20.0	1.0	06	169.1	71 49.8	1.0	06	168.9	72 49.5	99	06	168.6	73 19.4	99	06	168.4
7	71 16.4	99	07	167.3	71 46.2	99	07	167.1	72 45.8	99	07	166.7	73 15.5	99	07	166.5
8	71 12.2	99	08	165.5	71 42.0	99	08	165.3	72 41.5	99	08	164.8	73 11.2	99	08	164.6
9	71 07.6	99	09	163.7	71 37.3	99	09	163.5	72 36.6	99	09	163.0	73 06.2	99	09	162.7
10	71 02.4	99	10	161.9	71 32.0	99	10	161.7	72 31.2	99	10	161 1	73 00.7	98	10	160.8
1	70 56.7	99	10	160.2	71 26.2	98	10	159.9	72 25.3	98	11	159.3	72 54.7	98	11	159.0
2	70 50.5	98	11	158.4	71 20.0	98	11	158.1	72 18.8	98	12	157.5	72 48.2	98	12	157.2
3	70 43.8	98	12	156.7	71 13.2	98	12	156.4	72 11.8	98	12	155.7	72 41.1	98	13	155.3
4	70 36.6	98	13	155.0	71 05.9	98	13	154.6	72 04.4	97	13	153.9	72 33.5	97	13	153.5
15	70 28.9	97	14	153.3	70 58.1	97	14	152.9	71 56.4	97	14	152.2	72 25.5	97	14	151.8
6	70 20.8	97	14	151.6	70 49.9	97	14	151.2	71 48.0	97	15	150.4	72 16.9	96	15	150.0
7	70 12.2	97	15	149.9	70 41.3	97	15	149.5	71 39.1	96	16	148.7	72 08.0	96	16	148.3
8	70 03.2	96	16	148.3	70 32.1	96	16	147.9	71 29.8	96	16	147.0	71 58.5	96	16	146.6
9	69 53.8	96	16	146.6	70 22.6	96	17	146.2	71 20.0	95	17	145.3	71 48.6	95	17	144.9
20	69 43.9	96	17	145.0	70 12.6	96	17	144.6	71 09.8	95	18	143.7	71 38.3	95	18	143.2
1	69 33.7	95	18	143.4	70 02.3	95	18	143.0	70 59.2	95	18	142.0	71 27.6	94	19	141.5
2	69 23.0	95	18	141.8	69 51.5	95	19	141.4	70 48.2	94	19	140.4	71 16.5	94	19	139.9
3	69 12.0	95	19	140.3	69 40.4	94	19	139.8	70 36.9	94	20	138.8	71 05.0	94	20	138.3
4	69 00.6	94	20	138.7	69 28.9	94	20	138.3	70 25.2	93	20	137.3	70 53.2	93	20	136.7
25	68 48.9	94	20	137.2	69 17.0	94	20	136.7	70 13.1	93	21	135.7	70 41.0	93	21	135.2
6	68 36.8	94	21	135.7	69 04.8	93	21	135.2	70 00.7	93	21	134.2	70 28.4	92	21	133.6
7	68 24.4	93	21	134.2	68 52.3	93	21	133.7	69 47.9	92	22	132.7	70 15.6	92	22	132.1
8	68 11.7	93	22	132.8	68 39.5	93	22	132.3	69 34.9	92	22	131.2	70 02.4	92	22	130.6
9	67 58.6	93	22	131.3	68 26.4	92	22	130.8	69 21.5	92	23	129.7	69 48.9	91	23	129.1
30	67 45.3	92	23	129.9	68 13.0	92	23	129.4	69 07.9	91	23	128.3	69 35.2	91	23	127.7
1	67 31.7	92	23	128.5	67 59.3	92	23	128.0	68 54.0	91	24	126.9	69 21.2	90	24	126.3
2	67 17.9	92	24	127.1	67 45.3	91	24	126.6	68 39.8	90	24	125.5	69 06.9	90	24	124.9
3	67 03.8	91	24	125.8	67 31.1	91	24	125.2	68 25.4	90	24	124.1	68 52.4	90	25	123.5
4	66 49.4	91	24	124.4	67 16.7	91	24	123.9	68 10.8	90	25	122.7	68 37.7	89	25	122.1
35	66 34.8	91	25	123.1	67 02.0	90	25	122.5	67 55.9	89	25	121.4	68 22.7	89	25	120.8
6	66 20.0	90	25	121.8	66 47.1	90	25	121.2	67 40.8	89	25	120.1	68 07.5	89	26	119.5
7	66 05.0	90	25	120.5	66 32.0	90	26	119.9	67 25.5	89	26	118.8	67 52.1	88	26	118.1
8	65 49.8	90	26	119.2	66 16.7	89	26	118.6	67 10.1	89	26	117.5	67 36.6	88	26	116.9
9	65 34.4	90	26	117.9	66 01.2	89	26	117.4	66 54.4	88	26	116.2	67 20.8	88	26	115.6
40	65 18.8	89	26	116.7	65 45.5	89	26	116.1	66 38.6	88	27	115.0	67 04.9	88	27	114.3
1	65 03.0	89	27	115.4	65 29.7	89	27	114.9	66 22.6	88	27	113.7	66 48.9	87	27	113.1
2	64 47.1	89	27	114.2	65 13.7	88	27	113.7	66 06.5	88	27	112.5	66 32.7	87	27	111.9
3	64 31.0	89	27	113.0	64 57.5	88	27	112.5	65 50.2	87	27	111.3	66 16.3	87	27	110.7
4	64 14.8	88	27	111.8	64 41.3	88	27	111.3	65 33.8	87	28	110.1	65 59.9	87	28	109.5
45	63 58.4	88	27	110.6	64 24.8	88	28	110.1	65 17.3	87	28	108.9	65 43.3	86	28	108.3
6	63 42.0	88	28	109.5	64 08.3	88	28	108.9	65 00.6	87	28	107.8	65 26.6	86	28	107.2
7	63 25.4	88	28	108.3	63 51.7	87	28	107.8	64 43.9	87	28	106.7	65 09.8	86	28	106.1
8	63 08.7	88	28	107.2	63 34.9	87	28	106.7	64 27.0	86	28	105.5	64 52.9	86	28	104.9
9	62 51.9	88	28	106.1	63 18.1	87	28	105.5	64 10.1	86	28	104.4	64 35.9	86	28	103.8
50	62 35.0	87	28	105.0	63 01.1	87	28	104.4	63 53.0	86	29	103.3	64 18.8	86	29	102.7
1	62 18.0	87	28	103.9	62 44.1	87	29	103.3	63 35.9	86	29	102.2	64 01.6	85	29	101.6
2	62 00.9	87	29	102.8	62 27.0	87	29	102.3	63 18.7	86	29	101.1	63 44.4	85	29	100.6
3	61 43.8	87	29	101.7	62 09.8	87	29	101.2	63 01.5	86	29	100.1	63 27.2	85	29	99.5
4	61 26.5	87	29	100.7	61 52.6	86	29	100.1	62 44.2	86	29	99.0	63 09.8	85	29	98.5
55	61 09.3	87	29	99.6	61 35.3	86	29	99.1	62 26.9	86	29	98.0	62 52.4	85	29	97.4
6	60 52.0	87	29	98.6	61 17.9	86	29	98.0	62 09.5	85	29	97.0	62 35.0	85	29	96.4
7	60 34.6	87	29	97.5	61 00.5	86	29	97.0	61 52.0	85	29	95.9	62 17.6	85	29	95.4
8	60 17.2	87	29	96.5	60 43.1	86	29	96.0	61 34.6	85	29	94.9	62 00.1	85	29	94.4
9	59 59.7	87	29	95.5	60 25.6	86	29	95.0	61 17.1	85	29	93.9	61 42.6	85	29	93.4
60	59 42.3	86	29	94.5	60 08.1	86	29	94.0	60 59.6	85	29	93.0	61 25.1	85	29	92.4
1	59 24.8	86	29	93.5	59 50.6	86	29	93.0	60 42.0	85	29	92.0	61 07.6	85	29	91.4
2	59 07.2	86	29	92.5	59 33.1	86	29	92.0	60 24.5	85	29	91.0	60 50.0	85	29	90.5
3	58 49.7	86	29	91.6	59 15.6	86	29	91.1	60 07.0	85	29	90.0	60 32.5	85	29	89.5
4	58 32.2	86	29	90.6	58 58.0	86	29	90.1	59 49.4	85	29	89.1	60 14.9	85	29	88.6
65	58 14.6	86	29	89.6	58 40.5	86	29	89.2	59 31.9	85	29	88.1	59 57.4	85	29	87.6
6	57 57.1	86	29	88.7	58 23.0	86	29	88.2	59 14.4	85	29	87.2	59 39.9	85	29	86.7
7	57 39.6	86	29	87.7	58 05.4	86	29	87.3	58 56.8	85	29	86.3	59 22.4	85	29	85.8
8	57 22.0	86	29	86.8	57 47.9	86	29	86.3	58 39.4	85	29	85.4	59 04.9	85	29	84.9
9	57 04.5	86	29	85.9	57 30.4	86	29	85.4	58 21.9	85	29	84.4	58 47.4	85	29	83.9
70	56 47.0	87	29	85.0	57 12.9	86	29	84.5	58 04.4	85	29	83.5	58 30.0	85	29	83.0
1	56 29.6	87	29	84.0	56 55.5	86	29	83.6	57 47.0	86	29	82.6	58 12.6	85	29	82.1
2	56 12.1	87	29	83.1	56 38.1	86	29	82.7	57 29.6	86	29	81.7	57 55.3	85	29	81.3
3	55 54.7	87	29	82.2	56 20.7	86	29	81.8	57 12.3	86	29	80.9	57 37.9	85	29	80.4
4	55 37.4	87	29	81.3	56 03.4	86	29	80.9	56 55.0	86	29	80.0	57 20.7	85	29	79.5
75	55 20.1	87	29	80.5	55 46.1	86	29	80.0	56 37.7	86	29	79.1	57 03.4	85	29	78.6
6	55 02.8	87	29	79.6	55 28.8	87	29	79.1	56 20.5	86	29	78.2	56 46.3	86	29	77.8
7	54 45.6	87	29	78.7	55 11.6	87	29	78.3	56 03.4	86	28	77.4	56 29.2	86	28	76.9
8	54 28.4	87	29	77.8	54 54.5	87	28	77.4	55 46.3	86	28	76.5	56 12.1	86	28	76.1
9	54 11.3	87	28	77.0	54 37.4	87	28	76.5	55 29.3	86	28	75.7	55 55.1	86	28	75.2
80	53 54.2	87	28	76.1	54 20.3	87	28	75.7	55 12.3	86	28	74.8	55 38.2	86	28	74.4
1	53 37.2	87	28	75.2	54 03.4	87	28	74.8	54 55.4	86	28	74.0	55 21.3	86	28	73.5
2	53 20.3	87	28	74.4	53 46.5	87	28	74.0	54 38.6	87	28	73.1	55 04.5	86	28	72.7
3	53 03.4	88	28	73.5	53 29.6	87	28	73.1	54 21.9	87	28	72.3	54 47.8	86	28	71.9
4	52 46.6	88	28	72.7	53 12.9	87	28	72.3	54 05.2	87	28	71.5	54 31.2	87	28	71.0
85	52 29.9	88	28	71.9	52 56.2	88	28	71.5	53 48.6	87	28	70.6	54 14.6	87	27	70.2
6	52 13.3	88	28	71.0	52 39.6	88	28	70.6	53 32.1	87	27	69.8	53 58.2	87	27	69.4
7	51 56.7	88	27	70.2	52 23.1	88	27	69.8	53 15.7	87	27	69.0	53 41.8	87	27	68.6
8	51 40.3	88	27	69.4	52 06.7	88	27	69.0	52 59.3	87	27	68.2	53 25.5	87	27	67.8
9	51 23.9	88	27	68.5	51 50.4	88	27	68.2	52 43.1	88	27	67.4	53 09.3	87	27	67.0
90	51 07.6	88	27	67.7	51 34.1	88	27	67.3	52 26.9	88	27	66.6	52 53.2	87	27	66.2

H.A.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	74 00.0	1.0	00	180.0	74 30.0	1.0	01	180.0	76 00.0	1.0	01	180.0	76 30.0	1.0	01	180.0
1	73 59.7	1.0	02	178.0	74 29.7	1.0	02	178.0	75 59.7	1.0	02	177.9	76 29.7	1.0	02	177.8
2	73 58.8	1.0	03	176.1	74 28.8	1.0	03	176.0	75 58.7	1.0	03	175.7	76 28.7	1.0	03	175.7
3	73 57.3	1.0	04	174.1	74 27.2	1.0	04	174.0	75 57.1	1.0	04	173.6	76 27.0	1.0	04	173.5
4	73 55.2	1.0	04	172.1	74 25.1	1.0	05	172.0	75 54.8	1.0	05	171.5	76 24.7	1.0	05	171.3
05	73 52.5	1.0	05	170.2	74 22.3	1.0	06	170.0	75 51.9	99	06	169.4	76 21.7	99	06	169.2
6	73 49.2	99	06	168.2	74 19.0	99	07	168.0	75 48.4	99	07	167.3	76 18.1	99	07	167.1
7	73 45.3	99	07	166.3	74 15.1	99	08	166.0	75 44.2	99	08	165.2	76 13.9	99	08	164.9
8	73 40.9	99	08	164.4	74 10.5	99	08	164.1	75 39.4	99	09	163.2	76 09.0	99	09	162.8
9	73 35.8	99	09	162.4	74 05.4	99	09	162.1	75 34.0	98	10	161.1	76 03.5	98	10	160.8
10	73 30.3	98	10	160.5	73 59.8	98	10	160.2	75 28.1	98	11	159.1	75 57.4	98	11	158.7
1	73 24.2	98	11	158.7	73 53.6	98	11	158.3	75 21.5	98	12	157.1	75 50.8	97	12	156.7
2	73 17.5	98	12	156.8	73 46.8	98	12	156.4	75 14.4	97	13	155.1	75 43.6	97	13	154.7
3	73 10.4	97	13	155.0	73 39.5	97	13	154.6	75 06.8	97	14	153.2	75 35.8	96	14	152.7
4	73 02.7	97	14	153.1	73 31.8	97	14	152.7	74 58.6	96	14	151.3	75 27.5	96	15	150.7
15	72 54.5	97	14	151.3	73 23.5	96	15	150.9	74 49.9	96	15	149.4	75 18.6	95	16	148.8
6	72 45.8	96	15	149.6	73 14.7	96	15	149.1	74 40.8	95	16	147.5	75 09.3	95	16	146.9
7	72 36.7	96	16	147.8	73 05.4	96	16	147.3	74 31.1	95	17	145.7	74 59.5	94	17	145.0
8	72 27.2	95	17	146.1	72 55.7	95	17	145.6	74 21.0	94	18	143.8	74 49.2	94	18	143.2
9	72 17.2	95	17	144.4	72 45.6	95	18	143.8	74 10.4	94	18	142.1	74 38.5	93	19	141.4
20	72 06.7	95	18	142.7	72 35.0	94	18	142.1	73 59.4	93	19	140.3	74 27.3	93	19	139.6
1	71 55.9	94	19	141.0	72 24.1	94	19	140.4	73 48.0	93	20	138.6	74 15.7	92	20	137.9
2	71 44.6	94	19	139.4	72 12.7	93	20	138.8	73 36.2	92	20	136.9	74 03.8	92	21	136.2
3	71 33.0	93	20	137.7	72 01.0	93	20	137.2	73 24.0	92	21	135.2	73 51.5	91	21	134.5
4	71 21.1	93	21	136.2	71 48.8	92	21	135.6	73 11.5	91	21	133.6	73 38.8	91	22	132.8
25	71 08.7	92	21	134.6	71 36.4	92	21	134.0	72 58.6	91	22	132.0	73 25.7	90	22	131.2
6	70 56.1	92	22	133.0	71 23.6	92	22	132.4	72 45.4	90	23	130.4	73 12.4	90	23	129.6
7	70 43.1	92	22	131.5	71 10.5	91	22	130.9	72 31.9	90	23	128.8	72 58.7	89	23	128.1
8	70 29.8	91	23	130.0	70 57.1	91	23	129.4	72 18.1	89	24	127.3	72 44.8	89	24	126.6
9	70 16.2	91	23	128.5	70 43.4	90	23	127.9	72 04.0	89	24	125.8	72 30.5	88	24	125.0
30	70 02.4	90	24	127.1	70 29.4	90	24	126.4	71 49.6	88	24	124.3	72 16.1	88	25	123.6
1	69 48.2	90	24	125.7	70 15.2	90	24	125.0	71 35.0	88	25	122.9	72 01.3	87	25	122.1
2	69 33.9	90	24	124.2	70 00.7	89	25	123.6	71 20.2	87	25	121.5	71 46.3	87	25	120.7
3	69 19.2	89	25	122.9	69 46.0	89	25	122.2	71 05.1	87	25	120.1	71 31.2	86	26	119.3
4	69 04.4	89	25	121.5	69 31.0	88	25	120.8	70 49.8	87	26	118.7	71 15.8	86	26	117.9
35	68 49.3	89	25	120.1	69 15.8	88	26	119.5	70 34.4	86	26	117.4	71 00.2	86	26	116.6
6	68 34.1	88	26	118.8	69 00.5	88	26	118.2	70 18.7	86	26	116.0	70 44.4	85	27	115.3
7	68 18.6	88	26	117.5	68 44.9	87	26	116.9	70 02.8	86	27	114.7	70 28.4	85	27	114.0
8	68 03.0	88	26	116.2	68 29.2	87	26	115.6	69 46.8	85	27	113.4	70 12.3	85	27	112.7
9	67 47.1	87	27	115.0	68 13.3	87	27	114.3	69 30.6	85	27	112.2	69 56.1	84	27	111.4
40	67 31.1	87	27	113.7	67 57.2	87	27	113.1	69 14.3	85	27	110.9	69 39.7	84	28	110.2
1	67 15.0	87	27	112.5	67 41.0	86	27	111.8	68 57.9	85	28	109.7	69 23.1	84	28	109.0
2	66 58.7	87	27	111.3	67 24.6	86	27	110.6	68 41.3	84	28	108.5	69 06.5	84	28	107.8
3	66 42.3	86	28	110.1	67 08.1	86	28	109.4	68 24.6	84	28	107.3	68 49.7	83	28	106.6
4	66 25.8	86	28	108.9	66 51.5	86	28	108.2	68 07.8	84	28	106.2	68 32.9	83	28	105.4
45	66 09.1	86	28	107.7	66 34.8	85	28	107.1	67 50.9	84	28	105.0	68 15.9	83	28	104.3
6	65 52.4	86	28	106.6	66 18.0	85	28	105.9	67 33.9	83	28	103.9	67 58.9	83	29	103.1
7	65 35.5	86	28	105.4	66 01.1	85	28	104.8	67 16.9	83	29	102.8	67 41.7	83	29	102.0
8	65 18.6	85	28	104.3	65 44.1	85	28	103.7	66 59.7	83	29	101.7	67 24.6	82	29	100.9
9	65 01.5	85	29	103.2	65 27.0	85	29	102.6	66 42.5	83	29	100.6	67 07.3	82	29	99.9
50	64 44.4	85	29	102.1	65 09.9	85	29	101.5	66 25.2	83	29	99.5	66 50.0	82	29	98.8
1	64 27.2	85	29	101.0	64 52.6	84	29	100.4	66 07.9	83	29	98.4	66 32.6	82	29	97.7
2	64 10.0	85	29	100.0	64 35.3	84	29	99.4	65 50.5	83	29	97.4	66 15.2	82	29	96.7
3	63 52.7	85	29	98.9	64 18.0	84	29	98.3	65 33.1	83	29	96.4	65 57.8	82	29	95.7
4	63 35.3	85	29	97.9	64 00.6	84	29	97.3	65 15.7	82	29	95.3	65 40.3	82	29	94.6
55	63 17.9	85	29	96.8	63 43.2	84	29	96.2	64 58.2	82	29	94.3	65 22.8	82	29	93.6
6	63 00.5	85	29	95.8	63 25.8	84	29	95.2	64 40.7	82	29	93.3	65 05.3	82	29	92.7
7	62 43.0	84	29	94.8	63 08.3	84	29	94.2	64 23.2	82	29	92.3	64 47.8	82	29	91.7
8	62 25.5	84	29	93.8	62 50.8	84	29	93.2	64 05.6	82	29	91.4	64 30.2	82	29	90.7
9	62 08.0	84	29	92.8	62 33.3	84	29	92.2	63 48.1	82	29	90.4	64 12.7	82	29	89.7
60	61 50.5	84	29	91.8	62 15.7	84	29	91.3	63 30.5	82	29	89.4	63 55.2	82	29	88.8
1	61 32.9	84	29	90.9	61 58.2	84	29	90.3	63 13.0	82	29	88.5	63 37.6	82	29	87.9
2	61 15.4	84	29	89.9	61 40.6	84	29	89.4	62 55.5	82	29	87.6	63 20.1	82	29	86.9
3	60 57.9	84	29	89.0	61 23.1	84	29	88.4	62 37.9	82	29	86.6	63 02.6	82	29	86.0
4	60 40.3	84	29	88.0	61 05.6	84	29	87.5	62 20.4	82	29	85.7	62 45.1	82	29	85.1
65	60 22.8	84	29	87.1	60 48.0	84	29	86.5	62 03.0	82	29	84.8	62 27.6	82	29	84.2
6	60 05.3	84	29	86.2	60 30.5	84	29	85.6	61 45.5	83	29	83.9	62 10.2	82	29	83.3
7	59 47.8	84	29	85.2	60 13.1	84	29	84.7	61 28.1	83	29	83.0	61 52.8	82	29	82.4
8	59 30.3	85	29	84.3	59 55.6	84	29	83.8	61 10.7	83	29	82.1	61 35.4	82	29	81.5
9	59 12.9	85	29	83.4	59 38.2	84	29	82.9	60 53.3	83	29	81.2	61 18.1	82	29	80.7
70	58 55.5	85	29	82.5	59 20.8	84	29	82.0	60 36.0	83	29	80.4	61 00.8	82	29	79.8
1	58 38.1	85	29	81.6	59 03.4	84	29	81.1	60 18.7	83	29	79.5	60 43.6	82	29	78.9
2	58 20.8	85	29	80.8	58 46.1	84	29	80.2	60 01.5	83	29	78.6	60 26.4	83	29	78.1
3	58 03.5	85	29	79.9	58 28.9	84	29	79.4	59 44.3	83	29	77.8	60 09.2	83	28	77.2
4	57 46.2	85	29	79.0	58 11.7	85	29	78.5	59 27.2	83	28	76.9	59 52.2	83	28	76.4
75	57 29.0	85	29	78.1	57 54.5	85	28	77.7	59 10.2	83	28	76.1	59 35.1	83	28	75.6
6	57 11.9	85	28	77.3	57 37.4	85	28	76.8	58 53.2	84	28	75.3	59 18.2	83	28	74.7
7	56 54.8	85	28	76.4	57 20.3	85	28	76.0	58 36.2	84	28	74.4	59 01.3	83	28	73.9
8	56 37.8	85	28	75.6	57 03.3	85	28	75.1	58 19.4	84	28	73.6	58 44.5	83	28	73.1
9	56 20.8	86	28	74.7	56 46.4	85	28	74.3	58 02.6	84	28	72.8	58 27.7	84	28	72.3
80	56 03.9	86	28	73.9	56 29.6	85	28	73.4	57 45.9	84	28	72.0	58 11.1	84	28	71.5
1	55 47.1	86	28	73.1	56 12.8	85	28	72.6	57 29.2	84	28	71.2	57 54.5	84	28	70.7
2	55 30.4	86	28	72.2	55 56.1	86	28	71.8	57 12.7	85	27	70.4	57 38.0	84	27	69.9
3	55 13.7	86	28	71.4	55 39.5	86	28	71.0	56 56.2	85	27	69.6	57 21.5	84	27	69.1
4	54 57.1	86	28	70.6	55 22.9	86	27	70.2	56 39.8	85	27	68.8	57 05.2	84	27	68.3
85	54 40.6	86	27	69.8	55 06.5	86	27	69.3	56 23.5	85	27	68.0	56 48.9	85	27	67.5
6	54 24.2	87	27	69.0	54 50.1	86	27	68.5	56 07.3	85	27	67.2	56 32.8	85	27	66.7
7	54 07.9	87	27	68.2	54 33.8	86	27	67.7	55 51.1	85	27	66.4	56 16.7	85	27	65.9
8	53 51.6	87	27	67.4	54 17.6	87	27	66.9	55 35.1	86	27	65.6	56 00.7	85	26	65.1
9	53 35.5	87	27	66.6	54 01.5	87	27	66.1	55 19.2	86	26	64.8	55 44.9	85	26	64.4
90	53 19.4	87	27	65.8	53 45.6	87	26	65.3	55 03.4	86	26	64.1	55 29.1	86	26	63.6

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	50 51.5	89 27	66.9	51 18.0	88 27	66.5	52 10.9	88 27	65.8	52 37.2	88 26	65.4	53 03.5	87 26	65.0	53 29.7	87 26	64.6	54 47.6	86 26	63.3	55 13.5	86 26	62.8	91
2	50 35.4	89 27	66.1	51 02.0	89 27	65.7	51 55.0	88 26	65.0	52 21.3	88 26	64.6	52 47.6	88 26	64.2	53 13.9	87 26	63.8	54 32.0	86 26	62.5	54 57.9	86 26	62.1	2
3	50 19.4	89 26	65.3	50 46.0	89 26	64.9	51 39.1	88 26	64.2	52 05.5	88 26	63.8	52 31.9	88 26	63.4	52 58.2	87 26	63.0	54 16.5	87 26	61.7	54 42.5	86 26	61.3	3
4	50 03.5	89 26	64.5	50 30.2	89 26	64.1	51 23.4	88 26	63.4	51 49.9	88 26	63.0	52 16.3	88 26	62.6	52 42.6	88 26	62.2	54 01.1	87 25	61.0	54 27.1	87 25	60.6	4
95	49 47.7	89 26	63.7	50 14.5	89 26	63.3	51 07.8	89 26	62.6	51 34.3	88 26	62.2	52 00.8	88 26	61.8	52 27.1	88 26	61.4	53 45.8	87 25	60.2	54 11.9	87 25	59.8	95
6	49 32.1	89 26	62.9	49 58.9	89 26	62.5	50 52.2	89 26	61.8	51 18.8	89 26	61.4	51 45.3	88 26	61.0	52 11.8	88 25	60.7	53 30.7	87 25	59.5	53 56.8	87 25	59.1	6
7	49 16.5	90 26	62.1	49 43.3	89 26	61.7	50 36.8	89 25	61.0	51 03.5	89 25	60.6	51 30.1	88 25	60.3	51 56.6	88 25	59.9	53 15.6	87 25	58.7	53 41.8	87 25	58.3	7
8	49 01.1	90 26	61.3	49 28.0	90 25	60.9	50 21.6	89 25	60.2	50 48.2	89 25	59.9	51 14.9	89 25	59.5	51 41.4	88 25	59.1	53 00.7	88 25	58.0	53 26.9	87 25	57.6	8
9	48 45.7	90 25	60.5	49 12.7	90 25	60.1	50 06.4	89 25	59.4	50 33.1	89 25	59.1	50 59.8	89 25	58.7	51 26.4	89 25	58.4	52 45.9	88 24	57.2	53 12.2	88 24	56.8	9
100	48 30.5	90 25	59.7	48 57.5	90 25	59.3	49 51.3	89 25	58.7	50 18.1	89 25	58.3	50 44.9	89 25	58.0	51 11.6	89 25	57.6	52 31.2	88 24	56.5	52 57.6	88 24	56.1	100
1	48 15.5	90 25	58.9	48 42.5	90 25	58.6	49 36.4	90 25	57.9	50 03.3	89 25	57.5	50 30.1	89 24	57.2	50 56.8	89 24	56.8	52 16.6	88 24	55.7	52 43.1	88 24	55.3	1
2	48 00.5	90 25	58.1	48 27.6	90 25	57.8	49 21.6	90 24	57.1	49 48.5	90 24	56.8	50 15.4	89 24	56.4	50 42.2	89 24	56.1	52 02.2	88 24	55.0	52 28.7	88 24	54.6	2
3	47 45.7	91 25	57.3	48 12.8	90 24	57.0	49 07.0	90 24	56.4	49 33.9	90 24	56.0	50 00.9	90 24	55.7	50 27.7	89 24	55.3	51 47.9	89 24	54.2	52 14.5	89 24	53.9	3
4	47 31.0	91 24	56.5	47 58.2	91 24	56.2	48 52.4	90 24	55.6	49 19.5	90 24	55.3	49 46.4	90 24	54.9	50 13.4	90 24	54.6	51 33.7	89 23	53.5	52 00.4	89 23	53.1	4
105	47 16.4	91 24	55.8	47 43.7	91 24	55.5	48 38.0	90 24	54.8	49 05.1	90 24	54.5	49 32.1	90 24	54.2	49 59.1	90 24	53.8	51 19.7	89 23	52.8	51 46.4	89 23	52.4	105
6	47 02.0	91 24	55.0	47 29.3	91 24	54.7	48 23.7	91 24	54.1	48 50.9	90 23	53.7	49 18.0	90 23	53.4	49 45.0	90 23	53.1	51 05.8	89 23	52.0	51 32.6	89 23	51.7	6
7	46 47.7	91 24	54.2	47 15.0	91 24	53.9	48 09.6	91 23	53.3	48 36.8	91 23	53.0	49 04.0	90 23	52.7	49 31.1	90 23	52.3	50 52.0	90 23	51.3	51 18.9	89 23	50.9	7
8	46 33.5	91 23	53.4	47 00.9	91 23	53.1	47 55.6	91 23	52.5	48 22.9	91 23	52.2	48 50.1	91 23	51.9	49 17.3	90 23	51.6	50 38.4	90 22	50.6	51 05.4	90 22	50.2	8
9	46 19.5	92 23	52.7	46 47.0	91 23	52.4	47 41.8	91 23	51.8	48 09.1	91 23	51.5	48 36.4	91 23	51.2	49 03.6	91 23	50.8	50 24.9	90 22	49.8	50 51.9	90 22	49.5	9
110	46 05.6	92 23	51.9	46 33.1	92 23	51.6	47 28.1	91 23	51.0	47 55.4	91 22	50.7	48 22.8	91 22	50.4	48 50.1	91 22	50.1	50 11.6	90 22	49.1	50 38.7	90 22	48.8	110
1	45 51.9	92 23	51.1	46 19.5	92 23	50.8	47 14.5	92 22	50.3	47 41.9	91 22	50.0	48 09.3	91 22	49.7	48 36.7	91 22	49.3	49 58.4	91 22	48.4	50 25.6	90 22	48.1	1
2	45 38.3	92 22	50.4	46 05.9	92 22	50.1	47 01.1	92 22	49.5	47 28.6	92 22	49.2	47 56.0	91 22	48.9	48 23.4	91 22	48.6	49 45.4	91 22	47.7	50 12.6	91 21	47.3	2
3	45 24.9	92 22	49.6	45 52.6	92 22	49.3	46 47.8	92 22	48.8	47 15.4	92 22	48.5	47 42.9	92 22	48.2	48 10.4	91 22	47.9	49 32.5	91 21	46.9	49 59.8	91 21	46.6	3
4	45 11.6	93 22	48.8	45 39.3	92 22	48.6	46 34.7	92 22	48.0	47 02.3	92 22	47.7	47 29.9	92 21	47.4	47 57.4	92 21	47.1	49 19.7	91 21	46.2	49 47.1	91 21	45.9	4
115	44 58.5	93 22	48.1	45 26.3	93 22	47.8	46 21.7	92 21	47.3	46 49.4	92 21	47.0	47 17.1	92 21	46.7	47 44.6	92 21	46.4	49 07.2	91 21	45.5	49 34.6	91 21	45.2	115
6	44 45.5	93 21	47.3	45 13.3	93 21	47.0	46 08.9	93 21	46.5	46 36.7	92 21	46.2	47 04.4	92 21	46.0	47 32.0	92 21	45.7	48 54.7	92 20	44.8	49 22.2	91 20	44.5	6
7	44 32.7	93 21	46.6	45 00.6	93 21	46.3	45 56.3	93 21	45.8	46 24.1	93 21	45.5	46 51.8	92 21	45.2	47 19.6	92 20	44.9	48 42.4	92 20	44.1	49 10.0	92 20	43.8	7
8	44 20.0	93 21	45.8	44 48.0	93 21	45.5	45 43.8	93 21	45.0	46 11.7	93 20	44.7	46 39.5	93 20	44.5	47 07.2	93 20	44.2	48 30.3	92 20	43.3	48 57.9	92 20	43.0	8
9	44 07.5	93 21	45.0	44 35.5	93 20	44.8	45 31.5	93 20	44.3	45 59.4	93 20	44.0	46 27.3	93 20	43.7	46 55.1	93 20	43.5	48 18.4	92 20	42.6	48 46.0	92 20	42.3	9
120	43 55.2	94 20	44.3	44 23.3	94 20	44.0	45 19.3	93 20	43.5	45 47.3	93 20	43.3	46 15.2	93 20	43.0	46 43.1	93 20	42.7	48 06.6	93 19	41.9	48 34.3	92 19	41.6	120
1	43 43.0	94 20	43.5	44 11.2	94 20	43.3	45 07.3	93 20	42.8	45 35.3	93 20	42.5	46 03.3	93 20	42.3	46 31.3	93 19	42.0	47 54.9	93 19	41.2	48 22.7	93 19	40.9	1
2	43 31.0	94 20	42.8	43 59.2	94 20	42.5	44 55.5	94 19	42.0	45 23.6	94 19	41.8	45 51.6	93 19	41.5	46 19.6	93 19	41.3	47 43.5	93 19	40.5	48 11.3	93 19	40.2	2
3	43 19.2	94 19	42.0	43 47.4	94 19	41.8	44 43.8	94 19	41.3	45 11.9	94 19	41.1	45 40.1	94 19	40.8	46 08.1	94 19	40.6	47 32.2	93 19	39.8	48 00.1	93 18	39.5	3
4	43 07.5	94 19	41.3	43 35.8	94 19	41.0	44 32.3	94 19	40.6	45 00.5	94 19	40.3	45 28.7	94 19	40.1	45 56.8	94 19	39.8	47 21.0	93 18	39.1	47 49.0	93 18	38.8	4
125	42 56.1	94 19	40.5	43 24.4	94 19	40.3	44 21.0	94 19	39.8	44 49.2	94 18	39.6	45 17.5	94 18	39.4	45 45.7	94 18	39.1	47 10.0	94 18	38.4	47 38.1	93 18	38.1	125
6	42 44.8	95 19	39.8	43 13.1	95 18	39.6	44 09.8	94 18	39.1	44 38.1	94 18	38.9	45 06.4	94 18	38.6	45 34.7	94 18	38.4	46 59.2	94 18	37.6	47 27.4	94 18	37.4	6
7	42 33.6	95 18	39.0	43 02.1	95 18	38.8	43 58.9	95 18	38.4	44 27.2	94 18	38.1	44 55.6	94 18	37.9	45 23.9	94 18	37.7	46 48.6	94 17	36.9	47 16.8	94 17	36.7	7
8	42 22.7	95 18	38.3	42 51.2	95 18	38.1	43 48.1	95 18	37.6	44 16.5	95 18	37.4	44 44.9	95 18	37.2	45 13.2	94 17	36.9	46 38.2	94 17	36.2	47 06.4	94 17	36.0	8
9	42 11.9	95 18	37.5	42 40.4	95 18	37.3	43 37.4	95 17	36.9	44 05.9	95 17	36.7	44 34.4	95 17	36.5	45 02.8	95 17	36.2	46 27.9	94 17	35.5	46 56.2	94 17	35.3	9
130	42 01.3	95 17	36.8	42 29.9	95 17	36.6	43 27.0	95 17	36.2	43 55.5	95 17	35.9	44 24.0	95 17	35.7	44 52.5	95 17	35.5	46 17.8	95 17	34.8	46 46.1	95 16	34.6	130
1	41 50.9	96 17	36.0	42 19.5	95 17	35.8	43 16.7	95 17	35.4	43 45.3	95 17	35.2	44 13.9	95 17	35.0	44 42.4	95 17	34.8	46 07.8	95 16	34.1	46 36.3	95 16	33.9	1
2	41 40.6	96 17	35.3	42 09.3	96 17	35.1	43 06.7	95 16	34.7	43 35.3	95 16	34.5	44 03.9	95 16	34.3	44 32.5	95 16	34.1	45 58.1	95 16	33.4	46 26.6	95 16	33.2	2
3	41 30.6	96 16	34.6	41 59.3	96 16	34.4	42 56.8	96 16	34.0	43 25.5	96 16	33.8	43 54.1	95 16	33.6	44 22.8	95 16	33.4	45 48.5	95 16	32.7	46 17.1	95 16	32.5	3
4	41 20.8	96 16	33.8	41 49.5	96 16	33.6	42 47.1	96 16	33.2	43 15.8	96 16	33.0	43 44.5	96 16	32.8	44 13.2	96 16	32.6	45 39.1	95 15	32.0	46 07.7	95 15	31.8	4
135	41 11.1	96 16	33.1	41 39.9	96 16	32.9	42 37.5	96 16	32.5	43 06.3	96 15	32.3	43 35.1	96 15	32.1	44 03.8	96 15	31.9	45 29.9	96 15	31.3	45 58.6	95 15	31.1	135
6	41 01.6	96 15	32.3	41 30.5	96 15	32.1	42 28.2	96 15	31.8	42 57.0	96 15	31.6	43 25.9	96 15	31.4	43 54.6	96 15	31.2	45 20.9	96 15	30.6	45 49.6	96 15	30.4	6
7	40 52.3	96 15	31.6	41 21.3	96 15	31.4	42 19.1	96 15	31.0	42 47.9	96 15	30.9	43 16.8	96 15	30.7	43 45.7	96 15	30.5	45 12.1	96 14	29.9	45 40.8	96 14	29.7	7
8	40 43.2	97 15	30.8	41 12.2	97 15	30.7	42 10.1	96 15	30.3	42 39.0	96 15	30.1	43 08.0	96 14	30.0	43 36.8	96 14	29.8	45 03.4	96 14	29.2	45 32.2	96 14	29.0	8
9	40 34.3	97 14	30.1	41 03.4	97 14	29.9	42 01.4	97 14	29.6	42 30.3	97 14	29.4	42 59.3	97 14	29.2	43 28.2	96 14	29.1	44 54.9	96 14	28.5	45 23.8	96 14	28.3	9
140	40 25.6	97 14	29.4	40 54.7	97 14	29.2	41 52.8	97 14	28.9	42 21.8	97 14	28.7	42 50.8	97 14	28.5	43 19.8	97 14	28.3	44 46.7	96 13	27.8	45 15.6	96 13	27.6	140
1	40 17.1	97 14	28.6	40 46.2	97 14	28.5	41 44.4	97 14	28.1	42 13.5	97 14	28.0	42 42.5	97 13	27.8	43 11.6	97 13	27.6	44 38.6	97 13	27.1	45 07.6	97 13	26.9	1
2	40 08.8	97 14	27.9	40 38.0	97 13	27.7	41 36.2	97 13	27.4	42 05.4	97 13	27.3	42 34.5	97 13	27.1	43 03.5	97 13	26.9	44 30.7	97 13	26.4	44 59.7	97 13	26.2	2
3	40 00.7	97 13	27.1	40 29.9	97 13	27.0	41 28.3	97 13	26.7	41 57.4	97 13	26.5	42 26.6	97 13	26.4	42 55.7	97 13	26.2	44 23.0	97 13	25.7	44 52.1	97 12	25.5	3
4	39 52.8	97 13	26.4	40 22.1	97 13	26.3	41 20.5	97 13	26.0	41 49.7	97 13	25.8	42 18.9	97 12	25.7	42 48.0	97 12	25.5	44 15.5	97 12	25.0	44 44.6	97 12	24.8	4
145	39 45.1	98 12	25.7	40 14.4	98 12	25.5	41 12.9	97 12	25.2	41 42.1	97 12	25.1	42 11.4	97 12	24.9	42 40.6	97 12	24.8	44 08.2	97 12	24.3	44 37.3	97 12	24.1	145
6	39 37.6	98 12	24.9	40 06.9	98 12	24.8	41 05.5	98 12	24.5	41 34.8	98 12	24.4	42 04.1	98 12	24.2	42 33.3	98 12	24.1	44 01.0	97 12	23.6	44 30.2	97 11	23.4	6
7	39 30.3	98 12	24.2	39 59.7	98 12	24.1	40 58.3	98 12	23.8	41 27.7	98 12	23.6	41 57.0	98 12	23.5	42 26.3	98 11	23.4	43 54.1	98 11	22.9	44 23.4	97 11	22.8	7
8	39 23.2	98 11	23.5	39 52.6	98 11	23.3	40 51.4	98 11	23.1	41 20.7	98 11	22.9	41 50.1	98 11	22.8	42 19.4	98 11	22.6	43 47.4	98 11	22.2	44 16.7	98 11	22.1	8
9	39 16.4	98 11	22.7	39 45.8	98 11	22.6	40 44.6	98 11	22.3	41 14.0	98 11	22.2	41 43.4	98 11	22.1	42 12.8	98 11	21.9	43 40.8	98 11	21.5	44 10.2	98 10	21.4	9
150	39 09.7	98 11	22.0	39 39.1	98 11	21.9	40 38.0	98 11	21.6	41 07.5	98 11	21.5	41 36.9	98 10	21.4	42 06.3	98 10	21.2	43 34.5	98 10	20.8	44 03.9	98 10	20.7	150
1	39 03.2	98 10	21.3	39 32.7	98 10	21.1	40 31.7	98 10	20.9	41 01.1	98 10	20.8	41 30.6	98 10	20.6	42 00.1	98 10	20.5	43 28.4	98 10	20.1	43 57.8	98 10	20.0	1
2	38 57.0	98 10	20.5	39 26.5	98 10	20.4	40 25.5	98 10	20.2	40 55.0	98 10	20.1	41 24.5	98 10	19.9	41 54.0	98 10	19.8	43 22.4	98 10	19.4	43 51.9	98 10	19.3	2
3	38 50.9	99 10	19.8	39 20.5	99 10	19.7	40 19.6	98 10	19.5	40 49.1	98 10	19.3	41 18.6	98 09	19.2	41 48.2	98 09	19.1	43 16.7	98 09	18.7	43 46.2	98 09	18.6	3
4	38 45.1	99 09	19.1	39 14.7	99 09	18.9	40 13.8	99 09	18.7	40 43.4	99 09	18.6	41 13.0	99 09	18.5	41 42.5	99 09	18.4	43 11.2	98 09	18.0	43 40.7	98 09	17.9	4
155	38 39.5	99 09	18.3	39 09.1	99 09	18.2	40 08.3	99 09	18.0	40 37.9	99 09	17.9	41 07.5	99 09	17.8	41 37.1	99 09	17.7	43 05.8	99 09	17.3	43 35.4	99 08	17.2	155
6	38 34.1	99 09	17.6	39 03.7	99 09	17.5	40 03.0	99 09	17.3	40 32.6	99 08	17.2	41 02.3	99 08	17.1	41 31.9	99 08	17.0	43 00.7	99 08	16.6	43 30.3	99 08	16.5	6
7	38 28.9	99 08	16.8	38 58.6	99 08	16.8	39 57.9	99 08	16.6	40 27.6	99 08	16.5	40 57.2	99 08	16.4	41 26.9	99 08	16.3	42 55.8	99 08	16.0	43 25.4	99 08	15.8	7
8	38 23.9	99 08	16.1	38 53.6	99 08	16.0	39 53.0	99 08	15.8	40 22.7	99 08	15.7	40 52.4	99 08	15.7	41 22.1	99 08	15.6	42 51.1	99 08	15.3	43 20.7	99 07	15.2	8
9	38 19.1	99 08	15.4	38 48.9	99 08	15.3	39 48.3	99 07	15.1	40 18.0	99 07	15.0	40 47.7	99 07	14.9	41 17.5	99 07	14.8	42 46.6	99 07	14.6	43 16.2	99 07	14.5	9
160	38 14.6	99 07	14.6	38 44.3	99 07	14.6	39 43.8	99 07	14.4	40 13.6	99 07	14.3	40 43.3	99 07	14.2	41 13.1	99 07	14.1	42 42.2	99 07	13.9	43 12.0	99 07	13.8	160
1	38 10.3	99 07	13.9	38 40.0	99 07	13.8	39 39.6	99 07	13.7	40 09.4	99 07	13.6	40 39.1	99 07	13.5	41 08.9	99 07	13.4	42 38.1	99 06	13.2	43 07.9	99 06	13.1	1
2	38 06.2	99 06	13.2	38 36.0	99 06	13.1	39 35.5	99 06	13.0	40 05.3	99 06	12.9	40 35.1	99 06	12.8	41 04.9	99 06	12.7	42 34.2	99 06	12.5	43 04.0	99 06	12.4	2
3	38 02.3	99 06	12.4	38 32.1	99 06	12.4	39 31.7	99 06	12.2	40 01.5	99 06	12.2	40 31.3	99 06	12.1	41 01.2	99 06	12.0	42 30.6	99 06	11.8	43 00.4	99 06	11.7	3
4	37 58.6	99 06	11.7	38 28.4	99 06	11.7	39 28.1	99 06	11.5	39 57.9	99 06	11.4	40 27.8	99 06	11.4	40 57.6	99 06	11.3	42 27.1	99 05	11.1	42 56.9	99 05	11.0	4
165	37 55.1	1.0 05	11.0	38 25.0	1.0 05	10.9	39 24.7	1.0 05	10.8	39 54.6	1.0 05	10.7	40 24.4	1.0 05	10.7	40 54.3	99 05	10.6	42 23.8	99 05	10.4	42 53.7	99 05	10.3	165
6	37 51.9	1.0 05	10.3	38 21.8	1.0 05	10.2	39 21.5	1.0 05	10.1	39 51.4	1.0 05	10.0	40 21.3	1.0 05	10.0	40 51.2	1.0 05	09.9	42 20.7	1.0 05	09.7	42 50.6	1.0 05	09.6	6
7	37 48.9	1.0 05	09.5	38 18.8	1.0 05	09.5	39 18.6	1.0 05	09.4	39 48.5	1.0 05	09.3	40 18.4	1.0 04	09.2	40 48.2	1.0 04	09.2	42 17.9	1.0 04	09.0	42 47.8	1.0 04	09.0	7
8	37 46.1	1.0 04	08.8	38 16.0	1.0 04	08.7	39 15.8	1.0 04	08.6	39 45.7	1.0 04	08.6	40 15.6	1.0 04	08.5	40 45.5	1.0 04	08.5	42 15.3	1.0 04	08.3	42 45.2	1.0 04	08.3	8
9	37 43.5	1.0 04	08.1	38 13.5	1.0 04	08.0	39 13.3	1.0 04	07.9	39 43.2	1.0 04	07.9	40 13.2	1.0 04	07.8	40 43.1	1.0 04	07.8	42 12.8	1.0 04	07.6	42 42.7	1.0 04	07.6	9
170	37 41.2	1.0 04	07.3	38 11.1	1.0 04	07.3	39 11.0	1.0 03	07.2	39 40.9	1.0 03	07.2	40 10.9	1.0 03	07.1	40 40.8	1.0 03	07.1	42 10.6	1.0 03	06.9	42 40.5	1.0 03	06.9	170
1	37 39.1	1.0 03	06.6	38 09.0	1.0 03	06.6	39 08.9	1.0 03	06.5	39 38.9	1.0 03	06.4	40 08.8	1.0 03	06.4	40 38.8	1.0 03	06.4	42 08.6	1.0 03	06.2	42 38.5	1.0 03	06.2	1
2	37 37.2	1.0 03	05.9	38 07.1	1.0 03	05.8	39 07.0	1.0 03	05.8	39 37.0	1.0 03	05.7	40 07.0	1.0 03	05.7	40 36.9	1.0 03	05.7	42 06.8	1.0 03	05.5	42 36.7	1.0 03	05.5	2
3	37 35.5	1.0 02	05.1	38 05.5	1.0 02	05.1	39 05.4	1.0 02	05.0	39 35.4	1.0 02	05.0	40 05.3	1.0 02	05.0	40 35.3	1.0 02	04.9	42 05.2	1.0 02	04.9	42 35.2	1.0 02	04.8	3
4	37 34.0	1.0 02	04.4	38 04.0	1.0 02	04.4	39 04.0	1.0 02	04.3	39 33.9	1.0 02	04.3	40 03.9	1.0 02	04.3	40 33.9	1.0 02	04.2	42 03.8	1.0 02	04.2	42 33.8	1.0 02	04.1	4
175	37 32.8	1.0 02	03.7	38 02.8	1.0 02	03.6	39 02.8	1.0 02	03.6	39 32.7	1.0 02	03.6	40 02.7	1.0 02	03.6	40 32.7	1.0 02	03.5	42 02.7	1.0 02	03.5	42 32.6	1.0 02	03.4	175
6	37 31.8	1.0 01	02.9	38 01.8	1.0 01	02.9	39 01.8	1.0 01	02.9	39 31.8	1.0 01	02.9	40 01.7	1.0 01	02.8	40 31.7	1.0 01	02.8	42 01.7	1.0 01	02.8	42 31.7	1.0 01	02.8	6
7	37 31.0	1.0 01	02.2	38 01.0	1.0 01	02.2	39 01.0	1.0 01	02.2	39 31.0	1.0 01	02.1	40 01.0	1.0 01	02.1	40 31.0	1.0 01	02.1	42 01.0	1.0 01	02.1	42 30.9	1.0 01	02.1	7
8	37 30.4	1.0 01	01.5	38 00.4	1.0 01	01.5	39 00.4	1.0 01	01.4	39 30.4	1.0 01	01.4	40 00.4	1.0 01	01.4	40 30.4	1.0 01	01.4	42 00.4	1.0 01	01.4	42 30.4	1.0 01	01.4	8
9	37 30.1	1.0 00	00.7	38 00.1	1.0 00	00.7	39 00.1	1.0 00	00.7	39 30.1	1.0 00	00.7	40 00.1	1.0 00	00.7	40 30.1	1.0 00	00.7	42 00.1	1.0 00	00.7	42 30.1	1.0 00	00.7	9
180	37 30.0	1.0 00	00.0	38 00.0	1.0 00	00.0	39 00.0	1.0 00	00.0	39 30.0	1.0 00	00.0	40 00.0	1.0 00	00.0	40 30.0	1.0 00	00.0	42 00.0	1.0 00	00.0	42 30.0	1.0 00	00.0	180

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	77 00.0	1.0 01	180.0	77 30.0	1.0 01	180.0	79 00.0	1.0 01	180.0	79 30.0	1.0 01	180.0
1	76 59.7	1.0 02	177.8	77 29.6	1.0 02	177.7	78 59.6	1.0 02	177.5	79 29.6	1.0 02	177.5
2	76 58.6	1.0 03	175.6	77 28.6	1.0 03	175.5	78 58.5	1.0 03	175.1	79 28.5	1.0 03	174.9
3	76 56.9	1.0 04	173.3	77 26.9	1.0 04	173.2	78 56.6	1.0 04	172.6	79 26.5	1.0 04	172.4
4	76 54.6	1.0 05	171.1	77 24.4	1.0 05	170.9	78 54.0	99 06	170.2	79 23.8	99 06	169.9
05	76 51.5	99 06	168.9	77 21.4	99 06	168.7	78 50.7	99 07	167.8	79 20.4	99 07	167.4
6	76 47.9	99 07	166.8	77 17.6	99 07	166.5	78 46.6	99 08	165.4	79 16.2	99 08	165.0
7	76 43.5	99 08	164.6	77 13.1	99 08	164.3	78 41.8	98 09	163.0	79 11.3	98 09	162.5
8	76 38.6	98 09	162.5	77 08.1	98 10	162.1	78 36.4	98 10	160.7	79 05.7	98 10	160.1
9	76 33.0	98 10	160.4	77 02.3	98 11	159.9	78 30.2	97 11	158.4	78 59.4	97 12	157.8
10	76 26.8	98 11	158.3	76 56.0	97 12	157.8	78 23.4	97 12	156.1	78 52.4	96 13	155.4
1	76 20.0	97 12	156.2	76 49.1	97 13	155.7	78 16.0	96 13	153.9	78 44.8	96 14	153.2
2	76 12.6	97 13	154.1	76 41.6	96 13	153.6	78 08.0	96 14	151.7	78 36.6	95 15	150.9
3	76 04.7	96 14	152.1	76 33.5	96 14	151.5	77 59.4	95 15	149.5	78 27.8	94 16	148.7
4	75 56.2	96 15	150.1	76 24.9	95 15	149.5	77 50.2	94 16	147.4	78 18.4	94 17	146.6
15	75 47.2	95 16	148.2	76 15.7	95 16	147.5	77 40.5	94 17	145.3	78 08.4	93 17	144.4
6	75 37.7	95 17	146.3	76 06.0	94 17	145.6	77 30.2	93 18	143.3	77 58.0	92 18	142.4
7	75 27.7	94 17	144.4	75 55.9	94 18	143.7	77 19.5	92 19	141.3	77 47.0	91 19	140.4
8	75 17.3	93 18	142.5	75 45.3	93 18	141.8	77 08.3	91 19	139.3	77 35.6	91 20	138.4
9	75 06.4	93 19	140.7	75 34.2	92 19	140.0	76 56.6	91 20	137.4	77 23.7	90 20	136.5
20	74 55.1	92 20	138.9	75 22.7	92 20	138.2	76 44.6	90 21	135.6	77 11.4	89 21	134.6
1	74 43.3	92 20	137.2	75 10.8	91 20	136.4	76 32.1	89 21	133.7	76 58.7	89 22	132.7
2	74 31.2	91 21	135.4	74 58.5	91 21	134.6	76 19.2	89 22	132.0	76 45.7	88 22	130.9
3	74 18.7	91 21	133.7	74 45.8	90 22	132.9	76 06.0	88 23	130.2	76 32.3	87 23	129.2
4	74 05.9	90 22	132.1	74 32.8	89 22	131.3	75 52.4	87 23	128.5	76 18.5	86 23	127.5
25	73 52.7	90 23	130.4	74 19.5	89 23	129.6	75 38.5	87 24	126.9	76 04.4	86 24	125.8
6	73 39.2	89 23	128.9	74 05.8	88 23	128.0	75 24.4	86 24	125.2	75 50.1	85 24	124.2
7	73 25.4	89 23	127.3	73 51.8	88 23	126.4	75 09.9	86 25	123.7	75 35.4	85 25	122.6
8	73 11.3	88 24	125.7	73 37.6	87 24	124.9	74 55.2	85 25	122.1	75 20.5	84 25	121.1
9	72 56.9	88 24	124.2	73 23.1	87 25	123.4	74 40.2	84 25	120.6	75 05.4	83 26	119.5
30	72 42.3	87 25	122.8	73 08.3	86 25	121.9	74 25.0	84 26	119.1	74 50.0	83 26	118.1
1	72 27.4	87 25	121.3	72 53.3	86 25	120.5	74 09.5	83 26	117.7	74 34.4	82 26	116.6
2	72 12.3	86 26	119.9	72 38.1	85 26	119.0	73 53.9	83 26	116.2	74 18.6	82 27	115.2
3	71 57.0	86 26	118.5	72 22.6	85 26	117.6	73 38.1	82 27	114.8	74 02.7	82 27	113.8
4	71 41.5	85 26	117.1	72 07.0	85 26	116.3	73 22.1	82 27	113.5	73 46.5	81 27	112.5
35	71 25.8	85 26	115.8	71 51.2	84 27	114.9	73 05.9	82 27	112.1	73 30.2	81 27	111.1
6	71 09.9	85 27	114.5	71 35.2	84 27	113.6	72 49.6	81 27	110.8	73 13.8	80 28	109.8
7	70 53.8	84 27	113.2	71 19.0	84 27	112.3	72 33.1	81 28	109.6	72 57.2	80 28	108.6
8	70 37.6	84 27	111.9	71 02.7	83 27	111.0	72 16.5	81 28	108.3	72 40.6	80 28	107.3
9	70 21.3	84 27	110.6	70 46.3	83 28	109.8	71 59.8	80 28	107.1	72 23.8	79 28	106.1
40	70 04.8	83 28	109.4	70 29.7	83 28	108.6	71 43.0	80 28	105.9	72 06.8	79 28	104.9
1	69 48.2	83 28	108.2	70 13.0	82 28	107.3	71 26.1	80 28	104.7	71 49.9	79 28	103.7
2	69 31.5	83 28	107.0	69 56.2	82 28	106.2	71 09.0	80 28	103.5	71 32.8	79 29	102.6
3	69 14.6	83 28	105.8	69 39.3	82 28	105.0	70 51.9	79 29	102.4	71 15.6	78 29	101.4
4	68 57.7	82 28	104.6	69 22.3	82 28	103.8	70 34.8	79 29	101.2	70 58.4	78 29	100.3
45	68 40.7	82 28	103.5	69 05.3	82 29	102.7	70 17.5	79 29	100.1	70 41.1	78 29	99.2
6	68 23.6	82 29	102.4	68 48.1	81 29	101.6	70 00.2	79 29	99.0	70 23.8	78 29	98.1
7	68 06.4	82 29	101.3	68 30.9	81 29	100.5	69 42.9	79 29	98.0	70 06.4	78 29	97.1
8	67 49.2	82 29	100.2	68 13.6	81 29	99.4	69 25.5	79 29	96.9	69 48.9	78 29	96.0
9	67 31.9	82 29	99.1	67 56.3	81 29	98.3	69 08.1	78 29	95.9	69 31.5	78 29	95.0
50	67 14.6	82 29	98.0	67 38.9	81 29	97.3	68 50.6	78 29	94.8	69 14.0	78 29	94.0
1	66 57.2	81 29	97.0	67 21.5	81 29	96.2	68 33.1	78 29	93.8	68 56.5	77 29	93.0
2	66 39.7	81 29	96.0	67 04.0	81 29	95.2	68 15.6	78 29	92.8	68 38.9	78 29	92.0
3	66 22.3	81 29	94.9	66 46.6	81 29	94.2	67 58.1	78 29	91.8	68 21.4	77 29	91.0
4	66 04.8	81 29	93.9	66 29.0	81 29	93.2	67 40.5	78 29	90.9	68 03.9	77 29	90.0
55	65 47.3	81 29	92.9	66 11.5	80 29	92.2	67 23.0	78 29	89.9	67 46.3	77 29	89.1
6	65 29.7	81 29	92.0	65 54.0	80 29	91.2	67 05.4	78 29	89.0	67 28.8	77 29	88.1
7	65 12.2	81 29	91.0	65 36.4	80 29	90.3	66 47.9	78 29	88.0	67 11.3	77 29	87.2
8	64 54.7	81 29	90.0	65 18.9	80 29	89.3	66 30.4	78 29	87.1	66 53.7	77 29	86.3
9	64 37.1	81 29	89.1	65 01.4	80 29	88.4	66 12.9	78 29	86.2	66 36.3	78 29	85.4
60	64 19.6	81 29	88.1	64 43.8	81 29	87.4	65 55.4	78 29	85.3	66 18.8	78 29	84.5
1	64 02.1	81 29	87.2	64 26.3	81 29	86.5	65 37.9	78 29	84.4	66 01.3	78 29	83.6
2	63 44.5	81 29	86.3	64 08.8	81 29	85.6	65 20.5	79 29	83.5	65 43.9	78 29	82.7
3	63 27.0	81 29	85.4	63 51.3	81 29	84.7	65 03.0	79 29	82.6	65 26.5	78 29	81.9
4	63 09.6	81 29	84.5	63 33.9	81 29	83.8	64 45.7	79 29	81.7	65 09.2	78 29	81.0
65	62 52.1	81 29	83.6	63 16.5	81 29	82.9	64 28.3	79 29	80.9	64 51.9	78 29	80.1
6	62 34.7	81 29	82.7	62 59.1	81 29	82.0	64 11.0	79 29	80.0	64 34.6	78 29	79.3
7	62 17.3	82 29	81.8	62 41.7	81 29	81.2	63 53.8	79 29	79.2	64 17.4	78 29	78.5
8	62 00.0	82 29	80.9	62 24.4	81 29	80.3	63 36.6	79 29	78.3	64 00.2	79 29	77.6
9	61 42.7	82 29	80.1	62 07.1	81 29	79.4	63 19.4	79 28	77.5	63 43.1	79 28	76.8
70	61 25.4	82 29	79.2	61 49.9	81 29	78.6	63 02.3	80 28	76.7	63 26.1	79 28	76.0
1	61 08.2	82 29	78.3	61 32.7	81 29	77.7	62 45.3	80 28	75.8	63 09.1	79 28	75.2
2	60 51.1	82 28	77.5	61 15.6	82 28	76.9	62 28.3	80 28	75.0	62 52.2	79 28	74.4
3	60 34.0	82 28	76.7	60 58.6	82 28	76.1	62 11.4	80 28	74.2	62 35.3	79 28	73.6
4	60 16.9	82 28	75.8	60 41.6	82 28	75.2	61 54.5	80 28	73.4	62 18.5	80 28	72.8
75	60 00.0	83 28	75.0	60 24.6	82 28	74.4	61 37.8	80 28	72.6	62 01.8	80 28	72.0
6	59 43.1	83 28	74.2	60 07.8	82 28	73.6	61 21.1	81 28	71.8	61 45.2	80 28	71.2
7	59 26.2	83 28	73.4	59 51.0	82 28	72.8	61 04.4	81 28	71.0	61 28.6	80 28	70.4
8	59 09.4	83 28	72.5	59 34.3	83 28	72.0	60 47.9	81 27	70.3	61 12.1	80 27	69.6
9	58 52.7	83 28	71.7	59 17.6	83 28	71.2	60 31.4	81 27	69.5	60 55.7	81 27	68.9
80	58 36.1	83 28	70.9	59 01.1	83 27	70.4	60 15.0	81 27	68.7	60 39.4	81 27	68.1
1	58 19.6	84 27	70.1	58 44.6	83 27	69.6	59 58.7	82 27	67.9	60 23.1	81 27	67.4
2	58 03.1	84 27	69.3	58 28.2	83 27	68.8	59 42.5	82 27	67.2	60 07.0	81 27	66.6
3	57 46.8	84 27	68.6	58 11.9	83 27	68.0	59 26.4	82 27	66.4	59 50.9	82 27	65.8
4	57 30.5	84 27	67.8	57 55.6	84 27	67.3	59 10.4	82 27	65.7	59 35.0	82 26	65.1
85	57 14.3	84 27	67.0	57 39.5	84 27	66.5	58 54.4	83 26	64.9	59 19.1	82 26	64.4
6	56 58.2	84 27	66.2	57 23.5	84 27	65.7	58 38.6	83 26	64.2	59 03.4	82 26	63.6
7	56 42.2	85 26	65.4	57 07.5	84 26	65.0	58 22.8	83 26	63.4	58 47.7	83 26	62.9
8	56 26.3	85 26	64.7	56 51.7	85 26	64.2	58 07.2	83 26	62.7	58 32.1	83 26	62.1
9	56 10.5	85 26	63.9	56 35.9	85 26	63.4	57 51.7	84 26	61.9	58 16.7	83 26	61.4
90	55 54.8	85 26	63.1	56 20.3	85 26	62.7	57 36.2	84 26	61.2	58 01.3	83 25	60.7

63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
80 00.0	1.0 01	180.0	86 00.0	1.0 01	180.0	86 30.0	1.0 02	180.0	88 30.0	1.0 03	00.0	00
79 59.6	1.0 02	177.4	85 59.2	1.0 04	174.9	86 29.1	1.0 04	174.3	88 28.4	98 07	10.1	1
79 58.4	1.0 03	174.8	85 56.9	99 06	169.8	86 26.5	99 07	168.6	88 24.0	93 12	19.5	2
79 56.4	1.0 05	172.2	85 53.0	98 09	164.9	86 22.2	97 10	163.2	88 16.9	86 15	27.8	3
79 53.6	99 06	169.6	85 47.7	96 11	160.1	86 16.4	95 12	157.9	88 07.8	78 18	34.8	4
79 50.1	99 07	167.0	85 41.1	94 13	155.5	86 09.1	93 14	153.0	87 57.0	70 20	40.6	05
79 45.8	99 08	164.5	85 33.2	92 15	151.1	86 00.5	90 16	148.3	87 45.0	63 22	45.4	6
79 40.7	98 10	162.0	85 24.2	90 17	147.0	85 50.7	87 18	143.9	87 32.1	56 23	49.2	7
79 34.9	97 11	159.5	85 14.1	87 18	143.1	85 39.9	84 20	139.9	87 18.5	50 24	52.4	8
79 28.5	97 12	157.1	85 03.1	85 20	139.5	85 28.1	82 21	136.1	87 04.4	44 24	55.0	9
79 21.3	96 13	154.7	84 51.4	82 21	136.0	85 15.6	79 22	132.6	86 49.8	40 25	57.1	10
79 13.5	95 14	152.4	84 38.8	80 22	132.9	85 02.3	76 23	129.4	86 35.0	35 25	58.8	1
79 05.1	95 15	150.1	84 25.7	78 23	129.9	84 48.5	74 24	126.4	86 19.8	31 26	60.2	2
78 56.0	94 16	147.9	84 11.9	76 24	127.1	84 34.1	72 25	123.7	86 04.5	28 26	61.4	3
78 46.4	93 17	145.7	83 57.7	74 24	124.5	84 19.3	70 25	121.1	85 49.0	24 26	62.4	4
78 36.2	92 18	143.5	83 43.0	72 25	122.1	84 04.1	68 26	118.7	85 33.4	21 26	63.2	15
78 25.5	92 19	141.4	83 28.0	71 26	119.8	83 48.6	66 26	116.5	85 17.7	19 26	63.9	6
78 14.4	91 19	139.4	83 12.6	69 26	117.6	83 32.7	65 27	114.4	85 01.9	16 26	64.5	7
78 02.7	90 20	137.4	82 56.9	68 27	115.6	83 16.6	64 27	112.4	84 46.1	14 26	64.9	8
77 50.6	89 21	135.4	82 41.0	66 27	113.6	83 00.3	62 28	110.6	84 30.2	11 27	65.3	9
77 38.1	88 22	133.5	82 24.8	65 27	111.8	82 43.8	61 28	108.8	84 14.2	09 27	65.5	20
77 25.2	88 22	131.7	82 08.4	64 28	110.1	82 27.1	60 28	107.2	83 58.2	07 27	65.7	1
77 11.9	87 23	129.9	81 51.8	63 28	108.5	82 10.3	59 28	105.6	83 42.2	05 27	65.9	2
76 58.3	86 23	128.1	81 35.1	62 28	106.9	81 53.3	59 28	104.1	83 26.2	03 27	66.0	3
76 44.3	86 24	126.4	81 18.3	62 28	105.4	81 36.2	58 29	102.7	83 10.2	02 27	66.1	4
76 30.0	85 24	124.7	81 01.3	61 28	104.0	81 19.1	57 29	101.3	82 54.1	00 27	66.1	25
76 15.5	84 25	123.1	80 44.2	60 29	102.6	81 01.8	57 29	100.0	82 38.1	02 27	66.0	6
76 00.6	84 25	121.5	80 27.1	60 29	101.3	80 44.5	57 29	98.8	82 22.1	03 27	66.0	7
75 45.6	83 26	120.0	80 09.8	60 29	100.0	80 27.2	56 29	97.6	82 06.1	05 27	65.9	8
75 30.2	82 26	118.4	79 52.5	59 29	98.8	80 09.8	56 29	96.4	81 50.0	06 27	65.8	9
75 14.7	82 26	117.0	79 35.2	59 29	97.6	79 52.3	56 29	95.3	81 34.1	08 27	65.7	30
74 59.0	81 27	115.5	79 17.7	59 29	96.4	79 34.8	55 29	94.2	81 18.1	09 27	65.5	1
74 43.1	81 27	114.1	79 00.3	58 29	95.3	79 17.3	55 29	93.1	81 02.1	11 27	65.3	2
74 27.0	80 27	112.7	78 42.8	58 29	94.2	78 59.8	55 29	92.1	80 46.2	12 27	65.2	3
74 10.7	80 27	111.4	78 25.3	58 29	93.2	78 42.3	55 29	91.1	80 30.3	13 26	64.9	4
73 54.3	80 28	110.1	78 07.8	58 29	92.2	78 24.7	55 29	90.1	80 14.4	15 26	64.7	35
73 37.8	79 28	108.8	77 50.2	58 29	91.2	78 07.2	55 29	89.2	79 58.6	16 26	64.5	6
73 21.1	79 28	107.5	77 32.7	58 29	90.2	77 49.6	55 29	88.3	79 42.8	17 26	64.2	7
73 04.3	79 28	106.3	77 15.2	58 29	89.2	77 32.1	55 29	87.4	79 27.0	18 26	64.0	8
72 47.4	78 28	105.1	76 57.6	58 29	88.3	77 14.6	55 29	86.5	79 11.2	20 26	63.7	9
72 30.4	78 28	103.9	76 40.1	58 29	87.4	76 57.1	55 29	85.6	78 55.5	21 26	63.4	40
72 13.4	78 29	102.7	76 22.6	58 29	86.5	76 39.6	56 29	84.8	78 39.9	22 26	63.1	1
71 56.2	78 29	101.6	76 05.1	58 29	85.6	76 22.2	56 29	83.9	78 24.2	23 26	62.8	2
71 39.0	77 29	100.4	75 47.6	58 29	84.8	76 04.7	56 29	83.1	78 08.6	24 26	62.5	3
71 21.7	77 29	99.3	75 30.1	58 29	83.9	75 47.3	56 29	82.3	77 53.1	25 26	62.2	4
71 04.4	77 29	98.2	75 12.7	59 29	83.1	75 30.0	56 29	81.5	77 37.6	26 26	61.9	45
70 47.0	77 29	97.2	74 55.3	59 29	82.3	75 12.6	57 29	80.7	77 22.2	27 26	61.5	6
70 29.6	77 29	96.1	74 37.9	59 29	81.5	74 55.3	57 29	79.9	77 06.8	28 26	61.2	7
70 12.1	77 29	95.1	74 20.6	59 29	80.7	74 38.1	57 29	79.2	76 51.4	29 25	60.9	8
69 54.6	77 29	94.1	74 03.3	60 29	79.9	74 20.9	58 29	78.4	76 36.1	31 25	60.5	9
69 37.1	77 29	93.1	73 46.1	60 29	79.1	74 03.7	58 29	77.7	76 20.9	32 25	60.2	50
69 19.6	77 29	92.1	73 28.9	60 29	78.4	73 46.6	58 28	76.9	76 05.7	33 25	59.8	1
69 02.0	77 29	91.1	73 11.7	60 29	77.6	73 29.5	59 28	76.2	75 50.6	34 25	59.4	2
68 44.5	77 29	90.1	72 54.6	61 28	76.9	73 12.5	59 28	75.5	75 35.5	35 25	59.1	3
68 27.0	77 29	89.2	72 37.5	61 28	76.1	72 55.6	59 28	74.8	75 20.5	36 25	58.7	4
68 09.4	77 29	88.2	72 20.5	61 28	75.4	72 38.7	60 28	74.1	75 05.5	37 25	58.3	55
67 51.9	77 29	87.3	72 03.6	62 28	74.7	72 21.8	60 28	73.4	74 50.6	37 25	57.9	6
67 34.4	77 29	86.4	71 46.7	62 28	74.0	72 05.1	60 28	72.7	74 35.8	38 25	57.5	7
67 16.9	77 29	85.5	71 29.9	62 28	73.3	71 48.3	61 28	72.0	74 21.0	39 25	57.2	8
66 59.4	77 29	84.6	71 13.1	63 28	72.6	71 31.7	61 28	71.3	74 06.3	40 24	56.8	9
66 42.0	77 29	83.7	70 56.4	63 28	71.9	71 15.1	62 28	70.7	73 51.7	41 24	56.4	60
66 24.5	77 29	82.8	70 39.7	64 28	71.2	70 58.6	62 27	70.0	73 37.1	42 24	56.0	1
66 07.1	77 29	82.0	70 23.2	64 28	70.5	70 42.1	62 27	69.3	73 22.6	43 24	55.6	2
65 49.8	77 29	81.1	70 06.7	64 27	69.8	70 25.8	63 27	68.7	73 08.2	44 24	55.2	3
65 32.5	77 29	80.2	69 50.2	65 27	69.1	70 09.4	63 27	68.0	72 53.8	45 24	54.8	4
65 15.2	77 29	79.4	69 33.9	65 27	68.5	69 53.2	64 27	67.4	72 39.5	46 24	54.3	65
64 58.0	78 29	78.6	69 17.6	66 27	67.8	69 37.1	64 27	66.7	72 25.3	47 24	53.9	6
64 40.8	78 29	77.7	69 01.4	66 27	67.1	69 21.0	65 27	66.1	72 11.1	48 23	53.5	7
64 23.7	78 28	76.9	68 45.3	66 27	66.5	69 05.0	65 27	65.4	71 57.1	48 23	53.1	8
64 06.7	78 28	76.1	68 29.2	67 27	65.8	68 49.1	66 26	64.8	71 43.1	49 23	52.7	9
63 49.7	78 28	75.3	68 13.3	67 26	65.2	68 33.2	66 26	64.2	71 29.2	50 23	52.3	70
63 32.7	78 28	74.5	67 57.4	68 26	64.5	68 17.5	66 26	63.5	71 15.3	51 23	51.8	1
63 15.9	79 28	73.7	67 41.6	68 26	63.9	68 01.8	67 26	62.9	71 01.6	52 23	51.4	2
62 59.1	79 28	72.9	67 25.9	69 26	63.2	67 46.3	67 26	62.3	70 47.9	53 23	51.0	3
62 42.3	79 28	72.1	67 10.3	69 26	62.6	67 30.8	68 26	61.7	70 34.3	53 23	50.6	4
62 25.7	79 28	71.3	66 54.7	69 26	62.0	67 15.4	68 26	61.0	70 20.8	54 22	50.1	75
62 09.1	79 28	70.6	66 39.3	70 26	61.3	67 00.1	69 25	60.4	70 07.4	55 22	49.7	6
61 52.6	80 27	69.8	66 24.0	70 25	60.7	66 44.9	69 25	59.8	69 54.1	56 22	49.3	7
61 36.2	80 27	69.0	66 08.7	71 25	60.1	66 29.8	70 25	59.2	69 40.8	57 22	48.8	8
61 19.8	80 27	68.3	65 53.5	71 25	59.5	66 14.7	70 25	58.6	69 27.7	58 22	48.4	9
61 03.6	80 27	67.5	65 38.5	72 25	58.8	65 59.8	71 25	58.0	69 14.6	58 22	48.0	80
60 47.4	81 27	66.8	65 23.5	72 25	58.2	65 45.0	71 24	57.4	69 01.6	59 22	47.5	1
60 31.3	81 27	66.0	65 08.7	72 25	57.6	65 30.3	72 24	56.8	68 48.7	60 21	47.1	2
60 15.4	81 26	65.3	64 53.9	73 24	57.0	65 15.6	72 24	56.2	68 35.9	61 21	46.6	3
59 59.5	81 26	64.5	64 39.2	73 24	56.4	65 01.1	73 24	55.6	68 23.2	61 21	46.2	4
59 43.7	82 26	63.8	64 24.7	74 24	55.7	64 46.7	73 24	55.0	68 10.6	62 21	45.7	85
59 28.0	82 26	63.1	64 10.2	74 24	55.1	64 32.4	73 24	54.4	67 58.1	63 21	45.3	6
59 12.4	82 26	62.3	63 55.9	75 24	54.5	64 18.2	74 23	53.8	67 45.7	64 21	44.8	7
58 56.9	82 26	61.6	63 41.7	75 24	53.9	64 04.1	74 23	53.2	67 33.3	64 20	44.4	8
58 41.5	83 25	60.9	63 27.6	76 23	53.3	63 50.1	75 23	52.6	67 21.1	65 20	43.9	9
58 26.3	83 25	60.2	63 13.5	76 23	52.7	63 36.2	75 23	52.0	67 09.0	66 20	43.5	90

16—12868

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	55 39.2	86 26	62.4	56 04.8	85 26	61.9	57 20.9	84 25	60.5	57 46.1	84 25	60.0	58 11.1	83 25	59.4	62 59.6	77 23	52.1	63 22.5	76 23	51.4	66 57.0	67 20	43.0	91
2	55 23.7	86 26	61.6	55 49.3	85 26	61.2	57 05.7	84 25	59.7	57 31.0	84 25	59.2	57 56.1	83 25	58.7	62 45.9	77 23	51.5	63 08.8	76 23	50.8	66 45.1	67 20	42.6	2
3	55 08.3	86 25	60.9	55 34.0	86 25	60.4	56 50.6	85 25	59.0	57 15.9	84 25	58.5	57 41.1	84 25	58.0	62 32.2	77 23	50.9	62 55.3	77 22	50.2	66 33.2	68 20	42.1	3
4	54 53.0	86 25	60.1	55 18.8	86 25	59.7	56 35.7	85 25	58.3	57 01.0	84 25	57.8	57 26.3	84 24	57.3	62 18.6	78 22	50.3	62 41.9	77 22	49.6	66 21.5	69 19	41.7	4
95	54 37.9	86 25	59.4	55 03.7	86 25	58.9	56 20.8	85 25	57.6	56 46.3	85 24	57.1	57 11.6	84 24	56.6	62 05.2	78 22	49.7	62 28.6	78 22	49.0	66 09.9	69 19	41.2	95
6	54 22.8	87 25	58.6	54 48.8	86 25	58.2	56 06.0	85 24	56.8	56 31.6	85 24	56.4	56 57.0	85 24	55.9	61 51.9	79 22	49.1	62 15.4	78 22	48.4	65 58.4	70 19	40.7	6
7	54 07.9	87 25	57.9	54 33.9	87 25	57.5	55 51.4	86 24	56.1	56 17.0	85 24	55.7	56 42.6	85 24	55.2	61 38.7	79 22	48.5	62 02.3	79 22	47.8	65 47.0	71 19	40.3	7
8	53 53.1	87 24	57.1	54 19.2	87 24	56.7	55 36.9	86 24	55.4	56 02.6	86 24	54.9	56 28.2	85 24	54.5	61 25.6	80 22	47.9	61 49.4	79 21	47.3	65 35.7	71 19	39.8	8
9	53 38.4	87 24	56.4	54 04.6	87 24	56.0	55 22.5	86 24	54.7	55 48.3	86 24	54.2	56 14.0	85 24	53.8	61 12.6	80 21	47.3	61 36.6	79 21	46.7	65 24.5	72 18	39.4	9
100	53 23.9	88 24	55.7	53 50.1	87 24	55.3	55 08.3	86 24	54.0	55 34.2	86 23	53.5	55 59.9	86 23	53.1	60 59.8	80 21	46.7	61 23.9	80 21	46.1	65 13.5	73 18	38.9	100
1	53 09.5	88 24	54.9	53 35.8	88 24	54.5	54 54.2	87 23	53.3	55 20.1	86 23	52.8	55 46.0	86 23	52.4	60 47.1	81 21	46.1	61 11.3	80 21	45.5	65 02.5	73 18	38.4	1
2	52 55.2	88 24	54.2	53 21.5	88 24	53.8	54 40.2	87 23	52.6	55 06.2	87 23	52.1	55 32.1	86 23	51.7	60 34.5	81 21	45.5	60 58.8	81 21	44.9	64 51.7	74 18	38.0	2
3	52 41.0	88 23	53.5	53 07.5	88 23	53.1	54 26.3	87 23	51.9	54 52.4	87 23	51.4	55 18.4	87 23	51.0	60 22.1	82 21	44.9	60 46.5	81 20	44.3	64 40.9	75 18	37.5	3
4	52 27.0	89 23	52.8	52 53.5	88 23	52.4	54 12.6	87 23	51.2	54 38.8	87 23	50.7	55 04.9	87 22	50.3	60 09.7	82 20	44.3	60 34.3	82 20	43.8	64 30.3	75 18	37.0	4
105	52 13.1	89 23	52.0	52 39.7	88 23	51.6	53 59.0	88 23	50.5	54 25.2	87 22	50.0	54 51.4	87 22	49.6	59 57.6	83 20	43.7	60 22.2	82 20	43.2	64 19.8	76 17	36.6	105
6	51 59.3	89 23	51.3	52 26.0	89 23	50.9	53 45.5	88 22	49.8	54 11.9	88 22	49.4	54 38.1	87 22	48.9	59 45.5	83 20	43.2	60 10.3	83 20	42.6	64 09.4	76 17	36.1	6
7	51 45.7	89 22	50.6	52 12.4	89 22	50.2	53 32.2	88 22	49.1	53 58.6	88 22	48.7	54 25.0	88 22	48.3	59 33.6	83 20	42.6	59 58.5	83 19	42.0	63 59.1	77 17	35.6	7
8	51 32.2	89 22	49.9	51 59.0	89 22	49.5	53 19.0	89 22	48.4	53 45.5	88 22	48.0	54 12.0	88 21	47.6	59 21.8	84 19	42.0	59 46.8	83 19	41.4	63 48.9	78 17	35.2	8
9	51 18.9	90 22	49.1	51 45.8	89 22	48.8	53 06.0	89 22	47.7	53 32.6	89 21	47.3	53 59.1	88 21	46.9	59 10.1	84 19	41.4	59 35.3	84 19	40.9	63 38.9	78 17	34.7	9
110	51 05.7	90 22	48.4	51 32.6	90 22	48.1	52 53.1	89 21	47.0	53 19.7	89 21	46.6	53 46.3	89 21	46.2	58 58.6	85 19	40.8	59 23.9	84 19	40.3	63 29.0	79 16	34.2	110
1	50 52.6	90 22	47.7	51 19.7	90 21	47.4	52 40.3	89 21	46.3	53 07.1	89 21	45.9	53 33.8	89 21	45.5	58 47.2	85 19	40.2	59 12.6	85 19	39.7	63 19.2	79 16	33.8	1
2	50 39.7	90 21	47.0	51 06.8	90 21	46.7	52 27.7	90 21	45.6	52 54.5	89 21	45.2	53 21.3	89 20	44.8	58 35.9	85 19	39.6	59 01.5	85 18	39.1	63 09.5	80 16	33.3	2
3	50 27.0	91 21	46.3	50 54.1	90 21	46.0	52 15.3	90 20	44.9	52 42.2	90 20	44.5	53 09.0	89 20	44.2	58 24.8	86 18	39.0	58 50.5	85 18	38.5	62 59.9	81 16	32.8	3
4	50 14.4	91 21	45.6	50 41.6	91 21	45.2	52 02.9	90 20	44.2	52 29.9	90 20	43.9	52 56.9	90 20	43.5	58 13.8	86 18	38.4	58 39.6	86 18	38.0	62 50.5	81 16	32.3	4
115	50 01.9	91 20	44.9	50 29.2	91 20	44.5	51 50.8	90 20	43.5	52 17.9	90 20	43.2	52 44.9	90 20	42.8	58 03.0	87 18	37.9	58 28.9	86 18	37.4	62 41.2	82 15	31.9	115
6	49 49.6	91 20	44.2	50 17.0	91 20	43.8	51 38.8	91 20	42.8	52 05.9	90 20	42.5	52 33.0	90 20	42.1	57 52.3	87 18	37.3	58 18.3	87 17	36.8	62 32.0	82 15	31.4	6
7	49 37.5	92 20	43.5	50 04.9	91 20	43.1	51 26.9	91 20	42.2	51 54.2	91 19	41.8	52 21.3	90 19	41.5	57 41.7	87 17	36.7	58 07.9	87 17	36.2	62 22.9	83 15	30.9	7
8	49 25.5	92 20	42.7	49 53.0	92 20	42.4	51 15.2	91 19	41.5	51 42.5	91 19	41.1	52 09.8	91 19	40.8	57 31.3	88 17	36.1	57 57.6	87 17	35.7	62 13.9	83 15	30.4	8
9	49 13.7	92 19	42.0	49 41.2	92 19	41.7	51 03.7	91 19	40.8	51 31.1	91 19	40.5	51 58.4	91 19	40.1	57 21.1	88 17	35.5	57 47.4	88 17	35.1	62 05.1	84 14	30.0	9
120	49 02.0	92 19	41.3	49 29.7	92 19	41.0	50 52.3	92 19	40.1	51 19.8	91 19	39.8	51 47.2	91 18	39.5	57 10.9	88 17	34.9	57 37.4	88 16	34.5	61 56.4	84 14	29.5	120
1	48 50.5	92 19	40.6	49 18.2	92 19	40.3	50 41.1	92 18	39.4	51 08.6	92 18	39.1	51 36.1	91 18	38.8	57 01.0	89 16	34.4	57 27.6	88 16	33.9	61 47.8	85 14	29.0	1
2	48 39.2	93 19	39.9	49 06.9	93 18	39.6	50 30.0	92 18	38.8	50 57.6	92 18	38.4	51 25.2	92 18	38.1	56 51.1	89 16	33.8	57 17.8	89 16	33.3	61 39.4	85 14	28.5	2
3	48 28.0	93 18	39.2	48 55.8	93 18	38.9	50 19.1	92 18	38.1	50 46.8	92 18	37.8	51 14.4	92 18	37.5	56 41.5	89 16	33.2	57 08.3	89 16	32.8	61 31.1	86 14	28.0	3
4	48 17.0	93 18	38.5	48 44.9	93 18	38.3	50 08.4	93 18	37.4	50 36.1	92 18	37.1	51 03.8	92 17	36.8	56 31.9	90 16	32.6	56 58.8	90 15	32.2	61 22.9	86 13	27.6	4
125	48 06.1	93 18	37.8	48 34.1	93 18	37.6	49 57.8	93 17	36.7	50 25.6	93 17	36.4	50 53.4	93 17	36.1	56 22.6	90 15	32.0	56 49.6	90 15	31.6	61 14.9	87 13	27.1	125
6	47 55.4	94 18	37.1	48 23.5	93 17	36.9	49 47.4	93 17	36.0	50 15.3	93 17	35.8	50 43.2	93 17	35.5	56 13.3	90 15	31.4	56 40.5	90 15	31.0	61 07.0	87 13	26.6	6
7	47 44.9	94 17	36.4	48 13.1	94 17	36.2	49 37.2	93 17	35.4	50 05.1	93 17	35.1	50 33.1	93 17	34.8	56 04.3	91 15	30.8	56 31.5	91 15	30.5	60 59.2	88 13	26.1	7
8	47 34.6	94 17	35.7	48 02.8	94 17	35.5	49 27.1	94 16	34.7	49 55.2	93 16	34.4	50 23.1	93 16	34.1	55 55.4	91 15	30.3	56 22.7	91 14	29.9	60 51.5	88 13	25.6	8
9	47 24.5	94 17	35.0	47 52.7	94 17	34.8	49 17.2	94 16	34.0	49 45.3	94 16	33.7	50 13.4	93 16	33.5	55 46.6	91 14	29.7	56 14.0	91 14	29.3	60 44.0	89 12	25.1	9
130	47 14.5	94 16	34.3	47 42.8	94 16	34.1	49 07.5	94 16	33.3	49 35.7	94 16	33.1	50 03.8	94 16	32.8	55 38.0	92 14	29.1	56 05.5	92 14	28.7	60 36.6	89 12	24.7	130
1	47 04.7	95 16	33.6	47 33.0	95 16	33.4	48 57.9	94 16	32.7	49 26.2	94 16	32.4	49 54.4	94 15	32.1	55 29.5	92 14	28.5	55 57.1	92 14	28.2	60 29.4	89 12	24.2	1
2	46 55.0	95 16	33.0	47 23.5	95 16	32.7	48 48.6	94 15	32.0	49 16.9	94 15	31.7	49 45.1	94 15	31.5	55 21.2	92 14	27.9	55 48.9	92 13	27.6	60 22.2	90 12	23.7	2
3	46 45.6	95 15	32.3	47 14.1	95 15	32.0	48 39.4	95 15	31.3	49 07.7	95 15	31.1	49 36.1	94 15	30.8	55 13.1	93 13	27.4	55 40.9	93 13	27.0	60 15.3	90 11	23.2	3
4	46 36.3	95 15	31.6	47 04.8	95 15	31.3	48 30.3	95 15	30.6	48 58.8	95 15	30.4	49 27.2	95 15	30.2	55 05.1	93 13	26.8	55 33.0	93 13	26.4	60 08.4	91 11	22.7	4
135	46 27.2	95 15	30.9	46 55.8	95 15	30.7	48 21.5	95 14	30.0	48 50.0	95 14	29.7	49 18.4	95 14	29.5	54 57.3	93 13	26.2	55 25.2	93 13	25.9	60 01.7	91 11	22.2	135
6	46 18.3	96 15	30.2	46 47.0	96 14	30.0	48 12.8	95 14	29.3	48 41.4	95 14	29.1	49 09.9	95 14	28.8	54 49.6	94 12	25.6	55 17.7	93 12	25.3	59 55.2	91 11	21.7	6
7	46 09.6	96 14	29.5	46 38.3	96 14	29.3	48 04.3	95 14	28.6	48 32.9	95 14	28.4	49 01.5	95 14	28.2	54 42.1	94 12	25.0	55 10.3	94 12	24.7	59 48.7	92 10	21.3	7
8	46 01.0	96 14	28.8	46 29.8	96 14	28.6	47 56.0	96 14	28.0	48 24.7	96 13	27.7	48 53.3	95 13	27.5	54 34.8	94 12	24.4	55 03.0	94 12	24.1	59 42.4	92 10	20.8	8
9	45 52.7	96 14	28.1	46 21.5	96 14	27.9	47 47.8	96 13	27.3	48 16.6	96 13	27.1	48 45.3	96 13	26.9	54 27.6	94 12	23.9	54 55.9	94 12	23.6	59 36.3	93 10	20.3	9
140	45 44.5	96 13	27.4	46 13.4	96 13	27.2	47 39.9	96 13	26.6	48 08.7	96 13	26.4	48 37.5	96 13	26.2	54 20.6	95 11	23.3	54 49.0	95 11	23.0	59 30.3	93 10	19.8	140
1	45 36.5	96 13	26.7	46 05.4	96 13	26.5	47 32.1	96 13	26.0	48 01.0	96 13	25.7	48 29.8	96 12	25.5	54 13.7	95 11	22.7	54 42.2	95 11	22.4	59 24.4	93 10	19.3	1
2	45 28.7	97 13	26.0	45 57.7	97 13	25.9	47 24.5	96 12	25.3	47 53.5	96 12	25.1	48 22.3	96 12	24.9	54 07.1	95 11	22.1	54 35.6	95 11	21.8	59 18.7	94 09	18.8	2
3	45 21.1	97 12	25.4	45 50.1	97 12	25.2	47 17.1	97 12	24.6	47 46.1	97 12	24.4	48 15.1	96 12	24.2	54 00.5	95 11	21.5	54 29.1	95 10	21.3	59 13.1	94 09	18.3	3
4	45 13.7	97 12	24.7	45 42.8	97 12	24.5	47 09.9	97 12	23.9	47 39.0	97 12	23.8	48 07.9	97 12	23.6	53 54.2	96 10	20.9	54 22.9	96 10	20.7	59 07.7	94 09	17.8	4
145	45 06.5	97 12	24.0	45 35.6	97 12	23.8	47 02.9	97 11	23.3	47 32.0	97 11	23.1	48 01.0	97 11	22.9	53 48.0	96 10	20.4	54 16.7	96 10	20.1	59 02.4	95 09	17.3	145
6	44 59.4	97 11	23.3	45 28.6	97 11	23.1	46 56.1	97 11	22.6	47 25.2	97 11	22.4	47 54.3	97 11	22.3	53 42.0	96 10	19.8	54 10.8	96 10	19.5	58 57.2	95 08	16.8	6
7	44 52.6	97 11	22.6	45 21.8	97 11	22.4	46 49.4	97 11	21.9	47 18.6	97 11	21.8	47 47.7	97 11	21.6	53 36.1	96 09	19.2	54 05.0	96 09	19.0	58 52.2	95 08	16.4	7
8	44 46.0	98 11	21.9	45 15.2	98 11	21.8	46 43.0	97 10	21.3	47 12.2	97 10	21.1	47 41.4	97 10	20.9	53 30.4	97 09	18.6	53 59.4	96 09	18.4	58 47.3	95 08	15.9	8
9	44 39.5	98 10	21.2	45 08.8	98 10	21.1	46 36.7	98 10	20.6	47 06.0	98 10	20.4	47 35.2	97 10	20.3	53 24.9	97 09	18.0	53 53.9	97 09	17.8	58 42.6	96 08	15.4	9
150	44 33.3	98 10	20.5	45 02.6	98 10	20.4	46 30.6	98 10	19.9	46 59.9	98 10	19.8	47 29.2	98 10	19.6	53 19.6	97 09	17.5	53 48.6	97 09	17.3	58 38.0	96 07	14.9	150
1	44 27.2	98 10	19.9	44 56.6	98 10	19.7	46 24.7	98 09	19.3	46 54.1	98 09	19.1	47 23.4	98 09	19.0	53 14.4	97 08	16.9	53 43.5	97 08	16.7	58 33.6	96 07	14.4	1
2	44 21.3	98 09	19.2	44 50.8	98 09	19.0	46 19.0	98 09	18.6	46 48.4	98 09	18.5	47 17.8	98 09	18.3	53 09.4	97 08	16.3	53 38.6	97 08	16.1	58 29.3	96 07	13.9	2
3	44 15.7	98 09	18.5	44 45.2	98 09	18.3	46 13.5	98 09	17.9	46 43.0	98 09	17.8	47 12.4	98 09	17.7	53 04.5	98 08	15.7	53 33.8	97 08	15.5	58 25.2	97 07	13.4	3
4	44 10.2	98 09	17.8	44 39.7	98 09	17.7	46 08.2	98 09	17.3	46 37.7	98 08	17.1	47 07.2	98 08	17.0	52 59.9	98 08	15.1	53 29.2	98 07	15.0	58 21.2	97 06	12.9	4
155	44 05.0	99 08	17.1	44 34.5	98 08	17.0	46 03.1	98 08	16.6	46 32.6	98 08	16.5	47 02.1	98 08	16.4	52 55.4	98 07	14.5	53 24.7	98 07	14.4	58 17.4	97 06	12.4	155
6	43 59.9	99 08	16.4	44 29.5	99 08	16.3	45 58.2	99 08	15.9	46 27.7	98 08	15.8	46 57.3	98 08	15.7	52 51.1	98 07	14.0	53 20.5	98 07	13.8	58 13.7	97 06	11.9	6
7	43 55.0	99 08	15.7	44 24.7	99 08	15.6	45 53.5	99 08	15.3	46 23.1	99 07	15.2	46 52.6	99 07	15.0	52 46.9	98 07	13.4	53 16.4	98 07	13.2	58 10.1	98 06	11.4	7
8	43 50.4	99 07	15.1	44 20.0	99 07	14.9	45 48.9	99 07	14.6	46 18.6	99 07	14.5	46 48.2	99 07	14.4	52 42.9	98 06	12.8	53 12.4	98 06	12.7	58 06.7	98 05	10.9	8
9	43 45.9	99 07	14.4	44 15.6	99 07	14.3	45 44.6	99 07	14.0	46 14.3	99 07	13.8	46 43.9	99 07	13.7	52 39.1	98 06	12.2	53 08.7	98 06	12.1	58 03.5	98 05	10.4	9
160	43 41.7	99 07	13.7	44 11.4	99 07	13.6	45 40.5	99 07	13.3	46 10.2	99 06	13.2	46 39.9	99 06	13.1	52 35.5	99 06	11.6	53 05.1	99 06	11.5	58 00.4	98 05	09.9	160
1	43 37.6	99 06	13.0	44 07.4	99 06	12.9	45 36.6	99 06	12.6	46 06.3	99 06	12.5	46 36.0	99 06	12.4	52 32.1	99 05	11.1	53 01.7	99 05	10.9	57 57.4	98 05	09.4	1
2	43 33.8	99 06	12.3	44 03.6	99 06	12.2	45 32.8	99 06	12.0	46 02.6	99 06	11.9	46 32.3	99 06	11.8	52 28.8	99 05	10.5	52 58.5	99 05	10.4	57 54.6	99 04	08.9	2
3	43 30.2	99 06	11.6	43 59.9	99 06	11.5	45 29.3	99 06	11.3	45 59.1	99 06	11.2	46 28.8	99 05	11.1	52 25.7	99 05	09.9	52 55.4	99 05	09.8	57 52.0	99 04	08.4	3
4	43 26.7	99 05	10.9	43 56.5	99 05	10.9	45 25.9	99 05	10.6	45 55.7	99 05	10.5	46 25.5	99 05	10.5	52 22.8	99 05	09.3	52 52.5	99 05	09.2	57 49.5	99 04	08.0	4
165	43 23.5	99 05	10.3	43 53.3	99 05	10.2	45 22.8	99 05	10.0	45 52.6	99 05	09.9	46 22.5	99 05	09.8	52 20.0	99 04	08.7	52 49.8	99 04	08.6	57 47.1	99 04	07.5	165
6	43 20.5	1.0 05	09.6	43 50.3	1.0 05	09.5	45 19.9	99 05	09.3	45 49.7	99 05	09.2	46 19.6	99 04	09.2	52 17.4	99 04	08.1	52 47.2	99 04	08.1	57 44.9	99 03	07.0	6
7	43 17.7	1.0 04	08.9	43 47.5	1.0 04	08.8	45 17.1	1.0 04	08.6	45 47.0	1.0 04	08.6	46 16.9	1.0 04	08.5	52 15.0	99 04	07.6	52 44.9	99 04	07.5	57 42.9	99 03	06.5	7
8	43 15.0	1.0 04	08.2	43 44.9	1.0 04	08.1	45 14.6	1.0 04	08.0	45 44.5	1.0 04	07.9	46 14.4	1.0 04	07.8	52 12.8	1.0 03	07.0	52 42.7	99 03	06.9	57 41.0	99 03	06.0	8
9	43 12.6	1.0 04	07.5	43 42.6	1.0 04	07.5	45 12.3	1.0 04	07.3	45 42.2	1.0 04	07.2	46 12.1	1.0 03	07.2	52 10.8	1.0 03	06.4	52 40.6	1.0 03	06.3	57 39.2	99 03	05.5	9
170	43 10.5	1.0 03	06.8	43 40.4	1.0 03	06.8	45 10.2	1.0 03	06.6	45 40.1	1.0 03	06.6	46 10.0	1.0 03	06.5	52 08.9	1.0 03	05.8	52 38.8	1.0 03	05.8	57 37.6	1.0 02	05.0	170
1	43 08.5	1.0 03	06.2	43 38.4	1.0 03	06.1	45 08.2	1.0 03	06.0	45 38.2	1.0 03	05.9	46 08.1	1.0 03	05.9	52 07.2	1.0 03	05.2	52 37.1	1.0 02	05.2	57 36.2	1.0 02	04.5	1
2	43 06.7	1.0 03	05.5	43 36.6	1.0 03	05.4	45 06.5	1.0 03	05.3	45 36.4	1.0 03	05.3	46 06.4	1.0 02	05.2	52 05.7	1.0 02	04.7	52 35.6	1.0 02	04.6	57 34.9	1.0 02	04.0	2
3	43 05.1	1.0 02	04.8	43 35.1	1.0 02	04.8	45 05.0	1.0 02	04.6	45 34.9	1.0 02	04.6	46 04.9	1.0 02	04.6	52 04.4	1.0 02	04.1	52 34.3	1.0 02	04.0	57 33.7	1.0 02	03.5	3
4	43 03.8	1.0 02	04.1	43 33.7	1.0 02	04.1	45 03.7	1.0 02	04.0	45 33.6	1.0 02	04.0	46 03.6	1.0 02	03.9	52 03.2	1.0 02	03.5	52 33.2	1.0 02	03.5	57 32.7	1.0 01	03.0	4
175	43 02.6	1.0 02	03.4	43 32.6	1.0 02	03.4	45 02.5	1.0 02	03.3	45 32.5	1.0 02	03.3	46 02.5	1.0 02	03.3	52 02.2	1.0 01	02.9	52 32.2	1.0 01	02.9	57 31.9	1.0 01	02.5	175
6	43 01.7	1.0 01	02.7	43 31.7	1.0 01	02.7	45 01.6	1.0 01	02.7	45 31.6	1.0 01	02.6	46 01.6	1.0 01	02.6	52 01.4	1.0 01	02.3	52 31.4	1.0 01	02.3	57 31.2	1.0 01	02.0	6
7	43 00.9	1.0 01	02.1	43 30.9	1.0 01	02.0	45 00.9	1.0 01	02.0	45 30.9	1.0 01	02.0	46 00.9	1.0 01	02.0	52 00.8	1.0 01	01.7	52 30.8	1.0 01	01.7	57 30.7	1.0 01	01.5	7
8	43 00.4	1.0 01	01.4	43 30.4	1.0 01	01.4	45 00.4	1.0 00	01.3	45 30.4	1.0 00	01.3	46 00.4	1.0 00	01.3	52 00.4	1.0 00	01.2	52 30.4	1.0 00	01.2	57 30.3	1.0 00	01.0	8
9	43 00.1	1.0 00	00.7	43 30.1	1.0 00	00.7	45 00.1	1.0 00	00.7	45 30.1	1.0 00	00.7	46 00.1	1.0 00	00.7	52 00.1	1.0 00	00.6	52 30.1	1.0 00	00.6	57 30.1	1.0 00	00.5	9
180	43 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	46 00.0	1.0 00	00.0	52 00.0	1.0 00	00.0	52 30.0	1.0 00	00.0	57 30.0	1.0 00	00.0	180

Lat. 73°

Lat. 74°

Lat. 75°

Lat. 76°

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	21	180	25	180	29	180	33	180	37	180	41	180	45	180	49	180	53	180	57	180	61	180	00
4	21	176	25	176	29	176	33	175	37	175	41	175	45	175	49	175	53	175	57	174	61	174	4
8	21	171	25	171	29	171	33	171	37	171	41	170	45	170	49	170	53	169	57	169	61	168	8
12	21	167	25	167	29	167	33	166	37	166	41	166	45	165	49	165	53	164	56	163	60	162	12
16	20	163	24	163	28	162	32	162	36	161	40	161	44	160	48	159	52	159	56	158	60	157	16
20	20	159	24	158	28	158	32	157	36	157	40	156	44	155	48	154	52	154	56	152	60	151	20
24	19	155	23	154	27	153	31	153	35	152	39	151	43	150	47	150	51	148	55	147	59	145	24
28	19	150	23	150	27	149	31	148	35	148	39	147	43	146	47	145	50	143	54	142	58	140	28
32	18	146	22	145	26	145	30	144	34	143	38	142	42	141	46	140	50	138	54	137	57	135	32
36	18	142	22	141	25	140	29	140	33	139	37	138	41	136	45	135	49	134	53	132	57	130	36
40	17	138	21	137	25	136	29	135	33	134	36	133	40	132	44	131	48	129	52	127	56	125	40
44	16	134	20	133	24	132	28	131	32	130	36	129	39	127	43	126	47	124	51	123	55	120	44
48	15	130	19	129	23	128	27	127	31	126	35	124	38	123	42	122	46	120	50	118	54	116	48
52	14	126	18	125	22	124	26	123	30	121	34	120	37	119	41	117	45	116	49	114	53	111	52
56	13	122	17	121	21	120	25	119	29	117	33	116	36	115	40	113	44	111	48	109	51	107	56
60	12	118	16	117	20	116	24	114	28	113	32	112	35	110	39	109	43	107	47	105	50	103	60
64	11	114	15	113	19	112	23	110	27	109	30	108	34	106	38	105	42	103	45	101	49	99	64
68	10	110	14	109	18	108	22	106	25	105	29	104	33	102	37	101	41	99	44	97	48	95	68
72	09	106	13	105	17	104	21	103	24	101	28	100	32	98	36	97	39	95	43	93	47	91	72
76	08	102	12	101	16	100	19	99	23	97	27	96	31	94	35	93	38	91	42	89	46	87	76
80	07	98	11	97	14	96	18	95	22	93	26	92	30	91	33	89	37	87	41	85	44	83	80
84	06	95	09	93	13	92	17	91	21	90	25	88	28	87	32	85	36	84	40	82	43	80	84
88	04	91	08	90	12	88	16	87	20	86	23	84	27	83	31	82	35	80	39	78	42	76	88
92	03	87	07	86	11	85	15	83	19	82	22	81	26	79	30	78	34	76	37	74	41	72	92
96	02	83	06	82	10	81	14	80	17	78	21	77	25	76	29	74	33	73	36	71	40	69	96
100	01	79	05	78	09	77	12	76	16	75	20	73	24	72	28	70	31	69	35	67	39	66	100
104	*00*	75	04	74	07	73	11	72	15	71	19	70	23	68	27	67	30	65	34	64	38	62	104
108	*01*	72	03	71	06	69	10	68	14	67	18	66	22	65	25	63	29	62	33	60	37	59	108
112	*02*	68	01	67	05	66	09	65	13	63	17	62	21	61	24	60	28	58	32	57	36	55	112
116	*04*	64	00	63	04	62	08	61	12	60	16	59	20	57	23	56	27	55	31	54	35	52	116
120	*05*	60	*01*	59	03	58	07	57	11	56	15	55	19	54	23	53	26	51	30	50	34	49	120
124	*06*	56	*02*	55	02	54	06	53	10	52	14	51	18	50	22	49	25	48	29	47	33	45	124
128	*06*	52	*03*	51	01	50	05	50	09	49	13	48	17	47	21	46	25	45	28	43	32	42	128
132	*07*	48	*03*	47	00	47	04	46	08	45	12	44	16	43	20	42	24	41	28	40	32	39	132
136	*08*	44	*04*	44	*00*	43	04	42	07	41	11	40	15	39	19	39	23	38	27	37	31	36	136
140	*09*	40	*05*	40	*01*	39	03	38	07	37	11	37	15	36	18	35	22	34	26	33	30	32	140
144	*10*	37	*06*	36	*02*	35	02	34	06	34	10	33	14	32	18	32	22	31	26	30	30	29	144
148	*10*	33	*06*	32	*03*	31	01	31	05	30	09	29	13	29	17	28	21	27	25	27	29	26	148
152	*11*	28	*07*	28	*03*	27	01	27	05	26	09	26	13	25	17	25	21	24	25	23	29	23	152
156	*12*	24	*08*	24	*04*	23	00	23	04	23	08	22	12	22	16	21	20	21	24	20	28	19	156
160	*12*	20	*08*	20	*04*	20	*00*	19	04	19	08	18	12	18	16	18	20	17	24	17	28	16	160
164	*12*	16	*08*	16	*04*	16	*00*	15	04	15	08	15	12	14	16	14	20	14	24	13	28	13	164
168	*13*	12	*09*	12	*05*	12	*01*	12	03	11	07	11	11	11	15	11	19	10	23	10	27	10	168
172	*13*	08	*09*	08	*05*	08	*01*	08	03	08	07	07	11	07	15	07	19	07	23	07	27	06	172
176	*13*	04	*09*	04	*05*	04	*01*	04	03	04	07	04	11	04	15	04	19	03	23	03	27	03	176
180	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	23	00	27	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—12898

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 73°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	65	180	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	00
4	65	174	69	173	73	172	77	171	81	169	85	163	88	128	87	18	83	06	79	02	75	01	4
8	65	167	69	166	73	165	77	162	81	158	84	148	87	109	86	32	83	11	79	04	75	01	8
12	64	161	68	160	72	158	76	154	80	148	84	136	86	100	86	41	82	16	79	06	75	02	12
16	64	155	68	153	72	150	76	146	79	139	83	125	85	94	85	47	82	20	79	08	75	02	16
20	63	149	67	147	71	144	75	139	79	131	82	117	84	90	84	51	82	24	78	10	75	03	20
24	63	143	67	141	70	137	74	132	78	124	81	110	83	86	83	54	81	27	78	12	75	03	24
28	62	138	66	135	70	131	73	126	77	118	80	104	82	83	82	55	81	30	78	14	75	04	28
32	61	133	65	129	69	125	72	120	76	112	78	99	80	80	81	56	80	32	78	15	75	04	32
36	60	127	64	124	68	120	71	114	74	107	77	95	79	78	80	56	79	34	77	16	75	04	36
40	59	122	63	119	67	115	70	109	73	102	76	91	78	75	79	56	79	35	77	17	74	05	40
44	58	118	62	114	66	110	69	105	72	97	75	87	77	73	78	55	78	36	77	18	74	05	44
48	57	113	61	110	64	106	68	100	71	93	74	84	76	71	77	54	77	36	76	19	74	05	48
52	56	109	60	105	63	101	67	96	70	89	73	80	75	68	76	53	77	36	76	20	74	06	52
56	55	104	59	101	62	97	65	92	69	86	71	77	74	66	75	52	76	36	76	20	74	06	56
60	54	100	58	97	61	93	64	88	67	82	70	74	73	64	74	51	75	36	75	21	74	06	60
64	53	96	56	93	60	89	63	84	66	79	69	71	72	62	74	50	75	36	75	21	74	06	64
68	52	92	55	89	59	85	62	81	65	75	68	68	71	60	73	49	74	36	74	21	74	07	68
72	50	88	54	85	57	82	61	77	64	72	67	66	70	58	72	47	73	35	74	21	74	07	72
76	49	85	53	82	56	78	60	74	63	69	66	63	69	55	71	46	73	34	73	21	73	07	76
80	48	81	52	78	55	75	59	71	62	66	65	60	68	53	70	44	72	33	73	21	73	07	80
84	47	77	51	75	54	71	58	68	61	63	64	58	67	51	69	43	71	33	73	20	73	07	84
88	46	74	49	71	53	68	56	65	60	60	63	55	66	49	68	41	71	32	72	20	73	07	88
92	45	70	48	68	52	65	55	62	59	58	62	53	65	47	68	40	70	31	72	20	73	07	92
96	44	67	47	65	51	62	54	59	58	55	61	50	64	45	67	38	69	29	71	19	73	07	96
100	43	64	46	61	50	59	53	56	57	52	60	48	63	43	66	36	69	28	71	18	73	07	100
104	42	60	45	58	49	56	52	53	56	49	59	45	63	41	66	35	68	27	71	18	72	06	104
108	41	57	44	55	48	53	52	50	55	47	59	43	62	39	65	33	68	26	70	17	72	06	108
112	40	54	43	52	47	50	51	47	54	44	58	41	61	36	64	31	67	25	70	16	72	06	112
116	39	50	42	49	46	47	50	44	53	41	57	38	60	34	64	29	67	23	70	16	72	06	116
120	38	47	42	45	45	44	49	41	53	39	56	36	60	32	63	28	66	22	69	15	72	06	120
124	37	44	41	42	45	41	48	39	52	36	56	33	59	30	63	26	66	21	69	14	72	05	124
128	36	41	40	39	44	38	48	36	51	34	55	31	59	28	62	24	66	19	69	13	72	05	128
132	35	38	39	36	43	35	47	33	51	31	54	29	58	26	62	22	65	18	69	12	72	05	132
136	35	34	39	33	42	32	46	30	50	28	54	26	58	24	61	20	65	16	68	11	72	04	136
140	34	31	38	30	42	29	46	27	50	26	53	24	57	21	61	19	65	15	68	10	71	04	140
144	34	28	37	27	41	26	45	25	49	23	53	21	57	19	61	17	64	14	68	09	71	04	144
148	33	25	37	24	41	23	45	22	49	21	53	19	56	17	60	15	64	12	68	08	71	03	148
152	33	22	36	21	40	20	44	19	48	18	52	17	56	15	60	13	64	11	68	07	71	03	152
156	32	19	36	18	40	17	44	16	48	15	52	14	56	13	60	11	64	09	67	06	71	03	156
160	32	16	36	15	40	14	44	14	48	13	52	12	56	11	59	09	63	08	67	05	71	02	160
164	32	12	35	12	39	12	43	11	47	10	51	10	55	09	59	08	63	06	67	04	71	02	164
168	31	09	35	09	39	09	43	08	47	08	51	07	55	06	59	06	63	05	67	03	71	01	168
172	31	06	35	06	39	06	43	05	47	05	51	05	55	04	59	04	63	03	67	02	71	01	172
176	31	03	35	03	39	03	43	03	47	03	51	02	55	02	59	02	63	02	67	01	71	00	176
180	31	00	35	00	39	00	43	00	47	00	51	00	55	00	59	00	63	00	67	00	71	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 74°

Lat. 75°

Lat. 76°

Lat. 77°

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	16 00.0 1.0 00	180.0	16 30.0 1.0 00	180.0	17 00.0 1.0 00	180.0	17 30.0 1.0 00	180.0	18 00.0 1.0 00	180.0	18 30.0 1.0 00	180.0	19 00.0 1.0 00	180.0	19 30.0 1.0 00	180.0	00
1	15 59.9 1.0 01	179.0	16 29.8 1.0 01	179.0	16 59.8 1.0 01	179.0	17 29.8 1.0 01	179.0	17 59.8 1.0 01	178.9	18 29.8 1.0 01	178.9	18 59.8 1.0 01	178.9	19 29.8 1.0 01	178.9	1
2	15 59.4 1.0 01	177.9	16 29.4 1.0 01	177.9	16 59.4 1.0 01	177.9	17 29.4 1.0 01	177.9	17 59.4 1.0 01	177.9	18 29.4 1.0 01	177.9	18 59.4 1.0 01	177.9	19 29.4 1.0 01	177.9	2
3	15 58.6 1.0 02	176.9	16 28.6 1.0 02	176.9	16 58.6 1.0 02	176.9	17 28.6 1.0 02	176.9	17 58.6 1.0 02	176.8	18 28.6 1.0 02	176.8	18 58.6 1.0 02	176.8	19 28.6 1.0 02	176.8	3
4	15 57.6 1.0 02	175.8	16 27.6 1.0 02	175.8	16 57.6 1.0 02	175.8	17 27.6 1.0 02	175.8	17 57.6 1.0 02	175.8	18 27.6 1.0 02	175.8	18 57.6 1.0 02	175.8	19 27.6 1.0 02	175.8	4
05	15 56.2 1.0 03	174.8	16 26.2 1.0 03	174.8	16 56.2 1.0 03	174.8	17 26.2 1.0 03	174.8	17 56.2 1.0 03	174.7	18 26.2 1.0 03	174.7	18 56.2 1.0 03	174.7	19 26.2 1.0 03	174.7	05
6	15 54.6 1.0 03	173.8	16 24.6 1.0 03	173.7	16 54.6 1.0 03	173.7	17 24.6 1.0 03	173.7	17 54.5 1.0 03	173.7	18 24.5 1.0 03	173.7	18 54.5 1.0 03	173.7	19 24.5 1.0 03	173.6	6
7	15 52.7 1.0 04	172.7	16 22.6 1.0 04	172.7	16 52.6 1.0 04	172.7	17 22.6 1.0 04	172.7	17 52.6 1.0 04	172.6	18 22.6 1.0 04	172.6	18 52.5 1.0 04	172.6	19 22.5 1.0 04	172.6	7
8	15 50.4 1.0 04	171.7	16 20.4 1.0 04	171.7	16 50.4 1.0 04	171.6	17 20.3 1.0 04	171.6	17 50.3 1.0 04	171.6	18 20.3 1.0 04	171.6	18 50.3 1.0 04	171.6	19 20.2 1.0 04	171.5	8
9	15 47.9 1.0 05	170.6	16 17.8 1.0 05	170.6	16 47.8 1.0 05	170.6	17 17.8 1.0 05	170.6	17 47.7 1.0 05	170.5	18 17.7 1.0 05	170.5	18 47.7 1.0 05	170.5	19 17.7 1.0 05	170.5	9
10	15 45.0 1.0 05	169.6	16 15.0 1.0 05	169.6	16 45.0 1.0 05	169.6	17 14.9 1.0 05	169.5	17 44.9 1.0 05	169.5	18 14.8 1.0 05	169.5	18 44.8 1.0 05	169.4	19 14.8 1.0 05	169.4	10
1	15 41.9 1.0 06	168.6	16 11.9 1.0 06	168.5	16 41.8 1.0 06	168.5	17 11.8 1.0 06	168.5	17 41.7 1.0 06	168.5	18 11.7 1.0 06	168.4	18 41.6 1.0 06	168.4	19 11.6 1.0 06	168.4	1
2	15 38.5 1.0 06	167.5	16 08.4 1.0 06	167.5	16 38.4 1.0 06	167.5	17 08.3 1.0 06	167.4	17 38.3 1.0 06	167.4	18 08.2 1.0 06	167.4	18 38.2 1.0 06	167.3	19 08.1 1.0 06	167.3	2
3	15 34.8 1.0 07	166.5	16 04.7 1.0 07	166.5	16 34.6 1.0 07	166.4	17 04.6 1.0 07	166.4	17 34.5 1.0 07	166.4	18 04.4 1.0 07	166.3	18 34.4 1.0 07	166.3	19 04.3 1.0 07	166.3	3
4	15 30.8 1.0 07	165.5	16 00.7 1.0 07	165.4	16 30.6 1.0 07	165.4	17 00.5 1.0 07	165.4	17 30.5 1.0 07	165.3	18 00.4 1.0 07	165.3	18 30.3 1.0 07	165.2	19 00.2 1.0 07	165.2	4
15	15 26.5 1.0 08	164.4	15 56.4 1.0 08	164.4	16 26.3 1.0 08	164.3	16 56.2 1.0 08	164.3	17 26.1 1.0 08	164.3	17 56.0 1.0 08	164.2	18 26.0 1.0 08	164.2	18 55.9 1.0 08	164.2	15
6	15 21.9 1.0 08	163.4	15 51.8 1.0 08	163.3	16 21.7 1.0 08	163.3	16 51.6 1.0 08	163.3	17 21.5 1.0 08	163.2	17 51.4 1.0 08	163.2	18 21.3 1.0 08	163.1	18 51.2 1.0 08	163.1	6
7	15 17.0 1.0 09	162.4	15 46.9 1.0 09	162.3	16 16.8 1.0 09	162.3	16 46.7 1.0 09	162.2	17 16.6 1.0 09	162.2	17 46.5 1.0 09	162.1	18 16.4 1.0 09	162.1	18 46.3 1.0 09	162.0	7
8	15 11.8 1.0 09	161.3	15 41.7 1.0 09	161.3	16 11.6 1.0 09	161.2	16 41.5 1.0 09	161.2	17 11.4 1.0 09	161.1	17 41.3 1.0 09	161.1	18 11.1 1.0 09	161.0	18 41.0 1.0 09	161.0	8
9	15 06.4 1.0 10	160.3	15 36.3 1.0 10	160.2	16 06.2 1.0 10	160.2	16 36.0 1.0 10	160.1	17 05.9 1.0 10	160.1	17 35.8 1.0 10	160.0	18 05.6 1.0 10	160.0	18 35.5 1.0 10	159.9	9
20	15 00.7 1.0 10	159.3	15 30.6 1.0 10	159.2	16 00.4 1.0 10	159.2	16 30.3 1.0 10	159.1	17 00.1 1.0 10	159.1	17 30.0 1.0 10	159.0	17 59.8 1.0 10	159.0	18 29.7 1.0 10	158.9	20
1	14 54.7 99 10	158.2	15 24.5 99 10	158.2	15 54.4 99 10	158.1	16 24.2 99 11	158.1	16 54.1 99 11	158.0	17 23.9 99 11	158.0	17 53.7 99 11	157.9	18 23.6 99 11	157.9	1
2	14 48.4 99 11	157.2	15 18.3 99 11	157.1	15 48.1 99 11	157.1	16 17.9 99 11	157.0	16 47.7 99 11	157.0	17 17.6 99 11	156.9	17 47.4 99 11	156.9	18 17.2 99 11	156.8	2
3	14 41.9 99 11	156.2	15 11.7 99 11	156.1	15 41.5 99 11	156.1	16 11.3 99 11	156.0	16 41.1 99 11	155.9	17 10.9 99 11	155.9	17 40.7 99 12	155.8	18 10.6 99 12	155.8	3
4	14 35.1 99 12	155.1	15 04.9 99 12	155.1	15 34.7 99 12	155.0	16 04.5 99 12	155.0	16 34.3 99 12	154.9	17 04.0 99 12	154.8	17 33.8 99 12	154.8	18 03.6 99 12	154.7	4
25	14 28.0 99 12	154.1	14 57.8 99 12	154.1	15 27.5 99 12	154.0	15 57.3 99 12	153.9	16 27.1 99 12	153.9	16 56.9 99 12	153.8	17 26.7 99 12	153.7	17 56.4 99 12	153.7	25
6	14 20.6 99 13	153.1	14 50.4 99 13	153.0	15 20.2 99 13	153.0	15 49.9 99 13	152.9	16 19.7 99 13	152.8	16 49.4 99 13	152.8	17 19.2 99 13	152.7	17 49.0 99 13	152.6	6
7	14 13.0 99 13	152.1	14 42.8 99 13	152.0	15 12.5 99 13	151.9	15 42.3 99 13	151.9	16 12.0 99 13	151.8	16 41.7 99 13	151.7	17 11.5 99 13	151.7	17 41.2 99 13	151.6	7
8	14 05.1 99 14	151.1	14 34.9 99 14	151.0	15 04.6 99 14	150.9	15 34.3 99 14	150.8	16 04.1 99 14	150.8	16 33.8 99 14	150.7	17 03.5 99 14	150.6	17 33.2 99 14	150.6	8
9	13 57.0 99 14	150.0	14 26.7 99 14	150.0	14 56.4 99 14	149.9	15 26.1 99 14	149.8	15 55.9 99 14	149.7	16 25.6 99 14	149.7	16 55.3 99 14	149.6	17 25.0 99 14	149.5	9
30	13 48.6 99 14	149.0	14 18.3 99 14	148.9	14 48.0 99 14	148.9	15 17.7 99 14	148.8	15 47.4 99 15	148.7	16 17.1 99 15	148.6	16 46.8 99 15	148.6	17 16.5 99 15	148.5	30
1	13 40.0 99 15	148.0	14 09.7 99 15	147.9	14 39.3 99 15	147.8	15 09.0 99 15	147.8	15 38.7 99 15	147.7	16 08.4 99 15	147.6	16 38.0 99 15	147.5	17 07.7 99 15	147.5	1
2	13 31.1 99 15	147.0	14 00.7 99 15	146.9	14 30.4 99 15	146.8	15 00.1 99 15	146.7	15 29.7 99 15	146.7	15 59.4 99 15	146.6	16 29.0 99 15	146.5	16 58.7 99 15	146.4	2
3	13 22.0 99 16	146.0	13 51.6 99 16	145.9	14 21.2 99 16	145.8	14 50.9 99 16	145.7	15 20.5 99 16	145.6	15 50.1 99 16	145.6	16 19.8 99 16	145.5	16 49.4 99 16	145.4	3
4	13 12.6 99 16	144.9	13 42.2 99 16	144.9	14 11.8 99 16	144.8	14 41.4 99 16	144.7	15 11.0 99 16	144.6	15 40.7 99 16	144.5	16 10.3 99 16	144.4	16 39.9 99 16	144.4	4
35	13 03.0 99 16	143.9	13 32.6 99 16	143.8	14 02.2 99 16	143.8	14 31.8 99 17	143.7	15 01.4 99 17	143.6	15 30.9 99 17	143.5	16 00.5 99 17	143.4	16 30.1 99 17	143.3	35
6	12 53.1 99 17	142.9	13 22.7 99 17	142.8	13 52.3 99 17	142.7	14 21.8 99 17	142.7	14 51.4 99 17	142.6	15 21.0 99 17	142.5	15 50.6 99 17	142.4	16 20.1 99 17	142.3	6
7	12 43.0 99 17	141.9	13 12.6 99 17	141.8	13 42.1 99 17	141.7	14 11.7 99 17	141.6	14 41.3 99 17	141.6	15 10.8 99 17	141.5	15 40.4 99 17	141.4	16 09.9 98 17	141.3	7
8	12 32.7 98 18	140.9	13 02.2 98 18	140.8	13 31.8 98 18	140.7	14 01.3 98 18	140.6	14 30.9 98 18	140.5	15 00.4 98 18	140.4	15 29.9 98 18	140.4	15 59.5 98 18	140.3	8
9	12 22.2 98 18	139.9	12 51.7 98 18	139.8	13 21.2 98 18	139.7	13 50.7 98 18	139.6	14 20.2 98 18	139.5	14 49.7 98 18	139.4	15 19.3 98 18	139.3	15 48.8 98 18	139.2	9
40	12 11.4 98 18	138.9	12 40.9 98 18	138.8	13 10.4 98 18	138.7	13 39.9 98 18	138.6	14 09.4 98 18	138.5	14 38.9 98 18	138.4	15 08.4 98 18	138.3	15 37.9 98 19	138.2	40
1	12 00.4 98 19	137.9	12 29.9 98 19	137.8	12 59.4 98 19	137.7	13 28.8 98 19	137.6	13 58.3 98 19	137.5	14 27.8 98 19	137.4	14 57.3 98 19	137.3	15 26.7 98 19	137.2	1
2	11 49.2 98 19	136.9	12 18.7 98 19	136.8	12 48.1 98 19	136.7	13 17.6 98 19	136.6	13 47.0 98 19	136.5	14 16.5 98 19	136.4	14 45.9 98 19	136.3	15 15.4 98 19	136.2	2
3	11 37.8 98 19	135.9	12 07.2 98 19	135.8	12 36.7 98 19	135.7	13 06.1 98 19	135.6	13 35.5 98 20	135.5	14 05.0 98 20	135.4	14 34.4 98 20	135.3	15 03.8 98 20	135.2	3
4	11 26.2 98 20	134.9	11 55.6 98 20	134.8	12 25.0 98 20	134.7	12 54.4 98 20	134.6	13 23.8 98 20	134.5	13 53.3 98 20	134.4	14 22.7 98 20	134.3	14 52.1 98 20	134.2	4
45	11 14.4 98 20	133.9	11 43.8 98 20	133.8	12 13.2 98 20	133.7	12 42.5 98 20	133.6	13 11.9 98 20	133.5	13 41.3 98 20	133.4	14 10.7 98 20	133.3	14 40.1 98 20	133.2	45
6	11 02.3 98 20	132.9	11 31.7 98 20	132.8	12 01.1 98 20	132.7	12 30.5 98 20	132.6	12 59.8 98 20	132.5	13 29.2 98 21	132.4	13 58.6 98 21	132.2	14 27.9 98 21	132.1	6
7	10 50.1 98 21	131.9	11 19.5 98 21	131.8	11 48.8 98 21	131.7	12 18.2 98 21	131.6	12 47.5 98 21	131.5	13 16.9 98 21	131.3	13 46.2 98 21	131.2	14 15.6 98 21	131.1	7
8	10 37.7 98 21	130.9	11 07.0 98 21	130.8	11 36.4 98 21	130.7	12 05.7 98 21	130.6	12 35.0 98 21	130.5	13 04.4 98 21	130.3	13 33.7 98 21	130.2	14 03.0 98 21	130.1	8
9	10 25.1 98 21	129.9	10 54.4 98 21	129.8	11 23.7 98 21	129.7	11 53.1 98 21	129.6	12 22.4 98 21	129.5	12 51.7 98 21	129.3	13 21.0 98 22	129.2	13 50.3 98 22	129.1	9
50	10 12.3 98 22	128.9	10 41.6 98 22	128.8	11 10.9 98 22	128.7	11 40.2 98 22	128.6	12 09.5 98 22	128.5	12 38.8 98 22	128.3	13 08.1 98 22	128.2	13 37.4 98 22	128.1	50
1	9 59.4 98 22	127.9	10 28.6 98 22	127.8	10 57.9 98 22	127.7	11 27.2 98 22	127.6	11 56.5 98 22	127.5	12 25.7 98 22	127.3	12 55.0 98 22	127.2	13 24.3 98 22	127.1	1
2	9 46.2 98 22	126.9	10 15.5 98 22	126.8	10 44.7 98 22	126.7	11 14.0 98 22	126.6	11 43.2 98 22	126.5	12 12.5 97 22	126.3	12 41.7 97 22	126.2	13 11.0 97 22	126.1	2
3	9 32.9 97 22	125.9	10 02.2 97 22	125.8	10 31.4 97 23	125.7	11 00.6 97 23	125.6	11 29.9 97 23	125.5	11 59.1 97 23	125.3	12 28.3 97 23	125.2	12 57.6 97 23	125.1	3
4	9 19.4 97 23	124.9	9 48.7 97 23	124.8	10 17.9 97 23	124.7	10 47.1 97 23	124.6	11 16.3 97 23	124.5	11 45.5 97 23	124.4	12 14.7 97 23	124.2	12 43.9 97 23	124.1	4
55	9 05.8 97 23	123.9	9 35.0 97 23	123.8	10 04.2 97 23	123.7	10 33.4 97 23	123.6	11 02.6 97 23	123.5	11 31.8 97 23	123.4	12 01.0 97 23	123.2	12 30.2 97 23	123.1	55
6	8 52.0 97 23	123.0	9 21.2 97 23	122.8	9 50.4 97 23	122.7	10 19.5 97 23	122.6	10 48.7 97 23	122.5	11 17.9 97 23	122.4	11 47.1 97 23	122.3	12 16.2 97 23	122.1	6
7	8 38.0 97 24	122.0	9 07.2 97 24	121.9	9 36.4 97 24	121.7	10 05.5 97 24	121.6	10 34.7 97 24	121.5	11 03.9 97 24	121.4	11 33.0 97 24	121.3	12 02.2 97 24	121.1	7
8	8 23.9 97 24	121.0	8 53.1 97 24	120.9	9 22.2 97 24	120.8	9 51.4 97 24	120.6	10 20.5 97 24	120.5	10 49.7 97 24	120.4	11 18.8 97 24	120.3	11 47.9 97 24	120.1	8
9	8 09.7 97 24	120.0	8 38.8 97 24	119.9	9 08.0 97 24	119.8	9 37.1 97 24	119.6	10 06.2 97 24	119.5	10 35.3 97 24	119.4	11 04.4 97 24	119.3	11 33.6 97 24	119.2	9
60	7 55.3 97 24	119.0	8 24.4 97 24	118.9	8 53.5 97 24	118.8	9 22.6 97 24	118.7	9 51.7 97 24	118.5	10 20.8 97 24	118.4	10 50.0 97 24	118.3	11 19.0 97 24	118.2	60
1	7 40.8 97 24	118.1	8 09.9 97 24	117.9	8 39.0 97 24	117.8	9 08.1 97 24	117.7	9 37.1 97 25	117.6	10 06.2 97 25	117.4	10 35.3 97 25	117.3	11 04.4 97 25	117.2	1
2	7 26.1 97 25	117.1	7 55.2 97 25	116.9	8 24.3 97 25	116.8	8 53.3 97 25	116.7	9 22.4 97 25	116.6	9 51.5 97 25	116.5	10 20.6 97 25	116.3	10 49.6 97 25	116.2	2
3	7 11.3 97 25	116.1	7 40.4 97 25	116.0	8 09.4 97 25	115.8	8 38.5 97 25	115.7	9 07.6 97 25	115.6	9 36.6 97 25	115.5	10 05.7 97 25	115.3	10 34.7 97 25	115.2	3
4	6 56.4 97 25	115.1	7 25.5 97 25	115.0	7 54.5 97 25	114.9	8 23.5 97 25	114.7	8 52.6 97 25	114.6	9 21.6 97 25	114.5	9 50.7 97 25	114.4	10 19.7 97 25	114.2	4
65	6 41.4 97 25	114.1	7 10.4 97 25	114.0	7 39.4 97 25	113.9	8 08.5 97 25	113.8	8 37.5 97 25	113.6	9 06.5 97 25	113.5	9 35.5 97 25	113.4	10 04.6 97 25	113.3	65
6	6 26.2 97 25	113.2	6 55.2 97 25	113.0	7 24.3 97 26	112.9	7 53.3 97 26	112.8	8 22.3 97 26	112.7	8 51.3 97 26	112.5	9 20.3 97 26	112.4	9 49.3 97 26	112.3	6
7	6 11.0 97 26	112.2	6 40.0 97 26	112.1	7 09.0 97 26	111.9	7 38.0 97 26	111.8	8 07.0 97 26	111.7	8 36.0 97 26	111.6	9 05.0 97 26	111.4	9 34.0 97 26	111.3	7
8	5 55.6 97 26	111.2	6 24.6 97 26	111.1	6 53.6 97 26	111.0	7 22.6 97 26	110.8	7 51.6 97 26	110.7	8 20.5 97 26	110.6	8 49.5 97 26	110.4	9 18.5 97 26	110.3	8
9	5 40.1 97 26	110.3	6 09.1 97 26	110.1	6 38.1 97 26	110.0	7 07.1 97 26	109.9	7 36.0 97 26	109.7	8 05.0 97 26	109.6	8 34.0 97 26	109.5	9 02.9 97 26	109.3	9
70	5 24.6 97 26	109.3	5 53.5 97 26	109.2	6 22.5 97 26	109.0	6 51.5 97 26	108.9	7 20.4 97 26	108.8	7 49.4 97 26	108.6	8 18.3 97 26	108.5	8 47.3 97 26	108.4	70
1	5 08.9 97 26	108.3	5 37.9 97 26	108.2	6 06.8 97 26	108.1	6 35.8 96 26	107.9	7 04.7 96 26	107.8	7 33.7 96 26	107.7	8 02.6 96 26	107.5	8 31.5 96 26	107.4	1
2			5 22.1 96 26	107.2	5 51.1 96 26	107.1	6 20.0 96 26	106.9	6 48.9 96 26	106.8	7 17.9 96 26	106.7	7 46.8 96 26	106.5	8 15.7 96 26	106.4	2
3			5 06.3 96 27	106.2	5 35.2 96 27	106.1	6 04.1 96 27	106.0	6 33.1 96 27	105.8	7 02.0 96 27	105.7	7 30.9 96 27	105.6	7 59.8 96 27	105.4	3
4					5 19.3 96 27	105.1	5 48.2 96 27	105.0	6 17.1 96 27	104.9	6 46.0 96 27	104.7	7 14.9 96 27	104.6	7 43.8 96 27	104.5	4
75					5 03.3 96 27	104.2	5 32.2 96 27	104.0	6 01.1 96 27	103.9	6 30.0 96 27	103.8	6 58.9 96 27	103.6	7 27.8 96 27	103.5	75
6							5 16.1 96 27	103.1	5 45.0 96 27	102.9	6 13.9 96 27	102.8	6 42.8 96 27	102.7	7 11.7 96 27	102.5	6
7							5 00.0 96 27	102.1	5 28.9 96 27	102.0	5 57.7 96 27	101.8	6 26.6 96 27	101.7	6 55.5 96 27	101.6	7
8									5 12.6 96 27	101.0	5 41.5 96 27	100.9	6 10.4 96 27	100.7	6 39.3 96 27	100.6	8
9											5 25.3 96 27	99.9	5 54.1 96 27	99.8	6 23.0 96 27	99.6	9
80											5 08.9 96 27	98.9	5 37.8 96 27	98.8	6 06.7 96 27	98.7	80
1													5 21.4 96 27	97.8	5 50.3 96 27	97.7	1
2													5 05.0 96 27	96.9	5 33.9 96 27	96.7	2
3															5 17.5 96 27	95.8	3
4															5 01.0 96 28	94.8	4

Lat. 74°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az	Alt.	Az.	
°	′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		°
00	16 00.0 1.0 00 180.0		15 30.0 1.0 00 180.0		15 00.0 1.0 00 180.0		14 30.0 1.0 00 180.0		14 00.0 1.0 00 180.0		13 30.0 1.0 00 180.0		13 00.0 1.0 00 180.0		12 30.0 1.0 00 180.0		00
1	15 59.9 1.0 01 179.0		15 29.9 1.0 01 179.0		14 59.9 1.0 01 179.0		14 29.9 1.0 01 179.0		13 59.9 1.0 01 179.0		13 29.9 1.0 01 179.0		12 59.9 1.0 01 179.0		12 29.9 1.0 01 179.0		1
2	15 59.4 1.0 01 177.9		15 29.4 1.0 01 177.9		14 59.4 1.0 01 177.9		14 29.4 1.0 01 177.9		13 59.4 1.0 01 177.9		13 29.4 1.0 01 177.9		12 59.4 1.0 01 178.0		12 29.4 1.0 01 178.0		2
3	15 58.6 1.0 02 176.9		15 28.7 1.0 02 176.9		14 58.7 1.0 02 176.9		14 28.7 1.0 02 176.9		13 58.7 1.0 02 176.9		13 28.7 1.0 02 176.9		12 58.7 1.0 02 176.9		12 28.7 1.0 02 176.9		3
4	15 57.6 1.0 02 175.8		15 27.6 1.0 02 175.8		14 57.6 1.0 02 175.9		14 27.6 1.0 02 175.9		13 57.6 1.0 02 175.9		13 27.6 1.0 02 175.9		12 57.6 1.0 02 175.9		12 27.6 1.0 02 175.9		4
05	15 56.2 1.0 03 174.8		15 26.3 1.0 03 174.8		14 56.3 1.0 03 174.8		14 26.3 1.0 03 174.8		13 56.3 1.0 03 174.9		13 26.3 1.0 03 174.9		12 56.3 1.0 03 174.9		12 26.3 1.0 03 174.9		05
6	15 54.6 1.0 03 173.8		15 24.6 1.0 03 173.8		14 54.6 1.0 03 173.8		14 24.6 1.0 03 173.8		13 54.7 1.0 03 173.8		13 24.7 1.0 03 173.8		12 54.7 1.0 03 173.9		12 24.7 1.0 03 173.9		6
7	15 52.7 1.0 04 172.7		15 22.7 1.0 04 172.7		14 52.7 1.0 04 172.8		14 22.7 1.0 04 172.8		13 52.7 1.0 04 172.8		13 22.7 1.0 04 172.8		12 52.8 1.0 04 172.8		12 22.8 1.0 04 172.8		7
8	15 50.4 1.0 04 171.7		15 20.4 1.0 04 171.7		14 50.5 1.0 04 171.7		14 20.5 1.0 04 171.7		13 50.5 1.0 04 171.8		13 20.5 1.0 04 171.8		12 50.6 1.0 04 171.8		12 20.6 1.0 04 171.8		8
9	15 47.9 1.0 05 170.6		15 17.9 1.0 05 170.7		14 47.9 1.0 05 170.7		14 18.0 1.0 05 170.7		13 48.0 1.0 05 170.7		13 18.0 1.0 05 170.8		12 48.0 1.0 05 170.8		12 18.1 1.0 05 170.8		9
10	15 45.0 1.0 05 169.6		15 15.1 1.0 05 169.6		14 45.1 1.0 05 169.7		14 15.1 1.0 05 169.7		13 45.2 1.0 05 169.7		13 15.2 1.0 05 169.7		12 45.3 1.0 05 169.8		12 15.3 1.0 05 169.8		10
1	15 41.9 1.0 06 168.6		15 11.9 1.0 06 168.6		14 42.0 1.0 06 168.6		14 12.0 1.0 06 168.7		13 42.1 1.0 06 168.7		13 12.1 1.0 06 168.7		12 42.2 1.0 06 168.7		12 12.2 1.0 06 168.8		1
2	15 38.5 1.0 06 167.5		15 08.5 1.0 06 167.6		14 38.6 1.0 06 167.6		14 08.6 1.0 06 167.6		13 38.7 1.0 06 167.7		13 08.7 1.0 06 167.7		12 38.8 1.0 06 167.7		12 08.8 1.0 06 167.7		2
3	15 34.8 1.0 07 166.5		15 04.8 1.0 07 166.5		14 34.9 1.0 07 166.6		14 04.9 1.0 07 166.6		13 35.0 1.0 07 166.6		13 05.1 1.0 07 166.7		12 35.1 1.0 07 166.7		12 05.2 1.0 07 166.7		3
4	15 30.8 1.0 07 165.5		15 00.8 1.0 07 165.5		14 30.9 1.0 07 165.5		14 01.0 1.0 07 165.6		13 31.0 1.0 07 165.6		13 01.1 1.0 07 165.6		12 31.2 1.0 07 165.7		12 01.3 1.0 07 165.7		4
15	15 26.5 1.0 08 164.4		14 56.5 1.0 08 164.5		14 26.6 1.0 08 164.5		13 56.7 1.0 08 164.5		13 26.8 1.0 08 164.6		12 56.9 1.0 08 164.6		12 26.9 1.0 08 164.7		11 57.0 1.0 08 164.7		15
6	15 21.9 1.0 08 163.4		14 52.0 1.0 08 163.4		14 22.1 1.0 08 163.5		13 52.2 1.0 08 163.5		13 22.2 1.0 08 163.6		12 52.3 1.0 08 163.6		12 22.4 1.0 08 163.6		11 52.5 1.0 08 163.7		6
7	15 17.0 1.0 09 162.4		14 47.1 1.0 09 162.4		14 17.2 1.0 09 162.4		13 47.3 1.0 09 162.5		13 17.4 1.0 08 162.5		12 47.5 1.0 08 162.6		12 17.6 1.0 08 162.6		11 47.7 1.0 08 162.7		7
8	15 11.8 1.0 09 161.3		14 42.0 1.0 09 161.4		14 12.1 1.0 09 161.4		13 42.2 1.0 09 161.5		13 12.3 1.0 09 161.5		12 42.4 1.0 09 161.6		12 12.5 1.0 09 161.6		11 42.7 1.0 09 161.6		8
9	15 06.4 1.0 10 160.3		14 36.5 1.0 10 160.3		14 06.7 1.0 09 160.4		13 36.8 1.0 09 160.4		13 06.9 1.0 09 160.5		12 37.1 1.0 09 160.5		12 07.2 1.0 09 160.6		11 37.3 1.0 09 160.6		9
20	15 00.7 1.0 10 159.3		14 30.8 1.0 10 159.3		14 01.0 1.0 10 159.4		13 31.1 1.0 10 159.4		13 01.3 1.0 10 159.5		12 31.4 1.0 10 159.5		12 01.5 1.0 10 159.6		11 31.7 1.0 10 159.6		20
1	14 54.7 99 10 158.2		14 24.9 99 10 158.3		13 55.0 99 10 158.3		13 25.2 99 10 158.4		12 55.3 99 10 158.4		12 25.5 99 10 158.5		11 55.6 99 10 158.5		11 25.8 99 10 158.6		1
2	14 48.4 99 11 157.2		14 18.6 99 11 157.3		13 48.8 99 11 157.3		13 18.9 99 11 157.4		12 49.1 99 11 157.4		12 19.3 99 11 157.5		11 49.4 99 11 157.5		11 19.6 99 11 157.6		2
3	14 41.9 99 11 156.2		14 12.1 99 11 156.2		13 42.3 99 11 156.3		13 12.4 99 11 156.3		12 42.6 99 11 156.4		12 12.8 99 11 156.5		11 43.0 99 11 156.5		11 13.2 99 11 156.6		3
4	14 35.1 99 12 155.1		14 05.3 99 12 155.2		13 35.5 99 12 155.3		13 05.7 99 12 155.3		12 35.9 99 12 155.4		12 06.1 99 12 155.4		11 36.3 99 12 155.5		11 06.5 99 12 155.6		4
25	14 28.0 99 12 154.1		13 58.2 99 12 154.2		13 28.4 99 12 154.2		12 58.6 99 12 154.3		12 28.8 99 12 154.4		11 59.1 99 12 154.4		11 29.3 99 12 154.5		10 59.5 99 12 154.6		25
6	14 20.6 99 13 153.1		13 50.9 99 13 153.2		13 21.1 99 13 153.2		12 51.3 99 13 153.3		12 21.6 99 13 153.4		11 51.8 99 13 153.4		11 22.0 99 13 153.5		10 52.2 99 12 153.5		6
7	14 13.0 99 13 152.1		13 43.3 99 13 152.1		13 13.5 99 13 152.2		12 43.8 99 13 152.3		12 14.0 99 13 152.3		11 44.3 99 13 152.4		11 14.5 99 13 152.5		10 44.8 99 13 152.5		7
8	14 05.1 99 14 151.1		13 35.4 99 14 151.1		13 05.7 99 14 151.2		12 35.9 99 13 151.3		12 06.2 99 13 151.3		11 36.5 99 13 151.4		11 06.7 99 13 151.5		10 37.0 99 13 151.5		8
9	13 57.0 99 14 150.0		13 27.3 99 14 150.1		12 57.6 99 14 150.2		12 27.9 99 14 150.2		11 58.1 99 14 150.3		11 28.4 99 14 150.4		10 58.7 99 14 150.5		10 29.0 99 14 150.5		9
30	13 48.6 99 14 149.0		13 18.9 99 14 149.1		12 49.2 99 14 149.2		12 19.5 99 14 149.2		11 49.8 99 14 149.3		11 20.1 99 14 149.4		10 50.4 99 14 149.4		10 20.7 99 14 149.5		30
1	13 40.0 99 15 148.0		13 10.3 99 15 148.1		12 40.6 99 15 148.1		12 10.9 99 15 148.2		11 41.3 99 15 148.3		11 11.6 99 15 148.4		10 41.9 99 15 148.4		10 12.2 99 15 148.5		1
2	13 31.1 99 15 147.0		13 01.4 99 15 147.1		12 31.8 99 15 147.1		12 02.1 99 15 147.2		11 32.4 99 15 147.3		11 02.8 99 15 147.4		10 33.1 99 15 147.4		10 03.4 99 15 147.5		2
3	13 22.0 99 16 146.0		12 52.3 99 16 146.0		12 22.7 99 16 146.1		11 53.0 99 16 146.2		11 23.4 99 16 146.3		10 53.7 99 15 146.4		10 24.1 99 15 146.4		9 54.4 99 15 146.5		3
4	13 12.6 99 16 144.9		12 43.0 99 16 145.0		12 13.3 99 16 145.1		11 43.7 99 16 145.2		11 14.1 99 16 145.3		10 44.4 99 16 145.3		10 14.8 99 16 145.4		9 45.2 99 16 145.5		4
35	13 03.0 99 16 143.9		12 33.4 99 16 144.0		12 03.7 99 16 144.1		11 34.1 99 16 144.2		11 04.5 99 16 144.3		10 34.9 99 16 144.3		10 05.3 99 16 144.4		9 35.7 99 16 144.5		35
6	12 53.1 99 17 142.9		12 23.5 99 17 143.0		11 53.9 99 17 143.1		11 24.3 99 17 143.2		10 54.8 99 17 143.3		10 25.2 99 17 143.3		9 55.6 99 17 143.4		9 26.0 99 17 143.5		6
7	12 43.0 99 17 141.9		12 13.4 99 17 142.0		11 43.9 99 17 142.1		11 14.3 99 17 142.2		10 44.7 99 17 142.3		10 15.2 99 17 142.3		9 45.6 99 17 142.4		9 16.0 99 17 142.5		7
8	12 32.7 98 18 140.9		12 03.2 98 18 141.0		11 33.6 98 18 141.1		11 04.1 98 17 141.2		10 34.5 98 17 141.3		10 05.0 99 17 141.3		9 35.4 99 17 141.4		9 05.9 99 17 141.5		8
9	12 22.2 98 18 139.9		11 52.6 98 18 140.0		11 23.1 98 18 140.1		10 53.6 98 18 140.2		10 24.0 98 18 140.2		9 54.5 98 18 140.3		9 25.0 98 18 140.4		8 55.5 98 18 140.5		9
40	12 11.4 98 18 138.9		11 41.9 98 18 139.0		11 12.4 98 18 139.1		10 42.9 98 18 139.2		10 13.4 98 18 139.2		9 43.9 98 18 139.3		9 14.3 98 18 139.4		8 44.8 98 18 139.5		40
1	12 00.4 98 19 137.9		11 30.9 98 19 138.0		11 01.4 98 19 138.1		10 31.9 98 19 138.2		10 02.5 98 19 138.3		9 33.0 98 18 138.3		9 03.5 98 18 138.4		8 34.0 98 18 138.5		1
2	11 49.2 98 19 136.9		11 19.7 98 19 137.0		10 50.3 98 19 137.1		10 20.8 98 19 137.2		9 51.3 98 19 137.3		9 21.9 98 19 137.3		8 52.4 98 19 137.4		8 22.9 98 19 137.5		2
3	11 37.8 98 19 135.9		11 08.3 98 19 136.0		10 38.9 98 19 136.1		10 09.5 98 19 136.2		9 40.0 98 19 136.3		9 10.6 98 19 136.4		8 41.1 98 19 136.5		8 11.7 98 19 136.5		3
4	11 26.2 98 20 134.9		10 56.8 98 20 135.0		10 27.3 98 20 135.1		9 57.9 98 20 135.2		9 28.5 98 20 135.3		8 59.0 98 20 135.4		8 29.6 98 20 135.5		8 00.2 98 19 135.6		4
45	11 14.4 98 20 133.9		10 44.9 98 20 134.0		10 15.5 98 20 134.1		9 46.1 98 20 134.2		9 16.7 98 20 134.3		8 47.3 98 20 134.4		8 17.9 98 20 134.5		7 48.5 98 20 134.6		45
6	11 02.3 98 20 132.9		10 32.9 98 20 133.0		10 03.6 98 20 133.1		9 34.2 98 20 133.2		9 04.8 98 20 133.3		8 35.4 98 20 133.4		8 06.0 98 20 133.5		7 36.6 98 20 133.6		6
7	10 50.1 98 21 131.9		10 20.7 98 21 132.0		9 51.4 98 21 132.1		9 22.0 98 21 132.2		8 52.6 98 21 132.3		8 23.3 98 21 132.4		7 53.9 98 20 132.5		7 24.5 98 20 132.6		7
8	10 37.7 98 21 130.9		10 08.4 98 21 131.0		9 39.0 98 21 131.1		9 09.7 98 21 131.2		8 40.3 98 21 131.3		8 11.0 98 21 131.4		7 41.6 98 21 131.5		7 12.3 98 21 131.6		8
9	10 25.1 98 21 129.9		9 55.8 98 21 130.0		9 26.5 98 21 130.1		8 57.1 98 21 130.2		8 27.8 98 21 130.3		7 58.5 98 21 130.4		7 29.1 98 21 130.5		6 59.8 98 21 130.6		9
50	10 12.3 98 22 128.9		9 43.0 98 22 129.0		9 13.7 98 22 129.1		8 44.4 98 22 129.2		8 15.1 98 21 129.3		7 45.8 98 21 129.4		7 16.5 98 21 129.5		6 47.2 98 21 129.6		50
1	9 59.4 98 22 127.9		9 30.1 98 22 128.0		9 00.8 98 22 128.1		8 31.5 98 22 128.2		8 02.2 98 22 128.3		7 32.9 98 22 128.4		7 03.6 98 22 128.6		6 34.3 98 22 128.7		1
2	9 46.2 98 22 126.9		9 17.0 98 22 127.0		8 47.7 98 22 127.1		8 18.4 98 22 127.2		7 49.2 98 22 127.4		7 19.9 98 22 127.5		6 50.6 98 22 127.6		6 21.3 98 22 127.7		2
3	9 32.9 97 22 125.9		9 03.7 97 22 126.0		8 34.4 97 22 126.1		8 05.2 97 22 126.3		7 35.9 98 22 126.4		7 06.7 98 22 126.5		6 37.4 98 22 126.6		6 08.2 98 22 126.7		3
4	9 19.4 97 23 124.9		8 50.2 97 23 125.0		8 21.0 97 23 125.2		7 51.8 97 23 125.3		7 22.5 97 23 125.4		6 53.3 97 23 125.5		6 24.1 97 23 125.6		5 54.8 97 22 125.7		4
55	9 05.8 97 23 123.9		8 36.6 97 23 124.1		8 07.4 97 23 124.2		7 38.2 97 23 124.3		7 09.0 97 23 124.4		6 39.7 97 23 124.5		6 10.5 97 23 124.6		5 41.3 97 23 124.7		55
6	8 52.0 97 23 123.0		8 22.8 97 23 123.1		7 53.6 97 23 123.2		7 24.4 97 23 123.3		6 55.2 97 23 123.4		6 26.0 97 23 123.5		5 56.8 97 23 123.7		5 27.6 97 23 123.8		6
7	8 38.0 97 24 122.0		8 08.9 97 23 122.1		7 39.7 97 23 122.2		7 10.5 97 23 122.3		6 41.4 97 23 122.4		6 12.2 97 23 122.6		5 43.0 97 23 122.7		5 13.8 97 23 122.8		7
8	8 23.9 97 24 121.0		7 54.8 97 24 121.1		7 25.6 97 24 121.2		6 56.5 97 24 121.3		6 27.3 97 24 121.5		5 58.2 97 24 121.6		5 29.0 97 24 121.7				8
9	8 09.7 97 24 120.0		7 40.6 97 24 120.1		7 11.4 97 24 120.3		6 42.3 97 24 120.4		6 13.1 97 24 120.5		5 44.0 97 24 120.6		5 14.9 97 24 120.7				9
60	7 55.3 97 24 119.0		7 26.2 97 24 119.2		6 57.1 97 24 119.3		6 27.9 97 24 119.4		5 58.8 97 24 119.5		5 29.7 97 24 119.6		5 00.6 97 24 119.8				60
1	7 40.8 97 24 118.1		7 11.7 97 24 118.2		6 42.6 97 24 118.3		6 13.5 97 24 118.4		5 44.4 97 24 118.5		5 15.3 97 24 118.7						1
2	7 26.1 97 25 117.1		6 57.0 97 25 117.2		6 27.9 97 25 117.3		5 58.9 97 25 117.4		5 29.8 97 25 117.6		5 00.7 97 25 117.7						2
3	7 11.3 97 25 116.1		6 42.3 97 25 116.2		6 13.2 97 25 116.3		5 44.1 97 25 116.5		5 15.0 97 25 116.6								3
4	6 56.4 97 25 115.1		6 27.4 97 25 115.2		5 58.3 97 25 115.4		5 29.2 97 25 115.5		5 00.2 97 25 115.6								4
65	6 41.4 97 25 114.1		6 12.3 97 25 114.3		5 43.3 97 25 114.4		5 14.3 97 25 114.5										65
6	6 26.2 97 25 113.2		5 57.2 97 25 113.3		5 28.2 97 25 113.4												6
7	6 11.0 97 26 112.2		5 42.0 97 26 112.3		5 12.9 97 26 112.5												7
8	5 55.6 97 26 111.2		5 26.6 97 26 111.4														8
9	5 40.1 97 26 110.3		5 11.2 97 26 110.4														9
70	5 24.6 97 26 109.3																70
1	5 08.9 97 26 108.3																1

Lat. 74°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	00
1	19 59.8	1.0 01	178.9	20 29.8	1.0 01	178.9	20 59.8	1.0 01	178.9	21 29.8	1.0 01	178.9	21 59.8	1.0 01	178.9	22 29.8	1.0 01	178.9	22 59.8	1.0 01	178.9	23 29.8	1.0 01	178.9	1
2	19 59.4	1.0 01	177.9	20 29.4	1.0 01	177.9	20 59.4	1.0 01	177.9	21 29.4	1.0 01	177.9	21 59.4	1.0 01	177.9	22 29.4	1.0 01	177.8	22 59.4	1.0 01	177.8	23 29.4	1.0 01	177.8	2
3	19 58.6	1.0 02	176.8	20 28.6	1.0 02	176.8	20 58.6	1.0 02	176.8	21 28.6	1.0 02	176.8	21 58.6	1.0 02	176.8	22 28.6	1.0 02	176.8	22 58.6	1.0 02	176.8	23 28.6	1.0 02	176.8	3
4	19 57.5	1.0 02	175.8	20 27.5	1.0 02	175.7	20 57.5	1.0 02	175.7	21 27.5	1.0 02	175.7	21 57.5	1.0 02	175.7	22 27.5	1.0 02	175.7	22 57.5	1.0 02	175.7	23 27.5	1.0 02	175.7	4
05	19 56.2	1.0 03	174.7	20 26.2	1.0 03	174.7	20 56.2	1.0 03	174.7	21 26.1	1.0 03	174.7	21 56.1	1.0 03	174.6	22 26.1	1.0 03	174.6	22 56.1	1.0 03	174.6	23 26.1	1.0 03	174.6	05
6	19 54.5	1.0 03	173.6	20 24.5	1.0 03	173.6	20 54.5	1.0 03	173.6	21 24.4	1.0 03	173.6	21 54.4	1.0 03	173.6	22 24.4	1.0 03	173.5	22 54.4	1.0 03	173.5	23 24.4	1.0 03	173.5	6
7	19 52.5	1.0 04	172.6	20 22.5	1.0 04	172.6	20 52.5	1.0 04	172.5	21 22.4	1.0 04	172.5	21 52.4	1.0 04	172.5	22 22.4	1.0 04	172.5	22 52.4	1.0 04	172.5	23 22.4	1.0 04	172.4	7
8	19 50.2	1.0 04	171.5	20 20.2	1.0 04	171.5	20 50.2	1.0 04	171.5	21 20.1	1.0 04	171.4	21 50.1	1.0 04	171.4	22 20.1	1.0 04	171.4	22 50.1	1.0 04	171.4	23 20.0	1.0 04	171.4	8
9	19 47.6	1.0 05	170.5	20 17.6	1.0 05	170.4	20 47.6	1.0 05	170.4	21 17.5	1.0 05	170.4	21 47.5	1.0 05	170.4	22 17.5	1.0 05	170.3	22 47.4	1.0 05	170.3	23 17.4	1.0 05	170.3	9
10	19 44.7	1.0 05	169.4	20 14.7	1.0 05	169.4	20 44.7	1.0 05	169.3	21 14.6	1.0 05	169.3	21 44.6	1.0 05	169.3	22 14.5	1.0 05	169.3	22 44.5	1.0 05	169.2	23 14.5	1.0 05	169.2	10
1	19 41.5	1.0 06	168.3	20 11.5	1.0 06	168.3	20 41.4	1.0 06	168.3	21 11.4	1.0 06	168.2	21 41.3	1.0 06	168.2	22 11.3	1.0 06	168.2	22 41.2	1.0 06	168.2	23 11.2	1.0 06	168.1	1
2	19 38.0	1.0 06	167.3	20 08.0	1.0 06	167.2	20 37.9	1.0 06	167.2	21 07.9	1.0 06	167.2	21 37.8	1.0 06	167.1	22 07.8	1.0 06	167.1	22 37.7	1.0 06	167.1	23 07.6	1.0 06	167.0	2
3	19 34.3	1.0 07	166.2	20 04.2	1.0 07	166.2	20 34.1	1.0 07	166.2	21 04.1	1.0 07	166.1	21 34.0	1.0 07	166.1	22 03.9	1.0 07	166.0	22 33.9	1.0 07	166.0	23 03.8	1.0 07	166.0	3
4	19 30.2	1.0 07	165.2	20 00.1	1.0 07	165.1	20 30.0	1.0 07	165.1	20 59.9	1.0 07	165.1	21 29.9	1.0 07	165.0	21 59.8	1.0 07	165.0	22 29.7	1.0 07	164.9	22 59.6	1.0 07	164.9	4
15	19 25.8	1.0 08	164.1	19 55.7	1.0 08	164.1	20 25.6	1.0 08	164.0	20 55.5	1.0 08	164.0	21 25.4	1.0 08	163.9	21 55.3	1.0 08	163.9	22 25.3	1.0 08	163.9	22 55.2	1.0 08	163.8	15
6	19 21.1	1.0 08	163.1	19 51.0	1.0 08	163.0	20 20.9	1.0 08	163.0	20 50.8	1.0 08	162.9	21 20.7	1.0 08	162.9	21 50.6	1.0 08	162.8	22 20.5	1.0 08	162.8	22 50.4	1.0 08	162.8	6
7	19 16.1	1.0 09	162.0	19 46.0	1.0 09	162.0	20 15.9	1.0 09	161.9	20 45.8	1.0 09	161.9	21 15.7	1.0 09	161.8	21 45.6	1.0 09	161.8	22 15.5	1.0 09	161.7	22 45.4	1.0 09	161.7	7
8	19 10.9	1.0 09	161.0	19 40.8	1.0 09	160.9	20 10.6	1.0 09	160.9	20 40.5	1.0 09	160.8	21 10.4	1.0 09	160.8	21 40.3	1.0 09	160.7	22 10.1	1.0 09	160.7	22 40.0	1.0 09	160.6	8
9	19 05.4	1.0 10	159.9	19 35.2	1.0 10	159.8	20 05.1	1.0 10	159.8	20 34.9	1.0 10	159.7	21 04.8	1.0 10	159.7	21 34.7	1.0 10	159.6	22 04.5	1.0 10	159.6	22 34.4	1.0 10	159.5	9
20	18 59.5	1.0 10	158.8	19 29.4	99 10	158.8	19 59.2	99 10	158.7	20 29.1	99 10	158.7	20 58.9	99 10	158.6	21 28.8	99 10	158.6	21 58.6	99 10	158.5	22 28.5	99 10	158.5	20
1	18 53.4	99 11	157.8	19 23.3	99 11	157.7	19 53.1	99 11	157.7	20 22.9	99 11	157.6	20 52.8	99 11	157.6	21 22.6	99 11	157.5	21 52.4	99 11	157.5	22 22.2	99 11	157.4	1
2	18 47.0	99 11	156.8	19 16.8	99 11	156.7	19 46.7	99 11	156.6	20 16.5	99 11	156.6	20 46.3	99 11	156.5	21 16.1	99 11	156.5	21 45.9	99 11	156.4	22 15.7	99 11	156.3	2
3	18 40.4	99 12	155.7	19 10.2	99 12	155.6	19 40.0	99 12	155.6	20 09.8	99 12	155.5	20 39.6	99 12	155.5	21 09.4	99 12	155.4	21 39.2	99 12	155.3	22 09.0	99 12	155.3	3
4	18 33.4	99 12	154.7	19 03.2	99 12	154.6	19 33.0	99 12	154.5	20 02.8	99 12	154.5	20 32.6	99 12	154.4	21 02.4	99 12	154.3	21 32.1	99 12	154.3	22 01.9	99 12	154.2	4
25	18 26.2	99 12	153.6	18 56.0	99 12	153.6	19 25.7	99 13	153.5	19 55.5	99 13	153.4	20 25.3	99 13	153.4	20 55.1	99 13	153.3	21 24.8	99 13	153.2	21 54.6	99 13	153.2	25
6	18 18.7	99 13	152.6	18 48.5	99 13	152.5	19 18.2	99 13	152.4	19 48.0	99 13	152.4	20 17.7	99 13	152.3	20 47.5	99 13	152.2	21 17.2	99 13	152.2	21 47.0	99 13	152.1	6
7	18 11.0	99 13	151.5	18 40.7	99 13	151.5	19 10.4	99 13	151.4	19 40.2	99 13	151.3	20 09.9	99 13	151.3	20 39.6	99 14	151.2	21 09.4	99 14	151.1	21 39.1	99 14	151.0	7
8	18 03.0	99 14	150.5	18 32.7	99 14	150.4	19 02.4	99 14	150.3	19 32.1	99 14	150.3	20 01.8	99 14	150.2	20 31.5	99 14	150.1	21 01.3	99 14	150.1	21 31.0	99 14	150.0	8
9	17 54.7	99 14	149.5	18 24.4	99 14	149.4	18 54.1	99 14	149.3	19 23.8	99 14	149.2	19 53.5	99 14	149.2	20 23.2	99 14	149.1	20 52.9	99 14	149.0	21 22.6	99 14	148.9	9
30	17 46.1	99 15	148.4	18 15.8	99 15	148.3	18 45.5	99 15	148.3	19 15.2	99 15	148.2	19 44.9	99 15	148.1	20 14.5	99 15	148.0	20 44.2	99 15	148.0	21 13.9	99 15	147.9	30
1	17 37.4	99 15	147.4	18 07.0	99 15	147.3	18 36.7	99 15	147.2	19 06.3	99 15	147.1	19 36.0	99 15	147.1	20 05.7	99 15	147.0	20 35.3	99 15	146.9	21 05.0	99 15	146.8	1
2	17 28.3	99 15	146.3	17 58.0	99 16	146.3	18 27.6	99 16	146.2	18 57.2	99 16	146.1	19 26.9	99 16	146.0	19 56.5	99 16	145.9	20 26.2	99 16	145.9	20 55.8	99 16	145.8	2
3	17 19.0	99 16	145.3	17 48.7	99 16	145.2	18 18.3	99 16	145.1	18 47.9	99 16	145.1	19 17.5	99 16	145.0	19 47.1	99 16	144.9	20 16.7	99 16	144.8	20 46.4	99 16	144.7	3
4	17 09.5	99 16	144.3	17 39.1	99 16	144.2	18 08.7	99 16	144.1	18 38.3	99 16	144.0	19 07.9	99 16	143.9	19 37.5	99 16	143.9	20 07.1	99 16	143.8	20 36.7	99 17	143.7	4
35	16 59.7	99 17	143.3	17 29.3	99 17	143.2	17 58.9	99 17	143.1	18 28.5	99 17	143.0	18 58.0	99 17	142.9	19 27.6	99 17	142.8	19 57.2	99 17	142.7	20 26.8	99 17	142.6	35
6	16 49.7	99 17	142.2	17 19.3	99 17	142.1	17 48.8	99 17	142.0	18 18.4	99 17	142.0	18 48.0	99 17	141.9	19 17.5	99 17	141.8	19 47.1	99 17	141.7	20 16.6	98 17	141.6	6
7	16 39.5	98 17	141.2	17 09.0	98 18	141.1	17 38.5	98 18	141.0	18 08.1	98 18	140.9	18 37.6	98 18	140.8	19 07.2	98 18	140.7	19 36.7	98 18	140.6	20 06.2	98 18	140.6	7
8	16 29.0	98 18	140.2	16 58.5	98 18	140.1	17 28.0	98 18	140.0	17 57.5	98 18	139.9	18 27.1	98 18	139.8	18 56.6	98 18	139.7	19 26.1	98 18	139.6	19 55.6	98 18	139.5	8
9	16 18.3	98 18	139.1	16 47.8	98 18	139.1	17 17.3	98 18	139.0	17 46.8	98 18	138.9	18 16.3	98 18	138.8	18 45.8	98 18	138.7	19 15.3	98 18	138.6	19 44.7	98 18	138.5	9
40	16 07.3	98 19	138.1	16 36.8	98 19	138.0	17 06.3	98 19	137.9	17 35.8	98 19	137.8	18 05.3	98 19	137.7	18 34.7	98 19	137.6	19 04.2	98 19	137.5	19 33.7	98 19	137.4	40
1	15 56.2	98 19	137.1	16 25.7	98 19	137.0	16 55.1	98 19	136.9	17 24.6	98 19	136.8	17 54.0	98 19	136.7	18 23.5	98 19	136.6	18 52.9	98 19	136.5	19 22.4	98 19	136.4	1
2	15 44.8	98 19	136.1	16 14.3	98 19	136.0	16 43.7	98 19	135.9	17 13.2	98 19	135.8	17 42.6	98 19	135.7	18 12.0	98 19	135.6	18 41.4	98 20	135.5	19 10.9	98 20	135.4	2
3	15 33.3	98 20	135.1	16 02.7	98 20	135.0	16 32.1	98 20	134.9	17 01.5	98 20	134.8	17 30.9	98 20	134.7	18 00.3	98 20	134.6	18 29.7	98 20	134.5	18 59.1	98 20	134.4	3
4	15 21.5	98 20	134.1	15 50.9	98 20	134.0	16 20.3	98 20	133.9	16 49.7	98 20	133.7	17 19.1	98 20	133.6	17 48.5	98 20	133.5	18 17.8	98 20	133.4	18 47.2	98 20	133.3	4
45	15 09.5	98 20	133.0	15 38.9	98 20	132.9	16 08.2	98 20	132.8	16 37.6	98 20	132.7	17 07.0	98 20	132.6	17 36.4	98 20	132.5	18 05.7	98 21	132.4	18 35.1	98 21	132.3	45
6	14 57.3	98 21	132.0	15 26.7	98 21	131.9	15 56.0	98 21	131.8	16 25.4	98 21	131.7	16 54.7	98 21	131.6	17 24.1	98 21	131.5	17 53.4	98 21	131.4	18 22.8	98 21	131.3	6
7	14 44.9	98 21	131.0	15 14.3	98 21	130.9	15 43.6	98 21	130.8	16 12.9	98 21	130.7	16 42.3	98 21	130.6	17 11.6	98 21	130.5	17 40.9	98 21	130.4	18 10.2	98 21	130.3	7
8	14 32.4	98 21	130.0	15 01.7	98 21	129.9	15 31.0	98 21	129.8	16 00.3	98 21	129.7	16 29.6	98 21	129.6	16 58.9	98 21	129.5	17 28.2	98 21	129.4	17 57.5	98 22	129.2	8
9	14 19.6	98 22	129.0	14 48.9	98 22	128.9	15 18.2	98 22	128.8	15 47.5	98 22	128.7	16 16.8	98 22	128.6	16 46.1	98 22	128.4	17 15.3	98 22	128.3	17 44.6	98 22	128.2	9
50	14 06.7	98 22	128.0	14 35.9	98 22	127.9	15 05.2	98 22	127.8	15 34.5	98 22	127.7	16 03.7	98 22	127.6	16 33.0	98 22	127.4	17 02.3	98 22	127.3	17 31.5	98 22	127.2	50
1	13 53.5	98 22	127.0	14 22.8	98 22	126.9	14 52.0	98 22	126.8	15 21.3	98 22	126.7	15 50.5	97 22	126.5	16 19.8	97 22	126.4	16 49.0	97 22	126.3	17 18.3	97 22	126.2	1
2	13 40.2	97 22	126.0	14 09.5	97 22	125.9	14 38.7	97 22	125.8	15 07.9	97 23	125.7	15 37.2	97 23	125.5	16 06.4	97 23	125.4	16 35.6	97 23	125.3	17 04.8	97 23	125.2	2
3	13 26.8	97 23	125.0	13 56.0	97 23	124.9	14 25.2	97 23	124.8	14 54.4	97 23	124.6	15 23.6	97 23	124.5	15 52.8	97 23	124.4	16 22.0	97 23	124.3	16 51.2	97 23	124.2	3
4	13 13.1	97 23	124.0	13 42.3	97 23	123.9	14 11.5	97 23	123.8	14 40.7	97 23	123.6	15 09.9	97 23	123.5	15 39.1	97 23	123.4	16 08.3	97 23	123.3	16 37.5	97 23	123.2	4
55	12 59.4	97 23	123.0	13 28.5	97 23	122.9	13 57.7	97 23	122.8	14 26.9	97 23	122.6	14 56.1	97 23	122.5	15 25.2	97 23	122.4	15 54.4	97 23	122.3	16 23.6	97 23	122.2	55
6	12 45.4	97 24	122.0	13 14.6	97 24	121.9	13 43.7	97 24	121.8	14 12.9	97 24	121.6	14 42.0	97 24	121.5	15 11.2	97 24	121.4	15 40.3	97 24	121.3	16 09.5	97 24	121.2	6
7	12 31.3	97 24	121.0	13 00.5	97 24	120.9	13 29.6	97 24	120.8	13 58.7	97 24	120.7	14 27.9	97 24	120.5	14 57.0	97 24	120.4	15 26.1	97 24	120.3	15 55.2	97 24	120.2	7
8	12 17.1	97 24	120.0	12 46.2	97 24	119.9	13 15.3	97 24	119.8	13 44.4	97 24	119.7	14 13.6	97 24	119.5	14 42.7	97 24	119.4	15 11.8	97 24	119.3	15 40.9	97 24	119.2	8
9	12 02.7	97 24	119.0	12 31.8	97 24	118.9	13 00.9	97 24	118.8	13 30.0	97 24	118.7	13 59.1	97 24	118.5	14 28.2	97 24	118.4	14 57.3	97 24	118.3	15 26.4	97 24	118.2	9
60	11 48.1	97 24	118.0	12 17.2	97 24	117.9	12 46.3	97 24	117.8	13 15.4	97 25	117.7	13 44.5	97 25	117.5	14 13.6	97 25	117.4	14 42.6	97 25	117.3	15 11.7	97 25	117.2	60
1	11 33.5	97 25	117.1	12 02.6	97 25	116.9	12 31.6	97 25	116.8	13 00.7	97 25	116.7	13 29.8	97 25	116.6	13 58.8	97 25	116.4	14 27.9	97 25	116.3	14 56.9	97 25	116.2	1
2	11 18.7	97 25	116.1	11 47.7	97 25	115.9	12 16.8	97 25	115.8	12 45.9	97 25	115.7	13 14.9	97 25	115.6	13 44.0	97 25	115.4	14 13.0	97 25	115.3	14 42.0	97 25	115.2	2
3	11 03.8	97 25	115.1	11 32.8	97 25	115.0	12 01.9	97 25	114.8	12 30.9	97 25	114.7	12 59.9	97 25	114.6	13 29.0	97 25	114.4	13 58.0	97 26	114.3	14 27.0	97 26	114.2	3
4	10 48.7	97 25	114.1	11 17.8	97 25	114.0	11 46.8	97 25	113.8	12 15.8	97 25	113.7	12 44.8	97 25	113.6	13 13.8	97 25	113.5	13 42.9	97 26	113.3	14 11.9	97 26	113.2	4
65	10 33.6	97 25	113.1	11 02.6	97 25	113.0	11 31.6	97 25	112.9	12 00.6	97 26	112.7	12 29.6	97 26	112.6	12 58.6	97 26	112.5	13 27.6	97 26	112.3	13 56.6	97 26	112.2	65
6	10 18.3	97 26	112.1	10 47.3	97 26	112.0	11 16.3	97 26	111.9	11 45.3	97 26	111.7	12 14.3	97 26	111.6	12 43.3	97 26	111.5	13 12.3	97 26	111.4	13 41.2	97 26	111.2	6
7	10 02.9	97 26	111.2	10 31.9	97 26	111.0	11 00.9	97 26	110.9	11 29.9	97 26	110.8	11 58.9	97 26	110.6	12 27.8	97 26	110.5	12 56.8	97 26	110.4	13 25.8	97 26	110.2	7
8	9 47.5	97 26	110.2	10 16.4	97 26	110.1	10 45.4	97 26	109.9	11 14.4	97 26	109.8	11 43.3	97 26	109.7	12 12.3	97 26	109.5	12 41.3	97 26	109.4	13 10.2	96 26	109.3	8
9	9 31.9	97 26	109.2	10 00.9	97 26	109.1	10 29.8	97 26	108.9	10 58.8	97 26	108.8	11 27.7	96 26	108.7	11 56.7	96 26	108.5	12 25.6	96 26	108.4	12 54.5	96 26	108.3	9
70	9 16.2	96 26	108.2	9 45.2	96 26	108.1	10 14.1	96 26	108.0	10 43.1	96 26	107.8	11 12.0	96 26	107.7	11 40.9	96 26	107.6	12 09.8	96 26	107.4	12 38.8	96 26	107.3	70
1	9 00.5	96 26	107.3	9 29.4	96 26	107.1	9 58.4	96 26	107.0	10 27.3	96 26	106.9	10 56.2	96 26	106.7	11 25.1	96 26	106.6	11 54.0	96 26	106.4	12 23.0	96 26	106.3	1
2	8 44.7	96 27	106.3	9 13.6	96 27	106.1	9 42.5	96 27	106.0	10 11.4	96 27	105.9	10 40.3	96 27	105.7	11 09.2	96 27	105.6	11 38.1	96 27	105.5	12 07.1	96 27	105.3	2
3	8 28.7	96 27	105.3	8 57.7	96 27	105.2	9 26.6	96 27	105.0	9 55.5	96 27	104.9	10 24.4	96 27	104.8	10 53.3	96 27	104.6	11 22.2	96 27	104.5	11 51.1	96 27	104.4	3
4	8 12.8	96 27	104.3	8 41.7	96 27	104.2	9 10.6	96 27	104.1	9 39.5	96 27	103.9	10 08.3	96 27	103.8	10 37.2	96 27	103.7	11 06.1	96 27	103.5	11 35.0	96 27	103.4	4
75	7 56.7	96 27	103.4	8 25.6	96 27	103.2	8 54.5	96 27	103.1	9 23.4	96 27	103.0	9 52.3	96 27	102.8	10 21.1	96 27	102.7	10 50.0	96 27	102.5	11 18.9	96 27	102.4	75
6	7 40.6	96 27	102.4	8 09.5	96 27	102.3	8 38.3	96 27	102.1	9 07.2	96 27	102.0	9 36.1	96 27	101.8	10 05.0	96 27	101.7	10 33.8	96 27	101.6	11 02.7	96 27	101.4	6
7	7 24.4	96 27	101.4	7 53.3	96 27	101.3	8 22.1	96 27	101.2	8 51.0	96 27	101.0	9 19.9	96 27	100.9	9 48.7	96 27	100.7	10 17.6	96 27	100.6	10 46.5	96 27	100.5	7
8	7 08.2	96 27	100.5	7 37.0	96 27	100.3	8 05.9	96 27	100.2	8 34.8	96 27	100.0	9 03.6	96 27	99.9	9 32.5	96 27	99.8	10 01.3	96 27	99.6	10 30.2	96 27	99.5	8
9	6 51.9	96 27	99.5	7 20.7	96 27	99.4	7 49.6	96 27	99.2	8 18.4	96 27	99.1	8 47.3	96 27	98.9	9 16.2	96 27	98.8	9 45.0	96 27	98.7	10 13.8	96 27	98.5	9
80	6 35.5	96 27	98.5	7 04.4	96 27	98.4	7 33.2	96 27	98.3	8 02.1	96 27	98.1	8 30.9	96 27	98.0	8 59.8	96 27	97.8	9 28.6	96 27	97.7	9 57.5	96 27	97.6	80
1	6 19.2	96 27	97.6	6 48.0	96 27	97.4	7 16.9	96 27	97.3	7 45.7	96 27	97.1	8 14.5	96 27	97.0	8 43.4	96 27	96.9	9 12.2	96 27	96.7	9 41.1	96 27	96.6	1
2	6 02.7	96 27	96.6	6 31.6	96 27	96.5	7 00.4	96 27	96.3	7 29.3	96 27	96.2	7 58.1	96 27	96.0	8 27.0	96 27	95.9	8 55.8	96 27	95.8	9 24.6	96 27	95.6	2
3	5 46.3	96 27	95.6	6 15.1	96 27	95.5	6 44.0	96 27	95.4	7 12.8	96 27	95.2	7 41.7	96 27	95.1	8 10.5	96 27	94.9	8 39.3	96 27	94.8	9 08.1	96 28	94.7	3
4	5 29.8	96 28	94.7	5 58.7	96 28	94.5	6 27.5	96 28	94.4	6 56.3	96 28	94.3	7 25.2	96 28	94.1	7 54.0	96 28	94.0	8 22.8	96 28	93.8	8 51.7	96 28	93.7	4
85	5 13.3	96 28	93.7	5 42.2	96 28	93.6	6 11.0	96 28	93.4	6 39.8	96 28	93.3	7 08.7	96 28	93.1	7 37.5	96 28	93.0	8 06.3	96 28	92.9	8 35.1	96 28	92.7	85
6				5 25.7	96 28	92.6	5 54.5	96 28	92.5	6 23.3	96 28	92.3	6 52.1	96 28	92.2	7 21.0	96 28	92.0	7 49.8	96 28	91.9	8 18.6	96 28	91.8	6
7				5 09.1	96 28	91.6	5 38.0	96 28	91.5	6 06.8	96 28	91.4	6 35.6	96 28	91.2	7 04.4	96 28	91.1	7 33.3	96 28	90.9	8 02.1	96 28	90.8	7
8							5 21.4	96 28	90.5	5 50.3	96 28	90.4	6 19.1	96 28	90.3	6 47.9	96 28	90.1	7 16.7	96 28	90.0	7 45.5	96 28	89.8	8
9							5 04.9	96 28	89.6	5 33.7	96 28	89.4	6 02.5	96 28	89.3	6 31.4	96 28	89.2	7 00.2	96 28	89.0	7 29.0	96 28	88.9	9
90										5 17.2	96 28	88.5	5 46.0	96 28	88.3	6 14.8	96 28	88.2	6 43.7	96 28	88.1	7 12.5	96 28	87.9	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	11 00.0 1.0 00	180.0	10 30.0 1.0 00	180.0	10 00.0 1.0 00	180.0	9 30.0 1.0 00	180.0	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	00
1	11 59.9 1.0 01	179.0	11 29.9 1.0 01	179.0	10 59.9 1.0 01	179.0	10 29.9 1.0 01	179.0	9 59.9 1.0 01	179.0	9 29.9 1.0 01	179.0	8 59.9 1.0 01	179.0	8 29.9 1.0 01	179.0	1
2	11 59.4 1.0 01	178.0	11 29.4 1.0 01	178.0	10 59.4 1.0 01	178.0	10 29.4 1.0 01	178.0	9 59.4 1.0 01	178.0	9 29.4 1.0 01	178.0	8 59.4 1.0 01	178.0	8 29.4 1.0 01	178.0	2
3	11 58.7 1.0 02	176.9	11 28.7 1.0 02	176.9	10 58.7 1.0 02	177.0	10 28.7 1.0 02	177.0	9 58.7 1.0 02	177.0	9 28.7 1.0 02	177.0	8 58.7 1.0 02	177.0	8 28.7 1.0 02	177.0	3
4	11 57.6 1.0 02	175.9	11 27.7 1.0 02	175.9	10 57.7 1.0 02	175.9	10 27.7 1.0 02	176.0	9 57.7 1.0 02	176.0	9 27.7 1.0 02	176.0	8 57.7 1.0 02	176.0	8 27.7 1.0 02	176.0	4
05	11 56.3 1.0 03	174.9	11 26.3 1.0 03	174.9	10 56.3 1.0 03	174.9	10 26.4 1.0 03	174.9	9 56.4 1.0 03	175.0	9 26.4 1.0 03	175.0	8 56.4 1.0 03	175.0	8 26.4 1.0 03	175.0	05
6	11 54.7 1.0 03	173.9	11 24.7 1.0 03	173.9	10 54.7 1.0 03	173.9	10 24.7 1.0 03	173.9	9 54.8 1.0 03	173.9	9 24.8 1.0 03	174.0	8 54.8 1.0 03	174.0	8 24.8 1.0 03	174.0	6
7	11 52.8 1.0 04	172.9	11 22.8 1.0 04	172.9	10 52.8 1.0 04	172.9	10 22.9 1.0 04	172.9	9 52.9 1.0 04	172.9	9 22.9 1.0 04	173.0	8 52.9 1.0 04	173.0	8 22.9 1.0 04	173.0	7
8	11 50.6 1.0 04	171.8	11 20.6 1.0 04	171.9	10 50.6 1.0 04	171.9	10 20.7 1.0 04	171.9	9 50.7 1.0 04	171.9	9 20.7 1.0 04	171.9	8 50.7 1.0 04	172.0	8 20.8 1.0 04	172.0	8
9	11 48.1 1.0 05	170.8	11 18.1 1.0 05	170.8	10 48.2 1.0 05	170.9	10 18.2 1.0 05	170.9	9 48.2 1.0 05	170.9	9 18.3 1.0 05	170.9	8 48.3 1.0 05	171.0	8 18.3 1.0 05	171.0	9
10	11 45.3 1.0 05	169.8	11 15.4 1.0 05	169.8	10 45.4 1.0 05	169.9	10 15.4 1.0 05	169.9	9 45.5 1.0 05	169.9	9 15.5 1.0 05	169.9	8 45.5 1.0 05	170.0	8 15.6 1.0 05	170.0	10
1	11 42.3 1.0 06	168.8	11 12.3 1.0 06	168.8	10 42.3 1.0 06	168.8	10 12.4 1.0 06	168.9	9 42.4 1.0 06	168.9	9 12.5 1.0 06	168.9	8 42.5 1.0 06	169.0	8 12.6 1.0 06	169.0	1
2	11 38.9 1.0 06	167.8	11 08.9 1.0 06	167.8	10 39.0 1.0 06	167.8	10 09.1 1.0 06	167.9	9 39.1 1.0 06	167.9	9 09.2 1.0 06	167.9	8 39.2 1.0 06	168.0	8 09.3 1.0 06	168.0	2
3	11 35.3 1.0 07	166.8	11 05.3 1.0 07	166.8	10 35.4 1.0 06	166.8	10 05.4 1.0 06	166.9	9 35.5 1.0 06	166.9	9 05.5 1.0 06	166.9	8 35.6 1.0 06	166.9	8 05.7 1.0 06	167.0	3
4	11 31.3 1.0 07	165.7	11 01.4 1.0 07	165.8	10 31.5 1.0 07	165.8	10 01.5 1.0 07	165.8	9 31.6 1.0 07	165.9	9 01.7 1.0 07	165.9	8 31.7 1.0 07	165.9	8 01.8 1.0 07	166.0	4
15	11 27.1 1.0 08	164.7	10 57.2 1.0 07	164.8	10 27.3 1.0 07	164.8	9 57.3 1.0 07	164.8	9 27.4 1.0 07	164.9	8 57.5 1.0 07	164.9	8 27.6 1.0 07	164.9	7 57.7 1.0 07	165.0	15
6	11 22.6 1.0 08	163.7	10 52.7 1.0 08	163.8	10 22.8 1.0 08	163.8	9 52.9 1.0 08	163.8	9 23.0 1.0 08	163.9	8 53.1 1.0 08	163.9	8 23.1 1.0 08	163.9	7 53.2 1.0 08	164.0	6
7	11 17.8 1.0 08	162.7	10 47.9 1.0 08	162.7	10 18.0 1.0 08	162.8	9 48.1 1.0 08	162.8	9 18.2 1.0 08	162.9	8 48.3 1.0 08	162.9	8 18.4 1.0 08	162.9	7 48.5 1.0 08	163.0	7
8	11 12.8 1.0 09	161.7	10 42.9 1.0 09	161.7	10 13.0 1.0 09	161.8	9 43.1 1.0 09	161.8	9 13.2 1.0 09	161.9	8 43.3 1.0 09	161.9	8 13.4 1.0 09	161.9	7 43.6 1.0 09	162.0	8
9	11 07.4 1.0 09	160.7	10 37.6 1.0 09	160.7	10 07.7 1.0 09	160.8	9 37.8 1.0 09	160.8	9 07.9 1.0 09	160.9	8 38.1 1.0 09	160.9	8 08.2 1.0 09	160.9	7 38.3 1.0 09	161.0	9
20	11 01.8 1.0 10	159.7	10 32.0 1.0 10	159.7	10 02.1 1.0 10	159.8	9 32.2 1.0 10	159.8	9 02.4 1.0 10	159.9	8 32.5 1.0 10	159.9	8 02.6 1.0 10	159.9	7 32.8 1.0 10	160.0	20
1	10 55.9 99 10	158.6	10 26.1 99 10	158.7	9 56.2 99 10	158.7	9 26.4 99 10	158.8	8 56.5 99 10	158.9	8 26.7 1.0 10	158.9	7 56.8 1.0 10	159.0	7 27.0 1.0 10	159.0	1
2	10 49.8 99 11	157.6	10 19.9 99 11	157.7	9 50.1 99 11	157.7	9 20.3 99 11	157.8	8 50.4 99 11	157.9	8 20.6 99 11	157.9	7 50.8 99 11	158.0	7 20.9 99 11	158.0	2
3	10 43.4 99 11	156.6	10 13.5 99 11	156.7	9 43.7 99 11	156.7	9 13.9 99 11	156.8	8 44.1 99 11	156.8	8 14.2 99 11	156.9	7 44.4 99 11	157.0	7 14.6 99 11	157.0	3
4	10 36.7 99 12	155.6	10 06.9 99 12	155.7	9 37.0 99 12	155.7	9 07.2 99 12	155.8	8 37.4 99 12	155.8	8 07.6 99 11	155.9	7 37.8 99 11	156.0	7 08.0 99 11	156.0	4
25	10 29.7 99 12	154.6	9 59.9 99 12	154.7	9 30.1 99 12	154.7	9 00.3 99 12	154.8	8 30.5 99 12	154.9	8 00.7 99 12	154.9	7 31.0 99 12	155.0	7 01.2 99 12	155.0	25
6	10 22.5 99 12	153.6	9 52.7 99 12	153.7	9 22.9 99 12	153.7	8 53.2 99 12	153.8	8 23.4 99 12	153.9	7 53.6 99 12	153.9	7 23.8 99 12	154.0	6 54.1 99 12	154.0	6
7	10 15.0 99 13	152.6	9 45.2 99 13	152.7	9 15.5 99 13	152.7	8 45.7 99 13	152.8	8 16.0 99 13	152.9	7 46.2 99 13	152.9	7 16.4 99 13	153.0	6 46.7 99 13	153.0	7
8	10 07.3 99 13	151.6	9 37.5 99 13	151.7	9 07.8 99 13	151.7	8 38.0 99 13	151.8	8 08.3 99 13	151.9	7 38.5 99 13	151.9	7 08.8 99 13	152.0	6 39.1 99 13	152.1	8
9	9 59.3 99 14	150.6	9 29.5 99 14	150.7	8 59.8 99 14	150.7	8 30.1 99 14	150.8	8 00.4 99 14	150.9	7 30.6 99 14	150.9	7 00.9 99 14	151.0	6 31.2 99 14	151.1	9
30	9 51.0 99 14	149.6	9 21.3 99 14	149.7	8 51.6 99 14	149.7	8 21.9 99 14	149.8	7 52.2 99 14	149.9	7 22.5 99 14	149.9	6 52.8 99 14	150.0	6 23.1 99 14	150.1	30
1	9 42.5 99 15	148.6	9 12.8 99 15	148.7	8 43.1 99 14	148.7	8 13.5 99 14	148.8	7 43.8 99 14	148.9	7 14.1 99 14	148.9	6 44.4 99 14	149.0	6 14.7 99 14	149.1	1
2	9 33.8 99 15	147.6	9 04.1 99 15	147.7	8 34.4 99 15	147.7	8 04.8 99 15	147.8	7 35.1 99 15	147.9	7 05.4 99 15	148.0	6 35.7 99 15	148.0	6 06.1 99 15	148.1	2
3	9 24.8 99 15	146.6	8 55.1 99 15	146.7	8 25.5 99 15	146.7	7 55.8 99 15	146.8	7 26.2 99 15	146.9	6 56.5 99 15	147.0	6 26.9 99 15	147.0	5 57.2 99 15	147.1	3
4	9 15.6 99 16	145.6	8 45.9 99 16	145.7	8 16.3 99 16	145.7	7 46.7 99 16	145.8	7 17.0 99 16	145.9	6 47.4 99 16	146.0	6 17.8 99 16	146.1	5 48.1 99 16	146.1	4
35	9 06.1 99 16	144.6	8 36.5 99 16	144.7	8 06.9 99 16	144.7	7 37.2 99 16	144.8	7 07.6 99 16	144.9	6 38.0 99 16	145.0	6 08.4 99 16	145.1	5 38.8 99 16	145.1	35
6	8 56.4 99 17	143.6	8 26.8 99 17	143.7	7 57.2 99 16	143.8	7 27.6 99 16	143.8	6 58.0 99 16	143.9	6 28.4 99 16	144.0	5 58.8 99 16	144.1	5 29.2 99 16	144.2	6
7	8 46.5 99 17	142.6	8 16.9 99 17	142.7	7 47.3 99 17	142.8	7 17.7 99 17	142.8	6 48.2 99 17	142.9	6 18.6 99 17	143.0	5 49.0 99 17	143.1	5 19.4 99 17	143.2	7
8	8 36.3 99 17	141.6	8 06.7 99 17	141.7	7 37.2 99 17	141.8	7 07.6 99 17	141.9	6 38.1 99 17	141.9	6 08.5 99 17	142.0	5 39.0 99 17	142.1	5 09.4 99 17	142.2	8
9	8 25.9 98 18	140.6	7 56.4 98 18	140.7	7 26.8 98 18	140.8	6 57.3 98 18	140.9	6 27.8 98 18	141.0	5 58.2 98 18	141.0	5 28.7 98 17	141.1			9
40	8 15.3 98 18	139.6	7 45.8 98 18	139.7	7 16.3 98 18	139.8	6 46.8 98 18	139.9	6 17.2 98 18	140.0	5 47.7 98 18	140.1	5 18.2 98 18	140.2			40
1	8 04.5 98 18	138.6	7 35.0 98 18	138.7	7 05.5 98 18	138.8	6 36.0 98 18	138.9	6 06.5 98 18	139.0	5 37.0 98 18	139.1	5 07.5 98 18	139.2			1
2	7 53.4 98 19	137.6	7 24.0 98 19	137.7	6 54.5 98 19	137.8	6 25.0 98 19	137.9	5 55.5 98 19	138.0	5 26.1 98 19	138.1					2
3	7 42.2 98 19	136.6	7 12.7 98 19	136.7	6 43.3 98 19	136.8	6 13.8 98 19	136.9	5 44.4 98 19	137.0	5 14.9 98 19	137.1					3
4	7 30.7 98 19	135.7	7 01.3 98 19	135.8	6 31.9 98 19	135.9	6 02.4 98 19	135.9	5 33.0 98 19	136.0	5 03.6 98 19	136.1					4
45	7 19.1 98 20	134.7	6 49.7 98 20	134.8	6 20.2 98 20	134.9	5 50.8 98 20	135.0	5 21.4 98 20	135.1							45
6	7 07.2 98 20	133.7	6 37.8 98 20	133.8	6 08.4 98 20	133.9	5 39.0 98 20	134.0	5 09.6 98 20	134.1							6
7	6 55.2 98 20	132.7	6 25.8 98 20	132.8	5 56.4 98 20	132.9	5 27.0 98 20	133.0									7
8	6 42.9 98 21	131.7	6 13.6 98 21	131.8	5 44.2 98 21	131.9	5 14.8 98 21	132.0									8
9	6 30.5 98 21	130.7	6 01.1 98 21	130.8	5 31.8 98 21	130.9	5 02.5 98 21	131.0									9
50	6 17.8 98 21	129.8	5 48.5 98 21	129.9	5 19.2 98 21	130.0											50
1	6 05.0 98 22	128.8	5 35.7 98 22	128.9	5 06.4 98 22	129.0											1
2	5 52.1 98 22	127.8	5 22.8 98 22	127.9													2
3	5 38.9 98 22	126.8	5 09.6 98 22	126.9													3
4	5 25.6 97 22	125.8															4
55	5 12.1 97 23	124.9															55

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91							5 00.7 96 28	87.5	5 29.5 96 28	87.4	5 58.3 96 28	87.2	6 27.1 96 28	87.1	6 56.0 96 28	87.0	91
2									5 13.0 96 28	86.4	5 41.8 96 28	86.3	6 10.6 96 27	86.1	6 39.4 96 28	86.0	2
3											5 25.3 96 27	85.3	5 54.1 96 27	85.2	6 23.0 96 27	85.0	3
4											5 08.8 96 27	84.4	5 37.7 96 27	84.2	6 06.5 96 27	84.1	4
95													5 21.2 96 27	83.3	5 50.1 96 27	83.1	95
6													5 04.8 96 27	82.3	5 33.7 96 27	82.2	6
7															5 17.3 96 27	81.2	7
8															5 01.0 96 27	80.3	8

at.
4°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	27 00.0	1.0 00	180.0	27 30.0	1.0 00	180.0	00
1	23 59.8	1.0 01	178.9	24 29.8	1.0 01	178.9	24 59.8	1.0 01	178.9	25 29.8	1.0 01	178.9	25 59.8	1.0 01	178.9	26 29.8	1.0 01	178.9	26 59.8	1.0 01	178.9	27 29.8	1.0 01	178.9	1
2	23 59.4	1.0 01	177.8	24 29.4	1.0 01	177.8	24 59.4	1.0 01	177.8	25 29.4	1.0 01	177.8	25 59.4	1.0 01	177.8	26 29.4	1.0 01	177.8	26 59.4	1.0 01	177.8	27 29.4	1.0 01	177.8	2
3	23 58.6	1.0 02	176.7	24 28.6	1.0 02	176.7	24 58.6	1.0 02	176.7	25 28.6	1.0 02	176.7	25 58.6	1.0 02	176.7	26 28.6	1.0 02	176.7	26 58.6	1.0 02	176.7	27 28.6	1.0 02	176.7	3
4	23 57.5	1.0 02	175.7	24 27.5	1.0 02	175.7	24 57.5	1.0 02	175.7	25 27.5	1.0 02	175.6	25 57.5	1.0 02	175.6	26 27.5	1.0 02	175.6	26 57.5	1.0 02	175.6	27 27.4	1.0 02	175.6	4
05	23 56.1	1.0 03	174.6	24 26.1	1.0 03	174.6	24 56.1	1.0 03	174.6	25 26.1	1.0 03	174.5	25 56.1	1.0 03	174.5	26 26.0	1.0 03	174.5	26 56.0	1.0 03	174.5	27 26.0	1.0 03	174.5	05
6	23 54.4	1.0 03	173.5	24 24.4	1.0 03	173.5	24 54.3	1.0 03	173.5	25 24.3	1.0 03	173.4	25 54.3	1.0 03	173.4	26 24.3	1.0 03	173.4	26 54.3	1.0 03	173.4	27 24.3	1.0 03	173.4	6
7	23 52.3	1.0 04	172.4	24 22.3	1.0 04	172.4	24 52.3	1.0 04	172.4	25 22.3	1.0 04	172.4	25 52.3	1.0 04	172.3	26 22.2	1.0 04	172.3	26 52.2	1.0 04	172.3	27 22.2	1.0 04	172.3	7
8	23 50.0	1.0 04	171.3	24 20.0	1.0 04	171.3	24 50.0	1.0 04	171.3	25 19.9	1.0 04	171.3	25 49.9	1.0 04	171.2	26 19.9	1.0 04	171.2	26 49.8	1.0 04	171.2	27 19.8	1.0 04	171.2	8
9	23 47.4	1.0 05	170.3	24 17.3	1.0 05	170.2	24 47.3	1.0 05	170.2	25 17.3	1.0 05	170.2	25 47.2	1.0 05	170.1	26 17.2	1.0 05	170.1	26 47.2	1.0 05	170.1	27 17.1	1.0 05	170.1	9
10	23 44.4	1.0 05	169.2	24 14.4	1.0 05	169.1	24 44.3	1.0 05	169.1	25 14.3	1.0 05	169.1	25 44.2	1.0 06	169.1	26 14.2	1.0 06	169.0	26 44.2	1.0 06	169.0	27 14.1	1.0 06	169.0	10
1	23 41.2	1.0 06	168.1	24 11.1	1.0 06	168.1	24 41.1	1.0 06	168.0	25 11.0	1.0 06	168.0	25 41.0	1.0 06	168.0	26 10.9	1.0 06	167.9	26 40.8	1.0 06	167.9	27 10.8	1.0 06	167.9	1
2	23 37.6	1.0 06	167.0	24 07.5	1.0 06	167.0	24 37.5	1.0 06	166.9	25 07.4	1.0 06	166.9	25 37.3	1.0 07	166.9	26 07.3	1.0 07	166.8	26 37.2	1.0 07	166.8	27 07.2	1.0 07	166.8	2
3	23 33.7	1.0 07	165.9	24 03.6	1.0 07	165.9	24 33.6	1.0 07	165.9	25 03.5	1.0 07	165.8	25 33.4	1.0 07	165.8	26 03.4	1.0 07	165.7	26 33.3	1.0 07	165.7	27 03.2	1.0 07	165.7	3
4	23 29.5	1.0 07	164.9	23 59.5	1.0 07	164.8	24 29.4	1.0 07	164.8	24 59.3	1.0 08	164.7	25 29.2	1.0 08	164.7	25 59.1	1.0 08	164.7	26 29.1	1.0 08	164.6	26 59.0	1.0 08	164.6	4
15	23 25.1	1.0 08	163.8	23 55.0	1.0 08	163.7	24 24.9	1.0 08	163.7	24 54.8	1.0 08	163.7	25 24.7	1.0 08	163.6	25 54.6	1.0 08	163.6	26 24.5	1.0 08	163.5	26 54.4	1.0 08	163.5	15
6	23 20.3	1.0 08	162.7	23 50.2	1.0 08	162.7	24 20.1	1.0 08	162.6	24 50.0	1.0 08	162.6	25 19.9	1.0 09	162.5	25 49.8	1.0 09	162.5	26 19.7	1.0 09	162.4	26 49.6	1.0 09	162.4	6
7	23 15.2	1.0 09	161.6	23 45.1	1.0 09	161.6	24 15.0	1.0 09	161.5	24 44.9	1.0 09	161.5	25 14.8	1.0 09	161.4	25 44.7	1.0 09	161.4	26 14.5	1.0 09	161.3	26 44.4	1.0 09	161.3	7
8	23 09.9	1.0 09	160.6	23 39.8	1.0 09	160.5	24 09.6	1.0 09	160.5	24 39.5	1.0 10	160.4	25 09.4	1.0 10	160.4	25 39.2	1.0 10	160.3	26 09.1	1.0 10	160.2	26 39.0	1.0 10	160.2	8
9	23 04.2	1.0 10	159.5	23 34.1	1.0 10	159.4	24 03.9	1.0 10	159.4	24 33.8	1.0 10	159.3	25 03.7	1.0 10	159.3	25 33.5	1.0 10	159.2	26 03.4	99 10	159.2	26 33.2	99 10	159.1	9
20	22 58.3	99 10	158.4	23 28.1	99 10	158.4	23 58.0	99 10	158.3	24 27.8	99 10	158.2	24 57.7	99 10	158.2	25 27.5	99 11	158.1	25 57.3	99 11	158.1	26 27.2	99 11	158.0	20
1	22 52.1	99 11	157.3	23 21.9	99 11	157.3	23 51.7	99 11	157.2	24 21.5	99 11	157.2	24 51.4	99 11	157.1	25 21.2	99 11	157.1	25 51.0	99 11	157.0	26 20.8	99 11	156.9	1
2	22 45.6	99 11	156.3	23 15.4	99 11	156.2	23 45.2	99 11	156.2	24 15.0	99 11	156.1	24 44.8	99 11	156.0	25 14.6	99 11	156.0	25 44.4	99 12	155.9	26 14.2	99 12	155.8	2
3	22 38.8	99 12	155.2	23 08.6	99 12	155.1	23 38.4	99 12	155.1	24 08.1	99 12	155.0	24 37.9	99 12	155.0	25 07.7	99 12	154.9	25 37.5	99 12	154.8	26 07.3	99 12	154.8	3
4	22 31.7	99 12	154.1	23 01.5	99 12	154.1	23 31.2	99 12	154.0	24 01.0	99 12	153.9	24 30.8	99 12	153.9	25 00.6	99 12	153.8	25 30.3	99 12	153.7	26 00.1	99 12	153.7	4
25	22 24.3	99 13	153.1	22 54.1	99 13	153.0	23 23.9	99 13	152.9	23 53.6	99 13	152.9	24 23.4	99 13	152.8	24 53.1	99 13	152.7	25 22.9	99 13	152.7	25 52.6	99 13	152.6	25
6	22 16.7	99 13	152.0	22 46.5	99 13	152.0	23 16.2	99 13	151.9	23 45.9	99 13	151.8	24 15.7	99 13	151.7	24 45.4	99 13	151.7	25 15.1	99 13	151.6	25 44.9	99 13	151.5	6
7	22 08.8	99 14	151.0	22 38.6	99 14	150.9	23 08.3	99 14	150.8	23 38.0	99 14	150.7	24 07.7	99 14	150.7	24 37.4	99 14	150.6	25 07.1	99 14	150.5	25 36.9	99 14	150.4	7
8	22 00.7	99 14	149.9	22 30.4	99 14	149.8	23 00.1	99 14	149.8	23 29.8	99 14	149.7	23 59.5	99 14	149.6	24 29.2	99 14	149.5	24 58.9	99 14	149.4	25 28.6	99 14	149.4	8
9	21 52.2	99 14	148.8	22 21.9	99 15	148.8	22 51.6	99 15	148.7	23 21.3	99 15	148.6	23 51.0	99 15	148.5	24 20.7	99 15	148.5	24 50.3	99 15	148.4	25 20.0	99 15	148.3	9
30	21 43.6	99 15	147.8	22 13.2	99 15	147.7	22 42.9	99 15	147.6	23 12.6	99 15	147.6	23 42.2	99 15	147.5	24 11.9	99 15	147.4	24 41.5	99 15	147.3	25 11.2	99 15	147.2	30
1	21 34.6	99 15	146.7	22 04.3	99 15	146.7	22 33.9	99 15	146.6	23 03.5	99 15	146.5	23 33.2	99 15	146.4	24 02.8	99 15	146.3	24 32.5	99 16	146.2	25 02.1	99 16	146.1	1
2	21 25.4	99 16	145.7	21 55.0	99 16	145.6	22 24.7	99 16	145.5	22 54.3	99 16	145.4	23 23.9	99 16	145.3	23 53.5	99 16	145.3	24 23.1	99 16	145.2	24 52.7	99 16	145.1	2
3	21 16.0	99 16	144.6	21 45.6	99 16	144.6	22 15.2	99 16	144.5	22 44.8	99 16	144.4	23 14.4	99 16	144.3	23 44.0	99 16	144.2	24 13.6	99 16	144.1	24 43.2	99 16	144.0	3
4	21 06.3	99 17	143.6	21 35.9	99 17	143.5	22 05.4	99 17	143.4	22 35.0	99 17	143.3	23 04.6	99 17	143.2	23 34.2	99 17	143.1	24 03.7	99 17	143.0	24 33.3	99 17	143.0	4
35	20 56.3	99 17	142.5	21 25.9	99 17	142.5	21 55.5	99 17	142.4	22 25.0	99 17	142.3	22 54.6	99 17	142.2	23 24.1	99 17	142.1	23 53.7	98 17	142.0	24 23.2	98 17	141.9	35
6	20 46.2	98 17	141.5	21 15.7	98 17	141.4	21 45.2	98 17	141.3	22 14.8	98 17	141.2	22 44.3	98 18	141.1	23 13.9	98 18	141.0	23 43.4	98 18	140.9	24 12.9	98 18	140.8	6
7	20 35.7	98 18	140.5	21 05.3	98 18	140.4	21 34.8	98 18	140.3	22 04.3	98 18	140.2	22 33.8	98 18	140.1	23 03.3	98 18	140.0	23 32.8	98 18	139.9	24 02.3	98 18	139.8	7
8	20 25.1	98 18	139.4	20 54.6	98 18	139.3	21 24.1	98 18	139.2	21 53.6	98 18	139.1	22 23.1	98 18	139.0	22 52.6	98 18	138.9	23 22.1	98 18	138.8	23 51.5	98 18	138.7	8
9	20 14.2	98 18	138.4	20 43.7	98 19	138.3	21 13.2	98 19	138.2	21 42.7	98 19	138.1	22 12.1	98 19	138.0	22 41.6	98 19	137.9	23 11.1	98 19	137.8	23 40.5	98 19	137.7	9
40	20 03.1	98 19	137.3	20 32.6	98 19	137.2	21 02.1	98 19	137.1	21 31.5	98 19	137.0	22 01.0	98 19	136.9	22 30.4	98 19	136.8	22 59.8	98 19	136.7	23 29.3	98 19	136.6	40
1	19 51.8	98 19	136.3	20 21.3	98 19	136.2	20 50.7	98 19	136.1	21 20.1	98 19	136.0	21 49.6	98 19	135.9	22 19.0	98 19	135.8	22 48.4	98 19	135.7	23 17.8	98 19	135.6	1
2	19 40.3	98 20	135.3	20 09.7	98 20	135.2	20 39.1	98 20	135.1	21 08.5	98 20	135.0	21 37.9	98 20	134.9	22 07.3	98 20	134.7	22 36.7	98 20	134.6	23 06.1	98 20	134.5	2
3	19 28.5	98 20	134.2	19 57.9	98 20	134.1	20 27.3	98 20	134.0	20 56.7	98 20	133.9	21 26.1	98 20	133.8	21 55.5	98 20	133.7	22 24.9	98 20	133.6	22 54.2	98 20	133.5	3
4	19 16.6	98 20	133.2	19 46.0	98 20	133.1	20 15.3	98 20	133.0	20 44.7	98 20	132.9	21 14.1	98 20	132.8	21 43.4	98 20	132.7	22 12.8	98 20	132.6	22 42.1	98 20	132.5	4
45	19 04.4	98 21	132.2	19 33.8	98 21	132.1	20 03.1	98 21	132.0	20 32.5	98 21	131.9	21 01.8	98 21	131.8	21 31.2	98 21	131.6	22 00.5	98 21	131.5	22 29.8	98 21	131.4	45
6	18 52.1	98 21	131.2	19 21.4	98 21	131.1	19 50.8	98 21	130.9	20 20.1	98 21	130.8	20 49.4	98 21	130.7	21 18.7	98 21	130.6	21 48.0	98 21	130.5	22 17.3	98 21	130.4	6
7	18 39.5	98 21	130.1	19 08.9	98 21	130.0	19 38.2	98 21	129.9	20 07.5	98 21	129.8	20 36.8	98 21	129.7	21 06.1	98 21	129.6	21 35.3	98 21	129.5	22 04.6	98 21	129.3	7
8	18 26.8	98 22	129.1	18 56.1	98 22	129.0	19 25.4	98 22	128.9	19 54.7	98 22	128.8	20 23.9	98 22	128.7	20 53.2	98 22	128.5	21 22.5	98 22	128.4	21 51.7	98 22	128.3	8
9	18 13.9	98 22	128.1	18 43.2	98 22	128.0	19 12.4	98 22	127.9	19 41.7	98 22	127.8	20 10.9	98 22	127.6	20 40.2	97 22	127.5	21 09.4	97 22	127.4	21 38.7	97 22	127.3	9
50	18 00.8	98 22	127.1	18 30.0	97 22	127.0	18 59.3	97 22	126.9	19 28.5	97 22	126.7	19 57.8	97 22	126.6	20 27.0	97 22	126.5	20 56.2	97 22	126.4	21 25.4	97 22	126.3	50
1	17 47.5	97 22	126.1	18 16.7	97 22	126.0	18 46.0	97 22	125.8	19 15.2	97 22	125.7	19 44.4	97 22	125.6	20 13.6	97 23	125.5	20 42.8	97 23	125.4	21 12.0	97 23	125.2	1
2	17 34.1	97 23	125.1	18 03.3	97 23	124.9	18 32.5	97 23	124.8	19 01.7	97 23	124.7	19 30.9	97 23	124.6	20 00.0	97 23	124.5	20 29.2	97 23	124.3	20 58.4	97 23	124.2	2
3	17 20.4	97 23	124.1	17 49.6	97 23	123.9	18 18.8	97 23	123.8	18 48.0	97 23	123.7	19 17.2	97 23	123.6	19 46.3	97 23	123.4	20 15.5	97 23	123.3	20 44.7	97 23	123.2	3
4	17 06.6	97 23	123.0	17 35.8	97 23	122.9	18 05.0	97 23	122.8	18 34.1	97 23	122.7	19 03.3	97 23	122.6	19 32.4	97 23	122.4	20 01.6	97 23	122.3	20 30.7	97 23	122.2	4
55	16 52.7	97 23	122.0	17 21.9	97 24	121.9	17 51.0	97 24	121.8	18 20.1	97 24	121.7	18 49.3	97 24	121.5	19 18.4	97 24	121.4	19 47.5	97 24	121.3	20 16.7	97 24	121.2	55
6	16 38.6	97 24	121.0	17 07.7	97 24	120.9	17 36.9	97 24	120.8	18 06.0	97 24	120.7	18 35.1	97 24	120.5	19 04.2	97 24	120.4	19 33.3	97 24	120.3	20 02.4	97 24	120.1	6
7	16 24.4	97 24	120.0	16 53.5	97 24	119.9	17 22.6	97 24	119.8	17 51.7	97 24	119.7	18 20.8	97 24	119.5	18 49.9	97 24	119.4	19 19.0	97 24	119.3	19 48.1	97 24	119.1	7
8	16 10.0	97 24	119.0	16 39.1	97 24	118.9	17 08.2	97 24	118.8	17 37.2	97 24	118.6	18 06.3	97 24	118.5	18 35.4	97 24	118.4	19 04.5	97 24	118.3	19 33.5	97 24	118.1	8
9	15 55.4	97 24	118.0	16 24.5	97 24	117.9	16 53.6	97 24	117.8	17 22.7	97 25	117.6	17 51.7	97 25	117.5	18 20.8	97 25	117.4	18 49.8	97 25	117.3	19 18.9	97 25	117.1	9
60	15 40.8	97 25	117.0	16 09.8	97 25	116.9	16 38.9	97 25	116.8	17 08.0	97 25	116.6	17 37.0	97 25	116.5	18 06.0	97 25	116.4	18 35.1	97 25	116.2	19 04.1	97 25	116.1	60
1	15 26.0	97 25	116.0	15 55.0	97 25	115.9	16 24.1	97 25	115.8	16 53.1	97 25	115.6	17 22.1	97 25	115.5	17 51.2	97 25	115.4	18 20.2	97 25	115.2	18 49.2	97 25	115.1	1
2	15 11.1	97 25	115.0	15 40.1	97 25	114.9	16 09.1	97 25	114.8	16 38.1	97 25	114.6	17 07.1	97 25	114.5	17 36.2	97 25	114.4	18 05.2	97 25	114.2	18 34.2	97 25	114.1	2
3	14 56.0	97 25	114.1	15 25.0	97 25	113.9	15 54.0	97 25	113.8	16 23.0	97 25	113.7	16 52.0	97 25	113.5	17 21.0	97 25	113.4	17 50.0	97 25	113.3	18 19.0	97 25	113.1	3
4	14 40.9	97 25	113.1	15 09.9	97 25	112.9	15 38.9	97 25	112.8	16 07.8	97 26	112.7	16 36.8	97 26	112.5	17 05.8	97 26	112.4	17 34.8	97 26	112.3	18 03.7	97 26	112.1	4
65	14 25.6	97 26	112.1	14 54.6	97 26	111.9	15 23.5	97 26	111.8	15 52.5	97 26	111.7	16 21.5	97 26	111.5	16 50.5	97 26	111.4	17 19.4	97 26	111.3	17 48.4	96 26	111.1	65
6	14 10.2	97 26	111.1	14 39.2	97 26	111.0	15 08.1	97 26	110.8	15 37.1	97 26	110.7	16 06.1	97 26	110.5	16 35.0	96 26	110.4	17 03.9	96 26	110.3	17 32.9	96 26	110.1	6
7	13 54.7	97 26	110.1	14 23.7	97 26	110.0	14 52.6	96 26	109.8	15 21.6	96 26	109.7	15 50.5	96 26	109.6	16 19.5	96 26	109.4	16 48.4	96 26	109.3	17 17.3	96 26	109.1	7
8	13 39.2	96 26	109.1	14 08.1	96 26	109.0	14 37.0	96 26	108.8	15 06.0	96 26	108.7	15 34.9	96 26	108.6	16 03.8	96 26	108.4	16 32.7	96 26	108.3	17 01.6	96 26	108.2	8
9	13 23.5	96 26	108.1	13 52.4	96 26	108.0	14 21.3	96 26	107.9	14 50.3	96 26	107.7	15 19.2	96 26	107.6	15 48.1	96 26	107.4	16 17.0	96 26	107.3	16 45.9	96 26	107.2	9
70	13 07.7	96 26	107.2	13 36.6	96 26	107.0	14 05.5	96 26	106.9	14 34.5	96 26	106.7	15 03.4	96 26	106.6	15 32.3	96 26	106.5	16 01.2	96 27	106.3	16 30.0	96 27	106.2	70
1	12 51.9	96 27	106.2	13 20.8	96 27	106.0	13 49.7	96 27	105.9	14 18.6	96 27	105.8	14 47.5	96 27	105.6	15 16.4	96 27	105.5	15 45.2	96 27	105.3	16 14.1	96 27	105.2	1
2	12 36.0	96 27	105.2	13 04.8	96 27	105.1	13 33.7	96 27	104.9	14 02.6	96 27	104.8	14 31.5	96 27	104.6	15 00.4	96 27	104.5	15 29.3	96 27	104.4	15 58.1	96 27	104.2	2
3	12 20.0	96 27	104.2	12 48.8	96 27	104.1	13 17.7	96 27	103.9	13 46.6	96 27	103.8	14 15.5	96 27	103.7	14 44.3	96 27	103.5	15 13.2	96 27	103.4	15 42.1	96 27	103.2	3
4	12 03.9	96 27	103.2	12 32.8	96 27	103.1	13 01.6	96 27	103.0	13 30.5	96 27	102.8	13 59.4	96 27	102.7	14 28.2	96 27	102.5	14 57.1	96 27	102.4	15 25.9	96 27	102.3	4
75	11 47.8	96 27	102.3	12 16.6	96 27	102.1	12 45.5	96 27	102.0	13 14.3	96 27	101.8	13 43.2	96 27	101.7	14 12.1	96 27	101.6	14 40.9	96 27	101.4	15 09.7	96 27	101.3	75
6	11 31.6	96 27	101.3	12 00.4	96 27	101.2	12 29.3	96 27	101.0	12 58.1	96 27	100.9	13 27.0	96 27	100.7	13 55.8	96 27	100.6	14 24.7	96 27	100.5	14 53.5	96 27	100.3	6
7	11 15.3	96 27	100.3	11 44.2	96 27	100.2	12 13.0	96 27	100.0	12 41.9	96 27	99.9	13 10.7	96 27	99.8	13 39.5	96 27	99.6	14 08.4	96 27	99.5	14 37.2	96 27	99.3	7
8	10 59.0	96 27	99.4	11 27.9	96 27	99.2	11 56.7	96 27	99.1	12 25.6	96 27	98.9	12 54.4	96 27	98.8	13 23.2	96 27	98.6	13 52.0	96 27	98.5	14 20.9	96 27	98.4	8
9	10 42.7	96 27	98.4	11 11.5	96 27	98.2	11 40.4	96 27	98.1	12 09.2	96 27	98.0	12 38.0	96 27	97.8	13 06.8	96 27	97.7	13 35.7	96 27	97.5	14 04.5	96 27	97.4	9
80	10 26.3	96 27	97.4	10 55.1	96 27	97.3	11 24.0	96 27	97.1	11 52.8	96 27	97.0	12 21.6	96 27	96.9	12 50.4	96 27	96.7	13 19.2	96 27	96.6	13 48.1	96 27	96.4	80
1	10 09.9	96 27	96.4	10 38.7	96 27	96.3	11 07.5	96 27	96.2	11 36.4	96 27	96.0	12 05.2	96 27	95.9	12 34.0	96 27	95.7	13 02.8	96 27	95.6	13 31.6	96 27	95.5	1
2	9 53.4	96 27	95.5	10 22.3	96 27	95.3	10 51.1	96 27	95.2	11 19.9	96 27	95.1	11 48.7	96 27	94.9	12 17.5	96 27	94.8	12 46.3	96 28	94.6	13 15.1	96 28	94.5	2
3	9 37.0	96 28	94.5	10 05.8	96 28	94.4	10 34.6	96 28	94.2	11 03.4	96 28	94.1	11 32.2	96 28	94.0	12 01.0	96 28	93.8	12 29.8	96 28	93.7	12 58.6	96 28	93.5	3
4	9 20.5	96 28	93.6	9 49.3	96 28	93.4	10 18.1	96 28	93.3	10 46.9	96 28	93.1	11 15.7	96 28	93.0	11 44.5	96 28	92.8	12 13.3	96 28	92.7	12 42.1	96 28	92.6	4
85	9 04.0	96 28	92.6	9 32.8	96 28	92.4	10 01.6	96 28	92.3	10 30.4	96 28	92.2	10 59.2	96 28	92.0	11 28.0	96 28	91.9	11 56.8	96 28	91.7	12 25.6	96 28	91.6	85
6	8 47.4	96 28	91.6	9 16.2	96 28	91.5	9 45.1	96 28	91.3	10 13.9	96 28	91.2	10 42.7	96 28	91.1	11 11.5	96 28	90.9	11 40.3	96 28	90.8	12 09.1	96 28	90.6	6
7	8 30.9	96 28	90.7	8 59.7	96 28	90.5	9 28.5	96 28	90.4	9 57.3	96 28	90.2	10 26.1	96 28	90.1	10 54.9	96 28	90.0	11 23.7	96 28	89.8	11 52.5	96 28	89.7	7
8	8 14.4	96 28	89.7	8 43.2	96 28	89.6	9 12.0	96 28	89.4	9 40.8	96 28	89.3	10 09.6	96 28	89.1	10 38.4	96 28	89.0	11 07.2	96 28	88.9	11 36.0	96 28	88.7	8
9	7 57.8	96 28	88.7	8 26.6	96 28	88.6	8 55.4	96 28	88.5	9 24.3	96 28	88.3	9 53.1	96 28	88.2	10 21.9	96 28	88.0	10 50.7	96 28	87.9	11 19.4	96 28	87.7	9
90	7 41.3	96 28	87.8	8 10.1	96 28	87.6	8 38.9	96 28	87.5	9 07.7	96 28	87.4	9 36.5	96 28	87.2	10 05.3	96 28	87.1	10 34.1	96 28	86.9	11 02.9	96 28	86.8	90

Lat. 74°

H.A.	8° 00′ Alt.	Δd	Δt	Az.	8° 30′ Alt.	Δd	Δt	Az.	9° 00′ Alt.	Δd	Δt	Az.	9° 30′ Alt.	Δd	Δt	Az.	10° 00′ Alt.	Δd	Δt	Az.	10° 30′ Alt.	Δd	Δt	Az.	11° 00′ Alt.	Δd	Δt	Az.	11° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	7 00.0	1.0	00	180.0	6 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	5 00.0	1.0	00	180.0					00
1	7 59.9	1.0	01	179.0	7 29.9	1.0	01	179.0	6 59.9	1.0	01	179.0	6 29.9	1.0	01	179.0	5 59.9	1.0	01	179.0	5 29.9	1.0	01	179.0									1
2	7 59.4	1.0	01	178.0	7 29.4	1.0	01	178.0	6 59.4	1.0	01	178.0	6 29.4	1.0	01	178.0	5 59.4	1.0	01	178.0	5 29.4	1.0	01	178.0									2
3	7 58.7	1.0	02	177.0	7 28.7	1.0	02	177.0	6 58.7	1.0	02	177.0	6 28.7	1.0	02	177.0	5 58.7	1.0	02	177.0	5 28.7	1.0	02	177.0									3
4	7 57.7	1.0	02	176.0	7 27.7	1.0	02	176.0	6 57.7	1.0	02	176.0	6 27.7	1.0	02	176.0	5 57.7	1.0	02	176.0	5 27.7	1.0	02	176.0									4
05	7 56.4	1.0	03	175.0	7 26.4	1.0	03	175.0	6 56.4	1.0	03	175.0	6 26.4	1.0	03	175.0	5 56.4	1.0	03	175.0	5 26.4	1.0	03	175.1									05
6	7 54.8	1.0	03	174.0	7 24.8	1.0	03	174.0	6 54.8	1.0	03	174.0	6 24.8	1.0	03	174.0	5 54.9	1.0	03	174.1	5 24.9	1.0	03	174.1									6
7	7 52.9	1.0	04	173.0	7 23.0	1.0	04	173.0	6 53.0	1.0	04	173.0	6 23.0	1.0	04	173.1	5 53.0	1.0	04	173.1	5 23.0	1.0	04	173.1									7
8	7 50.8	1.0	04	172.0	7 20.8	1.0	04	172.0	6 50.8	1.0	04	172.0	6 20.8	1.0	04	172.1	5 50.9	1.0	04	172.1	5 20.9	1.0	04	172.1									8
9	7 48.3	1.0	05	171.0	7 18.4	1.0	05	171.0	6 48.4	1.0	05	171.0	6 18.4	1.0	04	171.1	5 48.4	1.0	04	171.1	5 18.5	1.0	04	171.1									9
10	7 45.6	1.0	05	170.0	7 15.6	1.0	05	170.0	6 45.7	1.0	05	170.1	6 15.7	1.0	05	170.1	5 45.7	1.0	05	170.1	5 15.8	1.0	05	170.1									10
1	7 42.6	1.0	06	169.0	7 12.6	1.0	05	169.0	6 42.7	1.0	05	169.1	6 12.7	1.0	05	169.1	5 42.8	1.0	05	169.1	5 12.8	1.0	05	169.1									1
2	7 39.3	1.0	06	168.0	7 09.4	1.0	06	168.0	6 39.4	1.0	06	168.1	6 09.5	1.0	06	168.1	5 39.5	1.0	06	168.1	5 09.6	1.0	06	168.2									2
3	7 35.7	1.0	06	167.0	7 05.8	1.0	06	167.0	6 35.8	1.0	06	167.1	6 05.9	1.0	06	167.1	5 36.0	1.0	06	167.1	5 06.0	1.0	06	167.2									3
4	7 31.9	1.0	07	166.0	7 01.9	1.0	07	166.0	6 32.0	1.0	07	166.1	6 02.1	1.0	07	166.1	5 32.1	1.0	07	166.2	5 02.2	1.0	07	166.2									4
15	7 27.7	1.0	07	165.0	6 57.8	1.0	07	165.1	6 27.9	1.0	07	165.1	5 58.0	1.0	07	165.1	5 28.0	1.0	07	165.2													15
6	7 23.3	1.0	08	164.0	6 53.4	1.0	08	164.1	6 23.5	1.0	08	164.1	5 53.6	1.0	08	164.1	5 23.7	1.0	08	164.2													6
7	7 18.6	1.0	08	163.0	6 48.7	1.0	08	163.1	6 18.8	1.0	08	163.1	5 48.9	1.0	08	163.2	5 19.0	1.0	08	163.2													7
8	7 13.7	1.0	09	162.0	6 43.8	1.0	09	162.1	6 13.9	1.0	09	162.1	5 44.0	1.0	09	162.2	5 14.1	1.0	09	162.2													8
9	7 08.4	1.0	09	161.0	6 38.5	1.0	09	161.1	6 08.7	1.0	09	161.1	5 38.8	1.0	09	161.2	5 08.9	1.0	09	161.2													9
20	7 02.9	1.0	10	160.0	6 33.1	1.0	10	160.1	6 03.2	1.0	10	160.1	5 33.3	1.0	10	160.2	5 03.5	1.0	10	160.2													20
1	6 57.1	1.0	10	159.1	6 27.3	1.0	10	159.1	5 57.4	1.0	10	159.2	5 27.6	1.0	10	159.2																	1
2	6 51.1	99	11	158.1	6 21.3	99	10	158.1	5 51.4	99	10	158.2	5 21.6	99	10	158.2																	2
3	6 44.8	99	11	157.1	6 15.0	99	11	157.1	5 45.1	99	11	157.2	5 15.3	99	11	157.2																	3
4	6 38.2	99	11	156.1	6 08.4	99	11	156.1	5 38.6	99	11	156.2	5 08.8	99	11	156.2																	4
25	6 31.4	99	12	155.1	6 01.6	99	12	155.1	5 31.8	99	12	155.2	5 02.0	99	12	155.3																	25
6	6 24.3	99	12	154.1	5 54.5	99	12	154.2	5 24.7	99	12	154.2																					6
7	6 16.9	99	13	153.1	5 47.2	99	13	153.2	5 17.4	99	13	153.2																					7
8	6 09.3	99	13	152.1	5 39.6	99	13	152.2	5 09.8	99	13	152.3																					8
9	6 01.5	99	14	151.1	5 31.7	99	14	151.2	5 02.0	99	14	151.3																					9
30	5 53.3	99	14	150.1	5 23.6	99	14	150.2																									30
1	5 45.0	99	14	149.2	5 15.3	99	14	149.2																									1
2	5 36.4	99	15	148.2	5 06.7	99	15	148.3																									2
3	5 27.6	99	15	147.2																													3
4	5 18.5	99	16	146.2																													4
35	5 09.2	99	16	145.2																													35

Lat. 75°

Lat. 76

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′ Alt.	Δd	Δt	Az.	8° 30′ Alt.	Δd	Δt	Az.	9° 00′ Alt.	Δd	Δt	Az.	9° 30′ Alt.	Δd	Δt	Az.	10° 00′ Alt.	Δd	Δt	Az.	10° 30′ Alt.	Δd	Δt	Az.	11° 00′ Alt.	Δd	Δt	Az.	11° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	7 24.8	96	28	86.8	7 53.6	96	28	86.7	8 22.4	96	28	86.5	8 51.2	96	28	86.4	9 20.0	96	27	86.3	9 48.8	96	28	86.1	10 17.6	96	28	86.0	10 46.4	96	27	85.8	91
2	7 08.3	96	27	85.9	7 37.1	96	27	85.7	8 05.9	96	27	85.6	8 34.7	96	27	85.4	9 03.5	96	27	85.3	9 32.3	96	27	85.2	10 01.1	96	27	85.0	10 29.9	96	27	84.9	2
3	6 51.8	96	27	84.9	7 20.6	96	27	84.8	7 49.4	96	27	84.6	8 18.2	96	27	84.5	8 47.1	96	27	84.3	9 15.9	96	27	84.2	9 44.7	96	27	84.1	10 13.5	96	27	83.9	3
4	6 35.3	96	27	83.9	7 04.1	96	27	83.8	7 33.0	96	27	83.7	8 01.8	96	27	83.5	8 30.6	96	27	83.4	8 59.4	96	27	83.2	9 28.2	96	27	83.1	9 57.1	96	27	83.0	4
95	6 18.9	96	27	83.0	6 47.7	96	27	82.8	7 16.6	96	27	82.7	7 45.4	96	27	82.6	8 14.2	96	27	82.4	8 43.0	96	27	82.3	9 11.8	96	27	82.1	9 40.7	96	27	82.0	95
6	6 02.5	96	27	82.0	6 31.3	96	27	81.9	7 00.2	96	27	81.8	7 29.0	96	27	81.6	7 57.8	96	27	81.5	8 26.7	96	27	81.3	8 55.5	96	27	81.2	9 24.3	96	27	81.1	6
7	5 46.1	96	27	81.1	6 15.0	96	27	80.9	6 43.8	96	27	80.8	7 12.7	96	27	80.7	7 41.5	96	27	80.5	8 10.3	96	27	80.4	8 39.2	96	27	80.2	9 08.0	96	27	80.1	7
8	5 29.8	96	27	80.1	5 58.7	96	27	80.0	6 27.5	96	27	79.8	6 56.4	96	27	79.7	7 25.2	96	27	79.6	7 54.0	96	27	79.4	8 22.9	96	27	79.3	8 51.7	96	27	79.1	8
9	5 13.6	96	27	79.2	5 42.4	96	27	79.0	6 11.3	96	27	78.9	6 40.1	96	27	78.7	7 09.0	96	27	78.6	7 37.8	96	27	78.5	8 06.7	96	27	78.3	8 35.5	96	27	78.2	9
100					5 26.2	96	27	78.1	5 55.1	96	27	77.9	6 23.9	96	27	77.8	6 52.8	96	27	77.7	7 21.6	96	27	77.5	7 50.5	96	27	77.4	8 19.3	96	27	77.2	100
1					5 10.0	96	27	77.1	5 38.9	96	27	77.0	6 07.8	96	27	76.8	6 36.7	96	27	76.7	7 05.5	96	27	76.6	7 34.4	96	27	76.4	8 03.2	96	27	76.3	1
2									5 22.8	96	27	76.0	5 51.7	96	27	75.9	6 20.6	96	27	75.7	6 49.5	96	27	75.6	7 18.3	96	27	75.5	7 47.2	96	27	75.3	2
3									5 06.8	96	27	75.1	5 35.7	96	27	74.9	6 04.6	96	27	74.8	6 33.5	96	27	74.7	7 02.4	96	26	74.5	7 31.2	96	26	74.4	3
4													5 19.8	96	26	74.0	5 48.7	96	26	73.8	6 17.6	96	26	73.7	6 46.5	96	26	73.6	7 15.4	96	26	73.4	4
105													5 03.9	96	26	73.0	5 32.8	96	26	72.9	6 01.7	96	26	72.8	6 30.6	96	26	72.6	6 59.5	96	26	72.5	105
6																	5 17.1	96	26	71.9	5 46.0	96	26	71.8	6 14.9	96	26	71.7	6 43.8	96	26	71.5	6
7																	5 01.4	96	26	71.0	5 30.3	96	26	70.8	5 59.2	96	26	70.7	6 28.2	96	26	70.6	7
8																					5 14.7	96	26	69.9	5 43.7	96	26	69.8	6 12.6	96	26	69.6	8
9																									5 28.2	97	26	68.8	5 57.2	97	26	68.7	9
110																									5 12.8	97	26	67.9	5 41.8	97	25	67.7	110
1																													5 26.6	97	25	66.8	1
2																													5 11.4	97	25	65.8	2

at.
4°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0
1	27 59.8	1.0 01	178.9	28 29.8	1.0 01	178.9	28 59.8	1.0 01	178.9	29 29.8	1.0 01	178.9
2	27 59.4	1.0 01	177.8	28 29.4	1.0 01	177.8	28 59.4	1.0 01	177.8	29 29.4	1.0 01	177.8
3	27 58.6	1.0 02	176.7	28 28.6	1.0 02	176.7	28 58.6	1.0 02	176.7	29 28.5	1.0 02	176.6
4	27 57.4	1.0 02	175.6	28 27.4	1.0 02	175.6	28 57.4	1.0 02	175.5	29 27.4	1.0 02	175.5
05	27 56.0	1.0 03	174.5	28 26.0	1.0 03	174.4	28 56.0	1.0 03	174.4	29 26.0	1.0 03	174.4
6	27 54.3	1.0 03	173.4	28 24.2	1.0 03	173.3	28 54.2	1.0 03	173.3	29 24.2	1.0 03	173.3
7	27 52.2	1.0 04	172.3	28 22.2	1.0 04	172.2	28 52.1	1.0 04	172.2	29 22.1	1.0 04	172.2
8	27 49.8	1.0 04	171.1	28 19.8	1.0 05	171.1	28 49.7	1.0 05	171.1	29 19.7	1.0 05	171.1
9	27 47.1	1.0 05	170.0	28 17.1	1.0 05	170.0	28 47.0	1.0 05	170.0	29 17.0	1.0 05	170.0
10	27 44.1	1.0 06	168.9	28 14.0	1.0 06	168.9	28 44.0	1.0 06	168.9	29 13.9	1.0 06	168.8
1	27 40.7	1.0 06	167.8	28 10.7	1.0 06	167.8	28 40.6	1.0 06	167.8	29 10.6	1.0 06	167.7
2	27 37.1	1.0 07	166.7	28 07.0	1.0 07	166.7	28 37.0	1.0 07	166.7	29 06.9	1.0 07	166.6
3	27 33.2	1.0 07	165.6	28 03.1	1.0 07	165.6	28 33.0	1.0 07	165.6	29 02.9	1.0 07	165.5
4	27 28.9	1.0 08	164.5	27 58.8	1.0 08	164.5	28 28.7	1.0 08	164.4	28 58.6	1.0 08	164.4
15	27 24.3	1.0 08	163.4	27 54.2	1.0 08	163.4	28 24.1	1.0 08	163.3	28 54.0	1.0 08	163.3
6	27 19.5	1.0 09	162.3	27 49.4	1.0 09	162.3	28 19.2	1.0 09	162.2	28 49.1	1.0 09	162.2
7	27 14.3	1.0 00	161.2	27 44.2	1.0 09	161.2	28 14.0	1.0 09	161.1	28 43.9	1.0 09	161.1
8	27 08.8	1.0 10	160.1	27 38.7	1.0 10	160.1	28 08.5	1.0 10	160.0	28 38.4	1.0 10	160.0
9	27 03.1	99 10	159.0	27 32.9	99 10	159.0	28 02.7	99 10	158.9	28 32.6	99 10	158.9
20	26 57.0	99 11	158.0	27 26.8	99 11	157.9	27 56.7	99 11	157.8	28 26.5	99 11	157.8
1	26 50.6	99 11	156.9	27 29.5	99 11	156.8	27 50.3	99 11	156.7	28 20.1	99 11	156.7
2	26 44.0	99 12	155.8	27 13.8	99 12	155.7	27 43.6	99 12	155.6	28 13.4	99 12	155.6
3	26 37.1	99 12	154.7	27 06.9	99 12	154.6	27 36.6	99 12	154.6	28 06.4	99 12	154.5
4	26 29.9	99 12	153.6	26 59.6	99 13	153.5	27 29.4	99 13	153.5	27 59.1	99 13	153.4
25	26 22.4	99 13	152.5	26 52.1	99 13	152.4	27 21.9	99 13	152.4	27 51.6	99 13	152.3
6	26 14.6	99 13	151.4	26 44.3	99 13	151.4	27 14.1	99 13	151.3	27 43.8	99 14	151.2
7	26 06.6	99 14	150.4	26 36.3	99 14	150.3	27 06.0	99 14	150.2	27 35.7	99 14	150.1
8	25 58.2	99 14	149.3	26 27.9	99 14	149.2	26 57.6	99 14	149.1	27 27.3	99 14	149.0
9	25 49.7	99 15	148.2	26 19.3	99 15	148.1	26 49.0	99 15	148.0	27 18.7	99 15	148.0
30	25 40.8	99 15	147.1	26 10.5	99 15	147.0	26 40.1	99 15	147.0	27 09.7	99 15	146.9
1	25 31.7	99 16	146.1	26 01.3	99 16	146.0	26 31.0	99 16	145.9	27 00.6	99 16	145.8
2	25 22.4	99 16	145.0	25 52.0	99 16	144.9	26 21.6	99 16	144.8	26 51.2	99 16	144.7
3	25 12.7	99 16	143.9	25 42.3	99 16	143.8	26 11.9	99 16	143.7	26 41.5	99 17	143.6
4	25 02.9	99 17	142.9	25 32.4	99 17	142.8	26 02.0	99 17	142.7	26 31.6	99 17	142.6
35	24 52.8	98 17	141.8	25 22.3	98 17	141.7	25 51.8	98 17	141.6	26 21.4	98 17	141.5
6	24 42.4	98 18	140.7	25 11.9	98 18	140.6	25 41.5	98 18	140.5	26 11.0	98 18	140.4
7	24 31.8	98 18	139.7	25 01.3	98 18	139.6	25 30.8	98 18	139.5	26 00.3	98 18	139.4
8	24 21.0	98 18	138.6	24 50.5	98 18	138.5	25 20.0	98 18	138.4	25 49.4	98 19	138.3
9	24 10.0	98 19	137.6	24 39.4	98 19	137.5	25 08.9	98 19	137.4	25 38.3	98 19	137.3
40	23 58.7	98 19	136.5	24 28.1	98 19	136.4	24 57.6	98 19	136.3	25 27.0	98 19	136.2
1	23 47.2	98 20	135.5	24 16.6	98 20	135.4	24 46.0	98 20	135.3	25 15.4	98 20	135.1
2	23 35.5	98 20	134.4	24 04.9	98 20	134.3	24 34.3	98 20	134.2	25 03.7	98 20	134.1
3	23 23.6	98 20	133.4	23 53.0	98 20	133.3	24 22.3	98 20	133.2	24 51.7	98 20	133.0
4	23 11.5	98 21	132.3	23 40.8	98 21	132.2	24 10.2	98 21	132.1	24 39.5	98 21	132.0
45	22 59.2	98 21	131.3	23 28.5	98 21	131.2	23 57.8	98 21	131.1	24 27.1	98 21	130.9
6	22 46.6	98 21	130.3	23 15.9	98 21	130.1	23 45.2	98 21	130.0	24 14.5	98 21	129.9
7	22 33.9	98 22	129.2	23 03.2	98 22	129.1	23 32.5	98 22	129.0	24 01.7	98 22	128.9
8	22 21.0	98 22	128.2	22 50.3	97 22	128.1	23 19.5	97 22	128.0	23 48.7	97 22	127.8
9	22 07.9	97 22	127.2	22 37.1	97 22	127.0	23 06.4	97 22	126.9	23 35.6	97 22	126.8
50	21 54.6	97 22	126.1	22 23.9	97 22	126.0	22 53.1	97 22	125.9	23 22.3	97 22	125.8
1	21 41.2	97 23	125.1	22 10.4	97 23	125.0	22 39.6	97 23	124.9	23 08.8	97 23	124.7
2	21 27.6	97 23	124.1	21 56.8	97 23	124.0	22 25.9	97 23	123.8	22 55.1	97 23	123.7
3	21 13.8	97 23	123.1	21 43.0	97 23	122.9	22 12.1	97 23	122.8	22 41.2	97 23	122.7
4	20 59.9	97 24	122.0	21 29.0	97 24	121.9	21 58.1	97 24	121.8	22 27.2	97 24	121.7
55	20 45.8	97 24	121.0	21 14.9	97 24	120.9	21 44.0	97 24	120.8	22 13.1	97 24	120.6
6	20 31.5	97 24	120.0	21 00.6	97 24	119.9	21 29.7	97 24	119.8	21 58.8	97 24	119.6
7	20 17.1	97 24	119.0	20 46.2	97 24	118.9	21 15.3	97 24	118.7	21 44.3	97 24	118.6
8	20 02.6	97 24	118.0	20 31.7	97 24	117.9	21 00.7	97 24	117.7	21 29.7	97 25	117.6
9	19 47.9	97 25	117.0	20 17.0	97 25	116.9	20 46.0	97 25	116.7	21 15.0	97 25	116.6
60	19 33.1	97 25	116.0	20 02.1	97 25	115.8	20 31.2	97 25	115.7	21 00.2	97 25	115.6
1	19 18.2	97 25	115.0	19 47.2	97 25	114.8	20 16.2	97 25	114.7	20 45.2	97 25	114.6
2	19 03.1	97 25	114.0	19 32.1	97 25	113.8	20 01.1	97 25	113.7	20 30.1	97 25	113.6
3	18 48.0	97 25	113.0	19 16.9	97 26	112.8	19 45.9	97 26	112.7	20 14.9	97 26	112.6
4	18 32.7	97 26	112.0	19 01.7	97 26	111.8	19 30.6	96 26	111.7	19 59.5	96 26	111.6
65	18 17.3	96 26	111.0	18 46.2	96 26	110.8	19 15.2	96 26	110.7	19 44.1	96 26	110.6
6	18 01.8	96 26	110.0	18 30.7	96 26	109.9	18 59.7	96 26	109.7	19 28.6	96 26	109.6
7	17 46.2	96 26	109.0	18 15.1	96 26	108.9	18 44.0	96 26	108.7	19 12.9	96 26	108.6
8	17 30.5	96 26	108.0	17 59.4	96 26	107.9	18 28.3	96 26	107.7	18 57.2	96 26	107.6
9	17 14.8	96 26	107.0	17 43.7	96 26	106.9	18 12.5	96 26	106.7	18 41.4	96 26	106.6
70	16 58.9	96 27	106.0	17 27.8	96 27	105.9	17 56.7	96 27	105.8	18 25.5	96 27	105.6
1	16 43.0	96 27	105.1	17 11.9	96 27	104.9	17 40.7	96 27	104.8	18 09.6	96 27	104.6
2	16 27.0	96 27	104.1	16 55.8	96 27	103.9	17 24.7	96 27	103.8	17 53.5	96 27	103.6
3	16 10.9	96 27	103.1	16 39.7	96 27	103.0	17 08.6	96 27	102.8	17 37.4	96 27	102.7
4	15 54.8	96 27	102.1	16 23.6	96 27	102.0	16 52.4	96 27	101.8	17 21.3	96 27	101.7
75	15 38.6	96 27	101.1	16 07.4	96 27	101.0	16 36.2	96 27	100.9	17 05.0	96 27	100.7
6	15 22.3	96 27	100.2	15 51.1	96 27	100.0	16 19.9	96 27	99.9	16 48.8	96 27	99.7
7	15 06.0	96 27	99.2	15 34.8	96 27	99.0	16 03.6	96 27	98.9	16 32.4	96 27	98.8
8	14 49.7	96 27	98.2	15 18.5	96 27	98.1	15 47.3	96 27	97.9	16 16.1	96 27	97.8
9	14 33.3	96 27	97.2	15 02.1	96 27	97.1	15 30.9	96 27	97.0	15 59.7	96 27	96.8
80	14 16.9	96 27	96.3	14 45.6	96 27	96.1	15 14.4	96 27	96.0	15 43.2	96 27	95.8
1	14 00.4	96 27	95.3	14 29.2	96 27	95.2	14 58.0	96 27	95.0	15 26.8	96 28	94.9
2	13 43.9	96 28	94.3	14 12.7	96 28	94.2	14 41.5	96 28	94.1	15 10.3	96 28	93.9
3	13 27.4	96 28	93.4	13 56.2	96 28	93.2	14 25.0	96 28	93.1	14 53.8	96 28	92.9
4	13 10.9	96 28	92.4	13 39.7	96 28	92.3	14 08.5	96 28	92.1	14 37.2	96 28	92.0
85	12 54.4	96 28	91.4	13 23.2	96 28	91.3	13 51.9	96 28	91.2	14 20.7	96 28	91.0
6	12 37.8	96 28	90.5	13 06.6	96 28	90.3	13 35.4	96 28	90.2	14 04.2	96 28	90.0
7	12 21.3	96 28	89.5	12 50.1	96 28	89.4	13 18.9	96 28	89.2	13 47.6	96 28	89.1
8	12 04.8	96 28	88.6	12 33.5	96 28	88.4	13 02.3	96 28	88.3	13 31.1	96 28	88.1
9	11 48.2	96 28	87.6	12 17.0	96 28	87.5	12 45.8	96 28	87.3	13 14.6	96 28	87.2
90	11 31.7	96 28	86.6	12 00.5	96 28	86.5	12 29.3	96 28	86.4	12 58.1	96 28	86.2

14° 00′			14° 30′			15° 00′			15° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	00
29 59.8	1.0 01	178.9	30 29.8	1.0 01	178.9	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9	1
29 59.4	1.0 01	177.8	30 29.4	1.0 01	177.8	30 59.3	1.0 01	177.7	31 29.3	1.0 01	177.7	2
29 58.5	1.0 02	176.6	30 28.5	1.0 02	176.6	30 58.5	1.0 02	176.6	31 28.5	1.0 02	176.6	3
29 57.4	1.0 02	175.5	30 27.4	1.0 02	175.5	30 57.4	1.0 02	175.5	31 27.4	1.0 02	175.5	4
29 56.0	1.0 03	174.4	30 26.0	1.0 03	174.4	30 55.9	1.0 03	174.4	31 25.9	1.0 03	174.4	05
29 54.2	1.0 04	173.3	30 24.2	1.0 04	173.3	30 54.2	1.0 04	173.2	31 24.1	1.0 04	173.2	6
29 52.1	1.0 04	172.2	30 22.1	1.0 04	172.1	30 52.0	1.0 04	172.1	31 22.0	1.0 04	172.1	7
29 49.7	1.0 05	171.0	30 19.6	1.0 05	171.0	30 49.6	1.0 05	171.0	31 19.6	1.0 05	171.0	8
29 46.9	1.0 05	169.9	30 16.9	1.0 05	169.9	30 46.9	1.0 05	169.9	31 16.8	1.0 05	169.8	9
29 43.9	1.0 06	168.8	30 13.8	1.0 06	168.8	30 43.8	1.0 06	168.7	31 13.8	1.0 06	168.7	10
29 40.5	1.0 06	167.7	30 10.5	1.0 06	167.7	30 40.4	1.0 06	167.6	31 10.4	1.0 06	167.6	1
29 36.8	1.0 07	166.6	30 06.8	1.0 07	166.5	30 36.7	1.0 07	166.5	31 06.6	1.0 07	166.5	2
29 32.9	1.0 07	165.5	30 02.8	1.0 07	165.4	30 32.7	1.0 07	165.4	31 02.6	1.0 07	165.3	3
29 28.5	1.0 08	164.4	29 58.5	1.0 08	164.3	30 28.4	1.0 08	164.3	30 58.3	1.0 08	164.2	4
29 23.9	1.0 08	163.2	29 53.8	1.0 08	163.2	30 23.7	1.0 08	163.2	30 53.6	1.0 08	163.1	15
29 19.0	1.0 09	162.1	29 48.9	1.0 09	162.1	30 18.8	1.0 09	162.0	30 48.7	1.0 09	162.0	6
29 13.8	1.0 09	161.0	29 43.7	1.0 09	161.0	30 13.5	1.0 09	160.9	30 43.4	1.0 09	160.9	7
29 08.3	1.0 10	159.9	29 38.1	1.0 10	159.9	30 08.0	1.0 10	159.8	30 37.8	1.0 10	159.8	8
29 02.4	99 10	158.8	29 32.3	99 10	158.8	30 02.1	99 10	158.7	30 32.0	99 10	158.6	9
28 56.3	99 11	157.7	29 26.1	99 11	157.7	29 56.0	99 11	157.6	30 25.8	99 11	157.5	20
28 49.9	99 11	156.6	29 19.7	99 11	156.5	29 49.5	99 11	156.5	30 19.3	99 11	156.4	1
28 43.2	99 12	155.5	29 13.0	99 12	155.4	29 42.8	99 12	155.4	30 12.5	99 12	155.3	2
28 36.2	99 12	154.4	29 06.0	99 12	154.3	29 35.7	99 12	154.3	30 05.5	99 12	154.2	3
28 28.9	99 13	153.3	28 58.7	99 13	153.2	29 28.4	99 13	153.2	29 58.2	99 13	153.1	4
28 21.3	99 13	152.2	28 51.1	99 13	152.2	29 20.8	99 13	152.1	29 50.5	99 13	152.0	25
28 13.5	99 14	151.1	28 43.2	99 14	151.1	29 12.9	99 14	151.0	29 42.6	99 14	150.9	6
28 05.4	99 14	150.0	28 35.1	99 14	150.0	29 04.8	99 14	149.9	29 34.4	99 14	149.8	7
27 57.0	99 14	149.0	28 26.6	99 14	148.9	28 56.3	99 14	148.8	29 26.0	99 15	148.7	8
27 48.3	99 15	147.9	28 18.0	99 15	147.8	28 47.6	99 15	147.7	29 17.3	99 15	147.6	9
27 39.4	99 15	146.8	28 09.0	99 15	146.7	28 38.6	99 15	146.6	29 08.3	99 15	146.5	30
27 30.2	99 16	145.7	27 59.8	99 16	145.6	28 29.4	99 16	145.5	28 59.0	99 16	145.4	1
27 20.8	99 16	144.6	27 50.3	99 16	144.5	28 19.9	99 16	144.4	28 49.5	99 16	144.3	2
27 11.1	99 17	143.6	27 40.6	99 17	143.5	28 10.2	99 17	143.4	28 39.7	99 17	143.3	3
27 01.1	98 17	142.5	27 30.6	98 17	142.4	28 00.2	98 17	142.3	28 29.7	98 17	142.2	4
26 50.9	98 17	141.4	27 20.4	98 17	141.3	27 49.9	98 17	141.2	28 19.5	98 18	141.1	35
26 40.5	98 18	140.3	27 10.0	98 18	140.2	27 39.5	98 18	140.1	28 09.0	98 18	140.0	6
26 29.8	98 18	139.3	26 59.3	98 18	139.2	27 28.7	98 18	139.1	27 58.2	98 18	139.0	7
26 18.9	98 19	138.2	26 48.3	98 19	138.1	27 17.8	98 19	138.0	27 47.2	98 19	137.9	8
26 07.8	98 19	137.1	26 37.2	98 19	137.0	27 06.6	98 19	136.9	27 36.0	98 19	136.8	9
25 56.4	98 19	136.1	26 25.8	98 19	136.0	26 55.2	98 19	135.9	27 24.6	98 19	135.8	40
25 44.8	98 20	135.0	26 14.2	98 20	134.9	26 43.6	98 20	134.8	27 13.0	98 20	134.7	1
25 33.0	98 20	134.0	26 02.4	98 20	133.9	26 31.7	98 20	133.7	27 01.1	98 20	133.6	2
25 21.0	98 20	132.9	25 50.4	98 20	132.8	26 19.7	98 20	132.7	26 49.0	98 20	132.6	3
25 08.8	98 21	131.9	25 38.1	98 21	131.8	26 07.4	98 21	131.6	26 36.7	98 21	131.5	4
24 56.4	98 21	130.8	25 25.7	98 21	130.7	25 55.0	98 21	130.6	26 24.3	98 21	130.5	45
24 43.8	98 21	129.8	25 13.0	98 21	129.7	25 42.3	98 21	129.5	26 11.6	98 21	129.4	6
24 31.0	98 22	128.7	25 00.2	97 22	128.6	25 29.5	97 22	128.5	25 58.7	97 22	128.4	7
24 18.0	97 22	127.7	24 47.2	97 22	127.6	25 16.4	97 22	127.5	25 45.7	97 22	127.3	8
24 04.8	97 22	126.7	24 34.0	97 22	126.5	25 03.2	97 22	126.4	25 32.4	97 22	126.3	9
23 51.5	97 23	125.6	24 20.6	97 23	125.5	24 49.8	97 23	125.4	25 19.0	97 23	125.3	50
23 37.9	97 23	124.6	24 07.1	97 23	124.5	24 36.2	97 23	124.3	25 05.4	97 23	124.2	1
23 24.2	97 23	123.6	23 53.4	97 23	123.4	24 22.5	97 23	123.3	24 51.6	97 23	123.2	2
23 10.4	97 23	122.6	23 39.5	97 23	122.4	24 08.6	97 23	122.3	24 37.7	97 23	122.2	3
22 56.3	97 24	121.5	23 25.5	97 24	121.4	23 54.5	97 24	121.3	24 23.6	97 24	121.1	4
22 42.2	97 24	120.5	23 11.3	97 24	120.4	23 40.3	97 24	120.2	24 09.4	97 24	120.1	55
22 27.9	97 24	119.5	22 56.9	97 24	119.4	23 26.0	97 24	119.2	23 55.0	97 24	119.1	6
22 13.4	97 24	118.5	22 42.4	97 24	118.3	23 11.5	97 24	118.2	23 40.5	97 24	118.1	7
21 58.8	97 25	117.5	22 27.8	97 25	117.3	22 56.8	97 25	117.2	23 25.8	97 25	117.0	8
21 44.0	97 25	116.4	22 13.0	97 25	116.3	22 42.0	97 25	116.2	23 11.0	97 25	116.0	9
21 29.2	97 25	115.4	21 58.2	97 25	115.3	22 27.1	97 25	115.2	22 56.1	97 25	115.0	60
21 14.2	97 25	114.4	21 43.1	97 25	114.3	22 12.1	97 25	114.2	22 41.1	97 25	114.0	1
20 59.1	97 25	113.4	21 28.0	97 25	113.3	21 57.0	96 25	113.1	22 25.9	96 25	113.0	2
20 43.8	96 26	112.4	21 12.8	96 26	112.3	21 41.7	96 26	112.1	22 10.6	96 26	112.0	3
20 28.5	96 26	111.4	20 57.4	96 26	111.3	21 26.3	96 26	111.1	21 55.2	96 26	111.0	4
20 13.0	96 26	110.4	20 41.9	96 26	110.3	21 10.9	96 26	110.1	21 39.8	96 26	110.0	65
19 57.5	96 26	109.4	20 26.4	96 26	109.3	20 55.3	96 26	109.1	21 24.2	96 26	109.0	6
19 41.8	96 26	108.4	20 10.7	96 26	108.3	20 39.6	96 26	108.1	21 08.5	96 26	108.0	7
19 26.1	96 26	107.4	19 55.0	96 26	107.3	20 23.8	96 26	107.2	20 52.7	96 26	107.0	8
19 10.3	96 26	106.5	19 39.1	96 27	106.3	20 08.0	96 27	106.2	20 36.8	96 27	106.0	9
18 54.4	96 27	105.5	19 23.2	96 27	105.3	19 52.1	96 27	105.2	20 20.9	96 27	105.0	70
18 38.4	96 27	104.5	19 07.2	96 27	104.3	19 36.1	96 27	104.2	20 04.9	96 27	104.0	1
18 22.4	96 27	103.5	18 51.2	96 27	103.4	19 20.0	96 27	103.2	19 48.8	96 27	103.1	2
18 06.2	96 27	102.5	18 35.1	96 27	102.4	19 03.9	96 27	102.2	19 32.7	96 27	102.1	3
17 50.1	96 27	101.5	18 18.9	96 27	101.4	18 47.7	96 27	101.2	19 16.5	96 27	101.1	4
17 33.8	96 27	100.6	18 02.6	96 27	100.4	18 31.4	96 27	100.3	19 00.2	96 27	100.1	75
17 17.6	96 27	99.6	17 46.4	96 27	99.4	18 15.1	96 27	99.3	18 43.9	96 27	99.1	6
17 01.2	96 27	98.6	17 30.0	96 27	98.5	17 58.8	96 27	98.3	18 27.6	96 27	98.2	7
16 44.9	96 27	97.6	17 13.6	96 27	97.5	17 42.4	96 27	97.3	18 11.2	96 27	97.2	8
16 28.4	96 27	96.7	16 57.2	96 27	96.5	17 26.0	96 27	96.4	17 54.8	96 27	96.2	9
16 12.0	96 27	95.7	16 40.8	96 27	95.5	17 09.5	96 27	95.4	17 38.3	96 27	95.2	80
15 55.5	96 27	94.7	16 24.3	96 27	94.6	16 53.1	96 28	94.4	17 21.8	96 28	94.3	1
15 39.0	96 28	93.8	16 07.8	96 28	93.6	16 36.6	96 28	93.5	17 05.3	96 28	93.3	2
15 22.5	96 28	92.8	15 51.3	96 28	92.6	16 20.1	96 28	92.5	16 48.8	96 28	92.3	3
15 06.0	96 28	91.8	15 34.8	96 28	91.7	16 03.5	96 28	91.5	16 32.3	96 28	91.4	4
14 49.5	96 28	90.9	15 18.2	96 28	90.7	15 47.0	96 28	90.6	16 15.7	96 28	90.4	85
14 32.9	96 28	89.9	15 01.7	96 28	89.8	15 30.5	96 28	89.6	15 59.2	96 28	89.5	6
14 16.4	96 28	88.9	14 45.2	96 28	88.8	15 13.9	96 28	88.6	15 42.7	96 28	88.5	7
13 59.9	96 28	88.0	14 28.6	96 28	87.8	14 57.4	96 28	87.7	15 26.1	96 28	87.5	8
13 43.3	96 28	87.0	14 12.1	96 28	86.9	14 40.9	96 28	86.7	15 09.6	96 28	86.6	9
13 26.8	96 27	86.1	13 55.6	96 27	85.9	14 24.4	96 27	85.8	14 53.1	96 27	85.6	90

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 15.2	96 27	85.7	11 44.0	96 27	85.5	12 12.8	96 27	85.4	12 41.6	96 27	85.3	13 10.3	96 27	85.1	13 39.1	96 27	85.0	14 07.9	96 27	84.8	14 36.6	96 27	84.7	91
2	10 58.7	96 27	84.7	11 27.5	96 27	84.6	11 56.3	96 27	84.4	12 25.1	96 27	84.3	12 53.9	96 27	84.2	13 22.7	96 27	84.0	13 51.4	96 27	83.9	14 20.2	96 27	83.7	2
3	10 42.3	96 27	83.8	11 11.1	96 27	83.6	11 39.9	96 27	83.5	12 08.7	96 27	83.3	12 37.4	96 27	83.2	13 06.2	96 27	83.1	13 35.0	96 27	82.9	14 03.8	96 27	82.8	3
4	10 25.9	96 27	82.8	10 54.7	96 27	82.7	11 23.5	96 27	82.5	11 52.2	96 27	82.4	12 21.0	96 27	82.2	12 49.8	96 27	82.1	13 18.6	96 27	82.0	13 47.4	96 27	81.8	4
95	10 09.5	96 27	81.9	10 38.3	96 27	81.7	11 07.1	96 27	81.6	11 35.9	96 27	81.4	12 04.7	96 27	81.3	12 33.5	96 27	81.2	13 02.2	96 27	81.0	13 31.0	96 27	80.9	95
6	9 53.1	96 27	80.9	10 21.9	96 27	80.8	10 50.7	96 27	80.6	11 19.5	96 27	80.5	11 48.3	96 27	80.3	12 17.1	96 27	80.2	12 45.9	96 27	80.1	13 14.7	96 27	79.9	6
7	9 36.8	96 27	80.0	10 05.6	96 27	79.8	10 34.4	96 27	79.7	11 03.3	96 27	79.5	11 32.1	96 27	79.4	12 00.9	96 27	79.2	12 29.7	96 27	79.1	12 58.5	96 27	79.0	7
8	9 20.5	96 27	79.0	9 49.4	96 27	78.9	10 18.2	96 27	78.7	10 47.0	96 27	78.6	11 15.8	96 27	78.4	11 44.6	96 27	78.3	12 13.5	96 27	78.2	12 42.3	96 27	78.0	8
9	9 04.3	96 27	78.1	9 33.2	96 27	77.9	10 02.0	96 27	77.8	10 30.8	96 27	77.6	10 59.7	96 27	77.5	11 28.5	96 27	77.4	11 57.3	96 27	77.2	12 26.1	96 27	77.1	9
100	8 48.2	96 27	77.1	9 17.0	96 27	77.0	9 45.9	96 27	76.8	10 14.7	96 27	76.7	10 43.5	96 27	76.5	11 12.4	96 27	76.4	11 41.2	96 27	76.3	12 10.0	96 27	76.1	100
1	8 32.1	96 27	76.2	9 01.0	96 27	76.0	9 29.8	96 27	75.9	9 58.6	96 27	75.7	10 27.5	96 27	75.6	10 56.3	96 27	75.5	11 25.2	96 27	75.3	11 54.0	96 27	75.2	1
2	8 16.1	96 27	75.2	8 44.9	96 27	75.1	9 13.8	96 27	74.9	9 42.7	96 27	74.8	10 11.5	96 27	74.6	10 40.4	96 26	74.5	11 09.2	96 26	74.4	11 38.1	96 26	74.2	2
3	8 00.1	96 26	74.2	8 29.0	96 26	74.1	8 57.9	96 26	74.0	9 26.7	96 26	73.8	9 55.6	96 26	73.7	10 24.5	96 26	73.6	10 53.3	96 26	73.4	11 22.2	96 26	73.3	3
4	7 44.2	96 26	73.3	8 13.1	96 26	73.2	8 42.0	96 26	73.0	9 10.9	96 26	72.9	9 39.8	96 26	72.8	10 08.6	96 26	72.6	10 37.5	96 26	72.5	11 06.4	96 26	72.3	4
105	7 28.4	96 26	72.3	7 57.3	96 26	72.2	8 26.2	96 26	72.1	8 55.1	96 26	71.9	9 24.0	96 26	71.8	9 52.9	96 26	71.7	10 21.8	96 26	71.5	10 50.7	96 26	71.4	105
6	7 12.7	96 26	71.4	7 41.6	96 26	71.3	8 10.5	96 26	71.1	8 39.4	96 26	71.0	9 08.3	96 26	70.9	9 37.2	96 26	70.7	10 06.1	96 26	70.6	10 35.0	96 26	70.4	6
7	6 57.1	96 26	70.4	7 26.0	96 26	70.3	7 54.9	96 26	70.2	8 23.9	96 26	70.0	8 52.8	96 26	69.9	9 21.7	96 26	69.8	9 50.6	96 26	69.6	10 19.5	96 26	69.5	7
8	6 41.6	96 26	69.5	7 10.5	96 26	69.4	7 39.4	96 26	69.2	8 08.4	96 26	69.1	8 37.3	96 26	69.0	9 06.2	96 26	68.8	9 35.1	96 26	68.7	10 04.0	96 26	68.6	8
9	6 26.1	96 26	68.5	6 55.1	96 26	68.4	7 24.0	96 26	68.3	7 53.0	96 26	68.2	8 21.9	96 25	68.0	8 50.8	96 25	67.9	9 19.8	96 25	67.8	9 48.7	96 25	67.6	9
110	6 10.8	97 25	67.6	6 39.7	97 25	67.5	7 08.7	97 25	67.3	7 37.7	97 25	67.2	8 06.6	97 25	67.1	8 35.6	97 25	66.9	9 04.5	96 25	66.8	9 33.5	96 25	66.7	110
1	5 55.5	97 25	66.6	6 24.5	97 25	66.5	6 53.5	97 25	66.4	7 22.5	97 25	66.3	7 51.4	97 25	66.1	8 20.4	97 25	66.0	8 49.4	97 25	65.9	9 18.3	97 25	65.7	1
2	5 40.4	97 25	65.7	6 09.4	97 25	65.6	6 38.4	97 25	65.4	7 07.4	97 25	65.3	7 36.4	97 25	65.2	8 05.3	97 25	65.0	8 34.3	97 25	64.9	9 03.3	97 25	64.8	2
3	5 25.4	97 25	64.7	5 54.4	97 25	64.6	6 23.4	97 25	64.5	6 52.4	97 25	64.4	7 21.4	97 25	64.2	7 50.4	97 25	64.1	8 19.4	97 25	64.0	8 48.4	97 25	63.8	3
4	5 10.5	97 25	63.8	5 39.5	97 25	63.7	6 08.5	97 25	63.5	6 37.6	97 25	63.4	7 06.6	97 25	63.3	7 35.6	97 24	63.2	8 04.6	97 24	63.0	8 33.6	97 24	62.9	4
115				5 24.8	97 24	62.7	5 53.8	97 24	62.6	6 22.8	97 24	62.5	6 51.9	97 24	62.3	7 20.9	97 24	62.2	7 49.9	97 24	62.1	8 19.0	97 24	62.0	115
6				5 10.1	97 24	61.8	5 39.2	97 24	61.6	6 08.2	97 24	61.5	6 37.3	97 24	61.4	7 06.3	97 24	61.3	7 35.4	97 24	61.1	8 04.4	97 24	61.0	6
7							5 24.7	97 24	60.7	5 53.8	97 24	60.6	6 22.8	97 24	60.5	6 51.9	97 24	60.3	7 21.0	97 24	60.2	7 50.0	97 24	60.1	7
8							5 10.3	97 24	59.8	5 39.4	97 24	59.6	6 08.5	97 24	59.5	6 37.6	97 24	59.4	7 06.7	97 24	59.3	7 35.8	97 24	59.1	8
9										5 25.2	97 23	58.7	5 54.3	97 23	58.6	6 23.4	97 23	58.4	6 52.5	97 23	58.3	7 21.6	97 23	58.2	9
120										5 11.2	97 23	57.7	5 40.3	97 23	57.6	6 09.4	97 23	57.5	6 38.5	97 23	57.4	7 07.7	97 23	57.2	120
1													5 26.4	97 23	56.7	5 55.5	97 23	56.5	6 24.7	97 23	56.4	6 53.8	97 23	56.3	1
2													5 12.7	97 23	55.7	5 41.8	97 23	55.6	6 11.0	97 23	55.5	6 40.1	97 23	55.4	2
3																5 28.3	97 22	54.7	5 57.4	97 22	54.5	6 26.6	97 22	54.4	3
4																5 14.8	97 22	53.7	5 44.0	97 22	53.6	6 13.2	97 22	53.5	4
125																5 01.6	97 22	52.8	5 30.8	97 22	52.6	6 00.0	97 22	52.5	125
6																			5 17.7	97 22	51.7	5 47.0	97 21	51.6	6
7																			5 04.9	98 21	50.8	5 34.1	98 21	50.6	7
8																						5 21.4	98 21	49.7	8
9																						5 08.9	98 21	48.8	9

Lat. 74°

H.A.	16° 00′ Alt.		Az.	16° 30′ Alt.		Az.	17° 00′ Alt.		Az.	17° 30′ Alt.		Az.	18° 00′ Alt.		Az.	18° 30′ Alt.		Az.	19° 00′ Alt.		Az.	19° 30′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	00
1	31 59.8	1.0 01	178.9	32 29.8	1.0 01	178.9	32 59.8	1.0 01	178.9	33 29.8	1.0 01	178.9	33 59.8	1.0 01	178.9	34 29.8	1.0 01	178.8	34 59.8	1.0 01	178.8	35 29.8	1.0 01	178.8	1
2	31 59.3	1.0 01	177.7	32 29.3	1.0 01	177.7	32 59.3	1.0 01	177.7	33 29.3	1.0 01	177.7	33 59.3	1.0 01	177.7	34 29.3	1.0 01	177.7	34 59.3	1.0 01	177.7	35 29.3	1.0 01	177.7	2
3	31 58.5	1.0 02	176.6	32 28.5	1.0 02	176.6	32 58.5	1.0 02	176.6	33 28.5	1.0 02	176.6	33 58.5	1.0 02	176.6	34 28.5	1.0 02	176.5	34 58.5	1.0 02	176.5	35 28.5	1.0 02	176.5	3
4	31 57.4	1.0 02	175.5	32 27.4	1.0 02	175.5	32 57.4	1.0 02	175.4	33 27.4	1.0 02	175.4	33 57.4	1.0 02	175.4	34 27.3	1.0 02	175.4	34 57.3	1.0 02	175.4	35 27.3	1.0 02	175.4	4
05	31 55.9	1.0 03	174.3	32 25.9	1.0 03	174.3	32 55.9	1.0 03	174.3	33 25.9	1.0 03	174.3	33 55.9	1.0 03	174.3	34 25.9	1.0 03	174.2	34 55.8	1.0 03	174.2	35 25.8	1.0 03	174.2	05
6	31 54.1	1.0 04	173.2	32 24.1	1.0 04	173.2	32 54.1	1.0 04	173.2	33 24.1	1.0 04	173.1	33 54.0	1.0 04	173.1	34 24.0	1.0 04	173.1	34 54.0	1.0 04	173.1	35 24.0	1.0 04	173.1	6
7	31 52.0	1.0 04	172.1	32 22.0	1.0 04	172.0	32 52.0	1.0 04	172.0	33 21.9	1.0 04	172.0	33 51.9	1.0 04	172.0	34 21.9	1.0 04	172.0	34 51.9	1.0 04	171.9	35 21.8	1.0 04	171.9	7
8	31 49.6	1.0 05	170.9	32 19.5	1.0 05	170.9	32 49.5	1.0 05	170.9	33 19.5	1.0 05	170.9	33 49.4	1.0 05	170.8	34 19.4	1.0 05	170.8	34 49.4	1.0 05	170.8	35 19.3	1.0 05	170.7	8
9	31 46.8	1.0 05	169.8	32 16.8	1.0 05	169.8	32 46.7	1.0 05	169.8	33 16.7	1.0 05	169.7	33 46.6	1.0 05	169.7	34 16.6	1.0 05	169.7	34 46.6	1.0 05	169.6	35 16.5	1.0 05	169.6	9
10	31 43.7	1.0 06	168.7	32 13.7	1.0 06	168.6	32 43.6	1.0 06	168.6	33 13.6	1.0 06	168.6	33 43.5	1.0 06	168.5	34 13.5	1.0 06	168.5	34 43.4	1.0 06	168.5	35 13.4	1.0 06	168.4	10
1	31 40.3	1.0 06	167.6	32 10.2	1.0 06	167.5	32 40.2	1.0 06	167.5	33 10.1	1.0 06	167.4	33 40.1	1.0 06	167.4	34 10.0	1.0 06	167.4	34 39.9	1.0 06	167.3	35 09.9	1.0 06	167.3	1
2	31 36.6	1.0 07	166.4	32 06.5	1.0 07	166.4	32 36.4	1.0 07	166.3	33 06.4	1.0 07	166.3	33 36.3	1.0 07	166.3	34 06.2	1.0 07	166.2	34 36.2	1.0 07	166.2	35 06.1	1.0 07	166.1	2
3	31 32.5	1.0 07	165.3	32 02.5	1.0 07	165.3	32 32.4	1.0 07	165.2	33 02.3	1.0 07	165.2	33 32.2	1.0 07	165.1	34 02.1	1.0 07	165.1	34 32.0	1.0 07	165.0	35 02.0	1.0 07	165.0	3
4	31 28.2	1.0 08	164.2	31 58.1	1.0 08	164.1	32 28.0	1.0 08	164.1	32 57.9	1.0 08	164.0	33 27.8	1.0 08	164.0	33 57.7	1.0 08	163.9	34 27.6	1.0 08	163.9	34 57.5	1.0 08	163.8	4
15	31 23.5	1.0 08	163.1	31 53.4	1.0 08	163.0	32 23.3	1.0 08	163.0	32 53.2	1.0 08	162.9	33 23.1	1.0 08	162.9	33 53.0	1.0 08	162.8	34 22.9	1.0 08	162.8	34 52.8	1.0 08	162.7	15
6	31 18.5	1.0 09	161.9	31 48.4	1.0 09	161.9	32 18.3	1.0 09	161.8	32 48.2	1.0 09	161.8	33 18.1	1.0 09	161.7	33 47.9	1.0 09	161.7	34 17.8	1.0 09	161.6	34 47.7	1.0 09	161.6	6
7	31 13.3	1.0 09	160.8	31 43.1	1.0 09	160.8	32 13.0	1.0 09	160.7	32 42.9	1.0 09	160.6	33 12.7	1.0 09	160.6	33 42.6	1.0 09	160.5	34 12.4	1.0 09	160.5	34 42.3	1.0 10	160.4	7
8	31 07.7	1.0 10	159.7	31 37.5	99 10	159.6	32 07.4	99 10	159.6	32 37.2	99 10	159.5	33 07.1	99 10	159.5	33 36.9	99 10	159.4	34 06.8	99 10	159.3	34 36.6	99 10	159.3	8
9	31 01.8	99 10	158.6	31 31.6	99 10	158.5	32 01.5	99 10	158.5	32 31.3	99 10	158.4	33 01.1	99 10	158.3	33 30.9	99 10	158.3	34 00.8	99 10	158.2	34 30.6	99 10	158.1	9
20	30 55.6	99 11	157.5	31 25.4	99 11	157.4	31 55.2	99 11	157.3	32 25.0	99 11	157.3	32 54.9	99 11	157.2	33 24.7	99 11	157.1	33 54.5	99 11	157.1	34 24.3	99 11	157.0	20
1	30 49.1	99 11	156.4	31 18.9	99 11	156.3	31 48.7	99 11	156.2	32 18.5	99 11	156.1	32 48.3	99 11	156.1	33 18.1	99 11	156.0	33 47.9	99 12	155.9	34 17.7	99 12	155.9	1
2	30 42.3	99 12	155.2	31 12.1	99 12	155.2	31 41.9	99 12	155.1	32 11.7	99 12	155.0	32 41.4	99 12	155.0	33 11.2	99 12	154.9	33 41.0	99 12	154.8	34 10.8	99 12	154.7	2
3	30 35.3	99 12	154.1	31 05.0	99 12	154.1	31 34.8	99 12	154.0	32 04.5	99 12	153.9	32 34.3	99 12	153.8	33 04.0	99 12	153.8	33 33.8	99 12	153.7	34 03.5	99 12	153.6	3
4	30 27.9	99 13	153.0	30 57.6	99 13	152.9	31 27.4	99 13	152.9	31 57.1	99 13	152.8	32 26.9	99 13	152.7	32 56.6	99 13	152.6	33 26.3	99 13	152.6	33 56.0	99 13	152.5	4
25	30 20.3	99 13	151.9	30 50.0	99 13	151.8	31 19.7	99 13	151.8	31 49.4	99 13	151.7	32 19.1	99 13	151.6	32 48.8	99 13	151.5	33 18.6	99 13	151.4	33 48.3	99 13	151.4	25
6	30 12.3	99 14	150.8	30 42.0	99 14	150.7	31 11.7	99 14	150.7	31 41.4	99 14	150.6	32 11.1	99 14	150.5	32 40.8	99 14	150.4	33 10.5	99 14	150.3	33 40.2	99 14	150.2	6
7	30 04.1	99 14	149.7	30 33.8	99 14	149.6	31 03.5	99 14	149.5	31 33.2	99 14	149.5	32 02.8	99 14	149.4	32 32.5	99 14	149.3	33 02.2	99 14	149.2	33 31.8	99 14	149.1	7
8	29 55.7	99 15	148.6	30 25.3	99 15	148.5	30 55.0	99 15	148.4	31 24.6	99 15	148.4	31 54.3	99 15	148.3	32 23.9	99 15	148.2	32 53.6	99 15	148.1	33 23.2	99 15	148.0	8
9	29 46.9	99 15	147.5	30 16.5	99 15	147.4	30 46.2	99 15	147.3	31 15.8	99 15	147.3	31 45.4	99 15	147.2	32 15.1	99 15	147.1	32 44.7	99 15	147.0	33 14.3	99 15	146.9	9
30	29 37.9	99 15	146.4	30 07.5	99 16	146.3	30 37.1	99 16	146.2	31 06.7	99 16	146.2	31 36.3	99 16	146.1	32 05.9	99 16	146.0	32 35.5	99 16	145.9	33 05.1	99 16	145.8	30
1	29 28.6	99 16	145.3	29 58.2	99 16	145.2	30 27.8	99 16	145.2	30 57.4	99 16	145.1	31 27.0	99 16	145.0	31 56.6	99 16	144.9	32 26.1	99 16	144.8	32 55.7	99 16	144.7	1
2	29 19.1	99 16	144.3	29 48.7	99 16	144.2	30 18.2	99 16	144.1	30 47.8	99 16	144.0	31 17.4	99 16	143.9	31 46.9	99 16	143.8	32 16.5	98 17	143.7	32 46.0	98 17	143.6	2
3	29 09.3	99 16	143.2	29 38.8	98 17	143.1	30 08.4	98 17	143.0	30 37.9	98 17	142.9	31 07.5	98 17	142.8	31 37.0	98 17	142.7	32 06.5	98 17	142.6	32 36.1	98 17	142.5	3
4	28 59.3	98 17	142.1	29 28.8	98 17	142.0	29 58.3	98 17	141.9	30 27.8	98 17	141.8	30 57.3	98 17	141.7	31 26.9	98 17	141.6	31 56.4	98 17	141.5	32 25.9	98 17	141.4	4
35	28 49.0	98 18	141.0	29 18.5	98 18	140.9	29 48.0	98 18	140.8	30 17.5	98 18	140.7	30 47.0	98 18	140.6	31 16.4	98 18	140.5	31 45.9	98 18	140.4	32 15.4	98 18	140.3	35
6	28 38.4	98 18	139.9	29 07.9	98 18	139.8	29 37.4	98 18	139.7	30 06.9	98 18	139.6	30 36.3	98 18	139.5	31 05.8	98 18	139.4	31 35.3	98 18	139.3	32 04.7	98 18	139.2	6
7	28 27.7	98 18	138.8	28 57.1	98 18	138.7	29 26.6	98 18	138.6	29 56.0	98 18	138.5	30 25.5	98 18	138.4	30 54.9	98 19	138.3	31 24.4	98 19	138.2	31 53.8	98 19	138.1	7
8	28 16.7	98 19	137.8	28 46.1	98 19	137.7	29 15.5	98 19	137.6	29 45.0	98 19	137.4	30 14.4	98 19	137.3	30 43.8	98 19	137.2	31 13.2	98 19	137.1	31 42.6	98 19	137.0	8
9	28 05.5	98 19	136.7	28 34.9	98 19	136.6	29 04.3	98 19	136.5	29 33.7	98 19	136.4	30 03.1	98 19	136.3	30 32.5	98 19	136.1	31 01.8	98 19	136.0	31 31.2	98 19	135.9	9
40	27 54.0	98 19	135.6	28 23.4	98 19	135.5	28 52.8	98 20	135.4	29 22.2	98 20	135.3	29 51.5	98 20	135.2	30 20.9	98 20	135.1	30 50.2	98 20	134.9	31 19.6	98 20	134.8	40
1	27 42.3	98 20	134.6	28 11.7	98 20	134.5	28 41.1	98 20	134.3	29 10.4	98 20	134.2	29 39.8	98 20	134.1	30 09.1	98 20	134.0	30 38.4	98 20	133.9	31 07.8	98 20	133.7	1
2	27 30.4	98 20	133.5	27 59.8	98 20	133.4	28 29.1	98 20	133.3	28 58.4	98 20	133.2	29 27.8	98 20	133.0	29 57.1	98 20	132.9	30 26.4	98 20	132.8	30 55.7	98 20	132.7	2
3	27 18.3	98 20	132.5	27 47.7	98 21	132.3	28 17.0	98 21	132.2	28 46.3	98 21	132.1	29 15.6	98 21	132.0	29 44.9	98 21	131.8	30 14.2	98 21	131.7	30 43.4	98 21	131.6	3
4	27 06.0	98 21	131.4	27 35.3	98 21	131.3	28 04.6	98 21	131.2	28 33.9	98 21	131.0	29 03.2	98 21	130.9	29 32.4	98 21	130.8	30 01.7	98 21	130.7	30 31.0	97 21	130.5	4
45	26 53.5	98 21	130.3	27 22.8	98 21	130.2	27 52.1	98 21	130.1	28 21.3	98 21	130.0	28 50.6	97 21	129.8	29 19.8	97 21	129.7	29 49.1	97 21	129.6	30 18.3	97 21	129.5	45
6	26 40.8	98 22	129.3	27 10.1	97 22	129.2	27 39.3	97 22	129.0	28 08.6	97 22	128.9	28 37.8	97 22	128.8	29 07.0	97 22	128.7	29 36.2	97 22	128.5	30 05.4	97 22	128.4	6
7	26 27.9	97 22	128.2	26 57.2	97 22	128.1	27 26.4	97 22	128.0	27 55.6	97 22	127.9	28 24.8	97 22	127.7	28 54.0	97 22	127.6	29 23.2	97 22	127.5	29 52.4	97 22	127.3	7
8	26 14.9	97 22	127.2	26 44.1	97 22	127.1	27 13.3	97 22	126.9	27 42.5	97 22	126.8	28 11.6	97 22	126.7	28 40.8	97 22	126.6	29 10.0	97 22	126.4	29 39.1	97 22	126.3	8
9	26 01.6	97 22	126.2	26 30.8	97 22	126.0	27 00.0	97 22	125.9	27 29.1	97 22	125.8	27 58.3	97 23	125.6	28 27.4	97 23	125.5	28 56.6	97 23	125.4	29 25.7	97 23	125.2	9
50	25 48.2	97 23	125.1	26 17.3	97 23	125.0	26 46.5	97 23	124.9	27 15.6	97 23	124.7	27 44.8	97 23	124.6	28 13.9	97 23	124.5	28 43.0	97 23	124.3	29 12.1	97 23	124.2	50
1	25 34.5	97 23	124.1	26 03.7	97 23	124.0	26 32.8	97 23	123.8	27 01.9	97 23	123.7	27 31.1	97 23	123.6	28 00.2	97 23	123.4	28 29.3	97 23	123.3	28 58.4	97 23	123.1	1
2	25 20.8	97 23	123.1	25 49.9	97 23	122.9	26 19.0	97 23	122.8	26 48.1	97 23	122.6	27 17.2	97 23	122.5	27 46.3	97 23	122.4	28 15.4	97 23	122.2	28 44.4	97 23	122.1	2
3	25 06.8	97 24	122.0	25 35.9	97 24	121.9	26 05.0	97 24	121.8	26 34.1	97 24	121.6	27 03.2	97 24	121.5	27 32.2	97 24	121.3	28 01.3	97 24	121.2	28 30.3	97 24	121.1	3
4	24 52.7	97 24	121.0	25 21.8	97 24	120.9	25 50.9	97 24	120.7	26 19.9	97 24	120.6	26 49.0	97 24	120.4	27 18.0	97 24	120.3	27 47.1	97 24	120.2	28 16.1	97 24	120.0	4
55	24 38.5	97 24	120.0	25 07.5	97 24	119.8	25 36.6	97 24	119.7	26 05.6	97 24	119.6	26 34.6	97 24	119.4	27 03.7	97 24	119.3	27 32.7	97 24	119.1	28 01.7	97 24	119.0	55
6	24 24.1	97 24	118.9	24 53.1	97 24	118.8	25 22.1	97 24	118.7	25 51.2	97 24	118.5	26 20.2	97 24	118.4	26 49.2	97 24	118.2	27 18.2	97 24	118.1	27 47.2	97 24	118.0	6
7	24 09.5	97 24	117.9	24 38.5	97 24	117.8	25 07.6	97 25	117.6	25 36.6	97 25	117.5	26 05.5	97 25	117.4	26 34.5	97 25	117.2	27 03.5	97 25	117.1	27 32.5	97 25	116.9	7
8	23 54.8	97 25	116.9	24 23.8	97 25	116.8	24 52.8	97 25	116.6	25 21.8	97 25	116.5	25 50.8	97 25	116.3	26 19.8	97 25	116.2	26 48.7	97 25	116.0	27 17.7	96 25	115.9	8
9	23 40.0	97 25	115.9	24 09.0	97 25	115.7	24 38.0	97 25	115.6	25 07.0	97 25	115.5	25 35.9	97 25	115.3	26 04.9	96 25	115.2	26 33.8	96 25	115.0	27 02.7	96 25	114.9	9
60	23 25.1	97 25	114.9	23 54.1	97 25	114.7	24 23.0	97 25	114.6	24 52.0	96 25	114.4	25 20.9	96 25	114.3	25 49.8	96 25	114.2	26 18.7	96 25	114.0	26 47.7	96 25	113.9	60
1	23 10.0	97 25	113.9	23 39.0	96 25	113.7	24 07.9	96 25	113.6	24 36.8	96 25	113.4	25 05.8	96 25	113.3	25 34.7	96 25	113.1	26 03.6	96 25	113.0	26 32.5	96 26	112.8	1
2	22 54.8	96 26	112.9	23 23.8	96 26	112.7	23 52.7	96 26	112.6	24 21.6	96 26	112.4	24 50.5	96 26	112.3	25 19.4	96 26	112.1	25 48.3	96 26	112.0	26 17.2	96 26	111.8	2
3	22 39.6	96 26	111.9	23 08.5	96 26	111.7	23 37.4	96 26	111.6	24 06.3	96 26	111.4	24 35.2	96 26	111.3	25 04.0	96 26	111.1	25 32.9	96 26	111.0	26 01.8	96 26	110.8	3
4	22 24.1	96 26	110.9	22 53.0	96 26	110.7	23 21.9	96 26	110.6	23 50.8	96 26	110.4	24 19.7	96 26	110.3	24 48.6	96 26	110.1	25 17.4	96 26	110.0	25 46.3	96 26	109.8	4
65	22 08.6	96 26	109.9	22 37.5	96 26	109.7	23 06.4	96 26	109.6	23 35.3	96 26	109.4	24 04.1	96 26	109.3	24 33.0	96 26	109.1	25 01.8	96 26	109.0	25 30.7	96 26	108.8	65
6	21 53.0	96 26	108.9	22 21.9	96 26	108.7	22 50.8	96 26	108.6	23 19.6	96 26	108.4	23 48.5	96 26	108.3	24 17.3	96 26	108.1	24 46.1	96 26	108.0	25 15.0	96 26	107.8	6
7	21 37.3	96 26	107.9	22 06.2	96 26	107.7	22 35.0	96 26	107.6	23 03.9	96 26	107.4	23 32.7	96 26	107.3	24 01.5	96 26	107.1	24 30.4	96 26	107.0	24 59.2	96 26	106.8	7
8	21 21.6	96 26	106.9	21 50.4	96 26	106.7	22 19.2	96 26	106.6	22 48.1	96 26	106.4	23 16.9	96 27	106.3	23 45.7	96 27	106.1	24 14.5	96 27	106.0	24 43.3	96 27	105.8	8
9	21 05.7	96 27	105.9	21 34.5	96 27	105.7	22 03.3	96 27	105.6	22 32.2	96 27	105.4	23 01.0	96 27	105.3	23 29.8	96 27	105.1	23 58.6	96 27	105.0	24 27.3	96 27	104.8	9
70	20 49.7	96 27	104.9	21 18.6	96 27	104.7	21 47.4	96 27	104.6	22 16.2	96 27	104.4	22 45.0	96 27	104.3	23 13.8	96 27	104.1	23 42.5	96 27	104.0	24 11.3	96 27	103.8	70
1	20 33.7	96 27	103.9	21 02.5	96 27	103.7	21 31.3	96 27	103.6	22 00.1	96 27	103.4	22 28.9	96 27	103.3	22 57.7	96 27	103.1	23 26.5	96 27	103.0	23 55.2	96 27	102.8	1
2	20 17.6	96 27	102.9	20 46.4	96 27	102.8	21 15.2	96 27	102.6	21 44.0	96 27	102.5	22 12.8	96 27	102.3	22 41.6	96 27	102.2	23 10.3	96 27	102.0	23 39.1	96 27	101.8	2
3	20 01.5	96 27	101.9	20 30.3	96 27	101.8	20 59.1	96 27	101.6	21 27.8	96 27	101.5	21 56.6	96 27	101.3	22 25.4	96 27	101.2	22 54.1	96 27	101.0	23 22.9	96 27	100.9	3
4	19 45.3	96 27	100.9	20 14.1	96 27	100.8	20 42.8	96 27	100.6	21 11.6	96 27	100.5	21 40.4	96 27	100.3	22 09.1	96 27	100.2	22 37.9	96 27	100.0	23 06.6	96 27	99.9	4
75	19 29.0	96 27	100.0	19 57.8	96 27	99.8	20 26.6	96 27	99.7	20 55.3	96 27	99.5	21 24.1	96 27	99.4	21 52.8	96 27	99.2	22 21.5	96 27	99.1	22 50.3	96 27	98.9	75
6	19 12.7	96 27	99.0	19 41.5	96 27	98.8	20 10.2	96 27	98.7	20 39.0	96 27	98.5	21 07.7	96 27	98.4	21 36.5	96 27	98.2	22 05.2	96 27	98.1	22 33.9	96 27	97.9	6
7	18 56.3	96 27	98.0	19 25.1	96 27	97.9	19 53.9	96 27	97.7	20 22.6	96 27	97.6	20 51.3	96 27	97.4	21 20.1	96 27	97.3	21 48.8	96 27	97.1	22 17.5	96 27	96.9	7
8	18 39.9	96 27	97.0	19 08.7	96 27	96.9	19 37.5	96 27	96.7	20 06.2	96 27	96.6	20 34.9	96 27	96.4	21 03.7	96 27	96.3	21 32.4	96 27	96.1	22 01.1	96 27	96.0	8
9	18 23.5	96 27	96.0	18 52.3	96 27	95.9	19 21.0	96 27	95.8	19 49.7	96 27	95.6	20 18.5	96 27	95.5	20 47.2	96 27	95.3	21 15.9	96 27	95.2	21 44.6	96 27	95.0	9
80	18 07.1	96 27	95.1	18 35.8	96 27	94.9	19 04.5	96 28	94.8	19 33.3	96 28	94.6	20 02.0	96 28	94.5	20 30.7	96 28	94.3	20 59.4	96 28	94.2	21 28.1	96 28	94.0	80
1	17 50.6	96 28	94.1	18 19.3	96 28	94.0	18 48.1	96 28	93.8	19 16.8	96 28	93.7	19 45.5	96 28	93.5	20 14.2	96 28	93.4	20 42.9	96 28	93.2	21 11.6	96 28	93.1	1
2	17 34.1	96 28	93.2	18 02.8	96 28	93.0	18 31.5	96 28	92.9	19 00.3	96 28	92.7	19 29.0	96 28	92.6	19 57.7	96 28	92.4	20 26.4	96 28	92.2	20 55.1	96 28	92.1	2
3	17 17.6	96 28	92.2	17 46.3	96 28	92.0	18 15.0	96 28	91.9	18 43.7	96 28	91.7	19 12.5	96 28	91.6	19 41.2	96 28	91.4	20 09.9	96 28	91.3	20 38.6	96 28	91.1	3
4	17 01.0	96 28	91.2	17 29.8	96 28	91.1	17 58.5	96 28	90.9	18 27.2	96 28	90.8	18 55.9	96 28	90.6	19 24.6	96 28	90.5	19 53.3	96 28	90.3	20 22.0	96 28	90.2	4
85	16 44.5	96 28	90.3	17 13.2	96 28	90.1	17 42.0	96 28	90.0	18 10.7	96 28	89.8	18 39.4	96 28	89.7	19 08.1	96 28	89.5	19 36.8	96 28	89.4	20 05.5	96 28	89.2	85
6	16 27.9	96 28	89.3	16 56.7	96 28	89.2	17 25.4	96 28	89.0	17 54.1	96 28	88.9	18 22.9	96 28	88.7	18 51.6	96 28	88.6	19 20.3	96 28	88.4	19 49.0	96 28	88.2	6
7	16 11.4	96 28	88.4	16 40.1	96 28	88.2	17 08.9	96 28	88.1	17 37.6	96 28	87.9	18 06.3	96 28	87.7	18 35.0	96 28	87.6	19 03.7	96 28	87.4	19 32.4	96 28	87.3	7
8	15 54.9	96 28	87.4	16 23.6	96 28	87.2	16 52.4	96 28	87.1	17 21.1	96 28	86.9	17 49.8	96 28	86.8	18 18.5	96 28	86.6	18 47.2	96 28	86.5	19 15.9	96 27	86.3	8
9	15 38.4	96 28	86.4	16 07.1	96 28	86.3	16 35.8	96 28	86.1	17 04.6	96 28	86.0	17 33.3	96 27	85.8	18 02.0	96 27	85.7	18 30.7	96 27	85.5	18 59.4	96 27	85.4	9
90	15 21.9	96 27	85.5	15 50.6	96 27	85.3	16 19.4	96 27	85.2	16 48.1	96 27	85.0	17 16.8	96 27	84.9	17 45.5	96 27	84.7	18 14.2	96 27	84.6	18 43.0	96 27	84.4	90

16—18508

Lat. 74°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	15 05.4	96	27	84.5	15 34.1	96	27	84.4	16 02.9	96	27	84.2	16 31.6	96	27	84.1	17 00.4	96	27	83.9	17 29.1	96	27	83.8	17 57.8	96	27	83.6	18 26.5	96	27	83.5	91
2	14 48.9	96	27	83.6	15 17.7	96	27	83.4	15 46.4	96	27	83.3	16 15.2	96	27	83.1	16 43.9	96	27	83.0	17 12.7	96	27	82.8	17 41.4	96	27	82.7	18 10.1	96	27	82.5	2
3	14 32.5	96	27	82.6	15 01.3	96	27	82.5	15 30.0	96	27	82.3	15 58.8	96	27	82.2	16 27.5	96	27	82.0	16 56.3	96	27	81.9	17 25.0	96	27	81.7	17 53.7	96	27	81.6	3
4	14 16.1	96	27	81.7	14 44.9	96	27	81.5	15 13.7	96	27	81.4	15 42.4	96	27	81.2	16 11.2	96	27	81.1	16 39.9	96	27	80.9	17 08.6	96	27	80.8	17 37.4	96	27	80.6	4
95	13 59.8	96	27	80.7	14 28.6	96	27	80.6	14 57.3	96	27	80.4	15 26.1	96	27	80.3	15 54.9	96	27	80.1	16 23.6	96	27	80.0	16 52.3	96	27	79.8	17 21.1	96	27	79.7	95
6	13 43.5	96	27	79.8	14 12.3	96	27	79.6	14 41.1	96	27	79.5	15 09.8	96	27	79.3	15 38.6	96	27	79.2	16 07.3	96	27	79.0	16 36.1	96	27	78.9	17 04.8	96	27	78.7	6
7	13 27.3	96	27	78.8	13 56.0	96	27	78.7	14 24.8	96	27	78.5	14 53.6	96	27	78.4	15 22.4	96	27	78.2	15 51.1	96	27	78.1	16 19.9	96	27	77.9	16 48.6	96	27	77.8	7
8	13 11.1	96	27	77.9	13 39.9	96	27	77.7	14 08.6	96	27	77.6	14 37.4	96	27	77.4	15 06.2	96	27	77.3	15 35.0	96	27	77.1	16 03.7	96	27	77.0	16 32.5	96	27	76.8	8
9	12 54.9	96	27	76.9	13 23.7	96	27	76.8	13 52.5	96	27	76.6	14 21.3	96	27	76.5	14 50.1	96	27	76.3	15 18.9	96	27	76.2	15 47.7	96	27	76.1	16 16.4	96	27	75.9	9
100	12 38.8	96	27	76.0	13 07.7	96	27	75.8	13 36.5	96	27	75.7	14 05.3	96	27	75.5	14 34.1	96	27	75.4	15 02.9	96	27	75.3	15 31.6	96	27	75.1	16 00.4	96	27	75.0	100
1	12 22.8	96	27	75.0	12 51.7	96	27	74.9	13 20.5	96	27	74.7	13 49.3	96	26	74.6	14 18.1	96	26	74.5	14 46.9	96	26	74.3	15 15.7	96	26	74.2	15 44.5	96	26	74.0	1
2	12 06.9	96	26	74.1	12 35.7	96	26	73.9	13 04.6	96	26	73.8	13 33.4	96	26	73.7	14 02.2	96	26	73.5	14 31.0	96	26	73.4	14 59.8	96	26	73.2	15 28.6	96	26	73.1	2
3	11 51.0	96	26	73.1	12 19.9	96	26	73.0	12 48.7	96	26	72.9	13 17.5	96	26	72.7	13 46.4	96	26	72.6	14 15.2	96	26	72.4	14 44.0	96	26	72.3	15 12.8	96	26	72.1	3
4	11 35.2	96	26	72.2	12 04.1	96	26	72.1	12 32.9	96	26	71.9	13 01.8	96	26	71.8	13 30.6	96	26	71.6	13 59.5	96	26	71.5	14 28.3	96	26	71.4	14 57.1	96	26	71.2	4
105	11 19.5	96	26	71.3	11 48.4	96	26	71.1	12 17.3	96	26	71.0	12 46.1	96	26	70.8	13 15.0	96	26	70.7	13 43.8	96	26	70.6	14 12.7	96	26	70.4	14 41.5	96	26	70.3	105
6	11 03.9	96	26	70.3	11 32.8	96	26	70.2	12 01.7	96	26	70.0	12 30.6	96	26	69.9	12 59.4	96	26	69.8	13 28.3	96	26	69.6	13 57.2	96	26	69.5	14 26.0	96	26	69.3	6
7	10 48.4	96	26	69.4	11 17.3	96	26	69.2	11 46.2	96	26	69.1	12 15.1	96	26	69.0	12 44.0	96	26	68.8	13 12.8	96	26	68.7	13 41.7	96	26	68.5	14 10.6	96	26	68.4	7
8	10 33.0	96	26	68.4	11 01.9	96	26	68.3	11 30.8	96	26	68.2	11 59.7	96	25	68.0	12 28.6	96	25	67.9	12 57.5	96	25	67.7	13 26.4	96	25	67.6	13 55.3	96	25	67.5	8
9	10 17.6	96	25	67.5	10 46.6	96	25	67.3	11 15.5	96	25	67.2	11 44.4	96	25	67.1	12 13.3	96	25	66.9	12 42.2	96	25	66.8	13 11.1	96	25	66.7	13 40.0	96	25	66.5	9
110	10 02.4	96	25	66.5	10 31.3	96	25	66.4	11 00.3	96	25	66.3	11 29.2	96	25	66.1	11 58.2	96	25	66.0	12 27.1	96	25	65.9	12 56.0	96	25	65.7	13 24.9	96	25	65.6	110
1	9 47.3	97	25	65.6	10 16.2	97	25	65.5	10 45.2	97	25	65.3	11 14.2	96	25	65.2	11 43.1	96	25	65.1	12 12.0	96	26	64.9	12 41.0	96	25	64.8	13 09.9	96	26	64.7	1
2	9 32.3	97	25	64.7	10 01.3	97	25	64.5	10 30.2	97	25	64.4	10 59.2	97	25	64.3	11 28.2	97	25	64.1	11 57.1	97	25	64.0	12 26.1	97	25	63.9	12 55.0	97	25	63.7	2
3	9 17.4	97	25	63.7	9 46.4	97	25	63.6	10 15.4	97	25	63.5	10 44.4	97	25	63.3	11 13.3	97	24	63.2	11 42.3	97	24	63.1	12 11.3	97	24	62.9	12 40.3	97	24	62.8	3
4	9 02.6	97	24	62.8	9 31.6	97	24	62.6	10 00.6	97	24	62.5	10 29.6	97	24	62.4	10 58.6	97	24	62.3	11 27.6	97	24	62.1	11 56.6	97	24	62.0	12 25.6	97	24	61.9	4
115	8 48.0	97	24	61.8	9 17.0	97	24	61.7	9 46.0	97	24	61.6	10 15.1	97	24	61.4	10 44.1	97	24	61.3	11 13.1	97	24	61.2	11 42.1	97	24	61.1	12 11.1	97	24	60.9	115
6	8 33.5	97	24	60.9	9 02.5	97	24	60.8	9 31.6	97	24	60.6	10 00.6	97	24	60.5	10 29.6	97	24	60.4	10 58.7	97	24	60.3	11 27.7	97	24	60.1	11 56.7	97	24	60.0	6
7	8 19.1	97	24	60.0	8 48.2	97	24	59.8	9 17.2	97	24	59.7	9 46.3	97	24	59.6	10 15.3	97	24	59.4	10 44.4	97	24	59.3	11 13.4	97	24	59.2	11 42.5	97	24	59.1	7
8	8 04.8	97	24	59.0	8 33.9	97	23	58.9	9 03.0	97	23	58.8	9 32.1	97	23	58.6	10 01.1	97	23	58.5	10 30.2	97	23	58.4	10 59.3	97	23	58.3	11 28.3	97	23	58.1	8
9	7 50.7	97	23	58.1	8 19.8	97	23	57.9	8 48.9	97	23	57.8	9 18.0	97	23	57.7	9 47.1	97	23	57.6	10 16.2	97	23	57.5	10 45.3	97	23	57.3	11 14.4	97	23	57.2	9
120	7 36.8	97	23	57.1	8 05.9	97	23	57.0	8 35.0	97	23	56.9	9 04.1	97	23	56.8	9 33.2	97	23	56.6	10 02.3	97	23	56.5	10 31.4	97	23	56.4	11 00.5	97	23	56.3	120
1	7 23.0	97	23	56.2	7 52.1	97	23	56.1	8 21.2	97	23	55.9	8 50.4	97	23	55.8	9 19.5	97	23	55.7	9 48.6	97	23	55.6	10 17.7	97	23	55.5	10 46.9	97	23	55.3	1
2	7 09.3	97	23	55.2	7 38.4	97	22	55.1	8 07.6	97	22	55.0	8 36.8	97	22	54.9	9 05.9	97	22	54.8	9 35.0	97	22	54.6	10 04.2	97	22	54.5	10 33.3	97	22	54.4	2
3	6 55.8	97	22	54.3	7 25.0	97	22	54.2	7 54.1	97	22	54.1	8 23.3	97	22	53.9	8 52.5	97	22	53.8	9 21.6	97	22	53.7	9 50.8	97	22	53.6	10 20.0	97	22	53.5	3
4	6 42.4	97	22	53.4	7 11.6	97	22	53.2	7 40.8	97	22	53.1	8 10.0	97	22	53.0	8 39.2	97	22	52.9	9 08.4	97	22	52.8	9 37.6	97	22	52.7	10 06.8	97	22	52.5	4
125	6 29.2	97	22	52.4	6 58.5	97	22	52.3	7 27.7	97	22	52.2	7 56.9	97	22	52.1	8 26.1	97	22	52.0	8 55.3	97	22	51.8	9 24.5	97	22	51.7	9 53.7	97	21	51.6	125
6	6 16.2	97	21	51.5	6 45.5	97	21	51.4	7 14.7	97	21	51.3	7 43.9	97	21	51.1	8 13.2	97	21	51.0	8 42.4	97	21	50.9	9 11.6	97	21	50.8	9 40.8	97	21	50.7	6
7	6 03.4	98	21	50.5	6 32.6	98	21	50.4	7 01.9	98	21	50.3	7 31.1	98	21	50.2	8 00.4	97	21	50.1	8 29.6	97	21	50.0	8 58.9	97	21	49.9	9 28.1	97	21	49.8	7
8	5 50.7	98	21	49.6	6 20.0	98	21	49.5	6 49.2	98	21	49.4	7 18.5	98	21	49.3	7 47.8	98	21	49.2	8 17.1	98	21	49.0	8 46.3	98	21	48.9	9 15.6	98	21	48.8	8
9	5 38.2	98	21	48.6	6 07.5	98	20	48.5	6 36.8	98	20	48.4	7 06.1	98	20	48.3	7 35.4	98	20	48.2	8 04.7	98	20	48.1	8 33.9	98	20	48.0	9 03.2	98	20	47.9	9
130	5 25.9	98	20	47.7	5 55.2	98	20	47.6	6 24.5	98	20	47.5	6 53.8	98	20	47.4	7 23.1	98	20	47.3	7 52.4	98	20	47.2	8 21.7	98	20	47.1	8 51.0	98	20	47.0	130
1	5 13.7	98	20	46.8	5 43.1	98	20	46.7	6 12.4	98	20	46.6	6 41.7	98	20	46.4	7 11.1	98	20	46.3	7 40.4	98	20	46.2	8 09.7	98	20	46.1	8 39.1	98	20	46.0	1
2	5 01.8	98	20	45.8	5 31.1	98	20	45.7	6 00.5	98	20	45.6	6 29.8	98	20	45.5	6 59.2	98	19	45.4	7 28.5	98	19	45.3	7 57.9	98	19	45.2	8 27.2	98	19	45.1	2
3					5 19.4	98	19	44.8	5 48.8	98	19	44.7	6 18.1	98	19	44.6	6 47.5	98	19	44.5	7 16.9	98	19	44.4	7 46.3	98	19	44.3	8 15.6	98	19	44.2	3
4					5 07.8	98	19	43.8	5 37.2	98	19	43.7	6 06.6	98	19	43.6	6 36.0	98	19	43.5	7 05.4	98	19	43.4	7 34.8	98	19	43.3	8 04.2	98	19	43.2	4
135									5 25.9	98	19	42.8	5 55.3	98	19	42.7	6 24.7	98	18	42.6	6 54.1	98	18	42.5	7 23.6	98	18	42.4	7 53.0	98	18	42.3	135
6									5 14.8	98	18	41.8	5 44.2	98	18	41.7	6 13.6	98	18	41.7	6 43.1	98	18	41.6	7 12.5	98	18	41.5	7 41.9	98	18	41.4	6
7									5 03.8	98	18	40.9	5 33.3	98	18	40.8	6 02.8	98	18	40.7	6 32.2	98	18	40.6	7 01.7	98	18	40.5	7 31.1	98	18	40.4	7
8													5 22.6	98	18	39.9	5 52.1	98	17	39.8	6 21.5	98	17	39.7	6 51.0	98	17	39.6	7 20.5	98	17	39.5	8
9													5 12.1	98	17	38.9	5 41.6	98	17	38.8	6 11.1	98	17	38.7	6 40.6	98	17	38.6	7 10.1	98	17	38.6	9
140													5 01.8	98	17	38.0	5 31.3	98	17	37.9	6 00.8	98	17	37.8	6 30.4	98	17	37.7	6 59.9	98	17	37.6	140
1																	5 21.3	98	16	37.0	5 50.8	98	16	36.9	6 20.4	98	16	36.8	6 49.9	98	16	36.7	1
2																	5 11.4	99	16	36.0	5 41.0	99	16	35.9	6 10.6	99	16	35.8	6 40.1	99	16	35.8	2
3																	5 01.8	99	16	35.1	5 31.4	99	16	35.0	6 01.0	99	16	34.9	6 30.6	99	16	34.8	3
4																					5 22.0	99	15	34.0	5 51.6	99	15	34.0	6 21.2	99	15	33.9	4
145																					5 12.9	99	15	33.1	5 42.5	99	15	33.0	6 12.1	99	15	32.9	145
6																					5 04.0	99	14	32.2	5 33.6	99	14	32.1	6 03.3	99	14	32.0	6
7																									5 24.9	99	14	31.1	5 54.6	99	14	31.1	7
8																									5 16.5	99	14	30.2	5 46.2	99	14	30.1	8
9																									5 08.3	99	13	29.3	5 38.0	99	13	29.2	9
150																									5 00.3	99	13	28.3	5 30.0	99	13	28.3	150
1																													5 22.3	99	12	27.3	1
2																													5 14.9	99	12	26.4	2
3																													5 07.6	99	12	25.4	3
4																													5 00.7	99	11	24.5	4

Lat. 75°

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0
1	35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8
2	35 59.3	1.0 01	177.7	36 29.3	1.0 01	177.7	36 59.3	1.0 01	177.7	37 29.3	1.0 01	177.7
3	35 58.5	1.0 02	176.5	36 28.5	1.0 02	176.5	36 58.5	1.0 02	176.5	37 28.5	1.0 02	176.5
4	35 57.3	1.0 02	175.4	36 27.3	1.0 03	175.3	36 57.3	1.0 03	175.3	37 27.3	1.0 03	175.3
05	35 55.8	1.0 03	174.2	36 25.8	1.0 03	174.2	36 55.8	1.0 03	174.2	37 25.8	1.0 03	174.1
6	35 54.0	1.0 04	173.0	36 24.0	1.0 04	173.0	36 53.9	1.0 04	173.0	37 23.9	1.0 04	173.0
7	35 51.8	1.0 04	171.9	36 21.8	1.0 04	171.9	36 51.8	1.0 04	171.8	37 21.7	1.0 04	171.8
8	35 49.3	1.0 05	170.7	36 19.3	1.0 05	170.7	36 49.2	1.0 05	170.7	37 19.2	1.0 05	170.6
9	35 46.5	1.0 05	169.6	36 16.4	1.0 05	169.5	36 46.4	1.0 05	169.5	37 16.3	1.0 05	169.5
10	35 43.3	1.0 06	168.4	36 13.3	1.0 06	168.4	36 43.2	1.0 06	168.3	37 13.2	1.0 06	168.3
1	35 39.8	1.0 06	167.3	36 09.8	1.0 06	167.2	36 39.7	1.0 06	167.2	37 09.6	1.0 06	167.1
2	35 36.0	1.0 07	166.1	36 05.9	1.0 07	166.1	36 35.9	1.0 07	166.0	37 05.8	1.0 07	166.0
3	35 31.9	1.0 07	164.9	36 01.8	1.0 07	164.9	36 31.7	1.0 07	164.8	37 01.6	1.0 07	164.8
4	35 27.4	1.0 08	163.8	35 57.3	1.0 08	163.7	36 27.2	1.0 08	163.7	36 57.1	1.0 08	163.6
15	35 22.6	1.0 08	162.6	35 52.5	1.0 09	162.6	36 22.4	1.0 09	162.5	36 52.3	1.0 09	162.5
6	35 17.6	1.0 09	161.5	35 47.4	1.0 09	161.4	36 17.3	1.0 09	161.4	36 47.2	1.0 09	161.3
7	35 12.1	1.0 10	160.4	35 42.0	1.0 10	160.3	36 11.9	1.0 10	160.2	36 41.7	99 10	160.2
8	35 06.4	99 10	159.2	35 36.3	99 10	159.1	36 06.1	99 10	159.1	36 35.9	99 10	159.0
9	35 00.4	99 11	158.1	35 30.2	99 11	158.0	36 00.0	99 11	157.9	36 29.9	99 11	157.9
20	34 54.1	99 11	156.9	35 23.9	99 11	156.9	35 53.7	99 11	156.8	36 23.5	99 11	156.7
1	34 47.4	99 12	155.8	35 17.2	99 12	155.7	35 47.0	99 12	155.6	36 16.8	99 12	155.6
2	34 40.5	99 12	154.7	35 10.3	99 12	154.6	35 40.0	99 12	154.5	36 09.8	99 12	154.4
3	34 33.3	99 13	153.5	35 03.0	99 13	153.4	35 32.8	99 13	153.4	36 02.5	99 13	153.3
4	34 25.8	99 13	152.4	34 55.5	99 13	152.3	35 25.2	99 13	152.2	35 54.9	99 13	152.1
25	34 18.0	99 14	151.3	34 47.7	99 14	151.2	35 17.4	99 14	151.1	35 47.0	99 14	151.0
6	34 09.9	99 14	150.1	34 39.5	99 14	150.1	35 09.2	99 14	150.0	35 38.9	99 14	149.9
7	34 01.5	99 14	149.0	34 31.2	99 14	148.9	35 00.8	99 14	148.8	35 30.4	99 15	148.7
8	33 52.8	99 15	147.9	34 22.5	99 15	147.8	34 52.1	99 15	147.7	35 21.7	99 15	147.6
9	33 43.9	99 15	146.8	34 13.5	99 15	146.7	34 43.1	99 15	146.6	35 12.7	99 15	146.5
30	33 34.7	99 16	145.7	34 04.3	99 16	145.6	34 33.9	99 16	145.5	35 03.5	99 16	145.4
1	33 25.3	99 16	144.6	33 54.8	99 16	144.5	34 24.4	99 16	144.4	34 53.9	98 16	144.2
2	33 15.6	98 17	143.5	33 45.1	98 17	143.3	34 14.6	98 17	143.2	34 44.1	98 17	143 1
3	33 05.6	98 17	142.3	33 35.1	98 17	142.2	34 04.6	98 17	142.1	34 34.1	98 17	142.0
4	32 55.3	98 17	141.2	33 24.8	98 18	141.1	33 54.3	98 18	141.0	34 23.8	98 18	140.9
35	32 44.9	98 18	140.1	33 14.3	98 18	140.0	33 43.8	98 18	139.9	34 13.2	98 18	139.8
6	32 34.2	98 18	139.0	33 03.6	98 18	138.9	33 33.0	98 18	138.8	34 02.4	98 18	138.7
7	32 23.2	98 19	138.0	32 52.6	98 19	137.8	33 22.0	98 19	137.7	33 51.4	98 19	137.6
8	32 12.0	98 19	136.9	32 41.4	98 19	136.7	33 10.8	98 19	136.6	33 40.1	98 19	136.5
9	32 00.6	98 19	135.8	32 29.9	98 19	135.7	32 59.3	98 20	135.5	33 28.6	98 20	135.4
40	31 48.9	98 20	134.7	32 18.3	98 20	134.6	32 47.6	98 20	134.4	33 16.9	98 20	134.3
1	31 37.1	98 20	133.6	32 06.4	98 20	133.5	32 35.7	98 20	133.4	33 05.0	98 20	133.2
2	31 25.0	98 20	132.5	31 54.3	98 21	132.4	32 23.6	98 21	132.3	32 52.8	98 21	132.2
3	31 12.7	98 21	131.5	31 42.0	98 21	131.3	32 11.2	98 21	131.2	32 40.5	97 21	131.1
4	31 00.2	97 21	130.4	31 29.4	97 21	130.3	31 58.7	97 21	130.1	32 27.9	97 21	130.0
45	30 47.5	97 21	129.3	31 16.7	97 22	129.2	31 45.9	97 22	129.1	32 15.1	97 22	128.9
6	30 34.6	97 22	128.3	31 03.8	97 22	128.1	31 33.0	97 22	128.0	32 02.2	97 22	127.9
7	30 21.5	97 22	127.2	30 50.7	97 22	127.1	31 19.9	97 22	126.9	31 49.0	97 22	126.8
8	30 08.3	97 22	126.1	30 37.4	97 22	126.0	31 06.6	97 22	125.9	31 35.7	97 23	125.7
9	29 54.8	97 23	125.1	30 24.0	97 23	125.0	30 53.1	97 23	124.8	31 22.2	97 23	124.7
50	29 41.2	97 23	124.0	30 10.3	97 23	123.9	30 39.4	97 23	123.8	31 08.5	97 23	123.6
1	29 27.4	97 23	123.0	29 56.5	97 23	122.9	30 25.6	97 23	122.7	30 54.6	97 23	122.6
2	29 13.5	97 24	122.0	29 42.5	97 24	121.8	30 11.6	97 24	121.7	30 40.6	97 24	121.5
3	28 59.4	97 24	120.9	29 28.4	97 24	120.8	29 57.4	97 24	120.6	30 26.4	97 24	120.5
4	28 45.1	97 24	119.9	29 14.1	97 24	119.7	29 43.1	97 24	119.6	30 12.1	97 24	119.4
55	28 30.7	97 24	118.8	28 59.7	97 24	118.7	29 28.7	97 24	118.5	29 57.6	97 24	118.4
6	28 16.1	97 24	117.8	28 45.1	97 25	117.7	29 14.1	97 25	117.5	29 43.0	96 25	117.4
7	28 01.4	97 25	116.8	28 30.4	96 25	116.6	28 59.3	96 25	116.5	29 28.3	96 25	116.3
8	27 46.6	96 25	115.8	28 15.5	96 25	115.6	28 44.5	96 25	115.5	29 13.4	96 25	115.3
9	27 31.6	96 25	114.7	28 00.6	96 25	114.6	28 29.5	96 25	114.4	28 58.3	96 25	114.3
60	27 16.6	96 25	113.7	27 45.5	96 25	113.6	28 14.3	96 25	113.4	28 43.2	96 25	113.2
1	27 01.4	96 26	112.7	27 30.2	96 26	112.5	27 59.1	96 26	112.4	28 28.0	96 26	112.2
2	26 46.0	96 26	111.7	27 14.9	96 26	111.5	27 43.8	96 26	111.4	28 12.6	96 26	111.2
3	26 30.6	96 26	110.7	26 59.5	96 26	110.5	27 28.3	96 26	110.4	27 57.1	96 26	110.2
4	26 15.1	96 26	109.7	26 43.9	96 26	109.5	27 12.7	96 26	109.3	27 41.6	96 26	109.2
65	25 59.5	96 26	108.7	26 28.3	96 26	108.5	26 57.1	96 26	108.3	27 25.9	96 26	108.2
6	25 43.8	96 26	107.6	26 12.6	96 26	107.5	26 41.4	96 26	107.3	27 10.1	96 26	107.2
7	25 28.0	96 26	106.6	25 56.7	96 26	106.5	26 25.5	96 26	106.3	26 54.3	96 27	106.2
8	25 12.1	96 27	105.7	25 40.9	96 27	105.5	26 09.6	96 27	105.3	26 38.4	96 27	105.2
9	24 56.1	96 27	104.7	25 24.9	96 27	104.5	25 53.6	96 27	104.3	26 22.4	96 27	104.2
70	24 40.1	96 27	103.7	25 08.8	96 27	103.5	25 37.6	96 27	103.3	26 06.3	96 27	103.2
1	24 24.0	96 27	102.7	24 52.7	96 27	102.5	25 21.4	96 27	102.4	25 50.2	96 27	102.2
2	24 07.8	96 27	101.7	24 36.5	96 27	101.5	25 05.3	96 27	101.4	25 34.0	96 27	101.2
3	23 51.6	96 27	100.7	24 20.3	96 27	100.5	24 49.0	96 27	100.4	25 17.7	96 27	100.2
4	23 35.3	96 27	99.7	24 04.0	96 27	99.6	24 32.7	96 27	99.4	25 01.4	96 27	99.2
75	23 19.0	96 27	98.7	23 47.7	96 27	98.6	24 16.4	96 27	98.4	24 45.1	96 27	98.3
6	23 02.6	96 27	97.8	23 31.3	96 27	97.6	24 00.0	96 27	97.4	24 28.7	96 27	97.3
7	22 46.2	96 27	96.8	23 14.9	96 27	96.6	23 43.6	96 27	96.5	24 12.3	96 27	96.3
8	22 29.8	96 27	95.8	22 58.5	96 27	95.7	23 27.1	96 27	95.5	23 55.8	96 27	95.3
9	22 13.3	96 27	94.8	22 42.0	96 28	94.7	23 10.7	96 28	94.5	23 39.3	96 28	94.4
80	21 56.8	96 28	93.9	22 25.5	96 28	93.7	22 54.2	96 28	93.6	23 22.8	96 28	93.4
1	21 40.3	96 28	92.9	22 09.0	96 28	92.7	22 37.7	96 28	92.6	23 06.3	96 28	92.4
2	21 23.8	96 28	91.9	21 52.5	96 28	91.8	22 21.1	96 28	91.6	22 49.8	96 28	91.5
3	21 07.3	96 28	91.0	21 35.9	96 28	90.8	22 04.6	96 28	90.7	22 33.3	96 28	90.5
4	20 50.7	96 28	90.0	21 19.4	96 28	89.9	21 48.1	96 28	89.7	22 16.7	96 28	89.5
85	20 34.2	96 28	89.0	21 02.9	96 28	88.9	21 31.5	96 28	88.7	22 00.2	96 28	88.6
6	20 17.6	96 28	88.1	20 46.3	96 28	87.9	21 15.0	96 28	87.8	21 43.7	96 28	87.6
7	20 01.1	96 28	87.1	20 29.8	96 28	87.0	20 58.5	96 28	86.8	21 27.1	96 28	86.7
8	19 44.6	96 28	86.2	20 13.3	96 28	86.0	20 42.0	96 27	85.9	21 10.6	96 27	85.7
9	19 28.1	96 27	85.2	19 56.8	96 27	85.1	20 25.5	96 27	84.9	20 54.2	96 27	84.8
90	19 11.7	96 27	84.3	19 40.3	96 27	84.1	20 09.0	96 27	84.0	20 37.7	96 27	83.8

H.A.	22° 00′			22° 30′			23° 00′			23° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0
1	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8
2	37 59.3	1.0 01	177.6	38 29.3	1.0 01	177.6	38 59.3	1.0 01	177.6	39 29.3	1.0 01	177.6
3	37 58.5	1.0 02	176.5	38 28.5	1.0 02	176.5	38 58.5	1.0 02	176.4	39 28.5	1.0 02	176.4
4	37 57.3	1.0 03	175.3	38 27.3	1.0 03	175.3	38 57.3	1.0 03	175.3	39 27.3	1.0 03	175.2
05	37 55.8	1.0 03	174.1	38 25.7	1.0 03	174.1	38 55.7	1.0 03	174.1	39 25.7	1.0 03	174.1
6	37 53.9	1.0 04	172.9	38 23.9	1.0 04	172.9	38 53.9	1.0 04	172.9	39 23.8	1.0 04	172.9
7	37 51.7	1.0 04	171.8	38 21.7	1.0 04	171.7	38 51.6	1.0 04	171.7	39 21.6	1.0 04	171.7
8	37 49.2	1.0 05	170.6	38 19.1	1.0 05	170.6	38 49.1	1.0 05	170.5	39 19.1	1.0 05	170.5
9	37 46.3	1.0 05	169.4	38 16.2	1.0 05	169.4	38 46.2	1.0 05	169.4	39 16.2	1.0 05	169.3
10	37 43.1	1.0 06	168.3	38 13.0	1.0 06	168.2	38 43.0	1.0 06	168.2	39 12.9	1.0 06	168.1
1	37 39.6	1.0 06	167.1	38 09.5	1.0 06	167.0	38 39.4	1.0 06	167.0	39 09.4	1.0 06	167.0
2	37 35.7	1.0 07	165.9	38 05.6	1.0 07	165.9	38 35.5	1.0 07	165.8	39 05.5	1.0 07	165.8
3	37 31.5	1.0 08	164.8	38 01.4	1.0 08	164.7	38 31.3	1.0 08	164.7	39 01.2	1.0 08	164.6
4	37 27.0	1.0 08	163.6	37 56.9	1.0 08	163.5	38 26.8	1.0 08	163.5	38 56.7	1.0 08	163.4
15	37 22.2	1.0 09	162.4	37 52.0	1.0 09	162.4	38 21.9	1.0 09	162.3	38 51.8	1.0 09	162.3
6	37 17.0	1.0 09	161.3	37 46.9	1.0 09	161.2	38 16.7	1.0 09	161.1	38 46.6	1.0 09	161.1
7	37 11.5	99 10	160.1	37 41.4	99 10	160.0	38 11.2	99 10	160.0	38 41.1	99 10	159.9
8	37 05.8	99 10	158.9	37 35.6	99 10	158.9	38 05.4	99 10	158.8	38 35.2	99 10	158.7
9	36 59.7	99 11	157.8	37 29.5	99 11	157.7	37 59.3	99 11	157.7	38 29.1	99 11	157.6
20	36 53.3	99 11	156.6	37 23.1	99 11	156.6	37 52.8	99 11	156.5	38 22.6	99 11	156.4
1	36 46.6	99 12	155.5	37 16.3	99 12	155.4	37 46.1	99 12	155.3	38 15.9	99 12	155.3
2	36 39.5	99 12	154.3	37 09.3	99 12	154.3	37 39.0	99 12	154.2	38 08.8	99 12	154.1
3	36 32.2	99 13	153.2	37 02.0	99 13	153.1	37 31.7	99 13	153.0	38 01.4	99 13	152.9
4	36 24.6	99 13	152.1	36 54.3	99 13	152.0	37 24.0	99 13	151.9	37 53.7	99 13	151.8
25	36 16.7	99 14	150.9	36 46.4	99 14	150.8	37 16.1	99 14	150.7	37 45.8	99 14	150.6
6	36 08.6	99 14	149.8	36 38.2	99 14	149.7	37 07.9	99 14	149.6	37 37.5	99 14	149.5
7	36 00.1	99 15	148.6	36 29.7	99 15	148.6	36 59.4	99 15	148.5	37 29.0	99 15	148.4
8	35 51.3	99 15	147.5	36 21.0	99 15	147.4	36 50.6	99 15	147.3	37 20.2	99 15	147.2
9	35 42.3	99 16	146.4	36 11.9	99 16	146.3	36 41.5	99 16	146.2	37 11.1	99 16	146.1
30	35 33.0	99 16	145.3	36 02.6	99 16	145.2	36 32.2	99 16	145.1	37 01.7	98 16	144.9
1	35 23.5	98 16	144.1	35 53.0	98 16	144.0	36 22.6	98 16	143.9	36 52.1	98 16	143.8
2	35 13.7	98 17	143.0	35 43.2	98 17	142.9	36 12.7	98 17	142.8	36 42.2	98 17	142.7
3	35 03.6	98 17	141.9	35 33.1	98 17	141.8	36 02.6	98 17	141.7	36 32.0	98 17	141.6
4	34 53.3	98 18	140.8	35 22.7	98 18	140.7	35 52.2	98 18	140.6	36 21.6	98 18	140.4
35	34 42.7	98 18	139.7	35 12.1	98 18	139.6	35 41.5	98 18	139.5	36 11.0	98 18	139.3
6	34 31.9	98 18	138.6	35 01.3	98 18	138.5	35 30.7	98 19	138.3	36 00.1	98 19	138.2
7	34 20.8	98 19	137.5	34 50.2	98 19	137.4	35 19.6	98 19	137.2	35 48.9	98 19	137.1
8	34 09.5	98 19	136.4	34 38.9	98 19	136.3	35 08.2	98 19	136.1	35 37.6	98 19	136.0
9	33 58.0	98 20	135.3	34 27.3	98 20	135.2	34 56.6	98 20	135.0	35 26.0	98 20	134.9
40	33 46.2	98 20	134.2	34 15.5	98 20	134.1	34 44.8	98 20	133.9	35 14.1	98 20	133.8
1	33 34.3	98 20	133.1	34 03.6	98 20	133.0	34 32.8	98 20	132.8	35 02.1	98 20	132.7
2	33 22.1	98 21	132.0	33 51.3	98 21	131.9	34 20.6	97 21	131.8	34 49.8	97 21	131.6
3	33 09.7	97 21	130.9	33 38.9	97 21	130.8	34 08.2	97 21	130.7	34 37.4	97 21	130.5
4	32 57.1	97 21	129.9	33 26.3	97 21	129.7	33 55.5	97 21	129.6	34 24.7	97 21	129.5
45	32 44.3	97 22	128.8	33 13.5	97 22	128.7	33 42.7	97 22	128.5	34 11.8	97 22	128.4
6	32 31.3	97 22	127.7	33 00.5	97 22	127.6	33 29.6	97 22	127.4	33 58.8	97 22	127.3
7	32 18.2	97 22	126.7	32 47.3	97 22	126.5	33 16.4	97 22	126.4	33 45.5	97 22	126.2
8	32 04.8	97 23	125.6	32 33.9	97 23	125.4	33 03.0	97 23	125.3	33 32.1	97 23	125.2
9	31 51.3	97 23	124.5	32 20.3	97 23	124.4	32 49.4	97 23	124.2	33 18.5	97 23	124.1
50	31 37.6	97 23	123.5	32 06.6	97 23	123.3	32 35.7	97 23	123.2	33 04.7	97 23	123.0
1	31 23.7	97 23	122.4	31 52.7	97 23	122.3	32 21.7	97 23	122.1	32 50.7	97 24	122.0
2	31 09.6	97 24	121.4	31 38.6	97 24	121.2	32 07.6	97 24	121.1	32 36.6	97 24	120.9
3	30 55.4	97 24	120.3	31 24.4	97 24	120.2	31 53.4	97 24	120.0	32 22.4	97 24	119.9
4	30 41.1	97 24	119.3	31 10.0	97 24	119.1	31 39.0	97 24	119.0	32 08.0	96 24	118.8
55	30 26.6	97 24	118.2	30 55.5	96 24	118.1	31 24.5	96 24	117.9	31 53.4	96 24	117.8
6	30 11.9	96 25	117.2	30 40.9	96 25	117.1	31 09.8	96 25	116.9	31 38.7	96 25	116.7
7	29 57.2	96 25	116.2	30 26.1	96 25	116.0	30 55.0	96 25	115.9	31 23.9	96 25	115.7
8	29 42.3	96 25	115.1	30 11.1	96 25	115.0	30 40.0	96 25	114.8	31 08.9	96 25	114.7
9	29 27.2	96 25	114.1	29 56.1	96 25	114.0	30 25.0	96 25	113.8	30 53.8	96 25	113.6
60	29 12.1	96 25	113.1	29 40.9	96 25	112.9	30 09.8	96 26	112.8	30 38.6	96 26	112.6
1	28 56.8	96 26	112.1	29 25.6	96 26	111.9	29 54.5	96 26	111.8	30 23.3	96 26	111.6
2	28 41.4	96 26	111.1	29 10.2	96 26	110.9	29 39.0	96 26	110.7	30 07.8	96 26	110.6
3	28 25.9	96 26	110.0	28 54.7	96 26	109.9	29 23.5	96 26	109.7	29 52.3	96 26	109.6
4	28 10.4	96 26	109.0	28 39.1	96 26	108.9	29 07.9	96 26	108.7	29 36.7	96 26	108.5
65	27 54.7	96 26	108.0	28 23.4	96 26	107.9	28 52.2	96 26	107.7	29 20.9	96 26	107.5
6	27 38.9	96 26	107.0	28 07.7	96 26	106.9	28 36.4	96 26	106.7	29 05.1	96 26	106.5
7	27 23.0	96 27	106.0	27 51.8	96 27	105.9	28 20.5	96 27	105.7	28 49.2	96 27	105.5
8	27 07.1	96 27	105.0	27 35.8	96 27	104.9	28 04.6	96 27	104.7	28 33.3	96 27	104.5
9	26 51.1	96 27	104.0	27 19.8	96 27	103.9	27 48.5	96 27	103.7	28 17.2	96 27	103.5
70	26 35.0	96 27	103.0	27 03.7	96 27	102.9	27 32.4	96 27	102.7	28 01.1	96 27	102.5
1	26 18.9	96 27	102.0	26 47.6	96 27	101.9	27 16.3	96 27	101.7	27 44.9	96 27	101.5
2	26 02.7	96 27	101.0	26 31.4	96 27	100.9	27 00.0	96 27	100.7	27 28.7	96 27	100.6
3	25 46.4	96 27	100.1	26 15.1	96 27	99.9	26 43.8	96 27	99.7	27 12.4	96 27	99.6
4	25 30.1	96 27	99.1	25 58.8	96 27	98.9	26 27.4	96 27	98.8	26 56.1	95 27	98.6
75	25 13.8	96 27	98.1	25 42.4	96 27	97.9	26 11.1	95 27	97.8	26 39.7	95 27	97.6
6	24 57.4	96 27	97.1	25 26.0	96 27	97.0	25 54.7	95 27	96.8	26 23.3	95 27	96.6
7	24 40.9	96 27	96.1	25 09.6	95 27	96.0	25 38.2	95 27	95.8	26 06.9	95 27	95.6
8	24 24.5	96 27	95.2	24 53.1	95 27	95.0	25 21.8	95 28	94.8	25 50.4	95 27	94.7
9	24 08.0	96 28	94.2	24 36.6	95 28	94.0	25 05.3	95 28	93.9	25 33.9	95 28	93.7
80	23 51.5	95 28	93.2	24 20.1	95 28	93.1	24 48.8	95 28	92.9	25 17.4	95 28	92.7
1	23 35.0	95 28	92.3	24 03.6	95 28	92.1	24 32.2	95 28	91.9	25 00.9	95 28	91.8
2	23 18.4	95 28	91.3	23 47.1	95 28	91.1	24 15.7	95 28	91.0	24 44.3	95 28	90.8
3	23 01.9	95 28	90.3	23 30.5	95 28	90.2	23 59.2	95 28	90.0	24 27.8	95 28	89.8
4	22 45.4	95 28	89.4	23 14.0	95 28	89.2	23 42.6	95 28	89.0	24 11.3	95 28	88.9
85	22 28.8	95 28	88.4	22 57.5	95 28	88.3	23 26.1	95 28	88.1	23 54.7	95 28	87.9
6	22 12.3	95 28	87.5	22 40.9	95 28	87.3	23 09.6	95 28	87.1	23 38.2	95 28	87.0
7	21 55.8	95 28	86.5	22 24.4	95 28	86.3	22 53.1	95 27	86.2	23 21.7	95 27	86.0
8	21 39.3	96 27	85.5	22 07.9	95 27	85.4	22 36.6	95 27	85.2	23 05.2	95 27	85.1
9	21 22.8	96 27	84.6	21 51.5	95 27	84.4	22 20.1	95 27	84.3	22 48.7	95 27	84.1
90	21 06.4	96 27	83.6	21 35.0	96 27	83.5	22 03.7	95 27	83.3	22 32.3	95 27	83.2

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	18 55.2	96 27	83.3	19 23.9	96 27	83.2	19 52.6	96 27	83.0	20 21.3	96 27	82.9	20 49.9	96 27	82.7	21 18.6	96 27	82.5	21 47.3	96 27	82.4	22 15.9	96 27	82.2	91
2	18 38.8	96 27	82.4	19 07.5	96 27	82.2	19 36.2	96 27	82.1	20 04.9	96 27	81.9	20 33.6	96 27	81.8	21 02.2	96 27	81.6	21 30.9	96 27	81.4	21 59.5	96 27	81.3	2
3	18 22.4	96 27	81.4	18 51.1	96 27	81.3	19 19.8	96 27	81.1	19 48.5	96 27	81.0	20 17.2	96 27	80.8	20 45.9	96 27	80.6	21 14.5	96 27	80.5	21 43.2	96 27	80.3	3
4	18 06.1	96 27	80.5	18 34.8	96 27	80.3	19 03.5	96 27	80.2	19 32.2	96 27	80.0	20 00.9	96 27	79.9	20 29.6	96 27	79.7	20 58.3	96 27	79.5	21 26.9	96 27	79.4	4
95	17 49.8	96 27	79.5	18 18.5	96 27	79.4	18 47.2	96 27	79.2	19 16.0	96 27	79.1	19 44.6	96 27	78.9	20 13.3	96 27	78.8	20 42.0	96 27	78.6	21 10.7	96 27	78.4	95
6	17 33.6	96 27	78.6	18 02.3	96 27	78.4	18 31.0	96 27	78.3	18 59.7	96 27	78.1	19 28.4	96 27	78.0	19 57.1	96 27	77.8	20 25.8	96 27	77.7	20 54.5	96 27	77.5	6
7	17 17.4	96 27	77.6	17 46.1	96 27	77.5	18 14.9	96 27	77.3	18 43.6	96 27	77.2	19 12.3	96 27	77.0	19 41.0	96 27	76.9	20 09.7	96 27	76.7	20 38.4	96 27	76.6	7
8	17 01.3	96 27	76.7	17 30.0	96 27	76.5	17 58.8	96 27	76.4	18 27.5	96 27	76.2	18 56.2	96 27	76.1	19 24.9	96 27	75.9	19 53.6	96 27	75.8	20 22.4	96 27	75.6	8
9	16 45.2	96 27	75.8	17 14.0	96 27	75.6	17 42.7	96 27	75.5	18 11.5	96 27	75.3	18 40.2	96 27	75.2	19 08.9	96 27	75.0	19 37.6	96 27	74.9	20 06.4	96 27	74.7	9
100	16 29.2	96 27	74.8	16 58.0	96 26	74.7	17 26.7	96 26	74.5	17 55.5	96 26	74.4	18 24.2	96 26	74.2	18 53.0	96 26	74.1	19 21.7	96 26	73.9	19 50.4	96 26	73.8	100
1	16 13.3	96 26	73.9	16 42.1	96 26	73.7	17 10.8	96 26	73.6	17 39.6	96 26	73.4	18 08.4	96 26	73.3	18 37.1	96 26	73.1	19 05.9	96 26	73.0	19 34.6	96 26	72.8	1
2	15 57.4	96 26	72.9	16 26.2	96 26	72.8	16 55.0	96 26	72.6	17 23.8	96 26	72.5	17 52.6	96 26	72.4	18 21.3	96 26	72.2	18 50.1	96 26	72.1	19 18.8	96 26	71.9	2
3	15 41.7	96 26	72.0	16 10.5	96 26	71.9	16 39.3	96 26	71.7	17 08.1	96 26	71.6	17 36.8	96 26	71.4	18 05.6	96 26	71.3	18 34.4	96 26	71.1	19 03.2	96 26	71.0	3
4	15 26.0	96 26	71.1	15 54.8	96 26	70.9	16 23.6	96 26	70.8	16 52.4	96 26	70.6	17 21.2	96 26	70.5	17 50.0	96 26	70.3	18 18.8	96 26	70.2	18 47.6	96 26	70.0	4
105	15 10.4	96 26	70.1	15 39.2	96 26	70.0	16 08.0	96 26	69.8	16 36.9	96 26	69.7	17 05.7	96 26	69.6	17 34.5	96 26	69.4	18 03.3	96 26	69.3	18 32.1	96 26	69.1	105
6	14 54.9	96 26	69.2	15 23.7	96 26	69.1	15 52.6	96 26	68.9	16 21.4	96 26	68.8	16 50.2	96 26	68.6	17 19.0	96 26	68.5	17 47.9	96 26	68.3	18 16.7	96 26	68.2	6
7	14 39.5	96 26	68.3	15 08.3	96 26	68.1	15 37.2	96 25	68.0	16 06.0	96 25	67.8	16 34.9	96 25	67.7	17 03.7	96 25	67.5	17 32.5	96 25	67.4	18 01.4	96 25	67.3	7
8	14 24.1	96 25	67.3	14 53.0	96 25	67.2	15 21.9	96 25	67.0	15 50.8	96 25	66.9	16 19.6	96 25	66.8	16 48.5	96 25	66.6	17 17.3	96 25	66.5	17 46.2	96 25	66.3	8
9	14 08.9	96 25	66.4	14 37.8	96 25	66.3	15 06.7	96 25	66.1	15 35.6	96 25	66.0	16 04.5	96 25	65.8	16 33.4	96 25	65.7	17 02.2	96 25	65.5	17 31.1	96 25	65.4	9
110	13 53.8	96 25	65.5	14 22.7	96 25	65.3	14 51.7	96 25	65.2	15 20.6	96 25	65.0	15 49.4	96 25	64.9	16 18.3	96 25	64.8	16 47.2	96 25	64.6	17 16.1	96 25	64.5	110
1	13 38.9	96 25	64.5	14 07.8	96 25	64.4	14 36.7	96 25	64.3	15 05.6	96 25	64.1	15 34.5	96 25	64.0	16 03.4	96 25	63.8	16 32.3	96 25	63.7	17 01.2	96 25	63.6	1
2	13 24.0	96 25	63.6	13 52.9	96 25	63.5	14 21.9	96 25	63.3	14 50.8	96 24	63.2	15 19.7	96 24	63.0	15 48.7	96 24	62.9	16 17.6	96 24	62.8	16 46.5	96 24	62.6	2
3	13 09.2	97 24	62.7	13 38.2	97 24	62.5	14 07.1	97 24	62.4	14 36.1	97 24	62.3	15 05.0	96 24	62.1	15 34.0	96 24	62.0	16 02.9	96 24	61.8	16 31.9	96 24	61.7	3
4	12 54.6	97 24	61.7	13 23.6	97 24	61.6	13 52.6	97 24	61.5	14 21.5	97 24	61.3	14 50.5	97 24	61.2	15 19.5	97 24	61.1	15 48.4	97 24	60.9	16 17.4	96 24	60.8	4
115	12 40.1	97 24	60.8	13 09.1	97 24	60.7	13 38.1	97 24	60.5	14 07.1	97 24	60.4	14 36.1	97 24	60.3	15 05.0	97 24	60.1	15 34.0	97 24	60.0	16 03.0	97 24	59.9	115
6	12 25.7	97 24	59.9	12 54.7	97 24	59.7	13 23.8	97 24	59.6	13 52.8	97 24	59.5	14 21.8	97 24	59.3	14 50.8	97 24	59.2	15 19.8	97 24	59.1	15 48.8	97 23	58.9	6
7	12 11.5	97 24	58.9	12 40.5	97 23	58.8	13 09.6	97 23	58.7	13 38.6	97 23	58.5	14 07.6	97 23	58.4	14 36.6	97 23	58.3	15 05.6	97 23	58.2	15 34.7	97 23	58.0	7
8	11 57.4	97 23	58.0	12 26.5	97 23	57.9	12 55.5	97 23	57.8	13 24.6	97 23	57.6	13 53.6	97 23	57.5	14 22.6	97 23	57.4	14 51.7	97 23	57.2	15 20.7	97 23	57.1	8
9	11 43.4	97 23	57.1	12 12.5	97 23	56.9	12 41.6	97 23	56.8	13 10.7	97 23	56.7	13 39.7	97 23	56.6	14 08.8	97 23	56.4	14 37.8	97 23	56.3	15 06.9	97 23	56.2	9
120	11 29.6	97 23	56.1	11 58.7	97 23	56.0	12 27.8	97 23	55.9	12 56.9	97 23	55.8	13 26.0	97 23	55.6	13 55.1	97 23	55.5	14 24.1	97 23	55.4	14 53.2	97 23	55.3	120
1	11 16.0	97 22	55.2	11 45.1	97 22	55.1	12 14.2	97 22	55.0	12 43.3	97 22	54.8	13 12.4	97 22	54.7	13 41.5	97 22	54.6	14 10.6	97 22	54.5	14 39.7	97 22	54.3	1
2	11 02.5	97 22	54.3	11 31.6	97 22	54.2	12 00.7	97 22	54.0	12 29.9	97 22	53.9	12 59.0	97 22	53.8	13 28.1	97 22	53.7	13 57.2	97 22	53.5	14 26.3	97 22	53.4	2
3	10 49.1	97 22	53.4	11 18.3	97 22	53.2	11 47.4	97 22	53.1	12 16.6	97 22	53.0	12 45.7	97 22	52.9	13 14.9	97 22	52.8	13 44.0	97 22	52.6	14 13.1	97 22	52.5	3
4	10 35.9	97 22	52.4	11 05.1	97 22	52.3	11 34.3	97 22	52.2	12 03.5	97 22	52.1	12 32.6	97 22	51.9	13 01.8	97 22	51.8	13 30.9	97 22	51.7	14 00.1	97 21	51.6	4
125	10 22.9	97 21	51.5	10 52.1	97 21	51.4	11 21.3	97 21	51.3	11 50.5	97 21	51.1	12 19.7	97 21	51.0	12 48.9	97 21	50.9	13 18.1	97 21	50.8	13 47.2	97 21	50.7	125
6	10 10.0	97 21	50.6	10 39.3	97 21	50.5	11 08.5	97 21	50.3	11 37.7	97 21	50.2	12 06.9	97 21	50.1	12 36.1	97 21	50.0	13 05.3	97 21	49.9	13 34.5	97 21	49.8	6
7	9 57.4	97 21	49.6	10 26.6	97 21	49.5	10 55.8	97 21	49.4	11 25.1	97 21	49.3	11 54.3	97 21	49.2	12 23.5	97 21	49.1	12 52.8	97 21	48.9	13 22.0	97 21	48.8	7
8	9 44.8	98 21	48.7	10 14.1	98 21	48.6	10 43.4	98 20	48.5	11 12.6	98 20	48.4	11 41.9	98 20	48.3	12 11.1	97 20	48.1	12 40.4	97 20	48.0	13 09.6	97 20	47.9	8
9	9 32.5	98 20	47.8	10 01.8	98 20	47.7	10 31.1	98 20	47.6	11 00.4	98 20	47.4	11 29.6	98 20	47.3	11 58.9	98 20	47.2	12 28.2	98 20	47.1	12 57.4	98 20	47.0	9
130	9 20.4	98 20	46.8	9 49.7	98 20	46.7	10 19.0	98 20	46.6	10 48.3	98 20	46.5	11 17.6	98 20	46.4	11 46.9	98 20	46.3	12 16.1	98 20	46.2	12 45.4	98 20	46.1	130
1	9 08.4	98 20	45.9	9 37.7	98 20	45.8	10 07.0	98 20	45.7	10 36.4	98 20	45.6	11 05.7	98 20	45.5	11 35.0	98 19	45.4	12 04.3	98 19	45.3	12 33.6	98 19	45.2	1
2	8 56.6	98 19	45.0	9 25.9	98 19	44.9	9 55.3	98 19	44.8	10 24.6	98 19	44.7	10 54.0	98 19	44.6	11 23.3	98 19	44.5	11 52.6	98 19	44.3	12 22.0	98 19	44.2	2
3	8 45.0	98 19	44.1	9 14.4	98 19	44.0	9 43.7	98 19	43.8	10 13.1	98 19	43.7	10 42.5	98 19	43.6	11 11.8	98 19	43.5	11 41.2	98 19	43.4	12 10.5	98 19	43.3	3
4	8 33.6	98 19	43.1	9 03.0	98 19	43.0	9 32.4	98 19	42.9	10 01.8	98 19	42.8	10 31.1	98 19	42.7	11 00.5	98 18	42.6	11 29.9	98 18	42.5	11 59.3	98 18	42.4	4
135	8 22.4	98 18	42.2	8 51.8	98 18	42.1	9 21.2	98 18	42.0	9 50.6	98 18	41.9	10 20.0	98 18	41.8	10 49.4	98 18	41.7	11 18.8	98 18	41.6	11 48.2	98 18	41.5	135
6	8 11.4	98 18	41.3	8 40.8	98 18	41.2	9 10.2	98 18	41.1	9 39.7	98 18	41.0	10 09.1	98 18	40.9	10 38.5	98 18	40.8	11 08.0	98 18	40.7	11 37.4	98 18	40.6	6
7	8 00.6	98 18	40.3	8 30.0	98 18	40.2	8 59.5	98 18	40.1	9 28.9	98 18	40.0	9 58.4	98 18	39.9	10 27.8	98 18	39.8	10 57.3	98 17	39.7	11 26.7	98 17	39.7	7
8	7 50.0	98 17	39.4	8 19.5	98 17	39.3	8 48.9	98 17	39.2	9 18.4	98 17	39.1	9 47.9	98 17	39.0	10 17.3	98 17	38.9	10 46.8	98 17	38.8	11 16.3	98 17	38.7	8
9	7 39.6	98 17	38.5	8 09.1	98 17	38.4	8 38.6	98 17	38.3	9 08.1	98 17	38.2	9 37.6	98 17	38.1	10 07.1	98 17	38.0	10 36.5	98 17	37.9	11 06.0	98 17	37.8	9
140	7 29.4	98 17	37.5	7 58.9	98 17	37.4	8 28.4	98 17	37.4	8 57.9	98 16	37.3	9 27.5	98 16	37.2	9 57.0	98 16	37.1	10 26.5	98 16	37.0	10 56.0	98 16	36.9	140
1	7 19.4	98 16	36.6	7 49.0	98 16	36.5	8 18.5	98 16	36.4	8 48.0	98 16	36.3	9 17.6	98 16	36.2	9 47.1	98 16	36.2	10 16.6	98 16	36.1	10 46.2	98 16	36.0	1
2	7 09.7	99 16	35.7	7 39.2	99 16	35.6	8 08.8	99 16	35.5	8 38.4	99 16	35.4	9 07.9	99 16	35.3	9 37.5	99 16	35.2	10 07.0	99 16	35.1	10 36.6	98 16	35.1	2
3	7 00.2	99 16	34.7	7 29.7	99 16	34.6	7 59.3	99 15	34.6	8 28.9	99 15	34.5	8 58.5	99 15	34.4	9 28.0	99 15	34.3	9 57.6	99 15	34.2	10 27.2	99 15	34.1	3
4	6 50.8	99 15	33.8	7 20.4	99 15	33.7	7 50.0	99 15	33.6	8 19.6	99 15	33.6	8 49.2	99 15	33.5	9 18.8	99 15	33.4	9 48.4	99 15	33.3	10 18.0	99 15	33.2	4
145	6 41.8	99 15	32.9	7 11.4	99 15	32.8	7 41.0	99 15	32.7	8 10.6	99 15	32.6	8 40.2	99 15	32.5	9 09.8	99 15	32.5	9 39.4	99 15	32.4	10 09.1	99 15	32.3	145
6	6 32.9	99 14	31.9	7 02.5	99 14	31.9	7 32.2	99 14	31.8	8 01.8	99 14	31.7	8 31.4	99 14	31.6	9 01.1	99 14	31.5	9 30.7	99 14	31.5	10 00.3	99 14	31.4	6
7	6 24.3	99 14	31.0	6 53.9	99 14	30.9	7 23.6	99 14	30.8	7 53.2	99 14	30.8	8 22.9	99 14	30.7	8 52.5	99 14	30.6	9 22.2	99 14	30.5	9 51.8	99 14	30.5	7
8	6 15.9	99 14	30.1	6 45.5	99 14	30.0	7 15.2	99 14	29.9	7 44.9	99 14	29.8	8 14.5	99 14	29.8	8 44.2	99 13	29.7	9 13.9	99 13	29.6	9 43.6	99 13	29.5	8
9	6 07.7	99 13	29.1	6 37.4	99 13	29.1	7 07.1	99 13	29.0	7 36.8	99 13	28.9	8 06.5	99 13	28.8	8 36.1	99 13	28.8	9 05.8	99 13	28.7	9 35.5	99 13	28.6	9
150	5 59.8	99 13	28.2	6 29.5	99 13	28.1	6 59.2	99 13	28.1	7 28.9	99 13	28.0	7 58.6	99 13	27.9	8 28.3	99 13	27.8	8 58.0	99 13	27.8	9 27.7	99 13	27.7	150
1	5 52.1	99 12	27.3	6 21.8	99 12	27.2	6 51.5	99 12	27.1	7 21.2	99 12	27.1	7 51.0	99 12	27.0	8 20.7	99 12	26.9	8 50.4	99 12	26.8	9 20.1	99 12	26.8	1
2	5 44.6	99 12	26.3	6 14.4	99 12	26.3	6 44.1	99 12	26.2	7 13.8	99 12	26.1	7 43.6	99 12	26.1	8 13.3	99 12	26.0	8 43.1	99 12	25.9	9 12.8	99 12	25.9	2
3	5 37.4	99 12	25.4	6 07.2	99 12	25.3	6 36.9	99 12	25.3	7 06.7	99 12	25.2	7 36.4	99 12	25.1	8 06.2	99 11	25.1	8 36.0	99 11	25.0	9 05.7	99 11	24.9	3
4	5 30.4	99 11	24.4	6 00.2	99 11	24.4	6 30.0	99 11	24.3	6 59.8	99 11	24.3	7 29.5	99 11	24.2	7 59.3	99 11	24.1	8 29.1	99 11	24.1	8 58.9	99 11	24.0	4
155	5 23.7	99 11	23.5	5 53.5	99 11	23.5	6 23.3	99 11	23.4	6 53.1	99 11	23.3	7 22.9	99 11	23.3	7 52.7	99 11	23.2	8 22.5	99 11	23.2	8 52.3	99 11	23.1	155
6	5 17.2	99 10	22.6	5 47.0	99 10	22.5	6 16.9	99 10	22.5	6 46.7	99 10	22.4	7 16.5	99 10	22.3	7 46.3	99 10	22.3	8 16.1	99 10	22.2	8 45.9	99 10	22.2	6
7	5 11.0	99 10	21.6	5 40.8	99 10	21.6	6 10.7	99 10	21.5	6 40.5	99 10	21.5	7 10.3	99 10	21.4	7 40.1	99 10	21.4	8 10.0	99 10	21.3	8 39.8	99 10	21.3	7
8	5 05.0	99 10	20.7	5 34.9	99 10	20.6	6 04.7	99 09	20.6	6 34.6	99 09	20.5	7 04.4	99 09	20.5	7 34.2	99 09	20.4	8 04.1	99 09	20.4	8 33.9	99 09	20.3	8
9				5 29.2	1.0 09	19.7	5 59.0	1.0 09	19.7	6 28.9	1.0 09	19.6	6 58.7	1.0 09	19.6	7 28.6	1.0 09	19.5	7 58.4	1.0 09	19.5	8 28.3	1.0 09	19.4	9
160				5 23.7	1.0 09	18.8	5 53.6	1.0 09	18.7	6 23.5	1.0 09	18.7	6 53.3	1.0 09	18.6	7 23.2	1.0 09	18.6	7 53.1	1.0 09	18.5	8 22.9	1.0 09	18.5	160
1				5 18.5	1.0 08	17.8	5 48.4	1.0 08	17.8	6 18.3	1.0 08	17.7	6 48.2	1.0 08	17.7	7 18.0	1.0 08	17.7	7 47.9	1.0 08	17.6	8 17.8	1.0 08	17.6	1
2				5 13.6	1.0 08	16.9	5 43.5	1.0 08	16.8	6 13.4	1.0 08	16.8	6 43.3	1.0 08	16.8	7 13.2	1.0 08	16.7	7 43.0	1.0 08	16.7	8 12.9	1.0 08	16.6	2
3				5 08.9	1.0 07	16.0	5 38.8	1.0 07	15.9	6 08.7	1.0 07	15.9	6 38.6	1.0 07	15.8	7 08.5	1.0 07	15.8	7 38.4	1.0 07	15.8	8 08.3	1.0 07	15.7	3
4				5 04.5	1.0 07	15.0	5 34.4	1.0 07	15.0	6 04.3	1.0 07	14.9	6 34.2	1.0 07	14.9	7 04.2	1.0 07	14.9	7 34.1	1.0 07	14.8	8 04.0	1.0 07	14.8	4
165				5 00.3	1.0 06	14.1	5 30.3	1.0 06	14.0	6 00.2	1.0 06	14.0	6 30.1	1.0 06	14.0	7 00.0	1.0 06	13.9	7 30.0	1.0 06	13.9	7 59.9	1.0 06	13.9	165
6							5 26.4	1.0 06	13.1	5 56.3	1.0 06	13.1	6 26.3	1.0 06	13.0	6 56.2	1.0 06	13.0	7 26.1	1.0 06	13.0	7 56.0	1.0 06	12.9	6
7							5 22.8	1.0 06	12.2	5 52.7	1.0 06	12.1	6 22.6	1.0 06	12.1	6 52.6	1.0 06	12.1	7 22.5	1.0 06	12.1	7 52.5	1.0 06	12.0	7
8							5 19.4	1.0 05	11.2	5 49.4	1.0 05	11.2	6 19.3	1.0 05	11.2	6 49.3	1.0 05	11.2	7 19.2	1.0 05	11.1	7 49.2	1.0 05	11.1	8
9							5 16.3	1.0 05	10.3	5 46.3	1.0 05	10.3	6 16.2	1.0 05	10.3	6 46.2	1.0 05	10.2	7 16.2	1.0 05	10.2	7 46.1	1.0 05	10.2	9
170							5 13.5	1.0 04	09.4	5 43.5	1.0 04	09.3	6 13.4	1.0 04	09.3	6 43.4	1.0 04	09.3	7 13.4	1.0 04	09.3	7 43.3	1.0 04	09.2	170
1							5 10.9	1.0 04	08.4	5 40.9	1.0 04	08.4	6 10.9	1.0 04	08.4	6 40.9	1.0 04	08.4	7 10.8	1.0 04	08.3	7 40.8	1.0 04	08.3	1
2							5 08.6	1.0 03	07.5	5 38.6	1.0 03	07.5	6 08.6	1.0 03	07.5	6 38.6	1.0 03	07.4	7 08.6	1.0 03	07.4	7 38.5	1.0 03	07.4	2
3							5 06.6	1.0 03	06.6	5 36.6	1.0 03	06.5	6 06.6	1.0 03	06.5	6 36.6	1.0 03	06.5	7 06.6	1.0 03	06.5	7 36.5	1.0 03	06.5	3
4							5 04.9	1.0 02	05.6	5 34.9	1.0 02	05.6	6 04.8	1.0 02	05.6	6 34.8	1.0 02	05.6	7 04.8	1.0 02	05.6	7 34.8	1.0 02	05.5	4
175							5 03.4	1.0 02	04.7	5 33.4	1.0 02	04.7	6 03.4	1.0 02	04.7	6 33.4	1.0 02	04.6	7 03.3	1.0 02	04.6	7 33.3	1.0 02	04.6	175
6							5 02.2	1.0 02	03.7	5 32.2	1.0 02	03.7	6 02.2	1.0 02	03.7	6 32.1	1.0 02	03.7	7 02.1	1.0 02	03.7	7 32.1	1.0 02	03.7	6
7							5 01.2	1.0 01	02.8	5 31.2	1.0 01	02.8	6 01.2	1.0 01	02.8	6 31.2	1.0 01	02.8	7 01.2	1.0 01	02.8	7 31.2	1.0 01	02.8	7
8							5 00.5	1.0 01	01.9	5 30.5	1.0 01	01.9	6 00.5	1.0 01	01.9	6 30.5	1.0 01	01.9	7 00.5	1.0 01	01.9	7 30.5	1.0 01	01.8	8
9							5 00.1	1.0 00	00.9	5 30.1	1.0 00	00.9	6 00.1	1.0 00	00.9	6 30.1	1.0 00	00.9	7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	9
							5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	

H.A.	24° 00′			24° 30′			25° 00′			25° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	41 00.0	1.0 00	180.0	41 30.0	1.0 00	180.0
1	39 59.8	1.0 01	178.8	40 29.8	1.0 01	178.8	40 59.8	1.0 01	178.8	41 29.8	1.0 01	178.8
2	39 59.3	1.0 01	177.6	40 29.3	1.0 01	177.6	40 59.3	1.0 01	177.6	41 29.3	1.0 01	177.6
3	39 58.5	1.0 02	176.4	40 28.4	1.0 02	176.4	40 58.4	1.0 02	176.4	41 28.4	1.0 02	176.4
4	39 57.2	1.0 03	175.2	40 27.2	1.0 03	175.2	40 57.2	1.0 03	175.2	41 27.2	1.0 03	175.2
05	39 55.7	1.0 03	174.0	40 25.7	1.0 03	174.0	40 55.7	1.0 03	174.0	41 25.7	1.0 03	174.0
6	39 53.8	1.0 04	172.8	40 23.8	1.0 04	172.8	40 53.8	1.0 04	172.8	41 23.8	1.0 04	172.8
7	39 51.6	1.0 04	171.7	40 21.6	1.0 04	171.6	40 51.5	1.0 04	171.6	41 21.5	1.0 04	171.6
8	39 49.0	1.0 05	170.5	40 19.0	1.0 05	170.4	40 48.9	1.0 05	170.4	41 18.9	1.0 05	170.4
9	39 46.1	1.0 05	169.3	40 16.1	1.0 05	169.2	40 46.0	1.0 05	169.2	41 16.0	1.0 05	169.2
10	39 42.9	1.0 06	168.1	40 12.8	1.0 06	168.1	40 42.8	1.0 06	168.0	41 12.7	1.0 06	168.0
1	39 39.3	1.0 06	166.9	40 09.2	1.0 07	166.9	40 39.1	1.0 07	166.8	41 09.1	1.0 07	166.8
2	39 35.4	1.0 07	165.7	40 05.3	1.0 07	165.7	40 35.2	1.0 07	165.6	41 05.1	1.0 07	165.6
3	39 31.1	1.0 08	164.6	40 01.0	1.0 08	164.5	40 30.9	1.0 08	164.4	41 00.8	1.0 08	164.4
4	39 26.6	1.0 08	163.4	39 56.5	1.0 08	163.3	40 26.3	1.0 08	163.3	40 56.2	1.0 08	163.2
15	39 21.7	1.0 09	162.2	39 51.5	1.0 09	162.1	40 21.4	1.0 09	162.1	40 51.3	1.0 09	162.0
6	39 16.5	1.0 09	161.0	39 46.3	1.0 09	161.0	40 16.2	1.0 09	160.9	40 46.0	99 09	160.8
7	39 10.9	99 10	159.8	39 40.8	99 10	159.8	40 10.6	99 10	159.7	40 40.4	99 10	159.6
8	39 05.1	99 10	158.7	39 34.9	99 10	158.6	40 04.7	99 10	158.5	40 34.5	99 10	158.5
9	38 58.9	99 11	157.5	39 28.7	99 11	157.4	39 58.5	99 11	157.4	40 28.3	99 11	157.3
20	38 52.4	99 11	156.3	39 22.2	99 11	156.3	39 52.0	99 11	156.2	40 21.7	99 11	156.1
1	38 45.6	99 12	155.2	39 15.4	99 12	155.1	39 45.1	99 12	155.0	40 14.9	99 12	154.9
2	38 38.5	99 12	154.0	39 08.3	99 12	153.9	39 38.0	99 12	153.8	40 07.7	99 12	153.8
3	38 31.1	99 13	152.9	39 00.8	99 13	152.8	39 30.5	99 13	152.7	40 00.2	99 13	152.6
4	38 23.4	99 13	151.7	38 53.1	99 13	151.6	39 22.8	99 13	151.5	39 52.5	99 13	151.4
25	38 15.4	99 14	150.5	38 45.1	99 14	150.5	39 14.8	99 14	150.4	39 44.4	99 14	150.3
6	38 07.2	99 14	149.4	38 36.8	99 14	149.3	39 06.4	99 14	149.2	39 36.1	99 14	149.1
7	37 58.6	99 15	148.3	38 28.2	99 15	148.2	38 57.8	99 15	148.1	39 27.4	99 15	147.9
8	37 49.8	99 15	147.1	38 19.4	99 15	147.0	38 48.9	99 15	146.9	39 18.5	99 15	146.8
9	37 40.6	99 16	146.0	38 10.2	99 16	145.9	38 39.8	99 16	145.8	39 00.3	99 16	145.6
30	37 31.3	98 16	144.8	38 00.8	98 16	144.7	38 30.3	98 16	144.6	38 59.9	98 16	144.5
1	37 21.6	98 17	143.7	37 51.1	98 17	143.6	38 20.6	98 17	143.5	38 50.1	98 17	143.4
2	37 11.7	98 17	142.6	37 41.2	98 17	142.5	38 10.6	98 17	142.3	38 40.1	98 17	142.2
3	37 01.5	98 17	141.4	37 31.0	98 17	141.3	38 00.4	98 17	141.2	38 29.9	98 18	141.1
4	36 51.1	98 18	140.3	37 20.5	98 18	140.2	37 49.9	98 18	140.1	38 19.4	98 18	140.0
35	36 40.4	98 18	139.2	37 09.8	98 18	139.1	37 39.2	98 18	139.0	38 08.6	98 18	138.8
6	36 29.5	98 19	138.1	36 58.8	98 19	138.0	37 28.2	98 19	137.8	37 57.6	98 19	137.7
7	36 18.3	98 19	137.0	36 47.6	98 19	136.9	37 17.0	98 19	136.7	37 46.3	98 19	136.6
8	36 06.9	98 19	135.9	36 36.2	98 19	135.7	37 05.5	98 19	135.6	37 34.8	98 20	135.5
9	35 55.3	98 20	134.8	36 24.6	98 20	134.6	36 53.9	98 20	134.5	37 23.1	98 20	134.4
40	35 43.4	98 20	133.7	36 12.7	98 20	133.5	36 42.0	98 20	133.4	37 11.2	97 20	133.3
1	35 31.3	98 20	132.6	36 00.6	97 21	132.4	36 29.8	97 21	132.3	36 59.1	97 21	132.2
2	35 19.1	97 21	131.5	35 48.3	97 21	131.3	36 17.5	97 21	131.2	36 46.7	97 21	131.1
3	35 06.6	97 21	130.4	35 35.8	97 21	130.3	36 04.9	97 21	130.1	36 34.1	97 21	130.0
4	34 53.9	97 21	129.3	35 23.0	97 22	129.2	35 52.2	97 22	129.0	36 21.3	97 22	128.9
45	34 41.0	97 22	128.2	35 10.1	97 22	128.1	35 39.2	97 22	127.9	36 08.4	97 22	127.8
6	34 27.9	97 22	127.2	34 57.0	97 22	127.0	35 26.1	97 22	126.9	35 55.2	97 22	126.7
7	34 14.6	97 22	126.1	34 43.7	97 22	125.9	35 12.8	97 22	125.8	35 41.8	97 23	125.6
8	34 01.2	97 23	125.0	34 30.2	97 23	124.9	34 50.3	97 23	124.7	35 28.3	97 23	124.6
9	33 47.5	97 23	123.9	34 16.6	97 23	123.8	34 45.6	97 23	123.6	35 14.6	97 23	123.5
50	33 33.7	97 23	122.9	34 02.7	97 23	122.7	34 31.7	97 23	122.6	35 00.7	97 23	122.4
1	33 19.7	97 24	121.8	33 48.7	97 24	121.7	34 17.7	97 24	121.5	34 46.7	97 24	121.4
2	33 05.6	97 24	120.8	33 34.6	97 24	120.6	34 03.5	97 24	120.5	34 32.5	96 24	120.3
3	32 51.3	97 24	119.7	33 20.3	96 24	119.6	33 49.2	96 24	119.4	34 18.1	96 24	119.2
4	32 36.9	96 24	118.7	33 05.8	96 24	118.5	33 34.7	96 24	118.3	34 03.6	96 24	118.2
55	32 22.3	96 25	117.6	32 51.2	96 25	117.5	33 20.1	96 25	117.3	33 49.0	96 25	117.1
6	32 07.6	96 25	116.6	32 36.5	96 25	116.4	33 05.3	96 25	116.3	33 34.2	96 25	116.1
7	31 52.7	96 25	115.5	32 21.6	96 25	115.4	32 50.4	96 25	115.2	33 19.3	96 25	115.1
8	31 37.7	96 25	114.5	32 06.6	96 25	114.3	32 35.4	96 25	114.2	33 04.2	96 25	114.0
9	31 22.6	96 25	113.5	31 51.5	96 25	113.3	32 20.3	96 25	113.2	32 49.1	96 25	113.0
60	31 07.4	96 26	112.5	31 36.2	96 26	112.3	32 05.0	96 26	112.1	32 33.8	96 26	112.0
1	30 52.1	96 26	111.4	31 20.9	96 26	111.3	31 49.6	96 26	111.1	32 18.4	96 26	110.9
2	30 36.6	96 26	110.4	31 05.4	96 26	110.2	31 34.1	96 26	110.1	32 02.9	96 26	109.9
3	30 21.1	96 26	109.4	30 49.8	96 26	109.2	31 18.6	96 26	109.1	31 47.3	96 26	108.9
4	30 05.4	96 26	108.4	30 34.2	96 26	108.2	31 02.9	96 26	108.0	31 31.6	96 26	107.9
65	29 49.7	96 26	107.4	30 18.4	96 26	107.2	30 47.1	96 26	107.0	31 15.8	96 26	106.9
6	29 33.9	96 26	106.4	30 02.6	96 27	106.2	30 31.3	96 27	106.0	30 59.9	96 27	105.9
7	29 17.9	96 27	105.4	29 46.6	96 27	105.2	30 15.3	96 27	105.0	30 44.0	96 27	104.9
8	29 02.0	96 27	104.4	29 30.6	96 27	104.2	29 59.3	96 27	104.0	30 28.0	96 27	103.9
9	28 45.9	96 27	103.4	29 14.6	96 27	103.2	29 43.2	96 27	103.0	30 11.9	95 27	102.9
70	28 29.8	96 27	102.4	28 58.4	96 27	102.2	29 27.1	95 27	102.0	29 55.7	95 27	101.9
1	28 13.6	96 27	101.4	28 42.2	95 27	101.2	29 10.9	95 27	101.0	29 39.5	95 27	100.9
2	27 57.4	95 27	100.4	28 26.0	95 27	100.2	28 54.6	95 27	100.0	29 23.2	95 27	99.9
3	27 41.1	95 27	99.4	28 09.7	95 27	99.2	28 38.3	95 27	99.1	29 06.9	95 27	98.9
4	27 24.7	95 27	98.4	27 53.4	95 27	98.2	28 22.0	95 27	98.1	28 50.6	95 27	97.9
75	27 08.3	95 27	97.4	27 37.0	95 27	97.3	28 05.6	95 27	97.1	28 34.2	95 27	96.9
6	26 51.9	95 27	96.5	27 20.5	95 27	96.3	27 49.1	95 27	96.1	28 17.7	95 27	95.9
7	26 35.5	95 27	95.5	27 04.1	95 27	95.3	27 32.7	95 27	95.1	28 01.3	95 27	95.0
8	26 19.0	95 27	94.5	26 47.6	95 28	94.3	27 16.2	95 28	94.2	27 44.8	95 28	94.0
9	26 02.5	95 28	93.5	26 31.1	95 28	93.4	26 59.7	95 28	93.2	27 28.3	95 28	93.0
80	25 46.0	95 28	92.6	26 14.6	95 28	92.4	26 43.2	95 28	92.2	27 11.8	95 28	92.1
1	25 29.5	95 28	91.6	25 58.1	95 28	91.4	26 26.7	95 28	91.3	26 55.2	95 28	91.1
2	25 12.9	95 28	90.6	25 41.5	95 28	90.5	26 10.1	95 28	90.3	26 38.7	95 28	90.1
3	24 56.4	96 28	89.7	25 25.0	96 28	89.5	25 53.6	95 28	89.3	26 22.2	95 28	89.2
4	24 39.9	96 28	88.7	25 08.5	95 28	88.6	25 37.0	95 28	88.4	26 05.6	95 28	88.2
85	24 23.3	96 28	87.8	24 51.9	95 28	87.6	25 20.5	95 28	87.4	25 49.1	95 28	87.3
6	24 06.8	95 28	86.8	24 35.4	95 28	86.6	25 04.0	95 28	86.5	25 32.6	95 28	86.3
7	23 50.3	96 27	85.9	24 18.9	95 27	85.7	24 47.5	95 27	85.5	25 16.1	95 27	85.4
8	23 33.8	96 27	84.9	24 02.4	95 27	84.7	24 31.0	95 27	84.6	24 59.6	95 27	84.4
9	23 17.4	95 27	84.0	23 46.0	95 27	83.8	24 14.6	95 27	83.6	24 43.2	95 27	83.5
90	23 00.9	95 27	83.0	23 29.5	95 27	82.8	23 58.2	95 27	82.7	24 26.8	95 27	82.5

H.A.	26° 00′			26° 30′			27° 00′			27° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	42 00.0	1.0 00	180.0	42 30.0	1.0 00	180.0	43 00.0	1.0 00	180.0	43 30.0	1.0 00	180.0
1	41 59.8	1.0 01	178.8	42 29.8	1.0 01	178.8	42 59.8	1.0 01	178.8	43 29.8	1.0 01	178.8
2	41 59.3	1.0 01	177.6	42 29.3	1.0 01	177.6	42 59.3	1.0 01	177.6	43 29.3	1.0 01	177.6
3	41 58.4	1.0 02	176.4	42 28.4	1.0 02	176.4	42 58.4	1.0 02	176.3	43 28.4	1.0 02	176.3
4	41 57.2	1.0 03	175.2	42 27.2	1.0 03	175.1	42 57.2	1.0 03	175.1	43 27.2	1.0 03	175.1
05	41 55.6	1.0 03	174.0	42 25.6	1.0 03	173.9	42 55.6	1.0 03	173.9	43 25.6	1.0 03	173.9
6	41 53.7	1.0 04	172.7	42 23.7	1.0 04	172.7	42 53.7	1.0 04	172.7	43 23.7	1.0 04	172.7
7	41 51.5	1.0 04	171.5	42 21.4	1.0 04	171.5	42 51.4	1.0 04	171.5	43 21.4	1.0 04	171.4
8	41 48.9	1.0 05	170.3	42 18.8	1.0 05	170.3	42 48.8	1.0 05	170.3	43 18.7	1.0 05	170.2
9	41 45.9	1.0 06	169.1	42 15.9	1.0 06	169.1	42 45.8	1.0 06	169.1	43 15.8	1.0 06	169.0
10	41 42.6	1.0 06	167.9	42 12.6	1.0 06	167.9	42 42.5	1.0 06	167.8	43 12.4	1.0 06	167.8
1	41 39.0	1.0 07	166.7	42 08.9	1.0 07	166.7	42 38.9	1.0 07	166.6	43 08.8	1.0 07	166.6
2	41 35.0	1.0 07	165.5	42 04.9	1.0 07	165.5	42 34.9	1.0 07	165.4	43 04.8	1.0 07	165.4
3	41 30.7	1.0 08	164.3	42 00.6	1.0 08	164.3	42 30.5	1.0 08	164.2	43 00.4	1.0 08	164.2
4	41 26.1	1.0 08	163.1	41 56.0	1.0 08	163.1	42 25.9	1.0 08	163.0	42 55.7	1.0 08	163.0
15	41 21.1	1.0 09	161.9	41 51.0	1.0 09	161.9	42 20.9	1.0 09	161.8	42 50.7	1.0 09	161.8
6	41 15.9	99 09	160.8	41 45.7	99 09	160.7	42 15.5	99 09	160.6	42 45.4	99 09	160.6
7	41 10.2	99 10	159.6	41 40.1	99 10	159.5	42 09.9	99 10	159.4	42 39.7	99 10	159.4
8	41 04.3	99 10	158.4	41 34.1	99 10	158.3	42 03.9	99 10	158.2	42 33.7	99 11	158.2
9	40 58.1	99 11	157.2	41 27.8	99 11	157.1	41 57.6	99 11	157.0	42 27.4	99 11	157.0
20	40 51.5	99 11	156.0	41 21.3	99 12	155.9	41 51.0	99 12	155.9	42 20.8	99 12	155.8
1	40 44.6	99 12	154.8	41 14.4	99 12	154.8	41 44.1	99 12	154.7	42 13.8	99 12	154.6
2	40 37.4	99 12	153.7	41 07.2	99 12	153.6	41 36.9	99 13	153.5	42 06.6	99 13	153.4
3	40 29.9	99 13	152.5	40 59.6	99 13	152.4	41 29.3	99 13	152.3	41 59.0	99 13	152.2
4	40 22.2	99 13	151.3	40 51.8	99 14	151.2	41 21.5	99 14	151.1	41 51.2	99 14	151.0
25	40 14.1	99 14	150.2	40 43.7	99 14	150.1	41 13.4	99 14	150.0	41 43.0	99 14	149.9
6	40 05.7	99 14	149.0	40 35.3	99 14	148.9	41 04.9	99 14	148.8	41 34.5	99 15	148.7
7	39 57.0	99 15	147.8	40 26.6	99 15	147.7	40 56.2	99 15	147.6	41 25.8	99 15	147.5
8	39 48.1	99 15	146.7	40 17.7	99 15	146.6	40 47.2	99 15	146.5	41 16.8	99 16	146.3
9	39 38.9	98 16	145.5	40 08.4	98 16	145.4	40 38.0	98 16	145.3	41 07.5	98 16	145.2
30	39 29.4	98 16	144.4	39 58.9	98 16	144.3	40 28.4	98 16	144.2	40 57.9	98 16	144.0
1	39 19.6	98 17	143.2	39 49.1	98 17	143.1	40 18.6	98 17	143.0	40 48.1	98 17	142.9
2	39 09.6	98 17	142.1	39 39.0	98 17	142.0	40 08.5	98 17	141.9	40 37.9	98 17	141.7
3	38 59.3	98 18	141.0	39 28.7	98 18	140.8	39 58.2	98 18	140.7	40 27.6	98 18	140.6
4	38 48.8	98 18	139.8	39 18.2	98 18	139.7	39 47.6	98 18	139.6	40 16.9	98 18	139.4
35	38 38.0	98 18	138.7	39 07.3	98 18	138.6	39 36.7	98 18	138.4	40 06.1	98 19	138.3
6	38 26.9	98 19	137.6	38 56.3	98 19	137.4	39 25.6	98 19	137.3	39 54.9	98 19	137.2
7	38 15.7	98 19	136.5	38 45.0	98 19	136.3	39 14.3	98 19	136.2	39 43.6	98 19	136.0
8	38 04.1	98 20	135.3	38 33.4	98 20	135.2	39 02.7	98 20	135.1	39 32.0	98 20	134.9
9	37 52.4	98 20	134.2	38 21.7	98 20	134.1	38 50.9	97 20	133.9	39 20.2	97 20	133.8
40	37 40.5	97 20	133.1	38 09.7	97 20	133.0	38 38.9	97 20	132.8	39 08.1	97 20	132.7
1	37 28.3	97 21	132.0	37 57.5	97 21	131.9	38 26.7	97 21	131.7	38 55.9	97 21	131.6
2	37 15.9	97 21	130.9	37 45.1	97 21	130.8	38 14.2	97 21	130.6	38 43.4	97 21	130.5
3	37 03.3	97 21	129.8	37 32.4	97 21	129.7	38 01.6	97 21	129.5	38 30.7	97 22	129.4
4	36 50.5	97 22	128.7	37 19.6	97 22	128.6	37 48.7	97 22	128.4	38 17.8	97 22	128.3
45	36 37.5	97 22	127.6	37 06.6	97 22	127.5	37 35.7	97 22	127.3	38 04.7	97 22	127.2
6	36 24.3	97 22	126.6	36 53.4	97 22	126.4	37 22.4	97 22	126.2	37 51.5	97 22	126.1
7	36 10.9	97 23	125.5	36 39.9	97 23	125.3	37 09.0	97 23	125.2	37 38.0	97 23	125.0
8	35 57.3	97 23	124.4	36 26.4	97 23	124.2	36 55.4	97 23	124.1	37 24.4	97 23	123.9
9	35 43.6	97 23	123.3	36 12.6	97 23	123.2	36 41.6	97 23	123.0	37 10.6	97 23	122.8
50	35 29.7	97 23	122.3	35 58.7	97 24	122.1	36 27.6	96 24	121.9	36 56.6	96 24	121.8
1	35 15.6	96 24	121.2	35 44.6	96 24	121.0	36 13.5	96 24	120.9	36 42.4	96 24	120.7
2	35 01.4	96 24	120.1	35 30.3	96 24	120.0	35 59.2	96 24	119.8	36 28.1	96 24	119.6
3	34 47.0	96 24	119.1	35 15.9	96 24	118.9	35 44.8	96 24	118.7	36 13.7	96 24	118.6
4	34 32.5	96 24	118.0	35 01.4	96 24	117.9	35 30.2	96 25	117.7	35 59.1	96 25	117.5
55	34 17.8	96 25	117.0	34 46.7	96 25	116.8	35 15.5	96 25	116.6	35 44.4	96 25	116.5
6	34 03.0	96 25	115.9	34 31.9	96 25	115.8	35 00.7	96 25	115.6	35 29.5	96 25	115.4
7	33 48.1	96 25	114.9	34 16.9	96 25	114.7	34 45.7	96 25	114.6	35 14.5	96 25	114.4
8	33 33.0	96 25	113.9	34 01.8	96 25	113.7	34 30.6	96 25	113.5	34 59.4	96 26	113.3
9	33 17.8	96 26	112.8	33 46.6	96 26	112.6	34 15.4	96 26	112.5	34 44.1	96 26	112.3
60	33 02.5	96 26	111.8	33 31.3	96 26	111.6	34 00.0	96 26	111.4	34 28.8	96 26	111.3
1	32 47.1	96 26	110.8	33 15.9	96 26	110.6	33 44.6	96 26	110.4	34 13.3	96 26	110.2
2	32 31.6	96 26	109.7	33 00.3	96 26	109.6	33 29.0	96 26	109.4	33 57.7	96 26	109.2
3	32 16.0	96 26	108.7	32 44.7	96 26	108.5	33 13.4	96 26	108.4	33 42.1	96 26	108.2
4	32 00.3	96 26	107.7	32 29.0	96 26	107.5	32 57.6	96 26	107.4	33 26.3	95 26	107.2
65	31 44.5	96 26	106.7	32 13.2	96 26	106.5	32 41.8	95 26	106.3	33 10.5	95 27	106.2
6	31 28.6	96 27	105.7	31 57.3	95 27	105.5	32 25.9	95 27	105.3	32 54.5	95 27	105.2
7	31 12.7	95 27	104.7	31 41.3	95 27	104.5	32 09.9	95 27	104.3	32 38.5	95 27	104.2
8	30 56.6	95 27	103.7	31 25.2	95 27	103.5	31 53.9	95 27	103.3	32 22.5	96 27	103.1
9	30 40.5	95 27	102.7	31 09.1	95 27	102.5	31 37.7	95 27	102.3	32 06.3	95 27	102.2
70	30 24.4	95 27	101.7	30 53.0	95 27	101.5	31 21.6	95 27	101.3	31 50.1	96 27	101.2
1	30 08.1	95 27	100.7	30 36.7	95 27	100.5	31 05.3	95 27	100.3	31 33.9	96 27	100.2
2	29 51.8	95 27	99.7	30 20.4	95 27	99.5	30 49.0	95 27	99.4	31 17.6	96 27	99.2
3	29 35.5	95 27	98.7	30 04.1	95 27	98.5	30 32.7	95 27	98.4	31 01.2	96 27	98.2
4	29 19.2	95 27	97.7	29 47.7	95 27	97.6	30 16.3	95 27	97.4	30 44.8	95 27	97.2
75	29 02.8	95 27	96.8	29 31.3	95 27	96.6	29 59.9	95 27	96.4	30 28.4	95 27	96.2
6	28 46.3	95 27	95.8	29 14.9	95 27	95.6	29 43.4	95 27	95.4	30 12.0	96 27	95.2
7	28 29.8	95 28	94.8	28 58.4	95 28	94.6	29 26.9	95 28	94.4	29 55.5	95 28	94.3
8	28 13.4	95 28	93.8	28 41.9	95 28	93.7	29 10.4	95 28	93.5	29 39.0	95 28	93.3
9	27 56.8	95 28	92.9	28 25.4	95 28	92.7	28 53.9	95 28	92.5	29 22.5	95 28	92.3
80	27 40.3	95 28	91.9	28 08.9	95 28	91.7	28 37.4	95 28	91.5	29 05.9	95 28	91.4
1	27 23.8	95 28	90.9	27 52.3	95 28	90.8	28 20.9	95 28	90.6	28 49.4	95 28	90.4
2	27 07.2	95 28	90.0	27 35.8	95 28	89.8	28 04.3	95 28	89.6	28 32.9	95 28	89.4
3	26 50.7	95 28	89.0	27 19.3	95 28	88.8	27 47.8	95 28	88.7	28 16.3	95 28	88.5
4	26 34.2	95 28	88.0	27 02.7	95 28	87.9	27 31.3	95 28	87.7	27 59.8	96 28	87.5
85	26 17.7	95 28	87.1	26 46.2	95 28	86.9	27 14.7	95 28	86.7	27 43.3	95 28	86.6
6	26 01.1	95 28	86.1	26 29.7	95 27	86.0	26 58.2	95 27	85.8	27 26.8	95 27	85.6
7	25 44.7	96 27	85.2	26 13.2	95 27	85.0	26 41.8	95 27	84.8	27 10.3	95 27	84.7
8	25 28.2	96 27	84.2	25 56.8	95 27	84.1	26 25.3	95 27	83.9	26 53.8	96 27	83.7
9	25 11.7	95 27	83.3	25 40.3	95 27	83.1	26 08.9	95 27	82.9	26 37.4	96 27	82.8
90	24 55.3	95 27	82.3	25 22.9	95 27	82.2	25 52.5	95 27	82.0	26 21.0	96 27	81.8

Lat. 74°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	22 44.5	96 27	82.1	23 13.2	96 27	81.9	23 41.8	96 27	81.7	24 10.4	95 27	81.6
2	22 28.2	96 27	81.1	22 56.8	95 27	81.0	23 25.4	95 27	80.8	23 54.0	96 27	80.6
3	22 11.9	95 27	80.2	22 40.5	95 27	80.0	23 09.1	95 27	79.8	23 37.7	96 27	79.7
4	21 55.6	96 27	79.2	22 24.2	95 27	79.1	22 52.9	96 27	78.9	23 21.5	95 27	78.7
95	21 39.4	96 27	78.3	22 08.0	96 27	78.1	22 36.7	95 27	78.0	23 05.3	95 27	77.8
6	21 23.2	96 27	77.4	21 51.9	96 27	77.2	22 20.5	96 27	77.0	22 49.2	95 27	76.9
7	21 07.1	96 27	76.4	21 35.8	96 27	76.3	22 04.4	96 27	76.1	22 33.1	96 27	75.9
8	20 51.0	96 27	75.5	21 19.7	96 27	75.3	21 48.4	96 27	75.2	22 17.1	96 27	75.0
9	20 35.1	96 26	74.5	21 03.8	96 26	74.4	21 32.5	96 26	74.2	22 01.1	96 26	74.1
100	20 19.2	96 26	73.6	20 47.9	96 26	73.5	21 16.6	96 26	73.3	21 45.3	96 26	73.1
1	20 03.3	96 26	72.7	20 32.1	96 26	72.5	21 00.8	96 26	72.4	21 29.5	95 26	72.2
2	19 47.6	96 26	71.7	20 16.3	96 26	71.6	20 45.1	96 26	71.4	21 13.8	96 26	71.3
3	19 31.9	96 26	70.8	20 00.7	96 26	70.7	20 29.4	96 26	70.5	20 58.2	96 26	70.4
4	19 16.4	96 26	69.9	19 45.1	96 26	69.7	20 13.9	96 26	69.6	20 42.6	96 26	69.4
105	19 00.9	96 26	69.0	19 29.7	96 26	68.8	19 58.4	96 26	68.7	20 27.2	96 26	68.5
6	18 45.5	96 25	68.0	19 14.3	96 25	67.9	19 43.1	96 25	67.7	20 11.9	96 25	67.6
7	18 30.2	96 25	67.1	18 59.0	96 25	67.0	19 27.8	96 25	66.8	19 56.6	96 25	66.7
8	18 15.0	96 25	66.2	18 43.8	96 25	66.0	19 12.7	96 25	65.9	19 41.5	96 25	65.7
9	17 59.9	96 25	65.3	18 28.8	96 25	65.1	18 57.6	96 25	65.0	19 26.5	96 25	64.8
110	17 45.0	96 25	64.3	18 13.8	96 25	64.2	18 42.7	96 25	64.1	19 11.6	96 25	63.9
1	17 30.1	96 25	63.4	17 59.0	96 25	63.3	18 27.9	96 24	63.1	18 56.8	96 24	63.0
2	17 15.4	96 24	62.5	17 44.3	96 24	62.4	18 13.2	96 24	62.2	18 42.1	96 24	62.1
3	17 00.8	96 24	61.6	17 29.7	96 24	61.4	17 58.6	96 24	61.3	18 27.5	96 24	61.2
4	16 46.3	96 24	60.7	17 15.3	96 24	60.5	17 44.2	96 24	60.4	18 13.1	96 24	60.2
115	16 32.0	97 24	59.7	17 00.9	97 24	59.6	17 29.9	97 24	59.5	17 58.8	96 24	59.3
6	16 17.7	97 23	58.8	16 46.7	97 23	58.7	17 15.7	97 23	58.5	17 44.7	97 23	58.4
7	16 03.7	97 23	57.9	16 32.7	97 23	57.8	17 01.7	97 23	57.6	17 30.7	97 23	57.5
8	15 49.7	97 23	57.0	16 18.8	97 23	56.8	16 47.8	97 23	56.7	17 16.8	97 23	56.6
9	15 35.9	97 23	56.1	16 05.0	97 23	55.9	16 34.0	97 23	55.8	17 03.0	97 23	55.7
120	15 22.3	97 22	55.1	15 51.4	97 22	55.0	16 20.4	97 22	54.9	16 49.5	97 22	54.7
1	15 08.8	97 22	54.2	15 37.9	97 22	54.1	16 07.0	97 22	54.0	16 36.0	97 22	53.8
2	14 55.5	97 22	53.3	15 24.6	97 22	53.2	15 53.7	97 22	53.0	16 22.8	97 22	52.9
3	14 42.3	97 22	52.4	15 11.4	97 22	52.3	15 40.5	97 22	52.1	16 09.7	97 22	52.0
4	14 29.3	97 21	51.5	14 58.4	97 21	51.3	15 27.6	97 21	51.2	15 56.7	97 21	51.1
125	14 16.4	97 21	50.6	14 45.6	97 21	50.4	15 14.7	97 21	50.3	15 43.9	97 21	50.2
6	14 03.7	97 21	49.6	14 32.9	97 21	49.5	15 02.1	97 21	49.4	15 31.3	97 21	49.3
7	13 51.2	97 21	48.7	14 20.4	97 21	48.6	14 49.6	97 20	48.5	15 18.8	97 20	48.4
8	13 38.9	97 20	47.8	14 08.1	97 20	47.7	14 37.3	97 20	47.6	15 06.6	97 20	47.5
9	13 26.7	98 20	46.9	13 56.0	98 20	46.8	14 25.2	98 20	46.7	14 54.5	98 20	46.5
130	13 14.7	98 20	46.0	13 44.0	98 20	45.9	14 13.3	98 20	45.7	14 42.6	98 20	45.6
1	13 02.9	98 19	45.1	13 32.2	98 19	44.9	14 01.5	98 19	44.8	14 30.8	98 19	44.7
2	12 51.3	98 19	44.1	13 20.6	98 19	44.0	13 50.0	98 19	43.9	14 19.3	98 19	43.8
3	12 39.9	98 19	43.2	13 09.2	98 19	43.1	13 38.6	98 19	43.0	14 07.9	98 19	42.9
4	12 28.7	98 18	42.3	12 58.0	98 18	42.2	13 27.4	98 18	42.1	13 56.8	98 18	42.0
135	12 17.6	98 18	41.4	12 47.0	98 18	41.3	13 16.4	98 18	41.2	13 45.8	98 18	41.1
6	12 06.8	98 18	40.5	12 36.2	98 18	40.4	13 05.6	98 18	40.3	13 35.0	98 18	40.2
7	11 56.2	98 17	39.6	12 25.6	98 17	39.5	12 55.0	98 17	39.4	13 24.5	98 17	39.3
8	11 45.7	98 17	38.6	12 15.2	98 17	38.5	12 44.7	98 17	38.4	13 14.1	98 17	38.3
9	11 35.5	98 17	37.7	12 05.0	98 17	37.6	12 34.5	98 17	37.5	13 04.0	98 17	37.4
140	11 25.5	98 16	36.8	11 55.0	98 16	36.7	12 24.5	98 16	36.6	12 54.0	98 16	36.5
1	11 15.7	98 16	35.9	11 45.2	98 16	35.8	12 14.7	98 16	35.7	12 44.3	98 16	35.6
2	11 06.1	98 16	35.0	11 35.7	98 16	34.9	12 05.2	98 16	34.8	12 34.7	98 16	34.7
3	10 56.7	99 15	34.1	11 26.3	99 15	34.0	11 55.9	99 15	33.9	12 25.4	99 15	33.8
4	10 47.6	99 15	33.1	11 17.2	99 15	33.1	11 46.8	99 15	33.0	12 16.4	99 15	32.9
145	10 38.7	99 15	32.2	11 08.3	99 14	32.1	11 37.9	99 14	32.1	12 07.5	99 14	32.0
6	10 30.0	99 14	31.3	10 59.6	99 14	31.2	11 29.2	99 14	31.1	11 58.8	99 14	31.1
7	10 21.5	99 14	30.4	10 51.1	99 14	30.3	11 20.8	99 14	30.2	11 50.4	99 14	30.1
8	10 13.2	99 13	29.5	10 42.9	99 13	29.4	11 12.6	99 13	29.3	11 42.2	99 13	29.2
9	10 05.2	99 13	28.5	10 34.9	99 13	28.5	11 04.6	99 13	28.4	11 34.3	99 13	28.3
150	9 57.4	99 13	27.6	10 27.1	99 13	27.6	10 56.8	99 13	27.5	11 26.5	99 12	27.4
1	9 49.9	99 12	26.7	10 19.6	99 12	26.6	10 49.3	99 12	26.6	11 19.0	99 12	26.5
2	9 42.6	99 12	25.8	10 12.3	99 12	25.7	10 42.0	99 12	25.7	11 11.8	99 12	25.6
3	9 35.5	99 11	24.9	10 05.2	99 11	24.8	10 35.0	99 11	24.7	11 04.7	99 11	24.7
4	9 28.6	99 11	24.0	9 58.4	99 11	23.9	10 28.2	99 11	23.8	10 58.0	99 11	23.8
155	9 22.0	99 11	23.0	9 51.8	99 11	23.0	10 21.6	99 11	22.9	10 51.4	99 10	22.9
6	9 15.7	99 10	22.1	9 45.5	99 10	22.1	10 15.3	99 10	22.0	10 45.1	99 10	21.9
7	9 09.6	99 10	21.2	9 39.4	99 10	21.1	10 09.2	99 10	21.1	10 39.1	99 10	21.0
8	9 03.7	99 09	20.3	9 33.6	99 09	20.2	10 03.4	99 09	20.2	10 33.2	99 09	20.1
9	8 58.1	99 09	19.4	9 28.0	99 09	19.3	9 57.8	99 09	19.3	10 27.7	99 09	19.2
160	8 52.8	1.0 09	18.4	9 22.6	1.0 08	18.4	9 52.5	1.0 08	18.3	10 22.4	1.0 08	18.3
1	8 47.7	1.0 08	17.5	9 17.5	1.0 08	17.5	9 47.4	1.0 08	17.4	10 17.3	1.0 08	17.4
2	8 42.8	1.0 08	16.6	9 12.7	1.0 08	16.6	9 42.6	1.0 08	16.5	10 12.5	1.0 08	16.5
3	8 38.2	1.0 07	15.7	9 08.1	1.0 07	15.6	9 38.0	1.0 07	15.6	10 07.9	1.0 07	15.5
4	8 33.9	1.0 07	14.8	9 03.8	1.0 07	14.7	9 33.7	1.0 07	14.7	10 03.6	1.0 07	14.6
165	8 29.8	1.0 06	13.8	8 59.7	1.0 06	13.8	9 29.6	1.0 06	13.8	9 59.6	1.0 06	13.7
6	8 26.0	1.0 06	12.9	8 55.9	1.0 06	12.9	9 25.8	1.0 06	12.8	9 55.8	1.0 06	12.8
7	8 22.4	1.0 06	12.0	8 52.4	1.0 05	12.0	9 22.3	1.0 06	11.9	9 52.2	1.0 05	11.9
8	8 19.1	1.0 05	11.1	8 49.1	1.0 05	11.0	9 19.0	1.0 05	11.0	9 49.0	1.0 05	11.0
9	8 16.1	1.0 05	10.1	8 46.0	1.0 05	10.1	9 16.0	1.0 05	10.1	9 45.9	1.0 05	10.1
170	8 13.3	1.0 04	09.2	8 43.2	1.0 04	09.2	9 13.2	1.0 04	09.2	9 43.2	1.0 04	09.1
1	8 10.8	1.0 04	08.3	8 40.7	1.0 04	08.3	9 10.7	1.0 04	08.3	9 40.7	1.0 04	08.2
2	8 08.5	1.0 03	07.4	8 38.5	1.0 03	07.4	9 08.5	1.0 03	07.3	9 38.4	1.0 03	07.3
3	8 06.5	1.0 03	06.5	8 36.5	1.0 03	06.4	9 06.5	1.0 03	06.4	9 36.5	1.0 03	06.4
4	8 04.8	1.0 02	05.5	8 34.8	1.0 02	05.5	9 04.8	1.0 02	05.5	9 34.8	1.0 02	05.5
175	8 03.3	1.0 02	04.6	8 33.3	1.0 02	04.6	9 03.3	1.0 02	04.6	9 33.3	1.0 02	04.6
6	8 02.1	1.0 02	03.7	8 32.1	1.0 02	03.7	9 02.1	1.0 02	03.7	9 32.1	1.0 02	03.7
7	8 01.2	1.0 01	02.8	8 31.2	1.0 01	02.8	9 01.2	1.0 01	02.8	9 31.2	1.0 01	02.7
8	8 00.5	1.0 01	01.8	8 30.5	1.0 01	01.8	9 00.5	1.0 01	01.8	9 30.5	1.0 01	01.8
9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9
180	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0

26° 00′			26° 30′			27° 00′			27° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
24 39.0	95 27	81.4	25 07.6	95 27	81.2	25 36.1	95 27	81.1	26 04.7	95 27	80.9	91
24 22.6	95 27	80.5	24 51.2	95 27	80.3	25 19.8	95 27	80.1	25 48.4	95 27	80.0	2
24 06.4	95 27	79.5	24 34.9	95 27	79.4	25 03.5	95 27	79.2	25 32.1	95 27	79.0	3
23 50.1	95 27	78.6	24 18.7	95 27	78.4	24 47.3	95 27	78.2	25 15.9	95 27	78.1	4
23 33.9	95 27	77.6	24 02.5	95 27	77.5	24 31.2	95 27	77.3	24 59.7	95 27	77.1	95
23 17.8	95 27	76.7	23 46.4	95 27	76.5	24 15.0	95 27	76.4	24 43.7	95 27	76.2	6
23 01.7	95 27	75.8	23 30.4	95 27	75.6	23 59.0	95 27	75.5	24 27.6	95 27	75.3	7
22 45.7	96 27	74.8	23 14.4	95 27	74.7	23 43.0	95 26	74.5	24 11.7	95 26	74.4	8
22 29.8	96 26	73.9	22 58.5	96 26	73.8	23 27.1	95 26	73.6	23 55.8	95 26	73.4	9
22 14.0	96 26	73.0	22 42.6	96 26	72.8	23 11.3	96 26	72.7	23 40.0	96 26	72.5	100
21 58.2	96 26	72.1	22 26.9	96 26	71.9	22 55.6	96 26	71.7	23 24.2	96 26	71.6	1
21 42.5	96 26	71.1	22 11.2	96 26	71.0	22 39.9	96 26	70.8	23 08.6	96 26	70.7	2
21 26.9	96 26	70.2	21 55.6	96 26	70.1	22 24.3	96 26	69.9	22 53.0	96 26	69.7	3
21 11.4	96 26	69.3	21 40.1	96 26	69.1	22 08.8	96 26	69.0	22 37.6	96 26	68.8	4
20 56.0	96 26	68.4	21 24.7	96 26	68.2	21 53.4	96 25	68.1	22 22.2	96 25	67.9	105
20 40.6	96 25	67.4	21 09.4	96 25	67.3	21 38.2	96 25	67.1	22 06.9	96 25	67.0	6
20 25.4	96 25	66.5	20 54.2	96 25	66.4	21 23.0	96 25	66.2	21 51.7	96 25	66.1	7
20 10.3	96 25	65.6	20 39.1	96 25	65.4	21 07.9	96 25	65.3	21 36.7	96 25	65.1	8
19 55.3	96 25	64.7	20 24.1	96 25	64.5	20 52.9	96 25	64.4	21 21.7	96 25	64.2	9
19 40.4	96 25	63.8	20 09.2	96 25	63.6	20 38.1	96 25	63.5	21 06.9	96 25	63.3	110
19 25.6	96 24	62.8	19 54.5	96 24	62.7	20 23.3	96 24	62.6	20 52.2	96 24	62.4	1
19 11.0	96 24	61.9	19 39.8	96 24	61.8	20 08.7	96 24	61.6	20 37.6	96 24	61.5	2
18 56.4	96 24	61.0	19 25.3	96 24	60.9	19 54.2	96 24	60.7	20 23.1	96 24	60.6	3
18 42.0	96 24	60.1	19 11.0	96 24	60.0	19 39.9	96 24	59.8	20 08.8	96 24	59.7	4
18 27.8	96 24	59.2	18 56.7	96 24	59.0	19 25.6	96 23	58.9	19 54.6	96 23	58.8	115
18 13.6	97 23	58.3	18 42.6	97 23	58.1	19 11.5	96 23	58.0	19 40.5	96 23	57.9	6
17 59.6	97 23	57.4	18 28.6	97 23	57.2	18 57.6	97 23	57.1	19 26.6	97 23	56.9	7
17 45.8	97 23	56.4	18 14.8	97 23	56.3	18 43.8	97 23	56.2	19 12.8	97 23	56.0	8
17 32.1	97 23	55.5	18 01.1	97 23	55.4	18 30.1	97 23	55.3	18 59.1	97 22	55.1	9
17 18.5	97 22	54.6	17 47.6	97 22	54.5	18 16.6	97 22	54.4	18 45.6	97 22	54.2	120
17 05.1	97 22	53.7	17 34.2	97 22	53.6	18 03.2	97 22	53.4	18 32.3	97 22	53.3	1
16 51.9	97 22	52.8	17 20.9	97 22	52.7	17 50.0	97 22	52.5	18 19.1	97 22	52.4	2
16 38.8	97 22	51.9	17 07.9	97 22	51.8	17 37.0	97 21	51.6	18 06.1	97 21	51.5	3
16 25.8	97 21	51.0	16 55.0	97 21	50.8	17 24.1	97 21	50.7	17 53.2	97 21	50.6	4
16 13.1	97 21	50.1	16 42.2	97 21	49.9	17 11.4	97 21	49.8	17 40.5	97 21	49.7	125
16 00.5	97 21	49.2	16 29.7	97 21	49.0	16 58.8	97 21	48.9	17 28.0	97 21	48.8	6
15 48.1	97 20	48.2	16 17.3	97 20	48.1	16 46.5	97 20	48.0	17 15.6	97 20	47.9	7
15 35.8	97 20	47.3	16 05.0	97 20	47.2	16 34.3	97 20	47.1	17 03.5	97 20	47.0	8
15 23.7	98 20	46.4	15 53.0	97 20	46.3	16 22.2	97 20	46.2	16 51.5	97 20	46.1	9
15 11.8	98 20	45.5	15 41.1	98 19	45.4	16 10.4	98 19	45.3	16 39.6	98 19	45.2	130
15 00.1	98 19	44.6	15 29.4	98 19	44.5	15 58.7	98 19	44.4	16 28.0	98 19	44.3	1
14 48.6	98 19	43.7	15 17.9	98 19	43.6	15 47.2	98 19	43.5	16 16.6	98 19	43.4	2
14 37.3	98 19	42.8	15 06.6	98 19	42.7	15 36.0	98 18	42.6	16 05.3	98 18	42.5	3
14 26.1	98 18	41.9	14 55.5	98 18	41.8	15 24.9	98 18	41.7	15 54.2	98 18	41.6	4
14 15.2	98 18	41.0	14 44.6	98 18	40.9	15 14.0	98 18	40.8	15 43.3	98 18	40.7	135
14 04.5	98 18	40.1	14 33.9	98 18	40.0	15 03.3	98 18	39.9	15 32.7	98 17	39.8	6
13 53.9	98 17	39.2	14 23.3	98 17	39.1	14 52.8	98 17	39.0	15 22.2	98 17	38.9	7
13 43.6	98 17	38.2	14 13.0	98 17	38.2	14 42.5	98 17	38.1	15 11.9	98 17	38.0	8
13 33.4	98 17	37.3	14 02.9	98 17	37.2	14 32.4	98 16	37.1	15 01.9	98 16	37.1	9
13 23.5	98 16	36.4	13 53.0	98 16	36.3	14 22.5	98 16	36.2	14 52.0	98 16	36.2	140
13 13.8	98 16	35.5	13 43.3	98 16	35.4	14 12.8	98 16	35.3	14 42.3	98 16	35.2	1
13 04.3	98 15	34.6	13 33.8	98 15	34.5	14 03.4	98 15	34.4	14 32.9	98 15	34.3	2
12 55.0	99 15	33.7	13 24.6	99 15	33.6	13 54.1	99 15	33.5	14 23.7	99 15	33.4	3
12 45.9	99 15	32.8	13 15.5	99 15	32.7	13 45.1	99 15	32.6	14 14.7	99 15	32.5	4
12 37.1	99 14	31.9	13 06.7	99 14	31.8	13 36.3	99 14	31.7	14 05.9	99 14	31.6	145
12 28.5	99 14	31.0	12 58.1	99 14	30.9	13 27.7	99 14	30.8	13 57.3	99 14	30.7	6
12 20.1	99 14	30.1	12 49.7	99 14	30.0	13 19.3	99 14	29.9	13 49.0	99 14	29.8	7
12 11.9	99 13	29.2	12 41.6	99 13	29.1	13 11.2	99 13	29.0	13 40.9	99 13	28.9	8
12 03.9	99 13	28.3	12 33.6	99 13	28.2	13 03.3	99 13	28.1	13 33.0	99 13	28.0	9
11 56.2	99 12	27.3	12 25.9	99 12	27.3	12 55.6	99 12	27.2	13 25.3	99 12	27.1	150
11 48.8	99 12	26.4	12 18.5	99 12	26.4	12 48.2	99 12	26.3	13 17.9	99 12	26.2	1
11 41.5	99 12	25.5	12 11.2	99 12	25.5	12 41.0	99 12	25.4	13 10.7	99 12	25.3	2
11 34.5	99 11	24.6	12 04.3	99 11	24.5	12 34.0	99 11	24.5	13 03.8	99 11	24.4	3
11 27.7	99 11	23.7	11 57.5	99 11	23.6	12 27.3	99 11	23.6	12 57.0	99 11	23.5	4
11 21.2	99 10	22.8	11 51.0	99 10	22.7	12 20.8	99 10	22.7	12 50.6	99 10	22.6	155
11 14.9	99 10	21.9	11 44.7	99 10	21.8	12 14.5	99 10	21.8	12 44.3	99 10	21.7	6
11 08.9	99 10	21.0	11 38.7	99 10	20.9	12 08.5	99 10	20.9	12 38.3	99 10	20.8	7
11 03.1	99 09	20.1	11 32.9	99 09	20.0	12 02.7	99 09	20.0	12 32.6	99 09	19.9	8
10 57.5	99 09	19.2	11 27.4	99 09	19.1	11 57.2	99 09	19.0	12 27.1	99 09	19.0	9
10 52.2	1.0 08	18.2	11 22.1	1.0 08	18.2	11 51.9	1.0 08	18.1	12 21.8	1.0 08	18.1	160
10 47.2	1.0 08	17.3	11 17.0	1.0 08	17.3	11 46.9	1.0 08	17.2	12 16.8	1.0 08	17.2	1
10 42.4	1.0 08	16.4	11 12.3	1.0 08	16.4	11 42.1	1.0 08	16.3	12 12.0	1.0 08	16.3	2
10 37.8	1.0 07	15.5	11 07.7	1.0 07	15.5	11 37.6	1.0 07	15.4	12 07.5	1.0 07	15.4	3
10 33.5	1.0 07	14.6	11 03.4	1.0 07	14.6	11 33.4	1.0 07	14.5	12 03.3	1.0 07	14.5	4
10 29.5	1.0 06	13.7	10 59.4	1.0 06	13.6	11 29.3	1.0 06	13.6	11 59.3	1.0 06	13.6	165
10 25.7	1.0 06	12.8	10 55.6	1.0 06	12.7	11 25.6	1.0 06	12.7	11 55.5	1.0 06	12.7	6
10 22.2	1.0 05	11.9	10 52.1	1.0 05	11.8	11 22.1	1.0 05	11.8	11 52.0	1.0 05	11.8	7
10 18.9	1.0 05	10.9	10 48.9	1.0 05	10.9	11 18.8	1.0 05	10.9	11 48.8	1.0 05	10.9	8
10 15.9	1.0 05	10.0	10 45.9	1.0 05	10.0	11 15.8	1.0 05	10.0	11 45.8	1.0 05	10.0	9
10 13.1	1.0 04	09.1	10 43.1	1.0 04	09.1	11 13.1	1.0 04	09.1	11 43.0	1.0 04	09.1	170
10 10.7	1.0 04	08.2	10 40.6	1.0 04	08.2	11 10.6	1.0 04	08.2	11 40.6	1.0 04	08.1	1
10 08.4	1.0 03	07.3	10 38.4	1.0 03	07.3	11 08.4	1.0 03	07.3	11 38.4	1.0 03	07.2	2
10 06.4	1.0 03	06.4	10 36.4	1.0 03	06.4	11 06.4	1.0 03	06.4	11 36.4	1.0 03	06.3	3
10 04.7	1.0 02	05.5	10 34.7	1.0 02	05.5	11 04.7	1.0 02	05.4	11 34.7	1.0 02	05.4	4
10 03.3	1.0 02	04.6	10 33.3	1.0 02	04.6	11 03.3	1.0 02	04.5	11 33.3	1.0 02	04.5	175
10 02.1	1.0 02	03.7	10 32.1	1.0 02	03.6	11 02.1	1.0 02	03.6	11 32.1	1.0 02	03.6	6
10 01.2	1.0 01	02.7	10 31.2	1.0 01	02.7	11 01.2	1.0 01	02.7	11 31.2	1.0 01	02.7	7
10 00.5	1.0 01	01.8	10 30.5	1.0 01	01.8	11 00.5	1.0 01	01.8	11 30.5	1.0 01	01.8	8
10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	9
10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	44 00.0	1.00	180.0	44 30.0	1.00	180.0	45 00.0	1.00	180.0	46 00.0	1.00	180.0	48 00.0	1.00	180.0	50 00.0	1.00	180.0	50 30.0	1.00	180.0	51 30.0	1.00	180.0	00
1	43 59.8	1.00	178.8	44 29.8	1.00	178.8	44 59.8	1.00	178.8	45 59.8	1.00	178.8	47 59.8	1.00	178.7	49 59.8	1.00	178.7	50 29.8	1.00	178.7	51 29.8	1.00	178.7	1
2	43 59.3	1.00	177.5	44 29.3	1.00	177.5	44 59.3	1.00	177.5	45 59.3	1.00	177.5	47 59.3	1.00	177.5	49 59.3	1.00	177.4	50 29.3	1.00	177.4	51 29.2	1.00	177.4	2
3	43 58.4	1.00	176.3	44 28.4	1.00	176.3	44 58.4	1.00	176.3	45 58.4	1.00	176.3	47 58.4	1.00	176.2	49 58.3	1.00	176.1	50 28.3	1.00	176.1	51 28.3	1.00	176.1	3
4	43 57.2	1.00	175.1	44 27.2	1.00	175.1	44 57.1	1.00	175.1	45 57.1	1.00	175.0	47 57.1	1.00	174.9	49 57.0	1.00	174.8	50 27.0	1.00	174.8	51 27.0	1.00	174.8	4
05	43 55.6	1.00	173.9	44 25.6	1.00	173.8	44 55.5	1.00	173.8	45 55.5	1.00	173.8	47 55.4	1.00	173.7	49 55.4	1.00	173.6	50 25.3	1.00	173.5	51 25.3	1.00	173.5	05
6	43 53.6	1.00	172.6	44 23.6	1.00	172.6	44 53.6	1.00	172.6	45 53.5	1.00	172.5	47 53.4	1.00	172.4	49 53.3	1.00	172.3	50 23.3	1.00	172.2	51 23.2	1.00	172.2	6
7	43 51.3	1.00	171.4	44 21.3	1.00	171.4	44 51.3	1.00	171.4	45 51.2	1.00	171.3	47 51.1	1.00	171.1	49 50.9	1.00	171.0	50 20.9	1.00	170.9	51 20.8	1.00	170.9	7
8	43 48.7	1.00	170.2	44 18.7	1.00	170.2	44 48.6	1.00	170.1	45 48.5	1.00	170.0	47 48.3	1.00	169.9	49 48.1	1.00	169.7	50 18 1	1.00	169.7	51 18.0	1.00	169.6	8
9	43 45.7	1.00	169.0	44 15.7	1.00	168.9	44 45.6	1.00	168.9	45 45.5	1.00	168.8	47 45.2	1.00	168.6	49 45.0	1.00	168.4	50 14.9	1.00	168.4	51 14.8	1.00	168.3	9
10	43 42.4	1.00	167.8	44 12.3	1.00	167.7	44 42.2	1.00	167.7	45 42.1	1.00	167.6	47 41.8	1.00	167.4	49 41.5	1.00	167.1	50 11.4	1.00	167.1	51 11.2	1.00	167.0	10
1	43 38.7	1.00	166.5	44 08.6	1.00	166.5	44 38.5	1.00	166.4	45 38.4	1.00	166.3	47 38.0	1.00	166.1	49 37.6	1.00	165.9	50 07.5	1.00	165.8	51 07.3	1.00	165.7	1
2	43 34.7	1.00	165.3	44 04.6	1.00	165.3	44 34.5	1.00	165.2	45 34.3	1.00	165.1	47 33.9	1.00	164.9	49 33.4	1.00	164.6	50 03.3	1.00	164.5	51 03.1	1.00	164.4	2
3	43 30.3	1.00	164.1	44 00.2	1.00	164.0	44 30.1	1.00	164.0	45 29.9	1.00	163.9	47 29.4	1.00	163.6	49 28.8	1.00	163.3	49 58.7	1.00	163.2	50 58.4	1.00	163.1	3
4	43 25.6	1.00	162.9	43 55.5	1.00	162.8	44 25.4	1.00	162.8	45 25.1	1.00	162.6	47 24.5	1.00	162.4	49 23.9	99	162.1	49 53.8	99	162.0	50 53.4	99	161.8	4
15	43 20.6	1.00	161.7	43 50.4	1.00	161.6	44 20.3	1.00	161.5	45 20.0	99	161.4	47 19.3	99	161.1	49 18.7	99	160.8	49 48.5	99	160.7	50 48.1	99	160.5	15
6	43 15.2	99	160.5	43 45.1	99	160.4	44 14.9	99	160.3	45 14.5	99	160.2	47 13.8	99	159.9	49 13.0	99	159.5	49 42.8	99	159.4	50 42.4	99	159.2	6
7	43 09.5	99	159.3	43 39.3	99	159.2	44 09.2	99	159.1	45 08.8	99	159.0	47 08.0	99	158.6	49 07.1	99	158.3	49 36.9	99	158.2	50 36.4	99	158.0	7
8	43 03.5	99	158.1	43 33.3	99	158.0	44 03.1	99	157.9	45 02.7	99	157.7	47 01.8	99	157.4	49 00.8	99	157.0	49 30.5	99	156.9	50 30.0	99	156.7	8
9	42 57.2	99	156.9	43 27.0	99	156.8	43 56.7	99	156.7	44 56.2	99	156.5	46 55.2	99	156.2	48 54.2	99	155.8	49 23.9	99	155.7	50 23.3	99	155.4	9
20	42 50.5	99	155.7	43 20.3	99	155.6	43 50.0	99	155.5	44 49.5	99	155.3	46 48.4	99	154.9	48 47.2	99	154.5	49 16.9	99	154.4	50 16.3	99	154.2	20
1	42 43.6	99	154.5	43 13.3	99	154.4	43 43.0	99	154.3	44 42.4	99	154.1	46 41.2	99	153.7	48 39.9	99	153.3	49 09.6	99	153.2	50 08.9	99	152.9	1
2	42 36.3	99	153.3	43 06.0	99	153.2	43 35.7	99	153.1	44 35.1	99	152.9	46 33.7	99	152.5	48 32.3	99	152.0	49 02.0	99	151.9	50 01.2	99	151.7	2
3	42 28.7	99	152.1	42 58.4	99	152.0	43 28.0	99	151.9	44 27.4	99	151.7	46 25.9	99	151.3	48 24.4	99	150.8	48 54.0	99	150.7	49 53.2	99	150.4	3
4	42 20.8	99	150.9	42 50.5	99	150.8	43 20.1	99	150.7	44 19.4	99	150.5	46 17.8	99	150.1	48 16.2	99	149.6	48 45.8	99	149.4	49 44.9	98	149.2	4
25	42 12.6	99	149.7	42 42.3	99	149.6	43 11.9	99	149.5	44 11.1	99	149.3	46 09.4	99	148.8	48 07.7	98	148.3	48 37.2	98	148.2	49 36.2	98	147.9	25
6	42 04.2	99	148.6	42 33.7	99	148.5	43 03.3	99	148.4	44 02.5	99	148.1	46 00.7	98	147.6	47 58.8	98	147.1	48 28.3	98	147.0	49 27.3	98	146.7	6
7	41 55.4	99	147.4	42 25.0	99	147.3	42 54.5	99	147.2	43 53.6	98	146.9	45 51.7	98	146.4	47 49.7	98	145.9	48 19.2	98	145.8	49 18.1	98	145.5	7
8	41 46.3	98	146.2	42 15.9	98	146.1	42 45.4	98	146.0	43 44.5	98	145.8	45 42.4	98	145.2	47 40.3	98	144.7	48 09.7	98	144.5	49 08.6	98	144.2	8
9	41 37.0	98	145.1	42 06.5	98	144.9	42 36.0	98	144.8	43 35.0	98	144.6	45 32.9	98	144.0	47 30.6	98	143.5	48 00.0	98	143.3	48 58.8	98	143.0	9
30	41 27.4	98	143.9	41 56.9	98	143.8	42 26.4	98	143.7	43 25.3	98	143.4	45 23.0	98	142.9	47 20.6	98	142.3	47 50.0	98	142.1	48 48.7	98	141.8	30
1	41 17.5	98	142.8	41 47.0	98	142.6	42 16.4	98	142.5	43 15.3	98	142.2	45 12.9	98	141.7	47 10.4	98	141.1	47 39.7	98	140.9	48 38.3	98	140.6	1
2	41 07.4	98	141.6	41 36.8	98	141.5	42 06.2	98	141.3	43 05.0	98	141.1	45 02.5	98	140.5	46 59.8	98	139.9	47 29.1	98	139.7	48 27.7	98	139.4	2
3	40 57.0	98	140.5	41 26.4	98	140.3	41 55.8	98	140.2	42 54.5	98	139.9	44 51.9	98	139.3	46 49.1	98	138.7	47 18.3	98	138.6	48 16.8	97	138.2	3
4	40 46.3	98	139.3	41 15.7	98	139.2	41 45.0	98	139.0	42 43.7	98	138.8	44 41.0	98	138.2	46 38.0	97	137.5	47 07.2	97	137.4	48 05.7	97	137.0	4
35	40 35.4	98	138.2	41 04.8	98	138.0	41 34.1	98	137.9	42 32.7	98	137.6	44 29.8	98	137.0	46 26.7	97	136.4	46 55.9	97	136.2	47 54.3	97	135.8	35
6	40 24.3	98	137.0	40 53.6	98	136.9	41 22.9	98	136.8	42 21.4	98	136.5	44 18.4	97	135.8	46 15.2	97	135.2	46 44.3	97	135.0	47 42.6	97	134.7	6
7	40 12.9	98	135.9	40 42.2	98	135.8	41 11.4	98	135.6	42 09.9	97	135.3	44 06.8	97	134.7	46 03.4	97	134.0	46 32.5	97	133.9	47 30.7	97	133.5	7
8	40 01.2	98	134.8	40 30.5	97	134.6	40 59.7	97	134.5	41 58.2	97	134.2	43 54.9	97	133.5	45 51.4	97	132.9	46 20.5	97	132.7	47 18.6	97	132.3	8
9	39 49.4	97	133.7	40 18.6	97	133.5	40 47.8	97	133.4	41 46.2	97	133.1	43 42.8	97	132.4	45 39.2	97	131.7	46 08.2	97	131.5	47 06.3	97	131.2	9
40	39 37.3	97	132.5	40 06.5	97	132.4	40 35.7	97	132.2	41 34.0	97	131.9	43 30.5	97	131.3	45 26.7	97	130.6	45 55.7	97	130.4	46 53.7	97	130.0	40
1	39 25.0	97	131.4	39 54.2	97	131.3	40 23.3	97	131.1	41 21.6	97	130.8	43 17.9	97	130.1	45 14.1	97	129.4	45 43.0	97	129.3	46 41.0	96	128.9	1
2	39 12.5	97	130.3	39 41.7	97	130.2	40 10.8	97	130.0	41 09.0	97	129.7	43 05.2	97	129.0	45 01.2	97	128.3	45 30.1	96	128.1	46 28.0	96	127.7	2
3	38 59.8	97	129.2	39 28.9	97	129.1	39 58.0	97	128.9	40 56.1	97	128.6	42 52.3	97	127.9	44 48.1	96	127.2	45 17.0	96	127.0	46 14.8	96	126.6	3
4	38 46.9	97	128.1	39 16.0	97	128.0	39 45.0	97	127.8	40 43.1	97	127.5	42 39.1	97	126.8	44 34.8	96	126.0	45 03.7	96	125.9	46 01.4	96	125.5	4
45	38 33.8	97	127.0	39 02.8	97	126.9	39 31.9	97	126.7	40 29.9	97	126.4	42 25.8	96	125.7	44 21.4	96	124.9	44 50.2	96	124.7	45 47.9	96	124.3	45
6	38 20.5	97	125.9	38 49.5	97	125.8	39 18.5	97	125.6	40 16.5	97	125.3	42 12.2	96	124.6	44 07.7	96	123.8	44 36.5	96	123.6	45 34.1	96	123.2	6
7	38 07.0	97	124.8	38 36.0	97	124.7	39 05.0	97	124.5	40 02.9	96	124.2	41 58.5	96	123.5	43 53.9	96	122.7	44 22.7	96	122.5	45 20.2	96	122.1	7
8	37 53.3	97	123.8	38 22.3	97	123.6	38 51.3	96	123.4	39 49.1	96	123.1	41 44.6	96	122.4	43 39.9	96	121.6	44 08.6	96	121.4	45 06.1	96	121.0	8
9	37 39.5	96	122.7	38 08.4	96	122.5	38 37.4	96	122.3	39 35.2	96	122.0	41 30.6	96	121.3	43 25.7	96	120.5	43 54.4	96	120.3	44 51.8	96	119.9	9
50	37 25.5	96	121.6	37 54.4	96	121.4	38 23.3	96	121.3	39 21.1	96	120.9	41 16.4	96	120.2	43 11.4	96	119.4	43 40.1	96	119.2	44 37.4	95	118.8	50
1	37 11.3	96	120.5	37 40.2	96	120.4	38 09.1	96	120.2	39 06.8	96	119.8	41 02.0	96	119.1	42 56.9	96	118.3	43 25.6	96	118.1	44 22.9	95	117.7	1
2	36 57.0	96	119.5	37 25.9	96	119.3	37 54.7	96	119.1	38 52.4	96	118.8	40 47.5	96	118.0	42 42.3	96	117.3	43 10.9	96	117.0	44 08.2	95	116.6	2
3	36 42.5	96	118.4	37 11.4	96	118.2	37 40.2	96	118.1	38 37.8	96	117.7	40 32.8	96	117.0	42 27.5	95	116.2	42 56.1	95	116.0	43 53.3	95	115.6	3
4	36 27.9	96	117.4	36 56.7	96	117.2	37 25.5	96	117.0	38 23.1	96	116.6	40 18.0	96	115.9	42 12.6	95	115.1	42 41.2	95	114.9	43 38.3	95	114.5	4
55	36 13.2	96	116.3	36 42.0	96	116.1	37 10.7	96	115.9	38 08.2	96	115.6	40 03.0	96	114.8	41 57.5	95	114.0	42 26.1	95	113.8	43 23.2	95	113.4	55
6	35 58.3	96	115.2	36 27.0	96	115.1	36 55.8	96	114.9	37 53.3	96	114.5	39 48.0	95	113.8	41 42.4	95	113.0	42 10.9	95	112.8	43 08.0	95	112.4	6
7	35 43.2	96	114.2	36 12.0	96	114.0	36 40.7	96	113.8	37 38.2	96	113.5	39 32.8	95	112.7	41 27.1	95	111.9	41 55.6	95	111.7	42 52.6	95	111.3	7
8	35 28.1	96	113.2	35 56.8	96	113.0	36 25.5	96	112.8	37 22.9	96	112.4	39 17.5	95	111.7	41 11.7	95	110.9	41 40.2	96	110.7	42 37.1	95	110.2	8
9	35 12.8	96	112.1	35 41.5	96	111.9	36 10.2	96	111.8	37 07.6	96	111.4	39 02.0	95	110.6	40 56.2	95	109.8	41 24.7	95	109.6	42 21.6	95	109.2	9
60	34 57.5	96	111.1	35 26.2	96	110.9	35 54.8	96	110.7	36 52.1	95	110.4	38 46.5	95	109.6	40 40.6	95	108.8	41 09.1	95	108.6	42 05.9	95	108.2	60
1	34 42.0	96	110.1	35 10.7	96	109.9	35 39.3	95	109.7	36 36.6	95	109.3	38 30.9	95	108.6	40 24.9	95	107.8	40 53.3	95	107.5	41 50.2	95	107.1	1
2	34 26.4	96	109.0	34 55.1	95	108.9	35 23.7	95	108.7	36 20.9	95	108.3	38 15.2	95	107.5	40 09.1	95	106.7	40 37.5	95	106.5	41 34.3	95	106.1	2
3	34 10.7	95	108.0	34 39.4	95	107.8	35 08.0	95	107.7	36 05.2	95	107.3	37 59.4	95	106.5	39 53.2	95	105.7	40 21.6	95	105.5	41 18.4	95	105.1	3
4	33 54.9	95	107.0	34 23.6	95	106.8	34 52.2	95	106.6	35 49.3	95	106.3	37 43.5	95	105.5	39 37.3	95	104.7	40 05.6	95	104.5	41 02.4	94	104.0	4
65	33 39.1	95	106.0	34 07.7	95	105.8	34 36.3	95	105.6	35 33.4	95	105.3	37 27.5	95	104.5	39 21.2	95	103.7	39 49.6	95	103.5	40 46.3	94	103.0	65
6	33 23.1	95	105.0	33 51.7	95	104.8	34 20.3	95	104.6	35 17.4	95	104.2	37 11.4	95	103.5	39 05.1	95	102.7	39 33.5	95	102.4	40 30.1	94	102.0	6
7	33 07.1	95	104.0	33 35.7	95	103.8	34 04.3	95	103.6	35 01.4	95	103.2	36 55.3	95	102.5	38 48.9	95	101.6	39 17.3	94	101.4	40 13.9	94	101.0	7
8	32 51.1	95	103.0	33 19.6	95	102.8	33 48.2	95	102.6	34 45.2	95	102.2	36 39.1	95	101.5	38 32.7	95	100.6	39 01.1	94	100.4	39 57.7	94	100.0	8
9	32 34.9	95	102.0	33 03.5	95	101.8	33 32.0	95	101.6	34 29.0	95	101.2	36 22.9	95	100.5	38 16.4	94	99.6	38 44.8	94	99.4	39 41.4	94	99.0	9
70	32 18.7	95	101.0	32 47.2	95	100.8	33 15.8	95	100.6	34 12.8	95	100.2	36 06.6	95	99.5	38 00.1	94	98.6	38 28.4	94	98.4	39 25.0	94	98.0	70
1	32 02.4	95	100.0	32 31.0	95	99.8	32 59.5	95	99.6	33 56.5	95	99.2	35 50.3	95	98.5	37 43.7	94	97.7	38 12.1	94	97.4	39 08.6	94	97.0	1
2	31 46.1	95	99.0	32 14.7	95	98.8	32 43.2	95	98.6	33 40.1	95	98.3	35 33.9	95	97.5	37 27.3	94	96.7	37 55.6	94	96.5	38 52.2	94	96.0	2
3	31 29.8	95	98.0	31 58.3	95	97.8	32 26.8	95	97.6	33 23.8	95	97.3	35 17.5	95	96.5	37 10.9	94	95.7	37 39.2	94	95.5	38 35.7	94	95.0	3
4	31 13.4	95	97.0	31 41.9	95	96.8	32 10.4	95	96.7	33 07.3	95	96.3	35 01.0	95	95.5	36 54.4	94	94.7	37 22.7	94	94.5	38 19.2	94	94.1	4
75	30 56.9	95	96.0	31 25.4	95	95.9	31 53.9	95	95.7	32 50.9	95	95.3	34 44.6	95	94.5	36 37.9	94	93.7	37 06.2	94	93.5	38 02.7	94	93.1	75
6	30 40.5	95	95.1	31 09.0	95	94.9	31 37.5	95	94.7	32 34.4	95	94.3	34 28.1	95	93.6	36 21.4	94	92.8	36 49.7	94	92.5	37 46.2	94	92.1	6
7	30 24.0	95	94.1	30 52.5	95	93.9	31 21.0	95	93.7	32 17.9	95	93.4	34 11.5	95	92.6	36 04.9	94	91.8	36 33.2	94	91.6	37 29.7	94	91.2	7
8	30 07.5	95	93.1	30 36.0	95	92.9	31 04.5	95	92.8	32 01.4	95	92.4	33 55.0	95	91.6	35 48.4	94	90.8	36 16.6	94	90.6	37 13.1	94	90.2	8
9	29 51.0	95	92.2	30 19.5	95	92.0	30 47.9	95	91.8	31 44.9	95	91.4	33 38.5	95	90.7	35 31.8	94	89.9	36 00.1	94	89.6	36 56.6	94	89.2	9
80	29 34.4	95	91.2	30 02.9	95	91.0	30 31.4	95	90.8	31 28.3	95	90.5	33 21.9	95	89.7	35 15.3	94	88.9	35 43.6	94	88.7	36 40.1	94	88.3	80
1	29 17.9	95	90.2	29 46.4	95	90.0	30 14.9	95	89.9	31 11.8	95	89.5	33 05.4	95	88.7	34 58.7	94	87.9	35 27.0	94	87.7	36 23.5	94	87.3	1
2	29 01.4	95	89.3	29 29.9	95	89.1	29 58.3	95	88.9	30 55.2	95	88.5	32 48.9	95	87.8	34 42.2	94	87.0	35 10.5	94	86.8	36 07.0	94	86.4	2
3	28 44.8	95	88.3	29 13.3	95	88.1	29 41.8	95	87.9	30 38.7	95	87.6	32 32.4	95	86.8	34 25.7	94	86.0	34 54.0	94	85.8	35 50.5	94	85.4	3
4	28 28.3	95	87.3	28 56.8	95	87.2	29 25.3	95	87.0	30 22.2	95	86.6	32 15.9	95	85.9	34 09.2	94	85.1	34 37.5	94	84.9	35 34.1	94	84.5	4
85	28 11.8	95	86.4	28 40.3	95	86.2	29 08.8	95	86.0	30 05.7	95	85.7	31 59.4	95	84.9	33 52.8	94	84.1	34 21.1	94	83.9	35 17.6	94	83.5	85
6	27 55.3	95	85.4	28 23.8	95	85.3	28 52.3	95	85.1	29 49.2	95	84.7	31 42.9	95	84.0	33 36.3	94	83.2	34 04.6	94	83.0	35 01.2	94	82.6	6
7	27 38.8	95	84.5	28 07.3	95	84.3	28 35.8	95	84.1	29 32.8	95	83.8	31 26.5	95	83.0	33 19.9	94	82.3	33 48.2	94	82.1	34 44.8	94	81.7	7
8	27 22.4	95	83.5	27 50.9	95	83.4	28 19.4	95	83.2	29 16.3	95	82.8	31 10.1	95	82.1	33 03.6	94	81.3	33 31.9	94	81.1	34 28.5	94	80.7	8
9	27 06.0	95	82.6	27 34.5	95	82.4	28 03.0	95	82.3	29 00.0	95	81.9	30 53.7	95	81.2	32 47.2	94	80.4	33 15.6	94	80.2	34 12.2	94	79.8	9
90	26 49.6	95	81.7	27 18.1	95	81.5	27 46.6	95	81.3	28 43.6	95	81.0	30 37.4	95	80.2	32 30.9	95	79.5	32 59.3	94	79.3	33 55.9	94	78.9	90

H.A.	28° 00′		28° 30′		29° 00′		30° 00′		32° 00′		34° 00′		34° 30′		35° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	26 33.2 95 27	80.7	27 01.8 95 27	80.5	27 30.3 95 27	80.4	28 27.3 95 27	80.0	30 21.1 95 27	79.3	32 14.7 95 27	78.5	32 43.1 94 27	78.3	33 39.7 94 27	78.0	91
2	26 16.9 95 27	79.8	26 45.5 95 27	79.6	27 14.0 95 27	79.4	28 11.0 95 27	79.1	30 04.9 95 27	78.4	31 58.5 95 27	77.6	32 26.9 95 27	77.4	33 23.6 94 27	77.0	2
3	26 00.7 95 27	78.8	26 29.2 95 27	78.7	26 57.8 95 27	78.5	27 54.8 95 27	78.2	29 48.7 95 27	77.4	31 42.4 95 27	76.7	32 10.8 95 27	76.5	33 07.5 94 27	76.1	3
4	25 44.5 95 27	77.9	26 13.0 95 27	77.7	26 41.6 95 27	77.6	27 38.7 95 27	77.2	29 32.6 95 27	76.5	31 26.3 95 27	75.8	31 54.7 95 27	75.6	32 51.5 94 27	75.2	4
95	25 28.3 95 27	77.0	25 56.9 95 27	76.8	26 25.5 95 27	76.6	27 22.6 95 27	76.3	29 16.6 95 27	75.6	31 10.3 95 27	74.9	31 38.7 95 27	74.7	32 35.5 95 26	74.3	95
6	25 12.3 95 27	76.1	25 40.8 95 27	75.9	26 09.4 95 27	75.7	27 06.5 95 27	75.4	29 00.6 95 27	74.7	30 54.4 95 26	73.9	31 22.8 95 26	73.7	32 19.6 95 26	73.4	6
7	24 56.2 95 27	75.1	25 24.8 95 27	75.0	25 53.4 95 27	74.8	26 50.6 95 26	74.4	28 44.7 95 26	73.7	30 38.6 95 26	73.0	31 07.0 95 26	72.8	32 03.8 95 26	72.5	7
8	24 40.3 95 26	74.2	25 08.9 95 26	74.0	25 37.5 95 26	73.9	26 34.7 95 26	73.5	28 28.8 95 26	72.8	30 22.8 95 26	72.1	30 51.2 95 26	71.9	31 48.1 95 26	71.5	8
9	24 24.4 95 26	73.3	24 53.0 95 26	73.1	25 21.6 95 26	72.9	26 18.8 95 26	72.6	28 13.1 95 26	71.9	30 07.1 95 26	71.2	30 35.6 95 26	71.0	31 32.4 95 26	70.6	9
100	24 08.6 95 26	72.3	24 37.2 95 26	72.2	25 05.9 95 26	72.0	26 03.1 95 26	71.7	27 57.4 95 26	71.0	29 51.5 95 26	70.3	30 20.0 95 26	70.1	31 16.9 95 26	69.7	100
1	23 52.9 96 26	71.4	24 21.5 95 26	71.3	24 50.2 95 26	71.1	25 47.4 95 26	70.8	27 41.8 95 26	70.1	29 35.9 95 26	69.4	30 04.4 95 26	69.2	31 01.4 95 26	68.8	1
2	23 37.3 96 26	70.5	24 05.9 96 26	70.3	24 34.6 96 26	70.2	25 31.9 95 26	69.8	27 26.3 95 26	69.2	29 20.5 95 26	68.5	29 49.0 95 26	68.3	30 46.0 95 25	67.9	2
3	23 21.7 96 26	69.6	23 50.4 96 26	69.4	24 19.1 96 26	69.3	25 16.4 95 26	68.9	27 10.9 95 26	68.3	29 05.2 95 25	67.6	29 33.7 95 25	67.4	30 30.8 95 25	67.0	3
4	23 06.3 96 26	68.7	23 35.0 96 26	68.5	24 03.7 96 26	68.3	25 01.0 96 25	68.0	26 55.6 95 25	67.4	28 49.9 95 25	66.7	29 18.5 95 25	66.5	30 15.6 95 25	66.1	4
105	22 50.9 96 25	67.7	23 19.6 96 25	67.6	23 48.3 96 25	67.4	24 45.7 96 25	67.1	26 40.4 95 25	66.4	28 34.8 95 25	65.8	29 03.4 95 25	65.6	30 00.5 95 25	65.2	105
6	22 35.7 96 25	66.8	23 04.4 96 25	66.7	23 33.1 96 25	66.5	24 30.5 96 25	66.2	26 25.2 96 25	65.5	28 19.8 95 25	64.9	28 48.4 95 25	64.7	29 45.5 95 25	64.4	6
7	22 20.5 96 25	65.9	22 49.3 96 25	65.8	23 18.0 96 25	65.6	24 15.5 96 25	65.3	26 10.2 96 25	64.6	28 04.9 95 25	64.0	28 33.5 95 25	63.8	29 30.7 95 25	63.5	7
8	22 05.5 96 25	65.0	22 34.2 96 25	64.8	23 03.0 96 25	64.7	24 00.5 96 25	64.4	25 55.4 96 25	63.7	27 50.1 96 24	63.1	28 18.7 95 24	62.9	29 16.0 95 24	62.6	8
9	21 50.5 96 25	64.1	22 19.3 96 25	63.9	22 48.1 96 25	63.8	23 45.6 96 25	63.5	25 40.6 96 24	62.8	27 35.4 96 24	62.2	28 04.0 96 24	62.0	29 01.3 95 24	61.7	9
110	21 35.7 96 24	63.2	22 04.5 96 24	63.0	22 33.3 96 24	62.9	23 30.9 96 24	62.6	25 25.9 96 24	61.9	27 20.8 96 24	61.3	27 49.5 96 24	61.1	28 46.8 96 24	60.8	110
1	21 21.0 96 24	62.3	21 49.8 96 24	62.1	22 18.7 96 24	62.0	23 16.3 96 24	61.7	25 11.4 96 24	61.0	27 06.4 96 24	60.4	27 35.1 96 24	60.2	28 32.5 96 24	59.9	1
2	21 06.4 96 24	61.3	21 35.3 96 24	61.2	22 04.1 96 24	61.1	23 01.8 96 24	60.8	24 57.0 96 24	60.1	26 52.0 96 24	59.5	27 20.8 96 24	59.3	28 18.2 96 24	59.0	2
3	20 52.0 96 24	60.4	21 20.9 96 24	60.3	21 49.7 96 24	60.1	22 47.4 96 24	59.8	24 42.7 96 24	59.2	26 37.9 96 23	58.6	27 06.6 96 23	58.5	28 04.1 96 23	58.1	3
4	20 37.7 96 24	59.5	21 06.6 96 24	59.4	21 35.4 96 24	59.2	22 33.2 96 24	58.9	24 28.6 96 23	58.3	26 23.8 96 23	57.7	26 52.6 96 23	57.6	27 50.1 96 23	57.3	4
115	20 23.5 96 23	58.6	20 52.4 96 23	58.5	21 21.3 96 23	58.3	22 19.1 96 23	58.0	24 14.6 96 23	57.5	26 09.9 96 23	56.8	26 38.7 96 23	56.7	27 36.3 96 23	56.4	115
6	20 09.4 96 23	57.7	20 38.4 96 23	57.6	21 07.3 96 23	57.4	22 05.1 96 23	57.1	24 00.7 96 23	56.6	25 56.1 96 23	56.0	26 25.0 96 23	55.8	27 22.6 96 23	55.5	6
7	19 55.5 97 23	56.8	20 24.5 97 23	56.7	20 53.4 96 23	56.5	21 51.3 96 23	56.2	23 47.0 96 23	55.7	25 42.5 96 22	55.1	26 11.4 96 22	54.9	27 09.0 96 22	54.6	7
8	19 41.8 97 23	55.9	20 10.7 97 23	55.8	20 39.7 97 23	55.6	21 37.6 97 23	55.3	23 33.4 96 22	54.8	25 29.0 96 22	54.2	25 57.9 96 22	54.0	26 55.6 96 22	53.7	8
9	19 28.1 97 22	55.0	19 57.1 97 22	54.9	20 26.1 97 22	54.7	21 24.1 97 22	54.4	23 19.9 96 22	53.9	25 15.7 96 22	53.3	25 44.6 96 22	53.2	26 42.4 96 22	52.9	9
120	19 14.7 97 22	54.1	19 43.7 97 22	54.0	20 12.7 97 22	53.8	21 10.7 97 22	53.5	23 06.7 97 22	53.0	25 02.5 96 22	52.4	25 31.4 96 22	52.3	26 29.3 96 22	52.0	120
1	19 01.3 97 22	53.2	19 30.4 97 22	53.1	19 59.4 97 22	52.9	20 57.5 97 22	52.6	22 53.5 97 22	52.1	24 49.5 97 21	51.5	25 18.4 97 21	51.4	26 16.3 96 21	51.1	1
2	18 48.2 97 22	52.3	19 17.3 97 22	52.1	19 46.3 97 22	52.0	20 44.4 97 22	51.8	22 40.6 97 21	51.2	24 36.6 97 21	50.7	25 05.6 97 21	50.5	26 03.5 97 21	50.2	2
3	18 35.2 97 21	51.4	19 04.3 97 21	51.2	19 33.4 97 21	51.1	20 31.5 97 21	50.9	22 27.8 97 21	50.3	24 23.9 97 21	49.8	24 52.9 97 21	49.6	25 50.9 97 21	49.3	3
4	18 22.3 97 21	50.5	18 51.5 97 21	50.3	19 20.6 97 21	50.2	20 18.8 97 21	50.0	22 15.1 97 21	49.4	24 11.3 97 21	48.9	24 40.4 97 21	48.8	25 38.4 97 20	48.5	4
125	18 09.7 97 21	49.6	18 38.8 97 21	49.4	19 07.9 97 21	49.3	20 06.2 97 21	49.1	22 02.6 97 21	48.5	23 59.0 97 20	48.0	24 28.0 97 20	47.9	25 26.1 97 20	47.6	125
6	17 57.2 97 21	48.7	18 26.3 97 21	48.5	18 55.5 97 20	48.4	19 53.8 97 20	48.2	21 50.3 97 20	47.7	23 46.8 97 20	47.1	24 15.8 97 20	47.0	25 14.0 97 20	46.7	6
7	17 44.8 97 20	47.8	18 14.0 97 20	47.6	18 43.2 97 20	47.5	19 41.6 97 20	47.3	21 38.2 97 20	46.8	23 34.7 97 20	46.3	24 03.8 97 20	46.1	25 02.1 97 20	45.9	7
8	17 32.7 97 20	46.9	18 01.9 97 20	46.7	18 31.1 97 20	46.6	19 29.5 97 20	46.4	21 26.2 97 20	45.9	23 22.9 97 19	45.4	23 52.0 97 19	45.2	24 50.3 97 19	45.0	8
9	17 20.7 97 20	46.0	17 49.9 97 20	45.8	18 19.2 97 20	45.7	19 17.6 97 20	45.5	21 14.4 97 19	45.0	23 11.2 97 19	44.5	23 40.4 97 19	44.4	24 38.7 97 19	44.1	9
130	17 08.9 98 19	45.1	17 38.2 98 19	44.9	18 07.4 98 19	44.8	19 05.9 97 19	44.6	21 02.8 97 19	44.1	22 59.7 97 19	43.6	23 28.9 97 19	43.5	24 27.3 97 19	43.2	130
1	16 57.3 98 19	44.2	17 26.6 98 19	44.0	17 55.8 98 19	43.9	18 54.4 98 19	43.7	20 51.4 97 19	43.2	22 48.4 97 19	42.7	23 17.6 97 18	42.6	24 16.0 97 18	42.4	1
2	16 45.9 98 19	43.3	17 15.2 98 19	43.1	17 44.5 98 19	43.0	18 43.1 98 19	42.8	20 40.2 98 18	42.3	22 37.2 98 18	41.9	23 06.5 97 18	41.7	24 05.0 97 18	41.5	2
3	16 34.6 98 18	42.4	17 04.0 98 18	42.2	17 33.3 98 18	42.1	18 31.9 98 18	41.9	20 29.1 98 18	41.5	22 26.3 98 18	41.0	22 55.6 98 18	40.9	23 54.1 98 18	40.6	3
4	16 23.6 98 18	41.5	16 52.9 98 18	41.3	17 22.3 98 18	41.2	18 21.0 98 18	41.0	20 18.3 98 18	40.6	22 15.5 98 18	40.1	22 44.8 98 18	40.0	23 43.4 98 17	39.8	4
135	16 12.7 98 18	40.6	16 42.1 98 18	40.5	17 11.5 98 18	40.3	18 10.2 98 18	40.1	20 07.6 98 17	39.7	22 05.0 98 17	39.2	22 34.3 98 17	39.1	23 32.9 98 17	38.9	135
6	16 02.1 98 17	39.7	16 31.5 98 17	39.6	17 00.9 98 17	39.4	17 59.6 98 17	39.2	19 57.2 98 17	38.8	21 54.6 98 17	38.4	22 24.0 98 17	38.3	23 22.6 98 17	38.0	6
7	15 51.6 98 17	38.8	16 21.0 98 17	38.7	16 50.5 98 17	38.6	17 49.3 98 17	38.3	19 46.9 98 17	37.9	21 44.4 98 17	37.5	22 13.8 98 17	37.4	23 12.6 98 16	37.2	7
8	15 41.4 98 17	37.9	16 10.8 98 17	37.8	16 40.3 98 17	37.7	17 39.1 98 17	37.5	19 36.8 98 16	37.0	21 34.5 98 16	36.6	22 03.9 98 16	36.5	23 02.7 98 16	36.3	8
9	15 31.3 98 16	37.0	16 00.8 98 16	36.9	16 30.2 98 16	36.8	17 29.2 98 16	36.6	19 27.0 98 16	36.2	21 24.7 98 16	35.7	21 54.1 98 16	35.6	22 53.0 98 16	35.4	9
140	15 21.5 98 16	36.1	15 51.0 98 16	36.0	16 20.5 98 16	35.9	17 19.4 98 16	35.7	19 17.3 98 16	35.3	21 15.2 98 16	34.9	21 44.6 98 16	34.8	22 43.5 98 15	34.6	140
1	15 11.9 98 16	35.2	15 41.4 98 16	35.1	16 10.9 98 16	35.0	17 09.9 98 16	34.8	19 07.9 98 15	34.4	21 05.8 98 15	34.0	21 35.3 98 15	33.9	22 34.2 98 15	33.7	1
2	15 02.4 98 15	34.3	15 32.0 98 15	34.2	16 01.5 98 15	34.1	17 00.6 98 15	33.9	18 58.6 98 15	33.5	20 56.7 98 15	33.1	21 26.2 98 15	33.0	22 25.1 98 15	32.8	2
3	14 53.2 99 15	33.4	15 22.8 99 15	33.3	15 52.3 99 15	33.2	16 51.4 98 15	33.0	18 49.6 98 15	32.6	20 47.7 98 15	32.3	21 17.2 98 14	32.2	22 16.3 98 14	32.0	3
4	14 44.3 99 15	32.5	15 13.8 99 15	32.4	15 43.4 99 15	32.3	16 42.5 99 14	32.1	18 40.8 99 14	31.7	20 39.0 98 14	31.4	21 08.5 98 14	31.3	22 07.6 98 14	31.1	4
145	14 35.5 99 14	31.6	15 05.1 99 14	31.5	15 34.7 99 14	31.4	16 33.9 99 14	31.2	18 32.2 99 14	30.9	20 30.5 99 14	30.5	21 00.1 99 14	30.4	21 59.2 99 14	30.2	145
6	14 26.9 99 14	30.7	14 56.6 99 14	30.6	15 26.2 99 14	30.5	16 25.4 99 14	30.3	18 23.8 99 14	30.0	20 22.2 99 13	29.6	20 51.8 99 13	29.5	21 51.0 99 13	29.4	6
7	14 18.6 99 13	29.8	14 48.3 99 13	29.7	15 17.9 99 13	29.6	16 17.2 99 13	29.4	18 15.7 99 13	29.1	20 14.1 99 13	28.8	20 43.8 99 13	28.7	21 43.0 99 13	28.5	7
8	14 10.5 99 13	28.9	14 40.2 99 13	28.8	15 09.8 99 13	28.7	16 09.1 99 13	28.5	18 07.7 99 13	28.2	20 06.3 99 13	27.9	20 35.9 99 13	27.8	21 35.2 99 13	27.6	8
9	14 02.7 99 13	28.0	14 32.3 99 13	27.9	15 02.0 99 13	27.8	16 01.4 99 13	27.6	18 00.0 99 12	27.3	19 58.7 99 12	27.0	20 28.3 99 12	26.9	21 27.6 99 12	26.8	9
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1	13 47.6 99 12	26.2	14 17.3 99 12	26.1	14 47.0 99 12	26.0	15 46.5 99 12	25.9	17 45.3 99 12	25.6	19 44.1 99 12	25.3	20 13.8 99 12	25.2	21 13.2 99 11	25.0	1
2	13 40.4 99 12	25.3	14 10.2 99 12	25.2	14 39.9 99 12	25.1	15 39.4 99 11	25.0	17 38.3 99 11	24.7	19 37.1 99 11	24.4	20 06.9 99 11	24.3	21 06.3 99 11	24.2	2
3	13 33.5 99 11	24.4	14 03.3 99 11	24.3	14 33.0 99 11	24.2	15 32.5 99 11	24.1	17 31.5 99 11	23.8	19 30.4 99 11	23.5	20 00.2 99 11	23.5	20 59.6 99 11	23.3	3
4	13 26.8 99 11	23.5	13 56.6 99 11	23.4	14 26.3 99 11	23.3	15 25.9 99 11	23.2	17 24.9 99 11	22.9	19 23.9 99 10	22.7	19 53.7 99 10	22.6	20 53.2 99 10	22.5	4
155	13 20.3 99 10	22.6	13 50.1 99 10	22.5	14 19.9 99 10	22.4	15 19.5 99 10	22.3	17 18.6 99 10	22.0	19 17.7 99 10	21.8	19 47.5 99 10	21.7	20 47.0 99 10	21.6	155
6	13 14.1 99 10	21.6	13 43.9 99 10	21.6	14 13.7 99 10	21.5	15 13.3 99 10	21.4	17 12.5 99 10	21.2	19 11.7 99 10	20.9	19 41.4 99 10	20.9	20 41.0 99 10	20 7	6
7	13 08.1 99 10	20.7	13 38.0 99 10	20.7	14 07.8 99 10	20.6	15 07.4 99 09	20.5	17 06.6 99 09	20.3	19 05.9 99 09	20.0	19 35.7 99 09	20.0	20 35.3 99 09	19.9	7
8	13 02.4 99 09	19.8	13 32.2 99 09	19.8	14 02.1 99 09	19.7	15 01.7 99 09	19.6	17 01.0 99 09	19.4	19 00.3 99 09	19.2	19 30.1 99 09	19.1	20 29.8 99 09	19.0	8
9	12 56.9 99 09	18.9	13 26.8 99 09	18.9	13 56.6 99 09	18.8	14 56.3 99 09	18.7	16 55.7 99 09	18.5	18 55.0 99 08	18.3	19 24.8 99 08	18.2	20 24.5 99 08	18.1	9
160	12 51.7 1.0 08	18.0	13 21.5 1.0 08	18.0	13 51.4 1.0 08	17.9	14 51.1 1.0 08	17.8	16 50.5 1.0 08	17.6	18 49.9 1.0 08	17.4	19 19.8 99 08	17.4	20 19.5 99 08	17.3	160
1	12 46.7 1.0 08	17.1	13 16.5 1.0 08	17.1	13 46.4 1.0 08	17.0	14 46.2 1.0 08	17.0	16 45.6 1.0 08	16.8	18 45.1 1.0 08	16.6	19 15.0 1.0 08	16.5	20 14.7 1.0 08	16.4	1
2	12 41.9 1.0 08	16.2	13 11.8 1.0 07	16.2	13 41.7 1.0 07	16.2	14 41.5 1.0 07	16.1	16 41.0 1.0 07	15.9	18 40.5 1.0 07	15.7	19 10.4 1.0 07	15.6	20 10.1 1.0 07	15.5	2
3	12 37.4 1.0 07	15.3	13 07.3 1.0 07	15.3	13 37.2 1.0 07	15.3	14 37.0 1.0 07	15.2	16 36.6 1.0 07	15.0	18 36.2 1.0 07	14.8	19 06.0 1.0 07	14.8	20 05.8 1.0 07	14.7	3
4	12 33.2 1.0 07	14.4	13 03.1 1.0 07	14.4	13 33.0 1.0 07	14.4	14 32.8 1.0 07	14.3	16 32.4 1.0 07	14.1	18 32.0 1.0 06	13.9	19 02.0 1.0 06	13.9	20 01.8 1.0 06	13.8	4
165	12 29.2 1.0 06	13.5	12 59.1 1.0 06	13.5	13 29.0 1.0 06	13.5	14 28.8 1.0 06	13.4	16 28.5 1.0 06	13.2	18 28.2 1.0 06	13.1	18 58.1 1.0 06	13.0	19 57.9 1.0 06	13.0	165
6	12 25.4 1.0 06	12.6	12 55.4 1.0 06	12.6	13 25.3 1.0 06	12.6	14 25.1 1.0 06	12.5	16 24.9 1.0 06	12.3	18 24.6 1.0 06	12.2	18 54.5 1.0 06	12.2	19 54.3 1.0 06	12.1	6
7	12 21.9 1.0 05	11.7	12 51.9 1.0 05	11.7	13 21.8 1.0 05	11.7	14 21.7 1.0 05	11.6	16 21.4 1.0 05	11.5	18 21.2 1.0 05	11.3	18 51.1 1.0 05	11.3	19 51.0 1.0 05	11.2	7
8	12 18.7 1.0 05	10.8	12 48.6 1.0 05	10.8	13 18.6 1.0 05	10.8	14 18.5 1.0 05	10.7	16 18.3 1.0 05	10.6	18 18.1 1.0 05	10.5	18 48.0 1.0 05	10.4	19 47.9 1.0 05	10.4	8
9	12 15.7 1.0 05	09.9	12 45.7 1.0 05	09.9	13 15.6 1.0 04	09.9	14 15.5 1.0 04	09.8	16 15.4 1.0 04	09.7	18 15.2 1.0 04	09.6	18 45.1 1.0 04	09.6	19 45.0 1.0 04	09.5	9
170	12 13.0 1.0 04	09.0	12 43.0 1.0 04	09.0	13 12.9 1.0 04	09.0	14 12.9 1.0 04	08.9	16 12.7 1.0 04	08.8	18 12.6 1.0 04	08.7	18 42.5 1.0 04	08.7	19 42.4 1.0 04	08.6	170
1	12 10.5 1.0 04	08.1	12 40.5 1.0 04	08.1	13 10.5 1.0 04	08.1	14 10.4 1.0 04	08.0	16 10.3 1.0 04	07.9	18 10.2 1.0 04	07.8	18 40.1 1.0 04	07.8	19 40.1 1.0 04	07.8	1
2	12 08.3 1.0 03	07.2	12 38.3 1.0 03	07.2	13 08.3 1.0 03	07.2	14 08.2 1.0 03	07.1	16 08.1 1.0 03	07.1	18 08.0 1.0 03	07.0	18 38.0 1.0 03	07.0	19 38.0 1.0 03	06.9	2
3	12 06.4 1.0 03	06.3	12 36.4 1.0 03	06.3	13 06.3 1.0 03	06.3	14 06.3 1.0 03	06.2	16 06.2 1.0 03	06.2	18 06.2 1.0 03	06.1	18 36.1 1.0 03	06.1	19 36.1 1.0 03	06.0	3
4	12 04.7 1.0 02	05.4	12 34.7 1.0 02	05.4	13 04.7 1.0 02	05.4	14 04.6 1.0 02	05.4	16 04.6 1.0 02	05.3	18 04.5 1.0 02	05.2	18 34.5 1.0 02	05.2	19 34.5 1.0 02	05.2	4
175	12 03.3 1.0 02	04.5	12 33.2 1.0 02	04.5	13 03.2 1.0 02	04.5	14 03.2 1.0 02	04.5	16 03.2 1.0 02	04.4	18 03.1 1.0 02	04.4	18 33.1 1.0 02	04.3	19 33.1 1.0 02	04.3	175
6	12 02.1 1.0 02	03.6	12 32.1 1.0 02	03.6	13 02.1 1.0 02	03.6	14 02.1 1.0 02	03.6	16 02.0 1.0 01	03.5	18 02.0 1.0 01	03.5	18 32.0 1.0 01	03.5	19 32.0 1.0 01	03.5	6
7	12 01.2 1.0 01	02.7	12 31.2 1.0 01	02.7	13 01.2 1.0 01	02.7	14 01.2 1.0 01	02.7	16 01.1 1.0 01	02.6	18 01.1 1.0 01	02.6	18 31.1 1.0 01	02.6	19 31.1 1.0 01	02.6	7
8	12 00.5 1.0 01	01.8	12 30.5 1.0 01	01.8	13 00.5 1.0 01	01.8	14 00.5 1.0 01	01.8	16 00.5 1.0 01	01.8	18 00.5 1.0 01	01.7	18 30.5 1.0 01	01.7	19 30.5 1.0 01	01.7	8
9	12 00.1 1.0 00	00.9	12 30.1 1.0 00	00.9	13 00.1 1.0 00	00.9	14 00.1 1.0 00	00.9	16 00.1 1.0 00	00.9	18 00.1 1.0 00	00.9	18 30.1 1.0 00	00.9	19 30.1 1.0 00	00.9	9
180	12 00.0 1.0 00	00.0	12 30.0 1.0 00	00.0	13 00.0 1.0 00	00.0	14 00.0 1.0 00	00.0	16 00.0 1.0 00	00.0	18 00.0 1.0 00	00.0	18 30.0 1.0 00	00.0	19 30.0 1.0 00	00.0	180

Lat. 74°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	52 00.0	1.0 00	180.0	53 00.0	1.0 00	180.0	54 30.0	1.0 00	180.0	56 00.0	1.0 00	180.0	58 00.0	1.0 00	180.0	58 30.0	1.0 00	180.0	59 00.0	1.0 00	180.0	61 00.0	1.0 00	180.0	00
1	51 59.8	1.0 01	178.7	52 59.8	1.0 01	178.7	54 29.8	1.0 01	178.7	55 59.8	1.0 01	178.6	57 59.8	1.0 01	178.6	58 29.8	1.0 01	178.6	58 59.8	1.0 01	178.6	60 59.8	1.0 01	178.5	1
2	51 59.2	1.0 02	177.4	52 59.2	1.0 02	177.3	54 29.2	1.0 02	177.3	55 59.2	1.0 02	177.3	57 59.2	1.0 02	177.2	58 29.2	1.0 02	177.2	58 59.2	1.0 02	177.2	60 59.2	1.0 02	177.1	2
3	51 58.3	1.0 02	176.1	52 58.3	1.0 02	176.0	54 28.3	1.0 02	176.0	55 58.2	1.0 02	175.9	57 58.2	1.0 02	175.8	58 28.2	1.0 02	175.8	58 58.2	1.0 02	175.7	60 58.1	1.0 02	175.6	3
4	51 57.0	1.0 03	174.7	52 56.9	1.0 03	174.7	54 26.9	1.0 03	174.6	55 56.8	1.0 03	174.5	57 56.8	1.0 03	174.4	58 26.7	1.0 03	174.4	58 56.7	1.0 03	174.3	60 56.6	1.0 03	174.2	4
05	51 55.3	1.0 03	173.4	52 55.2	1.0 04	173.4	54 25.1	1.0 04	173.3	55 55.1	1.0 04	173.2	57 54.9	1.0 04	173.0	58 24.9	1.0 04	173.0	58 54.9	1.0 04	172.9	60 54.7	1.0 04	172.7	05
6	51 53.2	1.0 04	172.1	52 53.1	1.0 04	172.0	54 23.0	1.0 04	171.9	55 52.9	1.0 04	171.8	57 52.7	1.0 04	171.6	58 22.7	1.0 04	171.5	58 52.6	1.0 04	171.5	60 52.4	1.0 05	171.3	6
7	51 50.7	1.0 05	170.8	52 50.6	1.0 05	170.7	54 20.5	1.0 05	170.6	55 50.3	1.0 05	170.4	57 50.1	1.0 05	170.2	58 20.1	1.0 05	170.1	58 50.0	1.0 05	170.1	60 49.7	1.0 05	169.8	7
8	51 47.9	1.0 05	169.5	52 47.8	1.0 05	169.4	54 17.6	1.0 05	169.2	55 47.4	1.0 06	169.1	57 47.1	1.0 06	168.8	58 17.0	1.0 06	168.7	58 46.9	1.0 06	168.7	60 46.6	1.0 06	168.4	8
9	51 44.7	1.0 06	168.2	52 44.6	1.0 06	168.1	54 14.3	1.0 06	167.9	55 44.1	1.0 06	167.7	57 43.7	1.0 06	167.4	58 13.6	1.0 06	167.3	58 43.5	1.0 06	167.3	60 43.1	1.0 07	166.9	9
10	51 41.2	1.0 07	166.9	52 41.0	1.0 07	166.8	54 10.7	1.0 07	166.6	55 40.4	1.0 07	166.4	57 39.9	1.0 07	166.0	58 09.8	1.0 07	166.0	58 39.7	1.0 07	165.9	60 39.1	1.0 07	165.5	10
1	51 37.2	1.0 07	165.6	52 37.0	1.0 07	165.5	54 06.6	1.0 07	165.2	55 36.3	1.0 07	165.0	57 35.7	1.0 08	164.7	58 05.6	1.0 08	164.6	58 35.4	99 08	164.5	60 34.8	99 08	164.1	1
2	51 32.9	1.0 08	164.3	52 32.7	1.0 08	164.2	54 02.3	1.0 08	163.9	55 31.8	99 08	163.7	57 31.2	99 08	163.3	58 01.0	99 08	163.2	58 30.8	99 08	163.1	60 30.0	99 09	162.6	2
3	51 28.3	1.0 08	163.0	52 28.0	99 08	162.8	53 57.5	99 09	162.6	55 27.0	99 09	162.3	57 26.2	99 09	161.9	57 56.0	99 09	161.8	58 25.8	99 09	161.7	60 24.9	99 09	161.2	3
4	51 23.3	99 09	161.7	52 22.9	99 09	161.5	53 52.4	99 09	161.3	55 21.8	99 09	161.0	57 20.9	99 10	160.5	57 50.6	99 10	160.4	58 20.4	99 10	160.3	60 19.4	99 10	159.8	4
15	51 17.9	99 10	160.4	52 17.5	99 10	160.2	53 46.9	99 10	160.0	55 16.2	99 10	159.6	57 15.2	99 10	159.2	57 44.9	99 10	159.0	58 14.6	99 10	158.9	60 13.5	99 10	158.4	15
6	51 12.2	99 10	159.2	52 11.7	99 10	159.0	53 41.0	99 10	158.6	55 10.2	99 10	158.3	57 09.1	99 11	157.8	57 38.8	99 11	157.7	58 08.5	99 11	157.5	60 07.2	99 11	157.0	6
7	51 06.1	99 11	157.9	52 05.6	99 11	157.7	53 34.8	99 11	157.3	55 04.0	99 11	157.0	57 02.7	99 11	156.5	57 32.4	99 11	156.3	58 02.0	99 11	156.2	60 00.5	99 12	155.6	7
8	50 59.7	99 11	156.6	51 59.2	99 11	156.4	53 28.3	99 11	156.0	54 57.3	99 12	155.7	56 55.9	99 12	155.1	57 25.5	99 12	155.0	57 55.2	99 12	154.8	59 53.5	99 12	154.2	8
9	50 53.0	99 12	155.3	51 52.4	99 12	155.1	53 21.4	99 12	154.7	54 50.3	99 12	154.3	56 48.8	99 12	153.8	57 18.4	99 13	153.6	57 47.9	99 13	153.5	59 46.1	98 13	152.8	9
20	50 45.9	99 12	154.1	51 45.2	99 12	153.8	53 14.2	99 13	153.4	54 43.0	99 13	153.0	56 41.3	99 13	152.4	57 10.8	98 13	152.3	57 40.4	98 13	152.1	59 38.4	98 14	151.4	20
1	50 38.5	99 13	152.8	51 37.8	99 13	152.5	53 06.6	99 13	152.1	54 35.3	99 13	151.7	56 33.5	98 14	151.1	57 03.0	98 14	150.9	57 32.5	98 14	150.8	59 30.3	98 15	150.0	1
2	50 30.8	99 13	151.5	51 30.0	99 13	151.3	52 58.7	99 14	150.9	54 27.3	98 14	150.4	56 25.3	98 14	149.8	56 54.8	98 14	149.6	57 24.2	98 14	149.4	59 21.9	98 15	148.7	2
3	50 22.8	99 14	150.3	51 21.9	99 14	150.0	52 50.5	98 14	149.6	54 19.0	98 14	149.1	56 16.8	98 15	148.5	56 46.2	98 15	148.3	57 15.7	98 15	148.1	59 13.1	98 15	147.3	3
4	50 14.4	98 14	149.0	51 13.5	98 15	148.8	52 42.0	98 15	148.3	54 10.3	98 15	147.8	56 08.0	98 15	147.2	56 37.4	98 15	147.0	57 06.8	98 15	146.8	59 04.0	98 16	146.0	4
25	50 05.7	98 15	147.8	51 04.7	98 15	147.5	52 33.1	98 15	147.0	54 01.4	98 15	146.6	55 58.9	98 16	145.8	56 28.2	98 16	145.7	56 57.5	98 16	145.5	58 54.6	97 16	144.6	25
6	49 56.8	98 15	146.6	50 55.7	98 16	146.3	52 24.0	98 16	145.8	53 52.1	98 16	145.3	55 49.4	98 16	144.6	56 18.7	98 16	144.4	56 48.0	98 16	144.2	58 44.9	97 17	143.3	6
7	49 47.5	98 16	145.3	50 46.4	98 16	145.0	52 14.5	98 16	144.5	53 42.6	98 16	144.0	55 39.7	98 17	143.3	56 08.9	97 17	143.1	56 38.2	97 17	142.9	58 34.8	97 17	142.0	7
8	49 38.0	98 16	144.1	50 36.7	98 17	143.8	52 04.8	98 17	143.3	53 32.7	98 17	142.8	55 29.7	97 17	142.0	55 58.9	97 17	141.8	56 28.0	97 17	141.6	58 24.5	97 18	140.7	8
9	49 28.1	98 17	142.9	50 26.8	98 17	142.6	51 54.7	98 17	142.0	53 22.5	97 17	141.5	55 19.3	97 18	140.7	55 48.5	97 18	140.5	56 17.6	97 18	140.3	58 13.9	97 18	139.4	9
30	49 18.0	98 17	141.7	50 16.6	98 17	141.3	51 44.4	97 18	140.8	53 12.1	97 18	140.3	55 08.7	97 18	139.4	55 37.8	97 18	139.2	56 06.9	97 18	139.0	58 03.0	97 19	138.1	30
1	49 07.6	98 18	140.5	50 06.2	98 18	140.1	51 33.8	97 18	139.6	53 01.4	97 18	139.0	54 57.8	97 19	138.2	55 26.9	97 19	138.0	55 55.9	97 19	137.7	57 51.8	96 19	136.8	1
2	48 56.9	97 18	139.2	49 55.4	97 18	138.9	51 23.0	97 19	138.4	52 50.4	97 19	137.8	54 46.7	97 19	136.9	55 15.7	97 19	136.7	55 44.7	97 19	136.5	57 40.3	96 20	135.5	2
3	48 46.0	97 19	138.0	49 44.4	97 18	137.7	51 11.9	97 19	137.1	52 39.2	97 19	136.5	54 35.3	97 19	135.7	55 04.2	97 20	135.5	55 33.2	96 20	135.2	57 28.6	96 20	134.2	3
4	48 34.8	97 19	136.9	49 33.2	97 19	136.5	51 00.5	97 19	135.9	52 27.7	97 20	135.3	54 23.6	96 20	134.5	54 52.5	96 20	134.2	55 21.4	96 20	134.0	57 16.6	96 20	133.0	4
35	48 23.4	97 19	135.7	49 21.6	97 20	135.3	50 48.9	97 20	134.7	52 15.9	97 20	134.1	54 11.6	96 20	133.2	54 40.5	96 20	133.0	55 09.4	96 20	132.8	57 04.4	96 21	131.7	35
6	48 11.7	97 20	134.5	49 09.9	97 20	134.1	50 37.0	97 20	133.5	52 03.9	96 20	132.9	53 59.5	96 21	132.0	54 28.3	96 21	131.8	54 57.1	96 21	131.5	56 52.0	96 21	130.5	6
7	47 59.8	97 20	133.3	48 57.9	97 20	132.9	50 24.9	97 21	132.3	51 51.7	96 21	131.7	53 47.1	96 21	130.8	54 15.9	96 21	130.6	54 44.6	96 21	130.3	56 39.3	95 22	129.3	7
8	47 47.7	97 21	132.1	48 45.7	97 21	131.8	50 12.6	96 21	131.2	51 39.2	96 21	130.5	53 34.4	96 21	129.6	54 03.2	96 22	129.4	54 31.9	96 22	129.1	56 26.4	95 22	128.0	8
9	47 35.3	97 21	131.0	48 33.2	97 21	130.6	50 00.0	96 21	130.0	51 26.5	96 22	129.3	53 21.6	96 22	128.4	53 50.3	96 22	128.2	54 18.9	95 22	127.9	56 13.2	95 22	126.8	9
40	47 22.7	97 21	129.8	48 20.6	96 21	129.4	49 47.2	96 22	128.8	51 13.6	96 22	128.2	53 08.5	96 22	127.2	53 37.2	95 22	127.0	54 05.8	95 22	126.7	55 59.9	95 23	125.6	40
1	47 09.9	96 22	128.7	48 07.7	96 22	128.3	49 34.2	96 22	127.7	51 00.5	96 22	127.0	52 55.3	95 22	126.0	53 23.9	95 23	125.8	53 52.4	95 23	125.5	55 46.4	95 23	124.4	1
2	46 56.9	96 22	127.5	47 54.6	96 22	127.1	49 21.0	96 22	126.5	50 47.2	96 23	125.8	52 41.8	95 23	124.9	53 10.3	95 23	124.6	53 38.9	95 23	124.4	55 32.6	95 23	123.3	2
3	46 43.7	96 22	126.4	47 41.3	96 22	126.0	49 07.6	96 23	125.3	50 33.7	96 23	124.7	52 28.1	95 23	123.7	52 56.6	95 23	123.4	53 25.1	95 23	123.2	55 18.7	94 24	122.1	3
4	46 30.3	96 23	125.3	47 27.8	96 23	124.9	48 54.0	96 23	124.2	50 20.0	95 23	123.5	52 14.3	95 23	122.5	52 42.7	95 23	122.3	53 11.2	95 24	122.0	55 04.6	94 24	120.9	4
45	46 16.7	96 23	124.1	47 14.2	96 23	123.7	48 40.3	96 23	123.1	50 06.2	95 23	122.4	52 00.2	95 24	121.4	52 28.7	95 24	121.1	52 57.1	95 24	120.9	54 50.3	94 24	119.7	45
6	46 02.9	96 23	123.0	47 00.3	96 23	122.6	48 26.3	95 24	121.9	49 52.1	95 24	121.2	51 46.0	95 24	120.3	52 14.4	95 24	120.0	52 42.8	94 24	119.7	54 35.9	94 24	118.6	6
7	45 48.9	96 24	121.9	46 46.3	96 24	121.5	48 12.2	95 24	120.8	49 37.9	95 24	120.1	51 31.7	95 24	119.1	52 00.0	94 24	118.9	52 28.4	94 24	118.6	54 21.3	94 25	117.5	7
8	45 34.8	96 24	120.8	46 32.1	95 24	120.4	47 57.9	95 24	119.7	49 23.5	95 24	119.0	51 17.1	94 24	118.0	51 45.5	94 25	117.7	52 13.8	94 25	117.5	54 06.5	94 25	116.3	8
9	45 20.5	96 24	119.7	46 17.8	95 24	119.3	47 43.5	95 24	118.6	49 08.9	95 24	117.9	51 02.5	94 25	116.9	51 30.8	94 25	116.6	51 59.0	94 25	116.3	53 51.6	94 25	115.2	9
50	45 06.1	95 24	118.6	46 03.3	95 24	118.2	47 28.9	95 25	117.5	48 54.3	95 25	116.8	50 47.6	94 25	115.8	51 15.9	94 25	115.5	51 44.1	94 25	115.2	53 36.6	93 25	114.1	50
1	44 51.5	95 25	117.5	45 48.6	95 25	117.1	47 14.1	95 25	116.4	48 39.4	95 25	115.7	50 32.7	94 25	114.7	51 00.9	94 25	114.4	51 29.1	94 25	114.1	53 21.4	93 25	113.0	1
2	44 36.7	95 25	116.4	45 33.8	95 25	116.0	46 59.3	95 25	115.3	48 24.4	94 25	114.6	50 17.6	94 25	113.6	50 45.8	94 25	113.3	51 13.9	94 25	113.0	53 06.1	93 26	111.9	2
3	44 21.9	95 25	115.3	45 18.9	95 25	114.9	46 44.2	95 25	114.2	48 09.3	94 26	113.5	50 02.4	94 26	112.5	50 30.5	94 26	112.2	50 58.6	94 26	111.9	52 50.7	93 26	110.8	3
4	44 06.8	95 25	114.3	45 03.8	95 25	113.8	46 29.1	95 25	113.1	47 54.1	94 26	112.4	49 47.0	94 26	111.4	50 15.1	94 26	111.1	50 43.2	94 26	110.8	52 35.2	93 26	109.7	4
55	43 51.7	95 25	113.2	44 48.6	95 26	112.8	46 13.8	95 26	112.1	47 38.8	94 26	111.3	49 31.6	94 26	110.3	49 59.7	94 26	110.0	50 27.7	93 26	109.8	52 19.6	93 26	108.6	55
6	43 36.4	95 26	112.1	44 33.3	95 26	111.7	45 58.4	94 26	111.0	47 23.3	94 26	110.3	49 16.0	94 26	109.2	49 44.1	94 26	109.0	50 12.1	93 26	108.7	52 03.9	93 26	107.5	6
7	43 21.1	95 26	111.1	44 17.9	95 26	110.6	45 43.0	94 26	109.9	47 07.7	94 26	109.2	49 00.3	94 26	108.2	49 28.4	93 26	107.9	49 56.4	93 26	107.6	51 48.1	93 27	106.5	7
8	43 05.6	95 26	110.0	44 02.4	95 26	109.6	45 27.4	94 26	108.9	46 52.1	94 26	108.2	48 44.6	94 26	107.1	49 12.6	93 26	106.8	49 40.6	93 26	106.6	51 32.2	93 27	105.4	8
9	42 50.0	95 26	109.0	43 46.7	94 26	108.5	45 11.7	94 26	107.8	46 36.3	94 26	107.1	48 28.7	93 27	106.1	48 56.7	93 27	105.8	49 24.7	93 27	105.5	51 16.2	93 27	104.4	9
60	42 34.3	95 26	107.9	43 31.0	94 26	107.5	44 55.9	94 26	106.8	46 20.5	94 27	106.1	48 12.8	93 27	105.0	48 40.8	93 27	104.8	49 08.7	93 27	104.5	51 00.1	93 27	103.3	60
1	42 18.5	95 26	106.9	43 15.2	94 26	106.5	44 40.0	94 27	105.8	46 04.5	94 27	105.0	47 56.8	93 27	104.0	48 24.7	93 27	103.7	48 52.7	93 27	103.4	50 44.0	92 27	102.3	1
2	42 02.7	94 27	105.9	42 59.3	94 27	105.4	44 24.0	94 27	104.7	45 48.5	94 27	104.0	47 40.7	93 27	103.0	48 08.6	93 27	102.7	48 36.6	93 27	102.4	50 27.8	92 27	101.3	2
3	41 46.7	94 27	104.8	42 43.3	94 27	104.4	44 08.0	94 27	103.7	45 32.4	94 27	103.0	47 24.5	93 27	101.9	47 52.5	93 27	101.7	48 20.4	93 27	101.4	50 11.6	92 27	100.2	3
4	41 30.7	94 27	103.8	42 27.3	94 27	103.4	43 51.9	94 27	102.7	45 16.3	94 27	101.9	47 08.3	93 27	100.9	47 36.3	93 27	100.6	48 04.1	93 27	100.4	49 55.2	92 27	99.2	4
65	41 14.6	94 27	102.8	42 11.1	94 27	102.4	43 35.7	94 27	101.7	45 00.1	94 27	100.9	46 52.1	93 27	99.9	47 20.0	93 27	99.6	47 47.8	93 27	99.3	49 38.9	92 27	98.2	65
6	40 58.4	94 27	101.8	41 55.0	94 27	101.3	43 19.5	94 27	100.6	44 43.8	94 27	99.9	46 35.8	93 27	98.9	47 03.6	93 27	98.6	47 31.5	93 27	98.3	49 22.5	92 27	97.2	6
7	40 42.2	94 27	100.8	41 38.7	94 27	100.3	43 03.2	94 27	99.6	44 27.5	93 27	98.9	46 19.4	93 27	97.9	46 47.3	93 27	97.6	47 15.1	93 27	97.3	49 06.1	92 27	96.2	7
8	40 25.9	94 27	99.8	41 22.4	94 27	99.3	42 46.9	94 27	98.6	44 11.1	93 27	97.9	46 03.0	93 27	96.9	46 30.9	93 27	96.6	46 58.7	93 27	96.3	48 49.6	92 27	95.2	8
9	40 09.6	94 27	98.8	41 06.1	94 27	98.3	42 30.5	94 27	97.6	43 54.7	93 27	96.9	45 46.6	93 27	95.9	46 14.4	93 27	95.6	46 42.2	93 27	95.4	48 33.1	92 28	94.2	9
70	39 53.3	94 27	97.8	40 49.7	94 27	97.3	42 14.1	94 27	96.6	43 38.3	93 27	95.9	45 30.1	93 27	94.9	45 57.9	93 28	94.6	46 25.8	93 28	94.4	48 16.6	92 28	93.2	70
1	39 36.9	94 27	96.8	40 33.3	94 27	96.4	41 57.7	94 27	95.7	43 21.8	93 27	94.9	45 13.6	93 28	93.9	45 41.5	93 28	93.7	46 09.3	93 28	93.4	48 00.1	92 28	92.3	1
2	39 20.4	94 27	95.8	40 16.8	94 27	95.4	41 41.2	94 28	94.7	43 05.4	93 28	94.0	44 57.1	93 28	92.9	45 24.9	93 28	92.7	45 52.7	93 28	92.4	47 43.6	92 28	91.3	2
3	39 03.9	94 27	94.8	40 00.3	94 28	94.4	41 24.7	94 28	93.7	42 48.8	93 28	93.0	44 40.6	93 28	92.0	45 08.4	93 28	91.7	45 36.2	93 28	91.4	47 27.1	92 28	90.3	3
4	38 47.5	94 28	93.9	39 43.8	94 28	93.4	41 08.2	94 28	92.7	42 32.3	93 28	92.0	44 24.0	93 28	91.0	44 51.9	93 28	90.7	45 19.7	93 28	90.5	47 10.5	92 28	89.4	4
75	38 31.0	94 28	92.9	39 27.3	94 28	92.4	40 51.7	94 28	91.8	42 15.8	93 28	91.0	44 07.5	93 28	90.0	44 35.3	93 28	89.8	45 03.1	93 28	89.5	46 54.0	92 28	88.4	75
6	38 14.4	94 28	91.9	39 10.8	94 28	91.5	40 35.1	94 28	90.8	41 59.3	93 28	90.1	43 51.0	93 28	89.1	44 18.8	93 28	88.8	44 46.6	93 28	88.6	46 37.5	92 28	87.5	6
7	37 57.9	94 28	90.9	38 54.3	94 28	90.5	40 18.6	94 28	89.8	41 42.7	93 28	89.1	43 34.4	93 28	88.1	44 02.3	93 28	87.9	44 30.1	93 28	87.6	46 20.9	92 28	86.5	7
8	37 41.4	94 28	90.0	38 37.7	94 28	89.5	40 02.1	94 28	88.9	41 26.2	93 28	88.2	43 17.9	93 28	87.2	43 45.8	93 28	86.9	44 13.6	93 28	86.7	46 04.4	92 27	85.6	8
9	37 24.8	94 28	89.0	38 21.2	94 28	88.6	39 45.5	94 28	87.9	41 09.7	93 28	87.2	43 01.4	93 28	86.2	43 29.2	93 28	86.0	43 57.1	93 27	85.7	45 48.0	92 27	84.6	9
80	37 08.3	94 28	88.1	38 04.7	94 28	87.6	39 29.0	94 28	87.0	40 53.1	93 28	86.3	42 44.9	93 27	85.3	43 12.8	93 27	85.0	43 40.6	93 27	84.8	45 31.5	92 27	83.7	80
1	36 51.8	94 28	87.1	37 48.1	94 28	86.7	39 12.5	94 27	86.0	40 36.7	93 27	85.3	42 28.4	93 27	84.3	42 56.3	93 27	84.1	43 24.1	93 27	83.8	45 15.1	92 27	82.8	1
2	36 35.3	94 27	86.2	37 31.6	94 27	85.7	38 56.0	94 27	85.1	40 20.2	93 27	84.4	42 12.0	93 27	83.4	42 39.9	93 27	83.2	43 07.7	93 27	82.9	44 58.7	92 27	81.8	2
3	36 18.8	94 27	85.2	37 15.2	94 27	84.8	38 39.6	94 27	84.1	40 03.7	93 27	83.4	41 55.6	93 27	82.5	42 23.5	93 27	82.2	42 51.3	93 27	82.0	44 42.4	92 27	80.9	3
4	36 02.3	94 27	84.3	36 58.7	94 27	83.8	38 23.1	94 27	83.2	39 47.3	93 27	82.5	41 39.2	93 27	81.6	42 07.1	93 27	81.3	42 34.9	93 27	81.1	44 26.0	92 27	80.0	4
85	35 45.9	94 27	83.3	36 42.3	94 27	82.9	38 06.7	94 27	82.3	39 30.9	93 27	81.6	41 22.9	93 27	80.6	41 50.8	93 27	80.4	42 18.6	93 27	80.1	44 09.8	92 27	79.1	85
6	35 29.4	94 27	82.4	36 25.9	94 27	82.0	37 50.3	94 27	81.3	39 14.6	93 27	80.7	41 06.6	93 27	79.7	41 34.5	93 27	79.5	42 02.4	93 27	79.2	43 53.6	92 27	78.2	6
7	35 13.1	94 27	81.5	36 09.5	94 27	81.0	37 34.0	94 27	80.4	38 58.3	94 27	79.7	40 50.3	93 27	78.8	41 18.2	93 27	78.5	41 46.1	93 27	78.3	43 37.4	92 27	77.3	7
8	34 56.7	94 27	80.5	35 53.2	94 27	80.1	37 17.7	94 27	79.5	38 42.1	94 27	78.8	40 34.1	93 27	77.9	41 02.1	93 27	77.6	41 30.0	93 27	77.4	43 21.3	93 27	76.4	8
9	34 40.4	94 27	79.6	35 36.9	94 27	79.2	37 01.5	94 27	78.6	38 25.9	94 27	77.9	40 18.0	93 27	77.0	40 45.9	93 27	76.7	41 13.9	93 27	76.5	43 05.3	93 27	75.5	9
90	34 24.2	94 27	78.7	35 20.7	94 27	78.3	36 45.3	94 27	77.6	38 09.7	94 27	77.0	40 01.9	93 27	76.1	40 29.9	93 27	75.8	40 57.8	93 27	75.6	42 49.3	93 27	74.6	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	34 08.0	94 27	77.8	35 04.5	94 27	77.3	36 29.2	94 27	76.7	37 53.6	94 27	76.1	39 45.9	93 27	75.2	40 13.9	93 27	74.9	40 41.8	93 27	74.7	42 33.4	93 26	73.7	91
2	33 51.9	94 27	76.8	34 48.4	94 27	76.4	36 13.1	94 27	75.8	37 37.6	94 27	75.2	39 29.9	93 26	74.3	39 57.9	93 26	74.0	40 25.9	93 26	73.8	42 17.5	93 26	72.8	2
3	33 35.8	94 27	75.9	34 32.4	94 27	75.5	35 57.1	94 27	74.9	37 21.7	94 26	74.3	39 14.0	93 26	73.4	39 42.1	93 26	73.1	40 10.1	93 26	72.9	42 01.8	93 26	71.9	3
4	33 19.8	94 27	75.0	34 16.4	94 26	74.6	35 41.2	94 26	74.0	37 05.8	94 26	73.4	38 58.2	94 26	72.5	39 26.3	93 26	72.2	39 54.3	93 26	72.0	41 46.1	93 26	71.0	4
95	33 03.9	94 26	74.1	34 00.5	94 26	73.7	35 25.3	94 26	73.1	36 50.0	94 26	72.4	38 42.5	94 26	71.6	39 10.6	94 26	71.3	39 38.6	93 26	71.1	41 30.5	93 26	70.2	95
6	32 48.0	95 26	73.2	33 44.7	94 26	72.8	35 09.6	94 26	72.2	36 34.2	94 26	71.6	38 26.9	94 26	70.7	38 54.9	94 26	70.5	39 23.0	93 26	70.2	41 15.0	93 26	69.3	6
7	32 32.2	95 26	72.3	33 28.9	94 26	71.9	34 53.9	94 26	71.3	36 18.6	94 26	70.7	38 11.3	94 26	69.8	38 39.4	94 26	69.6	39 07.5	94 26	69.3	40 59.6	93 26	68.4	7
8	32 16.5	95 26	71.4	33 13.2	95 26	71.0	34 38.2	94 26	70.4	36 03.0	94 26	69.8	37 55.8	94 26	68.9	38 23.9	94 26	68.7	38 52.1	94 26	68.5	40 44.2	93 25	67.5	8
9	32 00.9	95 26	70.5	32 57.6	95 26	70.1	34 22.7	94 26	69.5	35 47.6	94 26	68.9	37 40.4	94 25	68.0	38 08.6	94 26	67.8	38 36.7	94 25	67.6	40 29.0	93 25	66.7	9
100	31 45.3	95 26	69.6	32 42.1	95 26	69.2	34 07.3	94 26	68.6	35 32.2	94 25	68.0	37 25.1	94 25	67.1	37 53.3	94 25	66.9	38 21.5	94 25	66.7	40 13.9	93 25	65.8	100
1	31 29.9	95 26	68.7	32 26.7	95 26	68.3	33 51.9	95 25	67.7	35 16.9	94 25	67.1	37 10.0	94 25	66.3	37 38.2	94 25	66.1	38 06.3	94 25	65.8	39 58.8	93 25	64.9	1
2	31 14.5	95 26	67.8	32 11.4	95 25	67.4	33 36.7	95 25	66.8	35 01.7	94 25	66.2	36 54.9	94 25	65.4	37 23.1	94 25	65.2	37 51.3	94 25	65.0	39 43.9	94 25	64.1	2
3	30 59.3	95 25	66.9	31 56.2	95 25	66.5	33 21.5	95 25	65.9	34 46.6	95 25	65.3	36 39.9	94 25	64.5	37 08.1	94 25	64.3	37 36.4	94 25	64.1	39 29.1	94 25	63.2	3
4	30 44.1	95 25	66.0	31 41.1	95 25	65.6	33 06.5	95 25	65.0	34 31.7	95 25	64.5	36 25.0	94 25	63.6	36 53.3	94 25	63.4	37 21.6	94 24	63.2	39 14.4	94 24	62.4	4
105	30 29.0	95 25	65.1	31 26.1	95 25	64.7	32 51.5	95 25	64.1	34 16.8	95 25	63.6	36 10.2	94 24	62.8	36 38.6	94 24	62.6	37 06.8	94 24	62.4	38 59.8	94 24	61.5	105
6	30 14.1	95 25	64.2	31 11.2	95 25	63.8	32 36.7	95 24	63.3	34 02.0	95 25	62.7	35 55.6	94 24	61.9	36 23.9	94 24	61.7	36 52.3	94 24	61.5	38 45.3	94 24	60.6	6
7	29 59.3	95 25	63.3	30 56.4	95 24	62.9	32 22.0	95 24	62.4	33 47.4	95 24	61.8	35 41.1	95 24	61.0	36 09.4	95 24	60.8	36 37.8	94 24	60.6	38 30.9	94 24	59.8	7
8	29 44.6	95 24	62.4	30 41.7	95 24	62.0	32 07.4	95 24	61.5	33 32.9	95 24	60.9	35 26.7	95 24	60.2	35 55.1	95 24	60.0	36 23.4	95 24	59.8	38 16.7	94 24	58.9	8
9	29 30.0	95 24	61.5	30 27.2	95 24	61.2	31 52.9	95 24	60.6	33 18.5	95 24	60.1	35 12.4	95 24	59.3	35 40.8	95 24	59.1	36 09.2	95 24	58.9	38 02.6	94 23	58.1	9
110	29 15.5	95 24	60.6	30 12.8	95 24	60.3	31 38.6	95 24	59.8	33 04.2	95 24	59.2	34 58.2	95 23	58.5	35 26.7	95 23	58.3	35 55.1	95 23	58.1	37 48.6	94 23	57.3	110
1	29 01.1	96 24	59.7	29 58.5	95 24	59.4	31 24.3	95 23	58.9	32 50.1	95 23	58.3	34 44.2	95 23	57.6	35 12.7	95 23	57.4	35 41.1	95 23	57.2	37 34.8	95 23	56.4	1
2	28 46.9	96 24	58.9	29 44.3	96 23	58.5	31 10.2	95 23	58.0	32 36.1	95 23	57.5	34 30.3	95 23	56.7	34 58.8	95 23	56.5	35 27.3	95 23	56.4	37 21.1	95 23	55.6	2
3	28 32.8	96 23	58.0	29 30.3	96 23	57.6	30 56.3	96 23	57.1	32 22.2	95 23	56.6	34 16.5	95 23	55.9	34 45.1	95 23	55.7	35 13.6	95 23	55.5	37 07.5	95 22	54.7	3
4	28 18.9	96 23	57.1	29 16.4	96 23	56.8	30 42.5	96 23	56.3	32 08.5	95 23	55.7	34 02.9	95 22	55.0	34 31.5	95 22	54.8	35 00.0	95 22	54.6	36 54.1	95 22	53.9	4
115	28 05.1	96 23	56.2	29 02.6	96 23	55.9	30 28.8	96 23	55.4	31 54.9	96 22	54.9	33 49.4	95 22	54.2	34 18.0	95 22	54.0	34 46.6	95 22	53.8	36 40.8	95 22	53.0	115
6	27 51.4	96 23	55.3	28 49.0	96 22	55.0	30 15.2	96 22	54.5	31 41.4	96 22	54.0	33 36.1	95 22	53.3	34 04.7	95 22	53.1	34 33.3	95 22	53.0	36 27.7	95 22	52.2	6
7	27 37.9	96 22	54.5	28 35.5	96 22	54.1	30 01.9	96 22	53.7	31 28.1	96 22	53.2	33 22.9	96 22	52.5	33 51.6	96 22	52.3	34 20.2	95 22	52.1	36 14.7	95 21	51.4	7
8	27 24.5	96 22	53.6	28 22.2	96 22	53.3	29 48.6	96 22	52.8	31 14.9	96 22	52.3	33 09.9	96 21	51.6	33 38.6	96 21	51.4	34 07.2	96 21	51.3	36 01.8	95 21	50.5	8
9	27 11.3	96 22	52.7	28 09.0	96 22	52.4	29 35.5	96 22	51.9	31 01.9	96 21	51.4	32 57.0	96 21	50.8	33 25.7	96 21	50.6	33 54.4	96 21	50.4	35 49.1	95 21	49.7	9
120	26 58.2	96 22	51.8	27 56.0	96 21	51.5	29 22.6	96 21	51.1	30 49.1	96 21	50.6	32 44.2	96 21	49.9	33 13.0	96 21	49.7	33 41.8	96 21	49.6	35 36.6	96 21	48.9	120
1	26 45.3	96 21	51.0	27 43.1	96 21	50.7	29 09.8	96 21	50.2	30 36.4	96 21	49.7	32 31.7	96 21	49.1	33 00.5	96 21	48.9	33 29.2	96 21	48.7	35 24.2	96 20	48.0	1
2	26 32.5	97 21	50.1	27 30.4	96 21	49.8	28 57.2	96 21	49.3	30 23.8	96 21	48.9	32 19.3	96 20	48.2	32 48.1	96 20	48.1	33 16.9	96 20	47.9	35 12.0	96 20	47.2	2
3	26 19.9	97 21	49.2	27 17.8	97 21	48.9	28 44.7	96 20	48.5	30 11.5	96 20	48.0	32 07.0	96 20	47.4	32 35.9	96 20	47.2	33 04.7	96 20	47.1	34 59.9	96 20	46.4	3
4	26 07.5	97 20	48.3	27 05.5	97 20	48.0	28 32.4	97 20	47.6	29 59.3	96 20	47.2	31 54.9	96 20	46.5	32 23.8	96 20	46.4	32 52.7	96 20	46.2	34 48.0	96 20	45.6	4
125	25 55.2	97 20	47.5	26 53.2	97 20	47.2	28 20.3	97 20	46.7	29 47.2	97 20	46.3	31 43.0	96 20	45.7	32 11.9	96 20	45.5	32 40.8	96 20	45.4	34 36.3	96 19	44.7	125
6	25 43.1	97 20	46.6	26 41.2	97 20	46.3	28 08.3	97 20	45.9	29 35.3	97 20	45.5	31 31.3	97 19	44.9	32 00.2	96 19	44.7	32 29.1	96 19	44.5	34 24.8	96 19	43.9	6
7	25 31.2	97 20	45.7	26 29.3	97 19	45.5	27 56.5	97 19	45.0	29 23.6	97 20	44.6	31 19.7	97 19	44.0	31 48.7	97 19	43.9	32 17.6	97 19	43.7	34 13.4	96 19	43.1	7
8	25 19.4	97 19	44.9	26 17.6	97 19	44.6	27 44.9	97 19	44.2	29 12.1	97 19	43.8	31 08.3	97 19	43.2	31 37.3	97 19	43.0	32 06.3	97 19	42.9	34 02.2	97 18	42.3	8
9	25 07.8	97 19	44.0	26 06.1	97 19	43.7	27 33.5	97 19	43.3	29 00.8	97 19	42.9	30 57.0	97 18	42.3	31 26.1	97 18	42.2	31 55.1	97 18	42.0	33 51.2	97 18	41.4	9
130	24 56.4	97 19	43.1	25 54.8	97 19	42.9	27 22.2	97 18	42.5	28 49.6	97 18	42.1	30 46.0	97 18	41.5	31 15.1	97 18	41.3	31 44.1	97 18	41.2	33 40.3	97 18	40.6	130
1	24 45.2	97 18	42.2	25 43.6	97 18	42.0	27 11.1	97 18	41.6	28 38.6	97 18	41.2	30 35.1	97 18	40.7	31 04.2	97 18	40.5	31 33.3	97 18	40.4	33 29.6	97 17	39.8	1
2	24 34.2	97 18	41.4	25 32.6	97 18	41.1	27 00.3	97 18	40.8	28 27.8	97 18	40.4	30 24.4	97 18	39.8	30 53.6	97 17	39.7	31 22.7	97 17	39.5	33 19.1	97 17	39.0	2
3	24 23.4	98 18	40.5	25 21.9	97 18	40.3	26 49.6	97 18	39.9	28 17.2	97 17	39.5	30 14.0	97 17	39.0	30 43.1	97 17	38.8	31 12.3	97 17	38.7	33 08.8	97 17	38.1	3
4	24 12.7	98 17	39.6	25 11.3	98 17	39.4	26 39.0	98 17	39.0	28 06.8	97 17	38.7	30 03.6	97 17	38.1	30 32.8	97 17	38.0	31 02.0	97 17	37.9	32 58.7	97 17	37.3	4
135	24 02.2	98 17	38.8	25 00.9	98 17	38.5	26 28.7	98 17	38.2	27 56.5	98 17	37.8	29 53.5	97 17	37.3	30 22.7	97 16	37.2	30 52.0	97 16	37.0	32 48.8	97 16	36.5	135
6	23 52.0	98 17	37.9	24 50.6	98 17	37.7	26 18.6	98 17	37.3	27 46.5	98 16	37.0	29 43.6	98 16	36.5	30 12.9	98 16	36.3	30 42.1	97 16	36.2	32 39.0	97 16	35.7	6
7	23 41.9	98 16	37.1	24 40.6	98 16	36.8	26 08.7	98 16	36.5	27 36.6	98 16	36.1	29 33.9	98 16	35.6	30 03.1	98 16	35.5	30 32.4	98 16	35.4	32 29.5	97 16	34.9	7
8	23 32.1	98 16	36.2	24 30.8	98 16	36.0	25 58.9	98 16	35.6	27 27.0	98 16	35.3	29 24.3	98 16	34.8	29 53.6	98 16	34.7	30 22.9	98 15	34.6	32 20.1	98 15	34.1	8
9	23 22.4	98 16	35.3	24 21.2	98 16	35.1	25 49.4	98 16	34.8	27 17.5	98 15	34.4	29 15.0	98 15	34.0	29 44.3	98 15	33.9	30 13.7	98 15	33.7	32 11.0	98 15	33.2	9
140	23 12.9	98 15	34.5	24 11.8	98 15	34.3	25 40.1	98 15	33.9	27 08.3	98 15	33.6	29 05.8	98 15	33.1	29 35.2	98 15	33.0	30 04.6	98 15	32.9	32 02.0	98 15	32.4	140
1	23 03.7	98 15	33.6	24 02.6	98 15	33.4	25 30.9	98 15	33.1	26 59.2	98 15	32.8	28 56.9	98 15	32.3	29 26.3	98 15	32.2	29 55.7	98 14	32.1	31 53.2	98 14	31.6	1
2	22 54.6	98 15	32.7	23 53.6	98 15	32.5	25 22.0	98 15	32.2	26 50.4	98 14	31.9	28 48.2	98 14	31.5	29 17.6	98 14	31.4	29 47.0	98 14	31.3	31 44.7	98 14	30.8	2
3	22 45.8	98 14	31.9	23 44.8	98 14	31.7	25 13.3	98 14	31.4	26 41.8	98 14	31.1	28 39.6	98 14	30.6	29 09.1	98 14	30.5	29 38.5	98 14	30.4	31 36.3	98 14	30.0	3
4	22 37.2	98 14	31.0	23 36.2	98 14	30.8	25 04.8	98 14	30.5	26 33.3	98 14	30.2	28 31.3	98 14	29.8	29 00.8	98 13	29.7	29 30.3	98 13	29.6	31 28.1	98 13	29.2	4
145	22 28.8	99 14	30.1	23 27.9	99 14	30.0	24 56.5	98 13	29.7	26 25.1	98 13	29.4	28 23.2	98 13	29.0	28 52.7	98 13	28.9	29 22.2	98 13	28.8	31 20.2	98 13	28.3	145
6	22 20.6	99 13	29.3	23 19.7	99 13	29.1	24 48.4	99 13	28.8	26 17.1	99 13	28.5	28 15.3	98 13	28.1	28 44.8	98 13	28.0	29 14.3	98 13	27.9	31 12.4	98 13	27.5	6
7	22 12.6	99 13	28.4	23 11.8	99 13	28.2	24 40.6	99 13	28.0	26 09.3	99 13	27.7	28 07.6	99 12	27.3	28 37.1	99 12	27.2	29 06.7	99 12	27.1	31 04.9	98 12	26.7	7
8	22 04.8	99 13	27.6	23 04.1	99 12	27.4	24 32.9	99 12	27.1	26 01.7	99 12	26.9	28 00.1	99 12	26.5	28 29.7	99 12	26.4	28 59.3	99 12	26.3	30 57.5	99 12	25.9	8
9	21 57.3	99 12	26.7	22 56.6	99 12	26.5	24 25.5	99 12	26.3	25 54.4	99 12	26.0	27 52.8	99 12	25.7	28 22.4	99 12	25.6	28 52.0	99 12	25.5	30 50.4	99 12	25.1	9
150	21 50.0	99 12	25.8	22 49.3	99 12	25.7	24 18.3	99 12	25.4	25 47.2	99 12	25.2	27 45.8	99 11	24.8	28 15.4	99 11	24.7	28 45.0	99 11	24.7	30 43.5	99 11	24.3	150
1	21 42.9	99 11	25.0	22 42.2	99 11	24.8	24 11.3	99 11	24.6	25 40.3	99 11	24.3	27 38.9	99 11	24.0	28 08.6	99 11	23.9	28 38.2	99 11	23.8	30 36.8	99 11	23.5	1
2	21 36.0	99 11	24.1	22 35.4	99 11	24.0	24 04.5	99 11	23.7	25 33.6	99 11	23.5	27 32.3	99 11	23.2	28 02.0	99 11	23.1	28 31.7	99 11	23.0	30 30.3	99 10	22.7	2
3	21 29.3	99 11	23.2	22 28.8	99 11	23.1	23 58.0	99 11	22.9	25 27.1	99 10	22.7	27 25.9	99 10	22.3	27 55.6	99 10	22.3	28 25.3	99 10	22.2	30 24.1	99 10	21.9	3
4	21 22.9	99 10	22.4	22 22.4	99 10	22.2	23 51.6	99 10	22.0	25 20.8	99 10	21.8	27 19.8	99 10	21.5	27 49.5	99 10	21.4	28 19.2	99 10	21.4	30 18.0	99 10	21.0	4
155	21 16.8	99 10	21.5	22 16.3	99 10	21.4	23 45.6	99 10	21.2	25 14.8	99 10	21.0	27 13.8	99 10	20.7	27 43.5	99 10	20.6	28 13.3	99 10	20.5	30 12.2	99 09	20.2	155
6	21 10.8	99 10	20.7	22 10.4	99 09	20.5	23 39.7	99 09	20.3	25 09.0	99 09	20.1	27 08.1	99 09	19.9	27 37.8	99 09	19.8	28 07.6	99 09	19.7	30 06.6	99 09	19.4	6
7	21 05.1	99 09	19.8	22 04.7	99 09	19.7	23 34.1	99 09	19.5	25 03.4	99 09	19.3	27 02.6	99 09	19.0	27 32.3	99 09	19.0	28 02.1	99 09	18.9	30 01.2	99 09	18.6	7
8	20 59.6	99 09	18.9	21 59.2	99 09	18.8	23 28.7	99 09	18.6	24 58.1	99 09	18.5	26 57.3	99 08	18.2	27 27.1	99 08	18.1	27 56.9	99 08	18.1	29 56.0	99 08	17.8	8
9	20 54.3	99 08	18.1	21 54.0	99 08	18.0	23 23.5	99 08	17.8	24 53.0	99 08	17.6	26 52.2	99 08	17.4	27 22.0	99 08	17.3	27 51.9	99 08	17.2	29 51.1	99 08	17.0	9
160	20 49.3	99 08	17.2	21 49.0	99 08	17.1	23 18.6	99 08	16.9	24 48.1	99 08	16.8	26 47.4	99 08	16.5	27 17.2	99 08	16.5	27 47.1	99 08	16.4	29 46.4	99 08	16.2	160
1	20 44.6	1.0 08	16.4	21 44.3	1.0 08	16.3	23 13.8	1.0 07	16.1	24 43.4	1.0 07	15.9	26 42.8	99 07	15.7	27 12.7	99 07	15.7	27 42.5	99 07	15.6	29 41.9	99 07	15.4	1
2	20 40.0	1.0 07	15.5	21 39.8	1.0 07	15.4	23 09.4	1.0 07	15.2	24 39.0	1.0 07	15.1	26 38.5	1.0 07	14.9	27 08.3	1.0 07	14.8	27 38.2	1.0 07	14.8	29 37.6	1.0 07	14.6	2
3	20 35.7	1.0 07	14.6	21 35.5	1.0 07	14.5	23 05.1	1.0 07	14.4	24 34.8	1.0 07	14.3	26 34.3	1.0 06	14.1	27 04.2	1.0 06	14.0	27 34.1	1.0 06	14.0	29 33.6	1.0 06	13.7	3
4	20 31.7	1.0 06	13.8	21 31.5	1.0 06	13.7	23 01.2	1.0 06	13.6	24 30.8	1.0 06	13.4	26 30.4	1.0 06	13.2	27 00.3	1.0 06	13.2	27 30.2	1.0 06	13.1	29 29.7	1.0 06	12.9	4
165	20 27.8	1.0 06	12.9	21 27.7	1.0 06	12.8	22 57.4	1.0 06	12.7	24 27.1	1.0 06	12.6	26 26.7	1.0 06	12.4	26 56.7	1.0 06	12.4	27 26.6	1.0 06	12.3	29 26.2	1.0 06	12.1	165
6	20 24.3	1.0 06	12.1	21 24.1	1.0 06	12.0	22 53.9	1.0 05	11.9	24 23.6	1.0 05	11.7	26 23.3	1.0 05	11.6	26 53.2	1.0 05	11.5	27 23.1	1.0 05	11.5	29 22.8	1.0 05	11.3	6
7	20 20.9	1.0 05	11.2	21 20.8	1.0 05	11.1	22 50.6	1.0 05	11.0	24 20.4	1.0 05	10.9	26 20.1	1.0 05	10.8	26 50.0	1.0 05	10.7	27 20.0	1.0 05	10.7	29 19.7	1.0 05	10.5	7
8	20 17.8	1.0 05	10.3	21 17.7	1.0 05	10.3	72 47.6	1.0 05	10.2	24 17.4	1.0 05	10.1	26 17.1	1.0 05	09.9	26 47.1	1.0 05	09.9	27 17.0	1.0 05	09.9	29 16.8	1.0 04	09.7	8
9	20 15.0	1.0 04	09.5	21 14.9	1.0 04	09.4	22 44.8	1.0 04	09.3	24 14.6	1.0 04	09.2	26 14.4	1.0 04	09.1	26 44.4	1.0 04	09.1	27 14.3	1.0 04	09.0	29 14.1	1.0 04	08.9	9
170	20 12.4	1.0 04	08.6	21 12.3	1.0 04	08.6	22 42.2	1.0 04	08.5	24 12.1	1.0 04	08.4	26 11.9	1.0 04	08.3	26 41.9	1.0 04	08.2	27 11.8	1.0 04	08.2	29 11.6	1.0 04	08.1	170
1	20 10.0	1.0 04	07.7	21 10.0	1.0 03	07.7	22 39.9	1.0 03	07.6	24 09.8	1.0 03	07.5	26 09.7	1.0 03	07.4	26 39.6	1.0 03	07.4	27 09.6	1.0 03	07.4	29 09.4	1.0 03	07.3	1
2	20 07.9	1.0 03	06.9	21 07.9	1.0 03	06.8	22 37.8	1.0 03	06.8	24 07.7	1.0 03	06.7	26 07.6	1.0 03	06.6	26 37.6	1.0 03	06.6	27 07.6	1.0 03	06.6	29 07.5	1.0 03	06.5	2
3	20 06.1	1.0 03	06.0	21 06.0	1.0 03	06.0	22 36.0	1.0 03	05.9	24 05.9	1.0 03	05.9	26 05.8	1.0 03	05.8	26 35.8	1.0 03	05.8	27 05.8	1.0 03	05.7	29 05.7	1.0 03	05.7	3
4	20 04.5	1.0 02	05.2	21 04.4	1.0 02	05.1	22 34.4	1.0 02	05.1	24 04.4	1.0 02	05.0	26 04.3	1.0 02	05.0	26 34.3	1.0 02	04.9	27 04.3	1.0 02	04.9	29 04.2	1.0 02	04.9	4
175	20 03.1	1.0 02	04.3	21 03.1	1.0 02	04.3	22 33.1	1.0 02	04.2	24 03.0	1.0 02	04.2	26 03.0	1.0 02	04.1	26 33.0	1.0 02	04.1	27 03.0	1.0 02	04.1	29 02.9	1.0 02	04.0	175
6	20 02.0	1.0 01	03.4	21 02.0	1.0 01	03.4	22 32.0	1.0 01	03.4	24 01.9	1.0 01	03.4	26 01.9	1.0 01	03.3	26 31.9	1.0 01	03.3	27 01.9	1.0 01	03.3	29 01.9	1.0 01	03.2	6
7	20 01.1	1.0 01	02.6	21 01.1	1.0 01	02.6	22 31.1	1.0 01	02.5	24 01.1	1.0 01	02.5	26 01.1	1.0 01	02.5	26 31.1	1.0 01	02.5	27 01.1	1.0 01	02.5	29 01.0	1.0 01	02.4	7
8	20 00.5	1.0 01	01.7	21 00.5	1.0 01	01.7	22 30.5	1.0 01	01.7	24 00.5	1.0 01	01.7	26 00.5	1.0 01	01.7	26 30.5	1.0 01	01.6	27 00.5	1.0 01	01.6	29 00.5	1.0 01	01.6	8
9	20 00.1	1.0 00	00.9	21 00.1	1.0 00	00.9	22 30.1	1.0 00	00.8	24 00.1	1.0 00	00.8	26 00.1	1.0 00	00.8	26 30.1	1.0 00	00.8	27 00.1	1.0 00	00.8	29 00.1	1.0 00	00.8	9
180	20 00.0	1.0 00	00.0	21 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	24 00.0	1.0 00	00.0	26 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	27 00.0	1.0 00	00.0	29 00.0	1.0 00	00.0	180

Lat. 74°
Lat. 75°
Lat. 76°
Lat. 77°

H.A.	46° 00′				47° 00′				48° 30′				49° 30′			
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	62 00.0	1.0	00	180.0	63 00.0	1.0	00	180.0	64 30.0	1.0	00	180.0	65 30.0	1.0	00	180.0
1	61 59.8	1.0	01	178.5	62 59.8	1.0	01	178.5	64 29.8	1.0	01	178.5	65 29.8	1.0	01	178.4
2	61 59.1	1.0	02	177.0	62 59.1	1.0	02	177.0	64 29.1	1.0	02	176.9	65 29.1	1.0	02	176.9
3	61 58.1	1.0	02	175.6	62 58.0	1.0	03	175.5	64 28.0	1.0	03	175.4	65 28.0	1.0	03	175.3
4	61 56.6	1.0	03	174.1	62 56.5	1.0	03	174.0	64 26.4	1.0	03	173.8	65 26.4	1.0	03	173.7
05	61 54.7	1.0	04	172.6	62 54.6	1.0	04	172.5	64 24.5	1.0	04	172.3	65 24.4	1.0	04	172.2
6	61 52.3	1.0	05	171.1	62 52.2	1.0	05	171.0	64 22.0	1.0	05	170.8	65 21.9	1.0	05	170.6
7	61 49.6	1.0	05	169.7	62 49.4	1.0	05	169.5	64 19.2	1.0	06	169.3	65 19.0	1.0	06	169.1
8	61 46.4	1.0	06	168.2	62 46.2	1.0	06	168.0	64 15.9	1.0	06	167.7	65 15.6	1.0	06	167.5
9	61 42.8	1.0	07	166.7	62 42.6	1.0	07	166.5	64 12.1	1.0	07	166.2	65 11.8	99	07	166.0
10	61 38.8	99	07	165.3	62 38.5	99	07	165.1	64 08.0	99	08	164.7	65 07.6	99	08	164.4
1	61 34.4	99	08	163.8	62 34.0	99	08	163.6	64 03.4	99	08	163.2	65 03.0	99	08	162.9
2	61 29.6	99	09	162.4	62 29.2	99	08	162.1	63 58.4	99	09	161.7	64 57.9	99	09	161.4
3	61 24.4	99	09	160.9	62 23.9	99	09	160.7	63 53.0	99	10	160.2	64 52.4	99	10	159.9
4	61 18.8	99	10	159.5	62 18.2	99	10	159.2	63 47.2	99	10	158.7	64 46.5	99	10	158.4
15	61 12.8	99	11	158.1	62 12.1	99	11	157.8	63 41.0	99	11	157.2	64 40.2	99	11	156.9
6	61 06.5	99	11	156.7	62 05.7	99	11	156.3	63 34.4	99	12	155.8	64 33.5	98	12	155.4
7	60 59.7	99	12	155.2	61 58.9	99	12	154.9	63 27.5	98	12	154.3	64 26.4	98	12	153.9
8	60 52.6	98	12	153.8	61 51.7	98	13	153.5	63 20.1	98	13	152.9	64 19.0	98	13	152.4
9	60 45.1	98	13	152.4	61 44.1	98	13	152.0	63 12.4	98	13	151.4	64 11.1	98	14	151.0
20	60 37.3	98	14	151.0	61 36.2	98	14	150.6	63 04.3	98	14	150.0	64 02.9	98	14	149.5
1	60 29.1	98	14	149.6	61 27.9	98	14	149.2	62 55.8	98	15	148.5	63 54.3	97	15	148.1
2	60 20.6	98	15	148.3	61 19.2	98	15	147.8	62 47.0	97	15	147.1	63 45.4	97	15	146.6
3	60 11.7	98	15	146.9	61 10.3	97	16	146.5	62 37.9	97	16	145.7	63 36.1	97	16	145.2
4	60 02.5	97	16	145.5	61 01.0	97	16	145.1	62 28.4	97	16	144.3	63 26.5	97	17	143.8
25	59 53.0	97	16	144.2	60 51.3	97	17	143.7	62 18.6	97	17	142.9	63 16.6	97	17	142.4
6	59 43.2	97	17	142.8	60 41.4	97	17	142.4	62 08.5	97	17	141.6	63 06.4	96	18	141.0
7	59 33.0	97	17	141.5	60 31.1	97	18	141.0	61 58.0	96	18	140.2	62 55.8	96	18	139.6
8	59 22.6	97	18	140.2	60 20.6	97	18	139.7	61 47.3	96	18	138.8	62 44.9	96	19	138.3
9	59 11.9	97	18	138.9	60 09.7	96	19	138.4	61 36.3	96	19	137.5	62 33.8	96	19	136.9
30	59 00.9	96	19	137.6	59 58.6	96	19	137.0	61 25.0	96	19	136.2	62 22.3	95	20	135.6
1	58 49.6	96	19	136.3	59 47.2	96	19	135.7	61 13.4	96	20	134.9	62 10.6	95	20	134.2
2	58 38.0	96	20	135.0	59 35.5	96	20	134.4	61 01.5	95	20	133.5	61 58.6	95	20	132.9
3	58 26.2	96	20	133.7	59 23.6	96	20	133.2	60 49.4	95	21	132.2	61 46.4	95	21	131.6
4	58 14.1	96	21	132.4	59 11.4	95	21	131.9	60 37.0	95	21	131.0	61 33.9	95	21	130.3
35	58 01.8	95	21	131.2	58 58.9	95	21	130.6	60 24.4	95	21	129.7	61 21.2	94	22	129.0
6	57 49.2	95	22	129.9	58 46.3	95	22	129.4	60 11.6	95	22	128.4	61 08.2	94	22	127.7
7	57 36.4	95	22	128.7	58 33.4	95	22	128.1	59 58.5	94	22	127.2	60 55.0	94	22	126.5
8	57 23.4	95	22	127.5	58 20.3	95	22	126.9	59 45.2	94	22	125.9	60 41.6	94	23	125.2
9	57 10.2	95	22	126.3	58 06.9	94	23	125.7	59 31.7	94	23	124.7	60 28.0	94	23	124.0
40	56 56.7	95	23	125.1	57 53.4	94	23	124.4	59 18.0	94	23	123.5	60 14.2	93	23	122.8
1	56 43.1	94	23	123.9	57 39.6	94	23	123.2	59 04.1	94	23	122.2	60 00.2	93	24	121.5
2	56 29.3	94	23	122.7	57 25.7	94	24	122.0	58 50.0	93	24	121.0	59 46.0	93	24	120.3
3	56 15.2	94	24	121.5	57 11.6	94	24	120.9	58 35.8	93	24	119.9	59 31.6	93	24	119.1
4	56 01.1	94	24	120.3	56 57.3	94	24	119.7	58 21.4	93	24	118.7	59 17.1	93	24	118.0
45	55 46.7	94	24	119.1	56 42.9	93	24	118.5	58 06.8	93	25	117.5	59 02.4	93	25	116.8
6	55 32.2	94	24	118.0	56 28.3	93	25	117.4	57 52.0	93	25	116.3	58 47.6	92	25	115.6
7	55 17.5	94	25	116.8	56 13.5	93	25	116.2	57 37.1	93	25	115.2	58 32.6	92	25	114.5
8	55 02.7	93	25	115.7	55 58.6	93	25	115.1	57 22.1	93	25	114.1	58 17.5	92	26	113.3
9	54 47.7	93	25	114.6	55 43.5	93	26	113.9	57 06.9	92	26	112.9	58 02.2	92	26	112.2
50	54 32.6	93	25	113.5	55 28.4	93	26	112.8	56 51.6	92	26	111.8	57 46.9	92	26	111.1
1	54 17.3	93	26	112.3	55 13.1	93	26	111.7	56 36.2	92	26	110.7	57 31.4	92	26	110.0
2	54 02.0	93	26	111.2	54 57.6	93	26	110.6	56 20.7	92	26	109.6	57 15.8	92	26	108.9
3	53 46.5	93	26	110.2	54 42.1	93	26	109.5	56 05.1	92	26	108.5	57 00.1	91	26	107.8
4	53 30.9	93	26	109.1	54 26.5	93	26	108.4	55 49.3	92	26	107.4	56 44.3	91	26	106.7
55	53 15.3	93	26	108.0	54 10.7	92	26	107.3	55 33.5	92	26	106.3	56 28.4	91	27	105.6
6	52 59.5	93	26	106.9	53 54.9	92	27	106.3	55 17.6	92	27	105.2	56 12.4	91	27	104.5
7	52 43.6	92	27	105.9	53 39.0	92	27	105.2	55 01.6	92	27	104.2	55 56.4	91	27	103.5
8	52 27.7	92	27	104.8	53 23.0	92	27	104.2	54 45.5	91	27	103.1	55 40.2	91	27	102.4
9	52 11.6	92	27	103.7	53 06.9	92	27	103.1	54 29.4	91	27	102.1	55 24.1	91	27	101.4
60	51 55.5	92	27	102.7	52 50.8	92	27	102.1	54 13.2	91	27	101.0	55 07.8	91	27	100.3
1	51 39.4	92	27	101.7	52 34.6	92	27	101.0	53 56.9	91	27	100.0	54 51.5	91	27	99.3
2	51 23.1	92	27	100.6	52 18.3	92	27	100.0	53 40.6	91	27	99.0	54 35.2	91	27	98.3
3	51 06.9	92	27	99.6	52 02.0	92	27	99.0	53 24.2	91	27	98.0	54 18.8	91	27	97.3
4	50 50.5	92	27	98.6	51 45.6	92	27	98.0	53 07.9	91	27	97.0	54 02.4	91	27	96.3
65	50 34.2	92	27	97.6	51 29.2	92	27	97.0	52 51.4	91	27	96.0	53 45.9	91	27	95.3
6	50 17.8	92	27	96.6	51 12.8	92	27	96.0	52 35.0	91	27	95.0	53 29.4	91	28	94.3
7	50 01.3	92	27	95.6	50 56.3	92	27	95.0	52 18.5	91	28	94.0	53 12.9	91	28	93.3
8	49 44.8	92	28	94.6	50 39.8	92	28	94.0	52 02.0	91	28	93.0	52 56.4	91	28	92.3
9	49 28.3	92	28	93.6	50 23.3	91	28	93.0	51 45.4	91	28	92.0	52 39.9	91	28	91.3
70	49 11.8	92	28	92.6	50 06.8	91	28	92.0	51 28.9	91	28	91.1	52 23.4	91	28	90.4
1	48 55.3	92	28	91.7	49 50.3	91	28	91.1	51 12.4	91	28	90.1	52 06.8	91	28	89.4
2	48 38.8	92	28	90.7	49 33.7	91	28	90.1	50 55.8	91	28	89.1	51 50.3	91	28	88.5
3	48 22.2	92	28	89.7	49 17.2	91	28	89.1	50 39.3	91	28	88.2	51 33.8	91	28	87.5
4	48 05.7	92	28	88.8	49 00.7	91	28	88.2	50 22.8	91	28	87.2	51 17.2	91	28	86.6
75	47 49.2	92	28	87.8	48 44.1	91	28	87.2	50 06.3	91	28	86.3	51 00.7	91	27	85.6
6	47 32.6	92	28	86.9	48 27.6	91	28	86.3	49 49.8	91	28	85.3	50 44.3	91	27	84.7
7	47 16.1	92	27	85.9	48 11.1	91	28	85.3	49 33.3	91	27	84.4	50 27.8	91	27	83.8
8	46 59.6	92	27	85.0	47 54.7	92	27	84.4	49 16.8	91	27	83.5	50 11.4	91	27	82.8
9	46 43.2	92	27	84.1	47 38.2	92	27	83.5	49 00.4	91	27	82.6	49 55.0	91	27	81.9
80	46 26.7	92	27	83.1	47 21.8	92	27	82.6	48 44.1	91	27	81.6	49 38.6	91	27	81.0
1	46 10.3	92	27	82.2	47 05.4	92	27	81.6	48 27.7	91	27	80.7	49 22.3	91	27	80.1
2	45 54.0	92	27	81.3	46 49.1	92	27	80.7	48 11.4	91	27	79.8	49 06.0	91	27	79.2
3	45 37.7	92	27	80.4	46 32.8	92	27	79.8	47 55.2	91	27	78.9	48 49.8	91	27	78.3
4	45 21.4	92	27	79.5	46 16.5	92	27	78.9	47 39.0	91	27	78.0	48 33.7	91	27	77.4
85	45 05.1	92	27	78.6	46 00.3	92	27	78.0	47 22.8	91	27	77.1	48 17.6	91	27	76.5
6	44 49.0	92	27	77.7	45 44.2	92	27	77.1	47 06.7	91	27	76.2	48 01.5	91	27	75.6
7	44 32.8	92	27	76.8	45 28.1	92	27	76.2	46 50.7	92	27	75.3	47 45.5	91	27	74.7
8	44 16.8	92	27	75.9	45 12.1	92	27	75.3	46 34.7	92	26	74.5	47 29.6	91	26	73.9
9	44 00.8	92	27	75.0	44 56.1	92	26	74.4	46 18.8	92	26	73.6	47 13.7	91	26	73.0
90	43 44.8	92	26	74.1	44 40.2	92	26	73.5	46 03.0	92	26	72.7	46 58.0	91	26	72.1

50° 30′				51° 30′				52° 30′				54° 00′				H.A.
Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
° ′			°	° ′			°	° ′			°	° ′			°	°
66 30.0	1.0	00	180.0	67 30.0	1.0	00	180.0	68 30.0	1.0	00	180.0	70 00.0	1.0	00	180.0	00
66 29.8	1.0	01	178.4	67 29.8	1.0	01	178.4	68 29.8	1.0	01	178.3	69 59.8	1.0	01	178.3	1
66 29.1	1.0	02	176.8	67 29.1	1.0	02	176.7	68 29.0	1.0	02	176.7	69 59.0	1.0	02	176.6	2
66 27.9	1.0	03	175.2	67 27.9	1.0	03	175.1	68 27.8	1.0	03	175.0	69 57.8	1.0	03	174.8	3
66 26.3	1.0	03	173.6	67 26.2	1.0	04	173.5	68 26.2	1.0	04	173.4	69 56.0	1.0	04	173.1	4
66 24.3	1.0	04	172.0	67 24.1	1.0	04	171.9	68 24.0	1.0	04	171.7	69 53.8	1.0	04	171.4	05
66 21.7	1.0	05	170.5	67 21.6	1.0	05	170.3	68 21.4	1.0	05	170.1	69 51.1	1.0	05	169.7	6
66 18.8	1.0	06	168.9	67 18.6	1.0	06	168.7	68 18.3	1.0	06	168.4	69 47.9	1.0	06	168.0	7
66 15.4	1.0	06	167.3	67 15.1	1.0	07	167.1	68 14.8	99	07	166.8	69 44.2	99	07	166.3	8
66 11.5	99	07	165.7	67 11.1	99	07	165.5	68 10.8	99	07	165.2	69 40.1	99	08	164.7	9
66 07.2	99	08	164.2	67 06.8	99	08	163.9	68 06.3	99	08	163.5	69 35.5	99	08	163.0	10
66 02.5	99	08	162.6	67 02.0	99	09	162.3	68 01.4	99	09	161.9	69 30.4	99	09	161.3	1
65 57.3	99	09	161.1	66 56.7	99	09	160.7	67 56.0	99	10	160.3	69 24.9	99	10	159.7	2
65 51.7	99	10	159.5	66 51.0	99	10	159.1	67 50.2	99	10	158.7	69 18.9	98	11	158.0	3
65 45.8	99	11	158.0	66 44.9	99	11	157.6	67 44.0	99	11	157.1	69 12.5	98	11	156.4	4
65 39.4	98	11	156.5	66 38.4	98	12	156.0	67 37.4	98	12	155.6	69 05.7	98	12	154.8	15
65 32.5	98	12	154.9	66 31.5	98	12	154.5	67 30.3	98	12	154.0	68 58.4	98	13	153.2	6
65 25.3	98	13	153.4	66 24.2	98	13	153.0	67 22.9	98	13	152.4	68 50.8	97	13	151.6	7
65 17.8	98	13	151.9	66 16.4	98	14	151.4	67 15.0	98	14	150.9	68 42.7	97	14	150.0	8
65 09.8	98	14	150.5	66 08.4	98	14	149.9	67 06.8	97	14	149.4	68 34.2	97	15	148.4	9
65 01.5	97	14	149.0	65 59.9	97	15	148.4	66 58.2	97	15	147.8	68 25.4	97	15	146.9	20
64 52.8	97	15	147.5	65 51.0	97	15	147.0	66 49.2	97	16	146.3	68 16.1	96	16	145.3	1
64 43.7	97	16	146.1	65 41.8	97	16	145.5	66 39.9	97	16	144.9	68 06.5	96	17	143.8	2
64 34.3	97	16	144.6	65 32.3	97	16	144.0	66 30.2	96	17	143.4	67 56.6	96	17	142.3	3
64 24.6	97	17	143.2	65 22.4	96	17	142.6	66 20.1	96	17	141.9	67 46.3	96	18	140.8	4
64 14.5	96	17	141.8	65 12.2	96	18	141.1	66 09.8	96	18	140.5	67 35.7	95	18	139.3	25
64 04.1	96	18	140.4	65 01.7	96	18	139.7	65 59.1	95	18	139.0	67 24.8	95	19	137.9	6
63 53.4	96	18	139.0	64 50.8	96	19	138.3	65 48.1	95	19	137.6	67 13.5	95	19	136.4	7
63 42.4	96	19	137.6	64 39.7	95	19	136.9	65 36.8	95	19	136.2	67 02.0	94	20	135.0	8
63 31.1	95	19	136.2	64 28.2	95	20	135.6	65 25.2	95	20	134.8	66 50.1	94	20	133.6	9
63 19.5	95	20	134.9	64 16.5	95	20	134.2	65 13.3	94	20	133.4	66 38.0	94	21	132.2	30
63 07.7	95	20	133.5	64 04.5	95	21	132.8	65 01.2	94	21	132.1	66 25.6	93	21	130.8	1
62 55.6	95	21	132.2	63 52.3	94	21	131.5	64 48.8	94	21	130.7	66 13.0	93	22	129.4	2
62 43.2	94	21	130.9	63 39.8	94	21	130.2	64 36.1	94	22	129.4	66 00.1	93	22	128.1	3
62 30.6	94	21	129.6	63 27.0	94	22	128.8	64 23.2	93	22	128.1	65 46.9	93	22	126.7	4
62 17.7	94	22	128.3	63 14.0	94	22	127.5	64 10.0	93	22	126.7	65 33.6	92	23	125.4	35
62 04.6	94	22	127.0	63 00.8	93	23	126.3	63 56.7	93	23	125.4	65 20.0	92	23	124.1	6
61 51.3	94	23	125.8	62 47.3	93	23	125.0	63 43.1	93	23	124.2	65 06.2	92	23	122.8	7
61 37.8	93	23	124.5	62 33.7	93	23	123.7	63 29.3	92	23	122.9	64 52.2	92	24	121.6	8
61 24.0	93	23	123.3	62 19.8	93	23	122.5	63 15.3	92	24	121.6	64 38.0	91	24	120.3	9
61 10.1	93	24	122.0	62 05.8	93	24	121.2	63 01.2	92	24	120.4	64 23.6	91	24	119.0	40
60 56.0	93	24	120.8	61 51.5	92	24	120.0	62 46.8	92	24	119.2	64 09.1	91	24	117.8	1
60 41.7	93	24	119.6	61 37.1	92	24	118.8	62 32.3	92	24	118.0	63 54.4	91	25	116.6	2
60 27.2	92	24	118.4	61 22.6	92	25	117.6	62 17.6	91	25	116.8	63 39.5	91	25	115.4	3
60 12.6	92	25	117.2	61 07.8	92	25	116.4	62 02.8	91	25	115.6	63 24.5	90	25	114.2	4
59 57.8	92	25	116.0	60 52.9	92	25	115.2	61 47.8	91	25	114.4	63 09.4	90	26	113.0	45
59 42.9	92	25	114.9	60 37.9	91	25	114.1	61 32.6	91	25	113.2	62 54.1	90	26	111.8	6
59 27.8	92	25	113.7	60 22.7	91	26	112.9	61 17.4	91	26	112.1	62 38.7	90	26	110.7	7
59 12.6	92	26	112.6	60 07.4	91	26	111.8	61 02.0	91	26	110.9	62 23.1	90	26	109.5	8
58 57.3	92	26	111.4	59 52.0	91	26	110.6	60 46.5	90	26	109.8	62 07.5	90	26	108.4	9
58 41.8	91	26	110.3	59 36.5	91	26	109.5	60 30.9	90	26	108.7	61 51.8	89	26	107.3	50
58 26.3	91	26	109.2	59 20.8	91	26	108.4	60 15.1	90	26	107.5	61 35.9	89	27	106.2	1
58 10.6	91	26	108.1	59 05.1	91	26	107.3	59 59.3	90	26	106.4	61 20.0	89	27	105.1	2
57 54.8	91	26	107.0	58 49.3	91	27	106.2	59 43.4	90	27	105.4	61 04.0	89	27	104.0	3
57 39.0	91	27	105.9	58 33.3	90	27	105.1	59 27.4	90	27	104.3	60 47.9	89	27	102.9	4
57 23.0	91	27	104.8	58 17.3	90	27	104.0	59 11.4	90	27	103.2	60 31.7	89	27	101.9	55
57 07.0	91	27	103.8	58 01.3	90	27	103.0	58 55.2	90	27	102.1	60 15.5	89	27	100.8	6
56 50.9	91	27	102.7	57 45.1	90	27	101.9	58 39.0	90	27	101.1	59 59.3	89	27	99.8	7
56 34.7	91	27	101.7	57 28.9	90	27	100.9	58 22.8	90	27	100.0	59 42.9	89	27	98.7	8
56 18.5	90	27	100.6	57 12.6	90	27	99.8	58 06.5	89	27	99.0	59 26.6	89	27	97.7	9
56 02.2	90	27	99.6	56 56.3	90	27	98.8	57 50.1	89	27	98.0	59 10.2	88	27	96.7	60
55 45.9	90	27	98.6	56 39.9	90	27	97.8	57 33.7	89	27	97.0	58 53.7	88	27	95.7	1
55 29.5	90	27	97.5	56 23.5	90	27	96.8	57 17.3	89	27	96.0	58 37.2	88	27	94.7	2
55 13.1	90	27	96.5	56 07.1	90	28	95.8	57 00.8	89	27	95.0	58 20.7	88	28	93.7	3
54 56.6	90	27	95.5	55 50.6	90	28	94.8	56 44.3	89	28	94.0	58 04.2	88	28	92.7	4
54 40.2	90	28	94.5	55 34.1	90	28	93.8	56 27.8	89	28	93.0	57 47.7	88	28	91.7	65
54 23.7	90	28	93.5	55 17.6	90	28	92.8	56 11.3	89	28	92.0	57 31.2	88	28	90.7	6
54 07.2	90	28	92.6	55 01.1	90	28	91.8	55 54.8	89	28	91.0	57 14.6	88	28	89.8	7
53 50.6	90	28	91.6	54 44.6	90	28	90.8	55 38.2	89	28	90.1	56 58.1	88	28	88.8	8
53 34.1	90	28	90.6	54 28.0	90	28	89.9	55 21.7	89	28	89.1	56 41.6	88	28	87.9	9
53 17.6	90	28	89.7	54 11.5	90	28	88.9	55 05.1	89	28	88.1	56 25.0	88	28	86.9	70
53 01.0	90	28	88.7	53 55.0	90	28	88.0	54 48.6	89	28	87.2	56 08.5	88	27	86.0	1
52 44.5	90	28	87.8	53 38.4	90	28	87.0	54 32.1	89	28	86.3	55 52.1	88	27	85.1	2
52 28.0	90	28	86.8	53 21.9	90	27	86.1	54 15.6	89	27	85.3	55 35.6	88	27	84.1	3
52 11.5	90	27	85.9	53 05.4	90	27	85.2	53 59.1	89	27	84.4	55 19.2	88	27	83.2	4
51 55.0	90	27	84.9	52 49.0	90	27	84.2	53 42.7	89	27	83.5	55 02.7	89	27	82.3	75
51 38.5	90	27	84.0	52 32.5	90	27	83.3	53 26.3	89	27	82.6	54 46.4	89	27	81.4	6
51 22.1	90	27	83.1	52 16.1	90	27	82.4	53 09.9	89	27	81.7	54 30.0	89	27	80.5	7
51 05.7	90	27	82.2	51 59.8	90	27	81.5	52 53.6	89	27	80.7	54 13.8	89	27	79.6	8
50 49.3	90	27	81.3	51 43.4	90	27	80.6	52 37.3	90	27	79.8	53 57.5	89	27	78.7	9
50 33.0	90	27	80.4	51 27.1	90	27	79.7	52 21.0	90	27	79.0	53 41.3	89	27	77.8	80
50 16.7	90	27	79.4	51 10.9	90	27	78.8	52 04.8	90	27	78.1	53 25.2	89	27	76.9	1
50 00.5	90	27	78.5	50 54.7	90	27	77.9	51 48.6	90	27	77.2	53 09.1	89	27	76.1	2
49 44.3	91	27	77.7	50 38.5	90	27	77.0	51 32.6	90	27	76.3	52 53.1	89	27	75.2	3
49 28.2	91	27	76.8	50 22.5	90	27	76.1	51 16.5	90	27	75.4	52 37.1	89	26	74.3	4
49 12.1	91	27	75.9	50 06.4	90	27	75.2	51 00.5	90	26	74.5	52 21.2	89	26	73.5	85
48 56.1	91	27	75.0	49 50.5	90	26	74.3	50 44.6	90	26	73.7	52 05.4	89	26	72.6	6
48 40.2	91	26	74.1	49 34.6	91	26	73.5	50 28.8	90	26	72.8	51 49.7	90	26	71.8	7
48 24.3	91	26	73.2	49 18.8	91	26	72.6	50 13.0	90	26	72.0	51 34.0	90	26	70.9	8
48 08.5	91	26	72.4	49 03.0	91	26	71.7	49 57.4	90	26	71.1	51 18.4	90	26	70.1	9
47 52.8	91	26	71.5	48 47.4	91	26	70.9	49 41.7	90	26	70.2	51 02.9	90	26	69.2	90

Lat. 74°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	43 28.9	93 26	73.2	44 24.4	92 26	72.7	45 47.2	92 26	71.8	46 42.3	92 26	71.2	47 37.1	91 26	70.6	48 31.8	91 26	70.0	49 26.2	91 26	69.4	50 47.5	90 26	68.4	91
2	43 13.2	93 26	72.3	44 08.6	92 26	71.8	45 31.6	92 26	71.0	46 26.6	92 26	70.4	47 21.5	91 26	69.8	48 16.3	91 26	69.2	49 10.8	91 26	68.5	50 32.2	90 25	67.6	2
3	42 57.4	93 26	71.4	43 53.0	92 26	70.9	45 16.0	92 26	70.1	46 11.1	92 26	69.5	47 06.1	91 26	68.9	48 00.9	91 26	68.3	48 55.4	91 25	67.7	50 16.9	90 25	66.7	3
4	42 41.8	93 26	70.5	43 37.4	93 26	70.0	45 00.5	92 26	69.2	45 55.7	92 26	68.7	46 50.7	92 26	68.1	47 45.5	91 25	67.5	48 40.2	91 25	66.9	50 01.8	90 25	65.9	4
95	42 26.2	93 26	69.7	43 21.9	93 26	69.2	44 45.0	92 26	68.4	45 40.3	92 25	67.8	46 35.4	92 25	67.2	47 30.3	91 25	66.6	48 25.0	91 25	66.0	49 46.7	91 25	65.1	95
6	42 10.8	93 26	68.8	43 06.5	93 26	68.3	44 29.7	92 25	67.5	45 25.0	92 25	66.9	46 20.2	92 25	66.4	47 15.2	91 25	65.8	48 10.0	91 25	65.2	49 31.8	91 25	64.2	6
7	41 55.4	93 25	67.9	42 51.1	93 25	67.4	44 14.5	92 25	66.6	45 09.9	92 25	66.1	46 05.1	92 25	65.5	47 00.1	92 25	65.0	47 55.0	91 25	64.4	49 16.9	91 25	63.4	7
8	41 40.1	93 25	67.1	42 35.9	93 25	66.6	43 59.4	93 25	65.8	44 54.8	92 25	65.3	45 50.1	92 25	64.7	46 45.2	92 25	64.1	47 40.1	91 25	63.5	49 02.2	91 24	62.6	8
9	41 25.0	93 25	66.2	42 20.8	93 25	65.7	43 44.3	93 25	64.9	44 39.8	92 25	64.4	45 35.2	92 25	63.9	46 30.4	92 25	63.3	47 25.4	92 24	62.7	48 47.6	91 24	61.8	9
100	41 09.9	93 25	65.3	42 05.8	93 25	64.8	43 29.4	93 25	64.1	44 25.0	92 25	63.6	45 20.4	92 24	63.0	46 15.7	92 24	62.5	47 10.7	92 24	61.9	48 33.1	91 24	61.0	100
1	40 54.9	93 25	64.5	41 50.9	93 25	64.0	43 14.6	93 24	63.2	44 10.2	93 24	62.7	45 05.7	92 24	62.2	46 01.0	92 24	61.6	46 56.2	92 24	61.1	48 18.6	91 24	60.2	1
2	40 40.0	93 25	63.6	41 36.1	93 24	63.1	42 59.9	93 24	62.4	43 55.6	93 24	61.9	44 51.1	92 24	61.4	45 46.5	92 24	60.8	46 41.8	92 24	60.2	48 04.4	91 24	59.4	2
3	40 25.3	94 24	62.8	41 21.4	93 24	62.3	42 45.3	93 24	61.6	43 41.0	93 24	61.1	44 36.7	93 24	60.5	45 32.2	92 24	60.0	46 27.5	92 24	59.4	47 50.2	92 23	58.6	3
4	40 10.6	94 24	61.9	41 06.8	93 24	61.4	42 30.8	93 24	60.7	43 26.6	93 24	60.2	44 22.3	93 24	59.7	45 17.9	92 24	59.2	46 13.3	92 23	58.6	47 36.1	92 23	57.8	4
105	39 56.1	94 24	61.1	40 52.3	94 24	60.6	42 16.4	93 24	59.9	43 12.3	93 24	59.4	44 08.1	93 24	58.9	45 03.8	93 23	58.4	45 59.3	92 23	57.8	47 22.2	92 23	57.0	105
6	39 41.7	94 24	60.2	40 38.0	94 24	59.8	42 02.2	93 24	59.0	42 58.2	93 23	58.6	43 54.0	93 23	58.1	44 49.7	93 23	57.5	45 45.3	93 23	57.0	47 08.4	92 23	56.2	6
7	39 27.4	94 24	59.4	40 23.7	94 24	58.9	41 48.0	94 23	58.2	42 44.1	93 23	57.7	43 40.1	93 23	57.2	44 35.9	93 23	56.7	45 31.5	93 23	56.2	46 54.7	92 23	55.4	7
8	39 13.2	94 23	58.5	40 09.6	94 23	58.1	41 34.1	94 23	57.4	42 30.2	93 23	56.9	43 26.2	93 23	56.4	44 22.1	93 23	55.9	45 17.8	93 23	55.4	46 41.2	92 22	54.6	8
9	38 59.2	94 23	57.7	39 55.7	94 23	57.2	41 20.2	94 23	56.6	42 16.4	94 23	56.1	43 12.5	93 23	55.6	44 08.5	93 22	55.1	45 04.3	93 22	54.6	46 27.8	93 22	53.8	9
110	38 45.3	94 23	56.8	39 41.8	94 23	56.4	41 06.5	94 23	55.7	42 02.7	94 23	55.3	42 58.9	94 22	54.8	43 55.0	93 22	54.3	44 50.9	93 22	53.8	46 14.5	93 22	53.0	110
1	38 31.5	94 23	56.0	39 28.1	94 23	55.6	40 52.9	94 22	54.9	41 49.2	94 22	54.4	42 45.5	94 22	54.0	43 41.6	93 22	53.5	44 37.6	93 22	53.0	46 01.4	93 22	52.2	1
2	38 17.9	95 22	55.2	39 14.5	94 22	54.7	40 39.4	94 22	54.1	41 35.8	94 22	53.6	42 32.2	94 22	53.2	43 28.4	94 22	52.7	44 24.5	93 22	52.2	45 48.4	93 21	51.4	2
3	38 04.4	95 22	54.3	39 01.1	95 22	53.9	40 26.1	94 22	53.3	41 22.6	94 22	52.8	42 19.0	94 22	52.4	43 15.3	94 22	51.9	44 11.5	94 21	51.4	45 35.5	93 21	50.6	3
4	37 51.0	95 22	53.5	38 47.8	95 22	53.1	40 12.9	94 22	52.4	41 09.5	94 22	52.0	42 06.0	94 21	51.6	43 02.4	94 21	51.1	43 58.6	94 21	50.6	45 22.8	93 21	49.9	4
115	37 37.8	95 22	52.6	38 34.7	95 22	52.2	39 59.8	95 21	51.6	40 56.5	94 21	51.2	41 53.1	94 21	50.7	42 49.6	94 21	50.3	43 45.9	94 21	49.8	45 10.2	94 21	49.1	115
6	37 24.7	95 22	51.8	38 21.7	95 21	51.4	39 47.0	95 21	50.8	40 43.7	95 21	50.4	41 40.4	94 21	49.9	42 36.9	94 21	49.5	43 33.4	94 21	49.0	44 57.8	94 20	48.3	6
7	37 11.8	95 21	51.0	38 08.8	95 21	50.6	39 34.2	95 21	50.0	40 31.0	95 21	49.6	41 27.8	94 21	49.1	42 24.4	94 21	48.7	43 20.9	94 20	48.2	44 45.5	94 20	47.5	7
8	36 59.0	95 21	50.2	37 56.1	95 21	49.8	39 21.6	95 21	49.2	40 18.5	95 21	48.8	41 15.3	95 20	48.3	42 12.1	94 20	47.9	43 08.7	94 20	47.4	44 33.4	94 20	46.7	8
9	36 46.4	95 21	49.3	37 43.6	95 21	49.0	39 09.2	95 20	48.4	40 06.2	95 20	48.0	41 03.1	95 20	47.5	41 59.9	95 20	47.1	42 56.6	94 20	46.7	44 21.4	94 20	46.0	9
120	36 33.9	95 21	48.5	37 31.2	95 20	48.1	38 56.9	95 20	47.6	39 54.0	95 20	47.2	40 50.9	95 20	46.7	41 47.8	95 20	46.3	42 44.6	95 20	45.9	44 09.6	94 19	45.2	120
1	36 21.6	96 20	47.7	37 18.9	95 20	47.3	38 44.8	95 20	46.7	39 41.9	95 20	46.3	40 39.0	95 20	45.9	41 36.0	95 20	45.5	42 32.8	95 19	45.1	43 58.0	94 19	44.4	1
2	36 09.5	96 20	46.9	37 06.9	96 20	46.5	38 32.8	95 20	45.9	39 30.0	95 20	45.5	40 27.2	95 19	45.1	41 24.2	95 19	44.7	42 21.2	95 19	44.3	43 46.5	95 19	43.7	2
3	35 57.5	96 20	46.0	36 54.9	96 20	45.7	38 21.0	96 19	45.1	39 18.3	95 19	44.7	40 15.5	95 19	44.3	41 12.7	95 19	43.9	42 09.7	95 19	43.5	43 35.1	95 19	42.9	3
4	35 45.6	96 19	45.2	36 43.2	96 19	44.9	38 09.4	96 19	44.3	39 06.8	96 19	43.9	40 04.1	95 19	43.6	41 01.3	95 19	43.2	41 58.4	95 19	42.8	43 24.0	95 18	42.1	4
125	35 34.0	96 19	44.4	36 31.6	96 19	44.0	37 57.9	96 19	43.5	38 55.4	96 19	43.1	39 52.7	96 19	42.8	40 50.1	95 18	42.4	41 47.3	95 18	42.0	43 13.0	95 18	41.4	125
6	35 22.5	96 19	43.6	36 20.2	96 19	43.2	37 46.6	96 19	42.7	38 44.1	96 18	42.3	39 41.6	96 18	42.0	40 39.0	96 18	41.6	41 36.3	95 18	41.2	43 02.1	95 18	40.6	6
7	35 11.2	96 19	42.8	36 09.0	96 18	42.4	37 35.5	96 18	41.9	38 33.1	96 18	41.5	39 30.6	96 18	41.2	40 28.1	96 18	40.8	41 25.5	96 18	40.4	42 51.4	95 18	39.8	7
8	35 00.1	96 18	41.9	35 57.9	96 18	41.6	37 24.5	96 18	41.1	38 22.2	96 18	40.8	39 19.8	96 18	40.4	40 17.4	96 18	40.0	41 14.9	96 17	39.6	42 40.9	96 17	39.1	8
9	34 49.1	97 18	41.1	35 47.0	96 18	40.8	37 13.7	96 18	40.3	38 11.5	96 18	40.0	39 09.2	96 17	39.6	40 06.8	96 17	39.2	41 04.4	96 17	38.9	42 30.6	96 17	38.3	9
130	34 38.3	97 18	40.3	35 36.3	97 18	40.0	37 03.1	96 17	39.5	38 01.0	96 17	39.2	38 58.7	96 17	38.8	39 56.5	96 17	38.5	40 54.1	96 17	38.1	42 20.4	96 17	37.5	130
1	34 27.7	97 17	39.5	35 25.7	97 17	39.2	36 52.7	97 17	38.7	37 50.6	96 17	38.4	38 48.5	96 17	38.0	39 46.3	96 17	37.7	40 44.0	96 17	37.3	42 10.4	96 16	36.8	1
2	34 17.3	97 17	38.7	35 15.4	97 17	38.4	36 42.5	97 17	37.9	37 40.4	97 17	37.6	38 38.4	97 17	37.2	39 36.2	96 16	36.9	40 34.0	96 16	36.6	42 00.6	96 16	36.0	2
3	34 07.0	97 17	37.9	35 05.2	97 17	37.6	36 32.4	97 16	37.1	37 30.4	97 16	36.8	38 28.4	97 16	36.5	39 26.4	97 16	36.1	40 24.3	96 16	35.8	41 51.0	96 16	35.2	3
4	33 57.0	97 16	37.0	34 55.2	97 16	36.7	36 22.5	97 16	36.3	37 20.6	97 16	36.0	38 18.7	97 16	35.7	39 16.7	97 16	35.3	40 14.7	97 16	35.0	41 41.5	96 15	34.5	4
135	33 47.1	97 16	36.2	34 45.4	97 16	35.9	36 12.8	97 16	35.5	37 11.0	97 16	35.2	38 09.2	97 16	34.9	39 07.3	97 16	34.6	40 05.3	97 15	34.2	41 32.3	97 15	33.7	135
6	33 37.4	97 16	35.4	34 35.8	97 16	35.1	36 03.3	97 16	34.7	37 01.6	97 15	34.4	37 59.8	97 15	34.1	38 58.0	97 15	33.8	39 56.1	97 15	33.5	41 23.2	97 15	33.0	6
7	33 27.9	97 16	34.6	34 26.4	97 15	34.3	35 54.0	97 15	33.9	36 52.3	97 15	33.6	37 50.6	97 15	33.3	38 48.9	97 15	33.0	39 47.1	97 15	32.7	41 14.3	97 15	32.2	7
8	33 18.7	98 15	33.8	34 17.2	97 15	33.5	35 44.8	97 15	33.1	36 43.3	97 15	32.8	37 41.6	97 15	32.5	38 39.9	97 15	32.2	39 38.2	97 14	31.9	41 05.5	97 14	31.5	8
9	33 09.5	98 15	33.0	34 08.1	98 15	32.7	35 35.9	97 15	32.3	36 34.4	97 14	32.0	37 32.8	97 14	31.8	38 31.2	97 14	31.5	39 29.6	97 14	31.2	40 57.0	97 14	30.7	9
140	33 00.6	98 15	32.2	33 59.3	98 14	31.9	35 27.2	98 14	31.5	36 25.7	98 14	31.3	37 24.2	97 14	31.0	38 22.7	97 14	30.7	39 21.1	97 14	30.4	40 48.7	97 14	29.9	140
1	32 51.9	98 14	31.4	33 50.6	98 14	31.1	35 18.6	98 14	30.7	36 17.2	98 14	30.5	37 15.8	98 14	30.2	38 14.3	98 14	29.9	39 12.8	97 13	29.6	40 40.5	97 13	29.2	1
2	32 43.4	98 14	30.6	33 42.2	98 14	30.3	35 10.3	98 14	29.9	36 08.9	98 13	29.7	37 07.6	98 13	29.4	38 06.2	98 13	29.1	39 04.8	98 13	28.9	40 32.5	97 13	28.4	2
3	32 35.1	98 14	29.7	33 33.9	98 13	29.5	35 02.1	98 13	29.1	36 00.8	98 13	28.9	36 59.6	98 13	28.6	37 58.2	98 13	28.4	38 56.9	98 13	28.1	40 24.7	98 13	27.7	3
4	32 27.0	98 13	28.9	33 25.9	98 13	28.7	34 54.1	98 13	28.4	35 53.0	98 13	28.1	36 51.7	98 13	27.9	37 50.5	98 13	27.6	38 49.2	98 12	27.3	40 17.2	98 12	26.9	4
145	32 19.1	98 13	28.1	33 18.0	98 13	27.9	34 46.4	98 13	27.6	35 45.3	98 12	27.3	36 44.1	98 12	27.1	37 42.9	98 12	26.8	38 41.7	98 12	26.6	40 09.8	98 12	26.2	145
6	32 11.4	98 12	27.3	33 10.4	98 12	27.1	34 38.8	98 12	26.8	35 37.8	98 12	26.5	36 36.7	98 12	26.3	37 35.5	98 12	26.1	38 34.4	98 12	25.8	40 02.6	98 12	25.4	6
7	32 03.9	98 12	26.5	33 03.0	98 12	26.3	34 31.5	98 12	26.0	35 30.5	98 12	25.8	36 29.4	98 12	25.5	37 28.4	98 12	25.3	38 27.3	98 12	25.0	39 55.6	98 11	24.7	7
8	31 56.7	99 12	25.7	32 55.8	98 12	25.5	34 24.4	98 12	25.2	35 23.4	98 11	25.0	36 22.4	98 11	24.7	37 21.4	98 11	24.5	38 20.4	98 11	24.3	39 48.8	98 11	23.9	8
9	31 49.6	99 11	24.9	32 48.7	99 11	24.7	34 17.4	99 11	24.4	35 16.5	98 11	24.2	36 15.6	98 11	24.0	37 14.6	98 11	23.8	38 13.7	98 11	23.5	39 42.2	98 11	23.2	9
150	31 42.7	99 11	24.1	32 41.9	99 11	23.9	34 10.7	99 11	23.6	35 09.8	99 11	23.4	36 09.0	99 11	23.2	37 08.1	98 11	23.0	38 07.2	98 10	22.8	39 35.7	98 10	22.4	150
1	31 36.1	99 11	23.3	32 35.3	99 11	23.1	34 04.2	99 11	22.8	35 03.4	99 10	22.6	36 02.6	99 10	22.4	37 01.7	99 10	22.2	38 00.9	99 10	22.0	39 29.5	98 10	21.7	1
2	31 29.7	99 10	22.5	32 29.0	99 10	22.3	33 57.9	99 10	22.0	34 57.1	99 10	21.8	35 56.4	99 10	21.6	36 55.6	99 10	21.4	37 54.8	99 10	21.2	39 23.5	99 10	20.9	2
3	31 23.4	99 10	21.7	32 22.8	99 10	21.5	33 51.8	99 10	21.2	34 51.1	99 10	21.1	35 50.4	99 10	20.9	36 49.6	99 10	20.7	37 48.9	99 09	20.5	39 17.7	99 09	20.2	3
4	31 17.4	99 10	20.9	32 16.8	99 10	20.7	33 45.9	99 09	20.5	34 45.2	99 09	20.3	35 44.6	99 09	20.1	36 43.9	99 09	19.9	37 43.2	99 09	19.7	39 12.1	99 09	19.4	4
155	31 11.6	99 09	20.1	32 11.1	99 09	19.9	33 40.2	99 09	19.7	34 39.6	99 09	19.5	35 39.0	99 09	19.3	36 38.4	99 09	19.1	37 37.7	99 09	19.0	39 06.7	99 09	18.7	155
6	31 06.1	99 09	19.3	32 05.6	99 09	19.1	33 34.8	99 09	18.9	34 34.2	99 09	18.7	35 33.6	99 09	18.5	36 33.1	99 08	18.4	37 32.5	99 08	18.2	39 01.5	99 08	17.9	6
7	31 00.7	99 09	18.5	32 00.3	99 08	18.3	33 29.5	99 08	18.1	34 29.0	99 08	17.9	35 28.5	99 08	17.8	36 28.0	99 08	17.6	37 27.4	99 08	17.4	38 56.6	99 08	17.2	7
8	30 55.6	99 08	17.7	31 55.2	99 08	17.5	33 24.5	99 08	17.3	34 24.0	99 08	17.1	35 23.5	99 08	17.0	36 23.1	99 08	16.8	37 22.6	99 08	16.7	38 51.8	99 08	16.4	8
9	30 50.7	99 08	16.9	31 50.3	99 08	16.7	33 19.7	99 08	16.5	34 19.3	99 08	16.4	35 18.8	99 08	16.2	36 18.4	99 07	16.1	37 17.9	99 07	15.9	38 47.2	99 07	15.7	9
160	30 46.0	99 07	16.1	31 45.7	99 07	15.9	33 15.1	99 07	15.7	34 14.7	99 07	15.6	35 14.3	99 07	15.4	36 13.9	99 07	15.3	37 13.5	99 07	15.2	38 42.8	99 07	14.9	160
1	30 41.6	99 07	15.2	31 41.2	99 07	15.1	33 10.7	99 07	14.9	34 10.4	99 07	14.8	35 10.0	99 07	14.7	36 09.6	99 07	14.5	37 09.3	99 07	14.4	38 38.7	99 07	14.2	1
2	30 37.3	1.0 07	14.4	31 37.0	99 07	14.3	33 06.6	99 07	14.1	34 06.2	99 06	14.0	35 05.9	99 06	13.9	36 05.6	99 06	13.8	37 05.3	99 06	13.6	38 34.7	99 06	13.4	2
3	30 33.3	1.0 06	13.6	31 33.0	1.0 06	13.5	33 02.6	1.0 06	13.4	34 02.3	1.0 06	13.2	35 02.1	1.0 06	13.1	36 01.8	1.0 06	13.0	37 01.5	99 06	12.9	38 31.0	99 06	12.7	3
4	30 29.5	1.0 06	12.8	31 29.3	1.0 06	12.7	32 58.9	1.0 06	12.6	33 58.7	1.0 06	12.5	34 58.4	1.0 06	12.4	35 58.2	1.0 06	12.2	36 57.9	1.0 06	12.1	38 27.5	1.0 06	11.9	4
165	30 26.0	1.0 06	12.0	31 25.7	1.0 06	11.9	32 55.4	1.0 05	11.8	33 55.2	1.0 05	11.7	34 55.0	1.0 05	11.6	35 54.8	1.0 05	11.5	36 54.5	1.0 05	11.4	38 24.2	1.0 05	11.2	165
6	30 22.6	1.0 05	11.2	31 22.4	1.0 05	11.1	32 52.2	1.0 05	11.0	33 52.0	1.0 05	10.9	34 51.8	1.0 05	10.8	35 51.6	1.0 05	10.7	36 51.4	1.0 05	10.6	38 21.0	1.0 05	10.4	6
7	30 19.5	1.0 05	10.4	31 19.4	1.0 05	10.3	32 49.1	1.0 05	10.2	33 48.9	1.0 05	10.1	34 48.8	1.0 05	10.0	35 48.6	1.0 05	09.9	36 48.4	1.0 05	09.8	38 18.2	1.0 04	09.7	7
8	30 16.6	1.0 04	09.6	31 16.5	1.0 04	09.5	32 46.3	1.0 04	09.4	33 46.2	1.0 04	09.3	34 46.0	1.0 04	09.3	35 45.9	1.0 04	09.2	36 45.7	1.0 04	09.1	38 15.5	1.0 04	09.0	8
9	30 14.0	1.0 04	08.8	31 13.9	1.0 04	08.8	32 43.7	1.0 04	08.6	33 43.6	1.0 04	08.6	34 43.5	1.0 04	08.5	35 43.3	1.0 04	08.4	36 43.2	1.0 04	08.3	38 13.0	1.0 04	08.2	9
170	30 11.6	1.0 04	08.0	31 11.5	1.0 04	08.0	32 41.3	1.0 04	07.9	33 41.2	1.0 04	07.8	34 41.1	1.0 04	07.7	35 41.0	1.0 03	07.6	36 40.9	1.0 03	07.6	38 10.8	1.0 03	07.5	170
1	30 09.4	1.0 03	07.2	31 09.3	1.0 03	07.2	32 39.2	1.0 03	07.1	33 39.1	1.0 03	07.0	34 39.0	1.0 03	06.9	35 38.9	1.0 03	06.9	36 38.8	1.0 03	06.8	38 08.7	1.0 03	06.7	1
2	30 07.4	1.0 03	06.4	31 07.3	1.0 03	06.4	32 37.3	1.0 03	06.3	33 37.2	1.0 03	06.2	34 37.1	1.0 03	06.2	35 37.1	1.0 03	06.1	36 37.0	1.0 03	06.1	38 06.9	1.0 03	06.0	2
3	30 05.7	1.0 02	05.6	31 05.6	1.0 02	05.6	32 35.6	1.0 02	05.5	33 35.5	1.0 02	05.5	34 35.5	1.0 02	05.4	35 35.4	1.0 02	05.4	36 35.4	1.0 02	05.3	38 05.3	1.0 02	05.2	3
4	30 04.2	1.0 02	04.8	31 04.1	1.0 02	04.8	32 34.1	1.0 02	04.7	33 34.0	1.0 02	04.7	34 34.0	1.0 02	04.6	35 34.0	1.0 02	04.6	36 33.9	1.0 02	04.5	38 03.9	1.0 02	04.5	4
175	30 02.9	1.0 02	04.0	31 02.9	1.0 02	04.0	32 32.8	1.0 02	03.9	33 32.8	1.0 02	03.9	34 32.8	1.0 02	03.9	35 32.8	1.0 02	03.8	36 32.7	1.0 02	03.8	38 02.7	1.0 02	03.7	175
6	30 01.9	1.0 01	03.2	31 01.8	1.0 01	03.2	32 31.8	1.0 01	03.1	33 31.8	1.0 01	03.1	34 31.8	1.0 01	03.1	35 31.8	1.0 01	03.1	36 31.7	1.0 01	03.0	38 01.7	1.0 01	03.0	6
7	30 01.0	1.0 01	02.4	31 01.0	1.0 01	02.4	32 31.0	1.0 01	02.4	33 31.0	1.0 01	02.3	34 31.0	1.0 01	02.3	35 31.0	1.0 01	02.3	36 31.0	1.0 01	02.3	38 01.0	1.0 01	02.2	7
8	30 00.5	1.0 01	01.6	31 00.5	1.0 01	01.6	32 30.5	1.0 01	01.6	33 30.4	1.0 01	01.6	34 30.4	1.0 01	01.5	35 30.4	1.0 01	01.5	36 30.4	1.0 01	01.5	38 00.4	1.0 01	01.5	8
9	30 00.1	1.0 00	00.8	31 00.1	1.0 00	00.8	32 30.1	1.0 00	00.8	33 30.1	1.0 00	00.8	34 30.1	1.0 00	00.8	35 30.1	1.0 00	00.8	36 30.1	1.0 00	00.8	38 00.1	1.0 00	00.7	9
180	30 00.0	1.0 00	00.0	31 00.0	1.0 00	00.0	32 30.0	1.0 00	00.0	33 30.0	1.0 00	00.0	34 30.0	1.0 00	00.0	35 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	38 00.0	1.0 00	00.0	180

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	70 30.0	1.0 00	180.0	71 00.0	1.0 00	180.0	72 00.0	1.0 00	180.0	72 30.0	1.0 00	180.0	73 00.0	1.0 00	180.0	73 30.0	1.0 00	180.0	75 00.0	1.0 00	180.0	75 30.0	1.0 00	180.0	00
1	70 29.8	1.0 01	178.3	70 59.7	1.0 01	178.2	71 59.7	1.0 01	178.2	72 29.7	1.0 01	178.2	72 59.7	1.0 01	178.1	73 29.7	1.0 01	178.1	74 59.7	1.0 01	178.0	75 29.7	1.0 01	178.0	1
2	70 29.0	1.0 02	176.5	70 59.0	1.0 02	176.5	71 59.0	1.0 02	176.4	72 28.9	1.0 02	176.3	72 58.9	1.0 02	176.3	73 28.9	1.0 02	176.2	74 58.9	1.0 02	176.0	75 28.8	1.0 02	175.9	2
3	70 27.7	1.0 03	174.8	70 57.7	1.0 03	174.7	71 57.7	1.0 03	174.6	72 27.6	1.0 03	174.5	72 57.6	1.0 03	174.4	73 27.5	1.0 03	174.3	74 57.4	1.0 03	174.0	75 27.4	1.0 03	173.9	3
4	70 26.0	1.0 04	173.1	70 55.9	1.0 04	173.0	71 55.8	1.0 04	172.8	72 25.8	1.0 04	172.7	72 55.7	1.0 04	172.6	73 25.6	1.0 04	172.4	74 55.4	1.0 04	172.1	75 25.3	1.0 04	171.9	4
05	70 23.7	1.0 05	171.3	70 53.7	1.0 05	171.2	71 53.5	1.0 05	171.0	72 23.4	1.0 05	170.9	72 53.3	1.0 05	170.7	73 23.2	1.0 05	170.6	74 52.9	1.0 05	170.1	75 22.7	1.0 05	169.9	05
6	70 21.0	1.0 06	169.6	70 50.9	1.0 05	169.5	71 50.6	1.0 06	169.2	72 20.5	1.0 06	169.0	72 50.4	1.0 06	168.9	73 20.2	99 06	168.7	74 49.7	99 06	168.1	75 19.5	99 06	167.9	6
7	70 17.8	1.0 06	167.9	70 47.6	99 06	167.7	71 47.3	99 06	167.4	72 17.1	99 07	167.2	72 46.9	99 07	167.0	73 16.7	99 07	166.8	74 46.0	99 07	166.2	75 15.8	99 07	165.9	7
8	70 14.1	99 07	166.2	70 43.9	99 07	166.0	71 43.4	99 07	165.6	72 13.2	99 07	165.4	72 43.0	99 07	165.2	73 12.7	99 08	165.0	74 41.8	99 08	164.2	75 11.5	99 08	164.0	8
9	70 09.9	99 08	164.5	70 39.6	99 08	164.3	71 39.1	99 08	163.9	72 08.8	99 08	163.6	72 38.5	99 08	163.4	73 08.2	99 08	163.2	74 37.1	99 09	162.3	75 06.7	99 09	162.0	9
10	70 05.2	99 09	162.8	70 34.9	99 09	162.6	71 34.2	99 09	162.1	72 03.9	99 09	161.9	72 33.5	99 09	161.6	73 03.1	99 09	161.3	74 31.8	98 10	160.4	75 01.3	98 10	160.1	10
1	70 00.1	99 09	161.1	70 29.7	99 09	160.9	71 28.9	99 10	160.4	71 58.5	99 10	160.1	72 28.1	98 10	159.8	72 57.6	98 10	159.5	74 26.0	98 10	158.5	74 55.4	98 11	158.1	1
2	69 54.5	99 10	159.4	70 24.1	99 10	159.2	71 23.1	98 10	158.6	71 52.6	98 11	158.4	72 22.1	98 11	158.0	72 51.6	98 11	157.7	74 19.7	98 11	156.6	74 49.0	98 12	156.2	2
3	69 48.5	98 11	157.8	70 18.0	98 11	157.5	71 16.9	98 11	156.9	71 46.3	98 11	156.6	72 15.7	98 11	156.3	72 45.0	98 12	155.9	74 12.9	97 12	154.8	74 42.1	97 12	154.4	3
4	69 42.0	98 12	156.1	70 11.4	98 12	155.8	71 10.2	98 12	155.2	71 39.5	98 12	154.9	72 08.8	98 12	154.5	72 38.1	97 12	154.2	74 05.6	97 13	153.0	74 34.7	97 13	152.5	4
15	69 35.1	98 12	154.5	70 04.4	98 12	154.2	71 03.0	98 13	153.5	71 32.3	97 13	153.2	72 01.5	97 13	152.8	72 30.6	97 13	152.4	73 57.8	97 14	151.1	74 26.8	96 14	150.7	15
6	69 27.7	98 13	152.9	69 57.0	98 13	152.5	70 55.4	97 13	151.9	71 24.6	97 14	151.5	71 53.7	97 14	151.1	72 22.8	97 14	150.7	73 49.6	96 14	149.4	74 18.5	96 15	148.9	6
7	69 20.0	97 14	151.2	69 49.2	97 14	150.9	70 47.4	97 14	150.2	71 16.5	97 14	149.8	71 45.5	97 14	149.4	72 14.5	96 15	149.0	73 41.0	96 15	147.6	74 09.7	96 15	147.1	7
8	69 11.8	97 14	149.7	69 40.9	97 14	149.3	70 39.0	97 15	148.6	71 08.0	96 15	148.2	71 36.9	96 15	147.8	72 05.7	96 15	147.3	73 31.9	96 16	145.8	74 00.5	96 16	145.3	8
9	69 03.3	97 15	148.1	69 32.3	97 15	147.7	70 30.2	96 15	146.9	70 59.0	96 16	146.5	71 27.9	96 16	146.1	71 56.6	96 16	145.6	73 22.4	95 16	144.1	73 50.9	95 17	143.6	9
20	68 54.3	97 16	146.5	69 23.3	96 16	146.1	70 21.0	96 16	145.3	70 49.7	96 16	144.9	71 18.4	96 16	144.5	71 47.1	95 17	144.0	73 12.5	95 17	142.4	73 40.8	94 17	141.8	20
1	68 45.0	96 16	145.0	69 13.9	96 16	144.6	70 11.4	96 17	143.8	70 40.0	95 17	143.3	71 08.6	95 17	142.8	71 37.2	95 17	142.4	73 02.3	94 18	140.8	73 30.4	94 18	140.2	1
2	68 35.3	96 17	143.4	69 04.1	96 17	143.0	70 01.4	96 17	142.2	70 30.0	95 17	141.7	70 58.5	95 18	141.3	71 26.9	95 18	140.8	72 51.6	94 18	139.1	73 19.7	93 19	138.5	2
3	68 25.3	96 17	141.9	68 54.0	95 17	141.5	69 51.1	95 18	140.6	70 19.6	95 18	140.2	70 47.9	94 18	139.7	71 16.2	94 18	139.2	72 40.6	93 19	137.5	73 08.5	93 19	136.9	3
4	68 14.9	95 18	140.4	68 43.5	95 18	140.0	69 40.4	95 18	139.1	70 08.8	94 18	138.6	70 37.1	94 19	138.1	71 05.3	94 19	137.6	72 29.3	93 19	135.9	72 57.0	92 20	135.2	4
25	68 04.2	95 18	138.9	68 32.7	95 19	138.5	69 29.4	94 19	137.6	69 57.7	94 19	137.1	70 25.9	94 19	136.6	70 53.9	93 19	136.1	72 17.6	92 20	134.3	72 45.2	92 20	133.7	25
6	67 53.2	95 19	137.4	68 21.6	94 19	137.0	69 18.1	94 19	136.1	69 46.3	94 20	135.6	70 14.3	93 20	135.1	70 42.3	93 20	134.5	72 05.6	92 20	132.8	72 33.1	92 21	132.1	6
7	67 41.9	94 19	136.0	68 10.2	94 20	135.6	69 06.5	94 20	134.6	69 34.6	93 20	134.1	70 02.5	93 20	133.6	70 30.4	93 20	133.0	71 53.3	92 21	131.2	72 20.7	91 21	130.6	7
8	67 30.2	94 20	134.6	67 58.4	94 20	134.1	68 54.6	93 20	133.2	69 22.5	93 20	132.6	69 50.4	93 21	132.1	70 18.1	92 21	131.6	71 40.7	91 21	129.7	72 08.0	91 21	129.0	8
9	67 18.3	94 20	133.1	67 46.4	94 20	132.7	68 42.4	93 21	131.7	69 10.2	93 21	131.2	69 38.0	92 21	130.7	70 05.6	92 21	130.1	71 27.9	91 22	128.2	71 55.0	90 22	127.6	9
30	67 06.1	94 21	131.7	67 34.1	93 21	131.3	68 29.9	93 21	130.3	68 57.6	92 21	129.8	69 25.3	92 22	129.2	69 52.8	92 22	128.6	71 14.7	90 22	126.8	71 41.8	90 22	126.1	30
1	66 53.6	93 21	130.3	67 21.6	93 21	129.9	68 17.2	92 22	128.9	68 44.8	92 22	128.4	69 12.4	92 22	127.8	69 39.8	91 22	127.2	71 01.4	90 23	125.3	71 28.3	89 23	124.7	1
2	66 40.9	93 22	129.0	67 08.7	93 22	128.5	68 04.2	92 22	127.5	68 31.7	92 22	127.0	68 59.2	91 22	126.4	69 26.5	91 23	125.8	70 47.8	90 23	123.9	71 14.6	89 23	123.2	2
3	66 27.9	93 22	127.6	66 55.7	92 22	127.1	67 50.9	92 22	126.1	68 18.4	91 23	125.6	68 45.7	91 23	125.0	69 13.0	91 23	124.4	70 33.9	89 23	122.5	71 00.6	89 23	121.8	3
4	66 14.7	92 22	126.3	66 42.4	92 23	125.8	67 37.4	91 23	124.8	68 04.8	91 23	124.2	68 32.1	91 23	123.7	68 59.2	90 23	123.1	70 19.9	89 24	121.2	70 46.5	88 24	120.5	4
35	66 01.3	92 23	125.0	66 28.8	92 23	124.5	67 23.7	91 23	123.4	67 51.0	91 23	122.9	68 18.2	90 23	122.3	68 45.3	90 24	121.7	70 05.6	89 24	119.8	70 32.1	88 24	119.1	35
6	65 47.6	92 23	123.6	66 15.1	92 23	123.2	67 09.8	91 24	122.1	67 37.0	90 24	121.6	68 04.1	90 24	121.0	68 31.1	90 24	120.4	69 51.2	88 24	118.5	70 17.6	88 25	117.8	6
7	65 33.7	92 23	122.4	66 01.2	91 24	121.9	66 55.7	91 24	120.8	67 22.9	90 24	120.3	67 49.9	90 24	119.7	68 16.7	89 24	119.1	69 36.6	88 25	117.2	70 02.9	87 25	116.5	7
8	65 19.7	91 24	121.1	65 47.0	91 24	120.6	66 41.4	90 24	119.5	67 08.5	90 24	119.0	67 35.4	90 24	118.4	68 02.2	89 25	117.8	69 21.8	88 25	115.9	69 48.0	87 25	115.2	8
9	65 05.4	91 24	119.8	65 32.7	91 24	119.3	66 27.0	90 24	118.3	66 53.9	90 25	117.7	67 20.8	89 25	117.1	67 47.5	89 25	116.5	69 06.8	87 25	114.6	69 32.9	87 25	113.9	9
40	64 51.0	91 24	118.6	65 18.2	91 24	118.1	66 12.3	90 25	117.0	66 39.2	89 25	116.5	67 06.0	89 25	115.9	67 32.6	89 25	115.3	68 51.7	87 25	113.4	69 17.7	87 26	112.7	40
1	64 36.4	91 25	117.3	65 03.5	90 25	116.8	65 57.5	90 25	115.8	66 24.3	89 25	115.2	66 51.0	89 25	114.6	67 17.6	88 25	114.1	68 36.4	87 26	112.1	69 02.4	86 26	111.4	1
2	64 21.6	90 25	116.1	64 48.7	90 25	115.6	65 42.5	89 25	114.6	66 09.3	89 26	114.0	66 35.9	89 25	113.4	67 02.4	88 26	112.8	68 21.1	87 26	110.9	68 47.0	86 26	110.2	2
3	64 06.7	90 25	114.9	64 33.7	90 25	114.4	65 27.4	89 25	113.3	65 54.1	89 26	112.8	66 20.7	88 26	112.2	66 47.1	88 26	111.6	68 05.6	86 26	109.7	68 31.4	86 26	109.0	3
4	63 51.6	90 25	113.7	64 18.6	90 25	113.2	65 12.2	89 26	112.2	65 38.8	89 26	111.6	66 05.3	88 26	111.0	66 31.7	88 26	110.4	67 49.9	86 26	108.5	68 15.7	86 26	107.8	4
45	63 36.4	90 26	112.5	64 03.3	90 26	112.0	64 56.8	89 26	111.0	65 23.4	88 26	110.4	65 49.8	88 26	109.8	66 16.1	87 26	109.3	67 34.2	86 26	107.4	67 59.9	85 26	106.7	45
6	63 21.0	90 26	111.4	63 47.9	89 26	110.9	64 41.3	89 26	109.8	65 07.8	88 26	109.3	65 34.2	88 26	108.7	66 00.4	87 26	108.1	67 18.4	86 27	106.2	67 44.0	85 27	105.5	6
7	63 05.6	90 26	110.2	63 32.4	89 26	109.7	64 25.7	88 26	108.7	64 52.1	88 26	108.1	65 18.5	88 26	107.5	65 44.7	87 26	107.0	67 02.4	86 27	105.1	67 28.0	85 27	104.4	7
8	62 50.0	89 26	109.1	63 16.8	89 26	108.6	64 09.9	88 26	107.5	64 36.4	88 26	107.0	65 02.7	87 26	106.4	65 28.8	87 27	105.8	66 46.4	85 27	103.9	67 12.0	85 27	103.3	8
9	62 34.3	89 26	107.9	63 01.0	89 26	107.4	63 54.1	88 26	106.4	64 20.5	88 27	105.8	64 46.7	87 27	105.3	65 12.9	87 27	104.7	66 30.3	85 27	102.8	66 55.8	85 27	102.2	9
50	62 18.5	89 26	106.8	62 45.2	89 27	106.3	63 38.2	88 27	105.3	64 04.5	88 27	104.7	64 30.7	87 27	104.2	64 56.8	87 27	103.6	66 14.2	85 27	101.7	66 39.6	85 27	101.1	50
1	62 02.6	89 27	105.7	62 29.3	89 26	105.2	63 22.2	88 27	104.2	63 48.5	87 27	103.6	64 14.7	87 27	103.1	64 40.7	87 27	102.5	65 57.9	85 27	100.7	66 23.4	84 27	100.0	1
2	61 46.7	89 27	104.6	62 13.3	88 27	104.1	63 06.1	88 27	103.1	63 32.4	87 27	102.5	63 58.5	87 27	102.0	64 24.5	86 27	101.4	65 41.7	85 27	99.6	66 07.1	84 27	98.9	2
3	61 30.6	89 27	103.5	61 57.2	88 27	103.0	62 50.0	88 27	102.0	63 16.2	87 27	101.5	63 42.3	87 27	100.9	64 08.3	86 27	100.3	65 25.3	85 27	98.5	65 50.7	84 27	97.9	3
4	61 14.5	89 27	102.4	61 41.1	88 27	102.0	62 33.8	88 27	100.9	63 00.0	87 27	100.4	63 26.1	87 27	99.9	63 52.0	86 27	99.3	65 09.0	85 27	97.5	65 34.3	84 27	96.8	4
55	60 58.3	89 27	101.4	61 24.8	88 27	100.9	62 17.5	87 27	99.9	62 43.7	87 27	99.4	63 09.7	87 27	98.8	63 35.6	86 27	98.2	64 52.5	85 27	96.5	65 17.9	84 27	95.8	55
6	60 42.1	88 27	100.3	61 08.6	88 27	99.8	62 01.2	87 27	98.8	62 27.4	87 27	98.3	62 53.4	87 27	97.8	63 19.3	86 27	97.2	64 36.1	85 27	95.4	65 01.4	84 27	94.8	6
7	60 25.8	88 27	99.3	60 52.3	88 27	98.8	61 44.8	87 27	97.8	62 11.0	87 27	97.3	62 37.0	87 27	96.7	63 02.8	86 27	96.2	64 19.6	85 28	94.4	64 44.9	84 28	93.8	7
8	60 09.5	88 27	98.2	60 35.9	88 27	97.8	61 28.4	87 27	96.8	61 54.5	87 27	96.3	62 20.5	86 27	95.7	62 46.4	86 27	95.2	64 03.1	85 28	93.4	64 28.4	84 28	92.8	8
9	59 53.1	88 27	97.2	60 19.5	88 27	96.7	61 12.0	87 27	95.8	61 38.1	87 27	95.2	62 04.1	86 27	94.7	62 29.9	86 28	94.2	63 46.6	85 28	92.4	64 11.9	84 28	91.8	9
60	59 36.7	88 27	96.2	60 03.1	88 27	95.7	60 55.5	87 27	94.8	61 21.6	87 28	94.2	61 47.6	86 28	93.7	62 13.4	86 28	93.2	63 30.1	84 28	91.4	63 55.3	84 28	90.8	60
1	59 20.2	88 27	95.2	59 46.6	88 28	94.7	60 39.0	87 28	93.8	61 05.1	87 28	93.2	61 31.0	86 28	92.7	61 56.9	86 28	92.2	63 13.5	84 28	90.5	63 38.8	84 28	89.9	1
2	59 03.7	88 28	94.2	59 30.1	88 28	93.7	60 22.5	87 28	92.8	60 48.6	87 28	92.3	61 14.5	86 28	91.7	61 40.3	86 28	91.2	62 57.0	84 28	89.5	63 22.3	84 28	88.9	2
3	58 47.2	88 28	93.2	59 13.6	88 28	92.7	60 06.0	87 28	91.8	60 32.1	87 28	91.3	60 58.0	86 28	90.8	61 23.8	86 28	90.2	62 40.5	84 28	88.6	63 05.7	84 28	88.0	3
4	58 30.7	88 28	92.2	58 57.1	88 28	91.8	59 49.5	87 28	90.8	60 15.5	87 28	90.3	60 41.5	86 28	89.8	61 07.3	86 28	89.3	62 23.9	85 28	87.6	62 49.2	84 28	87.0	4
65	58 14.2	88 28	91.3	58 40.5	88 28	90.8	59 32.9	87 28	89.8	59 59.0	87 28	89.4	60 24.9	86 28	88.8	60 50.7	86 28	88.3	62 07.4	85 28	86.7	62 32.7	84 27	86.1	65
6	57 57.6	88 28	90.3	58 24.0	88 28	89.8	59 16.4	87 28	88.9	59 42.4	87 28	88.4	60 08.4	86 28	87.9	60 34.2	86 28	87.4	61 50.9	85 27	85.8	62 16.2	84 27	85.2	6
7	57 41.1	88 28	89.3	58 07.4	88 28	88.9	58 59.9	87 28	87.9	59 25.9	87 28	87.5	59 51.9	86 28	87.0	60 17.7	86 27	86.5	61 34.4	85 27	84.8	61 59.7	84 27	84.3	7
8	57 24.6	88 28	88.4	57 50.9	88 28	87.9	58 43.3	87 28	87.0	59 09.4	87 28	86.5	59 35.4	86 27	86.0	60 01.2	86 27	85.5	61 18.0	85 27	83.9	61 43.3	84 27	83.4	8
9	57 08.0	88 28	87.4	57 34.4	88 28	87.0	58 26.8	87 27	86.1	58 52.9	87 27	85.6	59 18.9	86 27	85.1	59 44.7	86 27	84.6	61 01.5	85 27	83.0	61 26.9	84 27	82.5	9
70	56 51.5	88 28	86.5	57 17.9	88 27	86.1	58 10.3	87 27	85.1	58 36.4	87 27	84.7	59 02.4	86 27	84.2	59 28.3	86 27	83.7	60 45.1	85 27	82.1	61 10.5	84 27	81.6	70
1	56 35.0	88 27	85.6	57 01.4	88 27	85.1	57 53.9	87 27	84.2	58 20.0	87 27	83.8	58 46.0	86 27	83.3	59 11.8	86 27	82.8	60 28.8	85 27	81.2	60 54.2	84 27	80.7	1
2	56 18.5	88 27	84.6	56 44.9	88 27	84.2	57 37.4	87 27	83.3	58 03.5	87 27	82.8	58 29.6	87 27	82.4	58 55.5	86 27	81.9	60 12.5	85 27	80.4	60 37.9	85 27	79.8	2
3	56 02.1	88 27	83.7	56 28.5	88 27	83.3	57 21.0	87 27	82.4	57 47.2	87 27	81.9	58 13.2	87 27	81.5	58 39.1	86 27	81.0	59 56.2	85 27	79.5	60 21.6	85 27	78.9	3
4	55 45.7	88 27	82.8	56 12.1	88 27	82.4	57 04.7	87 27	81.5	57 30.8	87 27	81.0	57 56.8	87 27	80.6	58 22.8	86 27	80.1	59 39.9	85 27	78.6	60 05.4	85 27	78.1	4
75	55 29.3	88 27	81.9	55 55.7	88 27	81.5	56 48.3	87 27	80.6	57 14.5	87 27	80.2	57 40.6	87 27	79.7	58 06.5	86 27	79.2	59 23.8	85 27	77.7	59 49.3	85 27	77.2	75
6	55 12.9	88 27	81.0	55 39.4	88 27	80.6	56 32.0	87 27	79.7	56 58.2	87 27	79.3	57 24.3	87 27	78.8	57 50.3	86 27	78.3	59 07.6	85 27	76.9	59 33.2	85 27	76.4	6
7	54 56.6	88 27	80.1	55 23.1	88 27	79.7	56 15.8	87 27	78.8	56 42.0	87 27	78.4	57 08.1	87 27	77.9	57 34.1	87 27	77.5	58 51.5	86 27	76.0	59 17.1	85 27	75.5	7
8	54 40.3	88 27	79.2	55 06.8	88 27	78.8	55 59.6	88 27	78.0	56 25.8	87 27	77.5	56 52.0	87 27	77.1	57 18.0	87 27	76.6	58 35.5	86 27	75.2	59 01.1	85 27	74.7	8
9	54 24.1	89 27	78.3	54 50.6	88 27	77.9	55 43.4	88 27	77.1	56 09.7	87 27	76.6	56 35.9	87 27	76.2	57 01.9	87 27	75.8	58 19.6	86 26	74.3	58 45.2	85 26	73.8	9
80	54 07.9	89 27	77.4	54 34.5	88 27	77.0	55 27.3	88 27	76.2	55 53.6	88 27	75.8	56 19.8	87 27	75.3	56 45.9	87 27	74.9	58 03.7	86 26	73.5	58 29.4	85 26	73.0	80
1	53 51.8	89 27	76.6	54 18.4	88 27	76.2	55 11.3	88 27	75.3	55 37.6	88 27	74.9	56 03.9	87 26	74.5	56 30.0	87 26	74.0	57 47.8	86 26	72.7	58 13.6	86 26	72.2	1
2	53 35.8	89 27	75.7	54 02.4	89 27	75.3	54 55.3	88 26	74.5	55 21.7	88 26	74.1	55 48.0	87 26	73.6	56 14.1	87 26	73.2	57 32.1	86 26	71.8	57 57.9	86 26	71.4	2
3	53 19.8	89 27	74.8	53 46.4	89 26	74.4	54 39.4	88 26	73.6	55 05.8	88 26	73.2	55 32.1	88 26	72.8	55 58.3	87 26	72.4	57 16.4	86 26	71.0	57 42.2	86 26	70.5	3
4	53 03.9	89 26	74.0	53 30.5	89 26	73.6	54 23.6	88 26	72.8	54 50.0	88 26	72.4	55 16.4	88 26	72.0	55 42.6	87 26	71.5	57 00.8	86 26	70.2	57 26.7	86 26	69.7	4
85	52 48.0	89 26	73.1	53 14.7	89 26	72.7	54 07.8	88 26	71.9	54 34.3	88 26	71.5	55 00.7	88 26	71.1	55 27.0	87 26	70.7	56 45.3	87 26	69.4	57 11.2	86 26	68.9	85
6	52 32.2	89 26	72.2	52 58.9	89 26	71.9	53 52.2	88 26	71.1	54 18.7	88 26	70.7	54 45.1	88 26	70.3	55 11.4	88 26	69.9	56 29.9	87 26	68.6	56 55.8	86 26	68.1	6
7	52 16.5	90 26	71.4	52 43.2	89 26	71.0	53 36.6	89 26	70.3	54 03.1	88 26	69.9	54 29.5	88 26	69.5	54 55.9	88 26	69.0	56 14.5	87 25	67.8	56 40.5	87 25	67.3	7
8	52 00.9	90 26	70.6	52 27.7	89 26	70.2	53 21.0	89 26	69.4	53 47.6	88 26	69.0	54 14.1	88 26	68.6	54 40.5	88 26	68.2	55 59.3	87 25	66.9	56 25.3	87 25	66.5	8
9	51 45.3	90 26	69.7	52 12.1	89 26	69.3	53 05.6	89 26	68.6	53 32.2	89 26	68.2	53 58.7	88 25	67.8	54 25.2	88 25	67.4	55 44.1	87 25	66.2	56 10.2	87 25	65.7	9
90	51 29.8	90 26	68.9	51 56.7	89 26	68.5	52 50.2	89 26	67.8	53 16.9	89 25	67.4	53 43.5	88 25	67.0	54 10.0	88 25	66.6	55 29.0	87 25	65.4	55 55.2	87 25	64.9	90

Lat. 74°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	51 14.5	90 26	68.0	51 41.4	90 25	67.7	52 35.0	89 25	67.0	53 01.7	89 25	66.6
2	50 59.2	90 25	67.2	51 26.1	90 25	66.9	52 19.8	89 25	66.1	52 46.5	89 25	65.8
3	50 44.0	90 25	66.4	51 10.9	90 25	66.0	52 04.7	89 25	65.3	52 31.5	89 25	64.9
4	50 28.9	90 25	65.6	50 55.9	90 25	65.2	51 49.7	90 25	64.5	52 16.6	89 25	64.1
95	50 13.8	90 25	64.7	50 40.9	90 25	64.4	51 34.9	90 25	63.7	52 01.7	89 25	63.3
6	49 58.9	90 25	63.9	50 26.1	90 25	63.6	51 20.1	90 24	62.9	51 47.0	90 24	62.5
7	49 44.1	91 24	63.1	50 11.3	90 24	62.8	51 05.4	90 24	62.1	51 32.4	90 24	61.7
8	49 29.4	91 24	62.3	49 56.6	91 24	62.0	50 50.9	90 24	61.3	51 17.9	90 24	60.9
9	49 14.9	91 24	61.5	49 42.1	91 24	61.2	50 36.4	90 24	60.5	51 03.5	90 24	60.2
100	49 00.4	91 24	60.7	49 27.7	91 24	60.4	50 22.1	90 24	59.7	50 49.2	90 24	59.4
1	48 46.0	91 24	59.9	49 13.4	91 24	59.6	50 07.9	91 24	58.9	50 35.0	90 23	58.6
2	48 31.8	91 24	59.1	48 59.2	91 23	58.8	49 53.8	91 23	58.1	50 21.0	91 23	57.8
3	48 17.7	91 23	58.3	48 45.1	91 23	58.0	49 39.8	91 23	57.3	50 07.0	91 23	57.0
4	48 03.7	92 23	57.5	48 31.1	91 23	57.2	49 25.9	91 23	56.5	49 53.2	91 23	56.2
105	47 49.8	92 23	56.7	48 17.3	92 23	56.4	49 12.2	91 23	55.8	49 39.6	91 23	55.4
6	47 36.0	92 23	55.9	48 03.6	92 23	55.6	48 58.6	91 22	55.0	49 26.0	91 22	54.7
7	47 22.4	92 22	55.1	47 50.0	92 22	54.8	48 45.1	92 22	54.2	49 12.6	91 22	53.9
8	47 08.9	92 22	54.3	47 36.6	92 22	54.0	48 31.7	92 22	53.4	48 59.3	92 22	53.1
9	46 55.5	92 22	53.5	47 23.2	92 22	53.2	48 18.5	92 22	52.6	48 46.1	92 22	52.4
110	46 42.3	93 22	52.7	47 10.1	92 22	52.4	48 05.5	92 22	51.9	48 33.1	92 21	51.6
1	46 29.2	93 22	51.9	46 57.0	93 22	51.7	47 52.5	92 21	51.1	48 20.2	92 21	50.8
2	46 16.3	93 21	51.2	46 44.1	93 21	50.9	47 39.7	93 21	50.3	48 07.4	92 21	50.1
3	46 03.4	93 21	50.4	46 31.4	93 21	50.1	47 27.0	93 21	49.6	47 54.8	93 21	49.3
4	45 50.8	93 21	49.6	46 18.7	93 21	49.3	47 14.5	93 21	48.8	47 42.4	93 21	48.5
115	45 38.3	93 21	48.8	46 06.3	93 21	48.6	47 02.2	93 20	48.0	47 30.1	93 20	47.8
6	45 25.9	94 20	48.1	45 53.9	93 20	47.8	46 49.9	93 20	47.3	47 17.9	93 20	47.0
7	45 13.7	94 20	47.3	45 41.8	94 20	47.0	46 37.9	93 20	46.5	47 05.9	93 20	46.3
8	45 01.6	94 20	46.5	45 29.7	94 20	46.3	46 25.9	94 20	45.8	46 54.0	93 20	45.5
9	44 49.7	94 20	45.7	45 17.9	94 20	45.5	46 14.2	94 19	45.0	46 42.3	94 19	44.7
120	44 37.9	94 19	45.0	45 06.1	94 19	44.7	46 02.5	94 19	44.2	46 30.7	94 19	44.0
1	44 26.3	94 19	44.2	44 54.6	94 19	44.0	45 51.1	94 19	43.5	46 19.3	94 19	43.2
2	44 14.8	95 19	43.4	44 43.2	94 19	43.2	45 39.8	94 19	42.7	46 08.0	94 18	42.5
3	44 03.6	95 19	42.7	44 31.9	95 18	42.4	45 28.6	94 18	42.0	45 57.0	94 18	41.7
4	43 52.4	95 18	41.9	44 20.9	95 18	41.7	45 17.7	95 18	41.2	45 46.0	94 18	41.0
125	43 41.5	95 18	41.1	44 10.0	95 18	40.9	45 06.8	95 18	40.5	45 35.3	95 18	40.2
6	43 30.7	95 18	40.4	43 59.2	95 18	40.2	44 56.2	95 17	39.7	45 24.7	95 17	39.5
7	43 20.0	95 17	39.6	43 48.6	95 17	39.4	44 45.7	95 17	39.0	45 14.2	95 17	38.8
8	43 09.6	95 17	38.9	43 38.2	95 17	38.6	44 35.4	95 17	38.2	45 04.0	95 17	38.0
9	42 59.3	96 17	38.1	43 28.0	96 17	37.9	44 25.2	95 17	37.5	44 53.9	95 17	37.3
130	42 49.2	96 17	37.3	43 17.9	96 16	37.1	44 15.3	96 16	36.7	44 43.9	95 16	36.5
1	42 39.2	96 16	36.6	43 08.0	96 16	36.4	44 05.5	96 16	36.0	44 34.2	96 16	35.8
2	42 29.5	96 16	35.8	42 58.3	96 16	35.6	43 55.8	96 16	35.2	44 24.6	96 16	35.0
3	42 19.9	96 16	35.1	42 48.7	96 16	34.9	43 46.4	96 15	34.5	44 15.2	96 15	34.3
4	42 10.5	96 15	34.3	42 39.4	96 15	34.1	43 37.1	96 15	33.8	44 05.9	96 15	33.6
135	42 01.2	96 15	33.6	42 30.2	96 15	33.4	43 28.0	96 15	33.0	43 56.9	96 15	32.8
6	41 52.2	97 15	32.8	42 21.2	97 15	32.6	43 19.1	96 15	32.3	43 48.0	96 14	32.1
7	41 43.3	97 14	32.0	42 12.3	97 14	31.9	43 10.3	97 14	31.5	43 39.3	97 14	31.4
8	41 34.6	97 14	31.3	42 03.7	97 14	31.1	43 01.8	97 14	30.8	43 30.8	97 14	30.6
9	41 26.1	97 14	30.5	41 55.2	97 14	30.4	42 53.4	97 14	30.0	43 22.5	97 14	29.9
140	41 17.8	97 14	29.8	41 47.0	97 13	29.6	42 45.2	97 13	29.3	43 14.3	97 13	29.1
1	41 09.7	97 13	29.0	41 38.9	97 13	28.9	42 37.2	97 13	28.6	43 06.4	97 13	28.4
2	41 01.8	97 13	28.3	41 31.0	97 13	28.1	42 29.4	97 13	27.8	42 58.6	97 13	27.7
3	40 54.0	98 13	27.5	41 23.3	98 13	27.4	42 21.8	97 12	27.1	42 51.0	97 12	26.9
4	40 46.5	98 12	26.8	41 15.8	98 12	26.6	42 14.3	98 12	26.4	42 43.6	98 12	26.2
145	40 39.1	98 12	26.0	41 08.4	98 12	25.9	42 07.1	98 12	25.6	42 36.4	98 12	25.5
6	40 32.0	98 12	25.3	41 01.3	98 12	25.2	42 00.0	98 11	24.9	42 29.4	98 11	24.7
7	40 25.0	98 11	24.5	40 54.4	98 11	24.4	41 53.2	98 11	24.1	42 22.6	98 11	24.0
8	40 18.2	98 11	23.8	40 47.7	98 11	23.7	41 46.5	98 11	23.4	42 15.9	98 11	23.3
9	40 11.6	98 11	23.1	40 41.1	98 11	22.9	41 40.0	98 10	22.7	42 09.5	98 10	22.5
150	40 05.3	98 10	22.3	40 34.8	98 10	22.2	41 33.8	98 10	21.9	42 03.2	98 10	21.8
1	39 59.1	98 10	21.6	40 28.6	98 10	21.4	41 27.7	98 10	21.2	41 57.2	98 10	21.1
2	39 53.1	99 10	20.8	40 22.7	99 10	20.7	41 21.8	99 09	20.5	41 51.3	98 09	20.4
3	39 47.3	99 09	20.1	40 16.9	99 09	20.0	41 16.1	99 09	19.7	41 45.7	99 09	19.6
4	39 41.8	99 09	19.3	40 11.4	99 09	19.2	41 10.6	99 09	19.0	41 40.2	99 09	18.9
155	39 36.4	99 09	18.6	40 06.0	99 09	18.5	41 05.3	99 08	18.3	41 35.0	99 08	18.2
6	39 31.2	99 08	17.8	40 00.9	99 08	17.7	41 00.2	99 08	17.5	41 29.9	99 08	17.4
7	39 26.3	99 08	17.1	39 56.0	99 08	17.0	40 55.4	99 08	16.8	41 25.1	99 08	16.7
8	39 21.5	99 08	16.3	39 51.2	99 08	16.3	40 50.7	99 07	16.1	41 20.4	99 07	16.0
9	39 17.0	99 07	15.6	39 46.7	99 07	15.5	40 46.2	99 07	15.3	41 15.9	99 07	15.3
160	39 12.6	99 07	14.9	39 42.4	99 07	14.8	40 41.9	99 07	14.6	41 11.7	99 07	14.5
1	39 08.5	99 07	14.1	39 38.3	99 06	14.0	40 37.9	99 06	13.9	41 07.6	99 06	13.8
2	39 04.6	99 06	13.4	39 34.4	99 06	13.3	40 34.0	99 06	13.1	41 03.8	99 06	13.1
3	39 00.8	99 06	12.6	39 30.7	99 06	12.6	40 30.3	99 06	12.4	41 00.2	99 06	12.3
4	38 57.3	1.0 05	11.9	39 27.2	1.0 05	11.8	40 26.9	1.0 05	11.7	40 56.7	99 05	11.6
165	38 54.0	1.0 05	11.1	39 23.9	1.0 05	11.1	40 23.6	1.0 05	11.0	40 53.5	1.0 05	10.9
6	38 50.9	1.0 05	10.4	39 20.8	1.0 05	10.3	40 20.6	1.0 05	10.2	40 50.5	1.0 05	10.2
7	38 48.1	1.0 04	09.6	39 18.0	1.0 04	09.6	40 17.8	1.0 04	09.5	40 47.7	1.0 04	09.4
8	38 45.4	1.0 04	08.9	39 15.3	1.0 04	08.9	40 15.1	1.0 04	08.8	40 45.1	1.0 04	08.7
9	38 42.9	1.0 04	08.2	39 12.9	1.0 04	08.1	40 12.7	1.0 04	08.0	40 42.7	1.0 04	08.0
170	38 40.7	1.0 03	07.4	39 10.6	1.0 03	07.4	40 10.5	1.0 03	07.3	40 40.5	1.0 03	07.3
1	38 38.7	1.0 03	06.7	39 08.6	1.0 03	06.6	40 08.5	1.0 03	06.6	40 38.5	1.0 03	06.5
2	38 36.8	1.0 03	05.9	39 06.8	1.0 03	05.9	40 06.7	1.0 03	05.8	40 36.7	1.0 03	05.8
3	38 35.2	1.0 02	05.2	39 05.2	1.0 02	05.2	40 05.2	1.0 02	05.1	40 35.1	1.0 02	05.1
4	38 33.9	1.0 02	04.5	39 03.8	1.0 02	04.4	40 03.8	1.0 02	04.4	40 33.8	1.0 02	04.4
175	38 32.7	1.0 02	03.7	39 02.7	1.0 02	03.7	40 02.6	1.0 02	03.6	40 32.6	1.0 02	03.6
6	38 31.7	1.0 01	03.0	39 01.7	1.0 01	03.0	40 01.7	1.0 01	02.9	40 31.7	1.0 01	02.9
7	38 31.0	1.0 01	02.2	39 01.0	1.0 01	02.2	40 00.9	1.0 01	02.2	40 30.9	1.0 01	02.2
8	38 30.4	1.0 01	01.5	39 00.4	1.0 01	01.5	40 00.4	1.0 01	01.5	40 30.4	1.0 01	01.5
9	38 30.1	1.0 00	00.7	39 00.1	1.0 00	00.7	40 00.1	1.0 00	00.7	40 30.1	1.0 00	00.7
180	38 30.0	1.0 00	00.0	39 00.0	1.0 00	00.0	40 00.0	1.0 00	00.0	40 30.0	1.0 00	00.0

57° 00′			57° 30′			59° 00′			59° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
53 28.3	89 25	66.2	53 54.8	88 25	65.8	55 14.0	88 25	64.6	55 40.2	87 25	64.1	91
53 13.2	89 25	65.4	53 39.8	89 25	65.0	54 59.1	88 25	63.8	55 25.4	87 25	63.4	2
52 58.2	89 25	64.6	53 24.9	89 25	64.2	54 44.3	88 24	63.0	55 10.7	88 24	62.6	3
52 43.3	89 25	63.8	53 10.0	89 25	63.4	54 29.7	88 24	62.2	54 56.0	88 24	61.8	4
52 28.6	89 24	63.0	52 55.3	89 24	62.6	54 15.1	88 24	61.4	54 41.5	88 24	61.0	95
52 13.9	89 24	62.2	52 40.7	89 24	61.8	54 00.6	88 24	60.7	54 27.1	88 24	60.2	6
51 59.3	90 24	61.4	52 26.2	89 24	61.0	53 46.3	89 24	59.9	54 12.8	88 24	59.5	7
51 44.8	90 24	60.6	52 11.7	90 24	60.2	53 32.0	89 24	59.1	53 58.6	89 23	58.7	8
51 30.5	90 24	59.8	51 57.4	90 24	59.4	53 17.9	89 23	58.3	53 44.5	89 23	58.0	9
51 16.3	90 24	59.0	51 43.3	90 23	58.7	53 03.9	89 23	57.6	53 30.6	89 23	57.2	100
51 02.1	90 23	58.2	51 29.2	90 23	57.9	52 50.0	89 23	56.8	53 16.7	89 23	56.4	1
50 48.1	90 23	57.5	51 15.2	90 23	57.1	52 36.2	90 23	56.0	53 03.0	89 23	55.7	2
50 34.3	91 23	56.7	51 01.4	90 23	56.3	52 22.5	90 23	55.3	52 49.4	90 22	54.9	3
50 20.5	91 23	55.9	50 47.7	91 23	55.6	52 09.0	90 22	54.5	52 36.0	90 22	54.2	4
50 06.9	91 22	55.1	50 34.1	91 22	54.8	51 55.6	90 22	53.8	52 22.6	90 22	53.4	105
49 53.4	91 22	54.4	50 20.7	91 22	54.0	51 42.3	90 22	53.0	52 09.4	90 22	52.7	6
49 40.0	91 22	53.6	50 07.4	91 22	53.3	51 29.2	91 22	52.3	51 56.3	90 22	51.9	7
49 26.7	92 22	52.8	49 54.2	91 22	52.5	51 16.1	91 21	51.5	51 43.4	91 21	51.2	8
49 13.6	92 22	52.0	49 41.1	92 22	51.7	51 03.3	91 21	50.8	51 30.5	91 21	50.4	9
49 00.7	92 21	51.3	49 28.2	92 21	51.0	50 50.5	91 21	50.0	51 17.9	91 21	49.7	110
48 47.8	92 21	50.5	49 15.4	92 21	50.2	50 37.9	91 21	49.3	51 05.3	91 21	49.0	1
48 35.1	92 21	49.8	49 02.8	92 21	49.5	50 25.4	92 21	48.6	50 52.9	91 20	48.2	2
48 22.6	92 21	49.0	48 50.3	92 21	48.7	50 13.1	92 20	47.8	50 40.6	92 20	47.5	3
48 10.2	93 20	48.2	48 37.9	92 20	48.0	50 00.9	92 20	47.1	50 28.5	92 20	46.8	4
47 57.9	93 20	47.5	48 25.7	93 20	47.2	49 48.9	92 20	46.3	50 16.5	92 20	46.0	115
47 45.8	93 20	46.7	48 13.7	93 20	46.5	49 37.0	92 20	45.6	50 04.7	92 19	45.3	6
47 33.8	93 20	46.0	48 01.7	93 20	45.7	49 25.3	93 19	44.9	49 53.0	92 19	44.6	7
47 22.0	93 19	45.2	47 50.0	93 19	45.0	49 13.7	93 19	44.1	49 41.5	93 19	43.8	8
47 10.3	94 19	44.5	47 38.4	93 19	44.2	49 02.2	93 19	43.4	49 30.1	93 19	43.1	9
46 58.8	94 19	43.7	47 26.9	94 19	43.5	48 51.0	93 19	42.7	49 18.9	93 18	42.4	120
46 47.5	94 19	43.0	47 15.6	94 19	42.7	48 39.8	93 18	41.9	49 07.8	93 18	41.7	1
46 36.3	94 18	42.2	47 04.5	94 18	42.0	48 28.8	94 18	41.2	48 56.9	93 18	40.9	2
46 25.2	94 18	41.5	46 53.5	94 18	41.3	48 18.0	94 18	40.5	48 46.1	94 18	40.2	3
46 14.4	94 18	40.8	46 42.7	94 18	40.5	48 07.4	94 18	39.8	48 35.5	94 17	39.5	4
46 03.6	95 18	40.0	46 32.0	94 18	39.8	47 56.9	94 17	39.0	48 25.1	94 17	38.8	125
45 53.1	95 17	39.3	46 21.5	95 17	39.0	47 46.5	94 17	38.3	48 14.8	94 17	38.1	6
45 42.7	95 17	38.5	46 11.2	95 17	38.3	47 36.4	95 17	37.6	48 04.7	94 17	37.4	7
45 32.5	95 17	37.8	46 01.0	95 17	37.6	47 26.4	95 16	36.9	47 54.8	95 16	36.6	8
45 22.4	95 16	37.1	45 51.0	95 16	36.8	47 16.5	95 16	36.2	47 45.0	95 16	35.9	9
45 12.6	95 16	36.3	45 41.2	95 16	36.1	47 06.8	95 16	35.4	47 35.3	95 16	35.2	130
45 02.8	96 16	35.6	45 31.5	95 16	35.4	46 57.3	95 16	34.7	47 25.9	95 15	34.5	1
44 53.3	96 16	34.8	45 22.0	96 16	34.6	46 48.0	95 15	34.0	47 16.6	95 15	33.8	2
44 44.0	96 15	34.1	45 12.7	96 15	33.9	46 38.8	96 15	33.3	47 07.5	96 15	33.1	3
44 34.8	96 15	33.4	45 03.6	96 15	33.2	46 29.9	96 15	32.6	46 58.6	96 15	32.3	4
44 25.8	96 15	32.6	44 54.6	96 15	32.4	46 21.0	96 14	31.8	46 49.8	96 14	31.6	135
44 16.9	96 14	31.9	44 45.8	96 14	31.7	46 12.4	96 14	31.1	46 41.2	96 14	30.9	6
44 08.3	97 14	31.2	44 37.2	96 14	31.0	46 03.9	96 14	30.4	46 32.8	96 14	30.2	7
43 59.8	97 14	30.4	44 28.8	97 14	30.3	45 55.7	96 14	29.7	46 24.6	96 13	29.5	8
43 51.5	97 14	29.7	44 20.6	97 13	29.5	45 47.6	97 13	29.0	46 16.5	97 13	28.8	9
43 43.4	97 13	29.0	44 12.5	97 13	28.8	45 39.6	97 13	28.3	46 08.6	97 13	28.1	140
43 35.5	97 13	28.2	44 04.6	97 13	28.1	45 31.9	97 13	27.6	46 00.9	97 13	27.4	1
43 27.8	97 13	27.5	43 56.9	97 13	27.4	45 24.3	97 12	26.8	45 53.4	97 12	26.7	2
43 20.2	97 12	26.8	43 49.4	97 12	26.6	45 17.0	97 12	26.1	45 46.1	97 12	26.0	3
43 12.9	97 12	26.1	43 42.1	97 12	25.9	45 09.8	97 12	25.4	45 38.9	97 12	25.3	4
43 05.7	98 12	25.3	43 35.0	98 12	25.2	45 02.8	97 11	24.7	45 32.0	97 11	24.6	145
42 58.7	98 11	24.6	43 28.0	98 11	24.5	44 55.9	98 11	24.0	45 25.2	98 11	23.8	6
42 51.9	98 11	23.9	43 21.3	98 11	23.7	44 49.3	98 11	23.3	45 18.6	98 11	23.1	7
42 45.3	98 11	23.1	43 14.7	98 11	23.0	44 42.8	98 10	22.6	45 12.2	98 10	22.4	8
42 38.9	98 10	22.4	43 08.4	98 10	22.3	44 36.6	98 10	21.9	45 06.0	98 10	21.7	9
42 32.7	98 10	21.7	43 02.2	98 10	21.6	44 30.5	98 10	21.2	45 00.0	98 10	21.0	150
42 26.7	98 10	21.0	42 56.2	98 10	20.8	44 24.6	98 09	20.5	44 54.1	98 09	20.3	1
42 20.9	98 09	20.2	42 50.4	98 09	20.1	44 19.0	98 09	19.8	44 48.5	98 09	19.6	2
42 15.3	99 09	19.5	42 44.8	99 09	19.4	44 13.5	98 09	19.0	44 43.0	98 09	18.9	3
42 09.8	99 09	18.8	42 39.4	99 09	18.7	44 08.2	99 08	18.3	44 37.7	99 08	18.2	4
42 04.6	99 08	18.1	42 34.2	99 08	18.0	44 03.1	99 08	17.6	44 32.7	99 08	17.5	155
41 59.6	99 08	17.3	42 29.2	99 08	17.2	43 58.2	99 08	16.9	44 27.8	99 08	16.8	6
41 54.7	99 08	16.6	42 24.4	99 08	16.5	43 53.4	99 08	16.2	44 23.1	99 08	16.1	7
41 50.1	99 07	15.9	42 19.8	99 07	15.8	43 48.9	99 07	15.5	44 18.6	99 07	15.4	8
41 45.7	99 07	15.2	42 15.4	99 07	15.1	43 44.6	99 07	14.8	44 14.3	99 07	14.7	9
41 41.5	99 07	14.4	42 11.2	99 07	14.4	43 40.5	99 07	14.1	44 10.2	99 07	14.0	160
41 37.4	99 06	13.7	42 07.2	99 06	13.6	43 36.5	99 06	13.4	44 06.3	99 06	13.3	1
41 33.6	99 06	13.0	42 03.4	99 06	12.9	43 32.8	99 06	12.7	44 02.6	99 06	12.6	2
41 30.0	99 06	12.3	41 59.8	99 06	12.2	43 29.3	99 06	12.0	43 59.1	99 06	11.9	3
41 26.6	99 05	11.6	41 56.4	99 05	11.5	43 25.9	99 05	11.3	43 55.8	99 05	11.2	4
41 23.4	1.0 05	10.8	41 53.2	1.0 05	10.8	43 22.8	1.0 05	10.6	43 52.7	1.0 05	10.5	165
41 20.4	1.0 05	10.1	41 50.2	1.0 05	10.0	43 19.9	1.0 05	09.9	43 49.7	1.0 05	09.8	6
41 17.6	1.0 04	09.4	41 47.5	1.0 04	09.3	43 17.1	1.0 04	09.2	43 47.0	1.0 04	09.1	7
41 15.0	1.0 04	08.7	41 44.9	1.0 04	08.6	43 14.6	1.0 04	08.5	43 44.5	1.0 04	08.4	8
41 12.6	1.0 04	07.9	41 42.5	1.0 04	07.9	43 12.3	1.0 04	07.7	43 42.2	1.0 04	07.7	9
41 10.4	1.0 03	07.2	41 40.3	1.0 03	07.2	43 10.2	1.0 03	07.0	43 40.1	1.0 03	07.0	170
41 08.4	1.0 03	06.5	41 38.4	1.0 03	06.5	43 08.2	1.0 03	06.3	43 38.2	1.0 03	06.3	1
41 06.7	1.0 03	05.8	41 36.6	1.0 03	05.7	43 06.5	1.0 03	05.6	43 36.5	1.0 03	05.6	2
41 05.1	1.0 02	05.1	41 35.1	1.0 02	05.0	43 05.0	1.0 02	04.9	43 34.9	1.0 02	04.9	3
41 03.7	1.0 02	04.3	41 33.7	1.0 02	04.3	43 03.7	1.0 02	04.2	43 33.6	1.0 02	04.2	4
41 02.6	1.0 02	03.6	41 32.6	1.0 02	03.6	43 02.5	1.0 02	03.5	43 32.5	1.0 02	03.5	175
41 01.7	1.0 01	02.9	41 31.7	1.0 01	02.9	43 01.6	1.0 01	02.8	43 31.6	1.0 01	02.8	6
41 00.9	1.0 01	02.2	41 30.9	1.0 01	02.2	43 00.9	1.0 01	02.1	43 30.9	1.0 01	02.1	7
41 00.4	1.0 01	01.4	41 30.4	1.0 01	01.4	43 00.4	1.0 00	01.4	43 30.4	1.0 00	01.4	8
41 00.1	1.0 00	00.7	41 30.1	1.0 00	00.7	43 00.1	1.0 00	00.7	43 30.1	1.0 00	00.7	9
41 00.0	1.0 00	00.0	41 30.0	1.0 00	00.0	43 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0	180

Lat. 74°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′		
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°
00	76 00.0	1.0 00	180.0	76 30.0	1.0 00	180.0	78 00.0	1.0 01	180.0	78 30.0	1.0 01	180.0	79 00.0	1.0 01	180.0	85 00.0	1.0 01	180.0	85 30.0	1.0 01	180.0	89 30.0	1.0 07	00.0
1	75 59.7	1.0 01	177.9	76 29.7	1.0 02	177.9	77 59.7	1.0 02	177.7	78 29.7	1.0 02	177.7	78 59.7	1.0 02	177.6	84 59.4	1.0 03	175.9	85 29.4	1.0 03	175.5	89 25.9	07 17	28.0
2	75 58.8	1.0 02	175.9	76 28.8	1.0 03	175.8	77 58.7	1.0 03	175.5	78 28.7	1.0 03	175.4	78 58.6	1.0 03	175.2	84 57.6	99 05	171.8	85 27.4	99 06	171.1	89 15.7	06 22	46.4
3	75 57.3	1.0 03	173.8	76 27.3	1.0 04	173.7	77 57.1	1.0 04	173.2	78 27.0	1.0 04	173.1	78 56.9	1.0 04	172.9	84 54.7	99 07	167.8	85 24.3	98 07	166.8	89 02.7	05 24	57.0
4	75 55.2	1.0 04	171.8	76 25.1	1.0 05	171.6	77 54.8	1.0 05	171.0	78 24.7	1.0 05	170.8	78 54.5	99 05	170.5	84 50.6	98 09	163.8	85 19.9	97 09	162.5	88 48.3	39 25	63.4
05	75 52.6	1.0 05	169.7	76 22.4	99 06	169.5	77 51.9	99 06	168.8	78 21.7	99 06	168.5	78 51.5	99 06	168.2	84 45.5	96 10	160.0	85 14.4	96 11	158.4	88 33.2	31 26	67.4
6	75 49.3	99 06	167.7	76 19.1	99 06	167.4	77 48.4	99 07	166.6	78 18.1	99 07	166.2	78 47.8	99 07	165.9	84 39.4	95 12	156.3	85 07.7	94 13	154.5	88 17.8	24 26	70.1
7	75 45.5	99 07	165.7	76 15.2	99 07	165.4	77 44.2	99 08	164.4	78 13.8	99 08	164.0	78 43.4	99 08	163.6	84 32.2	94 13	152.7	85 00.1	92 14	150.7	88 02.2	20 26	71.9
8	75 41.2	99 08	163.7	76 10.8	99 08	163.3	77 39.5	98 09	162.2	78 09.0	98 09	161.8	78 38.4	98 09	161.3	84 24.2	92 15	149.2	84 51.6	90 16	147.0	87 46.4	16 26	73.2
9	75 36.2	98 09	161.7	76 05.7	98 09	161.3	77 34.1	98 10	160.1	78 03.5	98 10	159.6	78 32.8	98 10	159.0	84 15.3	90 16	145.9	84 42.2	88 17	143.6	87 30.5	13 27	74.1
10	75 30.7	98 10	159.7	76 00.2	98 10	159.3	77 28.2	98 11	157.9	77 57.4	97 11	157.4	78 26.6	97 11	156.8	84 05.7	89 17	142.8	84 32.0	86 18	140.3	87 14.6	10 27	74.8
1	75 24.7	98 11	157.7	75 54.1	98 11	157.3	77 21.7	97 12	155.8	77 50.8	97 12	155.3	78 19.8	97 12	154.6	83 55.4	87 18	139.8	84 21.1	85 19	137.2	86 58.6	07 27	75.2
2	75 18.2	97 12	155.8	75 47.4	97 12	155.3	77 14.6	97 13	153.8	77 43.6	96 13	153.2	78 12.4	96 13	152.5	83 44.4	85 19	136.9	84 09.5	83 20	134.3	86 42.6	05 27	75.5
3	75 11.2	97 13	153.9	75 40.3	97 13	153.4	77 07.1	96 13	151.7	77 35.8	96 14	151.1	78 04.5	95 14	150.4	83 32.8	83 20	134.2	83 57.4	81 21	131.6	86 26.6	03 27	75.7
4	75 03.7	97 13	152.0	75 32.6	96 14	151.5	76 59.0	96 14	149.7	77 27.6	95 15	149.0	77 56.1	95 15	148.3	83 20.7	82 21	131.6	83 44.8	79 22	128.9	86 10.6	01 27	75.8
15	74 55.7	96 14	150.2	75 24.5	96 14	149.6	76 50.4	95 15	147.7	77 18.8	95 15	147.0	77 47.1	94 16	146.3	83 08.0	80 22	129.1	83 31.7	77 22	126.5	85 54.5	00 27	75.8
6	74 47.2	96 15	148.3	75 15.9	96 15	147.7	76 41.3	94 16	145.8	77 09.6	94 16	145.1	77 37.7	94 16	144.3	82 55.0	79 22	126.8	83 18.2	76 23	124.1	85 38.5	02 27	75.8
7	74 38.3	95 16	146.5	75 06.8	95 16	145.9	76 31.8	94 17	143.9	76 59.9	93 17	143.1	77 27.8	93 17	142.3	82 41.6	77 23	124.5	83 04.3	74 24	121.9	85 22.5	04 27	75.7
8	74 29.0	95 16	144.7	74 57.4	94 17	144.1	76 21.9	93 17	142.0	76 49.8	93 18	141.2	77 17.5	92 18	140.4	82 27.8	76 24	122.4	82 50.2	73 24	119.8	85 06.5	05 27	75.5
9	74 19.2	94 17	143.0	74 47.5	94 17	142.3	76 11.5	93 18	140.2	76 39.2	92 18	139.4	77 06.7	92 19	138.5	82 13.7	75 24	120.4	82 35.7	72 25	117.8	84 50.4	06 27	75.4
20	74 09.1	94 18	141.2	74 37.2	93 18	140.6	76 00.7	92 19	138.4	76 28.2	92 19	137.5	76 55.6	91 19	136.7	81 59.2	74 24	118.4	82 20.9	71 25	115.9	84 34.5	08 27	75.2
1	73 58.5	93 18	139.5	74 26.5	93 18	138.9	75 49.5	92 19	136.6	76 16.9	91 20	135.8	76 44.0	90 20	134.8	81 44.6	73 25	116.6	82 05.9	70 25	114.1	84 18.5	09 27	74.9
2	73 47.6	93 19	137.8	74 15.4	92 19	137.2	75 38.0	91 20	134.9	76 05.2	90 20	134.0	76 32.1	90 20	133.1	81 29.7	72 25	114.8	81 50.7	69 26	112.4	84 02.5	10 27	74.7
3	73 36.3	92 19	136.2	74 04.0	92 20	135.5	75 26.1	90 20	133.2	75 53.1	90 21	132.3	76 19.9	89 21	131.4	81 14.6	71 26	113.1	81 35.3	68 26	110.7	83 46.6	11 27	74.4
4	73 24.7	92 20	134.6	73 52.2	91 20	133.9	75 13.8	90 21	131.5	75 40.7	89 21	130.6	76 07.3	88 21	129.7	80 59.3	70 26	111.5	81 19.8	67 26	109.1	83 30.7	13 26	74.1
25	73 12.8	92 20	133.0	73 40.1	91 21	132.3	75 01.3	89 21	129.9	75 28.0	89 22	129.0	75 54.4	88 22	128.0	80 43.8	69 26	109.9	81 04.1	66 26	107.6	83 14.8	14 26	73.8
6	73 00.5	91 21	131.4	73 27.7	91 21	130.7	74 48.5	89 22	128.2	75 15.0	88 22	127.3	75 41.3	87 22	126.4	80 28.2	68 26	108.4	80 48.2	65 27	106.1	82 58.9	15 26	73.5
7	72 48.0	91 21	129.9	73 15.1	90 22	129.1	74 35.3	88 22	126.7	75 01.7	87 23	125.8	75 27.8	87 23	124.8	80 12.4	68 26	107.0	80 32.3	65 27	104.7	82 43.0	16 26	73.2
8	72 35.1	90 22	128.3	73 02.1	90 22	127.6	74 21.9	88 23	125.1	74 48.1	87 23	124.2	75 14.1	86 23	123.2	79 56.5	67 27	105.6	80 16.3	64 27	103.4	82 27.2	17 26	72.8
9	72 22.0	90 22	126.8	72 48.9	89 22	126.1	74 08.3	87 23	123.6	74 34.3	86 23	122.7	75 00.2	86 24	121.7	79 40.6	67 27	104.2	80 00.1	64 27	102.1	82 11.5	18 26	72.5
30	72 08.7	89 23	125.4	72 35.4	89 23	124.6	73 54.4	87 24	122.1	74 20.3	86 24	121.2	74 46.0	85 24	120.2	79 24.5	66 27	102.9	79 43.9	63 27	100.8	81 55.7	19 26	72.1
1	71 55.1	89 23	123.9	72 21.6	88 23	123.2	73 40.3	86 24	120.7	74 06.1	86 24	119.8	74 31.6	85 24	118.8	79 08.3	66 27	101.6	79 27.6	63 27	99.6	81 40.0	20 26	71.7
2	71 41.2	89 23	122.5	72 07.7	88 24	121.8	73 26.0	86 24	119.3	73 51.6	85 24	118.3	74 17.0	84 25	117.4	78 52.1	65 27	100.4	79 11.3	63 27	98.4	81 24.3	21 26	71.4
3	71 27.2	88 24	121.1	71 53.5	88 24	120.4	73 11.4	85 24	117.9	73 36.9	85 25	116.9	74 02.2	84 25	116.0	78 35.8	65 27	99.2	78 54.9	62 27	97.2	81 08.6	22 26	71.0
4	71 12.9	88 24	119.7	71 39.2	87 24	119.0	72 56.7	85 25	116.5	73 22.1	84 25	115.6	73 47.3	83 25	114.6	78 19.4	65 27	98.0	78 38.5	62 27	96.1	80 53.0	23 26	70.6
35	70 58.4	87 24	118.4	71 24.6	87 25	117.6	72 41.8	85 25	115.1	73 07.1	84 25	114.2	73 32.1	83 25	113.3	78 03.0	65 27	96.9	78 22.0	62 28	95.0	80 37.4	24 26	70.2
6	70 43.8	87 25	117.1	71 09.9	86 25	116.3	72 26.8	84 25	113.8	72 51.9	84 26	112.9	73 16.9	83 26	111.9	77 46.6	64 27	95.8	78 05.5	62 28	93.9	80 21.9	25 26	69.8
7	70 29.0	87 25	115.7	70 54.9	86 25	115.0	72 11.6	84 26	112.5	72 36.6	83 26	111.6	73 01.5	82 26	110.6	77 30.1	64 28	94.7	77 49.0	62 28	92.9	80 06.4	26 26	69.4
8	70 14.0	86 25	114.5	70 39.9	86 25	113.7	71 56.2	84 26	111.2	72 21.2	83 26	110.3	72 45.9	82 26	109.4	77 13.6	64 28	93.7	77 32.5	62 28	91.9	79 50.9	27 26	69.0
9	69 58.9	86 25	113.2	70 24.7	86 26	112.4	71 40.7	83 26	110.0	72 05.6	83 26	109.1	72 30.3	82 26	108.1	76 57.1	64 28	92.6	77 16.0	62 28	90.9	79 35.5	28 26	68.6
40	69 43.6	86 26	111.9	70 09.3	85 26	111.2	71 25.1	83 26	108.7	71 49.9	82 26	107.8	72 14.5	81 26	106.9	76 40.6	64 28	91.6	76 59.4	62 28	89.9	79 20.1	29 26	68.2
1	69 28.2	86 26	110.7	69 53.8	85 26	110.0	71 09.4	83 26	107.5	71 34.1	82 26	106.6	71 58.6	81 27	105.7	76 24.1	64 28	90.6	76 42.9	62 28	89.0	79 04.8	30 25	67.7
2	69 12.7	85 26	109.5	69 38.2	85 26	108.8	70 53.6	83 27	106.3	71 18.2	82 27	105.4	71 42.7	81 27	104.5	76 07.5	64 28	89.7	76 26.4	62 28	88.0	78 49.5	31 25	67.3
3	68 57.0	85 26	108.3	69 22.5	85 26	107.6	70 37.7	82 27	105.1	71 02.3	82 27	104.3	71 26.6	81 27	103.4	75 51.0	64 28	88.7	76 09.8	62 28	87.1	78 34.3	32 25	66.9
4	68 41.3	85 26	107.1	69 06.7	84 26	106.4	70 21.7	82 27	104.0	70 46.2	81 27	103.1	71 10.5	80 27	102.2	75 34.5	64 28	87.8	75 53.3	62 27	86.2	78 19.1	33 25	66.5
45	68 25.4	85 27	106.0	68 50.8	84 27	105.2	70 05.6	82 27	102.9	70 30.1	81 27	102.0	70 54.3	80 27	101.1	75 17.9	64 28	86.9	75 36.8	62 27	85.4	78 04.0	33 25	66.0
6	68 09.5	85 27	104.8	68 34.8	84 27	104.1	69 49.4	82 27	101.7	70 13.8	81 27	100.9	70 38.0	80 27	100.0	75 01.4	64 28	86.0	75 20.4	62 27	84.5	77 48.9	34 25	65.6
7	67 53.5	84 27	103.7	68 18.7	84 27	103.0	69 33.2	82 27	100.6	69 57.6	81 27	99.8	70 21.7	80 27	98.9	74 44.9	64 27	85.1	75 03.9	62 27	83.6	77 33.8	35 25	65.2
8	67 37.4	84 27	102.6	68 02.5	84 27	101.9	69 16.9	82 27	99.5	69 41.2	81 27	98.7	70 05.3	80 27	97.8	74 28.5	64 27	84.2	74 47.5	62 27	82.8	77 18.9	36 25	64.7
9	67 21.2	84 27	101.5	67 46.3	84 27	100.8	69 00.6	81 27	98.5	69 24.9	81 27	97.6	69 48.9	80 27	96.8	74 12.0	65 27	83.4	74 31.1	63 27	82.0	77 03.9	37 25	64.3
50	67 04.9	84 27	100.4	67 30.0	83 27	99.7	68 44.2	81 27	97.4	69 08.5	81 27	96.6	69 32.5	80 27	95.7	73 55.6	65 27	82.6	74 14.8	63 27	81.1	76 49.1	38 25	63.9
1	66 48.6	84 27	99.3	67 13.7	83 27	98.6	68 27.8	81 27	96.4	68 52.0	80 27	95.5	69 16.0	80 28	94.7	73 39.2	65 27	81.7	73 58.4	63 27	80.3	76 34.2	39 25	63.4
2	66 32.3	84 27	98.3	66 57.4	83 27	97.6	68 11.3	81 27	95.3	68 35.6	80 28	94.5	68 59.5	80 28	93.7	73 22.9	65 27	80.9	73 42.1	63 27	79.5	76 19.5	39 24	63.0
3	66 15.9	84 27	97.2	66 40.9	83 27	96.5	67 54.8	81 28	94.3	68 19.1	80 28	93.5	68 43.0	80 28	92.7	73 06.6	65 27	80.1	73 25.9	64 27	78.8	76 04.8	40 24	62.5
4	65 59.5	84 27	96.2	66 24.5	83 27	95.5	67 38.3	81 28	93.3	68 02.5	80 28	92.5	68 26.5	79 28	91.7	72 50.3	65 27	79.3	73 09.7	64 27	78.0	75 50.1	41 24	62.1
55	65 43.0	84 27	95.2	66 08.0	83 28	94.5	67 21.8	81 28	92.3	67 46.0	80 28	91.5	68 10.0	79 28	90.7	72 34.1	66 27	78.5	72 53.6	64 27	77.2	75 35.6	42 24	61.6
6	65 26.5	84 28	94.1	65 51.5	83 28	93.5	67 05.3	81 28	91.3	67 29.5	80 28	90.6	67 53.4	79 28	89.8	72 17.9	66 27	77.7	72 37.4	64 27	76.5	75 21.0	43 24	61.2
7	65 10.0	83 28	93.1	65 35.0	83 28	92.5	66 48.8	81 28	90.4	67 12.9	80 28	89.6	67 36.9	79 28	88.8	72 01.8	66 27	76.9	72 21.4	65 27	75.7	75 06.6	44 24	60.7
8	64 53.5	83 28	92.2	65 18.5	83 28	91.5	66 32.2	81 28	89.4	66 56.4	80 28	88.6	67 20.4	79 28	87.9	71 45.7	66 27	76.2	72 05.4	65 27	75.0	74 52.2	44 24	60.3
9	64 37.0	83 28	91.2	65 01.9	83 28	90.5	66 15.7	81 28	88.4	66 39.9	80 28	87.7	67 03.8	80 28	86.9	71 29.6	67 27	75.4	71 49.5	65 26	74.2	74 37.9	45 24	59.8
60	64 20.5	83 28	90.2	64 45.4	83 28	89.6	65 59.2	81 28	87.5	66 23.4	80 28	86.8	66 47.3	80 27	86.0	71 13.7	67 27	74.7	71 33.6	66 26	73.5	74 23.6	46 24	59.3
1	64 03.9	83 28	89.3	64 28.9	83 28	88.6	65 42.6	81 28	86.6	66 06.8	80 27	85.8	66 30.8	80 27	85.1	70 57.7	67 26	73.9	71 17.7	66 26	72.8	74 09.4	47 24	58.9
2	63 47.4	83 28	88.3	64 12.3	83 28	87.7	65 26.1	81 27	85.7	65 50.4	80 27	84.9	66 14.4	80 27	84.2	70 41.9	68 26	73.2	71 02.0	66 26	72.1	73 55.3	48 23	58.4
3	63 30.9	83 28	87.4	63 55.8	83 28	86.7	65 09.7	81 27	84.7	65 33.9	80 27	84.0	65 57.9	80 27	83.3	70 26.1	68 26	72.5	70 46.3	67 26	71.3	73 41.2	49 23	58.0
4	63 14.3	84 28	86.4	63 39.3	83 27	85.8	64 53.2	81 27	83.8	65 17.5	81 27	83.1	65 41.5	80 27	82.4	70 10.3	68 26	71.7	70 30.6	67 26	70.6	73 27.2	49 23	57.5
65	62 57.8	84 27	85.5	63 22.8	83 27	84.9	64 36.8	81 27	82.9	65 01.1	81 27	82.3	65 25.2	80 27	81.5	69 54.7	69 26	71.0	70 15.1	67 26	69.9	73 13.3	50 23	57.0
6	62 41.4	84 27	84.6	63 06.4	83 27	84.0	64 20.4	81 27	82.1	64 44.7	81 27	81.4	65 08.8	80 27	80.7	69 39.1	69 26	70.3	69 59.6	68 26	69.2	72 59.5	51 23	56.6
7	62 24.9	84 27	83.7	62 49.9	83 27	83.1	64 04.0	81 27	81.2	64 28.4	81 27	80.5	64 52.5	80 27	79.8	69 23.5	69 26	69.6	69 44.1	68 26	68.6	72 45.7	52 23	56.1
8	62 08.5	84 27	82.8	62 33.5	83 27	82.2	63 47.7	82 27	80.3	64 12.1	81 27	79.6	64 36.3	80 27	79.0	69 08.1	70 26	68.9	69 28.8	68 25	67.9	72 32.0	52 23	55.6
9	61 52.1	84 27	81.9	62 17.2	83 27	81.3	63 31.4	82 27	79.4	63 55.8	81 27	78.8	64 20.0	80 27	78.1	68 52.7	70 26	68.2	69 13.5	69 25	67.2	72 18.4	53 23	55.2
70	61 35.7	84 27	81.0	62 00.8	83 27	80.4	63 15.2	82 27	78.6	63 39.6	81 27	77.9	64 03.9	81 27	77.3	68 37.4	70 25	67.5	68 58.3	69 25	66.5	72 04.9	54 22	54.7
1	61 19.4	84 27	80.1	61 44.6	83 27	79.6	62 59.0	82 27	77.7	63 23.5	81 27	77.1	63 47.8	81 27	76.4	68 22.1	71 25	66.8	68 43.2	70 25	65.8	71 51.4	55 22	54.2
2	61 03.2	84 27	79.3	61 28.3	84 27	78.7	62 42.9	82 27	76.9	63 07.4	81 27	76.3	63 31.7	81 27	75.6	68 07.0	71 25	66.1	68 28.1	70 25	65.2	71 38.0	55 22	53.8
3	60 46.9	84 27	78.4	61 12.1	84 27	77.8	62 26.8	82 27	76.1	62 51.3	82 27	75.4	63 15.7	81 27	74.8	67 51.9	71 25	65.4	68 13.1	70 25	64.5	71 24.7	56 22	53.3
4	60 30.8	84 27	77.5	60 56.0	84 27	77.0	62 10.8	82 27	75.2	62 35.4	82 26	74.6	62 59.8	81 26	74.0	67 36.9	72 25	64.8	67 58.3	71 25	63.8	71 11.5	57 22	52.8
75	60 14.6	84 27	76.7	60 39.9	84 27	76.1	61 54.8	82 26	74.4	62 19.5	82 26	73.8	62 44.0	81 26	73.2	67 22.0	72 25	64.1	67 43.5	71 25	63.2	70 58.4	58 22	52.4
6	59 58.6	85 27	75.8	60 23.9	84 27	75.3	61 38.9	83 26	73.6	62 03.6	82 26	73.0	62 28.2	82 26	72.4	67 07.1	73 25	63.4	67 28.7	72 24	62.5	70 45.3	58 22	51.9
7	59 42.6	85 27	75.0	60 07.9	84 26	74.5	61 23.1	83 26	72.8	61 47.8	82 26	72.2	62 12.4	82 26	71.6	66 52.4	73 24	62.8	67 14.1	72 24	61.9	70 32.4	59 21	51.4
8	59 26.6	85 26	74.2	59 52.0	84 26	73.6	61 07.3	83 26	72.0	61 32.1	82 26	71.4	61 56.8	82 26	70.8	66 37.7	73 24	62.1	66 59.6	72 24	61.2	70 19.5	60 21	50.9
9	59 10.8	85 26	73.3	59 36.2	85 26	72.8	60 51.6	83 26	71.2	61 16.5	83 26	70.6	61 41.2	82 26	70.0	66 23.1	74 24	61.4	66 45.1	73 24	60.6	70 06.7	61 21	50.5
80	58 54.9	85 26	72.5	59 20.4	85 26	72.0	60 36.0	83 26	70.4	61 00.9	83 26	69.8	61 25.7	82 26	69.2	66 08.7	74 24	60.8	66 30.8	73 24	59.9	69 54.0	61 21	50.0
1	58 39.2	85 26	71.7	59 04.7	85 26	71.2	60 20.5	84 26	69.6	60 45.4	83 26	69.0	61 10.3	83 26	68.4	65 54.3	75 24	60.1	66 16.5	74 24	59.3	69 41.4	62 21	49.5
2	58 23.5	85 26	70.9	58 49.1	85 26	70.4	60 05.0	84 26	68.8	60 30.0	83 26	68.2	60 54.9	83 25	67.6	65 40.0	75 24	59.5	66 02.3	74 23	58.6	69 28.8	63 21	49.0
3	58 08.0	86 26	70.0	58 33.6	85 26	69.6	59 49.6	84 25	68.0	60 14.7	83 25	67.4	60 39.7	83 25	66.9	65 25.8	75 24	58.8	65 48.3	74 23	58.0	69 16.4	63 21	48.5
4	57 52.5	86 26	69.2	58 18.1	85 26	68.8	59 34.3	84 25	67.2	59 59.5	84 25	66.7	60 24.5	83 25	66.1	65 11.7	76 23	58.2	65 34.3	75 23	57.4	69 04.0	64 20	48.1
85	57 37.0	86 26	68.4	58 02.7	85 25	68.0	59 19.1	84 25	66.4	59 44.4	84 25	65.9	60 09.5	83 25	65.3	64 57.7	76 23	57.5	65 20.4	75 23	56.7	68 51.8	65 20	47.6
6	57 21.7	86 25	67.6	57 47.4	86 25	67.2	59 04.0	84 25	65.7	59 29.3	84 25	65.1	59 54.5	84 25	64.6	64 43.8	76 23	56.9	65 06.6	76 23	56.1	68 39.6	66 20	47.1
7	57 06.4	86 25	66.8	57 32.3	86 25	66.4	58 49.0	85 25	64.9	59 14.4	84 25	64.4	59 39.6	84 25	63.8	64 30.0	77 23	56.2	64 52.9	76 23	55.5	68 27.5	66 20	46.6
8	56 51.3	86 25	66.1	57 17.1	86 25	65.6	58 34.1	85 25	64.1	58 59.5	85 25	63.6	59 24.8	84 24	63.1	64 16.3	77 23	55.6	64 39.4	77 22	54.9	68 15.6	67 20	46.1
9	56 36.2	87 25	65.3	57 02.1	86 25	64.8	58 19.2	85 25	63.4	58 44.7	85 24	62.9	59 10.1	84 24	62.3	64 02.7	78 22	55.0	64 25.9	77 22	54.2	68 03.7	68 20	45.7
90	56 21.2	87 25	64.5	56 47.2	86 25	64.0	58 04.5	85 24	62.6	58 30.1	85 24	62.1	58 55.5	85 24	61.6	63 49.2	78 22	54.3	64 12.5	77 22	53.6	67 51.9	68 19	45.2

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	56 06.4	87 25	63.7	56 32.4	87 25	63.2	57 49.9	86 24	61.8	58 15.5	85 24	61.3	58 41.0	85 24	60.8	63 35.8	78 22	53.7	63 59.3	78 22	53.0	67 40.2	69 19	44.7	91
2	55 51.6	87 24	62.9	56 17.7	87 24	62.5	57 35.4	86 24	61.1	58 01.0	85 24	60.6	58 26.6	85 24	60.1	63 22.6	79 22	53.1	63 46.1	78 22	52.4	67 28.7	69 19	44.2	2
3	55 36.9	87 24	62.1	56 03.1	87 24	61.7	57 20.9	86 24	60.3	57 46.7	86 24	59.9	58 12.3	85 24	59.4	63 09.4	79 22	52.4	63 33.1	79 22	51.7	67 17.2	70 19	43.7	3
4	55 22.3	88 24	61.4	55 48.6	87 24	60.9	57 06.6	86 24	59.6	57 32.4	86 24	59.1	57 58.1	86 23	58.6	62 56.4	80 22	51.8	63 20.2	79 21	51.1	67 05.8	71 19	43.2	4
95	55 07.9	88 24	60.6	55 34.2	87 24	60.2	56 52.4	86 24	58.8	57 18.3	86 23	58.4	57 44.1	86 23	57.9	62 43.4	80 21	51.2	63 07.3	79 21	50.5	66 54.5	71 19	42.7	95
6	54 53.5	88 24	59.8	55 19.9	88 24	59.4	56 38.3	87 23	58.1	57 04.3	86 23	57.6	57 30.1	86 23	57.2	62 30.6	80 21	50.5	62 54.6	80 21	49.9	66 43.3	72 18	42.3	6
7	54 39.3	88 24	59.1	55 05.7	88 23	58.7	56 24.3	87 23	57.4	56 50.4	87 23	56.9	57 16.3	86 23	56.5	62 17.9	81 21	49.9	62 42.0	80 21	49.3	66 32.3	73 18	41.8	7
8	54 25.2	88 23	58.3	54 51.6	88 23	57.9	56 10.5	87 23	56.6	56 36.6	87 23	56.2	57 02.6	87 23	55.7	62 05.3	81 21	49.3	62 29.6	81 21	48.7	66 21.3	73 18	41.3	8
9	54 11.1	89 23	57.6	54 37.7	88 23	57.2	55 56.7	87 23	55.9	56 22.9	87 23	55.5	56 48.9	87 22	55.0	61 52.8	82 21	48.7	62 17.2	81 20	48.1	66 10.5	74 18	40.8	9
100	53 57.2	89 23	56.8	54 23.8	88 23	56.4	55 43.1	88 23	55.2	56 09.3	87 22	54.7	56 35.5	87 22	54.3	61 40.4	82 20	48.1	62 05.0	81 20	47.4	65 59.7	74 18	40.3	100
1	53 43.5	89 23	56.1	54 10.1	89 23	55.7	55 29.6	88 22	54.4	55 55.9	88 22	54.0	56 22.1	87 22	53.6	61 28.2	82 20	47.4	61 52.8	82 20	46.8	65 49.1	75 18	39.8	1
2	53 29.8	89 23	55.3	53 56.5	89 22	54.9	55 16.2	88 22	53.7	55 42.5	88 22	53.3	56 08.8	88 22	52.9	61 16.1	83 20	46.8	61 40.8	82 20	46.2	65 38.5	76 17	39.3	2
3	53 16.3	89 22	54.6	53 43.0	89 22	54.2	55 02.9	88 22	53.0	55 29.3	88 22	52.6	55 55.7	88 22	52.1	61 04.1	83 20	46.2	61 29.0	83 20	45.6	65 28.1	76 17	38.8	3
4	53 02.9	90 22	53.8	53 29.7	89 22	53.4	54 49.8	89 22	52.3	55 16.3	88 22	51.9	55 42.7	88 21	51.4	60 52.2	84 20	45.6	61 17.2	83 19	45.0	65 17.8	77 17	38.3	4
105	52 49.6	90 22	53.1	53 16.5	90 22	52.7	54 36.7	89 21	51.5	55 03.3	89 21	51.1	55 29.9	88 21	50.7	60 40.5	84 19	45.0	61 05.6	83 19	44.4	65 07.6	77 17	37.9	105
6	52 36.4	90 22	52.3	53 03.4	90 22	52.0	54 23.8	89 21	50.8	54 50.5	89 21	50.4	55 17.1	89 21	50.0	60 28.8	84 19	44.4	60 54.1	84 19	43.8	64 57.5	78 17	37.4	6
7	52 23.4	90 22	51.6	52 50.4	90 21	51.2	54 11.1	89 21	50.1	54 37.8	89 21	49.7	55 04.5	89 21	49.3	60 17.3	85 19	43.7	60 42.7	84 19	43.2	64 47.5	79 16	36.9	7
8	52 10.5	90 21	50.8	52 37.6	90 21	50.5	53 58.5	90 21	49.4	54 25.3	89 21	49.0	54 52.0	89 21	48.6	60 06.0	85 19	43.1	60 31.4	85 19	42.6	64 37.6	79 16	36.4	8
9	51 57.8	91 21	50.1	52 24.9	90 21	49.8	53 46.0	90 21	48.7	54 12.9	90 20	48.3	54 39.7	89 20	47.9	59 54.7	85 19	42.5	60 20.3	85 18	42.0	64 27.9	80 16	35.9	9
110	51 45.1	91 21	49.4	52 12.3	91 21	49.0	53 33.6	90 20	48.0	54 00.6	90 20	47.6	54 27.5	90 20	47.2	59 43.6	86 18	41.9	60 09.3	85 18	41.4	64 18.2	80 16	35.4	110
1	51 32.6	91 21	48.6	51 59.9	91 20	48.3	53 21.4	90 20	47.3	53 48.5	90 20	46.9	54 15.4	90 20	46.5	59 32.6	86 18	41.3	59 58.4	86 18	40.8	64 08.7	81 16	34.9	1
2	51 20.3	91 20	47.9	51 47.6	91 20	47.6	53 09.3	90 20	46.5	53 36.4	90 20	46.2	54 03.5	90 20	45.8	59 21.8	87 18	40.7	59 47.7	86 18	40.2	63 59.3	81 15	34.4	2
3	51 08.1	91 20	47.2	51 35.5	91 20	46.9	52 57.4	91 20	45.8	53 24.6	90 20	45.5	53 51.7	90 19	45.1	59 11.1	87 18	40.1	59 37.1	87 17	39.6	63 50.0	82 15	33.9	3
4	50 56.0	92 20	46.5	51 23.5	91 20	46.1	52 45.6	91 19	45.1	53 12.9	91 19	44.8	53 40.1	91 19	44.4	59 00.5	87 17	39.5	59 26.6	87 17	39.0	63 40.9	82 15	33.4	4
115	50 44.1	92 20	45.7	51 11.7	92 20	45.4	52 34.0	91 19	44.4	53 01.3	91 19	44.1	53 28.5	91 19	43.7	58 50.0	88 17	38.9	59 16.2	87 17	38.4	63 31.8	83 15	32.9	115
6	50 32.4	92 19	45.0	51 00.0	92 19	44.7	52 22.5	91 19	43.7	52 49.9	91 19	43.4	53 17.2	91 19	43.0	58 39.7	88 17	38.3	59 06.0	88 17	37.8	63 22.9	83 15	32.4	6
7	50 20.7	92 19	44.3	50 48.4	92 19	44.0	52 11.1	92 19	43.0	52 38.6	91 19	42.7	53 06.0	91 18	42.4	58 29.5	88 17	37.7	58 56.0	88 17	37.2	63 14.1	84 14	31.9	7
8	50 09.3	93 19	43.6	50 37.0	92 19	43.3	51 59.9	92 18	42.3	52 27.4	92 18	42.0	52 54.9	91 18	41.7	58 19.5	89 16	37.1	58 46.0	88 16	36.6	63 05.4	84 14	31.4	8
9	49 58.0	93 19	42.8	50 25.7	93 19	42.5	51 48.8	92 18	41.6	52 16.4	92 18	41.3	52 44.0	92 18	41.0	58 09.6	89 16	36.5	58 36.2	89 16	36.0	62 56.8	85 14	30.9	9
120	49 46.8	93 18	42.1	50 14.6	93 18	41.8	51 37.9	92 18	40.9	52 05.6	92 18	40.6	52 33.2	92 18	40.3	57 59.9	89 16	35.8	58 26.6	89 16	35.4	62 48.4	85 14	30.4	120
1	49 35.8	93 18	41.4	50 03.7	93 18	41.1	51 27.2	93 18	40.2	51 54.9	92 18	39.9	52 22.6	92 17	39.6	57 50.2	90 16	35.2	58 17.1	89 16	34.8	62 40.1	86 14	29.9	1
2	49 24.9	93 18	40.7	49 52.9	93 18	40.4	51 16.6	93 17	39.5	51 44.4	93 17	39.2	52 12.1	92 17	38.9	57 40.8	90 16	34.6	58 07.7	90 15	34.2	62 31.9	86 13	29.4	2
3	49 14.2	94 18	40.0	49 42.3	93 17	39.7	51 06.1	93 17	38.8	51 34.0	93 17	38.5	52 01.8	93 17	38.2	57 31.4	90 15	34.0	57 58.5	90 15	33.6	62 23.8	87 13	28.9	3
4	49 03.7	94 17	39.2	49 31.8	94 17	39.0	50 55.8	93 17	38.1	51 23.8	93 17	37.8	51 51.7	93 17	37.5	57 22.3	91 15	33.4	57 49.4	90 15	33.0	62 15.9	87 13	28.4	4
125	48 53.3	94 17	38.5	49 21.4	94 17	38.3	50 45.7	93 17	37.4	51 13.7	93 17	37.2	51 41.7	93 16	36.9	57 13.2	91 15	32.8	57 40.4	91 15	32.4	62 08.1	88 13	27.9	125
6	48 43.1	94 17	37.8	49 11.3	94 17	37.6	50 35.7	94 16	36.7	51 03.8	93 16	36.5	51 31.8	93 16	36.2	57 04.3	91 15	32.2	57 31.6	91 14	31.9	62 00.4	88 13	27.4	6
7	48 33.0	94 16	37.1	49 01.3	94 16	36.8	50 25.9	94 16	36.1	50 54.0	94 16	35.8	51 22.1	94 16	35.5	56 55.6	92 14	31.6	57 23.0	91 14	31.3	61 52.9	88 12	26.9	7
8	48 23.1	95 16	36.4	48 51.5	94 16	36.1	50 16.3	94 16	35.4	50 44.4	94 16	35.1	51 12.6	94 16	34.8	56 47.0	92 14	31.0	57 14.5	92 14	30.7	61 45.4	89 12	26.4	8
9	48 13.4	95 16	35.7	48 41.8	95 16	35.4	50 06.8	94 16	34.7	50 35.0	94 15	34.4	51 03.2	94 15	34.1	56 38.5	92 14	30.4	57 06.1	92 14	30.1	61 38.1	89 12	25.9	9
130	48 03.8	95 16	35.0	48 32.3	95 16	34.7	49 57.4	94 15	34.0	50 25.8	94 15	33.7	50 54.0	94 15	33.5	56 30.2	92 14	29.8	56 57.9	92 13	29.5	61 31.0	90 12	25.4	130
1	47 54.4	95 15	34.3	48 22.9	95 15	34.0	49 48.3	95 15	33.3	50 16.7	95 15	33.0	50 45.0	94 15	32.8	56 22.1	93 13	29.2	56 49.8	92 13	28.9	61 23.9	90 12	24.9	1
2	47 45.2	95 15	33.6	48 13.8	95 15	33.3	49 39.3	95 15	32.6	50 07.7	95 15	32.4	50 36.1	95 15	32.1	56 14.1	93 13	28.6	56 41.9	93 13	28.3	61 17.0	90 11	24.4	2
3	47 36.2	95 15	32.8	48 04.8	95 15	32.6	49 30.4	95 14	31.9	49 59.0	95 14	31.7	50 27.4	95 14	31.4	56 06.2	93 13	28.0	56 34.2	93 13	27.7	61 10.3	91 11	23.9	3
4	47 27.3	96 15	32.1	47 55.9	96 14	31.9	49 21.8	95 14	31.2	49 50.3	95 14	31.0	50 18.9	95 14	30.8	55 58.5	94 13	27.4	56 26.6	93 12	27.1	61 03.6	91 11	23.4	4
135	47 18.6	96 14	31.4	47 47.3	96 14	31.2	49 13.3	95 14	30.5	49 41.9	95 14	30.3	50 10.5	95 14	30.1	55 51.0	94 12	26.8	56 19.1	94 12	26.5	60 57.1	92 11	22.9	135
6	47 10.0	96 14	30.7	47 38.8	96 14	30.5	49 05.0	96 14	29.9	49 33.7	96 13	29.6	50 02.3	96 13	29.4	55 43.6	94 12	26.2	56 11.8	94 12	25.9	60 50.8	92 10	22.4	6
7	47 01.7	96 14	30.0	47 30.5	96 14	29.8	48 56.8	96 13	29.2	49 25.6	96 13	29.0	49 54.3	96 13	28.7	55 36.4	94 12	25.6	56 04.6	94 12	25.3	60 44.5	92 10	21.9	7
8	46 53.5	96 13	29.3	47 22.4	96 13	29.1	48 48.9	96 13	28.5	49 17.6	96 13	28.3	49 46.4	96 13	28.1	55 29.3	95 12	25.0	55 57.6	94 11	24.7	60 38.4	93 10	21.4	8
9	46 45.5	96 13	28.6	47 14.4	96 13	28.4	48 41.0	96 13	27.8	49 09.9	96 13	27.6	49 38.7	96 13	27.4	55 22.4	95 11	24.4	55 50.8	95 11	24.2	60 32.5	93 10	20.9	9
140	46 37.6	97 13	27.9	47 06.6	97 13	27.7	48 33.4	96 12	27.1	49 02.3	96 12	26.9	49 31.2	96 12	26.7	55 15.6	95 11	23.8	55 44.1	95 11	23.6	60 26.6	93 09	20.4	140
1	46 30.0	97 12	27.2	46 59.0	97 12	27.0	48 26.0	97 12	26.4	48 54.9	96 12	26.2	49 23.8	96 12	26.0	55 09.0	95 11	23.2	55 37.6	95 11	23.0	60 20.9	94 09	19.9	1
2	46 22.5	97 12	26.5	46 51.6	97 12	26.3	48 18.7	97 12	25.8	48 47.7	97 12	25.6	49 16.7	97 12	25.4	55 02.5	96 10	22.6	55 31.2	95 10	22.4	60 15.4	94 09	19.4	2
3	46 15.2	97 12	25.8	46 44.3	97 12	25.6	48 11.6	97 12	25.1	48 40.6	97 11	24.9	49 09.7	97 11	24.7	54 56.3	96 10	22.1	55 25.0	96 10	21.8	60 10.0	94 09	18.9	3
4	46 08.1	97 12	25.1	46 37.3	97 11	24.9	48 04.7	97 11	24.4	48 33.8	97 11	24.2	49 02.8	97 11	24.0	54 50.1	96 10	21.5	55 18.9	96 10	21.2	60 04.7	95 09	18.4	4
145	46 01.2	97 11	24.4	46 30.4	97 11	24.2	47 57.9	97 11	23.7	48 27.1	97 11	23.5	48 56.2	97 11	23.4	54 44.2	96 10	20.9	55 13.0	96 10	20.6	59 59.6	95 08	17.8	145
6	45 54.5	98 11	23.7	46 23.7	97 11	23.5	47 51.4	97 11	23.0	48 20.6	97 11	22.9	48 49.7	97 10	22.7	54 38.3	96 09	20.3	55 07.2	96 09	20.0	59 54.6	95 08	17.3	6
7	45 47.9	98 11	23.0	46 17.2	98 11	22.8	47 45.0	97 10	22.4	48 14.2	97 10	22.2	48 43.4	97 10	22.0	54 32.7	97 09	19.7	55 01.7	97 09	19.4	59 49.7	95 08	16.8	7
8	45 41.5	98 10	22.3	46 10.9	98 10	22.1	47 38.8	98 10	21.7	48 08.1	98 10	21.5	48 37.3	98 10	21.3	54 27.2	97 09	19.1	54 56.2	97 09	18.8	59 45.0	96 08	16.3	8
9	45 35.4	98 10	21.6	46 04.7	98 10	21.4	47 32.8	98 10	21.0	48 02.1	98 10	20.8	48 31.4	98 10	20.7	54 21.9	97 09	18.5	54 51.0	97 08	18.3	59 40.4	96 07	15.8	9
150	45 29.4	98 10	20.9	45 58.8	98 10	20.8	47 26.9	98 09	20.3	47 56.3	98 09	20.2	48 25.7	98 09	20.0	54 16.7	97 08	17.9	54 45.9	97 08	17.7	59 36.0	96 07	15.3	150
1	45 23.6	98 09	20.2	45 53.0	98 09	20.1	47 21.3	98 09	19.6	47 50.7	98 09	19.5	48 20.1	98 09	19.3	54 11.7	97 08	17.3	54 40.9	97 08	17.1	59 31.7	96 07	14.8	1
2	45 18.0	98 09	19.5	45 47.4	98 09	19.4	47 15.8	98 09	19.0	47 45.3	98 09	18.8	48 14.7	98 09	18.7	54 06.9	98 08	16.7	54 36.2	97 08	16.5	59 27.5	97 07	14.3	2
3	45 12.5	98 09	18.8	45 42.0	98 09	18.7	47 10.6	98 08	18.3	47 40.0	98 08	18.1	48 09.5	98 08	18.0	54 02.2	98 08	16.1	54 31.6	98 07	15.9	59 23.5	97 06	13.8	3
4	45 07.3	99 08	18.1	45 36.9	98 08	18.0	47 05.5	98 08	17.6	47 35.0	98 08	17.5	48 04.5	98 08	17.3	53 57.8	98 07	15.5	54 27.1	98 07	15.3	59 19.6	97 06	13.3	4
155	45 02.3	99 08	17.4	45 31.8	99 08	17.3	47 00.6	99 08	16.9	47 30.1	99 08	16.8	47 59.7	98 08	16.7	53 53.4	98 07	14.9	54 22.8	98 07	14.7	59 15.9	97 06	12.8	155
6	44 57.4	99 08	16.7	45 27.0	99 08	16.6	46 55.8	99 08	16.2	47 25.4	99 08	16.1	47 55.0	99 07	16.0	53 49.3	98 07	14.3	54 18.7	98 07	14.1	59 12.3	98 06	12.3	6
7	44 52.8	99 07	16.0	45 22.4	99 07	15.9	46 51.3	99 07	15.6	47 20.9	99 07	15.4	47 50.5	99 07	15.3	53 45.3	98 06	13.7	54 14.7	98 06	13.5	59 08.9	98 06	11.7	7
8	44 48.3	99 07	15.3	45 18.0	99 07	15.2	46 47.0	99 07	14.9	47 16.6	99 07	14.8	47 46.3	99 07	14.7	53 41.4	98 06	13.1	54 11.0	98 06	13.0	59 05.6	98 05	11.2	8
9	44 44.0	99 07	14.6	45 13.7	99 07	14.5	46 42.8	99 07	14.2	47 12.5	99 07	14.1	47 42.2	99 06	14.0	53 37.8	99 06	12.5	54 07.3	99 06	12.4	59 02.4	98 05	10.7	9
160	44 39.9	99 06	13.9	45 09.7	99 06	13.8	46 38.8	99 06	13.5	47 08.6	99 06	13.4	47 38.3	99 06	13.3	53 34.3	99 06	11.9	54 03.9	99 05	11.8	58 59.4	98 05	10.2	160
1	44 36.1	99 06	13.2	45 05.8	99 06	13.1	46 35.1	99 06	12.8	47 04.8	99 06	12.8	47 34.6	99 06	12.7	53 30.9	99 05	11.3	54 00.6	99 05	11.2	58 56.6	98 05	09.7	1
2	44 32.4	99 06	12.5	45 02.2	99 06	12.4	46 31.5	99 06	12.2	47 01.3	99 06	12.1	47 31.0	99 06	12.0	53 27.8	99 05	10.7	53 57.5	99 05	10.6	58 53.9	99 04	09.2	2
3	44 28.9	99 06	11.8	44 58.7	99 05	11.7	46 28.1	99 05	11.5	46 57.9	99 05	11.4	47 27.7	99 05	11.3	53 24.8	99 05	10.1	53 54.5	99 05	10.0	58 51.3	99 04	08.7	3
4	44 25.6	99 05	11.1	44 55.4	99 05	11.1	46 24.9	99 05	10.8	46 54.7	99 05	10.7	47 24.5	99 05	10.7	53 22.0	99 04	09.5	53 51.7	99 04	09.4	58 48.9	99 04	08.2	4
165	44 22.5	1.0 05	10.4	44 52.4	99 05	10.4	46 21.9	99 05	10.1	46 51.7	99 05	10.1	47 21.6	99 05	10.0	53 19.3	99 04	08.9	53 49.1	99 04	08.8	58 46.6	99 04	07.7	165
6	44 19.6	1.0 04	09.7	44 49.5	1.0 04	09.7	46 19.1	1.0 04	09.5	46 48.9	1.0 04	09.4	47 18.8	1.0 04	09.3	53 16.8	99 04	08.3	53 46.6	99 04	08.2	58 44.4	99 03	07.2	6
7	44 16.9	1.0 04	09.0	44 46.8	1.0 04	09.0	46 16.5	1.0 04	08.8	46 46.3	1.0 04	08.7	47 16.2	1.0 04	08.7	53 14.5	99 04	07.7	53 44.3	99 04	07.7	58 42.5	99 03	06.6	7
8	44 14.4	1.0 04	08.3	44 44.3	1.0 04	08.3	46 14.0	1.0 04	08.1	46 43.9	1.0 04	08.1	47 13.8	1.0 04	08.0	53 12.4	1.0 03	07.1	53 42.2	1.0 03	07.1	58 40.6	99 03	06.1	8
9	44 12.1	1.0 04	07.6	44 42.0	1.0 03	07.6	46 11.8	1.0 03	07.4	46 41.7	1.0 03	07.4	47 11.6	1.0 03	07.3	53 10.4	1.0 03	06.6	53 40.3	1.0 03	06.5	58 38.9	99 03	05.6	9
170	44 10.0	1.0 03	07.0	44 40.0	1.0 03	06.9	46 09.7	1.0 03	06.8	46 39.7	1.0 03	06.7	47 09.6	1.0 03	06.7	53 08.6	1.0 03	06.0	53 38.5	1.0 03	05.9	58 37.4	1.0 02	05.1	170
1	44 08.1	1.0 03	06.3	44 38.1	1.0 03	06.2	46 07.9	1.0 03	06.1	46 37.8	1.0 03	06.0	47 07.8	1.0 03	06.0	53 07.0	1.0 02	05.4	53 36.9	1.0 02	05.3	58 36.0	1.0 02	04.6	1
2	44 06.4	1.0 02	05.6	44 36.4	1.0 02	05.5	46 06.2	1.0 02	05.4	46 36.2	1.0 02	05.4	47 06.1	1.0 02	05.3	53 05.5	1.0 02	04.8	53 35.4	1.0 02	04.7	58 34.7	1.0 02	04.1	2
3	44 04.9	1.0 02	04.9	44 34.9	1.0 02	04.8	46 04.8	1.0 02	04.7	46 34.7	1.0 02	04.7	47 04.7	1.0 02	04.7	53 04.2	1.0 02	04.2	53 34.2	1.0 02	04.1	58 33.6	1.0 02	03.6	3
4	44 03.6	1.0 02	04.2	44 33.6	1.0 02	04.1	46 03.5	1.0 02	04.1	46 33.5	1.0 02	04.0	47 03.5	1.0 02	04.0	53 03.1	1.0 02	03.6	53 33.1	1.0 02	03.5	58 32.7	1.0 01	03.1	4
175	44 02.5	1.0 02	03.5	44 32.5	1.0 01	03.5	46 02.4	1.0 01	03.4	46 32.4	1.0 01	03.4	47 02.4	1.0 01	03.3	53 02.1	1.0 01	03.0	53 32.1	1.0 01	02.9	58 31.8	1.0 01	02.6	175
6	44 01.6	1.0 01	02.8	44 31.6	1.0 01	02.8	46 01.6	1.0 01	02.7	46 31.6	1.0 01	02.7	47 01.5	1.0 01	02.7	53 01.4	1.0 01	02.4	53 31.4	1.0 01	02.4	58 31.2	1.0 01	02.0	6
7	44 00.9	1.0 01	02.1	44 30.9	1.0 01	02.1	46 00.9	1.0 01	02.0	46 30.9	1.0 01	02.0	47 00.9	1.0 01	02.0	53 00.8	1.0 01	01.8	53 30.8	1.0 01	01.8	58 30.7	1.0 01	01.5	7
8	44 00.4	1.0 00	01.4	44 30.4	1.0 00	01.4	46 00.4	1.0 00	01.4	46 30.4	1.0 00	01.3	47 00.4	1.0 00	01.3	53 00.3	1.0 00	01.2	53 30.3	1.0 00	01.2	58 30.3	1.0 00	01.0	8
9	44 00.1	1.0 00	00.7	44 30.1	1.0 00	00.7	46 00.1	1.0 00	00.7	46 30.1	1.0 00	00.7	47 00.1	1.0 00	00.7	53 00.1	1.0 00	00.6	53 30.1	1.0 00	00.6	58 30.1	1.0 00	00.5	9
180	44 00.0	1.0 00	00.0	44 30.0	1.0 00	00.0	46 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	47 00.0	1.0 00	00.0	53 00.0	1.0 00	00.0	53 30.0	1.0 00	00.0	58 30.0	1.0 00	00.0	180

Lat. 74°

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	20	180	24	180	28	180	32	180	36	180	40	180	44	180	48	180	52	180	56	180	60	180	00
4	20	176	24	176	28	176	32	175	36	175	40	175	44	175	48	175	52	175	56	175	60	174	4
8	20	172	24	171	28	171	32	171	36	171	40	170	44	170	48	170	52	170	56	169	60	169	8
12	20	167	24	167	28	167	32	166	36	166	40	166	44	165	48	165	52	164	56	164	60	163	12
16	19	163	23	163	27	162	31	162	35	161	39	161	43	160	47	160	51	159	55	158	59	157	16
20	19	159	23	158	27	158	31	157	35	157	39	156	43	156	47	155	51	154	55	153	59	152	20
24	19	155	23	154	26	154	30	153	34	152	38	152	42	151	46	150	50	149	54	148	58	146	24
28	18	150	22	150	26	149	30	149	34	148	38	147	42	146	46	145	50	144	54	143	57	141	28
32	17	146	21	146	25	145	29	144	33	143	37	143	41	142	45	141	49	139	53	138	57	136	32
36	17	142	21	141	25	141	29	140	33	139	36	138	40	137	44	136	48	134	52	133	56	131	36
40	16	138	20	137	24	137	28	136	32	135	36	134	40	133	44	131	47	130	51	128	55	126	40
44	15	134	19	133	23	132	27	131	31	130	35	129	39	128	43	127	47	125	50	124	54	121	44
48	15	130	18	129	22	128	26	127	30	126	34	125	38	124	42	122	46	121	49	119	53	117	48
52	14	126	18	125	21	124	25	123	29	122	33	121	37	119	41	118	45	116	48	115	52	112	52
56	13	122	17	121	21	120	24	119	28	118	32	117	36	115	40	114	44	112	47	110	51	108	56
60	12	118	16	117	20	116	23	115	27	114	31	112	35	111	39	110	43	108	46	106	50	104	60
64	11	114	15	113	19	112	22	111	26	110	30	108	34	107	38	105	42	104	45	102	49	100	64
68	10	110	14	109	18	108	21	107	25	106	29	104	33	103	37	101	40	100	44	98	48	96	68
72	09	106	13	105	16	104	20	103	24	102	28	100	32	99	36	97	39	96	43	94	47	92	72
76	08	102	12	101	15	100	19	99	23	98	27	96	31	95	34	94	38	92	42	90	46	88	76
80	07	99	10	97	14	96	18	95	22	94	26	93	30	91	33	90	37	88	41	86	45	84	80
84	05	95	09	94	13	92	17	91	21	90	25	89	28	87	32	86	36	84	40	83	44	81	84
88	04	91	08	90	12	89	16	87	20	86	24	85	27	84	31	82	35	81	39	79	42	77	88
92	03	87	07	86	11	85	15	84	19	82	22	81	26	80	30	78	34	77	38	75	41	73	92
96	02	83	06	82	10	81	14	80	18	79	21	77	25	76	29	75	33	73	37	72	40	70	96
100	01	79	05	78	09	77	13	76	16	75	20	74	24	72	28	71	32	70	36	68	39	66	100
104	00	75	04	74	08	73	12	72	15	71	19	70	23	69	27	67	31	66	35	64	38	63	104
108	*01*	72	03	71	07	69	11	68	14	67	18	66	22	65	26	64	30	62	34	61	37	59	108
112	*02*	68	02	67	06	66	10	65	13	64	17	62	21	61	25	60	29	59	33	57	36	56	112
116	*03*	64	01	63	05	62	09	61	12	60	16	59	20	58	24	57	28	55	32	54	36	53	116
120	*04*	60	*00*	59	04	58	08	57	11	56	15	55	19	54	23	53	27	52	31	51	35	49	120
124	*05*	56	*01*	55	03	54	07	53	11	52	14	51	18	50	22	49	26	48	30	47	34	46	124
128	*06*	52	*02*	51	02	50	06	50	10	49	14	48	18	47	21	46	25	45	29	44	33	43	128
132	*07*	48	*03*	47	01	47	05	46	09	45	13	44	17	43	21	42	25	41	28	40	32	39	132
136	*08*	44	*04*	44	00	43	04	42	08	41	12	40	16	40	20	39	24	38	28	37	32	36	136
140	*08*	40	*04*	40	*00*	39	04	38	07	38	11	37	15	36	19	35	23	34	27	34	31	33	140
144	*09*	36	*05*	36	*01*	35	03	34	07	34	11	33	15	32	19	32	23	31	27	30	30	29	144
148	*10*	32	*06*	32	*02*	31	02	31	06	30	10	29	14	29	18	28	22	28	26	27	30	26	148
152	*10*	28	*06*	28	*02*	27	02	27	06	26	10	26	14	25	18	25	22	24	26	23	30	23	152
156	*11*	24	*07*	24	*03*	23	01	23	05	23	09	22	13	22	17	21	21	21	25	20	29	20	156
160	*11*	20	*07*	20	*03*	20	01	19	05	19	09	18	13	18	17	18	21	17	25	17	29	16	160
164	*11*	16	*07*	16	*03*	16	01	15	05	15	09	15	13	14	17	14	21	14	25	13	28	13	164
168	*12*	12	*08*	12	*04*	12	00	12	04	11	08	11	12	11	16	11	20	10	24	10	28	10	168
172	*12*	08	*08*	08	*04*	08	00	08	04	08	08	07	12	07	16	07	20	07	24	07	28	07	172
176	*12*	04	*08*	04	*04*	04	00	04	04	04	08	04	12	04	16	04	20	03	24	03	28	03	176
180	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	28	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18606

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 74°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	64	180	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	00
4	64	174	68	173	72	173	76	172	80	170	84	166	88	148	88	25	84	07	80	02	76	01	4
8	64	168	68	167	72	166	76	164	80	160	83	153	87	127	87	42	84	13	80	05	76	01	8
12	63	162	67	161	71	159	75	156	79	151	83	141	86	114	86	52	83	18	80	07	76	02	12
16	63	156	67	154	71	152	75	148	79	142	82	131	85	105	85	57	83	23	80	09	76	02	16
20	63	150	66	148	70	145	74	141	78	135	81	123	84	99	84	59	83	27	79	11	76	03	20
24	62	145	66	142	70	139	73	135	77	128	80	116	83	94	84	61	82	31	79	13	76	03	24
28	61	139	65	137	69	133	73	128	76	121	79	110	82	90	83	61	81	33	79	15	76	04	28
32	61	134	64	131	68	127	72	123	75	115	78	104	81	86	82	61	81	35	79	16	76	04	32
36	60	129	63	126	67	122	71	117	74	110	77	99	79	83	81	61	80	37	78	18	76	05	36
40	59	124	63	121	66	117	70	112	73	105	76	95	78	80	80	60	80	38	78	19	75	05	40
44	58	119	62	116	65	112	69	107	72	100	75	91	77	77	79	59	79	39	78	20	75	06	44
48	57	114	61	111	64	108	68	103	71	96	74	87	76	75	78	58	78	39	77	21	75	06	48
52	56	110	60	107	63	103	67	98	70	92	73	83	75	72	77	57	77	39	77	21	75	06	52
56	55	106	58	103	62	99	65	94	69	88	72	80	74	69	76	56	77	39	76	22	75	06	56
60	54	101	57	98	61	95	64	90	68	84	71	77	73	67	75	54	76	39	76	22	75	07	60
64	53	97	56	94	60	91	63	86	66	81	69	74	72	65	74	53	75	38	76	22	75	07	64
68	52	93	55	90	59	87	62	83	65	78	68	71	71	62	73	51	75	38	75	22	75	07	68
72	50	89	54	87	58	83	61	79	64	74	67	68	70	60	72	50	74	37	75	22	75	07	72
76	49	86	53	83	57	80	60	76	63	71	66	65	69	58	72	48	73	36	74	22	74	07	76
80	48	82	52	79	55	76	59	73	62	68	65	62	68	55	71	46	73	35	74	22	74	07	80
84	47	78	51	76	54	73	58	69	61	65	64	60	67	53	70	45	72	34	74	22	74	07	84
88	46	75	50	72	53	69	57	66	60	62	63	57	67	51	69	43	72	33	73	21	74	07	88
92	45	71	49	69	52	66	56	63	59	59	63	54	66	49	68	41	71	32	73	21	74	07	92
96	44	68	48	65	51	63	55	60	58	56	62	52	65	46	68	40	70	31	72	20	74	07	96
100	43	64	47	62	50	60	54	57	57	53	61	49	64	44	67	38	70	30	72	19	74	07	100
104	42	61	46	59	49	57	53	54	57	51	60	47	63	42	66	36	69	28	72	19	73	07	104
108	41	58	45	56	49	53	52	51	56	48	59	44	63	40	66	34	69	27	71	18	73	07	108
112	40	54	44	52	48	50	51	48	55	45	58	42	62	37	65	32	68	26	71	17	73	06	112
116	39	51	43	49	47	47	51	45	54	42	58	39	61	35	65	30	68	24	71	16	73	06	116
120	38	48	42	46	46	44	50	42	53	40	57	37	61	33	64	29	67	23	70	16	73	06	120
124	38	44	41	43	45	41	49	39	53	37	56	34	60	31	64	27	67	22	70	15	73	06	124
128	37	41	41	40	45	38	48	36	52	34	56	32	60	29	63	25	67	20	70	14	73	05	128
132	36	38	40	37	44	35	48	34	52	32	55	29	59	26	63	23	66	19	70	13	73	05	132
136	36	35	39	34	43	32	47	31	51	29	55	27	59	24	62	21	66	17	69	12	73	05	136
140	35	32	39	31	43	29	47	28	50	26	54	24	58	22	62	19	66	16	69	11	72	04	140
144	34	28	38	27	42	26	46	25	50	24	54	22	58	20	61	17	65	14	69	10	72	04	144
148	34	25	38	24	42	23	46	22	50	21	53	19	57	18	61	15	65	13	69	09	72	03	148
152	33	22	37	21	41	20	45	19	49	18	53	17	57	15	61	14	65	11	69	08	72	03	152
156	33	19	37	18	41	18	45	17	49	16	53	15	57	13	61	12	65	09	68	07	72	03	156
160	33	16	37	15	41	15	45	14	49	13	53	12	57	11	60	10	64	08	68	06	72	02	160
164	32	13	36	12	40	12	44	11	48	10	52	10	56	09	60	08	64	06	68	04	72	02	164
168	32	09	36	09	40	09	44	08	48	08	52	07	56	07	60	06	64	05	68	03	72	01	168
172	32	06	36	06	40	06	44	06	48	05	52	05	56	04	60	04	64	03	68	02	72	01	172
176	32	03	36	03	40	03	44	03	48	03	52	02	56	02	60	02	64	02	68	01	72	00	176
180	32	00	36	00	40	00	44	00	48	00	52	00	56	00	60	00	64	00	68	00	72	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 75°

Lat. 76°

Lat 77

L 7

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	°
00	15 00.0	1.0 00 180.0	15 30.0	1.0 00 180.0	16 00.0	1.0 00 180.0	16 30.0	1.0 00 180.0	17 00.0	1.0 00 180.0	17 30.0	1.0 00 180.0	18 00.0	1.0 00 180.0	18 30.0	1.0 00 180.0	00
1	14 59.9	1.0 01 179.0	15 29.9	1.0 01 179.0	15 59.9	1.0 01 179.0	16 29.9	1.0 01 179.0	16 59.9	1.0 01 179.0	17 29.9	1.0 01 179.0	17 59.9	1.0 01 179.0	18 29.9	1.0 01 178.9	1
2	14 59.4	1.0 01 177.9	15 29.4	1.0 01 177.9	15 59.4	1.0 01 177.9	16 29.4	1.0 01 177.9	16 59.4	1.0 01 177.9	17 29.4	1.0 01 177.9	17 59.4	1.0 01 177.9	18 29.4	1.0 01 177.9	2
3	14 58.7	1.0 02 176.9	15 28.7	1.0 02 176.9	15 58.7	1.0 02 176.9	16 28.7	1.0 02 176.9	16 58.7	1.0 02 176.9	17 28.7	1.0 02 176.9	17 58.7	1.0 02 176.9	18 28.7	1.0 02 176.8	3
4	14 57.8	1.0 02 175.9	15 27.8	1.0 02 175.8	15 57.7	1.0 02 175.8	16 27.7	1.0 02 175.8	16 57.7	1.0 02 175.8	17 27.7	1.0 02 175.8	17 57.7	1.0 02 175.8	18 27.7	1.0 02 175.8	4
05	14 56.5	1.0 03 174.8	15 26.5	1.0 03 174.8	15 56.5	1.0 03 174.8	16 26.5	1.0 03 174.8	16 56.5	1.0 03 174.8	17 26.5	1.0 03 174.8	17 56.4	1.0 03 174.8	18 26.4	1.0 03 174.7	05
6	14 55.0	1.0 03 173.8	15 24.9	1.0 03 173.8	15 54.9	1.0 03 173.8	16 24.9	1.0 03 173.7	16 54.9	1.0 03 173.7	17 24.9	1.0 03 173.7	17 54.9	1.0 03 173.7	18 24.9	1.0 03 173.7	6
7	14 53.1	1.0 04 172.8	15 23.1	1.0 04 172.7	15 53.1	1.0 04 172.7	16 23.1	1.0 04 172.7	16 53.1	1.0 04 172.7	17 23.1	1.0 04 172.7	17 53.0	1.0 04 172.7	18 23.0	1.0 04 172.6	7
8	14 51.0	1.0 04 171.7	15 21.0	1.0 04 171.7	15 51.0	1.0 04 171.7	16 21.0	1.0 04 171.7	16 51.0	1.0 04 171.6	17 20.9	1.0 04 171.6	17 50.9	1.0 04 171.6	18 20.9	1.0 04 171.6	8
9	14 48.7	1.0 04 170.7	15 18.6	1.0 04 170.7	15 48.6	1.0 04 170.6	16 18.6	1.0 04 170.6	16 48.6	1.0 04 170.6	17 18.5	1.0 04 170.6	17 48.5	1.0 04 170.6	18 18.5	1.0 04 170.5	9
10	14 46.0	1.0 05 169.7	15 16.0	1.0 05 169.6	15 45.9	1.0 05 169.6	16 15.9	1.0 05 169.6	16 45.9	1.0 05 169.6	17 15.8	1.0 05 169.5	17 45.8	1.0 05 169.5	18 15.8	1.0 05 169.5	10
1	14 43.1	1.0 05 168.6	15 13.0	1.0 05 168.6	15 43.0	1.0 05 168.6	16 13.0	1.0 05 168.5	16 42.9	1.0 05 168.5	17 12.9	1.0 05 168.5	17 42.8	1.0 05 168.5	18 12.8	1.0 05 168.4	1
2	14 39.9	1.0 06 167.6	15 09.8	1.0 06 167.6	15 39.8	1.0 06 167.5	16 09.7	1.0 06 167.5	16 39.7	1.0 06 167.5	17 09.7	1.0 06 167.4	17 39.6	1.0 06 167.4	18 09.6	1.0 06 167.4	2
3	14 36.4	1.0 06 166.6	15 06.4	1.0 06 166.5	15 36.3	1.0 06 166.5	16 06.2	1.0 06 166.5	16 36.2	1.0 06 166.4	17 06.1	1.0 06 166.4	17 36.1	1.0 06 166.4	18 06.0	1.0 06 166.3	3
4	14 32.7	1.0 07 165.5	15 02.6	1.0 07 165.5	15 32.5	1.0 07 165.5	16 02.5	1.0 07 165.4	16 32.4	1.0 07 165.4	17 02.3	1.0 07 165.4	17 32.3	1.0 07 165.3	18 02.2	1.0 07 165.3	4
15	14 28.6	1.0 07 164.5	14 58.6	1.0 07 164.5	15 28.5	1.0 07 164.4	15 58.4	1.0 07 164.4	16 28.4	1.0 07 164.4	16 58.3	1.0 07 164.3	17 28.2	1.0 07 164.3	17 58.1	1.0 07 164.2	15
6	14 24.4	1.0 08 163.5	14 54.3	1.0 08 163.4	15 24.2	1.0 08 163.4	15 54.1	1.0 08 163.4	16 24.0	1.0 08 163.3	16 54.0	1.0 08 163.3	17 23.9	1.0 08 163.2	17 53.8	1.0 08 163.2	6
7	14 19.8	1.0 08 162.4	14 49.7	1.0 08 162.4	15 19.6	1.0 08 162.4	15 49.5	1.0 08 162.3	16 19.4	1.0 08 162.3	16 49.3	1.0 08 162.2	17 19.3	1.0 08 162.2	17 49.2	1.0 08 162.1	7
8	14 15.0	1.0 08 161.4	14 44.9	1.0 08 161.4	15 14.8	1.0 08 161.3	15 44.7	1.0 09 161.3	16 14.6	1.0 09 161.2	16 44.5	1.0 09 161.2	17 14.4	1.0 09 161.1	17 44.3	1.0 09 161.1	8
9	14 09.9	1.0 09 160.4	14 39.8	1.0 09 160.3	15 09.7	1.0 09 160.3	15 39.6	1.0 09 160.2	16 09.5	1.0 09 160.2	16 39.3	1.0 09 160.2	17 09.2	1.0 09 160.1	17 39.1	1.0 09 160.1	9
20	14 04.6	1.0 09 159.4	14 34.4	1.0 09 159.3	15 04.3	1.0 09 159.3	15 34.2	1.0 09 159.2	16 04.1	1.0 09 159.2	16 33.9	1.0 09 159.1	17 03.8	1.0 09 159.1	17 33.7	1.0 09 159.0	20
1	13 59.0	1.0 10 158.3	14 28.8	1.0 10 158.3	14 58.7	1.0 10 158.2	15 28.5	1.0 10 158.2	15 58.4	1.0 10 158.1	16 28.3	1.0 10 158.1	16 58.1	1.0 10 158.0	17 28.0	1.0 10 158.0	1
2	13 53.1	1.0 10 157.3	14 22.9	99 10 157.2	14 52.8	99 10 157.2	15 22.6	99 10 157.1	15 52.5	99 10 157.1	16 22.3	99 10 157.0	16 52.2	99 10 157.0	17 22.0	99 10 156.9	2
3	13 47.0	99 11 156.3	14 16.8	99 11 156.2	14 46.6	99 11 156.2	15 16.5	99 11 156.1	15 46.3	99 11 156.1	16 16.2	99 11 156.0	16 46.0	99 11 156.0	17 15.8	99 11 155.9	3
4	13 40.6	99 11 155.3	14 10.4	99 11 155.2	14 40.2	99 11 155.1	15 10.1	99 11 155.1	15 39.9	99 11 155.0	16 09.7	99 11 155.0	16 39.5	99 11 154.9	17 09.3	99 11 154.9	4
25	13 34.0	99 11 154.2	14 03.8	99 11 154.2	14 33.6	99 12 154.1	15 03.4	99 12 154.1	15 33.2	99 12 154.0	16 03.0	99 12 153.9	16 32.8	99 12 153.9	17 02.6	99 12 153.8	25
6	13 27.1	99 12 153.2	13 56.9	99 12 153.1	14 26.7	99 12 153.1	14 56.5	99 12 153.0	15 26.3	99 12 153.0	15 56.1	99 12 152.9	16 25.9	99 12 152.8	16 55.6	99 12 152.8	6
7	13 20.0	99 12 152.2	13 49.8	99 12 152.1	14 19.5	99 12 152.1	14 49.3	99 12 152.0	15 19.1	99 12 151.9	15 48.9	99 12 151.9	16 18.6	99 12 151.8	16 48.4	99 12 151.7	7
8	13 12.6	99 13 151.2	13 42.4	99 13 151.1	14 12.1	99 13 151.0	14 41.9	99 13 151.0	15 11.7	99 13 150.9	15 41.4	99 13 150.8	16 11.2	99 13 150.8	16 40.9	99 13 150.7	8
9	13 05.0	99 13 150.2	13 34.8	99 13 150.1	14 04.5	99 13 150.0	14 34.2	99 13 150.0	15 04.0	99 13 149.9	15 33.7	99 13 149.8	16 03.5	99 13 149.7	16 33.2	99 13 149.7	9
30	12 57.2	99 13 149.1	13 26.9	99 14 149.1	13 56.6	99 14 149.0	14 26.3	99 14 148.9	14 56.1	99 14 148.9	15 25.8	99 14 148.8	15 55.5	99 14 148.7	16 25.3	99 14 148.6	30
1	12 49.1	99 14 148.1	13 18.8	99 14 148.0	13 48.5	99 14 148.0	14 18.2	99 14 147.9	14 47.9	99 14 147.8	15 17.6	99 14 147.8	15 47.4	99 14 147.7	16 17.1	99 14 147.6	1
2	12 40.7	99 14 147.1	13 10.4	99 14 147.0	13 40.1	99 14 147.0	14 09.8	99 14 146.9	14 39.5	99 14 146.8	15 09.2	99 14 146.7	15 38.9	99 14 146.7	16 08.6	99 14 146.6	2
3	12 32.2	99 15 146.1	13 01.9	99 15 146.0	13 31.6	99 15 145.9	14 01.2	99 15 145.9	14 30.9	99 15 145.8	15 00.6	99 15 145.7	15 30.3	99 15 145.6	16 00.0	99 15 145.6	3
4	12 23.4	99 15 145.1	12 53.1	99 15 145.0	13 22.8	99 15 144.9	13 52.4	99 15 144.8	14 22.1	99 15 144.8	14 51.7	99 15 144.7	15 21.4	99 15 144.6	15 51.1	99 15 144.5	4
35	12 14 4	99 15 144.1	12 44.1	99 15 144.0	13 13.7	99 15 143.9	13 43.4	99 15 143.8	14 13.0	99 16 143.7	14 42.7	99 16 143.7	15 12.3	99 16 143.6	15 41.9	99 16 143.5	35
6	12 05.2	99 16 143.1	12 34.8	99 16 143.0	13 04.5	99 16 142.9	13 34.1	99 16 142.8	14 03.7	99 16 142.7	14 33.3	99 16 142.6	15 03.0	99 16 142.6	15 32.6	99 16 142.5	6
7	11 55.7	99 16 142.0	12 25.4	99 16 142.0	12 55.0	99 16 141.9	13 24.6	99 16 141.8	13 54.2	99 16 141.7	14 23.8	99 16 141.6	14 53.4	99 16 141.5	15 23.0	99 16 141.5	7
8	11 46.1	99 16 141.0	12 15.7	99 16 140.9	12 45.3	99 16 140.9	13 14.9	99 17 140.8	13 44.5	99 17 140.7	14 14.1	99 17 140.6	14 43.7	99 17 140.5	15 13.2	99 17 140.4	8
9	11 36.2	99 17 140.0	12 05.8	99 17 139.9	12 35.4	99 17 139.9	13 05.0	99 17 139.8	13 34.5	99 17 139.7	14 04.1	99 17 139.6	14 33.7	99 17 139.5	15 03.3	99 17 139.4	9
40	11 26.1	99 17 139.0	11 55.7	99 17 138.9	12 25.3	99 17 138.8	12 54.8	99 17 138.8	13 24.4	99 17 138.7	13 53.9	99 17 138.6	14 23.5	99 17 138.5	14 53.0	99 17 138.4	40
1	11 15.9	98 17 138.0	11 45.4	98 18 137.9	12 14.9	98 18 137.8	12 44.5	98 18 137.7	13 14.0	98 18 137.7	13 43.6	98 18 137.6	14 13.1	98 18 137.5	14 42.6	98 18 137.4	1
2	11 05.4	98 18 137.0	11 34.9	98 18 136.9	12 04.4	98 18 136.8	12 33.9	98 18 136.7	13 03.5	98 18 136.6	13 33.0	98 18 136.6	14 02.5	98 18 136.5	14 32.0	98 18 136.4	2
3	10 54.7	98 18 136.0	11 24.2	98 18 135.9	11 53.7	98 18 135.8	12 23.2	98 18 135.7	12 52.7	98 18 135.6	13 22.2	98 18 135.5	13 51.7	98 18 135.5	14 21.2	98 18 135.4	3
4	10 43.8	98 18 135.0	11 13.3	98 18 134.9	11 42.8	98 19 134.8	12 12.3	98 19 134.7	12 41.8	98 19 134.6	13 11.2	98 19 134.5	13 40.7	98 19 134.4	14 10.2	98 19 134.3	4
45	10 32.7	98 19 134.0	11 02.2	98 19 133.9	11 31.7	98 19 133.8	12 01.1	98 19 133.7	12 30.6	98 19 133.6	13 00.1	98 19 133.5	13 29.5	98 19 133.4	13 59.0	98 19 133.3	45
6	10 21.5	98 19 133.0	10 50.9	98 19 132.9	11 20.4	98 19 132.8	11 49.8	98 19 132.7	12 19.3	98 19 132.6	12 48.7	98 19 132.5	13 18.2	98 19 132.4	13 47.6	98 19 132.3	6
7	10 10.0	98 19 132.0	10 39.4	98 19 131.9	11 08.9	98 19 131.8	11 38.3	98 19 131.7	12 07.8	98 20 131.6	12 37.2	98 20 131.5	13 06.6	98 20 131.4	13 36.0	98 20 131.3	7
8	9 58.4	98 20 131.0	10 27.8	98 20 130.9	10 57.2	98 20 130.8	11 26.6	98 20 130.7	11 56.1	98 20 130.6	12 25.5	98 20 130.5	12 54.9	98 20 130.4	13 24.3	98 20 130.3	8
9	9 46.6	98 20 130.0	10 16.0	98 20 129.9	10 45.4	98 20 129.8	11 14.8	98 20 129.7	11 44.2	98 20 129.6	12 13.6	98 20 129.5	12 43.0	98 20 129.4	13 12.4	98 20 129.3	9
50	9 34.6	98 20 129.0	10 04.0	98 20 128.9	10 33.4	98 20 128.8	11 02.7	98 20 128.7	11 32.1	98 20 128.6	12 01.5	98 20 128.5	12 30.9	98 20 128.4	13 00.3	98 20 128.3	50
1	9 22.4	98 21 128.0	9 51.8	98 21 127.9	10 21.2	98 21 127.8	10 50.5	98 21 127.7	11 19.9	98 21 127.6	11 49.3	98 21 127.5	12 18.6	98 21 127.4	12 48.0	98 21 127.3	1
2	9 10.1	98 21 127.0	9 39.5	98 21 126.9	10 08.8	98 21 126.8	10 38.2	98 21 126.7	11 07.5	98 21 126.6	11 36.9	98 21 126.5	12 06.2	98 21 126.4	12 35.6	98 21 126.3	2
3	8 57.7	98 21 126.0	9 27.0	98 21 125.9	9 56.3	98 21 125.8	10 25.7	98 21 125.7	10 55.0	98 21 125.6	11 24.3	98 21 125.5	11 53.6	98 21 125.4	12 23.0	98 21 125.3	3
4	8 45.0	98 21 125.1	9 14.3	98 21 125.0	9 43.7	98 21 124.8	10 13.0	98 21 124.7	10 42.3	98 21 124.6	11 11.6	98 21 124.5	11 40.9	98 21 124.4	12 10.2	98 22 124.3	4
55	8 32.2	98 22 124.1	9 01.5	98 22 124.0	9 30.8	98 22 123.9	10 00.1	98 22 123.7	10 29.4	98 22 123.6	10 58.7	98 22 123.5	11 28.0	98 22 123.4	11 57.3	98 22 123.3	55
6	8 19.3	98 22 123.1	8 48.6	98 22 123.0	9 17.9	98 22 122.9	9 47.1	98 22 122.8	10 16.4	98 22 122.6	10 45.7	98 22 122.5	11 15.0	98 22 122.4	11 44.2	98 22 122.3	6
7	8 06.2	98 22 122.1	8 35.5	98 22 122.0	9 04.8	98 22 121.9	9 34.0	98 22 121.8	10 03.3	98 22 121.7	10 32.5	98 22 121.5	11 01.8	98 22 121.4	11 31.1	98 22 121.3	7
8	7 53.0	98 22 121.1	8 22.2	98 22 121.0	8 51.5	98 22 120.9	9 20.7	97 22 120.8	9 50.0	97 22 120.7	10 19.2	97 22 120.6	10 48.5	97 22 120.4	11 17.7	97 22 120.3	8
9	7 39.6	97 22 120.1	8 08.9	97 23 120.0	8 38.1	97 23 119.9	9 07.3	97 23 119.8	9 36.6	97 23 119.7	10 05.8	97 23 119.6	10 35.0	97 23 119.4	11 04.2	97 23 119.3	9
60	7 26.1	97 23 119.1	7 55.4	97 23 119.0	8 24.6	97 23 118.9	8 53.8	97 23 118.8	9 23.0	97 23 118.7	9 52.2	97 23 118.6	10 21.4	97 23 118.5	10 50.6	97 23 118.3	60
1	7 12.5	97 23 118.2	7 41.7	97 23 118.0	8 10.9	97 23 117.9	8 40.1	97 23 117.8	9 09.3	97 23 117.7	9 38.5	97 23 117.6	10 07.7	97 23 117.5	10 36.9	97 23 117.4	1
2	6 58.7	97 23 117.2	7 27.9	97 23 117.1	7 57.1	97 23 117.0	8 26.3	97 23 116.8	8 55.5	97 23 116.7	9 24.7	97 23 116.6	9 53.9	97 23 116.5	10 23.1	97 23 116.4	2
3	6 44.9	97 23 116.2	7 14.1	97 23 116.1	7 43.2	97 23 116.0	8 12.4	97 23 115.9	8 41.6	97 23 115.7	9 10.8	97 23 115.6	9 39.9	97 23 115.5	10 09.1	97 23 115.4	3
4	6 30.9	97 24 115.2	7 00.0	97 24 115.1	7 29.2	97 24 115.0	7 58.4	97 24 114.9	8 27.5	97 24 114.8	8 56.7	97 24 114.6	9 25.8	97 24 114.5	9 55.0	97 24 114.4	4
65	6 16.8	97 24 114.2	6 45.9	97 24 114.1	7 15.1	97 24 114.0	7 44.2	97 24 113.9	8 13.4	97 24 113.8	8 42.5	97 24 113.7	9 11.7	97 24 113.5	9 40.8	97 24 113.4	65
6	6 02.6	97 24 113.3	6 31.7	97 24 113.2	7 00.8	97 24 113.0	7 30.0	97 24 112.9	7 59.1	97 24 112.8	8 28.2	97 24 112.7	8 57.4	97 24 112.5	9 26.5	97 24 112.4	6
7	5 48.2	97 24 112.3	6 17.4	97 24 112.2	6 46.5	97 24 112.1	7 15.6	97 24 111.9	7 44.7	97 24 111.8	8 13.9	97 24 111.7	8 43.0	97 24 111.6	9 12.1	97 24 111.4	7
8	5 33.8	97 24 111.3	6 02.9	97 24 111.2	6 32.1	97 24 111.1	7 01.2	97 24 111.0	7 30.3	97 24 110.8	7 59.4	97 24 110.7	8 28.5	97 24 110.6	8 57.6	97 24 110.5	8
9	5 19.3	97 24 110.3	5 48.4	97 24 110.2	6 17.5	97 24 110.1	6 46.6	97 24 110.0	7 15.7	97 24 109.9	7 44.8	97 24 109.7	8 13.9	97 24 109.6	8 43.0	97 24 109.5	9
70	5 04.7	97 24 109.4	5 33.8	97 24 109.2	6 02.9	97 25 109.1	6 32.0	97 25 109.0	7 01.1	97 25 108.9	7 30.2	97 25 108.8	7 59.2	97 25 108.6	8 28.3	97 25 108.5	70
1			5 19.1	97 25 108.3	5 48.2	97 25 108.2	6 17.3	97 25 108.0	6 46.3	97 25 107.9	7 15.4	97 25 107.8	7 44.5	97 25 107.7	8 13.5	97 25 107.5	1
2			5 04.3	97 25 107.3	5 33.4	97 25 107.2	6 02.4	97 25 107.1	6 31.5	97 25 106.9	7 00.6	97 25 106.8	7 29.6	97 25 106.7	7 58.7	97 25 106.6	2
3					5 18.5	97 25 106.2	5 47.6	97 25 106.1	6 16.6	97 25 106.0	6 45.7	97 25 105.8	7 14.7	97 25 105.7	7 43.8	97 25 105.6	3
4					5 03.6	97 25 105.2	5 32.6	97 25 105.1	6 01.7	97 25 105.0	6 30.7	97 25 104.9	6 59.7	97 25 104.7	7 28.8	97 25 104.6	4
75							5 17.6	97 25 104.1	5 46.6	97 25 104.0	6 15.7	97 25 103.9	6 44.7	97 25 103.8	7 13.7	97 25 103.6	75
6							5 02.5	97 25 103.2	5 31.5	97 25 103.0	6 00.6	97 25 102.9	6 29.6	97 25 102.8	6 58.6	97 25 102.7	6
7									5 16.4	97 25 102.1	5 45.4	97 25 101.9	6 14.4	97 25 101.8	6 43.4	97 25 101.7	7
8									5 01.2	97 25 101.1	5 30.2	97 25 101.0	5 59.2	97 25 100.8	6 28.2	97 25 100.7	8
9											5 14.9	97 26 100.0	5 43.9	97 26 99.9	6 12.9	97 26 99.7	9
80													5 28.6	97 26 98.9	5 57.6	97 26 98.8	80
1													5 13.2	97 26 97.9	5 42.2	97 26 97.8	1
2															5 26.8	97 26 96.8	2
3															5 11.4	97 26 95.9	3

Lat. 75°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	15 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	00
1	14 59.9 1.0 01	179.0	14 29.9 1.0 01	179.0	13 59.9 1.0 01	179.0	13 29.9 1.0 01	179.0	12 59.9 1.0 01	179.0	12 29.9 1.0 01	179.0	11 59.9 1.0 01	179.0	11 29.9 1.0 01	179.0	1
2	14 59.4 1.0 01	177.9	14 29.4 1.0 01	177.9	13 59.4 1.0 01	177.9	13 29.4 1.0 01	177.9	12 59.4 1.0 01	177.9	12 29.4 1.0 01	178.0	11 59.4 1.0 01	178.0	11 29.4 1.0 01	178.0	2
3	14 58.7 1.0 02	176.9	14 28.7 1.0 02	176.9	13 58.7 1.0 02	176.9	13 28.7 1.0 02	176.9	12 58.7 1.0 02	176.9	12 28.8 1.0 02	176.9	11 58.8 1.0 02	176.9	11 28.8 1.0 02	176.9	3
4	14 57.8 1.0 02	175.9	14 27.8 1.0 02	175.9	13 57.8 1.0 02	175.9	13 27.8 1.0 02	175.9	12 57.8 1.0 02	175.9	12 27.8 1.0 02	175.9	11 57.8 1.0 02	175.9	11 27.8 1.0 02	175.9	4
05	14 56.5 1.0 03	174.8	14 26.5 1.0 03	174.8	13 56.5 1.0 03	174.8	13 26.5 1.0 03	174.9	12 56.5 1.0 03	174.9	12 26.5 1.0 03	174.9	11 56.5 1.0 03	174.9	11 26.6 1.0 03	174.9	05
6	14 55.0 1.0 03	173.8	14 25.0 1.0 03	173.8	13 55.0 1.0 03	173.8	13 25.0 1.0 03	173.8	12 55.0 1.0 03	173.8	12 25.0 1.0 03	173.9	11 55.0 1.0 03	173.9	11 25.0 1.0 03	173.9	6
7	14 53.1 1.0 04	172.8	14 23.2 1.0 03	172.8	13 53.2 1.0 03	172.8	13 23.2 1.0 03	172.8	12 53.2 1.0 03	172.8	12 23.2 1.0 03	172.8	11 53.2 1.0 03	172.9	11 23.2 1.0 03	172.9	7
8	14 51.0 1.0 04	171.7	14 21.1 1.0 04	171.7	13 51.1 1.0 04	171.8	13 21.1 1.0 04	171.8	12 51.1 1.0 04	171.8	12 21.1 1.0 04	171.8	11 51.2 1.0 04	171.8	11 21.2 1.0 04	171.9	8
9	14 48.7 1.0 04	170.7	14 18.7 1.0 04	170.7	13 48.7 1.0 04	170.7	13 18.7 1.0 04	170.8	12 48.8 1.0 04	170.8	12 18.8 1.0 04	170.8	11 48.8 1.0 04	170.8	11 18.8 1.0 04	170.8	9
10	14 46.0 1.0 05	169.7	14 16.0 1.0 05	169.7	13 46.1 1.0 05	169.7	13 16.1 1.0 05	169.7	12 46.1 1.0 05	169.8	12 16.2 1.0 05	169.8	11 46.2 1.0 05	169.8	11 16.2 1.0 05	169.8	10
1	14 43.1 1.0 05	168.6	14 13.1 1.0 05	168.6	13 43.2 1.0 05	168.7	13 13.2 1.0 05	168.7	12 43.2 1.0 05	168.7	12 13.3 1.0 05	168.8	11 43.3 1.0 05	168.8	11 13.4 1.0 05	168.8	1
2	14 39.9 1.0 06	167.6	14 09.9 1.0 06	167.6	13 40.0 1.0 06	167.6	13 10.0 1.0 06	167.7	12 40.1 1.0 06	167.7	12 10.1 1.0 06	167.7	11 40.2 1.0 06	167.8	11 10.2 1.0 06	167.8	2
3	14 36.4 1.0 06	166.6	14 06.5 1.0 06	166.6	13 36.5 1.0 06	166.6	13 06.6 1.0 06	166.7	12 36.6 1.0 06	166.7	12 06.7 1.0 06	166.7	11 36.7 1.0 06	166.7	11 06.8 1.0 06	166.8	3
4	14 32.7 1.0 07	165.5	14 02.7 1.0 07	165.6	13 32.8 1.0 07	165.6	13 02.9 1.0 07	165.6	12 32.9 1.0 07	165.7	12 03.0 1.0 07	165.7	11 33.0 1.0 07	165.7	11 03.1 1.0 07	165.8	4
15	14 28.6 1.0 07	164.5	13 58.7 1.0 07	164.5	13 28.8 1.0 07	164.6	12 58.9 1.0 07	164.6	12 28.9 1.0 07	164.6	11 59.0 1.0 07	164.7	11 29.1 1.0 07	164.7	10 59.1 1.0 07	164.7	15
6	14 24.4 1.0 08	163.5	13 54.4 1.0 08	163.5	13 24.5 1.0 08	163.5	12 54.6 1.0 08	163.6	12 24.7 1.0 08	163.6	11 54.8 1.0 08	163.7	11 24.8 1.0 08	163.7	10 54.9 1.0 07	163.7	6
7	14 19.8 1.0 08	162.4	13 49.9 1.0 08	162.5	13 20.0 1.0 08	162.5	12 50.1 1.0 08	162.6	12 20.2 1.0 08	162.6	11 50.3 1.0 08	162.6	11 20.4 1.0 08	162.7	10 50.4 1.0 08	162.7	7
8	14 15.0 1.0 08	161.4	13 45.1 1.0 08	161.5	13 15.2 1.0 08	161.5	12 45.3 1.0 08	161.5	12 15.4 1.0 08	161.6	11 45.5 1.0 08	161.6	11 15.6 1.0 08	161.7	10 45.7 1.0 08	161.7	8
9	14 09.9 1.0 09	160.4	13 40.0 1.0 09	160.4	13 10.1 1.0 09	160.5	12 40.2 1.0 09	160.5	12 10.4 1.0 09	160.6	11 40.5 1.0 09	160.6	11 10.6 1.0 09	160.6	10 40.7 1.0 09	160.7	9
20	14 04.6 1.0 09	159.4	13 34.7 1.0 09	159.4	13 04.8 1.0 09	159.4	12 34.9 1.0 09	159.5	12 05.1 1.0 09	159.5	11 35.2 1.0 09	159.6	11 05.3 1.0 09	159.6	10 35.4 1.0 09	159.7	20
1	13 59.0 1.0 10	158.3	13 29.1 1.0 10	158.4	12 59.2 1.0 10	158.4	12 29.4 1.0 10	158.5	11 59.5 1.0 10	158.5	11 29.6 1.0 10	158.6	10 59.8 1.0 10	158.6	10 29.9 1.0 10	158.7	1
2	13 53.1 1.0 10	157.3	13 23.2 1.0 10	157.4	12 53.4 1.0 10	157.4	12 23.5 1.0 10	157.5	11 53.7 1.0 10	157.5	11 23.8 1.0 10	157.6	10 54.0 1.0 10	157.6	10 24.1 1.0 10	157.7	2
3	13 47.0 99 11	156.3	13 17.1 99 11	156.3	12 47.3 99 11	156.4	12 17.5 99 11	156.4	11 47.6 99 11	156.5	11 17.8 99 10	156.5	10 47.9 99 10	156.6	10 18.1 99 10	156.6	3
4	13 40.6 99 11	155.3	13 10.8 99 11	155.3	12 41.0 99 11	155.4	12 11.1 99 11	155.4	11 41.3 99 11	155.5	11 11.5 99 11	155.5	10 41.6 99 11	155.6	10 11.8 99 11	155.6	4
25	13 34.0 99 11	154.2	13 04.2 99 11	154.3	12 34.4 99 11	154.3	12 04.5 99 11	154.4	11 34.7 99 11	154.5	11 04.9 99 11	154.5	10 35.1 99 11	154.6	10 05.3 99 11	154.6	25
6	13 27.1 99 12	153.2	12 57.3 99 12	153.3	12 27.5 99 12	153.3	11 57.7 99 12	153.4	11 27.9 99 12	153.4	10 58.1 99 12	153.5	10 28.3 99 12	153.6	9 58.5 99 12	153.6	6
7	13 20.0 99 12	152.2	12 50.2 99 12	152.3	12 20.4 99 12	152.3	11 50.6 99 12	152.4	11 20.8 99 12	152.4	10 51.1 99 12	152.5	10 21.3 99 12	152.6	9 51.5 99 12	152.6	7
8	13 12.6 99 13	151.2	12 42.8 99 13	151.2	12 13.1 99 13	151.3	11 43.3 99 13	151.4	11 13.5 99 13	151.4	10 43.8 99 13	151.5	10 14.0 99 13	151.5	9 44.2 99 12	151.6	8
9	13 05.0 99 13	150.2	12 35.2 99 13	150.2	12 05.5 99 13	150.3	11 35.7 99 13	150.3	11 06.0 99 13	150.4	10 36.2 99 13	150.5	10 06.5 99 13	150.5	9 36.7 99 13	150.6	9
30	12 57.2 99 13	149.1	12 27.4 99 13	149.2	11 57.7 99 13	149.3	11 27.9 99 13	149.3	10 58.2 99 13	149.4	10 28.5 99 13	149.5	9 58.7 99 13	149.5	9 29.0 99 13	149.6	30
1	12 49.1 99 14	148.1	12 19.3 99 14	148.2	11 49.6 99 14	148.3	11 19.9 99 14	148.3	10 50.2 99 14	148.4	10 20.5 99 14	148.5	9 50.7 99 14	148.5	9 21.0 99 14	148.6	1
2	12 40.7 99 14	147.1	12 11.0 99 14	147.2	11 41.3 99 14	147.2	11 11.6 99 14	147.3	10 41.9 99 14	147.4	10 12.2 99 14	147.5	9 42.5 99 14	147.5	9 12.8 99 14	147.6	2
3	12 32.2 99 15	146.1	12 02.5 99 15	146.2	11 32.8 99 15	146.2	11 03.1 99 15	146.3	10 33.4 99 15	146.4	10 03.8 99 14	146.5	9 34.1 99 14	146.5	9 04.4 99 14	146.6	3
4	12 23.4 99 15	145.1	11 53.8 99 15	145.1	11 24.1 99 15	145.2	10 54.4 99 15	145.3	10 24.7 99 15	145.4	9 55.1 99 15	145.4	9 25.4 99 15	145.5	8 55.7 99 15	145.6	4
35	12 14.4 99 15	144.1	11 44.8 99 15	144.1	11 15.1 99 15	144.2	10 45.5 99 15	144.3	10 15.8 99 15	144.4	9 46.1 99 15	144.4	9 16.5 99 15	144.5	8 46.8 99 15	144.6	35
6	12 05.2 99 16	143.1	11 35.6 99 16	143.1	11 05.9 99 16	143.2	10 36.3 99 16	143.3	10 06.6 99 16	143.4	9 37.0 99 16	143.4	9 07.4 99 16	143.5	8 37.7 99 16	143.6	6
7	11 55.7 99 16	142.0	11 26.1 99 16	142.1	10 56.5 99 16	142.2	10 26.9 99 16	142.3	9 57.3 99 16	142.4	9 27.6 99 16	142.4	8 58.0 99 16	142.5	8 28.4 99 16	142.6	7
8	11 46.1 99 16	141.0	11 16.5 99 16	141.1	10 46.9 99 16	141.2	10 17.3 99 16	141.3	9 47.7 99 16	141.4	9 18.1 99 16	141.4	8 48.5 99 16	141.5	8 18.9 99 16	141.6	8
9	11 36.2 99 17	140.0	11 06.6 99 17	140.1	10 37.1 99 17	140.2	10 07.5 99 17	140.3	9 37.9 99 17	140.4	9 08.3 99 17	140.4	8 38.7 99 17	140.5	8 09.1 99 17	140.6	9
40	11 26.1 99 17	139.0	10 56.6 99 17	139.1	10 27.0 99 17	139.2	9 57.4 99 17	139.3	9 27.9 99 17	139.4	8 58.3 99 17	139.4	8 28.7 99 17	139.5	7 59.2 99 17	139.6	40
1	11 15.9 98 17	138.0	10 46.3 98 17	138.1	10 16.8 98 17	138.2	9 47.2 99 17	138.3	9 17.7 99 17	138.4	8 48.1 99 17	138.5	8 18.5 99 17	138.5	7 49.0 99 17	138.6	1
2	11 05.4 98 18	137.0	10 35.8 98 18	137.1	10 06.3 98 18	137.2	9 36.8 98 18	137.3	9 07.2 98 18	137.4	8 37.7 98 18	137.5	8 08.2 98 18	137.5	7 38.6 98 18	137.6	2
3	10 54.7 98 18	136.0	10 25.2 98 18	136.1	9 55.6 98 18	136.2	9 26.1 98 18	136.3	8 56.6 98 18	136.4	8 27.1 98 18	136.5	7 57.6 98 18	136.6	7 28.1 98 18	136.6	3
4	10 43.8 98 18	135.0	10 14.3 98 18	135.1	9 44.8 98 18	135.2	9 15.3 98 18	135.3	8 45.8 98 18	135.4	8 16.3 98 18	135.5	7 46.8 98 18	135.6	7 17.3 98 18	135.7	4
45	10 32.7 98 19	134.0	10 03.2 98 19	134.1	9 33.8 98 19	134.2	9 04.3 98 19	134.3	8 34.8 98 19	134.4	8 05.3 98 19	134.5	7 35.8 98 19	134.6	7 06.4 98 19	134.7	45
6	10 21.5 98 19	133.0	9 52.0 98 19	133.1	9 22.5 98 19	133.2	8 53.1 98 19	133.3	8 23.6 98 19	133.4	7 54.1 98 19	133.5	7 24.7 98 19	133.6	6 55.2 98 19	133.7	6
7	10 10.0 98 19	132.0	9 40.6 98 19	132.1	9 11.1 98 19	132.2	8 41.7 98 19	132.3	8 12.2 98 19	132.4	7 42.8 98 19	132.5	7 13.3 98 19	132.6	6 43.9 98 19	132.7	7
8	9 58.4 98 20	131.0	9 29.0 98 20	131.1	8 59.5 98 20	131.2	8 30.1 98 20	131.3	8 00.7 98 20	131.4	7 31.2 98 20	131.5	7 01.8 98 20	131.6	6 32.4 98 19	131.7	8
9	9 46.6 98 20	130.0	9 17.2 98 20	130.1	8 47.8 98 20	130.2	8 18.4 98 20	130.3	7 48.9 98 20	130.4	7 19.5 98 20	130.5	6 50.1 98 20	130.6	6 20.7 98 20	130.7	9
50	9 34.6 98 20	129.0	9 05.2 98 20	129.1	8 35.8 98 20	129.2	8 06.4 98 20	129.3	7 37.0 98 20	129.4	7 07.6 98 20	129.5	6 38.2 98 20	129.6	6 08.8 98 20	129.7	50
1	9 22.4 98 21	128.0	8 53.1 98 20	128.1	8 23.7 98 20	128.2	7 54.3 98 20	128.3	7 25.0 98 20	128.4	6 55.6 98 20	128.5	6 26.2 98 20	128.6	5 56.8 98 20	128.7	1
2	9 10.1 98 21	127.0	8 40.8 98 21	127.1	8 11.4 98 21	127.2	7 42.1 98 21	127.4	7 12.7 98 21	127.5	6 43.3 98 21	127.6	6 14.0 98 21	127.7	5 44.6 98 21	127.8	2
3	8 57.7 98 21	126.0	8 28.3 98 21	126.2	7 59.0 98 21	126.3	7 29.6 98 21	126.4	7 00.3 98 21	126.5	6 31.0 98 21	126.6	6 01.6 98 21	126.7	5 32.3 98 21	126.8	3
4	8 45.0 98 21	125.1	8 15.7 98 21	125.2	7 46.4 98 21	125.3	7 17.1 98 21	125.4	6 47.7 98 21	125.5	6 18.4 98 21	125.6	5 49.1 98 21	125.7	5 19.8 98 21	125.8	4
55	8 32.2 98 22	124.1	8 02.9 98 22	124.2	7 33.6 98 22	124.3	7 04.3 98 21	124.4	6 35.0 98 21	124.5	6 05.7 98 21	124.6	5 36.4 98 21	124.7	5 07.1 98 21	124.8	55
6	8 19.3 98 22	123.1	7 50.0 98 22	123.2	7 20.7 98 22	123.3	6 51.4 98 22	123.4	6 22.1 98 22	123.5	5 52.8 98 22	123.6	5 23.6 98 22	123.7			6
7	8 06.2 98 22	122.1	7 36.9 98 22	122.2	7 07.7 98 22	122.3	6 38.4 98 22	122.4	6 09.1 98 22	122.5	5 39.8 98 22	122.7	5 10.6 98 22	122.8			7
8	7 53.0 98 22	121.1	7 23.7 98 22	121.2	6 54.5 98 22	121.3	6 25.2 98 22	121.4	5 56.0 98 22	121.6	5 26.7 98 22	121.7					8
9	7 39.6 97 22	120.1	7 10.4 97 22	120.2	6 41.1 97 22	120.4	6 11.9 97 22	120.5	5 42.7 97 22	120.6	5 13.4 97 22	120.7					9
60	7 26.1 97 23	119.1	6 56.9 97 23	119.3	6 27.7 97 23	119.4	5 58.5 97 23	119.5	5 29.2 97 23	119.6	5 00.0 97 23	119.7					60
1	7 12.5 97 23	118.2	6 43.3 97 23	118.3	6 14.1 97 23	118.4	5 44.9 97 23	118.5	5 15.7 97 23	118.6							1
2	6 58.7 97 23	117.2	6 29.6 97 23	117.3	6 00.4 97 23	117.4	5 31.2 97 23	117.5	5 02.0 97 23	117.6							2
3	6 44.9 97 23	116.2	6 15.7 97 23	116.3	5 46.5 97 23	116.4	5 17.3 97 23	116.6									3
4	6 30.9 97 24	115.2	6 01.7 97 23	115.3	5 32.5 97 23	115.5	5 03.4 97 23	115.6									4
65	6 16.8 97 24	114.2	5 47.6 97 24	114.4	5 18.5 97 24	114.5											65
6	6 02.6 97 24	113.3	5 33.4 97 24	113.4	5 04.3 97 24	113.5											6
7	5 48.2 97 24	112.3	5 19.1 97 24	112.4													7
8	5 33.8 97 24	111.3	5 04.7 97 24	111.4													8
9	5 19.3 97 24	110.3															9
70	5 04.7 97 24	109.4															70

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	00
1	18 59.9	1.0 01	178.9	19 29.9	1.0 01	178.9	19 59.9	1.0 01	178.9	20 29.9	1.0 01	178.9	20 59.9	1.0 01	178.9	21 29.9	1.0 01	178.9	21 59.9	1.0 01	178.9	22 29.9	1.0 01	178.9	1
2	18 59.4	1.0 01	177.9	19 29.4	1.0 01	177.9	19 59.4	1.0 01	177.9	20 29.4	1.0 01	177.9	20 59.4	1.0 01	177.9	21 29.4	1.0 01	177.9	21 59.4	1.0 01	177.9	22 29.4	1.0 01	177.9	2
3	18 58.7	1.0 02	176.8	19 28.7	1.0 02	176.8	19 58.7	1.0 02	176.8	20 28.7	1.0 02	176.8	20 58.7	1.0 02	176.8	21 28.7	1.0 02	176.8	21 58.7	1.0 02	176.8	22 28.7	1.0 02	176.8	3
4	18 57.7	1.0 02	175.8	19 27.7	1.0 02	175.8	19 57.7	1.0 02	175.8	20 27.7	1.0 02	175.7	20 57.7	1.0 02	175.7	21 27.7	1.0 02	175.7	21 57.7	1.0 02	175.7	22 27.7	1.0 02	175.7	4
05	18 56.4	1.0 03	174.7	19 26.4	1.0 03	174.7	19 56.4	1.0 03	174.7	20 26.4	1.0 03	174.7	20 56.4	1.0 03	174.7	21 26.4	1.0 03	174.7	21 56.4	1.0 03	174.6	22 26.4	1.0 03	174.6	05
6	18 54.9	1.0 03	173.7	19 24.8	1.0 03	173.7	19 54.8	1.0 03	173.6	20 24.8	1.0 03	173.6	20 54.8	1.0 03	173.6	21 24.8	1.0 03	173.6	21 54.8	1.0 03	173.6	22 24.8	1.0 03	173.6	6
7	18 53.0	1.0 04	172.6	19 23.0	1.0 04	172.6	19 53.0	1.0 04	172.6	20 23.0	1.0 04	172.6	20 52.9	1.0 04	172.5	21 22.9	1.0 04	172.5	21 52.9	1.0 04	172.5	22 22.9	1.0 04	172.5	7
8	18 50.9	1.0 04	171.6	19 20.8	1.0 04	171.5	19 50.8	1.0 04	171.5	20 20.8	1.0 04	171.5	20 50.8	1.0 04	171.5	21 20.8	1.0 04	171.5	21 50.7	1.0 04	171.4	22 20.7	1.0 04	171.4	8
9	18 48.4	1.0 04	170.5	19 18.4	1.0 04	170.5	19 48.4	1.0 05	170.5	20 18.4	1.0 05	170.4	20 48.3	1.0 05	170.4	21 18.3	1.0 05	170.4	21 48.3	1.0 05	170.4	22 18.3	1.0 05	170.3	9
10	18 45.7	1.0 05	169.5	19 15.7	1.0 05	169.4	19 45.7	1.0 05	169.4	20 15.6	1.0 05	169.4	20 45.6	1.0 05	169.4	21 15.6	1.0 05	169.3	21 45.5	1.0 05	169.3	22 15.5	1.0 05	169.3	10
1	18 42.8	1.0 05	168.4	19 12.7	1.0 05	168.4	19 42.7	1.0 05	168.4	20 12.6	1.0 05	168.3	20 42.6	1.0 06	168.3	21 12.6	1.0 06	168.3	21 42.5	1.0 06	168.2	22 12.5	1.0 06	168.2	1
2	18 39.5	1.0 06	167.4	19 09.5	1.0 06	167.3	19 39.4	1.0 06	167.3	20 09.4	1.0 06	167.3	20 39.3	1.0 06	167.2	21 09.3	1.0 06	167.2	21 39.2	1.0 06	167.2	22 09.2	1.0 06	167.1	2
3	18 36.0	1.0 06	166.3	19 05.9	1.0 06	166.3	19 35.9	1.0 06	166.2	20 05.8	1.0 06	166.2	20 35.7	1.0 06	166.2	21 05.7	1.0 06	166.1	21 35.6	1.0 06	166.1	22 05.6	1.0 06	166.1	3
4	18 32.2	1.0 07	165.3	19 02.1	1.0 07	165.2	19 32.0	1.0 07	165.2	20 02.0	1.0 07	165.1	20 31.9	1.0 07	165.1	21 01.8	1.0 07	165.1	21 31.8	1.0 07	165.0	22 01.7	1.0 07	165.0	4
15	18 28.1	1.0 07	164.2	18 58.0	1.0 07	164.2	19 27.9	1.0 07	164.1	19 57.8	1.0 07	164.1	20 27.8	1.0 07	164.1	20 57.7	1.0 07	164.0	21 27.6	1.0 07	164.0	21 57.5	1.0 07	163.9	15
6	18 23.7	1.0 08	163.2	18 53.6	1.0 08	163.1	19 23.5	1.0 08	163.1	19 53.4	1.0 08	163.0	20 23.4	1.0 08	163.0	20 53.3	1.0 08	163.0	21 23.2	1.0 08	162.9	21 53.1	1.0 08	162.9	6
7	18 19.1	1.0 08	162.1	18 49.0	1.0 08	162.1	19 18.9	1.0 08	162.0	19 48.8	1.0 08	162.0	20 18.7	1.0 08	161.9	20 48.6	1.0 08	161.9	21 18.5	1.0 08	161.9	21 48.4	1.0 08	161.8	7
8	18 14.2	1.0 09	161.1	18 44.1	1.0 09	161.0	19 13.9	1.0 09	161.0	19 43.8	1.0 09	160.9	20 13.7	1.0 09	160.9	20 43.6	1.0 09	160.8	21 13.5	1.0 09	160.8	21 43.4	1.0 09	160.7	8
9	18 09.0	1.0 09	160.0	18 38.9	1.0 09	160.0	19 08.7	1.0 09	159.9	19 38.6	1.0 09	159.9	20 08.5	1.0 09	159.8	20 38.4	1.0 09	159.8	21 08.3	1.0 09	159.7	21 38.1	1.0 09	159.7	9
20	18 03.5	1.0 10	159.0	18 33.4	1.0 10	158.9	19 03.3	1.0 10	158.9	19 33.2	1.0 10	158.8	20 03.0	1.0 10	158.8	20 32.9	1.0 10	158.7	21 02.7	1.0 10	158.7	21 32.6	1.0 10	158.6	20
1	17 57.8	1.0 10	157.9	18 27.7	1.0 10	157.9	18 57.6	1.0 10	157.8	19 27.4	1.0 10	157.8	19 57.3	1.0 10	157.7	20 27.1	1.0 10	157.7	20 57.0	1.0 10	157.6	21 26.8	1.0 10	157.6	1
2	17 51.9	99 10	156.9	18 21.7	99 10	156.8	18 51.6	99 10	156.8	19 21.4	99 10	156.7	19 51.2	99 10	156.7	20 21.1	99 10	156.6	20 50.9	99 10	156.6	21 20.8	99 11	156.5	2
3	17 45.6	99 11	155.8	18 15.5	99 11	155.8	18 45.3	99 11	155.7	19 15.1	99 11	155.7	19 45.0	99 11	155.6	20 14.8	99 11	155.6	20 44.6	99 11	155.5	21 14.4	99 11	155.4	3
4	17 39.2	99 11	154.8	18 09.0	99 11	154.7	18 38.8	99 11	154.7	19 08.6	99 11	154.6	19 38.4	99 11	154.6	20 08.2	99 11	154.5	20 38.0	99 11	154.4	21 07.8	99 11	154.4	4
25	17 32.4	99 12	153.8	18 02.2	99 12	153.7	18 32.0	99 12	153.6	19 01.8	99 12	153.6	19 31.6	99 12	153.5	20 01.4	99 12	153.5	20 31.2	99 12	153.4	21 01.0	99 12	153.3	25
6	17 25.4	99 12	152.7	17 55.2	99 12	152.7	18 25.0	99 12	152.6	18 54.8	99 12	152.5	19 24.6	99 12	152.5	19 54.4	99 12	152.4	20 24.1	99 12	152.3	20 53.9	99 12	152.3	6
7	17 18.2	99 12	151.7	17 48.0	99 13	151.6	18 17.7	99 13	151.6	18 47.5	99 13	151.5	19 17.3	99 13	151.4	19 47.0	99 13	151.4	20 16.8	99 13	151.3	20 46.6	99 13	151.2	7
8	17 10.7	99 13	150.6	17 40.5	99 13	150.6	18 10.2	99 13	150.5	18 40.0	99 13	150.4	19 09.7	99 13	150.4	19 39.5	99 13	150.3	20 09.2	99 13	150.2	20 39.0	99 13	150.2	8
9	17 03.0	99 13	149.6	17 32.7	99 13	149.5	18 02.4	99 13	149.5	18 32.2	99 13	149.4	19 01.9	99 13	149.3	19 31.6	99 13	149.3	20 01.4	99 13	149.2	20 31.1	99 14	149.1	9
30	16 55.0	99 14	148.6	17 24.7	99 14	148.5	17 54.4	99 14	148.4	18 24.2	99 14	148.4	18 53.9	99 14	148.3	19 23.6	99 14	148.2	19 53.3	99 14	148.1	20 23.0	99 14	148.1	30
1	16 46.8	99 14	147.5	17 16.5	99 14	147.5	17 46.2	99 14	147.4	18 15.9	99 14	147.3	18 45.6	99 14	147.3	19 15.3	99 14	147.2	19 45.0	99 14	147.1	20 14.7	99 14	147.0	1
2	16 38.3	99 14	146.5	17 08.0	99 14	146.4	17 37.7	99 15	146.4	18 07.4	99 15	146.3	18 37.1	99 15	146.2	19 06.8	99 15	146.1	19 36.4	99 15	146.1	20 06.1	99 15	146.0	2
3	16 29.6	99 15	145.5	16 59.3	99 15	145.4	17 29.0	99 15	145.3	17 58.7	99 15	145.3	18 28.3	99 15	145.2	18 58.0	99 15	145.1	19 27.7	99 15	145.0	19 57.3	99 15	144.9	3
4	16 20.7	99 15	144.5	16 50.4	99 15	144.4	17 20.0	99 15	144.3	17 49.7	99 15	144.2	18 19.3	99 15	144.1	18 49.0	99 15	144.1	19 18.6	99 15	144.0	19 48.3	99 15	143.9	4
35	16 11.6	99 16	143.4	16 41.2	99 16	143.3	17 10.9	99 16	143.3	17 40.5	99 16	143.2	18 10.1	99 16	143.1	18 39.8	99 16	143.0	19 09.4	99 16	142.9	19 39.0	99 16	142.9	35
6	16 02.2	99 16	142.4	16 31.8	99 16	142.3	17 01.5	99 16	142.2	17 31.1	99 16	142.2	18 00.7	99 16	142.1	18 30.3	99 16	142.0	18 59.9	99 16	141.9	19 29.5	99 16	141.8	6
7	15 52.6	99 16	141.4	16 22.2	99 16	141.3	16 51.8	99 16	141.2	17 21.4	99 16	141.1	17 51.0	99 16	141.0	18 20.6	99 16	141.0	18 50.2	99 16	140.9	19 19.8	99 17	140.8	7
8	15 42.8	99 17	140.4	16 12.4	99 17	140.3	16 42.0	99 17	140.2	17 11.6	99 17	140.1	17 41.2	99 17	140.0	18 10.7	99 17	139.9	18 40.3	99 17	139.8	19 09.9	99 17	139.7	8
9	15 32.8	99 17	139.3	16 02.4	99 17	139.2	16 32.0	99 17	139.2	17 01.5	99 17	139.1	17 31.1	99 17	139.0	18 00.6	99 17	138.9	18 30.2	99 17	138.8	18 59.7	99 17	138.7	9
40	15 22.6	99 17	138.3	15 52.1	98 17	138.2	16 21.7	98 17	138.1	16 51.2	98 17	138.0	17 20.8	98 18	138.0	17 50.3	98 18	137.9	18 19.9	98 18	137.8	18 49.4	98 18	137.7	40
1	15 12.2	98 18	137.3	15 41.7	98 18	137.2	16 11.2	98 18	137.1	16 40.8	98 18	137.0	17 10.3	98 18	136.9	17 39.8	98 18	136.8	18 09.3	98 18	136.7	18 38.8	98 18	136.6	1
2	15 01.5	98 18	136.3	15 31.1	98 18	136.2	16 00.6	98 18	136.1	16 30.1	98 18	136.0	16 59.6	98 18	135.9	17 29.1	98 18	135.8	17 58.6	98 18	135.7	18 28.1	98 18	135.6	2
3	14 50.7	98 18	135.3	15 20.2	98 18	135.2	15 49.7	98 18	135.1	16 19.2	98 18	135.0	16 48.7	98 18	134.9	17 18.2	98 19	134.8	17 47.6	98 19	134.7	18 17.1	98 19	134.6	3
4	14 39.7	98 19	134.3	15 09.2	98 18	134.2	15 38.6	98 18	134.1	16 08.1	98 19	134.0	16 37.6	98 19	133.9	17 07.0	98 19	133.8	17 36.5	98 19	133.7	18 06.0	98 19	133.6	4
45	14 28.5	98 19	133.2	14 57.9	98 19	133.1	15 27.4	98 19	133.0	15 56.8	98 19	132.9	16 26.3	98 19	132.8	16 55.7	98 19	132.7	17 25.2	98 19	132.6	17 54.6	98 19	132.5	45
6	14 17.1	98 19	132.2	14 46.5	98 19	132.1	15 15.9	98 19	132.0	15 45.4	98 19	131.9	16 14.8	98 19	131.8	16 44.2	98 19	131.7	17 13.7	98 20	131.6	17 43.1	98 20	131.5	6
7	14 05.5	98 20	131.2	14 34.9	98 20	131.1	15 04.3	98 20	131.0	15 33.7	98 20	130.9	16 03.1	98 20	130.8	16 32.5	98 20	130.7	17 02.0	98 20	130.6	17 31.4	98 20	130.5	7
8	13 53.7	98 20	130.2	14 23.1	98 20	130.1	14 52.5	98 20	130.0	15 21.9	98 20	129.9	15 51.3	98 20	129.8	16 20.7	98 20	129.7	16 50.1	98 20	129.6	17 19.5	98 20	129.5	8
9	13 41.7	98 20	129.2	14 11.1	98 20	129.1	14 40.5	98 20	129.0	15 09.9	98 20	128.9	15 39.3	98 20	128.8	16 08.6	98 20	128.7	16 38.0	98 20	128.6	17 07.4	98 20	128.5	9
50	13 29.6	98 20	128.2	13 59.0	98 21	128.1	14 28.4	98 21	128.0	14 57.7	98 21	127.9	15 27.1	98 21	127.8	15 56.4	98 21	127.7	16 25.8	98 21	127.6	16 55.1	98 21	127.5	50
1	13 17.3	98 21	127.2	13 46.7	98 21	127.1	14 16.0	98 21	127.0	14 45.4	98 21	126.9	15 14.7	98 21	126.8	15 44.1	98 21	126.7	16 13.4	98 21	126.5	16 42.7	98 21	126.4	1
2	13 04.9	98 21	126.2	13 34.2	98 21	126.1	14 03.6	98 21	126.0	14 32.9	98 21	125.9	15 02.2	98 21	125.8	15 31.5	98 21	125.6	16 00.8	98 21	125.5	16 30.2	98 21	125.4	2
3	12 52.3	98 21	125.2	13 21.6	98 21	125.1	13 50.9	98 21	125.0	14 20.2	98 21	124.9	14 49.5	98 21	124.8	15 18.8	98 21	124.6	15 48.1	98 21	124.5	16 17.4	98 22	124.4	3
4	12 39.5	98 22	124.2	13 08.8	98 22	124.1	13 38.1	98 22	124.0	14 07.4	98 22	123.9	14 36.7	98 22	123.7	15 06.0	98 22	123.6	15 35.3	98 22	123.5	16 04.5	98 22	123.4	4
55	12 26.6	98 22	123.2	12 55.9	98 22	123.1	13 25.2	98 22	123.0	13 54.4	98 22	122.9	14 23.7	98 22	122.7	14 53.0	98 22	122.6	15 22.2	98 22	122.5	15 51.5	98 22	122.4	55
6	12 13.5	98 22	122.2	12 42.8	98 22	122.1	13 12.0	98 22	122.0	13 41.3	98 22	121.9	14 10.6	98 22	121.7	14 39.8	98 22	121.6	15 09.1	97 22	121.5	15 38.3	97 22	121.4	6
7	12 00.3	98 22	121.2	12 29.6	97 22	121.1	12 58.8	97 22	121.0	13 28.1	97 22	120.9	13 57.3	97 22	120.7	14 26.5	97 22	120.6	14 55.8	97 22	120.5	15 25.0	97 22	120.4	7
8	11 47.0	97 22	120.2	12 16.2	97 22	120.1	12 45.4	97 23	120.0	13 14.7	97 23	119.9	13 43.9	97 23	119.7	14 13.1	97 23	119.6	14 42.3	97 23	119.5	15 11.5	97 23	119.4	8
9	11 33.5	97 23	119.2	12 02.7	97 23	119.1	12 31.9	97 23	119.0	13 01.1	97 23	118.9	13 30.3	97 23	118.8	13 59.5	97 23	118.6	14 28.7	97 23	118.5	14 57.9	97 23	118.4	9
60	11 19.9	97 23	118.2	11 49.1	97 23	118.1	12 18.3	97 23	118.0	12 47.5	97 23	117.9	13 16.6	97 23	117.8	13 45.8	97 23	117.6	14 15.0	97 23	117.5	14 44.2	97 23	117.4	60
1	11 06.1	97 23	117.2	11 35.3	97 23	117.1	12 04.5	97 23	117.0	12 33.7	97 23	116.9	13 02.8	97 23	116.8	13 32.0	97 23	116.6	14 01.2	97 23	116.5	14 30.4	97 23	116.4	1
2	10 52.2	97 23	116.2	11 21.4	97 23	116.1	11 50.6	97 23	116.0	12 19.8	97 23	115.9	12 48.9	97 23	115.8	13 18.1	97 23	115.7	13 47.2	97 23	115.5	14 16.4	97 23	115.4	2
3	10 38.3	97 24	115.3	11 07.4	97 24	115.2	11 36.6	97 24	115.0	12 05.7	97 24	114.9	12 34.9	97 24	114.8	13 04.0	97 24	114.7	13 33.2	97 24	114.5	14 02.3	97 24	114.4	3
4	10 24.1	97 24	114.3	10 53.3	97 24	114.2	11 22.4	97 24	114.0	11 51.6	97 24	113.9	12 20.7	97 24	113.8	12 49.9	97 24	113.7	13 19.0	97 24	113.5	13 48.1	97 24	113.4	4
65	10 09.9	97 24	113.3	10 39.1	97 24	113.2	11 08.2	97 24	113.0	11 37.3	97 24	112.9	12 06.5	97 24	112.8	12 35.6	97 24	112.7	13 04.7	97 24	112.6	13 33.8	97 24	112.4	65
6	9 55.6	97 24	112.3	10 24.7	97 24	112.2	10 53.9	97 24	112.1	11 23.0	97 24	111.9	11 52.1	97 24	111.8	12 21.2	97 24	111.7	12 50.3	97 24	111.6	13 19.4	97 24	111.4	6
7	9 41.2	97 24	111.3	10 10.3	97 24	111.2	10 39.4	97 24	111.1	11 08.5	97 24	111.0	11 37.6	97 24	110.8	12 06.7	97 24	110.7	12 35.8	97 24	110.6	13 04.9	97 24	110.5	7
8	9 26.7	97 24	110.3	9 55.8	97 24	110.2	10 24.9	97 24	110.1	10 54.0	97 24	110.0	11 23.1	97 24	109.8	11 52.2	97 24	109.7	12 21.2	97 24	109.6	12 50.3	97 24	109.5	8
9	9 12.1	97 24	109.4	9 41.2	97 24	109.2	10 10.3	97 25	109.1	10 39.3	97 25	109.0	11 08.4	97 25	108.9	11 37.5	97 25	108.7	12 06.6	97 25	108.6	12 35.6	97 25	108.5	9
70	8 57.4	97 25	108.4	9 26.5	97 25	108.3	9 55.5	97 25	108.1	10 24.6	97 25	108.0	10 53.7	97 25	107.9	11 22.7	97 25	107.8	11 51.8	97 25	107.6	12 20.9	97 25	107.5	70
1	8 42.6	97 25	107.4	9 11.7	97 25	107.3	9 40.7	97 25	107.2	10 09.8	97 25	107.0	10 38.9	97 25	106.9	11 07.9	97 25	106.8	11 37.0	97 25	106.6	12 06.0	97 25	106.5	1
2	8 27.8	97 25	106.4	8 56.8	97 25	106.3	9 25.9	97 25	106.2	9 54.9	97 25	106.0	10 24.0	97 25	105.9	10 53.0	97 25	105.8	11 22.0	97 25	105.7	11 51.1	97 25	105.5	2
3	8 12.8	97 25	105.4	8 41.9	97 25	105.3	9 10.9	97 25	105.2	9 40.0	97 25	105.1	10 09.0	97 25	104.9	10 38.0	97 25	104.8	11 07.1	97 25	104.7	11 36.1	97 25	104.6	3
4	7 57.8	97 25	104.5	8 26.9	97 25	104.3	8 55.9	97 25	104.2	9 24.9	97 25	104.1	9 54.0	97 25	104.0	10 23.0	97 25	103.8	10 52.0	97 25	103.7	11 21.0	97 25	103.6	4
75	7 42.8	97 25	103.5	8 11.8	97 25	103.4	8 40.8	97 25	103.2	9 09.8	97 25	103.1	9 38.9	97 25	103.0	10 07.9	97 25	102.9	10 36.9	97 25	102.7	11 05.9	97 26	102.6	75
6	7 27.6	97 25	102.5	7 56.6	97 25	102.4	8 25.7	97 25	102.3	8 54.7	97 25	102.1	9 23.7	97 25	102.0	9 52.7	97 25	101.9	10 21.7	97 25	101.8	10 50.7	97 26	101.6	6
7	7 12.4	97 25	101.6	7 41.5	97 25	101.4	8 10.5	97 25	101.3	8 39.5	97 25	101.2	9 08.5	97 25	101.0	9 37.5	97 25	100.9	10 06.5	97 25	100.8	10 35.5	97 26	100.6	7
8	6 57.2	97 25	100.6	7 26.2	97 25	100.5	7 55.2	97 26	100.3	8 24.2	97 26	100.2	8 53.2	97 26	100.1	9 22.2	97 26	99.9	9 51.2	97 26	99.8	10 20.2	97 26	99.7	8
9	6 41.9	97 26	99.6	7 10.9	97 26	99.5	7 39.9	97 26	99.4	8 08.9	97 26	99.2	8 37.9	97 26	99.1	9 06.9	97 26	99.0	9 35.9	97 26	98.8	10 04.9	97 26	98.7	9
80	6 26.6	97 26	98.6	6 55.6	97 26	98.5	7 24.6	97 26	98.4	7 53.6	97 26	98.3	8 22.5	97 26	98.1	8 51.5	97 26	98.0	9 20.5	97 26	97.9	9 49.5	97 26	97.7	80
1	6 11.2	97 26	97.7	6 40.2	97 26	97.5	7 09.2	97 26	97.4	7 38.2	97 26	97.3	8 07.2	97 26	97.1	8 36.1	97 26	97.0	9 05.1	97 26	96.9	9 34.1	97 26	96.8	1
2	5 55.8	97 26	96.7	6 24.8	97 26	96.6	6 53.8	97 26	96.4	7 22.7	97 26	96.3	7 51.7	97 26	96.2	8 20.7	97 26	96.0	8 49.7	97 26	95.9	9 18.7	97 26	95.8	2
3	5 40.4	97 26	95.7	6 09.3	97 26	95.6	6 38.3	97 26	95.5	7 07.3	97 26	95.3	7 36.3	97 26	95.2	8 05.2	97 26	95.1	8 34.2	97 26	94.9	9 03.2	97 26	94.8	3
4	5 24.9	97 26	94.8	5 53.9	97 26	94.6	6 22.9	97 26	94.5	6 51.8	97 26	94.4	7 20.8	97 26	94.2	7 49.8	97 26	94.1	8 18.7	97 26	94.0	8 47.7	97 26	93.8	4
85	5 09.4	97 26	93.8	5 38.4	97 26	93.7	6 07.4	97 26	93.5	6 36.3	97 26	93.4	7 05.3	97 26	93.3	7 34.3	97 26	93.1	8 03.2	97 26	93.0	8 32.2	97 26	92.9	85
6				5 22.9	97 26	92.7	5 51.9	97 26	92.6	6 20.8	97 26	92.5	6 49.8	97 26	92.3	7 18.8	97 26	92.2	7 47.7	97 26	92.0	8 16.7	97 26	91.9	6
7				5 07.4	97 26	91.7	5 36.3	97 26	91.6	6 05.3	97 26	91.5	6 34.3	97 26	91.3	7 03.2	97 26	91.2	7 32.2	97 26	91.1	8 01.2	97 26	90.9	7
8							5 20.8	97 26	90.6	5 49.8	97 26	90.5	6 18.7	97 26	90.4	6 47.7	97 26	90.2	7 16.7	97 26	90.1	7 45.6	97 26	90.0	8
9							5 05.3	97 26	89.7	5 34.3	97 26	89.5	6 03.2	97 26	89.4	6 32.2	97 26	89.3	7 01.1	97 26	89.1	7 30.1	97 26	89.0	9
90										5 18.7	97 26	88.6	5 47.7	97 26	88.4	6 16.7	97 26	88.3	6 45.6	97 26	88.2	7 14.6	97 26	88.0	90

Lat. 75°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	11 00.0	1.0	00	180.0	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	00
1	10 59.9	1.0	01	179.0	10 29.9	1.0	01	179.0	9 59.9	1.0	01	179.0	9 29.9	1.0	01	179.0	8 59.9	1.0	01	179.0	8 29.9	1.0	01	179.0	7 59.9	1.0	01	179.0	7 29.9	1.0	01	179.0	1
2	10 59.4	1.0	01	178.0	10 29.5	1.0	01	178.0	9 59.5	1.0	01	178.0	9 29.5	1.0	01	178.0	8 59.5	1.0	01	178.0	8 29.5	1.0	01	178.0	7 59.5	1.0	01	178.0	7 29.5	1.0	01	178.0	2
3	10 58.8	1.0	02	177.0	10 28.8	1.0	02	177.0	9 58.8	1.0	02	177.0	9 28.8	1.0	02	177.0	8 58.8	1.0	02	177.0	8 28.8	1.0	02	177.0	7 58.8	1.0	02	177.0	7 28.8	1.0	02	177.0	3
4	10 57.8	1.0	02	175.9	10 27.8	1.0	02	175.9	9 57.8	1.0	02	176.0	9 27.8	1.0	02	176.0	8 57.8	1.0	02	176.0	8 27.8	1.0	02	176.0	7 57.8	1.0	02	176.0	7 27.8	1.0	02	176.0	4
05	10 56.6	1.0	03	174.9	10 26.6	1.0	02	174.9	9 56.6	1.0	02	174.9	9 26.6	1.0	02	175.0	8 56.6	1.0	02	175.0	8 26.6	1.0	02	175.0	7 56.6	1.0	02	175.0	7 26.6	1.0	02	175.0	05
6	10 55.0	1.0	03	173.9	10 25.1	1.0	03	173.9	9 55.1	1.0	03	173.9	9 25.1	1.0	03	173.9	8 55.1	1.0	03	174.0	8 25.1	1.0	03	174.0	7 55.1	1.0	03	174.0	7 25.1	1.0	03	174.0	6
7	10 53.3	1.0	03	172.9	10 23.3	1.0	03	172.9	9 53.3	1.0	03	172.9	9 23.3	1.0	03	172.9	8 53.3	1.0	03	173.0	8 23.3	1.0	03	173.0	7 53.4	1.0	03	173.0	7 23.4	1.0	03	173.0	7
8	10 51.2	1.0	04	171.9	10 21.2	1.0	04	171.9	9 51.2	1.0	04	171.9	9 21.3	1.0	04	171.9	8 51.3	1.0	04	171.9	8 21.3	1.0	04	172.0	7 51.3	1.0	04	172.0	7 21.3	1.0	04	172.0	8
9	10 48.9	1.0	04	170.9	10 18.9	1.0	04	170.9	9 48.9	1.0	04	170.9	9 18.9	1.0	04	170.9	8 49.0	1.0	04	170.9	8 19.0	1.0	04	171.0	7 49.0	1.0	04	171.0	7 19.0	1.0	04	171.0	9
10	10 46.3	1.0	05	169.8	10 16.3	1.0	05	169.9	9 46.3	1.0	05	169.9	9 16.4	1.0	05	169.9	8 46.4	1.0	05	169.9	8 16.4	1.0	05	170.0	7 46.5	1.0	05	170.0	7 16.5	1.0	05	170.0	10
1	10 43.4	1.0	06	168.8	10 13.4	1.0	06	168.9	9 43.5	1.0	06	168.9	9 13.5	1.0	06	168.9	8 43.5	1.0	06	168.9	8 13.6	1.0	06	169.0	7 43.6	1.0	06	169.0	7 13.7	1.0	06	169.0	1
2	10 40.3	1.0	06	167.8	10 10.3	1.0	06	167.8	9 40.3	1.0	06	167.9	9 10.4	1.0	06	167.9	8 40.4	1.0	06	167.9	8 10.5	1.0	06	168.0	7 40.5	1.0	06	168.0	7 10.6	1.0	06	168.0	2
3	10 36.8	1.0	06	166.8	10 06.9	1.0	06	166.8	9 36.9	1.0	06	166.9	9 07.0	1.0	06	166.9	8 37.0	1.0	06	166.9	8 07.1	1.0	06	167.0	7 37.2	1.0	06	167.0	7 07.2	1.0	06	167.0	3
4	10 33.2	1.0	07	165.8	10 03.2	1.0	07	165.8	9 33.3	1.0	07	165.9	9 03.3	1.0	07	165.9	8 33.4	1.0	06	165.9	8 03.5	1.0	06	166.0	7 33.5	1.0	06	166.0	7 03.6	1.0	06	166.0	4
15	10 29.2	1.0	07	164.8	9 59.3	1.0	07	164.8	9 29.4	1.0	07	164.8	8 59.4	1.0	07	164.9	8 29.5	1.0	07	164.9	7 59.6	1.0	07	164.9	7 29.6	1.0	07	165.0	6 59.7	1.0	07	165.0	15
6	10 25.0	1.0	07	163.8	9 55.1	1.0	07	163.8	9 25.2	1.0	07	163.8	8 55.2	1.0	07	163.9	8 25.3	1.0	07	163.9	7 55.4	1.0	07	163.9	7 25.5	1.0	07	164.0	6 55.6	1.0	07	164.0	6
7	10 20.5	1.0	08	162.8	9 50.6	1.0	08	162.8	9 20.7	1.0	08	162.8	8 50.8	1.0	08	162.9	8 20.9	1.0	08	162.9	7 51.0	1.0	08	162.9	7 21.1	1.0	08	163.0	6 51.2	1.0	08	163.0	7
8	10 15.8	1.0	08	161.7	9 45.9	1.0	08	161.8	9 16.0	1.0	08	161.8	8 46.1	1.0	08	161.9	8 16.2	1.0	08	161.9	7 46.3	1.0	08	161.9	7 16.4	1.0	08	162.0	6 46.5	1.0	08	162.0	8
9	10 10.8	1.0	09	160.7	9 40.9	1.0	09	160.8	9 11.0	1.0	09	160.8	8 41.1	1.0	09	160.9	8 11.2	1.0	09	160.9	7 41.4	1.0	09	160.9	7 11.5	1.0	09	161.0	6 41.6	1.0	09	161.0	9
20	10 05.6	1.0	09	159.7	9 35.7	1.0	09	159.8	9 05.8	1.0	09	159.8	8 35.9	1.0	09	159.9	8 06.0	1.0	09	159.9	7 36.2	1.0	09	160.0	7 06.3	1.0	09	160.0	6 36.4	1.0	09	160.0	20
1	10 00.0	1.0	10	158.7	9 30.2	1.0	10	158.8	9 00.3	1.0	10	158.8	8 30.4	1.0	10	158.9	8 00.6	1.0	10	158.9	7 30.7	1.0	10	159.0	7 00.8	1.0	09	159.0	6 31.0	1.0	09	159.0	1
2	9 54.3	1.0	10	157.7	9 24.4	1.0	10	157.8	8 54.6	1.0	10	157.8	8 24.7	1.0	10	157.9	7 54.9	1.0	10	157.9	7 25.0	1.0	10	158.0	6 55.1	1.0	10	158.0	6 25.3	1.0	10	158.1	2
3	9 48.3	99	10	156.7	9 18.4	99	10	156.8	8 48.6	99	10	156.8	8 18.7	99	10	156.9	7 48.9	99	10	156.9	7 19.0	99	10	157.0	6 49.2	99	10	157.0	6 19.4	99	10	157.1	3
4	9 42.0	99	11	155.7	9 12.2	99	11	155.7	8 42.3	99	11	155.8	8 12.5	99	11	155.9	7 42.7	99	11	155.9	7 12.8	99	11	156.0	6 43.0	99	11	156.0	6 13.2	99	11	156.1	4
25	9 35.5	99	11	154.7	9 05.7	99	11	154.7	8 35.8	99	11	154.8	8 06.0	99	11	154.9	7 36.2	99	11	154.9	7 06.4	99	11	155.0	6 36.6	99	11	155.0	6 06.8	99	11	155.1	25
6	9 28.7	99	12	153.7	8 58.9	99	12	153.7	8 29.1	99	12	153.8	7 59.3	99	12	153.9	7 29.5	99	12	153.9	6 59.7	99	12	154.0	6 29.9	99	12	154.0	6 00.1	99	12	154.1	6
7	9 21.7	99	12	152.7	8 51.9	99	12	152.7	8 22.1	99	12	152.8	7 52.3	99	12	152.9	7 22.6	99	12	152.9	6 52.8	99	12	153.0	6 23.0	99	12	153.0	5 53.2	99	12	153.1	7
8	9 14.5	99	12	151.7	8 44.7	99	12	151.7	8 14.9	99	12	151.8	7 45.1	99	12	151.9	7 15.4	99	12	151.9	6 45.6	99	12	152.0	6 15.8	99	12	152.0	5 46.0	99	12	152.1	8
9	9 07.0	99	13	150.7	8 37.2	99	13	150.7	8 07.5	99	13	150.8	7 37.7	99	13	150.9	7 07.9	99	13	150.9	6 38.2	99	13	151.0	6 08.4	99	13	151.1	5 38.7	99	13	151.1	9
30	8 59.2	99	13	149.7	8 29.5	99	13	149.7	7 59.8	99	13	149.8	7 30.0	99	13	149.9	7 00.3	99	13	149.9	6 30.5	99	13	150.0	6 00.8	99	13	150.1	5 31.0	99	13	150.1	30
1	8 51.3	99	14	148.7	8 21.6	99	14	148.7	7 51.8	99	14	148.8	7 22.1	99	14	148.9	6 52.4	99	14	148.9	6 22.7	99	14	149.0	5 52.9	99	13	149.1	5 23.2	99	13	149.1	1
2	8 43.1	99	14	147.7	8 13.4	99	14	147.7	7 43.7	99	14	147.8	7 14.0	99	14	147.9	6 44.3	99	14	147.9	6 14.5	99	14	148.0	5 44.8	99	14	148.1	5 15.1	99	14	148.2	2
3	8 34.7	99	14	146.7	8 05.0	99	14	146.7	7 35.3	99	14	146.8	7 05.6	99	14	146.9	6 35.9	99	14	147.0	6 06.2	99	14	147.0	5 36.5	99	14	147.1	5 06.8	99	14	147.2	3
4	8 26.0	99	15	145.7	7 56.4	99	15	145.7	7 26.7	99	15	145.8	6 57.0	99	15	145.9	6 27.3	99	15	146.0	5 57.6	99	15	146.0	5 28.0	99	15	146.1					4
35	8 17.2	99	15	144.7	7 47.5	99	15	144.8	7 17.8	99	15	144.8	6 48.2	99	15	144.9	6 18.5	99	15	145.0	5 48.9	99	15	145.1	5 19.2	99	15	145.1					35
6	8 06.1	99	16	143.7	7 38.4	99	15	143.8	7 08.8	99	15	143.8	6 39.1	99	15	143.9	6 09.5	99	15	144.0	5 39.8	99	15	144.1	5 10.2	99	15	144.1					6
7	7 58.8	99	16	142.7	7 29.1	99	16	142.8	6 59.5	99	16	142.8	6 29.9	99	16	142.9	6 00.3	99	16	143.0	5 30.6	99	16	143.1	5 01.0	99	16	143.2					7
8	7 49.2	99	16	141.7	7 19.6	99	16	141.8	6 50.0	99	16	141.9	6 20.4	99	16	141.9	5 50.8	99	16	142.0	5 21.2	99	16	142.1									8
9	7 39.5	99	17	140.7	7 09.9	99	17	140.8	6 40.3	99	16	140.9	6 10.7	99	16	140.9	5 41.1	99	16	141.0	5 11.5	99	16	141.1									9
40	7 29.6	99	17	139.7	7 00.0	99	17	139.8	6 30.4	99	17	139.9	6 00.8	99	17	140.0	5 31.3	99	17	140.0	5 01.7	99	17	140.1									40
1	7 19.4	99	17	138.7	6 49.9	99	17	138.8	6 20.3	99	17	138.9	5 50.8	99	17	139.0	5 21.2	99	17	139.1													1
2	7 09.1	98	18	137.7	6 39.5	98	18	137.8	6 10.0	98	18	137.9	5 40.5	98	18	138.0	5 10.9	98	17	138.1													2
3	6 58.5	98	18	136.7	6 29.0	98	18	136.8	5 59.5	98	18	136.9	5 30.0	98	18	137.0	5 00.4	98	18	137.1													3
4	6 47.8	98	18	135.7	6 18.3	98	18	135.8	5 48.8	98	18	135.9	5 19.3	98	18	136.0																	4
45	6 36.9	98	19	134.8	6 07.4	98	19	134.8	5 37.9	98	18	134.9	5 08.4	98	18	135.0																	45
6	6 25.7	98	19	133.8	5 56.3	98	19	133.9	5 26.8	98	19	134.0																					6
7	6 14.4	98	19	132.8	5 45.0	98	19	132.9	5 15.5	98	19	133.0																					7
8	6 03.0	98	19	131.8	5 33.5	98	19	131.9	5 04.1	98	19	132.0																					8
9	5 51.3	98	20	130.8	5 21.9	98	20	130.9																									9
50	5 39.4	98	20	129.8	5 10.0	98	20	129.9																									50
1	5 27.4	98	20	128.9																													1
2	5 15.3	98	21	127.9																													2
3	5 02.9	98	21	126.9																													3

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91													5 03.2	97	26	87.6	5 32.2	97	26	87.5	6 01.1	97	26	87.3	6 30.1	97	26	87.2	6 59.1	97	26	87.1	91
2																	5 16.7	97	26	86.5	5 45.6	97	26	86.4	6 14.6	97	26	86.3	6 43.6	97	26	86.1	2
3																	5 01.2	97	26	85.5	5 30.1	97	26	85.4	5 59.1	97	26	85.3	6 28.1	97	26	85.2	3
4																					5 14.7	97	26	84.5	5 43.6	97	26	84.3	6 12.6	97	26	84.2	4
95																									5 28.2	97	26	83.4	5 57.2	97	26	83.2	95
6																									5 12.8	97	26	82.4	5 41.8	97	26	82.3	6
7																													5 26.4	97	26	81.3	7
8																													5 11.1	97	26	80.3	8

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	00
1	22 59.9	1.0 01	178.9	23 29.9	1.0 01	178.9	23 59.9	1.0 01	178.9	24 29.9	1.0 01	178.9	24 59.9	1.0 01	178.9	25 29.9	1.0 01	178.9	25 59.9	1.0 01	178.9	26 29.9	1.0 01	178.9	1
2	22 59.4	1.0 01	177.8	23 29.4	1.0 01	177.8	23 59.4	1.0 01	177.8	24 29.4	1.0 01	177.8	24 59.4	1.0 01	177.8	25 29.4	1.0 01	177.8	25 59.4	1.0 01	177.8	26 29.4	1.0 01	177.8	2
3	22 58.7	1.0 02	176.8	23 28.7	1.0 02	176.8	23 58.7	1.0 02	176.8	24 28.7	1.0 02	176.7	24 58.7	1.0 02	176.7	25 28.7	1.0 02	176.7	25 58.7	1.0 02	176.7	26 28.7	1.0 02	176.7	3
4	22 57.7	1.0 02	175.7	23 27.7	1.0 02	175.7	23 57.7	1.0 02	175.7	24 27.7	1.0 02	175.7	24 57.6	1.0 02	175.7	25 27.6	1.0 02	175.6	25 57.6	1.0 02	175.6	26 27.6	1.0 02	175.6	4
05	22 56.4	1.0 03	174.6	23 26.3	1.0 03	174.6	23 56.3	1.0 03	174.6	24 26.3	1.0 03	174.6	24 56.3	1.0 03	174.6	25 26.3	1.0 03	174.6	25 56.3	1.0 03	174.5	26 26.3	1.0 03	174.5	05
6	22 54.8	1.0 03	173.5	23 24.7	1.0 03	173.5	23 54.7	1.0 03	173.5	24 24.7	1.0 03	173.5	24 54.7	1.0 03	173.5	25 24.7	1.0 03	173.5	25 54.7	1.0 03	173.4	26 24.7	1.0 03	173.4	6
7	22 52.9	1.0 04	172.5	23 22.9	1.0 04	172.5	23 52.8	1.0 04	172.4	24 22.8	1.0 04	172.4	24 52.8	1.0 04	172.4	25 22.8	1.0 04	172.4	25 52.8	1.0 04	172.4	26 22.7	1.0 04	172.3	7
8	22 50.7	1.0 04	171.4	23 20.7	1.0 04	171.4	23 50.6	1.0 04	171.4	24 20.6	1.0 04	171.3	24 50.6	1.0 04	171.3	25 20.6	1.0 04	171.3	25 50.5	1.0 04	171.3	26 20.5	1.0 04	171.2	8
9	22 48.2	1.0 05	170.3	23 18.2	1.0 05	170.3	23 48.2	1.0 05	170.3	24 18.1	1.0 05	170.3	24 48.1	1.0 05	170.2	25 18.1	1.0 05	170.2	25 48.0	1.0 05	170.2	26 18.0	1.0 05	170.2	9
10	22 45.5	1.0 05	169.3	23 15.4	1.0 05	169.2	23 45.4	1.0 05	169.2	24 15.4	1.0 05	169.2	24 45.3	1.0 05	169.1	25 15.3	1.0 05	169.1	25 45.3	1.0 05	169.1	26 15.2	1.0 05	169.1	10
1	22 42.4	1.0 06	168.2	23 12.4	1.0 06	168.2	23 42.3	1.0 06	168.1	24 12.3	1.0 06	168.1	24 42.3	1.0 06	168.1	25 12.2	1.0 06	168.0	25 42.2	1.0 06	168.0	26 12.1	1.0 06	168.0	1
2	22 39.1	1.0 06	167.1	23 09.1	1.0 06	167.1	23 39.0	1.0 06	167.0	24 09.0	1.0 06	167.0	24 38.9	1.0 06	167.0	25 08.8	1.0 06	166.9	25 38.8	1.0 06	166.9	26 08.7	1.0 06	166.9	2
3	22 35.5	1.0 06	166.0	23 05.4	1.0 06	166.0	23 35.4	1.0 06	166.0	24 05.3	1.0 07	165.9	24 35.3	1.0 07	165.9	25 05.2	1.0 07	165.9	25 35.1	1.0 07	165.8	26 05.1	1.0 07	165.8	3
4	22 31.6	1.0 07	165.0	23 01.5	1.0 07	164.9	23 31.5	1.0 07	164.9	24 01.4	1.0 07	164.9	24 31.3	1.0 07	164.8	25 01.3	1.0 07	164.8	25 31.2	1.0 07	164.7	26 01.1	1.0 07	164.7	4
15	22 27.4	1.0 07	163.9	22 57.4	1.0 07	163.9	23 27.3	1.0 07	163.8	23 57.2	1.0 07	163.8	24 27.1	1.0 08	163.7	24 57.0	1.0 08	163.7	25 27.0	1.0 08	163.7	25 56.9	1.0 08	163.6	15
6	22 23.0	1.0 08	162.8	22 52.9	1.0 08	162.8	23 22.8	1.0 08	162.7	23 52.7	1.0 08	162.7	24 22.6	1.0 08	162.7	24 52.5	1.0 08	162.6	25 22.5	1.0 08	162.6	25 52.4	1.0 08	162.5	6
7	22 18.3	1.0 08	161.8	22 48.2	1.0 08	161.7	23 18.1	1.0 08	161.7	23 48.0	1.0 08	161.6	24 17.9	1.0 08	161.6	24 47.8	1.0 08	161.5	25 17.7	1.0 08	161.5	25 47.6	1.0 08	161.4	7
8	22 13.3	1.0 09	160.7	22 43.2	1.0 09	160.7	23 13.1	1.0 09	160.6	23 42.9	1.0 09	160.6	24 12.8	1.0 09	160.5	24 42.7	1.0 09	160.5	25 12.6	1.0 09	160.4	25 42.5	1.0 09	160.4	8
9	22 08.0	1.0 09	159.6	22 37.9	1.0 09	159.6	23 07.8	1.0 09	159.5	23 37.6	1.0 09	159.5	24 07.5	1.0 09	159.4	24 37.4	1.0 09	159.4	25 07.3	1.0 09	159.3	25 37.1	1.0 09	159.3	9
20	22 02.5	1.0 10	158.6	22 32.3	1.0 10	158.5	23 02.2	1.0 10	158.5	23 32.1	1.0 10	158.4	24 01.9	1.0 10	158.4	24 31.8	1.0 10	158.3	25 01.6	1.0 10	158.3	25 31.5	1.0 10	158.2	20
1	21 56.7	99 10	157.5	22 26.5	99 10	157.5	22 56.4	99 10	157.4	23 26.2	99 10	157.3	23 56.1	99 10	157.3	24 25.9	99 10	157.2	24 55.7	99 10	157.2	25 25.6	99 10	157.1	1
2	21 50.6	99 11	156.4	22 20.4	99 11	156.4	22 50.3	99 11	156.3	23 20.1	99 11	156.3	23 49.9	99 11	156.2	24 19.8	99 11	156.1	24 49.6	99 11	156.1	25 19.4	99 11	156.0	2
3	21 44.3	99 11	155.4	22 14.1	99 11	155.3	22 43.9	99 11	155.3	23 13.7	99 11	155.2	23 43.5	99 11	155.1	24 13.3	99 11	155.1	24 43.2	99 11	155.0	25 13.0	99 11	155.0	3
4	21 37.7	99 11	154.3	22 07.5	99 11	154.3	22 37.3	99 11	154.2	23 07.1	99 12	154.1	23 36.9	99 12	154.1	24 06.7	99 12	154.0	24 36.5	99 12	154.0	25 06.3	99 12	153.9	4
25	21 30.8	99 12	153.3	22 00.6	99 12	153.2	22 30.4	99 12	153.1	23 00.2	99 12	153.1	23 30.0	99 12	153.0	23 59.7	99 12	152.9	24 29.5	99 12	152.9	24 59.3	99 12	152.8	25
6	21 23.7	99 12	152.2	21 53.5	99 12	152.1	22 23.2	99 12	152.1	22 53.0	99 12	152.0	23 22.8	99 12	151.9	23 52.5	99 12	151.9	24 22.3	99 12	151.8	24 52.1	99 12	151.7	6
7	21 16.3	99 13	151.2	21 46.1	99 13	151.1	22 15.8	99 13	151.0	22 45.6	99 13	151.0	23 15.3	99 13	150.9	23 45.1	99 13	150.8	24 14.9	99 13	150.8	24 44.6	99 13	150.7	7
8	21 08.7	99 13	150.1	21 38.4	99 13	150.0	22 08.2	99 13	150.0	22 37.9	99 13	149.9	23 07.7	99 13	149.8	23 37.4	99 13	149.7	24 07.1	99 13	149.7	24 36.9	99 13	149.6	8
9	21 00.8	99 14	149.0	21 30.6	99 14	149.0	22 00.3	99 14	148.9	22 30.0	99 14	148.8	22 59.7	99 14	148.8	23 29.5	99 14	148.7	23 59.2	99 14	148.6	24 28.9	99 14	148.5	9
30	20 52.7	99 14	148.0	21 22.4	99 14	147.9	21 52.1	99 14	147.9	22 21.9	99 14	147.8	22 51.6	99 14	147.7	23 21.3	99 14	147.6	23 51.0	99 14	147.5	24 20.7	99 14	147.5	30
1	20 44.4	99 14	147.0	21 14.1	99 14	146.9	21 43.8	99 14	146.8	22 13.5	99 14	146.7	22 43.1	99 14	146.6	23 12.8	99 14	146.6	23 42.5	99 14	146.5	24 12.2	99 15	146.4	1
2	20 35.8	99 15	145.9	21 05.5	99 15	145.8	21 35.1	99 15	145.7	22 04.8	99 15	145.7	22 34.5	99 15	145.6	23 04.1	99 15	145.5	23 33.8	99 15	145.4	24 03.5	99 15	145.3	2
3	20 27.0	99 15	144.9	20 56.6	99 15	144.8	21 26.3	99 15	144.7	21 55.9	99 15	144.6	22 25.6	99 15	144.5	22 55.2	99 15	144.4	23 24.9	99 15	144.4	23 54.5	99 15	144.3	3
4	20 17.9	99 15	143.8	20 47.6	99 15	143.7	21 17.2	99 16	143.6	21 46.8	99 16	143.6	22 16.5	99 16	143.5	22 46.1	99 16	143.4	23 15.7	99 16	143.3	23 45.3	99 16	143.2	4
35	20 08.6	99 16	142.8	20 38.3	99 16	142.7	21 07.9	99 16	142.6	21 37.5	99 16	142.5	22 07.1	99 16	142.4	22 36.7	99 16	142.3	23 06.3	99 16	142.3	23 35.9	99 16	142.2	35
6	19 59.1	99 16	141.7	20 28.7	99 16	141.6	20 58.3	99 16	141.6	21 27.9	99 16	141.5	21 57.5	99 16	141.4	22 27.1	99 16	141.3	22 56.7	99 16	141.2	23 26.3	99 16	141.1	6
7	19 49.4	99 17	140.7	20 19.0	99 17	140.6	20 48.6	99 17	140.5	21 18.1	99 17	140.4	21 47.7	99 17	140.3	22 17.3	99 17	140.2	22 46.9	99 17	140.2	23 16.4	99 17	140.1	7
8	19 39.5	99 17	139.7	20 09.0	99 17	139.6	20 38.6	99 17	139.5	21 08.1	99 17	139.4	21 37.7	99 17	139.3	22 07.3	99 17	139.2	22 36.8	98 17	139.1	23 06.4	98 17	139.0	8
9	19 29.3	98 17	138.6	19 58.8	98 17	138.5	20 28.4	98 17	138.4	20 57.9	98 17	138.3	21 27.5	98 17	138.2	21 57.0	98 17	138.2	22 26.5	98 17	138.1	22 56.1	98 18	138.0	9
40	19 18.9	98 18	137.6	19 48.5	98 18	137.5	20 18.0	98 18	137.4	20 47.5	98 18	137.3	21 17.0	98 18	137.2	21 46.5	98 18	137.1	22 16.1	98 18	137.0	22 45.6	98 18	136.9	40
1	19 08.3	98 18	136.6	19 37.9	98 18	136.5	20 07.4	98 18	136.4	20 36.9	98 18	136.3	21 06.4	98 18	136.2	21 35.9	98 18	136.1	22 05.4	98 18	136.0	22 34.8	98 18	135.9	1
2	18 57.6	98 18	135.5	19 27.1	98 18	135.4	19 56.5	98 18	135.3	20 26.0	98 18	135.2	20 55.5	98 18	135.1	21 25.0	98 18	135.0	21 54.5	98 18	134.9	22 23.9	98 19	134.8	2
3	18 46.6	98 19	134.5	19 16.1	98 19	134.4	19 45.5	98 19	134.3	20 15.0	98 19	134.2	20 44.5	98 19	134.1	21 13.9	98 19	134.0	21 43.4	98 19	133.9	22 12.8	98 19	133.8	3
4	18 35.4	98 19	133.5	19 04.9	98 19	133.4	19 34.3	98 19	133.3	20 03.8	98 19	133.2	20 33.2	98 19	133.1	21 02.6	98 19	133.0	21 32.1	98 19	132.9	22 01.5	98 19	132.8	4
45	18 24.0	98 19	132.4	18 53.5	98 19	132.3	19 22.9	98 19	132.2	19 52.3	98 19	132.1	20 21.8	98 19	132.0	20 51.2	98 19	131.9	21 20.6	98 19	131.8	21 50.0	98 19	131.7	45
6	18 12.5	98 20	131.4	18 41.9	98 20	131.3	19 11.3	98 20	131.2	19 40.7	98 20	131.1	20 10.1	98 20	131.0	20 39.5	98 20	130.9	21 08.9	98 20	130.8	21 38.3	98 20	130.7	6
7	18 00.8	98 20	130.4	18 30.2	98 20	130.3	18 59.6	98 20	130.2	19 28.9	98 20	130.1	19 58.3	98 20	130.0	20 27.7	98 20	129.9	20 57.1	98 20	129.8	21 26.5	98 20	129.6	7
8	17 48.8	98 20	129.4	18 18.2	98 20	129.3	18 47.6	98 20	129.2	19 17.0	98 20	129.1	19 46.3	98 20	128.9	20 15.7	98 20	128.8	20 45.1	98 20	128.7	21 14.4	98 20	128.6	8
9	17 36.8	98 20	128.4	18 06.1	98 20	128.3	18 35.5	98 20	128.1	19 04.8	98 21	128.0	19 34.2	98 21	127.9	20 03.5	98 21	127.8	20 32.9	98 21	127.7	21 02.2	98 21	127.6	9
50	17 24.5	98 21	127.3	17 53.8	98 21	127.2	18 23.2	98 21	127.1	18 52.5	98 21	127.0	19 21.8	98 21	126.9	19 51.2	98 21	126.8	20 20.5	98 21	126.7	20 49.8	98 21	126.6	50
1	17 12.1	98 21	126.3	17 41.4	98 21	126.2	18 10.7	98 21	126.1	18 40.0	98 21	126.0	19 09.3	98 21	125.9	19 38.7	98 21	125.8	20 08.0	98 21	125.7	20 37.3	98 21	125.5	1
2	16 59.5	98 21	125.3	17 28.8	98 21	125.2	17 58.1	98 21	125.1	18 27.4	98 21	125.0	18 56.7	98 21	124.9	19 26.0	98 21	124.8	19 55.3	98 21	124.6	20 24.5	98 21	124.5	2
3	16 46.7	98 22	124.3	17 16.0	98 22	124.2	17 45.3	98 22	124.1	18 14.6	98 22	124.0	18 43.9	98 22	123.9	19 13.1	98 22	123.7	19 42.4	98 22	123.6	20 11.7	98 22	123.5	3
4	16 33.8	98 22	123.3	17 03.1	98 22	123.2	17 32.4	98 22	123.1	18 01.6	98 22	123.0	18 30.9	98 22	122.8	19 00.1	98 22	122.7	19 29.4	98 22	122.6	19 58.6	97 22	122.5	4
55	16 20.8	98 22	122.3	16 50.0	98 22	122.2	17 19.3	98 22	122.1	17 48.5	97 22	121.9	18 17.8	97 22	121.8	18 47.0	97 22	121.7	19 16.2	97 22	121.6	19 45.5	97 22	121.5	55
6	16 07.6	97 22	121.3	16 36.8	97 22	121.2	17 06.0	97 22	121.1	17 35.3	97 22	120.9	18 04.5	97 22	120.8	18 33.7	97 22	120.7	19 02.9	97 22	120.6	19 32.2	97 22	120.5	6
7	15 54.2	97 22	120.3	16 23.4	97 22	120.2	16 52.7	97 22	120.0	17 21.9	97 23	119.9	17 51.1	97 23	119.8	18 20.3	97 23	119.7	18 49.5	97 23	119.6	19 18.7	97 23	119.4	7
8	15 40.7	97 23	119.3	16 10.0	97 23	119.2	16 39.2	97 23	119.0	17 08.4	97 23	118.9	17 37.6	97 23	118.8	18 06.7	97 23	118.7	18 35.9	97 23	118.6	19 05.1	97 23	118.4	8
9	15 27.1	97 23	118.3	15 56.3	97 23	118.2	16 25.5	97 23	118.0	16 54.7	97 23	117.9	17 23.9	97 23	117.8	17 53.1	97 23	117.7	18 22.2	97 23	117.6	18 51.4	97 23	117.4	9
60	15 13.4	97 23	117.3	15 42.6	97 23	117.2	16 11.7	97 23	117.0	16 40.9	97 23	116.9	17 10.1	97 23	116.8	17 39.2	97 23	116.7	18 08.4	97 23	116.5	18 37.5	97 23	116.4	60
1	14 59.5	97 23	116.3	15 28.7	97 23	116.2	15 57.9	97 23	116.0	16 27.0	97 23	115.9	16 56.2	97 23	115.8	17 25.3	97 23	115.7	17 54.4	97 23	115.5	18 23.6	97 23	115.4	1
2	14 45.5	97 24	115.3	15 14.7	97 24	115.2	15 43.8	97 24	115.0	16 13.0	97 24	114.9	16 42.1	97 24	114.8	17 11.2	97 24	114.7	17 40.4	97 24	114.5	18 09.5	97 24	114.4	2
3	14 31.5	97 24	114.3	15 00.6	97 24	114.2	15 29.7	97 24	114.0	15 58.8	97 24	113.9	16 28.0	97 24	113.8	16 57.1	97 24	113.7	17 26.2	97 24	113.5	17 55.3	97 24	113.4	3
4	14 17.2	97 24	113.3	14 46.4	97 24	113.2	15 15.5	97 24	113.1	15 44.6	97 24	112.9	16 13.7	97 24	112.8	16 42.8	97 24	112.7	17 11.9	97 24	112.5	17 41.0	97 24	112.4	4
65	14 02.9	97 24	112.3	14 32.0	97 24	112.2	15 01.1	97 24	112.1	15 30.2	97 24	111.9	15 59.3	97 24	111.8	16 28.4	97 24	111.7	16 57.5	97 24	111.5	17 26.6	97 24	111.4	65
6	13 48.5	97 24	111.3	14 17.6	97 24	111.2	14 46.7	97 24	111.1	15 15.8	97 24	110.9	15 44.9	97 24	110.8	16 13.9	97 24	110.7	16 43.0	97 24	110.6	17 12.1	97 24	110.4	6
7	13 34.0	97 24	110.3	14 03.1	97 24	110.2	14 32.2	97 24	110.1	15 01.2	97 24	109.9	15 30.3	97 24	109.8	15 59.4	97 24	109.7	16 28.4	97 24	109.6	16 57.5	97 24	109.4	7
8	13 19.4	97 24	109.3	13 48.5	97 25	109.2	14 17.5	97 25	109.1	14 46.6	97 25	109.0	15 15.6	97 25	108.8	15 44.7	97 25	108.7	16 13.8	97 25	108.6	16 42.8	97 25	108.4	8
9	13 04.7	97 25	108.4	13 33.8	97 25	108.2	14 02.8	97 25	108.1	14 31.9	97 25	108.0	15 00.9	97 25	107.8	15 30.0	97 25	107.7	15 59.0	97 25	107.6	16 28.0	97 25	107.5	9
70	12 49.9	97 25	107.4	13 19.0	97 25	107.2	13 48.0	97 25	107.1	14 17.0	97 25	107.0	14 46.1	97 25	106.9	15 15.1	97 25	106.7	15 44.1	97 25	106.6	16 13.2	97 25	106.5	70
1	12 35.1	97 25	106.4	13 04.1	97 25	106.3	13 33.1	97 25	106.1	14 02.2	97 25	106.0	14 31.2	97 25	105.9	15 00.2	97 25	105.7	15 29.2	97 25	105.6	15 58.2	97 25	105.5	1
2	12 20.1	97 25	105.4	12 49.1	97 25	105.3	13 18.2	97 25	105.2	13 47.2	97 25	105.0	14 16.2	97 25	104.9	14 45.2	97 25	104.8	15 14.2	97 25	104.6	15 43.2	97 25	104.5	2
3	12 05.1	97 25	104.4	12 34.1	97 25	104.3	13 03.2	97 25	104.2	13 32.2	97 25	104.0	14 01.2	97 25	103.9	14 30.2	97 25	103.8	14 59.2	97 25	103.6	15 28.2	97 25	103.5	3
4	11 50.0	97 25	103.4	12 19.1	97 25	103.3	12 48.1	97 25	103.2	13 17.1	97 25	103.1	13 46.1	97 25	102.9	14 15.1	97 25	102.8	14 44.1	97 25	102.7	15 13.0	97 25	102.5	4
75	11 34.9	97 25	102.5	12 03.9	97 25	102.3	12 32.9	97 25	102.2	13 01.9	97 25	102.1	13 30.9	97 25	101.9	13 59.9	97 25	101.8	14 28.9	97 25	101.7	14 57.9	97 25	101.5	75
6	11 19.7	97 25	101.5	11 48.7	97 25	101.4	12 17.7	97 25	101.2	12 46.7	97 25	101.1	13 15.7	97 25	101.0	13 44.7	97 25	100.8	14 13.6	97 25	100.7	14 42.6	97 25	100.6	6
7	11 04.5	97 25	100.5	11 33.5	97 25	100.4	12 02.5	97 25	100.3	12 31.4	97 26	100.1	13 00.4	97 26	100.0	13 29.4	97 26	99.9	13 58.4	97 26	99.7	14 27.3	97 26	99.6	7
8	10 49.2	97 26	99.5	11 18.2	97 26	99.4	11 47.1	97 26	99.3	12 16.1	97 26	99.1	12 45.1	97 26	99.0	13 14.1	97 26	98.9	13 43.0	97 26	98.7	14 12.0	97 26	98.6	8
9	10 33.8	97 26	98.6	11 02.8	97 26	98.4	11 31.8	97 26	98.3	12 00.8	97 26	98.2	12 29.7	97 26	98.0	12 58.7	97 26	97.9	13 27.7	97 26	97.8	13 56.6	97 26	97.6	9
80	10 18.5	97 26	97.6	10 47.4	97 26	97.5	11 16.4	97 26	97.3	11 45.4	97 26	97.2	12 14.3	97 26	97.1	12 43.3	97 26	96.9	13 12.3	97 26	96.8	13 41.2	96 26	96.7	80
1	10 03.1	97 26	96.6	10 32.0	97 26	96.5	11 01.0	97 26	96.4	11 30.0	97 26	96.2	11 58.9	97 26	96.1	12 27.9	97 26	96.0	12 56.8	96 26	95.8	13 25.8	96 26	95.7	1
2	9 47.6	97 26	95.7	10 16.6	97 26	95.5	10 45.5	97 26	95.4	11 14.5	97 26	95.3	11 43.5	97 26	95.1	12 12.4	97 26	95.0	12 41.4	96 26	94.9	13 10.3	96 26	94.7	2
3	9 32.2	97 26	94.7	10 01.1	97 26	94.6	10 30.1	97 26	94.4	10 59.0	97 26	94.3	11 28.0	97 26	94.2	11 56.9	96 26	94.0	12 25.9	96 26	93.9	12 54.8	96 26	93.8	3
4	9 16.7	97 26	93.7	9 45.6	97 26	93.6	10 14.6	97 26	93.5	10 43.5	97 26	93.3	11 12.5	96 26	93.2	11 41.4	96 26	93.1	12 10.4	96 26	92.9	12 39.3	96 26	92.8	4
85	9 01.2	97 26	92.7	9 30.1	97 26	92.6	9 59.1	97 26	92.5	10 28.0	97 26	92.4	10 57.0	96 26	92.2	11 25.9	96 26	92.1	11 54.9	96 26	91.9	12 23.8	96 26	91.8	85
6	8 45.6	97 26	91.8	9 14.6	97 26	91.6	9 43.6	97 26	91.5	10 12.5	96 26	91.4	10 41.5	96 26	91.2	11 10.4	96 26	91.1	11 39.3	96 26	91.0	12 08.3	96 26	90.8	6
7	8 30.1	97 26	90.8	8 59.1	97 26	90.7	9 28.0	97 26	90.5	9 57.0	96 26	90.4	10 25.9	96 26	90.3	10 54.9	96 26	90.1	11 23.8	96 26	90.0	11 52.7	96 26	89.9	7
8	8 14.6	97 26	89.8	8 43.5	97 26	89.7	9 12.5	97 26	89.6	9 41.5	96 26	89.4	10 10.4	96 26	89.3	10 39.3	96 26	89.2	11 08.3	96 26	89.0	11 37.2	96 26	88.9	8
9	7 59.1	97 26	88.9	8 28.0	97 26	88.7	8 57.0	97 26	88.6	9 25.9	96 26	88.5	9 54.9	96 26	88.4	10 23.8	96 26	88.2	10 52.8	96 26	88.1	11 21.7	96 26	87.9	9
90	7 43.5	97 26	87.9	8 12.5	97 26	87.8	8 41.5	97 26	87.7	9 10.4	97 26	87.5	9 39.4	96 26	87.4	10 08.3	96 26	87.3	10 37.2	96 26	87.1	11 06.2	96 26	87.0	90

Lat. 75°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	6 59.9	1.0 01	179.0	6 29.9	1.0 01	179.0	5 59.9	1.0 01	179.0	5 29.9	1.0 01	179.0													1
2	6 59.5	1.0 01	178.0	6 29.5	1.0 01	178.0	5 59.5	1.0 01	178.0	5 29.5	1.0 01	178.0													2
3	6 58.8	1.0 02	177.0	6 28.8	1.0 02	177.0	5 58.8	1.0 02	177.0	5 28.8	1.0 02	177.0													3
4	6 57.8	1.0 02	176.0	6 27.8	1.0 02	176.0	5 57.8	1.0 02	176.0	5 27.9	1.0 02	176.0													4
05	6 56.6	1.0 02	175.0	6 26.6	1.0 02	175.0	5 56.6	1.0 02	175.0	5 26.6	1.0 02	175.0													05
6	6 55.1	1.0 03	174.0	6 25.1	1.0 03	174.0	5 55.2	1.0 03	174.0	5 25.2	1.0 03	174.1													6
7	6 53.4	1.0 03	173.0	6 23.4	1.0 03	173.0	5 53.4	1.0 03	173.0	5 23.4	1.0 03	173.1													7
8	6 51.4	1.0 04	172.0	6 21.4	1.0 04	172.0	5 51.4	1.0 04	172.1	5 21.4	1.0 04	172.1													8
9	6 49.1	1.0 04	171.0	6 19.1	1.0 04	171.0	5 49.1	1.0 04	171.1	5 19.1	1.0 04	171.1													9
10	6 46.5	1.0 05	170.0	6 16.5	1.0 05	170.1	5 46.6	1.0 05	170.1	5 16.6	1.0 05	170.1													10
1	6 43.7	1.0 05	169.0	6 13.7	1.0 05	169.1	5 43.8	1.0 05	169.1	5 13.8	1.0 05	169.1													1
2	6 40.6	1.0 06	168.0	6 10.7	1.0 06	168.1	5 40.7	1.0 06	168.1	5 10.7	1.0 06	168.1													2
3	6 37.3	1.0 06	167.0	6 07.3	1.0 06	167.1	5 37.4	1.0 06	167.1	5 07.4	1.0 06	167.1													3
4	6 33.6	1.0 06	166.0	6 03.7	1.0 06	166.1	5 33.8	1.0 06	166.1	5 03.8	1.0 06	166.1													4
15	6 29.8	1.0 07	165.1	5 59.8	1.0 07	165.1	5 29.9	1.0 07	165.1	5 00.0	1.0 07	165.2													15
6	6 25.6	1.0 07	164.1	5 55.7	1.0 07	164.1	5 25.8	1.0 07	164.1																6
7	6 21.2	1.0 08	163.1	5 51.3	1.0 08	163.1	5 21.4	1.0 08	163.1																7
8	6 16.6	1.0 08	162.1	5 46.7	1.0 08	162.1	5 16.8	1.0 08	162.2																8
9	6 11.7	1.0 09	161.1	5 41.8	1.0 09	161.1	5 11.9	1.0 09	161.2																9
20	6 06.5	1.0 09	160.1	5 36.6	1.0 09	160.1	5 06.8	1.0 09	160.2																20
1	6 01.1	1.0 09	159.1	5 31.2	1.0 09	159.1	5 01.4	1.0 09	159.2																1
2	5 55.4	1.0 10	158.1	5 25.6	1.0 10	158.2																			2
3	5 49.5	99 10	157.1	5 19.7	99 10	157.2																			3
4	5 43.4	99 11	156.1	5 13.5	99 11	156.2																			4
25	5 36.9	99 11	155.1	5 07.1	99 11	155.2																			25
6	5 30.3	99 11	154.1	5 00.5	99 11	154.2																			6
7	5 23.4	99 12	153.2																						7
8	5 16.3	99 12	152.2																						8
9	5 08.9	99 13	151.2																						9
30	5 01.3	99 13	150.2																						30

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	7 28.0	97 26	87.0	7 57.0	97 26	86.8	8 25.9	97 26	86.7	8 54.9	97 26	86.6	9 23.8	96 26	86.4	9 52.8	96 26	86.3	10 21.7	96 26	86.2	10 50.7	96 26	86.0	91
2	7 12.5	97 26	86.0	7 41.5	97 26	85.9	8 10.4	97 26	85.7	8 39.4	97 26	85.6	9 08.4	97 26	85.5	9 37.3	96 26	85.3	10 06.3	96 26	85.2	10 35.2	96 26	85.1	2
3	6 57.0	97 26	85.0	7 26.0	97 26	84.9	7 55.0	97 26	84.8	8 23.9	97 26	84.6	8 52.9	97 26	84.5	9 21.8	97 26	84.4	9 50.8	96 26	84.2	10 19.7	96 26	84.1	3
4	6 41.6	97 26	84.1	7 10.6	97 26	83.9	7 39.5	97 26	83.8	8 08.5	97 26	83.7	8 37.4	97 26	83.5	9 06.4	97 26	83.4	9 35.4	97 26	83.3	10 04.3	97 26	83.1	4
95	6 26.2	97 26	83.1	6 55.1	97 26	83.0	7 24.1	97 26	82.8	7 53.1	97 26	82.7	8 22.0	97 26	82.6	8 51.0	97 26	82.4	9 20.0	97 26	82.3	9 48.9	97 26	82.2	95
6	6 10.8	97 26	82.1	6 39.7	97 26	82.0	7 08.7	97 26	81.9	7 37.7	97 26	81.7	8 06.6	97 26	81.6	8 35.6	97 26	81.5	9 04.6	97 26	81.4	9 33.5	97 26	81.2	6
7	5 55.4	97 26	81.2	6 24.4	97 26	81.0	6 53.4	97 26	80.9	7 22.3	97 26	80.8	7 51.3	97 26	80.7	8 20.3	97 26	80.5	8 49.2	97 25	80.4	9 18.2	97 25	80.3	7
8	5 40.1	97 25	80.2	6 09.1	97 25	80.1	6 38.0	97 25	80.0	7 07.0	97 25	79.8	7 36.0	97 25	79.7	8 05.0	97 25	79.6	8 34.0	97 25	79.4	9 02.9	97 25	79.3	8
9	5 24.8	97 25	79.3	5 53.8	97 25	79.1	6 22.8	97 25	79.0	6 51.8	97 25	78.9	7 20.8	97 25	78.7	7 49.7	97 25	78.6	8 18.7	97 25	78.5	8 47.7	97 25	78.3	9
100	5 09.6	97 25	78.3	5 38.6	97 25	78.2	6 07.6	97 25	78.0	6 36.6	97 25	77.9	7 05.5	97 25	77.8	7 34.5	97 25	77.6	8 03.5	97 25	77.5	8 32.5	97 25	77.4	100
1				5 23.4	97 25	77.2	5 52.4	97 25	77.1	6 21.4	97 25	76.9	6 50.4	97 25	76.8	7 19.4	97 25	76.7	7 48.4	97 25	76.6	8 17.4	97 25	76.4	1
2				5 08.3	97 25	76.2	5 37.3	97 25	76.1	6 06.3	97 25	76.0	6 35.3	97 25	75.9	7 04.3	97 25	75.7	7 33.3	97 25	75.6	8 02.3	97 25	75.5	2
3							5 22.2	97 25	75.2	5 51.3	97 25	75.0	6 20.3	97 25	74.9	6 49.3	97 25	74.8	7 18.3	97 25	74.6	7 47.3	97 25	74.5	3
4							5 07.3	97 25	74.2	5 36.3	97 25	74.1	6 05.3	97 25	73.9	6 34.4	97 25	73.8	7 03.4	97 25	73.7	7 32.4	97 25	73.6	4
105										5 21.4	97 25	73.1	5 50.4	97 25	73.0	6 19.5	97 25	72.9	6 48.5	97 25	72.7	7 17.5	97 25	72.6	105
6										5 06.6	97 25	72.1	5 35.6	97 25	72.0	6 04.7	97 25	71.9	6 33.7	97 24	71.8	7 02.8	97 24	71.6	6
7													5 20.9	97 24	71.1	5 50.0	97 24	70.9	6 19.0	97 24	70.8	6 48.1	97 24	70.7	7
8													5 06.3	97 24	70.1	5 35.3	97 24	70.0	6 04.4	97 24	69.9	6 33.5	97 24	69.7	8
9																5 20.8	97 24	69.0	5 49.9	97 24	68.9	6 18.9	97 24	68.8	9
110																5 06.3	97 24	68.1	5 35.4	97 24	67.9	6 04.5	97 24	67.8	110
1																			5 21.1	97 24	67.0	5 50.2	97 24	66.9	1
2																			5 06.8	97 24	66.0	5 35.9	97 24	65.9	2
3																						5 21.8	97 23	65.0	3
4																						5 07.8	97 23	64.0	4

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		
00	27 00.0	1.00	180.0	27 30.0	1.00	180.0	28 00.0	1.00	180.0	28 30.0	1.00	180.0	29 00.0	1.00	180.0	29 30.0	1.00	180.0	30 00.0	1.00	180.0	30 30.0	1.00	180.0	00
1	26 59.9	1.00	178.9	27 29.8	1.00	178.9	27 59.8	1.00	178.9	28 29.8	1.00	178.9	28 59.8	1.00	178.9	29 29.8	1.00	178.9	29 59.8	1.00	178.9	30 29.8	1.00	178.9	1
2	26 59.4	1.00	177.8	27 29.4	1.00	177.8	27 59.4	1.00	177.8	28 29.4	1.00	177.8	28 59.4	1.00	177.8	29 29.4	1.00	177.8	29 59.4	1.00	177.8	30 29.4	1.00	177.8	2
3	26 58.7	1.00	176.7	27 28.7	1.00	176.7	27 58.7	1.00	176.7	28 28.7	1.00	176.7	28 58.6	1.00	176.7	29 28.6	1.00	176.7	29 58.6	1.00	176.7	30 28.6	1.00	176.6	3
4	26 57.6	1.00	175.6	27 27.6	1.00	175.6	27 57.6	1.00	175.6	28 27.6	1.00	175.6	28 57.6	1.00	175.6	29 27.6	1.00	175.6	29 57.6	1.00	175.5	30 27.6	1.00	175.5	4
05	26 56.3	1.00	174.5	27 26.3	1.00	174.5	27 56.3	1.00	174.5	28 26.3	1.00	174.5	28 56.2	1.00	174.5	29 26.2	1.00	174.4	29 56.2	1.00	174.4	30 26.2	1.00	174.4	05
6	26 54.7	1.00	173.4	27 24.6	1.00	173.4	27 54.6	1.00	173.4	28 24.6	1.00	173.4	28 54.6	1.00	173.3	29 24.6	1.00	173.3	29 54.6	1.00	173.3	30 24.6	1.00	173.3	6
7	26 52.7	1.00	172.3	27 22.7	1.00	172.3	27 52.7	1.00	172.3	28 22.7	1.00	172.3	28 52.6	1.00	172.2	29 22.6	1.00	172.2	29 52.6	1.00	172.2	30 22.6	1.00	172.2	7
8	26 50.5	1.00	171.2	27 20.5	1.00	171.2	27 50.5	1.00	171.2	28 20.4	1.00	171.2	28 50.4	1.00	171.1	29 20.4	1.00	171.1	29 50.3	1.00	171.1	30 20.3	1.00	171.1	8
9	26 48.0	1.00	170.1	27 18.0	1.00	170.1	27 47.9	1.00	170.1	28 17.9	1.00	170.1	28 47.9	1.00	170.0	29 17.8	1.00	170.0	29 47.8	1.00	170.0	30 17.8	1.00	169.9	9
10	26 45.2	1.00	169.0	27 15.1	1.00	169.0	27 45.1	1.00	169.0	28 15.1	1.00	168.9	28 45.0	1.00	168.9	29 15.0	1.00	168.9	29 44.9	1.00	168.9	30 14.9	1.00	168.8	10
1	26 42.1	1.00	167.9	27 12.0	1.00	167.9	27 42.0	1.00	167.9	28 11.9	1.00	167.8	28 41.9	1.00	167.8	29 11.8	1.00	167.8	29 41.8	1.00	167.8	30 11.7	1.00	167.7	1
2	26 38.7	1.00	166.8	27 08.6	1.00	166.8	27 38.6	1.00	166.8	28 08.5	1.00	166.7	28 38.5	1.00	166.7	29 08.4	1.00	166.7	29 38.4	1.00	166.6	30 08.3	1.00	166.6	2
3	26 35.0	1.00	165.8	27 04.9	1.00	165.7	27 34.9	1.00	165.7	28 04.8	1.00	165.6	28 34.8	1.00	165.6	29 04.7	1.00	165.6	29 34.6	1.00	165.5	30 04.6	1.00	165.5	3
4	26 31.0	1.00	164.7	27 01.0	1.00	164.6	27 30.9	1.00	164.6	28 00.8	1.00	164.5	28 30.7	1.00	164.5	29 00.7	1.00	164.5	29 30.6	1.00	164.4	30 00.5	1.00	164.4	4
15	26 26.8	1.00	163.6	26 56.7	1.00	163.5	27 26.6	1.00	163.5	27 56.5	1.00	163.4	28 26.5	1.00	163.4	28 56.4	1.00	163.4	29 26.3	1.00	163.3	29 56.2	1.00	163.3	15
6	26 22.3	1.00	162.5	26 52.2	1.00	162.4	27 22.1	1.00	162.4	27 52.0	1.00	162.4	28 21.9	1.00	162.3	28 51.8	1.00	162.3	29 21.7	1.00	162.2	29 51.6	1.00	162.2	6
7	26 17.5	1.00	161.4	26 47.3	1.00	161.4	27 17.2	1.00	161.3	27 47.1	1.00	161.3	28 17.0	1.00	161.2	28 46.9	1.00	161.2	29 16.8	1.00	161.1	29 46.7	1.00	161.1	7
8	26 12.4	1.00	160.3	26 42.2	1.00	160.3	27 12.1	1.00	160.2	27 42.0	1.00	160.2	28 11.9	1.00	160.1	28 41.7	1.00	160.1	29 11.6	1.00	160.0	29 41.5	1.00	160.0	8
9	26 07.0	1.00	159.2	26 36.9	1.00	159.2	27 06.7	1.00	159.1	27 36.6	1.00	159.1	28 06.5	1.01	159.0	28 36.3	1.01	159.0	29 06.2	1.01	158.9	29 36.0	1.01	158.8	9
20	26 01.3	1.01	158.1	26 31.2	1.01	158.1	27 01.1	1.01	158.0	27 30.9	1.01	158.0	28 00.8	99	157.9	28 30.6	99	157.9	29 00.4	99	157.8	29 30.3	99	157.7	20
1	25 55.4	99	157.1	26 25.3	99	157.0	26 55.1	99	156.9	27 24.9	99	156.9	27 54.8	99	156.8	28 24.6	99	156.8	28 54.4	99	156.7	29 24.3	99	156.6	1
2	25 49.2	99	156.0	26 19.1	99	155.9	26 48.9	99	155.9	27 18.7	99	155.8	27 48.5	99	155.7	28 18.4	99	155.7	28 48.2	99	155.6	29 18.0	99	155.5	2
3	25 42.8	99	154.9	26 12.6	99	154.8	26 42.4	99	154.8	27 12.2	99	154.7	27 42.0	99	154.6	28 11.8	99	154.6	28 41.6	99	154.5	29 11.4	99	154.5	3
4	25 36.1	99	153.8	26 05.9	99	153.8	26 35.7	99	153.7	27 05.4	99	153.6	27 35.2	99	153.6	28 05.0	99	153.5	28 34.8	99	153.4	29 04.6	99	153.4	4
25	25 29.1	99	152.7	25 58.9	99	152.7	26 28.6	99	152.6	26 58.4	99	152.5	27 28.2	99	152.5	27 58.0	99	152.4	28 27.7	99	152.3	28 57.5	99	152.3	25
6	25 21.8	99	151.7	25 51.6	99	151.6	26 21.4	99	151.5	26 51.1	99	151.5	27 20.9	99	151.4	27 50.6	99	151.3	28 20.4	99	151.2	28 50.1	99	151.2	6
7	25 14.3	99	150.6	25 44.1	99	150.5	26 13.8	99	150.5	26 43.6	99	150.4	27 13.3	99	150.3	27 43.0	99	150.2	28 12.8	99	150.2	28 42.5	99	150.1	7
8	25 06.6	99	149.5	25 36.3	99	149.5	26 06.1	99	149.4	26 35.8	99	149.3	27 05.5	99	149.2	27 35.2	99	149.1	28 04.9	99	149.1	28 34.6	99	149.0	8
9	24 58.6	99	148.5	25 28.3	99	148.4	25 58.0	99	148.3	26 27.7	99	148.2	26 57.4	99	148.1	27 27.1	99	148.1	27 56.8	99	148.0	28 26.5	99	147.9	9
30	24 50.4	99	147.4	25 20.0	99	147.3	25 49.7	99	147.2	26 19.4	99	147.2	26 49.1	99	147.1	27 18.8	99	147.0	27 48.5	99	146.9	28 18.1	99	146.8	30
1	24 41.9	99	146.3	25 11.5	99	146.2	25 41.2	99	146.2	26 10.9	99	146.1	26 40.5	99	146.0	27 10.2	99	145.9	27 39.9	99	145.8	28 09.5	99	145.7	1
2	24 33.1	99	145.3	25 02.8	99	145.2	25 32.4	99	145.1	26 02.1	99	145.0	26 31.7	99	144.9	27 01.4	99	144.8	27 31.0	99	144.7	28 00.7	99	144.7	2
3	24 24.2	99	144.2	24 53.8	99	144.1	25 23.4	99	144.0	25 53.1	99	143.9	26 22.7	99	143.9	26 52.3	99	143.8	27 21.9	99	143.7	27 51.6	99	143.6	3
4	24 15.0	99	143.1	24 44.6	99	143.0	25 14.2	99	143.0	25 43.8	99	142.9	26 13.4	99	142.8	26 43.0	99	142.7	27 12.6	99	142.6	27 42.2	99	142.5	4
35	24 05.5	99	142.1	24 35.1	99	142.0	25 04.7	99	141.9	25 34.3	99	141.8	26 03.9	99	141.7	26 33.5	99	141.6	27 03.1	99	141.5	27 32.7	99	141.4	35
6	23 55.9	99	141.0	24 25.5	99	140.9	24 55.0	99	140.8	25 24.6	99	140.7	25 54.2	99	140.7	26 23.7	99	140.6	26 53.3	99	140.5	27 22.9	99	140.4	6
7	23 46.0	99	140.0	24 15.6	99	139.9	24 45.1	99	139.8	25 14.7	99	139.7	25 44.2	98	139.6	26 13.8	98	139.5	26 43.3	98	139.4	27 12.8	98	139.3	7
8	23 35.9	98	138.9	24 05.4	98	138.8	24 35.0	98	138.7	25 04.5	98	138.6	25 34.0	98	138.5	26 03.6	98	138.4	26 33.1	98	138.3	27 02.6	98	138.2	8
9	23 25.6	98	137.9	23 55.1	98	137.8	24 24.6	98	137.7	24 54.1	98	137.6	25 23.7	98	137.5	25 53.2	98	137.4	26 22.7	98	137.3	26 52.2	98	137.2	9
40	23 15.1	98	136.8	23 44.6	98	136.7	24 14.1	98	136.6	24 43.6	98	136.5	25 13.1	98	136.4	25 42.5	98	136.3	26 12.0	98	136.2	26 41.5	98	136.1	40
1	23 04.3	98	135.8	23 33.8	98	135.7	24 03.3	98	135.6	24 32.8	98	135.5	25 02.2	98	135.4	25 31.7	98	135.3	26 01.2	98	135.2	26 30.6	98	135.1	1
2	22 53.4	98	134.7	23 22.9	98	134.6	23 52.3	98	134.5	24 21.8	98	134.4	24 51.2	98	134.3	25 20.7	98	134.2	25 50.1	98	134.1	26 19.6	98	134.0	2
3	22 42.3	98	133.7	23 11.7	98	133.6	23 41.2	98	133.5	24 10.6	98	133.4	24 40.0	98	133.3	25 09.4	98	133.2	25 38.9	98	133.0	26 08.3	98	132.9	3
4	22 30.9	98	132.6	23 00.4	98	132.5	23 29.8	98	132.4	23 59.2	98	132.3	24 28.6	98	132.2	24 58.0	98	132.1	25 27.4	98	132.0	25 56.8	98	131.9	4
45	22 19.4	98	131.6	22 48.8	98	131.5	23 18.2	98	131.4	23 47.6	98	131.3	24 17.0	98	131.2	24 46.4	98	131.1	25 15.8	98	131.0	25 45.2	98	130.8	45
6	22 07.7	98	130.6	22 37.1	98	130.5	23 06.5	98	130.4	23 35.9	98	130.2	24 05.2	98	130.1	24 34.6	98	130.0	25 04.0	98	129.9	25 33.3	98	129.8	6
7	21 55.8	98	129.5	22 25.2	98	129.4	22 54.6	98	129.3	23 23.9	98	129.2	23 53.3	98	129.1	24 22.6	98	129.0	24 52.0	98	128.9	25 21.3	98	128.8	7
8	21 43.8	98	128.5	22 13.1	98	128.4	22 42.5	98	128.3	23 11.8	98	128.2	23 41.1	98	128.1	24 10.5	98	127.9	24 39.8	98	127.8	25 09.1	98	127.7	8
9	21 31.5	98	127.5	22 00.9	98	127.4	22 30.2	98	127.3	22 59.5	98	127.1	23 28.8	98	127.0	23 58.1	98	126.9	24 27.4	98	126.8	24 56.7	98	126.7	9
50	21 19.1	98	126.5	21 48.4	98	126.3	22 17.7	98	126.2	22 47.0	98	126.1	23 16.3	98	126.0	23 45.6	98	125.9	24 14.9	98	125.8	24 44.2	98	125.6	50
1	21 06.6	98	125.4	21 35.8	98	125.3	22 05.1	98	125.2	22 34.4	98	125.1	23 03.7	98	125.0	23 33.0	98	124.8	24 02.2	98	124.7	24 31.5	98	124.6	1
2	20 53.8	98	124.4	21 23.1	98	124.3	21 52.4	98	124.2	22 21.6	98	124.1	22 50.9	98	123.9	23 20.1	98	123.8	23 49.4	97	123.7	24 18.6	97	123.6	2
3	20 40.9	98	123.4	21 10.2	98	123.3	21 39.4	97	123.1	22 08.7	97	123.0	22 37.9	97	122.9	23 07.2	97	122.8	23 36.4	97	122.7	24 05.6	97	122.5	3
4	20 27.9	97	122.4	20 57.1	97	122.2	21 26.4	97	122.1	21 55.6	97	122.0	22 24.8	97	121.9	22 54.0	97	121.8	23 23.2	97	121.6	23 52.5	97	121.5	4
55	20 14.7	97	121.3	20 43.9	97	121.2	21 13.1	97	121.1	21 42.4	97	121.0	22 11.6	97	120.9	22 40.8	97	120.7	23 10.0	97	120.6	23 39.1	97	120.5	55
6	20 01.4	97	120.3	20 30.6	97	120.2	20 59.8	97	120.1	21 29.0	97	120.0	21 58.2	97	119.8	22 27.3	97	119.7	22 56.5	97	119.6	23 25.7	97	119.5	6
7	19 47.9	97	119.3	20 17.1	97	119.2	20 46.3	97	119.1	21 15.4	97	119.0	21 44.6	97	118.8	22 13.8	97	118.7	22 42.9	97	118.6	23 12.1	97	118.4	7
8	19 34.3	97	118.3	20 03.5	97	118.2	20 32.6	97	118.1	21 01.8	97	117.9	21 30.9	97	117.8	22 00.1	97	117.7	22 29.2	97	117.6	22 58.4	97	117.4	8
9	19 20.6	97	117.3	19 49.7	97	117.2	20 18.9	97	117.1	20 48.0	97	116.9	21 17.1	97	116.8	21 46.3	97	116.7	22 15.4	97	116.5	22 44.5	97	116.4	9
60	19 06.7	97	116.3	19 35.8	97	116.2	20 05.0	97	116.0	20 34.1	97	115.9	21 03.2	97	115.8	21 32.3	97	115.7	22 01.5	97	115.5	22 30.6	97	115.4	60
1	18 52.7	97	115.3	19 21.8	97	115.2	19 51.0	97	115.0	20 20.1	97	114.9	20 49.2	97	114.8	21 18.3	97	114.6	21 47.4	97	114.5	22 16.5	97	114.4	1
2	18 38.6	97	114.3	19 07.7	97	114.2	19 36.8	97	114.0	20 05.9	97	113.9	20 35.0	97	113.8	21 04.1	97	113.6	21 33.2	97	113.5	22 02.3	97	113.4	2
3	18 24.4	97	113.3	18 53.5	97	113.2	19 22.6	97	113.0	19 51.7	97	112.9	20 20.8	97	112.8	20 49.8	97	112.6	21 18.9	97	112.5	21 48.0	97	112.4	3
4	18 10.1	97	112.3	18 39.2	97	112.2	19 08.3	97	112.0	19 37.3	97	111.9	20 06.4	97	111.8	20 35.5	97	111.6	21 04.5	97	111.5	21 33.6	97	111.4	4
65	17 55.7	97	111.3	18 24.7	97	111.2	18 53.8	97	111.0	19 22.9	97	110.9	19 51.9	97	110.8	20 21.0	97	110.6	20 50.0	97	110.5	21 19.1	97	110.4	65
6	17 41.2	97	110.3	18 10.2	97	110.2	18 39.3	97	110.0	19 08.3	97	109.9	19 37.4	97	109.8	20 06.4	97	109.6	20 35.4	97	109.5	21 04.4	97	109.4	6
7	17 26.5	97	109.3	17 55.6	97	109.2	18 24.6	97	109.0	18 53.7	97	108.9	19 22.7	97	108.8	19 51.7	97	108.6	20 20.7	97	108.5	20 49.8	97	108.4	7
8	17 11.8	97	108.3	17 40.9	97	108.2	18 09.9	97	108.0	18 38.9	97	107.9	19 07.9	97	107.8	19 37.0	97	107.6	20 06.0	97	107.5	20 35.0	97	107.4	8
9	16 57.1	97	107.3	17 26.1	97	107.2	17 55.1	97	107.1	18 24.1	97	106.9	18 53.1	97	106.8	19 22.1	97	106.7	19 51.1	97	106.5	20 20.1	97	106.4	9
70	16 42.2	97	106.3	17 11.2	97	106.2	17 40.2	97	106.1	18 09.2	97	105.9	18 38.2	97	105.8	19 07.2	97	105.7	19 36.2	97	105.5	20 05.2	97	105.4	70
1	16 27.3	97	105.3	16 56.3	97	105.2	17 25.3	97	105.1	17 54.3	97	104.9	18 23.2	97	104.8	18 52.2	97	104.7	19 21.2	97	104.5	19 50.2	97	104.4	1
2	16 12.2	97	104.4	16 41.2	97	104.2	17 10.2	97	104.1	17 39.2	97	104.0	18 08.2	97	103.8	18 37.2	97	103.7	19 06.1	97	103.5	19 35.1	97	103.4	2
3	15 57.2	97	103.4	16 26.2	97	103.2	16 55.1	97	103.1	17 24.1	97	103.0	17 53.1	97	102.8	18 22.0	97	102.7	18 51.0	97	102.6	19 20.0	96	102.4	3
4	15 42.0	97	102.4	16 11.0	97	102.3	16 40.0	97	102.1	17 08.9	97	102.0	17 37.9	97	101.9	18 06.9	97	101.7	18 35.8	96	101.6	19 04.8	96	101.4	4
75	15 26.8	97	101.4	15 55.8	97	101.3	16 24.8	97	101.1	16 53.7	97	101.0	17 22.7	97	100.9	17 51.6	96	100.7	18 20.6	96	100.6	18 49.5	96	100.5	75
6	15 11.6	97	100.4	15 40.6	97	100.3	16 09.5	97	100.2	16 38.5	97	100.0	17 07.4	96	99.9	17 36.4	96	99.8	18 05.3	96	99.6	18 34.2	96	99.5	6
7	14 56.3	97	99.5	15 25.2	97	99.3	15 54.2	97	99.2	16 23.1	96	99.0	16 52.1	96	98.9	17 21.0	96	98.8	17 50.0	96	98.6	18 18.9	96	98.5	7
8	14 41.0	97	98.5	15 09.9	96	98.3	15 38.9	96	98.2	16 07.8	96	98.1	16 36.7	96	97.9	17 05.7	96	97.8	17 34.6	96	97.7	18 03.5	96	97.5	8
9	14 25.6	96	97.5	14 54.5	96	97.4	15 23.5	96	97.2	15 52.4	96	97.1	16 21.3	96	97.0	16 50.3	96	96.8	17 19.2	96	96.7	17 48.1	96	96.5	9
80	14 10.2	96	96.5	14 39.1	96	96.4	15 08.0	96	96.3	15 37.0	96	96.1	16 05.9	96	96.0	16 34.8	96	95.8	17 03.7	96	95.7	17 32.7	96	95.6	80
1	13 54.7	96	95.6	14 23.7	96	95.4	14 52.6	96	95.3	15 21.5	96	95.1	15 50.4	96	95.0	16 19.4	96	94.9	16 48.3	96	94.7	17 17.2	96	94.6	1
2	13 39.2	96	94.6	14 08.2	96	94.4	14 37.1	96	94.3	15 06.0	96	94.2	15 35.0	96	94.0	16 03.9	96	93.9	16 32.8	96	93.8	17 01.7	96	93.6	2
3	13 23.8	96	93.6	13 52.7	96	93.5	14 21.6	96	93.3	14 50.5	96	93.2	15 19.5	96	93.1	15 48.4	96	92.9	16 17.3	96	92.8	16 46.2	96	92.6	3
4	13 08.3	96	92.6	13 37.2	96	92.5	14 06.1	96	92.4	14 35.0	96	92.2	15 04.0	96	92.1	15 32.9	96	92.0	16 01.8	96	91.8	16 30.7	96	91.7	4
85	12 52.7	96	91.7	13 21.7	96	91.5	13 50.6	96	91.4	14 19.5	96	91.3	14 48.4	96	91.1	15 17.3	96	91.0	15 46.2	96	90.9	16 15.1	96	90.7	85
6	12 37.2	96	90.7	13 06.1	96	90.6	13 35.1	96	90.4	14 04.0	96	90.3	14 32.9	96	90.2	15 01.8	96	90.0	15 30.7	96	89.9	15 59.6	96	89.7	6
7	12 21.7	96	89.7	12 50.6	96	89.6	13 19.5	96	89.5	13 48.5	96	89.3	14 17.4	96	89.2	14 46.3	96	89.1	15 15.2	96	88.9	15 44.1	96	88.8	7
8	12 06.2	96	88.8	12 35.1	96	88.6	13 04.0	96	88.5	13 32.9	96	88.4	14 01.8	96	88.2	14 30.8	96	88.1	14 59.7	96	88.0	15 28.6	96	87.8	8
9	11 50.6	96	87.8	12 19.6	96	87.7	12 48.5	96	87.5	13 17.4	96	87.4	13 46.3	96	87.3	14 15.2	96	87.1	14 44.2	96	87.0	15 13.1	96	86.9	9
90	11 35.1	96	86.9	12 04.1	96	86.7	12 33.0	96	86.6	13 01.9	96	86.4	13 30.8	96	86.3	13 59.7	96	86.2	14 28.7	96	86.0	14 57.6	96	85.9	90

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	11 19.6	96 26	85.9	11 48.6	96 26	85.8	12 17.5	96 26	85.6	12 46.4	96 26	85.5	13 15.3	96 26	85.3	13 44.3	96 26	85.2	14 13.2	96 26	85.1	14 42.1	96 26	84.9	91
2	11 04.1	96 26	84.9	11 33.1	96 26	84.8	12 02.0	96 26	84.7	12 30.9	96 26	84.5	12 59.9	96 26	84.4	13 28.8	96 26	84.2	13 57.7	96 26	84.1	14 26.6	96 26	84.0	2
3	10 48.7	96 26	84.0	11 17.6	96 26	83.8	11 46.6	96 26	83.7	12 15.5	96 26	83.6	12 44.4	96 26	83.4	13 13.4	96 26	83.3	13 42.3	96 26	83.2	14 11.2	96 26	83.0	3
4	10 33.3	96 26	83.0	11 02.2	96 26	82.9	11 31.1	96 26	82.7	12 00.1	96 26	82.6	12 29.0	96 26	82.5	12 57.9	96 26	82.3	13 26.9	96 26	82.2	13 55.8	96 26	82.1	4
95	10 17.9	97 26	82.0	10 46.8	96 26	81.9	11 15.8	96 26	81.8	11 44.7	96 26	81.6	12 13.6	96 26	81.5	12 42.6	96 26	81.4	13 11.5	96 26	81.2	13 40.4	96 26	81.1	95
6	10 02.5	97 26	81.1	10 31.5	97 26	81.0	11 00.4	97 26	80.8	11 29.4	96 26	80.7	11 58.3	96 26	80.6	12 27.2	96 26	80.4	12 56.2	96 25	80.3	13 25.1	96 25	80.1	6
7	9 47.2	97 25	80.1	10 16.1	97 25	80.0	10 45.1	97 25	79.9	11 14.1	97 25	79.7	11 43.0	96 25	79.6	12 12.0	96 25	79.5	12 40.9	96 25	79.3	13 09.8	96 25	79.2	7
8	9 31.9	97 25	79.2	10 00.9	97 25	79.0	10 29.8	97 25	78.9	10 58.8	97 25	78.8	11 27.8	97 25	78.6	11 56.7	97 25	78.5	12 25.7	96 25	78.4	12 54.6	96 25	78.2	8
9	9 16.7	97 25	78.2	9 45.7	97 25	78.1	10 14.6	97 25	78.0	10 43.6	97 25	77.8	11 12.6	97 25	77.7	11 41.5	97 25	77.6	12 10.5	97 25	77.4	12 39.4	97 25	77.3	9
100	9 01.5	97 25	77.3	9 30.5	97 25	77.1	9 59.5	97 25	77.0	10 28.4	97 25	76.9	10 57.4	97 25	76.7	11 26.4	97 25	76.6	11 55.3	97 25	76.5	12 24.3	97 25	76.3	100
1	8 46.4	97 25	76.3	9 15.4	97 25	76.2	9 44.4	97 25	76.0	10 13.3	97 25	75.9	10 42.3	97 25	75.8	11 11.3	97 25	75.6	11 40.3	97 25	75.5	12 09.3	97 25	75.4	1
2	8 31.3	97 25	75.3	9 00.3	97 25	75.2	9 29.3	97 25	75.1	9 58.3	97 25	75.0	10 27.3	97 25	74.8	10 56.3	97 25	74.7	11 25.3	97 25	74.6	11 54.3	97 25	74.4	2
3	8 16.3	97 25	74.4	8 45.3	97 25	74.3	9 14.4	97 25	74.1	9 43.4	97 25	74.0	10 12.4	97 25	73.9	10 41.4	97 25	73.7	11 10.3	97 25	73.6	11 39.3	97 25	73.5	3
4	8 01.4	97 25	73.4	8 30.4	97 25	73.3	8 59.5	97 25	73.2	9 28.5	97 25	73.0	9 57.5	97 25	72.9	10 26.5	97 25	72.8	10 55.5	97 25	72.7	11 24.5	97 25	72.5	4
105	7 46.6	97 25	72.5	8 15.6	97 25	72.3	8 44.6	97 25	72.2	9 13.6	97 25	72.1	9 42.7	97 25	72.0	10 11.7	97 25	71.8	10 40.7	97 24	71.7	11 09.7	97 24	71.6	105
6	7 31.8	97 24	71.5	8 00.8	97 24	71.4	8 29.9	97 24	71.3	8 58.9	97 24	71.1	9 27.9	97 24	71.0	9 57.0	97 24	70.9	10 26.0	97 24	70.8	10 55.0	97 24	70.6	6
7	7 17.1	97 24	70.6	7 46.2	97 24	70.4	8 15.2	97 24	70.3	8 44.3	97 24	70.2	9 13.3	97 24	70.1	9 42.3	97 24	69.9	10 11.4	97 24	69.8	10 40.4	97 24	69.7	7
8	7 02.5	97 24	69.6	7 31.6	97 24	69.5	8 00.6	97 24	69.4	8 29.7	97 24	69.2	8 58.7	97 24	69.1	9 27.8	97 24	69.0	9 56.9	97 24	68.9	10 25.9	97 24	68.7	8
9	6 48.0	97 24	68.7	7 17.1	97 24	68.5	7 46.2	97 24	68.4	8 15.2	97 24	68.3	8 44.3	97 24	68.2	9 13.4	97 24	68.0	9 42.4	97 24	67.9	10 11.5	97 24	67.8	9
110	6 33.6	97 24	67.7	7 02.7	97 24	67.6	7 31.8	97 24	67.5	8 00.8	97 24	67.3	8 29.9	97 24	67.2	8 59.0	97 24	67.1	9 28.1	97 24	67.0	9 57.1	97 24	66.8	110
1	6 19.3	97 24	66.7	6 48.4	97 24	66.6	7 17.5	97 24	66.5	7 46.6	97 24	66.4	8 15.7	97 24	66.3	8 44.7	97 24	66.1	9 13.8	97 24	66.0	9 42.9	97 24	65.9	1
2	6 05.1	97 24	65.8	6 34.2	97 24	65.7	7 03.3	97 23	65.5	7 32.4	97 23	65.4	8 01.5	97 23	65.3	8 30.6	97 23	65.2	8 59.7	97 23	65.1	9 28.8	97 23	64.9	2
3	5 50.9	97 23	64.8	6 20.1	97 23	64.7	6 49.2	97 23	64.6	7 18.3	97 23	64.5	7 47.4	97 23	64.4	8 16.6	97 23	64.2	8 45.7	97 23	64.1	9 14.8	97 23	64.0	3
4	5 36.9	97 23	63.9	6 06.1	97 23	63.8	6 35.2	97 23	63.6	7 04.4	97 23	63.5	7 33.5	97 23	63.4	8 02.6	97 23	63.3	8 31.8	97 23	63.2	9 00.9	97 23	63 0	4
115	5 23.1	97 23	62.9	5 52.2	97 23	62.8	6 21.4	97 23	62.7	6 50.5	97 23	62.6	7 19.7	97 23	62.5	7 48.8	97 23	62.3	8 18.0	97 23	62.2	8 47.1	97 23	62.1	115
6	5 09.3	97 23	62.0	5 38.5	97 23	61.9	6 07.6	97 23	61.7	6 36.8	97 23	61.6	7 06.0	97 23	61.5	7 35.1	97 23	61.4	8 04.3	97 23	61.3	8 33.4	97 23	61.1	6
7				5 24.8	97 23	60.9	5 54.0	97 22	60.8	6 23.2	97 22	60.7	6 52.4	97 22	60.6	7 21.6	97 22	60.4	7 50.7	97 22	60.3	8 19.9	97 22	60.2	7
8				5 11.3	97 22	59.9	5 40.5	97 22	59.8	6 09.7	97 22	59.7	6 38.9	97 22	59.6	7 08.1	97 22	59.5	7 37.3	97 22	59.4	8 06.5	97 22	59.3	8
9							5 27.2	97 22	58.9	5 56.4	97 22	58.8	6 25.6	97 22	58.7	6 54.8	97 22	58.5	7 24.0	97 22	58.4	7 53.2	97 22	58.3	9
120							5 13.9	97 22	57.9	5 43.2	97 22	57.8	6 12.4	97 22	57.7	6 41.6	97 22	57.6	7 10.8	97 22	57.5	7 40.1	97 22	57.4	120
1							5 00.8	97 22	57.0	5 30.1	97 22	56.9	5 59.3	97 22	56.7	6 28.6	97 22	56.6	6 57.8	97 21	56.5	7 27.1	97 21	56.4	1
2										5 17.2	98 21	55.9	5 46.4	98 21	55.8	6 15.7	98 21	55.7	6 44.9	98 21	55.6	7 14.2	98 21	55.5	2
3										5 04.4	98 21	55.0	5 33.7	98 21	54.8	6 02.9	98 21	54.7	6 32.2	98 21	54.6	7 01.5	98 21	54.5	3
4													5 21.0	98 21	53.9	5 50.3	98 21	53.8	6 19.6	98 21	53.7	6 48.9	98 21	53.6	4
125													5 08.6	98 21	52.9	5 37.9	98 20	52.8	6 07.2	98 20	52.7	6 36.5	98 20	52.6	125
6																5 25.6	98 20	51.9	5 54.9	98 20	51.8	6 24.2	98 20	51.7	6
7																5 13.4	98 20	50.9	5 42.8	98 20	50.8	6 12.1	98 20	50.7	7
8																5 01.5	98 20	50.0	5 30.8	98 20	49.9	6 00.2	98 20	49.8	8
9																			5 19.0	98 19	48.9	5 48.4	98 19	48.8	9
130																			5 07.4	98 19	48.0	5 36.8	98 19	47.9	130
1																						5 25.4	98 19	46.9	1
2																						5 14.1	98 18	46.0	2
3																						5 03.0	98 18	45.0	3

Lat. 75°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	00
1	30 59.8	1.0 01	178.9	31 29.8	1.0 01	178.9	31 59.8	1.0 01	178.9	32 29.8	1.0 01	178.9	32 59.8	1.0 01	178.9	33 29.8	1.0 01	178.9	33 59.8	1.0 01	178.9	34 29.8	1.0 01	178.9	1
2	30 59.4	1.0 01	177.8	31 29.4	1.0 01	177.8	31 59.4	1.0 01	177.7	32 29.4	1.0 01	177.7	32 59.4	1.0 01	177.7	33 29.4	1.0 01	177.7	33 59.4	1.0 01	177.7	34 29.4	1.0 01	177.7	2
3	30 58.6	1.0 02	176.6	31 28.6	1.0 02	176.6	31 58.6	1.0 02	176.6	32 28.6	1.0 02	176.6	32 58.6	1.0 02	176.6	33 28.6	1.0 02	176.6	33 58.6	1.0 02	176.6	34 28.6	1.0 02	176.6	3
4	30 57.6	1.0 02	175.5	31 27.6	1.0 02	175.5	31 57.6	1.0 02	175.5	32 27.6	1.0 02	175.5	32 57.5	1.0 02	175.5	33 27.5	1.0 02	175.5	33 57.5	1.0 02	175.4	34 27.5	1.0 02	175.4	4
05	30 56.2	1.0 03	174.4	31 26.2	1.0 03	174.4	31 56.2	1.0 03	174.4	32 26.2	1.0 03	174.3	32 56.2	1.0 03	174.3	33 26.2	1.0 03	174.3	33 56.1	1.0 03	174.3	34 26.1	1.0 03	174.3	05
6	30 54.5	1.0 03	173.3	31 24.5	1.0 03	173.3	31 54.5	1.0 03	173.2	32 24.5	1.0 03	173.2	32 54.5	1.0 03	173.2	33 24.5	1.0 03	173.2	33 54.4	1.0 03	173.2	34 24.4	1.0 03	173.1	6
7	30 52.6	1.0 04	172.2	31 22.5	1.0 04	172.1	31 52.5	1.0 04	172.1	32 22.5	1.0 04	172.1	32 52.5	1.0 04	172.1	33 22.5	1.0 04	172.0	33 52.4	1.0 04	172.0	34 22.4	1.0 04	172.0	7
8	30 50.3	1.0 04	171.0	31 20.3	1.0 04	171.0	31 50.2	1.0 04	171.0	32 20.2	1.0 04	171.0	32 50.2	1.0 04	170.9	33 20.2	1.0 04	170.9	33 50.1	1.0 04	170.9	34 20.1	1.0 04	170.9	8
9	30 47.7	1.0 05	169.9	31 17.7	1.0 05	169.9	31 47.7	1.0 05	169.9	32 17.6	1.0 05	169.8	32 47.6	1.0 05	169.8	33 17.6	1.0 05	169.8	33 47.5	1.0 05	169.7	34 17.5	1.0 05	169.7	9
10	30 44.9	1.0 05	168.8	31 14.8	1.0 05	168.8	31 44.8	1.0 05	168.7	32 14.7	1.0 05	168.7	32 44.7	1.0 05	168.7	33 14.7	1.0 05	168.6	33 44.6	1.0 05	168.6	34 14.6	1.0 05	168.6	10
1	30 41.7	1.0 06	167.7	31 11.6	1.0 06	167.7	31 41.6	1.0 06	167.6	32 11.5	1.0 06	167.6	32 41.5	1.0 06	167.5	33 11.4	1.0 06	167.5	33 41.4	1.0 06	167.5	34 11.3	1.0 06	167.4	1
2	30 38.2	1.0 06	166.6	31 08.2	1.0 06	166.5	31 38.1	1.0 06	166.5	32 08.1	1.0 06	166.5	32 38.0	1.0 06	166.4	33 07.9	1.0 06	166.4	33 37.9	1.0 06	166.3	34 07.8	1.0 06	166.3	2
3	30 34.5	1.0 07	165.5	31 04.4	1.0 07	165.4	31 34.3	1.0 07	165.4	32 04.3	1.0 07	165.3	32 34.2	1.0 07	165.3	33 04.1	1.0 07	165.3	33 34.1	1.0 07	165.2	34 04.0	1.0 07	165.2	3
4	30 30.4	1.0 07	164.3	31 00.4	1.0 07	164.3	31 30.3	1.0 07	164.3	32 00.2	1.0 07	164.2	32 30.1	1.0 07	164.2	33 00.0	1.0 07	164.1	33 29.9	1.0 07	164.1	33 59.9	1.0 07	164.0	4
15	30 26.1	1.0 08	163.2	30 56.0	1.0 08	163.2	31 25.9	1.0 08	163.1	31 55.8	1.0 08	163.1	32 25.7	1.0 08	163.0	32 55.6	1.0 08	163.0	33 25.5	1.0 08	162.9	33 55.4	1.0 08	162.9	15
6	30 21.5	1.0 08	162.1	30 51.4	1.0 08	162.1	31 21.3	1.0 08	162.0	31 51.2	1.0 08	162.0	32 21.1	1.0 08	161.9	32 50.9	1.0 08	161.9	33 20.8	1.0 08	161.8	33 50.7	1.0 08	161.8	6
7	30 16.6	1.0 09	161.0	30 46.4	1.0 09	161.0	31 16.3	1.0 09	160.9	31 46.2	1.0 09	160.9	32 16.1	1.0 09	160.8	32 46.0	1.0 09	160.7	33 15.8	1.0 09	160.7	33 45.7	1.0 09	160.6	7
8	30 11.4	1.0 09	159.9	30 41.2	1.0 09	159.8	31 11.1	1.0 09	159.8	31 41.0	1.0 09	159.7	32 10.8	1.0 09	159.7	32 40.7	1.0 09	159.6	33 10.6	1.0 09	159.6	33 40.4	1.0 09	159.5	8
9	30 05.9	1.0 10	158.8	30 35.7	1.0 10	158.7	31 05.6	1.0 10	158.7	31 35.5	1.0 10	158.6	32 05.3	1.0 10	158.6	32 35.2	99 10	158.5	33 05.0	99 10	158.4	33 34.9	99 10	158.4	9
20	30 00.1	99 10	157.7	30 30.0	99 10	157.6	30 59.8	99 10	157.6	31 29.7	99 10	157.5	31 59.5	99 10	157.4	32 29.3	99 10	157.4	32 59.2	99 10	157.3	33 29.0	99 10	157.3	20
1	29 54.1	99 10	156.6	30 23.9	99 11	156.5	30 53.8	99 11	156.5	31 23.6	99 11	156.4	31 53.4	99 11	156.3	32 23.2	99 11	156.3	32 53.0	99 11	156.2	33 22.9	99 11	156.1	1
2	29 47.8	99 11	155.5	30 17.6	99 11	155.4	30 47.4	99 11	155.4	31 17.2	99 11	155.3	31 47.0	99 11	155.2	32 16.8	99 11	155.2	32 46.6	99 11	155.1	33 16.4	99 11	155.0	2
3	29 41.2	99 11	154.4	30 11.0	99 11	154.3	30 40.8	99 11	154.2	31 10.6	99 12	154.2	31 40.4	99 12	154.1	32 10.2	99 12	154.0	32 40.0	99 12	154.0	33 09.7	99 12	153.9	3
4	29 34.4	99 12	153.3	30 04.1	99 12	153.2	30 33.9	99 12	153.1	31 03.7	99 12	153.1	31 33.5	99 12	153.0	32 03.2	99 12	152.9	32 33.0	99 12	152.9	33 02.8	99 12	152.8	4
25	29 27.3	99 12	152.2	29 57.0	99 12	152.1	30 26.8	99 12	152.0	30 56.5	99 12	152.0	31 26.3	99 12	151.9	31 56.0	99 12	151.8	32 25.8	99 12	151.7	32 55.5	99 12	151.7	25
6	29 19.9	99 13	151.1	29 49.6	99 13	151.0	30 19.4	99 13	150.9	30 49.1	99 13	150.9	31 18.8	99 13	150.8	31 48.6	99 13	150.7	32 18.3	99 13	150.6	32 48.0	99 13	150.6	6
7	29 12.2	99 13	150.0	29 42.0	99 13	149.9	30 11.7	99 13	149.8	30 41.4	99 13	149.8	31 11.1	99 13	149.7	31 40.8	99 13	149.6	32 10.6	99 13	149.5	32 40.3	99 13	149.4	7
8	29 04.4	99 14	148.9	29 34.1	99 14	148.8	30 03.8	99 14	148.8	30 33.5	99 14	148.7	31 03.2	99 14	148.6	31 32.9	99 14	148.5	32 02.5	99 14	148.4	32 32.2	99 14	148.3	8
9	28 56.2	99 14	147.8	29 25.9	99 14	147.7	29 55.6	99 14	147.7	30 25.3	99 14	147.6	30 54.9	99 14	147.5	31 24.6	99 14	147.4	31 54.3	99 14	147.3	32 24.0	99 14	147.2	9
30	28 47.8	99 14	146.7	29 17.5	99 14	146.7	29 47.1	99 14	146.6	30 16.8	99 14	146.5	30 46.5	99 15	146.4	31 16.1	99 15	146.3	31 45.8	99 15	146.2	32 15.4	99 15	146.1	30
1	28 39.2	99 15	145.7	29 08.8	99 15	145.6	29 38.5	99 15	145.5	30 08.1	99 15	145.4	30 37.8	99 15	145.3	31 07.4	99 15	145.2	31 37.0	99 15	145.1	32 06.6	99 15	145.0	1
2	28 30.3	99 15	144.6	28 59.9	99 15	144.5	29 29.5	99 15	144.4	29 59.2	99 15	144.3	30 28.8	99 15	144.2	30 58.4	99 15	144.1	31 28.0	99 15	144.0	31 57.6	99 15	143.9	2
3	28 21.2	99 16	143.5	28 50.8	99 16	143.4	29 20.4	99 16	143.3	29 50.0	99 16	143.2	30 19.6	99 16	143.1	30 49.2	99 16	143.0	31 18.8	99 16	142.9	31 48.4	99 16	142.8	3
4	28 11.8	99 16	142.4	28 41.4	99 16	142.3	29 11.0	99 16	142.2	29 40.6	99 16	142.1	30 10.2	99 16	142.0	30 39.7	99 16	141.9	31 09.3	99 16	141.8	31 38.9	99 16	141.7	4
35	28 02.2	99 16	141.3	28 31.8	99 16	141.2	29 01.4	99 16	141.2	29 30.9	99 16	141.1	30 00.5	99 16	141.0	30 30.0	99 17	140.9	30 59.6	98 17	140.8	31 29.1	98 17	140.7	35
6	27 52.4	99 17	140.3	28 22.0	98 17	140.2	28 51.5	98 17	140.1	29 21.1	98 17	140.0	29 50.6	98 17	139.9	30 20.1	98 17	139.8	30 49.7	98 17	139.7	31 19.2	98 17	139.6	6
7	27 42.4	99 17	139.2	28 11.9	98 17	139.1	28 41.4	98 17	139.0	29 11.0	98 17	138.9	29 40.5	98 17	138.8	30 10.0	98 17	138.7	30 39.5	98 17	138.6	31 09.0	98 17	138.5	7
8	27 32.1	98 17	138.1	28 01.6	98 17	138.0	28 31.1	98 18	137.9	29 00.6	98 18	137.8	29 30.1	98 18	137.7	29 59.6	98 18	137.6	30 29.1	98 18	137.5	30 58.6	98 18	137.4	8
9	27 21.7	98 18	137.1	27 51.1	98 18	137.0	28 20.6	98 18	136.9	28 50.1	98 18	136.8	29 19.6	98 18	136.6	29 49.0	98 18	136.5	30 18.5	98 18	136.4	30 48.0	98 18	136.3	9
40	27 11.0	98 18	136.0	27 40.4	98 18	135.9	28 09.9	98 18	135.8	28 39.4	98 18	135.7	29 08.8	98 18	135.6	29 38.3	98 18	135.5	30 07.7	98 18	135.4	30 37.1	98 18	135.2	40
1	27 00.1	98 18	134.9	27 29.5	98 19	134.8	27 59.0	98 19	134.7	28 28.4	98 19	134.6	28 57.8	98 19	134.5	29 27.3	98 19	134.4	29 56.7	98 19	134.3	30 26.1	98 19	134.2	1
2	26 49.0	98 19	133.9	27 18.4	98 19	133.8	27 47.8	98 19	133.7	28 17.3	98 19	133.6	28 46.7	98 19	133.4	29 16.1	98 19	133.3	29 45.5	98 19	133.2	30 14.9	98 19	133.1	2
3	26 37.7	98 19	132.8	27 07.1	98 19	132.7	27 36.5	98 19	132.6	28 05.9	98 19	132.5	28 35.3	98 19	132.4	29 04.7	98 19	132.3	29 34.1	98 19	132.1	30 03.4	98 19	132.0	3
4	26 26.2	98 19	131.8	26 55.6	98 20	131.7	27 25.0	98 20	131.6	27 54.4	98 20	131.4	28 23.7	98 20	131.3	28 53.1	98 20	131.2	29 22.4	98 20	131.1	29 51.8	98 20	131.0	4
45	26 14.5	98 20	130.7	26 43.9	98 20	130.6	27 13.3	98 20	130.5	27 42.6	98 20	130.4	28 12.0	98 20	130.3	28 41.3	98 20	130.1	29 10.6	98 20	130.0	29 40.0	98 20	129.9	45
6	26 02.7	98 20	129.7	26 32.0	98 20	129.6	27 01.4	98 20	129.4	27 30.7	98 20	129.3	28 00.0	98 20	129.2	28 29.3	98 20	129.1	28 58.7	98 20	129.0	29 28.0	98 20	128.8	6
7	25 50.6	98 20	128.6	26 20.0	98 20	128.5	26 49.3	98 20	128.4	27 18.6	98 20	128.3	27 47.9	98 20	128.2	28 17.2	98 21	128.0	28 46.5	98 21	127.9	29 15.8	98 21	127.8	7
8	25 38.4	98 21	127.6	26 07.7	98 21	127.5	26 37.0	98 21	127.4	27 06.3	98 21	127.2	27 35.6	98 21	127.1	28 04.9	98 21	127.0	28 34.2	98 21	126.9	29 03.4	98 21	126.7	8
9	25 26.0	98 21	126.6	25 55.3	98 21	126.4	26 24.6	98 21	126.3	26 53.9	98 21	126.2	27 23.1	98 21	126.1	27 52.4	98 21	125.9	28 21.7	98 21	125.8	28 50.9	97 21	125.7	9
50	25 13.5	98 21	125.5	25 42.7	98 21	125.4	26 12.0	98 21	125.3	26 41.3	98 21	125.1	27 10.5	97 21	125.0	27 39.7	97 21	124.9	28 09.0	97 21	124.8	28 38.2	97 21	124.6	50
1	25 00.7	98 21	124.5	25 30.0	97 22	124.4	25 59.2	97 22	124.2	26 28.5	97 22	124.1	26 57.7	97 22	124.0	27 26.9	97 22	123.9	27 56.1	97 22	123.7	28 25.4	97 22	123.6	1
2	24 47.9	97 22	123.4	25 17.1	97 22	123.3	25 46.3	97 22	123.2	26 15.5	97 22	123.1	26 44.8	97 22	122.9	27 14.0	97 22	122.8	27 43.2	97 22	122.7	28 12.3	97 22	122.6	2
3	24 34.8	97 22	122.4	25 04.0	97 22	122.3	25 33.3	97 22	122.2	26 02.4	97 22	122.0	26 31.6	97 22	121.9	27 00.8	97 22	121.8	27 30.0	97 22	121.6	27 59.2	97 22	121.5	3
4	24 21.7	97 22	121.4	24 50.8	97 22	121.3	25 20.0	97 22	121.1	25 49.2	97 22	121.0	26 18.4	97 22	120.9	26 47.6	97 22	120.7	27 16.7	97 22	120.6	27 45.9	97 22	120.5	4
55	24 08.3	97 22	120.4	24 37.5	97 22	120.2	25 06.7	97 22	120.1	25 35.8	97 23	120.0	26 05.0	97 23	119.8	26 34.1	97 23	119.7	27 03.3	97 23	119.6	27 32.4	97 23	119.4	55
6	23 54.9	97 23	119.3	24 24.0	97 23	119.2	24 53.2	97 23	119.1	25 22.3	97 23	118.9	25 51.4	97 23	118.8	26 20.6	97 23	118.7	26 49.7	97 23	118.5	27 18.8	97 23	118.4	6
7	23 41.2	97 23	118.3	24 10.4	97 23	118.2	24 39.5	97 23	118.1	25 08.7	97 23	117.9	25 37.8	97 23	117.8	26 06.9	97 23	117.7	26 36.0	97 23	117.5	27 05.1	97 23	117.4	7
8	23 27.5	97 23	117.3	23 56.6	97 23	117.2	24 25.8	97 23	117.0	24 54.9	97 23	116.9	25 24.0	97 23	116.8	25 53.1	97 23	116.6	26 22.2	97 23	116.5	26 51.2	97 23	116.4	8
9	23 13.6	97 23	116.3	23 42.8	97 23	116.1	24 11.9	97 23	116.0	24 41.0	97 23	115.9	25 10.0	97 23	115.7	25 39.1	97 23	115.6	26 08.2	97 23	115.5	26 37.3	97 24	115.3	9
60	22 59.7	97 24	115.3	23 28.8	97 24	115.1	23 57.8	97 24	115.0	24 26.9	97 24	114.9	24 56.0	97 24	114.7	25 25.1	97 24	114.6	25 54.1	97 24	114.5	26 23.2	97 24	114.3	60
1	22 45.6	97 24	114.3	23 14.6	97 24	114.1	23 43.7	97 24	114.0	24 12.8	97 24	113.9	24 41.8	97 24	113.7	25 10.9	97 24	113.6	25 39.9	97 24	113.4	26 09.0	97 24	113.3	1
2	22 31.4	97 24	113.2	23 00.4	97 24	113.1	23 29.5	97 24	113.0	23 58.5	97 24	112.8	24 27.6	97 24	112.7	24 56.6	97 24	112.6	25 25.6	97 24	112.4	25 54.6	97 24	112.3	2
3	22 17.0	97 24	112.2	22 46.1	97 24	112.1	23 15.1	97 24	112.0	23 44.2	97 24	111.8	24 13.2	97 24	111.7	24 42.2	97 24	111.6	25 11.2	97 24	111.4	25 40.2	97 24	111.3	3
4	22 02.6	97 24	111.2	22 31.6	97 24	111.1	23 00.7	97 24	111.0	23 29.7	97 24	110.8	23 58.7	97 24	110.7	24 27.7	97 24	110.5	24 56.7	97 24	110.4	25 25.7	97 24	110.3	4
65	21 48.1	97 24	110.2	22 17.1	97 24	110.1	22 46.1	97 24	110.0	23 15.1	97 24	109.8	23 44.1	97 24	109.7	24 13.1	97 24	109.5	24 42.1	97 24	109.4	25 11.1	97 25	109.3	65
6	21 33.5	97 25	109.2	22 02.5	97 25	109.1	22 31.5	97 25	109.0	23 00.5	97 25	108.8	23 29.5	97 25	108.7	23 58.4	97 25	108.5	24 27.4	97 25	108.4	24 56.4	97 25	108.2	6
7	21 18.8	97 25	108.2	21 47.8	97 25	108.1	22 16.7	97 25	108.0	22 45.7	97 25	107.8	23 14.7	97 25	107.7	23 43.7	97 25	107.5	24 12.6	97 25	107.4	24 41.6	97 25	107.2	7
8	21 04.0	97 25	107.2	21 33.0	97 25	107.1	22 01.9	97 25	107.0	22 30.9	97 25	106.8	22 59.9	97 25	106.7	23 28.8	97 25	106.5	23 57.8	96 25	106.4	24 26.7	96 25	106.2	8
9	20 49.1	97 25	106.2	21 18.1	97 25	106.1	21 47.0	97 25	106.0	22 16.0	97 25	105.8	22 45.0	97 25	105.7	23 13.9	96 25	105.5	23 42.8	96 25	105.4	24 11.8	96 25	105.2	9
70	20 34.1	97 25	105.2	21 03.1	97 25	105.1	21 32.1	97 25	105.0	22 01.0	96 25	104.8	22 30.0	96 25	104.7	22 58.9	96 25	104.5	23 27.8	96 25	104.4	23 56.8	96 25	104.3	70
1	20 19.1	97 25	104.3	20 48.1	97 25	104.1	21 17.0	96 25	104.0	21 46.0	96 25	103.8	22 14.9	96 25	103.7	22 43.8	96 25	103.5	23 12.8	96 25	103.4	23 41.7	96 25	103.3	1
2	20 04.0	97 25	103.3	20 33.0	96 25	103.1	21 01.9	96 25	103.0	21 30.9	96 25	102.8	21 59.8	96 25	102.7	22 28.7	96 25	102.6	22 57.6	96 25	102.4	23 26.5	96 25	102.3	2
3	19 48.9	96 25	102.3	20 17.8	96 25	102.1	20 46.8	96 25	102.0	21 15.7	96 25	101.9	21 44.6	96 25	101.7	22 13.5	96 25	101.6	22 42.4	96 25	101.4	23 11.3	96 25	101.3	3
4	19 33.7	96 25	101.3	20 02.6	96 25	101.1	20 31.6	96 25	101.0	21 00.5	96 25	100.9	21 29.4	96 25	100.7	21 58.3	96 26	100.6	22 27.2	96 25	100.4	22 56.1	96 26	100.3	4
75	19 18.4	96 26	100.3	19 47.4	96 26	100.2	20 16.3	96 26	100.0	20 45.2	96 26	99.9	21 14.1	96 26	99.7	21 43.0	96 26	99.6	22 11.9	96 26	99.5	22 40.8	96 26	99.3	75
6	19 03.1	96 26	99.3	19 32.1	96 26	99.2	20 01.0	96 26	99.1	20 29.9	96 26	98.9	20 58.8	96 26	98.8	21 27.7	96 26	98.6	21 56.6	96 26	98.5	22 25.4	96 26	98.3	6
7	18 47.8	96 26	98.4	19 16.7	96 26	98.2	19 45.6	96 26	98.1	20 14.5	96 26	97.9	20 43.4	96 26	97.8	21 12.3	96 26	97.6	21 41.2	96 26	97.5	22 10.0	96 26	97.3	7
8	18 32.4	96 26	97.4	19 01.3	96 26	97.2	19 30.2	96 26	97.1	19 59.1	96 26	96.9	20 28.0	96 26	96.8	20 56.9	96 26	96.7	21 25.8	96 26	96.5	21 54.6	96 26	96.4	8
9	18 17.0	96 26	96.4	18 45.9	96 26	96.3	19 14.8	96 26	96.1	19 43.7	96 26	96.0	20 12.6	96 26	95.8	20 41.5	96 26	95.7	21 10.3	96 26	95.5	21 39.2	96 26	95.4	9
80	18 01.6	96 26	95.4	18 30.5	96 26	95.3	18 59.3	96 26	95.1	19 28.2	96 26	95.0	19 57.1	96 26	94.9	20 26.0	96 26	94.7	20 54.9	96 26	94.6	21 23.7	96 26	94.4	80
1	17 46.1	96 26	94.5	18 15.0	96 26	94.3	18 43.9	96 26	94.2	19 12.8	96 26	94.0	19 41.6	96 26	93.9	20 10.5	96 26	93.7	20 39.4	96 26	93.6	21 08.2	96 26	93.4	1
2	17 30.6	96 26	93.5	17 59.5	96 26	93.3	18 28.4	96 26	93.2	18 57.3	96 26	93.1	19 26.1	96 26	92.9	19 55.0	96 26	92.8	20 23.9	96 26	92.6	20 52.7	96 26	92.5	2
3	17 15.1	96 26	92.5	17 44.0	96 26	92.4	18 12.9	96 26	92.2	18 41.7	96 26	92.1	19 10.6	96 26	91.9	19 39.5	96 26	91.8	20 08.3	96 26	91.7	20 37.2	96 26	91.5	3
4	16 59.6	96 26	91.5	17 28.5	96 26	91.4	17 57.3	96 26	91.3	18 26.2	96 26	91.1	18 55.1	96 26	91.0	19 24.0	96 26	90.8	19 52.8	96 26	90.7	20 21.7	96 26	90.5	4
85	16 44.0	96 26	90.6	17 12.9	96 26	90.4	17 41.8	96 26	90.3	18 10.7	96 26	90.1	18 39.6	96 26	90.0	19 08.4	96 26	89.9	19 37.3	96 26	89.7	20 06.1	96 26	89.6	85
6	16 28.5	96 26	89.6	16 57.4	96 26	89.5	17 26.3	96 26	89.3	17 55.2	96 26	89.2	18 24.0	96 26	89.0	18 52.9	96 26	88.9	19 21.8	96 26	88.8	19 50.6	96 26	88.6	6
7	16 13.0	96 26	88.6	16 41.9	96 26	88.5	17 10.8	96 26	88.4	17 39.6	96 26	88.2	18 08.5	96 26	88.1	18 37.4	96 26	87.9	19 06.2	96 26	87.8	19 35.1	96 26	87.6	7
8	15 57.5	96 26	87.7	16 26.4	96 26	87.5	16 55.2	96 26	87.4	17 24.1	96 26	87.3	17 53.0	96 26	87.1	18 21.9	96 26	87.0	18 50.7	96 26	86.8	19 19.6	96 26	86.7	8
9	15 42.0	96 26	86.7	16 10.8	96 26	86.6	16 39.7	96 26	86.4	17 08.6	96 26	86.3	17 37.5	96 26	86.2	18 06.4	96 26	86.0	18 35.2	96 26	85.9	19 04.1	96 26	85.7	9
90	15 26.5	96 26	85.8	15 55.4	96 26	85.6	16 24.2	96 26	85.5	16 53.1	96 26	85.3	17 22.0	96 26	85.2	17 50.9	96 26	85.1	18 19.7	96 26	84.9	18 48.6	96 26	84.8	90

Lat. 75°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	15 11.0	96	26	84.8	15 39.9	96	26	84.7	16 08.8	96	26	84.5	16 37.7	96	26	84.4	17 06.5	96	26	84.2	17 35.4	96	26	84.1	18 04.3	96	26	83.9	18 33.2	96	26	83.8	91
2	14 55.5	96	26	83.8	15 24.4	96	26	83.7	15 53.3	96	26	83.6	16 22.2	96	26	83.4	16 51.1	96	26	83.3	17 20.0	96	26	83.1	17 48.9	96	26	83.0	18 17.7	96	26	82.9	2
3	14 40.1	96	26	82.9	15 09.0	96	26	82.7	15 37.9	96	26	82.6	16 06.8	96	26	82.5	16 35.7	96	26	82.3	17 04.6	96	26	82.2	17 33.5	96	26	82.0	18 02.3	96	26	81.9	3
4	14 24.7	96	26	81.9	14 53.6	96	26	81.8	15 22.5	96	26	81.6	15 51.4	96	26	81.5	16 20.3	96	26	81.4	16 49.2	96	26	81.2	17 18.1	96	26	81.1	17 47.0	96	26	80.9	4
95	14 09.4	96	26	81.0	14 38.3	96	26	80.8	15 07.2	96	26	80.7	15 36.1	96	26	80.6	16 05.0	96	26	80.4	16 33.9	96	25	80.3	17 02.8	96	25	80.1	17 31.7	96	25	80.0	95
6	13 54.0	96	25	80.0	14 23.0	96	25	79.9	14 51.9	96	25	79.7	15 20.8	96	25	79.6	15 49.7	96	25	79.5	16 18.6	96	25	79.3	16 47.5	96	25	79.2	17 16.4	96	25	79.0	6
7	13 38.8	96	25	79.1	14 07.7	96	25	78.9	14 36.6	96	25	78.8	15 05.5	96	25	78.6	15 34.5	96	25	78.5	16 03.4	96	25	78.4	16 32.3	96	25	78.2	17 01.2	96	25	78.1	7
8	13 23.5	96	25	78.1	13 52.5	96	25	78.0	14 21.4	96	25	77.8	14 50.3	96	25	77.7	15 19.3	96	25	77.6	15 48.2	96	25	77.4	16 17.1	96	25	77.3	16 46.0	96	25	77.1	8
9	13 08.4	96	25	77.2	13 37.3	96	25	77.0	14 06.3	96	25	76.9	14 35.2	96	25	76.7	15 04.1	96	25	76.6	15 33.1	96	25	76.5	16 02.0	96	25	76.3	16 30.9	96	25	76.2	9
100	12 53.3	97	25	76.2	13 22.2	97	25	76.1	13 51.2	96	25	75.9	14 20.1	96	25	75.8	14 49.1	96	25	75.7	15 18.0	96	25	75.5	15 46.9	96	25	75.4	16 15.9	96	25	75.2	100
1	12 38.2	97	25	75.2	13 07.2	97	25	75.1	13 36.1	97	25	75.0	14 05.1	97	25	74.8	14 34.0	96	25	74.7	15 03.0	96	25	74.6	15 31.9	96	25	74.4	16 00.9	96	25	74.3	1
2	12 23.2	97	25	74.3	12 52.2	97	25	74.2	13 21.2	97	25	74.0	13 50.1	97	25	73.9	14 19.1	97	25	73.8	14 48.1	97	25	73.6	15 17.0	96	25	73.5	15 46.0	96	25	73.4	2
3	12 08.3	97	25	73.3	12 37.3	97	25	73.2	13 06.3	97	25	73.1	13 35.3	97	25	72.9	14 04.2	97	25	72.8	14 33.2	97	25	72.7	15 02.2	97	25	72.5	15 31.1	97	25	72.4	3
4	11 53.5	97	25	72.4	12 22.5	97	25	72.3	12 51.5	97	25	72.1	13 20.5	97	25	72.0	13 49.4	97	25	71.9	14 18.4	97	25	71.7	14 47.4	97	24	71.6	15 16.3	97	24	71.5	4
105	11 38.7	97	24	71.4	12 07.7	97	24	71.3	12 36.7	97	24	71.2	13 05.7	97	24	71.1	13 34.7	97	24	70.9	14 03.7	97	24	70.8	14 32.7	97	24	70.7	15 01.7	97	24	70.5	105
6	11 24.0	97	24	70.5	11 53.1	97	24	70.4	12 22.1	97	24	70.2	12 51.1	97	24	70.1	13 20.1	97	24	70.0	13 49.1	97	24	69.8	14 18.1	97	24	69.7	14 47.1	97	24	69.6	6
7	11 09.4	97	24	69.5	11 38.5	97	24	69.4	12 07.5	97	24	69.3	12 36.5	97	24	69.2	13 05.5	97	24	69.0	13 34.5	97	24	68.9	14 03.6	97	24	68.8	14 32.6	97	24	68.6	7
8	10 54.9	97	24	68.6	11 24.0	97	24	68.5	11 53.0	97	24	68.3	12 22.1	97	24	68.2	12 51.1	97	24	68.1	13 20.1	97	24	68.0	13 49.1	97	24	67.8	14 18.1	97	24	67.7	8
9	10 40.5	97	24	67.7	11 09.6	97	24	67.5	11 38.6	97	24	67.4	12 07.7	97	24	67.3	12 36.7	97	24	67.1	13 05.8	97	24	67.0	13 34.8	97	24	66.9	14 03.8	97	24	66.8	9
110	10 26.2	97	24	66.7	10 55.3	97	24	66.6	11 24.3	97	24	66.5	11 53.4	97	24	66.3	12 22.5	97	24	66.2	12 51.5	97	24	66.1	13 20.6	97	24	65.9	13 49.6	97	24	65.8	110
1	10 12.0	97	24	65.8	10 41.1	97	23	65.6	11 10.2	97	23	65.5	11 39.2	97	23	65.4	12 08.3	97	23	65.3	12 37.4	97	23	65.1	13 06.4	97	23	65.0	13 35.5	97	23	64.9	1
2	9 57.9	97	23	64.8	10 27.0	97	23	64.7	10 56.1	97	23	64.6	11 25.2	97	23	64.4	11 54.3	97	23	64.3	12 23.3	97	23	64.2	12 52.4	97	23	64.1	13 21.5	97	23	63.9	2
3	9 43.9	97	23	63.9	10 13.0	97	23	63.7	10 42.1	97	23	63.6	11 11.2	97	23	63.5	11 40.3	97	23	63.4	12 09.4	97	23	63.2	12 38.5	97	23	63.1	13 07.6	97	23	63.0	3
4	9 30.0	97	23	62.9	9 59.1	97	23	62.8	10 28.3	97	23	62.7	10 57.4	97	23	62.6	11 26.5	97	23	62.4	11 55.6	97	23	62.3	12 24.7	97	23	62.2	12 53.8	97	23	62.1	4
115	9 16.2	97	23	62.0	9 45.4	97	23	61.9	10 14.5	97	23	61.7	10 43.7	97	23	61.6	11 12.8	97	23	61.5	11 41.9	97	23	61.4	12 11.0	97	23	61.2	12 40.2	97	23	61.1	115
6	9 02.6	97	23	61.0	9 31.8	97	22	60.9	10 00.9	97	22	60.8	10 30.1	97	22	60.7	10 59.2	97	22	60.5	11 28.3	97	22	60.4	11 57.5	97	22	60.3	12 26.6	97	22	60.2	6
7	8 49.1	97	22	60.1	9 18.2	97	22	60.0	9 47.4	97	22	59.8	10 16.6	97	22	59.7	10 45.7	97	22	59.6	11 14.9	97	22	59.5	11 44.1	97	22	59.4	12 13.2	97	22	59.2	7
8	8 35.7	97	22	59.1	9 04.9	97	22	59.0	9 34.1	97	22	58.9	10 03.2	97	22	58.8	10 32.4	97	22	58.7	11 01.6	97	22	58.5	11 30.8	97	22	58.4	11 59.9	97	22	58.3	8
9	8 22.4	97	22	58.2	8 51.6	97	22	58.1	9 20.8	97	22	58.0	9 50.0	97	22	57.8	10 19.2	97	22	57.7	10 48.4	97	22	57.6	11 17.6	97	22	57.5	11 46.8	97	22	57.4	9
120	8 09.3	97	22	57.2	8 38.5	97	22	57.1	9 07.7	97	22	57.0	9 36.9	97	22	56.9	10 06.2	97	22	56.8	10 35.4	97	22	56.7	11 04.6	97	22	56.6	11 33.8	97	21	56.4	120
1	7 56.3	97	21	56.3	8 25.5	97	21	56.2	8 54.8	97	21	56.1	9 24.0	97	21	56.0	9 53.2	97	21	55.8	10 22.5	97	21	55.7	10 51.7	97	21	55.6	11 20.9	97	21	55.5	1
2	7 43.5	98	21	55.4	8 12.7	98	21	55.2	8 42.0	98	21	55.1	9 11.2	97	21	55.0	9 40.5	97	21	54.9	10 09.7	97	21	54.8	10 38.9	97	21	54.7	11 08.2	97	21	54.6	2
3	7 30.8	98	21	54.4	8 00.0	98	21	54.3	8 29.3	98	21	54.2	8 58.6	98	21	54.1	9 27.8	98	21	54.0	9 57.1	98	21	53.8	10 26.4	98	21	53.7	10 55.6	98	21	53.6	3
4	7 18.2	98	21	53.5	7 47.5	98	21	53.3	8 16.8	98	21	53.2	8 46.1	98	21	53.1	9 15.3	98	21	53.0	9 44.6	98	21	52.9	10 13.9	98	20	52.8	10 43.2	98	20	52.7	4
125	7 05.8	98	20	52.5	7 35.1	98	20	52.4	8 04.4	98	20	52.3	8 33.7	98	20	52.2	9 03.0	98	20	52.1	9 32.3	98	20	52.0	10 01.6	98	20	51.9	10 30.9	98	20	51.8	125
6	6 53.6	98	20	51.6	7 22.9	98	20	51.5	7 52.2	98	20	51.4	8 21.5	98	20	51.2	8 50.8	98	20	51.1	9 20.2	98	20	51.0	9 49.5	98	20	50.9	10 18.8	98	20	50.8	6
7	6 41.5	98	20	50.6	7 10.8	98	20	50.5	7 40.2	98	20	50.4	8 09.5	98	20	50.3	8 38.8	98	20	50.2	9 08.2	98	20	50.1	9 37.5	98	20	50.0	10 06.8	98	20	49.9	7
8	6 29.5	98	20	49.7	6 58.9	98	20	49.6	7 28.3	98	20	49.5	7 57.6	98	20	49.4	8 27.0	98	19	49.3	8 56.3	98	19	49.2	9 25.7	98	19	49.0	9 55.0	98	19	48.9	8
9	6 17.8	98	19	48.7	6 47.2	98	19	48.6	7 16.6	98	19	48.5	7 45.9	98	19	48.4	8 15.3	98	19	48.3	8 44.7	98	19	48.2	9 14.0	98	19	48.1	9 43.4	98	19	48.0	9
130	6 06.2	98	19	47.8	6 35.6	98	19	47.7	7 05.0	98	19	47.6	7 34.4	98	19	47.5	8 03.8	98	19	47.4	8 33.2	98	19	47.3	9 02.6	98	19	47.2	9 32.0	98	19	47.1	130
1	5 54.8	98	19	46.8	6 24.2	98	19	46.7	6 53.6	98	19	46.6	7 23.0	98	19	46.5	7 52.4	98	19	46.4	8 21.9	98	19	46.3	8 51.3	98	19	46.2	9 20.7	98	18	46.1	1
2	5 43.6	98	18	45.9	6 13.0	98	18	45.8	6 42.4	98	18	45.7	7 11.9	98	18	45.6	7 41.3	98	18	45.5	8 10.7	98	18	45.4	8 40.1	98	18	45.3	9 09.6	98	18	45.2	2
3	5 32.5	98	18	44.9	6 01.9	98	18	44.8	6 31.4	98	18	44.7	7 00.8	98	18	44.6	7 30.3	98	18	44.6	7 59.7	98	18	44.5	8 29.2	98	18	44.4	8 58.6	98	18	44.3	3
4	5 21.6	98	18	44.0	5 51.1	98	18	43.9	6 20.6	98	18	43.8	6 50.0	98	18	43.7	7 19.5	98	18	43.6	7 49.0	98	18	43.5	8 18.4	98	18	43.4	8 47.9	98	18	43.3	4
135	5 10.9	98	18	43.0	5 40.4	98	17	42.9	6 09.9	98	17	42.9	6 39.4	98	17	42.8	7 08.9	98	17	42.7	7 38.4	98	17	42.6	8 07.8	98	17	42.5	8 37.3	98	17	42.4	135
6	5 00.4	98	17	42.1	5 29.9	98	17	42.0	5 59.4	98	17	41.9	6 28.9	98	17	41.8	6 58.4	98	17	41.7	7 27.9	98	17	41.6	7 57.5	98	17	41.5	8 27.0	98	17	41.5	6
7					5 19.6	98	17	41.1	5 49.2	98	17	41.0	6 18.7	98	17	40.9	6 48.2	98	17	40.8	7 17.7	98	17	40.7	7 47.2	98	17	40.6	8 16.8	98	17	40.5	7
8					5 09.5	98	16	40.1	5 39.1	98	16	40.0	6 08.6	98	16	39.9	6 38.2	98	16	39.8	7 07.7	98	16	39.8	7 37.2	98	16	39.7	8 06.8	98	16	39.6	8
9									5 29.2	99	16	39.1	5 58.8	99	16	39.0	6 28.3	99	16	38.9	6 57.9	99	16	38.8	7 27.4	99	16	38.7	7 57.0	99	16	38.6	9
140									5 19.5	99	16	38.1	5 49.1	99	16	38.0	6 18.7	99	16	38.0	6 48.2	99	16	37.9	7 17.8	99	16	37.8	7 47.4	99	16	37.7	140
1									5 10.0	99	15	37.2	5 39.6	99	15	37.1	6 09.2	99	15	37.0	6 38.8	99	15	36.9	7 08.4	99	15	36.8	7 38.0	99	15	36.8	1
2									5 00.7	99	15	36.2	5 30.3	99	15	36.1	6 00.0	99	15	36.1	6 29.6	99	15	36.0	6 59.2	99	15	35.9	7 28.8	99	15	35.8	2
3													5 21.3	99	15	35.2	5 50.9	99	15	35.1	6 20.6	99	15	35.0	6 50.2	99	15	35.0	7 19.8	99	15	34.9	3
4													5 12.4	99	14	34.3	5 42.1	99	14	34.2	6 11.7	99	14	34.1	6 41.4	99	14	34.0	7 11.0	99	14	33.9	4
145													5 03.8	99	14	33.3	5 33.5	99	14	33.2	6 03.1	99	14	33.2	6 32.8	99	14	33.1	7 02.5	99	14	33.0	145
6																	5 25.1	99	14	32.3	5 54.8	99	14	32.2	6 24.4	99	14	32.1	6 54.1	99	14	32.1	6
7																	5 16.9	99	13	31.3	5 46.6	99	13	31.3	6 16.3	99	13	31.2	6 46.0	99	13	31.1	7
8																	5 08.9	99	13	30.4	5 38.6	99	13	30.3	6 08.3	99	13	30.3	6 38.1	99	13	30.2	8
9																	5 01.2	99	13	29.5	5 30.9	99	13	29.4	6 00.6	99	12	29.3	6 30.4	99	12	29.3	9
150																					5 23.4	99	12	28.4	5 53.1	99	12	28.4	6 22.9	99	12	28.3	150
1																					5 16.1	99	12	27.5	5 45.9	99	12	27.4	6 15.6	99	12	27.4	1
2																					5 09.1	99	11	26.6	5 38.8	99	11	26.5	6 08.6	99	11	26.4	2
3																					5 02.2	99	11	25.6	5 32.0	99	11	25.5	6 01.8	99	11	25.5	3
4																									5 25.4	99	11	24.6	5 55.2	99	11	24.5	4
155																									5 19.1	99	10	23.7	5 48.9	99	10	23.6	155
6																									5 13.0	99	10	22.7	5 42.8	99	10	22.7	6
7																									5 07.1	99	09	21.8	5 36.9	99	09	21.7	7
8																									5 01.4	1.0	09	20.8	5 31.3	1.0	09	20.8	8
9																													5 25.9	1.0	09	19.8	9
160																													5 20.8	1.0	08	18.9	160
1																													5 15.9	1.0	08	18.0	1
2																													5 11.2	1.0	07	17.0	2
3																													5 06.8	1.0	07	16.1	3
4																													5 02.6	1.0	07	15.1	4

Lat. 75°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	00
1	34 59.8	1.0 01	178.9	35 29.8	1.0 01	178.8	35 59.8	1.0 01	178.8	36 29.8	1.0 01	178.8	1
2	34 59.4	1.0 01	177.7	35 29.4	1.0 01	177.7	35 59.4	1.0 01	177.7	36 29.4	1.0 01	177.7	2
3	34 58.6	1.0 02	176.6	35 28.6	1.0 02	176.5	35 58.6	1.0 02	176.5	36 28.6	1.0 02	176.5	3
4	34 57.5	1.0 02	175.4	35 27.5	1.0 02	175.4	35 57.5	1.0 02	175.4	36 27.5	1.0 02	175.4	4
05	34 56.1	1.0 03	174.3	35 26.1	1.0 03	174.2	35 56.1	1.0 03	174.2	36 26.1	1.0 03	174.2	05
6	34 54.4	1.0 03	173.1	35 24.4	1.0 03	173.1	35 54.4	1.0 03	173.1	36 24.4	1.0 03	173.1	6
7	34 52.4	1.0 04	172.0	35 22.4	1.0 04	172.0	35 52.4	1.0 04	171.9	36 22.3	1.0 04	171.9	7
8	34 50.1	1.0 04	170.8	35 20.0	1.0 04	170.8	35 50.0	1.0 04	170.8	36 20.0	1.0 04	170.8	8
9	34 47.4	1.0 05	169.7	35 17.4	1.0 05	169.7	35 47.4	1.0 05	169.6	36 17.3	1.0 05	169.6	9
10	34 44.5	1.0 05	168.5	35 14.5	1.0 05	168.5	35 44.4	1.0 05	168.5	36 14.4	1.0 05	168.4	10
1	34 41.3	1.0 06	167.4	35 11.2	1.0 06	167.4	35 41.2	1.0 06	167.3	36 11.1	1.0 06	167.3	1
2	34 37.7	1.0 06	166.3	35 07.7	1.0 06	166.2	35 37.6	1.0 06	166.2	36 07.5	1.0 06	166.1	2
3	34 33.9	1.0 07	165.1	35 03.8	1.0 07	165.1	35 33.8	1.0 07	165.0	36 03.7	1.0 07	165.0	3
4	34 29.8	1.0 07	164.0	34 59.7	1.0 07	163.9	35 29.6	1.0 07	163.9	35 59.5	1.0 07	163.8	4
15	34 25.3	1.0 08	162.9	34 55.2	1.0 08	162.8	35 25.1	1.0 08	162.8	35 55.0	1.0 08	162.7	15
6	34 20.6	1.0 08	161.7	34 50.5	1.0 08	161.7	35 20.4	1.0 08	161.6	35 50.3	1.0 08	161.6	6
7	34 15.6	1.0 09	160.6	34 45.5	1.0 09	160.5	35 15.3	1.0 09	160.5	35 45.2	1.0 09	160.4	7
8	34 10.3	1.0 09	159.5	34 40.2	1.0 09	159.4	35 10.0	1.0 09	159.3	35 39.9	1.0 09	159.3	8
9	34 04.7	99 10	158.3	34 34.5	99 10	158.3	35 04.4	99 10	158.2	35 34.2	99 10	158.1	9
20	33 58.8	99 10	157.2	34 28.7	99 10	157.1	34 58.5	99 10	157.1	35 28.3	99 10	157.0	20
1	33 52.7	99 11	156.1	34 22.5	99 11	156.0	34 52.3	99 11	155.9	35 22.1	99 11	155.9	1
2	33 46.2	99 11	154.9	34 16.0	99 11	154.9	34 45.8	99 11	154.8	35 15.6	99 11	154.7	2
3	33 39.5	99 12	153.8	34 09.3	99 12	153.8	34 39.1	99 12	153.7	35 08.8	99 12	153.6	3
4	33 32.5	99 12	152.7	34 02.3	99 12	152.6	34 32.0	99 12	152.6	35 01.8	99 12	152.5	4
25	33 25.3	99 13	151.6	33 55.0	99 13	151.5	34 24.7	99 13	151.4	34 54.5	99 13	151.3	25
6	33 17.8	99 13	150.5	33 47.5	99 13	150.4	34 17.2	99 13	150.3	34 46.9	99 13	150.2	6
7	33 10.0	99 13	149.4	33 39.7	99 13	149.3	34 09.4	99 13	149.2	34 39.1	99 14	149.1	7
8	33 01.9	99 14	148.3	33 31.6	99 14	148.2	34 01.3	99 14	148.1	34 31.0	99 14	148.0	8
9	32 53.6	99 14	147.1	33 23.3	99 14	147.1	33 52.9	99 14	147.0	34 22.6	99 14	146.9	9
30	32 45.1	99 15	146.0	33 14.7	99 15	145.9	33 44.4	99 15	145.9	34 14.0	99 15	145.8	30
1	32 36.3	99 15	144.9	33 05.9	99 15	144.8	33 35.5	99 15	144.7	34 05.1	99 15	144.6	1
2	32 27.2	99 15	143.8	32 56.8	99 16	143.7	33 26.4	99 16	143.6	33 56.0	99 16	143.5	2
3	32 17.9	99 16	142.7	32 47.5	99 16	142.6	33 17.1	99 16	142.5	33 46.7	99 16	142.4	3
4	32 08.4	99 16	141.6	32 38.0	99 16	141.5	33 07.5	98 16	141.4	33 37.1	98 16	141.3	4
35	31 58.7	98 17	140.6	32 28.2	98 17	140.4	32 57.7	98 17	140.3	33 27.3	98 17	140.2	35
6	31 48.7	98 17	139.5	32 18.2	98 17	139.4	32 47.7	98 17	139.2	33 17.2	98 17	139.1	6
7	31 38.5	98 17	138.4	32 08.0	98 17	138.3	32 37.5	98 17	138.2	33 06.9	98 18	138.0	7
8	31 28.1	98 18	137.3	31 57.5	98 18	137.2	32 27.0	98 18	137.1	32 56.5	98 18	137.0	8
9	31 17.4	98 18	136.2	31 46.9	98 18	136.1	32 16.3	98 18	136.0	32 45.7	98 18	135.9	9
40	31 06.6	98 18	135.1	31 36.0	98 18	135.0	32 05.4	98 18	134.9	32 34.8	98 19	134.8	40
1	30 55.5	98 19	134.1	31 24.9	98 19	133.9	31 54.3	98 19	133.8	32 23.7	98 19	133.7	1
2	30 44.3	98 19	133.0	31 13.6	98 19	132.9	31 43.0	98 19	132.7	32 12.4	98 19	132.6	2
3	30 32.8	98 19	131.9	31 02.2	98 19	131.8	31 31.5	98 19	131.7	32 00.9	98 20	131.6	3
4	30 21.1	98 20	130.8	30 50.5	98 20	130.7	31 19.8	98 20	130.6	31 49.1	98 20	130.5	4
45	30 09.3	98 20	129.8	30 38.6	98 20	129.7	31 07.9	98 20	129.5	31 37.2	98 20	129.4	45
6	29 57.3	98 20	128.7	30 26.6	98 20	128.6	30 55.9	98 20	128.5	31 25.1	98 20	128.3	6
7	29 45.1	98 21	127.7	30 14.3	98 21	127.5	30 43.6	98 21	127.4	31 12.9	98 21	127.3	7
8	29 32.7	98 21	126.6	30 01.9	98 21	126.5	30 31.2	97 21	126.4	31 00.4	97 21	126.2	8
9	29 20.1	97 21	125.6	29 49.4	97 21	125.4	30 18.6	97 21	125.3	30 47.8	97 21	125.2	9
50	29 07.4	97 22	124.5	29 36.6	97 22	124.4	30 05.8	97 22	124.2	30 35.0	97 22	124.1	50
1	28 54.6	97 22	123.5	29 23.7	97 22	123.3	29 52.9	97 22	123.2	30 22.1	97 22	123.1	1
2	28 41.5	97 22	122.4	29 10.7	97 22	122.3	29 39.9	97 22	122.2	30 09.0	97 22	122.0	2
3	28 28.3	97 22	121.4	28 57.5	97 22	121.2	29 26.6	97 22	121.1	29 55.8	97 22	121.0	3
4	28 15.0	97 22	120.3	28 44.1	97 22	120.2	29 13.3	97 22	120.1	29 42.4	97 23	119.9	4
55	28 01.5	97 23	119.3	28 30.7	97 23	119.2	28 59.8	97 23	119.0	29 28.9	97 23	118.9	55
6	27 47.9	97 23	118.3	28 17.0	97 23	118.1	28 46.1	97 23	118.0	29 15.2	97 23	117.9	6
7	27 34.2	97 23	117.2	28 03.3	97 23	117.1	28 32.3	97 23	117.0	29 01.4	97 23	116.8	7
8	27 20.3	97 23	116.2	27 49.4	97 23	116.1	28 18.4	97 23	115.9	28 47.5	97 23	115.8	8
9	27 06.3	97 24	115.2	27 35.4	97 24	115.1	28 04.4	97 24	114.9	28 33.4	97 24	114.8	9
60	26 52.2	97 24	114.2	27 21.2	97 24	114.0	27 50.3	97 24	113.9	28 19.3	97 24	113.7	60
1	26 38.0	97 24	113.2	27 07.0	97 24	113.0	27 36.0	97 24	112.9	28 05.0	97 24	112.7	1
2	26 23.7	97 24	112.1	26 52.7	97 24	112.0	27 21.7	97 24	111.9	27 50.6	97 24	111.7	2
3	26 09.2	97 24	111.1	26 38.2	97 24	111.0	27 07.2	97 24	110.8	27 36.2	97 24	110.7	3
4	25 54.7	97 24	110.1	26 23.7	97 24	110.0	26 52.6	97 24	109.8	27 21.6	97 24	109.7	4
65	25 40.1	97 25	109.1	26 09.0	97 25	109.0	26 38.0	96 25	108.8	27 06.9	96 25	108.7	65
6	25 25.3	97 25	108.1	25 54.3	96 25	108.0	26 23.2	96 25	107.8	26 52.2	96 25	107.7	6
7	25 10.5	96 25	107.1	25 39.5	96 25	107.0	26 08.4	96 25	106.8	26 37.3	96 25	106.7	7
8	24 55.7	96 25	106.1	25 24.6	96 25	106.0	25 53.5	96 25	105.8	26 22.4	96 25	105.7	8
9	24 40.7	96 25	105.1	25 09.6	96 25	105.0	25 38.5	96 25	104.8	26 07.4	96 25	104.7	9
70	24 25.7	96 25	104.1	24 54.6	96 25	104.0	25 23.5	96 25	103.8	25 52.4	96 25	103.7	70
1	24 10.6	96 25	103.1	24 39.5	96 25	103.0	25 08.4	96 25	102.8	25 37.2	96 25	102.7	1
2	23 55.4	96 25	102.1	24 24.3	96 25	102.0	24 53.2	96 25	101.8	25 22.1	96 25	101.7	2
3	23 40.2	96 25	101.1	24 09.1	96 25	101.0	24 38.0	96 25	100.8	25 06.8	96 25	100.7	3
4	23 25.0	96 25	100.1	23 53.8	96 26	100.0	24 22.7	96 26	99.9	24 51.6	96 26	99.7	4
75	23 09.7	96 26	99.2	23 38.5	96 26	99.0	24 07.4	96 26	98.9	24 36.2	96 26	98.7	75
6	22 54.3	96 26	98.2	23 23.2	96 26	98.0	23 52.0	96 26	97.9	24 20.9	96 26	97.7	6
7	22 38.9	96 26	97.2	23 07.8	96 26	97.1	23 36.6	96 26	96.9	24 05.4	96 26	96.8	7
8	22 23.5	96 26	96.2	22 52.3	96 26	96.1	23 21.2	96 26	95.9	23 50.0	96 26	95.8	8
9	22 08.0	96 26	95.2	22 36.9	96 26	95.1	23 05.7	96 26	94.9	23 34.5	96 26	94.8	9
80	21 52.6	96 26	94.3	22 21.4	96 26	94.1	22 50.2	96 26	94.0	23 19.1	96 26	93.8	80
1	21 37.1	96 26	93.3	22 05.9	96 26	93.1	22 34.7	96 26	93.0	23 03.6	96 26	92.8	1
2	21 21.6	96 26	92.3	21 50.4	96 26	92.2	22 19.2	96 26	92.0	22 48.0	96 26	91.9	2
3	21 06.0	96 26	91.4	21 34.9	96 26	91.2	22 03.7	96 26	91.1	22 32.5	96 26	90.9	3
4	20 50.5	96 26	90.4	21 19.3	96 26	90.2	21 48.2	96 26	90.1	22 17.0	96 26	89.9	4
85	20 35.0	96 26	89.4	21 03.8	96 26	89.3	21 32.6	96 26	89.1	22 01.5	96 26	89.0	85
6	20 19.5	96 26	88.5	20 48.3	96 26	88.3	21 17.1	96 26	88.2	21 45.9	96 26	88.0	6
7	20 03.9	96 26	87.5	20 32.8	96 26	87.4	21 01.6	96 26	87.2	21 30.4	96 26	87.1	7
8	19 48.4	96 26	86.5	20 17.3	96 26	86.4	20 46.1	96 26	86.2	21 14.9	96 26	86.1	8
9	19 32.9	96 26	85.6	20 01.8	96 26	85.4	20 30.6	96 26	85.3	20 59.4	96 26	85.1	9
90	19 17.5	96 26	84.6	19 46.3	96 26	84.5	20 15.1	96 26	84.3	20 44.0	96 26	84.2	90

H.A.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	00
1	36 59.8	1.0 01	178.8	37 29.8	1.0 01	178.8	37 59.8	1.0 01	178.8	38 29.8	1.0 01	178.8	1
2	36 59.4	1.0 01	177.7	37 29.4	1.0 01	177.7	37 59.4	1.0 01	177.7	38 29.4	1.0 01	177.7	2
3	36 58.6	1.0 02	176.5	37 28.6	1.0 02	176.5	37 58.6	1.0 02	176.5	38 28.6	1.0 02	176.5	3
4	36 57.5	1.0 02	175.4	37 27.5	1.0 02	175.3	37 57.5	1.0 02	175.3	38 27.5	1.0 02	175.3	4
05	36 56.1	1.0 03	174.2	37 26.1	1.0 03	174.2	37 56.0	1.0 03	174.2	38 26.0	1.0 03	174.1	05
6	36 54.3	1.0 03	173.0	37 24.3	1.0 03	173.0	37 54.3	1.0 03	173.0	38 24.3	1.0 03	173.0	6
7	36 52.3	1.0 04	171.9	37 22.3	1.0 04	171.9	37 52.3	1.0 04	171.8	38 22.2	1.0 04	171.8	7
8	36 50.0	1.0 04	170.7	37 19.9	1.0 04	170.7	37 49.9	1.0 04	170.7	38 19.9	1.0 04	170.6	8
9	36 47.3	1.0 05	169.6	37 17.3	1.0 05	169.5	37 47.2	1.0 05	169.5	38 17.2	1.0 05	169.5	9
10	36 44.3	1.0 05	168.4	37 14.3	1.0 05	168.4	37 44.2	1.0 05	168.3	38 14.2	1.0 06	168.3	10
1	36 41.1	1.0 06	167.3	37 11.0	1.0 06	167.2	37 40.9	1.0 06	167.2	38 10.9	1.0 06	167.1	1
2	36 37.5	1.0 06	166.1	37 07.4	1.0 06	166.1	37 37.3	1.0 07	166.0	38 07.3	1.0 07	166.0	2
3	36 33.6	1.0 07	165.0	37 03.5	1.0 07	164.9	37 33.4	1.0 07	164.9	38 03.4	1.0 07	164.8	3
4	36 29.4	1.0 07	163.8	36 59.3	1.0 08	163.8	37 29.2	1.0 08	163.7	37 59.1	1.0 08	163.7	4
15	36 24.9	1.0 08	162.7	36 54.8	1.0 08	162.6	37 24.7	1.0 08	162.5	37 54.6	1.0 08	162.5	15
6	36 20.2	1.0 08	161.5	36 50.0	1.0 08	161.4	37 19.9	1.0 08	161.4	37 49.8	1.0 08	161.3	6
7	36 15.1	1.0 09	160.4	36 45.0	1.0 09	160.3	37 14.8	1.0 09	160.2	37 44.7	1.0 09	160.2	7
8	36 09.7	1.0 09	159.2	36 39.6	1.0 09	159.2	37 09.4	99 09	159.1	37 39.3	99 10	159.0	8
9	36 04.1	99 10	158.1	36 33.9	99 10	158.0	37 03.7	99 10	157.9	37 33.6	99 10	157.9	9
20	35 58.1	99 10	156.9	36 27.9	99 10	156.9	36 57.8	99 10	156.8	37 27.6	99 10	156.7	20
1	35 51.9	99 11	155.8	36 21.7	99 11	155.7	36 51.5	99 11	155.7	37 21.3	99 11	155.6	1
2	35 45.4	99 11	154.7	36 15.2	99 11	154.6	36 45.0	99 11	154.5	37 14.7	99 11	154.4	2
3	35 38.6	99 12	153.5	36 08.4	99 12	153.4	36 38.1	99 12	153.4	37 07.9	99 12	153.3	3
4	35 31.5	99 12	152.4	36 01.3	99 12	152.3	36 31.0	99 12	152.2	37 00.8	99 12	152.2	4
25	35 24.2	99 13	151.3	35 53.9	99 13	151.2	36 23.7	99 13	151.1	36 53.4	99 13	151.0	25
6	35 16.6	99 13	150.1	35 46.3	99 13	150.1	36 16.0	99 13	150.0	36 45.7	99 13	149.9	6
7	35 08.7	99 14	149.0	35 38.4	99 14	148.9	36 08.1	99 14	148.8	36 37.8	99 14	148.7	7
8	35 00.6	99 14	147.9	35 30.3	99 14	147.8	36 00.0	99 14	147.7	36 29.6	99 14	147.6	8
9	34 52.2	99 14	146.8	35 21.9	99 14	146.7	35 51.5	99 14	146.6	36 21.2	99 14	146.5	9
30	34 43.6	99 15	145.7	35 13.2	99 15	145.6	35 42.9	99 15	145.5	36 12.5	99 15	145.4	30
1	34 34.7	99 15	144.6	35 04.3	99 15	144.5	35 33.9	99 15	144.4	36 03.5	99 15	144.2	1
2	34 25.6	99 16	143.4	34 55.2	99 16	143.3	35 24.8	99 16	143.2	35 54.3	99 16	143.1	2
3	34 16.2	99 16	142.3	34 45.8	99 16	142.2	35 15.3	98 16	142.1	35 44.9	98 16	142.0	3
4	34 06.6	98 16	141.2	34 36.2	98 16	141.1	35 05.7	98 16	141.0	35 35.2	98 17	140.9	4
35	33 56.8	98 17	140.1	34 26.3	98 17	140.0	34 55.8	98 17	139.9	35 25.3	98 17	139.8	35
6	33 46.7	98 17	139.0	34 16.2	98 17	138.9	34 45.7	98 17	138.8	35 15.2	98 17	138.7	6
7	33 36.4	98 18	137.9	34 05.9	98 18	137.8	34 35.3	98 18	137.7	35 04.8	98 18	137.6	7
8	33 25.9	98 18	136.8	33 55.4	98 18	136.7	34 24.8	98 18	136.6	34 54.2	98 18	136.5	8
9	33 15.2	98 18	135.8	33 44.6	98 18	135.6	34 14.0	98 18	135.5	34 43.4	98 18	135.4	9
40	33 04.2	98 19	134.7	33 33.6	98 19	134.5	34 03.0	98 19	134.4	34 32.4	98 19	134.3	40
1	32 53.1	98 19	133.6	33 22.5	98 19	133.5	33 51.8	98 19	133.3	34 21.2	98 19	133.2	1
2	32 41.7	98 19	132.5	33 11.1	98 19	132.4	33 40.4	98 19	132.3	34 09.8	98 19	132.1	2
3	32 30.2	98 20	131.4	32 59.5	98 20	131.3	33 28.8	98 20	131.2	33 58.2	98 20	131.0	3
4	32 18.5	98 20	130.4	32 47.8	98 20	130.2	33 17.1	98 20	130.1	33 46.4	98 20	130.0	4
45	32 06.5	98 20	129.3	32 35.8	98 20	129.2	33 05.1	98 20	129.0	33 34.4	98 20	128.9	45
6	31 54.4	98 20	128.2	32 23.7	98 21	128.1	32 52.9	98 21	128.0	33 22.2	97 21	127.8	6
7	31 42.1	97 21	127.2	32 11.4	97 21	127.0	32 40.6	97 21	126.9	33 09.8	97 21	126.8	7
8	31 29.7	97 21	126.1	31 58.9	97 21	126.0	32 28.1	97 21	125.8	32 57.3	97 21	125.7	8
9	31 17.0	97 21	125.0	31 46.2	97 21	124.9	32 15.4	97 21	124.8	32 44.6	97 21	124.6	9
50	31 04.2	97 22	124.0	31 33.4	97 22	123.8	32 02.6	97 22	123.7	32 31.8	97 22	123.6	50
1	30 51.3	97 22	122.9	31 20.4	97 22	122.8	31 49.6	97 22	122.7	32 18.7	97 22	122.5	1
2	30 38.2	97 22	121.9	31 07.3	97 22	121.7	31 36.4	97 22	121.6	32 05.6	97 22	121.5	2
3	30 24.9	97 22	120.8	30 54.0	97 22	120.7	31 23.1	97 22	120.6	31 52.2	97 22	120.4	3
4	30 11.5	97 23	119.8	30 40.6	97 23	119.7	31 09.7	97 23	119.5	31 38.8	97 23	119.4	4
55	29 58.0	97 23	118.8	30 27.0	97 23	118.6	30 56.1	97 23	118.5	31 25.2	97 23	118.3	55
6	29 44.3	97 23	117.7	30 13.3	97 23	117.6	30 42.4	97 23	117.4	31 11.4	97 23	117.3	6
7	29 30.5	97 23	116.7	29 59.5	97 23	116.5	30 28.5	97 23	116.4	30 57.6	97 23	116.2	7
8	29 16.5	97 23	115.7	29 45.6	97 23	115.5	30 14.6	97 24	115.4	30 43.6	97 24	115.2	8
9	29 02.5	97 24	114.6	29 31.5	97 24	114.5	30 00.5	97 24	114.3	30 29.5	97 24	114.2	9
60	28 48.3	97 24	113.6	29 17.3	97 24	113.5	29 46.3	97 24	113.3	30 15.3	97 24	113.2	60
1	28 34.0	97 24	112.6	29 03.0	97 24	112.4	29 32.0	97 24	112.3	30 00.9	97 24	112.1	1
2	28 19.6	97 24	111.6	28 48.6	97 24	111.4	29 17.5	97 24	111.3	29 46.5	96 24	111.1	2
3	28 05.1	97 24	110.5	28 34.1	96 24	110.4	29 03.0	96 24	110.2	29 32.0	96 24	110.1	3
4	27 50.5	96 24	109.5	28 19.5	96 24	109.4	28 48.4	96 24	109.2	29 17.3	96 25	109.1	4
65	27 35.9	96 25	108.5	28 04.8	96 25	108.4	28 33.7	96 25	108.2	29 02.6	96 25	108.1	65
6	27 21.1	96 25	107.5	27 50.0	96 25	107.4	28 18.9	96 25	107.2	28 47.8	96 25	107.1	6
7	27 06.2	96 25	106.5	27 35.1	96 25	106.4	28 04.0	96 25	106.2	28 32.9	96 25	106.1	7
8	26 51.3	96 25	105.5	27 20.2	96 25	105.4	27 49.1	96 25	105.2	28 18.0	96 25	105.1	8
9	26 36.3	96 25	104.5	27 05.2	96 25	104.4	27 34.1	96 25	104.2	28 02.9	96 25	104.1	9
70	26 21.2	96 25	103.5	26 50.1	96 25	103.4	27 19.0	96 25	103.2	27 47.8	96 25	103.1	70
1	26 06.1	96 25	102.5	26 35.0	96 25	102.4	27 03.8	96 25	102.2	27 32.7	96 25	102.1	1
2	25 50.9	96 25	101.5	26 19.8	96 25	101.4	26 48.6	96 25	101.2	27 17.5	96 25	101.1	2
3	25 35.7	96 25	100.5	26 04.5	96 26	100.4	26 33.4	96 26	100.2	27 02.2	96 26	100.1	3
4	25 20.4	96 26	99.5	25 49.2	96 26	99.4	26 18.1	96 26	99.2	26 46.9	96 26	99.1	4
75	25 05.1	96 26	98.6	25 33.9	96 26	98.4	26 02.7	96 26	98.3	26 31.5	96 26	98.1	75
6	24 49.7	96 26	97.6	25 18.5	96 26	97.4	25 47.3	96 26	97.3	26 16.1	96 26	97.1	6
7	24 34.3	96 26	96.6	25 03.1	96 26	96.4	25 31.9	96 26	96.3	26 00.7	96 26	96.1	7
8	24 18.8	96 26	95.6	24 47.6	96 26	95.5	25 16.5	96 26	95.3	25 45.2	96 26	95.2	8
9	24 03.4	96 26	94.6	24 32.2	96 26	94.5	25 01.0	96 26	94.3	25 29.8	96 26	94.2	9
80	23 47.9	96 26	93.7	24 16.7	96 26	93.5	24 45.5	96 26	93.4	25 14.3	96 26	93.2	80
1	23 32.4	96 26	92.7	24 01.2	96 26	92.5	24 30.0	96 26	92.4	24 58.8	96 26	92.2	1
2	23 16.9	96 26	91.7	23 45.7	96 26	91.6	24 14.5	96 26	91.4	24 43.2	96 26	91.3	2
3	23 01.3	96 26	90.8	23 30.1	96 26	90.6	23 58.9	96 26	90.5	24 27.7	96 26	90.3	3
4	22 45.8	96 26	89.8	23 14.6	96 26	89.6	23 43.4	96 26	89.5	24 12.2	96 26	89.3	4
85	22 30.3	96 26	88.8	22 59.1	96 26	88.7	23 27.9	96 26	88.5	23 56.7	96 26	88.4	85
6	22 14.8	96 26	87.9	22 43.6	96 26	87.7	23 12.4	96 26	87.6	23 41.1	96 26	87.4	6
7	21 59.2	96 26	86.9	22 28.0	96 26	86.8	22 56.8	96 26	86.6	23 25.6	96 26	86.4	7
8	21 43.7	96 26	85.9	22 12.6	96 26	85.8	22 41.4	96 26	85.6	23 10.1	96 26	85.5	8
9	21 28.3	96 26	85.0	21 57.1	96 26	84.8	22 25.9	96 26	84.7	22 54.7	96 26	84.5	9
90	21 12.8	96 26	84.0	21 41.6	96 26	83.9	22 10.4	96 26	83.7	22 39.2	96 26	83.6	90

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	19 02.0	96 26	83.7	19 30.9	96 26	83.5	19 59.7	96 26	83.4	20 28.5	96 26	83.2
2	18 46.6	96 26	82.7	19 15.4	96 26	82.6	19 44.3	96 26	82.4	20 13.1	96 26	82.3
3	18 31.2	96 26	81.8	19 00.1	96 26	81.6	19 28.9	96 26	81.5	19 57.8	96 26	81.3
4	18 15.9	96 26	80.8	18 44.7	96 26	80.7	19 13.6	96 26	80.5	19 42.4	96 25	80.4
95	18 00.5	96 25	79.8	18 29.4	96 25	79.7	18 58.3	96 25	79.6	19 27.1	96 25	79.4
6	17 45.3	96 25	78.9	18 14.2	96 25	78.8	18 43.0	96 25	78.6	19 11.9	96 25	78.5
7	17 30.1	96 25	77.9	17 59.0	96 25	77.8	18 27.8	96 25	77.7	18 56.7	96 25	77.5
8	17 14.9	96 25	77.0	17 43.8	96 25	76.9	18 12.7	96 25	76.7	18 41.6	96 25	76.6
9	16 59.8	96 25	76.1	17 28.7	96 25	75.9	17 57.6	96 25	75.8	18 26.5	96 25	75.6
100	16 44.8	96 25	75.1	17 13.7	96 25	75.0	17 42.6	96 25	74.8	18 11.5	96 25	74.7
1	16 29.8	96 25	74.2	16 58.7	96 25	74.0	17 27.6	96 25	73.9	17 56.6	96 25	73.7
2	16 14.9	96 25	73.2	16 43.8	96 25	73.1	17 12.8	96 25	72.9	17 41.7	96 25	72.8
3	16 00.1	96 25	72.3	16 29.0	96 25	72.1	16 58.0	96 25	72.0	17 26.9	96 25	71.9
4	15 45.3	97 24	71.3	16 14.3	97 24	71.2	16 43.2	97 24	71.1	17 12.2	96 24	70.9
105	15 30.6	97 24	70.4	15 59.6	97 24	70.3	16 28.6	97 24	70.1	16 57.5	97 24	70.0
6	15 16.1	97 24	69.4	15 45.0	97 24	69.3	16 14.0	97 24	69.2	16 43.0	97 24	69.0
7	15 01.6	97 24	68.5	15 30.6	97 24	68.4	15 59.6	97 24	68.2	16 28.5	97 24	68.1
8	14 47.2	97 24	67.6	15 16.2	97 24	67.4	15 45.2	97 24	67.3	16 14.2	97 24	67.2
9	14 32.9	97 24	66.6	15 01.9	97 24	66.5	15 30.9	97 24	66.4	15 59.9	97 24	66.2
110	14 18.7	97 24	65.7	14 47.7	97 23	65.6	15 16.7	97 23	65.4	15 45.8	97 23	65.3
1	14 04.6	97 23	64.7	14 33.6	97 23	64.6	15 02.7	97 23	64.5	15 31.7	97 23	64.4
2	13 50.6	97 23	63.8	14 19.6	97 23	63.7	14 48.7	97 23	63.6	15 17.8	97 23	63.4
3	13 36.7	97 23	62.9	14 05.8	97 23	62.7	14 34.8	97 23	62.6	15 03.9	97 23	62.5
4	13 22.9	97 23	61.9	13 52.0	97 23	61.8	14 21.1	97 23	61.7	14 50.2	97 23	61.6
115	13 09.3	97 23	61.0	13 38.4	97 22	60.9	14 07.5	97 22	60.8	14 36.6	97 22	60.6
6	12 55.8	97 22	60.1	13 24.9	97 22	59.9	13 54.0	97 22	59.8	14 23.1	97 22	59.7
7	12 42.4	97 22	59.1	13 11.5	97 22	59.0	13 40.7	97 22	58.9	14 09.8	97 22	58.8
8	12 29.1	97 22	58.2	12 58.3	97 22	58.1	13 27.4	97 22	57.9	13 56.6	97 22	57.8
9	12 16.0	97 22	57.3	12 45.2	97 22	57.1	13 14.3	97 22	57.0	13 43.5	97 22	56.9
120	12 03.0	97 21	56.3	12 32.2	97 21	56.2	13 01.4	97 21	56.1	13 30.6	97 21	56.0
1	11 50.1	97 21	55.4	12 19.4	97 21	55.3	12 48.6	97 21	55.2	13 17.8	97 21	55.0
2	11 37.4	97 21	54.4	12 06.7	97 21	54.3	12 35.9	97 21	54.2	13 05.1	97 21	54.1
3	11 24.9	98 21	53.5	11 54.1	98 21	53.4	12 23.4	97 21	53.3	12 52.6	97 21	53.2
4	11 12.5	98 20	52.6	11 41.7	98 20	52.5	12 11.0	98 20	52.4	12 40.3	98 20	52.2
125	11 00.2	98 20	51.6	11 29.5	98 20	51.5	11 58.8	98 20	51.4	12 28.1	98 20	51.3
6	10 48.1	98 20	50.7	11 17.4	98 20	50.6	11 46.7	98 20	50.5	12 16.0	98 20	50.4
7	10 36.2	98 20	49.8	11 05.5	98 20	49.7	11 34.8	98 20	49.6	12 04.1	98 20	49.5
8	10 24.4	98 19	48.8	10 53.7	98 19	48.7	11 23.1	98 19	48.6	11 52.4	98 19	48.5
9	10 12.8	98 19	47.9	10 42.1	98 19	47.8	11 11.5	98 19	47.7	11 40.9	98 19	47.6
130	10 01.3	98 19	47.0	10 30.7	98 19	46.9	11 00.1	98 19	46.8	11 29.5	98 19	46.7
1	9 50.1	98 18	46.0	10 19.5	98 18	45.9	10 48.9	98 18	45.8	11 18.3	98 18	45.7
2	9 39.0	98 18	45.1	10 08.4	98 18	45.0	10 37.8	98 18	44.9	11 07.3	98 18	44.8
3	9 28.1	98 18	44.2	9 57.5	98 18	44.1	10 27.0	98 18	44.0	10 56.4	98 18	43.9
4	9 17.4	98 18	43.2	9 46.8	98 18	43.1	10 16.3	98 18	43.0	10 45.7	98 17	42.9
135	9 06.8	98 17	42.3	9 36.3	98 17	42.2	10 05.8	98 17	42.1	10 35.2	98 17	42.0
6	8 56.5	98 17	41.4	9 26.0	98 17	41.3	9 55.4	98 17	41.2	10 24.9	98 17	41.1
7	8 46.3	98 17	40.4	9 15.8	98 17	40.3	9 45.3	98 17	40.2	10 14.8	98 17	40.2
8	8 36.3	98 16	39.5	9 05.8	98 16	39.4	9 35.4	98 16	39.3	10 04.9	98 16	39.2
9	8 26.5	99 16	38.6	8 56.1	99 16	38.5	9 25.6	98 16	38.4	9 55.2	99 16	38.3
140	8 17.0	99 16	37.6	8 46.5	99 16	37.5	9 16.1	99 16	37.4	9 45.7	99 16	37.4
1	8 07.6	99 15	36.7	8 37.2	99 15	36.6	9 06.8	99 15	36.5	9 36.3	99 15	36.4
2	7 58.4	99 15	35.7	8 28.0	99 15	35.7	8 57.6	99 15	35.6	9 27.2	99 15	35.5
3	7 49.4	99 15	34.8	8 19.1	99 15	34.7	8 48.7	99 15	34.6	9 18.3	99 15	34.6
4	7 40.7	99 14	33.9	8 10.3	99 14	33.8	8 40.0	99 14	33.7	9 09.6	99 14	33.6
145	7 32.1	99 14	32.9	8 01.8	99 14	32.9	8 31.4	99 14	32.8	9 01.1	99 14	32.7
6	7 23.8	99 14	32.0	7 53.5	99 14	31.9	8 23.1	99 13	31.8	8 52.8	99 13	31.8
7	7 15.7	99 13	31.1	7 45.4	99 13	31.0	8 15.1	99 13	30.9	8 44.8	99 13	30.8
8	7 07.8	99 13	30.1	7 37.5	99 13	30.1	8 07.2	99 13	30.0	8 36.9	99 13	29.9
9	7 00.1	99 12	29.2	7 29.8	99 12	29.1	7 59.5	99 12	29.0	8 29.3	99 12	29.0
150	6 52.6	99 12	28.2	7 22.4	99 12	28.2	7 52.1	99 12	28.1	8 21.9	99 12	28.0
1	6 45.4	99 12	27.3	7 15.1	99 12	27.2	7 44.9	99 12	27.2	8 14.7	99 12	27.1
2	6 38.4	99 11	26.4	7 08.2	99 11	26.3	7 37.9	99 11	26.2	8 07.7	99 11	26.2
3	6 31.6	99 11	25.4	7 01.4	99 11	25.4	7 31.2	99 11	25.3	8 01.0	99 11	25.2
4	6 25.0	99 11	24.5	6 54.8	99 11	24.4	7 24.6	99 10	24.4	7 54.5	99 10	24.3
155	6 18.7	99 10	23.6	6 48.5	99 10	23.5	7 18.4	99 10	23.4	7 48.2	99 10	23.4
6	6 12.6	99 10	22.6	6 42.5	99 10	22.6	7 12.3	99 10	22.5	7 42.1	99 10	22.5
7	6 06.8	99 09	21.7	6 36.6	99 09	21.6	7 06.5	99 09	21.6	7 36.3	99 09	21.5
8	6 01.2	1.0 09	20.7	6 31.0	1.0 09	20.7	7 00.9	1.0 09	20.6	7 30.7	1.0 09	20.6
9	5 55.8	1.0 09	19.8	6 25.7	1.0 09	19.7	6 55.5	1.0 09	19.7	7 25.4	1.0 08	19.6
160	5 50.6	1.0 08	18.8	6 20.5	1.0 08	18.8	6 50.4	1.0 08	18.8	7 20.3	1.0 08	18.7
1	5 45.8	1.0 08	17.9	6 15.6	1.0 08	17.9	6 45.5	1.0 08	17.8	7 15.4	1.0 08	17.8
2	5 41.1	1.0 07	17.0	6 11.0	1.0 07	16.9	6 40.9	1.0 07	16.9	7 10.8	1.0 07	16.8
3	5 36.7	1.0 07	16.0	6 06.6	1.0 07	16.0	6 36.5	1.0 07	15.9	7 06.4	1.0 07	15.9
4	5 32.5	1.0 07	15.1	6 02.4	1.0 07	15.0	6 32.4	1.0 06	15.0	7 02.3	1.0 06	15.0
165	5 28.6	1.0 06	14.1	5 58.5	1.0 06	14.1	6 28.5	1.0 06	14.1	6 58.4	1.0 06	14.0
6	5 24.9	1.0 06	13.2	5 54.9	1.0 06	13.2	6 24.8	1.0 06	13.1	6 54.8	1.0 06	13.1
7	5 21.5	1.0 05	12.3	5 51.5	1.0 05	12.2	6 21.4	1.0 05	12.2	6 51.4	1.0 05	12.2
8	5 18.3	1.0 05	11.3	5 48.3	1.0 05	11.3	6 18.3	1.0 05	11.3	6 48.2	1.0 05	11.2
9	5 15.4	1.0 04	10.4	5 45.4	1.0 04	10.3	6 15.3	1.0 04	10.3	6 45.3	1.0 04	10.3
170	5 12.8	1.0 04	09.4	5 42.7	1.0 04	09.4	6 12.7	1.0 04	09.4	6 42.7	1.0 04	09.4
1	5 10.3	1.0 04	08.5	5 40.3	1.0 04	08.5	6 10.3	1.0 04	08.4	6 40.3	1.0 04	08.4
2	5 08.2	1.0 03	07.5	5 38.1	1.0 03	07.5	6 08.1	1.0 03	07.5	6 38.1	1.0 03	07.5
3	5 06.3	1.0 03	06.6	5 36.2	1.0 03	06.6	6 06.2	1.0 03	06.6	6 36.2	1.0 03	06.6
4	5 04.6	1.0 02	05.7	5 34.6	1.0 02	05.6	6 04.6	1.0 02	05.6	6 34.6	1.0 02	05.6
175	5 03.2	1.0 02	04.7	5 33.2	1.0 02	04.7	6 03.2	1.0 02	04.7	6 33.2	1.0 02	04.7
6	5 02.0	1.0 02	03.8	5 32.0	1.0 01	03.8	6 02.0	1.0 01	03.8	6 32.0	1.0 01	03.7
7	5 01.2	1.0 01	02.8	5 31.1	1.0 01	02.8	6 01.1	1.0 01	02.8	6 31.1	1.0 01	02.8
8	5 00.5	1.0 01	01.9	5 30.5	1.0 01	01.9	6 00.5	1.0 01	01.9	6 30.5	1.0 01	01.9
9	5 00.1	1.0 00	00.9	5 30.1	1.0 00	00.9	6 00.1	1.0 00	00.9	6 30.1	1.0 00	00.9
180	5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0

22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
20 57.4	96 26	83.1	21 26.2	96 26	82.9	21 55.0	96 26	82.8	22 23.8	96 26	82.6	91
20 42.0	96 26	82.1	21 10.8	96 26	82.0	21 39.6	96 26	81.8	22 08.4	96 26	81.7	2
20 26.6	96 26	81.2	20 55.4	96 26	81.0	21 24.3	96 26	80.9	21 53.1	96 26	80.7	3
20 11.3	96 25	80.2	20 40.1	96 25	80.1	21 09.0	96 25	79.9	21 37.8	96 25	79.8	4
19 56.0	96 25	79.3	20 24.8	96 25	79.1	20 53.7	96 25	79.0	21 22.5	96 25	78.8	95
19 40.8	96 25	78.3	20 09.6	96 25	78.2	20 38.5	96 25	78.0	21 07.3	96 25	77.9	6
19 25.6	96 25	77.4	19 54.5	96 25	77.2	20 23.3	96 25	77.1	20 52.2	96 25	76.9	7
19 10.5	96 25	76.4	19 39.3	96 25	76.3	20 08.2	96 25	76.1	20 37.1	96 25	76.0	8
18 55.4	96 25	75.5	19 24.3	96 25	75.3	19 53.2	96 25	75.2	20 22.0	96 25	75.1	9
18 40.4	96 25	74.5	19 09.3	96 25	74.4	19 38.2	96 25	74.3	20 07.0	96 25	74.1	100
18 25.5	96 25	73.6	18 54.4	96 25	73.5	19 23.3	96 25	73.3	19 52.1	96 25	73.2	1
18 10.6	96 25	72.7	18 39.5	96 25	72.5	19 08.4	96 25	72.4	19 37.3	96 25	72.2	2
17 55.8	96 24	71.7	18 24.7	96 24	71.6	18 53.7	96 24	71.4	19 22.6	96 24	71.3	3
17 41.1	96 24	70.8	18 10.0	96 24	70.6	18 39.0	96 24	70.5	19 07.9	96 24	70.4	4
17 26.5	97 24	69.8	17 55.4	96 24	69.7	18 24.4	96 24	69.6	18 53.3	96 24	69.4	105
17 12.0	97 24	68.9	17 40.9	97 24	68.8	18 09.9	97 24	68.6	18 38.8	96 24	68.5	6
16 57.5	97 24	68.0	17 26.5	97 24	67.8	17 55.5	97 24	67.7	18 24.4	97 24	67.6	7
16 43.2	97 24	67.0	17 12.2	97 24	66.9	17 41.1	97 24	66.8	18 10.1	97 24	66.6	8
16 28.9	97 24	66.1	16 57.9	97 24	66.0	17 26.9	97 24	65.8	17 55.9	97 24	65.7	9
16 14.8	97 23	65.2	16 43.8	97 23	65.0	17 12.8	97 23	64.9	17 41.8	97 23	64.8	110
16 00.7	97 23	64.2	16 29.8	97 23	64.1	16 58.8	97 23	64.0	17 27.8	97 23	63.8	1
15 46.8	97 23	63.3	16 15.9	97 23	63.2	16 44.9	97 23	63.0	17 13.9	97 23	62.9	2
15 33.0	97 23	62.4	16 02.1	97 23	62.2	16 31.1	97 23	62.1	17 00.2	97 23	62.0	3
15 19.3	97 23	61.4	15 48.4	97 23	61.3	16 17.5	97 23	61.2	16 46.5	97 23	61.0	4
15 05.7	97 22	60.5	15 34.8	97 22	60.4	16 03.9	97 22	60.2	16 33.0	97 22	60.1	115
14 52.3	97 22	59.6	15 21.4	97 22	59.4	15 50.5	97 22	59.3	16 19.6	97 22	59.2	6
14 38.9	97 22	58.6	15 08.1	97 22	58.5	15 37.2	97 22	58.4	16 06.3	97 22	58.3	7
14 25.7	97 22	57.7	14 54.9	97 22	57.6	15 24.0	97 22	57.5	15 53.2	97 22	57.3	8
14 12.7	97 22	56.8	14 41.9	97 22	56.7	15 11.0	97 21	56.5	15 40.2	97 22	56.4	9
13 59.8	97 21	55.8	14 29.0	97 21	55.7	14 58.1	97 21	55.6	15 27.3	97 21	55.5	120
13 47.0	97 21	54.9	14 16.2	97 21	54.8	14 45.4	97 21	54.7	15 14.6	97 21	54.6	1
13 34.4	97 21	54.0	14 03.6	97 21	53.9	14 32.8	97 21	53.8	15 02.0	97 21	53.6	2
13 21.9	97 21	53.1	13 51.1	97 21	52.9	14 20.3	97 20	52.8	14 49.6	97 20	52.7	3
13 09.5	98 20	52.1	13 38.8	98 20	52.0	14 08.0	98 20	51.9	14 37.3	98 20	51.8	4
12 57.3	98 20	51.2	13 26.6	98 20	51.1	13 55.9	98 20	51.0	14 25.2	98 20	50.9	125
12 45.3	98 20	50.3	13 14.6	98 20	50.2	13 43.9	98 20	50.1	14 13.2	98 20	49.9	6
12 33.5	98 20	49.3	13 02.8	98 19	49.2	13 32.1	98 19	49.1	14 01.4	98 19	49.0	7
12 21.8	98 19	48.4	12 51.1	98 19	48.3	13 20.4	98 19	48.2	13 49.8	98 19	48.1	8
12 10.2	98 19	47.5	12 39.6	98 19	47.4	13 08.9	98 19	47.3	13 38.3	98 19	47.2	9
11 58.9	98 19	46.6	12 28.2	98 19	46.5	12 57.6	98 19	46.4	13 27.0	98 19	46.2	130
11 47.7	98 18	45.6	12 17.1	98 18	45.5	12 46.5	98 18	45.4	13 15.9	98 18	45.3	1
11 36.7	98 18	44.7	12 06.1	98 18	44.6	12 35.5	98 18	44.5	13 04.9	98 18	44.4	2
11 25.8	98 18	43.8	11 55.3	98 18	43.7	12 24.7	98 18	43.6	12 54.1	98 18	43.5	3
11 15.2	98 17	42.8	11 44.6	98 17	42.7	12 14.1	98 17	42.7	12 43.5	98 17	42.6	4
11 04.7	98 17	41.9	11 34.2	98 17	41.8	12 03.7	98 17	41.7	12 33.1	98 17	41.6	135
10 54.4	98 17	41.0	11 23.9	98 17	40.9	11 53.4	98 17	40.8	12 22.9	98 17	40.7	6
10 44.3	98 16	40.1	11 13.9	98 16	40.0	11 43.4	98 16	39.9	12 12.9	98 16	39.8	7
10 34.4	98 16	39.1	11 04.0	98 16	39.0	11 33.5	98 16	39.0	12 03.0	98 16	38.9	8
10 24.7	98 16	38.2	10 54.3	98 16	38.1	11 23.8	98 16	38.0	11 53.4	98 16	37.9	9
10 15.2	99 16	37.3	10 44.8	99 15	37.2	11 14.4	99 15	37.1	11 43.9	99 15	37.0	140
10 05.9	99 15	36.3	10 35.5	99 15	36.3	11 05.1	99 15	36.2	11 34.7	99 15	36.1	1
9 56.8	99 15	35.4	10 26.4	99 15	35.3	10 56.0	99 15	35.3	11 25.6	99 15	35.2	2
9 47.9	99 14	34.5	10 17.6	99 14	34.4	10 47.2	99 14	34.3	11 16.8	99 14	34.2	3
9 39.2	99 14	33.6	10 08.9	99 14	33.5	10 38.5	99 14	33.4	11 08.2	99 14	33.3	4
9 30.8	99 14	32.6	10 00.4	99 14	32.6	10 30.1	99 14	32.5	10 59.7	99 14	32.4	145
9 22.5	99 13	31.7	9 52.2	99 13	31.6	10 21.9	99 13	31.6	10 51.5	99 13	31.5	6
9 14.4	99 13	30.8	9 44.1	99 13	30.7	10 13.8	99 13	30.6	10 43.5	99 13	30.6	7
9 06.6	99 13	29.8	9 36.3	99 13	29.8	10 06.0	99 13	29.7	10 35.7	99 13	29.6	8
8 59.0	99 12	28.9	9 28.7	99 12	28.8	9 58.4	99 12	28.8	10 28.2	99 12	28.7	9
8 51.6	99 12	28.0	9 21.3	99 12	27.9	9 51.1	99 12	27.8	10 20.8	99 12	27.8	150
8 44.4	99 12	27.1	9 14.2	99 12	27.0	9 43.9	99 12	26.9	10 13.7	99 12	26.9	1
8 37.5	99 11	26.1	9 07.2	99 11	26.1	9 37.0	99 11	26.0	10 06.8	99 11	25.9	2
8 30.7	99 11	25.2	9 00.5	99 11	25.1	9 30.3	99 11	25.1	10 00.1	99 11	25.0	3
8 24.3	99 10	24.3	8 54.1	99 10	24.2	9 23.9	99 10	24.1	9 53.7	99 10	24.1	4
8 18.0	99 10	23.3	8 47.8	99 10	23.3	9 17.6	99 10	23.2	9 47.4	99 10	23.2	155
8 12.0	99 10	22.4	8 41.8	99 10	22.3	9 11.6	99 10	22.3	9 41.4	99 10	22.2	6
8 06.2	99 09	21.5	8 36.0	99 09	21.4	9 05.8	99 09	21.4	9 35.7	99 09	21.3	7
8 00.6	1.0 09	20.5	8 30.4	1.0 09	20.5	9 00.3	1.0 09	20.4	9 30.2	1.0 09	20.4	8
7 55.3	1.0 08	19.6	8 25.1	1.0 08	19.6	8 55.0	1.0 08	19.5	9 24.9	1.0 08	19.5	9
7 50.2	1.0 08	18.7	8 20.1	1.0 08	18.6	8 49.9	1.0 08	18.6	9 19.8	1.0 08	18.5	160
7 45.3	1.0 08	17.7	8 15.2	1.0 08	17.7	8 45.1	1.0 08	17.7	9 15.0	1.0 08	17.6	1
7 40.7	1.0 07	16.8	8 10.6	1.0 07	16.8	8 40.5	1.0 07	16.7	9 10.4	1.0 07	16.7	2
7 36.3	1.0 07	15.9	8 06.3	1.0 07	15.8	8 36.2	1.0 07	15.8	9 06.1	1.0 07	15.8	3
7 32.2	1.0 06	14.9	8 02.1	1.0 06	14.9	8 32.1	1.0 06	14.9	9 02.0	1.0 06	14.8	4
7 28.3	1.0 06	14.0	7 58.3	1.0 06	14.0	8 28.2	1.0 06	13.9	8 58.1	1.0 06	13.9	165
7 24.7	1.0 06	13.1	7 54.6	1.0 06	13.0	8 24.6	1.0 06	13.0	8 54.5	1.0 06	13.0	6
7 21.3	1.0 05	12.1	7 51.3	1.0 05	12.1	8 21.2	1.0 05	12.1	8 51.2	1.0 05	12.1	7
7 18.2	1.0 05	11.2	7 48.1	1.0 05	11.2	8 18.1	1.0 05	11.2	8 48.0	1.0 06	11.1	8
7 15.3	1.0 04	10.3	7 45.2	1.0 04	10.2	8 15.2	1.0 04	10.2	8 45.2	1.0 04	10.2	9
7 12.6	1.0 04	09.3	7 42.6	1.0 04	09.3	8 12.6	1.0 04	09.3	8 42.5	1.0 04	09.3	170
7 10.2	1.0 04	08.4	7 40.2	1.0 04	08.4	8 10.2	1.0 04	08.4	8 40.2	1.0 04	08.3	1
7 08.1	1.0 03	07.5	7 38.1	1.0 03	07.5	8 08.1	1.0 03	07.4	8 38.0	1.0 03	07.4	2
7 06.2	1.0 03	06.5	7 36.2	1.0 03	06.5	8 06.2	1.0 03	06.5	8 36.2	1.0 03	06.5	3
7 04.6	1.0 02	05.6	7 34.5	1.0 02	05.6	8 04.5	1.0 02	05.6	8 34.5	1.0 02	05.6	4
7 03.2	1.0 02	04.7	7 33.2	1.0 02	04.7	8 03.1	1.0 02	04.6	8 33.1	1.0 02	04.6	175
7 02.0	1.0 01	03.7	7 32.0	1.0 01	03.7	8 02.0	1.0 01	03.7	8 32.0	1.0 01	03.7	6
7 01.1	1.0 01	02.8	7 31.1	1.0 01	02.8	8 01.1	1.0 01	02.8	8 31.1	1.0 01	02.8	7
7 00.5	1.0 01	01.9	7 30.5	1.0 01	01.9	8 00.5	1.0 01	01.9	8 30.5	1.0 01	01.9	8
7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9
7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	180

H.A.	24° 00′ Alt.		Az.	24° 30′ Alt.		Az.	25° 00′ Alt.		Az.	25° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0
1	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8	39 59.8	1.0 01	178.8	40 29.8	1.0 01	178.8
2	38 59.4	1.0 01	177.6	39 29.4	1.0 01	177.6	39 59.4	1.0 01	177.6	40 29.4	1.0 01	177.6
3	38 58.6	1.0 02	176.5	39 28.6	1.0 02	176.5	39 58.6	1.0 02	176.5	40 28.6	1.0 02	176.4
4	38 57.5	1.0 02	175.3	39 27.4	1.0 02	175.3	39 57.4	1.0 02	175.3	40 27.4	1.0 02	175.3
05	38 56.0	1.0 03	174.1	39 26.0	1.0 03	174.1	39 56.0	1.0 03	174.1	40 26.0	1.0 03	174.1
6	38 54.3	1.0 03	173.0	39 24.3	1.0 03	172.9	39 54.2	1.0 03	172.9	40 24.2	1.0 03	172.9
7	38 52.2	1.0 04	171.8	39 22.2	1.0 04	171.8	39 52.2	1.0 04	171.7	40 22.1	1.0 04	171.7
8	38 49.8	1.0 04	170.6	39 19.8	1.0 04	170.6	39 49.8	1.0 04	170.5	40 19.7	1.0 05	170.5
9	38 47.1	1.0 05	169.4	39 17.1	1.0 05	169.4	39 47.1	1.0 05	169.4	40 17.0	1.0 05	169.3
10	38 44.1	1.0 06	168.3	39 14.1	1.0 06	168.2	39 44.0	1.0 06	168.2	40 14.0	1.0 06	168.2
1	38 40.8	1.0 06	167.1	39 10.8	1.0 06	167.1	39 40.7	1.0 06	167.0	40 10.6	1.0 06	167.0
2	38 37.2	1.0 07	165.9	39 07.1	1.0 07	165.9	39 37.1	1.0 07	165.8	40 07.0	1.0 07	165.8
3	38 33.3	1.0 07	164.8	39 03.2	1.0 07	164.7	39 33.1	1.0 07	164.7	40 03.0	1.0 07	164.6
4	38 29.0	1.0 08	163.6	38 58.9	1.0 08	163.5	39 28.8	1.0 08	163.5	39 58.7	1.0 08	163.4
15	38 24.5	1.0 08	162.4	38 54.4	1.0 08	162.4	39 24.3	1.0 08	162.3	39 54.2	1.0 08	162.3
6	38 19.7	1.0 09	161.3	38 49.5	1.0 09	161.2	39 19.4	1.0 09	161.2	39 49.3	1.0 09	161.1
7	38 14.5	1.0 09	160.1	38 44.4	1.0 09	160.1	39 14.3	1.0 09	160.0	39 44.1	1.0 09	159.9
8	38 09.1	99 10	159.0	38 39.0	99 10	158.9	39 08.8	99 10	158.8	39 38.6	99 10	158.8
9	38 03.4	99 10	157.8	38 33.2	99 10	157.7	39 03.0	99 10	157.7	39 32.9	99 10	157.6
20	37 57.4	99 10	156.7	38 27.2	99 10	156.6	38 57.0	99 11	156.5	39 26.8	99 11	156.4
1	37 51.1	99 11	155.5	38 20.9	99 11	155.4	38 50.7	99 11	155.4	39 20.4	99 11	155.3
2	37 44.5	99 11	154.4	38 14.3	99 11	154.3	38 44.0	99 12	154.2	39 13.8	99 12	154.1
3	37 37.6	99 12	153.2	38 07.4	99 12	153.1	38 37.1	99 12	153.0	39 06.9	99 12	153.0
4	37 30.5	99 12	152.1	38 00.2	99 12	152.0	38 30.0	99 12	151.9	38 59.7	99 12	151.8
25	37 23.1	99 13	150.9	37 52.8	99 13	150.8	38 22.5	99 13	150.8	38 52.2	99 13	150.7
6	37 15.4	99 13	149.8	37 45.1	99 13	149.7	38 14.8	99 13	149.6	38 44.5	99 13	149.5
7	37 07.5	99 14	148.7	37 37.1	99 14	148.6	38 06.8	99 14	148.5	38 36.5	99 14	148.4
8	36 59.3	99 14	147.5	37 28.9	99 14	147.4	37 58.6	99 14	147.3	38 28.2	99 14	147.2
9	36 50.8	99 15	146.4	37 20.4	99 15	146.3	37 50.0	99 15	146.2	38 19.7	99 15	146.1
30	36 42.1	99 15	145.3	37 11.7	99 15	145.2	37 41.3	99 15	145.1	38 10.9	99 15	145.0
1	36 33.1	99 15	144.1	37 02.7	99 15	144.0	37 32.3	99 15	143.9	38 01.8	99 15	143.8
2	36 23.9	99 16	143.0	36 53.4	99 16	142.9	37 23.0	98 16	142.8	37 52.5	98 16	142.7
3	36 14.4	98 16	141.9	36 44.0	98 16	141.8	37 13.5	98 16	141.7	37 43.0	98 16	141.6
4	36 04.7	98 17	140.8	36 34.2	98 17	140.7	37 03.7	98 17	140.6	37 33.2	98 17	140.5
35	35 54.8	98 17	139.7	36 24.3	98 17	139.6	36 53.8	98 17	139.5	37 23.2	98 17	139.3
6	35 44.6	98 17	138.6	36 14.1	98 17	138.5	36 43.6	98 17	138.3	37 13.0	98 17	138.2
7	35 34.2	98 18	137.5	36 03.7	98 18	137.4	36 33.1	98 18	137.2	37 02.6	98 18	137.1
8	35 23.6	98 18	136.4	35 53.1	98 18	136.3	36 22.5	98 18	136.1	36 51.9	98 18	136.0
9	35 12.8	98 18	135.3	35 42.2	98 18	135.2	36 11.6	98 18	135.0	36 41.0	98 18	134.9
40	35 01.8	98 19	134.2	35 31.2	98 19	134.1	36 00.5	98 19	133.9	36 29.9	98 19	133.8
1	34 50.6	98 19	133.1	35 19.9	98 19	133.0	35 49.2	98 19	132.8	36 18.6	98 19	132.7
2	34 39.1	98 19	132.0	35 08.4	98 19	131.9	35 37.8	98 19	131.7	36 07.1	98 20	131.6
3	34 27.5	98 20	130.9	34 56.8	98 20	130.8	35 26.1	98 20	130.7	35 55.4	98 20	130.5
4	34 15.6	98 20	129.8	34 44.9	98 20	129.7	35 14.2	98 20	129.6	35 43.5	98 20	129.4
45	34 03.6	98 20	128.8	34 32.9	98 20	128.6	35 02.1	97 20	128.5	35 31.4	97 20	128.4
6	33 51.4	97 21	127.7	34 20.7	97 21	127.6	34 49.9	97 21	127.4	35 19.1	97 21	127.3
7	33 39.1	97 21	126.6	34 08.3	97 21	126.5	34 37.5	97 21	126.3	35 06.7	97 21	126.2
8	33 26.5	97 21	125.6	33 55.7	97 21	125.4	34 24.9	97 21	125.3	34 54.0	97 21	125.1
9	33 13.8	97 21	124.5	33 43.0	97 22	124.3	34 12.1	97 22	124.2	34 41.3	97 22	124.1
50	33 00.9	97 22	123.4	33 30.1	97 22	123.3	33 59.2	97 22	123.1	34 28.3	97 22	123.0
1	32 47.9	97 22	122.4	33 17.0	97 22	122.2	33 46.1	97 22	122.1	34 15.2	97 22	121.9
2	32 34.7	97 22	121.3	33 03.8	97 22	121.2	33 32.9	97 22	121.0	34 02.0	97 22	120.9
3	32 21.3	97 22	120.3	32 50.4	97 22	120.1	33 19.5	97 23	120.0	33 48.6	97 23	119.8
4	32 07.9	97 23	119.2	32 36.9	97 23	119.1	33 06.0	97 23	118.9	33 35.0	97 23	118.8
55	31 54.2	97 23	118.2	32 23.3	97 23	118.0	32 52.3	97 23	117.9	33 21.3	97 23	117.7
6	31 40.5	97 23	117.1	32 09.5	97 23	117.0	32 38.5	97 23	116.8	33 07.5	97 23	116.7
7	31 26.6	97 23	116.1	31 55.6	97 23	115.9	32 24.6	97 23	115.8	32 53.6	97 23	115.6
8	31 12.6	97 24	115.1	31 41.6	97 24	114.9	32 10.6	97 24	114.8	32 39.5	97 24	114.6
9	30 58.5	97 24	114.0	31 27.4	97 24	113.9	31 56.4	97 24	113.7	32 25.3	96 24	113.6
60	30 44.2	97 24	113.0	31 13.2	97 24	112.9	31 42.1	96 24	112.7	32 11.1	96 24	112.5
1	30 29.9	96 24	112.0	30 58.8	96 24	111.8	31 27.7	96 24	111.7	31 56.7	96 24	111.5
2	30 15.4	96 24	111.0	30 44.4	96 24	110.8	31 13.3	96 24	110.7	31 42.2	96 24	110.5
3	30 00.9	96 24	109.9	30 29.8	96 24	109.8	30 58.7	96 24	109.6	31 27.6	96 24	109.5
4	29 46.2	96 25	108.9	30 15.1	96 25	108.8	30 44.0	96 25	108.6	31 12.9	96 25	108.5
65	29 31.5	96 25	107.9	30 00.4	96 25	107.8	30 29.3	96 25	107.6	30 58.1	96 25	107.4
6	29 16.7	96 25	106.9	29 45.6	96 25	106.7	30 14.4	96 25	106.6	30 43.3	96 25	106.4
7	29 01.8	96 25	105.9	29 30.6	96 25	105.7	29 59.5	96 25	105.6	30 28.3	96 25	105.4
8	28 46.8	96 25	104.9	29 15.7	96 25	104.7	29 44.5	96 25	104.6	30 13.3	96 25	104.4
9	28 31.8	96 25	103.9	29 00.6	96 25	103.7	29 29.4	96 25	103.6	29 58.2	96 25	103.4
70	28 16.7	96 25	102.9	28 45.5	96 25	102.7	29 14.3	96 25	102.6	29 43.1	96 25	102.4
1	28 01.5	96 25	101.9	28 30.3	96 25	101.7	28 59.1	96 25	101.6	29 27.9	96 25	101.4
2	27 46.3	96 25	100.9	28 15.1	96 25	100.7	28 43.9	96 25	100.6	29 12.7	96 26	100.4
3	27 31.0	96 26	99.9	27 59.8	96 26	99.8	28 28.6	96 26	99.6	28 57.4	96 26	99.4
4	27 15.7	96 26	98.9	27 44.5	96 26	98.8	28 13.3	96 26	98.6	28 42.0	96 26	98.4
75	27 00.3	96 26	97.9	27 29.1	96 26	97.8	27 57.9	96 26	97.6	28 26.7	96 26	97.5
6	26 44.9	96 26	97.0	27 13.7	96 26	96.8	27 42.5	96 26	96.6	28 11.2	96 26	96.5
7	26 29.5	96 26	96.0	26 58.3	96 26	95.8	27 27.0	96 26	95.7	27 55.8	96 26	95.5
8	26 14.0	96 26	95.0	26 42.8	96 26	94.8	27 11.6	96 26	94.7	27 40.3	96 26	94.5
9	25 58.6	96 26	94.0	26 27.3	96 26	93.9	26 56.1	96 26	93.7	27 24.8	96 26	93.5
80	25 43.1	96 26	93.1	26 11.8	96 26	92.9	26 40.6	96 26	92.7	27 09.3	96 26	92.6
1	25 27.5	96 26	92.1	25 56.3	96 26	91.9	26 25.1	96 26	91.8	26 53.8	96 26	91.6
2	25 12.0	96 26	91.1	25 40.8	96 26	91.0	26 09.5	96 26	90.8	26 38.3	96 26	90.6
3	24 56.5	96 26	90.1	25 25.3	96 26	90.0	25 54.0	96 26	89.8	26 22.8	96 26	89.7
4	24 41.0	96 26	89.2	25 09.7	96 26	89.0	25 38.5	96 26	88.9	26 07.2	96 26	88.7
85	24 25.4	96 26	88.2	24 54.2	96 26	88.1	25 23.0	96 26	87.9	25 51.7	96 26	87.7
6	24 09.9	96 26	87.3	24 38.7	96 26	87.1	25 07.4	96 26	86.9	25 36.2	96 26	86.8
7	23 54.4	96 26	86.3	24 23.2	96 26	86.1	24 51.9	96 26	86.0	25 20.7	96 26	85.8
8	23 38.9	96 26	85.3	24 07.7	96 26	85.2	24 36.5	96 26	85.0	25 05.2	96 26	84.9
9	23 23.5	96 26	84.4	23 52.2	96 26	84.2	24 21.0	96 26	84.1	24 49.8	96 26	83.9
90	23 08.0	96 26	83.4	23 36.8	96 26	83.3	24 05.6	96 26	83.1	24 34.3	96 26	83.0

26° 00′ Alt.		Az.	26° 30′ Alt.		Az.	27° 00′ Alt.		Az.	27° 30′ Alt.		Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
41 00.0	1.0 00	180.0	41 30.0	1.0 00	180.0	42 00.0	1.0 00	180.0	42 30.0	1.0 00	180.0	00
40 59.8	1.0 01	178.8	41 29.8	1.0 01	178.8	41 59.8	1.0 01	178.8	42 29.8	1.0 01	178.8	1
40 59.4	1.0 01	177.6	41 29.4	1.0 01	177.6	41 59.4	1.0 01	177.6	42 29.3	1.0 01	177.6	2
40 58.5	1.0 02	176.4	41 28.5	1.0 02	176.4	41 58.5	1.0 02	176.4	42 28.5	1.0 02	176.4	3
40 57.4	1.0 02	175.2	41 27.4	1.0 02	175.2	41 57.4	1.0 02	175.2	42 27.4	1.0 02	175.2	4
40 56.0	1.0 03	174.0	41 26.0	1.0 03	174.0	41 55.9	1.0 03	174.0	42 25.9	1.0 03	174.0	05
40 54.2	1.0 03	172.9	41 24.2	1.0 04	172.8	41 54.2	1.0 04	172.8	42 24.1	1.0 04	172.8	6
40 52.1	1.0 04	171.7	41 22.1	1.0 04	171.6	41 52.1	1.0 04	171.6	42 22.0	1.0 04	171.6	7
40 49.7	1.0 05	170.5	41 19.7	1.0 05	170.5	41 49.6	1.0 05	170.4	42 19.6	1.0 05	170.4	8
40 47.0	1.0 05	169.3	41 16.9	1.0 05	169.3	41 46.9	1.0 05	169.2	42 16.8	1.0 05	169.2	9
40 43.9	1.0 06	168.1	41 13.9	1.0 06	168.1	41 43.8	1.0 06	168.0	42 13.8	1.0 06	168.0	10
40 40.6	1.0 06	166.9	41 10.5	1.0 06	166.9	41 40.4	1.0 06	166.8	42 10.4	1.0 06	166.8	1
40 36.9	1.0 07	165.7	41 06.8	1.0 07	165.7	41 36.8	1.0 07	165.7	42 06.7	1.0 07	165.6	2
40 32.9	1.0 07	164.6	41 02.8	1.0 07	164.5	41 32.8	1.0 07	164.5	42 02.7	1.0 07	164.4	3
40 28.6	1.0 08	163.4	40 58.5	1.0 08	163.3	41 28.4	1.0 08	163.3	41 58.3	1.0 08	163.2	4
40 24.1	1.0 08	162.2	40 53.9	1.0 08	162.2	41 23.8	1.0 08	162.1	41 53.7	1.0 08	162.0	15
40 19.2	1.0 09	161.0	40 49.0	1.0 09	161.0	41 18.9	1.0 09	160.9	41 48.8	1.0 09	160.9	6
40 14.0	1.0 09	159.9	40 43.8	1.0 09	159.8	41 13.7	99 09	159.7	41 43.5	99 09	159.7	7
40 08.5	99 10	158.7	40 38.3	99 10	158.6	41 08.1	99 10	158.6	41 38.0	99 10	158.5	8
40 02.7	99 10	157.5	40 32.5	99 10	157.5	41 02.3	99 10	157.4	41 32.1	99 10	157.3	9
39 56.6	99 11	156.4	40 26.4	99 11	156.3	40 56.2	99 11	156.2	41 26.0	99 11	156.1	20
39 50.2	99 11	155.2	40 20.0	99 11	155.1	40 49.8	99 11	155.0	41 19.6	99 11	155.0	1
39 43.6	99 12	154.0	40 13.3	99 12	154.0	40 43.1	99 12	153.9	41 12.8	99 12	153.8	2
39 36.6	99 12	152.9	40 06.4	99 12	152.8	40 36.1	99 12	152.7	41 05.8	99 12	152.6	3
39 29.4	99 12	151.7	39 59.1	99 13	151.6	40 28.8	99 13	151.5	40 58.6	99 13	151.5	4
39 21.9	99 13	150.6	39 51.6	99 13	150.5	40 21.3	99 13	150.4	40 51.0	99 13	150.3	25
39 14.2	99 13	149.4	39 43.8	99 13	149.3	40 13.5	99 13	149.2	40 43.2	99 14	149.1	6
39 06.1	99 14	148.3	39 35.8	99 14	148.2	40 05.4	99 14	148.1	40 35.1	99 14	148.0	7
38 57.8	99 14	147.1	39 27.5	99 14	147.0	39 57.1	99 14	146.9	40 26.7	99 14	146.8	8
38 49.3	99 15	146.0	39 18.9	99 15	145.9	39 48.5	99 15	145.8	40 18.1	99 15	145.7	9
38 40.5	99 15	144.9	39 10.0	99 15	144.7	39 39.6	99 15	144.6	40 09.2	99 15	144.5	30
38 31.4	99 16	143.7	39 01.0	99 16	143.6	39 30.5	98 16	143.5	40 00.1	98 16	143.4	1
38 22.1	98 16	142.6	38 51.6	98 16	142.5	39 21.1	98 16	142.4	39 50.7	98 16	142.3	2
38 12.5	98 16	141.5	38 42.0	98 16	141.4	39 11.5	98 16	141.2	39 41.0	98 16	141.1	3
38 02.7	98 17	140.3	38 32.2	98 17	140.2	39 01.7	98 17	140.1	39 31.2	98 17	140.0	4
37 52.7	98 17	139.2	38 22.2	98 17	139.1	38 51.6	98 17	139.0	39 21.1	98 17	138.9	35
37 42.5	98 17	138.1	38 11.9	98 18	138.0	38 41.3	98 18	137.9	39 10.7	98 18	137.7	6
37 32.0	98 18	137.0	38 01.4	98 18	136.9	38 30.8	98 18	136.7	39 00.2	98 18	136.6	7
37 21.3	98 18	135.9	37 50.7	98 18	135.8	38 20.0	98 18	135.6	38 49.4	98 18	135.5	8
37 10.4	98 19	134.8	37 39.7	98 19	134.6	38 09.1	98 19	134.5	38 38.4	98 19	134.4	9
36 59.2	98 19	133.7	37 28.6	98 19	133.5	37 57.9	98 19	133.4	38 27.2	98 19	133.3	40
36 47.9	98 19	132.6	37 17.2	98 19	132.4	37 46.5	98 19	132.3	38 15.8	98 19	132.2	1
36 36.4	98 20	131.5	37 05.6	98 20	131.3	37 34.9	98 20	131.2	38 04.2	98 20	131.1	2
36 24.6	98 20	130.4	36 53.9	98 20	130.3	37 23.1	98 20	130.1	37 52.4	97 20	130.0	3
36 12.7	97 20	129.3	36 41.9	97 20	129.2	37 11.2	97 20	129.0	37 40.4	97 20	128.9	4
36 00.6	97 20	128.2	36 29.8	97 21	128.1	36 59.0	97 21	127.9	37 28.2	97 21	127.8	45
35 48.3	97 21	127.1	36 17.5	97 21	127.0	36 46.7	97 21	126.8	37 15.9	97 21	126.7	6
35 35.8	97 21	126.1	36 05.0	97 21	125.9	36 34.2	97 21	125.8	37 03.3	97 21	125.6	7
35 23.2	97 21	125.0	35 52.3	97 21	124.8	36 21.5	97 21	124.7	36 50.6	97 21	124.5	8
35 10.4	97 22	123.9	35 39.5	97 22	123.8	36 08.6	97 22	123.6	36 37.7	97 22	123.5	9
34 57.4	97 22	122.9	35 26.5	97 22	122.7	35 55.6	97 22	122.6	36 24.7	97 22	122.4	50
34 44.3	97 22	121.8	35 13.4	97 22	121.6	35 42.5	97 22	121.5	36 11.5	97 22	121.3	1
34 31.0	97 22	120.7	35 00.1	97 22	120.6	35 29.1	97 22	120.4	35 58.2	97 22	120.3	2
34 17.6	97 23	119.7	34 46.6	97 23	119.5	35 15.7	97 23	119.4	35 44.7	97 23	119.2	3
34 04.0	97 23	118.6	34 33.1	97 23	118.5	35 02.1	97 23	118.3	35 31.1	97 23	118.2	4
33 50.3	97 23	117.6	34 19.3	97 23	117.4	34 48.3	97 23	117.3	35 17.3	97 23	117.1	55
33 36.5	97 23	116.5	34 05.5	97 23	116.4	34 34.5	97 23	116.2	35 03.4	97 23	116.1	6
33 22.6	97 23	115.5	33 51.5	97 23	115.3	34 20.5	96 24	115.2	34 49.4	96 24	115.0	7
33 08.5	97 24	114.5	33 37.4	96 24	114.3	34 06.4	96 24	114.1	34 35.3	96 24	114.0	8
32 54.3	96 24	113.4	33 23.2	96 24	113.3	33 52.1	96 24	113.1	34 21.0	96 24	112.9	9
32 40.0	96 24	112.4	33 08.9	96 24	112.2	33 37.8	96 24	112.1	34 06.7	96 24	111.9	60
32 25.6	96 24	111.4	32 54.5	96 24	111.2	33 23.4	96 24	111.0	33 52.2	96 24	110.9	1
32 11.1	96 24	110.3	32 39.9	96 24	110.2	33 08.8	96 24	110.0	33 37.7	96 24	109.8	2
31 56.5	96 24	109.3	32 25.3	96 25	109.2	32 54.2	96 25	109.0	33 23.0	96 25	108.8	3
31 41.8	96 25	108.3	32 10.6	96 25	108.1	32 39.4	96 25	108.0	33 08.3	96 25	107.8	4
31 27.0	96 25	107.3	31 55.8	96 25	107.1	32 24.6	96 25	107.0	32 53.4	96 25	106.8	65
31 12.1	96 25	106.3	31 40.9	96 25	106.1	32 09.7	96 25	105.9	32 38.5	96 25	105.8	6
30 57.2	96 25	105.3	31 26.0	96 25	105.1	31 54.8	96 25	104.9	32 23.6	96 25	104.8	7
30 42.1	96 25	104.3	31 10.9	96 25	104.1	31 39.7	96 25	103.9	32 08.5	96 25	103.8	8
30 27.1	96 25	103.3	30 55.8	96 25	103.1	31 24.6	96 25	102.9	31 53.4	96 25	102.8	9
30 11.9	96 25	102.3	30 40.7	96 25	102.1	31 09.5	96 25	101.9	31 38.2	96 25	101.8	70
29 56.7	96 25	101.3	30 25.5	96 25	101.1	30 54.2	96 25	100.9	31 23.0	96 25	100.8	1
29 41.4	96 26	100.3	30 10.2	96 26	100.1	30 39.0	96 26	99.9	31 07.7	96 26	99.8	2
29 26.1	96 26	99.3	29 54.9	96 26	99.1	30 23.6	96 26	98.9	30 52.4	96 26	98.8	3
29 10.8	96 26	98.3	29 39.5	96 26	98.1	30 08.3	96 26	98.0	30 37.0	96 26	97.8	4
28 55.4	96 26	97.3	29 24.2	96 26	97.1	29 52.9	96 26	97.0	30 21.6	96 26	96.8	75
28 40.0	96 26	96.3	29 08.7	96 26	96.2	29 37.5	96 26	96.0	30 06.2	96 26	95.8	6
28 24.5	96 26	95.3	28 53.3	96 26	95.2	29 22.0	96 26	95.0	29 50.7	96 26	94.8	7
28 09.1	96 26	94.4	28 37.8	96 26	94.2	29 06.5	96 26	94.0	29 35.2	96 26	93.9	8
27 53.6	96 26	93.4	28 22.3	96 26	93.2	28 51.0	96 26	93.1	29 19.7	96 26	92.9	9
27 38.1	96 26	92.4	28 06.8	96 26	92.2	28 35.5	96 26	92.1	29 04.2	96 26	91.9	80
27 22.5	96 26	91.4	27 51.3	96 26	91.3	28 20.0	96 26	91.1	28 48.7	96 26	90.9	1
27 07.0	96 26	90.5	27 35.7	96 26	90.3	28 04.5	96 26	90.1	28 33.2	96 26	90.0	2
26 51.5	96 26	89.5	27 20.2	96 26	89.3	27 48.9	96 26	89.2	28 17.6	96 26	89.0	3
26 36.0	96 26	88.5	27 04.7	96 26	88.4	27 33.4	96 26	88.2	28 02.1	96 26	88.1	4
26 20.4	96 26	87.6	26 49.2	96 26	87.4	27 17.9	96 26	87.3	27 46.6	96 26	87.1	85
26 04.9	96 26	86.6	26 33.7	96 26	86.5	27 02.4	96 26	86.3	27 31.1	96 26	86.1	6
25 49.4	96 26	85.7	26 18.2	96 26	85.5	26 46.9	96 26	85.3	27 15.6	96 26	85.2	7
25 34.0	96 26	84.7	26 02.7	96 26	84.6	26 31.4	96 26	84.4	27 00.1	96 26	84.2	8
75 18.5	96 26	83.8	25 47.3	96 26	83.6	26 16.0	96 26	83.4	26 44.7	96 26	83.3	9
25 03.1	96 26	82.8	25 31.8	96 26	82.6	26 00.6	96 26	82.5	26 29.3	96 26	82.3	90

Lat. 75°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	22 52.6	96 26	82.5	23 21.4	96 26	82.3	23 50.2	96 26	82.2	24 18.9	96 26	82.0	24 47.7	96 26	81.9	25 16.5	96 26	81.7	25 45.2	96 26	81.5	26 13.9	96 26	81.4	91
2	22 37.2	96 26	81.5	23 06.0	96 26	81.4	23 34.8	96 26	81.2	24 03.6	96 26	81.1	24 32.4	96 26	80.9	25 01.1	96 26	80.8	25 29.9	96 26	80.6	25 58.6	96 25	80.4	2
3	22 21.9	96 25	80.6	22 50.7	96 26	80.4	23 19.5	96 25	80.3	23 48.3	96 26	80.1	24 17.0	96 26	80.0	24 45.8	96 26	79.8	25 14.6	96 26	79.6	25 43.3	96 25	79.5	3
4	22 06.6	96 25	79.6	22 35.4	96 25	79.5	23 04.2	96 25	79.3	23 33.0	96 25	79.2	24 01.8	96 25	79.0	24 30.5	96 25	78.9	24 59.3	96 25	78.7	25 28.1	96 25	78.5	4
95	21 51.3	96 25	78.7	22 20.2	96 25	78.5	22 49.0	96 25	78.4	23 17.8	96 25	78.2	23 46.6	96 25	78.1	24 15.3	96 25	77.9	24 44.1	96 25	77.8	25 12.9	96 25	77.6	95
6	21 36.1	96 25	77.7	22 05.0	96 25	77.6	22 33.8	96 25	77.4	23 02.6	96 25	77.3	23 31.4	96 25	77.1	24 00.2	96 25	77.0	24 29.0	96 25	76.8	24 57.7	96 25	76.7	6
7	21 21.0	96 25	76.8	21 49.8	96 25	76.6	22 18.7	96 25	76.5	22 47.5	96 25	76.3	23 16.3	96 25	76.2	23 45.1	96 25	76.0	24 13.9	96 25	75.9	24 42.6	96 25	75.7	7
8	21 05.9	96 25	75.8	21 34.7	96 25	75.7	22 03.6	96 25	75.6	22 32.4	96 25	75.4	23 01.2	96 25	75.3	23 30.0	96 25	75.1	23 58.8	96 25	74.9	24 27.6	96 25	74.8	8
9	20 50.9	96 25	74.9	21 19.7	96 25	74.8	21 48.6	96 25	74.6	22 17.4	96 25	74.5	22 46.2	96 25	74.3	23 15.1	96 25	74.2	23 43.9	96 25	74.0	24 12.7	96 25	73.9	9
100	20 35.9	96 25	74.0	21 04.8	96 25	73.8	21 33.6	96 25	73.7	22 02.5	96 25	73.5	22 31.3	96 25	73.4	23 00.2	96 25	73.2	23 29.0	96 25	73.1	23 57.8	96 25	72.9	100
1	20 21.0	96 25	73.0	20 49.9	96 25	72.9	21 18.8	96 25	72.7	21 47.6	96 25	72.6	22 16.5	96 25	72.4	22 45.3	96 25	72.3	23 14.2	96 25	72.1	23 43.0	96 25	72.0	1
2	20 06.2	96 25	72.1	20 35.1	96 25	71.9	21 04.0	96 25	71.8	21 32.8	96 24	71.7	22 01.7	96 24	71.5	22 30.6	96 24	71.4	22 59.4	96 24	71.2	23 28.3	96 24	71.1	2
3	19 51.5	96 24	71.2	20 20.4	96 24	71.0	20 49.3	96 24	70.9	21 18.1	96 24	70.7	21 47.0	96 24	70.6	22 15.9	96 24	70.4	22 44.8	96 24	70.3	23 13.6	96 24	70.1	3
4	19 36.8	96 24	70.2	20 05.7	96 24	70.1	20 34.6	96 24	69.9	21 03.5	96 24	69.8	21 32.4	96 24	69.6	22 01.3	96 24	69.5	22 30.2	96 24	69.4	22 59.0	96 24	69.2	4
105	19 22.3	96 24	69.3	19 51.2	96 24	69.1	20 20.1	96 24	69.0	20 49.0	96 24	68.9	21 17.9	96 24	68.7	21 46.8	96 24	68.6	22 15.7	96 24	68.4	22 44.6	96 24	68.3	105
6	19 07.8	96 24	68.4	19 36.7	96 24	68.2	20 05.6	96 24	68.1	20 34.6	96 24	67.9	21 03.5	96 24	67.8	21 32.4	96 24	67.6	22 01.3	96 24	67.5	22 30.2	96 24	67.4	6
7	18 53.4	97 24	67.4	19 22.3	96 24	67.3	19 51.3	96 24	67.1	20 20.2	96 24	67.0	20 49.2	96 24	66.9	21 18.1	96 24	66.7	21 47.0	96 24	66.6	22 15.9	96 24	66.4	7
8	18 39.1	97 24	66.5	19 08.1	97 24	66.4	19 37.0	97 24	66.2	20 06.0	97 24	66.1	20 34.9	96 24	65.9	21 03.9	96 24	65.8	21 32.8	96 24	65.7	22 01.7	96 23	65.5	8
9	18 24.9	97 23	65.6	18 53.9	97 23	65.4	19 22.9	97 23	65.3	19 51.8	97 23	65.1	20 20.8	97 23	65.0	20 49.8	96 24	64.9	21 18.7	96 23	64.7	21 47.6	96 23	64.6	9
110	18 10.8	97 23	64.6	18 39.8	97 23	64.5	19 08.8	97 23	64.4	19 37.8	97 23	64.2	20 06.8	97 23	64.1	20 35.7	97 23	63.9	21 04.7	97 23	63.8	21 33.7	97 23	63.7	110
1	17 56.8	97 23	63.7	18 25.9	97 23	63.6	18 54.9	97 23	63.4	19 23.9	97 23	63.3	19 52.9	97 23	63.2	20 21.9	97 23	63.0	20 50.8	97 23	62.9	21 19.8	97 23	62.7	1
2	17 43.0	97 23	62.8	18 12.0	97 23	62.6	18 41.0	97 23	62.5	19 10.1	97 23	62.4	19 39.1	97 23	62.2	20 08.1	97 23	62.1	20 37.1	97 23	62.0	21 06.1	97 22	61.8	2
3	17 29.2	97 23	61.8	17 58.3	97 23	61.7	18 27.3	97 23	61.6	18 56.4	97 23	61.4	19 25.4	97 23	61.3	19 54.4	97 23	61.2	20 23.4	97 23	61.0	20 52.4	97 22	60.9	3
4	17 15.6	97 23	60.9	17 44.7	97 22	60.8	18 13.7	97 22	60.7	18 42.8	97 22	60.5	19 11.8	97 23	60.4	19 40.9	97 22	60.3	20 09.9	97 22	60.1	20 38.9	97 22	60.0	4
115	17 02.1	97 22	60.0	17 31.2	97 22	59.9	18 00.2	97 22	59.7	18 29.3	97 22	59.6	18 58.4	97 22	59.5	19 27.4	97 22	59.3	19 56.5	97 22	59.2	20 25.5	97 22	59.1	115
6	16 48.7	97 22	59.1	17 17.8	97 22	58.9	17 46.9	97 22	58.8	18 16.0	97 22	58.7	18 45.1	97 22	58.6	19 14.1	97 22	58.4	19 43.2	97 22	58.3	20 12.3	97 22	58.2	6
7	16 35.4	97 22	58.1	17 04.6	97 22	58.0	17 33.7	97 22	57.9	18 02.8	97 22	57.8	18 31.9	97 22	57.6	19 01.0	97 22	57.5	19 30.1	97 22	57.4	19 59.2	97 22	57.2	7
8	16 22.3	97 22	57.2	16 51.5	97 22	57.1	17 20.6	97 22	57.0	17 49.7	97 22	56.8	18 18.8	97 22	56.7	18 48.0	97 22	56.6	19 17.1	97 21	56.5	19 46.2	97 21	56.3	8
9	16 09.3	97 21	56.3	16 38.5	97 21	56.2	17 07.6	97 21	56.0	17 36.8	97 21	55.9	18 05.9	97 21	55.8	18 35.1	97 21	55.7	19 04.2	97 21	55.5	19 33.3	97 21	55.4	9
120	15 56.5	97 21	55.4	16 25.7	97 21	55.2	16 54.8	97 21	55.1	17 24.0	97 21	55.0	17 53.2	97 21	54.9	18 22.3	97 21	54.8	18 51.5	97 21	54.6	19 20.6	97 21	54.5	120
1	15 43.8	97 21	54.4	16 13.0	97 21	54.3	16 42.2	97 21	54.2	17 11.3	97 21	54.1	17 40.5	97 21	54.0	18 09.7	97 21	53.8	18 38.9	97 21	53.7	19 08.0	97 21	53.6	1
2	15 31.2	97 21	53.5	16 00.4	97 21	53.4	16 29.6	97 21	53.3	16 58.8	97 21	53.2	17 28.0	97 21	53.0	17 57.2	97 21	52.9	18 26.4	97 20	52.8	18 55.6	97 20	52.7	2
3	15 18.8	97 20	52.6	15 48.0	97 20	52.5	16 17.3	97 20	52.4	16 46.5	97 20	52.2	17 15.7	97 20	52.1	17 44.9	97 20	52.0	18 14.1	97 20	51.9	18 43.3	97 20	51.8	3
4	15 06.6	97 20	51.7	15 35.8	97 20	51.6	16 05.0	97 20	51.4	16 34.3	97 20	51.3	17 03.5	97 20	51.2	17 32.8	97 20	51.1	18 02.0	97 20	51.0	18 31.2	97 20	50.9	4
125	14 54.4	98 20	50.8	15 23.7	98 20	50.6	15 53.0	98 20	50.5	16 22.2	98 20	50.4	16 51.5	98 20	50.3	17 20.8	98 20	50.2	17 50.0	97 20	50.1	18 19.2	97 20	49.9	125
6	14 42.5	98 20	49.8	15 11.8	98 20	49.7	15 41.1	98 20	49.6	16 10.4	98 20	49.5	16 39.6	98 20	49.4	17 08.9	98 19	49.3	17 38.2	98 19	49.1	18 07.4	98 19	49.0	6
7	14 30.7	98 19	48.9	15 00.0	98 19	48.8	15 29.3	98 19	48.7	15 58.6	98 19	48.6	16 27.9	98 19	48.5	16 57.2	98 19	48.3	17 26.5	98 19	48.2	17 55.8	98 19	48.1	7
8	14 19.1	98 19	48.0	14 48.4	98 19	47.9	15 17.7	98 19	47.8	15 47.1	98 19	47.7	16 16.4	98 19	47.5	16 45.7	98 19	47.4	17 15.0	98 19	47.3	17 44.3	98 19	47.2	8
9	14 07.6	98 19	47.1	14 37.0	98 19	47.0	15 06.3	98 19	46.8	15 35.7	98 19	46.7	16 05.0	98 19	46.6	16 34.3	98 19	46.5	17 03.7	98 19	46.4	17 33.0	98 18	46.3	9
130	13 56.4	98 19	46.1	14 25.7	98 18	46.0	14 55.1	98 18	45.9	15 24.5	98 18	45.8	15 53.8	98 18	45.7	16 23.2	98 18	45.6	16 52.5	98 18	45.5	17 21.9	98 18	45.4	130
1	13 45.3	98 18	45.2	14 14.6	98 18	45.1	14 44.0	98 18	45.0	15 13.4	98 18	44.9	15 42.8	98 18	44.8	16 12.2	98 18	44.7	16 41.5	98 18	44.6	17 10.9	98 18	44.5	1
2	13 34.3	98 18	44.3	14 03.7	98 18	44.2	14 33.1	98 18	44.1	15 02.5	98 18	44.0	15 31.9	98 18	43.9	16 01.3	98 18	43.8	16 30.7	98 18	43.7	17 00.1	98 18	43.6	2
3	13 23.6	98 18	43.4	13 53.0	98 18	43.3	14 22.4	98 18	43.2	14 51.8	98 18	43.1	15 21.2	98 18	43.0	15 50.7	98 17	42.9	16 20.1	98 17	42.8	16 49.5	98 17	42.7	3
4	13 13.0	98 17	42.5	13 42.4	98 17	42.4	14 11.9	98 17	42.3	14 41.3	98 17	42.2	15 10.8	98 17	42.1	15 40.2	98 17	42.0	16 09.6	98 17	41.9	16 39.1	98 17	41.8	4
135	13 02.6	98 17	41.5	13 32.1	98 17	41.4	14 01.5	98 17	41.3	14 31.0	98 17	41.2	15 00.4	98 17	41.1	15 29.9	98 17	41.0	15 59.4	98 17	40.9	16 28.8	98 17	40.8	135
6	12 52.4	98 17	40.6	13 21.9	98 17	40.5	13 51.4	98 17	40.4	14 20.8	98 17	40.3	14 50.3	98 17	40.2	15 19.8	98 17	40.1	15 49.3	98 16	40.0	16 18.7	98 16	39.9	6
7	12 42.4	98 16	39.7	13 11.9	98 16	39.6	13 41.4	98 16	39.5	14 10.9	98 16	39.4	14 40.4	98 16	39.3	15 09.9	98 16	39.2	15 39.4	98 16	39.1	16 08.9	98 16	39.0	7
8	12 32.6	98 16	38.8	13 02.1	98 16	38.7	13 31.6	98 16	38.6	14 01.1	98 16	38.5	14 30.6	98 16	38.4	15 00.2	98 16	38.3	15 29.7	98 16	38.2	15 59.2	98 16	38.1	8
9	12 22.9	98 16	37.9	12 52.5	98 16	37.8	13 22.0	98 16	37.7	13 51.6	98 16	37.6	14 21.1	98 16	37.5	14 50.6	98 16	37.4	15 20.2	98 16	37.3	15 49.7	98 15	37.2	9
140	12 13.5	99 15	36.9	12 43.1	99 15	36.8	13 12.6	99 15	36.8	13 42.2	99 15	36.7	14 11.7	99 15	36.6	14 41.3	99 15	36.5	15 10.8	99 15	36.4	15 40.4	98 15	36.3	140
1	12 04.3	99 15	36.0	12 33.9	99 15	35.9	13 03.4	99 15	35.8	13 33.0	99 15	35.8	14 02.6	99 15	35.7	14 32.2	99 15	35.6	15 01.7	99 15	35.5	15 31.3	99 15	35.4	1
2	11 55.2	99 15	35.1	12 24.8	99 15	35.0	12 54.4	99 15	34.9	13 24.0	99 15	34.8	13 53.6	99 15	34.8	14 23.2	99 15	34.7	14 52.8	99 15	34.6	15 22.4	99 14	34.5	2
3	11 46.4	99 14	34.2	12 16.0	99 14	34.1	12 45.7	99 14	34.0	13 15.3	99 14	33.9	13 44.9	99 14	33.8	14 14.5	99 14	33.8	14 44.1	99 14	33.7	15 13.7	99 14	33.6	3
4	11 37.8	99 14	33.2	12 07.4	99 14	33.2	12 37.1	99 14	33.1	13 06.7	99 14	33.0	13 36.3	99 14	32.9	14 06.0	99 14	32.8	14 35.6	99 14	32.8	15 05.2	99 14	32.7	4
145	11 29.4	99 14	32.3	11 59.0	99 14	32.2	12 28.7	99 14	32.2	12 58.3	99 14	32.1	13 28.0	99 14	32.0	13 57.6	99 14	31.9	14 27.3	99 13	31.9	14 56.9	99 13	31.8	145
6	11 21.2	99 13	31.4	11 50.9	99 13	31.3	12 20.5	99 13	31.3	12 50.2	99 13	31.2	13 19.9	99 13	31.1	13 49.5	99 13	31.0	14 19.2	99 13	30.9	14 48.9	99 13	30.9	6
7	11 13.2	99 13	30.5	11 42.9	99 13	30.4	12 12.6	99 13	30.3	12 42.3	99 13	30.3	13 12.0	99 13	30.2	13 41.6	99 13	30.1	14 11.3	99 13	30.0	14 41.0	99 13	30.0	7
8	11 05.4	99 13	29.6	11 35.1	99 13	29.5	12 04.9	99 13	29.4	12 34.6	99 12	29.3	13 04.3	99 12	29.3	13 34.0	99 12	29.2	14 03.7	99 12	29.1	14 33.4	99 12	29.1	8
9	10 57.9	99 12	28.6	11 27.6	99 12	28.6	11 57.3	99 12	28.5	12 27.1	99 12	28.4	12 56.8	99 12	28.4	13 26.5	99 12	28.3	13 56.2	99 12	28.2	14 25.9	99 12	28.1	9
150	10 50.6	99 12	27.7	11 20.3	99 12	27.6	11 50.0	99 12	27.6	12 19.8	99 12	27.5	12 49.5	99 12	27.4	13 19.2	99 12	27.4	13 49.0	99 12	27.3	14 18.7	99 12	27.2	150
1	10 43.4	99 12	26.8	11 13.2	99 11	26.7	11 43.0	99 11	26.7	12 12.7	99 11	26.6	12 42.5	99 11	26.5	13 12.2	99 11	26.5	13 42.0	99 11	26.4	14 11.7	99 11	26.3	1
2	10 36.6	99 11	25.9	11 06.3	99 11	25.8	11 36.1	99 11	25.7	12 05.9	99 11	25.7	12 35.6	99 11	25.6	13 05.4	99 11	25.6	13 35.2	99 11	25.5	14 04.9	99 11	25.4	2
3	10 29.9	99 11	24.9	10 59.7	99 11	24.9	11 29.5	99 11	24.8	11 59.2	99 11	24.8	12 29.0	99 11	24.7	12 58.8	99 11	24.6	13 28.6	99 11	24.6	13 58.4	99 11	24.5	3
4	10 23.5	99 10	24.0	10 53.3	99 10	24.0	11 23.1	99 10	23.9	11 52.9	99 10	23.8	12 22.7	99 10	23.8	12 52.4	99 10	23.7	13 22.2	99 10	23.7	13 52.0	99 10	23.6	4
155	10 17.2	99 10	23.1	10 47.1	99 10	23.0	11 16.9	99 10	23.0	11 46.7	99 10	22.9	12 16.5	99 10	22.9	12 46.3	99 10	22.8	13 16.1	99 10	22.8	13 45.9	99 10	22.7	155
6	10 11.3	99 10	22.2	10 41.1	99 10	22.1	11 10.9	99 10	22.1	11 40.8	99 10	22.0	12 10.6	99 10	22.0	12 40.4	99 09	21.9	13 10.2	99 09	21.9	13 40.1	99 09	21.8	6
7	10 05.5	99 09	21.3	10 35.4	99 09	21.2	11 05.2	99 09	21.2	11 35.0	99 09	21.1	12 04.9	99 09	21.0	12 34.7	99 09	21.0	13 04.6	99 09	20.9	13 34.4	99 09	20.9	7
8	10 00.0	1.0 09	20.3	10 29.9	1.0 09	20.3	10 59.7	1.0 09	20.2	11 29.6	1.0 09	20.2	11 59.4	1.0 09	20.1	12 29.3	1.0 09	20.1	12 59.1	1.0 09	20.0	13 29.0	1.0 09	20.0	8
9	9 54.7	1.0 08	19.4	10 24.6	1.0 08	19.4	10 54.5	1.0 08	19.3	11 24.3	1.0 08	19.3	11 54.2	1.0 08	19.2	12 24.1	1.0 08	19.2	12 53.9	1.0 08	19.1	13 23.8	1.0 08	19.1	9
160	9 49.7	1.0 08	18.5	10 19.6	1.0 08	18.4	10 49.4	1.0 08	18.4	11 19.3	1.0 08	18.4	11 49.2	1.0 08	18.3	12 19.1	1.0 08	18.3	12 49.0	1.0 08	18.2	13 18.8	1.0 08	18.2	160
1	9 44.9	1.0 08	17.6	10 14.8	1.0 08	17.5	10 44.7	1.0 08	17.5	11 14.6	1.0 08	17.4	11 44.4	1.0 08	17.4	12 14.3	1.0 08	17.3	12 44.2	1.0 08	17.3	13 14.1	1.0 07	17.3	1
2	9 40.3	1.0 07	16.6	10 10.2	1.0 07	16.6	10 40.1	1.0 07	16.6	11 10.0	1.0 07	16.5	11 39.9	1.0 07	16.5	12 09.8	1.0 07	16.4	12 39.7	1.0 07	16.4	13 09.6	1.0 07	16.3	2
3	9 36.0	1.0 07	15.7	10 05.9	1.0 07	15.7	10 35.8	1.0 07	15.6	11 05.7	1.0 07	15.6	11 35.6	1.0 07	15.6	12 05.5	1.0 07	15.5	12 35.5	1.0 07	15.5	13 05.4	1.0 06	15.4	3
4	9 31.9	1.0 06	14.8	10 01.8	1.0 06	14.8	10 31.7	1.0 06	14.7	11 01.7	1.0 06	14.7	11 31.6	1.0 06	14.6	12 01.5	1.0 06	14.6	12 31.4	1.0 06	14.6	13 01.3	1.0 06	14.5	4
165	9 28.1	1.0 06	13.9	9 58.0	1.0 06	13.8	10 27.9	1.0 06	13.8	10 57.9	1.0 06	13.8	11 27.8	1.0 06	13.7	11 57.7	1.0 06	13.7	12 27.6	1.0 06	13.7	12 57.6	1.0 06	13.6	165
6	9 24.5	1.0 06	12.9	9 54.4	1.0 06	12.9	10 24.3	1.0 06	12.9	10 54.3	1.0 05	12.8	11 24.2	1.0 06	12.8	11 54.2	1.0 06	12.8	12 24.1	1.0 06	12.8	12 54.0	1.0 06	12.7	6
7	9 21.1	1.0 05	12.0	9 51.1	1.0 05	12.0	10 21.0	1.0 06	12.0	10 50.9	1.0 05	11.9	11 20.9	1.0 05	11.9	11 50.8	1.0 05	11.9	12 20.8	1.0 05	11.8	12 50.7	1.0 05	11.8	7
8	9 18.0	1.0 05	11.1	9 47.9	1.0 05	11.1	10 17.9	1.0 05	11.0	10 47.9	1.0 05	11.0	11 17.8	1.0 05	11.0	11 47.8	1.0 05	11.0	12 17.7	1.0 05	10.9	12 47.7	1.0 05	10.9	8
9	9 15.1	1.0 04	10.2	9 45.1	1.0 04	10.1	10 15.1	1.0 04	10.1	10 45.0	1.0 04	10.1	11 15.0	1.0 04	10.1	11 44.9	1.0 04	10.0	12 14.9	1.0 04	10.0	12 44.9	1.0 04	10.0	9
170	9 12.5	1.0 04	09.2	9 42.5	1.0 04	09.2	10 12.4	1.0 04	09.2	10 42.4	1.0 04	09.2	11 12.4	1.0 04	09.2	11 42.3	1.0 04	09.1	12 12.3	1.0 04	09.1	12 42.3	1.0 04	09.1	170
1	9 10.1	1.0 04	08.3	9 40.1	1.0 04	08.3	10 10.1	1.0 04	08.3	10 40.1	1.0 04	08.3	11 10.0	1.0 04	08.2	11 40.0	1.0 04	08.2	12 10.0	1.0 04	08.2	12 40.0	1.0 03	08.2	1
2	9 08.0	1.0 03	07.4	9 38.0	1.0 03	07.4	10 08.0	1.0 03	07.4	10 38.0	1.0 03	07.3	11 07.9	1.0 03	07.3	11 37.9	1.0 03	07.3	12 07.9	1.0 03	07.3	12 37.9	1.0 03	07.3	2
3	9 06.1	1.0 03	06.5	9 36.1	1.0 03	06.5	10 06.1	1.0 03	06.4	10 36.1	1.0 03	06.4	11 06.1	1.0 03	06.4	11 36.1	1.0 03	06.4	12 06.0	1.0 03	06.4	12 36.0	1.0 03	06.4	3
4	9 04.5	1.0 02	05.5	9 34.5	1.0 02	05.5	10 04.5	1.0 02	05.5	10 34.5	1.0 02	05.5	11 04.5	1.0 02	05.5	11 34.5	1.0 02	05.5	12 04.4	1.0 02	05.5	12 34.4	1.0 02	05.5	4
175	9 03.1	1.0 02	04.6	9 33.1	1.0 02	04.6	10 03.1	1.0 02	04.6	10 33.1	1.0 02	04.6	11 03.1	1.0 02	04.6	11 33.1	1.0 02	04.6	12 03.1	1.0 02	04.6	12 33.1	1.0 02	04.5	175
6	9 02.0	1.0 01	03.7	9 32.0	1.0 01	03.7	10 02.0	1.0 01	03.7	10 32.0	1.0 01	03.7	11 02.0	1.0 01	03.7	11 32.0	1.0 01	03.7	12 02.0	1.0 01	03.6	12 32.0	1.0 01	03.6	6
7	9 01.1	1.0 01	02.8	9 31.1	1.0 01	02.8	10 01.1	1.0 01	02.8	10 31.1	1.0 01	02.8	11 01.1	1.0 01	02.7	11 31.1	1.0 01	02.7	12 01.1	1.0 01	02.7	12 31.1	1.0 01	02.7	7
8	9 00.5	1.0 01	01.8	9 30.5	1.0 01	01.8	10 00.5	1.0 01	01.8	10 30.5	1.0 01	01.8	11 00.5	1.0 01	01.8	11 30.5	1.0 01	01.8	12 00.5	1.0 01	01.8	12 30.5	1.0 01	01.8	8
9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	12 00.1	1.0 00	00.9	12 30.1	1.0 00	00.9	9
180	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	180

Lat. 76°

Lat. 77°

Lat. 78°

Lat. 79

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	43 00.0	1.0 00	180.0	43 30.0	1.0 00	180.0	44 00.0	1.0 00	180.0	45 00.0	1.0 00	180.0	47 00.0	1.0 00	180.0	49 00.0	1.0 00	180.0	49 30.0	1.0 00	180.0	50 30.0	1.0 00	180.0	00
1	42 59.8	1.0 01	178.8	43 29.8	1.0 01	178.8	43 59.8	1.0 01	178.8	44 59.8	1.0 01	178.8	46 59.8	1.0 01	178.8	48 59.8	1.0 01	178.7	49 29.8	1.0 01	178.7	50 29.8	1.0 01	178.7	1
2	42 59.3	1.0 01	177.6	43 29.3	1.0 01	177.6	43 59.3	1.0 01	177.6	44 59.3	1.0 01	177.6	46 59.3	1.0 01	177.5	48 59.3	1.0 01	177.5	49 29.3	1.0 01	177.5	50 29.3	1.0 01	177.4	2
3	42 58.5	1.0 02	176.4	43 28.5	1.0 02	176.4	43 58.5	1.0 02	176.4	44 58.5	1.0 02	176.3	46 58.5	1.0 02	176.3	48 58.5	1.0 02	176.2	49 28.5	1.0 02	176.2	50 28.4	1.0 02	176.2	3
4	42 57.4	1.0 02	175.2	43 27.4	1.0 02	175.2	43 57.4	1.0 02	175.1	44 57.3	1.0 02	175.1	46 57.3	1.0 02	175.0	48 57.3	1.0 03	174.9	49 27.3	1.0 03	174.9	50 27.2	1.0 03	174.9	4
05	42 55.9	1.0 03	174.0	43 25.9	1.0 03	173.9	43 55.9	1.0 03	173.9	44 55.9	1.0 03	173.9	46 55.8	1.0 03	173.8	48 55.7	1.0 03	173.7	49 25.7	1.0 03	173.7	50 25.7	1.0 03	173.6	05
6	42 54.1	1.0 04	172.8	43 24.1	1.0 04	172.7	43 54.1	1.0 04	172.7	44 54.0	1.0 04	172.7	46 53.9	1.0 04	172.5	48 53.8	1.0 04	172.4	49 23.8	1.0 04	172.4	50 23.8	1.0 04	172.3	6
7	42 52.0	1.0 04	171.6	43 22.0	1.0 04	171.5	43 51.9	1.0 04	171.5	44 51.9	1.0 04	171.4	46 51.8	1.0 04	171.3	48 51.6	1.0 04	171.2	49 21.6	1.0 04	171.1	50 21.5	1.0 04	171.1	7
8	42 49.6	1.0 05	170.4	43 19.5	1.0 05	170.3	43 49.5	1.0 05	170.3	44 49.4	1.0 05	170.2	46 49.2	1.0 05	170.1	48 49.1	1.0 05	169.9	49 19.0	1.0 05	169.9	50 18.9	1.0 05	169.8	8
9	42 46.8	1.0 05	169.2	43 16.8	1.0 05	169.1	43 46.7	1.0 05	169.1	44 46.6	1.0 05	169.0	46 46.4	1.0 05	168.8	48 46.2	1.0 05	168.7	49 16.1	1.0 05	168.6	50 16.0	1.0 05	168.5	9
10	42 43.7	1.0 06	168.0	43 13.7	1.0 06	167.9	43 43.6	1.0 06	167.9	44 43.5	1.0 06	167.8	46 43.2	1.0 06	167.6	48 43.0	1.0 06	167.4	49 12.9	1.0 06	167.3	50 12.8	1.0 06	167.2	10
1	42 40.3	1.0 06	166.8	43 10.2	1.0 06	166.7	43 40.2	1.0 06	166.7	44 40.0	1.0 06	166.6	46 39.7	1.0 06	166.4	48 39.4	1.0 06	166.1	49 09.3	1.0 06	166.1	50 09.2	1.0 07	166.0	1
2	42 36.6	1.0 07	165.6	43 06.5	1.0 07	165.5	43 36.4	1.0 07	165.5	44 36.3	1.0 07	165.4	46 35.9	1.0 07	165.1	48 35.5	1.0 07	164.9	49 05.4	1.0 07	164.8	50 05.2	1.0 07	164.7	2
3	42 32.6	1.0 07	164.4	43 02.5	1.0 07	164.3	43 32.4	1.0 07	164.3	44 32.2	1.0 07	164.1	46 31.8	1.0 07	163.9	48 31.3	1.0 08	163.6	49 01.2	1.0 08	163.6	50 01.0	1.0 08	163.4	3
4	42 28.2	1.0 08	163.2	42 58.1	1.0 08	163.1	43 28.0	1.0 08	163.1	44 27.8	1.0 08	162.9	46 27.3	1.0 08	162.7	48 26.8	1.0 08	162.4	48 56.7	1.0 08	162.3	49 56.4	1.0 08	162.2	4
15	42 23.6	1.0 08	162.0	42 53.5	1.0 08	161.9	43 23.3	1.0 08	161.9	44 23.1	1.0 08	161.7	46 22.5	1.0 08	161.4	48 21.9	99 09	161.2	48 51.8	99 09	161.1	49 51.5	99 09	160.9	15
6	42 18.6	1.0 09	160.8	42 48.5	1.0 09	160.7	43 18.3	1.0 09	160.7	44 18.0	1.0 09	160.5	46 17.4	99 09	160.2	48 16.8	99 09	159.9	48 46.6	99 09	159.8	49 46.2	99 09	159.7	6
7	42 13.4	99 09	159.6	42 43.2	99 09	159.5	43 13.0	99 09	159.5	44 12.7	99 09	159.3	46 12.0	99 10	159.0	48 11.3	99 10	158.7	48 41.1	99 10	158.6	49 40.7	99 10	158.4	7
8	42 07.8	99 10	158.4	42 37.6	99 10	158.3	43 07.4	99 10	158.3	44 07.1	99 10	158.1	46 06.3	99 10	157.8	48 05.5	99 10	157.4	48 35.2	99 10	157.4	49 34.8	99 10	157.2	8
9	42 01.9	99 10	157.2	42 31.7	99 10	157.2	43 01.5	99 10	157.1	44 01.1	99 10	156.9	46 00.3	99 11	156.6	47 59.4	99 11	156.2	48 29.1	99 11	156.1	49 28.6	99 11	155.9	9
20	41 55.8	99 11	156.1	42 25.6	99 11	156.0	42 55.3	99 11	155.9	43 54.9	99 11	155.7	45 54.0	99 11	155.4	47 52.9	99 11	155.0	48 22.7	99 11	154.9	49 22.1	99 11	154.7	20
1	41 49.3	99 11	154.9	42 19.1	99 11	154.8	42 48.9	99 11	154.7	43 48.4	99 11	154.5	45 47.3	99 12	154.2	47 46.2	99 12	153.8	48 15.9	99 12	153.7	49 15.3	99 12	153.4	1
2	41 42.6	99 12	153.7	42 12.3	99 12	153.6	42 42.1	99 12	153.5	43 41.5	99 12	153.3	45 40.4	99 12	153.0	47 39.2	99 12	152.5	48 08.9	99 12	152.4	49 08.2	99 12	152.2	2
3	41 35.6	99 12	152.5	42 05.3	99 12	152.4	42 35.0	99 12	152.3	43 34.4	99 12	152.2	45 33.2	99 12	151.8	47 31.9	99 13	151.3	48 01.6	99 13	151.2	49 00.9	99 13	151.0	3
4	41 28.3	99 13	151.4	41 58.0	99 13	151.3	42 27.7	99 13	151.2	43 27.0	99 13	151.0	45 25.7	99 13	150.6	47 24.3	99 13	150.1	47 53.9	99 13	150.0	48 53.2	99 13	149.8	4
25	41 20.7	99 13	150.2	41 50.4	99 13	150.1	42 20.0	99 13	150.0	43 19.4	99 13	149.8	45 17.9	99 13	149.4	47 16.4	99 14	148.9	47 46.0	99 14	148.8	48 45.2	99 14	148.5	25
6	41 12.8	99 14	149.0	41 42.5	99 14	148.9	42 12.1	99 14	148.8	43 11.4	99 14	148.6	45 09.9	99 14	148.2	47 08.3	99 14	147.7	47 37.9	99 14	147.6	48 37.0	99 14	147.3	6
7	41 04.7	99 14	147.9	41 34.3	99 14	147.8	42 04.0	99 14	147.7	43 03.2	99 14	147.4	45 01.6	99 14	147.0	46 59.8	99 15	146.5	47 29.4	98 15	146.4	48 28.5	98 15	146.1	7
8	40 56.3	99 14	146.7	41 25.9	99 14	146.6	41 55.5	99 14	146.5	42 54.7	99 15	146.3	44 53.0	99 15	145.8	46 51.1	98 15	145.3	47 20.7	98 15	145.2	48 19.7	98 15	144.9	8
9	40 47.7	99 15	145.6	41 17.2	99 15	145.5	41 46.8	99 15	145.3	42 45.9	99 15	145.1	44 44.1	98 15	144.6	46 42.2	98 15	144.1	47 11.7	98 15	144.0	48 10.6	98 16	143.7	9
30	40 38.8	99 15	144.4	41 08.3	99 15	144.3	41 37.9	98 15	144.2	42 36.9	98 15	144.0	44 35.0	98 16	143.5	46 32.9	98 16	142.9	47 02.4	98 16	142.8	48 01.3	98 16	142.5	30
1	40 29.6	98 16	143.3	40 59.1	98 16	143.2	41 28.6	98 16	143.0	42 27.7	98 16	142.8	44 25.6	98 16	142.3	46 23.5	98 16	141.8	46 52.9	98 16	141.6	47 51.7	98 16	141.3	1
2	40 20.2	98 16	142.1	40 49.7	98 16	142.0	41 19.2	98 16	141.9	42 18.2	98 16	141.6	44 16.0	98 16	141.1	46 13.7	98 17	140.6	46 43.1	98 17	140.4	47 41.9	98 17	140.1	2
3	40 10.5	98 16	141.0	40 40.0	98 17	140.9	41 09.5	98 17	140.8	42 08.4	98 17	140.5	44 06.1	98 17	140.0	46 03.7	98 17	139.4	46 33.1	98 17	139.3	47 31.8	98 17	139.0	3
4	40 00.6	98 17	139.9	40 30.1	98 17	139.7	40 59.5	98 17	139.6	41 58.4	98 17	139.4	43 56.0	98 17	138.8	45 53.5	98 17	138.2	46 22.8	98 18	138.1	47 21.5	98 18	137.8	4
35	39 50.5	98 17	138.7	40 19.9	98 17	138.6	40 49.4	98 17	138.5	41 48.2	98 17	138.2	43 45.7	98 18	137.7	45 43.0	98 18	137.1	46 12.4	98 18	136.9	47 10.9	98 18	136.6	35
6	39 40.2	98 18	137.6	40 09.6	98 18	137.5	40 39.0	98 18	137.3	41 37.7	98 18	137.1	43 35.1	98 18	136.5	45 32.4	98 18	135.9	46 01.6	98 18	135.8	47 00.1	97 18	135.4	6
7	39 29.6	98 18	136.5	39 58.9	98 18	136.4	40 28.3	98 18	136.2	41 27.0	98 18	135.9	43 24.3	98 18	135.4	45 21.4	98 19	134.8	45 50.7	97 19	134.6	46 49.1	97 19	134.3	7
8	39 18.8	98 18	135.4	39 48.1	98 18	135.2	40 17.5	98 18	135.1	41 16.1	98 19	134.8	43 13.3	98 19	134.2	45 10.3	97 19	133.6	45 39.5	97 19	133.5	46 37.9	97 19	133.1	8
9	39 07.8	98 19	134.2	39 37.1	98 19	134.1	40 06.4	98 19	134.0	41 05.0	98 19	133.7	43 02.1	97 19	133.1	44 59.0	97 19	132.5	45 28.1	97 19	132.3	46 26.5	97 19	132.0	9
40	38 56.5	98 19	133.1	39 25.8	98 19	133.0	39 55.1	98 19	132.9	40 53.7	98 19	132.6	42 50.6	97 19	132.0	44 47.4	97 20	131.3	45 16.6	97 20	131.2	46 14.8	97 20	130.8	40
1	38 45.1	98 19	132.0	39 14.4	98 19	131.9	39 43.6	98 19	131.7	40 42.1	97 20	131.5	42 39.0	97 20	130.8	44 35.6	97 20	130.2	45 04.8	97 20	130.0	46 03.0	97 20	129.7	1
2	38 33.5	98 20	130.9	39 02.7	97 20	130.8	39 31.9	97 20	130.6	40 30.4	97 20	130.3	42 27.1	97 20	129.7	44 23.7	97 20	129.1	44 52.8	97 20	128.9	45 50.9	97 20	128.6	2
3	38 21.6	97 20	129.8	33 50.8	97 20	129.7	39 20.1	97 20	129.5	40 18.5	97 20	129.2	42 15.1	97 20	128.6	44 11.5	97 21	127.9	44 40.6	97 21	127.8	45 38.7	97 21	127.4	3
4	38 09.6	97 20	128.7	38 38.8	97 20	128.6	39 08.0	97 20	128.4	40 06.3	97 20	128.1	42 02.9	97 21	127.5	43 59.2	97 21	126.8	44 28.2	97 21	126.7	45 26.3	97 21	126.3	4
45	37 57.4	97 21	127.6	38 26.6	97 21	127.5	38 55.7	97 21	127.3	39 54.0	97 21	127.0	41 50.5	97 21	126.4	43 46.7	97 21	125.7	44 15.7	97 21	125.5	45 13.7	97 21	125.2	45
6	37 45.0	97 21	126.6	38 14.2	97 21	126.4	38 43.3	97 21	126.3	39 41.5	97 21	125.9	41 37.9	97 21	125.3	43 34.0	97 21	124.6	44 03.0	97 21	124.4	45 00.9	96 22	124.1	6
7	37 32.5	97 21	125.5	38 01.6	97 21	125.3	38 30.7	97 21	125.2	39 28.9	97 21	124.9	41 25.1	97 22	124.2	43 21.1	97 22	123.5	43 50.1	96 22	123.3	44 47.9	96 22	123.0	7
8	37 19.7	97 21	124.4	37 48.8	97 22	124.2	38 17.9	97 22	124.1	39 16.1	97 22	123.8	41 12.2	97 22	123.1	43 08.1	96 22	122.4	43 37.0	96 22	122.2	44 34.8	96 22	121.9	8
9	37 06.8	97 22	123.3	37 35.9	97 22	123.2	38 05.0	97 22	123.0	39 03.1	97 22	122.7	40 59.1	97 22	122.0	42 54.9	96 22	121.3	43 23.8	96 22	121.1	44 21.5	96 22	120.8	9
50	36 53.8	97 22	122.2	37 22.8	97 22	122.1	37 51.9	97 22	121.9	38 49.9	97 22	121.6	40 45.9	97 22	120.9	42 41.5	96 22	120.2	43 10.4	96 23	120.0	44 08.1	96 23	119.7	50
1	36 40.6	97 22	121.2	37 09.6	97 22	121.0	37 38.6	97 22	120.9	38 36.6	97 22	120.5	40 32.5	96 23	119.9	42 28.1	96 23	119.1	42 56.9	96 23	119.0	43 54.6	96 23	118.6	1
2	36 27.2	97 22	120.1	36 56.2	97 23	120.0	37 25.2	97 23	119.8	38 23.2	97 23	119.5	40 18.9	96 23	118.8	42 14.4	96 23	118.1	42 43.2	96 23	117.9	43 40.9	96 23	117.5	2
3	36 13.7	97 23	119.1	36 42.7	97 23	118.9	37 11.7	97 23	118.7	38 09.6	96 23	118.4	40 05.2	96 23	117.7	42 00.6	96 23	117.0	42 29.5	96 23	116.8	43 27.0	96 23	116.4	3
4	36 00.1	97 23	118.0	36 29.0	97 23	117.8	36 58.0	97 23	117.7	37 55.9	96 23	117.3	39 51.4	96 23	116.7	41 46.7	96 23	115.9	42 15.5	96 23	115.7	43 13.0	96 23	115.3	4
55	35 46.3	97 23	116.9	36 15.2	96 23	116.8	36 44.2	96 23	116.6	37 42.0	96 23	116.3	39 37.5	96 23	115.6	41 32.7	96 24	114.9	42 01.5	96 24	114.7	42 58.9	96 24	114.3	55
6	35 32.4	96 23	115.9	36 01.3	96 23	115.7	36 30.2	96 23	115.6	37 28.0	96 24	115.2	39 23.4	96 24	114.5	41 18.6	96 24	113.8	41 47.3	96 24	113.6	42 44.7	96 24	113.2	6
7	35 18.3	96 24	114.9	35 47.2	96 24	114.7	36 16.1	96 24	114.5	37 13.9	96 24	114.2	39 09.2	96 24	113.5	41 04.3	96 24	112.7	41 33.0	96 24	112.5	42 30.4	96 24	112.2	7
8	35 04.2	96 24	113.8	35 33.1	96 24	113.6	36 02.0	96 24	113.5	36 59.7	96 24	113.1	38 54.9	96 24	112.4	40 49.9	96 24	111.7	41 18.6	96 24	111.5	42 16.0	96 24	111.1	8
9	34 49.9	96 24	112.8	35 18.8	96 24	112.6	35 47.7	96 24	112.4	36 45.3	96 24	112.1	38 40.5	96 24	111.4	40 35.4	96 24	110.6	41 04.1	96 24	110.4	42 01.4	95 24	110.1	9
60	34 35.6	96 24	111.7	35 04.4	96 24	111.6	35 33.3	96 24	111.4	36 30.9	96 24	111.1	38 26.0	96 24	110.4	40 20.9	96 24	109.6	40 49.5	96 24	109.4	41 46.8	95 25	109.0	60
1	34 21.1	96 24	110.7	34 49.9	96 24	110.5	35 18.8	96 24	110.4	36 16.4	96 24	110.0	38 11.4	96 24	109.3	40 06.2	96 25	108.6	40 34.8	95 25	108.4	41 32.1	95 25	108.0	1
2	34 06.5	96 24	109.7	34 35.3	96 24	109.5	35 04.1	96 24	109.3	36 01.7	96 25	109.0	37 56.7	96 25	108.3	39 51.4	95 25	107.5	40 20.1	95 25	107.3	41 17.2	95 25	106.9	2
3	33 51.8	96 25	108.7	34 20.6	96 25	108.5	34 49.4	96 25	108.3	35 47.0	96 25	108.0	37 41.9	96 25	107.3	39 36.6	95 25	106.5	40 05.2	95 25	106.3	41 02.4	95 25	105.9	3
4	33 37.1	96 25	107.6	34 05.9	96 25	107.5	34 34.7	96 25	107.3	35 32.2	96 25	107.0	37 27.1	96 25	106.2	39 21.6	95 25	105.5	39 50.2	95 25	105.3	40 47.4	95 25	104.9	4
65	33 22.2	96 25	106.6	33 51.0	96 25	106.5	34 19.8	96 25	106.3	35 17.3	96 25	105.9	37 12.1	96 25	105.2	39 06.6	95 25	104.5	39 35.2	95 25	104.3	40 32.3	95 25	103.9	65
6	33 07.3	96 25	105.6	33 36.1	96 25	105.4	34 04.9	96 25	105.3	35 02.3	96 25	104.9	36 57.1	96 25	104.2	38 51.6	95 25	103.4	39 20.1	95 25	103.2	40 17.2	95 25	102.8	6
7	32 52.3	96 25	104.6	33 21.1	96 25	104.4	33 49.8	96 25	104.3	34 47.3	96 25	103.9	36 42.0	95 25	103.2	38 36.4	95 25	102.4	39 05.0	95 25	102.2	40 02.1	95 25	101.8	7
8	32 37.3	96 25	103.6	33 06.0	96 25	103.4	33 34.8	96 25	103.3	34 32.2	96 25	102.9	36 26.8	95 25	102.2	38 21.2	95 25	101.4	38 49.8	95 25	101.2	39 46.3	95 25	100.8	8
9	32 22.1	96 25	102.6	32 50.9	96 25	102.4	33 19.6	96 25	102.3	34 17.0	96 25	101.9	36 11.6	95 25	101.2	38 06.0	95 26	100.4	38 34.5	95 26	100.2	39 31.6	95 26	99.8	9
70	32 07.0	96 25	101.6	32 35.7	96 25	101.4	33 04.4	96 25	101.2	34 01.8	96 25	100.9	35 56.4	95 26	100.2	37 50.7	95 26	99.4	38 19.2	95 26	99.2	39 16.2	95 26	98.8	70
1	31 51.7	96 25	100.6	32 20.4	96 25	100.4	32 49.1	96 26	100.3	33 46.5	96 26	99.9	35 41.1	95 26	99.2	37 35.4	95 26	98.4	38 03.9	95 26	98.2	39 00.9	95 26	97.8	1
2	31 36.4	96 26	99.6	32 05.1	96 26	99.4	32 33.8	96 26	99.3	33 31.2	96 26	98.9	35 25.7	95 26	98.2	37 20.0	95 26	97.4	37 48.5	95 26	97.2	38 45.5	95 26	96.8	2
3	31 21.1	96 26	98.6	31 49.8	96 26	98.4	32 18.5	96 26	98.3	33 15.8	96 26	97.9	35 10.3	95 26	97.2	37 04.6	95 26	96.4	37 33.1	95 26	96.2	38 30.0	95 26	95.8	3
4	31 05.7	96 26	97.6	31 34.4	96 26	97.5	32 03.1	96 26	97.3	33 00.4	95 26	96.9	34 54.9	95 26	96.2	36 49.1	95 26	95.4	37 17.6	95 26	95.3	38 14.6	95 26	94.9	4
75	30 50.3	96 26	96.6	31 19.0	96 26	96.5	31 47.7	96 26	96.3	32 45.0	95 26	95.9	34 39.5	95 26	95.2	36 33.6	95 26	94.5	37 02.1	95 26	94.3	37 59.1	95 26	93.9	75
6	30 34.9	96 26	95.7	31 03.6	96 26	95.5	31 32.2	96 26	95.3	32 29.5	95 26	95.0	34 24.0	95 26	94.2	36 18.1	95 26	93.5	36 46.6	95 26	93.3	37 43.6	95 26	92.9	6
7	30 19.4	96 26	94.7	30 48.1	96 26	94.5	31 16.8	96 26	94.3	32 14.1	95 26	94.0	34 08.5	95 26	93.3	36 02.6	95 26	92.5	36 31.1	95 26	92.3	37 28.1	95 26	91.9	7
8	30 03.9	96 26	93.7	30 32.6	96 26	93.5	31 01.3	96 26	93.4	31 58.6	95 26	93.0	33 53.0	95 26	92.3	35 47.1	95 26	91.5	36 15.6	95 26	91.3	37 12.5	95 26	90.9	8
9	29 48.4	96 26	92.7	30 17.1	96 26	92.6	30 45.8	96 26	92.4	31 43.1	95 26	92.0	33 37.5	95 26	91.3	35 31.6	95 26	90.6	36 00.1	95 26	90.4	36 57.0	95 26	90.0	9
80	29 32.9	96 26	91.8	30 01.6	96 26	91.6	30 30.2	96 26	91.4	31 27.5	95 26	91.1	33 21.9	95 26	90.4	35 16.1	95 26	89.6	35 44.6	95 26	89.4	36 41.5	95 26	89.0	80
1	29 17.4	96 26	90.8	29 46.0	96 26	90.6	30 14.7	96 26	90.4	31 12.0	95 26	90.1	33 06.4	95 26	89.4	35 00.5	95 26	88.6	35 29.0	95 26	88.4	36 26.0	95 26	88.1	1
2	29 01.8	96 26	89.8	29 30.5	96 26	89.6	29 59.2	96 26	89.5	30 56.5	95 26	89.1	32 50.9	95 26	88.4	34 45.0	95 26	87.7	35 13.5	95 26	87.5	36 10.4	95 26	87.1	2
3	28 46.3	96 26	88.9	29 15.0	96 26	88.7	29 43.7	96 26	88.5	30 40.9	95 26	88.2	32 35.4	95 26	87.5	34 29.5	95 26	86.7	34 58.0	95 26	86.5	35 54.9	95 26	86.1	3
4	28 30.8	96 26	87.9	28 59.5	96 26	87.7	29 28.1	96 26	87.6	30 25.4	95 26	87.2	32 19.8	95 26	86.5	34 14.0	95 26	85.8	34 42.5	95 26	85.6	35 39.5	95 26	85.2	4
85	28 15.3	96 26	86.9	28 44.0	96 26	86.8	29 12.6	96 26	86.6	30 09.9	95 26	86.3	32 04.4	95 26	85.5	33 58.5	95 26	84.8	34 27.0	95 26	84.6	35 24.0	95 26	84.2	85
6	27 59.8	96 26	86.0	28 28.5	96 26	85.8	28 57.1	96 26	85.6	29 54.4	95 26	85.3	31 48.9	95 26	84.6	33 43.1	95 26	83.9	34 11.6	95 26	83.7	35 08.6	95 25	83.3	6
7	27 44.3	96 26	85.0	28 13.0	96 26	84.9	28 41.7	96 26	84.7	29 39.0	95 26	84.3	31 33.4	95 26	83.6	33 27.7	95 26	82.9	33 56.2	95 26	82.7	34 53.2	95 26	82.4	7
8	27 28.8	96 26	84.1	27 57.5	96 26	83.9	28 26.2	96 26	83.7	29 23.5	95 26	83.4	31 18.0	95 26	82.7	33 12.3	95 26	82.0	33 40.8	95 26	81.8	34 37.8	96 26	81.4	8
9	27 13.4	96 26	83.1	27 42.1	96 26	82.9	28 10.8	96 26	82.8	29 08.1	96 26	82.4	31 02.6	95 26	81.8	32 56.9	95 26	81.0	33 25.4	95 26	80.9	34 22.4	95 26	80.5	9
90	26 58.0	96 26	82.2	27 26.7	96 26	82.0	27 55.4	96 26	81.8	28 52.7	96 26	81.5	30 47.3	95 26	80.8	32 41.6	95 25	80.1	33 10.1	95 25	79.9	34 07.2	95 25	79.5	90

Lat. 75°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	26 42.6	96 26	81.2	27 11.4	96 26	81.1	27 40.0	96 26	80.9	28 37.4	96 25	80.6	30 32.0	95 25	79.9	32 26.3	95 25	79.2	32 54.9	95 25	79.0	33 51.9	95 25	78.6	91
2	26 27.3	96 25	80.3	26 56.0	96 25	80.1	27 24.7	96 25	79.9	28 22.1	96 25	79.6	30 16.7	95 25	78.9	32 11.1	95 25	78.2	32 39.6	95 25	78.0	33 36.7	95 25	77.7	2
3	26 12.0	96 25	79.3	26 40.8	96 25	79.2	27 09.5	96 25	79.0	28 06.9	96 25	78.7	30 01.5	95 25	78.0	31 55.9	95 25	77.3	32 24.5	95 25	77.1	33 21.6	95 25	76.7	3
4	25 56.8	96 25	78.4	26 25.5	96 25	78.2	26 54.2	96 25	78.1	27 51.7	96 25	77.7	29 46.3	95 25	77.1	31 40.8	95 25	76.4	32 09.4	95 25	76.2	33 06.5	95 25	75.8	4
95	25 41.6	96 25	77.4	26 10.4	96 25	77.3	26 39.1	96 25	77.1	27 36.5	96 25	76.8	29 31.2	96 25	76.1	31 25.7	95 25	75.4	31 54.3	95 25	75.3	32 51.4	95 25	74.9	95
6	25 26.5	96 25	76.5	25 55.2	96 25	76.4	26 24.0	96 25	76.2	27 21.4	96 25	75.9	29 16.2	96 25	75.2	31 10.7	95 25	74.5	31 39.3	95 25	74.3	32 36.5	95 25	74.0	6
7	25 11.4	96 25	75.6	25 40.2	96 25	75.4	26 08.9	96 25	75.3	27 06.4	96 25	74.9	29 01.2	96 25	74.3	30 55.8	95 25	73.6	31 24.4	95 25	73.4	32 21.6	95 25	73.1	7
8	24 56.4	96 25	74.6	25 25.2	96 25	74.5	25 53.9	96 25	74.3	26 51.4	96 25	74.0	28 46.3	96 25	73.3	30 40.9	95 25	72.7	31 09.6	95 25	72.5	32 06.8	95 25	72.1	8
9	24 41.5	96 25	73.7	25 10.2	96 25	73.6	25 39.0	96 25	73.4	26 36.5	96 25	73.1	28 31.4	96 25	72.4	30 26.1	96 25	71.8	30 54.8	95 24	71.6	31 52.0	95 24	71.2	9
100	24 26.6	96 25	72.8	24 55.4	96 25	72.6	25 24.2	96 25	72.5	26 21.7	96 25	72.1	28 16.7	96 24	71.5	30 11.4	96 24	70.8	30 40.1	96 24	70.7	31 37.4	95 24	70.3	100
1	24 11.8	96 25	71.8	24 40.6	96 25	71.7	25 09.4	96 24	71.5	26 07.0	96 24	71.2	28 02.0	96 24	70.6	29 56.8	96 24	69.9	30 25.5	96 24	69.7	31 22.8	95 24	69.4	1
2	23 57.1	96 24	70.9	24 25.9	96 24	70.8	24 54.7	96 24	70.6	25 52.3	96 24	70.3	27 47.4	96 24	69.7	29 42.3	96 24	69.0	30 11.0	96 24	68.8	31 08.3	96 24	68.5	2
3	23 42.5	96 24	70.0	24 11.3	96 24	69.8	24 40.1	96 24	69.7	25 37.7	96 24	69.4	27 32.9	96 24	68.7	29 27.8	96 24	68.1	29 56.5	96 24	67.9	30 53.9	96 24	67.6	3
4	23 27.9	96 24	69.1	23 56.8	96 24	68.9	24 25.6	96 24	68.8	25 23.2	96 24	68.5	27 18.4	96 24	67.8	29 13.5	96 24	67.2	29 42.2	96 24	67.0	30 39.6	96 24	66.7	4
105	23 13.4	96 24	68.1	23 42.3	96 24	68.0	24 11.2	96 24	67.8	25 08.8	96 24	67.5	27 04.1	96 24	66.9	28 59.2	96 24	66.3	29 27.9	96 24	66.1	30 25.4	96 24	65.8	105
6	22 59.1	96 24	67.2	23 28.0	96 24	67.1	23 56.8	96 24	66.9	24 54.5	96 24	66.6	26 49.9	96 24	66.0	28 45.0	96 23	65.4	29 13.8	96 23	65.2	30 11.3	96 23	64.9	6
7	22 44.8	96 24	66.3	23 13.7	96 24	66.1	23 42.6	96 24	66.0	24 40.3	96 24	65.7	26 35.7	96 23	65.1	28 31.0	96 23	64.5	28 59.7	96 23	64.3	29 57.3	96 23	64.0	7
8	22 30.6	96 23	65.4	22 59.6	96 23	65.2	23 28.5	96 23	65.1	24 26.2	96 23	64.8	26 21.7	96 23	64.2	28 17.0	96 23	63.6	28 45.8	96 23	63.4	29 43.4	96 23	63.1	8
9	22 16.6	96 23	64.4	22 45.5	96 23	64.3	23 14.4	96 23	64.2	24 12.2	96 23	63.9	26 07.8	96 23	63.3	28 03.2	96 23	62.7	28 32.0	96 23	62.5	29 29.6	96 23	62.2	9
110	22 02.6	96 23	63.5	22 31.6	96 23	63.4	23 00.5	96 23	63.2	23 58.4	96 23	63.0	25 54.0	96 23	62.4	27 49.4	96 23	61.7	28 18.3	96 23	61.6	29 15.9	96 23	61.3	110
1	21 48.8	97 23	62.6	22 17.7	97 23	62.5	22 46.7	97 23	62.3	23 44.6	96 23	62.0	25 40.3	96 23	61.5	27 35.8	96 22	60.8	28 04.7	96 22	60.7	29 02.3	96 22	60.4	1
2	21 35.1	97 23	61.7	22 04.0	97 23	61.6	22 33.0	97 23	61.4	23 30.9	97 23	61.1	25 26.7	96 22	60.5	27 22.3	96 22	59.9	27 51.2	96 22	59.8	28 48.9	96 22	59.5	2
3	21 21.4	97 22	60.8	21 50.4	97 22	60.6	22 19.4	97 22	60.5	23 17.4	97 22	60.2	25 13.2	96 22	59.6	27 08.9	96 22	59.1	27 37.8	96 22	58.9	28 35.6	96 22	58.6	3
4	21 08.0	97 22	59.9	21 37.0	97 22	59.7	22 06.0	97 22	59.6	23 04.0	97 22	59.3	24 59.9	97 22	58.7	26 55.7	96 22	58.2	27 24.6	96 22	58.0	28 22.4	96 22	57.7	4
115	20 54.6	97 22	58.9	21 23.6	97 22	58.8	21 52.6	97 22	58.7	22 50.7	97 22	58.4	24 46.7	97 22	57.8	26 42.5	96 22	57.3	27 11.5	96 22	57.1	28 09.3	96 22	56.8	115
6	20 41.3	97 22	58.0	21 10.4	97 22	57.9	21 39.4	97 22	57.8	22 37.5	97 22	57.5	24 33.6	97 22	56.9	26 29.5	97 21	56.4	26 58.5	97 21	56.2	27 56.4	96 21	55.9	6
7	20 28.2	97 22	57.1	20 57.3	97 22	57.0	21 26.4	97 22	56.8	22 24.5	97 22	56.6	24 20.6	97 21	56.0	26 16.7	97 21	55.5	26 45.7	97 21	55.3	27 43.6	97 21	55.0	7
8	20 15.3	97 21	56.2	20 44.4	97 21	56.1	21 13.4	97 21	55.9	22 11.6	97 21	55.7	24 07.8	97 21	55.1	26 04.0	97 21	54.6	26 33.0	97 21	54.4	27 31.0	97 21	54.1	8
9	20 02.4	97 21	55.3	20 31.5	97 21	55.2	21 00.7	97 21	55.0	21 58.8	97 21	54.8	23 55.2	97 21	54.2	25 51.4	97 21	53.7	26 20.4	97 21	53.5	27 18.4	97 21	53.3	9
120	19 49.7	97 21	54.4	20 18.9	97 21	54.2	20 48.0	97 21	54.1	21 46.2	97 21	53.9	23 42.6	97 21	53.3	25 38.9	97 20	52.8	26 08.0	97 20	52.7	27 06.1	97 20	52.4	120
1	19 37.2	97 21	53.5	20 06.3	97 21	53.3	20 35.5	97 21	53.2	21 33.8	97 21	53.0	23 30.3	97 20	52.4	25 26.6	97 20	51.9	25 55.7	97 20	51.8	26 53.8	97 20	51.5	1
2	19 24.8	97 20	52.6	19 54.0	97 20	52.4	20 23.1	97 20	52.3	21 21.4	97 20	52.1	23 18.0	97 20	51.5	25 14.5	97 20	51.0	25 43.6	97 20	50.9	26 41.8	97 20	50.6	2
3	19 12.5	97 20	51.6	19 41.7	97 20	51.5	20 10.9	97 20	51.4	21 09.3	97 20	51.2	23 05.9	97 20	50.6	25 02.5	97 20	50.1	25 31.6	97 20	50.0	26 29.8	97 20	49.7	3
4	19 00.4	97 20	50.7	19 29.6	97 20	50.6	19 58.9	97 20	50.5	20 57.3	97 20	50.2	22 54.0	97 20	49.7	24 50.7	97 19	49.2	25 19.8	97 19	49.1	26 18.1	97 19	48.8	4
125	18 48.5	97 20	49.8	19 17.7	97 20	49.7	19 47.0	97 20	49.6	20 45.4	97 20	49.3	22 42.2	97 19	48.9	24 39.0	97 19	48.3	25 08.1	97 19	48.2	26 06.5	97 19	48.0	125
6	18 36.7	98 19	48.9	19 06.0	98 19	48.8	19 35.2	97 19	48.7	20 33.7	97 19	48.4	22 30.6	97 19	48.0	24 27.4	97 19	47.5	24 56.6	97 19	47.3	25 55.0	97 19	47.1	6
7	18 25.1	98 19	48.0	18 54.4	98 19	47.9	19 23.6	98 19	47.8	20 22.2	98 19	47.5	22 19.2	97 19	47.1	24 16.1	97 19	46.6	24 45.3	97 19	46.5	25 43.7	97 19	46.2	7
8	18 13.6	98 19	47.1	18 42.9	98 19	47.0	19 12.2	98 19	46.9	20 10.8	98 19	46.6	22 07.9	98 19	46.2	24 04.9	97 18	45.7	24 34.1	97 18	45.6	25 32.6	97 18	45.3	8
9	18 02.3	98 19	46.2	18 31.6	98 18	46.1	19 01.0	98 18	46.0	19 59.6	98 18	45.7	21 56.8	98 18	45.3	23 53.9	98 18	44.8	24 23.1	98 18	44.7	25 21.6	97 18	44.4	9
130	17 51.2	98 18	45.3	18 20.5	98 18	45.2	18 49.9	98 18	45.1	19 48.5	98 18	44.8	21 45.8	98 18	44.4	23 43.0	98 18	43.9	24 12.3	98 18	43.8	25 10.8	98 18	43.6	130
1	17 40.3	98 18	44.4	18 09.6	98 18	44.3	18 39.0	98 18	44.2	19 37.7	98 18	43.9	21 35.0	98 18	43.5	23 32.3	98 18	43.0	24 01.6	98 18	42.9	25 00.2	98 17	42.7	1
2	17 29.5	98 18	43.5	17 58.9	98 18	43.4	18 28.2	98 18	43.3	19 27.0	98 18	43.0	21 24.4	98 17	42.6	23 21.8	98 17	42.2	23 51.1	98 17	42.0	24 49.8	98 17	41.8	2
3	17 18.9	98 17	42.6	17 48.3	98 17	42.5	18 17.7	98 17	42.4	19 16.5	98 17	42.1	21 14.0	98 17	41.7	23 11.5	98 17	41.3	23 40.8	98 17	41.2	24 39.5	98 17	40.9	3
4	17 08.5	98 17	41.7	17 37.9	98 17	41.6	18 07.3	98 17	41.5	19 06.2	98 17	41.2	21 03.8	98 17	40.8	23 01.3	98 17	40.4	23 30.7	98 17	40.3	24 29.4	98 17	40.1	4
135	16 58.2	98 17	40.8	17 27.7	98 17	40.6	17 57.1	98 17	40.5	18 56.0	98 17	40.3	20 53.7	98 16	39.9	22 51.4	98 16	39.5	23 20.8	98 16	39.4	24 19.5	98 16	39.2	135
6	16 48.2	98 16	39.8	17 17.7	98 16	39.7	17 47.1	98 16	39.6	18 46.0	98 16	39.4	20 43.8	98 16	39.0	22 41.6	98 16	38.6	23 11.0	98 16	38.5	24 09.8	98 16	38.3	6
7	16 38.3	98 16	38.9	17 07.8	98 16	38.8	17 37.3	98 16	38.7	18 36.3	98 16	38.6	20 34.1	98 16	38.2	22 32.0	98 16	37.7	23 01.4	98 16	37.6	24 00.3	98 16	37.4	7
8	16 28.7	98 16	38.0	16 58.2	98 16	37.9	17 27.7	98 16	37.8	18 26.7	98 16	37.7	20 24.6	98 16	37.3	22 22.6	98 15	36.9	22 52.0	98 15	36.8	23 50.9	98 15	36.6	8
9	16 19.2	98 15	37.1	16 48.7	98 15	37.0	17 18.3	98 15	36.9	18 17.3	98 15	36.8	20 15.3	98 15	36.4	22 13.3	98 15	36.0	22 42.8	98 15	35.9	23 41.8	98 15	35.7	9
140	16 09.9	98 15	36.2	16 39.5	98 15	36.1	17 09.0	98 15	36.0	18 08.1	98 15	35.9	20 06.2	98 15	35.5	22 04.3	98 15	35.1	22 33.8	98 15	35.0	23 32.8	98 15	34.8	140
1	16 00.9	99 15	35.3	16 30.4	99 15	35.2	17 00.0	99 15	35.1	17 59.1	99 15	35.0	19 57.3	98 15	34.6	21 55.5	98 14	34.2	22 25.0	98 14	34.1	23 24.1	98 14	33.9	1
2	15 52.0	99 14	34.4	16 21.6	99 14	34.3	16 51.2	99 14	34.2	17 50.3	99 14	34.1	19 48.6	99 14	33.7	21 46.8	99 14	33.3	22 16.4	99 14	33.2	23 15.5	98 14	33.1	2
3	15 43.3	99 14	33.5	16 12.9	99 14	33.4	16 42.5	99 14	33.3	17 41.7	99 14	33.2	19 40.1	99 14	32.8	21 38.4	99 14	32.5	22 08.0	99 14	32.4	23 07.1	99 14	32.2	3
4	15 34.8	99 14	32.6	16 04.5	99 14	32.5	16 34.1	99 14	32.4	17 33.3	99 14	32.3	19 31.8	99 14	31.9	21 30.2	99 13	31.6	21 59.8	99 13	31.5	22 58.9	99 13	31.3	4
145	15 26.6	99 13	31.7	15 56.2	99 13	31.6	16 25.9	99 13	31.5	17 25.1	99 13	31.4	19 23.7	99 13	31.0	21 22.1	99 13	30.7	21 51.8	99 13	30.6	22 51.0	99 13	30.4	145
6	15 18.5	99 13	30.8	15 48.2	99 13	30.7	16 17.8	99 13	30.6	17 17.2	99 13	30.5	19 15.8	99 13	30.2	21 14.3	99 13	29.8	21 43.9	99 13	29.7	22 43.2	99 13	29.6	6
7	15 10.7	99 13	29.9	15 40.4	99 13	29.8	16 10.0	99 13	29.7	17 09.4	99 13	29.6	19 08.1	99 12	29.3	21 06.7	99 12	28.9	21 36.3	99 12	28.9	22 35.6	99 12	28.7	7
8	15 03.0	99 12	29.0	15 32.7	99 12	28.9	16 02.4	99 12	28.8	17 01.8	99 12	28.7	19 00.6	99 12	28.4	20 59.3	99 12	28.1	21 29.0	99 12	28.0	22 28.3	99 12	27.8	8
9	14 55.6	99 12	28.1	15 25.3	99 12	28.0	15 55.1	99 12	27.9	16 54.5	99 12	27.8	18 53.3	99 12	27.5	20 52.1	99 12	27.2	21 21.8	99 12	27.1	22 21.1	99 12	27.0	9
150	14 48.4	99 12	27.2	15 18.2	99 12	27.1	15 47.9	99 12	27.0	16 47.3	99 12	26.9	18 46.2	99 11	26.6	20 45.1	99 11	26.3	21 14.8	99 11	26.2	22 14.2	99 11	26.1	150
1	14 41.5	99 11	26.3	15 11.2	99 11	26.2	15 40.9	99 11	26.1	16 40.4	99 11	26.0	18 39.4	99 11	25.7	20 38.3	99 11	25.4	21 08.0	99 11	25.4	22 07.5	99 11	25.2	1
2	14 34.7	99 11	25.4	15 04.5	99 11	25.3	15 34.2	99 11	25.2	16 33.7	99 11	25.1	18 32.8	99 11	24.8	20 31.8	99 11	24.6	21 01.5	99 11	24.5	22 01.0	99 10	24.3	2
3	14 28.1	99 11	24.5	14 57.9	99 10	24.4	15 27.7	99 10	24.3	16 27.3	99 10	24.2	18 26.3	99 10	23.9	20 25.4	99 10	23.7	20 55.2	99 10	23.6	21 54.7	99 10	23.5	3
4	14 21.8	99 10	23.6	14 51.6	99 10	23.5	15 21.4	99 10	23.4	16 21.0	99 10	23.3	18 20.1	99 10	23.1	20 19.3	99 10	22.8	20 49.1	99 10	22.7	21 48.6	99 10	22.6	4
155	14 15.7	99 10	22.6	14 45.5	99 10	22.6	15 15.4	99 10	22.5	16 15.0	99 10	22.4	18 14.2	99 10	22.2	20 13.4	99 09	21.9	20 43.2	99 09	21.9	21 42.7	99 09	21.7	155
6	14 09.9	99 09	21.7	14 39.7	99 09	21.7	15 09.5	99 09	21.6	16 09.2	99 09	21.5	18 08.4	99 09	21.3	20 07.7	99 09	21.0	20 37.5	99 09	21.0	21 37.1	99 09	20.9	6
7	14 04.2	99 09	20.8	14 34.1	99 09	20.8	15 03.9	99 09	20.7	16 03.6	99 09	20.6	18 02.9	99 09	20.4	20 02.2	99 09	20.2	20 32.0	99 09	20.1	21 31.7	99 09	20.0	7
8	13 58.8	99 09	19.9	14 28.7	99 09	19.9	14 58.5	99 09	19.8	15 58.2	99 09	19.7	17 57.6	99 08	19.5	19 57.0	99 08	19.3	20 26.8	99 08	19.2	21 26.5	99 08	19.1	8
9	13 53.7	1.0 08	19.0	14 23.5	1.0 08	19.0	14 53.4	1.0 08	18.9	15 53.1	1.0 08	18.8	17 52.5	1.0 08	18.6	19 52.0	1.0 08	18.4	20 21.8	1.0 08	18.4	21 21.5	1.0 08	18.3	9
160	13 48.7	1.0 08	18.1	14 18.6	1.0 08	18.1	14 48.5	1.0 08	18.0	15 48.2	1.0 08	17.9	17 47.7	1.0 08	17.7	19 47.2	1.0 08	17.5	20 17.0	1.0 08	17.5	21 16.8	1.0 08	17.4	160
1	13 44.0	1.0 07	17.2	14 13.9	1.0 07	17.2	14 43.8	1.0 07	17.1	15 43.5	1.0 07	17.0	17 43.1	1.0 07	16.8	19 42.6	1.0 07	16.7	20 12.5	1.0 07	16.6	21 12.2	1.0 07	16.5	1
2	13 39.5	1.0 07	16.3	14 09.4	1.0 07	16.3	14 39.3	1.0 07	16.2	15 39.1	1.0 07	16.1	17 38.7	1.0 07	16.0	19 38.3	1.0 07	15.8	20 08.1	1.0 07	15.7	21 07.9	1.0 07	15.6	2
3	13 35.3	1.0 07	15.4	14 05.2	1.0 07	15.4	14 35.1	1.0 07	15.3	15 34.9	1.0 07	15.2	17 34.5	1.0 07	15.1	19 34.1	1.0 06	14.9	20 04.0	1.0 06	14.9	21 03.9	1.0 06	14.8	3
4	13 31.3	1.0 06	14.5	14 01.2	1.0 06	14.5	14 31.1	1.0 06	14.4	15 30.9	1.0 06	14.3	17 30.6	1.0 06	14.2	19 30.3	1.0 06	14.0	20 00.2	1.0 06	14.0	21 00.0	1.0 06	13.9	4
165	13 27.5	1.0 06	13.6	13 57.4	1.0 06	13.6	14 27.4	1.0 06	13.5	15 27.2	1.0 06	13.4	17 26.9	1.0 06	13.3	19 26.6	1.0 06	13.2	19 56.5	1.0 06	13.1	20 56.4	1.0 06	13.0	165
6	13 24.0	1.0 05	12.7	13 53.9	1.0 05	12.7	14 23.8	1.0 05	12.6	15 23.7	1.0 05	12.6	17 23.5	1.0 05	12.4	19 23.2	1.0 05	12.3	19 53.1	1.0 05	12.2	20 53.0	1.0 05	12.2	6
7	13 20.7	1.0 05	11.8	13 50.6	1.0 05	11.7	14 20.6	1.0 05	11.7	15 20.5	1.0 05	11.7	17 20.2	1.0 05	11.5	19 20.0	1.0 05	11.4	19 50.0	1.0 05	11.4	20 49.8	1.0 05	11.3	7
8	13 17.6	1.0 05	10.9	13 47.6	1.0 05	10.8	14 17.5	1.0 05	10.8	15 17.4	1.0 05	10.8	17 17.3	1.0 05	10.6	19 17.1	1.0 05	10.5	19 47.0	1.0 05	10.5	20 46.9	1.0 04	10.4	8
9	13 14.8	1.0 04	10.0	13 44.8	1.0 04	09.9	14 14.7	1.0 04	09.9	15 14.7	1.0 04	09.9	17 14.5	1.0 04	09.8	19 14.3	1.0 04	09.6	19 44.3	1.0 04	09.6	20 44.2	1.0 04	09.6	9
170	13 12.3	1.0 04	09.1	13 42.2	1.0 04	09.0	14 12.2	1.0 04	09.0	15 12.1	1.0 04	09.0	17 12.0	1.0 04	08.9	19 11.9	1.0 04	08.8	19 41.8	1.0 04	08.7	20 41.8	1.0 04	08.7	170
1	13 09.9	1.0 03	08.2	13 39.9	1.0 03	08.1	14 09.9	1.0 03	08.1	15 09.8	1.0 03	08.1	17 09.7	1.0 03	08.0	19 09.6	1.0 03	07.9	19 39.6	1.0 03	07.9	20 39.5	1.0 03	07.8	1
2	13 07.8	1.0 03	07.2	13 37.8	1.0 03	07.2	14 07.8	1.0 03	07.2	15 07.8	1.0 03	07.2	17 07.7	1.0 03	07.1	19 07.6	1.0 03	07.0	19 37.6	1.0 03	07.0	20 37.5	1.0 03	07.0	2
3	13 06.0	1.0 03	06.3	13 36.0	1.0 03	06.3	14 06.0	1.0 03	06.3	15 05.9	1.0 03	06.3	17 05.9	1.0 03	06.2	19 05.8	1.0 03	06.1	19 35.8	1.0 03	06.1	20 35.8	1.0 03	06.1	3
4	13 04.4	1.0 02	05.4	13 34.4	1.0 02	05.4	14 04.4	1.0 02	05.4	15 04.4	1.0 02	05.4	17 04.3	1.0 02	05.3	19 04.3	1.0 02	05.3	19 34.3	1.0 02	05.2	20 34.2	1.0 02	05.2	4
175	13 03.1	1.0 02	04.5	13 33.1	1.0 02	04.5	14 03.1	1.0 02	04.5	15 03.0	1.0 02	04.5	17 03.0	1.0 02	04.4	19 03.0	1.0 02	04.4	19 33.0	1.0 02	04.4	20 32.9	1.0 02	04.3	175
6	13 02.0	1.0 01	03.6	13 32.0	1.0 01	03.6	14 02.0	1.0 01	03.6	15 01.9	1.0 01	03.6	17 01.9	1.0 01	03.5	19 01.9	1.0 01	03.5	19 31.9	1.0 01	03.5	20 31.9	1.0 01	03.5	6
7	13 01.1	1.0 01	02.7	13 31.1	1.0 01	02.7	14 01.1	1.0 01	02.7	15 01.1	1.0 01	02.7	17 01.1	1.0 01	02.7	19 01.1	1.0 01	02.6	19 31.1	1.0 01	02.6	20 31.1	1.0 01	02.6	7
8	13 00.5	1.0 01	01.8	13 30.5	1.0 01	01.8	14 00.5	1.0 01	01.8	15 00.5	1.0 01	01.8	17 00.5	1.0 01	01.8	19 00.5	1.0 01	01.8	19 30.5	1.0 01	01.7	20 30.5	1.0 01	01.7	8
9	13 00.1	1.0 00	00.9	13 30.1	1.0 00	00.9	14 00.1	1.0 00	00.9	15 00.1	1.0 00	00.9	17 00.1	1.0 00	00.9	19 00.1	1.0 00	00.9	19 30.1	1.0 00	00.9	20 30.1	1.0 00	00.9	9
180	13 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 00.0	1.0 00	00.0	15 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	19 30.0	1.0 00	00.0	20 30.0	1.0 00	00.0	180

Lat. 75°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	51 00.0	1.0 00	180.0	52 00.0	1.0 00	180.0	53 30.0	1.0 00	180.0	55 00.0	1.0 00	180.0
1	50 59.8	1.0 01	178.7	51 59.8	1.0 01	178.7	53 29.8	1.0 01	178.7	54 59.8	1.0 01	178.7
2	50 59.3	1.0 01	177.4	51 59.3	1.0 01	177.4	53 29.3	1.0 01	177.4	54 59.3	1.0 01	177.3
3	50 58.4	1.0 02	176.1	51 58.4	1.0 02	176.1	53 28.4	1.0 02	176.1	54 58.4	1.0 02	176.0
4	50 57.2	1.0 03	174.9	51 57.2	1.0 03	174.8	53 27.2	1.0 03	174.7	54 57.1	1.0 03	174.7
05	50 55.7	1.0 03	173.6	51 55.6	1.0 03	173.5	53 25.5	1.0 03	173.4	54 55.5	1.0 03	173.3
6	50 53.7	1.0 04	172.3	51 53.7	1.0 04	172.2	53 23.6	1.0 04	172.1	54 53.5	1.0 04	172.0
7	50 51.5	1.0 04	171.0	51 51.4	1.0 04	170.9	53 21.3	1.0 04	170.8	54 51.2	1.0 04	170.7
8	50 48.9	1.0 05	169.7	51 48.8	1.0 05	169.6	53 18.6	1.0 05	169.5	54 48.5	1.0 05	169.3
9	50 46.0	1.0 05	168.5	51 45.8	1.0 06	168.4	53 15.6	1.0 06	168.2	54 45.4	1.0 06	168.0
10	50 42.7	1.0 06	167.2	51 42.5	1.0 06	167.1	53 12.3	1.0 06	166.9	54 42.0	1.0 06	166.7
1	50 39.1	1.0 07	165.9	51 38.9	1.0 07	165.8	53 08.6	1.0 07	165.6	54 38.3	1.0 07	165.4
2	50 35.1	1.0 07	164.6	51 34.9	1.0 07	164.5	53 04.5	1.0 07	164.3	54 34.2	1.0 07	164.1
3	50 30.8	1.0 08	163.4	51 30.6	1.0 08	163.2	53 00.2	1.0 08	163.0	54 29.7	99 08	162.7
4	50 26.2	1.0 08	162.1	51 25.9	99 08	161.9	52 55.5	99 08	161.7	54 25.0	99 08	161.4
15	50 21.3	99 09	160.8	51 21.0	99 09	160.7	52 50.4	99 09	160.4	54 19.8	99 09	160.1
6	50 16.0	99 09	159.6	51 15.7	99 09	159.4	52 45.0	99 10	159.1	54 14.4	99 10	158.8
7	50 10.5	99 10	158.3	51 10.0	99 10	158.1	52 39.4	99 10	157.8	54 08.6	99 10	157.5
8	50 04.6	99 10	157.1	51 04.1	99 10	156.9	52 33.3	99 11	156.6	54 02.5	99 11	156.2
9	49 58.4	99 11	155.8	50 57.8	99 11	155.6	52 27.0	99 11	155.3	53 56.1	99 11	154.9
20	49 51.8	99 11	154.6	50 51.3	99 11	154.4	52 20.4	99 12	154.0	53 49.4	99 12	153.6
1	49 45.0	99 12	153.3	50 44.4	99 12	153.1	52 13.4	99 12	152.8	53 42.3	99 12	152.4
2	49 37.9	99 12	152.1	50 37.2	99 12	151.9	52 06.1	99 13	151.5	53 35.0	99 13	151.1
3	49 30.5	99 13	150.9	50 29.8	99 13	150.6	51 58.6	99 13	150.2	53 27.3	99 13	149.8
4	49 22.8	99 13	149.6	50 22.0	99 14	149.4	51 50.7	99 14	149.0	53 19.4	98 14	148.6
25	49 14.8	99 14	148.4	50 13.9	99 14	148.2	51 42.6	98 14	147.7	53 11.1	98 14	147.3
6	49 06.5	98 14	147.2	50 05.6	98 14	146.9	51 34.1	98 14	146.5	53 02.6	98 15	146.0
7	48 58.0	98 15	146.0	49 57.0	98 15	145.7	51 25.4	98 15	145.3	52 53.8	98 15	144.8
8	48 49.2	98 15	144.8	49 48.1	98 15	144.5	51 16.4	98 15	144.0	52 44.7	98 16	143.6
9	48 40.1	98 16	143.6	49 39.0	98 16	143.3	51 07.2	98 16	142.8	52 35.3	98 16	142.3
30	48 30.7	98 16	142.4	49 29.5	98 16	142.1	50 57.7	98 16	141.6	52 25.7	98 16	141.1
1	48 21.1	98 16	141.2	49 19.9	98 17	140.9	50 47.9	98 17	140.4	52 15.8	98 17	139.9
2	48 11.2	98 17	140.0	49 09.9	98 17	139.7	50 37.9	98 17	139.2	52 05.7	97 17	138.6
3	48 01.1	98 17	138.8	48 59.8	98 17	138.5	50 27.6	98 18	138.0	51 55.3	97 18	137.4
4	47 50.8	98 18	137.6	48 49.3	98 18	137.3	50 17.1	97 18	136.8	51 44.7	97 18	136.2
35	47 40.2	98 18	136.4	48 38.7	97 18	136.1	50 06.3	97 18	135.6	51 33.8	97 18	135.0
6	47 29.4	97 18	135.3	48 27.8	97 19	134.9	49 55.3	97 19	134.4	51 22.7	97 19	133.8
7	47 18.3	97 19	134.1	48 16.7	97 19	133.8	49 44.1	97 19	133.2	51 11.4	97 19	132.6
8	47 07.1	97 19	133.0	48 05.4	97 19	132.6	49 32.7	97 19	132.0	50 59.9	97 20	131.5
9	46 55.6	97 19	131.8	47 53.8	97 20	131.4	49 21.1	97 20	130.9	50 48.1	97 20	130.3
40	46 43.9	97 20	130.6	47 42.1	97 20	130.3	49 09.2	97 20	129.7	50 36.2	97 20	129.1
1	46 32.0	97 20	129.5	47 30.2	97 20	129.1	48 57.2	97 20	128.6	50 24.0	96 21	128.0
2	46 20.0	97 20	128.4	47 18.0	97 21	128.0	48 44.9	96 21	127.4	50 11.7	96 21	126.8
3	46 07.7	97 21	127.2	47 05.7	97 21	126.9	48 32.5	96 21	126.3	49 59.2	96 21	125.7
4	45 55.2	97 21	126.1	46 53.2	96 21	125.7	48 19.9	96 21	125.1	49 46.5	96 21	124.5
45	45 42.6	97 21	125.0	46 40.5	96 21	124.6	48 07.1	96 22	124.0	49 33.6	96 22	123.4
6	45 29.8	96 22	123.9	46 27.6	96 22	123.5	47 54.2	96 22	122.9	49 20.5	96 22	122.2
7	45 16.8	96 22	122.8	46 14.6	96 22	122.4	47 41.0	96 22	121.8	49 07.3	96 22	121.1
8	45 03.7	96 22	121.7	46 01.4	96 22	121.3	47 27.8	96 22	120.7	48 53.9	96 23	120.0
9	44 50.4	96 22	120.6	45 48.0	96 22	120.2	47 14.3	96 23	119.5	48 40.4	96 23	118.9
50	44 36.9	96 23	119.5	45 34.5	96 23	119.1	47 00.7	96 23	118.4	48 26.7	95 23	117.8
1	44 23.4	96 23	118.4	45 20.9	96 23	118.0	46 47.0	96 23	117.4	48 12.9	95 23	116.7
2	44 09.6	96 23	117.3	45 07.1	96 23	116.9	46 33.2	96 23	116.3	47 59.0	95 23	115.6
3	43 55.8	96 23	116.2	44 53.2	96 23	115.8	46 19.2	95 24	115.2	47 44.9	95 24	114.5
4	43 41.8	96 24	115.1	44 39.1	96 24	114.7	46 05.1	95 24	114.1	47 30.7	95 24	113.4
55	43 27.6	96 24	114.1	44 25.0	95 24	113.7	45 50.8	95 24	113.0	47 16.4	95 24	112.4
6	43 13.4	96 24	113.0	44 10.7	95 24	112.6	45 36.5	95 24	112.0	47 02.0	95 24	111.3
7	42 59.1	95 24	112.0	43 56.3	95 24	111.5	45 22.0	95 24	110.9	46 47.5	95 24	110.2
8	42 44.6	95 24	110.9	43 41.8	95 24	110.5	45 07.5	95 24	109.8	46 32.9	95 25	109.2
9	42 30.0	95 24	109.9	43 27.2	95 24	109.4	44 52.8	95 25	108.8	46 18.2	95 25	108.1
60	42 15.4	95 25	108.8	43 12.5	95 25	108.4	44 38.1	95 25	107.7	46 03.4	95 25	107.1
1	42 00.6	95 25	107.8	42 57.8	95 25	107.4	44 23.2	95 25	106.7	45 48.5	95 25	106.0
2	41 45.8	95 25	106.7	42 42.9	95 25	106.3	44 08.3	95 25	105.7	45 33.5	95 25	105.0
3	41 30.9	95 25	105.7	42 27.9	95 25	105.3	43 53.3	95 25	104.6	45 18.5	95 25	104.0
4	41 15.9	95 25	104.7	42 12.9	95 25	104.3	43 38.3	95 25	103.6	45 03.4	94 25	102.9
65	41 00.9	95 25	103.7	41 57.8	95 25	103.2	43 23.1	95 25	102.6	44 48.2	94 25	101.9
6	40 45.7	95 25	102.6	41 42.7	95 25	102.2	43 08.0	95 25	101.6	44 33.0	94 25	100.9
7	40 30.6	95 25	101.6	41 27.5	95 25	101.2	42 52.7	95 26	100.6	44 17.7	94 26	99.9
8	40 15.3	95 25	100.6	41 12.2	95 26	100.2	42 37.4	95 26	99.5	44 02.4	94 26	98.9
9	40 00.0	95 26	99.6	40 56.9	95 26	99.2	42 22.1	95 26	98.5	43 47.0	94 26	97.9
70	39 44.7	95 26	98.6	40 41.6	95 26	98.2	42 06.7	94 26	97.5	43 31.6	94 26	96.9
1	39 29.3	95 26	97.6	40 26.2	95 26	97.2	41 51.3	94 26	96.6	43 16.2	94 26	95.9
2	39 13.9	95 26	96.6	40 10.8	95 26	96.2	41 35.9	94 26	95.6	43 00.7	94 26	94.9
3	38 58.5	95 26	95.6	39 55.3	95 26	95.2	41 20.4	94 26	94.6	42 45.2	94 26	93.9
4	38 43.0	95 26	94.7	39 39.8	95 26	94.2	41 04.9	94 26	93.6	42 29.7	94 26	92.9
75	38 27.5	95 26	93.7	39 24.3	95 26	93.3	40 49.4	94 26	92.6	42 14.2	94 26	91.9
6	38 12.0	95 26	92.7	39 08.8	95 26	92.3	40 33.9	94 26	91.6	41 58.7	94 26	91.0
7	37 56.5	95 26	91.7	38 53.3	95 26	91.3	40 18.4	94 26	90.7	41 43.2	94 26	90.0
8	37 41.0	95 26	90.7	38 37.8	95 26	90.3	40 02.8	94 26	89.7	41 27.6	94 26	89.0
9	37 25.4	95 26	89.8	38 22.3	95 26	89.4	39 47.3	94 26	88.7	41 12.1	94 26	88.1
80	37 09.9	95 26	88.8	38 06.7	95 26	88.4	39 31.8	94 26	87.8	40 56.6	94 26	87.1
1	36 54.4	95 26	87.9	37 51.2	95 26	87.5	39 16.3	94 26	86.8	40 41.1	94 26	86.2
2	36 38.9	95 26	86.9	37 35.7	95 26	86.5	39 00.8	94 26	85.9	40 25.6	94 26	85.2
3	36 23.4	95 26	85.9	37 20.2	95 26	85.5	38 45.3	94 26	84.9	40 10.2	94 26	84.3
4	36 07.9	95 26	85.0	37 04.7	95 26	84.6	38 29.8	94 26	84.0	39 54.7	94 26	83.3
85	35 52.4	95 26	84.0	36 49.3	95 26	83.7	38 14.4	94 26	83.0	39 39.3	94 26	82.4
6	35 37.0	95 26	83.1	36 33.9	95 26	82.7	37 59.0	94 26	82.1	39 23.9	94 26	81.5
7	35 21.6	96 26	82.2	36 18.5	95 26	81.8	37 43.6	95 26	81.2	39 08.6	94 26	80.5
8	35 06.2	95 26	81.2	36 03.1	95 26	80.8	37 28.3	95 25	80.2	38 53.3	94 25	79.6
9	34 50.9	95 25	80.3	35 47.8	95 25	79.9	37 13.0	95 25	79.3	38 38.0	94 25	78.7
90	34 35.6	95 25	79.4	35 32.6	95 25	79.0	36 57.8	95 25	78.4	38 22.8	94 25	77.7

H.A.	42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	57 00.0	1.0 00	180.0	57 30.0	1.0 00	180.0	58 00.0	1.0 00	180.0	60 00.0	1.0 00	180.0	00
1	56 59.8	1.0 01	178.7	57 29.8	1.0 01	178.6	57 59.8	1.0 01	178.6	59 59.8	1.0 01	178.6	1
2	56 59.3	1.0 02	177.3	57 29.3	1.0 02	177.3	57 59.3	1.0 02	177.2	59 59.2	1.0 02	177.2	2
3	56 58.3	1.0 02	175.9	57 28.3	1.0 02	175.9	57 58.3	1.0 02	175.9	59 58.3	1.0 02	175.8	3
4	56 57.0	1.0 03	174.5	57 27.0	1.0 03	174.5	57 57.0	1.0 03	174.5	59 56.9	1.0 03	174.3	4
05	56 55.4	1.0 03	173.2	57 25.4	1.0 03	173.1	57 55.3	1.0 03	173.1	59 55.2	1.0 04	172.9	05
6	56 53.4	1.0 04	171.8	57 23.3	1.0 04	171.8	57 53.3	1.0 04	171.7	59 53.1	1.0 04	171.5	6
7	56 51.0	1.0 05	170.5	57 20.9	1.0 05	170.4	57 50.9	1.0 05	170.4	59 50.6	1.0 05	170.1	7
8	56 48.2	1.0 05	169.1	57 18.2	1.0 05	169.1	57 48.1	1.0 05	169.0	59 47.8	1.0 05	168.7	8
9	56 45.1	1.0 06	167.8	57 15.0	1.0 06	167.7	57 44.9	1.0 06	167.6	59 44.6	1.0 06	167.3	9
10	56 41.6	1.0 06	166.4	57 11.5	1.0 06	166.3	57 41.4	1.0 06	166.3	59 41.0	1.0 07	165.9	10
1	56 37.8	1.0 07	165.1	57 07.7	1.0 07	165.0	57 37.6	1.0 07	164.9	59 37.0	1.0 07	164.5	1
2	56 33.6	1.0 08	163.7	57 03.5	1.0 08	163.6	57 33.3	99 08	163.5	59 32.7	99 08	163.1	2
3	56 29.1	99 08	162.4	56 58.9	99 08	162.3	57 28.8	99 08	162.2	59 28.0	99 08	161.8	3
4	56 24.2	99 09	161.0	56 54.0	99 09	160.9	57 23.8	99 09	160.8	59 23.0	99 09	160.4	4
15	56 19.0	99 09	159.7	56 48.8	99 09	159.6	57 18.6	99 09	159.5	59 17.6	99 10	159.0	15
6	56 13.5	99 10	158.4	56 43.2	99 10	158.3	57 12.9	99 10	158.1	59 11.8	99 10	157.6	6
7	56 07.6	99 10	157.1	56 37.3	99 10	156.9	57 07.0	99 10	156.8	59 05.8	99 11	156.3	7
8	56 01.3	99 11	155.7	56 31.0	99 11	155.6	57 00.7	99 11	155.5	58 59.3	99 11	154.9	8
9	55 54.8	99 11	154.4	56 24.5	99 12	154.3	56 54.1	99 12	154.1	58 52.6	99 12	153.6	9
20	55 47.9	99 12	153.1	56 17.6	99 12	153.0	56 47.2	99 12	152.8	58 45.5	99 12	152.2	20
1	55 40.8	99 12	151.8	56 10.3	99 13	151.7	56 39.9	99 13	151.5	58 38.1	98 13	150.9	1
2	55 33.3	99 13	150.5	56 02.8	98 13	150.4	56 32.4	98 13	150.2	58 30.4	98 13	149.5	2
3	55 25.5	98 14	149.2	55 55.0	98 14	149.1	56 24.5	98 14	148.9	58 22.4	98 14	148.2	3
4	55 17.4	98 14	147.9	55 46.9	98 14	147.8	56 16.3	98 14	147.6	58 14.0	98 14	146.9	4
25	55 09.0	98 14	146.7	55 38.4	98 15	146.5	56 07.9	98 15	146.3	58 05.4	98 15	145.6	25
6	55 00.3	98 15	145.4	55 29.7	98 15	145.2	55 59.1	98 15	145.0	57 56.5	98 15	144.3	6
7	54 51.4	98 15	144.1	55 20.7	98 15	143.9	55 50.1	98 16	143.8	57 47.3	98 16	143.0	7
8	54 42.1	98 16	142.9	55 11.4	98 16	142.7	55 40.7	98 16	142.5	57 37.8	97 16	141.7	8
9	54 32.6	98 16	141.6	55 01.9	98 16	141.4	55 31.1	98 16	141.2	57 28.0	97 17	140.4	9
30	54 22.8	98 17	140.4	54 52.1	97 17	140.2	55 21.3	97 17	140.0	57 18.0	97 17	139.1	30
1	54 12.8	97 17	139.1	54 42.0	97 17	138.9	55 11.2	97 17	138.7	57 07.7	97 18	137.9	1
2	54 02.5	97 18	137.9	54 31.7	97 18	137.7	55 00.8	97 18	137.5	56 57.1	97 18	136.6	2
3	53 52.0	97 18	136.7	54 21.1	97 18	136.5	54 50.2	97 18	136.2	56 46.3	97 18	135.3	3
4	53 41.2	97 18	135.4	54 10.3	97 18	135.2	54 39.3	97 18	135.0	56 35.3	96 19	134.1	4
35	53 30.2	97 19	134.2	53 59.2	97 19	134.0	54 28.2	97 19	133.8	56 24.0	96 19	132.9	35
6	53 18.9	97 19	133.0	53 47.9	97 19	132.8	54 16.9	97 19	132.6	56 12.5	96 20	131.6	6
7	53 07.5	97 19	131.8	53 36.4	96 20	131.6	54 05.4	96 20	131.4	56 00.8	96 20	130.4	7
8	52 55.8	96 20	130.6	53 24.7	96 20	130.4	53 53.6	96 20	130.2	55 48.9	96 20	129.2	8
9	52 43.9	96 20	129.4	53 12.8	96 20	129.2	53 41.6	96 20	129.0	55 36.8	96 21	128.0	9
40	52 31.8	96 20	128.3	53 00.6	96 21	128.0	53 29.5	96 21	127.8	55 24.4	96 21	126.8	40
1	52 19.5	96 21	127.1	52 48.3	96 21	126.9	53 17.1	96 21	126.6	55 11.9	95 21	125.6	1
2	52 07.0	96 21	125.9	52 35.8	96 21	125.7	53 04.5	96 21	125.5	54 59.2	95 22	124.4	2
3	51 54.4	96 21	124.8	52 23.1	96 22	124.5	52 51.8	96 22	124.3	54 46.3	95 22	123.3	3
4	51 41.5	96 22	123.6	52 10.2	96 22	123.4	52 38.9	96 22	123.1	54 33.2	95 22	122.1	4
45	51 28.5	96 22	122.5	51 57.2	95 22	122.2	52 25.8	95 22	122.0	54 20.0	95 22	121.0	45
6	51 15.3	96 22	121.3	51 43.9	95 22	121.1	52 12.5	95 22	120.8	54 06.6	95 23	119.8	6
7	51 02.0	95 22	120.2	51 30.6	95 23	120.0	51 59.1	95 23	119.7	53 53.1	95 23	118.7	7
8	50 48.5	95 23	119.1	51 17.0	95 23	118.8	51 45.6	95 23	118.6	53 39.4	95 23	117.5	8
9	50 34.8	95 23	118.0	51 03.4	95 23	117.7	51 31.9	95 23	117.5	53 25.5	94 23	116.4	9
50	50 21.0	95 23	116.9	50 49.5	95 23	116.6	51 18.0	95 23	116.4	53 11.5	94 24	115.3	50
1	50 07.1	95 23	115.7	50 35.6	95 23	115.5	51 04.0	95 24	115.2	52 57.4	94 24	114.2	1
2	49 53.1	95 24	114.7	50 21.5	95 24	114.4	50 49.9	95 24	114.2	52 43.2	94 24	113.1	2
3	49 38.9	95 24	113.6	50 07.3	95 24	113.3	50 35.7	95 24	113.1	52 28.9	94 24	112.0	3
4	49 24.6	95 24	112.5	49 53.0	95 24	112.2	50 21.3	94 24	112.0	52 14.4	94 24	110.9	4
55	49 10.2	95 24	111.4	49 38.6	94 24	111.1	50 06.9	94 24	110.9	51 59.9	94 24	109.8	55
6	48 55.7	95 24	110.3	49 24.0	94 24	110.1	49 52.3	94 24	109.8	51 45.2	94 25	108.7	6
7	48 41.1	94 24	109.3	49 09.4	94 25	109.0	49 37.7	94 25	108.8	51 30.4	94 25	107.7	7
8	48 26.4	94 25	108.2	48 54.7	94 25	107.9	49 22.9	94 25	107.7	51 15.6	94 25	106.6	8
9	48 11.6	94 25	107.1	48 39.8	94 25	106.9	49 08.1	94 25	106.6	51 00.7	94 25	105.6	9
60	47 56.7	94 25	106.1	48 24.9	94 25	105.8	48 53.2	94 25	105.6	50 45.7	94 25	104.5	60
1	47 41.7	94 25	105.1	48 10.0	94 25	104.8	48 38.2	94 25	104.5	50 30.6	93 25	103.5	1
2	47 26.7	94 25	104.0	47 54.9	94 25	103.8	48 23.1	94 25	103.5	50 15.5	93 25	102.4	2
3	47 11.6	94 25	103.0	47 39.8	94 25	102.7	48 08.0	94 25	102.5	50 00.3	93 25	101.4	3
4	46 56.4	94 25	102.0	47 24.6	94 25	101.7	47 52.8	94 25	101.5	49 45.0	93 25	100.4	4
65	46 41.2	94 25	100.9	47 09.4	94 25	100.7	47 37.5	94 26	100.4	49 29.7	93 26	99.4	65
6	46 25.9	94 26	99.9	46 54.1	94 26	99.7	47 22.2	94 26	99.4	49 14.4	93 26	98.3	6
7	46 10.6	94 26	98.9	46 38.8	94 26	98.7	47 06.9	94 26	98.4	48 59.0	93 26	97.3	7
8	45 55.3	94 26	97.9	46 23.4	94 26	97.7	46 51.5	94 26	97.4	48 43.6	93 26	96.3	8
9	45 39.9	94 26	96.9	46 08.0	94 26	96.7	46 36.1	94 26	96.4	48 28.1	93 26	95.3	9
70	45 24.4	94 26	95.9	45 52.6	94 26	95.7	46 20.7	94 26	95.4	48 12.7	93 26	94.4	70
1	45 09.0	94 26	94.9	45 37.1	94 26	94.7	46 05.2	94 26	94.4	47 57.2	93 26	93.4	1
2	44 53.5	94 26	93.9	45 21.6	94 26	93.7	45 49.7	94 26	93.4	47 41.7	93 26	92.4	2
3	44 38.0	94 26	93.0	45 06.1	94 26	92.7	45 34.2	94 26	92.5	47 26.2	93 26	91.4	3
4	44 22.5	94 26	92.0	44 50.6	94 26	91.7	45 18.7	94 26	91.5	47 10.6	93 26	90.4	4
75	44 07.0	94 26	91.0	44 35.1	94 26	90.8	45 03.1	94 26	90.5	46 55.1	93 26	89.5	75
6	43 51.4	94 26	90.0	44 19.5	94 26	89.8	44 47.6	94 26	89.5	46 39.6	93 26	88.5	6
7	43 35.9	94 26	89.1	44 04.0	94 26	88.8	44 32.1	94 26	88.6	46 24.0	93 26	87.6	7
8	43 20.4	94 26	88.1	43 48.5	94 26	87.9	44 16.6	94 26	87.6	46 08.5	93 26	86.6	8
9	43 04.9	94 26	87.2	43 33.0	94 26	86.9	44 01.0	94 26	86.7	45 53.0	93 26	85.7	9
80	42 49.4	94 26	86.2	43 17.5	94 26	86.0	43 45.6	94 26	85.7	45 37.6	93 26	84.7	80
1	42 33.9	94 26	85.3	43 02.0	94 26	85.0	43 30.1	94 26	84.8	45 22.1	93 26	83.8	1
2	42 18.4	94 26	84.3	42 46.5	94 26	84.1	43 14.6	94 26	83.8	45 06.7	93 26	82.8	2
3	42 03.0	94 26	83.4	42 31.1	94 26	83.1	42 59.2	94 26	82.9	44 51.3	93 26	81.9	3
4	41 47.6	94 26	82.4	42 15.7	94 26	82.2	42 43.8	94 26	82.0	44 36.0	93 26	81.0	4
85	41 32.2	94 26	81.5	42 00.3	94 26	81.3	42 28.4	94 26	81.0	44 20.6	93 25	80.1	85
6	41 16.8	94 26	80.6	41 45.0	94 26	80.3	42 13.1	94 25	80.1	44 05.4	93 25	79.1	6
7	41 01.5	94 25	79.6	41 29.7	94 25	79.4	41 57.9	94 25	79.2	43 50.1	93 25	78.2	7
8	40 46.3	94 25	78.7	41 14.5	94 25	78.5	41 42.6	94 25	78.3	43 35.0	93 25	77.3	8
9	40 31.1	94 25	77.8	40 59.3	94 25	77.6	41 27.4	94 25	77.3	43 19.8	93 25	76.4	9
90	40 15.9	94 25	76.9	40 44.1	94 25	76.7	41 12.3	94 25	76.4	43 04.8	93 25	75.5	90

Lat. 75°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
91	34 20.4	96 25	78.4	35 17.3	96 25	78.0	36 42.6	95 25	77.4	38 07.7	94 25	76.8	40 00.8	94 25	76.0	40 29.1	94 25	75.7	40 57.3	94 25	75.5	42 49.8	94 25	74.6	91
2	34 05.2	96 25	77.5	35 02.2	96 25	77.1	36 27.5	95 25	76.5	37 52.6	94 25	75.9	39 45.8	94 25	75.1	40 14.0	94 25	74.8	40 42.3	94 25	74.6	42 34.8	94 25	73.7	2
3	33 50.1	96 25	76.6	34 47.1	96 25	76.2	36 12.4	95 25	75.6	37 37.6	95 25	75.0	39 30.8	94 25	74.1	39 59.1	94 25	73.9	40 27.3	94 25	73.7	42 20.0	94 25	72.8	3
4	33 35.0	96 25	75.6	34 32.0	95 25	75.3	35 57.4	95 25	74.7	37 22.6	95 25	74.1	39 15.9	94 25	73.2	39 44.2	94 25	73.0	40 12.4	94 25	72.8	42 05.2	94 25	71.9	4
95	33 20.0	95 25	74.7	34 17.0	95 25	74.3	35 42.5	95 25	73.8	37 07.7	95 25	73.2	39 01.1	94 25	72.3	39 29.4	94 25	72.1	39 57.6	94 25	71.9	41 50.4	94 24	71.0	95
6	33 05.0	95 25	73.8	34 02.1	95 25	73.4	35 27.6	95 25	72.9	36 52.9	95 25	72.3	38 46.3	94 24	71.4	39 14.6	94 24	71.2	39 42.9	94 24	71.0	41 35.8	94 24	70.1	6
7	32 50.2	96 25	72.9	33 47.3	95 25	72.5	35 12.8	95 25	71.9	36 38.1	95 24	71.4	38 31.7	94 24	70.5	39 00.0	94 24	70.3	39 28.3	94 24	70.1	41 21.2	94 24	69.2	7
8	32 35.4	96 25	72.0	33 32.5	95 24	71.6	34 58.1	95 24	71.0	36 23.5	95 24	70.5	38 17.0	95 24	69.6	38 45.4	94 24	69.4	39 13.7	94 24	69.2	41 06.8	94 24	68.3	8
9	32 20.6	95 24	71.0	33 17.8	95 24	70.7	34 43.4	95 24	70.1	36 08.9	95 24	69.6	38 02.5	95 24	68.7	38 30.9	95 24	68.5	38 59.2	94 24	68.3	40 52.4	94 24	67.5	9
100	32 06.0	95 24	70.1	33 03.2	95 24	69.8	34 28.8	95 24	69.2	35 54.4	95 24	68.7	37 48.1	95 24	67.9	38 16.5	95 24	67.6	38 44.9	95 24	67.4	40 38.1	94 24	66.6	100
1	31 51.4	95 24	69.2	32 48.7	95 24	68.9	34 14.4	95 24	68.3	35 39.9	95 24	67.8	37 33.8	95 24	67.0	38 02.2	95 24	66.8	38 30.6	95 24	66.6	40 23.9	94 24	65.7	1
2	31 37.0	95 24	68.3	32 34.2	95 24	68.0	34 00.0	95 24	67.4	35 25.6	95 24	66.9	37 19.5	95 24	66.1	37 48.0	95 24	65.9	38 16.4	95 24	65.7	40 09.8	94 23	64.8	2
3	31 22.6	96 24	67.4	32 19.9	95 24	67.1	33 45.7	95 24	66.5	35 11.4	95 24	66.0	37 05.4	95 23	65.2	37 33.8	95 23	65.0	38 02.3	95 23	64.8	39 55.8	94 23	64.0	3
4	31 08.3	96 24	66.5	32 05.6	96 24	66.2	33 31.5	95 24	65.6	34 57.2	95 23	65.1	36 51.3	95 23	64.3	37 19.8	95 23	64.1	37 48.3	95 23	63.9	39 41.9	95 23	63.1	4
105	30 54.1	96 23	65.6	31 51.5	96 23	65.3	33 17.4	95 23	64.7	34 43.2	95 23	64.2	36 37.4	95 23	63.4	37 05.9	95 23	63.2	37 34.4	95 23	63.0	39 28.1	95 23	62.2	105
6	30 40.0	96 23	64.7	31 37.4	96 23	64.4	33 03.4	95 23	63.8	34 29.3	95 23	63.3	36 23.6	95 23	62.6	36 52.1	95 23	62.4	37 20.6	95 23	62.2	39 14.4	95 23	61.4	6
7	30 26.0	96 23	63.8	31 23.5	96 23	63.5	32 49.5	96 23	63.0	34 15.5	95 23	62.4	36 09.8	95 23	61.7	36 38.4	95 23	61.5	37 06.9	95 23	61.3	39 00.8	95 22	60.5	7
8	30 12.1	96 23	62.9	31 09.6	96 23	62.6	32 35.8	96 23	62.1	34 01.8	95 23	61.5	35 56.2	95 22	60.8	36 24.8	95 22	60.6	36 53.3	95 22	60.4	38 47.4	95 22	59.6	8
9	29 58.4	96 23	62.0	30 55.9	96 23	61.7	32 22.1	96 23	61.2	33 48.2	96 22	60.7	35 42.7	95 22	59.9	36 11.3	95 22	59.7	36 39.9	95 22	59.6	38 34.0	95 22	58.8	9
110	29 44.7	96 23	61.1	30 42.3	96 22	60.8	32 08.5	96 22	60.3	33 34.7	96 22	59.8	35 29.3	95 22	59.1	35 58.0	95 22	58.9	36 26.6	95 22	58.7	38 20.8	95 22	57.9	110
1	29 31.2	96 22	60.2	30 28.8	96 22	59.9	31 55.1	96 22	59.4	33 21.3	96 22	58.9	35 16.1	96 22	58.2	35 44.7	95 22	58.0	36 13.4	95 22	57.8	38 07.7	95 22	57.1	1
2	29 17.7	96 22	59.3	30 15.4	96 22	59.0	31 41.8	96 22	58.5	33 08.1	96 22	58.0	35 02.9	96 22	57.3	35 31.6	96 22	57.1	36 00.3	95 22	57.0	37 54.7	95 21	56.2	2
3	29 04.5	96 22	58.4	30 02.2	96 22	58.1	31 28.6	96 22	57.6	32 55.0	96 22	57.1	34 49.9	96 21	56.4	35 18.6	96 21	56.3	35 47.3	96 21	56.1	37 41.9	95 21	55.3	3
4	28 51.3	96 22	57.5	29 49.0	96 22	57.2	31 15.6	96 22	56.8	32 42.0	96 22	56.3	34 37.1	96 21	55.6	35 05.8	96 21	55.4	35 34.5	96 21	55.2	37 29.2	95 21	54.5	4
115	28 38.2	96 22	56.7	29 36.0	96 21	56.4	31 02.7	96 21	55.9	32 29.2	96 21	55.4	34 24.3	96 21	54.7	34 53.1	96 21	54.5	35 21.8	96 21	54.4	37 16.6	95 21	53.6	115
6	28 25.3	96 21	55.8	29 23.2	96 21	55.5	30 49.9	96 21	55.0	32 16.4	96 21	54.5	34 11.7	96 21	53.9	34 40.5	96 21	53.7	35 09.3	96 21	53.5	37 04.2	96 20	52.8	6
7	28 12.6	97 21	54.9	29 10.5	96 21	54.6	30 37.2	96 21	54.1	32 03.9	96 21	53.7	33 59.2	96 21	53.0	34 28.1	96 20	52.8	34 56.8	96 20	52.7	36 51.9	96 20	52.0	7
8	27 59.9	97 21	54.0	28 57.9	97 21	53.7	30 24.7	96 21	53.2	31 51.4	96 20	52.8	33 46.9	96 20	52.1	34 15.7	96 20	52.0	34 44.6	96 20	51.8	36 39.7	96 20	51.1	8
9	27 47.4	97 21	53.1	28 45.4	97 21	52.8	30 12.3	97 20	52.4	31 39.1	96 20	51.9	33 34.7	96 20	51.3	34 03.6	96 20	51.1	34 32.4	96 20	50.9	36 27.7	96 20	50.3	9
120	27 35.1	97 20	52.2	28 33.1	97 20	51.9	30 00.1	97 20	51.5	31 27.0	96 20	51.0	33 22.7	96 20	50.4	33 51.6	96 20	50.3	34 20.5	96 20	50.1	36 15.8	96 20	49.4	120
1	27 22.9	97 20	51.3	28 21.0	97 20	51.1	29 48.0	97 20	50.6	31 15.0	97 20	50.2	33 10.8	96 20	49.6	33 39.7	96 20	49.4	34 08.6	96 19	49.2	36 04.1	96 19	48.6	1
2	27 10.8	97 20	50.5	28 09.0	97 20	50.2	29 36.1	97 20	49.8	31 03.1	97 20	49.3	32 59.0	97 19	48.7	33 28.0	96 19	48.5	33 56.9	96 19	48.4	35 52.6	96 19	47.7	2
3	26 58.9	97 20	49.6	27 57.1	97 20	49.3	29 24.3	97 19	48.9	30 51.4	97 19	48.5	32 47.5	97 19	47.8	33 16.4	97 19	47.7	33 45.4	96 19	47.5	35 41.1	96 19	46.9	3
4	26 47.2	97 19	48.7	27 45.4	97 19	48.4	29 12.7	97 19	48.0	30 39.9	97 19	47.6	32 36.0	97 19	47.0	33 05.0	97 19	46.8	33 34.0	97 19	46.7	35 29.9	96 18	46.1	4
125	26 35.6	97 19	47.8	27 33.9	97 19	47.6	29 01.2	97 19	47.1	30 28.5	97 19	46.7	32 24.7	97 19	46.1	32 53.8	97 18	46.0	33 22.8	97 18	45.8	35 18.8	97 18	45.2	125
6	26 24.2	97 19	46.9	27 22.5	97 19	46.7	28 49.9	97 19	46.3	30 17.3	97 18	45.9	32 13.6	97 18	45.3	32 42.7	97 18	45.1	33 11.7	97 18	45.0	35 07.8	97 18	44.4	6
7	26 12.9	97 18	46.1	27 11.3	97 18	45.8	28 38.8	97 18	45.4	30 06.2	97 18	45.0	32 02.7	97 18	44.4	32 31.8	97 18	44.3	33 00.8	97 18	44.2	34 57.0	97 18	43.6	7
8	26 01.8	97 18	45.2	27 00.2	97 18	44.9	28 27.8	97 18	44.5	29 55.3	97 18	44.1	31 51.9	97 18	43.6	32 21.0	97 18	43.4	32 50.1	97 18	43.3	34 46.4	97 17	42.7	8
9	25 50.9	97 18	44.3	26 49.3	97 18	44.1	28 17.0	97 18	43.7	29 44.6	97 18	43.3	31 41.3	97 17	42.7	32 10.4	97 17	42.6	32 39.5	97 17	42.5	34 36.0	97 17	41.9	9
130	25 40.1	98 18	43.4	26 38.6	98 18	43.2	28 06.4	97 17	42.8	29 34.0	97 17	42.4	31 30.8	97 17	41.9	32 00.0	97 17	41.8	32 29.1	97 17	41.6	34 25.7	97 17	41.0	130
1	25 29.5	98 17	42.6	26 28.1	98 17	42.3	27 55.9	98 17	42.0	29 23.6	97 17	41.6	31 20.5	97 17	41.0	31 49.7	97 17	40.9	32 18.9	97 17	40.8	34 15.6	97 17	40.2	1
2	25 19.1	98 17	41.7	26 17.7	98 17	41.5	27 45.6	98 17	41.1	29 13.4	98 17	40.7	31 10.4	97 17	40.2	31 39.6	97 17	40.1	32 08.9	97 16	39.9	34 05.6	97 16	39.4	2
3	25 08.9	98 17	40.8	26 07.5	98 17	40.6	27 35.5	98 17	40.2	29 03.4	98 16	39.9	31 00.5	98 16	39.4	31 29.7	98 16	39.2	31 59.0	97 16	39.1	33 55.9	97 16	38.6	3
4	24 58.8	98 16	39.9	25 57.5	98 16	39.7	27 25.5	98 16	39.4	28 53.5	98 16	39.0	30 50.7	98 16	38.5	31 20.0	98 16	38.4	31 49.3	98 16	38.3	33 46.3	97 16	37.7	4
135	24 48.9	98 16	39.1	25 47.7	98 16	38.8	27 15.8	98 16	38.5	28 43.8	98 16	38.1	30 41.1	98 16	37.7	31 10.4	98 16	37.5	31 39.7	98 16	37.4	33 36.9	98 15	36.9	135
6	24 39.2	98 16	38.2	25 38.0	98 16	38.0	27 06.2	98 16	37.6	28 34.3	98 16	37.3	30 31.7	98 15	36.8	31 01.1	98 15	36.7	31 30.4	98 15	36.6	33 27.6	98 15	36.1	6
7	24 29.7	98 16	37.3	25 28.6	98 15	37.1	26 56.8	98 15	36.8	28 25.0	98 15	36.4	30 22.5	98 15	36.0	30 51.9	98 15	35.9	31 21.2	98 15	35.7	33 18.6	98 15	35.2	7
8	24 20.4	98 15	36.5	25 19.3	98 15	36.2	26 47.6	98 15	35.9	28 15.9	98 15	35.6	30 13.5	98 15	35.1	30 42.9	98 15	35.0	31 12.3	98 15	34.9	33 09.7	98 14	34.4	8
9	24 11.3	98 15	35.6	25 10.2	98 15	35.4	26 38.6	98 15	35.1	28 06.9	98 15	34.7	30 04.6	98 14	34.3	30 34.1	98 14	34.2	31 03.5	98 14	34.1	33 01.0	98 14	33.6	9
140	24 02.3	98 15	34.7	25 01.3	98 14	34.5	26 29.8	98 14	34.2	27 58.2	98 14	33.9	29 56.0	98 14	33.5	30 25.4	98 14	33.3	30 54.9	98 14	33.2	32 52.5	98 14	32.8	140
1	23 53.6	98 14	33.8	24 52.6	98 14	33.6	26 21.1	98 14	33.3	27 49.6	98 14	33.0	29 47.5	98 14	32.6	30 17.0	98 14	32.5	30 46.4	98 14	32.4	32 44.2	98 14	31.9	1
2	23 45.0	98 14	33.0	24 44.1	98 14	32.8	26 12.7	98 14	32.5	27 41.2	98 14	32.2	29 39.3	98 13	31.8	30 08.7	98 13	31.7	30 38.2	98 13	31.6	32 36.1	98 13	31.1	2
3	23 36.7	99 14	32.1	24 35.8	99 14	31.9	26 04.5	98 13	31.6	27 33.1	98 13	31.3	29 31.2	98 13	30.9	30 00.7	98 13	30.8	30 30.2	98 13	30.7	32 28.2	98 13	30.3	3
4	23 28.5	99 13	31.2	24 27.7	99 13	31.0	25 56.4	99 13	30.8	27 25.1	99 13	30.5	29 23.3	98 13	30.1	29 52.8	98 13	30.0	30 22.4	98 13	29.9	32 20.4	98 13	29.5	4
145	23 20.6	99 13	30.4	24 19.8	99 13	30.2	25 48.6	99 13	29.9	27 17.3	99 13	29.6	29 15.6	99 12	29.2	29 45.2	99 12	29.1	30 14.7	99 12	29.1	32 12.9	98 12	28.6	145
6	23 12.8	99 13	29.5	24 12.1	99 12	29.3	25 40.9	99 12	29.1	27 09.7	99 12	28.8	29 08.1	99 12	28.4	29 37.7	99 12	28.3	30 07.3	99 12	28.2	32 05.6	99 12	27.8	6
7	23 05.3	99 12	28.6	24 04.6	99 12	28.5	25 33.5	99 12	28.2	27 02.4	99 12	27.9	29 00.8	99 12	27.6	29 30.4	99 12	27.5	30 00.0	99 12	27.4	31 58.4	99 12	27.0	7
8	22 58.0	99 12	27.8	23 57.3	99 12	27.6	25 26.3	99 12	27.3	26 55.2	99 12	27.1	28 53.7	99 11	26.7	29 23.4	99 11	26.6	29 53.0	99 11	26.6	31 51.5	99 11	26.2	8
9	22 50.8	99 12	26.9	23 50.2	99 11	26.7	25 19.2	99 11	26.5	26 48.2	99 11	26.2	28 46.9	99 11	25.9	29 16.5	99 11	25.8	29 46.2	99 11	25.7	31 44.7	99 11	25.4	9
150	22 43.9	99 11	26.0	23 43.3	99 11	25.9	25 12.4	99 11	25.6	26 41.5	99 11	25.4	28 40.2	99 11	25.1	29 09.9	99 11	25.0	29 39.5	99 11	24.9	31 38.2	99 11	24.5	150
1	22 37.2	99 11	25.1	23 36.7	99 11	25.0	25 05.8	99 11	24.8	26 34.9	99 11	24.5	28 33.7	99 10	24.2	29 03.4	99 10	24.1	29 33.1	99 10	24.1	31 31.8	99 10	23.7	1
2	22 30.7	99 10	24.3	23 30.2	99 10	24.1	24 59.4	99 10	23.9	26 28.6	99 10	23.7	28 27.4	99 10	23.4	28 57.2	99 10	23.3	29 26.9	99 10	23.2	31 25.7	99 10	22.9	2
3	22 24.4	99 10	23.4	23 24.0	99 10	23.3	24 53.2	99 10	23.1	26 22.4	99 10	22.8	28 21.4	99 10	22.5	28 51.1	99 10	22.5	29 20.8	99 10	22.4	31 19.7	99 10	22.1	3
4	22 18.4	99 10	22.5	23 17.9	99 10	22.4	24 47.2	99 10	22.2	26 16.5	99 10	22.0	28 15.5	99 09	21.7	28 45.3	99 09	21.6	29 15.0	99 09	21.6	31 14.0	99 09	21.3	4
155	22 12.5	99 09	21.7	23 12.1	99 09	21.5	24 41.5	99 09	21.3	26 10.8	99 09	21.1	28 09.9	99 09	20.9	28 39.7	99 09	20.8	29 09.4	99 09	20.7	31 08.5	99 09	20.4	155
6	22 06.9	99 09	20.8	23 06.5	99 09	20.7	24 35.9	99 09	20.5	26 05.3	99 09	20.3	28 04.5	99 09	20.0	28 34.3	99 09	20.0	29 04.0	99 09	19.9	31 03.1	99 09	19.6	6
7	22 01.5	99 09	19.9	23 01.1	99 09	19.8	24 30.6	99 09	19.6	26 00.0	99 08	19.5	27 59.3	99 08	19.2	28 29.1	99 08	19.1	28 58.9	99 08	19.1	30 58.0	99 08	18.8	7
8	21 56.3	99 08	19.1	22 56.0	99 08	19.0	24 25.5	99 08	18.8	25 55.0	99 08	18.6	27 54.3	99 08	18.4	28 24.1	99 08	18.3	28 53.9	99 08	18.2	30 53.1	99 08	18.0	8
9	21 51.4	99 08	18.2	22 51.1	99 08	18.1	24 20.6	99 08	17.9	25 50.1	99 08	17.8	27 49.5	99 08	17.5	28 19.3	99 08	17.5	28 49.1	99 08	17.4	30 48.5	99 07	17.2	9
160	21 46.6	1.00 08	17.3	22 46.3	1.00 08	17.2	24 15.9	1.00 07	17.1	25 45.5	1.00 07	16.9	27 44.9	99 07	16.7	28 14.8	99 07	16.6	28 44.6	99 07	16.6	30 44.0	99 07	16.3	160
1	21 42.1	1.00 07	16.5	22 41.9	1.00 07	16.4	24 11.5	1.00 07	16.2	25 41.1	1.00 07	16.1	27 40.6	1.00 07	15.9	28 10.4	1.00 07	15.8	28 40.3	1.00 07	15.7	30 39.7	1.00 07	15.5	1
2	21 37.8	1.00 07	15.6	22 37.6	1.00 07	15.5	24 07.3	1.00 07	15.4	25 36.9	1.00 07	15.2	27 36.4	1.00 07	15.0	28 06.3	1.00 06	15.0	28 36.2	1.00 06	14.9	30 35.7	1.00 06	14.7	2
3	21 33.8	1.00 06	14.7	22 33.6	1.00 06	14.6	24 03.2	1.00 06	14.5	25 32.9	1.00 06	14.4	27 32.5	1.00 06	14.2	28 02.4	1.00 06	14.1	28 32.3	1.00 06	14.1	30 31.8	1.00 06	13.9	3
4	21 29.9	1.00 06	13.9	22 29.7	1.00 06	13.8	23 59.5	1.00 06	13.7	25 29.2	1.00 06	13.5	27 28.8	1.00 06	13.3	27 58.7	1.00 06	13.3	28 28.6	1.00 06	13.3	30 28.2	1.00 06	13.1	4
165	21 26.3	1.00 06	13.0	22 26.2	1.00 06	12.9	23 55.9	1.00 06	12.8	25 25.7	1.00 06	12.7	27 25.3	1.00 05	12.5	27 55.2	1.00 05	12.5	28 25.2	1.00 05	12.4	30 24.8	1.00 05	12.3	165
6	21 22.9	1.00 05	12.1	22 22.8	1.00 05	12.1	23 52.6	1.00 05	11.9	25 22.4	1.00 05	11.8	27 22.1	1.00 05	11.7	27 52.0	1.00 05	11.6	28 21.9	1.00 05	11.6	30 21.6	1.00 05	11.4	6
7	21 19.8	1.00 05	11.3	22 19.7	1.00 05	11.2	23 49.5	1.00 05	11.1	25 19.3	1.00 05	11.0	27 19.0	1.00 05	10.8	27 49.0	1.00 05	10.8	28 18.9	1.00 05	10.8	30 18.6	1.00 05	10.6	7
8	21 16.9	1.00 04	10.4	22 16.8	1.00 04	10.3	23 46.6	1.00 04	10.2	25 16.5	1.00 04	10.1	27 16.2	1.00 04	10.0	27 46.2	1.00 04	10.0	28 16.1	1.00 04	09.9	30 15.9	1.00 04	09.8	8
9	21 14.2	1.00 04	09.5	22 14.1	1.00 04	09.5	23 44.0	1.00 04	09.4	25 13.8	1.00 04	09.3	27 13.6	1.00 04	09.2	27 43.6	1.00 04	09.1	28 13.6	1.00 04	09.1	30 13.4	1.00 04	09.0	9
170	21 11.7	1.00 04	08.7	22 11.7	1.00 04	08.6	23 41.5	1.00 04	08.5	25 11.4	1.00 04	08.5	27 11.3	1.00 04	08.3	27 41.2	1.00 04	08.3	28 11.2	1.00 04	08.3	30 11.0	1.00 04	08.2	170
1	21 09.5	1.00 03	07.8	22 09.4	1.00 03	07.8	23 39.4	1.00 03	07.7	25 09.3	1.00 03	07.6	27 09.1	1.00 03	07.5	27 39.1	1.00 03	07.5	28 09.1	1.00 03	07.5	30 09.0	1.00 03	07.3	1
2	21 07.5	1.00 03	06.9	22 07.5	1.00 03	06.9	23 37.4	1.00 03	06.8	25 07.3	1.00 03	06.8	27 07.2	1.00 03	06.7	27 37.2	1.00 03	06.6	28 07.2	1.00 03	06.6	30 07.1	1.00 03	06.5	2
3	21 05.7	1.00 03	06.1	22 05.7	1.00 03	06.0	23 35.7	1.00 02	06.0	25 05.6	1.00 02	05.9	27 05.5	1.00 02	05.8	27 35.5	1.00 02	05.8	28 05.5	1.00 02	05.8	30 05.4	1.00 02	05.7	3
4	21 04.2	1.00 02	05.2	22 04.2	1.00 02	05.2	23 34.2	1.00 02	05.1	25 04.1	1.00 02	05.1	27 04.1	1.00 02	05.0	27 34.1	1.00 02	05.0	28 04.0	1.00 02	05.0	30 04.0	1.00 02	04.9	4
175	21 02.9	1.00 02	04.3	22 02.9	1.00 02	04.3	23 32.9	1.00 02	04.3	25 02.9	1.00 02	04.2	27 02.8	1.00 02	04.2	27 32.8	1.00 02	04.2	28 02.8	1.00 02	04.1	30 02.8	1.00 02	04.1	175
6	21 01.9	1.00 01	03.5	22 01.9	1.00 01	03.4	23 31.8	1.00 01	03.4	25 01.8	1.00 01	03.4	27 01.8	1.00 01	03.3	27 31.8	1.00 01	03.3	28 01.8	1.00 01	03.3	30 01.8	1.00 01	03.3	6
7	21 01.1	1.00 01	02.6	22 01.1	1.00 01	02.6	23 31.0	1.00 01	02.6	25 01.0	1.00 01	02.5	27 01.0	1.00 01	02.5	27 31.0	1.00 01	02.5	28 01.0	1.00 01	02.5	30 01.0	1.00 01	02.4	7
8	21 00.5	1.00 01	01.7	22 00.5	1.00 01	01.7	23 30.5	1.00 01	01.7	25 00.5	1.00 01	01.7	27 00.5	1.00 01	01.7	27 30.5	1.00 01	01.7	28 00.4	1.00 01	01.7	30 00.4	1.00 01	01.6	8
9	21 00.1	1.00 00	00.9	22 00.1	1.00 00	00.9	23 30.1	1.00 00	00.9	25 00.1	1.00 00	00.8	27 00.1	1.00 00	00.8	27 30.1	1.00 00	00.8	28 00.1	1.00 00	00.8	30 00.1	1.00 00	00.8	9
180	21 00.0	1.00 00	00.0	22 00.0	1.00 00	00.0	23 30.0	1.00 00	00.0	25 00.0	1.00 00	00.0	27 00.0	1.00 00	00.0	27 30.0	1.00 00	00.0	28 00.0	1.00 00	00.0	30 00.0	1.00 00	00.0	180

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	61 00.0	1.0 00	180.0	62 00.0	1.0 00	180.0	63 30.0	1.0 00	180.0	64 30.0	1.0 00	180.0	65 30.0	1.0 00	180.0	66 30.0	1.0 00	180.0	67 30.0	1.0 00	180.0	69 00.0	1.0 00	180.0	00
1	60 59.8	1.0 01	178.6	61 59.8	1.0 01	178.5	63 29.8	1.0 01	178.5	64 29.8	1.0 01	178.5	65 29.8	1.0 01	178.5	66 29.8	1.0 01	178.4	67 29.8	1.0 01	178.4	68 59.8	1.0 01	178.4	1
2	60 59.2	1.0 02	177.1	61 59.2	1.0 02	177.1	63 29.2	1.0 02	177.0	64 29.2	1.0 02	177.0	65 29.2	1.0 02	176.9	66 29.2	1.0 02	176.9	67 29.1	1.0 02	176.8	68 59.1	1.0 02	176.7	2
3	60 58.3	1.0 02	175.7	61 58.2	1.0 02	175.6	63 28.2	1.0 02	175.5	64 28.2	1.0 02	175.5	65 28.1	1.0 02	175.4	66 28.1	1.0 02	175.3	67 28.1	1.0 03	175.2	68 58.0	1.0 03	175.1	3
4	60 56.9	1.0 03	174.3	61 56.9	1.0 03	174.2	63 26.8	1.0 03	174.1	64 26.7	1.0 03	174.0	65 26.7	1.0 03	173.9	66 26.6	1.0 03	173.8	67 26.6	1.0 03	173.6	68 56.4	1.0 03	173.4	4
05	60 55.2	1.0 04	172.8	61 55.1	1.0 04	172.7	63 25.0	1.0 04	172.6	64 24.9	1.0 04	172.5	65 24.8	1.0 04	172.3	66 24.7	1.0 04	172.2	67 24.6	1.0 04	172.1	68 54.5	1.0 04	171.8	05
6	60 53.0	1.0 04	171.4	61 52.9	1.0 04	171.3	63 22.8	1.0 04	171.1	64 22.7	1.0 04	171.0	65 22.5	1.0 04	170.8	66 22.4	1.0 05	170.7	67 22.3	1.0 05	170.5	68 52.0	1.0 05	170.2	6
7	60 50.5	1.0 05	170.0	61 50.4	1.0 05	169.9	63 20.2	1.0 05	169.6	64 20.0	1.0 05	169.5	65 19.9	1.0 05	169.3	66 19.7	1.0 05	169.1	67 19.5	1.0 05	168.9	68 49.2	1.0 06	168.6	7
8	60 47.6	1.0 05	168.6	61 47.5	1.0 06	168.4	63 17.2	1.0 06	168.2	64 17.0	1.0 06	168.0	65 16.8	1.0 06	167.8	66 16.5	1.0 06	167.6	67 16.3	1.0 06	167.3	68 45.9	1.0 06	166.9	8
9	60 44.4	1.0 06	167.2	61 44.2	1.0 06	167.0	63 13.8	1.0 06	166.7	64 13.6	1.0 06	166.5	65 13.3	1.0 06	166.3	66 13.0	99 07	166.0	67 12.7	99 07	165.8	68 42.2	99 07	165.3	9
10	60 40.7	1.0 07	165.7	61 40.5	1.0 07	165.5	63 10.0	1.0 07	165.2	64 09.7	99 07	165.0	65 09.4	99 07	164.8	66 09.0	99 07	164.5	67 08.7	99 07	164.2	68 38.0	99 08	163.7	10
1	60 36.7	99 07	164.3	61 36.4	99 07	164.1	63 05.9	99 08	163.8	64 05.5	99 08	163.5	65 05.1	99 08	163.3	66 04.7	99 08	163.0	67 04.2	99 08	162.7	68 33.5	99 08	162.1	1
2	60 32.3	99 08	162.9	61 32.0	99 08	162.7	63 01.4	99 08	162.3	64 00.9	99 08	162.0	65 00.5	99 08	161.8	65 59.9	99 09	161.4	66 59.4	99 09	161.1	68 28.5	99 09	160.5	2
3	60 27.6	99 08	161.5	61 27.2	99 09	161.3	62 56.5	99 09	160.9	63 56.0	99 09	160.6	64 55.4	99 09	160.3	65 54.8	99 09	159.9	66 54.2	99 09	159.6	68 23.1	99 10	159.0	3
4	60 22.5	99 09	160.1	61 22.0	99 09	159.9	62 51.2	99 09	159.4	63 50.6	99 10	159.1	64 50.0	99 10	158.8	65 49.3	99 10	158.4	66 48.6	99 10	158.0	68 17.3	99 10	157.4	4
15	60 17.0	99 10	158.7	61 16.5	99 10	158.5	62 45.6	99 10	158.0	63 44.9	99 10	157.7	64 44.2	99 10	157.3	65 43.4	99 10	156.9	66 42.6	99 11	156.5	68 11.2	98 11	155.8	15
6	60 11.2	99 10	157.3	61 10.6	99 10	157.1	62 39.6	99 11	156.6	63 38.8	99 11	156.2	64 38.0	99 11	155.8	65 37.1	98 11	155.4	66 36.2	98 11	155.0	68 04.6	98 12	154.3	6
7	60 05.1	99 11	156.0	61 04.4	99 11	155.7	62 33.2	99 11	155.1	63 32.4	99 11	154.8	64 31.5	98 12	154.4	65 30.5	98 12	154.0	66 29.4	98 12	153.5	67 57.7	98 12	152.7	7
8	59 58.6	99 11	154.6	60 57.8	99 12	154.3	62 26.5	98 12	153.7	63 25.6	98 12	153.3	64 24.6	98 12	152.9	65 23.5	98 12	152.5	66 22.3	98 12	152.0	67 50.4	98 13	151.2	8
9	59 51.8	99 12	153.2	60 50.9	98 12	152.9	62 19.5	98 12	152.3	63 18.4	98 12	151.9	64 17.3	98 13	151.5	65 16.1	98 13	151.0	66 14.9	98 13	150.5	67 42.7	98 13	149.7	9
20	59 44.6	98 12	151.9	60 43.6	98 13	151.5	62 12.1	98 13	150.9	63 11.0	98 13	150.5	64 09.7	98 13	150.1	65 08.4	98 13	149.6	66 07.0	98 14	149.1	67 34.7	97 14	148.2	20
1	59 37.1	98 13	150.5	60 36.1	98 13	150.1	62 04.4	98 13	149.5	63 03.1	98 14	149.1	64 01.8	98 14	148.6	65 00.4	98 14	148.1	65 58.9	97 14	147.6	67 26.4	97 14	146.7	1
2	59 29.3	98 14	149.2	60 28.2	98 14	148.8	61 56.3	98 14	148.2	62 55.0	98 14	147.7	63 53.6	98 14	147.2	64 52.0	97 14	146.7	65 50.4	97 15	146.1	67 17.7	97 15	145.2	2
3	59 21.2	98 14	147.8	60 20.0	98 14	147.4	61 48.0	98 14	146.8	62 46.5	98 15	146.3	63 45.0	97 15	145.8	64 43.4	97 15	145.3	65 41.6	97 15	144.7	67 08.7	97 16	143.8	3
4	59 12.8	98 15	146.5	60 11.5	98 15	146.1	61 39.3	98 15	145.4	62 37.8	97 15	144.9	63 36.1	97 15	144.4	64 34.4	97 16	143.9	65 32.5	97 16	143.3	66 59.3	96 16	142.3	4
25	59 04.1	98 15	145.2	60 02.6	98 15	144.7	61 30.4	97 15	144.1	62 28.7	97 16	143.6	63 26.9	97 16	143.0	64 25.0	97 16	142.5	65 23.0	96 16	141.9	66 49.7	96 17	140.9	25
6	58 55.0	98 16	143.9	59 53.5	97 16	143.4	61 21.1	97 16	142.7	62 19.3	97 16	142.2	63 17.5	97 16	141.7	64 15.4	97 16	141.1	65 13.3	96 17	140.5	66 39.7	96 17	139.4	6
7	58 45.7	97 16	142.5	59 44.1	97 16	142.1	61 11.5	97 16	141.4	62 09.7	97 17	140.8	63 07.7	97 17	140.3	64 05.5	96 17	139.7	65 03.2	96 17	139.1	66 29.5	96 18	138.0	7
8	58 36.2	97 16	141.2	59 34.5	97 17	140.8	61 01.7	97 17	140.0	61 59.7	97 17	139.5	62 57.6	96 17	138.9	63 55.4	96 17	138.3	64 52.9	96 18	137.7	66 18.9	95 18	136.6	8
9	58 26.3	97 17	140.0	59 24.5	97 17	139.5	60 51.6	97 17	138.7	61 49.5	96 17	138.2	62 47.3	96 18	137.6	63 44.9	96 18	137.0	64 42.3	96 18	136.3	66 08.1	95 18	135.2	9
30	58 16.2	97 17	138.7	59 14.3	97 17	138.2	60 41.2	96 18	137.4	61 39.0	96 18	136.9	62 36.7	96 18	136.3	63 34.2	96 18	135.6	64 31.5	95 19	135.0	65 57.1	95 19	133.8	30
1	58 05.8	97 18	137.4	59 03.8	97 18	136.9	60 30.6	96 18	136.1	61 28.3	96 18	135.5	62 25.8	96 19	134.9	63 23.2	95 19	134.3	64 20.4	95 19	133.6	65 45.7	95 19	132.5	1
2	57 55.2	97 18	136.1	58 53.1	96 18	135.6	60 19.7	96 19	134.8	61 17.3	96 19	134.2	62 14.7	96 19	133.6	63 11.9	95 19	133.0	64 09.0	95 19	132.3	65 34.2	94 20	131.1	2
3	57 44.3	96 19	134.9	58 42.1	96 19	134.4	60 08.6	96 19	133.5	61 06.0	96 19	133.0	62 03.3	95 19	132.3	63 00.5	95 20	131.7	63 57.4	95 20	131.0	65 22.4	94 20	129.8	3
4	57 33.1	96 19	133.6	58 30.9	96 19	133.1	59 57.2	96 19	132.3	60 54.5	95 20	131.7	61 51.7	95 20	131.0	62 48.7	95 20	130.4	63 45.5	94 20	129.7	65 10.3	94 20	128.5	4
35	57 21.8	96 19	132.4	58 19.4	96 19	131.8	59 45.6	96 20	131.0	60 42.8	95 20	130.4	61 39.9	95 20	129.8	62 36.8	95 20	129.1	63 33.5	94 20	128.4	64 58.0	94 21	127.2	35
6	57 10.2	96 20	131.1	58 07.7	96 20	130.6	59 33.7	95 20	129.8	60 30.9	95 20	129.1	61 27.9	95 20	128.5	62 24.6	94 21	127.8	63 21.2	94 21	127.1	64 45.6	93 21	125.9	6
7	56 58.4	96 20	129.9	57 55.8	95 20	129.4	59 21.7	95 20	128.5	60 18.7	95 21	127.9	61 15.6	95 21	127.2	62 12.3	94 21	126.5	63 08.7	94 21	125.8	64 32.9	93 21	124.6	7
8	56 46.4	96 20	128.7	57 43.7	95 21	128.2	59 09.4	95 21	127.3	60 06.4	95 21	126.7	61 03.1	94 21	126.0	61 59.7	94 21	125.3	62 56.0	94 22	124.5	64 20.0	93 22	123.3	8
9	56 34.2	96 21	127.5	57 31.4	95 21	126.9	58 57.0	95 21	126.1	59 53.8	95 21	125.4	60 50.5	94 21	124.8	61 46.9	94 22	124.1	62 43.1	93 22	123.3	64 06.9	93 22	122.1	9
40	56 21.7	95 21	126.3	57 18.9	95 21	125.7	58 44.3	95 21	124.8	59 41.1	94 22	124.2	60 37.6	94 22	123.5	61 34.0	94 22	122.8	62 30.1	93 22	122.1	63 53.7	93 22	120.8	40
1	56 09.1	95 21	125.1	57 06.2	95 21	124.5	58 31.5	95 22	123.6	59 28.1	94 22	123.0	60 24.6	94 22	122.3	61 20.8	94 22	121.6	62 16.8	93 22	120.8	63 40.3	92 23	119.6	1
2	55 56.3	95 22	123.9	56 53.3	95 22	123.3	58 18.5	94 22	122.4	59 15.0	94 22	121.8	60 11.4	94 22	121.1	61 07.5	93 22	120.4	62 03.4	93 23	119.6	63 26.7	92 23	118.4	2
3	55 43.4	95 22	122.7	56 40.2	95 22	122.2	58 05.3	94 22	121.3	59 01.7	94 22	120.6	59 58.0	94 23	119.9	60 54.0	93 23	119.2	61 49.8	93 23	118.4	63 13.0	92 23	117.2	3
4	55 30.2	95 22	121.6	56 27.0	95 22	121.0	57 51.9	94 23	120.1	58 48.3	94 23	119.4	59 44.5	93 23	118.7	60 40.4	93 23	118.0	61 36.1	93 23	117.2	62 59.1	92 23	116.0	4
45	55 16.9	95 22	120.4	56 13.6	94 23	119.8	57 38.4	94 23	118.9	58 34.7	94 23	118.3	59 30.8	93 23	117.6	60 26.6	93 23	116.8	61 22.2	92 23	116.1	62 45.0	92 24	114.8	45
6	55 03.4	95 23	119.3	56 00.1	94 23	118.7	57 24.7	94 23	117.7	58 20.9	93 23	117.1	59 16.9	93 23	116.4	60 12.7	93 23	115.7	61 08.2	92 24	114.9	62 30.9	92 24	113.6	6
7	54 49.8	94 23	118.1	55 46.4	94 23	117.5	57 10.9	94 23	116.6	58 07.0	93 23	115.9	59 03.0	93 24	115.2	59 58.6	93 24	114.5	60 54.0	92 24	113.7	62 16.6	91 24	112.5	7
8	54 36.0	94 23	117.0	55 32.5	94 23	116.4	56 57.0	94 23	115.5	57 53.0	93 24	114.8	58 48.8	93 24	114.1	59 44.4	92 24	113.4	60 39.7	92 24	112.6	62 02.2	91 24	111.3	8
9	54 22.1	94 23	115.9	55 18.6	94 24	115.3	56 42.9	93 24	114.3	57 38.9	93 24	113.7	58 34.6	93 24	113.0	59 30.1	92 24	112.2	60 25.3	92 24	111.4	61 47.7	91 24	110.2	9
50	54 08.1	94 24	114.7	55 04.5	94 24	114.1	56 28.7	93 24	113.2	57 24.6	93 24	112.5	58 20.2	93 24	111.8	59 15.7	92 24	111.1	60 10.8	92 24	110.3	61 33.0	91 25	109.1	50
1	53 53.9	94 24	113.6	54 50.2	94 24	113.0	56 14.3	93 24	112.1	57 10.2	93 24	111.4	58 05.8	92 24	110.7	59 01.1	92 24	110.0	59 56.2	92 24	109.2	61 18.3	91 25	107.9	1
2	53 39.6	94 24	112.5	54 35.9	94 24	111.9	55 59.9	93 24	111.0	56 55.7	93 24	110.3	57 51.2	92 24	109.6	58 46.5	92 25	108.9	59 41.5	91 25	108.1	61 03.5	91 25	106.8	2
3	53 25.2	94 24	111.4	54 21.4	93 24	110.8	55 45.3	93 24	109.9	56 41.0	93 25	109.2	57 36.5	92 25	108.5	58 31.7	92 25	107.8	59 26.7	91 25	107.0	60 48.6	91 25	105.7	3
4	53 10.7	94 24	110.3	54 06.8	93 24	109.7	55 30.7	93 25	108.8	56 26.3	93 25	108.1	57 21.7	92 25	107.4	58 16.9	92 25	106.7	59 11.8	91 25	105.9	60 33.6	90 25	104.7	4
55	52 56.1	94 24	109.2	53 52.2	93 25	108.7	55 15.9	93 25	107.7	56 11.5	92 25	107.0	57 06.9	92 25	106.3	58 02.0	92 25	105.6	58 56.8	91 25	104.8	60 18.5	90 25	103.6	55
6	52 41.4	94 25	108.2	53 37.4	93 25	107.6	55 01.1	93 25	106.6	55 56.6	92 25	106.0	56 51.9	92 25	105.3	57 47.0	92 25	104.5	58 41.8	91 25	103.7	60 03.4	90 25	102.5	6
7	52 26.6	93 25	107.1	53 22.6	93 25	106.5	54 46.2	93 25	105.6	55 41.7	92 25	104.9	56 36.9	92 25	104.2	57 31.9	91 25	103.5	58 26.7	91 25	102.7	59 48.2	90 25	101.4	7
8	52 11.7	93 25	106.0	53 07.6	93 25	105.4	54 31.2	93 25	104.5	55 26.6	92 25	103.8	56 21.8	92 25	103.1	57 16.8	91 25	102.4	58 11.5	91 25	101.6	59 33.0	90 26	100.4	8
9	51 56.7	93 25	105.0	52 52.6	93 25	104.4	54 16.1	93 25	103.4	55 11.5	92 25	102.8	56 06.7	92 25	102.1	57 01.6	91 25	101.4	57 56.2	91 25	100.6	59 17.7	90 26	99.4	9
60	51 41.7	93 25	103.9	52 37.6	93 25	103.3	54 01.0	92 25	102.4	54 56.3	92 25	101.7	55 51.5	92 25	101.0	56 46.3	91 26	100.3	57 41.0	91 26	99.5	59 02.3	90 26	98.3	60
1	51 26.6	93 25	102.9	52 22.4	93 25	102.3	53 45.8	92 25	101.4	54 41.1	92 25	100.7	55 36.2	92 26	100.0	56 31.0	91 26	99.3	57 25.6	91 26	98.5	58 46.9	90 26	97.3	1
2	51 11.4	93 25	101.9	52 07.2	93 25	101.3	53 30.5	92 26	100.3	54 25.8	92 26	99.7	55 20.9	92 26	99.0	56 15.7	91 26	98.3	57 10.2	91 26	97.5	58 31.5	90 26	96.3	2
3	50 56.2	93 25	100.8	51 52.0	93 26	100.2	53 15.2	92 26	99.3	54 10.5	92 26	98.6	55 05.5	92 26	98.0	56 00.3	91 26	97.2	56 54.8	91 26	96.5	58 16.1	90 26	95.3	3
4	50 40.9	93 26	99.8	51 36.7	93 26	99.2	52 59.9	92 26	98.3	53 55.1	92 26	97.6	54 50.1	91 26	96.9	55 44.9	91 26	96.2	56 39.4	91 26	95.5	58 00.6	90 26	94.3	4
65	50 25.6	93 26	98.8	51 21.3	93 26	98.2	52 44.5	92 26	97.3	53 39.7	92 26	96.6	54 34.7	91 26	95.9	55 29.4	91 26	95.2	56 23.9	91 26	94.5	57 45.1	90 26	93.3	65
6	50 10.2	93 26	97.8	51 05.9	93 26	97.2	52 29.1	92 26	96.3	53 24.3	92 26	95.6	54 19.2	91 26	94.9	55 14.0	91 26	94.2	56 08.4	91 26	93.5	57 29.6	90 26	92.3	6
7	49 54.8	93 26	96.8	50 50.5	93 26	96.2	52 13.6	92 26	95.3	53 08.8	92 26	94.6	54 03.8	91 26	93.9	54 58.5	91 26	93.2	55 52.9	91 26	92.5	57 14.1	90 26	91.3	7
8	49 39.4	93 26	95.8	50 35.0	93 26	95.2	51 58.2	92 26	94.3	52 53.3	92 26	93.6	53 48.2	91 26	93.0	54 43.0	91 26	92.3	55 37.4	91 26	91.5	56 58.5	90 26	90.3	8
9	49 23.9	93 26	94.8	50 19.6	93 26	94.2	51 42.7	92 26	93.3	52 37.8	92 26	92.6	53 32.7	91 26	92.0	54 27.4	91 26	91.3	55 21.9	91 26	90.5	56 43.0	90 26	89.4	9
70	49 08.5	93 26	93.8	50 04.1	93 26	93.2	51 27.2	92 26	92.3	52 22.3	92 26	91.7	53 17.2	91 26	91.0	54 11.9	91 26	90.3	55 06.3	91 26	89.6	56 27.5	90 26	88.4	70
1	48 53.0	93 26	92.8	49 48.6	93 26	92.2	51 11.6	92 26	91.3	52 06.8	92 26	90.7	53 01.7	91 26	90.0	53 56.4	91 26	89.3	54 50.8	91 26	88.6	56 12.0	90 26	87.5	1
2	48 37.4	93 26	91.8	49 33.0	93 26	91.3	50 56.1	92 26	90.4	51 51.2	92 26	89.7	52 46.2	91 26	89.1	53 40.8	91 26	88.4	54 35.3	91 26	87.7	55 56.5	90 26	86.5	2
3	48 21.9	93 26	90.9	49 17.5	93 26	90.3	50 40.6	92 26	89.4	51 35.7	92 26	88.8	52 30.6	91 26	88.1	53 25.3	91 26	87.4	54 19.8	91 26	86.7	55 41.0	90 26	85.6	3
4	48 06.4	93 26	89.9	49 02.0	93 26	89.3	50 25.0	92 26	88.4	51 20.2	92 26	87.8	52 15.1	91 26	87.2	53 09.8	91 26	86.5	54 04.3	91 26	85.8	55 25.5	90 26	84.7	4
75	47 50.9	93 26	88.9	48 46.5	93 26	88.4	50 09.5	92 26	87.5	51 04.7	92 26	86.9	51 59.6	91 26	86.2	52 54.3	91 26	85.5	53 48.8	91 26	84.8	55 10.0	90 26	83.7	75
6	47 35.3	93 26	88.0	48 30.9	93 26	87.4	49 54.0	92 26	86.5	50 49.2	92 26	85.9	51 44.1	91 26	85.3	52 38.9	91 26	84.6	53 33.4	91 26	83.9	54 54.6	90 26	82.8	6
7	47 19.8	93 26	87.0	48 15.4	93 26	86.5	49 38.5	92 26	85.6	50 33.7	92 26	85.0	51 28.7	91 26	84.3	52 23.4	91 26	83.7	53 17.9	91 26	83.0	54 39.2	90 26	81.9	7
8	47 04.3	93 26	86.1	47 59.9	93 26	85.5	49 23.1	92 26	84.6	50 18.2	92 26	84.0	51 13.2	91 26	83.4	52 08.0	91 26	82.7	53 02.5	91 26	82.1	54 23.9	90 26	81.0	8
9	46 48.8	93 26	85.1	47 44.5	93 26	84.6	49 07.6	92 26	83.7	50 02.8	92 26	83.1	50 57.8	92 26	82.5	51 52.6	91 26	81.8	52 47.2	91 26	81.1	54 08.6	90 25	80.1	9
80	46 33.4	93 26	84.2	47 29.0	93 26	83.6	48 52.2	92 26	82.8	49 47.4	92 26	82.2	50 42.4	92 26	81.6	51 37.3	91 26	80.9	52 31.8	91 25	80.2	53 53.3	90 25	79.2	80
1	46 17.9	93 26	83.2	47 13.6	93 26	82.7	48 36.8	92 26	81.9	49 32.0	92 26	81.3	50 27.1	92 26	80.6	51 21.9	91 25	80.0	52 16.6	91 25	79.3	53 38.1	90 25	78.3	1
2	46 02.5	93 26	82.3	46 58.2	93 26	81.8	48 21.4	92 26	80.9	49 16.7	92 25	80.3	50 11.8	92 25	79.7	51 06.7	91 25	79.1	52 01.3	91 25	78.4	53 22.9	90 25	77.4	2
3	45 47.2	93 26	81.4	46 42.9	93 26	80.9	48 06.1	92 25	80.0	49 01.4	92 25	79.4	49 56.5	92 25	78.8	50 51.4	91 25	78.2	51 46.1	91 25	77.5	53 07.8	90 25	76.5	3
4	45 31.8	93 25	80.5	46 27.6	93 25	79.9	47 50.9	92 25	79.1	48 46.2	92 25	78.5	49 41.3	92 25	77.9	50 36.3	91 25	77.3	51 31.0	91 25	76.6	52 52.7	90 25	75.6	4
85	45 16.5	93 25	79.5	46 12.3	93 25	79.0	47 35.6	92 25	78.2	48 31.0	92 25	77.6	49 26.2	92 25	77.0	50 21.1	91 25	76.4	51 15.9	91 25	75.7	52 37.7	91 26	74.7	85
6	45 01.3	93 25	78.6	45 57.1	93 25	78.1	47 20.5	92 25	77.3	48 15.8	92 25	76.7	49 11.1	92 25	76.1	50 06.1	92 25	75.5	51 00.9	91 25	74.9	52 22.7	91 25	73.9	6
7	44 46.1	93 25	77.7	45 41.9	93 25	77.2	47 05.3	93 25	76.4	48 00.8	92 25	75.8	48 56.0	92 25	75.2	49 51.1	92 25	74.6	50 45.9	91 25	74.0	52 07.8	91 25	73.0	7
8	44 30.9	93 25	76.8	45 26.8	93 25	76.3	46 50.3	93 25	75.5	47 45.7	92 25	74.9	48 41.0	92 25	74.3	49 36.1	92 25	73.7	50 31.1	91 25	73.1	51 53.0	91 25	72.1	8
9	44 15.8	93 25	75.9	45 11.7	93 25	75.4	46 35.3	93 25	74.6	47 30.8	92 25	74.0	48 26.1	92 25	73.5	49 21.3	92 25	72.9	50 16.2	91 25	72.2	51 38.3	91 24	71.3	9
90	44 00.8	93 25	75.0	44 56.7	93 25	74.5	46 20.3	93 25	73.7	47 15.9	92 25	73.1	48 11.3	92 25	72.6	49 06.5	92 25	72.0	50 01.5	92 24	71.4	51 23.6	91 24	70.4	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	43 45.8	93 25	74.1	44 41.8	93 25	73.6	46 05.5	93 25	72.8	47 01.0	93 25	72.3	47 56.5	92 25	71.7	48 51.7	92 24	71.1	49 46.8	92 24	70.5	51 09.0	91 24	69.5	91
2	43 30.9	93 25	73.2	44 26.9	93 25	72.7	45 50.7	93 25	71.9	46 46.3	93 24	71.4	47 41.8	92 24	70.8	48 37.1	92 24	70.2	49 32.2	92 24	69.6	50 54.5	91 24	68.7	2
3	43 16.1	93 25	72.3	44 12.1	93 25	71.8	45 35.9	93 24	71.0	46 31.6	93 24	70.5	47 27.1	92 24	69.9	48 22.5	92 24	69.4	49 17.7	92 24	68.8	50 40.1	91 24	67.8	3
4	43 01.4	94 24	71.4	43 57.4	93 24	70.9	45 21.3	93 24	70.2	46 17.0	93 24	69.6	47 12.6	92 24	69.1	48 08.0	92 24	68.5	49 03.3	92 24	67.9	50 25.8	91 24	67.0	4
95	42 46.7	94 24	70.5	43 42.8	93 24	70.0	45 06.7	93 24	69.3	46 02.5	93 24	68.8	46 58.1	93 24	68.2	47 53.6	92 24	67.7	48 48.9	92 24	67.1	50 11.5	92 24	66.1	95
6	42 32.1	94 24	69.6	43 28.2	93 24	69.2	44 52.2	93 24	68.4	45 48.1	93 24	67.9	46 43.8	93 24	67.4	47 39.3	92 24	66.8	48 34.6	92 24	66.2	49 57.4	92 23	65.3	6
7	42 17.6	94 24	68.8	43 13.8	94 24	68.3	44 37.8	93 24	67.5	45 33.7	93 24	67.0	46 29.5	93 24	66.5	47 25.1	93 24	65.9	48 20.5	92 23	65.4	49 43.3	92 23	64.5	7
8	42 03.1	94 24	67.9	42 59.4	94 24	67.4	44 23.5	93 24	66.7	45 19.5	93 24	66.2	46 15.3	93 24	65.6	47 10.9	93 23	65.1	48 06.4	92 23	64.5	49 29.3	92 23	63.6	8
9	41 48.8	94 24	67.0	42 45.1	94 24	66.5	44 09.3	93 24	65.8	45 05.3	93 23	65.3	46 01.2	93 23	64.8	46 56.9	93 23	64.2	47 52.4	92 23	63.7	49 15.5	92 23	62.8	9
100	41 34.5	94 24	66.1	42 30.9	94 24	65.7	43 55.2	94 23	64.9	44 51.3	93 23	64.5	45 47.2	93 23	63.9	46 43.0	93 23	63.4	47 38.6	93 23	62.8	49 01.7	92 23	62.0	100
1	41 20.4	94 23	65.3	42 16.8	94 23	64.8	43 41.2	94 23	64.1	44 37.3	93 23	63.6	45 33.3	93 23	63.1	46 29.1	93 23	62.6	47 24.8	93 23	62.0	48 48.0	92 23	61.2	1
2	41 06.3	94 23	64.4	42 02.8	94 23	63.9	43 27.3	94 23	63.2	44 23.4	94 23	62.7	45 19.5	93 23	62.2	46 15.4	93 23	61.7	47 11.2	93 23	61.2	48 34.5	92 22	60.3	2
3	40 52.4	94 23	63.5	41 48.9	94 23	63.1	43 13.5	94 23	62.4	44 09.7	94 23	61.9	45 05.8	93 23	61.4	46 01.8	93 22	60.9	46 57.6	93 22	60.4	48 21.1	93 22	59.5	3
4	40 38.5	94 23	62.7	41 35.1	94 23	62.2	42 59.8	94 23	61.5	43 56.0	94 23	61.1	44 52.2	94 22	60.6	45 48.3	93 22	60.1	46 44.2	93 22	59.5	48 07.7	93 22	58.7	4
105	40 24.8	94 23	61.8	41 21.4	94 23	61.4	42 46.2	94 22	60.7	43 42.5	94 22	60.2	44 38.8	94 22	59.7	45 34.9	93 22	59.2	46 30.8	93 22	58.7	47 54.5	93 22	57.9	105
6	40 11.2	95 23	60.9	41 07.8	94 22	60.5	42 32.7	94 22	59.8	43 29.1	94 22	59.4	44 25.4	94 22	58.9	45 21.6	94 22	58.4	46 17.6	93 22	57.9	47 41.4	93 22	57.1	6
7	39 57.6	95 22	60.1	40 54.4	94 22	59.6	42 19.3	94 22	59.0	43 15.8	94 22	58.5	44 12.2	94 22	58.1	45 08.4	94 22	57.6	46 04.5	93 22	57.1	47 28.4	93 21	56.3	7
8	39 44.2	95 22	59.2	40 41.0	95 22	58.8	42 06.1	94 22	58.1	43 02.6	94 22	57.7	43 59.0	94 22	57.2	44 55.4	94 22	56.7	45 51.6	94 21	56.2	47 15.6	93 21	55.5	8
9	39 31.0	95 22	58.4	40 27.8	95 22	57.9	41 52.9	94 22	57.3	42 49.5	94 22	56.9	43 46.1	94 21	56.4	44 42.4	94 21	55.9	45 38.7	94 21	55.4	47 02.9	93 21	54.7	9
110	39 17.8	95 22	57.5	40 14.7	95 22	57.1	41 39.9	95 21	56.5	42 36.6	94 21	56.0	43 33.2	94 21	55.6	44 29.6	94 21	55.1	45 26.0	94 21	54.6	46 50.3	93 21	53.8	110
1	39 04.8	95 22	56.7	40 01.7	95 21	56.3	41 27.0	95 21	55.6	42 23.8	95 21	55.2	43 20.4	94 21	54.7	44 17.0	94 21	54.3	45 13.4	94 21	53.8	46 37.8	93 21	53.0	1
2	38 51.9	95 21	55.8	39 48.9	95 21	55.4	41 14.3	95 21	54.8	42 11.1	95 21	54.4	43 07.8	94 21	53.9	44 04.4	94 21	53.5	45 00.9	94 21	53.0	46 25.4	94 20	52.2	2
3	38 39.1	95 21	55.0	39 36.2	95 21	54.6	41 01.7	95 21	54.0	41 58.6	95 21	53.5	42 55.3	95 21	53.1	43 52.0	94 20	52.6	44 48.6	94 20	52.2	46 13.2	94 20	51.4	3
4	38 26.4	95 21	54.1	39 23.6	95 21	53.7	40 49.2	95 21	53.1	41 46.1	95 20	52.7	42 43.0	95 20	52.3	43 39.7	95 20	51.8	44 36.3	94 20	51.4	46 01.2	94 20	50.6	4
115	38 13.9	95 21	53.3	39 11.1	95 20	52.9	40 36.8	95 20	52.3	41 33.8	95 20	51.9	42 30.8	95 20	51.5	43 27.6	95 20	51.0	44 24.3	94 20	50.6	45 49.2	94 20	49.9	115
6	38 01.5	96 21	52.4	38 58.8	95 20	52.0	40 24.6	95 20	51.5	41 21.7	95 20	51.1	42 18.7	95 20	50.6	43 15.6	95 20	50.2	44 12.4	95 20	49.8	45 37.4	94 19	49.1	6
7	37 49.3	96 20	51.6	38 46.6	96 20	51.2	40 12.5	95 20	50.6	41 09.7	95 20	50.2	42 06.8	95 20	49.8	43 03.7	95 20	49.4	44 00.6	95 19	49.0	45 25.8	94 19	48.3	7
8	37 37.2	96 20	50.7	38 34.6	96 20	50.4	40 00.6	95 20	49.8	40 57.8	95 20	49.4	41 55.0	95 19	49.0	42 52.0	95 19	48.6	43 49.0	95 19	48.2	45 14.2	95 19	47.5	8
9	37 25.2	96 20	49.9	38 22.7	96 20	49.5	39 48.8	96 19	49.0	40 46.1	95 19	48.6	41 43.3	95 19	48.2	42 40.5	95 19	47.8	43 37.5	95 19	47.4	45 02.9	95 19	46.7	9
120	37 13.4	96 19	49.1	38 11.0	96 19	48.7	39 37.2	96 19	48.2	40 34.5	96 19	47.8	41 31.8	95 19	47.4	42 29.0	95 19	47.0	43 26.1	95 19	46.6	44 51.6	95 18	45.9	120
1	37 01.8	96 19	48.2	37 59.4	96 19	47.9	39 25.7	96 19	47.3	40 23.1	96 19	47.0	41 20.5	96 19	46.6	42 17.8	95 19	46.2	43 14.9	95 18	45.8	44 40.6	95 18	45.1	1
2	36 50.3	96 19	47.4	37 47.9	96 19	47.1	39 14.3	96 19	46.5	40 11.8	96 19	46.1	41 09.3	96 18	45.8	42 06.6	96 18	45.4	43 03.9	95 18	45.0	44 29.6	95 18	44.3	2
3	36 38.9	96 19	46.6	37 36.7	96 19	46.2	39 03.1	96 18	45.7	40 00.7	96 18	45.3	40 58.2	96 18	45.0	41 55.6	96 18	44.6	42 53.0	96 18	44.2	44 18.9	95 18	43.5	3
4	36 27.7	96 18	45.7	37 25.5	96 18	45.4	38 52.1	96 18	44.9	39 49.8	96 18	44.5	40 47.3	96 18	44.1	41 44.8	96 18	43.8	42 42.3	96 18	43.4	44 08.2	95 17	42.8	4
125	36 16.7	96 18	44.9	37 14.5	96 18	44.6	38 41.2	96 18	44.1	39 38.9	96 18	43.7	40 36.6	96 18	43.3	41 34.2	96 18	43.0	42 31.7	96 17	42.6	43 57.8	96 17	42.0	125
6	36 05.8	97 18	44.1	37 03.7	96 18	43.7	38 30.5	96 18	43.2	39 28.3	96 18	42.9	40 26.0	96 17	42.5	41 23.7	96 17	42.2	42 21.2	96 17	41.8	43 47.5	96 17	41.2	6
7	35 55.1	97 18	43.2	36 53.1	97 17	42.9	38 20.0	96 17	42.4	39 17.8	96 17	42.1	40 15.6	96 17	41.7	41 13.3	96 17	41.4	42 11.0	96 17	41.0	43 37.3	96 17	40.4	7
8	35 44.5	97 17	42.4	36 42.6	97 17	42.1	38 09.6	97 17	41.6	39 07.5	96 17	41.3	40 05.3	96 17	40.9	41 03.1	96 17	40.6	42 00.9	96 17	40.2	43 27.3	96 16	39.6	8
9	35 34.1	97 17	41.6	36 32.3	97 17	41.3	37 59.3	97 17	40.8	38 57.3	97 17	40.5	39 55.2	96 17	40.1	40 53.1	96 16	39.8	41 50.9	96 16	39.4	43 17.5	96 16	38.9	9
130	35 23.9	97 17	40.8	36 22.1	97 17	40.5	37 49.3	97 16	40.0	38 47.3	97 16	39.7	39 45.3	97 16	39.3	40 43.3	97 16	39.0	41 41.1	96 16	38.6	43 07.8	96 16	38.1	130
1	35 13.9	97 16	39.9	36 12.1	97 16	39.6	37 39.4	97 16	39.2	38 37.5	97 16	38.9	39 35.6	97 16	38.5	40 33.6	97 16	38.2	41 31.5	97 15	37.9	42 58.3	96 16	37.3	1
2	35 04.0	97 16	39.1	36 02.3	97 16	38.8	37 29.7	97 16	38.4	38 27.8	97 16	38.1	39 26.0	97 16	37.7	40 24.1	97 16	37.4	41 22.1	97 15	37.1	42 49.0	97 15	36.5	2
3	34 54.3	97 16	38.3	35 52.6	97 16	38.0	37 20.1	97 16	37.6	38 18.3	97 16	37.2	39 16.6	97 15	36.9	40 14.7	97 15	36.6	41 12.8	97 15	36.3	42 39.8	97 15	35.8	3
4	34 44.7	97 16	37.5	35 43.2	97 16	37.2	37 10.7	97 15	36.7	38 09.0	97 15	36.4	39 07.3	97 15	36.1	40 05.5	97 15	35.8	41 03.7	97 15	35.5	42 30.8	97 15	35.0	4
135	34 35.4	97 15	36.6	35 33.9	97 15	36.4	37 01.5	97 15	35.9	37 59.9	97 15	35.6	38 58.2	97 15	35.3	39 56.5	97 15	35.0	40 54.8	97 15	34.7	42 22.0	97 14	34.2	135
6	34 26.2	98 15	35.8	35 24.8	98 15	35.5	36 52.5	97 15	35.1	37 50.9	97 15	34.8	38 49.3	97 15	34.6	39 47.7	97 14	34.3	40 46.0	97 14	33.9	42 13.4	97 14	33.5	6
7	34 17.2	98 15	35.0	35 15.8	98 15	34.7	36 43.6	98 14	34.3	37 42.2	97 14	34.0	38 40.6	97 14	33.8	39 39.0	97 14	33.5	40 37.4	97 14	33.2	42 04.9	97 14	32.7	7
8	34 08.4	98 14	34.2	35 07.1	98 14	33.9	36 35.0	98 14	33.5	37 33.6	98 14	33.2	38 32.1	98 14	33.0	39 30.6	97 14	32.7	40 29.0	97 14	32.4	41 56.6	97 14	31.9	8
9	33 59.8	98 14	33.3	34 58.5	98 14	33.1	36 26.5	98 14	32.7	37 25.1	98 14	32.4	38 23.7	98 14	32.2	39 22.3	98 14	31.9	40 20.8	97 13	31.6	41 48.5	97 13	31.2	9
140	33 51.3	98 14	32.5	34 50.1	98 14	32.3	36 18.2	98 14	31.9	37 16.9	98 13	31.6	38 15.5	98 13	31.4	39 14.2	98 13	31.1	40 12.7	98 13	30.8	41 40.5	97 13	30.4	140
1	33 43.1	98 13	31.7	34 41.9	98 13	31.5	36 10.1	98 13	31.1	37 08.8	98 13	30.8	38 07.6	98 13	30.6	39 06.2	98 13	30.3	40 04.9	98 13	30.0	41 32.8	98 13	29.6	1
2	33 35.0	98 13	30.9	34 33.9	98 13	30.7	36 02.2	98 13	30.3	37 01.0	98 13	30.1	37 59.7	98 13	29.8	38 58.5	98 13	29.5	39 57.2	98 12	29.3	41 25.2	98 12	28.9	2
3	33 27.1	98 13	30.1	34 26.1	98 13	29.8	35 54.4	98 13	29.5	36 53.3	98 12	29.3	37 52.1	98 12	29.0	38 50.9	98 12	28.8	39 49.7	98 12	28.5	41 17.8	98 12	28.1	3
4	33 19.4	98 12	29.3	34 18.4	98 12	29.0	35 46.9	98 12	28.7	36 45.8	98 12	28.5	37 44.7	98 12	28.2	38 43.5	98 12	28.0	39 42.4	98 12	27.7	41 10.6	98 12	27.3	4
145	33 12.0	98 12	28.4	34 11.0	98 12	28.2	35 39.5	98 12	27.9	36 38.5	98 12	27.7	37 37.4	98 12	27.4	38 36.4	98 12	27.2	39 35.2	98 12	26.9	41 03.5	98 11	26.6	145
6	33 04.7	98 12	27.6	34 03.7	98 12	27.4	35 32.3	98 12	27.1	36 31.4	98 12	26.9	37 30.4	98 11	26.6	38 29.4	98 11	26.4	39 28.3	98 11	26.2	40 56.7	98 11	25.8	6
7	32 57.6	98 12	26.8	33 56.7	99 11	26.6	35 25.4	98 11	26.3	36 24.4	98 11	26.1	37 23.5	98 11	25.9	38 22.5	98 11	25.6	39 21.6	98 11	25.4	40 50.0	98 11	25.0	7
8	32 50.7	99 11	26.0	33 49.8	99 11	25.8	35 18.6	99 11	25.5	36 17.7	99 11	25.3	37 16.8	99 11	25.1	38 15.9	98 11	24.8	39 15.0	98 11	24.6	40 43.5	98 11	24.3	8
9	32 44.0	99 11	25.2	33 43.2	99 11	25.0	35 12.0	99 11	24.7	36 11.2	99 11	24.5	37 10.4	99 10	24.3	38 09.5	99 10	24.1	39 08.6	99 10	23.8	40 37.2	98 10	23.5	9
150	32 37.4	99 10	24.4	33 36.7	99 10	24.2	35 05.6	99 10	23.9	36 04.8	99 10	23.7	37 04.1	99 10	23.5	38 03.3	99 10	23.3	39 02.4	99 10	23.1	40 31.1	99 10	22.7	150
1	32 31.1	99 10	23.5	33 30.5	99 10	23.4	34 59.4	99 10	23.1	35 58.7	99 10	22.9	36 58.0	99 10	22.7	37 57.2	99 10	22.5	38 56.4	99 10	22.3	40 25.2	99 10	22.0	1
2	32 25.0	99 10	22.7	33 24.4	99 10	22.6	34 53.4	99 10	22.3	35 52.8	99 10	22.1	36 52.1	99 10	21.9	37 51.4	99 09	21.7	38 50.6	99 09	21.5	40 19.5	99 09	21.2	2
3	32 19.1	99 09	21.9	33 18.6	99 09	21.7	34 47.6	99 09	21.5	35 47.0	99 09	21.3	36 46.4	99 09	21.1	37 45.7	99 09	20.9	38 45.0	99 09	20.8	40 14.0	99 09	20.5	3
4	32 13.5	99 09	21.1	33 12.9	99 09	20.9	34 42.1	99 09	20.7	35 41.5	99 09	20.5	36 40.9	99 09	20.3	37 40.3	99 09	20.2	38 39.6	99 09	20.0	40 08.7	99 09	19.7	4
155	32 08.0	99 09	20.3	33 07.5	99 09	20.1	34 36.7	99 09	19.9	35 36.1	99 09	19.7	36 35.6	99 08	19.6	37 35.0	99 09	19.4	38 34.4	99 08	19.2	40 03.5	99 08	18.9	155
6	32 02.7	99 08	19.5	33 02.2	99 08	19.3	34 31.5	99 08	19.1	35 31.0	99 08	18.9	36 30.5	99 08	18.8	37 30.0	99 08	18.6	38 29.4	99 08	18.4	39 58.6	99 08	18.2	6
7	31 57.6	99 08	18.7	32 57.2	99 08	18.5	34 26.5	99 08	18.3	35 26.1	99 08	18.1	36 25.6	99 08	18.0	37 25.1	99 08	17.8	38 24.6	99 08	17.7	39 53.8	99 08	17.4	7
8	31 52.8	99 08	17.8	32 52.4	99 08	17.7	34 21.7	99 08	17.5	35 21.3	99 08	17.4	36 20.9	99 07	17.2	37 20.4	99 07	17.1	38 20.0	99 07	16.9	39 49.3	99 07	16.7	8
9	31 48.1	99 07	17.0	32 47.7	99 07	16.9	34 17.2	99 07	16.7	35 16.8	99 07	16.6	36 16.4	99 07	16.4	37 16.0	99 07	16.3	38 15.6	99 07	16.1	39 44.9	99 07	15.9	9
160	31 43.7	99 07	16.2	32 43.3	99 07	16.1	34 12.8	99 07	15.9	35 12.5	99 07	15.8	36 12.1	99 07	15.6	37 11.7	99 07	15.5	38 11.4	99 07	15.4	39 40.8	99 07	15.1	160
1	31 39.4	1.0 07	15.4	32 39.1	99 07	15.3	34 08.7	99 07	15.1	35 08.3	99 07	15.0	36 08.0	99 06	14.9	37 07.7	99 07	14.7	38 07.4	99 06	14.6	39 36.8	99 06	14.4	1
2	31 35.4	1.0 06	14.6	32 35.1	1.0 06	14.5	34 04.7	1.0 06	14.3	35 04.4	1.0 06	14.2	36 04.1	1.0 06	14.1	37 03.8	99 06	13.9	38 03.5	99 06	13.8	39 33.1	99 06	13.6	2
3	31 31.6	1.0 06	13.8	32 31.4	1.0 06	13.7	34 01.0	1.0 06	13.5	35 00.7	1.0 06	13.4	36 00.5	1.0 06	13.3	37 00.2	1.0 06	13.2	37 59.9	1.0 06	13.1	39 29.5	1.0 06	12.9	3
4	31 28.0	1.0 06	13.0	32 27.8	1.0 06	12.9	33 57.5	1.0 06	12.7	34 57.2	1.0 06	12.6	35 57.0	1.0 05	12.5	36 56.8	1.0 06	12.4	37 56.5	1.0 05	12.3	39 26.1	1.0 05	12.1	4
165	31 24.6	1.0 05	12.2	32 24.4	1.0 05	12.1	33 54.1	1.0 05	11.9	34 54.0	1.0 05	11.8	35 53.7	1.0 05	11.7	36 53.5	1.0 05	11.6	37 53.3	1.0 05	11.5	39 23.0	1.0 05	11.4	165
6	31 21.5	1.0 05	11.3	32 21.3	1.0 05	11.3	33 51.0	1.0 05	11.1	34 50.9	1.0 05	11.0	35 50.7	1.0 05	10.9	36 50.5	1.0 05	10.8	37 50.3	1.0 05	10.7	39 20.0	1.0 05	10.6	6
7	31 18.5	1.0 05	10.5	32 18.4	1.0 04	10.5	33 48.2	1.0 04	10.3	34 48.0	1.0 04	10.2	35 47.9	1.0 04	10.2	36 47.7	1.0 04	10.1	37 47.5	1.0 04	10.0	39 17.3	1.0 04	09.8	7
8	31 15.8	1.0 04	09.7	32 15.7	1.0 04	09.7	33 45.5	1.0 04	09.5	34 45.3	1.0 04	09.5	35 45.2	1.0 04	09.4	36 45.1	1.0 04	09.3	37 44.9	1.0 04	09.2	39 14.7	1.0 04	09.1	8
9	31 13.3	1.0 04	08.9	32 13.2	1.0 04	08.8	33 43.0	1.0 04	08.7	34 42.9	1.0 04	08.7	35 42.8	1.0 04	08.6	36 42.7	1.0 04	08.5	37 42.6	1.0 04	08.4	39 12.4	1.0 04	08.3	9
170	31 11.0	1.0 03	08.1	32 10.9	1.0 03	08.0	33 40.8	1.0 03	07.9	34 40.7	1.0 03	07.9	35 40.6	1.0 03	07.8	36 40.5	1.0 03	07.7	37 40.4	1.0 03	07.7	39 10.2	1.0 03	07.6	170
1	31 08.9	1.0 03	07.3	32 08.8	1.0 03	07.2	33 38.7	1.0 03	07.2	34 38.6	1.0 03	07.1	35 38.6	1.0 03	07.0	36 38.5	1.0 03	07.0	37 38.4	1.0 03	06.9	39 08.3	1.0 03	06.8	1
2	31 07.0	1.0 03	06.5	32 07.0	1.0 03	06.4	33 36.9	1.0 03	06.4	34 36.8	1.0 03	06.3	35 36.8	1.0 03	06.3	36 36.7	1.0 03	06.2	37 36.6	1.0 03	06.1	39 06.6	1.0 03	06.1	2
3	31 05.4	1.0 02	05.7	32 05.3	1.0 02	05.6	33 35.3	1.0 02	05.6	34 35.2	1.0 02	05.5	35 35.2	1.0 02	05.5	36 35.1	1.0 02	05.4	37 35.1	1.0 02	05.4	39 05.0	1.0 02	05.3	3
4	31 04.0	1.0 02	04.9	32 03.9	1.0 02	04.8	33 33.9	1.0 02	04.8	34 33.8	1.0 02	04.7	35 33.8	1.0 02	04.7	36 33.8	1.0 02	04.6	37 33.7	1.0 02	04.6	39 03.7	1.0 02	04.5	4
175	31 02.7	1.0 02	04.1	32 02.7	1.0 02	04.0	33 32.7	1.0 02	04.0	34 32.7	1.0 02	03.9	35 32.6	1.0 02	03.9	36 32.6	1.0 02	03.9	37 32.6	1.0 02	03.8	39 02.6	1.0 02	03.8	175
6	31 01.8	1.0 01	03.2	32 01.7	1.0 01	03.2	33 31.7	1.0 01	03.2	34 31.7	1.0 01	03.2	35 31.7	1.0 01	03.1	36 31.7	1.0 01	03.1	37 31.7	1.0 01	03.1	39 01.6	1.0 01	03.0	6
7	31 01.0	1.0 01	02.4	32 01.0	1.0 01	02.4	33 31.0	1.0 01	02.4	34 31.0	1.0 01	02.4	35 31.0	1.0 01	02.3	36 30.9	1.0 01	02.3	37 30.9	1.0 01	02.3	39 00.9	1.0 01	02.3	7
8	31 00.4	1.0 01	01.6	32 00.4	1.0 01	01.6	33 30.4	1.0 01	01.6	34 30.4	1.0 01	01.6	35 30.4	1.0 01	01.6	36 30.4	1.0 01	01.5	37 30.4	1.0 01	01.5	39 00.4	1.0 01	01.5	8
9	31 00.1	1.0 00	00.8	32 00.1	1.0 00	00.8	33 30.1	1.0 00	00.8	34 30.1	1.0 00	00.8	35 30.1	1.0 00	00.8	36 30.1	1.0 00	00.8	37 30.1	1.0 00	00.8	39 00.1	1.0 00	00.8	9
180	31 00.0	1.0 00	00.0	32 00.0	1.0 00	00.0	33 30.0	1.0 00	00.0	34 30.0	1.0 00	00.0	35 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	39 00.0	1.0 00	00.0	180

Lat. 75°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°
00	69 30.0	1.0 00	180.0	70 00.0	1.0 00	180.0	71 00.0	1.0 00	180.0	71 30.0	1.0 00	180.0	72 00.0	1.0 00	180.0	72 30.0	1.0 00	180.0	74 00.0	1.0 00	180.0	74 30.0	1.0 00	180.0
1	69 29.8	1.0 01	178.3	69 59.8	1.0 01	178.3	70 59.8	1.0 01	178.3	71 29.8	1.0 01	178.3	71 59.8	1.0 01	178.2	72 29.8	1.0 01	178.2	73 59.7	1.0 01	178.1	74 29.7	1.0 01	178.1
2	69 29.1	1.0 02	176.7	69 59.1	1.0 02	176.6	70 59.1	1.0 02	176.6	71 29.1	1.0 02	176.5	71 59.0	1.0 02	176.5	72 29.0	1.0 02	176.4	73 59.0	1.0 02	176.3	74 29.0	1.0 02	176.2
3	69 28.0	1.0 03	175.0	69 58.0	1.0 03	175.0	70 57.9	1.0 03	174.9	71 27.9	1.0 03	174.8	71 57.9	1.0 03	174.7	72 27.8	1.0 03	174.6	73 57.7	1.0 03	174.4	74 27.7	1.0 03	174.3
4	69 26.4	1.0 03	173.4	69 56.4	1.0 03	173.3	70 56.3	1.0 03	173.1	71 26.2	1.0 04	173.1	71 56.2	1.0 04	173.0	72 26.1	1.0 04	172.9	73 56.0	1.0 04	172.5	74 25.9	1.0 04	172.4
05	69 24.4	1.0 04	171.7	69 54.3	1.0 04	171.6	70 54.2	1.0 04	171.4	71 24.1	1.0 04	171.3	71 54.0	1.0 04	171.2	72 24.0	1.0 04	171.1	73 53.7	1.0 05	170.7	74 23.6	1.0 05	170.5
6	69 21.9	1.0 05	170.1	69 51.9	1.0 05	170.0	70 51.7	1.0 05	169.7	71 21.6	1.0 05	169.6	71 51.4	1.0 05	169.5	72 21.3	1.0 05	169.3	73 50.9	1.0 05	168.8	74 20.8	99 06	168.7
7	69 19.0	1.0 06	168.4	69 48.9	1.0 06	168.3	70 48.7	1.0 06	168.0	71 18.5	1.0 06	167.9	71 48.4	99 06	167.7	72 18.2	99 06	167.6	73 47.7	99 06	167.0	74 17.5	99 06	166.8
8	69 15.7	99 06	166.8	69 45.6	99 06	166.7	70 45.2	99 06	166.3	71 15.0	99 07	166.2	71 44.8	99 07	166.0	72 14.6	99 07	165.8	73 44.0	99 07	165.2	74 13.7	99 07	164.9
9	69 12.0	99 07	165.2	69 41.8	99 07	165.0	70 41.3	99 07	164.7	71 11.1	99 07	164.5	71 40.9	99 07	164.3	72 10.6	99 07	164.1	73 39.7	99 08	163.4	74 09.4	99 08	163.1
10	69 07.8	99 08	163.6	69 37.5	99 08	163.4	70 37.0	99 08	163.0	71 06.7	99 08	162.8	71 36.4	99 08	162.6	72 06.1	99 08	162.3	73 35.1	99 09	161.6	74 04.7	99 09	161.3
1	69 03.2	99 08	161.9	69 32.9	99 08	161.7	70 32.2	99 09	161.3	71 01.9	99 09	161.1	71 31.6	99 09	160.9	72 01.2	99 09	160.6	73 29.9	98 09	159.8	73 59.4	98 09	159.4
2	68 58.2	99 09	160.3	69 27.8	99 09	160.1	70 27.1	99 09	159.7	70 56.7	99 09	159.4	71 26.2	99 10	159.2	71 55.8	98 10	158.9	73 24.3	98 10	158.0	73 53.8	98 10	157.6
3	68 52.7	99 10	158.7	69 22.3	99 10	158.5	70 21.5	98 10	158.0	70 51.0	98 10	157.8	71 20.5	98 10	157.5	71 50.0	98 10	157.2	73 18.3	98 11	156.2	73 47.6	98 11	155.9
4	68 46.9	98 10	157.2	69 16.4	98 10	156.9	70 15.4	98 11	156.4	70 44.9	98 11	156.1	71 14.3	98 11	155.8	71 43.8	98 11	155.5	73 11.8	98 12	154.5	73 41.1	97 12	154.1
15	68 40.7	98 11	155.6	69 10.1	98 11	155.3	70 09.0	98 11	154.8	70 38.4	98 11	154.5	71 07.8	98 12	154.2	71 37.1	98 12	153.8	73 04.9	97 12	152.7	73 34.1	97 12	152.3
6	68 34.1	98 12	154.0	69 03.5	98 12	153.7	70 02.2	98 12	153.2	70 31.5	98 12	152.8	71 00.8	98 12	152.5	71 30.1	97 12	152.2	72 57.6	97 13	151.0	73 26.6	97 13	150.6
7	68 27.1	98 12	152.5	68 56.4	98 12	152.2	69 55.0	98 13	151.6	70 24.2	97 13	151.2	70 53.5	97 13	150.9	71 22.6	97 13	150.5	72 49.8	97 14	149.3	73 18.8	96 14	148.9
8	68 19.7	98 13	150.9	68 49.0	98 13	150.6	69 47.4	97 13	150.0	70 16.6	97 13	149.6	70 45.7	97 14	149.3	71 14.8	97 14	148.9	72 41.7	96 14	147.7	73 10.6	96 14	147.2
9	68 12.0	97 13	149.4	68 41.2	97 14	149.1	69 39.5	97 14	148.4	70 08.6	97 14	148.1	70 37.6	97 14	147.7	71 06.6	97 14	147.3	72 33.2	96 15	146.0	73 02.0	96 15	145.5
20	68 03.9	97 14	147.9	68 33.0	97 14	147.6	69 31.2	97 14	146.9	70 00.2	97 15	146.5	70 29.1	96 15	146.1	70 58.0	96 15	145.7	72 24.4	96 15	144.4	72 53.0	95 16	143.9
1	67 55.5	97 15	146.4	68 24.5	97 15	146.0	69 22.5	96 15	145.3	69 51.4	96 15	144.9	70 20.3	96 15	144.5	70 49.1	96 15	144.1	72 15.1	95 16	142.7	72 43.7	95 16	142.2
2	67 46.7	97 15	144.9	68 15.7	97 15	144.5	69 13.5	96 16	143.8	69 42.3	96 16	143.4	70 11.1	96 16	143.0	70 39.8	96 16	142.6	72 05.6	95 17	141.1	72 34.0	95 17	140.6
3	67 37.6	96 16	143.4	68 06.5	96 16	143.1	69 04.2	96 16	142.3	69 32.9	96 16	141.9	70 01.6	96 16	141.5	70 30.2	95 17	141.0	71 55.6	95 17	139.6	72 24.0	94 17	139.0
4	67 28.2	96 16	141.9	67 57.0	96 16	141.6	68 54.5	96 17	140.8	69 23.2	95 17	140.4	69 51.8	95 17	140.0	70 20.3	95 17	139.5	71 45.4	94 18	138.0	72 13.6	94 18	137.4
25	67 18.5	96 17	140.5	67 47.2	96 17	140.1	68 44.5	95 17	139.3	69 13.1	95 17	138.9	69 41.6	95 17	138.5	70 10.0	95 18	138.0	71 34.9	94 18	136.5	72 03.0	93 18	135.9
6	67 08.4	96 17	139.1	67 37.1	95 17	138.7	68 34.3	95 18	137.9	69 02.7	95 18	137.4	69 31.2	95 18	137.0	69 59.5	94 18	136.5	71 24.0	93 19	134.9	71 52.0	93 19	134.4
7	66 58.1	95 18	137.6	67 26.7	95 18	137.2	68 23.7	95 18	136.4	68 52.1	95 18	136.0	69 20.4	94 18	135.5	69 48.7	94 19	135.0	71 12.9	93 19	133.4	71 40.8	93 19	132.9
8	66 47.5	95 18	136.2	67 16.0	95 18	135.8	68 12.8	94 19	135.0	68 41.2	94 19	134.5	69 09.4	94 19	134.1	69 37.6	94 19	133.6	71 01.5	93 19	132.0	71 29.2	92 20	131.4
9	66 36.6	95 19	134.8	67 05.1	95 19	134.4	68 01.7	94 19	133.6	68 30.0	94 19	133.1	68 58.1	94 19	132.6	69 26.2	93 19	132.1	70 49.8	92 20	130.5	71 17.5	92 20	129.9
30	66 25.5	95 19	133.5	66 53.8	94 19	133.0	67 50.3	94 19	132.2	68 18.5	94 20	131.7	68 46.5	93 20	131.2	69 14.5	93 20	130.7	70 37.9	92 20	129.1	71 05.4	92 20	128.5
1	66 14.1	94 19	132.1	66 42.4	94 20	131.7	67 38.7	94 20	130.8	68 06.8	93 20	130.3	68 34.7	93 20	129.8	69 02.6	93 20	129.3	70 25.7	92 21	127.6	70 53.1	91 21	127.0
2	66 02.4	94 20	130.7	66 30.6	94 20	130.3	67 26.8	93 20	129.4	67 54.8	93 20	128.9	68 22.7	93 20	128.4	68 50.5	92 21	127.9	70 13.3	91 21	126.2	70 40.6	91 21	125.6
3	65 50.6	94 20	129.4	66 18.7	94 20	129.0	67 14.7	93 21	128.1	67 42.6	93 21	127.6	68 10.4	93 21	127.1	68 38.1	92 21	126.6	70 00.6	91 21	124.9	70 27.9	91 22	124.2
4	65 38.4	94 21	128.1	66 06.5	93 21	127.6	67 02.4	93 21	126.7	67 30.2	93 21	126.2	67 57.9	92 21	125.7	68 25.6	92 21	125.2	69 47.8	91 22	123.5	70 15.0	90 22	122.9
35	65 26.1	93 21	126.8	65 54.1	93 21	126.3	66 49.8	93 21	125.4	67 17.6	92 21	124.9	67 45.2	92 22	124.4	68 12.8	92 22	123.9	69 34.7	90 22	122.1	70 01.8	90 22	121.5
6	65 13.6	93 21	125.5	65 41.5	93 21	125.0	66 37.1	92 22	124.1	67 04.7	92 22	123.6	67 32.3	92 22	123.1	67 59.8	91 22	122.6	69 21.5	90 22	120.8	69 48.5	90 23	120.2
7	65 00.8	93 22	124.2	65 28.7	93 22	123.7	66 24.1	92 22	122.8	66 51.7	92 22	122.3	67 19.2	91 22	121.8	67 46.6	91 22	121.2	69 08.1	90 23	119.5	69 35.0	89 23	118.9
8	64 47.9	93 22	122.9	65 15.6	92 22	122.5	66 11.0	92 22	121.5	66 38.5	92 22	121.0	67 05.9	91 22	120.5	67 33.2	91 23	120.0	68 54.5	90 23	118.2	69 21.3	89 23	117.6
9	64 34.7	93 22	121.6	65 02.5	92 22	121.2	65 57.6	92 22	120.2	66 25.1	91 23	119.7	66 52.4	91 23	119.2	67 19.7	91 23	118.7	68 40.7	89 23	116.9	69 07.5	89 23	116.3
40	64 21.4	92 22	120.4	64 49.1	92 23	119.9	65 44.1	91 23	119.0	66 11.5	91 23	118.5	66 38.8	91 23	118.0	67 06.0	90 23	117.4	68 26.8	89 23	115.7	68 53.5	89 24	115.1
1	64 08.0	92 23	119.2	64 35.5	92 23	118.7	65 30.5	91 23	117.8	65 57.8	91 23	117.3	66 25.0	91 23	116.7	66 52.1	90 23	116.2	68 12.7	89 24	114.4	68 39.3	89 24	113.8
2	63 54.3	92 23	117.9	64 21.8	92 23	117.5	65 16.6	91 23	116.5	65 43.9	91 23	116.0	66 11.1	90 24	115.5	66 38.1	90 24	115.0	67 58.5	89 24	113.2	68 25.1	88 24	112.6
3	63 40.5	92 23	116.7	64 08.0	91 23	116.3	65 02.7	91 24	115.3	65 29.9	90 24	114.8	65 57.0	90 24	114.3	66 24.0	90 24	113.8	67 44.2	88 24	112.0	68 10.7	88 24	111.4
4	63 26.6	92 23	115.5	63 54.0	91 24	115.1	64 48.6	91 24	114.1	65 15.7	90 24	113.6	65 42.8	90 24	113.1	66 09.7	90 24	112.6	67 29.7	88 24	110.8	67 56.1	88 24	110.2
45	63 12.5	91 24	114.4	63 39.9	91 24	113.9	64 34.3	90 24	112.9	65 01.4	90 24	112.4	65 28.4	90 24	111.9	65 55.3	89 24	111.4	67 15.2	88 24	109.6	67 41.5	88 25	109.0
6	62 58.3	91 24	113.2	63 25.6	91 24	112.7	64 20.0	90 24	111.8	64 47.0	90 24	111.3	65 13.9	90 24	110.7	65 40.8	89 24	110.2	67 00.5	88 25	108.5	67 26.8	87 25	107.8
7	62 44.0	91 24	112.0	63 11.2	91 24	111.6	64 05.5	90 24	110.6	64 32.5	90 24	110.1	64 59.4	89 24	109.6	65 26.1	89 25	109.0	66 45.7	88 25	107.3	67 12.0	87 25	106.7
8	62 29.5	91 24	110.9	62 56.7	91 24	110.4	63 50.9	90 24	109.5	64 17.8	90 25	109.0	64 44.7	89 25	108.4	65 11.4	89 25	107.9	66 30.8	88 25	106.2	66 57.0	87 25	105.6
9	62 14.9	91 24	109.7	62 42.1	90 24	109.3	63 36.2	90 25	108.3	64 03.1	89 25	107.8	64 29.9	89 25	107.3	64 56.6	89 25	106.8	66 15.9	87 25	105.1	66 42.0	87 25	104.4
50	62 00.3	91 25	108.6	62 27.4	90 25	108.2	63 21.4	90 25	107.2	63 48.3	89 25	106.7	64 15.0	89 25	106.2	64 41.7	88 25	105.7	66 00.8	87 25	103.9	66 27.0	87 25	103.3
1	61 45.5	91 25	107.5	62 12.6	90 25	107.0	63 06.6	90 25	106.1	63 33.4	89 25	105.6	64 00.1	89 25	105.1	64 26.7	88 25	104.5	65 45.7	87 25	102.8	66 11.8	87 25	102.2
2	61 30.6	90 25	106.4	61 57.7	90 25	105.9	62 51.6	89 25	105.0	63 18.4	89 25	104.5	63 45.0	89 25	104.0	64 11.6	88 25	103.4	65 30.6	87 25	101.8	65 56.6	87 25	101.1
3	61 15.7	90 25	105.3	61 42.8	90 25	104.8	62 36.6	89 25	103.9	63 03.3	89 25	103.4	63 29.9	89 25	102.9	63 56.5	88 25	102.4	65 15.3	87 26	100.7	65 41.3	86 26	100.1
4	61 00.7	90 25	104.2	61 27.7	90 25	103.8	62 21.4	89 25	102.8	62 48.2	89 25	102.3	63 14.8	89 25	101.8	63 41.3	88 25	101.3	65 00.0	87 26	99.6	65 26.0	86 26	99.0
55	60 45.6	90 25	103.1	61 12.6	90 25	102.7	62 06.3	89 25	101.7	62 33.0	89 25	101.3	62 59.5	88 25	100.7	63 26.0	88 26	100.2	64 44.7	87 26	98.6	65 10.7	86 26	98.0
6	60 30.4	90 25	102.1	60 57.4	90 25	101.6	61 51.0	89 25	100.7	62 17.7	89 26	100.2	62 44.3	88 26	99.7	63 10.7	88 26	99.2	64 29.3	87 26	97.5	64 55.3	86 26	96.9
7	60 15.2	90 25	101.0	60 42.2	90 25	100.6	61 35.8	89 26	99.6	62 02.4	89 26	99.1	62 28.9	88 26	98.6	62 55.4	88 26	98.1	64 13.9	87 26	96.5	64 39.8	86 26	95.9
8	60 00.0	90 26	100.0	60 26.9	90 26	99.5	61 20.4	89 26	98.6	61 47.0	89 26	98.1	62 13.6	88 26	97.6	62 40.0	88 26	97.1	63 58.5	87 26	95.5	64 24.4	86 26	94.9
9	59 44.6	90 26	98.9	60 11.5	90 26	98.5	61 05.0	89 26	97.6	61 31.6	89 26	97.1	61 58.2	88 26	96.6	62 24.5	88 26	96.1	63 43.0	87 26	94.5	64 08.9	86 26	93.9
60	59 29.3	90 26	97.9	59 56.2	89 26	97.5	60 49.6	89 26	96.5	61 16.2	88 26	96.1	61 42.7	88 26	95.6	62 09.1	88 26	95.1	63 27.5	87 26	93.5	63 53.4	86 26	92.9
1	59 13.9	90 26	96.9	59 40.7	89 26	96.4	60 34.2	89 26	95.5	61 00.8	88 26	95.0	61 27.2	88 26	94.6	61 53.6	88 26	94.1	63 12.0	86 26	92.5	63 37.9	86 26	91.9
2	58 58.5	90 26	95.9	59 25.3	89 26	95.4	60 18.7	89 26	94.5	60 45.3	88 26	94.0	61 11.8	88 26	93.6	61 38.1	88 26	93.1	62 56.5	86 26	91.5	63 22.4	86 26	90.9
3	58 43.0	90 26	94.9	59 09.8	89 26	94.4	60 03.2	89 26	93.5	60 29.8	88 26	93.1	60 56.2	88 26	92.6	61 22.6	88 26	92.1	62 41.0	86 26	90.5	63 06.8	86 26	89.9
4	58 27.5	90 26	93.9	58 54.3	89 26	93.4	59 47.7	89 26	92.5	60 14.3	88 26	92.1	60 40.7	88 26	91.6	61 07.1	88 26	91.1	62 25.4	86 26	89.5	62 51.3	86 26	89.0
65	58 12.0	90 26	92.9	58 38.8	89 26	92.4	59 32.2	89 26	91.5	59 58.8	88 26	91.1	60 25.2	88 26	90.6	60 51.5	88 26	90.1	62 09.9	86 26	88.6	62 35.8	86 26	88.0
6	57 56.5	90 26	91.9	58 23.3	89 26	91.5	59 16.7	89 26	90.6	59 43.2	88 26	90.1	60 09.7	88 26	89.6	60 36.0	88 26	89.2	61 54.4	86 26	87.6	62 20.3	86 26	87.1
7	57 41.0	90 26	90.9	58 07.8	89 26	90.5	59 01.1	89 26	89.6	59 27.7	88 26	89.2	59 54.1	88 26	88.7	60 20.5	88 26	88.2	61 38.9	87 26	86.7	62 04.8	86 26	86.1
8	57 25.4	90 26	89.9	57 52.2	89 26	89.5	58 45.6	89 26	88.6	59 12.2	88 26	88.2	59 38.6	88 26	87.7	60 05.0	88 26	87.3	61 23.4	87 26	85.7	61 49.3	86 26	85.2
9	57 09.9	90 26	89.0	57 36.7	89 26	88.6	58 30.1	89 26	87.7	58 56.7	88 26	87.2	59 23.1	88 26	86.8	59 49.5	88 26	86.3	61 07.9	87 26	84.8	61 33.8	86 26	84.3
70	56 54.4	90 26	88.0	57 21.2	89 26	87.6	58 14.6	89 26	86.8	58 41.1	88 26	86.3	59 07.6	88 26	85.8	59 34.0	88 26	85.4	60 52.4	87 26	83.9	61 18.4	86 26	83.4
1	56 38.9	90 26	87.1	57 05.7	89 26	86.7	57 59.1	89 26	85.8	58 25.7	88 26	85.4	58 52.1	88 26	84.9	59 18.5	88 26	84.5	60 37.0	87 26	83.0	61 03.0	86 26	82.5
2	56 23.4	90 26	86.1	56 50.2	89 26	85.7	57 43.6	89 26	84.9	58 10.2	88 26	84.4	58 36.7	88 26	84.0	59 03.1	88 26	83.5	60 21.6	87 26	82.1	60 47.6	86 26	81.6
3	56 07.9	90 26	85.2	56 34.7	89 26	84.8	57 28.2	89 26	84.0	57 54.8	88 26	83.5	58 21.2	88 26	83.1	58 47.7	88 26	82.6	60 06.3	87 26	81.2	60 32.2	86 26	80.7
4	55 52.4	90 26	84.3	56 19.3	89 26	83.9	57 12.7	89 26	83.0	57 39.3	88 26	82.6	58 05.8	88 26	82.2	58 32.3	88 26	81.7	59 50.9	87 26	80.3	60 16.9	86 25	79.8
75	55 37.0	90 26	83.3	56 03.8	89 26	82.9	56 57.3	89 26	82.1	57 24.0	89 26	81.7	57 50.5	88 26	81.3	58 16.9	88 26	80.8	59 35.6	87 25	79.4	60 01.7	87 25	78.9
6	55 21.6	90 26	82.4	55 48.4	89 26	82.0	56 42.0	89 26	81.2	57 08.6	89 26	80.8	57 35.2	88 25	80.4	58 01.6	88 25	79.9	59 20.4	87 25	78.5	59 46.5	87 25	78.0
7	55 06.2	90 26	81.5	55 33.1	90 26	81.1	56 26.6	89 25	80.3	56 53.3	89 25	79.9	57 19.9	88 25	79.5	57 46.3	88 25	79.0	59 05.2	87 25	77.6	59 31.3	87 25	77.2
8	54 50.9	90 25	80.6	55 17.8	90 25	80.2	56 11.4	89 25	79.4	56 38.0	89 25	79.0	57 04.6	88 25	78.6	57 31.1	88 25	78.1	58 50.1	87 25	76.8	59 16.2	87 25	76.3
9	54 35.6	90 25	79.7	55 02.5	90 25	79.3	55 56.1	89 25	78.5	56 22.8	89 25	78.1	56 49.4	88 25	77.7	57 15.9	88 25	77.3	58 35.0	87 25	75.9	59 01.1	87 25	75.4
80	54 20.3	90 25	78.8	54 47.2	90 25	78.4	55 40.9	89 25	77.6	56 07.6	89 25	77.2	56 34.3	89 25	76.8	57 00.8	88 25	76.4	58 19.9	87 25	75.0	58 46.1	87 25	74.6
1	54 05.1	90 25	77.9	54 32.1	90 25	77.5	55 25.8	89 25	76.7	55 52.5	89 25	76.3	56 19.2	89 25	75.9	56 45.8	88 25	75.5	58 05.0	88 25	74.2	58 31.2	87 25	73.7
2	53 49.9	90 25	77.0	54 16.9	90 25	76.6	55 10.7	89 25	75.9	55 37.5	89 25	75.5	56 04.1	89 25	75.1	56 30.8	88 25	74.7	57 50.1	88 25	73.3	58 16.3	87 25	72.9
3	53 34.8	90 25	76.1	54 01.8	90 25	75.8	54 55.7	89 25	75.0	55 22.5	89 25	74.6	55 49.2	89 25	74.2	56 15.8	88 25	73.8	57 35.2	88 25	72.5	58 01.5	87 25	72.0
4	53 19.8	90 25	75.2	53 46.8	90 25	74.9	54 40.7	90 25	74.1	55 07.5	89 25	73.7	55 34.3	89 25	73.3	56 00.9	89 25	72.9	57 20.4	88 24	71.7	57 46.8	88 25	71.2
85	53 04.8	90 25	74.4	53 31.9	90 25	74.0	54 25.8	90 25	73.3	54 52.6	89 25	72.9	55 19.4	89 25	72.5	55 46.1	89 24	72.1	57 05.7	88 24	70.8	57 32.1	88 24	70.4
6	52 49.9	90 25	73.5	53 17.0	90 25	73.1	54 10.9	90 25	72.4	54 37.8	90 25	72.0	55 04.6	89 24	71.6	55 31.4	89 24	71.2	56 51.1	88 24	70.0	57 17.5	88 24	69.5
7	52 35.0	91 25	72.6	53 02.1	90 25	72.3	53 56.2	90 24	71.6	54 23.1	90 24	71.2	54 49.9	89 24	70.8	55 16.7	89 24	70.4	56 36.6	88 24	69.2	57 03.0	88 24	68.7
8	52 20.2	91 25	71.8	52 47.4	90 24	71.4	53 41.5	90 24	70.7	54 08.4	90 24	70.3	54 35.3	89 24	69.9	55 02.1	89 24	69.6	56 22.1	88 24	68.3	56 48.6	88 24	67.9
9	52 05.5	91 24	70.9	52 32.7	90 24	70.6	53 26.9	90 24	69.9	53 53.9	90 24	69.5	54 20.8	90 24	69.1	54 47.6	89 24	68.7	56 07.7	88 24	67.5	56 34.2	88 24	67.1
90	51 50.9	91 24	70.1	52 18.1	91 24	69.7	53 12.3	90 24	69.0	53 39.4	90 24	68.6	54 06.3	90 24	68.3	54 33.2	89 24	67.9	55 53.4	88 24	66.7	56 20.0	88 24	66.3

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	51 36.3	91 24	69.2	52 03.6	91 24	68.9	52 57.9	90 24	68.2	53 24.9	90 24	67.8	53 51.9	90 24	67.4	54 18.8	90 24	67.1	55 39.2	89 24	65.9	56 05.8	89 23	65.5	91
2	51 21.8	91 24	68.4	51 49.1	91 24	68.0	52 43.5	90 24	67.3	53 10.6	90 24	67.0	53 37.6	90 24	66.6	54 04.6	90 24	66.2	55 25.0	89 23	65.1	55 51.7	89 23	64.7	2
3	51 07.5	91 24	67.5	51 34.8	91 24	67.2	52 29.2	91 24	66.5	52 56.3	90 24	66.1	53 23.4	90 24	65.8	53 50.4	90 23	65.4	55 11.0	89 23	64.3	55 37.7	89 23	63.9	3
4	50 53.2	91 24	66.7	51 20.5	91 24	66.3	52 15.0	91 24	65.7	52 42.2	90 23	65.3	53 09.3	90 23	65.0	53 36.3	90 23	64.6	54 57.1	89 23	63.5	55 23.8	89 23	63.1	4
95	50 38.9	91 24	65.8	51 06.3	91 23	65.5	52 00.9	91 23	64.8	52 28.1	91 23	64.5	52 55.3	90 23	64.1	53 22.4	90 23	63.8	54 43.2	89 23	62.7	55 10.0	89 23	62.3	95
6	50 24.8	91 23	65.0	50 52.2	91 23	64.7	51 46.9	91 23	64.0	52 14.2	91 23	63.7	52 41.4	91 23	63.3	53 08.5	90 23	63.0	54 29.5	90 23	61.9	54 56.3	89 23	61.5	6
7	50 10.8	92 23	64.2	50 38.2	91 23	63.8	51 33.0	91 23	63.2	52 00.3	91 23	62.9	52 27.5	91 23	62.5	52 54.7	90 23	62.2	54 15.8	90 23	61.1	54 42.7	90 22	60.7	7
8	49 56.9	92 23	63.3	50 24.4	92 23	63.0	51 19.2	91 23	62.4	51 46.5	91 23	62.0	52 13.8	91 23	61.7	52 41.0	91 23	61.4	54 02.3	90 22	60.3	54 29.2	90 22	59.9	8
9	49 43.0	92 23	62.5	50 10.6	92 23	62.2	51 05.5	91 23	61.6	51 32.9	91 23	61.2	52 00.2	91 23	60.9	52 27.4	91 22	60.6	53 48.9	90 22	59.5	54 15.9	90 22	59.1	9
100	49 29.3	92 23	61.7	49 56.9	92 23	61.4	50 51.9	91 22	60.8	51 19.3	91 22	60.4	51 46.7	91 22	60.1	52 14.0	91 22	59.8	53 35.5	90 22	58.7	54 02.6	90 22	58.3	100
1	49 15.7	92 23	60.9	49 43.3	92 22	60.6	50 38.4	92 22	59.9	51 05.8	91 22	59.6	51 33.3	91 22	59.3	52 00.6	91 22	59.0	53 22.3	90 22	57.9	53 49.4	90 22	57.6	1
2	49 02.2	92 22	60.0	49 29.8	92 22	59.7	50 25.0	92 22	59.1	50 52.5	92 22	58.8	51 20.0	91 22	58.5	51 47.4	91 22	58.2	53 09.2	91 22	57.2	53 36.4	90 22	56.8	2
3	48 48.8	92 22	59.2	49 16.5	92 22	58.9	50 11.7	92 22	58.3	50 39.3	92 22	58.0	51 06.8	92 22	57.7	51 34.2	91 22	57.4	52 56.2	91 21	56.4	53 23.4	91 21	56.0	3
4	48 35.5	93 22	58.4	49 03.2	92 22	58.1	49 58.6	92 22	57.5	50 26.2	92 22	57.2	50 53.7	92 22	56.9	51 21.2	92 22	56.6	52 43.4	91 21	55.6	53 10.6	91 21	55.3	4
105	48 22.3	93 22	57.6	48 50.1	93 22	57.3	49 45.5	92 22	56.7	50 13.2	92 21	56.4	50 40.7	92 21	56.1	51 08.3	92 21	55.8	52 30.6	91 21	54.8	52 57.9	91 21	54.5	105
6	48 09.3	93 22	56.8	48 37.1	93 22	56.5	49 32.6	92 21	55.9	50 00.3	92 21	55.6	50 27.9	92 21	55.3	50 55.5	92 21	55.0	52 18.0	91 21	54.1	52 45.3	91 21	53.7	6
7	47 56.3	93 21	56.0	48 24.2	93 21	55.7	49 19.8	93 21	55.1	49 47.5	92 21	54.8	50 15.2	92 21	54.5	50 42.8	92 21	54.2	52 05.5	92 21	53.3	52 32.9	91 21	53.0	7
8	47 43.5	93 21	55.2	48 11.4	93 21	54.9	49 07.1	93 21	54.3	49 34.9	93 21	54.1	50 02.6	92 21	53.8	50 30.3	92 21	53.5	51 53.1	92 20	52.5	52 20.6	92 20	52.2	8
9	47 30.8	93 21	54.4	47 58.8	93 21	54.1	48 54.6	93 21	53.6	49 22.4	93 21	53.3	49 50.2	93 21	53.0	50 17.9	92 20	52.7	51 40.8	92 20	51.8	52 08.3	92 20	51.4	9
110	47 18.3	93 21	53.6	47 46.3	93 21	53.3	48 42.1	93 20	52.8	49 10.0	93 20	52.5	49 37.8	93 20	52.2	50 05.6	93 20	51.9	51 28.7	92 20	51.0	51 56.3	92 20	50.7	110
1	47 05.9	93 20	52.8	47 33.9	93 20	52.5	48 29.8	93 20	52.0	48 57.7	93 20	51.7	49 25.6	93 20	51.4	49 53.4	93 20	51.1	51 16.7	92 20	50.2	51 44.3	92 20	49.9	1
2	46 53.6	94 20	52.0	47 21.6	94 20	51.7	48 17.7	93 20	51.2	48 45.6	93 20	50.9	49 13.5	93 20	50.6	49 41.4	93 20	50.4	51 04.8	92 20	49.5	51 32.5	92 19	49.2	2
3	46 41.4	94 20	51.2	47 09.5	94 20	50.9	48 05.6	93 20	50.4	48 33.6	93 20	50.1	49 01.6	93 20	49.9	49 29.5	93 20	49.6	50 53.1	93 19	48.7	51 20.8	92 19	48.4	3
4	46 29.3	94 20	50.4	46 57.5	94 20	50.1	47 53.7	94 20	49.6	48 21.8	93 20	49.4	48 49.8	93 19	49.1	49 17.8	93 19	48.8	50 41.5	93 19	48.0	51 09.3	93 19	47.7	4
115	46 17.5	94 20	49.6	46 45.7	94 20	49.4	47 42.0	94 19	48.9	48 10.1	94 19	48.6	48 38.1	93 19	48.3	49 06.2	93 19	48.1	50 30.0	93 19	47.2	50 57.9	93 19	46.9	115
6	46 05.7	94 19	48.8	46 33.9	94 19	48.6	47 30.3	94 19	48.1	47 58.5	94 19	47.8	48 26.6	94 19	47.6	48 54.7	94 19	47.3	50 18.7	93 19	46.5	50 46.6	93 19	46.2	6
7	45 54.1	94 19	48.0	46 22.4	94 19	47.8	47 18.9	94 19	47.3	47 47.0	94 19	47.0	48 15.2	94 19	46.8	48 43.3	94 19	46.5	50 07.5	93 18	45.7	50 35.5	93 18	45.4	7
8	45 42.6	94 19	47.2	46 10.9	94 19	47.0	47 07.5	94 19	46.5	47 35.8	94 19	46.3	48 04.0	94 18	46.0	48 32.1	94 18	45.8	49 56.4	93 18	45.0	50 24.5	93 18	44.7	8
9	45 31.3	96 19	46.5	45 59.6	96 19	46.2	46 56.3	94 18	45.8	47 24.6	94 18	45.5	47 52.9	94 18	45.3	48 21.1	94 18	45.0	49 45.5	94 18	44.2	50 13.6	94 18	43.9	9
120	45 20.1	96 18	45.7	45 48.5	95 18	45.4	46 45.3	94 18	45.0	47 13.6	94 18	44.7	47 41.9	94 18	44.5	48 10.2	94 18	44.2	49 34.8	94 18	43.5	50 02.9	94 18	43.2	120
1	45 09.1	95 18	44.9	45 37.5	96 18	44.7	46 34.4	96 18	44.2	47 02.7	95 18	44.0	47 31.1	94 18	43.7	47 59.4	94 18	43.5	49 24.2	94 17	42.7	49 52.4	94 17	42.5	1
2	44 58.2	95 18	44.1	45 26.7	96 18	43.9	46 23.6	95 18	43.4	46 52.0	95 18	43.2	47 20.4	95 18	43.0	47 48.8	95 17	42.7	49 13.7	94 17	42.0	49 42.0	94 17	41.7	2
3	44 47.4	95 18	43.3	45 16.0	95 18	43.1	46 13.0	95 17	42.7	46 41.5	95 17	42.4	47 09.9	95 17	42.2	47 38.3	95 17	42.0	49 03.4	94 17	41.2	49 31.7	94 17	41.0	3
4	44 36.9	95 17	42.6	45 05.4	95 17	42.3	46 02.6	95 17	41.9	46 31.1	95 17	41.7	46 59.6	95 17	41.5	47 28.0	95 17	41.2	48 53.2	95 17	40.5	49 21.6	94 17	40.2	4
125	44 26.4	95 17	41.8	44 55.1	95 17	41.6	45 52.3	95 17	41.1	46 20.8	95 17	40.9	46 49.4	95 17	40.7	47 17.9	95 17	40.5	48 43.2	95 16	39.8	49 11.6	95 16	39.5	125
6	44 16.2	95 17	41.0	44 44.8	96 17	40.8	45 42.1	95 17	40.4	46 10.7	95 17	40.2	46 39.3	95 16	39.9	47 07.9	95 16	39.7	48 33.4	95 16	39.0	49 01.8	95 16	38.8	6
7	44 06.1	96 17	40.2	44 34.8	96 16	40.0	45 32.1	96 16	39.6	46 00.8	95 16	39.4	46 29.4	95 16	39.2	46 58.0	95 16	39.0	48 23.7	95 16	38.3	48 52.2	95 16	38.0	7
8	43 56.1	96 16	39.5	44 24.9	96 16	39.3	45 22.3	96 16	38.8	45 51.0	96 16	38.6	46 19.7	96 16	38.4	46 48.3	95 16	38.2	48 14.1	95 16	37.5	48 42.7	95 16	37.3	8
9	43 46.3	96 16	38.7	44 15.1	96 16	38.5	45 12.7	96 16	38.1	45 41.4	96 16	37.9	46 10.1	96 16	37.7	46 38.8	96 16	37.5	48 04.8	95 15	36.8	48 33.4	95 15	36.6	9
130	43 36.7	96 16	37.9	44 05.5	96 16	37.7	45 03.2	96 16	37.3	45 32.0	96 15	37.1	46 00.7	96 15	36.9	46 29.5	96 15	36.7	47 55.5	96 15	36.1	48 24.2	95 15	35.8	130
1	43 27.2	96 15	37.1	43 56.1	96 15	37.0	44 53.8	96 15	36.6	45 22.7	96 15	36.4	45 51.5	96 15	36.2	46 20.3	96 15	36.0	47 46.5	96 15	35.3	48 15.2	96 15	35.1	1
2	43 17.9	96 15	36.4	43 46.9	96 15	36.2	44 44.7	96 15	35.8	45 13.5	96 15	35.6	45 42.4	95 15	35.4	46 11.2	96 15	35.2	47 37.6	96 15	34.6	48 06.3	96 14	34.4	2
3	43 08.8	97 15	35.6	43 37.8	97 15	35.4	44 35.7	96 15	35.1	45 04.6	96 15	34.9	45 33.5	96 15	34.7	46 02.3	96 14	34.5	47 28.8	96 14	33.9	47 57.6	96 14	33.7	3
4	42 59.9	97 15	34.8	43 28.9	97 15	34.7	44 26.8	97 14	34.3	44 55.8	96 14	34.1	45 24.7	96 14	33.9	45 53.6	96 14	33.7	47 20.3	96 14	33.1	47 49.1	96 14	32.9	4
135	42 51.1	97 14	34.1	43 20.1	97 14	33.9	44 18.2	97 14	33.5	44 47.2	97 14	33.4	45 16.1	97 14	33.2	45 45.1	96 14	33.0	47 11.9	96 14	32.4	47 40.7	96 14	32.2	135
6	42 42.5	97 14	33.3	43 11.6	97 14	33.1	44 09.7	97 14	32.8	44 38.7	97 14	32.6	45 07.7	97 14	32.4	45 36.7	97 14	32.2	47 03.6	96 13	31.7	47 32.5	96 13	31.5	6
7	42 34.0	97 14	32.5	43 03.2	97 14	32.4	44 01.3	97 14	32.0	44 30.4	97 14	31.9	44 59.5	97 13	31.7	45 28.5	97 13	31.5	46 55.5	97 13	31.0	47 24.5	97 13	30.8	7
8	42 25.8	97 13	31.8	42 54.9	97 13	31.6	43 53.2	97 13	31.3	44 22.3	97 13	31.1	44 51.4	97 13	30.9	45 20.5	97 13	30.8	46 47.6	97 13	30.2	47 16.7	97 13	30.0	8
9	42 17.7	97 13	31.0	42 46.9	97 13	30.8	43 45.2	97 13	30.5	44 14.4	97 13	30.4	44 43.5	97 13	30.2	45 12.6	97 13	30.0	46 39.9	97 13	29.5	47 09.0	97 13	29.3	9
140	42 09.8	97 13	30.2	42 39.0	97 13	30.1	43 37.4	97 13	29.8	44 06.6	97 13	29.6	44 35.8	97 13	29.4	45 05.0	97 12	29.3	46 32.4	97 12	28.8	47 01.5	97 12	28.6	140
1	42 02.0	98 13	29.5	42 31.3	98 13	29.3	43 29.8	97 12	29.0	43 59.0	97 12	28.9	44 28.2	97 12	28.7	44 57.4	97 12	28.5	46 25.0	97 12	28.0	46 54.1	97 12	27.9	1
2	41 54.5	98 12	28.7	42 23.8	98 12	28.6	43 22.4	98 12	28.3	43 51.6	98 12	28.1	44 20.9	97 12	28.0	44 50.1	97 12	27.8	46 17.8	97 12	27.3	46 46.9	97 12	27.1	2
3	41 47.1	98 12	27.9	42 16.5	98 12	27.8	43 15.1	98 12	27.5	43 44.4	98 12	27.4	44 13.7	98 12	27.2	44 43.0	98 12	27.1	46 10.7	97 11	26.6	46 39.9	97 11	26.4	3
4	41 39.9	98 12	27.2	42 09.3	98 12	27.1	43 08.0	98 12	26.8	43 37.3	98 11	26.6	44 06.7	98 11	26.5	44 36.0	98 11	26.3	46 03.8	98 11	25.9	46 33.1	98 11	25.7	4
145	41 32.9	98 11	26.4	42 02.3	98 11	26.3	43 01.1	98 11	26.0	43 30.5	98 11	25.9	43 59.8	98 11	25.7	44 29.2	98 11	25.6	45 57.2	98 11	25.1	46 26.5	98 11	25.0	145
6	41 26.1	98 11	25.7	41 55.5	98 11	25.5	42 54.4	98 11	25.3	43 23.8	98 11	25.1	43 53.2	98 11	25.0	44 22.6	98 11	24.9	45 50.7	98 11	24.4	46 20.0	98 10	24.3	6
7	41 19.5	98 11	24.9	41 48.9	98 11	24.8	42 47.8	98 11	24.5	43 17.3	98 11	24.4	43 46.7	98 10	24.3	44 16.1	98 10	24.1	45 44.3	98 10	23.7	46 13.7	98 10	23.6	7
8	41 13.0	98 10	24.1	41 42.5	98 10	24.0	42 41.5	98 10	23.8	43 11.0	98 10	23.6	43 40.4	98 10	23.5	44 09.9	98 10	23.4	45 38.2	98 10	23.0	46 07.6	98 10	22.8	8
9	41 06.8	98 10	23.4	41 36.3	98 10	23.3	42 35.3	98 10	23.0	43 04.8	98 10	22.9	43 34.3	98 10	22.8	44 03.8	98 10	22.7	45 32.2	98 10	22.3	46 01.6	98 10	22.1	9
150	41 00.7	99 10	22.6	41 30.3	98 10	22.5	42 29.3	98 10	22.3	42 58.9	98 10	22.2	43 28.4	98 10	22.0	43 57.9	98 10	21.9	45 26.4	98 09	21.5	45 55.9	98 09	21.4	150
1	40 54.8	99 10	21.9	41 24.4	99 09	21.8	42 23.5	99 09	21.5	42 53.1	99 09	21.4	43 22.7	98 09	21.3	43 52.2	98 09	21.2	45 20.8	98 09	20.8	45 50.3	98 09	20.7	1
2	40 49.1	99 09	21.1	41 18.7	99 09	21.0	42 17.9	99 09	20.8	42 47.5	99 09	20.7	43 17.1	99 09	20.6	43 46.7	99 09	20.4	45 15.4	98 09	20.1	45 44.9	98 09	20.0	2
3	40 43.6	99 09	20.4	41 13.3	99 09	20.3	42 12.5	99 09	20.0	42 42.1	99 09	19.9	43 11.8	99 09	19.8	43 41.4	99 09	19.7	45 10.1	99 08	19.4	45 39.7	99 08	19.2	3
4	40 38.3	99 09	19.6	41 08.0	99 08	19.5	42 07.3	99 08	19.3	42 36.9	99 08	19.2	43 06.6	99 08	19.1	43 36.2	99 08	19.0	45 05.1	99 08	18.6	45 34.7	99 08	18.5	4
155	40 33.2	99 08	18.8	41 02.9	99 08	18.7	42 02.3	99 08	18.6	42 31.9	99 08	18.5	43 01.6	99 08	18.4	43 31.3	99 08	18.2	45 00.2	99 08	17.9	45 29.8	99 08	17.8	155
6	40 28.3	99 08	18.1	40 58.0	99 08	18.0	41 57.4	99 08	17.8	42 27.1	99 08	17.7	42 56.8	99 08	17.6	43 26.5	99 08	17.5	44 55.5	99 08	17.2	45 25.2	99 07	17.1	6
7	40 23.6	99 08	17.3	40 53.3	99 08	17.2	41 52.8	99 07	17.1	42 22.5	99 07	17.0	42 52.2	99 07	16.9	43 21.9	99 07	16.8	44 51.0	99 07	16.5	45 20.7	99 07	16.4	7
8	40 19.0	99 07	16.6	40 48.8	99 07	16.5	41 48.3	99 07	16.3	42 18.0	99 07	16.2	42 47.8	99 07	16.1	43 17.5	99 07	16.1	44 46.7	99 07	15.8	45 16.4	99 07	15.7	8
9	40 14.7	99 07	15.8	40 44.5	99 07	15.7	41 44.0	99 07	15.6	42 13.8	99 07	15.5	42 43.6	99 07	15.4	43 13.3	99 07	15.3	44 42.6	99 07	15.1	45 12.3	99 07	15.0	9
160	40 10.6	99 07	15.1	40 40.4	99 07	15.0	41 40.0	99 06	14.8	42 09.7	99 06	14.8	42 39.5	99 06	14.7	43 09.3	99 06	14.6	44 38.6	99 06	14.3	45 08.4	99 06	14.2	160
1	40 06.6	99 06	14.3	40 36.5	99 06	14.2	41 36.1	99 06	14.1	42 05.9	99 06	14.0	42 35.7	99 06	13.9	43 05.5	99 06	13.9	44 34.9	99 06	13.6	45 04.7	99 06	13.5	1
2	40 02.9	99 06	13.6	40 32.7	99 06	13.5	41 32.4	99 06	13.3	42 02.2	99 06	13.3	42 32.0	99 06	13.2	43 01.9	99 06	13.1	44 31.3	99 06	12.9	45 01.1	99 06	12.8	2
3	39 59.4	1.0 06	12.8	40 29.2	1.0 06	12.7	41 28.9	99 06	12.6	41 58.8	99 05	12.5	42 28.6	99 05	12.5	42 58.4	99 05	12.4	44 27.9	99 05	12.2	44 57.8	99 05	12.1	3
4	39 56.0	1.0 05	12.0	40 25.9	1.0 05	12.0	41 25.6	1.0 05	11.9	41 55.5	1.0 05	11.8	42 25.3	1.0 05	11.7	42 55.2	1.0 05	11.7	44 24.8	1.0 05	11.5	44 54.6	99 05	11.4	4
165	39 52.9	1.0 05	11.3	40 22.8	1.0 05	11.2	41 22.5	1.0 05	11.1	41 52.4	1.0 05	11.1	42 22.3	1.0 05	11.0	42 52.2	1.0 05	10.9	44 21.8	1.0 05	10.7	44 51.6	1.0 05	10.7	165
6	39 49.9	1.0 05	10.5	40 19.8	1.0 05	10.5	41 19.6	1.0 04	10.4	41 49.5	1.0 04	10.3	42 19.4	1.0 04	10.3	42 49.3	1.0 04	10.2	44 19.0	1.0 04	10.0	44 48.9	1.0 04	10.0	6
7	39 47.2	1.0 04	09.8	40 17.1	1.0 04	09.7	41 16.9	1.0 04	09.6	41 46.8	1.0 04	09.6	42 16.8	1.0 04	09.5	42 46.7	1.0 04	09.5	44 16.4	1.0 04	09.3	44 46.3	1.0 04	09.3	7
8	39 44.7	1.0 04	09.0	40 14.6	1.0 04	09.0	41 14.4	1.0 04	08.9	41 44.4	1.0 04	08.8	42 14.3	1.0 04	08.8	42 44.2	1.0 04	08.7	44 13.9	1.0 04	08.6	44 43.9	1.0 04	08.5	8
9	39 42.3	1.0 04	08.3	40 12.3	1.0 04	08.2	41 12.1	1.0 04	08.2	41 42.1	1.0 04	08.1	42 12.0	1.0 03	08.1	42 41.9	1.0 03	08.0	44 11.7	1.0 03	07.9	44 41.7	1.0 03	07.8	9
170	39 40.2	1.0 03	07.5	40 10.1	1.0 03	07.5	41 10.0	1.0 03	07.4	41 40.0	1.0 03	07.4	42 09.9	1.0 03	07.3	42 39.9	1.0 03	07.3	44 09.7	1.0 03	07.2	44 39.6	1.0 03	07.1	170
1	39 38.3	1.0 03	06.8	40 08.2	1.0 03	06.7	41 08.1	1.0 03	06.7	41 38.1	1.0 03	06.6	42 08.0	1.0 03	06.6	42 38.0	1.0 03	06.6	44 07.9	1.0 03	06.4	44 37.8	1.0 03	06.4	1
2	39 36.5	1.0 03	06.0	40 06.5	1.0 03	06.0	41 06.4	1.0 02	05.9	41 36.4	1.0 02	05.9	42 06.4	1.0 02	05.9	42 36.3	1.0 02	05.8	44 06.2	1.0 02	05.7	44 36.2	1.0 02	05.7	2
3	39 35.0	1.0 02	05.3	40 05.0	1.0 02	05.2	41 04.9	1.0 02	05.2	41 34.9	1.0 02	05.2	42 04.9	1.0 02	05.1	42 34.8	1.0 02	05.1	44 04.8	1.0 02	05.0	44 34.7	1.0 02	05.0	3
4	39 33.7	1.0 02	04.5	40 03.7	1.0 02	04.5	41 03.6	1.0 02	04.4	41 33.6	1.0 02	04.4	42 03.6	1.0 02	04.4	42 33.6	1.0 02	04.4	44 03.5	1.0 02	04.3	44 33.5	1.0 02	04.3	4
175	39 32.5	1.0 02	03.8	40 02.5	1.0 02	03.7	41 02.5	1.0 02	03.7	41 32.5	1.0 02	03.7	42 02.5	1.0 02	03.7	42 32.5	1.0 01	03.6	44 02.4	1.0 01	03.6	44 32.4	1.0 01	03.6	175
6	39 31.6	1.0 01	03.0	40 01.6	1.0 01	03.0	41 01.6	1.0 01	03.0	41 31.6	1.0 01	02.9	42 01.6	1.0 01	02.9	42 31.6	1.0 01	02.9	44 01.6	1.0 01	02.9	44 31.5	1.0 01	02.8	6
7	39 30.9	1.0 01	02.3	40 00.9	1.0 01	02.2	41 00.9	1.0 01	02.2	41 30.9	1.0 01	02.2	42 00.9	1.0 01	02.2	42 30.9	1.0 01	02.2	44 00.9	1.0 01	02.1	44 30.9	1.0 01	02.1	7
8	39 30.4	1.0 00	01.5	40 00.4	1.0 00	01.5	41 00.4	1.0 00	01.5	41 30.4	1.0 00	01.5	42 00.4	1.0 00	01.5	42 30.4	1.0 00	01.5	44 00.4	1.0 00	01.4	44 30.4	1.0 00	01.4	8
9	39 30.1	1.0 00	00.8	40 00.1	1.0 00	00.7	41 00.1	1.0 00	00.7	41 30.1	1.0 00	00.7	42 00.1	1.0 00	00.7	42 30.1	1.0 00	00.7	44 00.1	1.0 00	00.7	44 30.1	1.0 00	00.7	9
180	39 30.0	1.0 00	00.0	40 00.0	1.0 00	00.0	41 00.0	1.0 00	00.0	41 30.0	1.0 00	00.0	42 00.0	1.0 00	00.0	42 30.0	1.0 00	00.0	44 00.0	1.0 00	00.0	44 30.0	1.0 00	00.0	180

Lat. 75°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	75 00.0	1.0 00	180.0	75 30.0	1.0 00	180.0	77 00.0	1.0 00	180.0	77 30.0	1.0 00	180.0	78 00.0	1.0 00	180.0	84 00.0	1.0 01	180.0	84 30.0	1.0 01	180.0	89 30.0	1.0 06	180.0	00
1	74 59.7	1.0 01	178.1	75 29.7	1.0 01	178.0	76 59.7	1.0 01	177.9	77 29.7	1.0 01	177.9	77 59.7	1.0 01	177.8	83 59.5	1.0 02	176.6	84 29.5	1.0 02	176.3	89 26.1	89 16	151.8	1
2	74 59.0	1.0 02	176.1	75 28.9	1.0 02	176.1	76 58.9	1.0 02	175.8	77 28.8	1.0 02	175.7	77 58.8	1.0 02	175.6	83 58.2	1.0 04	173.2	84 28.0	1.0 04	172.7	89 16.5	70 21	132.6	2
3	74 57.6	1.0 08	174.2	75 27.6	1.0 08	174.1	76 57.5	1.0 08	173.7	77 27.4	1.0 03	173.6	77 57.3	1.0 03	173.5	83 55.8	99 05	169.8	84 25.6	99 06	169.1	89 04.0	56 23	120.9	3
4	74 55.8	1.0 04	172.3	75 25.7	1.0 04	172.2	76 55.5	1.0 04	171.7	77 25.4	1.0 04	171.5	77 55.3	1.0 04	171.3	83 52.6	99 07	166.4	84 22.2	98 07	165.6	88 50.1	46 24	113.5	4
05	74 53.5	1.0 05	170.4	75 23.4	1.0 06	170.2	76 53.0	1.0 05	169.6	77 22.8	99 05	169.4	77 52.6	99 05	169.1	83 48.6	98 08	163.2	84 17.8	97 09	162.1	88 35.6	39 25	108.4	05
6	74 50.6	99 06	168.5	75 20.5	99 06	168.3	76 49.9	99 06	167.6	77 19.7	99 06	167.3	77 49.4	99 06	167.0	83 43.7	97 10	159.9	84 12.6	96 10	158.7	88 20.7	35 25	104.7	6
7	74 47.3	99 06	166.6	75 17.0	99 07	166.3	76 46.3	99 07	165.5	77 16.0	99 07	165.2	77 45.7	99 07	164.9	83 37.9	96 11	156.8	84 06.6	95 11	155.4	88 05.6	32 25	101.8	7
8	74 43.4	99 07	164.7	75 13.1	99 07	164.4	76 42.1	99 08	163.5	77 11.7	99 08	163.1	77 41.3	99 08	162.8	83 31.4	95 12	153.8	83 59.8	94 13	152.2	87 50.4	30 26	99.5	8
9	74 39.1	99 08	162.8	75 08.7	99 08	162.5	76 37.5	98 09	161.5	77 07.0	98 09	161.1	77 36.5	98 09	160.7	83 24.2	94 13	150.8	83 52.1	93 14	149.1	87 35.0	28 26	97.6	9
10	74 34.2	99 09	161.0	75 03.8	98 09	160.6	76 32.3	98 09	159.5	77 01.7	98 10	159.1	77 31.1	98 10	158.6	83 16.3	92 14	147.9	83 43.8	91 15	146.2	87 19.6	27 26	95.9	10
1	74 28.9	98 10	159.1	74 58.4	98 10	158.8	76 26.6	98 10	157.5	76 55.9	98 10	157.1	77 25.1	97 11	156.6	83 07.7	91 15	145.1	83 34.9	90 16	143.3	87 04.1	26 26	94.5	1
2	74 23.2	98 10	157.3	74 52.5	98 11	156.9	76 20.4	97 11	155.6	76 49.6	97 11	155.1	77 18.7	97 12	154.5	82 58.6	90 16	142.5	83 25.3	88 17	140.5	86 48.6	25 26	93.2	2
3	74 17.0	98 11	155.5	74 46.2	98 11	155.1	76 13.8	97 12	153.7	76 42.8	97 12	153.1	77 11.8	96 12	152.6	82 48.8	89 17	139.9	83 15.1	87 18	137.9	86 33.1	25 26	92.0	3
4	74 10.3	97 12	153.7	74 39.5	97 12	153.2	76 06.6	97 13	151.8	76 35.6	96 13	151.2	77 04.4	96 13	150.6	82 38.6	87 18	137.4	83 04.5	85 19	135.4	86 17.6	25 26	90.9	4
15	74 03.2	97 13	151.9	74 32.2	97 13	151.4	75 59.1	96 13	149.9	76 27.8	96 14	149.3	76 56.5	96 14	148.7	82 27.8	86 19	135.0	82 53.3	84 19	132.9	86 02.0	25 26	89.9	15
6	73 55.7	97 13	150.1	74 24.6	96 13	149.7	75 51.1	96 14	148.0	76 19.7	95 14	147.4	76 48.3	95 15	146.8	82 16.6	85 19	132.7	82 41.7	83 20	130.6	85 46.5	25 26	89.0	6
7	73 47.7	96 14	148.4	74 16.6	96 14	147.9	75 42.6	95 15	146.2	76 11.1	95 15	145.6	76 39.5	94 15	144.9	82 05.0	84 20	130.5	82 29.8	82 21	128.4	85 31.0	25 26	88.1	7
8	73 39.4	96 15	146.7	74 08.1	96 15	146.2	75 33.8	95 15	144.4	76 02.2	94 16	143.8	76 30.4	94 16	143.0	81 53.0	82 21	128.3	82 17.4	80 21	126.2	85 15.5	25 26	87.3	8
9	73 30.7	95 15	145.0	73 59.3	95 15	144.5	75 24.6	94 16	142.6	75 52.8	94 16	142.0	76 20.9	93 17	141.2	81 40.6	81 21	126.3	82 04.7	79 22	124.2	85 00.0	26 26	86.5	9
20	73 21.6	95 16	143.3	73 50.1	95 16	142.8	75 15.0	94 17	140.9	75 43.0	93 17	140.2	76 11.0	93 17	139.4	81 28.0	80 22	124.3	81 51.7	78 22	122.2	84 44.5	26 26	85.7	20
1	73 12.1	95 16	141.7	73 40.5	94 17	141.1	75 05.0	93 17	139.2	75 32.9	93 17	138.5	76 00.7	92 18	137.7	81 15.0	79 22	122.4	81 38.4	77 23	120.3	84 29.0	26 26	85.0	1
2	73 02.3	94 17	140.1	73 30.6	94 17	139.5	74 54.7	93 18	137.5	75 22.4	92 18	136.8	75 50.1	92 18	136.0	81 01.8	78 22	120.6	81 24.9	76 23	118.5	84 13.5	27 26	84.3	2
3	72 52.2	94 17	138.4	73 20.3	94 18	137.9	74 44.0	92 18	135.8	75 11.6	92 19	135.1	75 39.1	91 19	134.3	80 48.3	77 23	118.8	81 11.2	75 23	116.7	83 58.1	27 26	83.6	3
4	72 41.7	94 18	136.9	73 09.7	93 18	136.3	74 33.0	92 19	134.2	75 00.5	91 19	133.4	75 27.8	91 19	132.6	80 34.5	77 23	117.1	80 57.2	74 24	115.1	83 42.7	28 26	82.9	4
25	72 31.0	93 18	135.3	72 58.8	93 19	134.7	74 21.7	91 19	132.6	74 49.1	91 20	131.8	75 16.2	90 20	131.0	80 20.6	76 24	115.5	80 43.0	73 24	113.4	83 27.3	28 26	82.2	25
6	72 19.9	93 19	133.8	72 47.7	92 19	133.1	74 10.2	91 20	131.0	74 37.4	90 20	130.2	75 04.4	90 20	129.4	80 06.5	75 24	113.9	80 28.7	73 24	111.9	83 11.9	29 26	81.6	6
7	72 08.5	92 19	132.2	72 36.2	92 20	131.6	73 58.3	90 20	129.5	74 25.4	90 20	128.7	74 52.3	89 21	127.8	79 52.2	74 24	112.3	80 14.2	72 24	110.4	82 56.5	29 26	80.9	7
8	71 56.9	92 20	130.8	72 24.4	92 20	130.1	73 46.2	90 21	127.9	74 13.1	89 21	127.1	74 39.9	89 21	126.3	79 37.8	74 24	110.8	79 59.6	71 25	108.9	82 41.2	30 26	80.3	8
9	71 45.0	92 20	129.3	72 12.4	91 20	128.6	73 33.8	90 21	126.4	74 00.6	89 21	125.6	74 27.2	88 21	124.8	79 23.2	73 24	109.4	79 44.8	71 25	107.5	82 25.9	30 25	79.7	9
30	71 32.9	91 21	127.8	72 00.2	91 21	127.2	73 21.2	89 21	125.0	73 47.9	89 22	124.2	74 14.4	88 22	123.3	79 08.5	73 25	108.0	79 30.0	70 25	106.1	82 10.7	31 25	79.0	30
1	71 20.5	91 21	126.4	71 47.7	90 21	125.7	73 08.4	89 22	123.5	73 34.9	88 22	122.7	74 01.3	87 22	121.9	78 53.7	72 25	106.6	79 15.0	70 25	104.8	81 55.4	32 25	78.4	1
2	71 07.9	91 21	125.0	71 35.0	90 22	124.3	72 55.3	88 22	122.1	73 21.8	88 22	121.3	73 48.0	87 22	120.4	78 38.7	72 25	105.3	78 59.9	70 25	103.5	81 40.2	32 25	77.8	2
3	70 55.0	90 22	123.6	71 22.0	90 22	122.9	72 42.1	88 22	120.7	73 08.4	87 23	119.9	73 34.5	87 23	119.0	78 23.7	71 25	104.0	78 44.8	69 25	102.2	81 25.1	33 25	77.3	3
4	70 42.0	90 22	122.2	71 08.9	89 22	121.5	72 28.6	88 23	119.3	72 54.8	87 23	118.5	73 20.8	86 23	117.6	78 08.6	71 25	102.8	78 29.6	69 25	101.0	81 10.0	33 25	76.7	4
35	70 28.8	90 22	120.9	70 55.6	89 23	120.2	72 15.0	87 23	118.0	72 41.1	87 23	117.1	73 07.0	86 23	116.3	77 53.4	71 25	101.5	78 14.3	69 26	99.8	80 54.9	34 25	76.1	35
6	70 15.4	89 23	119.5	70 42.1	89 23	118.9	72 01.2	87 23	116.6	72 27.2	86 23	115.8	72 53.0	86 24	115.0	77 38.2	70 26	100.3	77 59.0	68 26	98.6	80 39.8	35 25	75.5	6
7	70 01.8	89 23	118.2	70 28.4	88 23	117.6	71 47.2	87 24	115.3	72 13.1	86 24	114.5	72 38.8	85 24	113.6	77 22.9	70 26	99.2	77 43.6	68 26	97.5	80 24.8	35 25	74.9	7
8	69 48.0	89 23	116.9	70 14.5	88 23	116.3	71 33.1	86 24	114.0	71 58.9	86 24	113.2	72 24.5	85 24	112.4	77 07.5	70 26	98.0	77 28.2	68 26	96.4	80 09.8	36 25	74.4	8
9	69 34.1	88 23	115.7	70 00.5	88 24	115.0	71 18.9	86 24	112.7	71 44.6	85 24	111.9	72 10.1	85 24	111.1	76 52.1	70 26	96.9	77 12.7	68 26	95.3	79 54.9	37 25	73.8	9
40	69 20.0	88 24	114.4	69 46.4	88 24	113.7	71 04.5	86 24	111.5	71 30.1	85 24	110.7	71 55.6	84 24	109.8	76 36.7	70 26	95.8	76 57.3	68 26	94.2	79 40.0	37 25	73.3	40
1	69 05.8	88 24	113.2	69 32.1	87 24	112.5	70 50.0	86 24	110.3	71 15.6	85 24	109.5	71 40.9	84 25	108.6	76 21.2	69 26	94.8	76 41.8	67 26	93.2	79 25.1	38 25	72.7	1
2	68 51.4	88 24	111.9	69 17.7	87 24	111.3	70 35.4	85 25	109.0	71 00.9	85 25	108.2	71 26.1	84 25	107.4	76 05.7	69 26	93.7	76 26.2	67 26	92.2	79 10.3	39 25	72.2	2
3	68 37.0	88 24	110.7	69 03.2	87 24	110.1	70 20.6	85 25	107.9	70 46.1	84 25	107.1	71 11.3	84 25	106.2	75 50.2	69 26	92.7	76 10.7	67 26	91.2	78 55.6	39 24	71.6	3
4	68 22.4	87 24	109.5	68 48.5	87 25	108.9	70 05.8	85 25	106.7	70 31.2	84 25	105.9	70 56.3	83 25	105.1	75 34.7	69 26	91.7	75 55.2	67 26	90.2	78 40.9	40 24	71.1	4
45	68 07.7	87 25	108.4	68 33.8	87 25	107.7	69 50.9	85 25	105.5	70 16.2	84 25	104.7	70 41.3	83 25	103.9	75 19.2	69 26	90.7	75 39.7	67 26	89.3	78 26.2	41 24	70.5	45
6	67 52.9	87 26	107.2	68 18.9	86 26	106.5	69 35.9	85 25	104.4	70 01.1	84 25	103.6	70 26.2	83 25	102.8	75 03.7	69 26	89.7	75 24.1	67 26	88.3	78 11.6	41 24	70.0	6
7	67 38.1	87 25	106.1	68 04.0	86 25	105.4	69 20.8	84 25	103.2	69 46.0	84 25	102.5	70 11.0	83 25	101.7	74 48.1	69 26	88.8	75 08.6	67 26	87.4	77 57.0	42 24	69.4	7
8	67 23.1	87 26	104.9	67 49.0	86 25	104.3	69 05.6	84 25	102.1	69 30.8	84 25	101.3	69 55.8	83 26	100.5	74 32.6	69 26	87.8	74 53.1	68 26	86.5	77 42.5	43 24	68.9	8
9	67 08.0	86 25	103.8	67 33.9	86 25	103.1	68 50.4	84 25	101.0	69 15.6	83 26	100.3	69 40.5	83 26	99.5	74 17.1	69 26	86.9	74 37.6	68 26	85.6	77 28.0	44 24	68.4	9
50	66 52.9	86 25	102.7	67 18.7	86 25	102.0	68 35.2	84 26	99.9	69 00.2	83 26	99.2	69 25.1	83 26	98.4	74 01.6	69 26	86.0	74 22.2	68 26	84.7	77 13.6	44 24	67.8	50
1	66 37.7	86 25	101.6	67 03.5	86 25	101.0	68 19.8	84 26	98.9	68 44.9	83 26	98.1	69 09.7	82 26	97.3	73 46.1	69 26	85.1	74 06.7	68 26	83.8	76 59.3	45 24	67.3	1
2	66 22.5	86 25	100.5	66 48.3	86 26	99.9	68 04.5	84 26	97.8	68 29.5	83 26	97.1	68 54.3	82 26	96.3	73 30.7	70 26	84.2	73 51.3	68 26	82.9	76 45.0	46 24	66.7	2
3	66 07.2	86 26	99.5	66 32.9	85 26	98.8	67 49.1	84 26	96.8	68 14.1	83 26	96.0	68 38.9	82 26	95.2	73 15.2	70 26	83.4	73 35.9	68 26	82.1	76 30.8	46 24	66.2	3
4	65 51.9	86 26	98.4	66 17.6	85 26	97.8	67 33.6	84 26	95.7	67 58.6	83 26	95.0	68 23.4	82 26	94.2	72 59.8	70 26	82.5	73 20.5	68 26	81.3	76 16.6	47 24	65.7	4
55	65 36.5	86 26	97.4	66 02.2	85 26	96.7	67 18.2	84 26	94.7	67 43.1	83 26	94.0	68 07.9	82 26	93.2	72 44.4	70 26	81.7	73 05.2	68 25	80.4	76 02.4	48 23	65.2	55
6	65 21.1	86 26	96.3	65 46.7	85 26	95.7	67 02.7	84 26	93.7	67 27.6	83 26	93.0	67 52.4	82 26	92.2	72 29.1	70 26	80.8	72 49.9	69 25	79.6	75 48.4	48 23	64.6	6
7	65 05.6	86 26	95.3	65 31.3	85 26	94.7	66 47.2	83 26	92.7	67 12.1	83 26	92.0	67 36.9	82 26	91.2	72 13.8	70 25	80.0	72 34.6	69 25	78.8	75 34.4	49 23	64.1	7
8	64 50.1	86 26	94.3	65 15.8	85 26	93.7	66 31.7	83 26	91.7	66 56.6	83 26	91.0	67 21.3	82 26	90.3	71 58.5	70 25	79.2	72 19.4	69 25	78.0	75 20.4	50 23	63.6	8
9	64 34.7	86 26	93.3	65 00.3	85 26	92.7	66 16.1	83 26	90.7	66 41.1	83 26	90.0	67 05.8	82 26	89.3	71 43.3	71 25	78.3	72 04.3	69 25	77.2	75 06.6	50 23	63.1	9
60	64 19.1	86 26	92.3	64 44.7	85 26	91.7	66 00.6	83 26	89.7	66 25.5	83 26	89.1	66 50.3	82 26	88.3	71 28.1	71 25	77.5	71 49.1	70 25	76.4	74 52.8	51 23	62.5	60
1	64 03.6	86 26	91.3	64 29.2	85 26	90.7	65 45.1	83 26	88.8	66 10.0	83 26	88.1	66 34.8	82 26	87.4	71 12.9	71 25	76.7	71 34.1	70 25	75.6	74 39.0	52 23	62.0	1
2	63 48.1	86 26	90.3	64 13.7	85 26	89.7	65 29.5	83 26	87.8	65 54.5	83 26	87.2	66 19.3	82 26	86.5	70 57.8	71 25	76.0	71 19.1	70 25	74.9	74 25.3	53 23	61.5	2
3	63 32.6	86 26	89.4	63 58.2	85 26	88.8	65 14.0	83 26	86.9	65 39.0	83 26	86.2	66 03.8	82 26	85.5	70 42.8	72 25	75.2	71 04.1	70 25	74.1	74 11.7	53 23	61.0	3
4	63 17.0	86 26	88.4	63 42.6	85 26	87.8	64 58.5	84 26	86.0	65 23.5	83 26	85.3	65 48.3	82 26	84.6	70 27.8	72 25	74.4	70 49.2	71 25	73.3	73 58.2	54 22	60.4	4
65	63 01.5	86 26	87.5	63 27.1	85 26	86.9	64 43.1	84 26	85.0	65 08.0	83 26	84.4	65 32.8	82 26	83.7	70 12.9	72 25	73.6	70 34.3	71 25	72.6	73 44.7	55 22	59.9	65
6	62 46.0	86 26	86.5	63 11.6	85 26	86.0	64 27.6	84 26	84.1	64 52.6	83 26	83.5	65 17.4	82 26	82.8	69 58.0	72 25	72.9	70 19.6	71 25	71.9	73 31.3	55 22	59.4	6
7	62 30.5	86 26	85.6	62 56.1	85 26	85.0	64 12.2	84 26	83.2	64 37.2	83 26	82.6	65 02.0	83 26	81.9	69 43.2	73 25	72.1	70 04.8	71 24	71.1	73 18.0	56 22	58.9	7
8	62 15.0	86 26	84.7	62 40.7	85 26	84.1	63 56.8	84 26	82.3	64 21.8	83 26	81.7	64 46.7	83 26	81.0	69 28.5	73 24	71.4	69 50.2	72 24	70.4	73 04.7	57 22	58.4	8
9	61 59.6	86 26	83.8	62 25.3	85 26	83.2	63 41.4	84 26	81.4	64 06.4	83 26	80.8	64 31.4	83 25	80.2	69 13.8	73 24	70.6	69 35.6	72 24	69.7	72 51.5	57 22	57.8	9
70	61 44.2	86 26	82.8	62 09.8	85 26	82.3	63 26.0	84 26	80.5	63 51.1	83 25	79.9	64 16.1	83 25	79.3	68 59.2	73 24	69.9	69 21.0	72 24	68.9	72 38.4	58 22	57.3	70
1	61 28.8	86 26	81.9	61 54.5	85 26	81.4	63 10.7	84 25	79.7	63 35.9	83 25	79.1	64 00.8	83 25	78.4	68 44.6	74 24	69.2	69 06.6	73 24	68.2	72 25.4	59 22	56.8	1
2	61 13.4	86 26	81.0	61 39.1	86 26	80.5	62 55.5	84 25	78.8	63 20.6	84 25	78.2	63 45.6	83 25	77.6	68 30.1	74 24	68.4	68 52.2	73 24	67.5	72 12.4	59 21	56.3	2
3	60 58.1	86 25	80.2	61 23.8	86 25	79.6	62 40.3	84 25	77.9	63 05.5	84 25	77.3	63 30.5	83 25	76.7	68 15.7	74 24	67.7	68 37.9	73 24	66.8	71 59.6	60 21	55.8	3
4	60 42.8	86 25	79.3	61 08.6	86 25	78.7	62 25.1	84 25	77.1	62 50.3	84 25	76.5	63 15.4	83 25	75.9	68 01.4	75 24	67.0	68 23.7	74 24	66.1	71 46.8	61 21	55.2	4
75	60 27.6	86 25	78.4	60 53.4	86 25	77.9	62 10.0	84 25	76.2	62 35.3	84 25	75.6	63 00.4	83 25	75.0	67 47.1	75 24	66.3	68 09.5	74 23	65.4	71 34.1	61 21	54.7	75
6	60 12.4	86 25	77.5	60 38.2	86 25	77.0	61 55.0	85 25	75.4	62 20.3	84 25	74.8	62 45.4	84 25	74.2	67 33.0	75 24	65.6	67 55.4	74 23	64.7	71 21.4	62 21	54.2	
7	59 57.3	86 25	76.7	60 23.1	86 25	76.2	61 40.0	85 25	74.5	62 05.3	84 25	74.0	62 30.5	84 25	73.4	67 18.9	76 23	64.9	67 41.4	75 23	64.0	71 08.9	63 21	53.7	
8	59 42.2	86 25	75.8	60 08.1	86 25	75.3	61 25.0	85 25	73.7	61 50.4	84 25	73.1	62 15.7	84 25	72.6	67 04.8	76 23	64.2	67 27.5	75 23	63.3	70 56.4	63 21	53.2	
9	59 27.2	87 25	74.9	59 53.1	86 25	74.4	61 10.1	85 25	72.9	61 35.6	85 25	72.3	62 00.9	84 24	71.8	66 50.9	76 23	63.5	67 13.7	75 23	62.6	70 44.0	64 20	52.7	
80	59 12.2	87 25	74.1	59 38.2	86 25	73.6	60 55.3	85 25	72.0	61 20.8	85 24	71.5	61 46.2	84 24	70.9	66 37.0	77 23	62.8	66 59.9	76 23	62.0	70 31.7	64 20	52.1	8
1	58 57.3	87 25	73.3	59 23.3	86 25	72.8	60 40.6	85 24	71.2	61 06.1	85 24	70.7	61 31.5	84 24	70.1	66 23.3	77 23	62.1	66 46.3	76 23	61.3	70 19.5	65 20	51.6	
2	58 42.4	87 25	72.4	59 08.5	87 25	71.9	60 25.9	85 24	70.4	60 51.5	85 24	69.9	61 16.9	85 24	69.3	66 09.6	77 23	61.4	66 32.7	77 22	60.6	70 07.3	66 20	51.1	
3	58 27.7	87 24	71.6	58 53.8	87 24	71.1	60 11.3	86 24	69.6	60 37.0	85 24	69.1	61 02.5	85 24	68.5	65 56.0	78 22	60.7	66 19.2	77 22	59.9	69 55.3	66 20	50.6	
4	58 13.0	87 24	70.7	58 39.1	87 24	70.3	59 56.8	86 24	68.8	60 22.5	85 24	68.3	60 48.0	85 24	67.7	65 42.5	78 22	60.0	66 05.8	77 22	59.3	69 43.4	67 20	50.1	
85	57 58.4	87 24	69.9	58 24.5	87 24	69.5	59 42.4	86 24	68.0	60 08.1	86 24	67.5	60 33.7	85 24	67.0	65 29.1	78 22	59.4	65 52.5	78 22	58.6	69 31.5	68 20	49.6	8
6	57 43.8	88 24	69.1	58 10.0	87 24	68.6	59 28.0	86 24	67.2	59 53.8	86 24	66.7	60 19.5	85 24	66.2	65 15.8	79 22	58.7	65 39.3	78 22	57.9	69 19.7	68 19	49.0	
7	57 29.3	88 24	68.3	57 55.6	87 24	67.8	59 13.8	86 24	66.4	59 39.6	86 24	65.9	60 05.3	86 23	65.4	65 02.6	79 22	58.0	65 26.2	78 22	57.3	69 08.0	69 19	48.5	
8	57 15.0	88 24	67.5	57 41.3	88 24	67.0	58 59.6	86 24	65.6	59 25.5	86 23	65.1	59 51.2	86 23	64.6	64 49.4	79 22	57.3	65 13.2	79 22	56.6	68 56.4	69 19	48.0	
9	57 00.7	88 24	66.7	57 27.0	88 24	66.2	58 45.5	87 23	64.8	59 11.4	86 23	64.3	59 37.2	86 23	63.8	64 36.4	80 22	56.7	65 00.2	79 22	56.0	68 45.0	70 19	47.5	
90	56 46.4	88 24	65.9	57 12.8	88 23	65.4	58 31.5	87 23	64.0	58 57.5	86 23	63.6	59 23.4	86 23	63.1	64 23.5	80 21	56.0	64 47.4	79 21	55.3	68 33.6	71 19	47.0	9

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	56 32.3	88 23	65.1	56 58.8	88 23	64.6	58 17.5	87 23	63.3	58 43.6	87 23	62.8	59 09.6	86 23	62.3	64 10.7	80 21	55.3	64 34.7	80 21	54.7	68 22.2	71 19	46.5	91
2	56 18.3	88 23	64.3	56 44.8	88 23	63.8	58 03.7	87 23	62.5	58 29.8	87 23	62.0	58 55.9	87 23	61.5	63 58.0	81 21	54.7	64 22.1	80 21	54.0	68 11.0	72 18	45.9	2
3	56 04.3	89 23	63.5	56 30.9	88 23	63.0	57 50.0	87 23	61.7	58 16.2	87 23	61.3	58 42.3	87 22	60.8	63 45.3	81 21	54.0	64 09.6	81 21	53.4	67 59.9	72 18	45.4	3
4	55 50.5	89 23	62.7	56 17.1	89 23	62.2	57 36.4	88 23	60.9	58 02.6	87 22	60.5	58 28.7	87 22	60.0	63 32.8	81 21	53.4	63 57.2	81 20	52.7	67 48.9	73 18	44.9	4
95	55 36.8	89 23	61.9	56 03.4	89 23	61.5	57 22.8	88 22	60.2	57 49.1	88 22	59.7	58 15.3	87 22	59.3	63 20.4	82 20	52.7	63 44.9	81 20	52.1	67 38.0	74 18	44.4	95
6	55 23.1	89 23	61.1	55 49.8	89 22	60.7	57 09.4	88 22	59.4	57 35.8	88 22	59.0	58 02.1	87 22	58.5	63 08.1	82 20	52.1	63 32.7	82 20	51.4	67 27.2	74 18	43.9	6
7	55 09.6	89 22	60.3	55 36.3	89 22	59.9	56 56.1	88 22	58.7	57 22.5	88 22	58.2	57 48.9	88 22	57.8	62 55.9	83 20	51.4	63 20.6	82 20	50.8	67 16.5	75 18	43.4	7
8	54 56.1	89 22	59.5	55 22.9	89 22	59.1	56 42.9	88 22	57.9	57 09.4	88 22	57.5	57 35.8	88 22	57.0	62 43.8	83 20	50.8	63 08.6	82 20	50.1	67 05.9	75 18	42.8	8
9	54 42.8	90 22	58.7	55 09.7	89 22	58.4	56 29.8	89 22	57.1	56 56.3	88 22	56.7	57 22.8	88 21	56.3	62 31.9	83 20	50.1	62 56.8	83 20	49.5	66 55.4	76 17	42.3	9
100	54 29.6	90 22	58.0	54 56.5	90 22	57.6	56 16.8	89 21	56.4	56 43.4	89 21	56.0	57 09.9	88 21	55.5	62 20.0	84 20	49.5	62 45.0	83 19	48.9	66 44.9	76 17	41.8	100
1	54 16.5	90 22	57.2	54 43.4	90 22	56.8	56 03.9	89 21	55.6	56 30.6	89 21	55.2	56 57.2	88 21	54.8	62 08.2	84 19	48.8	62 33.4	83 19	48.2	66 34.6	77 17	41.3	1
2	54 03.5	90 21	56.4	54 30.5	90 21	56.1	55 51.2	89 21	54.9	56 17.9	89 21	54.5	56 44.6	89 21	54.1	61 56.6	84 19	48.2	62 21.8	84 19	47.6	66 24.4	77 17	40.8	2
3	53 50.6	90 21	55.7	54 17.7	90 21	55.3	55 38.5	89 21	54.1	56 05.3	89 21	53.7	56 32.0	89 21	53.3	61 45.1	85 19	47.5	62 10.4	84 19	47.0	66 14.4	78 17	40.3	3
4	53 37.8	91 21	54.9	54 05.0	90 21	54.5	55 26.0	90 21	53.4	55 52.9	89 21	53.0	56 19.6	89 20	52.6	61 33.7	85 19	46.9	61 59.1	85 19	46.3	66 04.4	79 16	39.7	4
105	53 25.2	91 21	54.1	53 52.4	91 21	53.8	55 13.6	90 20	52.7	55 40.5	90 20	52.3	56 07.4	89 20	51.9	61 22.4	85 19	46.3	61 47.9	85 18	45.7	65 54.5	79 16	39.2	105
6	53 12.7	91 21	53.4	53 39.9	91 21	53.0	55 01.3	90 20	51.9	55 28.3	90 20	51.5	55 55.2	90 20	51.2	61 11.3	86 18	45.6	61 36.9	85 18	45.1	65 44.7	80 16	38.7	6
7	53 00.3	91 20	52.6	53 27.6	91 20	52.3	54 49.1	90 20	51.2	55 16.2	90 20	50.8	55 43.2	90 20	50.4	61 00.2	86 18	45.0	61 26.0	86 18	44.5	65 35.1	80 16	38.2	7
8	52 48.0	91 20	51.9	53 15.4	91 20	51.5	54 37.1	91 20	50.5	55 04.2	90 20	50.1	55 31.3	90 20	49.7	60 49.3	86 18	44.4	61 15.1	86 18	43.8	65 25.5	81 16	37.7	8
9	52 35.8	92 20	51.1	53 03.3	91 20	50.8	54 25.2	91 20	49.7	54 52.4	91 20	49.4	55 19.5	90 19	49.0	60 38.5	87 18	43.7	61 04.4	86 18	43.2	65 16.1	81 16	37.2	9
110	52 23.8	92 20	50.4	52 51.3	92 20	50.0	54 13.4	91 19	49.0	54 40.7	91 19	48.6	55 07.8	90 19	48.3	60 27.8	87 18	43.1	60 53.9	87 17	42.6	65 06.8	82 15	36.6	110
1	52 11.9	92 20	49.6	52 39.5	92 20	49.3	54 01.8	91 19	48.3	54 29.1	91 19	47.9	54 56.3	91 19	47.5	60 17.3	87 17	42.5	60 43.4	87 17	42.0	64 57.6	82 15	36.1	1
2	52 00.2	92 19	48.9	52 27.8	92 19	48.5	53 50.2	91 19	47.5	54 17.6	91 19	47.2	54 44.9	91 19	46.8	60 06.9	88 17	41.8	60 33.1	87 17	41.3	64 48.5	83 15	35.6	2
3	51 48.5	92 19	48.1	52 16.2	92 19	47.8	53 38.8	92 19	46.8	54 06.3	91 19	46.5	54 33.7	91 19	46.1	59 56.6	88 17	41.2	60 22.9	88 17	40.7	64 39.5	83 15	35.1	3
4	51 37.0	92 19	47.4	52 04.8	92 19	47.1	53 27.6	92 19	46.1	53 55.1	92 18	45.7	54 22.5	91 18	45.4	59 46.4	88 17	40.6	60 12.9	88 17	40.1	64 30.6	84 15	34.6	4
115	51 25.7	93 19	46.6	51 53.5	92 19	46.3	53 16.5	92 18	45.4	53 44.0	92 18	45.0	54 11.6	92 18	44.7	59 36.4	89 16	39.9	60 02.9	88 16	39.5	64 21.9	84 14	34.0	115
6	51 14.5	93 18	45.9	51 42.3	93 18	45.6	53 05.5	92 18	44.6	53 33.1	92 18	44.3	54 00.7	92 18	44.0	59 26.5	89 16	39.3	59 53.1	89 16	38.9	64 13.2	84 14	33.5	6
7	51 03.4	93 18	45.1	51 31.3	93 18	44.8	52 54.7	92 18	43.9	53 22.3	92 18	43.6	53 50.0	92 18	43.3	59 16.7	89 16	38.7	59 43.4	89 16	38.2	64 04.7	85 14	33.0	7
8	50 52.5	93 18	44.4	51 20.4	93 18	44.1	52 44.0	93 18	43.2	53 11.7	92 17	42.9	53 39.4	92 17	42.6	59 07.1	90 16	38.1	59 33.9	89 16	37.6	63 56.3	85 14	32.5	8
9	50 41.7	93 18	43.7	51 09.7	93 18	43.4	52 33.4	93 17	42.5	53 01.2	93 17	42.2	53 29.0	92 17	41.9	58 57.6	90 16	37.4	59 24.5	90 15	37.0	63 48.0	86 14	32.0	9
120	50 31.0	94 18	42.9	50 59.1	93 17	42.6	52 23.0	93 17	41.8	52 50.9	93 17	41.5	53 18.7	93 17	41.2	58 48.2	90 15	36.8	59 15.2	90 15	36.4	63 39.9	86 13	31.4	120
1	50 20.5	94 17	42.2	50 48.6	94 17	41.9	52 12.7	93 17	41.1	52 40.6	93 17	40.8	53 08.5	93 17	40.4	58 39.0	90 15	36.2	59 06.1	90 15	35.8	63 31.8	87 13	30.9	1
2	50 10.2	94 17	41.5	50 38.3	94 17	41.2	52 02.6	93 17	40.3	52 30.6	93 17	40.0	52 58.5	93 16	39.7	58 29.9	91 15	35.6	58 57.0	90 15	35.2	63 23.9	87 13	30.4	2
3	49 59.9	94 17	40.7	50 28.2	94 17	40.5	51 52.6	94 16	39.6	52 20.7	93 16	39.3	52 48.7	93 16	39.0	58 20.9	91 15	34.9	58 48.2	91 15	34.5	63 16.1	88 13	29.9	3
4	49 49.9	94 17	40.0	50 18.2	94 16	39.7	51 42.8	94 16	38.9	52 10.9	94 16	38.6	52 39.0	94 16	38.3	58 12.1	91 14	34.3	58 39.4	91 14	33.9	63 08.4	88 13	29.4	4
125	49 40.0	94 16	39.3	50 08.3	94 16	39.0	51 33.1	94 16	38.2	52 01.3	94 16	37.9	52 29.4	94 16	37.6	58 03.4	92 14	33.7	58 30.8	91 14	33.3	63 00.9	88 12	28.8	125
6	49 30.2	95 16	38.5	49 58.6	95 16	38.3	51 23.6	94 16	37.5	51 51.8	94 16	37.2	52 20.0	94 15	36.9	57 54.8	92 14	33.1	58 22.4	92 14	32.7	62 53.5	89 12	28.3	6
7	49 20.6	95 16	37.8	49 49.1	95 16	37.6	51 14.2	94 15	36.8	51 42.5	94 15	36.5	52 10.8	94 15	36.2	57 46.4	92 14	32.5	58 14.1	92 14	32.1	62 46.2	89 12	27.8	7
8	49 11.2	95 15	37.1	49 39.7	95 15	36.8	51 05.0	95 15	36.1	51 33.3	94 15	35.8	52 01.6	94 15	35.6	57 38.2	92 14	31.8	58 05.9	92 13	31.5	62 39.0	90 12	27.3	8
9	49 01.9	95 15	36.3	49 30.5	95 15	36.1	50 55.9	95 15	35.4	51 24.3	95 15	35.1	51 52.7	95 15	34.9	57 30.0	93 13	31.2	57 57.8	93 13	30.9	62 31.9	90 12	26.8	9
130	48 52.8	95 15	35.6	49 21.4	95 15	35.4	50 47.0	95 15	34.7	51 15.5	95 14	34.4	51 43.9	95 14	34.2	57 22.1	93 13	30.6	57 49.9	93 13	30.3	62 25.0	90 11	26.2	130
1	48 43.8	96 15	34.9	49 12.5	95 15	34.7	50 38.2	95 14	34.0	51 06.8	95 14	33.7	51 35.3	95 14	33.5	57 14.2	93 13	30.0	57 42.2	93 13	29.6	62 18.2	91 11	25.7	1
2	48 35.0	96 14	34.2	49 03.7	96 14	34.0	50 29.6	95 14	33.3	50 58.2	95 14	33.0	51 26.8	95 14	32.8	57 06.5	94 13	29.4	57 34.6	93 12	29.0	62 11.5	91 11	25.2	2
3	48 26.4	96 14	33.4	48 55.1	96 14	33.2	50 21.2	95 14	32.6	50 49.8	95 14	32.3	51 18.4	95 14	32.1	56 59.0	94 12	28.8	57 27.1	94 12	28.4	62 05.0	91 11	24.7	3
4	48 17.9	96 14	32.7	48 46.7	96 14	32.5	50 12.9	96 14	31.9	50 41.6	96 13	31.6	51 10.3	95 13	31.4	56 51.6	94 12	28.1	57 19.8	94 12	27.8	61 58.5	92 10	24.2	4
135	48 09.6	96 14	32.0	48 38.4	96 14	31.8	50 04.8	96 13	31.2	50 33.5	96 13	30.9	51 02.3	96 13	30.7	56 44.4	94 12	27.5	57 12.6	94 12	27.2	61 52.3	92 10	23.6	135
6	48 01.4	96 13	31.3	48 30.3	96 13	31.1	49 56.9	96 13	30.5	50 25.6	96 13	30.2	50 54.4	96 13	30.0	56 37.3	95 12	26.9	57 05.6	94 11	26.6	61 46.1	92 10	23.1	6
7	47 53.5	96 13	30.6	48 22.4	96 13	30.4	49 49.1	96 13	29.8	50 17.9	96 13	29.5	50 46.7	96 13	29.3	56 30.3	95 11	26.3	56 58.7	95 11	26.0	61 40.1	93 10	22.6	7
8	47 45.7	97 13	29.8	48 14.6	97 13	29.7	49 41.4	96 12	29.1	50 10.3	96 12	28.8	50 39.2	96 12	28.6	56 23.5	95 11	25.7	56 52.0	95 11	25.4	61 34.2	93 10	22.1	8
9	47 38.0	97 12	29.1	48 07.0	97 12	28.9	49 34.0	97 12	28.4	50 02.9	96 12	28.1	50 31.8	96 12	27.9	56 16.8	95 11	25.1	56 45.4	95 11	24.8	61 28.4	93 09	21.5	9
140	47 30.5	97 12	28.4	47 59.6	97 12	28.2	49 26.7	97 12	27.7	49 55.7	97 12	27.5	50 24.7	97 12	27.3	56 10.3	95 11	24.4	56 39.0	95 10	24.2	61 22.8	94 09	21.0	140
1	47 23.2	97 12	27.7	47 52.3	97 12	27.5	49 19.6	97 12	27.0	49 48.6	97 12	26.8	50 17.6	97 11	26.6	56 04.0	96 10	23.8	56 32.7	96 10	23.6	61 17.3	94 09	20.5	1
2	47 16.1	97 12	27.0	47 45.3	97 12	26.8	49 12.6	97 11	26.3	49 41.7	97 11	26.1	50 10.8	97 11	25.9	55 57.8	96 10	23.2	56 26.5	96 10	23.0	61 11.9	94 09	20.0	2
3	47 09.1	97 11	26.3	47 38.3	97 11	26.1	49 05.8	97 11	25.6	49 35.0	97 11	25.4	50 04.1	97 11	25.2	55 51.8	96 10	22.6	56 20.6	96 10	22.4	61 06.7	95 08	19.4	3
4	47 02.4	97 11	25.5	47 31.6	97 11	25.4	48 59.2	97 11	24.9	49 28.4	97 11	24.7	49 57.5	97 11	24.5	55 45.9	96 10	22.0	56 14.7	96 09	21.7	61 01.6	95 08	18.9	4
145	46 55.8	98 11	24.8	47 25.0	98 11	24.7	48 52.8	97 10	24.2	49 22.0	97 10	24.0	49 51.2	97 10	23.8	55 40.1	96 09	21.4	56 09.1	96 09	21.1	60 56.6	95 08	18.4	145
6	46 49.3	98 10	24.1	47 18.6	98 10	24.0	48 46.5	98 10	23.5	49 15.8	98 10	23.3	49 45.0	97 10	23.1	55 34.5	97 09	20.8	56 03.5	97 09	20.5	60 51.8	95 08	17.9	6
7	46 43.1	98 10	23.4	47 12.4	98 10	23.3	48 40.4	98 10	22.8	49 09.7	98 10	22.6	49 39.0	98 10	22.5	55 29.1	97 09	20.1	55 58.2	97 09	19.9	60 47.1	96 08	17.3	7
8	46 37.0	98 10	22.7	47 06.4	98 10	22.5	48 34.5	98 10	22.1	49 03.8	98 10	21.9	49 33.1	98 09	21.8	55 23.8	97 09	19.5	55 52.9	97 08	19.3	60 42.5	96 07	16.8	8
9	46 31.1	98 10	22.0	47 00.5	98 09	21.8	48 28.7	98 09	21.4	48 58.1	98 09	21.2	49 27.5	98 09	21.1	55 18.7	97 08	18.9	55 47.9	97 08	18.7	60 38.1	96 07	16.3	9
150	46 25.4	98 09	21.3	46 54.8	98 09	21.1	48 23.1	98 09	20.7	48 52.6	98 09	20.6	49 22.0	98 09	20.4	55 13.8	97 08	18.3	55 43.0	97 08	18.1	60 33.8	96 07	15.8	150
1	46 19.8	98 09	20.6	46 49.3	98 09	20.4	48 17.7	98 09	20.0	48 47.2	98 09	19.9	49 16.6	98 09	19.7	55 09.0	98 08	17.7	55 38.2	97 08	17.5	60 29.6	97 07	15.3	1
2	46 14.5	98 09	19.8	46 44.0	98 09	19.7	48 12.5	98 08	19.3	48 42.0	98 08	19.2	49 11.5	98 08	19.0	55 04.3	98 07	17.1	55 33.6	98 07	16.9	60 25.6	97 06	14.7	2
3	46 09.3	99 08	19.1	46 38.8	99 08	19.0	48 07.5	98 08	18.6	48 37.0	98 08	18.5	49 06.5	98 08	18.4	54 59.8	98 07	16.5	55 29.2	98 07	16.3	60 21.7	97 06	14.2	3
4	46 04.3	99 08	18.4	46 33.9	99 08	18.3	48 02.6	99 08	17.9	48 32.2	99 08	17.8	49 01.7	98 08	17.7	54 55.5	98 07	15.9	55 24.9	98 07	15.7	60 18.0	97 06	13.7	4
155	45 59.5	99 08	17.7	46 29.1	99 08	17.6	47 57.9	99 08	17.2	48 27.5	99 07	17.1	48 57.1	99 07	17.0	54 51.4	98 07	15.3	55 20.8	98 07	15.1	60 14.4	98 06	13.2	155
6	45 54.8	99 07	17.0	46 24.5	99 07	16.9	47 53.4	99 07	16.5	48 23.0	99 07	16.4	48 52.6	99 07	16.3	54 47.4	98 06	14.6	55 16.8	98 06	14.5	60 10.9	98 06	12.6	6
7	45 50.4	99 07	16.3	46 20.1	99 07	16.2	47 49.1	99 07	15.9	48 18.7	99 07	15.7	48 48.4	99 07	15.6	54 43.5	98 06	14.0	55 13.0	98 06	13.9	60 07.6	98 05	12.1	7
8	45 46.1	99 07	15.6	46 15.8	99 07	15.5	47 44.9	99 07	15.2	48 14.6	99 07	15.1	48 44.3	99 06	14.9	54 39.8	99 06	13.4	55 09.4	99 06	13.3	60 04.4	98 05	11.6	8
9	45 42.0	99 06	14.9	46 11.8	99 06	14.8	47 40.9	99 06	14.5	48 10.7	99 06	14.4	48 40.4	99 06	14.3	54 36.3	99 06	12.8	55 05.9	99 06	12.7	60 01.4	98 05	11.1	9
160	45 38.2	99 06	14.2	46 07.9	99 06	14.1	47 37.2	99 06	13.8	48 06.9	99 06	13.7	48 36.6	99 06	13.6	54 32.9	99 05	12.2	55 02.6	99 05	12.1	59 58.5	98 05	10.5	160
1	45 34.4	99 06	13.4	46 04.2	99 06	13.4	47 33.5	99 06	13.1	48 03.3	99 06	13.0	48 33.1	99 06	12.9	54 29.7	99 05	11.6	54 59.4	99 05	11.5	59 55.7	99 04	10.0	1
2	45 30.9	99 06	12.7	46 00.7	99 06	12.7	47 30.1	99 05	12.4	47 59.9	99 05	12.3	48 29.7	99 05	12.2	54 26.7	99 05	11.0	54 56.4	99 05	10.9	59 53.1	99 04	09.5	2
3	45 27.6	99 05	12.0	45 57.4	99 05	12.0	47 26.9	99 05	11.7	47 56.7	99 05	11.6	48 26.5	99 05	11.5	54 23.8	99 05	10.4	54 53.6	99 04	10.3	59 50.6	99 04	08.9	3
4	45 24.5	99 05	11.3	45 54.3	99 05	11.2	47 23.8	99 05	11.0	47 53.6	99 05	10.9	48 23.5	99 05	10.9	54 21.1	99 04	09.8	54 50.9	99 04	09.7	59 48.2	99 04	08.4	4
165	45 21.5	1.0 05	10.6	45 51.4	1.0 05	10.5	47 20.9	1.0 04	10.3	47 50.8	1.0 04	10.3	48 20.6	99 04	10.2	54 18.6	99 04	09.1	54 48.4	99 04	09.0	59 46.0	99 03	07.9	165
6	45 18.7	1.0 04	09.9	45 48.6	1.0 04	09.8	47 18.2	1.0 04	09.6	47 48.1	1.0 04	09.6	48 18.0	1.0 04	09.5	54 16.2	99 04	08.5	54 46.0	99 04	08.4	59 44.0	99 03	07.4	6
7	45 16.2	1.0 04	09.2	45 46.1	1.0 04	09.1	47 15.7	1.0 04	09.0	47 45.6	1.0 04	08.9	48 15.5	1.0 04	08.8	54 13.9	1.0 03	07.9	54 43.8	99 03	07.8	59 42.0	99 03	06.8	7
8	45 13.8	1.0 04	08.5	45 43.7	1.0 04	08.4	47 13.4	1.0 04	08.3	47 43.3	1.0 04	08.2	48 13.2	1.0 04	08.1	54 11.9	1.0 03	07.3	54 41.8	1.0 03	07.2	59 40.3	99 03	06.3	8
9	45 11.6	1.0 03	07.8	45 41.5	1.0 03	07.7	47 11.3	1.0 03	07.6	47 41.2	1.0 03	07.5	48 11.1	1.0 03	07.5	54 10.0	1.0 03	06.7	54 39.9	1.0 03	06.6	59 38.6	1.0 02	05.8	9
170	45 09.6	1.0 03	07.1	45 39.5	1.0 03	07.0	47 09.3	1.0 03	06.9	47 39.3	1.0 03	06.8	48 09.2	1.0 03	06.8	54 08.3	1.0 03	06.1	54 38.2	1.0 03	06.0	59 37.1	1.0 02	05.3	170
1	45 07.8	1.0 03	06.4	45 37.7	1.0 03	06.3	47 07.6	1.0 03	06.2	47 37.5	1.0 03	06.2	48 07.4	1.0 03	06.1	54 06.7	1.0 02	05.5	54 36.6	1.0 02	05.4	59 35.8	1.0 02	04.7	1
2	45 06.1	1.0 02	05.7	45 36.1	1.0 02	05.6	47 06.0	1.0 02	05.5	47 35.9	1.0 02	05.5	48 05.9	1.0 02	05.4	54 05.3	1.0 02	04.9	54 35.2	1.0 02	04.8	59 34.6	1.0 02	04.2	2
3	45 04.7	1.0 02	05.0	45 34.7	1.0 02	04.9	47 04.6	1.0 02	04.8	47 34.5	1.0 02	04.8	48 04.5	1.0 02	04.7	54 04.0	1.0 02	04.3	54 34.0	1.0 02	04.2	59 33.5	1.0 02	03.7	3
4	45 03.4	1.0 02	04.2	45 33.4	1.0 02	04.2	47 03.4	1.0 02	04.1	47 33.3	1.0 02	04.1	48 03.3	1.0 02	04.1	54 03.0	1.0 02	03.7	54 32.9	1.0 01	03.6	59 32.6	1.0 01	03.2	4
175	45 02.4	1.0 01	03.5	45 32.4	1.0 01	03.5	47 02.3	1.0 01	03.4	47 32.3	1.0 01	03.4	48 02.3	1.0 01	03.4	54 02.1	1.0 01	03.0	54 32.0	1.0 01	03.0	59 31.8	1.0 01	02.6	175
6	45 01.5	1.0 01	02.8	45 31.5	1.0 01	02.8	47 01.5	1.0 01	02.8	47 31.5	1.0 01	02.7	48 01.5	1.0 01	02.7	54 01.3	1.0 01	02.4	54 31.3	1.0 01	02.4	59 31.1	1.0 01	02.1	6
7	45 00.9	1.0 01	02.1	45 30.9	1.0 01	02.1	47 00.8	1.0 01	02.1	47 30.8	1.0 01	02.1	48 00.8	1.0 01	02.0	54 00.7	1.0 01	01.8	54 30.7	1.0 01	01.8	59 30.6	1.0 01	01.6	7
8	45 00.4	1.0 00	01.4	45 30.4	1.0 00	01.4	47 00.4	1.0 00	01.4	47 30.4	1.0 00	01.4	48 00.4	1.0 00	01.4	54 00.3	1.0 00	01.2	54 30.3	1.0 00	01.2	59 30.3	1.0 00	01.1	8
9	45 00.1	1.0 00	00.7	45 30.1	1.0 00	00.7	47 00.1	1.0 00	00.7	47 30.1	1.0 00	00.7	48 00.1	1.0 00	00.7	54 00.1	1.0 00	00.6	54 30.1	1.0 00	00.6	59 30.1	1.0 00	00.5	9
180	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	47 00.0	1.0 00	00.0	47 30.0	1.0 00	00.0	48 00.0	1.0 00	00.0	54 00.0	1.0 00	00.0	54 30.0	1.0 00	00.0	59 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 75°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	19	180	23	180	27	180	31	180	35	180	39	180	43	180	47	180	51	180	55	180	59	180	00
4	19	176	23	176	27	176	31	176	35	175	39	175	43	175	47	175	51	175	55	175	59	174	4
8	19	172	23	171	27	171	31	171	35	171	39	171	43	170	47	170	51	170	55	169	59	169	8
12	19	167	23	167	27	167	31	167	35	166	39	166	43	166	47	165	51	165	55	164	59	163	12
16	18	163	22	163	26	162	30	162	34	162	38	161	42	161	46	160	50	160	54	159	58	158	16
20	18	159	22	159	26	158	30	158	34	157	38	157	42	156	46	155	50	155	54	154	58	153	20
24	18	155	22	154	26	154	30	153	34	153	38	152	41	151	45	151	49	150	53	149	57	147	24
28	17	151	21	150	25	150	29	149	33	148	37	148	41	147	45	146	49	145	53	144	57	142	28
32	17	147	21	146	25	145	29	145	32	144	36	143	40	142	44	141	48	140	52	139	56	137	32
36	16	142	20	142	24	141	28	140	32	139	36	139	40	138	44	137	47	135	51	134	55	132	36
40	15	138	19	138	23	137	27	136	31	135	35	134	39	133	43	132	47	131	51	129	54	127	40
44	15	134	19	133	23	133	26	132	30	131	34	130	38	129	42	128	46	126	50	125	54	123	44
48	14	130	18	129	22	129	26	128	30	127	33	126	37	124	41	123	45	122	49	120	53	118	48
52	13	126	17	125	21	124	25	123	29	122	33	121	36	120	40	119	44	117	48	116	52	114	52
56	12	122	16	121	20	120	24	119	28	118	32	117	36	116	39	115	43	113	47	111	51	109	56
60	11	118	15	117	19	116	23	115	27	114	31	113	35	112	38	110	42	109	46	107	50	105	60
64	10	114	14	113	18	112	22	111	26	110	30	109	34	108	37	106	41	105	45	103	49	101	64
68	09	110	13	109	17	108	21	107	25	106	29	105	33	104	36	102	40	101	44	99	48	97	68
72	08	106	12	105	16	104	20	103	24	102	28	101	32	100	35	98	39	97	43	95	47	93	72
76	07	103	11	101	15	100	19	99	23	98	27	97	31	96	34	94	38	93	42	91	46	89	76
80	06	99	10	98	14	97	18	95	22	94	26	93	30	92	33	90	37	89	41	87	45	85	80
84	05	95	09	94	13	93	17	92	21	90	25	89	29	88	32	87	36	85	40	83	44	81	84
88	04	91	08	90	12	89	16	88	20	87	24	85	27	84	31	83	35	81	39	80	43	78	88
92	03	87	07	86	11	85	15	84	19	83	23	82	26	80	30	79	34	77	38	76	42	74	92
96	02	83	06	82	10	81	14	80	18	79	22	78	25	77	29	75	33	74	37	72	41	71	96
100	01	79	05	78	09	77	13	76	17	75	21	74	24	73	28	72	32	70	36	69	40	67	100
104	00	75	04	74	08	73	12	72	16	71	20	70	23	69	27	68	31	67	35	65	39	64	104
108	*01*	72	03	71	07	70	11	69	15	68	19	66	23	65	26	64	30	63	34	62	38	60	108
112	*02*	68	02	67	06	66	10	65	14	64	18	63	22	62	25	61	29	59	33	58	37	57	112
116	*03*	64	01	63	05	62	09	61	13	60	17	59	21	58	25	57	28	56	32	55	36	53	116
120	*04*	60	00	59	04	58	08	57	12	56	16	55	20	54	24	53	28	52	31	51	35	50	120
124	*04*	56	*01*	55	03	54	07	53	11	53	15	52	19	51	23	50	27	49	31	48	35	46	124
128	*05*	52	*01*	51	03	50	06	50	10	49	14	48	18	47	22	46	26	45	30	44	34	43	128
132	*06*	48	*02*	47	02	47	06	46	10	45	14	44	17	43	21	43	25	42	29	41	33	40	132
136	*07*	44	*03*	44	01	43	05	42	09	41	13	41	17	40	21	39	25	38	29	37	32	36	136
140	*07*	40	*04*	40	00	39	04	38	08	38	12	37	16	36	20	35	24	35	28	34	32	33	140
144	*08*	36	*04*	36	*00*	35	04	34	08	34	12	33	16	33	20	32	23	31	27	30	31	30	144
148	*09*	32	*05*	32	*01*	31	03	31	07	30	11	30	15	29	19	28	23	28	27	27	31	26	148
152	*09*	28	*05*	28	*01*	27	03	27	07	26	11	26	15	25	19	25	23	24	26	24	30	23	152
156	*10*	24	*06*	24	*02*	23	02	23	06	23	10	22	14	22	18	21	22	21	26	20	30	20	156
160	*10*	20	*06*	20	*02*	20	02	19	06	19	10	18	14	18	18	18	22	17	26	17	30	16	160
164	*10*	16	*06*	16	*02*	16	02	15	06	15	10	15	14	14	18	14	21	14	25	14	29	13	164
168	*11*	12	*07*	12	*03*	12	01	12	05	11	09	11	13	11	17	11	21	10	25	10	29	10	168
172	*11*	08	*07*	08	*03*	08	01	08	05	08	09	07	13	07	17	07	21	07	25	07	29	07	172
176	*11*	04	*07*	04	*03*	04	01	04	05	04	09	04	13	04	17	04	21	03	25	03	29	03	176
180	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	29	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18698

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 75°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	63	180	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	00
4	63	174	67	174	71	173	75	172	79	171	83	168	87	157	89	43	85	08	81	03	77	01	4
8	63	168	67	167	71	166	75	165	79	162	83	156	86	139	88	60	85	15	81	05	77	01	8
12	63	162	66	161	70	160	74	157	78	153	82	146	85	125	87	66	84	22	81	08	77	02	12
16	62	157	66	155	70	153	74	150	78	145	81	136	85	116	86	68	84	27	81	10	77	02	16
20	62	151	66	149	70	147	73	143	77	138	81	128	84	108	85	69	83	31	80	12	77	03	20
24	61	146	65	144	69	141	73	137	76	131	80	121	83	102	84	69	83	35	80	14	77	04	24
28	61	140	64	138	68	135	72	131	76	124	79	114	82	97	83	68	82	37	80	16	77	04	28
32	60	135	64	133	67	129	71	125	75	119	78	109	81	92	82	68	82	39	80	18	77	05	32
36	59	130	63	127	67	124	70	120	74	113	77	103	80	89	81	66	81	41	79	19	77	05	36
40	58	125	62	122	66	119	69	114	73	108	76	99	78	85	80	65	80	41	79	20	76	06	40
44	57	120	61	118	65	114	68	110	72	103	75	94	77	82	79	64	80	42	79	21	76	06	44
48	56	116	60	113	64	109	67	105	71	99	74	90	76	79	78	62	79	42	78	22	76	06	48
52	56	111	59	108	63	105	66	101	70	95	73	87	75	76	77	61	78	42	78	23	76	07	52
56	55	107	58	104	62	101	65	96	69	91	72	83	74	73	76	59	78	42	77	23	76	07	56
60	54	103	57	100	61	97	64	92	68	87	71	80	73	70	76	57	77	41	77	24	76	07	60
64	53	99	56	96	60	93	63	88	67	83	70	76	72	67	75	56	76	41	77	24	76	07	64
68	52	95	55	92	59	89	62	85	66	80	69	73	72	65	74	54	75	40	76	24	76	07	68
72	50	91	54	88	58	85	61	81	65	76	68	70	71	62	73	52	75	39	76	24	76	08	72
76	49	87	53	84	57	81	60	78	64	73	67	67	70	60	72	50	74	38	75	24	75	08	76
80	48	83	52	81	56	78	59	74	63	70	66	64	69	57	71	49	74	37	75	23	75	08	80
84	47	79	51	77	55	74	58	71	62	67	65	62	68	55	71	47	73	36	74	23	75	08	84
88	46	76	50	73	54	71	57	67	61	64	64	59	67	53	70	45	72	35	74	22	75	08	88
92	45	72	49	70	53	67	56	64	60	61	63	56	66	50	69	43	72	34	74	22	75	08	92
96	44	69	48	67	52	64	55	61	59	58	62	53	66	48	69	41	71	32	73	21	75	08	96
100	43	65	47	63	51	61	54	58	58	55	61	51	65	46	68	39	71	31	73	21	75	07	100
104	43	62	46	60	50	58	54	55	57	52	61	48	64	43	67	37	70	30	73	20	74	07	104
108	42	58	45	56	49	54	53	52	56	49	60	45	63	41	67	35	70	28	72	19	74	07	108
112	41	55	45	53	48	51	52	49	56	46	59	43	63	39	66	34	69	27	72	18	74	07	112
116	40	52	44	50	48	48	51	46	55	43	59	40	62	36	65	32	69	25	72	17	74	07	116
120	39	48	43	47	47	45	51	43	54	41	58	38	61	34	65	30	68	24	71	16	74	06	120
124	38	45	42	44	46	42	50	40	54	38	57	35	61	32	64	28	68	22	71	15	74	06	124
128	38	42	42	40	45	39	49	37	53	35	57	33	60	30	64	26	67	21	71	14	74	06	128
132	37	39	41	37	45	36	49	34	52	32	56	30	60	27	64	24	67	19	70	13	74	05	132
136	36	35	40	34	44	33	48	31	52	30	56	27	59	25	63	22	67	18	70	12	74	05	136
140	36	32	40	31	44	30	48	28	51	27	55	25	59	23	63	20	66	16	70	11	73	05	140
144	35	29	39	28	43	27	47	26	51	24	55	22	59	20	62	18	66	15	70	10	73	04	144
148	35	26	39	25	43	24	47	23	51	21	54	20	58	18	62	16	66	13	70	09	73	04	148
152	34	22	38	22	42	21	46	20	50	19	54	17	58	16	62	14	66	11	70	08	73	03	152
156	34	19	38	19	42	18	46	17	50	16	54	15	58	14	62	12	66	10	69	07	73	03	156
160	34	16	38	15	42	15	46	14	50	13	54	12	58	11	61	10	65	08	69	06	73	02	160
164	33	13	37	12	41	12	45	11	49	11	53	10	57	09	61	08	65	07	69	05	73	02	164
168	33	10	37	09	41	09	45	08	49	08	53	07	57	07	61	06	65	05	69	03	73	01	168
172	33	06	37	06	41	06	45	06	49	05	53	05	57	05	61	04	65	03	69	02	73	01	172
176	33	03	37	03	41	03	45	03	49	03	53	02	57	02	61	02	65	02	69	01	73	00	176
180	33	00	37	00	41	00	45	00	49	00	53	00	57	00	61	00	65	00	69	00	73	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 76°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°
00	14 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	15 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0
1	13 59.9	1.0 01	179.0	14 29.9	1.0 01	179.0	14 59.9	1.0 01	179.0	15 29.9	1.0 01	179.0	15 59.9	1.0 01	179.0	16 29.9	1.0 01	179.0	16 59.9	1.0 01	179.0	17 29.9	1.0 01	179.0
2	13 59.5	1.0 01	177.9	14 29.5	1.0 01	177.9	14 59.5	1.0 01	177.9	15 29.5	1.0 01	177.9	15 59.5	1.0 01	177.9	16 29.5	1.0 01	177.9	16 59.5	1.0 01	177.9	17 29.5	1.0 01	177.9
3	13 58.8	1.0 02	176.9	14 28.8	1.0 02	176.9	14 58.8	1.0 02	176.9	15 28.8	1.0 02	176.9	15 58.8	1.0 02	176.9	16 28.8	1.0 02	176.9	16 58.8	1.0 02	176.9	17 28.8	1.0 02	176.9
4	13 57.9	1.0 02	175.9	14 27.9	1.0 02	175.9	14 57.9	1.0 02	175.9	15 27.9	1.0 02	175.9	15 57.9	1.0 02	175.8	16 27.9	1.0 02	175.8	16 57.9	1.0 02	175.8	17 27.9	1.0 02	175.8
05	13 56.7	1.0 02	174.8	14 26.7	1.0 02	174.8	14 56.7	1.0 02	174.8	15 26.7	1.0 02	174.8	15 56.7	1.0 02	174.8	16 26.7	1.0 02	174.8	16 56.7	1.0 02	174.8	17 26.7	1.0 02	174.8
6	13 55.3	1.0 03	173.8	14 25.3	1.0 03	173.8	14 55.3	1.0 03	173.8	15 25.3	1.0 03	173.8	15 55.3	1.0 03	173.8	16 25.3	1.0 03	173.8	16 55.2	1.0 03	173.7	17 25.2	1.0 03	173.7
7	13 53.6	1.0 03	172.8	14 23.6	1.0 03	172.8	14 53.6	1.0 03	172.8	15 23.6	1.0 03	172.7	15 53.6	1.0 03	172.7	16 23.5	1.0 03	172.7	16 53.5	1.0 03	172.7	17 23.5	1.0 03	172.7
8	13 51.7	1.0 04	171.8	14 21.6	1.0 04	171.7	14 51.6	1.0 04	171.7	15 21.6	1.0 04	171.7	15 51.6	1.0 04	171.7	16 21.6	1.0 04	171.7	16 51.6	1.0 04	171.6	17 21.5	1.0 04	171.6
9	13 49.5	1.0 04	170.7	14 19.4	1.0 04	170.7	14 49.4	1.0 04	170.7	15 19.4	1.0 04	170.7	15 49.4	1.0 04	170.6	16 19.3	1.0 04	170.6	16 49.3	1.0 04	170.6	17 19.3	1.0 04	170.6
10	13 47.0	1.0 05	169.7	14 17.0	1.0 05	169.7	14 46.9	1.0 05	169.7	15 16.9	1.0 05	169.6	15 46.9	1.0 05	169.6	16 16.8	1.0 05	169.6	16 46.8	1.0 05	169.6	17 16.8	1.0 05	169.5
1	13 44.3	1.0 05	168.7	14 14.2	1.0 05	168.6	14 44.2	1.0 05	168.6	15 14.2	1.0 05	168.6	15 44.1	1.0 05	168.6	16 14.1	1.0 05	168.5	16 44.1	1.0 05	168.5	17 14.0	1.0 05	168.5
2	13 41.3	1.0 05	167.6	14 11.2	1.0 05	167.6	14 41.2	1.0 05	167.6	15 11.2	1.0 05	167.6	15 41.1	1.0 05	167.5	16 11.1	1.0 05	167.5	16 41.0	1.0 05	167.5	17 11.0	1.0 05	167.5
3	13 38.0	1.0 06	166.6	14 08.0	1.0 06	166.6	14 38.0	1.0 06	166.6	15 07.9	1.0 06	166.5	15 37.9	1.0 06	166.5	16 07.8	1.0 06	166.5	16 37.8	1.0 06	166.4	17 07.7	1.0 06	166.4
4	13 34.6	1.0 06	165.6	14 04.5	1.0 06	165.6	14 34.5	1.0 06	165.5	15 04.4	1.0 06	165.5	15 34.3	1.0 06	165.5	16 04.3	1.0 06	165.4	16 34.2	1.0 06	165.4	17 04.2	1.0 06	165.4
15	13 30.8	1.0 07	164.6	14 00.8	1.0 07	164.5	14 30.7	1.0 07	164.5	15 00.6	1.0 07	164.5	15 30.6	1.0 07	164.4	16 00.5	1.0 07	164.4	16 30.4	1.0 07	164.4	17 00.4	1.0 07	164.3
6	13 26.8	1.0 07	163.5	13 56.8	1.0 07	163.5	14 26.7	1.0 07	163.5	14 56.6	1.0 07	163.4	15 26.6	1.0 07	163.4	15 56.5	1.0 07	163.4	16 26.4	1.0 07	163.3	16 56.3	1.0 07	163.3
7	13 22.6	1.0 07	162.5	13 52.5	1.0 08	162.5	14 22.4	1.0 08	162.4	14 52.4	1.0 08	162.4	15 22.3	1.0 08	162.4	15 52.2	1.0 08	162.3	16 22.1	1.0 08	162.3	16 52.0	1.0 08	162.2
8	13 18.1	1.0 08	161.5	13 48.0	1.0 08	161.4	14 17.9	1.0 08	161.4	14 47.8	1.0 08	161.4	15 17.8	1.0 08	161.3	15 47.7	1.0 08	161.3	16 17.6	1.0 08	161.2	16 47.5	1.0 08	161.2
9	13 13.4	1.0 08	160.5	13 43.3	1.0 08	160.4	14 13.2	1.0 08	160.4	14 43.1	1.0 08	160.3	15 13.0	1.0 08	160.3	15 42.9	1.0 08	160.3	16 12.8	1.0 08	160.2	16 42.7	1.0 08	160.2
20	13 08.4	1.0 09	159.4	13 38.3	1.0 09	159.4	14 08.2	1.0 09	159.4	14 38.1	1.0 09	159.3	15 08.0	1.0 09	159.3	15 37.9	1.0 09	159.2	16 07.7	1.0 09	159.2	16 37.6	1.0 09	159.1
1	13 03.2	1.0 09	158.4	13 33.1	1.0 09	158.4	14 02.9	1.0 09	158.3	14 32.8	1.0 09	158.3	15 02.7	1.0 09	158.2	15 32.6	1.0 09	158.2	16 02.5	1.0 09	158.1	16 32.3	1.0 09	158.1
2	12 57.7	1.0 10	157.4	13 27.6	1.0 10	157.3	13 57.5	1.0 10	157.3	14 27.3	1.0 10	157.2	14 57.2	1.0 10	157.2	15 27.1	1.0 10	157.2	15 56.9	1.0 10	157.1	16 26.8	1.0 10	157.1
3	12 52.0	1.0 10	156.4	13 21.9	1.0 10	156.3	13 51.7	1.0 10	156.3	14 21.6	1.0 10	156.2	14 51.5	1.0 10	156.2	15 21.3	1.0 10	156.1	15 51.2	1.0 10	156.1	16 21.0	1.0 10	156.0
4	12 46.1	99 10	155.4	13 15.9	99 10	155.3	13 45.8	99 10	155.2	14 15.6	99 10	155.2	14 45.5	99 10	155.1	15 15.3	99 10	155.1	15 45.2	99 10	155.0	16 15.0	99 10	155.0
25	12 39.9	99 11	154.3	13 09.8	99 11	154.3	13 39.6	99 11	154.2	14 09.4	99 11	154.2	14 39.3	99 11	154.1	15 09.1	99 11	154.1	15 38.9	99 11	154.0	16 08.7	99 11	153.9
6	12 33.5	99 11	153.3	13 03.3	99 11	153.3	13 33.2	99 11	153.2	14 03.0	99 11	153.1	14 32.8	99 11	153.1	15 02.6	99 11	153.0	15 32.4	99 11	153.0	16 02.3	99 11	152.9
7	12 26.9	99 11	152.3	12 56.7	99 11	152.2	13 26.5	99 11	152.2	13 56.3	99 12	152.1	14 26.1	99 12	152.1	14 55.9	99 12	152.0	15 25.7	99 12	151.9	15 55.5	99 12	151.9
8	12 20.0	99 12	151.3	12 49.8	99 12	151.2	13 19.6	99 12	151.2	13 49.4	99 12	151.1	14 19.2	99 12	151.0	14 49.0	99 12	151.0	15 18.8	99 12	150.9	15 48.6	99 12	150.9
9	12 12.9	99 12	150.3	12 42.7	99 12	150.2	13 12.5	99 12	150.1	13 42.3	99 12	150.1	14 12.1	99 12	150.0	14 41.8	99 12	150.0	15 11.6	99 12	149.9	15 41.4	99 12	149.8
30	12 05.6	99 13	149.2	12 35.4	99 13	149.2	13 05.2	99 13	149.1	13 34.9	99 13	149.1	14 04.7	99 13	149.0	14 34.5	99 13	148.9	15 04.2	99 13	148.9	15 34.0	99 13	148.8
1	11 58.1	99 13	148.2	12 27.8	99 13	148.2	12 57.6	99 13	148.1	13 27.4	99 13	148.0	13 57.1	99 13	148.0	14 26.9	99 13	147.9	14 56.6	99 13	147.8	15 26.4	99 13	147.8
2	11 50.3	99 13	147.2	12 20.1	99 13	147.2	12 49.8	99 13	147.1	13 19.6	99 13	147.0	13 49.3	99 13	146.9	14 19.0	99 13	146.9	14 48.8	99 13	146.8	15 18.5	99 13	146.7
3	11 42.4	99 14	146.2	12 12.1	99 14	146.1	12 41.8	99 14	146.1	13 11.5	99 14	146.0	13 41.3	99 14	145.9	14 11.0	99 14	145.9	14 40.7	99 14	145.8	15 10.4	99 14	145.7
4	11 34.2	99 14	145.2	12 03.9	99 14	145.1	12 33.6	99 14	145.1	13 03.3	99 14	145.0	13 33.0	99 14	144.9	14 02.7	99 14	144.8	14 32.4	99 14	144.8	15 02.2	99 14	144.7
35	11 25.8	99 14	144.2	11 55.5	99 14	144.1	12 25.2	99 14	144.0	12 54.9	99 14	144.0	13 24.6	99 14	143.9	13 54.3	99 14	143.8	14 24.0	99 14	143.7	14 53.7	99 14	143.7
6	11 17.2	99 15	143.2	11 46.9	99 15	143.1	12 16.6	99 15	143.0	12 46.2	99 15	143.0	13 15.9	99 15	142.9	13 45.6	99 15	142.8	14 15.3	99 15	142.7	14 45.0	99 15	142.6
7	11 08.4	99 15	142.2	11 38.1	99 15	142.1	12 07.7	99 15	142.0	12 37.4	99 15	141.9	13 07.1	99 15	141.9	13 36.7	99 15	141.8	14 06.4	99 15	141.7	14 36.0	99 15	141.6
8	10 59.4	99 15	141.2	11 29.0	99 15	141.1	11 58.7	99 15	141.0	12 28.4	99 15	140.9	12 58.0	99 15	140.8	13 27.6	99 15	140.8	13 57.3	99 15	140.7	14 26.9	99 16	140.6
9	10 50.2	99 16	140.2	11 19.8	99 16	140.1	11 49.5	99 16	140.0	12 19.1	99 16	139.9	12 48.7	99 16	139.8	13 18.4	99 16	139.8	13 48.0	99 16	139.7	14 17.6	99 16	139.6
40	10 40.8	99 16	139.1	11 10.4	99 16	139.1	11 40.0	99 16	139.0	12 09.7	99 16	138.9	12 39.3	99 16	138.8	13 08.9	99 16	138.7	13 38.5	99 16	138.7	14 08.1	99 16	138.6
1	10 31.2	99 16	138.1	11 00.8	99 16	138.1	11 30.4	99 16	138.0	12 00.0	99 16	137.9	12 29.6	99 16	137.8	12 59.2	99 16	137.7	13 28.8	99 16	137.6	13 58.4	99 16	137.6
2	10 21.4	99 17	137.1	10 51.0	99 17	137.1	11 20.6	99 17	137.0	11 50.2	99 17	136.9	12 19.8	99 17	136.8	12 49.4	99 17	136.7	13 18.9	99 17	136.6	13 48.5	99 17	136.5
3	10 11.5	99 17	136.1	10 41.0	99 17	136.1	11 10.6	99 17	136.0	11 40.2	99 17	135.9	12 09.8	99 17	135.8	12 39.3	99 17	135.7	13 08.9	99 17	135.6	13 38.5	99 17	135.5
4	10 01.3	99 17	135.1	10 30.9	99 17	135.0	11 00.4	99 17	135.0	11 30.0	99 17	134.9	11 59.5	99 17	134.8	12 29.1	99 17	134.7	12 58.6	99 17	134.6	13 28.2	98 17	134.5
45	9 51.0	98 18	134.1	10 20.5	98 18	134.0	10 50.1	98 18	134.0	11 19.6	98 18	133.9	11 49.1	98 18	133.8	12 18.7	98 18	133.7	12 48.2	98 18	133.6	13 17.8	98 18	133.5
6	9 40.5	98 18	133.1	10 10.0	98 18	133.0	10 39.5	98 18	133.0	11 09.1	98 18	132.9	11 38.6	98 18	132.8	12 08.1	98 18	132.7	12 37.6	98 18	132.6	13 07.1	98 18	132.5
7	9 29.8	98 18	132.1	9 59.3	98 18	132.0	10 28.8	98 18	132.0	10 58.3	98 18	131.9	11 27.8	98 18	131.8	11 57.3	98 18	131.7	12 26.9	98 18	131.6	12 56.4	98 18	131.5
8	9 19.0	98 18	131.1	9 48.4	98 18	131.1	10 17.9	98 18	131.0	10 47.4	98 18	130.9	11 16.9	98 18	130.8	11 46.4	98 18	130.7	12 15.9	98 19	130.6	12 45.4	98 19	130.5
9	9 07.9	98 19	130.1	9 37.4	98 19	130.1	10 06.9	98 19	130.0	10 36.4	98 19	129.9	11 05.9	98 19	129.8	11 35.3	98 19	129.7	12 04.8	98 19	129.6	12 34.3	98 19	129.5
50	8 56.8	98 19	129.2	9 26.2	98 19	129.1	9 55.7	98 19	129.0	10 25.2	98 19	128.9	10 54.6	98 19	128.8	11 24.1	98 19	128.7	11 53.5	98 19	128.6	12 23.0	98 19	128.5
1	8 45.4	98 19	128.2	9 14.9	98 19	128.1	9 44.3	98 19	128.0	10 13.8	98 19	127.9	10 43.2	98 19	127.8	11 12.7	98 19	127.7	11 42.1	98 19	127.6	12 11.6	98 19	127.5
2	8 33.9	98 19	127.2	9 03.4	98 19	127.1	9 32.8	98 19	127.0	10 02.2	98 20	126.9	10 31.7	98 20	126.8	11 01.1	98 20	126.7	11 30.5	98 20	126.6	12 00.0	98 20	126.5
3	8 22.3	98 20	126.2	8 51.7	98 20	126.1	9 21.1	98 20	126.0	9 50.6	98 20	125.9	10 20.0	98 20	125.8	10 49.4	98 20	125.7	11 18.8	98 20	125.6	11 48.2	98 20	125.5
4	8 10.5	98 20	125.2	8 39.9	98 20	125.1	9 09.3	98 20	125.0	9 38.7	98 20	124.9	10 08.1	98 20	124.8	10 37.5	98 20	124.7	11 06.9	98 20	124.6	11 36.3	98 20	124.5
55	7 58.6	98 20	124.2	8 28.0	98 20	124.1	8 57.4	98 20	124.0	9 26.7	98 20	123.9	9 56.1	98 20	123.8	10 25.5	98 20	123.7	10 54.9	98 20	123.6	11 24.3	98 20	123.5
6	7 46.5	98 20	123.2	8 15.9	98 20	123.1	8 45.2	98 20	123.0	9 14.6	98 20	122.9	9 44.0	98 20	122.8	10 13.4	98 20	122.7	10 42.7	98 20	122.6	11 12.1	98 20	122.5
7	7 34.3	98 21	122.2	8 03.6	98 21	122.1	8 33.0	98 21	122.0	9 02.4	98 21	121.9	9 31.7	98 21	121.8	10 01.1	98 21	121.7	10 30.4	98 21	121.6	10 59.8	98 21	121.5
8	7 21.9	98 21	121.2	7 51.3	98 21	121.1	8 20.6	98 21	121.0	8 50.0	98 21	120.9	9 19.3	98 21	120.8	9 48.7	98 21	120.7	10 18.0	98 21	120.6	10 47.3	98 21	120.5
9	7 09.5	98 21	120.2	7 38.8	98 21	120.1	8 08.1	98 21	120.0	8 37.5	98 21	119.9	9 06.8	98 21	119.8	9 36.1	98 21	119.7	10 05.5	98 21	119.6	10 34.8	98 21	119.5
60	6 56.9	98 21	119.3	7 26.2	98 21	119.2	7 55.5	98 21	119.0	8 24.8	98 21	118.9	8 54.1	98 21	118.8	9 23.5	98 21	118.7	9 52.8	98 21	118.6	10 22.1	98 21	118.5
1	6 44.1	98 21	118.3	7 13.4	98 21	118.2	7 42.7	98 21	118.1	8 12.1	98 21	118.0	8 41.4	98 22	117.8	9 10.7	98 22	117.7	9 40.0	98 22	117.6	10 09.3	98 22	117.5
2	6 31.3	98 22	117.3	7 00.6	98 22	117.2	7 29.9	98 22	117.1	7 59.2	98 22	117.0	8 28.5	98 22	116.9	8 57.8	98 22	116.7	9 27.0	98 22	116.6	9 56.3	98 22	116.5
3	6 18.3	98 22	116.3	6 47.6	98 22	116.2	7 16.9	98 22	116.1	7 46.2	98 22	116.0	8 15.5	98 22	115.9	8 44.7	98 22	115.8	9 14.0	98 22	115.6	9 43.3	98 22	115.5
4	6 05.3	98 22	115.3	6 34.5	98 22	115.2	7 03.8	98 22	115.1	7 33.1	98 22	115.0	8 02.3	98 22	114.9	8 31.6	98 22	114.8	9 00.9	98 22	114.7	9 30.1	98 22	114.6
65	5 52.1	98 22	114.3	6 21.4	98 22	114.2	6 50.6	98 22	114.1	7 19.9	98 22	114.0	7 49.1	98 22	113.9	8 18.4	98 22	113.8	8 47.6	98 22	113.7	9 16.9	98 22	113.6
6	5 38.8	98 22	113.4	6 08.1	97 22	113.3	6 37.3	97 22	113.1	7 06.6	97 22	113.0	7 35.8	97 22	112.9	8 05.1	97 22	112.8	8 34.3	97 22	112.7	9 03.5	97 22	112.6
7	5 25.4	97 22	112.4	5 54.7	97 22	112.3	6 23.9	97 22	112.2	6 53.2	97 22	112.0	7 22.4	97 23	111.9	7 51.6	97 23	111.8	8 20.9	97 23	111.7	8 50.1	97 23	111.6
8	5 12.0	97 23	111.4	5 41.2	97 23	111.3	6 10.4	97 23	111.2	6 39.7	97 23	111.1	7 08.9	97 23	111.0	7 38.1	97 23	110.8	8 07.3	97 23	110.7	8 36.5	97 23	110.6
9				5 27.6	97 23	110.3	5 56.9	97 23	110.2	6 26.1	97 23	110.1	6 55.3	97 23	110.0	7 24.5	97 23	109.9	7 53.7	97 23	109.7	8 22.9	97 23	109.6
70				5 14.0	97 23	109.3	5 43.2	97 23	109.2	6 12.4	97 23	109.1	6 41.6	97 23	109.0	7 10.8	97 23	108.9	7 40.0	97 23	108.8	8 09.2	97 23	108.6
1				5 00.2	97 23	108.4	5 29.4	97 23	108.2	5 58.6	97 23	108.1	6 27.8	97 23	108.0	6 57.0	97 23	107.9	7 26.2	97 23	107.8	7 55.4	97 23	107.7
2							5 15.6	97 23	107.3	5 44.8	97 23	107.2	6 14.0	97 23	107.0	6 43.2	97 23	106.9	7 12.4	97 23	106.8	7 41.5	97 23	106.7
3							5 01.7	97 23	106.3	5 30.9	97 23	106.2	6 00.1	97 23	106.1	6 29.3	97 23	105.9	6 58.4	97 23	105.8	7 27.6	97 23	105.7
4										5 16.9	97 23	105.2	5 46.1	97 23	105.1	6 15.3	97 23	105.0	6 44.4	97 23	104.8	7 13.6	97 23	104.7
75										5 02.9	97 23	104.2	5 32.0	97 24	104.1	6 01.2	97 24	104.0	6 30.4	97 24	103.9	6 59.5	97 24	103.7
6													5 17.9	97 24	103.1	5 47.1	97 24	103.0	6 16.2	97 24	102.9	6 45.4	97 24	102.8
7													5 03.8	97 24	102.2	5 32.9	97 24	102.0	6 02.1	97 24	101.9	6 31.2	97 24	101.8
8																5 18.7	97 24	101.1	5 47.8	97 24	100.9	6 17.0	97 24	100.8
9																5 04.4	97 24	100.1	5 33.6	97 24	100.0	6 02.7	97 24	99.8
80																			5 19.3	97 24	99.0	5 48.4	97 24	98.9
1																			5 04.9	97 24	98.0	5 34.0	97 24	97.9
2																						5 19.6	97 24	96.9
3																						5 05.2	97 24	96.0

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	14 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	11 00.0 1.0 00	180.0	10 30.0 1.0 00	180.0	00
1	13 59.9 1.0 01	179.0	13 29.9 1.0 01	179.0	12 59.9 1.0 01	179.0	12 29.9 1.0 01	179.0	11 59.9 1.0 01	179.0	11 29.9 1.0 01	179.0	10 59.9 1.0 01	179.0	10 29.9 1.0 01	179.0	1
2	13 59.5 1.0 01	177.9	13 29.5 1.0 01	177.9	12 59.5 1.0 01	177.9	12 29.5 1.0 01	178.0	11 59.5 1.0 01	178.0	11 29.5 1.0 01	178.0	10 59.5 1.0 01	178.0	10 29.5 1.0 01	178.0	2
3	13 58.8 1.0 02	176.9	13 28.8 1.0 02	176.9	12 58.8 1.0 02	176.9	12 28.8 1.0 02	176.9	11 58.8 1.0 02	176.9	11 28.8 1.0 02	176.9	10 58.8 1.0 02	176.9	10 28.8 1.0 02	177.0	3
4	13 57.9 1.0 02	175.9	13 27.9 1.0 02	175.9	12 57.9 1.0 02	175.9	12 27.9 1.0 02	175.9	11 57.9 1.0 02	175.9	11 27.9 1.0 02	175.9	10 57.9 1.0 02	175.9	10 27.9 1.0 02	175.9	4
05	13 56.7 1.0 02	174.8	13 26.7 1.0 02	174.9	12 56.8 1.0 02	174.9	12 26.8 1.0 02	174.9	11 56.8 1.0 02	174.9	11 26.8 1.0 02	174.9	10 56.8 1.0 02	174.9	10 26.8 1.0 02	174.9	05
6	13 55.3 1.0 03	173.8	13 25.3 1.0 03	173.8	12 55.3 1.0 03	173.8	12 25.3 1.0 03	173.9	11 55.3 1.0 03	173.9	11 25.4 1.0 03	173.9	10 55.4 1.0 03	173.9	10 25.4 1.0 03	173.9	6
7	13 53.6 1.0 03	172.8	13 23.6 1.0 03	172.8	12 53.6 1.0 03	172.8	12 23.7 1.0 03	172.8	11 53.7 1.0 03	172.8	11 23.7 1.0 03	172.9	10 53.7 1.0 03	172.9	10 23.7 1.0 03	172.9	7
8	13 51.7 1.0 04	171.8	13 21.7 1.0 04	171.8	12 51.7 1.0 04	171.8	12 21.7 1.0 04	171.8	11 51.7 1.0 04	171.8	11 21.7 1.0 04	171.8	10 51.8 1.0 04	171.9	10 21.8 1.0 04	171.9	8
9	13 49.5 1.0 04	170.7	13 19.5 1.0 04	170.7	12 49.5 1.0 04	170.8	12 19.5 1.0 04	170.8	11 49.5 1.0 04	170.8	11 19.6 1.0 04	170.8	10 49.6 1.0 04	170.8	10 19.6 1.0 04	170.9	9
10	13 47.0 1.0 05	169.7	13 17.0 1.0 05	169.7	12 47.0 1.0 04	169.7	12 17.1 1.0 04	169.8	11 47.1 1.0 04	169.8	11 17.1 1.0 04	169.8	10 47.2 1.0 04	169.8	10 17.2 1.0 04	169.9	10
1	13 44.3 1.0 05	168.7	13 14.3 1.0 05	168.7	12 44.3 1.0 05	168.7	12 14.4 1.0 05	168.7	11 44.4 1.0 05	168.8	11 14.4 1.0 05	168.8	10 44.5 1.0 05	168.8	10 14.5 1.0 05	168.8	1
2	13 41.3 1.0 05	167.6	13 11.3 1.0 05	167.7	12 41.4 1.0 05	167.7	12 11.4 1.0 05	167.7	11 41.4 1.0 05	167.7	11 11.5 1.0 05	167.8	10 41.5 1.0 05	167.8	10 11.6 1.0 05	167.8	2
3	13 38.0 1.0 06	166.6	13 08.1 1.0 06	166.6	12 38.1 1.0 06	166.7	12 08.2 1.0 06	166.7	11 38.2 1.0 06	166.7	11 08.3 1.0 06	166.8	10 38.3 1.0 06	166.8	10 08.4 1.0 06	166.8	3
4	13 34.6 1.0 06	165.6	13 04.6 1.0 06	165.6	12 34.7 1.0 06	165.7	12 04.7 1.0 06	165.7	11 34.8 1.0 06	165.7	11 04.8 1.0 06	165.7	10 34.9 1.0 06	165.8	10 04.9 1.0 06	165.8	4
15	13 30.8 1.0 07	164.6	13 00.9 1.0 07	164.6	12 30.9 1.0 07	164.6	12 01.0 1.0 07	164.7	11 31.1 1.0 07	164.7	11 01.1 1.0 07	164.7	10 31.2 1.0 07	164.8	10 01.3 1.0 07	164.8	15
6	13 26.8 1.0 07	163.5	12 56.9 1.0 07	163.6	12 27.0 1.0 07	163.6	11 57.0 1.0 07	163.6	11 27.1 1.0 07	163.7	10 57.2 1.0 07	163.7	10 27.3 1.0 07	163.7	9 57.3 1.0 07	163.8	6
7	13 22.6 1.0 07	162.5	12 52.7 1.0 07	162.5	12 22.8 1.0 07	162.6	11 52.8 1.0 07	162.6	11 22.9 1.0 07	162.7	10 53.0 1.0 07	162.7	10 23.1 1.0 07	162.7	9 53.1 1.0 07	162.8	7
8	13 18.1 1.0 08	161.5	12 48.2 1.0 08	161.5	12 18.3 1.0 08	161.6	11 48.4 1.0 08	161.6	11 18.5 1.0 08	161.6	10 48.6 1.0 08	161.7	10 18.6 1.0 08	161.7	9 48.7 1.0 08	161.8	8
9	13 13.4 1.0 08	160.5	12 43.5 1.0 08	160.5	12 13.6 1.0 08	160.5	11 43.7 1.0 08	160.6	11 13.8 1.0 08	160.6	10 43.9 1.0 08	160.7	10 14.0 1.0 08	160.7	9 44.1 1.0 08	160.7	9
20	13 08.4 1.0 09	159.4	12 38.5 1.0 09	159.5	12 08.6 1.0 09	159.5	11 38.7 1.0 09	159.6	11 08.8 1.0 09	159.6	10 38.9 1.0 09	159.7	10 09.0 1.0 09	159.7	9 39.2 1.0 09	159.7	20
1	13 03.2 1.0 09	158.4	12 33.3 1.0 09	158.5	12 03.4 1.0 09	158.5	11 33.5 1.0 09	158.6	11 03.7 1.0 09	158.6	10 33.8 1.0 09	158.6	10 03.9 1.0 09	158.7	9 34.0 1.0 09	158.7	1
2	12 57.7 1.0 10	157.4	12 27.9 1.0 09	157.4	11 58.0 1.0 09	157.5	11 28.1 1.0 09	157.5	10 58.2 1.0 09	157.6	10 28.4 1.0 09	157.6	9 58.5 1.0 09	157.7	9 28.6 1.0 09	157.7	2
3	12 52.0 1.0 10	156.4	12 22.2 1.0 10	156.4	11 52.3 1.0 10	156.5	11 22.4 1.0 10	156.5	10 52.6 1.0 10	156.6	10 22.7 1.0 10	156.6	9 52.9 1.0 10	156.7	9 23.0 1.0 10	156.7	3
4	12 46.1 99 10	155.4	12 16.2 99 10	155.4	11 46.4 99 10	155.5	11 16.5 99 10	155.5	10 46.7 99 10	155.6	10 16.8 99 10	155.6	9 47.0 1.0 10	155.7	9 17.1 1.0 10	155.7	4
25	12 39.9 99 11	154.3	12 10.1 99 11	154.4	11 40.2 99 11	154.4	11 10.4 99 11	154.5	10 40.6 99 11	154.5	10 10.7 99 11	154.6	9 40.9 99 11	154.7	9 11.1 99 11	154.7	25
6	12 33.5 99 11	153.3	12 03.7 99 11	153.4	11 33.9 99 11	153.4	11 04.0 99 11	153.5	10 34.2 99 11	153.5	10 04.4 99 11	153.6	9 34.6 99 11	153.6	9 04.7 99 11	153.7	6
7	12 26.9 99 11	152.3	11 57.1 99 11	152.4	11 27.3 99 11	152.4	10 57.5 99 11	152.5	10 27.6 99 11	152.5	9 57.8 99 11	152.6	9 28.0 99 11	152.6	8 58.2 99 11	152.7	7
8	12 20.0 99 12	151.3	11 50.2 99 12	151.3	11 20.4 99 12	151.4	10 50.6 99 12	151.5	10 20.8 99 12	151.5	9 51.0 99 12	151.6	9 21.2 99 12	151.6	8 51.4 99 12	151.7	8
9	12 12.9 99 12	150.3	11 43.1 99 12	150.3	11 13.4 99 12	150.4	10 43.6 99 12	150.4	10 13.8 99 12	150.5	9 44.0 99 12	150.6	9 14.2 99 12	150.6	8 44.4 99 12	150.7	9
30	12 05.6 99 13	149.2	11 35.9 99 13	149.3	11 06.1 99 13	149.4	10 36.3 99 12	149.4	10 06.5 99 12	149.5	9 36.8 99 12	149.6	9 07.0 99 12	149.6	8 37.2 99 12	149.7	30
1	11 58.1 99 13	148.2	11 28.3 99 13	148.3	10 58.6 99 13	148.4	10 28.8 99 13	148.4	9 59.1 99 13	148.5	9 29.3 99 13	148.6	8 59.5 99 13	148.6	8 29.8 99 13	148.7	1
2	11 50.3 99 13	147.2	11 20.6 99 13	147.3	10 50.9 99 13	147.4	10 21.1 99 13	147.4	9 51.4 99 13	147.5	9 21.6 99 13	147.6	8 51.9 99 13	147.6	8 22.1 99 13	147.7	2
3	11 42.4 99 14	146.2	11 12.6 99 14	146.3	10 42.9 99 14	146.3	10 13.2 99 14	146.4	9 43.5 99 14	146.5	9 13.7 99 14	146.5	8 44.0 99 13	146.6	8 14.3 99 13	146.7	3
4	11 34.2 99 14	145.2	11 04.5 99 14	145.3	10 34.8 99 14	145.3	10 05.0 99 14	145.4	9 35.3 99 14	145.5	9 05.6 99 14	145.5	8 35.9 99 14	145.6	8 06.2 99 14	145.7	4
35	11 25.8 99 14	144.2	10 56.1 99 14	144.3	10 26.4 99 14	144.3	9 56.7 99 14	144.4	9 27.0 99 14	144.5	8 57.3 99 14	144.5	8 27.6 99 14	144.6	7 57.9 99 14	144.7	35
6	11 17.2 99 15	143.2	10 47.5 99 15	143.2	10 17.8 99 15	143.3	9 48.1 99 15	143.4	9 18.5 99 15	143.5	8 48.8 99 15	143.5	8 19.1 99 14	143.6	7 49.4 99 14	143.7	6
7	11 08.4 99 15	142.2	10 38.7 99 15	142.2	10 09.1 99 15	142.3	9 39.4 99 15	142.4	9 09.7 99 15	142.5	8 40.0 99 15	142.5	8 10.4 99 15	142.6	7 40.7 99 15	142.7	7
8	10 59.4 99 15	141.2	10 29.7 99 15	141.2	10 00.1 99 15	141.3	9 30.4 99 15	141.4	9 00.8 99 15	141.5	8 31.1 99 15	141.5	8 01.5 99 15	141.6	7 31.8 99 15	141.7	8
9	10 50.2 99 16	140.2	10 20.6 99 16	140.2	9 50.9 99 16	140.3	9 21.3 99 16	140.4	8 51.6 99 16	140.5	8 22.0 99 16	140.5	7 52.4 99 16	140.6	7 22.7 99 15	140.7	9
40	10 40.8 99 16	139.1	10 11.2 99 16	139.2	9 41.6 99 16	139.3	9 11.9 99 16	139.4	8 42.3 99 16	139.5	8 12.7 99 16	139.5	7 43.0 99 16	139.6	7 13.4 99 16	139.7	40
1	10 31.2 99 16	138.1	10 01.6 99 16	138.2	9 32.0 99 16	138.3	9 02.4 99 16	138.4	8 32.8 99 16	138.5	8 03.2 99 16	138.6	7 33.5 99 16	138.6	7 03.9 99 16	138.7	1
2	10 21.4 99 17	137.1	9 51.8 99 17	137.2	9 22.2 99 17	137.3	8 52.6 99 17	137.4	8 23.1 99 16	137.5	7 53.5 99 16	137.6	7 23.9 99 16	137.6	6 54.3 99 16	137.7	2
3	10 11.5 99 17	136.1	9 41.9 99 17	136.2	9 12.3 99 17	136.3	8 42.7 99 17	136.4	8 13.1 99 17	136.5	7 43.6 99 17	136.6	7 14.0 99 17	136.6	6 44.4 99 17	136.7	3
4	10 01.3 99 17	135.1	9 31.8 99 17	135.2	9 02.2 99 17	135.3	8 32.6 99 17	135.4	8 03.1 99 17	135.5	7 33.5 99 17	135.6	7 03.9 99 17	135.7	6 34.4 99 17	135.7	4
45	9 51.0 98 18	134.1	9 21.4 98 17	134.2	8 51.9 98 17	134.3	8 22.3 98 17	134.4	7 52.8 98 17	134.5	7 23.2 99 17	134.6	6 53.7 99 17	134.7	6 24.1 99 17	134.7	45
6	9 40.5 98 18	133.1	9 10.9 98 18	133.2	8 41.4 98 18	133.3	8 11.9 98 18	133.4	7 42.4 98 18	133.5	7 12.8 98 18	133.6	6 43.3 98 18	133.7	6 13.7 98 18	133.8	6
7	9 29.8 98 18	132.1	9 00.3 98 18	132.2	8 30.8 98 18	132.3	8 01.3 98 18	132.4	7 31.7 98 18	132.5	7 02.2 98 18	132.6	6 32.7 98 18	132.7	6 03.2 98 18	132.8	7
8	9 19.0 98 18	131.1	8 49.5 98 18	131.2	8 20.0 98 18	131.3	7 50.5 98 18	131.4	7 21.0 98 18	131.5	6 51.4 98 18	131.6	6 21.9 98 18	131.7	5 52.4 98 18	131.8	8
9	9 07.9 98 19	130.1	8 38.5 98 19	130.2	8 09.0 98 19	130.3	7 39.5 98 19	130.4	7 10.0 98 19	130.5	6 40.5 98 18	130.6	6 11.0 98 18	130.7	5 41.5 98 18	130.8	9
50	8 56.8 98 19	129.2	8 27.3 98 19	129.2	7 57.8 98 19	129.3	7 28.4 98 19	129.4	6 58.9 98 19	129.5	6 29.4 98 19	129.6	5 59.9 98 19	129.7	5 30.5 98 19	129.8	50
1	8 45.4 98 19	128.2	8 16.0 98 19	128.3	7 46.5 98 19	128.3	7 17.1 98 19	128.4	6 47.6 98 19	128.5	6 18.2 98 19	128.6	5 48.7 98 19	128.7	5 19.2 98 19	128.8	1
2	8 33.9 98 19	127.2	8 04.5 98 19	127.3	7 35.1 98 19	127.4	7 05.6 98 19	127.5	6 36.2 98 19	127.6	6 06.7 98 19	127.6	5 37.3 98 19	127.7	5 07.8 98 19	127.8	2
3	8 22.3 98 20	126.2	7 52.9 98 20	126.3	7 23.4 98 20	126.4	6 54.0 98 20	126.5	6 24.6 98 20	126.6	5 55.2 98 20	126.7	5 25.7 98 20	126.8			3
4	8 10.5 98 20	125.2	7 41.1 98 20	125.3	7 11.7 98 20	125.4	6 42.3 98 20	125.5	6 12.9 98 20	125.6	5 43.4 98 20	125.7	5 14.0 98 20	125.8			4
55	7 58.6 98 20	124.2	7 29.2 98 20	124.3	6 59.8 98 20	124.4	6 30.4 98 20	124.5	6 01.0 98 20	124.6	5 31.6 98 20	124.7	5 02.2 98 20	124.8			55
6	7 46.5 98 20	123.2	7 17.1 98 20	123.3	6 47.7 98 20	123.4	6 18.4 98 20	123.5	5 49.0 98 20	123.6	5 19.6 98 20	123.7					6
7	7 34.3 98 21	122.2	7 04.9 98 21	122.3	6 35.5 98 21	122.4	6 06.2 98 21	122.5	5 36.8 98 20	122.6	5 07.4 98 20	122.7					7
8	7 21.9 98 21	121.2	6 52.6 98 21	121.3	6 23.2 98 21	121.4	5 53.9 98 21	121.5	5 24.5 98 21	121.6							8
9	7 09.5 98 21	120.2	6 40.1 98 21	120.3	6 10.8 98 21	120.5	5 41.4 98 21	120.6	5 12.1 98 21	120.7							9
60	6 56.9 98 21	119.3	6 27.5 98 21	119.4	5 58.2 98 21	119.5	5 28.9 98 21	119.6									60
1	6 44.1 98 21	118.3	6 14.8 98 21	118.4	5 45.5 98 21	118.5	5 16.2 98 21	118.6									1
2	6 31.3 98 22	117.3	6 02.0 98 22	117.4	5 32.7 98 22	117.5	5 03.4 98 22	117.6									2
3	6 18.3 98 22	116.3	5 49.0 98 22	116.4	5 19.8 98 22	116.5											3
4	6 05.3 98 22	115.3	5 36.0 98 22	115.4	5 06.7 98 22	115.5											4
65	5 52.1 98 22	114.3	5 22.8 98 22	114.5													65
6	5 38.8 98 22	113.4	5 09.6 98 22	113.5													6
7	5 25.4 97 22	112.4															7
8	5 12.0 97 23	111.4															8

Lat. 76°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
00	18 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	0
1	17 59.9	1.0 01	179.0	18 29.9	1.0 01	178.9	18 59.9	1.0 01	178.9	19 29.9	1.0 01	178.9	19 59.9	1.0 01	178.9	20 29.9	1.0 01	178.9	20 59.9	1.0 01	178.9	21 29.9	1.0 01	178.9	
2	17 59.5	1.0 01	177.9	18 29.5	1.0 01	177.9	18 59.5	1.0 01	177.9	19 29.5	1.0 01	177.9	19 59.5	1.0 01	177.9	20 29.5	1.0 01	177.9	20 59.5	1.0 01	177.9	21 29.5	1.0 01	177.9	
3	17 58.8	1.0 02	176.9	18 28.8	1.0 02	176.8	18 58.8	1.0 02	176.8	19 28.8	1.0 02	176.8	19 58.8	1.0 02	176.8	20 28.8	1.0 02	176.8	20 58.8	1.0 02	176.8	21 28.8	1.0 02	176.8	
4	17 57.9	1.0 02	175.8	18 27.9	1.0 02	175.8	18 57.9	1.0 02	175.8	19 27.9	1.0 02	175.8	19 57.9	1.0 02	175.8	20 27.9	1.0 02	175.8	20 57.8	1.0 02	175.7	21 27.8	1.0 02	175.7	
05	17 56.7	1.0 02	174.8	18 26.7	1.0 02	174.7	18 56.7	1.0 02	174.7	19 26.7	1.0 02	174.7	19 56.7	1.0 02	174.7	20 26.6	1.0 02	174.7	20 56.6	1.0 02	174.7	21 26.6	1.0 02	174.7	0
6	17 55.2	1.0 03	173.7	18 25.2	1.0 03	173.7	18 55.2	1.0 03	173.7	19 25.2	1.0 03	173.7	19 55.2	1.0 03	173.7	20 25.2	1.0 03	173.6	20 55.2	1.0 03	173.6	21 25.1	1.0 03	173.6	
7	17 53.5	1.0 03	172.7	18 23.5	1.0 03	172.6	18 53.5	1.0 03	172.6	19 23.5	1.0 03	172.6	19 53.4	1.0 03	172.6	20 23.4	1.0 03	172.6	20 53.4	1.0 03	172.6	21 23.4	1.0 03	172.5	
8	17 51.5	1.0 04	171.6	18 21.5	1.0 04	171.6	18 51.5	1.0 04	171.6	19 21.5	1.0 04	171.6	19 51.4	1.0 04	171.5	20 21.4	1.0 04	171.5	20 51.4	1.0 04	171.5	21 21.4	1.0 04	171.5	
9	17 49.3	1.0 04	170.6	18 19.2	1.0 04	170.5	18 49.2	1.0 04	170.5	19 19.2	1.0 04	170.5	19 49.2	1.0 04	170.5	20 19.1	1.0 04	170.5	20 49.1	1.0 04	170.4	21 19.1	1.0 04	170.4	
10	17 46.8	1.0 05	169.5	18 16.7	1.0 05	169.5	18 46.7	1.0 05	169.4	19 16.7	1.0 05	169.4	19 46.6	1.0 05	169.4	20 16.6	1.0 05	169.4	20 46.6	1.0 05	169.4	21 16.5	1.0 05	169.4	1
1	17 44.0	1.0 05	168.5	18 13.9	1.0 05	168.4	18 43.9	1.0 05	168.4	19 13.9	1.0 05	168.4	19 43.8	1.0 05	168.4	20 13.8	1.0 05	168.3	20 43.8	1.0 05	168.3	21 13.7	1.0 05	168.3	
2	17 41.0	1.0 05	167.4	18 10.9	1.0 06	167.4	18 40.9	1.0 06	167.4	19 10.8	1.0 06	167.3	19 40.8	1.0 06	167.3	20 10.7	1.0 06	167.3	20 40.7	1.0 06	167.3	21 10.7	1.0 06	167.2	
3	17 37.7	1.0 06	166.4	18 07.6	1.0 06	166.4	18 37.6	1.0 06	166.3	19 07.5	1.0 06	166.3	19 37.5	1.0 06	166.3	20 07.4	1.0 06	166.2	20 37.4	1.0 06	166.2	21 07.3	1.0 06	166.2	
4	17 34.1	1.0 06	165.3	18 04.1	1.0 06	165.3	18 34.0	1.0 06	165.3	19 03.9	1.0 06	165.2	19 33.9	1.0 06	165.2	20 03.8	1.0 06	165.2	20 33.8	1.0 06	165.1	21 03.7	1.0 06	165.1	
15	17 30.3	1.0 07	164.3	18 00.3	1.0 07	164.3	18 30.2	1.0 07	164.2	19 00.1	1.0 07	164.2	19 30.1	1.0 07	164.2	20 00.0	1.0 07	164.1	20 29.9	1.0 07	164.1	20 59.9	1.0 07	164.0	1
6	17 26.3	1.0 07	163.2	17 56.2	1.0 07	163.2	18 26.1	1.0 07	163.2	18 56.0	1.0 07	163.1	19 26.0	1.0 07	163.1	19 55.9	1.0 07	163.1	20 25.8	1.0 07	163.0	20 55.7	1.0 07	163.0	
7	17 22.0	1.0 08	162.2	17 51.9	1.0 08	162.2	18 21.8	1.0 08	162.1	18 51.7	1.0 08	162.1	19 21.6	1.0 08	162.0	19 51.5	1.0 08	162.0	20 21.4	1.0 08	162.0	20 51.4	1.0 08	161.9	
8	17 17.4	1.0 08	161.2	17 47.3	1.0 08	161.1	18 17.2	1.0 08	161.1	18 47.1	1.0 08	161.0	19 17.0	1.0 08	161.0	19 46.9	1.0 08	161.0	20 16.8	1.0 08	160.9	20 46.7	1.0 08	160.9	
9	17 12.6	1.0 08	160.1	17 42.5	1.0 08	160.1	18 12.4	1.0 08	160.0	18 42.3	1.0 08	160.0	19 12.2	1.0 08	159.9	19 42.1	1.0 09	159.9	20 12.0	1.0 09	159.9	20 41.8	1.0 09	159.8	
20	17 07.5	1.0 09	159.1	17 37.4	1.0 09	159.0	18 07.3	1.0 09	159.0	18 37.2	1.0 09	158.9	19 07.1	1.0 09	158.9	19 36.9	1.0 09	158.9	20 06.8	1.0 09	158.8	20 36.7	1.0 09	158.8	2
1	17 02.2	1.0 09	158.0	17 32.1	1.0 09	158.0	18 02.0	1.0 09	157.9	18 31.8	1.0 09	157.9	19 01.7	1.0 09	157.9	19 31.6	1.0 09	157.8	20 01.5	1.0 09	157.8	20 31.3	1.0 09	157.7	
2	16 56.7	1.0 10	157.0	17 26.5	1.0 10	157.0	17 56.4	1.0 10	156.9	18 26.3	1.0 10	156.9	18 56.1	1.0 10	156.8	19 26.0	1.0 10	156.8	19 55.8	1.0 10	156.7	20 25.7	1.0 10	156.7	
3	16 50.9	1.0 10	156.0	17 20.7	1.0 10	155.9	17 50.6	1.0 10	155.9	18 20.4	1.0 10	155.8	18 50.3	1.0 10	155.8	19 20.1	99 10	155.7	19 50.0	99 10	155.7	20 19.8	99 10	155.6	
4	16 44.8	99 10	154.9	17 14.7	99 10	154.9	17 44.5	99 10	154.8	18 14.4	99 11	154.8	18 44.2	99 11	154.7	19 14.0	99 11	154.7	19 43.9	99 11	154.6	20 13.7	99 11	154.5	
25	16 38.6	99 11	153.9	17 08.4	99 11	153.8	17 38.2	99 11	153.8	18 08.1	99 11	153.7	18 37.9	99 11	153.7	19 07.7	99 11	153.6	19 37.5	99 11	153.6	20 07.4	99 11	153.5	2
6	16 32.1	99 11	152.9	17 01.9	99 11	152.8	17 31.7	99 11	152.7	18 01.5	99 11	152.7	18 31.3	99 11	152.6	19 01.1	99 11	152.6	19 30.9	99 11	152.5	20 00.8	99 11	152.4	
7	16 25.3	99 12	151.8	16 55.1	99 12	151.8	17 24.9	99 12	151.7	17 54.7	99 12	151.6	18 24.5	99 12	151.6	18 54.3	99 12	151.5	19 24.1	99 12	151.5	19 53.9	99 12	151.4	
8	16 18.4	99 12	150.8	16 48.2	99 12	150.7	17 17.9	99 12	150.7	17 47.7	99 12	150.6	18 17.5	99 12	150.5	18 47.3	99 12	150.5	19 17.1	99 12	150.4	19 46.9	99 12	150.4	
9	16 11.2	99 12	149.8	16 40.9	99 12	149.7	17 10.7	99 12	149.6	17 40.5	99 12	149.6	18 10.3	99 12	149.5	18 40.0	99 12	149.4	19 09.8	99 13	149.4	19 39.6	99 13	149.3	
30	16 03.7	99 13	148.7	16 33.5	99 13	148.7	17 03.3	99 13	148.6	17 33.0	99 13	148.5	18 02.8	99 13	148.5	18 32.5	99 13	148.4	19 02.3	99 13	148.3	19 32.0	99 13	148.3	3
1	15 56.1	99 13	147.7	16 25.8	99 13	147.6	16 55.6	99 13	147.6	17 25.3	99 13	147.5	17 55.1	99 13	147.4	18 24.8	99 13	147.4	18 54.6	99 13	147.3	19 24.3	99 13	147.2	
2	15 48.2	99 13	146.7	16 18.0	99 14	146.6	16 47.7	99 14	146.5	17 17.4	99 14	146.5	17 47.2	99 14	146.4	18 16.9	99 14	146.3	18 46.6	99 14	146.3	19 16.3	99 14	146.2	
3	15 40.2	99 14	145.6	16 09.9	99 14	145.6	16 39.6	99 14	145.5	17 09.3	99 14	145.4	17 39.0	99 14	145.4	18 08.7	99 14	145.3	18 38.4	99 14	145.2	19 08.1	99 14	145.1	
4	15 31.9	99 14	144.6	16 01.6	99 14	144.5	16 31.3	99 14	144.5	17 01.0	99 14	144.4	17 30.7	99 14	144.3	18 00.3	99 14	144.3	18 30.0	99 14	144.2	18 59.7	99 14	144.1	
35	15 23.3	99 15	143.6	15 53.0	99 15	143.5	16 22.7	99 15	143.4	16 52.4	99 15	143.4	17 22.1	99 15	143.3	17 51.8	99 15	143.2	18 21.4	99 15	143.1	18 51.1	99 15	143.1	3
6	15 14.6	99 15	142.6	15 44.3	99 15	142.5	16 14.0	99 15	142.4	16 43.6	99 15	142.3	17 13.3	99 15	142.3	17 43.0	99 15	142.2	18 12.6	99 15	142.1	18 42.3	99 15	142.0	
7	15 05.7	99 15	141.6	15 35.4	99 15	141.5	16 05.0	99 15	141.4	16 34.7	99 15	141.3	17 04.3	99 15	141.2	17 34.0	99 15	141.2	18 03.6	99 15	141.1	18 33.3	99 15	141.0	
8	14 56.6	99 16	140.5	15 26.2	99 16	140.5	15 55.9	99 16	140.4	16 25.5	99 16	140.3	16 55.1	99 16	140.2	17 24.8	99 16	140.1	17 54.4	99 16	140.0	18 24.0	99 16	140.0	
9	14 47.3	99 16	139.5	15 16.9	99 16	139.4	15 46.5	99 16	139.3	16 16.1	99 16	139.3	16 45.7	99 16	139.2	17 15.4	99 16	139.1	17 45.0	99 16	139.0	18 14.6	99 16	138.9	
40	14 37.7	99 16	138.5	15 07.3	99 16	138.4	15 36.9	99 16	138.3	16 06.6	99 16	138.2	16 36.2	99 16	138.2	17 05.8	99 16	138.1	17 35.4	99 16	138.0	18 05.0	99 16	137.9	4
1	14 28.0	99 17	137.5	14 57.6	99 17	137.4	15 27.2	99 17	137.3	15 56.8	99 17	137.2	16 26.4	99 17	137.1	16 56.0	99 17	137.0	17 25.5	99 17	137.0	17 55.1	99 17	136.9	
2	14 18.1	99 17	136.5	14 47.7	99 17	136.4	15 17.3	99 17	136.3	15 46.8	99 17	136.2	16 16.4	99 17	136.1	16 46.0	99 17	136.0	17 15.5	99 17	135.9	17 45.1	99 17	135.8	
3	14 08.0	99 17	135.4	14 37.6	99 17	135.4	15 07.1	99 17	135.3	15 36.7	99 17	135.2	16 06.3	99 17	135.1	16 35.8	99 17	135.0	17 05.4	98 17	134.9	17 34.9	98 17	134.8	
4	13 57.7	98 17	134.4	14 27.3	98 17	134.3	14 56.8	98 17	134.3	15 26.4	98 18	134.2	15 55.9	98 18	134.1	16 25.4	98 18	134.0	16 55.0	98 18	133.9	17 24.5	98 18	133.8	
45	13 47.3	98 18	133.4	14 16.8	98 18	133.3	14 46.3	98 18	133.2	15 15.9	98 18	133.1	15 45.4	98 18	133.1	16 14.9	98 18	133.0	16 44.4	98 18	132.9	17 14.0	98 18	132.8	4
6	13 36.7	98 18	132.4	14 06.2	98 18	132.3	14 35.7	98 18	132.2	15 05.2	98 18	132.1	15 34.7	98 18	132.0	16 04.2	98 18	131.9	16 33.7	98 18	131.9	17 03.2	98 18	131.8	
7	13 25.9	98 18	131.4	13 55.4	98 18	131.3	14 24.8	98 18	131.2	14 54.3	98 18	131.1	15 23.8	98 18	131.0	15 53.3	98 18	130.9	16 22.8	98 18	130.8	16 52.3	98 18	130.7	
8	13 14.9	98 19	130.4	13 44.4	98 19	130.3	14 13.8	98 19	130.2	14 43.3	98 19	130.1	15 12.8	98 19	130.0	15 42.3	98 19	129.9	16 11.7	98 19	129.8	16 41.2	98 19	129.7	
9	13 03.7	98 19	129.4	13 33.2	98 19	129.3	14 02.7	98 19	129.2	14 32.1	98 19	129.1	15 01.6	98 19	129.0	15 31.1	98 19	128.9	16 00.5	98 19	128.8	16 30.0	98 19	128.7	
50	12 52.4	98 19	128.4	13 21.9	98 19	128.3	13 51.3	98 19	128.2	14 20.8	98 19	128.1	14 50.2	98 19	128.0	15 19.7	98 19	127.9	15 49.1	98 19	127.8	16 18.6	98 19	127.7	5
1	12 41.0	98 19	127.4	13 10.4	98 19	127.3	13 39.9	98 19	127.2	14 09.3	98 19	127.1	14 38.7	98 19	127.0	15 08.2	98 19	126.9	15 37.6	98 20	126.8	16 07.0	98 20	126.7	
2	12 29.4	98 20	126.4	12 58.8	98 20	126.3	13 28.2	98 20	126.2	13 57.6	98 20	126.1	14 27.1	98 20	126.0	14 56.5	98 20	125.9	15 25.9	98 20	125.8	15 55.3	98 20	125.7	
3	12 17.6	98 20	125.4	12 47.0	98 20	125.3	13 16.4	98 20	125.2	13 45.8	98 20	125.1	14 15.2	98 20	125.0	14 44.6	98 20	124.9	15 14.0	98 20	124.8	15 43.4	98 20	124.7	
4	12 05.7	98 20	124.4	12 35.1	98 20	124.3	13 04.5	98 20	124.2	13 33.9	98 20	124.1	14 03.3	98 20	124.0	14 32.6	98 20	123.9	15 02.0	98 20	123.8	15 31.4	98 20	123.6	
55	11 53.7	98 20	123.4	12 23.0	98 20	123.3	12 52.4	98 20	123.2	13 21.8	98 20	123.1	13 51.2	98 20	123.0	14 20.5	98 20	122.9	14 49.9	98 20	122.7	15 19.2	98 20	122.6	5
6	11 41.5	98 21	122.4	12 10.8	98 21	122.3	12 40.2	98 21	122.2	13 09.6	98 21	122.1	13 38.9	98 21	122.0	14 08.3	98 21	121.8	14 37.6	98 21	121.7	15 07.0	98 21	121.6	
7	11 29.1	98 21	121.4	11 58.5	98 21	121.3	12 27.8	98 21	121.2	12 57.2	98 21	121.1	13 26.5	98 21	121.0	13 55.9	98 21	120.8	14 25.2	98 21	120.7	14 54.5	98 21	120.6	
8	11 16.7	98 21	120.4	11 46.0	98 21	120.3	12 15.4	98 21	120.2	12 44.7	98 21	120.1	13 14.0	98 21	120.0	13 43.3	98 21	119.8	14 12.7	98 21	119.7	14 42.0	98 21	119.6	
9	11 04.1	98 21	119.4	11 33.4	98 21	119.3	12 02.7	98 21	119.2	12 32.1	98 21	119.1	13 01.4	98 21	119.0	13 30.7	98 21	118.8	14 00.0	98 21	118.7	14 29.3	98 21	118.6	
60	10 51.4	98 21	118.4	11 20.7	98 21	118.3	11 50.0	98 21	118.2	12 19.3	98 21	118.1	12 48.6	98 21	118.0	13 17.9	98 22	117.9	13 47.2	98 22	117.7	14 16.5	98 22	117.6	6
1	10 38.6	98 22	117.4	11 07.9	98 22	117.3	11 37.2	98 22	117.2	12 06.4	98 22	117.1	12 35.7	98 22	117.0	13 05.0	98 22	116.9	13 34.3	98 22	116.7	14 03.6	98 22	116.6	
2	10 25.6	98 22	116.4	10 54.9	98 22	116.3	11 24.2	98 22	116.2	11 53.5	98 22	116.1	12 22.7	98 22	116.0	12 52.0	98 22	115.9	13 21.3	98 22	115.7	13 50.5	98 22	115.6	
3	10 12.6	98 22	115.4	10 41.8	98 22	115.3	11 11.1	98 22	115.2	11 40.4	98 22	115.1	12 09.6	98 22	115.0	12 38.9	98 22	114.9	13 08.2	98 22	114.8	13 37.4	98 22	114.6	
4	9 59.4	98 22	114.4	10 28.7	98 22	114.3	10 57.9	98 22	114.2	11 27.2	98 22	114.1	11 56.4	97 22	114.0	12 25.7	97 22	113.9	12 54.9	97 22	113.8	13 24.2	97 22	113.6	
65	9 46.1	97 22	113.5	10 15.4	97 22	113.3	10 44.6	97 22	113.2	11 13.9	97 22	113.1	11 43.1	97 22	113.0	12 12.3	97 22	112.9	12 41.6	97 22	112.8	13 10.8	97 22	112.7	6
6	9 32.8	97 22	112.5	10 02.0	97 22	112.4	10 31.2	97 22	112.2	11 00.5	97 22	112.1	11 29.7	97 22	112.0	11 58.9	97 23	111.9	12 28.2	97 23	111.8	12 57.4	97 23	111.7	
7	9 19.3	97 23	111.5	9 48.5	97 23	111.4	10 17.8	97 23	111.2	10 47.0	97 23	111.1	11 16.2	97 23	111.0	11 45.4	97 23	110.9	12 14.6	97 23	110.8	12 43.8	97 23	110.7	
8	9 05.8	97 23	110.5	9 35.0	97 23	110.4	10 04.2	97 23	110.3	10 33.4	97 23	110.1	11 02.6	97 23	110.0	11 31.8	97 23	109.9	12 01.0	97 23	109.8	12 30.2	97 23	109.7	
9	8 52.1	97 23	109.5	9 21.3	97 23	109.4	9 50.5	97 23	109.3	10 19.7	97 23	109.2	10 48.9	97 23	109.0	11 18.1	97 23	108.9	11 47.3	97 23	108.8	12 16.5	97 23	108.7	
70	8 38.4	97 23	108.5	9 07.6	97 23	108.4	9 36.8	97 23	108.3	10 06.0	97 23	108.2	10 35.2	97 23	108.1	11 04.3	97 23	107.9	11 33.5	97 23	107.8	12 02.7	97 23	107.7	7
1	8 24.6	97 23	107.5	8 53.8	97 23	107.4	9 23.0	97 23	107.3	9 52.1	97 23	107.2	10 21.3	97 23	107.1	10 50.5	97 23	107.0	11 19.7	97 23	106.8	11 48.8	97 23	106.7	
2	8 10.7	97 23	106.6	8 39.9	97 23	106.4	9 09.1	97 23	106.3	9 38.2	97 23	106.2	10 07.4	97 23	106.1	10 36.6	97 23	106.0	11 05.7	97 23	105.9	11 34.9	97 23	105.7	
3	7 56.8	97 23	105.6	8 25.9	97 23	105.5	8 55.1	97 23	105.4	9 24.3	97 23	105.2	9 53.4	97 23	105.1	10 22.6	97 23	105.0	10 51.8	97 23	104.9	11 20.9	97 23	104.8	
4	7 42.8	97 23	104.6	8 11.9	97 23	104.5	8 41.1	97 24	104.4	9 10.2	97 24	104.3	9 39.4	97 24	104.1	10 08.5	97 24	104.0	10 37.7	97 24	103.9	11 06.8	97 24	103.8	
75	7 28.7	97 24	103.6	7 57.8	97 24	103.5	8 27.0	97 24	103.4	8 56.1	97 24	103.3	9 25.3	97 24	103.2	9 54.4	97 24	103.0	10 23.6	97 24	102.9	10 52.7	97 24	102.8	7
6	7 14.5	97 24	102.7	7 43.7	97 24	102.5	8 12.8	97 24	102.4	8 42.0	97 24	102.3	9 11.1	97 24	102.2	9 40.3	97 24	102.1	10 09.4	97 24	101.9	10 38.5	97 24	101.8	
7	7 00.4	97 24	101.7	7 29.5	97 24	101.6	7 58.6	97 24	101.4	8 27.8	97 24	101.3	8 56.9	97 24	101.2	9 26.0	97 24	101.1	9 55.2	97 24	101.0	10 24.3	97 24	100.8	
8	6 46.1	97 24	100.7	7 15.3	97 24	100.6	7 44.4	97 24	100.5	8 13.5	97 24	100.3	8 42.6	97 24	100.2	9 11.8	97 24	100.1	9 40.9	97 24	100.0	10 10.0	97 24	99.9	
9	6 31.8	97 24	99.7	7 01.0	97 24	99.6	7 30.1	97 24	99.5	7 59.2	97 24	99.4	8 28.3	97 24	99.2	8 57.5	97 24	99.1	9 26.6	97 24	99.0	9 55.7	97 24	98.9	
80	6 17.5	97 24	98.8	6 46.6	97 24	98.6	7 15.8	97 24	98.5	7 44.9	97 24	98.4	8 14.0	97 24	98.3	8 43.1	97 24	98.1	9 12.2	97 24	98.0	9 41.3	97 24	97.9	8
1	6 03.1	97 24	97.8	6 32.3	97 24	97.7	7 01.4	97 24	97.5	7 30.5	97 24	97.4	7 59.6	97 24	97.3	8 28.7	97 24	97.2	8 57.8	97 24	97.0	9 26.9	97 24	96.9	
2	5 48.7	97 24	96.8	6 17.9	97 24	96.7	6 47.0	97 24	96.6	7 16.1	97 24	96.4	7 45.2	97 24	96.3	8 14.3	97 24	96.2	8 43.4	97 24	96.1	9 12.5	97 24	95.9	
3	5 34.3	97 24	95.8	6 03.4	97 24	95.7	6 32.5	97 24	95.6	7 01.7	97 24	95.5	7 30.8	97 24	95.3	7 59.9	97 24	95.2	8 29.0	97 24	95.1	8 58.1	97 24	95.0	
4	5 19.9	97 24	94.9	5 49.0	97 24	94.7	6 18.1	97 24	94.6	6 47.2	97 24	94.5	7 16.3	97 24	94.4	7 45.4	97 24	94.2	8 14.5	97 24	94.1	8 43.6	97 24	94.0	
85	5 05.4	97 24	93.9	5 34.5	97 24	93.8	6 03.6	97 24	93.6	6 32.7	97 24	93.5	7 01.8	97 24	93.4	7 30.9	97 24	93.3	8 00.0	97 24	93.2	8 29.1	97 24	93.0	8
6				5 20.0	97 24	92.8	5 49.1	97 24	92.7	6 18.2	97 24	92.5	6 47.3	97 24	92.4	7 16.4	97 24	92.3	7 45.5	97 24	92.2	8 14.6	97 24	92.1	
7				5 05.5	97 24	91.8	5 34.6	97 24	91.7	6 03.7	97 24	91.6	6 32.8	97 24	91.5	7 01.9	97 24	91.3	7 31.0	97 24	91.2	8 00.1	97 24	91.1	
8							5 20.1	97 24	90.7	5 49.2	97 24	90.6	6 18.3	97 24	90.5	6 47.4	97 24	90.4	7 16.5	97 24	90.2	7 45.6	97 24	90.1	
9							5 05.6	97 24	89.8	5 34.7	97 24	89.6	6 03.8	97 24	89.5	6 32.9	97 24	89.4	7 02.0	97 24	89.3	7 31.1	97 24	89.1	
90										5 20.2	97 24	88.7	5 49.3	97 24	88.5	6 18.4	97 24	88.4	6 47.5	97 24	88.3	7 16.6	97 24	88.2	9

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
00	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	00
1	9 59.9	1.0 01	179.0	9 29.9	1.0 01	179.0	8 59.9	1.0 01	179.0	8 29.9	1.0 01	179.0	7 59.9	1.0 01	179.0	7 29.9	1.0 01	179.0	6 59.9	1.0 01	179.0	6 29.9	1.0 01	179.0	1
2	9 59.5	1.0 01	178.0	9 29.5	1.0 01	178.0	8 59.5	1.0 01	178.0	8 29.5	1.0 01	178.0	7 59.5	1.0 01	178.0	7 29.5	1.0 01	178.0	6 59.5	1.0 01	178.0	6 29.5	1.0 01	178.0	2
3	9 58.8	1.0 02	177.0	9 28.8	1.0 02	177.0	8 58.8	1.0 02	177.0	8 28.9	1.0 01	177.0	7 58.9	1.0 01	177.0	7 28.9	1.0 01	177.0	6 58.9	1.0 02	177.0	6 28.9	1.0 01	177.0	3
4	9 57.9	1.0 02	175.9	9 28.0	1.0 02	176.0	8 58.0	1.0 02	176.0	8 28.0	1.0 02	176.0	7 58.0	1.0 02	176.0	7 28.0	1.0 02	176.0	6 58.0	1.0 02	176.0	6 28.0	1.0 02	176.0	4
05	9 56.8	1.0 02	174.9	9 26.8	1.0 02	174.9	8 56.8	1.0 02	175.0	8 26.8	1.0 02	175.0	7 56.8	1.0 02	175.0	7 26.8	1.0 02	175.0	6 56.8	1.0 02	175.0	6 26.8	1.0 02	175.0	05
6	9 55.4	1.0 03	173.9	9 25.4	1.0 03	173.9	8 55.4	1.0 03	173.9	8 25.4	1.0 03	174.0	7 55.4	1.0 03	174.0	7 25.4	1.0 03	174.0	6 55.4	1.0 03	174.0	6 25.5	1.0 03	174.0	6
7	9 53.7	1.0 03	172.9	9 23.7	1.0 03	172.9	8 53.7	1.0 03	172.9	8 23.8	1.0 03	173.0	7 53.8	1.0 03	173.0	7 23.8	1.0 03	173.0	6 53.8	1.0 03	173.0	6 23.8	1.0 03	173.0	7
8	9 51.8	1.0 04	171.9	9 21.8	1.0 04	171.9	8 51.8	1.0 04	171.9	8 21.9	1.0 04	172.0	7 51.9	1.0 04	172.0	7 21.9	1.0 04	172.0	6 51.9	1.0 04	172.0	6 21.9	1.0 04	172.0	8
9	9 49.6	1.0 04	170.9	9 19.7	1.0 04	170.9	8 49.7	1.0 04	170.9	8 19.7	1.0 04	170.9	7 49.7	1.0 04	171.0	7 19.7	1.0 04	171.0	6 49.8	1.0 04	171.0	6 19.8	1.0 04	171.0	9
10	9 47.2	1.0 04	169.9	9 17.2	1.0 04	169.9	8 47.3	1.0 04	169.9	8 17.3	1.0 04	169.9	7 47.3	1.0 04	170.0	7 17.3	1.0 04	170.0	6 47.4	1.0 04	170.0	6 17.4	1.0 04	170.0	10
1	9 44.5	1.0 05	168.9	9 14.6	1.0 05	168.9	8 44.6	1.0 05	168.9	8 14.6	1.0 05	168.9	7 44.7	1.0 05	169.0	7 14.7	1.0 05	169.0	6 44.7	1.0 05	169.0	6 14.8	1.0 05	169.0	1
2	9 41.6	1.0 05	167.9	9 11.6	1.0 05	167.9	8 41.7	1.0 05	167.9	8 11.7	1.0 05	167.9	7 41.8	1.0 05	168.0	7 11.8	1.0 05	168.0	6 41.8	1.0 05	168.0	6 11.9	1.0 05	168.0	2
3	9 38.4	1.0 06	166.8	9 08.5	1.0 06	166.9	8 38.5	1.0 06	166.9	8 08.6	1.0 06	166.9	7 38.6	1.0 06	167.0	7 08.6	1.0 06	167.0	6 38.7	1.0 06	167.0	6 08.7	1.0 06	167.0	3
4	9 35.0	1.0 06	165.8	9 05.0	1.0 06	165.9	8 35.1	1.0 06	165.9	8 05.1	1.0 06	165.9	7 35.2	1.0 06	166.0	7 05.3	1.0 06	166.0	6 35.3	1.0 06	166.0	6 05.4	1.0 06	166.0	4
15	9 31.3	1.0 07	164.8	9 01.4	1.0 07	164.9	8 31.4	1.0 06	164.9	8 01.5	1.0 06	164.9	7 31.6	1.0 06	165.0	7 01.6	1.0 06	165.0	6 31.7	1.0 06	165.0	6 01.7	1.0 06	165.0	15
6	9 27.4	1.0 07	163.8	8 57.5	1.0 07	163.8	8 27.5	1.0 07	163.9	7 57.6	1.0 07	163.9	7 27.7	1.0 07	164.0	6 57.7	1.0 07	164.0	6 27.8	1.0 07	164.0	5 57.9	1.0 07	164.1	6
7	9 23.2	1.0 07	162.8	8 53.3	1.0 07	162.8	8 23.4	1.0 07	162.9	7 53.5	1.0 07	162.9	7 23.5	1.0 07	163.0	6 53.6	1.0 07	163.0	6 23.7	1.0 07	163.0	5 53.8	1.0 07	163.1	7
8	9 18.8	1.0 08	161.8	8 48.9	1.0 08	161.8	8 19.0	1.0 08	161.9	7 49.1	1.0 08	161.9	7 19.2	1.0 08	161.9	6 49.2	1.0 08	162.0	6 19.3	1.0 08	162.0	5 49.4	1.0 08	162.1	8
9	9 14.2	1.0 08	160.8	8 44.3	1.0 08	160.8	8 14.3	1.0 08	160.9	7 44.4	1.0 08	160.9	7 14.5	1.0 08	161.0	6 44.6	1.0 08	161.0	6 14.7	1.0 08	161.0	5 44.8	1.0 08	161.1	9
20	9 09.3	1.0 09	159.8	8 39.4	1.0 09	159.8	8 09.5	1.0 09	159.9	7 39.6	1.0 08	159.9	7 09.7	1.0 08	160.0	6 39.8	1.0 08	160.0	6 09.9	1.0 08	160.0	5 40.0	1.0 08	160.1	20
1	9 04.1	1.0 09	158.8	8 34.2	1.0 09	158.8	8 04.4	1.0 09	158.9	7 34.5	1.0 09	158.9	7 04.6	1.0 09	159.0	6 34.7	1.0 09	159.0	6 04.8	1.0 09	159.0	5 34.9	1.0 09	159.1	1
2	8 58.8	1.0 09	157.8	8 28.9	1.0 09	157.8	7 59.0	1.0 09	157.9	7 29.1	1.0 09	157.9	6 59.3	1.0 09	158.0	6 29.4	1.0 09	158.0	5 59.5	1.0 09	158.0	5 29.6	1.0 09	158.1	2
3	8 53.1	1.0 10	156.8	8 23.3	1.0 10	156.8	7 53.4	1.0 10	156.9	7 23.6	1.0 10	156.9	6 53.7	1.0 10	157.0	6 23.8	1.0 10	157.0	5 54.0	1.0 10	157.1	5 24.1	1.0 10	157.1	3
4	8 47.3	1.0 10	155.8	8 17.4	1.0 10	155.8	7 47.6	1.0 10	155.9	7 17.7	1.0 10	155.9	6 47.9	1.0 10	156.0	6 18.0	1.0 10	156.0	5 48.2	1.0 10	156.1	5 18.3	1.0 10	156.1	4
25	8 41.2	99 10	154.8	8 11.4	99 10	154.8	7 41.5	99 10	154.9	7 11.7	99 10	154.9	6 41.9	99 10	155.0	6 12.0	99 10	155.0	5 42.2	99 10	155.1	5 12.3	99 10	155.1	25
6	8 34.9	99 11	153.8	8 05.1	99 11	153.8	7 35.3	99 11	153.9	7 05.4	99 11	153.9	6 35.6	99 11	154.0	6 05.8	99 11	154.0	5 35.9	99 11	154.1	5 06.1	99 11	154.1	6
7	8 28.4	99 11	152.7	7 58.6	99 11	152.8	7 28.8	99 11	152.9	6 58.9	99 11	152.9	6 29.1	99 11	153.0	5 59.3	99 11	153.0	5 29.5	99 11	153.1				7
8	8 21.6	99 12	151.7	7 51.8	99 12	151.8	7 22.0	99 12	151.9	6 52.2	99 12	151.9	6 22.4	99 12	152.0	5 52.6	99 12	152.0	5 22.8	99 12	152.1				8
9	8 14.6	99 12	150.7	7 44.9	99 12	150.8	7 15.1	99 12	150.9	6 45.3	99 12	150.9	6 15.5	99 12	151.0	5 45.7	99 12	151.0	5 15.9	99 12	151.1				9
30	8 07.4	99 12	149.7	7 37.7	99 12	149.8	7 07.9	99 12	149.9	6 38.1	99 12	149.9	6 08.3	99 12	150.0	5 38.6	99 12	150.1	5 08.8	99 12	150.1				30
1	8 00.0	99 13	148.7	7 30.3	99 13	148.8	7 00.5	99 13	148.9	6 30.7	99 13	148.9	6 01.0	99 13	149.0	5 31.2	99 13	149.1	5 01.4	99 13	149.1				1
2	7 52.4	99 13	147.7	7 22.6	99 13	147.8	6 52.9	99 13	147.9	6 23.1	99 13	147.9	5 53.4	99 13	148.0	5 23.6	99 13	148.1							2
3	7 44.5	99 13	146.7	7 14.8	99 13	146.8	6 45.1	99 13	146.9	6 15.3	99 13	146.9	5 45.6	99 13	147.0	5 15.9	99 13	147.1							3
4	7 36.5	99 14	145.8	7 06.7	99 14	145.8	6 37.0	99 14	145.9	6 07.3	99 14	146.0	5 37.6	99 14	146.0	5 07.9	99 14	146.1							4
35	7 28.2	99 14	144.8	6 58.5	99 14	144.8	6 28.8	99 14	144.9	5 59.1	99 14	145.0	5 29.4	99 14	145.0										35
6	7 19.7	99 14	143.8	6 50.0	99 14	143.8	6 20.3	99 14	143.9	5 50.6	99 14	144.0	5 20.9	99 14	144.0										6
7	7 11.0	99 15	142.8	6 41.4	99 15	142.8	6 11.7	99 15	142.9	5 42.0	99 15	143.0	5 12.3	99 15	143.1										7
8	7 02.1	99 15	141.8	6 32.5	99 15	141.8	6 02.8	99 15	141.9	5 33.2	99 15	142.0	5 03.5	99 15	142.1										8
9	6 53.1	99 15	140.8	6 23.4	99 15	140.9	5 53.8	99 15	140.9	5 24.1	99 15	141.0													9
40	6 43.8	99 16	139.8	6 14.2	99 16	139.9	5 44.5	99 16	139.9	5 14.9	99 16	140.0													40
1	6 34.3	99 16	138.8	6 04.7	99 16	138.9	5 35.1	99 16	139.0	5 05.5	99 16	139.0													1
2	6 24.7	99 16	137.8	5 55.1	99 16	137.9	5 25.5	99 16	138.0																2
3	6 14.8	99 17	136.8	5 45.2	99 17	136.9	5 15.7	99 17	137.0																3
4	6 04.8	99 17	135.8	5 35.2	99 17	135.9	5 05.7	99 17	136.0																4
45	5 54.6	99 17	134.8	5 25.0	99 17	134.9																			45
6	5 44.2	98 18	133.8	5 14.7	98 18	133.9																			6
7	5 33.7	98 18	132.9	5 04.1	98 18	132.9																			7
8	5 22.9	98 18	131.9																						8
9	5 12.0	98 18	130.9																						9
50	5 01.0	98 19	129.9																						50

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
91										5 05.7	97 24	87.7	5 34.8	97 24	87.6	6 03.9	97 24	87.5	6 33.0	97 24	87.3	7 02.1	97 24	87.2	91
2													5 20.3	97 24	86.6	5 49.4	97 24	86.5	6 18.5	97 24	86.4	6 47.6	97 24	86.2	2
3													5 05.8	97 24	85.6	5 34.9	97 24	85.5	6 04.0	97 24	85.4	6 33.1	97 24	85.3	3
4																5 20.4	97 24	84.5	5 49.5	97 24	84.4	6 18.6	97 24	84.3	4
95																5 06.0	97 24	83.6	5 35.1	97 24	83.5	6 04.2	97 24	83.3	95
6																			5 20.7	97 24	82.5	5 49.8	97 24	82.4	6
7																			5 06.3	97 24	81.5	5 35.4	97 24	81.4	7
8																						5 21.1	97 24	80.4	8
9																						5 06.8	97 24	79.5	9

Lat. 76°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		
00	22 00.0	1.00 180.0		22 30.0	1.00 180.0		23 00.0	1.00 180.0		23 30.0	1.00 180.0		24 00.0	1.00 180.0		24 30.0	1.00 180.0		25 00.0	1.00 180.0		25 30.0	1.00 180.0		00
1	21 59.9	1.00 178.9		22 29.9	1.00 178.9		22 59.9	1.00 178.9		23 29.9	1.00 178.9		23 59.9	1.00 178.9		24 29.9	1.00 178.9		24 59.9	1.00 178.9		25 29.9	1.00 178.9		1
2	21 59.5	1.00 177.9		22 29.5	1.00 177.9		22 59.5	1.00 177.9		23 29.5	1.00 177.8		23 59.5	1.00 177.8		24 29.5	1.00 177.8		24 59.5	1.00 177.8		25 29.4	1.00 177.8		2
3	21 58.8	1.00 176.8		22 28.8	1.00 176.8		22 58.8	1.00 176.8		23 28.8	1.00 176.8		23 58.8	1.00 176.8		24 28.8	1.00 176.8		24 58.8	1.00 176.8		25 28.8	1.00 176.7		3
4	21 57.8	1.00 175.7		22 27.8	1.00 175.7		22 57.8	1.00 175.7		23 27.8	1.00 175.7		23 57.8	1.00 175.7		24 27.8	1.00 175.7		24 57.8	1.00 175.7		25 27.8	1.00 175.7		4
05	21 56.6	1.00 174.7		22 26.6	1.00 174.6		22 56.6	1.00 174.6		23 26.6	1.00 174.6		23 56.6	1.00 174.6		24 26.6	1.00 174.6		24 56.6	1.00 174.6		25 26.6	1.00 174.6		05
6	21 55.1	1.00 173.6		22 25.1	1.00 173.6		22 55.1	1.00 173.6		23 25.1	1.00 173.5		23 55.1	1.00 173.5		24 25.1	1.00 173.5		24 55.1	1.00 173.5		25 25.1	1.00 173.5		6
7	21 53.4	1.00 172.5		22 23.4	1.00 172.5		22 53.4	1.00 172.5		23 23.3	1.00 172.5		23 53.3	1.00 172.5		24 23.3	1.00 172.4		24 53.3	1.00 172.4		25 23.3	1.00 172.4		7
8	21 51.4	1.00 171.5		22 21.3	1.00 171.4		22 51.3	1.00 171.4		23 21.3	1.00 171.4		23 51.3	1.00 171.4		24 21.3	1.00 171.4		24 51.2	1.00 171.3		25 21.2	1.00 171.3		8
9	21 49.1	1.00 170.4		22 19.0	1.00 170.4		22 49.0	1.00 170.4		23 19.0	1.00 170.3		23 49.0	1.00 170.3		24 18.9	1.00 170.3		24 48.9	1.00 170.3		25 18.9	1.00 170.2		9
10	21 46.5	1.00 169.3		22 16.5	1.00 169.3		22 46.5	1.00 169.3		23 16.4	1.00 169.3		23 46.4	1.00 169.2		24 16.4	1.00 169.2		24 46.3	1.00 169.2		25 16.3	1.00 169.2		10
1	21 43.7	1.00 168.3		22 13.7	1.00 168.2		22 43.6	1.00 168.2		23 13.6	1.00 168.2		23 43.5	1.00 168.2		24 13.5	1.00 168.1		24 43.5	1.00 168.1		25 13.4	1.00 168.1		1
2	21 40.6	1.00 167.2		22 10.6	1.00 167.2		22 40.5	1.00 167.1		23 10.5	1.00 167.1		23 40.4	1.00 167.1		24 10.4	1.00 167.1		24 40.3	1.00 167.0		25 10.3	1.00 167.0		2
3	21 37.3	1.00 166.1		22 07.2	1.00 166.1		22 37.2	1.00 166.1		23 07.1	1.00 166.0		23 37.1	1.00 166.0		24 07.0	1.00 166.0		24 36.9	1.00 165.9		25 06.9	1.00 165.9		3
4	21 33.7	1.00 165.1		22 03.6	1.00 165.0		22 33.5	1.00 165.0		23 03.5	1.00 165.0		23 33.4	1.00 164.9		24 03.4	1.00 164.9		24 33.3	1.00 164.9		25 03.2	1.00 164.8		4
15	21 29.8	1.00 164.0		21 59.7	1.00 164.0		22 29.6	1.00 163.9		22 59.6	1.00 163.9		23 29.5	1.00 163.9		23 59.4	1.00 163.8		24 29.4	1.00 163.8		24 59.3	1.00 163.8		15
6	21 25.7	1.00 162.9		21 55.6	1.00 162.9		22 25.5	1.00 162.9		22 55.4	1.00 162.8		23 25.3	1.00 162.8		23 55.3	1.00 162.8		24 25.2	1.00 162.7		24 55.1	1.00 162.7		6
7	21 21.3	1.00 161.9		21 51.2	1.00 161.8		22 21.1	1.00 161.8		22 51.0	1.00 161.8		23 20.9	1.00 161.7		23 50.8	1.00 161.7		24 20.7	1.00 161.6		24 50.7	1.00 161.6		7
8	21 16.6	1.00 160.8		21 46.5	1.00 160.8		22 16.4	1.00 160.7		22 46.3	1.00 160.7		23 16.2	1.00 160.7		23 46.1	1.00 160.6		24 16.0	1.00 160.6		24 45.9	1.00 160.5		8
9	21 11.7	1.00 159.8		21 41.6	1.00 159.7		22 11.5	1.00 159.7		22 41.4	1.00 159.6		23 11.3	1.00 159.6		23 41.2	1.00 159.5		24 11.1	1.00 159.5		24 41.0	1.00 159.4		9
20	21 06.6	1.00 99 158.7		21 36.5	1.00 99 158.7		22 06.4	1.00 99 158.6		22 36.2	1.00 99 158.6		23 06.1	1.00 99 158.5		23 36.0	1.00 99 158.5		24 05.9	1.00 99 158.4		24 35.7	1.00 99 158.4		20
1	21 01.2	1.00 99 157.7		21 31.1	1.00 99 157.6		22 00.9	1.00 99 157.6		22 30.8	1.00 99 157.5		23 00.7	1.01 0 157.5		23 30.5	1.01 0 157.4		24 00.4	1.01 0 157.4		24 30.3	1.01 0 157.3		1
2	20 55.6	1.01 0 156.6		21 25.4	1.01 0 156.5		21 55.3	1.01 0 156.5		22 25.1	1.01 0 156.4		22 55.0	1.01 0 156.4		23 24.8	1.01 0 156.3		23 54.7	1.01 0 156.3		24 24.5	1.01 0 156.2		2
3	20 49.7	99 10 155.5		21 19.5	99 10 155.5		21 49.4	99 10 155.4		22 19.2	99 10 155.4		22 49.1	99 10 155.3		23 18.9	99 10 155.3		23 48.7	99 10 155.2		24 18.6	99 10 155.2		3
4	20 43.5	99 11 154.5		21 13.4	99 11 154.4		21 43.2	99 11 154.4		22 13.0	99 11 154.3		22 42.9	99 11 154.3		23 12.7	99 11 154.2		23 42.5	99 11 154.1		24 12.4	99 11 154.1		4
25	20 37.2	99 11 153.4		21 07.0	99 11 153.4		21 36.8	99 11 153.3		22 06.6	99 11 153.3		22 36.4	99 11 153.2		23 06.3	99 11 153.1		23 36.1	99 11 153.1		24 05.9	99 11 153.0		25
6	20 30.6	99 11 152.4		21 00.4	99 11 152.3		21 30.2	99 11 152.3		22 00.0	99 11 152.2		22 29.8	99 12 152.1		22 59.6	99 12 152.1		23 29.4	99 12 152.0		23 59.2	99 12 152.0		6
7	20 23.7	99 12 151.3		20 53.5	99 12 151.3		21 23.3	99 12 151.2		21 53.1	99 12 151.1		22 22.9	99 12 151.1		22 52.7	99 12 151.0		23 22.5	99 12 151.0		23 52.2	99 12 150.9		7
8	20 16.6	99 12 150.3		20 46.4	99 12 150.2		21 16.2	99 12 150.2		21 46.0	99 12 150.1		22 15.7	99 12 150.0		22 45.5	99 12 150.0		23 15.3	99 12 149.9		23 45.1	99 12 149.8		8
9	20 09.3	99 13 149.2		20 39.1	99 13 149.2		21 08.9	99 13 149.1		21 38.6	99 13 149.0		22 08.4	99 13 149.0		22 38.1	99 13 148.9		23 07.9	99 13 148 8		23 37.6	99 13 148.8		9
30	20 01.8	99 13 148.2		20 31.5	99 13 148.1		21 01.3	99 13 148.1		21 31.0	99 13 148.0		22 00.8	99 13 147.9		22 30.5	99 13 147.8		23 00.3	99 13 147.8		23 30.0	99 13 147.7		30
1	19 54.0	99 13 147.2		20 23.8	99 13 147.1		20 53.5	99 13 147.0		21 23.2	99 13 146.9		21 53.0	99 13 146.9		22 22.7	99 13 146.8		22 52.4	99 13 146.7		23 22.1	99 13 146.6		1
2	19 46.0	99 14 146.1		20 15.8	99 14 146.0		20 45.5	99 14 146.0		21 15.2	99 14 145.9		21 44.9	99 14 145.8		22 14.6	99 14 145.7		22 44.3	99 14 145.7		23 14.0	99 14 145.6		2
3	19 37.8	99 14 145.1		20 07.6	99 14 145.0		20 37.3	99 14 144.9		21 07.0	99 14 144.8		21 36.7	99 14 144.8		22 06.3	99 14 144.7		22 36.0	99 14 144.6		23 05.7	99 14 144.5		3
4	19 29.4	99 14 144.0		19 59.1	99 14 144.0		20 28.8	99 14 143.9		20 58.5	99 14 143.8		21 28.2	99 14 143.7		21 57.8	99 15 143.6		22 27.5	99 15 143.6		22 57.2	99 15 143.5		4
35	19 20.8	99 15 143.0		19 50.5	99 15 142.9		20 20.1	99 15 142.8		20 49.8	99 15 142.8		21 19.5	99 15 142.7		21 49.1	99 15 142.6		22 18.8	99 15 142.5		22 48.5	99 15 142.4		35
6	19 12.0	99 15 142.0		19 41.6	99 15 141.9		20 11.3	99 15 141.8		20 40.9	99 15 141.7		21 10.6	99 15 141.6		21 40.2	99 15 141.5		22 09.9	99 15 141.5		22 39.5	99 15 141.4		6
7	19 02.9	99 15 140.9		19 32.5	99 15 140.8		20 02.2	99 15 140.8		20 31.8	99 16 140.7		21 01.5	99 16 140.6		21 31.1	99 16 140.5		22 00.7	99 16 140.4		22 30.3	99 16 140.3		7
8	18 53.6	99 16 139.9		19 23.3	99 16 139.8		19 52.9	99 16 139.7		20 22.5	99 16 139.6		20 52.1	99 16 139.5		21 21.7	99 16 139.5		21 51.4	99 16 139.4		22 21.0	99 16 139.3		8
9	18 44.2	99 16 138.8		19 13.8	99 16 138.8		19 43.4	99 16 138.7		20 13.0	99 16 138.6		20 42.6	99 16 138.5		21 12.2	99 16 138.4		21 41.8	99 16 138.3		22 11.4	99 16 138.2		9
40	18 34.5	99 16 137.8		19 04.1	99 16 137.7		19 33.7	99 16 137.6		20 03.3	99 16 137.6		20 32.9	99 16 137.5		21 02.5	99 17 137.4		21 32.1	99 17 137.3		22 01.6	99 17 137.2		40
1	18 24.7	99 17 136.8		18 54.3	99 17 136.7		19 23.9	99 17 136.6		19 53.4	99 17 136.5		20 23.0	99 17 136.4		20 52.6	99 17 136.3		21 22.1	99 17 136.2		21 51.7	99 17 136.2		1
2	18 14.7	99 17 135.8		18 44.2	99 17 135.7		19 13.8	99 17 135.6		19 43.3	99 17 135.5		20 12.9	99 17 135.4		20 42.4	98 17 135.3		21 12.0	98 17 135.2		21 41.5	98 17 135.1		2
3	18 04.4	98 17 134.7		18 34.0	98 17 134.6		19 03.5	98 17 134.5		19 33.1	98 17 134.5		20 02.6	98 17 134.4		20 32.1	98 17 134.3		21 01.7	98 18 134.2		21 31.2	98 18 134.1		3
4	17 54.0	98 18 133.7		18 23.6	98 18 133.6		18 53.1	98 18 133.5		19 22.6	98 18 133.4		19 52.1	98 18 133.3		20 21.7	98 18 133.2		20 51.2	98 18 133.1		21 20.7	98 18 133.0		4
45	17 43.5	98 18 132.7		18 13.0	98 18 132.6		18 42.5	98 18 132.5		19 12.0	98 18 132.4		19 41.5	98 18 132.3		20 11.0	98 18 132.2		20 40.5	98 18 132.1		21 10.0	98 18 132.0		45
6	17 32.7	98 18 131.7		18 02.2	98 18 131.6		18 31.7	98 18 131.5		19 01.2	98 18 131.4		19 30.7	98 18 131.3		20 00.2	98 18 131.2		20 29.6	98 18 131.1		20 59.1	98 18 131.0		6
7	17 21.8	98 18 130.6		17 51.3	98 19 130.5		18 20.7	98 19 130.4		18 50.2	98 19 130.3		19 19.7	98 19 130.2		19 49.1	98 19 130.1		20 18.6	98 19 130.0		20 48.1	98 19 129.9		7
8	17 10.7	98 19 129.6		17 40.1	98 19 129.5		18 09.6	98 19 129.4		18 39.1	98 19 129.3		19 08.5	98 19 129.2		19 38.0	98 19 129.1		20 07.4	98 19 129.0		20 36.9	98 19 128.9		8
9	16 59.4	98 19 128.6		17 28.9	98 19 128.5		17 58.3	98 19 128.4		18 27.7	98 19 128.3		18 57.2	98 19 128.2		19 26.6	98 19 128.1		19 56.1	98 19 128.0		20 25.5	98 19 127.9		9
50	16 48.0	98 19 127.6		17 17.4	98 19 127.5		17 46.9	98 19 127.4		18 16.3	98 19 127.3		18 45.7	98 19 127.2		19 15.1	98 19 127.1		19 44.5	98 19 127.0		20 13.9	98 20 126.9		50
1	16 36.4	98 20 126.6		17 05.8	98 20 126.5		17 35.2	98 20 126.4		18 04.7	98 20 126.3		18 34.1	98 20 126.2		19 03.5	98 20 126.1		19 32.9	98 20 126.0		20 02.3	98 20 125.8		1
2	16 24.7	98 20 125.6		16 54.1	98 20 125.5		17 23.5	98 20 125.4		17 52.9	98 20 125.2		18 22.3	98 20 125.1		18 51.6	98 20 125.0		19 21.0	98 20 124.9		19 50.4	98 20 124.8		2
3	16 12.8	98 20 124.6		16 42.2	98 20 124.4		17 11.6	98 20 124.3		17 40.9	98 20 124.2		18 10.3	98 20 124.1		18 39.7	98 20 124.0		19 09.1	98 20 123.9		19 38.4	98 20 123.8		3
4	16 00.8	98 20 123.5		16 30.1	98 20 123.4		16 59.5	98 20 123.3		17 28.9	98 20 123.2		17 58.2	98 20 123.1		18 27.6	98 20 123.0		18 56.9	98 20 122.9		19 26.3	98 20 122.8		4
55	15 48.6	98 20 122.5		16 18.0	98 21 122.4		16 47.3	98 21 122.3		17 16.7	98 21 122.2		17 46.0	98 21 122.1		18 15.3	98 21 122.0		18 44.7	98 21 121.9		19 14.0	98 21 121.8		55
6	15 36.3	98 21 121.5		16 05.6	98 21 121.4		16 35.0	98 21 121.3		17 04.3	98 21 121.2		17 33.6	98 21 121.1		18 03.0	98 21 121.0		18 32.3	98 21 120.9		19 01.6	98 21 120.8		6
7	15 23.9	98 21 120.5		15 53.2	98 21 120.4		16 22.5	98 21 120.3		16 51.8	98 21 120.2		17 21.1	98 21 120.1		17 50.5	98 21 120.0		18 19.8	98 21 119.9		18 49.1	98 21 119.7		7
8	15 11.3	98 21 119.5		15 40.6	98 21 119.4		16 09.9	98 21 119.3		16 39.2	98 21 119.2		17 08.5	98 21 119.1		17 37.8	98 21 119.0		18 07.1	98 21 118.8		18 36.4	98 21 118.7		8
9	14 58.6	98 21 118.5		15 27.9	98 21 118.4		15 57.2	98 21 118.3		16 26.5	98 21 118.2		16 55.8	98 21 118.1		17 25.1	98 21 118.0		17 54.3	98 21 117.8		18 23.6	98 22 117.7		9
60	14 45.8	98 22 117.5		15 15.1	98 22 117.4		15 44.4	98 22 117.3		16 13.6	98 22 117.2		16 42.9	98 22 117.1		17 12.2	98 22 117.0		17 41.4	98 22 116.8		18 10.7	98 22 116.7		60
1	14 32.9	98 22 116.5		15 02.1	98 22 116.4		15 31.4	98 22 116.3		16 00.7	98 22 116.2		16 29.9	98 22 116.1		16 59.2	98 22 115.9		17 28.4	98 22 115.8		17 57.7	97 22 115.7		1
2	14 19.8	98 22 115.5		14 49.1	98 22 115.4		15 18.3	98 22 115.3		15 47.6	98 22 115.2		16 16.8	97 22 115.1		16 46.1	97 22 114.9		17 15.3	97 22 114.8		17 44.6	97 22 114.7		2
3	14 06.7	97 22 114.5		14 35.9	97 22 114.4		15 05.2	97 22 114.3		15 34.4	97 22 114.2		16 03.6	97 22 114.1		16 32.9	97 22 113.9		17 02.1	97 22 113.8		17 31.3	97 22 113.7		3
4	13 53.4	97 22 113.5		14 22.6	97 22 113.4		14 51.9	97 22 113.3		15 21.1	97 22 113.2		15 50.3	97 22 113.1		16 19.5	97 22 112.9		16 48.8	97 22 112.8		17 18.0	97 22 112.7		4
65	13 40.0	97 22 112.5		14 09.3	97 22 112.4		14 38.5	97 22 112.3		15 07.7	97 22 112.2		15 36.9	97 22 112.1		16 06.1	97 23 111.9		16 35.3	97 23 111.8		17 04.5	97 23 111.7		65
6	13 26.6	97 23 111.5		13 55.8	97 23 111.4		14 25.0	97 23 111.3		14 54.2	97 23 111.2		15 23.4	97 23 111.1		15 52.6	97 23 111.0		16 21.8	97 23 110.8		16 51.0	97 23 110.7		6
7	13 13.0	97 23 110.6		13 42.2	97 23 110.4		14 11.4	97 23 110.3		14 40.6	97 23 110.2		15 09.8	97 23 110.1		15 39.0	97 23 110.0		16 08.2	97 23 109.8		16 37.4	97 23 109.7		7
8	12 59.4	97 23 109.6		13 28.6	97 23 109.4		13 57.8	97 23 109.3		14 27.0	97 23 109.2		14 56.2	97 23 109.1		15 25.3	97 23 109.0		15 54.5	97 23 108.8		16 23.7	97 23 108.7		8
9	12 45.7	97 23 108.6		13 14.9	97 23 108.5		13 44.0	97 23 108.3		14 13.2	97 23 108.2		14 42.4	97 23 108.1		15 11.6	97 23 108.0		15 40.7	97 23 107.9		16 09.9	97 23 107.7		9
70	12 31.9	97 23 107.6		13 01.1	97 23 107.5		13 30.2	97 23 107.3		13 59.4	97 23 107.2		14 28.6	97 23 107.1		14 57.7	97 23 107.0		15 26.9	97 23 106.9		15 56.0	97 23 106.7		70
1	12 18.0	97 23 106.6		12 47.2	97 23 106.5		13 16.3	97 23 106.4		13 45.5	97 23 106.2		14 14.7	97 23 106.1		14 43.8	97 23 106.0		15 13.0	97 23 105.9		15 42.1	97 23 105.8		1
2	12 04.1	97 23 105.6		12 33.2	97 23 105.5		13 02.4	97 23 105.4		13 31.5	97 23 105.3		14 00.7	97 23 105.1		14 29.8	97 23 105.0		14 59.0	97 23 104.9		15 28.1	97 23 104.8		2
3	11 50.1	97 23 104.6		12 19.2	97 23 104.5		12 48.4	97 23 104.4		13 17.5	97 24 104.3		13 46.6	97 24 104.1		14 15.8	97 24 104.0		14 44.9	97 24 103.9		15 14.0	97 24 103.8		3
4	11 36.0	97 24 103.7		12 05.1	97 24 103.5		12 34.3	97 24 103.4		13 03.4	97 24 103.3		13 32.5	97 24 103.2		14 01.7	97 24 103.0		14 30.8	97 24 102.9		14 59.9	97 24 102.8		4
75	11 21.8	97 24 102.7		11 51.0	97 24 102.5		12 20.1	97 24 102.4		12 49.2	97 24 102.3		13 18.4	97 24 102.2		13 47.5	97 24 102.1		14 16.6	97 24 101.9		14 45.7	97 24 101.8		75
6	11 07.7	97 24 101.7		11 36.8	97 24 101.6		12 05.9	97 24 101.4		12 35.0	97 24 101.3		13 04.1	97 24 101.2		13 33.3	97 24 101.1		14 02.4	97 24 101.0		14 31.5	97 24 100.8		6
7	10 53.4	97 24 100.7		11 22.5	97 24 100.6		11 51.7	97 24 100.5		12 20.8	97 24 100.3		12 49.9	97 24 100.2		13 19.0	97 24 100.1		13 48.1	97 24 100.0		14 17.2	97 24 99.8		7
8	10 39.1	97 24 99.7		11 08.3	97 24 99.6		11 37.4	97 24 99.5		12 06.5	97 24 99.4		12 35.6	97 24 99.2		13 04.7	97 24 99.1		13 33.8	97 24 99.0		14 02.9	97 24 98.9		8
9	10 24.8	97 24 98.8		10 53.9	97 24 98.6		11 23.0	97 24 98.5		11 52.1	97 24 98.4		12 21.2	97 24 98.3		12 50.3	97 24 98.1		13 19.4	97 24 98.0		13 48.5	97 24 97.9		9
80	10 10.4	97 24 97.8		10 39.6	97 24 97.7		11 08.7	97 24 97.5		11 37.8	97 24 97.4		12 06.9	97 24 97.3		12 35.9	97 24 97.2		13 05.0	97 24 97.0		13 34.1	97 24 96.9		80
1	9 56.0	97 24 96.8		10 25.2	97 24 96.7		10 54.2	97 24 96.6		11 23.3	97 24 96.4		11 52.4	97 24 96.3		12 21.5	97 24 96.2		12 50.6	97 24 96.1		13 19.7	97 24 95.9		1
2	9 41.6	97 24 95.8		10 10.7	97 24 95.7		10 39.8	97 24 95.6		11 08.9	97 24 95.5		11 38.0	97 24 95.3		12 07.1	97 24 95.2		12 36.2	97 24 95.1		13 05.3	97 24 95.0		2
3	9 27.2	97 24 94.9		9 56.3	97 24 94.7		10 25.4	97 24 94.6		10 54.4	97 24 94.5		11 23.5	97 24 94.4		11 52.6	97 24 94.2		12 21.7	97 24 94.1		12 50.8	97 24 94.0		3
4	9 12.7	97 24 93.9		9 41.8	97 24 93.8		10 10.9	97 24 93.6		10 40.0	97 24 93.5		11 09.1	97 24 93.4		11 38.1	97 24 93.3		12 07.2	97 24 93.1		12 36.3	97 24 93.0		4
85	8 58.2	97 24 92.9		9 27.3	97 24 92.8		9 56.4	97 24 92.7		10 25.5	97 24 92.5		10 54.6	97 24 92.4		11 23.6	97 24 92.3		11 52.7	97 24 92.2		12 21.8	97 24 92.0		85
6	8 43.7	97 24 91.9		9 12.8	97 24 91.8		9 41.9	97 24 91.7		10 11.0	97 24 91.6		10 40.0	97 24 91.4		11 09.1	97 24 91.3		11 38.2	97 24 91.2		12 07.3	97 24 91.1		6
7	8 29.2	97 24 91.0		8 58.3	97 24 90.8		9 27.4	97 24 90.7		9 56.5	97 24 90.6		10 25.5	97 24 90.5		10 54.6	97 24 90.3		11 23.7	97 24 90.2		11 52.8	97 24 90.1		7
8	8 14.7	97 24 90.0		8 43.8	97 24 89.9		9 12.9	97 24 89.7		9 41.9	97 24 89.6		10 11.0	97 24 89.5		10 40.1	97 24 89.4		11 09.2	97 24 89.2		11 38.3	97 24 89.1		8
9	8 00.2	97 24 89.0		8 29.3	97 24 88.9		8 58.3	97 24 88.8		9 27.4	97 24 88.7		9 56.5	97 24 88.5		10 25.6	97 24 88.4		10 54.7	97 24 88.3		11 23.7	97 24 88.2		9
90	7 45.7	97 24 88.1		8 14.7	97 24 87.9		8 43.8	97 24 87.8		9 12.9	97 24 87.7		9 42.0	97 24 87.6		10 11.1	97 24 87.4		10 40.2	97 24 87.3		11 09.2	97 24 87.2		90

H.A.	8° 00′		8° 30′		9° 00′		9° 30′		10° 00′		10° 30′		11° 00′		11° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	6 00.0 1.0 00	180.0	5 30.0 1.0 00	180.0	5 00.0 1.0 00	180.0											00
1	5 59.9 1.0 01	179.0	5 29.9 1.0 01	179.0													1
2	5 59.5 1.0 01	178.0	5 29.5 1.0 01	178.0													2
3	5 58.9 1.0 01	177.0	5 28.9 1.0 01	177.0													3
4	5 58.0 1.0 02	176.0	5 28.0 1.0 02	176.0													4
05	5 56.8 1.0 02	175.0	5 26.9 1.0 02	175.0													05
6	5 55.5 1.0 03	174.0	5 25.5 1.0 03	174.0													6
7	5 53.8 1.0 03	173.0	5 23.8 1.0 03	173.0													7
8	5 51.9 1.0 04	172.0	5 22.0 1.0 04	172.1													8
9	5 49.8 1.0 04	171.0	5 19.8 1.0 04	171.1													9
10	5 47.4 1.0 04	170.0	5 17.4 1.0 04	170.1													10
1	5 44.8 1.0 05	169.1	5 14.8 1.0 05	169.1													1
2	5 41.9 1.0 05	168.1	5 11.9 1.0 05	168.1													2
3	5 38.8 1.0 06	167.1	5 08.8 1.0 06	167.1													3
4	5 35.4 1.0 06	166.1	5 05.5 1.0 06	166.1													4
15	5 31.8 1.0 06	165.1	5 01.9 1.0 06	165.1													15
6	5 27.9 1.0 07	164.1															6
7	5 23.8 1.0 07	163.1															7
8	5 19.5 1.0 08	162.1															8
9	5 14.9 1.0 08	161.1															9
20	5 10.1 1.0 08	160.1															20
1	5 05.0 1.0 09	159.1															1

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′		8° 30′		9° 00′		9° 30′		10° 00′		10° 30′		11° 00′		11° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	7 31.2 97 24	87.1	8 00.2 97 24	87.0	8 29.3 97 24	86.8	8 58.4 97 24	86.7	9 27.5 97 24	86.6	9 56.6 97 24	86.5	10 25.7 97 24	86.3	10 54.7 97 24	86.2	91
2	7 16.7 97 24	86.1	7 45.8 97 24	86.0	8 14.8 97 24	85.9	8 43.9 97 24	85.7	9 13.0 97 24	85.6	9 42.1 97 24	85.5	10 11.2 97 24	85.4	10 40.3 97 24	85.2	2
3	7 02.2 97 24	85.1	7 31.3 97 24	85.0	8 00.4 97 24	84.9	8 29.5 97 24	84.8	8 58.6 97 24	84.7	9 27.6 97 24	84.5	9 56.7 97 24	84.4	10 25.8 97 24	84.3	3
4	6 47.7 97 24	84.2	7 16.8 97 24	84.1	7 45.9 97 24	83.9	8 15.0 97 24	83.8	8 44.1 97 24	83.7	9 13.2 97 24	83.6	9 42.3 97 24	83.4	10 11.4 97 24	83.3	4
95	6 33.3 97 24	83.2	7 02.4 97 24	83.1	7 31.5 97 24	83.0	8 00.6 97 24	82.8	8 29.7 97 24	82.7	8 58.8 97 24	82.6	9 27.9 97 24	82.5	9 57.0 97 24	82.4	95
6	6 18.9 97 24	82.2	6 48.0 97 24	82.1	7 17.1 97 24	82.0	7 46.2 97 24	81.9	8 15.3 97 24	81.8	8 44.4 97 24	81.6	9 13.5 97 24	81.5	9 42.6 97 24	81.4	6
7	6 04.5 97 24	81.3	6 33.7 97 24	81.2	7 02.8 97 24	81.0	7 31.9 97 24	80.9	8 01.0 97 24	80.8	8 30.1 97 24	80.7	8 59.2 97 24	80.5	9 28.3 97 24	80.4	7
8	5 50.2 97 24	80.3	6 19.3 97 24	80.2	6 48.4 97 24	80.1	7 17.6 97 24	79.9	7 46.7 97 24	79.8	8 15.8 97 24	79.7	8 44.9 97 24	79.6	9 14.0 97 24	79.5	8
9	5 35.9 97 24	79.3	6 05.1 97 24	79.2	6 34.2 97 24	79.1	7 03.3 97 24	79.0	7 32.4 97 24	78.9	8 01.5 97 24	78.7	8 30.6 97 24	78.6	8 59.7 97 24	78.5	9
100	5 21.7 97 24	78.4	5 50.8 97 24	78.3	6 19.9 97 24	78.1	6 49.1 97 24	78.0	7 18.2 97 24	77.9	7 47.3 97 24	77.8	8 16.4 97 24	77.7	8 45.5 97 24	77.5	100
1	5 07.5 97 24	77.4	5 36.6 97 24	77.3	6 05.8 97 24	77.2	6 34.9 97 24	77.1	7 04.0 97 24	76.9	7 33.1 97 24	76.8	8 02.3 97 23	76.7	8 31.4 97 23	76.6	1
2			5 22.5 97 23	76.3	5 51.6 97 23	76.2	6 20.8 97 23	76.1	6 49.9 97 23	76.0	7 19.0 97 23	75.9	7 48.2 97 23	75.7	8 17.3 97 23	75.6	2
3			5 08.4 97 23	75.4	5 37.6 97 23	75.2	6 06.7 97 23	75.1	6 35.9 97 23	75.0	7 05.0 97 23	74.9	7 34.1 97 23	74.8	8 03.3 97 23	74.6	3
4					5 23.6 97 23	74.3	5 52.7 97 23	74.2	6 21.9 97 23	74.0	6 51.0 97 23	73.9	7 20.2 97 23	73.8	7 49.3 97 23	73.7	4
105					5 09.6 97 23	73.3	5 38.8 97 23	73.2	6 07.9 97 23	73.1	6 37.1 97 23	73.0	7 06.3 97 23	72.8	7 35.4 97 23	72.7	105
6							5 24.9 97 23	72.2	5 54.1 97 23	72.1	6 23.3 97 23	72.0	6 52.4 97 23	71.9	7 21.6 97 23	71.8	6
7							5 11.1 97 23	71.3	5 40.3 97 23	71.2	6 09.5 97 23	71.0	6 38.7 97 23	70.9	7 07.8 97 23	70.8	7
8									5 26.6 97 23	70.2	5 55.8 97 23	70.1	6 25.0 97 23	70.0	6 54.2 97 23	69.8	8
9									5 13.0 97 23	69.2	5 42.2 97 23	69.1	6 11.4 97 22	69.0	6 40.6 97 22	68.9	9
110											5 28.7 97 22	68.2	5 57.9 97 22	68.0	6 27.1 97 22	67.9	110
1											5 15.3 97 22	67.2	5 44.5 97 22	67.1	6 13.7 97 22	67.0	1
2											5 01.9 97 22	66.2	5 31.2 97 22	66.1	6 00.4 97 22	66.0	2
3													5 17.9 97 22	65.2	5 47.2 97 22	65.0	3
4													5 04.8 98 22	64.2	5 34.1 98 22	64.1	4
115															5 21.1 98 22	63.1	115
6															5 08.2 98 21	62.2	6

Lat. 76°

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	26 00.0 1.0 00	180.0	26 30.0 1.0 00	180.0	27 00.0 1.0 00	180.0	27 30.0 1.0 00	180.0	28 00.0 1.0 00	180.0	28 30.0 1.0 00	180.0	29 00.0 1.0 00	180.0	29 30.0 1.0 00	180.0	00
1	25 59.9 1.0 01	178.9	26 29.9 1.0 01	178.9	26 59.9 1.0 01	178.9	27 29.9 1.0 01	178.9	27 59.9 1.0 01	178.9	28 29.9 1.0 01	178.9	28 59.9 1.0 01	178.9	29 29.9 1.0 01	178.9	1
2	25 59.4 1.0 01	177.8	26 29.4 1.0 01	177.8	26 59.4 1.0 01	177.8	27 29.4 1.0 01	177.8	27 59.4 1.0 01	177.8	28 29.4 1.0 01	177.8	28 59.4 1.0 01	177.8	29 29.4 1.0 01	177.8	2
3	25 58.8 1.0 02	176.7	26 28.8 1.0 02	176.7	26 58.8 1.0 02	176.7	27 28.8 1.0 02	176.7	27 58.7 1.0 02	176.7	28 28.7 1.0 02	176.7	28 58.7 1.0 02	176.7	29 28.7 1.0 02	176.7	3
4	25 57.8 1.0 02	175.6	26 27.8 1.0 02	175.6	26 57.8 1.0 02	175.6	27 27.8 1.0 02	175.6	27 57.8 1.0 02	175.6	28 27.8 1.0 02	175.6	28 57.8 1.0 02	175.6	29 27.8 1.0 02	175.6	4
05	25 56.6 1.0 02	174.6	26 26.5 1.0 03	174.5	26 56.5 1.0 03	174.5	27 26.5 1.0 03	174.5	27 56.5 1.0 03	174.5	28 26.5 1.0 03	174.5	28 56.5 1.0 03	174.5	29 26.5 1.0 03	174.5	05
6	25 55.0 1.0 03	173.5	26 25.0 1.0 03	173.5	26 55.0 1.0 03	173.4	27 25.0 1.0 03	173.4	27 55.0 1.0 03	173.4	28 25.0 1.0 03	173.4	28 55.0 1.0 03	173.4	29 25.0 1.0 03	173.4	6
7	25 53.3 1.0 03	172.4	26 23.2 1.0 03	172.4	26 53.2 1.0 03	172.3	27 23.2 1.0 03	172.3	27 53.2 1.0 03	172.3	28 23.2 1.0 03	172.3	28 53.2 1.0 03	172.3	29 23.1 1.0 03	172.3	7
8	25 51.2 1.0 04	171.3	26 21.2 1.0 04	171.3	26 51.2 1.0 04	171.3	27 21.1 1.0 04	171.2	27 51.1 1.0 04	171.2	28 21.1 1.0 04	171.2	28 51.1 1.0 04	171.2	29 21.0 1.0 04	171.1	8
9	25 48.9 1.0 04	170.2	26 18.8 1.0 04	170.2	26 48.8 1.0 04	170.2	27 18.8 1.0 04	170.1	27 48.8 1.0 04	170.1	28 18.7 1.0 04	170.1	28 48.7 1.0 04	170.1	29 18.7 1.0 04	170.0	9
10	25 46.3 1.0 05	169.1	26 16.2 1.0 05	169.1	26 46.2 1.0 05	169.1	27 16.2 1.0 05	169.0	27 46.1 1.0 05	169.0	28 16.1 1.0 05	169.0	28 46.1 1.0 05	169.0	29 16.0 1.0 05	168.9	10
1	25 43.4 1.0 05	168.0	26 13.4 1.0 05	168.0	26 43.3 1.0 05	168.0	27 13.3 1.0 05	168.0	27 43.2 1.0 05	167.9	28 13.2 1.0 05	167.9	28 43.1 1.0 05	167.9	29 13.1 1.0 05	167.8	1
2	25 40.2 1.0 06	167.0	26 10.2 1.0 06	166.9	26 40.2 1.0 06	166.9	27 10.1 1.0 06	166.9	27 40.1 1.0 06	166.8	28 10.0 1.0 06	166.8	28 40.0 1.0 06	166.8	29 09.9 1.0 06	166.7	2
3	25 36.8 1.0 06	165.9	26 06.8 1.0 06	165.8	26 36.7 1.0 06	165.8	27 06.7 1.0 06	165.8	27 36.6 1.0 06	165.7	28 06.6 1.0 06	165.7	28 36.5 1.0 06	165.7	29 06.4 1.0 06	165.6	3
4	25 33.2 1.0 07	164.8	26 03.1 1.0 07	164.8	26 33.0 1.0 07	164.7	27 03.0 1.0 07	164.7	27 32.9 1.0 07	164.6	28 02.8 1.0 07	164.6	28 32.8 1.0 07	164.6	29 02.7 1.0 07	164.5	4
15	25 29.2 1.0 07	163.7	25 59.2 1.0 07	163.7	26 29.1 1.0 07	163.6	26 59.0 1.0 07	163.6	27 28.9 1.0 07	163.6	27 58.9 1.0 07	163.5	28 28.8 1.0 07	163.5	28 58.7 1.0 07	163.4	15
6	25 25.0 1.0 07	162.6	25 54.9 1.0 07	162.6	26 24.9 1.0 07	162.6	26 54.8 1.0 08	162.5	27 24.7 1.0 08	162.5	27 54.6 1.0 08	162.4	28 24.5 1.0 08	162.4	28 54.4 1.0 08	162.3	6
7	25 20.6 1.0 08	161.6	25 50.5 1.0 08	161.5	26 20.4 1.0 08	161.5	26 50.3 1.0 08	161.4	27 20.2 1.0 08	161.4	27 50.1 1.0 08	161.3	28 20.0 1.0 08	161.3	28 49.9 1.0 08	161.2	7
8	25 15.8 1.0 08	160.5	25 45.7 1.0 08	160.4	26 15.6 1.0 08	160.4	26 45.5 1.0 08	160.3	27 15.4 1.0 08	160.3	27 45.3 1.0 08	160.2	28 15.2 1.0 08	160.2	28 45.1 1.0 08	160.1	8
9	25 10.9 1.0 09	159.4	25 40.7 1.0 09	159.3	26 10.6 1.0 09	159.3	26 40.5 1.0 09	159.3	27 10.4 1.0 09	159.2	27 40.3 1.0 09	159.2	28 10.2 1.0 09	159.1	28 40.0 1.0 09	159.0	9
20	25 05.6 1.0 09	158.3	25 35.5 1.0 09	158.3	26 05.4 1.0 09	158.2	26 35.2 1.0 09	158.2	27 05.1 1.0 09	158.1	27 35.0 1.0 09	158.1	28 04.9 1.0 09	158.0	28 34.7 1.0 09	158.0	20
1	25 00.1 1.0 10	157.2	25 30.0 1.0 10	157.2	25 59.9 1.0 10	157.1	26 29.7 1.0 10	157.1	26 59.6 1.0 10	157.0	27 29.4 1.0 10	157.0	27 59.3 1.0 10	156.9	28 29.1 1.0 10	156.9	1
2	24 54.4 99 10	156.2	25 24.2 99 10	156.1	25 54.1 99 10	156.1	26 23.9 99 10	156.0	26 53.8 99 10	155.9	27 23.6 99 10	155.9	27 53.5 99 10	155.8	28 23.3 99 10	155.8	2
3	24 48.4 99 10	155.1	25 18.2 99 10	155.0	25 48.1 99 10	155.0	26 17.9 99 10	154.9	26 47.7 99 10	154.9	27 17.6 99 11	154.8	27 47.4 99 11	154.7	28 17.2 99 11	154.7	3
4	24 42.2 99 11	154.0	25 12.0 99 11	154.0	25 41.8 99 11	153.9	26 11.6 99 11	153.8	26 41.5 99 11	153.8	27 11.3 99 11	153.7	27 41.1 99 11	153.7	28 10.9 99 11	153.6	4
25	24 35.7 99 11	153.0	25 05.5 99 11	152.9	25 35.3 99 11	152.8	26 05.1 99 11	152.8	26 34.9 99 11	152.7	27 04.7 99 11	152.6	27 34.5 99 11	152.6	28 04.3 99 11	152.5	25
6	24 29.0 99 12	151.9	24 58.8 99 12	151.8	25 28.6 99 12	151.8	25 58.4 99 12	151.7	26 28.1 99 12	151.6	26 57.9 99 12	151.6	27 27.7 99 12	151.5	27 57.5 99 12	151.4	6
7	24 22.0 99 12	150.8	24 51.8 99 12	150.8	25 21.6 99 12	150.7	25 51.4 99 12	150.6	26 21.1 99 12	150.6	26 50.9 99 12	150.5	27 20.7 99 12	150.4	27 50.4 99 12	150.3	7
8	24 14.8 99 12	149.8	24 44.6 99 12	149.7	25 14.4 99 12	149.6	25 44.1 99 12	149.6	26 13.9 99 12	149.5	26 43.6 99 12	149.4	27 13.4 99 13	149.3	27 43.1 99 13	149.3	8
9	24 07.4 99 13	148.7	24 37.1 99 13	148.6	25 06.9 99 13	148.6	25 36.6 99 13	148.5	26 06.4 99 13	148.4	26 36.1 99 13	148.3	27 05.9 99 13	148.3	27 35.6 99 13	148.2	9
30	23 59.7 99 13	147.6	24 29.5 99 13	147.6	24 59.2 99 13	147.5	25 28.9 99 13	147.4	25 58.7 99 13	147.3	26 28.4 99 13	147.3	26 58.1 99 13	147.2	27 27.8 99 13	147.1	30
1	23 51.9 99 14	146.6	24 21.6 99 14	146.5	24 51.3 99 14	146.4	25 21.0 99 14	146.3	25 50.7 99 14	146.3	26 20.4 99 14	146.2	26 50.1 99 14	146.1	27 19.8 99 14	146.0	1
2	23 43.8 99 14	145.5	24 13.5 99 14	145.4	24 43.2 99 14	145.4	25 12.9 99 14	145.3	25 42.5 99 14	145.2	26 12.2 99 14	145.1	26 41.9 99 14	145.0	27 11.6 99 14	145.0	2
3	23 35.4 99 14	144.5	24 05.1 99 14	144.4	24 34.8 99 14	144.3	25 04.5 99 14	144.2	25 34.2 99 14	144.1	26 03.8 99 14	144.1	26 33.5 99 14	144.0	27 03.2 99 14	143.9	3
4	23 26.9 99 15	143.4	23 56.5 99 15	143.3	24 26.2 99 15	143.2	24 55.9 99 15	143.2	25 25.5 99 15	143.1	25 55.2 99 15	143.0	26 24.9 99 15	142.9	26 54.5 99 15	142.8	4
35	23 18.1 99 15	142.3	23 47.8 99 15	142.3	24 17.4 99 15	142.2	24 47.1 99 15	142.1	25 16.7 99 15	142.0	25 46.4 99 15	141.9	26 16.0 99 15	141.8	26 45.6 99 15	141.8	35
6	23 09.1 99 15	141.3	23 38.8 99 15	141.2	24 08.4 99 15	141.1	24 38.0 99 15	141.0	25 07.7 99 15	141.0	25 37.3 99 15	140.9	26 06.9 99 15	140.8	26 36.5 99 16	140.7	6
7	23 00.0 99 16	140.2	23 29.6 99 16	140.2	23 59.2 99 16	140.1	24 28.8 99 16	140.0	24 58.4 99 16	139.9	25 28.0 99 16	139.8	25 57.6 99 16	139.7	26 27.2 99 16	139.6	7
8	22 50.6 99 16	139.2	23 20.2 99 16	139.1	23 49.8 99 16	139.0	24 19.4 99 16	138.9	24 49.0 99 16	138.8	25 18.6 99 16	138.8	25 48.2 99 16	138.7	26 17.7 99 16	138.6	8
9	22 41.0 99 16	138.2	23 10.6 99 16	138.1	23 40.2 99 16	138.0	24 09.7 99 16	137.9	24 39.3 99 16	137.8	25 08.9 99 16	137.7	25 38.5 99 16	137.6	26 08.0 99 16	137.5	9
40	22 31.2 99 17	137.1	23 00.8 99 17	137.0	23 30.3 99 17	136.9	23 59.9 99 17	136.8	24 29.5 99 17	136.7	24 59.0 99 17	136.6	25 28.6 99 17	136.5	25 58.1 98 17	136.5	40
1	22 21.2 99 17	136.1	22 50.8 99 17	136.0	23 20.3 98 17	135.9	23 49.9 98 17	135.8	24 19.4 98 17	135.7	24 49.0 98 17	135.6	25 18.5 98 17	135.5	25 48.0 98 17	135.4	1
2	22 11.1 98 17	135.0	22 40.6 98 17	134.9	23 10.1 98 17	134.8	23 39.7 98 17	134.7	24 09.2 98 17	134.6	24 38.7 98 17	134.5	25 08.2 98 17	134.4	25 37.7 98 17	134.3	2
3	22 00.7 98 18	134.0	22 30.2 98 18	133.9	22 59.8 98 18	133.8	23 29.3 98 18	133.7	23 58.8 98 18	133.6	24 28.3 98 18	133.5	24 57.8 98 18	133.4	25 27.3 98 18	133.3	3
4	21 50.2 98 18	132.9	22 19.7 98 18	132.8	22 49.2 98 18	132.8	23 18.7 98 18	132.7	23 48.2 98 18	132.5	24 17.7 98 18	132.4	24 47.1 98 18	132.3	25 16.6 98 18	132.2	4
45	21 39.5 98 18	131.9	22 09.0 98 18	131.8	22 38.4 98 18	131.7	23 07.9 98 18	131.6	23 37.4 98 18	131.5	24 06.9 98 18	131.4	24 36.3 98 18	131.3	25 05.8 98 18	131.2	45
6	21 28.6 98 18	130.9	21 58.0 98 18	130.8	22 27.5 98 18	130.7	22 57.0 98 18	130.6	23 26.4 98 19	130.5	23 55.9 98 19	130.4	24 25.3 98 19	130.3	24 54.8 98 19	130.2	6
7	21 17.5 98 19	129.8	21 47.0 98 19	129.7	22 16.4 98 19	129.6	22 45.9 98 19	129.5	23 15.3 98 19	129.4	23 44.7 98 19	129.3	24 14.2 98 19	129.2	24 43.6 98 19	129.1	7
8	21 06.3 98 19	128.8	21 35.7 98 19	128.7	22 05.2 98 19	128.6	22 34.6 98 19	128.5	23 04.0 98 19	128.4	23 33.4 98 19	128.3	24 02.8 98 19	128.2	24 32.3 98 19	128.1	8
9	20 54.9 98 19	127.8	21 24.3 98 19	127.7	21 53.7 98 19	127.6	22 23.1 98 19	127.5	22 52.6 98 19	127.4	23 22.0 98 19	127.3	23 51.4 98 19	127.1	24 20.7 98 19	127.0	9
50	20 43.4 98 20	126.8	21 12.8 98 20	126.7	21 42.2 98 20	126.5	22 11.5 98 20	126.4	22 40.9 98 20	126.3	23 10.3 98 20	126.2	23 39.7 98 20	126.1	24 09.1 98 20	126.0	50
1	20 31.6 98 20	125.7	21 01.0 98 20	125.6	21 30.4 98 20	125.5	21 59.8 98 20	125.4	22 29.2 98 20	125.3	22 58.5 98 20	125.2	23 27.9 98 20	125.1	23 57.3 98 20	125.0	1
2	20 19.8 98 20	124.7	20 49.2 98 20	124.6	21 18.5 98 20	124.5	21 47.9 98 20	124.4	22 17.2 98 20	124.3	22 46.6 98 20	124.2	23 16.0 98 20	124.1	23 45.3 98 20	123.9	2
3	20 07.8 98 20	123.7	20 37.1 98 20	123.6	21 06.5 98 20	123.5	21 35.8 98 20	123.4	22 05.2 98 20	123.2	22 34.5 98 20	123.1	23 03.9 98 20	123.0	23 33.2 98 20	122.9	3
4	19 55.6 98 20	122.7	20 25.0 98 20	122.6	20 54.3 98 21	122.5	21 23.6 98 21	122.3	21 53.0 98 21	122.2	22 22.3 98 21	122.1	22 51.6 98 21	122.0	23 20.9 98 21	121.9	4
55	19 43.3 98 21	121.7	20 12.7 98 21	121.5	20 42.0 98 21	121.4	21 11.3 98 21	121.3	21 40.6 98 21	121.2	22 09.9 98 21	121.1	22 39.2 98 21	121.0	23 08.5 98 21	120.9	55
6	19 30.9 98 21	120.6	20 00.2 98 21	120.5	20 29.5 98 21	120.4	20 58.8 98 21	120.3	21 28.1 98 21	120.2	21 57.4 98 21	120.1	22 26.7 98 21	120.0	22 56.0 98 21	119.8	6
7	19 18.4 98 21	119.6	19 47.7 98 21	119.5	20 17.0 98 21	119.4	20 46.2 98 21	119.3	21 15.5 98 21	119.2	21 44.8 98 21	119.1	22 14.1 98 21	118.9	22 43.4 98 21	118.8	7
8	19 05.7 98 21	118.6	19 35.0 98 21	118.5	20 04.3 98 21	118.4	20 33.5 98 21	118.3	21 02.8 98 21	118.2	21 32.1 98 21	118.0	22 01.3 98 21	117.9	22 30.6 98 22	117.8	8
9	18 52.9 98 22	117.6	19 22.2 98 22	117.5	19 51.4 98 22	117.4	20 20.7 98 22	117.3	20 49.9 98 22	117.1	21 19.2 97 22	117.0	21 48.4 97 22	116.9	22 17.7 97 22	116.8	9
60	18 40.0 98 22	116.6	19 09.2 98 22	116.5	19 38.5 97 22	116.4	20 07.7 97 22	116.2	20 37.0 97 22	116.1	21 06.2 97 22	116.0	21 35.4 97 22	115.9	22 04.7 97 22	115.8	60
1	18 26.9 97 22	115.6	18 56.2 97 22	115.5	19 25.4 97 22	115.4	19 54.6 97 22	115.2	20 23.9 97 22	115.1	20 53.1 97 22	115.0	21 22.3 97 22	114.9	21 51.5 97 22	114.8	1
2	18 13.8 97 22	114.6	18 43.0 97 22	114.5	19 12.2 97 22	114.4	19 41.5 97 22	114.2	20 10.7 97 22	114.1	20 39.9 97 22	114.0	21 09.1 97 22	113.9	21 38.3 97 22	113.7	2
3	18 00.5 97 22	113.6	18 29.8 97 22	113.5	18 59.0 97 22	113.4	19 28.2 97 22	113.2	19 57.4 97 22	113.1	20 26.6 97 22	113.0	20 55.8 97 22	112.9	21 25.0 97 22	112.7	3
4	17 47.2 97 22	112.6	18 16.4 97 22	112.5	18 45.6 97 22	112.3	19 14.8 97 22	112.2	19 44.0 97 22	112.1	20 13.2 97 23	112.0	20 42.3 97 23	111.9	21 11.5 97 23	111.7	4
65	17 33.7 97 23	111.6	18 02.9 97 23	111.5	18 32.1 97 23	111.3	19 01.3 97 23	111.2	19 30.5 97 23	111.1	19 59.7 97 23	111.0	20 28.8 97 23	110.9	20 58.0 97 23	110.7	65
6	17 20.2 97 23	110.6	17 49.4 97 23	110.5	18 18.6 97 23	110.3	18 47.7 97 23	110.2	19 16.9 97 23	110.1	19 46.1 97 23	110.0	20 15.2 97 23	109.9	20 44.4 97 23	109.7	6
7	17 06.6 97 23	109.6	17 35.7 97 23	109.5	18 04.9 97 23	109.4	18 34.1 97 23	109.2	19 03.2 97 23	109.1	19 32.4 97 23	109.0	20 01.5 97 23	108.9	20 30.7 97 23	108.7	7
8	16 52.8 97 23	108.6	17 22.0 97 23	108.5	17 51.2 97 23	108.4	18 20.3 97 23	108.2	18 49.5 97 23	108.1	19 18.6 97 23	108.0	19 47.7 97 23	107.9	20 16.9 97 23	107.7	8
9	16 39.0 97 23	107.6	17 08.2 97 23	107.5	17 37.4 97 23	107.4	18 06.5 97 23	107.2	18 35.6 97 23	107.1	19 04.8 97 23	107.0	19 33.9 97 23	106.9	20 03.0 97 23	106.7	9
70	16 25.2 97 23	106.6	16 54.3 97 23	106.5	17 23.5 97 23	106.4	17 52.6 97 23	106.2	18 21.7 97 23	106.1	18 50.8 97 23	106.0	19 20.0 97 23	105.9	19 49.1 97 23	105.7	70
1	16 11.2 97 23	105.6	16 40.4 97 23	105.5	17 09.5 97 23	105.4	17 38.6 97 23	105.3	18 07.7 97 23	105.1	18 36.9 97 23	105.0	19 06.0 97 23	104.9	19 35.1 97 23	104.7	1
2	15 57.2 97 23	104.6	16 26.3 97 23	104.5	16 55.5 97 23	104.4	17 24.6 97 24	104.3	17 53.7 97 24	104.1	18 22.8 97 24	104.0	18 51.9 97 24	103.9	19 21.0 97 24	103.8	2
3	15 43.1 97 24	103.7	16 12.3 97 24	103.5	16 41.4 97 24	103.4	17 10.5 97 24	103.3	17 39.6 97 24	103.1	18 08.7 97 24	103.0	18 37.8 97 24	102.9	19 06.9 97 24	102.8	3
4	15 29.0 97 24	102.7	15 58.1 97 24	102.5	16 27.2 97 24	102.4	16 56.3 97 24	102.3	17 25.4 97 24	102.2	17 54.5 97 24	102.0	18 23.6 97 24	101.9	18 52.7 97 24	101.8	4
75	15 14.8 97 24	101.7	15 43.9 97 24	101.6	16 13.0 97 24	101.4	16 42.1 97 24	101.3	17 11.2 97 24	101.2	17 40.3 97 24	101.0	18 09.4 97 24	100.9	18 38.5 97 24	100.8	75
6	15 00.6 97 24	100.7	15 29.7 97 24	100.6	15 58.8 97 24	100.4	16 27.9 97 24	100.3	16 57.0 97 24	100.2	17 26.0 97 24	100.1	17 55.1 97 24	99.9	18 24.2 97 24	99.8	6
7	14 46.3 97 24	99.7	15 15.4 97 24	99.6	15 44.5 97 24	99.5	16 13.6 97 24	99.3	16 42.6 97 24	99.2	17 11.7 97 24	99.1	17 40.8 97 24	98.9	18 09.9 97 24	98.8	7
8	14 32.0 97 24	98.7	15 01.1 97 24	98.6	15 30.1 97 24	98.5	15 59.2 97 24	98.4	16 28.3 97 24	98.2	16 57.4 97 24	98.1	17 26.4 97 24	98.0	17 55.5 97 24	97.8	8
9	14 17.6 97 24	97.8	14 46.7 97 24	97.6	15 15.8 97 24	97.5	15 44.8 97 24	97.4	16 13.9 97 24	97.2	16 43.0 97 24	97.1	17 12.0 97 24	97.0	17 41.1 97 24	96.9	9
80	14 03.2 97 24	96.8	14 32.3 97 24	96.7	15 01.4 97 24	96.5	15 30.4 97 24	96.4	15 59.5 97 24	96.3	16 28.6 97 24	96.1	16 57.6 97 24	96.0	17 26.7 97 24	95.9	80
1	13 48.8 97 24	95.8	14 17.9 97 24	95.7	14 46.9 97 24	95.5	15 16.0 97 24	95.4	15 45.1 97 24	95.3	16 14.1 97 24	95.2	16 43.2 97 24	95.0	17 12.2 97 24	94.9	1
2	13 34.3 97 24	94.8	14 03.4 97 24	94.7	14 32.5 97 24	94.6	15 01.5 97 24	94.4	15 30.6 97 24	94.3	15 59.6 97 24	94.2	16 28.7 97 24	94.1	16 57.7 97 24	93.9	2
3	13 19.9 97 24	93.9	13 48.9 97 24	93.7	14 18.0 97 24	93.6	14 47.1 97 24	93.5	15 16.1 97 24	93.3	15 45.2 97 24	93.2	16 14.2 97 24	93.1	16 43.3 97 24	93.0	3
4	13 05.4 97 24	92.9	13 34.4 97 24	92.8	14 03.5 97 24	92.6	14 32.6 97 24	92.5	15 01.6 97 24	92.4	15 30.7 97 24	92.2	15 59.7 97 24	92.1	16 28.8 97 24	92.0	4
85	12 50.9 97 24	91.9	13 19.9 97 24	91.8	13 49.0 97 24	91.7	14 18.1 97 24	91.5	14 47.1 97 24	91.4	15 16.2 97 24	91.3	15 45.2 97 24	91.1	16 14.2 97 24	91.0	85
6	12 36.3 97 24	90.9	13 05.4 97 24	90.8	13 34.5 97 24	90.7	14 03.5 97 24	90.6	14 32.6 97 24	90.4	15 01.6 97 24	90.3	15 30.7 97 24	90.2	15 59.7 97 24	90.0	6
7	12 21.8 97 24	90.0	12 50.9 97 24	89.8	13 20.0 97 24	89.7	13 49.0 97 24	89.6	14 18.1 97 24	89.5	14 47.1 97 24	89.3	15 16.2 97 24	89.2	15 45.2 97 24	89.1	7
8	12 07.3 97 24	89.0	12 36.4 97 24	88.9	13 05.5 97 24	88.7	13 34.5 97 24	88.6	14 03.6 97 24	88.5	14 32.6 97 24	88.4	15 01.7 97 24	88.2	15 30.7 97 24	88.1	8
9	11 52.8 97 24	88.0	12 21.9 97 24	87.9	12 50.9 97 24	87.8	13 20.0 97 24	87.6	13 49.1 97 24	87.5	14 18.1 97 24	87.4	14 47.2 97 24	87.3	15 16.2 97 24	87.1	9
90	11 38.3 97 24	87.1	12 07.4 97 24	86.9	12 36.4 97 24	86.8	13 05.5 97 24	86.7	13 34.6 97 24	86.5	14 03.6 97 24	86.4	14 32.7 97 24	86.3	15 01.7 97 24	86.2	90

Lat. 76°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	11 23.8	97	24	86.1	11 52.9	97	24	86.0	12 22.0	97	24	85.8	12 51.0	97	24	85.7	13 20.1	97	24	85.6	13 49.1	97	24	85.5	14 18.2	97	24	85.3	14 47.2	97	24	85.2	91
2	11 09.3	97	24	85.1	11 38.4	97	24	85.0	12 07.5	97	24	84.9	12 36.6	97	24	84.7	13 05.6	97	24	84.6	13 34.7	97	24	84.5	14 03.7	97	24	84.4	14 32.8	97	24	84.2	2
3	10 54.9	97	24	84.2	11 24.0	97	24	84.0	11 53.0	97	24	83.9	12 22.1	97	24	83.8	12 51.2	97	24	83.7	13 20.2	97	24	83.5	13 49.3	97	24	83.4	14 18.4	97	24	83.3	3
4	10 40.5	97	24	83.2	11 09.5	97	24	83.1	11 38.6	97	24	82.9	12 07.7	97	24	82.8	12 36.8	97	24	82.7	13 05.8	97	24	82.6	13 34.9	97	24	82.4	14 04.0	97	24	82.3	4
95	10 26.1	97	24	82.2	10 55.2	97	24	82.1	11 24.2	97	24	82.0	11 53.3	97	24	81.9	12 22.4	97	24	81.7	12 51.5	97	24	81.6	13 20.5	97	24	81.5	13 49.6	97	24	81.3	95
6	10 11.7	97	24	81.3	10 40.8	97	24	81.1	11 09.9	97	24	81.0	11 39.0	97	24	80.9	12 08.0	97	24	80.8	12 37.1	97	24	80.6	13 06.2	97	24	80.5	13 35.3	97	24	80.4	6
7	9 57.4	97	24	80.3	10 26.5	97	24	80.2	10 55.6	97	24	80.1	11 24.7	97	24	79.9	11 53.7	97	24	79.8	12 22.8	97	24	79.7	12 51.9	97	24	79.5	13 21.0	97	24	79.4	7
8	9 43.1	97	24	79.3	10 12.2	97	24	79.2	10 41.3	97	24	79.1	11 10.4	97	24	79.0	11 39.5	97	24	78.8	12 08.6	97	24	78.7	12 37.6	97	24	78.6	13 06.7	97	24	78.5	8
9	9 28.9	97	24	78.4	9 58.0	97	24	78.3	10 27.1	97	24	78.1	10 56.2	97	24	78.0	11 25.3	97	24	77.9	11 54.3	97	24	77.8	12 23.4	97	24	77.6	12 52.5	97	24	77.5	9
100	9 14.7	97	24	77.4	9 43.8	97	24	77.3	10 12.9	97	24	77.2	10 42.0	97	24	77.0	11 11.1	97	24	76.9	11 40.2	97	24	76.8	12 09.3	97	24	76.7	12 38.4	97	24	76.5	100
1	9 00.5	97	23	76.5	9 29.6	97	23	76.3	9 58.8	97	23	76.2	10 27.9	97	23	76.1	10 57.0	97	23	76.0	11 26.1	97	23	75.8	11 55.2	97	23	75.7	12 24.3	97	23	75.6	1
2	8 46.4	97	23	75.5	9 15.6	97	23	75.4	9 44.7	97	23	75.2	10 13.8	97	23	75.1	10 42.9	97	23	75.0	11 12.0	97	23	74.9	11 41.2	97	23	74.8	12 10.3	97	23	74.6	2
3	8 32.4	97	23	74.5	9 01.5	97	23	74.4	9 30.7	97	23	74.3	9 59.8	97	23	74.2	10 28.9	97	23	74.0	10 58.1	97	23	73.9	11 27.2	97	23	73.8	11 56.3	97	23	73.7	3
4	8 18.5	97	23	73.6	8 47.6	97	23	73.4	9 16.7	97	23	73.3	9 45.9	97	23	73.2	10 15.0	97	23	73.1	10 44.1	97	23	73.0	11 13.3	97	23	72.8	11 42.4	97	23	72.7	4
105	8 04.6	97	23	72.6	8 33.7	97	23	72.5	9 02.9	97	23	72.4	9 32.0	97	23	72.2	10 01.2	97	23	72.1	10 30.3	97	23	72.0	10 59.4	97	23	71.9	11 28.6	97	23	71.8	105
6	7 50.8	97	23	71.6	8 19.9	97	23	71.5	8 49.1	97	23	71.4	9 18.2	97	23	71.3	9 47.4	97	23	71.2	10 16.5	97	23	71.1	10 45.7	97	23	70.9	11 14.8	97	23	70.8	6
7	7 37.0	97	23	70.7	8 06.2	97	23	70.6	8 35.4	97	23	70.5	9 04.5	97	23	70.3	9 33.7	97	23	70.2	10 02.9	97	23	70.1	10 32.0	97	23	70.0	11 01.2	97	23	69.9	7
8	7 23.4	97	23	69.7	7 52.5	97	23	69.6	8 21.7	97	23	69.5	8 50.9	97	23	69.4	9 20.1	97	23	69.3	9 49.2	97	23	69.1	10 18.4	97	23	69.0	10 47.6	97	22	68.9	8
9	7 09.8	97	22	68.8	7 39.0	97	22	68.7	8 08.2	97	22	68.5	8 37.4	97	22	68.4	9 06.5	97	22	68.3	9 35.7	97	22	68.2	10 04.9	97	22	68.1	10 34.1	97	22	67.9	9
110	6 56.3	97	22	67.8	7 25.5	97	22	67.7	7 54.7	97	22	67.6	8 23.9	97	22	67.5	8 53.1	97	22	67.3	9 22.3	97	22	67.2	9 51.5	97	22	67.1	10 20.7	97	22	67.0	110
1	6 42.9	97	22	66.9	7 12.1	97	22	66.7	7 41.3	97	22	66.6	8 10.5	97	22	66.5	8 39.8	97	22	66.4	9 09.0	97	22	66.3	9 38.2	97	22	66.2	10 07.4	97	22	66.0	1
2	6 29.6	97	22	65.9	6 58.8	97	22	65.8	7 28.1	97	22	65.7	7 57.3	97	22	65.6	8 26.5	97	22	65.4	8 55.7	97	22	65.3	9 24.9	97	22	65.2	9 54.1	97	22	65.1	2
3	6 16.4	97	22	64.9	6 45.6	97	22	64.8	7 14.9	97	22	64.7	7 44.1	97	22	64.6	8 13.3	97	22	64.5	8 42.6	97	22	64.4	9 11.8	97	22	64.3	9 41.0	97	22	64.1	3
4	6 03.3	97	22	64.0	6 32.6	97	22	63.9	7 01.8	97	22	63.8	7 31.1	97	22	63.6	8 00.3	97	22	63.5	8 29.5	97	22	63.4	8 58.8	97	22	63.3	9 28.0	97	22	63.2	4
115	5 50.3	98	21	63.0	6 19.6	98	21	62.9	6 48.8	98	21	62.8	7 18.1	98	21	62.7	7 47.4	98	21	62.6	8 16.6	98	21	62.5	8 45.9	98	21	62.3	9 15.1	98	21	62.2	115
6	5 37.4	98	21	62.1	6 06.7	98	21	61.9	6 36.0	98	21	61.8	7 05.3	98	21	61.7	7 34.5	98	21	61.6	8 03.8	98	21	61.5	8 33.1	98	21	61.4	9 02.3	98	21	61.3	6
7	5 24.7	98	21	61.1	5 54.0	98	21	61.0	6 23.3	98	21	60.9	6 52.5	98	21	60.8	7 21.8	98	21	60.7	7 51.1	98	21	60.6	8 20.4	98	21	60.4	8 49.7	98	21	60.3	7
8	5 12.0	98	21	60.1	5 41.3	98	21	60.0	6 10.6	98	21	59.9	6 39.9	98	21	59.8	7 09.2	98	21	59.7	7 38.5	98	21	59.6	8 07.8	98	21	59.5	8 37.1	98	21	59.4	8
9					5 28.8	98	21	59.1	5 58.1	98	21	59.0	6 27.4	98	21	58.9	6 56.8	98	21	58.8	7 26.1	98	21	58.6	7 55.4	98	21	58.5	8 24.7	98	20	58.4	9
120					5 16.4	98	20	58.1	5 45.8	98	20	58.0	6 15.1	98	20	57.9	6 44.4	98	20	57.8	7 13.7	98	20	57.7	7 43.1	98	20	57.6	8 12.4	98	20	57.5	120
1					5 04.2	98	20	57.2	5 33.5	98	20	57.1	6 02.9	98	20	56.9	6 32.2	98	20	56.8	7 01.5	98	20	56.7	7 30.9	98	20	56.6	8 00.2	98	20	56.5	1
2									5 21.4	98	20	56.1	5 50.8	98	20	56.0	6 20.1	98	20	55.9	6 49.5	98	20	55.8	7 18.8	98	20	55.7	7 48.2	98	20	55.6	2
3									5 09.4	98	20	55.1	5 38.8	98	20	55.0	6 08.2	98	20	54.9	6 37.5	98	20	54.8	7 06.9	98	20	54.7	7 36.3	98	20	54.6	3
4													5 27.0	98	19	54.1	5 56.4	98	19	54.0	6 25.7	98	19	53.9	6 55.1	98	19	53.8	7 24.5	98	19	53.7	4
125													5 15.3	98	19	53.1	5 44.7	98	19	53.0	6 14.1	98	19	52.9	6 43.5	98	19	52.8	7 12.9	98	19	52.7	125
6													5 03.7	98	19	52.2	5 33.2	98	19	52.1	6 02.6	98	19	52.0	6 32.0	98	19	51.9	7 01.4	98	19	51.8	6
7																	5 21.8	98	19	51.1	5 51.2	98	19	51.0	6 20.6	98	19	50.9	6 50.1	98	19	50.8	7
8																	5 10.6	98	18	50.2	5 40.0	98	18	50.1	6 09.5	98	18	50.0	6 38.9	98	18	49.9	8
9																					5 29.0	98	18	49.1	5 58.4	98	18	49.0	6 27.9	98	18	48.9	9
130																					5 18.1	98	18	48.1	5 47.5	98	18	48.1	6 17.0	98	18	48.0	130
1																					5 07.3	98	18	47.2	5 36.8	98	18	47.1	6 06.3	98	18	47.0	1
2																									5 26.3	98	17	46.1	5 55.8	98	17	46.1	2
3																									5 15.9	98	17	45.2	5 45.4	98	17	45.1	3
4																									5 05.7	98	17	44.2	5 35.2	98	17	44.1	4
135																													5 25.2	99	16	43.2	135
6																													5 15.4	99	16	42.2	6
7																													5 05.7	99	16	41.3	7

Lat. 77°

Lat 78°

Lat. 76°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0
1	29 59.9	1.0 01	178.9	30 29.9	1.0 01	178.9	30 59.9	1.0 01	178.9	31 29.9	1.0 01	178.9
2	29 59.4	1.0 01	177.8	30 29.4	1.0 01	177.8	30 59.4	1.0 01	177.8	31 29.4	1.0 01	177.8
3	29 58.7	1.0 02	176.7	30 28.7	1.0 02	176.7	30 58.7	1.0 02	176.7	31 28.7	1.0 02	176.6
4	29 57.8	1.0 02	175.6	30 27.7	1.0 02	175.5	30 57.7	1.0 02	175.5	31 27.7	1.0 02	175.5
05	29 56.5	1.0 03	174.5	30 26.5	1.0 03	174.4	30 56.5	1.0 03	174.4	31 26.5	1.0 03	174.4
6	29 54.9	1.0 03	173.3	30 24.9	1.0 03	173.3	30 54.9	1.0 03	173.3	31 24.9	1.0 03	173.3
7	29 53.1	1.0 04	172.2	30 23.1	1.0 04	172.2	30 53.1	1.0 04	172.2	31 23.1	1.0 04	172.2
8	29 51.0	1.0 04	171.1	30 21.0	1.0 04	171.1	30 51.0	1.0 04	171.1	31 21.0	1.0 04	171.1
9	29 48.6	1.0 04	170.0	30 18.6	1.0 04	170.0	30 48.6	1.0 04	170.0	31 18.6	1.0 04	169.9
10	29 46.0	1.0 05	168.9	30 16.0	1.0 05	168.9	30 45.9	1.0 05	168.9	31 15.9	1.0 05	168.8
1	29 43.1	1.0 05	167.8	30 13.0	1.0 05	167.8	30 43.0	1.0 05	167.7	31 12.9	1.0 05	167.7
2	29 39.9	1.0 06	166.7	30 09.8	1.0 06	166.7	30 39.8	1.0 06	166.6	31 09.7	1.0 06	166.6
3	29 36.4	1.0 06	165.6	30 06.3	1.0 06	165.6	30 36.3	1.0 06	165.5	31 06.2	1.0 06	165.5
4	29 32.6	1.0 07	164.5	30 02.6	1.0 07	164.5	30 32.5	1.0 07	164.4	31 02.4	1.0 07	164.4
15	29 28.6	1.0 07	163.4	29 58.5	1.0 07	163.4	30 28.5	1.0 07	163.3	30 58.4	1.0 07	163.3
6	29 24.3	1.0 08	162.3	29 54.3	1.0 08	162.2	30 24.2	1.0 08	162.2	30 54.1	1.0 08	162.2
7	29 19.8	1.0 08	161.2	29 49.7	1.0 08	161.1	30 19.6	1.0 08	161.1	30 49.5	1.0 08	161.1
8	29 15.0	1.0 08	160.1	29 44.9	1.0 08	160.0	30 14.8	1.0 08	160.0	30 44.7	1.0 08	159.9
9	29 09.9	1.0 09	159.0	29 39.8	1.0 09	158.9	30 09.7	1.0 09	158.9	30 39.5	1.0 09	158.8
20	29 04.6	1.0 09	157.9	29 34.4	1.0 09	157.8	30 04.3	1.0 09	157.8	30 34.2	1.0 09	157.7
1	28 59.0	1.0 10	156.8	29 28.8	1.0 10	156.8	29 58.7	99 10	156.7	30 28.5	99 10	156.6
2	28 53.2	99 10	155.7	29 23.0	99 10	155.7	29 52.8	99 10	155.6	30 22.7	99 10	155.5
3	28 47.1	99 11	154.6	29 16.9	99 11	154.6	29 46.7	99 11	154.5	30 16.5	99 11	154.4
4	28 40.7	99 11	153.5	29 10.5	99 11	153.5	29 40.3	99 11	153.4	30 10.1	99 11	153.3
25	28 34.1	99 11	152.4	29 03.9	99 11	152.4	29 33.7	99 11	152.3	30 03.5	99 11	152.2
6	28 27.3	99 12	151.4	28 57.1	99 12	151.3	29 26.8	99 12	151.2	29 56.6	99 12	151.2
7	28 20.2	99 12	150.3	28 50.0	99 12	150.2	29 19.7	99 12	150.1	29 49.5	99 12	150.1
8	28 12.9	99 13	149.2	28 42.6	99 13	149.1	29 12.4	99 13	149.0	29 42.1	99 13	149.0
9	28 05.3	99 13	148.1	28 35.1	99 13	148.0	29 04.8	99 13	148.0	29 34.5	99 13	147.9
30	27 57.6	99 13	147.0	28 27.3	99 13	147.0	28 57.0	99 13	146.9	29 26.7	99 13	146.8
1	27 49.5	99 14	146.0	28 19.2	99 14	145.9	28 48.9	99 14	145.8	29 18.6	99 14	145.7
2	27 41.3	99 14	144.9	28 11.0	99 14	144.8	28 40.7	99 14	144.7	29 10.3	99 14	144.6
3	27 32.8	99 14	143.8	28 02.5	99 14	143.7	28 32.2	99 14	143.6	29 01.8	99 15	143.6
4	27 24.2	99 15	142.7	27 53.8	99 15	142.7	28 23.5	99 15	142.6	28 53.1	99 15	142.5
35	27 15.3	99 15	141.7	27 44.9	99 15	141.6	28 14.5	99 15	141.5	28 44.2	99 15	141.4
6	27 06.2	99 16	140.6	27 35.8	99 16	140.5	28 05.4	99 16	140.4	28 35.0	99 16	140.3
7	26 56.8	99 16	139.5	27 26.4	99 16	139.4	27 56.0	99 16	139.4	28 25.6	99 16	139.3
8	26 47.3	99 16	138.5	27 16.9	99 16	138.4	27 46.5	99 16	138.3	28 16.0	99 16	138.2
9	26 37.6	99 17	137.4	27 07.2	99 17	137.3	27 36.7	99 17	137.2	28 06.3	98 17	137.1
40	26 27.7	98 17	136.4	26 57.2	98 17	136.3	27 26.8	98 17	136.2	27 56.3	98 17	136.1
1	26 17.6	98 17	135.3	26 47.1	98 17	135.2	27 16.6	98 17	135.1	27 46.1	98 17	135.0
2	26 07.3	98 18	134.2	26 36.8	98 18	134.1	27 06.3	98 18	134.0	27 35.8	98 18	133.9
3	25 56.8	98 18	133.2	26 26.3	98 18	133.1	26 55.7	98 18	133.0	27 25.2	98 18	132.9
4	25 46.1	98 18	132.1	26 15.6	98 18	132.0	26 45.0	98 18	131.9	27 14.5	98 18	131.8
45	25 35.2	98 18	131.1	26 04.7	98 18	131.0	26 34.1	98 18	130.9	27 03.6	98 18	130.8
6	25 24.2	98 19	130.0	25 53.7	98 19	129.9	26 23.1	98 19	129.8	26 52.5	98 19	129.7
7	25 13.0	98 19	129.0	25 42.4	98 19	128.9	26 11.9	98 19	128.8	26 41.3	98 19	128.7
8	25 01.7	98 19	128.0	25 31.1	98 19	127.9	26 00.5	98 19	127.7	26 29.8	98 19	127.6
9	24 50.1	98 19	126.9	25 19.5	98 20	126.8	25 48.9	98 20	126.7	26 18.3	98 20	126.6
50	24 38.5	98 20	125.9	25 07.8	98 20	125.8	25 37.2	98 20	125.7	26 06.5	98 20	125.5
1	24 26.6	98 20	124.9	24 56.0	98 20	124.7	25 25.3	98 20	124.6	25 54.7	98 20	124.5
2	24 14.6	98 20	123.8	24 44.0	98 20	123.7	25 13.3	98 20	123.6	25 42.6	98 20	123.5
3	24 02.5	98 20	122.8	24 31.8	98 20	122.7	25 01.1	98 20	122.6	25 30.4	98 21	122.4
4	23 50.2	98 21	121.8	24 19.5	98 21	121.6	24 48.8	98 21	121.5	25 18.1	98 21	121.4
55	23 37.8	98 21	120.7	24 07.1	98 21	120.6	24 36.4	98 21	120.5	25 05.7	98 21	120.4
6	23 25.3	98 21	119.7	23 54.6	98 21	119.6	24 23.8	98 21	119.5	24 53.1	98 21	119.4
7	23 12.6	98 21	118.7	23 41.9	98 21	118.6	24 11.1	97 21	118.5	24 40.4	97 21	118.3
8	22 59.8	97 22	117.7	23 29.1	97 22	117.6	23 58.3	97 22	117.4	24 27.5	97 22	117.3
9	22 46.9	97 22	116.7	23 16.1	97 22	116.5	23 45.4	97 22	116.4	24 14.6	97 22	116.3
60	22 33.9	97 22	115.6	23 03.1	97 22	115.5	23 32.3	97 22	115.4	24 01.5	97 22	115.3
1	22 20.7	97 22	114.6	22 49.9	97 22	114.5	23 19.1	97 22	114.4	23 48.3	97 22	114.3
2	22 07.5	97 22	113.6	22 36.7	97 22	113.5	23 05.9	97 22	113.4	23 35.0	97 22	113.2
3	21 54.1	97 22	112.6	22 23.3	97 22	112.5	22 52.5	97 22	112.4	23 21.7	97 22	112.2
4	21 40.7	97 23	111.6	22 09.9	97 23	111.5	22 39.0	97 23	111.4	23 08.2	97 23	111.2
65	21 27.1	97 23	110.6	21 56.3	97 23	110.5	22 25.4	97 23	110.3	22 54.6	97 23	110.2
6	21 13.5	97 23	109.6	21 42.7	97 23	109.5	22 11.8	97 23	109.3	22 40.9	97 23	109.2
7	20 59.8	97 23	108.6	21 28.9	97 23	108.5	21 58.1	97 23	108.3	22 27.2	97 23	108.2
8	20 46.0	97 23	107.6	21 15.1	97 23	107.5	21 44.2	97 23	107.3	22 13.4	97 23	107.2
9	20 32.1	97 23	106.6	21 01.2	97 23	106.5	21 30.3	97 23	106.3	21 59.4	97 23	106.2
70	20 18.2	97 23	105.6	20 47.3	97 23	105.5	21 16.4	97 23	105.3	21 45.5	97 23	105.2
1	20 04.2	97 23	104.6	20 33.3	97 23	104.5	21 02.4	97 23	104.4	21 31.4	97 24	104.2
2	19 50.1	97 24	103.6	20 19.2	97 24	103.5	20 48.3	97 24	103.4	21 17.3	97 24	103.2
3	19 36.0	97 24	102.6	20 05.0	97 24	102.5	20 34.1	97 24	102.4	21 03.2	97 24	102.2
4	19 21.8	97 24	101.6	19 50.8	97 24	101.5	20 19.9	97 24	101.4	20 49.0	97 24	101.2
75	19 07.5	97 24	100.7	19 36.6	97 24	100.5	20 05.7	97 24	100.4	20 34.7	97 24	100.3
6	18 53.2	97 24	99.7	19 22.3	97 24	99.5	19 51.4	97 24	99.4	20 20.4	97 24	99.3
7	18 38.9	97 24	98.7	19 08.0	97 24	98.6	19 37.0	97 24	98.4	20 06.1	97 24	98.3
8	18 24.5	97 24	97.7	18 53.6	97 24	97.6	19 22.6	97 24	97.4	19 51.7	97 24	97.3
9	18 10.1	97 24	96.7	18 39.2	97 24	96.6	19 08.2	97 24	96.5	19 37.3	97 24	96.3
80	17 55.7	97 24	95.7	18 24.8	97 24	95.6	18 53.8	97 24	95.5	19 22.8	97 24	95.3
1	17 41.3	97 24	94.8	18 10.3	97 24	94.6	18 39.3	97 24	94.5	19 08.4	97 24	94.4
2	17 26.8	97 24	93.8	17 55.8	97 24	93.7	18 24.9	97 24	93.5	18 53.9	97 24	93.4
3	17 12.3	97 24	92.8	17 41.3	97 24	92.7	18 10.4	97 24	92.6	18 39.4	97 24	92.4
4	16 57.8	97 24	91.8	17 26.8	97 24	91.7	17 55.9	97 24	91.6	18 24.9	97 24	91.4
85	16 43.3	97 24	90.9	17 12.3	97 24	90.7	17 41.3	97 24	90.6	18 10.4	97 24	90.5
6	16 28.8	97 24	89.9	16 57.8	97 24	89.8	17 26.8	97 24	89.6	17 55.8	97 24	89.5
7	16 14.3	97 24	88.9	16 43.3	97 24	88.8	17 12.3	97 24	88.7	17 41.3	97 24	88.5
8	15 59.7	97 24	88.0	16 28.8	97 24	87.8	16 57.8	97 24	87.7	17 26.8	97 24	87.6
9	15 45.2	97 24	87.0	16 14.3	97 24	86.9	16 43.3	97 24	86.7	17 12.3	97 24	86.6
90	15 30.8	97 24	86.0	15 59.8	97 24	85.9	16 28.8	97 24	85.8	16 57.8	97 24	85.6

H.A.	18° 00′			18° 30′			19° 00′			19° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0
1	31 59.9	1.0 01	178.9	32 29.9	1.0 01	178.9	32 59.9	1.0 01	178.9	33 29.9	1.0 01	178.9
2	31 59.4	1.0 01	177.8	32 29.4	1.0 01	177.8	32 59.4	1.0 01	177.7	33 29.4	1.0 01	177.7
3	31 58.7	1.0 02	176.6	32 28.7	1.0 02	176.6	32 58.7	1.0 02	176.6	33 28.7	1.0 02	176.6
4	31 57.7	1.0 02	175.5	32 27.7	1.0 02	175.5	32 57.7	1.0 02	175.5	33 27.7	1.0 02	175.5
05	31 56.5	1.0 03	174.4	32 26.4	1.0 03	174.4	32 56.4	1.0 03	174.4	33 26.4	1.0 03	174.3
6	31 54.9	1.0 03	173.3	32 24.9	1.0 03	173.3	32 54.9	1.0 03	173.2	33 24.9	1.0 03	173.2
7	31 53.1	1.0 04	172.2	32 23.0	1.0 04	172.1	32 53.0	1.0 04	172.1	33 23.0	1.0 04	172.1
8	31 50.9	1.0 04	171.0	32 20.9	1.0 04	171.0	32 50.9	1.0 04	171.0	33 20.9	1.0 04	171.0
9	31 48.5	1.0 04	169.9	32 18.5	1.0 04	169.9	32 48.5	1.0 04	169.9	33 18.4	1.0 04	169.8
10	31 45.8	1.0 05	168.8	32 15.8	1.0 05	168.8	32 45.8	1.0 05	168.7	33 15.7	1.0 05	168.7
1	31 42.9	1.0 05	167.7	32 12.8	1.0 05	167.7	32 42.8	1.0 05	167.6	33 12.8	1.0 05	167.6
2	31 39.7	1.0 06	166.6	32 09.6	1.0 06	166.5	32 39.6	1.0 06	166.5	33 09.5	1.0 06	166.5
3	31 36.1	1.0 06	165.5	32 06.1	1.0 06	165.4	32 36.0	1.0 06	165.4	33 06.0	1.0 06	165.3
4	31 32.4	1.0 07	164.3	32 02.3	1.0 07	164.3	32 32.2	1.0 07	164.3	33 02.1	1.0 07	164.2
15	31 28.3	1.0 07	163.2	31 58.2	1.0 07	163.2	32 28.1	1.0 07	163.1	32 58.1	1.0 07	163.1
6	31 24.0	1.0 08	162.1	31 53.9	1.0 08	162.1	32 23.8	1.0 08	162.0	32 53.7	1.0 08	162.0
7	31 19.4	1.0 08	161.0	31 49.3	1.0 08	161.0	32 19.2	1.0 08	160.9	32 49.1	1.0 08	160.9
8	31 14.5	1.0 09	159.9	31 44.4	1.0 09	159.8	32 14.3	1.0 09	159.8	32 44.2	1.0 09	159.7
9	31 09.4	1.0 09	158.8	31 39.3	1.0 09	158.7	32 09.2	1.0 09	158.7	32 39.0	1.0 09	158.6
20	31 04.0	1.0 09	157.7	31 33.9	1.0 09	157.6	32 03.8	1.0 09	157.6	32 33.6	1.0 09	157.5
1	30 58.4	99 10	156.6	31 28.2	99 10	156.5	31 58.1	99 10	156.5	32 27.9	99 10	156.4
2	30 52.5	99 10	155.5	31 22.3	99 10	155.4	31 52.2	99 10	155.4	32 22.0	99 10	155.3
3	30 46.3	99 11	154.4	31 16.2	99 11	154.3	31 46.0	99 11	154.2	32 15.8	99 11	154.2
4	30 39.9	99 11	153.3	31 09.7	99 11	153.2	31 39.5	99 11	153.1	32 09.3	99 11	153.1
25	30 33.3	99 11	152.2	31 03.1	99 12	152.1	31 32.9	99 12	152.0	32 02.6	99 12	152.0
6	30 26.4	99 12	151.1	30 56.2	99 12	151.0	31 25.9	99 12	150.9	31 55.7	99 12	150.9
7	30 19.3	99 12	150.0	30 49.0	99 12	149.9	31 18.8	99 12	149.8	31 48.5	99 12	149.8
8	30 11.9	99 13	148.9	30 41.6	99 13	148.8	31 11.3	99 13	148.7	31 41.1	99 13	148.7
9	30 04.3	99 13	147.8	30 34.0	99 13	147.7	31 03.7	99 13	147.6	31 33.4	99 13	147.6
30	29 56.4	99 13	146.7	30 26.1	99 14	146.6	30 55.8	99 14	146.6	31 25.5	99 14	146.5
1	29 48.3	99 14	145.6	30 18.0	99 14	145.5	30 47.7	99 14	145.5	31 17.4	99 14	145.4
2	29 40.0	99 14	144.5	30 09.7	99 14	144.5	30 39.4	99 14	144.4	31 09.0	99 14	144.3
3	29 31.5	99 15	143.5	30 01.1	99 15	143.4	30 30.8	99 15	143.3	31 00.4	99 15	143.2
4	29 22.7	99 15	142.4	29 52.4	99 15	142.3	30 22.0	99 15	142.2	30 51.6	99 15	142.1
35	29 13.8	99 15	141.3	29 43.4	99 15	141.2	30 13.0	99 15	141.1	30 42.6	99 15	141.0
6	29 04.6	99 16	140.2	29 34.2	99 16	140.1	30 03.8	99 16	140.0	30 33.4	99 16	140.0
7	28 55.2	99 16	139.2	29 24.8	99 16	139.1	29 54.4	99 16	139.0	30 23.9	99 16	138.9
8	28 45.6	99 16	138.1	29 15.2	99 16	138.0	29 44.7	99 16	137.9	30 14.3	99 16	137.8
9	28 35.8	98 17	137.0	29 05.4	98 17	136.9	29 34.9	98 17	136.8	30 04.4	98 17	136.7
40	28 25.8	98 17	136.0	28 55.3	98 17	135.9	29 24.9	98 17	135.8	29 54.4	98 17	135.7
1	28 15.6	98 17	134.9	28 45.1	98 17	134.8	29 14.6	98 17	134.7	29 44.1	98 17	134.6
2	28 05.3	98 18	133.8	28 34.7	98 18	133.7	29 04.2	98 18	133.6	29 33.7	98 18	133.5
3	27 54.7	98 18	132.8	28 24.2	98 18	132.7	28 53.6	98 18	132.6	29 23.1	98 18	132.5
4	27 44.0	98 18	131.7	28 13.4	98 18	131.6	28 42.8	98 18	131.5	29 12.3	98 18	131.4
45	27 33.0	98 18	130.7	28 02.5	98 19	130.6	28 31.9	98 19	130.4	29 01.3	98 19	130.3
6	27 21.9	98 19	129.6	27 51.3	98 19	129.5	28 20.8	98 19	129.4	28 50.2	98 19	129.3
7	27 10.7	98 19	128.6	27 40.1	98 19	128.5	28 09.5	98 19	128.3	28 38.8	98 19	128.2
8	26 59.2	98 19	127.5	27 28.6	98 19	127.4	27 58.0	98 19	127.3	28 27.4	98 19	127.2
9	26 47.6	98 20	126.5	27 17.0	98 20	126.4	27 46.4	98 20	126.2	28 15.7	98 20	126.1
50	26 35.9	98 20	125.4	27 05.2	98 20	125.3	27 34.6	98 20	125.2	28 03.9	98 20	125.1
1	26 24.0	98 20	124.4	26 53.3	98 20	124.3	27 22.6	98 20	124.2	27 52.0	98 20	124.0
2	26 11.9	98 20	123.4	26 41.3	98 20	123.2	27 10.6	98 20	123.1	27 39.9	98 20	123.0
3	25 59.7	98 21	122.3	26 29.0	98 21	122.2	26 58.3	98 21	122.1	27 27.6	98 21	122.0
4	25 47.4	98 21	121.3	26 16.7	98 21	121.2	26 46.0	98 21	121.0	27 15.2	98 21	120.9
55	25 34.9	98 21	120.3	26 04.2	98 21	120.1	26 33.5	98 21	120.0	27 02.7	97 21	119.9
6	25 22.3	98 21	119.2	25 51.6	97 21	119.1	26 20.8	97 21	119.0	26 50.1	97 21	118.9
7	25 09.6	97 21	118.2	25 38.8	97 21	118.1	26 08.1	97 21	118.0	26 37.3	97 22	117.8
8	24 56.8	97 22	117.2	25 26.0	97 22	117.1	25 55.2	97 22	116.9	26 24.4	97 22	116.8
9	24 43.8	97 22	116.2	25 13.0	97 22	116.0	25 42.2	97 22	115.9	26 11.4	97 22	115.8
60	24 30.7	97 22	115.1	24 59.9	97 22	115.0	25 29.1	97 22	114.9	25 58.3	97 22	114.8
1	24 17.5	97 22	114.1	24 46.7	97 22	114.0	25 15.9	97 22	113.9	25 45.0	97 22	113.7
2	24 04.2	97 22	113.1	24 33.4	97 22	113.0	25 02.5	97 22	112.9	25 31.7	97 22	112.7
3	23 50.8	97 22	112.1	24 20.0	97 23	112.0	24 49.1	97 23	111.8	25 18.2	97 23	111.7
4	23 37.3	97 23	111.1	24 06.5	97 23	111.0	24 35.6	97 23	110.8	25 04.7	97 23	110.7
65	23 23.7	97 23	110.1	23 52.9	97 23	110.0	24 22.0	97 23	109.8	24 51.1	97 23	109.7
6	23 10.0	97 23	109.1	23 39.2	97 23	109.0	24 08.3	97 23	108.8	24 37.4	97 23	108.7
7	22 56.3	97 23	108.1	23 25.4	97 23	107.9	23 54.5	97 23	107.8	24 23.6	97 23	107.7
8	22 42.5	97 23	107.1	23 11.6	97 23	106.9	23 40.6	97 23	106.8	24 09.7	97 23	106.7
9	22 28.5	97 23	106.1	22 57.6	97 23	105.9	23 26.7	97 23	105.8	23 55.8	97 23	105.7
70	22 14.6	97 23	105.1	22 43.6	97 23	104.9	23 12.7	97 23	104.8	23 41.8	97 23	104.7
1	22 00.5	97 24	104.1	22 29.6	97 24	104.0	22 58.6	97 24	103.8	23 27.7	97 24	103.7
2	21 46.4	97 24	103.1	22 15.5	97 24	103.0	22 44.5	97 24	102.8	23 13.6	97 24	102.7
3	21 32.2	97 24	102.1	22 01.3	97 24	102.0	22 30.3	97 24	101.8	22 59.4	97 24	101.7
4	21 18.0	97 24	101.1	21 47.1	97 24	101.0	22 16.1	97 24	100.8	22 45.1	97 24	100.7
75	21 03.8	97 24	100.1	21 32.8	97 24	100.0	22 01.8	97 24	99.9	22 30.9	97 24	99.7
6	20 49.4	97 24	99.1	21 18.5	97 24	99.0	21 47.5	97 24	98.9	22 16.5	97 24	98.7
7	20 35.1	97 24	98.2	21 04.1	97 24	98.0	21 33.1	97 24	97.9	22 02.2	97 24	97.7
8	20 20.7	97 24	97.2	20 49.7	97 24	97.0	21 18.8	97 24	96.9	21 47.8	97 24	96.8
9	20 06.3	97 24	96.2	20 35.3	97 24	96.1	21 04.3	97 24	95.9	21 33.3	97 24	95.8
80	19 51.8	97 24	95.2	20 20.9	97 24	95.1	20 49.9	97 24	94.9	21 18.9	97 24	94.8
1	19 37.4	97 24	94.2	20 06.4	97 24	94.1	20 35.4	97 24	94.0	21 04.4	97 24	93.8
2	19 22.9	97 24	93.3	19 51.9	97 24	93.1	20 20.9	97 24	93.0	20 49.9	97 24	92.9
3	19 08.4	97 24	92.3	19 37.4	97 24	92.2	20 06.4	97 24	92.0	20 35.4	97 24	91.9
4	18 53.9	97 24	91.3	19 22.9	97 24	91.2	19 51.9	97 24	91.0	20 20.9	97 24	90.9
85	18 39.4	97 24	90.3	19 08.4	97 24	90.2	19 37.4	97 24	90.1	20 06.4	97 24	89.9
6	18 24.9	97 24	89.4	18 53.9	97 24	89.2	19 22.9	97 24	89.1	19 51.9	97 24	89.0
7	18 10.4	97 24	88.4	18 39.4	97 24	88.3	19 08.4	97 24	88.1	19 37.4	97 24	88.0
8	17 55.8	97 24	87.4	18 24.9	97 24	87.3	18 53.9	97 24	87.2	19 22.9	97 24	87.0
9	17 41.4	97 24	86.5	18 10.4	97 24	86.3	18 39.4	97 24	86.2	19 08.4	97 24	86.1
90	17 26.9	97 24	85.5	17 55.9	97 24	85.4	18 24.9	97 24	85.2	18 53.9	97 24	85.1

Lat. 76°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	15 16.3	97 24	85.1	15 45.3	97 24	84.9	16 14.4	97 24	84.8	16 43.4	97 24	84.7	17 12.4	97 24	84.5	17 41.4	97 24	84.4	18 10.4	97 24	84.3	18 39.5	97 24	84.1	91
2	15 01.8	97 24	84.1	15 30.9	97 24	84.0	15 59.9	97 24	83.8	16 28.9	97 24	83.7	16 58.0	97 24	83.6	17 27.0	97 24	83.4	17 56.0	97 24	83.3	18 25.0	97 24	83.2	2
3	14 47.4	97 24	83.1	15 16.5	97 24	83.0	15 45.5	97 24	82.9	16 14.5	97 24	82.7	16 43.6	97 24	82.6	17 12.6	97 24	82.5	17 41.6	97 24	82.4	18 10.6	97 24	82.2	3
4	14 33.0	97 24	82.2	15 02.1	97 24	82.0	15 31.1	97 24	81.9	16 00.1	97 24	81.8	16 29.2	97 24	81.7	16 58.2	97 24	81.5	17 27.2	97 24	81.4	17 56.3	97 24	81.3	4
95	14 18.6	97 24	81.2	14 47.7	97 24	81.1	15 16.8	97 24	81.0	15 45.8	97 24	80.8	16 14.8	97 24	80.7	16 43.9	97 24	80.6	17 12.9	97 24	80.4	17 41.9	97 24	80.3	95
6	14 04.3	97 24	80.3	14 33.4	97 24	80.1	15 02.4	97 24	80.0	15 31.5	97 24	79.9	16 00.5	97 24	79.7	16 29.6	97 24	79.6	16 58.6	97 24	79.5	17 27.7	97 24	79.3	6
7	13 50.0	97 24	79.3	14 19.1	97 24	79.2	14 48.2	97 24	79.0	15 17.2	97 24	78.9	15 46.3	97 24	78.8	16 15.3	97 24	78.7	16 44.4	97 24	78.5	17 13.4	97 24	78.4	7
8	13 35.8	97 24	78.3	14 04.9	97 24	78.2	14 33.9	97 24	78.1	15 03.0	97 24	78.0	15 32.1	97 24	77.8	16 01.1	97 24	77.7	16 30.2	97 24	77.6	16 59.2	97 24	77.4	8
9	13 21.6	97 24	77.4	13 50.7	97 24	77.3	14 19.8	97 24	77.1	14 48.8	97 24	77.0	15 17.9	97 24	76.9	15 47.0	97 24	76.7	16 16.0	97 23	76.6	16 45.1	97 23	76.5	9
100	13 07.5	97 23	76.4	13 36.6	97 23	76.3	14 05.6	97 23	76.2	14 34.7	97 23	76.0	15 03.8	97 23	75.9	15 32.9	97 23	75.8	16 01.9	97 23	75.7	16 31.0	97 23	75.5	100
1	12 53.4	97 23	75.5	13 22.5	97 23	75.3	13 51.6	97 23	75.2	14 20.7	97 23	75.1	14 49.7	97 23	75.0	15 18.8	97 23	74.8	15 47.9	97 23	74.7	16 17.0	97 23	74.6	1
2	12 39.4	97 23	74.5	13 08.5	97 23	74.4	13 37.6	97 23	74.3	14 06.7	97 23	74.1	14 35.8	97 23	74.0	15 04.8	97 23	73.9	15 33.9	97 23	73.8	16 03.0	97 23	73.6	2
3	12 25.4	97 23	73.6	12 54.5	97 23	73.4	13 23.6	97 23	73.3	13 52.7	97 23	73.2	14 21.8	97 23	73.1	14 50.9	97 23	72.9	15 20.0	97 23	72.8	15 49.1	97 23	72.7	3
4	12 11.5	97 23	72.6	12 40.6	97 23	72.5	13 09.8	97 23	72.4	13 38.9	97 23	72.2	14 08.0	97 23	72.1	14 37.1	97 23	72.0	15 06.2	97 23	71.9	15 35.3	97 23	71.7	4
105	11 57.7	97 23	71.6	12 26.8	97 23	71.5	12 56.0	97 23	71.4	13 25.1	97 23	71.3	13 54.2	97 23	71.2	14 23.3	97 23	71.0	14 52.4	97 23	70.9	15 21.5	97 23	70.8	105
6	11 44.0	97 23	70.7	12 13.1	97 23	70.6	12 42.3	97 23	70.4	13 11.4	97 23	70.3	13 40.5	97 23	70.2	14 09.6	97 23	70.1	14 38.8	97 23	70.0	15 07.9	97 23	69.8	6
7	11 30.3	97 23	69.7	11 59.5	97 23	69.6	12 28.6	97 23	69.5	12 57.8	97 23	69.4	13 26.9	97 23	69.3	13 56.0	97 23	69.1	14 25.2	97 22	69.0	14 54.3	97 22	68.9	7
8	11 16.7	97 22	68.8	11 45.9	97 22	68.7	12 15.1	97 22	68.5	12 44.2	97 22	68.4	13 13.4	97 22	68.3	13 42.5	97 22	68.2	14 11.7	97 22	68.1	14 40.8	97 22	67.9	8
9	11 03.3	97 22	67.8	11 32.4	97 22	67.7	12 01.6	97 22	67.6	12 30.8	97 22	67.5	12 59.9	97 22	67.4	13 29.1	97 22	67.2	13 58.2	97 22	67.1	14 27.4	97 22	67.0	9
110	10 49.9	97 22	66.9	11 19.0	97 22	66.8	11 48.2	97 22	66.6	12 17.4	97 22	66.5	12 46.6	97 22	66.4	13 15.8	97 22	66.3	13 44.9	97 22	66.2	14 14.1	97 22	66.0	110
1	10 36.6	97 22	65.9	11 05.8	97 22	65.8	11 34.9	97 22	65.7	12 04.1	97 22	65.6	12 33.3	97 22	65.5	13 02.5	97 22	65.3	13 31.7	97 22	65.2	14 00.9	97 22	65.1	1
2	10 23.4	97 22	65.0	10 52.6	97 22	64.9	11 21.8	97 22	64.7	11 51.0	97 22	64.6	12 20.2	97 22	64.5	12 49.4	97 22	64.4	13 18.6	97 22	64.3	13 47.8	97 22	64.2	2
3	10 10.3	97 22	64.0	10 39.5	97 22	63.9	11 08.7	97 22	63.8	11 37.9	97 22	63.7	12 07.1	97 22	63.6	12 36.3	97 22	63.4	13 05.5	97 22	63.3	13 34.7	97 22	63.2	3
4	9 57.3	97 22	63.1	10 26.5	97 21	63.0	10 55.7	97 21	62.8	11 25.0	97 21	62.7	11 54.2	97 21	62.6	12 23.4	97 21	62.5	12 52.6	97 21	62.4	13 21.8	97 21	62.3	4
115	9 44.4	97 21	62.1	10 13.6	97 21	62.0	10 42.9	97 21	61.9	11 12.1	97 21	61.8	11 41.3	97 21	61.7	12 10.6	97 21	61.6	12 39.8	97 21	61.4	13 09.0	97 21	61.3	115
6	9 31.6	98 21	61.2	10 00.9	98 21	61.1	10 30.1	98 21	60.9	10 59.4	98 21	60.8	11 28.6	98 21	60.7	11 57.9	97 21	60.6	12 27.1	97 21	60.5	12 56.4	97 21	60.4	6
7	9 18.9	98 21	60.2	9 48.2	98 21	60.1	10 17.5	98 21	60.0	10 46.8	98 21	59.9	11 16.0	98 21	59.8	11 45.3	98 21	59.7	12 14.6	98 21	59.5	12 43.8	98 21	59.4	7
8	9 06.4	98 21	59.3	9 35.7	98 21	59.2	10 05.0	98 21	59.0	10 34.3	98 21	58.9	11 03.5	98 21	58.8	11 32.8	98 21	58.7	12 02.1	98 21	58.6	12 31.4	98 21	58.5	8
9	8 54.0	98 20	58.3	9 23.3	98 20	58.2	9 52.6	98 20	58.1	10 21.9	98 20	58.0	10 51.2	98 20	57.9	11 20.5	98 20	57.8	11 49.8	98 20	57.7	12 19.1	98 20	57.6	9
120	8 41.7	98 20	57.4	9 11.0	98 20	57.3	9 40.3	98 20	57.2	10 09.6	98 20	57.0	10 39.0	98 20	56.9	11 08.3	98 20	56.8	11 37.6	98 20	56.7	12 06.9	98 20	56.6	120
1	8 29.5	98 20	56.4	8 58.9	98 20	56.3	9 28.2	98 20	56.2	9 57.5	98 20	56.1	10 26.9	98 20	56.0	10 56.2	98 20	55.9	11 25.5	98 20	55.8	11 54.8	98 20	55.7	1
2	8 17.5	98 20	55.5	8 46.9	98 20	55.4	9 16.2	98 20	55.3	9 45.6	98 20	55.2	10 14.9	98 20	55.0	10 44.2	98 20	54.9	11 13.6	98 20	54.8	11 42.9	98 20	54.7	2
3	8 05.6	98 20	54.5	8 35.0	98 20	54.4	9 04.4	98 20	54.3	9 33.7	98 20	54.2	10 03.1	98 19	54.1	10 32.4	98 19	54.0	11 01.8	98 19	53.9	11 31.1	98 19	53.8	3
4	7 53.9	98 19	53.6	8 23.3	98 19	53.5	8 52.6	98 19	53.4	9 22.0	98 19	53.3	9 51.4	98 19	53.2	10 20.7	98 19	53.1	10 50.1	98 19	52.9	11 19.5	98 19	52.8	4
125	7 42.3	98 19	52.6	8 11.7	98 19	52.5	8 41.1	98 19	52.4	9 10.4	98 19	52.3	9 39.8	98 19	52.2	10 09.2	98 19	52.1	10 38.6	98 19	52.0	11 08.0	98 19	51.9	125
6	7 30.8	98 19	51.7	8 00.2	98 19	51.6	8 29.6	98 19	51.5	8 59.0	98 19	51.4	9 28.4	98 19	51.3	9 57.8	98 19	51.2	10 27.2	98 19	51.1	10 56.6	98 19	51.0	6
7	7 19.5	98 19	50.7	7 48.9	98 19	50.6	8 18.3	98 19	50.5	8 47.8	98 18	50.4	9 17.2	98 18	50.3	9 46.6	98 18	50.2	10 16.0	98 18	50.1	10 45.4	98 18	50.0	7
8	7 08.3	98 18	49.8	7 37.8	98 18	49.7	8 07.2	98 18	49.6	8 36.7	98 18	49.5	9 06.1	98 18	49.4	9 35.5	98 18	49.3	10 05.0	98 18	49.2	10 34.4	98 18	49.1	8
9	6 57.3	98 18	48.8	7 26.8	98 18	48.7	7 56.3	98 18	48.6	8 25.7	98 18	48.5	8 55.2	98 18	48.4	9 24.6	98 18	48.3	9 54.1	98 18	48.2	10 23.5	98 18	48.1	9
130	6 46.5	98 18	47.9	7 16.0	98 18	47.8	7 45.4	98 18	47.7	8 14.9	98 18	47.6	8 44.4	98 18	47.5	9 13.8	98 18	47.4	9 43.3	98 18	47.3	10 12.8	98 18	47.2	130
1	6 35.8	98 18	46.9	7 05.3	98 18	46.8	7 34.8	98 17	46.7	8 04.3	98 17	46.6	8 33.8	98 17	46.5	9 03.2	98 17	46.4	9 32.7	98 17	46.4	10 02.2	98 17	46.3	1
2	6 25.3	98 17	46.0	6 54.8	98 17	45.9	7 24.3	98 17	45.8	7 53.8	98 17	45.7	8 23.3	98 17	45.6	8 52.8	98 17	45.5	9 22.3	98 17	45.4	9 51.8	98 17	45.3	2
3	6 14.9	98 17	45.0	6 44.5	98 17	44.9	7 14.0	98 17	44.8	7 43.5	98 17	44.7	8 13.0	98 17	44.6	8 42.5	98 17	44.6	9 12.1	98 17	44.5	9 41.6	98 17	44.4	3
4	6 04.8	98 17	44.1	6 34.3	98 17	44.0	7 03.8	98 17	43.9	7 33.4	98 17	43.8	8 02.9	98 17	43.7	8 32.4	98 17	43.6	9 02.0	98 16	43.5	9 31.5	98 16	43.4	4
135	5 54.8	99 16	43.1	6 24.3	99 16	43.0	6 53.9	99 16	42.9	7 23.4	99 16	42.8	7 53.0	98 16	42.8	8 22.5	98 16	42.7	8 52.1	98 16	42.6	9 21.6	98 16	42.5	135
6	5 44.9	99 16	42.2	6 14.5	99 16	42.1	6 44.1	99 16	42.0	7 13.6	99 16	41.9	7 43.2	99 16	41.8	8 12.8	99 16	41.7	8 42.3	99 16	41.6	9 11.9	99 16	41.6	6
7	5 35.3	99 16	41.2	6 04.9	99 16	41.1	6 34.4	99 16	41.0	7 04.0	99 16	41.0	7 33.6	99 16	40.9	8 03.2	99 16	40.8	8 32.8	99 16	40.7	9 02.3	99 16	40.6	7
8	5 25.8	99 15	40.2	5 55.4	99 15	40.2	6 25.0	99 15	40.1	6 54.6	99 15	40.0	7 24.2	99 15	39.9	7 53.8	99 15	39.8	8 23.4	99 15	39.8	8 53.0	99 15	39.7	8
9	5 16.5	99 15	39.3	5 46.1	99 15	39.2	6 15.8	99 15	39.1	6 45.4	99 15	39.1	7 15.0	99 15	39.0	7 44.6	99 15	38.9	8 14.2	99 15	38.8	8 43.8	99 15	38.7	9
140	5 07.4	99 15	38.3	5 37.1	99 15	38.3	6 06.7	99 15	38.2	6 36.3	99 15	38.1	7 05.9	99 15	38.0	7 35.6	99 15	37.9	8 05.2	99 15	37.9	8 34.8	99 15	37.8	140
1				5 28.2	99 15	37.3	5 57.8	99 14	37.2	6 27.5	99 14	37.2	6 57.1	99 14	37.1	7 26.7	99 14	37.0	7 56.4	99 14	36.9	8 26.0	99 14	36.8	1
2				5 19.5	99 14	36.4	5 49.1	99 14	36.3	6 18.8	99 14	36.2	6 48.4	99 14	36.1	7 18.1	99 14	36.1	7 47.8	99 14	36.0	8 17.4	99 14	35.9	2
3				5 10.9	99 14	35.4	5 40.6	99 14	35.3	6 10.3	99 14	35.3	6 40.0	99 14	35.2	7 09.7	99 14	35.1	7 39.3	99 14	35.0	8 09.0	99 14	35.0	3
4				5 02.6	99 14	34.5	5 32.3	99 14	34.4	6 02.0	99 13	34.3	6 31.7	99 13	34.2	7 01.4	99 13	34.2	7 31.1	99 13	34.1	8 00.8	99 13	34.0	4
145							5 24.2	99 13	33.4	5 53.9	99 13	33.4	6 23.6	99 13	33.3	6 53.4	99 13	33.2	7 23.1	99 13	33.2	7 52.8	99 13	33.1	145
6							5 16.3	99 13	32.5	5 46.1	99 13	32.4	6 15.8	99 13	32.3	6 45.5	99 13	32.3	7 15.2	99 13	32.2	7 44.9	99 13	32.1	6
7							5 08.6	99 12	31.5	5 38.4	99 12	31.5	6 08.1	99 12	31.4	6 37.8	99 12	31.3	7 07.6	99 12	31.3	7 37.3	99 12	31.2	7
8							5 01.2	99 12	30.6	5 30.9	99 12	30.5	6 00.7	99 12	30.4	6 30.4	99 12	30.4	7 00.2	99 12	30.3	7 29.9	99 12	30.3	8
9										5 23.6	99 12	29.6	5 53.4	99 12	29.5	6 23.2	99 12	29.4	6 52.9	99 12	29.4	7 22.7	99 12	29.3	9
150										5 16.6	99 11	28.6	5 46.4	99 11	28.6	6 16.1	99 11	28.5	6 45.9	99 11	28.4	7 15.7	99 11	28.4	150
1										5 09.7	99 11	27.7	5 39.5	99 11	27.6	6 09.3	99 11	27.5	6 39.1	99 11	27.5	7 08.9	99 11	27.4	1
2										5 03.1	99 11	26.7	5 32.9	99 11	26.7	6 02.7	99 11	26.6	6 32.5	99 11	26.5	7 02.3	99 11	26.5	2
3													5 26.5	99 10	25.7	5 56.3	99 10	25.6	6 26.1	99 10	25.6	6 56.0	99 10	25.5	3
4													5 20.3	99 10	24.8	5 50.1	99 10	24.7	6 20.0	99 10	24.6	6 49.8	99 10	24.6	4
155													5 14.3	99 10	23.8	5 44.2	99 10	23.8	6 14.0	99 10	23.7	6 43.9	99 10	23.6	155
6													5 08.6	1.0 09	22.9	5 38.5	1.0 09	22.8	6 08.3	1.0 09	22.8	6 38.2	1.0 09	22.7	6
7													5 03.1	1.0 09	21.9	5 32.9	1.0 09	21.9	6 02.8	1.0 09	21.8	6 32.7	1.0 09	21.8	7
8																5 27.6	1.0 08	20.9	5 57.5	1.0 08	20.9	6 27.4	1.0 08	20.8	8
9																5 22.6	1.0 08	20.0	5 52.5	1.0 08	19.9	6 22.4	1.0 08	19.9	9
160																5 17.7	1.0 08	19.0	5 47.6	1.0 08	19.0	6 17.5	1.0 08	18.9	160
1																5 13.1	1.0 07	18.1	5 43.0	1.0 07	18.0	6 12.9	1.0 07	18.0	1
2																5 08.7	1.0 07	17.1	5 38.7	1.0 07	17.1	6 08.6	1.0 07	17.0	2
3																5 04.6	1.0 07	16.2	5 34.5	1.0 07	16.1	6 04.4	1.0 07	16.1	3
4																5 00.7	1.0 06	15.2	5 30.6	1.0 06	15.2	6 00.5	1.0 06	15.1	4
165																			5 26.9	1.0 06	14.2	5 56.8	1.0 06	14.2	165
6																			5 23.5	1.0 05	13.3	5 53.4	1.0 05	13.3	6
7																			5 20.2	1.0 05	12.3	5 50.2	1.0 05	12.3	7
8																			5 17.3	1.0 05	11.4	5 47.2	1.0 05	11.4	8
9																			5 14.5	1.0 04	10.4	5 44.5	1.0 04	10.4	9
170																			5 12.0	1.0 04	09.5	5 42.0	1.0 04	09.5	170
1																			5 09.7	1.0 03	08.5	5 39.7	1.0 03	08.5	1
2																			5 07.7	1.0 03	07.6	5 37.7	1.0 03	07.6	2
3																			5 05.9	1.0 03	06.6	5 35.9	1.0 03	06.6	3
4																			5 04.3	1.0 02	05.7	5 34.3	1.0 02	05.7	4
175																			5 03.0	1.0 02	04.7	5 33.0	1.0 02	04.7	175
6																			5 01.9	1.0 01	03.8	5 31.9	1.0 01	03.8	6
7																			5 01.1	1.0 01	02.8	5 31.1	1.0 01	02.8	7
8																			5 00.5	1.0 01	01.9	5 30.5	1.0 01	01.9	8
9																			5 00.1	1.0 00	00.9	5 30.1	1.0 00	00.9	9
180																			5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	180

Lat. 77°

Lat. 78°

Lat. 76°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	00
1	33 59.9	1.0 01	178.9	34 29.9	1.0 01	178.9	34 59.9	1.0 01	178.9	35 29.9	1.0 01	178.9	35 59.9	1.0 01	178.9	36 29.9	1.0 01	178.9	36 59.9	1.0 01	178.8	37 29.9	1.0 01	178.8	1
2	33 59.4	1.0 01	177.7	34 29.4	1.0 01	177.7	34 59.4	1.0 01	177.7	35 29.4	1.0 01	177.7	35 59.4	1.0 01	177.7	36 29.4	1.0 01	177.7	36 59.4	1.0 01	177.7	37 29.4	1.0 01	177.7	2
3	33 58.7	1.0 02	176.6	34 28.7	1.0 02	176.6	34 58.7	1.0 02	176.6	35 28.7	1.0 02	176.6	35 58.7	1.0 02	176.6	36 28.7	1.0 02	176.6	36 58.7	1.0 02	176.5	37 28.7	1.0 02	176.5	3
4	33 57.7	1.0 02	175.5	34 27.7	1.0 02	175.5	34 57.7	1.0 02	175.4	35 27.7	1.0 02	175.4	35 57.7	1.0 02	175.4	36 27.7	1.0 02	175.4	36 57.7	1.0 02	175.4	37 27.7	1.0 02	175.4	4
05	33 56.4	1.0 03	174.3	34 26.4	1.0 03	174.3	34 56.4	1.0 03	174.3	35 26.4	1.0 03	174.3	35 56.4	1.0 03	174.3	36 26.4	1.0 03	174.3	36 56.4	1.0 03	174.2	37 26.3	1.0 03	174.2	05
6	33 54.8	1.0 03	173.2	34 24.8	1.0 03	173.2	34 54.8	1.0 03	173.2	35 24.8	1.0 03	173.1	35 54.8	1.0 03	173.1	36 24.8	1.0 03	173.1	36 54.8	1.0 03	173.1	37 24.7	1.0 03	173.1	6
7	33 53.0	1.0 04	172.1	34 23.0	1.0 04	172.0	34 52.9	1.0 04	172.0	35 22.9	1.0 04	172.0	35 52.9	1.0 04	172.0	36 22.9	1.0 04	172.0	36 52.9	1.0 04	171.9	37 22.8	1.0 04	171.9	7
8	33 50.8	1.0 04	170.9	34 20.8	1.0 04	170.9	34 50.8	1.0 04	170.9	35 20.8	1.0 04	170.9	35 50.7	1.0 04	170.8	36 20.7	1.0 04	170.8	36 50.7	1.0 04	170.8	37 20.7	1.0 04	170.8	8
9	33 48.4	1.0 04	169.8	34 18.4	1.0 05	169.8	34 48.3	1.0 05	169.8	35 18.3	1.0 05	169.7	35 48.3	1.0 05	169.7	36 18.2	1.0 05	169.7	36 48.2	1.0 05	169.6	37 18.2	1.0 05	169.6	9
10	33 45.7	1.0 05	168.7	34 15.7	1.0 05	168.7	34 45.6	1.0 05	168.6	35 15.6	1.0 05	168.6	35 45.5	1.0 05	168.6	36 15.5	1.0 05	168.5	36 45.5	1.0 05	168.5	37 15.4	1.0 05	168.5	10
1	33 42.7	1.0 05	167.6	34 12.7	1.0 05	167.5	34 42.6	1.0 05	167.5	35 12.6	1.0 06	167.5	35 42.5	1.0 06	167.4	36 12.5	1.0 06	167.4	36 42.4	1.0 06	167.3	37 12.4	1.0 06	167.3	1
2	33 39.4	1.0 06	166.4	34 09.4	1.0 06	166.4	34 39.3	1.0 06	166.4	35 09.3	1.0 06	166.4	35 39.2	1.0 06	166.3	36 09.2	1.0 06	166.2	36 39.1	1.0 06	166.2	37 09.0	1.0 06	166.2	2
3	33 35.9	1.0 06	165.3	34 05.8	1.0 06	165.3	34 35.8	1.0 06	165.2	35 05.7	1.0 06	165.2	35 35.6	1.0 06	165.1	36 05.6	1.0 06	165.1	36 35.5	1.0 06	165.1	37 05.4	1.0 06	165.0	3
4	33 32.1	1.0 07	164.2	34 02.0	1.0 07	164.1	34 31.9	1.0 07	164.1	35 01.8	1.0 07	164.0	35 31.8	1.0 07	164.0	36 01.7	1.0 07	164.0	36 31.6	1.0 07	163.9	37 01.5	1.0 07	163.9	4
15	33 28.0	1.0 07	163.0	33 57.9	1.0 07	163.0	34 27.8	1.0 07	163.0	34 57.7	1.0 07	162.9	35 27.6	1.0 07	162.9	35 57.5	1.0 07	162.8	36 27.5	1.0 07	162.8	36 57.4	1.0 07	162.7	15
6	33 23.6	1.0 08	161.9	33 53.5	1.0 08	161.9	34 23.4	1.0 08	161.8	34 53.3	1.0 08	161.8	35 23.2	1.0 08	161.7	35 53.1	1.0 08	161.7	36 23.0	1.0 08	161.6	36 52.9	1.0 08	161.6	6
7	33 19.0	1.0 08	160.8	33 48.9	1.0 08	160.8	34 18.8	1.0 08	160.7	34 48.6	1.0 08	160.7	35 18.5	1.0 08	160.6	35 48.4	1.0 08	160.5	36 18.3	1.0 08	160.5	36 48.2	1.0 08	160.4	7
8	33 14.1	1.0 09	159.7	33 43.9	1.0 09	159.6	34 13.8	1.0 09	159.6	34 43.7	1.0 09	159.5	35 13.6	1.0 09	159.5	35 43.4	1.0 09	159.4	36 13.3	1.0 09	159.4	36 43.2	1.0 09	159.3	8
9	33 08.9	1.0 09	158.6	33 38.8	1.0 09	158.5	34 08.6	1.0 09	158.5	34 38.5	1.0 09	158.4	35 08.4	1.0 09	158.3	35 38.2	1.0 09	158.3	36 08.1	1.0 09	158.2	36 37.9	1.0 09	158.2	9
20	33 03.5	1.0 10	157.5	33 33.3	1.0 10	157.4	34 03.2	1.0 10	157.3	34 33.0	99 10	157.3	35 02.9	99 10	157.2	35 32.7	99 10	157.1	36 02.5	99 10	157.1	36 32.4	99 10	157.0	20
1	32 57.8	99 10	156.3	33 27.6	99 10	156.3	33 57.4	99 10	156.2	34 27.3	99 10	156.1	34 57.1	99 10	156.1	35 26.9	99 10	156.0	35 56.8	99 10	156.0	36 26.6	99 10	155.9	1
2	32 51.8	99 10	155.2	33 21.6	99 10	155.2	33 51.5	99 10	155.1	34 21.3	99 10	155.0	34 51.1	99 10	155.0	35 20.9	99 10	154.9	35 50.7	99 10	154.8	36 20.5	99 11	154.8	2
3	32 45.6	99 11	154.1	33 15.4	99 11	154.0	33 45.2	99 11	154.0	34 15.0	99 11	153.9	34 44.8	99 11	153.8	35 14.6	99 11	153.8	35 44.4	99 11	153.7	36 14.2	99 11	153.6	3
4	32 39.1	99 11	153.0	33 08.9	99 11	152.9	33 38.7	99 11	152.9	34 08.5	99 11	152.8	34 38.3	99 11	152.7	35 08.1	99 11	152.6	35 37.9	99 11	152.6	36 07.6	99 11	152.5	4
25	32 32.4	99 12	151.9	33 02.2	99 12	151.8	33 32.0	99 12	151.7	34 01.7	99 12	151.7	34 31.5	99 12	151.6	35 01.3	99 12	151.5	35 31.0	99 12	151.4	36 00.8	99 12	151.4	25
6	32 25.5	99 12	150.8	32 55.2	99 12	150.7	33 25.0	99 12	150.6	33 54.7	99 12	150.6	34 24.5	99 12	150.5	34 54.2	99 12	150.4	35 24.0	99 12	150.3	35 53.7	99 12	150.2	6
7	32 18.3	99 12	149.7	32 48.0	99 12	149.6	33 17.7	99 12	149.5	33 47.5	99 12	149.5	34 17.2	99 13	149.4	34 46.9	99 13	149.3	35 16.7	99 13	149.2	35 46.4	99 13	149.1	7
8	32 10.8	99 13	148.6	32 40.5	99 13	148.5	33 10.3	99 13	148.4	33 40.0	99 13	148.3	34 09.7	99 13	148.3	34 39.4	99 13	148.2	35 09.1	99 13	148.1	35 38.8	99 13	148.0	8
9	32 03.1	99 13	147.5	32 32.8	99 13	147.4	33 02.5	99 13	147.3	33 32.2	99 13	147.2	34 01.9	99 13	147.2	34 31.6	99 13	147.1	35 01.3	99 13	147.0	35 31.0	99 13	146.9	9
30	31 55.2	99 14	146.4	32 24.9	99 14	146.3	32 54.6	99 14	146.2	33 24.3	99 14	146.1	33 54.0	99 14	146.0	34 23.6	99 14	146.0	34 53.3	99 14	145.9	35 23.0	99 14	145.8	30
1	31 47.1	99 14	145.3	32 16.7	99 14	145.2	32 46.4	99 14	145.1	33 16.1	99 14	145.0	33 45.7	99 14	144.9	34 15.4	99 14	144.9	34 45.0	99 14	144.8	35 14.7	99 14	144.7	1
2	31 38.7	99 14	144.2	32 08.3	99 14	144.1	32 38.0	99 14	144.0	33 07.6	99 15	143.9	33 37.3	99 15	143.8	34 06.9	99 15	143.7	34 36.6	99 15	143.7	35 06.2	99 15	143.6	2
3	31 30.1	99 15	143.1	31 59.7	99 15	143.0	32 29.3	99 15	142.9	32 59.0	99 15	142.8	33 28.6	99 15	142.7	33 58.2	99 15	142.6	34 27.8	99 15	142.6	34 57.5	99 15	142.5	3
4	31 21.3	99 15	142.0	31 50.9	99 15	141.9	32 20.5	99 15	141.8	32 50.1	99 15	141.7	33 19.7	99 15	141.6	33 49.3	99 15	141.5	34 18.9	99 15	141.4	34 48.5	99 15	141.3	4
35	31 12.2	99 15	140.9	31 41.8	99 15	140.8	32 11.4	99 16	140.7	32 41.0	99 16	140.7	33 10.6	99 16	140.6	33 40.2	99 16	140.5	34 09.8	99 16	140.4	34 39.3	99 16	140.2	35
6	31 03.0	99 16	139.9	31 32.5	99 16	139.8	32 02.1	99 16	139.7	32 31.7	99 16	139.6	33 01.3	99 16	139.5	33 30.8	99 16	139.4	34 00.4	99 16	139.3	34 29.9	99 16	139.2	6
7	30 53.5	99 16	138.8	31 23.1	99 16	138.7	31 52.6	99 16	138.6	32 22.2	99 16	138.5	32 51.7	98 16	138.4	33 21.3	98 16	138.3	33 50.8	98 16	138.2	34 20.3	98 16	138.1	7
8	30 43.8	98 16	137.7	31 13.4	98 16	137.6	31 42.9	98 17	137.5	32 12.4	98 17	137.4	32 42.0	98 17	137.3	33 11.5	98 17	137.2	33 41.0	98 17	137.1	34 10.5	98 17	137.0	8
9	30 34.0	98 17	136.6	31 03.5	98 17	136.5	31 33.0	98 17	136.4	32 02.5	98 17	136.3	32 32.0	98 17	136.2	33 01.5	98 17	136.1	33 31.0	98 17	136.0	34 00.5	98 17	135.9	9
40	30 23.9	98 17	135.5	30 53.4	98 17	135.4	31 22.9	98 17	135.3	31 52.4	98 17	135.2	32 21.9	98 17	135.1	32 51.4	98 17	135.0	33 20.8	98 17	134.9	33 50.3	98 17	134.8	40
1	30 13.6	98 17	134.5	30 43.1	98 17	134.4	31 12.6	98 17	134.3	31 42.1	98 18	134.2	32 11.5	98 18	134.0	32 41.0	98 18	133.9	33 10.5	98 18	133.8	33 39.9	98 18	133.7	1
2	30 03.2	98 18	133.4	30 32.7	98 18	133.3	31 02.1	98 18	133.2	31 31.6	98 18	133.1	32 01.0	98 18	133.0	32 30.5	98 18	132.9	32 59.9	98 18	132.7	33 29.3	98 18	132.6	2
3	29 52.5	98 18	132.3	30 22.0	98 18	132.2	30 51.4	98 18	132.1	31 20.9	98 18	132.0	31 50.3	98 18	131.9	32 19.7	98 18	131.8	32 49.2	98 18	131.7	33 18.6	98 18	131.5	3
4	29 41.7	98 18	131.3	30 11.2	98 18	131.2	30 40.6	98 18	131.1	31 10.0	98 18	130.9	31 39.4	98 18	130.8	32 08.8	98 18	130.7	32 38.2	98 18	130.6	33 07.6	98 18	130.5	4
45	29 30.7	98 19	130.2	30 00.1	98 19	130.1	30 29.6	98 19	130.0	30 58.9	98 19	129.9	31 28.3	98 19	129.8	31 57.7	98 19	129.6	32 27.1	98 19	129.5	32 56.5	98 19	129.4	45
6	29 19.6	98 19	129.2	29 49.0	98 19	129.1	30 18.3	98 19	128.9	30 47.7	98 19	128.8	31 17.1	98 19	128.7	31 46.5	98 19	128.6	32 15.8	98 19	128.5	32 45.2	98 19	128.3	6
7	29 08.2	98 19	128.1	29 37.6	98 19	128.0	30 07.0	98 19	127.9	30 36.3	98 19	127.8	31 05.7	98 19	127.6	31 35.0	98 19	127.5	32 04.4	98 19	127.4	32 33.7	98 19	127.3	7
8	28 56.7	98 19	127.1	29 26.1	98 19	126.9	29 55.4	98 20	126.8	30 24.8	98 20	126.7	30 54.1	98 20	126.6	31 23.4	98 20	126.5	31 52.8	98 20	126.3	32 22.1	98 20	126.2	8
9	28 45.1	98 20	126.0	29 14.4	98 20	125.9	29 43.7	98 20	125.8	30 13.1	98 20	125.6	30 42.4	98 20	125.5	31 11.7	98 20	125.4	31 41.0	98 20	125.3	32 10.3	98 20	125.1	9
50	28 33.2	98 20	125.0	29 02.6	98 20	124.8	29 31.9	98 20	124.7	30 01.2	98 20	124.6	30 30.5	98 20	124.5	30 59.8	98 20	124.3	31 29.1	98 20	124.2	31 58.3	98 20	124.1	50
1	28 21.3	98 20	123.9	28 50.6	98 20	123.8	29 19.9	98 20	123.7	29 49.2	98 20	123.5	30 18.4	98 20	123.4	30 47.7	98 20	123.3	31 17.0	98 20	123.2	31 46.3	98 20	123.0	1
2	28 09.2	98 20	122.9	28 38.4	98 20	122.8	29 07.7	98 20	122.6	29 37.0	98 21	122.5	30 06.3	98 21	122.4	30 35.5	98 21	122.2	31 04.8	97 21	122.1	31 34.0	97 21	122.0	2
3	27 56.9	98 21	121.8	28 26.2	98 21	121.7	28 55.4	98 21	121.6	29 24.7	98 21	121.5	29 53.9	97 21	121.3	30 23.2	97 21	121.2	30 52.4	97 21	121.1	31 21.6	97 21	120.9	3
4	27 44.5	98 21	120.8	28 13.7	98 21	120.7	28 43.0	97 21	120.5	29 12.2	97 21	120.4	29 41.5	97 21	120.3	30 10.7	97 21	120.2	30 39.9	97 21	120.0	31 09.1	97 21	119.9	4
55	27 32.0	97 21	119.8	28 01.2	97 21	119.6	28 30.4	97 21	119.5	28 59.6	97 21	119.4	29 28.9	97 21	119.3	29 58.1	97 21	119.1	30 27.3	97 21	119.0	30 56.5	97 21	118.9	55
6	27 19.3	97 21	118.7	27 48.5	97 21	118.6	28 17.7	97 21	118.5	28 46.9	97 21	118.3	29 16.1	97 21	118.2	29 45.3	97 21	118.1	30 14.5	97 21	118.0	30 43.7	97 22	117.8	6
7	27 06.5	97 22	117.7	27 35.7	97 22	117.6	28 04.9	97 22	117.4	28 34.1	97 22	117.3	29 03.3	97 22	117.2	29 32.5	97 22	117.1	30 01.6	97 22	116.9	30 30.8	97 22	116.8	7
8	26 53.6	97 22	116.7	27 22.8	97 22	116.5	27 52.0	97 22	116.4	28 21.1	97 22	116.3	28 50.3	97 22	116.2	29 19.5	97 22	116.0	29 48.6	97 22	115.9	30 17.8	97 22	115.7	8
9	26 40.6	97 22	115.7	27 09.7	97 22	115.5	27 38.9	97 22	115.4	28 08.1	97 22	115.3	28 37.2	97 22	115.1	29 06.4	97 22	115.0	29 35.5	97 22	114.9	30 04.6	97 22	114.7	9
60	26 27.4	97 22	114.6	26 56.6	97 22	114.5	27 25.7	97 22	114.4	27 54.9	97 22	114.2	28 24.0	97 22	114.1	28 53.2	97 22	114.0	29 22.3	97 22	113.8	29 51.4	97 22	113.7	60
1	26 14.2	97 22	113.6	26 43.3	97 22	113.5	27 12.5	97 22	113.3	27 41.6	97 22	113.2	28 10.7	97 22	113.1	28 39.8	97 22	112.9	29 09.0	97 22	112.8	29 38.1	97 22	112.7	1
2	26 00.8	97 22	112.6	26 30.0	97 22	112.5	26 59.1	97 22	112.3	27 28.2	97 22	112.2	27 57.3	97 22	112.1	28 26.4	97 23	111.9	28 55.5	97 23	111.8	29 24.6	97 23	111.6	2
3	25 47.4	97 23	111.6	26 16.5	97 23	111.4	26 45.6	97 23	111.3	27 14.7	97 23	111.2	27 43.8	97 23	111.0	28 12.9	97 23	110.9	28 42.0	97 23	110.8	29 11.1	97 23	110.6	3
4	25 33.8	97 23	110.6	26 02.9	97 23	110.4	26 32.0	97 23	110.3	27 01.1	97 23	110.2	27 30.2	97 23	110.0	27 59.3	97 23	109.9	28 28.4	97 23	109.7	28 57.4	97 23	109.6	4
65	25 20.2	97 23	109.6	25 49.3	97 23	109.4	26 18.4	97 23	109.3	26 47.5	97 23	109.2	27 16.6	97 23	109.0	27 45.6	97 23	108.9	28 14.7	97 23	108.7	28 43.7	97 23	108.6	65
6	25 06.5	97 23	108.6	25 35.6	97 23	108.4	26 04.6	97 23	108.3	26 33.7	97 23	108.1	27 02.8	97 23	108.0	27 31.8	97 23	107.9	28 00.9	97 23	107.7	28 29.9	97 23	107.6	6
7	24 52.7	97 23	107.5	25 21.8	97 23	107.4	25 50.8	97 23	107.3	26 19.9	97 23	107.1	26 48.9	97 23	107.0	27 18.0	97 23	106.9	27 47.0	97 23	106.7	28 16.1	97 23	106.6	7
8	24 38.8	97 23	106.5	25 07.9	97 23	106.4	25 36.9	97 23	106.3	26 06.0	97 23	106.1	26 35.0	97 23	106.0	27 04.1	97 23	105.9	27 33.1	97 23	105.7	28 02.1	97 23	105.6	8
9	24 24.8	97 23	105.5	24 53.9	97 23	105.4	25 23.0	97 23	105.3	25 52.0	97 23	105.1	26 21.0	97 23	105.0	26 50.1	97 23	104.8	27 19.1	97 23	104.7	27 48.1	97 23	104.6	9
70	24 10.8	97 23	104.5	24 39.9	97 23	104.4	25 08.9	97 23	104.3	25 38.0	97 24	104.1	26 07.0	97 24	104.0	26 36.0	97 24	103.8	27 05.0	97 24	103.7	27 34.0	97 24	103.6	70
1	23 56.8	97 24	103.5	24 25.8	97 24	103.4	24 54.8	97 24	103.3	25 23.9	97 24	103.1	25 52.9	97 24	103.0	26 21.9	97 24	102.9	26 50.9	97 24	102.7	27 19.9	97 24	102.6	1
2	23 42.6	97 24	102.6	24 11.6	97 24	102.4	24 40.7	97 24	102.3	25 09.7	97 24	102.1	25 38.7	97 24	102.0	26 07.7	97 24	101.9	26 36.7	97 24	101.7	27 05.7	97 24	101.6	2
3	23 28.4	97 24	101.6	23 57.4	97 24	101.4	24 26.5	97 24	101.3	24 55.5	97 24	101.1	25 24.5	97 24	101.0	25 53.5	97 24	100.9	26 22.5	97 24	100.7	26 51.4	97 24	100.6	3
4	23 14.2	97 24	100.6	23 43.2	97 24	100.4	24 12.2	97 24	100.3	24 41.2	97 24	100.2	25 10.2	97 24	100.0	25 39.2	97 24	99.9	26 08.2	97 24	99.7	26 37.1	97 24	99.6	4
75	22 59.9	97 24	99.6	23 28.9	97 24	99.4	23 57.9	97 24	99.3	24 26.9	97 24	99.2	24 55.9	97 24	99.0	25 24.9	97 24	98.9	25 53.8	97 24	98.7	26 22.8	97 24	98.6	75
6	22 45.5	97 24	98.6	23 14.6	97 24	98.5	23 43.6	97 24	98.3	24 12.5	97 24	98.2	24 41.5	97 24	98.0	25 10.5	97 24	97.9	25 39.5	97 24	97.7	26 08.4	97 24	97.6	6
7	22 31.2	97 24	97.6	23 00.2	97 24	97.5	23 29.2	97 24	97.3	23 58.2	97 24	97.2	24 27.1	97 24	97.1	24 56.1	97 24	96.9	25 25.1	97 24	96.8	25 54.0	97 24	96.6	7
8	22 16.8	97 24	96.6	22 45.8	97 24	96.5	23 14.8	97 24	96.4	23 43.7	97 24	96.2	24 12.7	97 24	96.1	24 41.7	97 24	95.9	25 10.7	97 24	95.8	25 39.6	96 24	95.6	8
9	22 02.3	97 24	95.6	22 31.3	97 24	95.5	23 00.3	97 24	95.4	23 29.3	97 24	95.2	23 58.3	97 24	95.1	24 27.2	97 24	94.9	24 56.2	97 24	94.8	25 25.1	96 24	94.7	9
80	21 47.9	97 24	94.7	22 16.9	97 24	94.5	22 45.9	97 24	94.4	23 14.8	97 24	94.3	23 43.8	97 24	94.1	24 12.8	97 24	94.0	24 41.7	97 24	93.8	25 10.7	96 24	93.7	80
1	21 33.4	97 24	93.7	22 02.4	97 24	93.6	22 31.4	97 24	93.4	23 00.4	97 24	93.3	23 29.3	97 24	93.1	23 58.3	97 24	93.0	24 27.2	96 24	92.8	24 56.2	96 24	92.7	1
2	21 18.9	97 24	92.7	21 47.9	97 24	92.6	22 16.9	97 24	92.4	22 45.9	97 24	92.3	23 14.8	97 24	92.2	23 43.8	97 24	92.0	24 12.7	96 24	91.9	24 41.7	96 24	91.7	2
3	21 04.4	97 24	91.7	21 33.4	97 24	91.6	22 02.4	97 24	91.5	22 31.3	97 24	91.3	23 00.3	97 24	91.2	23 29.3	97 24	91.0	23 58.2	96 24	90.9	24 27.2	96 24	90.8	3
4	20 49.9	97 24	90.8	21 18.9	97 24	90.6	21 47.9	97 24	90.5	22 16.8	97 24	90.4	22 45.8	97 24	90.2	23 14.8	97 24	90.1	23 43.7	96 24	89.9	24 12.6	96 24	89.8	4
85	20 35.4	97 24	89.8	21 04.4	97 24	89.7	21 33.3	97 24	89.5	22 02.3	97 24	89.4	22 31.3	97 24	89.2	23 00.2	97 24	89.1	23 29.2	96 24	89.0	23 58.1	96 24	88.8	85
6	20 20.9	97 24	88.8	20 49.9	97 24	88.7	21 18.8	97 24	88.6	21 47.8	97 24	88.4	22 16.8	97 24	88.3	22 45.7	97 24	88.1	23 14.7	96 24	88.0	23 43.6	96 24	87.8	6
7	20 06.4	97 24	87.9	20 35.3	97 24	87.7	21 04.3	97 24	87.6	21 33.3	97 24	87.4	22 02.3	97 24	87.3	22 31.2	97 24	87.2	23 00.2	96 24	87.0	23 29.1	96 24	86.9	7
8	19 51.9	97 24	86.9	20 20.9	97 24	86.8	20 49.8	97 24	86.6	21 18.8	97 24	86.5	21 47.8	97 24	86.3	22 16.7	97 24	86.2	22 45.7	96 24	86.1	23 14.6	96 24	85.9	8
9	19 37.4	97 24	85.9	20 06.4	97 24	85.8	20 35.3	97 24	85.7	21 04.3	97 24	85.5	21 33.3	97 24	85.4	22 02.3	97 24	85.2	22 31.2	96 24	85.1	23 00.2	96 24	85.0	9
90	19 22.9	97 24	85.0	19 51.9	97 24	84.8	20 20.9	97 24	84.7	20 49.9	97 24	84.6	21 18.8	97 24	84.4	21 47.8	97 24	84.3	22 16.8	96 24	84.1	22 45.7	96 24	84.0	90

Lat. 76°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	19 08.5	97 24	84.0	19 37.5	97 24	83.9	20 06.4	97 24	83.7	20 35.4	97 24	83.6	21 04.4	97 24	83.5	21 33.4	97 24	83.3	22 02.3	97 24	83.2	22 31.3	97 24	83.0	91
2	18 54.0	97 24	83.0	19 23.0	97 24	82.9	19 52.0	97 24	82.8	20 21.0	97 24	82.6	20 50.0	97 24	82.5	21 19.0	97 24	82.4	21 47.9	97 24	82.2	22 16.9	97 24	82.1	2
3	18 39.6	97 24	82.1	19 08.6	97 24	82.0	19 37.6	97 24	81.8	20 06.6	97 24	81.7	20 35.6	97 24	81.5	21 04.6	97 24	81.4	21 33.6	97 24	81.3	22 02.5	97 24	81.1	3
4	18 25.3	97 24	81.1	18 54.3	97 24	81.0	19 23.3	97 24	80.9	19 52.3	97 24	80.7	20 21.3	97 24	80.6	20 50.3	97 24	80.4	21 19.3	97 24	80.3	21 48.2	97 24	80.2	4
95	18 11.0	97 24	80.2	18 40.0	97 24	80.0	19 09.0	97 24	79.9	19 38.0	97 24	79.8	20 07.0	97 24	79.6	20 36.0	97 24	79.5	21 05.0	97 24	79.4	21 33.9	97 24	79.2	95
6	17 56.7	97 24	79.2	18 25.7	97 24	79.1	18 54.7	97 24	78.9	19 23.7	97 24	78.8	19 52.7	97 24	78.7	20 21.7	97 24	78.5	20 50.7	97 24	78.4	21 19.7	97 24	78.3	6
7	17 42.4	97 24	78.3	18 11.5	97 24	78.1	18 40.5	97 24	78.0	19 09.5	97 24	77.9	19 38.5	97 24	77.7	20 07.5	97 24	77.6	20 36.5	97 24	77.5	21 05.5	97 24	77.3	7
8	17 28.3	97 24	77.3	17 57.3	97 24	77.2	18 26.3	97 24	77.0	18 55.3	97 24	76.9	19 24.4	97 24	76.8	19 53.4	97 24	76.6	20 22.4	97 23	76.5	20 51.4	97 23	76.4	8
9	17 14.1	97 23	76.4	17 43.2	97 23	76.2	18 12.2	97 23	76.1	18 41.2	97 23	76.0	19 10.3	97 23	75.8	19 39.3	97 23	75.7	20 08.3	97 23	75.6	20 37.3	97 23	75.4	9
100	17 00.0	97 23	75.4	17 29.1	97 23	75.3	17 58.1	97 23	75.1	18 27.2	97 23	75.0	18 56.2	97 23	74.9	19 25.3	97 23	74.7	19 54.3	97 23	74.6	20 23.3	97 23	74.5	100
1	16 46.0	97 23	74.4	17 15.1	97 23	74.3	17 44.1	97 23	74.2	18 13.2	97 23	74.1	18 42.2	97 23	73.9	19 11.3	97 23	73.8	19 40.3	97 23	73.7	20 09.3	97 23	73.5	1
2	16 32.1	97 23	73.5	17 01.2	97 23	73.4	17 30.2	97 23	73.2	17 59.3	97 23	73.1	18 28.3	97 23	73.0	18 57.4	97 23	72.8	19 26.4	97 23	72.7	19 55.5	97 23	72.6	2
3	16 18.2	97 23	72.5	16 47.3	97 23	72.4	17 16.4	97 23	72.3	17 45.4	97 23	72.2	18 14.5	97 23	72.0	18 43.5	97 23	71.9	19 12.6	97 23	71.8	19 41.6	97 23	71.6	3
4	16 04.4	97 23	71.6	16 33.5	97 23	71.5	17 02.6	97 23	71.3	17 31.6	97 23	71.2	18 00.7	97 23	71.1	18 29.8	97 23	71.0	18 58.8	97 23	70.8	19 27.9	97 23	70.7	4
105	15 50.7	97 23	70.7	16 19.8	97 23	70.5	16 48.8	97 23	70.4	17 17.9	97 23	70.3	17 47.0	97 23	70.1	18 16.1	97 23	70.0	18 45.2	97 23	69.9	19 14.2	97 23	69.8	105
6	15 37.0	97 23	69.7	16 06.1	97 23	69.6	16 35.2	97 23	69.5	17 04.3	97 23	69.3	17 33.4	97 23	69.2	18 02.5	97 23	69.1	18 31.6	97 22	68.9	19 00.7	97 22	68.8	6
7	15 23.4	97 22	68.8	15 52.5	97 22	68.6	16 21.7	97 22	68.5	16 50.8	97 22	68.4	17 19.9	97 22	68.3	17 49.0	97 22	68.1	18 18.1	97 22	68.0	18 47.2	97 22	67.9	7
8	15 09.9	97 22	67.8	15 39.1	97 22	67.7	16 08.2	97 22	67.6	16 37.3	97 22	67.4	17 06.4	97 22	67.3	17 35.6	97 22	67.2	18 04.7	97 22	67.1	18 33.8	97 22	66.9	8
9	14 56.5	97 22	66.9	15 25.7	97 22	66.7	15 54.8	97 22	66.6	16 24.0	97 22	66.5	16 53.1	97 22	66.4	17 22.2	97 22	66.2	17 51.4	97 22	66.1	18 20.5	97 22	66.0	9
110	14 43.2	97 22	65.9	15 12.4	97 22	65.8	15 41.6	97 22	65.7	16 10.7	97 22	65.6	16 39.9	97 22	65.4	17 09.0	97 22	65.3	17 38.1	97 22	65.2	18 07.3	97 22	65.1	110
1	14 30.0	97 22	65.0	14 59.2	97 22	64.9	15 28.4	97 22	64.7	15 57.5	97 22	64.6	16 26.7	97 22	64.5	16 55.9	97 22	64.4	17 25.0	97 22	64.2	17 54.1	97 22	64.1	1
2	14 16.9	97 22	64.0	14 46.1	97 22	63.9	15 15.3	97 22	63.8	15 44.5	97 22	63.7	16 13.7	97 22	63.6	16 42.8	97 22	63.4	17 12.0	97 22	63.3	17 41.1	97 22	63.2	2
3	14 03.9	97 22	63.1	14 33.1	97 21	63.0	15 02.3	97 21	62.9	15 31.5	97 21	62.7	16 00.7	97 21	62.6	16 29.9	97 21	62.5	16 59.1	97 21	62.4	17 28.2	97 21	62.2	3
4	13 51.1	97 21	62.1	14 20.3	97 21	62.0	14 49.5	97 21	61.9	15 18.7	97 21	61.8	15 47.9	97 21	61.7	16 17.1	97 21	61.6	16 46.3	97 21	61.4	17 15.5	97 21	61.3	4
115	13 38.3	97 21	61.2	14 07.5	97 21	61.1	14 36.7	97 21	61.0	15 05.9	97 21	60.9	15 35.2	97 21	60.7	16 04.4	97 21	60.6	16 33.6	97 21	60.5	17 02.8	97 21	60.4	115
6	13 25.6	97 21	60.3	13 54.9	97 21	60.1	14 24.1	97 21	60.0	14 53.3	97 21	59.9	15 22.6	97 21	59.8	15 51.8	97 21	59.7	16 21.0	97 21	59.6	16 50.2	97 21	59.4	6
7	13 13.1	98 21	59.3	13 42.3	98 21	59.2	14 11.6	97 21	59.1	14 40.8	97 21	59.0	15 10.1	97 21	58.9	15 39.3	97 21	58.7	16 08.5	97 21	58.6	16 37.8	97 21	58.5	7
8	13 00.6	98 20	58.4	13 29.9	98 20	58.3	13 59.2	98 20	58.2	14 28.4	98 20	58.0	14 57.7	98 20	57.9	15 27.0	98 20	57.8	15 56.2	98 20	57.7	16 25.5	97 20	57.6	8
9	12 48.4	98 20	57.4	13 17.6	98 20	57.3	13 46.9	98 20	57.2	14 16.2	98 20	57.1	14 45.5	98 20	57.0	15 14.7	98 20	56.9	15 44.0	98 20	56.8	16 13.3	98 20	56.7	9
120	12 36.2	98 20	56.5	13 05.5	98 20	56.4	13 34.8	98 20	56.3	14 04.1	98 20	56.2	14 33.4	98 20	56.1	15 02.6	98 20	55.9	15 31.9	98 20	55.8	16 01.2	98 20	55.7	120
1	12 24.1	98 20	55.6	12 53.5	98 20	55.5	13 22.8	98 20	55.3	13 52.1	98 20	55.2	14 21.4	98 20	55.1	14 50.7	98 20	55.0	15 20.0	98 20	54.9	15 49.3	98 20	54.8	1
2	12 12.2	98 20	54.6	12 41.6	98 20	54.5	13 10.9	98 20	54.4	13 40.2	98 20	54.3	14 09.5	98 20	54.2	14 38.9	98 19	54.1	15 08.2	98 19	54.0	15 37.5	98 19	53.9	2
3	12 00.5	98 19	53.7	12 29.8	98 19	53.6	12 59.2	98 19	53.5	13 28.5	98 19	53.4	13 57.8	98 19	53.3	14 27.2	98 19	53.1	14 56.5	98 19	53.0	15 25.8	98 19	52.9	3
4	11 48.8	98 19	52.7	12 18.2	98 19	52.6	12 47.6	98 19	52.5	13 16.9	98 19	52.4	13 46.3	98 19	52.3	14 15.6	98 19	52.2	14 45.0	98 19	52.1	15 14.3	98 19	52.0	4
125	11 37.4	98 19	51.8	12 06.7	98 19	51.7	12 36.1	98 19	51.6	13 05.5	98 19	51.5	13 34.9	98 19	51.4	14 04.2	98 19	51.3	14 33.6	98 19	51.2	15 03.0	98 19	51.1	125
6	11 26.0	98 19	50.9	11 55.4	98 19	50.8	12 24.8	98 19	50.7	12 54.2	98 19	50.6	13 23.6	98 19	50.5	13 53.0	98 18	50.3	14 22.4	98 18	50.2	14 51.8	98 18	50.1	6
7	11 14.9	98 18	49.9	11 44.3	98 18	49.8	12 13.7	98 18	49.7	12 43.1	98 18	49.6	13 12.5	98 18	49.5	13 41.9	98 18	49.4	14 11.3	98 18	49.3	14 40.7	98 18	49.2	7
8	11 03.8	98 18	49.0	11 33.3	98 18	48.9	12 02.7	98 18	48.8	12 32.1	98 18	48.7	13 01.5	98 18	48.6	13 30.9	98 18	48.5	14 00.4	98 18	48.4	14 29.8	98 18	48.3	8
9	10 53.0	98 18	48.0	11 22.4	98 18	47.9	11 51.8	98 18	47.8	12 21.3	98 18	47.8	12 50.7	98 18	47.7	13 20.2	98 18	47.6	13 49.6	98 18	47.5	14 19.0	98 18	47.4	9
130	10 42.2	98 18	47.1	11 11.7	98 18	47.0	11 41.2	98 18	46.9	12 10.6	98 18	46.8	12 40.1	98 17	46.7	13 09.5	98 17	46.6	13 39.0	98 17	46.5	14 08.4	98 17	46.4	130
1	10 31.7	98 17	46.2	11 01.2	98 17	46.1	11 30.6	98 17	46.0	12 00.1	98 17	45.9	12 29.6	98 17	45.8	12 59.1	98 17	45.7	13 28.5	98 17	45.6	13 58.0	98 17	45.5	1
2	10 21.3	98 17	45.2	10 50.8	98 17	45.1	11 20.3	98 17	45.0	11 49.8	98 17	44.9	12 19.3	98 17	44.9	12 48.7	98 17	44.8	13 18.2	98 17	44.7	13 47.7	98 17	44.6	2
3	10 11.1	98 17	44.3	10 40.6	98 17	44.2	11 10.1	98 17	44.1	11 39.6	98 17	44.0	12 09.1	98 17	43.9	12 38.6	98 17	43.8	13 08.1	98 17	43.7	13 37.6	98 17	43.6	3
4	10 01.0	98 16	43.3	10 30.6	98 16	43.3	11 00.1	98 16	43.2	11 29.6	98 16	43.1	11 59.1	98 16	43.0	12 28.6	98 16	42.9	12 58.2	98 16	42.8	13 27.7	98 16	42.7	4
135	9 51.2	98 16	42.4	10 20.7	98 16	42.3	10 50.2	98 16	42.2	11 19.8	98 16	42.1	11 49.3	98 16	42.1	12 18.9	98 16	42.0	12 48.4	98 16	41.9	13 17.9	98 16	41.8	135
6	9 41.5	99 16	41.5	10 11.0	99 16	41.4	10 40.6	99 16	41.3	11 10.1	99 16	41.2	11 39.7	99 16	41.1	12 09.2	99 16	41.0	12 38.8	99 16	40.9	13 08.3	98 16	40.9	6
7	9 31.9	99 16	40.5	10 01.5	99 16	40.4	10 31.1	99 16	40.4	11 00.7	99 16	40.3	11 30.2	99 16	40.2	11 59.8	99 15	40.1	12 29.4	99 15	40.0	12 58.9	99 15	39.9	7
8	9 22.6	99 15	39.6	9 52.2	99 15	39.5	10 21.8	99 15	39.4	10 51.4	99 15	39.3	11 20.9	99 15	39.3	11 50.5	99 15	39.2	12 20.1	99 15	39.1	12 49.7	99 15	39.0	8
9	9 13.4	99 15	38.7	9 43.0	99 15	38.6	10 12.6	99 15	38.5	10 42.3	99 15	38.4	11 11.9	99 15	38.3	11 41.5	99 15	38.2	12 11.1	99 15	38.2	12 40.7	99 15	38.1	9
140	9 04.5	99 15	37.7	9 34.1	99 15	37.6	10 03.7	99 15	37.6	10 33.3	99 15	37.5	11 02.9	99 15	37.4	11 32.6	99 14	37.3	12 02.2	99 14	37.2	12 31.8	99 14	37.1	140
1	8 55.7	99 14	36.8	9 25.3	99 14	36.7	9 55.0	99 14	36.6	10 24.6	99 14	36.5	10 54.2	99 14	36.5	11 23.9	99 14	36.4	11 53.5	99 14	36.3	12 23.1	99 14	36.2	1
2	8 47.1	99 14	35.8	9 16.7	99 14	35.8	9 46.4	99 14	35.7	10 16.0	99 14	35.6	10 45.7	99 14	35.5	11 15.4	99 14	35.4	11 45.0	99 14	35.4	12 14.7	99 14	35.3	2
3	8 38.7	99 14	34.9	9 08.3	99 14	34.8	9 38.0	99 14	34.7	10 07.7	99 14	34.7	10 37.4	99 14	34.6	11 07.0	99 14	34.5	11 36.7	99 14	34.4	12 06.4	99 14	34.4	3
4	8 30.5	99 13	34.0	9 00.2	99 13	33.9	9 29.8	99 13	33.8	9 59.5	99 13	33.7	10 29.2	99 13	33.7	10 58.9	99 13	33.6	11 28.6	99 13	33.5	11 58.3	99 13	33.4	4
145	8 22.5	99 13	33.0	8 52.2	99 13	32.9	9 21.9	99 13	32.9	9 51.6	99 13	32.8	10 21.3	99 13	32.7	10 51.0	99 13	32.7	11 20.7	99 13	32.6	11 50.4	99 13	32.5	145
6	8 14.7	99 13	32.1	8 44.4	99 13	32.0	9 14.1	99 13	31.9	9 43.8	99 13	31.9	10 13.5	99 13	31.8	10 43.2	99 13	31.7	11 13.0	99 13	31.7	11 42.7	99 12	31.6	6
7	8 07.1	99 12	31.1	8 36.8	99 12	31.1	9 06.5	99 12	31.0	9 36.2	99 12	30.9	10 06.0	99 12	30.9	10 35.7	99 12	30.8	11 05.4	99 12	30.7	11 35.2	99 12	30.7	7
8	7 59.6	99 12	30.2	8 29.4	99 12	30.1	8 59.1	99 12	30.1	9 28.9	99 12	30.0	9 58.6	99 12	29.9	10 28.4	99 12	29.9	10 58.1	99 12	29.8	11 27.9	99 12	29.7	8
9	7 52.5	99 12	29.2	8 22.2	99 12	29.2	8 52.0	99 12	29.1	9 21.7	99 12	29.1	9 51.5	99 12	29.0	10 21.3	99 12	28.9	10 51.0	99 12	28.9	11 20.8	99 11	28.8	9
150	7 45.5	99 11	28.3	8 15.2	99 11	28.2	8 45.0	99 11	28.2	9 14.8	99 11	28.1	9 44.6	99 11	28.1	10 14.3	99 11	28.0	10 44.1	99 11	27.9	11 13.9	99 11	27.9	150
1	7 38.7	99 11	27.4	8 08.5	99 11	27.3	8 38.3	99 11	27.2	9 08.1	99 11	27.2	9 37.8	99 11	27.1	10 07.6	99 11	27.1	10 37.4	99 11	27.0	11 07.2	99 11	26.9	1
2	7 32.1	99 11	26.4	8 01.9	99 11	26.4	8 31.7	99 11	26.3	9 01.5	99 11	26.2	9 31.3	99 10	26.2	10 01.1	99 10	26.1	10 30.9	99 10	26.1	11 00.7	99 10	26.0	2
3	7 25.8	99 10	25.5	7 55.6	99 10	25.4	8 25.4	99 10	25.4	8 55.2	99 10	25.3	9 25.0	99 10	25.3	9 54.8	99 10	25.2	10 24.7	99 10	25.1	10 54.5	99 10	25.1	3
4	7 19.6	99 10	24.5	7 49.5	99 10	24.5	8 19.3	99 10	24.4	8 49.1	99 10	24.4	9 18.9	99 10	24.3	9 48.8	99 10	24.3	10 18.6	99 10	24.2	10 48.4	99 10	24.2	4
155	7 13.7	99 10	23.6	7 43.6	99 10	23.5	8 13.4	99 09	23.5	8 43.2	99 09	23.4	9 13.1	99 09	23.4	9 42.9	99 09	23.3	10 12.7	99 09	23.3	10 42.6	99 09	23.2	155
6	7 08.0	1.0 09	22.7	7 37.9	1.0 09	22.6	8 07.7	1.0 09	22.6	8 37.6	1.0 09	22.5	9 07.4	1.0 09	22.5	9 37.3	1.0 09	22.4	10 07.1	99 09	22.4	10 37.0	99 09	22.3	6
7	7 02.5	1.0 09	21.7	7 32.4	1.0 09	21.7	8 02.3	1.0 09	21.6	8 32.1	1.0 09	21.6	9 02.0	1.0 09	21.5	9 31.8	1.0 09	21.5	10 01.7	1.0 09	21.4	10 31.6	1.0 09	21.4	7
8	6 57.3	1.0 08	20.8	7 27.1	1.0 08	20.7	7 57.0	1.0 08	20.7	8 26.9	1.0 08	20.6	8 56.8	1.0 08	20.6	9 26.6	1.0 08	20.5	9 56.5	1.0 08	20.5	10 26.4	1.0 08	20.4	8
9	6 52.2	1.0 08	19.8	7 22.1	1.0 08	19.8	7 52.0	1.0 08	19.7	8 21.9	1.0 08	19.7	8 51.8	1.0 08	19.7	9 21.7	1.0 08	19.6	9 51.5	1.0 08	19.6	10 21.4	1.0 08	19.5	9
160	6 47.4	1.0 08	18.9	7 17.3	1.0 08	18.8	7 47.2	1.0 08	18.8	8 17.1	1.0 08	18.8	8 47.0	1.0 08	18.7	9 16.9	1.0 08	18.7	9 46.8	1.0 08	18.6	10 16.7	1.0 08	18.6	160
1	6 42.8	1.0 07	17.9	7 12.7	1.0 07	17.9	7 42.7	1.0 07	17.9	8 12.6	1.0 07	17.8	8 42.5	1.0 07	17.8	9 12.4	1.0 07	17.7	9 42.3	1.0 07	17.7	10 12.2	1.0 07	17.7	1
2	6 38.5	1.0 07	17.0	7 08.4	1.0 07	17.0	7 38.3	1.0 07	16.9	8 08.2	1.0 07	16.9	8 38.1	1.0 07	16.8	9 08.1	1.0 07	16.8	9 38.0	1.0 07	16.8	10 07.9	1.0 07	16.7	2
3	6 34.4	1.0 06	16.1	7 04.3	1.0 06	16.0	7 34.2	1.0 06	16.0	8 04.1	1.0 06	15.9	8 34.0	1.0 06	15.9	9 04.0	1.0 06	15.9	9 33.9	1.0 06	15.8	10 03.8	1.0 06	15.8	3
4	6 30.5	1.0 06	15.1	7 00.4	1.0 06	15.1	7 30.3	1.0 06	15.0	8 00.3	1.0 06	15.0	8 30.2	1.0 06	15.0	9 00.1	1.0 06	14.9	9 30.0	1.0 06	14.9	10 00.0	1.0 06	14.9	4
165	6 26.8	1.0 06	14.2	6 56.7	1.0 06	14.1	7 26.7	1.0 06	14.1	7 56.6	1.0 06	14.1	8 26.5	1.0 06	14.0	8 56.5	1.0 06	14.0	9 26.4	1.0 06	14.0	9 56.4	1.0 06	13.9	165
6	6 23.4	1.0 05	13.2	6 53.3	1.0 05	13.2	7 23.2	1.0 05	13.2	7 53.2	1.0 05	13.1	8 23.1	1.0 05	13.1	8 53.1	1.0 05	13.1	9 23.0	1.0 05	13.0	9 53.0	1.0 05	13.0	6
7	6 20.1	1.0 05	12.3	6 50.1	1.0 05	12.3	7 20.1	1.0 05	12.2	7 50.0	1.0 05	12.2	8 20.0	1.0 05	12.2	8 49.9	1.0 05	12.1	9 19.9	1.0 05	12.1	9 49.8	1.0 05	12.1	7
8	6 17.2	1.0 05	11.3	6 47.1	1.0 05	11.3	7 17.1	1.0 05	11.3	7 47.1	1.0 05	11.3	8 17.0	1.0 04	11.2	8 47.0	1.0 04	11.2	9 16.9	1.0 04	11.2	9 46.9	1.0 04	11.2	8
9	6 14.4	1.0 04	10.4	6 44.4	1.0 04	10.4	7 14.4	1.0 04	10.3	7 44.3	1.0 04	10.3	8 14.3	1.0 04	10.3	8 44.3	1.0 04	10.3	9 14.2	1.0 04	10.3	9 44.2	1.0 04	10.2	9
170	6 11.9	1.0 04	09.4	6 41.9	1.0 04	09.4	7 11.9	1.0 04	09.4	7 41.9	1.0 04	09.4	8 11.8	1.0 04	09.4	8 41.8	1.0 04	09.3	9 11.8	1.0 04	09.3	9 41.8	1.0 04	09.3	170
1	6 09.7	1.0 03	08.5	6 39.7	1.0 03	08.5	7 09.6	1.0 03	08.5	7 39.6	1.0 03	08.4	8 09.6	1.0 03	08.4	8 39.6	1.0 03	08.4	9 09.5	1.0 03	08.4	9 39.5	1.0 03	08.4	1
2	6 07.6	1.0 03	07.6	6 37.6	1.0 03	07.5	7 07.6	1.0 03	07.5	7 37.6	1.0 03	07.5	8 07.6	1.0 03	07.5	8 37.6	1.0 03	07.5	9 07.5	1.0 03	07.5	9 37.5	1.0 03	07.4	2
3	6 05.9	1.0 03	06.6	6 35.8	1.0 03	06.6	7 05.8	1.0 03	06.6	7 35.8	1.0 03	06.6	8 05.8	1.0 03	06.6	8 35.8	1.0 03	06.5	9 05.8	1.0 03	06.5	9 35.8	1.0 03	06.5	3
4	6 04.3	1.0 02	05.7	6 34.3	1.0 02	05.7	7 04.3	1.0 02	05.6	7 34.3	1.0 02	05.6	8 04.3	1.0 02	05.6	8 34.3	1.0 02	05.6	9 04.2	1.0 02	05.6	9 34.2	1.0 02	05.6	4
175	6 03.0	1.0 02	04.7	6 33.0	1.0 02	04.7	7 03.0	1.0 02	04.7	7 33.0	1.0 02	04.7	8 03.0	1.0 02	04.7	8 33.0	1.0 02	04.7	9 03.0	1.0 02	04.7	9 32.9	1.0 02	04.6	175
6	6 01.9	1.0 01	03.8	6 31.9	1.0 01	03.8	7 01.9	1.0 01	03.8	7 31.9	1.0 01	03.8	8 01.9	1.0 01	03.7	8 31.9	1.0 01	03.7	9 01.9	1.0 01	03.7	9 31.9	1.0 01	03.7	6
7	6 01.1	1.0 01	02.8	6 31.1	1.0 01	02.8	7 01.1	1.0 01	02.8	7 31.1	1.0 01	02.8	8 01.1	1.0 01	02.8	8 31.1	1.0 01	02.8	9 01.1	1.0 01	02.8	9 31.1	1.0 01	02.8	7
8	6 00.5	1.0 01	01.9	6 30.5	1.0 01	01.9	7 00.5	1.0 01	01.9	7 30.5	1.0 01	01.9	8 00.5	1.0 01	01.9	8 30.5	1.0 01	01.9	9 00.5	1.0 01	01.9	9 30.5	1.0 01	01.9	8
9	6 00.1	1.0 00	00.9	6 30.1	1.0 00	00.9	7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9	9
180	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	180

Lat. 77°

Lat. 78°

L 7

Lat. 76°

H.A.	24° 00′		24° 30′		25° 00′		25° 30′		26° 00′		26° 30′		27° 00′		27° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	38 00.0 1.0 00	180.0	38 30.0 1.0 00	180.0	39 00.0 1.0 00	180.0	39 30.0 1.0 00	180.0	40 00.0 1.0 00	180.0	40 30.0 1.0 00	180.0	41 00.0 1.0 00	180.0	41 30.0 1.0 00	180.0	00
1	37 59.9 1.0 01	178.8	38 29.9 1.0 01	178.8	38 59.9 1.0 01	178.8	39 29.9 1.0 01	178.8	39 59.9 1.0 01	178.8	40 29.9 1.0 01	178.8	40 59.8 1.0 01	178.8	41 29.8 1.0 01	178.8	1
2	37 59.4 1.0 01	177.7	38 29.4 1.0 01	177.7	38 59.4 1.0 01	177.7	39 29.4 1.0 01	177.7	39 59.4 1.0 01	177.7	40 29.4 1.0 01	177.6	40 59.4 1.0 01	177.6	41 29.4 1.0 01	177.6	2
3	37 58.7 1.0 02	176.5	38 28.7 1.0 02	176.5	38 58.7 1.0 02	176.5	39 28.7 1.0 02	176.5	39 58.7 1.0 02	176.5	40 28.7 1.0 02	176.5	40 58.7 1.0 02	176.5	41 28.6 1.0 02	176.4	3
4	37 57.7 1.0 02	175.4	38 27.6 1.0 02	175.4	38 57.6 1.0 02	175.3	39 27.6 1.0 02	175.3	39 57.6 1.0 02	175.3	40 27.6 1.0 02	175.3	40 57.6 1.0 02	175.3	41 27.6 1.0 02	175.3	4
05	37 56.3 1.0 03	174.2	38 26.3 1.0 03	174.2	38 56.3 1.0 03	174.2	39 26.3 1.0 03	174.2	39 56.3 1.0 03	174.1	40 26.3 1.0 03	174.1	40 56.3 1.0 03	174.1	41 26.3 1.0 03	174.1	05
6	37 54.7 1.0 03	173.0	38 24.7 1.0 03	173.0	38 54.7 1.0 03	173.0	39 24.7 1.0 03	173.0	39 54.7 1.0 03	173.0	40 24.6 1.0 03	172.9	40 54.6 1.0 03	172.9	41 24.6 1.0 03	172.9	6
7	37 52.8 1.0 04	171.9	38 22.8 1.0 04	171.9	38 52.8 1.0 04	171.8	39 22.8 1.0 04	171.8	39 52.7 1.0 04	171.8	40 22.7 1.0 04	171.8	40 52.7 1.0 04	171.7	41 22.7 1.0 04	171.7	7
8	37 50.6 1.0 04	170.7	38 20.6 1.0 04	170.7	38 50.6 1.0 04	170.7	39 20.5 1.0 04	170.7	39 50.5 1.0 04	170.6	40 20.5 1.0 04	170.6	40 50.5 1.0 04	170.6	41 20.4 1.0 04	170.5	8
9	37 48.1 1.0 05	169.6	38 18.1 1.0 05	169.5	38 48.1 1.0 05	169.5	39 18.0 1.0 05	169.5	39 48.0 1.0 05	169.5	40 18.0 1.0 05	169.4	40 47.9 1.0 05	169.4	41 17.9 1.0 05	169.4	9
10	37 45.4 1.0 06	168.4	38 15.3 1.0 05	168.4	38 45.3 1.0 05	168.4	39 15.2 1.0 05	168.3	39 45.2 1.0 05	168.3	40 15.2 1.0 05	168.3	40 45.1 1.0 05	168.2	41 15.1 1.0 05	168.2	10
1	37 42.3 1.0 06	167.3	38 12.3 1.0 06	167.2	38 42.2 1.0 06	167.2	39 12.2 1.0 06	167.2	39 42.1 1.0 06	167.1	40 12.1 1.0 06	167.1	40 42.0 1.0 06	167.0	41 11.9 1.0 06	167.0	1
2	37 39.0 1.0 06	166.1	38 08.9 1.0 06	166.1	38 38.9 1.0 06	166.0	39 08.8 1.0 06	166.0	39 38.7 1.0 06	166.0	40 08.7 1.0 06	165.9	40 38.6 1.0 06	165.9	41 08.5 1.0 06	165.8	2
3	37 35.4 1.0 06	165.0	38 05.3 1.0 07	164.9	38 35.2 1.0 07	164.9	39 05.1 1.0 07	164.8	39 35.1 1.0 07	164.8	40 05.0 1.0 07	164.7	40 34.9 1.0 07	164.7	41 04.8 1.0 07	164.7	3
4	37 31.5 1.0 07	163.8	38 01.4 1.0 07	163.8	38 31.3 1.0 07	163.7	39 01.2 1.0 07	163.7	39 31.1 1.0 07	163.6	40 01.0 1.0 07	163.6	40 30.9 1.0 07	163.5	41 00.9 1.0 07	163.5	4
15	37 27.3 1.0 07	162.7	37 57.2 1.0 07	162.6	38 27.1 1.0 07	162.6	38 57.0 1.0 08	162.5	39 26.9 1.0 08	162.5	39 56.8 1.0 08	162.4	40 26.7 1.0 08	162.4	40 56.6 1.0 08	162.3	15
6	37 22.8 1.0 08	161.5	37 52.7 1.0 08	161.5	38 22.6 1.0 08	161.4	38 52.5 1.0 08	161.4	39 22.4 1.0 08	161.3	39 52.3 1.0 08	161.3	40 22.1 1.0 08	161.2	40 52.0 1.0 08	161.1	6
7	37 18.1 1.0 08	160.4	37 47.9 1.0 08	160.3	38 17.8 1.0 08	160.3	38 47.7 1.0 08	160.2	39 17.6 1.0 08	160.2	39 47.5 1.0 08	160.1	40 17.3 1.0 08	160.0	40 47.2 1.0 09	160.0	7
8	37 13.1 1.0 09	159.2	37 42.9 1.0 09	159.2	38 12.8 1.0 09	159.1	38 42.7 1.0 09	159.1	39 12.5 1.0 09	159.0	39 42.4 1.0 09	158.9	40 12.2 1.0 09	158.9	40 42.1 1.0 09	158.8	8
9	37 07.8 1.0 09	158.1	37 37.6 1.0 09	158.0	38 07.5 99 09	158.0	38 37.3 99 09	157.9	39 07.2 99 09	157.8	39 37.0 99 09	157.8	40 06.9 99 09	157.7	40 36.7 99 09	157.6	9
20	37 02.2 99 10	157.0	37 32.1 99 10	156.9	38 01.9 99 10	156.8	38 31.7 99 10	156.8	39 01.6 99 10	156.7	39 31.4 99 10	156.6	40 01.2 99 10	156.6	40 31.0 99 10	156.5	20
1	36 56.4 99 10	155.8	37 26.2 99 10	155.8	37 56.1 99 10	155.7	38 25.9 99 10	155.6	38 55.7 99 10	155.5	39 25.5 99 10	155.5	39 55.3 99 10	155.4	40 25.1 99 10	155.3	1
2	36 50.3 99 11	154.7	37 20.1 99 11	154.6	37 50.0 99 11	154.5	38 19.8 99 11	154.5	38 49.5 99 11	154.4	39 19.3 99 11	154.3	39 49.1 99 11	154.2	40 18.9 99 11	154.2	2
3	36 44.0 99 11	153.6	37 13.8 99 11	153.5	37 43.6 99 11	153.4	38 13.4 99 11	153.3	38 43.1 99 11	153.2	39 12.9 99 11	153.2	39 42.7 99 11	153.1	40 12.5 99 11	153.0	3
4	36 37.4 99 11	152.4	37 07.2 99 11	152.3	37 37.0 99 11	152.3	38 06.7 99 12	152.2	38 36.5 99 12	152.1	39 06.2 99 12	152.0	39 36.0 99 12	151.9	40 05.8 99 12	151.9	4
25	36 30.6 99 12	151.3	37 00.3 99 12	151.2	37 30.1 99 12	151.1	37 59.8 99 12	151.0	38 29.6 99 12	151.0	38 59.3 99 12	150.9	39 29.0 99 12	150.8	39 58.8 99 12	150.7	25
6	36 23.5 99 12	150.2	36 53.2 99 12	150.1	37 22.9 99 12	150.0	37 52.7 99 12	149.9	38 22.4 99 12	149.8	38 52.1 99 12	149.7	39 21.8 99 12	149.7	39 51.5 99 12	149.6	6
7	36 16.1 99 13	149.0	36 45.8 99 13	149.0	37 15.6 99 13	148.9	37 45.3 99 13	148.8	38 15.0 99 13	148.7	38 44.7 99 13	148.6	39 14.4 99 13	148.5	39 44.1 99 13	148.4	7
8	36 08.5 99 13	147.9	36 38.2 99 13	147.8	37 07.9 99 13	147.7	37 37.6 99 13	147.7	38 07.3 99 13	147.6	38 37.0 99 13	147.5	39 06.7 99 13	147.4	39 36.3 99 13	147.3	8
9	36 00.7 99 13	146.8	36 30.4 99 13	146.7	37 00.1 99 14	146.6	37 29.7 99 14	146.5	37 59.4 99 14	146.4	38 29.1 99 14	146.3	38 58.7 99 14	146.2	39 28.4 99 14	146.1	9
30	35 52.6 99 14	145.7	36 22.3 99 14	145.6	36 52.0 99 14	145.5	37 21.6 99 14	145.4	37 51.3 99 14	145.3	38 20.9 99 14	145.2	38 50.5 99 14	145.1	39 20.2 99 14	145.0	30
1	35 44.3 99 14	144.6	36 14.0 99 14	144.5	36 43.6 99 14	144.4	37 13.3 99 14	144.3	37 42.9 99 14	144.2	38 12.5 99 14	144.1	38 42.1 99 14	144.0	39 11.7 99 14	143.9	1
2	35 35.8 99 15	143.5	36 05.4 99 15	143.4	36 35.1 99 15	143.3	37 04.7 99 15	143.2	37 34.3 99 15	143.1	38 03.9 99 15	143.0	38 33.5 99 15	142.9	39 03.1 99 15	142.8	2
3	35 27.1 99 15	142.4	35 56.7 99 15	142.3	36 26.3 99 15	142.2	36 55.9 99 15	142.1	37 25.4 99 15	141.9	37 55.0 99 15	141.8	38 24.6 99 15	141.7	38 54.2 99 15	141.6	3
4	35 18.1 99 15	141.2	35 47.7 99 15	141.1	36 17.2 99 15	141.0	36 46.8 99 15	140.9	37 16.4 99 15	140.8	37 45.9 99 16	140.7	38 15.5 99 16	140.6	38 45.0 98 16	140.5	4
35	35 08.9 99 16	140.1	35 38.5 99 16	140.0	36 08.0 99 16	139.9	36 37.6 98 16	139.8	37 07.1 98 16	139.7	37 36.6 98 16	139.6	38 06.2 98 16	139.5	38 35.7 98 16	139.4	35
6	34 59.5 98 16	139.0	35 29.0 98 16	138.9	35 58.6 98 16	138.8	36 28.1 98 16	138.7	36 57.6 98 16	138.6	37 27.1 98 16	138.5	37 56.6 98 16	138.4	38 26.1 98 16	138.3	6
7	34 49.9 98 16	137.9	35 19.4 98 16	137.8	35 48.9 98 16	137.7	36 18.4 98 16	137.6	36 47.9 98 17	137.5	37 17.4 98 17	137.4	37 46.9 98 17	137.3	38 16.4 98 17	137.2	7
8	34 40.0 98 17	136.9	35 09.5 98 17	136.7	35 39.0 98 17	136.6	36 08.5 98 17	136.5	36 38.0 98 17	136.4	37 07.5 98 17	136.3	37 36.9 98 17	136.2	38 06.4 98 17	136.1	8
9	34 30.0 98 17	135.8	34 59.5 98 17	135.7	35 29.0 98 17	135.5	35 58.4 98 17	135.4	36 27.9 98 17	135.3	36 57.3 98 17	135.2	37 26.8 98 17	135.1	37 56.2 98 17	134.9	9
40	34 19.8 98 17	134.7	34 49.2 98 17	134.6	35 18.7 98 17	134.4	35 48.1 98 17	134.3	36 17.6 98 18	134.2	36 47.0 98 18	134.1	37 16.4 98 18	134.0	37 45.9 98 18	133.8	40
1	34 09.4 98 18	133.6	34 38.8 98 18	133.5	35 08.2 98 18	133.4	35 37.7 98 18	133.2	36 07.1 98 18	133.1	36 36.5 98 18	133.0	37 05.9 98 18	132.9	37 35.3 98 18	132.7	1
2	33 58.8 98 18	132.5	34 28.2 98 18	132.4	34 57.6 98 18	132.3	35 27.0 98 18	132.2	35 56.4 98 18	132.0	36 25.8 98 18	131.9	36 55.2 98 18	131.8	37 24.5 98 18	131.6	2
3	33 48.0 98 18	131.4	34 17.4 98 18	131.3	34 46.8 98 18	131.2	35 16.1 98 18	131.1	35 45.5 98 18	130.9	36 14.9 98 18	130.8	36 44.3 98 18	130.7	37 13.6 98 19	130.6	3
4	33 37.0 98 19	130.4	34 06.4 98 19	130.2	34 35.8 98 19	130.1	35 05.1 98 19	130.0	35 34.5 98 19	129.9	36 03.8 98 19	129.7	36 33.2 98 19	129.6	37 02.5 98 19	129.5	4
45	33 25.9 98 19	129.3	33 55.2 98 19	129.2	34 24.6 98 19	129.0	34 53.9 98 19	128.9	35 23.2 98 19	128.8	35 52.6 98 19	128.7	36 21.9 98 19	128.5	36 51.2 98 19	128.4	45
6	33 14.5 98 19	128.2	33 43.9 98 19	128.1	34 13.2 98 19	128.0	34 42.5 98 19	127.8	35 11.8 98 19	127.7	35 41.1 98 19	127.6	36 10.4 98 19	127.4	36 39.7 98 19	127.3	6
7	33 03.0 98 19	127.1	33 32.4 98 19	127.0	34 01.7 98 19	126.9	34 31.0 98 20	126.8	35 00.3 98 20	126.6	35 29.6 98 20	126.5	35 58.8 98 20	126.4	36 28.1 98 20	126.2	7
8	32 51.4 98 20	126.1	33 20.7 98 20	126.0	33 50.0 98 20	125.8	34 19.3 98 20	125.7	34 48.5 98 20	125.6	35 17.8 98 20	125.4	35 47.1 98 20	125.3	36 16.3 97 20	125.2	8
9	32 39.6 98 20	125.0	33 08.9 98 20	124.9	33 38.1 98 20	124.8	34 07.4 98 20	124.6	34 36.7 98 20	124.5	35 05.9 97 20	124.4	35 35.1 97 20	124.2	36 04.4 97 20	124.1	9
50	32 27.6 98 20	124.0	32 56.9 98 20	123.8	33 26.1 98 20	123.7	33 55.4 97 20	123.6	34 24.6 97 20	123.4	34 53.9 97 20	123.3	35 23.1 97 20	123.2	35 52.3 97 20	123.0	50
1	32 15.5 97 20	122.9	32 44.8 97 20	122.8	33 14.0 97 20	122.6	33 43.2 97 21	122.5	34 12.4 97 21	122.4	34 41.6 97 21	122.2	35 10.8 97 21	122.1	35 40.0 97 21	122.0	1
2	32 03.2 97 21	121.9	32 32.5 97 21	121.7	33 01.7 97 21	121.6	33 30.9 97 21	121.5	34 00.1 97 21	121.3	34 29.3 97 21	121.2	34 58.5 97 21	121.0	35 27.6 97 21	120.9	2
3	31 50.8 97 21	120.8	32 20.1 97 21	120.7	32 49.3 97 21	120.5	33 18.5 97 21	120.4	33 47.6 97 21	120.3	34 16.8 97 21	120.1	34 46.0 97 21	120.0	35 15.1 97 21	119.8	3
4	31 38.3 97 21	119.8	32 07.5 97 21	119.6	32 36.7 97 21	119.5	33 05.9 97 21	119.4	33 35.0 97 21	119.2	34 04.2 97 21	119.1	34 33.3 97 21	118.9	35 02.5 97 21	118.8	4
55	31 25.6 97 21	118.7	31 54.8 97 21	118.6	32 24.0 97 21	118.4	32 53.1 97 21	118.3	33 22.3 97 21	118.2	33 51.4 97 21	118.0	34 20.6 97 22	117.9	34 49.7 97 22	117.7	55
6	31 12.9 97 22	117.7	31 42.0 97 22	117.5	32 11.2 97 22	117.4	32 40.3 97 22	117.3	33 09.4 97 22	117.1	33 38.6 97 22	117.0	34 07.7 97 22	116.8	34 36.8 97 22	116.7	6
7	30 59.9 97 22	116.6	31 29.1 97 22	116.5	31 58.2 97 22	116.4	32 27.3 97 22	116.2	32 56.5 97 22	116.1	33 25.6 97 22	115.9	33 54.7 97 22	115.8	34 23.7 97 22	115.6	7
8	30 46.9 97 22	115.6	31 16.0 97 22	115.5	31 45.2 97 22	115.3	32 14.3 97 22	115.2	32 43.4 97 22	115.0	33 12.5 97 22	114.9	33 41.5 97 22	114.7	34 10.6 97 22	114.6	8
9	30 33.8 97 22	114.6	31 02.9 97 22	114.4	31 32.0 97 22	114.3	32 01.1 97 22	114.2	32 30.2 97 22	114.0	32 59.2 97 22	113.9	33 28.3 97 22	113.7	33 57.3 97 22	113.6	9
60	30 20.5 97 22	113.5	30 49.6 97 22	113.4	31 18.7 97 22	113.3	31 47.8 97 22	113.1	32 16.8 97 22	113.0	32 45.9 97 22	112.8	33 15.0 97 22	112.7	33 44.0 97 22	112.5	60
1	30 07.2 97 22	112.5	30 36.2 97 22	112.4	31 05.3 97 22	112.2	31 34.4 97 22	112.1	32 03.4 97 23	111.9	32 32.5 97 23	111.8	33 01.5 97 23	111.6	33 30.5 97 23	111.5	1
2	29 53.7 97 23	111.5	30 22.8 97 23	111.4	30 51.8 97 23	111.2	31 20.9 97 23	111.1	31 49.9 97 23	110.9	32 19.0 97 23	110.8	32 48.0 97 23	110.6	33 17.0 97 23	110.5	2
3	29 40.1 97 23	110.5	30 09.2 97 23	110.3	30 38.3 97 23	110.2	31 07.3 97 23	110.0	31 36.3 97 23	109.9	32 05.3 97 23	109.7	32 34.3 97 23	109.6	33 03.3 97 23	109.4	3
4	29 26.5 97 23	109.5	29 55.5 97 23	109.3	30 24.6 97 23	109.2	30 53.6 97 23	109.0	31 22.6 97 23	108.9	31 51.6 97 23	108.7	32 20.6 97 23	108.6	32 49.6 97 23	108.4	4
65	29 12.8 97 23	108.4	29 41.8 97 23	108.3	30 10.8 97 23	108.2	30 39.8 97 23	108.0	31 08.8 97 23	107.9	31 37.8 97 23	107.7	32 06.8 97 23	107.6	32 35.8 97 23	107.4	65
6	28 59.0 97 23	107.4	29 28.0 97 23	107.3	29 57.0 97 23	107.1	30 26.0 97 23	107.0	30 55.0 97 23	106.8	31 24.0 97 23	106.7	31 52.9 97 23	106.5	32 21.9 97 23	106.4	6
7	28 45.1 97 23	106.4	29 14.1 97 23	106.3	29 43.1 97 23	106.1	30 12.1 97 23	106.0	30 41.1 97 23	105.8	31 10.0 97 23	105.7	31 39.0 97 23	105.5	32 07.9 96 23	105.4	7
8	28 31.1 97 23	105.4	29 00.1 97 23	105.3	29 29.1 97 23	105.1	29 58.1 97 23	105.0	30 27.1 97 23	104.8	30 56.0 97 23	104.7	31 25.0 96 23	104.5	31 53.9 96 23	104.4	8
9	28 17.1 97 24	104.4	28 46.1 97 24	104.3	29 15.1 97 24	104.1	29 44.0 97 24	104.0	30 13.0 97 24	103.8	30 42.0 96 24	103.7	31 10.9 96 24	103.5	31 39.8 96 24	103.4	9
70	28 03.0 97 24	103.4	28 32.0 97 24	103.3	29 01.0 97 24	103.1	29 29.9 97 24	103.0	29 58.9 96 24	102.8	30 27.8 96 24	102.7	30 56.8 96 24	102.5	31 25.7 96 24	102.4	70
1	27 48.9 97 24	102.4	28 17.8 97 24	102.3	28 46.8 97 24	102.1	29 15.8 97 24	102.0	29 44.7 96 24	101.8	30 13.6 96 24	101.7	30 42.6 96 24	101.5	31 11.5 96 24	101.4	1
2	27 34.7 97 24	101.4	28 03.6 97 24	101.3	28 32.6 97 24	101.1	29 01.5 96 24	101.0	29 30.5 96 24	100.8	29 59.4 96 24	100.7	30 28.3 96 24	100.5	30 57.2 96 24	100.4	2
3	27 20.4 97 24	100.4	27 49.4 97 24	100.3	28 18.3 96 24	100.1	28 47.3 96 24	100.0	29 16.2 96 24	99.8	29 45.1 96 24	99.7	30 14.0 96 24	99.5	30 42.9 96 24	99.4	3
4	27 06.1 97 24	99.4	27 35.1 96 24	99.3	28 04.0 96 24	99.1	28 32.9 96 24	99.0	29 01.9 96 24	98.8	29 30.8 96 24	98.7	29 59.7 96 24	98.5	30 28.6 96 24	98.4	4
75	26 51.8 97 24	98.4	27 20.7 96 24	98.3	27 49.7 96 24	98.1	28 18.6 96 24	98.0	28 47.5 96 24	97.8	29 16.4 96 24	97.7	29 45.3 96 24	97.5	30 14.2 96 24	97.4	75
6	26 37.4 96 24	97.5	27 06.3 96 24	97.3	27 35.3 96 24	97.2	28 04.2 96 24	97.0	28 33.1 96 24	96.9	29 02.0 96 24	96.7	29 30.9 96 24	96.6	29 59.8 96 24	96.4	6
7	26 23.0 96 24	96.5	26 51.9 96 24	96.3	27 20.9 96 24	96.2	27 49.8 96 24	96.0	28 18.7 96 24	95.9	28 47.6 96 24	95.7	29 16.5 96 24	95.6	29 45.3 96 24	95.4	7
8	26 08.5 96 24	95.5	26 37.5 96 24	95.3	27 06.4 96 24	95.2	27 35.3 96 24	95.0	28 04.2 96 24	94.9	28 33.1 96 24	94.7	29 02.0 96 24	94.6	29 30.9 96 24	94.4	8
9	25 54.1 96 24	94.5	26 23.0 96 24	94.4	26 51.9 96 24	94.2	27 20.9 96 24	94.1	27 49.8 96 24	93.9	28 18.7 96 24	93.8	28 47.5 96 24	93.6	29 16.4 96 24	93.5	9
80	25 39.6 96 24	93.5	26 08.5 96 24	93.4	26 37.5 96 24	93.2	27 06.4 96 24	93.1	27 35.3 96 24	92.9	28 04.2 96 24	92.8	28 33.0 96 24	92.6	29 01.9 96 24	92.5	80
1	25 25.1 96 24	92.6	25 54.0 96 24	92.4	26 23.0 96 24	92.3	26 51.9 96 24	92.1	27 20.8 96 24	92.0	27 49.7 96 24	91.8	28 18.5 96 24	91.7	28 47.4 96 24	91.5	1
2	25 10.6 96 24	91.6	25 39.5 96 24	91.4	26 08.5 96 24	91.3	26 37.4 96 24	91.1	27 06.3 96 24	91.0	27 35.1 96 24	90.8	28 04.0 96 24	90.7	28 32.9 96 24	90.5	2
3	24 56.1 96 24	90.6	25 25.0 96 24	90.5	25 53.9 96 24	90.3	26 22.8 96 24	90.2	26 51.7 96 24	90.0	27 20.6 96 24	89.9	27 49.5 96 24	89.7	28 18.4 96 24	89.6	3
4	24 41.6 96 24	89.6	25 10.5 96 24	89.5	25 39.4 96 24	89.3	26 08.3 96 24	89.2	26 37.2 96 24	89.0	27 06.1 96 24	88.9	27 35.0 96 24	88.7	28 03.9 96 24	88.6	4
85	24 27.1 96 24	88.7	24 56.0 96 24	88.5	25 24.9 96 24	88.4	25 53.8 96 24	88.2	26 22.7 96 24	88.1	26 51.6 96 24	87.9	27 20.5 96 24	87.8	27 49.4 96 24	87.6	85
6	24 12.6 96 24	87.7	24 41.5 96 24	87.6	25 10.4 96 24	87.4	25 39.3 96 24	87.3	26 08.2 96 24	87.1	26 37.1 96 24	87.0	27 06.0 96 24	86.8	27 34.9 96 24	86.7	6
7	23 58.1 96 24	86.7	24 27.0 96 24	86.6	24 55.9 96 24	86.4	25 24.8 96 24	86.3	25 53.7 96 24	86.2	26 22.6 96 24	86.0	26 51.5 96 24	85.8	27 20.4 96 24	85.7	7
8	23 43.6 96 24	85.8	24 12.5 96 24	85.6	24 41.4 96 24	85.5	25 10.3 96 24	85.3	25 39.3 96 24	85.2	26 08.1 96 24	85.0	26 37.0 96 24	84.9	27 05.9 96 24	84.7	8
9	23 29.1 96 24	84.8	23 58.0 96 24	84.7	24 27.0 96 24	84.5	24 55.9 96 24	84.4	25 24.8 96 24	84.2	25 53.7 96 24	84.1	26 22.6 96 24	83.9	26 51.5 96 24	83.8	9
90	23 14.7 96 24	83.9	23 43.6 96 24	83.7	24 12.5 96 24	83.6	24 41.5 96 24	83.4	25 10.4 96 24	83.3	25 39.3 96 24	83.1	26 08.2 96 24	83.0	26 37.1 96 24	82.8	90

Lat. 76°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	23 00.2	96 24	82.9	23 29.2	96 24	82.8	23 58.1	96 24	82.6	24 27.1	96 24	82.5
2	22 45.9	97 24	81.9	23 14.8	96 24	81.8	23 43.7	96 24	81.7	24 12.7	96 24	81.5
3	22 31.5	97 24	81.0	23 00.5	96 24	80.8	23 29.4	96 24	80.7	23 58.3	96 24	80.6
4	22 17.2	97 24	80.0	22 46.1	97 24	79.9	23 15.1	96 24	79.7	23 44.0	96 24	79.6
95	22 02.9	97 24	79.1	22 31.9	97 24	78.9	23 00.8	97 24	78.8	23 29.8	96 24	78.7
6	21 48.7	97 24	78.1	22 17.7	97 24	78.0	22 46.6	97 24	77.8	23 15.6	97 24	77.7
7	21 34.5	97 24	77.2	22 03.5	97 24	77.0	22 32.5	97 24	76.9	23 01.4	97 24	76.8
8	21 20.4	97 23	76.2	21 49.4	97 23	76.1	22 18.3	97 23	75.9	22 47.3	97 23	75.8
9	21 06.3	97 23	75.3	21 35.3	97 23	75.1	22 04.3	97 23	75.0	22 33.3	97 23	74.9
100	20 52.3	97 23	74.3	21 21.3	97 23	74.2	21 50.3	97 23	74.1	22 19.3	97 23	73.9
1	20 38.4	97 23	73.4	21 07.4	97 23	73.3	21 36.4	97 23	73.1	22 05.4	97 23	73.0
2	20 24.5	97 23	72.4	20 53.5	97 23	72.3	21 22.5	97 23	72.2	21 51.5	97 23	72.0
3	20 10.7	97 23	71.5	20 39.7	97 23	71.4	21 08.7	97 23	71.2	21 37.8	97 23	71.1
4	19 57.0	97 23	70.6	20 26.0	97 23	70.4	20 55.0	97 23	70.3	21 24.1	97 23	70.2
105	19 43.3	97 23	69.6	20 12.4	97 23	69.5	20 41.4	97 23	69.4	21 10.5	97 23	69.2
6	19 29.7	97 22	68.7	19 58.8	97 22	68.5	20 27.9	97 22	68.4	20 56.9	97 22	68.3
7	19 16.3	97 22	67.7	19 45.4	97 22	67.6	20 14.4	97 22	67.5	20 43.5	97 22	67.3
8	19 02.9	97 22	66.8	19 32.0	97 22	66.7	20 01.1	97 22	66.5	20 30.1	97 22	66.4
9	18 49.6	97 22	65.9	19 18.7	97 22	65.7	19 47.8	97 22	65.6	20 16.9	97 22	65.5
110	18 36.4	97 22	64.9	19 05.5	97 22	64.8	19 34.6	97 22	64.7	20 03.7	97 22	64.5
1	18 23.3	97 22	64.0	18 52.4	97 22	63.9	19 21.6	97 22	63.7	19 50.7	97 22	63.6
2	18 10.3	97 21	63.1	18 39.4	97 21	62.9	19 08.6	97 21	62.8	19 37.7	97 21	62.7
3	17 57.4	97 21	62.1	18 26.6	97 21	62.0	18 55.7	97 21	61.9	19 24.9	97 21	61.8
4	17 44.6	97 21	61.2	18 13.8	97 21	61.1	18 43.0	97 21	60.9	19 12.2	97 21	60.8
115	17 32.0	97 21	60.3	18 01.2	97 21	60.1	18 30.4	97 21	60.0	18 59.5	97 21	59.9
6	17 19.4	97 21	59.3	17 48.6	97 21	59.2	18 17.8	97 21	59.1	18 47.0	97 21	59.0
7	17 07.0	97 20	58.4	17 36.2	97 20	58.3	18 05.5	97 20	58.2	18 34.7	97 20	58.0
8	16 54.7	97 20	57.5	17 23.9	97 20	57.3	17 53.2	97 20	57.2	18 22.4	97 20	57.1
9	16 42.5	98 20	56.5	17 11.8	98 20	56.4	17 41.0	98 20	56.3	18 10.3	97 20	56.2
120	16 30.5	98 20	55.6	16 59.8	98 20	55.5	17 29.0	98 20	55.4	17 58.3	98 20	55.3
1	16 18.6	98 20	54.7	16 47.9	98 20	54.6	17 17.2	98 20	54.4	17 46.4	98 20	54.3
2	16 06.8	98 19	53.7	16 36.1	98 19	53.6	17 05.4	98 19	53.5	17 34.7	98 19	53.4
3	15 55.2	98 19	52.8	16 24.5	98 19	52.7	16 53.8	98 19	52.6	17 23.1	98 19	52.5
4	15 43.7	98 19	51.9	16 13.0	98 19	51.8	16 42.4	98 19	51.7	17 11.7	98 19	51.6
125	15 32.3	98 19	51.0	16 01.7	98 19	50.9	16 31.0	98 19	50.7	17 00.4	98 19	50.6
6	15 21.1	98 18	50.0	15 50.5	98 18	49.9	16 19.9	98 18	49.8	16 49.2	98 18	49.7
7	15 10.1	98 18	49.1	15 39.5	98 18	49.0	16 08.9	98 18	48.9	16 38.2	98 18	48.8
8	14 59.2	98 18	48.2	15 28.6	98 18	48.1	15 58.0	98 18	48.0	16 27.4	98 18	47.9
9	14 48.4	98 18	47.3	15 17.9	98 18	47.2	15 47.3	98 18	47.0	16 16.7	98 18	46.9
130	14 37.9	98 17	46.3	15 07.3	98 17	46.2	15 36.7	98 17	46.1	16 06.2	98 17	46.0
1	14 27.4	98 17	45.4	14 56.9	98 17	45.3	15 26.4	98 17	45.2	15 55.8	98 17	45.1
2	14 17.2	98 17	44.5	14 46.7	98 17	44.4	15 16.2	98 17	44.3	15 45.6	98 17	44.2
3	14 07.1	98 17	43.5	14 36.6	98 16	43.5	15 06.1	98 16	43.4	15 35.6	98 16	43.3
4	13 57.2	98 16	42.6	14 26.7	98 16	42.5	14 56.2	98 16	42.4	15 25.7	98 16	42.3
135	13 47.5	98 16	41.7	14 17.0	98 16	41.6	14 46.5	98 16	41.5	15 16.0	98 16	41.4
6	13 37.9	98 16	40.8	14 07.4	98 16	40.7	14 37.0	98 16	40.6	15 06.5	98 16	40.5
7	13 28.5	99 15	39.8	13 58.1	99 15	39.8	14 27.6	99 15	39.7	14 57.2	99 15	39.6
8	13 19 3	99 15	38.9	13 48.9	99 15	38.8	14 18.4	99 15	38.7	14 48.0	99 15	38.7
9	13 10.3	99 15	38.0	13 39.9	99 15	37.9	14 09.5	99 15	37.8	14 39.1	99 15	37.7
140	13 01.4	99 14	37.1	13 31.0	99 14	37.0	14 00.6	99 14	36.9	14 30.3	99 14	36.8
1	12 52.8	99 14	36.1	13 22.4	99 14	36.1	13 52.0	99 14	36.0	14 21.7	99 14	35.9
2	12 44.3	99 14	35.2	13 13.9	99 14	35.1	13 43.6	99 14	35.1	14 13.2	99 14	35.0
3	12 36.0	99 13	34.3	13 05.7	99 13	34.2	13 35.4	99 13	34.1	14 05.0	99 13	34.1
4	12 27.9	99 13	33.4	12 57.6	99 13	33.3	13 27.3	99 13	33.2	13 57.0	99 13	33.1
145	12 20.1	99 13	32.4	12 49.8	99 13	32.4	13 19.5	99 13	32.3	13 49.1	99 13	32.2
6	12 12.4	99 12	31.5	12 42.1	99 12	31.4	13 11.8	99 12	31.4	13 41.5	99 12	31.3
7	12 04.9	99 12	30.6	12 34.6	99 12	30.5	13 04.3	99 12	30.4	13 34.1	99 12	30.4
8	11 57.6	99 12	29.7	12 27.3	99 12	29.6	12 57.1	99 12	29.5	13 26.8	99 12	29.5
9	11 50.5	99 11	28.7	12 20.3	99 11	28.7	12 50.0	99 11	28.6	13 19.8	99 11	28.5
150	11 43.7	99 11	27.8	12 13.4	99 11	27.7	12 43.2	99 11	27.7	13 13.0	99 11	27.6
1	11 37.0	99 11	26.9	12 06.8	99 11	26.8	12 36.5	99 11	26.8	13 06.3	99 11	26.7
2	11 30.5	99 10	26.0	12 00.3	99 10	25.9	12 30.1	99 10	25.8	12 59.9	99 10	25.8
3	11 24.3	99 10	25.0	11 54.1	99 10	25.0	12 23.9	99 10	24.9	12 53.7	99 10	24.9
4	11 18.2	99 10	24.1	11 48.1	99 10	24.0	12 17.9	99 10	24.0	12 47.7	99 10	23.9
155	11 12.4	99 09	23.2	11 42.3	99 09	23.1	12 12.1	99 09	23.1	12 41.9	99 09	23.0
6	11 06.8	99 09	22.3	11 36.7	99 09	22.2	12 06.5	99 09	22.1	12 36.4	99 09	22.1
7	11 01.4	1.0 09	21.3	11 31.3	1.0 09	21.3	12 01.1	1.0 09	21.2	12 31.0	1.0 09	21.2
8	10 56.3	1.0 08	20.4	11 26.1	1.0 08	20.4	11 56.0	1.0 08	20.3	12 25.9	1.0 08	20.3
9	10 51.3	1.0 08	19.5	11 21.2	1.0 08	19.4	11 51.1	1.0 08	19.4	12 21.0	1.0 08	19.3
160	10 46.6	1.0 08	18.5	11 16.5	1.0 08	18.5	11 46.4	1.0 07	18.5	12 16.3	1.0 07	18.4
1	10 42.1	1.0 07	17.6	11 12.0	1.0 07	17.6	11 41.9	1.0 07	17.5	12 11.8	1.0 07	17.5
2	10 37.8	1.0 07	16.7	11 07.7	1.0 07	16.7	11 37.6	1.0 07	16.6	12 07.5	1.0 07	16.6
3	10 33.7	1.0 06	15.8	11 03.7	1.0 06	15.7	11 33.6	1.0 06	15.7	12 03.5	1.0 06	15.7
4	10 29.9	1.0 06	14.8	10 59.8	1.0 06	14.8	11 29.8	1.0 06	14.8	11 59.7	1.0 06	14.7
165	10 26.3	1.0 06	13.9	10 56.2	1.0 06	13.9	11 26.2	1.0 06	13.8	11 56.1	1.0 06	13.8
6	10 22.9	1.0 05	13.0	10 52.9	1.0 05	13.0	11 22.8	1.0 05	12.9	11 52.8	1.0 05	12.9
7	10 19.8	1.0 05	12.1	10 49.7	1.0 05	12.0	11 19.7	1.0 05	12.0	11 49.6	1.0 05	12.0
8	10 16.9	1.0 04	11.1	10 46.8	1.0 04	11.1	11 16.8	1.0 04	11.1	11 46.7	1.0 04	11.1
9	10 14.2	1.0 04	10.2	10 44.1	1.0 04	10.2	11 14.1	1.0 04	10.2	11 44.1	1.0 04	10.1
170	10 11.7	1.0 04	09.3	10 41.7	1.0 04	09.3	11 11.7	1.0 04	09.2	11 41.6	1.0 04	09.2
1	10 09.5	1.0 03	08.3	10 39.5	1.0 03	08.3	11 09.5	1.0 03	08.3	11 39.4	1.0 03	08.3
2	10 07.5	1.0 03	07.4	10 37.5	1.0 03	07.4	11 07.5	1.0 03	07.4	11 37.5	1.0 03	07.4
3	10 05.8	1.0 03	06.5	10 35.7	1.0 03	06.5	11 05.7	1.0 03	06.5	11 35.7	1.0 03	06.4
4	10 04.2	1.0 02	05.6	10 34.2	1.0 02	05.6	11 04.2	1.0 02	05.5	11 34.2	1.0 02	05.5
175	10 02.9	1.0 02	04.6	10 32.9	1.0 02	04.6	11 02.9	1.0 02	04.6	11 32.9	1.0 02	04.6
6	10 01.9	1.0 01	03.7	10 31.9	1.0 01	03.7	11 01.9	1.0 01	03.7	11 31.9	1.0 01	03.7
7	10 01.1	1.0 01	02.8	10 31.1	1.0 01	02.8	11 01.1	1.0 01	02.8	11 31.1	1.0 01	02.8
8	10 00.5	1.0 01	01.9	10 30.5	1.0 01	01.9	11 00.5	1.0 01	01.8	11 30.5	1.0 01	01.8
9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9
180	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0

H.A.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	24 56.0	96 24	82.3	25 24.9	96 24	82.2	25 53.8	96 24	82.0	26 22.7	96 24	81.9	91
2	24 41.6	96 24	81.4	25 10.5	96 24	81.2	25 39.4	96 24	81.1	26 08.3	96 24	80.9	2
3	24 27.3	96 24	80.4	24 56.2	96 24	80.3	25 25.1	96 24	80.1	25 54.0	96 24	80.0	3
4	24 13.0	96 24	79.5	24 41.9	96 24	79.3	25 10.8	96 24	79.2	25 39.7	96 24	79.0	4
95	23 58.7	96 24	78.5	24 27.7	96 24	78.4	24 56.6	96 24	78.2	25 25.5	96 24	78.1	95
6	23 44.5	96 24	77.6	24 13.5	96 24	77.4	24 42.4	96 24	77.3	25 11.3	96 24	77.1	6
7	23 30.4	97 24	76.6	23 59.3	96 23	76.5	24 28.3	96 23	76.3	24 57.2	96 23	76.2	7
8	23 16.3	97 23	75.7	23 45.2	97 23	75.5	24 14.2	96 23	75.4	24 43.1	96 23	75.2	8
9	23 02.3	97 23	74.7	23 31.2	97 23	74.6	24 00.2	97 23	74.4	24 29.1	96 23	74.3	9
100	22 48.3	97 23	73.8	23 17.3	97 23	73.6	23 46.2	97 23	73.5	24 15.2	97 23	73.4	100
1	22 34.4	97 23	72.8	23 03.4	97 23	72.7	23 32.3	97 23	72.6	24 01.3	97 23	72.4	1
2	22 20.5	97 23	71.9	22 49.5	97 23	71.8	23 18.5	97 23	71.6	23 47.5	97 23	71.5	2
3	22 06.8	97 23	71.0	22 35.8	97 23	70.8	23 04.8	97 23	70.7	23 33.8	97 23	70.5	3
4	21 53.1	97 23	70.0	22 22.1	97 23	69.9	22 51.1	97 23	69.7	23 20.1	97 23	69.6	4
105	21 39.5	97 23	69.1	22 08.5	97 22	69.0	22 37.6	97 22	68.8	23 06.6	97 22	68.7	105
6	21 26.0	97 22	68.2	21 55.0	97 22	68.0	22 24.1	97 22	67.9	22 53.1	97 22	67.7	6
7	21 12.6	97 22	67.2	21 41.6	97 22	67.1	22 10.7	97 22	66.9	22 39.7	97 22	66.8	7
8	20 59.2	97 22	66.3	21 28.3	97 22	66.2	21 57.4	97 22	66.0	22 26.4	97 22	65.9	8
9	20 46.0	97 22	65.4	21 15.1	97 22	65.2	21 44.1	97 22	65.1	22 13.2	97 22	65.0	9
110	20 32.8	97 22	64.4	21 01.9	97 22	64.3	21 31.0	97 22	64.2	22 00.1	97 22	64.0	110
1	20 19.8	97 22	63.5	20 48.9	97 22	63.4	21 18.0	97 22	63.2	21 47.1	97 22	63.1	1
2	20 06.9	97 21	62.6	20 36.0	97 21	62.4	21 05.1	97 21	62.3	21 34.2	97 21	62.2	2
3	19 54.0	97 21	61.6	20 23.2	97 21	61.5	20 52.3	97 21	61.4	21 21.5	97 21	61.2	3
4	19 41.3	97 21	60.7	20 10.5	97 21	60.6	20 39.6	97 21	60.5	21 08.8	97 21	60.3	4
115	19 28.7	97 21	59.8	19 57.9	97 21	59.6	20 27.1	97 21	59.5	20 56.2	97 21	59.4	115
6	19 16.2	97 21	58.8	19 45.4	97 21	58.7	20 14.6	97 21	58.6	20 43.8	97 21	58.5	6
7	19 03.9	97 20	57.9	19 33.1	97 20	57.8	20 02.3	97 20	57.7	20 31.5	97 20	57.6	7
8	18 51.6	97 20	57.0	19 20.9	97 20	56.9	19 50.1	97 20	56.8	20 19.3	97 20	56.6	8
9	18 39.5	97 20	56.1	19 08.8	97 20	56.0	19 38.0	97 20	55.8	20 07.2	97 20	55.7	9
120	18 27.6	98 20	55.1	18 56.8	98 20	55.0	19 26.1	98 20	54.9	19 55.3	97 20	54.8	120
1	18 15.7	98 20	54.2	18 45.0	98 19	54.1	19 14.3	98 19	54.0	19 43.5	98 19	53.9	1
2	18 04.0	98 19	53.3	18 33.3	98 19	53.2	19 02.6	98 19	53.1	19 31.9	98 19	53.0	2
3	17 52.4	98 19	52.4	18 21.7	98 19	52.3	18 51.1	98 19	52.1	19 20.4	98 19	52.0	3
4	17 41.0	98 19	51.5	18 10.3	98 19	51.3	18 39.7	98 19	51.2	19 09.0	98 19	51.1	4
125	17 29.7	98 19	50.5	17 59.1	98 19	50.4	18 28.4	98 18	50.3	18 57.8	98 18	50.2	125
6	17 18.6	98 18	49.6	17 48.0	98 18	49.5	18 17.3	98 18	49.4	18 46.7	98 18	49.3	6
7	17 07.6	98 18	48.7	17 37.0	98 18	48.6	18 06.4	98 18	48.5	18 35.8	98 18	48.4	7
8	16 56.8	98 18	47.8	17 26.2	98 18	47.7	17 55.6	98 18	47.6	18 25.0	98 18	47.5	8
9	16 46.1	98 18	46.8	17 15.5	98 18	46.7	17 45.0	98 18	46.6	18 14.4	98 17	46.5	9
130	16 35.6	98 17	45.9	17 05.1	98 17	45.8	17 34.5	98 17	45.7	18 03.9	98 17	45.6	130
1	16 25.3	98 17	45.0	16 54.7	98 17	44.9	17 24.2	98 17	44.8	17 53.6	98 17	44.7	1
2	16 15.1	98 17	44.1	16 44.6	98 17	44.0	17 14.0	98 17	43.9	17 43.5	98 17	43.8	2
3	16 05.1	98 16	43.2	16 34.6	98 16	43.1	17 04.0	98 16	43.0	17 33.5	98 16	42.9	3
4	15 55.2	98 16	42.2	16 24.7	98 16	42.2	16 54.2	98 16	42.1	17 23.7	98 16	42.0	4
135	15 45.6	98 16	41.3	16 15.1	98 16	41.2	16 44.6	98 16	41.1	17 14.1	98 16	41.0	135
6	15 36.1	98 16	40.4	16 05.6	98 16	40.3	16 35.1	98 15	40.2	17 04.7	98 15	40.1	6
7	15 26.7	99 15	39.5	15 56.3	99 15	39.4	16 25.9	99 15	39.3	16 55.4	99 15	39.2	7
8	15 17.6	99 15	38.6	15 47.2	99 15	38.5	16 16.7	99 15	38.4	16 46.3	99 15	38.3	8
9	15 08.6	99 15	37.7	15 38.2	99 15	37.6	16 07.8	99 15	37.5	16 37.4	99 15	37.4	9
140	14 59.9	99 14	36.7	15 29.5	99 14	36.7	15 59.1	99 14	36.6	16 28.7	99 14	36.5	140
1	14 51.3	99 14	35.8	15 20.9	99 14	35.7	15 50.5	99 14	35.7	16 20.2	99 14	35.6	1
2	14 42.9	99 14	34.9	15 12.5	99 14	34.8	15 42.2	99 14	34.7	16 11.8	99 14	34.7	2
3	14 34.7	99 13	34.0	15 04.3	99 13	33.9	15 34.0	99 13	33.8	16 03.6	99 13	33.7	3
4	14 26.7	99 13	33.1	14 56.3	99 13	33.0	15 26.0	99 13	32.9	15 55.7	99 13	32.8	4
145	14 18.8	99 13	32.1	14 48.5	99 13	32.1	15 18 2	99 13	32.0	15 47.9	99 13	31.9	145
6	14 11.2	99 12	31.2	14 40.9	99 12	31.2	15 10.6	99 12	31.1	15 40.3	99 12	31.0	6
7	14 03.8	99 12	30.3	14 33.5	99 12	30.2	15 03.2	99 12	30.2	15 32.9	99 12	30.1	7
8	13 56.6	99 12	29.4	14 26.3	99 12	29.3	14 56.0	99 12	29.3	15 25.8	99 12	29.2	8
9	13 49.5	99 11	28.5	14 19.3	99 11	28.4	14 49.0	99 11	28.3	15 18.8	99 11	28.3	9
150	13 42.7	99 11	27.6	14 12.5	99 11	27.5	14 42.3	99 11	27.4	15 12.0	99 11	27.4	150
1	13 36.1	99 11	26.6	14 05.9	99 11	26.6	14 35.7	99 11	26.5	15 05.5	99 11	26.4	1
2	13 29.7	99 10	25.7	13 59.5	99 10	25.7	14 29.3	99 10	25.6	14 59.1	99 10	25.5	2
3	13 23.5	99 10	24.8	13 53.3	99 10	24.7	14 23.1	99 10	24.7	14 52.9	99 10	24.6	3
4	13 17.5	99 10	23.9	13 47.4	99 10	23.8	14 17.2	99 10	23.8	14 47.0	99 10	23.7	4
155	13 11.8	99 09	23.0	13 41.6	99 09	22.9	14 11.4	99 09	22.9	14 41.3	99 09	22.8	155
6	13 06.2	99 09	22.0	13 36.1	99 09	22.0	14 05.9	99 09	21.9	14 35.7	99 09	21.9	6
7	13 00.9	1.0 09	21.1	13 30.7	1.0 09	21.1	14 00.6	1.0 08	21.0	14 30.4	1.0 08	21.0	7
8	12 55.7	1.0 08	20.2	13 25.6	1.0 08	20.2	13 55.5	1.0 08	20.1	14 25.4	1.0 08	20.1	8
9	12 50.8	1.0 08	19.3	13 20.7	1.0 08	19.2	13 50.6	1.0 08	19.2	14 20.5	1.0 08	19.2	9
160	12 46.2	1.0 07	18.4	13 16.0	1.0 07	18.3	13 45.9	1.0 07	18.3	14 15.8	1.0 07	18.2	160
1	12 41.7	1.0 07	17.5	13 11.6	1.0 07	17.4	13 41.5	1.0 07	17.4	14 11.4	1.0 07	17.3	1
2	12 37.4	1.0 07	16.5	13 07.4	1.0 07	16.5	13 37.3	1.0 07	16.5	14 07.2	1.0 07	16.4	2
3	12 33.4	1.0 06	15.6	13 03.3	1.0 06	15.6	13 33.3	1.0 06	15.5	14 03.2	1.0 06	15.5	3
4	12 29.6	1.0 06	14.7	12 59.6	1.0 06	14.7	13 29.5	1.0 06	14.6	13 59.4	1.0 06	14.6	4
165	12 26.1	1.0 06	13.8	12 56.0	1.0 06	13.7	13 25.9	1.0 06	13.7	13 55.9	1.0 06	13.7	165
6	12 22.7	1.0 05	12.9	12 52.7	1.0 05	12.8	13 22.6	1.0 05	12.8	13 52.6	1.0 05	12.8	6
7	12 19.6	1.0 05	11.9	12 49.6	1.0 05	11.9	13 19.5	1.0 05	11.9	13 49.5	1.0 05	11.9	7
8	12 16.7	1.0 04	11.0	12 46.7	1.0 04	11.0	13 16.6	1.0 04	11.0	13 46.6	1.0 04	10.9	8
9	12 14.0	1.0 04	10.1	12 44.0	1.0 04	10.1	13 14.0	1.0 04	10.1	13 43.9	1.0 04	10.0	9
170	12 11.6	1.0 04	09.2	12 41.6	1.0 04	09.2	13 11.6	1.0 04	09.1	13 41.5	1.0 04	09.1	170
1	12 09.4	1.0 03	08.3	12 39.4	1.0 03	08.2	13 09.4	1.0 03	08.2	13 39.3	1.0 03	08.2	1
2	12 07.4	1.0 03	07.4	12 37.4	1.0 03	07.3	13 07.4	1.0 03	07.3	13 37.4	1.0 03	07.3	2
3	12 05.7	1.0 03	06.4	12 35.7	1.0 02	06.4	13 05.7	1.0 02	06.4	13 35.7	1.0 02	06.4	3
4	12 04.2	1.0 02	05.5	12 34.2	1.0 02	05.5	13 04.2	1.0 02	05.5	13 34.2	1.0 02	05.5	4
175	12 02.9	1.0 02	04.6	12 32.9	1.0 02	04.6	13 02.9	1.0 02	04.6	13 32.9	1.0 02	04.6	175
6	12 01.9	1.0 01	03.7	12 31.9	1.0 01	03.7	13 01.9	1.0 01	03.7	13 31.8	1.0 01	03.6	6
7	12 01.0	1.0 01	02.8	12 31.0	1.0 01	02.8	13 01.0	1.0 01	02.7	13 31.0	1.0 01	02.7	7
8	12 00.5	1.0 01	01.8	12 30.5	1.0 01	01.8	13 00.5	1.0 01	01.8	13 30.5	1.0 01	01.8	8
9	12 00.1	1.0 00	00.9	12 30.1	1.0 00	00.9	13 00.1	1.0 00	00.9	13 30.1	1.0 00	00.9	9
180	12 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	180

Lat. 77°

Lat. 78°

Lat. 76°

H.A.	28° 00′ Alt. ° ′	Δd Δt	Az. °	28° 30′ Alt. ° ′	Δd Δt	Az. °	29° 00′ Alt. ° ′	Δd Δt	Az. °	30° 00′ Alt. ° ′	Δd Δt	Az. °
00	42 00.0	1.0 00	180.0	42 30.0	1.0 00	180.0	43 00.0	1.0 00	180.0	44 00.0	1.0 00	180.0
1	41 59.8	1.0 01	178.8	42 29.8	1.0 01	178.8	42 59.8	1.0 01	178.8	43 59.8	1.0 01	178.8
2	41 59.4	1.0 01	177.6	42 29.4	1.0 01	177.6	42 59.4	1.0 01	177.6	43 59.4	1.0 01	177.6
3	41 58.6	1.0 02	176.4	42 28.6	1.0 02	176.4	42 58.6	1.0 02	176.4	43 58.6	1.0 02	176.4
4	41 57.6	1.0 02	175.2	42 27.6	1.0 02	175.2	42 57.6	1.0 02	175.2	43 57.6	1.0 02	175.2
05	41 56.2	1.0 03	174.1	42 26.2	1.0 03	174.0	42 56.2	1.0 03	174.0	43 56.2	1.0 03	174.0
6	41 54.6	1.0 03	172.9	42 24.6	1.0 03	172.9	42 54.6	1.0 03	172.8	43 54.5	1.0 03	172.8
7	41 52.6	1.0 04	171.7	42 22.6	1.0 04	171.7	42 52.6	1.0 04	171.6	43 52.5	1.0 04	171.6
8	41 50.4	1.0 04	170.5	42 20.4	1.0 04	170.5	42 50.3	1.0 04	170.4	43 50.3	1.0 04	170.4
9	41 47.9	1.0 05	169.3	42 17.8	1.0 05	169.3	42 47.8	1.0 05	169.3	43 47.7	1.0 05	169.2
10	41 45.0	1.0 05	168.1	42 15.0	1.0 05	168.1	42 44.9	1.0 05	168.1	43 44.8	1.0 05	168.0
1	41 41.9	1.0 06	167.0	42 11.8	1.0 06	166.9	42 41.8	1.0 06	166.9	43 41.7	1.0 06	166.8
2	41 38.5	1.0 06	165.8	42 08.4	1.0 06	165.7	42 38.3	1.0 06	165.7	43 38.2	1.0 06	165.6
3	41 34.8	1.0 07	164.6	42 04.7	1.0 07	164.6	42 34.6	1.0 07	164.5	43 34.4	1.0 07	164.4
4	41 30.8	1.0 07	163.4	42 00.7	1.0 07	163.4	42 30.6	1.0 07	163.3	43 30.4	1.0 07	163.2
15	41 26.5	1.0 08	162.3	41 56.4	1.0 08	162.2	42 26.3	1.0 08	162.1	43 26.0	1.0 08	162.0
6	41 21.9	1.0 08	161.1	41 51.8	1.0 08	161.0	42 21.7	1.0 08	161.0	43 21.4	1.0 08	160.8
7	41 17.1	1.0 09	159.9	41 46.9	1.0 09	159.8	42 16.8	1.0 09	159.8	43 16.5	1.0 09	159.6
8	41 11.9	1.0 09	158.7	41 41.8	99 09	158.7	42 11.6	99 09	158.6	43 11.3	99 09	158.5
9	41 06.5	99 09	157.6	41 36.4	99 09	157.5	42 06.2	99 10	157.4	43 05.9	99 10	157.3
20	41 00.9	99 10	156.4	41 30.7	99 10	156.3	42 00.5	99 10	156.3	43 00.1	99 10	156.1
1	40 54.9	99 10	155.2	41 24.7	99 10	155.2	41 54.5	99 10	155.1	42 54.1	99 10	154.9
2	40 48.7	99 11	154.1	41 18.5	99 11	154.0	41 48.3	99 11	153.9	42 47.8	99 11	153.8
3	40 42.2	99 11	152.9	41 12.0	99 11	152.8	41 41.8	99 11	152.8	42 41.3	99 11	152.6
4	40 35.5	99 12	151.8	41 05.2	99 12	151.7	41 35.0	99 12	151.6	42 34.5	99 12	151.4
25	40 28.5	99 12	150.6	40 58.2	99 12	150.5	41 28.0	99 12	150.4	42 27.4	99 12	150.3
6	40 21.3	99 13	149.5	40 51.0	99 13	149.4	41 20.7	99 13	149.3	42 20.1	99 13	149.1
7	40 13.8	99 13	148.3	40 43.4	99 13	148.2	41 13.1	99 13	148.1	42 12.5	99 13	147.9
8	40 06.0	99 13	147.2	40 35.7	99 13	147.1	41 05.3	99 13	147.0	42 04.6	99 13	146.8
9	39 58.0	99 14	146.0	40 27.7	99 14	145.9	40 57.3	99 14	145.8	41 56.6	99 14	145.6
30	39 49.8	99 14	144.9	40 19.4	99 14	144.8	40 49.0	99 14	144.7	41 48.3	99 14	144.5
1	39 41.3	99 14	143.8	40 10.9	99 15	143.7	40 40.5	99 15	143.6	41 39.7	99 15	143.3
2	39 32.7	99 15	142.6	40 02.2	99 15	142.5	40 31.8	99 15	142.4	41 30.9	99 15	142.2
3	39 23.7	99 15	141.5	39 53.3	99 15	141.4	40 22.8	98 15	141.3	41 21.9	98 16	141.1
4	39 14.6	98 16	140.4	39 44.1	98 16	140.3	40 13.7	98 16	140.2	41 12.7	98 16	139.9
35	39 05.2	98 16	139.3	39 34.7	98 16	139.2	40 04.2	98 16	139.0	41 03.2	98 16	138.8
6	38 55.6	98 16	138.2	39 25.1	98 16	138.0	39 54.6	98 16	137.9	40 53.6	98 16	137.7
7	38 45.9	98 17	137.0	39 15.3	98 17	136.9	39 44.8	98 17	136.8	40 43.7	98 17	136.5
8	38 35.9	98 17	135.9	39 05.3	98 17	135.8	39 34.7	98 17	135.7	40 33.6	98 17	135.4
9	38 25.7	98 17	134.8	38 55.1	98 17	134.7	39 24.5	98 17	134.6	40 23.3	98 17	134.3
40	38 15.3	98 18	133.7	38 44.7	98 18	133.6	39 14.1	98 18	133.5	40 12.8	98 18	133.2
1	38 04.7	98 18	132.6	38 34.1	98 18	132.5	39 03.4	98 18	132.4	40 02.2	98 18	132.1
2	37 53.9	98 18	131.5	38 23.3	98 18	131.4	38 52.6	98 18	131.3	39 51.3	98 18	131.0
3	37 43.0	98 19	130.4	38 12.3	98 19	130.3	38 41.6	98 19	130.2	39 40.2	98 19	129.9
4	37 31.8	98 19	129.3	38 01.1	98 19	129.2	38 30.4	98 19	129.1	39 29.0	98 19	128.8
45	37 20.5	98 19	128.3	37 49.8	98 19	128.1	38 19.1	98 19	128.0	39 17.6	98 19	127.7
6	37 09.0	98 19	127.2	37 38.3	98 19	127.0	38 07.6	98 19	126.9	39 06.0	97 20	126.6
7	36 57.4	98 20	126.1	37 26.6	97 20	126.0	37 55.9	97 20	125.8	38 54.3	97 20	125.5
8	36 45.6	97 20	125.0	37 14.8	97 20	124.9	37 44.0	97 20	124.7	38 42.4	97 20	124.4
9	36 33.6	97 20	123.9	37 02.8	97 20	123.8	37 32.0	97 20	123.7	38 30.4	97 20	123.4
50	36 21.5	97 20	122.9	36 50.7	97 20	122.7	37 19.8	97 20	122.6	38 18.2	97 21	122.3
1	36 09.2	97 21	121.8	36 38.4	97 21	121.7	37 07.5	97 21	121.5	38 05.8	97 21	121.2
2	35 56.8	97 21	120.7	36 26.0	97 21	120.6	36 55.1	97 21	120.5	37 53.3	97 21	120.2
3	35 44.3	97 21	119.7	36 13.4	97 21	119.5	36 42.5	97 21	119.4	37 40.7	97 21	119.1
4	35 31.6	97 21	118.6	36 00.7	97 21	118.5	36 29.8	97 21	118.3	37 28.0	97 21	118.0
55	35 18.8	97 22	117.6	35 47.9	97 22	117.4	36 17.0	97 22	117.3	37 15.1	97 22	117.0
6	35 05.9	97 22	116.5	35 34.9	97 22	116.4	36 04.0	97 22	116.2	37 02.1	97 22	115.9
7	34 52.8	97 22	115.5	35 21.9	97 22	115.3	35 50.9	97 22	115.2	36 49.0	97 22	114.9
8	34 39.7	97 22	114.4	35 08.7	97 22	114.3	35 37.7	97 22	114.1	36 35.8	97 22	113.8
9	34 26.4	97 22	113.4	34 55.4	97 22	113.3	35 24.4	97 22	113.1	36 22.4	97 22	112.8
60	34 13.0	97 22	112.4	34 42.0	97 22	112.2	35 11.0	97 22	112.1	36 09.0	97 23	111.7
1	33 59.5	97 23	111.3	34 28.5	97 23	111.2	34 57.5	97 23	111.0	35 55.5	96 23	110.7
2	33 46.0	97 23	110.3	34 15.0	97 23	110.2	34 43.9	97 23	110.0	35 41.9	96 23	109.7
3	33 32.3	97 23	109.3	34 01.3	97 23	109.1	34 30.3	97 23	109.0	35 28.1	96 23	108.7
4	33 18.6	97 23	108.3	33 47.5	97 23	108.1	34 16.5	96 23	108.0	35 14.4	96 23	107.6
65	33 04.8	97 23	107.3	33 33.7	96 23	107.1	34 02.6	96 23	106.9	35 00.5	96 23	106.6
6	32 50.9	96 23	106.2	33 19.8	96 23	106.1	33 48.7	96 23	105.9	34 46.5	96 23	105.6
7	32 36.9	96 23	105.2	33 05.8	96 23	105.1	33 34.7	96 23	104.9	34 32.5	96 24	104.6
8	32 22.8	96 24	104.2	32 51.8	96 24	104.1	33 20.7	96 24	103.9	34 18.4	96 24	103.6
9	32 08.7	96 24	103.2	32 37.7	96 24	103.0	33 06.5	96 24	102.9	34 04.3	96 24	102.6
70	31 54.6	96 24	102.2	32 23.5	96 24	102.0	32 52.4	96 24	101.9	33 50.1	96 24	101.6
1	31 40.4	96 24	101.2	32 09.3	96 24	101.0	32 38.1	96 24	100.9	33 35.9	96 24	100.6
2	31 26.1	96 24	100.2	31 55.0	96 24	100.0	32 23.9	96 24	99.9	33 21.6	96 24	99.6
3	31 11.8	96 24	99.2	31 40.7	96 24	99.1	32 09.5	96 24	98.9	33 07.2	96 24	98.6
4	30 57.5	96 24	98.2	31 26.3	96 24	98.1	31 55.2	96 24	97.9	32 52.9	96 24	97.6
75	30 43.1	96 24	97.2	31 11.9	96 24	97.1	31 40.8	96 24	96.9	32 38.5	96 24	96.6
6	30 28.7	96 24	96.2	30 57.5	96 24	96.1	31 26.4	96 24	95.9	32 24.0	96 24	95.6
7	30 14.2	96 24	95.3	30 43.1	96 24	95.1	31 11.9	96 24	94.9	32 09.6	96 24	94.6
8	29 59.8	96 24	94.3	30 28.6	96 24	94.1	30 57.4	96 24	94.0	31 55.1	96 24	93.6
9	29 45.3	96 24	93.3	30 14.1	96 24	93.1	30 43.0	96 24	93.0	31 40.6	96 24	92.7
80	29 30.8	96 24	92.3	29 59.6	96 24	92.2	30 28.5	96 24	92.0	31 26.1	96 24	91.7
1	29 16.3	96 24	91.3	29 45.1	96 24	91.2	30 13.9	96 24	91.0	31 11.6	96 24	90.7
2	29 01.7	96 24	90.4	29 30.6	96 24	90.2	29 59.4	96 24	90.1	30 57.1	96 24	89.7
3	28 47.2	96 24	89.4	29 16.1	96 24	89.2	29 44.9	96 24	89.1	30 42.6	96 24	88.8
4	28 32.7	96 24	88.4	29 01.6	96 24	88.3	29 30.4	96 24	88.1	30 28.0	96 24	87.8
85	28 18.2	96 24	87.5	28 47.1	96 24	87.3	29 15.9	96 24	87.2	30 13.5	96 24	86.8
6	28 03.7	96 24	86.5	28 32.6	96 24	86.3	29 01.4	96 24	86.2	29 59.1	96 24	85.9
7	27 49.2	96 24	85.5	28 18.1	96 24	85.4	28 46.9	96 24	85.2	29 44.6	96 24	84.9
8	27 34.8	96 24	84.6	28 03.6	96 24	84.4	28 32.5	96 24	84.3	29 30.1	96 24	84.0
9	27 20.3	96 24	83.6	27 49.2	96 24	83.5	28 18.1	96 24	83.3	29 15.7	96 24	83.0
90	27 05.9	96 24	82.7	27 34.8	96 24	82.5	28 03.6	96 24	82.4	29 01.3	96 24	82.0

H.A.	32° 00′ Alt. ° ′	Δd Δt	Az. °	34° 00′ Alt. ° ′	Δd Δt	Az. °	34° 30′ Alt. ° ′	Δd Δt	Az. °	35° 30′ Alt. ° ′	Δd Δt	Az. °	H.A.
00	46 00.0	1.0 00	180.0	48 00.0	1.0 00	180.0	48 30.0	1.0 00	180.0	49 30.0	1.0 00	180.0	00
1	45 59.8	1.0 01	178.8	47 59.8	1.0 01	178.8	48 29.8	1.0 01	178.8	49 29.8	1.0 01	178.7	1
2	45 59.4	1.0 01	177.6	47 59.4	1.0 01	177.5	48 29.4	1.0 01	177.5	49 29.4	1.0 01	177.5	2
3	45 58.6	1.0 02	176.3	47 58.6	1.0 02	176.3	48 28.6	1.0 02	176.3	49 28.6	1.0 02	176.2	3
4	45 57.5	1.0 02	175.1	47 57.5	1.0 02	175.0	48 27.5	1.0 02	175.0	49 27.5	1.0 02	175.0	4
05	45 56.1	1.0 03	173.9	47 56.1	1.0 03	173.8	48 26.1	1.0 03	173.8	49 26.0	1.0 03	173.7	05
6	45 54.4	1.0 03	172.7	47 54.4	1.0 03	172.6	48 24.3	1.0 03	172.5	49 24.3	1.0 03	172.5	6
7	45 52.4	1.0 04	171.5	47 52.3	1.0 04	171.3	48 22.3	1.0 04	171.3	49 22.2	1.0 04	171.2	7
8	45 50.1	1.0 04	170.2	47 50.0	1.0 04	170.1	48 19.9	1.0 04	170.1	49 19.9	1.0 04	170.0	8
9	45 47.5	1.0 05	169.0	47 47.3	1.0 05	168.9	48 17.3	1.0 05	168.8	49 17.2	1.0 05	168.7	9
10	45 44.6	1.0 05	167.8	47 44.4	1.0 05	167.6	48 14.3	1.0 05	167.6	49 14.2	1.0 06	167.5	10
1	45 41.4	1.0 06	166.6	47 41.1	1.0 06	166.4	48 11.1	1.0 06	166.4	49 10.9	1.0 06	166.3	1
2	45 37.9	1.0 06	165.4	47 37.6	1.0 06	165.2	48 07.5	1.0 06	165.1	49 07.3	1.0 06	165.0	2
3	45 34.1	1.0 07	164.2	47 33.7	1.0 07	164.0	48 03.6	1.0 07	163.9	49 03.4	1.0 07	163.8	3
4	45 30.0	1.0 07	163.0	47 29.5	1.0 07	162.7	47 59.4	1.0 07	162.7	48 59.2	1.0 08	162.5	4
15	45 25.6	1.0 08	161.8	47 25.1	1.0 08	161.5	47 55.0	1.0 08	161.4	48 54.7	1.0 08	161.3	15
6	45 20.9	1.0 08	160.6	47 20.3	1.0 08	160.3	47 50.2	1.0 08	160.2	48 49.9	99 08	160.1	6
7	45 15.9	99 09	159.4	47 15.3	99 09	159.1	47 45.1	99 09	159.0	48 44.8	99 09	158.8	7
8	45 10.7	99 09	158.2	47 10.0	99 09	157.9	47 39.8	99 09	157.8	48 39.4	99 09	157.6	8
9	45 05.1	99 10	157.0	47 04.4	99 10	156.7	47 34.2	99 10	156.6	48 33.7	99 10	156.4	9
20	44 59.3	99 10	155.8	46 58.5	99 10	155.4	47 28.2	99 10	155.4	48 27.8	99 10	155.2	20
1	44 53.2	99 11	154.6	46 52.3	99 11	154.2	47 22.1	99 11	154.1	48 21.5	99 11	154.0	1
2	44 46.9	99 11	153.4	46 45.9	99 11	153.0	47 15.6	99 11	152.9	48 15.0	99 11	152.7	2
3	44 40.2	99 11	152.2	46 39.1	99 12	151.8	47 08.8	99 12	151.7	48 08.3	99 12	151.5	3
4	44 33.3	99 12	151.0	46 32.2	99 12	150.6	47 01.8	99 12	150.5	48 01.2	99 12	150.3	4
25	44 26.2	99 12	149.9	46 24.9	99 12	149.5	46 54.6	99 13	149.3	47 53.9	99 13	149.1	25
6	44 18.8	99 13	148.7	46 17.4	99 13	148.3	46 47.0	99 13	148.2	47 46.3	99 13	147.9	6
7	44 11.1	99 13	147.5	46 09.6	99 13	147.1	46 39.3	99 13	147.0	47 38.5	99 13	146.7	7
8	44 03.2	99 14	146.4	46 01.6	99 14	145.9	46 31.2	99 14	145.8	47 30.4	99 14	145.5	8
9	43 55.0	99 14	145.2	45 53.4	99 14	144.7	46 22.9	99 14	144.6	47 22.0	98 14	144.4	9
30	43 46.6	99 14	144.0	45 44.9	98 15	143.6	46 14.4	98 15	143.4	47 13.5	98 15	143.2	30
1	43 38.0	99 15	142.9	45 36.1	98 15	142.4	46 05.6	98 15	142.3	47 04.6	98 15	142.0	1
2	43 29.1	98 15	141.7	45 27.1	98 15	141.2	45 56.6	98 15	141.1	46 55.6	98 15	140.8	2
3	43 20.0	98 16	140.6	45 17.9	98 16	140.1	45 47.4	98 16	139.9	46 46.3	98 16	139.7	3
4	43 10.7	98 16	139.4	45 08.5	98 16	138.9	45 38.0	98 16	138.8	46 36.8	98 16	138.5	4
35	43 01.1	98 16	138.3	44 58.9	98 16	137.8	45 28.3	98 16	137.6	46 27.1	98 17	137.3	35
6	42 51.4	98 17	137.2	44 49.0	98 17	136.6	45 18.4	98 17	136.5	46 17.1	98 17	136.2	6
7	42 41.4	98 17	136.0	44 38.9	98 17	135.5	45 08.3	98 17	135.3	46 07.0	98 17	135.0	7
8	42 31.2	98 17	134.9	44 28.6	98 17	134.3	44 58.0	98 18	134.2	45 56.6	98 18	133.9	8
9	42 20.8	98 18	133.8	44 18.2	98 18	133.2	44 47.5	98 18	133.0	45 46.0	98 18	132.7	9
40	42 10.2	98 18	132.7	44 07.5	98 18	132.1	44 36.8	98 18	131.9	45 35.3	97 18	131.6	40
1	41 59.5	98 18	131.5	43 56.6	98 18	130.9	44 25.9	97 18	130.8	45 24.3	97 19	130.5	1
2	41 48.5	98 19	130.4	43 45.6	97 19	129.8	44 14.8	97 19	129.7	45 13.2	97 19	129.3	2
3	41 37.4	98 19	129.3	43 34.3	97 19	128.7	44 03.5	97 19	128.5	45 01.9	97 19	128.2	3
4	41 26.0	97 19	128.2	43 22.9	97 19	127.6	43 52.1	97 19	127.4	44 50.4	97 19	127.1	4
45	41 14.6	97 19	127.1	43 11.3	97 20	126.5	43 40.5	97 20	126.3	44 38.7	97 20	126.0	45
6	41 02.9	97 20	126.0	42 59.6	97 20	125.4	43 28.7	97 20	125.2	44 26.9	97 20	124.9	6
7	40 51.1	97 20	124.9	42 47.6	97 20	124.3	43 16.8	97 20	124.1	44 14.9	97 20	123.8	7
8	40 39.1	97 20	123.8	42 35.6	97 20	123.2	43 04.7	97 20	123.0	44 02.8	97 20	122.7	8
9	40 27.0	97 20	122.7	42 23.4	97 21	122.1	42 52.4	97 21	121.9	43 50.5	97 21	121.6	9
50	40 14.7	97 21	121.7	42 11.0	97 21	121.0	42 40.0	97 21	120.8	43 38.1	97 21	120.5	50
1	40 02.3	97 21	120.6	41 58.5	97 21	119.9	42 27.5	97 21	119.8	43 25.5	97 21	119.4	1
2	39 49.7	97 21	119.5	41 45.8	97 21	118.9	42 14.8	97 21	118.7	43 12.8	97 21	118.3	2
3	39 37.0	97 21	118.5	41 33.0	97 22	117.8	42 02.0	97 22	117.6	42 59.9	96 22	117.3	3
4	39 24.2	97 22	117.4	41 20.1	97 22	116.7	41 49.1	96 22	116.5	42 47.0	96 22	116.2	4
55	39 11.2	97 22	116.3	41 07.1	96 22	115.7	41 36.1	96 22	115.5	42 33.9	96 22	115.1	55
6	38 58.2	97 22	115.3	40 54.0	96 22	114.6	41 22.9	96 22	114.4	42 20.7	96 22	114.1	6
7	38 45.0	97 22	114.2	40 40.7	96 22	113.5	41 09.6	96 22	113.4	42 07.4	96 22	113.0	7
8	38 31.7	96 22	113.2	40 27.4	96 22	112.5	40 56.2	96 22	112.3	41 54.0	96 22	111.9	8
9	38 18.3	96 22	112.1	40 13.9	96 23	111.4	40 42.8	96 23	111.3	41 40.4	96 23	110.9	9
60	38 04.8	96 23	111.1	40 00.3	96 23	110.4	40 29.2	96 23	110.2	41 26.8	96 23	109.8	60
1	37 51.2	96 23	110.1	39 46.7	96 23	109.4	40 15.5	96 23	109.2	41 13.1	96 23	108.8	1
2	37 37.5	96 23	109.0	39 33.0	96 23	108.3	40 01.8	96 23	108.1	40 59.4	96 23	107.8	2
3	37 23.8	96 23	108.0	39 19.1	96 23	107.3	39 47.9	96 23	107.1	40 45.5	96 23	106.7	3
4	37 09.9	96 23	107.0	39 05.2	96 23	106.3	39 34.0	96 23	106.1	40 31.6	96 23	105.7	4
65	36 56.0	96 23	105.9	38 51.3	96 23	105.2	39 20.0	96 23	105.1	40 17.5	96 23	104.7	65
6	36 42.0	96 23	104.9	38 37.2	96 24	104.2	39 06.0	96 24	104.0	40 03.5	96 24	103.7	6
7	36 27.9	96 24	103.9	38 23.1	96 24	103.2	38 51.9	96 24	103.0	39 49.3	96 24	102.6	7
8	36 13.8	96 24	102.9	38 09.0	96 24	102.2	38 37.7	96 24	102.0	39 35.1	96 24	101.6	8
9	35 59.6	96 24	101.9	37 54.8	96 24	101.2	38 23.5	96 24	101.0	39 20.9	96 24	100.6	9
70	35 45.4	96 24	100.9	37 40.5	96 24	100.2	38 09.2	96 24	100.0	39 06.6	96 24	99.6	70
1	35 31.1	96 24	99.9	37 26.2	96 24	99.2	37 54.9	96 24	99.0	38 52.3	96 24	98.6	1
2	35 16.8	96 24	98.9	37 11.8	96 24	98.2	37 40.5	96 24	98.0	38 37.9	96 24	97.6	2
3	35 02.5	96 24	97.9	36 57.4	96 24	97.2	37 26.2	96 24	97.0	38 23.5	96 24	96.6	3
4	34 48.1	96 24	96.9	36 43.0	96 24	96.2	37 11.7	96 24	96.0	38 09.1	96 24	95.6	4
75	34 33.6	96 24	95.9	36 28.6	96 24	95.2	36 57.3	96 24	95.0	37 54.6	96 24	94.7	75
6	34 19.2	96 24	94.9	36 14.1	96 24	94.2	36 42.8	96 24	94.0	37 40.1	96 24	93.7	6
7	34 04.7	96 24	93.9	35 59.6	96 24	93.2	36 28.3	96 24	93.1	37 25.7	95 24	92.7	7
8	33 50.2	96 24	93.0	35 45.1	96 24	92.3	36 13.8	96 24	92.1	37 11.2	95 24	91.7	8
9	33 35.7	96 24	92.0	35 30.6	96 24	91.3	35 59.3	96 24	91.1	36 56.6	95 24	90.7	9
80	33 21.2	96 24	91.0	35 16.1	96 24	90.3	35 44.8	96 24	90.1	36 42.1	95 24	89.8	80
1	33 06.7	96 24	90.0	35 01.6	96 24	89.3	35 30.3	96 24	89.2	36 27.6	95 24	88.8	1
2	32 52.2	96 24	89.1	34 47.1	96 24	88.4	35 15.8	96 24	88.2	36 13.1	95 24	87.8	2
3	32 37.7	96 24	88.1	34 32.6	96 24	87.4	35 01.3	96 24	87.2	35 58.6	95 24	86.9	3
4	32 23.2	96 24	87.1	34 18.1	96 24	86.4	34 46.8	96 24	86.3	35 44.1	96 24	85.9	4
85	32 08.7	96 24	86.2	34 03.6	96 24	85.5	34 32.3	96 24	85.3	35 29.6	96 24	85.0	85
6	31 54.2	96 24	85.2	33 49.1	96 24	84.5	34 17.8	96 24	84.4	35 15.2	96 24	84.0	6
7	31 39.8	96 24	84.3	33 34.7	96 24	83.6	34 03.4	96 24	83.4	35 00.8	96 24	83.0	7
8	31 25.3	96 24	83.3	33 20.3	96 24	82.6	33 49.0	96 24	82.5	34 46.4	96 24	82.1	8
9	31 10.9	96 24	82.4	33 05.9	96 24	81.7	33 34.6	96 24	81.5	34 32.0	96 24	81.2	9
90	30 56.6	96 24	81.4	32 51.6	96 24	80.7	33 20.3	96 24	80.6	34 17.7	96 24	80.2	90

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	26 51.5	96 24	81.7	27 20.4	96 24	81.6	27 49.3	96 24	81.4	28 47.0	96 24	81.1	30 42.2	96 24	80.5	32 37.3	96 24	79.8	33 06.0	96 24	79.6	34 03.4	96 24	79.3	91
2	26 37.2	96 24	80.8	27 06.1	96 24	80.6	27 34.9	96 24	80.5	28 32.6	96 24	80.2	30 27.9	96 24	79.5	32 23.0	96 24	78.8	32 51.7	96 24	78.7	33 49.2	96 24	78.3	2
3	26 22.9	96 24	79.8	26 51.8	96 24	79.7	27 20.7	96 24	79.5	28 18.4	96 24	79.2	30 13.7	96 24	78.6	32 08.8	96 24	77.9	32 37.5	96 24	77.7	33 35.0	96 24	77.4	3
4	26 08.6	96 24	78.9	26 37.5	96 24	78.7	27 06.4	96 24	78.6	28 04.1	96 24	78.3	29 59.5	96 24	77.6	31 54.6	96 24	77.0	32 23.4	96 24	76.8	33 20.8	96 23	76.5	4
95	25 54.4	96 24	77.9	26 23.3	96 24	77.8	26 52.2	96 24	77.6	27 49.9	96 24	77.3	29 45.3	96 24	76.7	31 40.5	96 23	76.0	32 09.3	96 23	75.9	33 06.8	96 23	75.5	95
6	25 40.2	96 24	77.0	26 09.2	96 24	76.8	26 38.0	96 24	76.7	27 35.8	96 23	76.4	29 31.2	96 23	75.7	31 26.5	96 23	75.1	31 55.2	96 23	74.9	32 52.7	96 23	74.6	6
7	25 26.1	96 23	76.0	25 55.0	96 23	75.9	26 24.0	96 23	75.7	27 21.7	96 23	75.4	29 17.2	96 23	74.8	31 12.5	96 23	74.2	31 41.2	96 23	74.0	32 38.8	96 23	73.7	7
8	25 12.1	96 23	75.1	25 41.0	96 23	74.9	26 09.8	96 23	74.8	27 07.7	96 23	74.5	29 03.2	96 23	73.9	30 58.5	96 23	73.2	31 27.3	96 23	73.1	32 24.9	96 23	72.7	8
9	24 58.1	96 23	74.2	25 27.0	96 23	74.0	25 55.9	96 23	73.9	26 53.8	96 23	73.6	28 49.3	96 23	72.9	30 44.7	96 23	72.3	31 13.5	96 23	72.2	32 11.1	96 23	71.8	9
100	24 44.1	96 23	73.2	25 13.1	96 23	73.1	25 42.0	96 23	72.9	26 39.9	96 23	72.6	28 35.5	96 23	72.0	30 30.9	96 23	71.4	30 59.7	96 23	71.2	31 57.3	96 23	70.9	100
1	24 30.3	97 23	72.3	24 59.2	97 23	72.1	25 28.2	96 23	72.0	26 26.1	96 23	71.7	28 21.7	96 23	71.1	30 17.1	96 23	70.5	30 46.0	96 23	70.3	31 43.6	96 23	70.0	1
2	24 16.5	97 23	71.3	24 45.5	97 23	71.2	25 14.4	97 23	71.1	26 12.3	96 23	70.8	28 08.0	96 23	70.2	30 03.5	96 23	69.5	30 32.4	96 23	69.4	31 30.0	96 23	69.1	2
3	24 02.8	97 23	70.4	24 31.8	97 23	70.3	25 00.7	97 23	70.1	25 58.6	97 23	69.8	27 54.4	96 23	69.2	29 49.9	96 22	68.6	30 18.8	96 22	68.5	31 16.5	96 22	68.1	3
4	23 49.1	97 23	69.5	24 18.1	97 23	69.3	24 47.1	97 23	69.2	25 45.1	97 22	68.9	27 40.8	96 22	68.3	29 36.5	96 22	67.7	30 05.4	96 22	67.5	31 03.1	96 22	67.2	4
105	23 35.6	97 22	68.5	24 04.6	97 22	68.4	24 33.6	97 22	68.3	25 31.6	97 22	68.0	27 27.4	96 22	67.4	29 23.1	96 22	66.8	29 52.0	96 22	66.6	30 49.7	96 22	66.3	105
6	23 22.1	97 22	67.6	23 51.1	97 22	67.5	24 20.2	97 22	67.3	25 18.2	97 22	67.0	27 14.1	97 22	66.5	29 09.8	96 22	65.9	29 38.7	96 22	65.7	30 36.5	96 22	65.4	6
7	23 08.8	97 22	66.7	23 37.8	97 22	66.5	24 06.8	97 22	66.4	25 04.8	97 22	66.1	27 00.8	97 22	65.5	28 56.6	96 22	65.0	29 25.5	96 22	64.8	30 23.3	96 22	64.5	7
8	22 55.5	97 22	65.7	23 24.5	97 22	65.6	23 53.6	97 22	65.5	24 51.6	97 22	65.2	26 47.6	97 22	64.6	28 43.5	96 22	64.0	29 12.4	96 22	63.9	30 10.3	96 22	63.6	8
9	22 42.3	97 22	64.8	23 11.3	97 22	64.7	23 40.4	97 22	64.5	24 38.5	97 22	64.3	26 34.6	97 22	63.7	28 30.5	97 22	63.1	28 59.5	97 21	63.0	29 57.3	96 21	62.7	9
110	22 29.2	97 22	63.9	22 58.3	97 22	63.8	23 27.3	97 22	63.6	24 25.5	97 22	63.4	26 21.6	97 21	62.8	28 17.6	97 21	62.2	28 46.6	97 21	62.1	29 44.5	97 21	61.8	110
1	22 16.2	97 21	63.0	22 45.3	97 21	62.8	23 14.4	97 21	62.7	24 12.5	97 21	62.4	26 08.7	97 21	61.9	28 04.8	97 21	61.3	28 33.8	97 21	61.2	29 31.8	97 21	60.9	1
2	22 03.3	97 21	62.0	22 32.4	97 21	61.9	23 01.5	97 21	61.8	23 59.7	97 21	61.5	25 56.0	97 21	61.0	27 52.1	97 21	60.4	28 21.1	97 21	60.3	29 19.1	97 21	60.0	2
3	21 50.6	97 21	61.1	22 19.7	97 21	61.0	22 48.8	97 21	60.9	23 47.0	97 21	60.6	25 43.4	97 21	60.1	27 39.6	97 21	59.5	28 08.6	97 21	59.4	29 06.6	97 21	59.1	3
4	21 37.9	97 21	60.2	22 07.1	97 21	60.1	22 36.2	97 21	59.9	23 34.4	97 21	59.7	25 30.8	97 21	59.1	27 27.1	97 21	58.6	27 56.2	97 20	58.4	28 54.2	97 20	58.2	4
115	21 25.4	97 21	59.3	21 54.5	97 21	59.1	22 23.7	97 21	59.0	23 22.0	97 21	58.8	25 18.4	97 20	58.2	27 14.8	97 20	57.7	27 43.9	97 20	57.5	28 42.0	97 20	57.3	115
6	21 13.0	97 20	58.4	21 42.1	97 20	58.2	22 11.3	97 20	58.1	23 09.6	97 20	57.8	25 06.2	97 20	57.3	27 02.6	97 20	56.8	27 31.7	97 20	56.6	28 29.8	97 20	56.4	6
7	21 00.7	97 20	57.4	21 29.9	97 20	57.3	21 59.0	97 20	57.2	22 57.4	97 20	56.9	24 54.0	97 20	56.4	26 50.5	97 20	55.9	27 19.6	97 20	55.7	28 17.8	97 20	55.5	7
8	20 48.5	97 20	56.5	21 17.7	97 20	56.4	21 46.9	97 20	56.3	22 45.3	97 20	56.0	24 42.0	97 20	55.5	26 38.6	97 20	55.0	27 07.7	97 20	54.8	28 05.9	97 20	54.6	8
9	20 36.5	97 20	55.6	21 05.7	97 20	55.5	21 34.9	97 20	55.3	22 33.3	97 20	55.1	24 30.1	97 20	54.6	26 26.7	97 19	54.1	26 55.9	97 19	53.9	27 54.2	97 19	53.7	9
120	20 24.6	97 20	54.7	20 53.8	97 20	54.6	21 23.0	97 20	54.4	22 21.5	97 20	54.2	24 18.3	97 19	53.7	26 15.0	97 19	53.2	26 44.2	97 19	53.0	27 42.5	97 19	52.8	120
1	20 12.8	98 19	53.8	20 42.0	98 19	53.6	21 11.3	97 19	53.5	22 09.8	97 19	53.3	24 06.7	97 19	52.8	26 03.5	97 19	52.3	26 32.7	97 19	52.2	27 31.0	97 19	51.9	1
2	20 01.1	98 19	52.8	20 30.4	98 19	52.7	20 59.7	98 19	52.6	21 58.2	98 19	52.4	23 55.2	97 19	51.9	25 52.1	97 19	51.4	26 21.3	97 19	51.3	27 19.7	97 19	51.0	2
3	19 49.6	98 19	51.9	20 18.9	98 19	51.8	20 48.2	98 19	51.7	21 46.8	98 19	51.5	23 43.8	98 19	51.0	25 40.8	97 19	50.5	26 10.0	97 18	50.4	27 08.5	97 18	50.1	3
4	19 38.3	98 19	51.0	20 07.6	98 19	50.9	20 36.9	98 19	50.8	21 35.5	98 19	50.5	23 32.6	98 18	50.1	25 29.7	98 18	49.6	25 58.9	97 18	49.5	26 57.4	97 18	49.2	4
125	19 27.1	98 18	50.1	19 56.4	98 18	50.0	20 25.7	98 18	49.9	21 24.4	98 18	49.6	23 21.6	98 18	49.2	25 18.7	98 18	48.7	25 48.0	98 18	48.6	26 46.5	98 18	48.3	125
6	19 16.0	98 18	49.2	19 45.4	98 18	49.1	20 14.7	98 18	49.0	21 13.4	98 18	48.7	23 10.7	98 18	48.3	25 07.9	98 18	47.8	25 37.2	98 18	47.7	26 35.7	98 18	47.4	6
7	19 05.1	98 18	48.3	19 34.5	98 18	48.2	20 03.8	98 18	48.0	21 02.6	98 18	47.8	22 59.9	98 18	47.4	24 57.2	98 18	46.9	25 26.5	98 18	46.8	26 25.1	98 17	46.6	7
8	18 54.4	98 18	47.3	19 23.7	98 18	47.2	19 53.1	98 18	47.1	20 51.8	98 18	46.9	22 49.3	98 17	46.5	24 46.7	98 17	46.0	25 16.0	98 17	45.9	26 14.6	98 17	45.7	8
9	18 43.8	98 17	46.4	19 13.2	98 17	46.3	19 42.6	98 17	46.2	20 41.4	98 17	46.0	22 38.9	98 17	45.6	24 36.3	98 17	45.1	25 05.7	98 17	45.0	26 04.3	98 17	44.8	9
130	18 33.3	98 17	45.5	19 02.8	98 17	45.4	19 32.2	98 17	45.3	20 31.0	98 17	45.1	22 28.6	98 17	44.7	24 26.1	98 17	44.2	24 55.5	98 17	44.1	25 54.2	98 17	43.9	130
1	18 23.1	98 17	44.6	18 52.5	98 17	44.5	19 21.9	98 17	44.4	20 20.8	98 17	44.2	22 18.5	98 17	43.8	24 16.1	98 16	43.3	24 45.5	98 16	43.2	25 44.2	98 16	43.0	1
2	18 12.9	98 17	43.7	18 42.4	98 17	43.6	19 11.9	98 17	43.5	20 10.8	98 16	43.3	22 08.5	98 16	42.9	24 06.2	98 16	42.4	24 35.6	98 16	42.3	25 34.4	98 16	42.1	2
3	18 03.0	98 16	42.8	18 32.5	98 16	42.7	19 02.0	98 16	42.6	20 00.9	98 16	42.4	21 58.7	98 16	42.0	23 56.5	98 16	41.6	24 25.9	98 16	41.5	25 24.8	98 16	41.2	3
4	17 53.2	98 16	41.9	18 22.7	98 16	41.8	18 52.2	98 16	41.7	19 51.2	98 16	41.5	21 49.1	98 16	41.1	23 46.9	98 16	40.7	24 16.4	98 16	40.6	25 15.3	98 16	40.4	4
135	17 43.6	98 16	41.0	18 13.1	98 16	40.9	18 42.7	98 16	40.8	19 41.7	98 16	40.6	21 39.6	98 15	40.2	23 37.6	98 15	39.8	24 07.0	98 15	39.7	25 06.0	98 15	39.5	135
6	17 34.2	98 15	40.0	18 03.7	98 15	40.0	18 33.3	98 15	39.9	19 32.3	98 15	39.7	21 30.4	98 15	39.3	23 28.4	98 15	38.9	23 57.8	98 15	38.8	24 56.8	98 15	38.6	6
7	17 25.0	98 15	39.1	17 54.5	98 15	39.0	18 24.0	98 15	38.9	19 23.1	98 15	38.8	21 21.3	98 15	38.4	23 19.3	98 15	38.0	23 48.8	98 15	37.9	24 47.8	98 15	37.7	7
8	17 15.9	99 15	38.2	17 45.4	98 15	38.1	18 15.0	99 15	38.0	19 14.1	99 15	37.9	21 12.3	98 15	37.5	23 10.5	98 14	37.1	23 40.0	98 14	37.0	24 39.1	98 14	36.8	8
9	17 07.0	99 15	37.3	17 36.6	99 14	37.2	18 06.2	99 14	37.1	19 05.3	99 14	37.0	21 03.6	99 14	36.6	23 01.8	99 14	36.2	23 31.4	98 14	36.1	24 30.4	98 14	35.9	9
140	16 58.3	99 14	36.4	17 27.9	99 14	36.3	17 57.5	99 14	36.2	18 56.7	99 14	36.1	20 55.0	99 14	35.7	22 53.3	99 14	35.3	23 22.9	99 14	35.2	24 22.0	99 14	35.1	140
1	16 49.8	99 14	35.5	17 19.4	99 14	35.4	17 49.0	99 14	35.3	18 48.2	99 14	35.2	20 46.6	99 14	34.8	22 45.0	99 14	34.5	23 14.6	99 14	34.4	24 13.8	99 13	34.2	1
2	16 41.4	99 14	34.6	17 11.1	99 14	34.5	17 40.7	99 14	34.4	18 40.0	99 13	34.2	20 38.5	99 13	33.9	22 36.9	99 13	33.6	23 06.5	99 13	33.5	24 05.7	99 13	33.3	2
3	16 33.3	99 13	33.7	17 02.9	99 13	33.6	17 32.6	99 13	33.5	18 31.9	99 13	33.3	20 30.4	99 13	33.0	22 29.0	99 13	32.7	22 58.6	99 13	32.6	23 57.8	99 13	32.4	3
4	16 25.3	99 13	32.8	16 55.0	99 13	32.7	17 24.7	99 13	32.6	18 24.0	99 13	32.4	20 22.6	99 13	32.1	22 21.2	99 13	31.8	22 50.9	99 13	31.7	23 50.1	99 12	31.5	4
145	16 17.6	99 13	31.8	16 47.3	99 13	31.8	17 17.0	99 13	31.7	18 16.3	99 12	31.5	20 15.0	99 12	31.2	22 13.7	99 12	30.9	22 43.3	99 12	30.8	23 42.6	99 12	30.7	145
6	16 10.0	99 12	30.9	16 39.7	99 12	30.9	17 09.4	99 12	30.8	18 08.8	99 12	30.6	20 07.6	99 12	30.3	22 06.3	99 12	30.0	22 36.0	99 12	29.9	23 35.3	99 12	29.8	6
7	16 02.7	99 12	30.0	16 32.4	99 12	30.0	17 02.1	99 12	29.9	18 01.5	99 12	29.7	20 00.3	99 12	29.4	21 59.1	99 12	29.1	22 28.8	99 12	29.1	23 28.2	99 12	28.9	7
8	15 55.5	99 12	29.1	16 25.2	99 12	29.0	16 55.0	99 12	29.0	17 54.4	99 12	28.8	19 53.3	99 11	28.5	21 52.2	99 11	28.3	22 21.9	99 11	28.2	23 21.3	99 11	28.0	8
9	15 48.5	99 11	28.2	16 18.3	99 11	28.1	16 48.0	99 12	28.1	17 47.5	99 11	27.9	19 46.5	99 11	27.7	21 45.4	99 11	27.4	22 15.1	99 11	27.3	23 14.6	99 11	27.2	9
150	15 41.8	99 11	27.3	16 11.5	99 11	27.2	16 41.3	99 11	27.2	17 40.8	99 11	27.0	19 39.8	99 11	26.8	21 38.8	99 11	26.5	22 08.6	99 11	26.4	23 08.1	99 11	26.3	150
1	15 35.2	99 11	26.4	16 05.0	99 11	26.3	16 34.8	99 11	26.3	17 34.3	99 10	26.1	19 33.4	99 10	25.9	21 32.5	99 10	25.6	22 02.2	99 10	25.5	23 01.7	99 10	25.4	1
2	15 28.9	99 10	25.5	15 58.7	99 10	25.4	16 28.5	99 10	25.4	17 28.0	99 10	25.2	19 27.2	99 10	25.0	21 26.3	99 10	24.7	21 56.1	99 10	24.7	22 55.6	99 10	24.5	2
3	15 22.7	99 10	24.6	15 52.5	99 10	24.5	16 22.3	99 10	24.4	17 22.0	99 10	24.3	19 21.1	99 10	24.1	21 20.3	99 10	23.8	21 50.1	99 10	23.8	22 49.7	99 10	23.6	3
4	15 16.8	99 10	23.7	15 46.6	99 10	23.6	16 16.4	99 10	23.5	17 16.1	99 10	23.4	19 15.3	99 09	23.2	21 14.6	99 09	22.9	21 44.4	99 09	22.9	22 44.0	99 09	22.8	4
155	15 11.1	99 09	22.7	15 40.9	99 09	22.7	16 10.8	99 09	22.6	17 10.4	99 09	22.5	19 09.7	99 09	22.3	21 09.0	99 09	22.1	21 38.8	99 09	22.0	22 38.5	99 09	21.9	155
6	15 05.6	99 09	21.8	15 35.4	99 09	21.8	16 05.3	99 09	21.7	17 05.0	99 09	21.6	19 04.3	99 09	21.4	21 03.7	99 09	21.2	21 33.5	99 09	21.1	22 33.1	99 08	21.0	6
7	15 00.3	1.0 08	20.9	15 30.2	1.0 08	20.9	16 00.0	1.0 08	20.8	16 59.7	1.0 08	20.7	18 59.1	99 08	20.5	20 58.5	99 08	20.3	21 28.4	99 08	20.2	22 28.0	99 08	20.1	7
8	14 55.2	1.0 08	20.0	15 25.1	1.0 08	20.0	15 55.0	1.0 08	19.9	16 54.7	1.0 08	19.8	18 54.1	1.0 08	19.6	20 53.6	1.0 08	19.4	21 23.4	1.0 08	19.4	22 23.2	1.0 08	19.3	8
9	14 50.4	1.0 08	19.1	15 20.2	1.0 08	19.1	15 50.1	1.0 08	19.0	16 49.9	1.0 08	18.9	18 49.4	1.0 08	18.7	20 48.9	1.0 08	18.5	21 18.7	1.0 08	18.5	22 18.5	1.0 07	18.4	9
160	14 45.7	1.0 07	18.2	15 15.6	1.0 07	18.2	15 45.5	1.0 07	18.1	16 45.3	1.0 07	18.0	18 44.8	1.0 07	17.8	20 44.4	1.0 07	17.6	21 14.2	1.0 07	17.6	22 14.0	1.0 07	17.5	160
1	14 41.3	1.0 07	17.3	15 11.2	1.0 07	17.2	15 41.1	1.0 07	17.2	16 40.9	1.0 07	17.1	18 40.5	1.0 07	16.9	20 40.1	1.0 07	16.8	21 10.0	1.0 07	16.7	22 09.7	1.0 07	16.6	1
2	14 37.1	1.0 07	16.4	15 07.0	1.0 07	16.3	15 36.9	1.0 07	16.3	16 36.7	1.0 07	16.2	18 36.4	1.0 07	16.1	20 36.0	1.0 06	15.9	21 05.9	1.0 06	15.8	22 05.7	1.0 06	15.8	2
3	14 33.1	1.0 06	15.5	15 03.0	1.0 06	15.4	15 32.9	1.0 06	15.4	16 32.8	1.0 06	15.3	18 32.5	1.0 06	15.2	20 32.1	1.0 06	15.0	21 02.0	1.0 06	15.0	22 01.9	1.0 06	14.9	3
4	14 29.3	1.0 06	14.6	14 59.3	1.0 06	14.5	15 29.2	1.0 06	14.5	16 29.1	1.0 06	14.4	18 28.8	1.0 06	14.3	20 28.5	1.0 06	14.1	20 58.4	1.0 06	14.1	21 58.2	1.0 06	14.0	4
165	14 25.8	1.0 06	13.6	14 55.7	1.0 06	13.6	15 25.7	1.0 06	13.6	16 25.6	1.0 05	13.5	18 25.3	1.0 05	13.4	20 25.0	1.0 05	13.2	20 55.0	1.0 05	13.2	21 54.8	1.0 05	13.1	165
6	14 22.5	1.0 05	12.7	14 52.4	1.0 05	12.7	15 22.4	1.0 05	12.7	16 22.3	1.0 05	12.6	18 22.1	1.0 05	12.5	20 21.8	1.0 05	12.4	20 51.8	1.0 05	12.3	21 51.6	1.0 05	12.3	6
7	14 19.4	1.0 05	11.8	14 49.4	1.0 05	11.8	15 19.3	1.0 05	11.8	16 19.2	1.0 05	11.7	18 19.0	1.0 05	11.6	20 18.8	1.0 05	11.5	20 48.8	1.0 05	11.4	21 48.7	1.0 05	11.4	7
8	14 16.5	1.0 04	10.9	14 46.5	1.0 04	10.9	15 16.5	1.0 04	10.9	16 16.4	1.0 04	10.8	18 16.2	1.0 04	10.7	20 16.0	1.0 04	10.6	20 46.0	1.0 04	10.6	21 45.9	1.0 04	10.5	8
9	14 13.9	1.0 04	10.0	14 43.9	1.0 04	10.0	15 13.8	1.0 04	10.0	16 13.8	1.0 04	09.9	18 13.6	1.0 04	09.8	20 13.5	1.0 04	09.7	20 43.5	1.0 04	09.7	21 43.4	1.0 04	09.6	9
170	14 11.5	1.0 04	09.1	14 41.5	1.0 04	09.1	15 11.4	1.0 04	09.1	16 11.4	1.0 04	09.0	18 11.3	1.0 04	08.9	20 11.2	1.0 04	08.8	20 41.1	1.0 04	08.8	21 41.1	1.0 04	08.8	170
1	14 09.3	1.0 03	08.2	14 39.3	1.0 03	08.2	15 09.3	1.0 03	08.1	16 09.2	1.0 03	08.1	18 09.1	1.0 03	08.0	20 09.0	1.0 03	07.9	20 39.0	1.0 03	07.9	21 39.0	1.0 03	07.9	1
2	14 07.4	1.0 03	07.3	14 37.3	1.0 03	07.3	15 07.3	1.0 03	07.2	16 07.3	1.0 03	07.2	18 07.2	1.0 03	07.1	20 07.1	1.0 03	07.1	20 37.1	1.0 03	07.0	21 37.1	1.0 03	07.0	2
3	14 05.6	1.0 02	06.4	14 35.6	1.0 02	06.4	15 05.6	1.0 02	06.3	16 05.6	1.0 02	06.3	18 05.5	1.0 02	06.2	20 05.5	1.0 02	06.2	20 35.4	1.0 02	06.2	21 35.4	1.0 02	06.1	3
4	14 04.1	1.0 02	05.5	14 34.1	1.0 02	05.4	15 04.1	1.0 02	05.4	16 04.1	1.0 02	05.4	18 04.1	1.0 02	05.4	20 04.0	1.0 02	05.3	20 34.0	1.0 02	05.3	21 34.0	1.0 02	05.3	4
175	14 02.9	1.0 02	04.5	14 32.9	1.0 02	04.5	15 02.9	1.0 02	04.5	16 02.9	1.0 02	04.5	18 02.8	1.0 02	04.5	20 02.8	1.0 02	04.4	20 32.8	1.0 02	04.4	21 32.8	1.0 02	04.4	175
6	14 01.8	1.0 01	03.6	14 31.8	1.0 01	03.6	15 01.8	1.0 01	03.6	16 01.8	1.0 01	03.6	18 01.8	1.0 01	03.6	20 01.8	1.0 01	03.5	20 31.8	1.0 01	03.5	21 31.8	1.0 01	03.5	6
7	14 01.0	1.0 01	02.7	14 31.0	1.0 01	02.7	15 01.0	1.0 01	02.7	16 01.0	1.0 01	02.7	18 01.0	1.0 01	02.7	20 01.0	1.0 01	02.6	20 31.0	1.0 01	02.6	21 31.0	1.0 01	02.6	7
8	14 00.5	1.0 01	01.8	14 30.5	1.0 01	01.8	15 00.5	1.0 01	01.8	16 00.5	1.0 01	01.8	18 00.5	1.0 01	01.8	20 00.4	1.0 01	01.8	20 30.4	1.0 01	01.8	21 30.4	1.0 01	01.8	8
9	14 00.1	1.0 00	00.9	14 30.1	1.0 00	00.9	15 00.1	1.0 00	00.9	16 00.1	1.0 00	00.9	18 00.1	1.0 00	00.9	20 00.1	1.0 00	00.9	20 30.1	1.0 00	00.9	21 30.1	1.0 00	00.9	9
180	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 00.0	1.0 00	00.0	16 00.0	1.0 00	00.0	18 00.0	1.0 00	00.0	20 00.0	1.0 00	00.0	20 30.0	1.0 00	00.0	21 30.0	1.0 00	00.0	180

Lat. 76°

Lat. 77°

Lat. 78°

La
79

Lat. 76°

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	50 00.0	1.0 00	180.0	51 00.0	1.0 00	180.0	52 30.0	1.0 00	180.0	54 00.0	1.0 00	180.0	56 00.0	1.0 00	180.0	56 30.0	1.0 00	180.0	57 00.0	1.0 00	180.0	59 00.0	1.0 00	180.0	00
1	49 59.8	1.0 01	178.7	50 59.8	1.0 01	178.7	52 29.8	1.0 01	178.7	53 59.8	1.0 01	178.7	55 59.8	1.0 01	178.7	56 29.8	1.0 01	178.7	56 59.8	1.0 01	178.7	58 59.8	1.0 01	178.6	1
2	49 59.4	1.0 01	177.5	50 59.4	1.0 01	177.5	52 29.3	1.0 01	177.4	53 59.3	1.0 01	177.4	55 59.3	1.0 01	177.3	56 29.3	1.0 01	177.3	56 59.3	1.0 01	177.3	58 59.3	1.0 01	177.3	2
3	49 58.6	1.0 02	176.2	50 58.6	1.0 02	176.2	52 28.5	1.0 02	176.1	53 58.5	1.0 02	176.1	55 58.5	1.0 02	176.0	56 28.5	1.0 02	176.0	56 58.5	1.0 02	176.0	58 58.4	1.0 02	175.9	3
4	49 57.4	1.0 02	175.0	50 57.4	1.0 02	174.9	52 27.4	1.0 02	174.9	53 57.4	1.0 02	174.8	55 57.3	1.0 02	174.7	56 27.3	1.0 03	174.7	56 57.3	1.0 02	174.6	58 57.2	1.0 03	174.5	4
05	49 56.0	1.0 03	173.7	50 56.0	1.0 03	173.7	52 25.9	1.0 03	173.6	53 55.9	1.0 03	173.5	55 55.8	1.0 03	173.4	56 25.8	1.0 03	173.3	56 55.8	1.0 03	173.3	58 55.7	1.0 03	173.1	05
6	49 54.3	1.0 03	172.5	50 54.2	1.0 03	172.4	52 24.1	1.0 04	172.3	53 54.1	1.0 04	172.2	55 54.0	1.0 04	172.0	56 23.9	1.0 04	172.0	56 53.9	1.0 04	172.0	58 53.8	1.0 04	171.8	6
7	49 52.2	1.0 04	171.2	50 52.1	1.0 04	171.1	52 22.0	1.0 04	171.0	53 51.9	1.0 04	170.9	55 51.8	1.0 04	170.7	56 21.7	1.0 04	170.7	56 51.7	1.0 04	170.6	58 51.5	1.0 04	170.4	7
8	49 49.8	1.0 04	169.9	50 49.7	1.0 05	169.9	52 19.6	1.0 05	169.7	53 49.5	1.0 05	169.6	55 49.3	1.0 05	169.4	56 19.2	1.0 05	169.3	56 49.2	1.0 05	169.3	58 48.9	1.0 05	169.0	8
9	49 47.1	1.0 05	168.7	50 47.0	1.0 05	168.6	52 16.9	1.0 05	168.5	53 46.7	1.0 05	168.3	55 46.4	1.0 05	168.1	56 16.4	1.0 05	168.0	56 46.3	1.0 05	167.9	58 46.0	1.0 05	167.7	9
10	49 44.1	1.0 06	167.4	50 44.0	1.0 06	167.3	52 13.8	1.0 06	167.2	53 43.6	1.0 06	167.0	55 43.3	1.0 06	166.8	56 13.2	1.0 06	166.7	56 43.1	1.0 06	166.6	58 42.7	1.0 06	166.3	10
1	49 40.8	1.0 06	166.2	50 40.7	1.0 06	166.1	52 10.4	1.0 06	165.9	53 40.2	1.0 06	165.7	55 39.8	1.0 06	165.4	56 09.7	1.0 06	165.4	56 39.6	1.0 06	165.3	58 39.1	1.0 07	165.0	1
2	49 37.2	1.0 07	165.0	50 37.0	1.0 07	164.8	52 06.7	1.0 07	164.6	53 36.4	1.0 07	164.4	55 36.0	1.0 07	164.1	56 05.8	1.0 07	164.0	56 35.7	1.0 07	164.0	58 35.2	1.0 07	163.6	2
3	49 33.3	1.0 07	163.7	50 33.1	1.0 07	163.6	52 02.7	1.0 07	163.4	53 32.4	1.0 07	163.1	55 31.8	1.0 07	162.8	56 01.7	1.0 07	162.7	56 31.6	1.0 08	162.6	58 30.9	99 08	162.3	3
4	49 29.1	1.0 08	162.5	50 28.8	1.0 08	162.3	51 58.4	1.0 08	162.1	53 28.0	1.0 08	161.9	55 27.4	99 08	161.5	55 57.2	99 08	161.4	56 27.1	99 08	161.3	58 26.4	99 08	160.9	4
15	49 24.6	1.0 08	161.2	50 24.3	1.0 08	161.1	51 53.8	99 08	160.8	53 23.3	99 08	160.6	55 22.6	99 08	160.2	55 52.5	99 08	160.1	56 22.3	99 09	160.0	58 21.5	99 08	159.6	15
6	49 19.7	99 09	160.0	50 19.4	99 09	159.8	51 48.9	99 09	159.6	53 18.4	99 09	159.3	55 17.6	99 09	158.9	55 47.4	99 09	158.8	56 17.2	99 09	158.7	58 16.2	99 09	158.2	6
7	49 14.6	99 09	158.8	50 14.3	99 09	158.6	51 43.7	99 09	158.3	53 13.1	99 09	158.0	55 12.2	99 09	157.6	55 42.0	99 10	157.5	56 11.7	99 10	157.4	58 10.7	99 10	156.9	7
8	49 09.2	99 10	157.5	50 08.8	99 10	157.3	51 38.2	99 10	157.1	53 07.5	99 10	156.8	55 06.5	99 10	156.3	55 36.3	99 10	156.2	56 06.0	99 10	156.1	58 04.9	99 10	155.6	8
9	49 03.5	99 10	156.3	50 03.1	99 10	156.1	51 32.4	99 10	155.8	53 01.6	99 10	155.5	55 00.5	99 10	155.0	55 30.3	99 10	154.9	56 00.0	99 10	154.8	57 58.7	99 11	154.3	9
20	48 57.5	99 10	155.1	49 57.1	99 10	154.9	51 26.3	99 11	154.6	52 55.5	99 11	154.2	54 54.3	99 11	153.8	55 24.0	99 11	153.6	55 53.6	99 11	153.5	57 52.2	99 11	153.0	20
1	48 51.3	99 11	153.9	49 50.8	99 11	153.7	51 19.9	99 11	153.3	52 49.0	99 11	153.0	54 47.7	99 11	152.5	55 17.4	99 11	152.4	55 47.0	99 12	152.2	57 45.5	99 12	151.6	1
2	48 44.8	99 11	152.6	49 44.2	99 11	152.4	51 13.3	99 12	152.1	52 42.3	99 12	151.7	54 40.9	99 12	151.2	55 10.5	99 12	151.1	55 40.1	99 12	150.9	57 38.5	99 12	150.3	2
3	48 37.9	99 12	151.4	49 37.3	99 12	151.2	51 06.3	99 12	150.9	52 35.3	99 12	150.5	54 33.7	99 12	149.9	55 03.3	99 12	149.8	55 32.9	99 12	149.7	57 31.1	98 13	149.0	3
4	48 30.9	99 12	150.2	49 30.2	99 12	150.0	50 59.1	99 12	149.6	52 28.0	99 13	149.2	54 26.3	99 13	148.7	54 55.9	99 13	148.5	55 25.4	98 13	148.4	57 23.5	98 13	147.7	4
25	48 23.5	99 13	149.0	49 22.8	99 13	148.8	50 51.6	99 13	148.4	52 20.4	99 13	148.0	54 18.6	98 13	147.4	54 48.2	98 13	147.3	55 17.7	98 13	147.1	57 15.6	98 14	146.5	25
6	48 15.9	99 13	147.8	49 15.1	99 13	147.6	50 43.9	99 13	147.2	52 12.6	98 13	146.8	54 10.7	98 14	146.2	54 40.2	98 14	146.0	55 09.7	98 14	145.9	57 07.5	98 14	145.2	6
7	48 08.1	99 14	146.6	49 07.2	99 14	146.4	50 35.9	98 14	146.0	52 04.5	98 14	145.5	54 02.5	98 14	144.9	54 32.0	98 14	144.8	55 01.4	98 14	144.6	56 59.1	98 14	143.9	7
8	48 00.0	99 14	145.4	48 59.1	98 14	145.2	50 27.7	98 14	144.8	51 56.2	98 14	144.3	53 54.0	98 15	143.7	54 23.5	98 15	143.5	54 52.9	98 15	143.4	56 50.4	98 15	142.6	8
9	47 51.6	98 14	144.2	48 50.6	98 14	144.0	50 19.2	98 15	143.5	51 47.6	98 15	143.1	53 45.3	98 15	142.5	54 14.7	98 15	142.3	54 44.1	98 15	142.1	56 41.4	98 15	141.4	9
30	47 43.0	98 15	143.0	48 42.0	98 15	142.8	50 10.4	98 15	142.3	51 38.7	98 15	141.9	53 36.3	98 15	141.2	54 05.7	98 15	141.1	54 35.0	98 15	140.9	56 32.3	98 16	140.1	30
1	47 34.1	98 15	141.9	48 33.1	98 15	141.6	50 01.4	98 15	141.1	51 29.7	98 16	140.7	53 27.1	98 16	140.0	53 56.4	98 16	139.8	54 25.8	98 16	139.6	56 22.8	97 16	138.9	1
2	47 25.1	98 16	140.7	48 23.9	98 16	140.4	49 52.2	98 16	140.0	51 20.3	98 16	139.5	53 17.7	98 16	138.8	53 47.0	98 17	138.6	54 16.2	98 16	138.4	56 13.2	97 16	137.6	2
3	47 15.7	98 16	139.5	48 14.6	98 16	139.2	49 42.7	98 16	138.8	51 10.8	98 16	138.3	53 08.0	98 16	137.6	53 37.3	98 17	137.4	54 06.5	97 17	137.2	56 03.3	97 17	136.4	3
4	47 06.2	98 16	138.3	48 05.0	98 16	138.0	49 33.1	98 16	137.6	51 01.0	98 17	137.1	52 58.1	97 17	136.4	53 27.3	97 17	136.2	53 56.5	97 17	136.0	55 53.2	97 17	135.2	4
35	46 56.5	98 17	137.2	47 55.2	98 17	136.9	49 23.2	98 17	136.4	50 51.0	98 17	135.9	52 48.0	97 17	135.2	53 17.2	97 17	135.0	53 46.3	97 17	134.8	55 42.8	97 18	133.9	35
6	46 46.5	98 17	136.0	47 45.1	98 17	135.7	49 13.0	98 17	135.2	50 40.8	97 17	134.7	52 37.6	97 18	134.0	53 06.8	97 18	133.8	53 35.9	97 18	133.6	55 32.3	97 18	132.7	6
7	46 36.3	98 17	134.9	47 34.9	98 17	134.6	49 02.7	98 18	134.1	50 30.4	97 18	133.5	52 27.1	97 18	132.8	52 56.2	97 18	132.6	53 25.3	97 18	132.4	55 21.5	97 18	131.5	7
8	46 25.9	98 18	133.7	47 24.5	98 18	133.4	48 52.2	97 18	132.9	50 19.8	97 18	132.4	52 16.3	97 18	131.6	52 45.4	97 18	131.4	53 14.5	97 18	131.2	55 10.5	97 19	130.3	8
9	46 15.3	98 18	132.6	47 13.8	97 18	132.3	48 41.5	97 18	131.7	50 09.0	97 18	131.2	52 05.4	97 19	130.4	52 34.4	97 19	130.2	53 03.5	97 19	130.0	54 59.4	96 19	129.1	9
40	46 04.5	97 18	131.4	47 03.0	97 18	131.1	48 30.5	97 19	130.6	49 57.9	97 19	130.0	51 54.2	97 19	129.3	52 23.3	97 19	129.1	52 52.2	97 19	128.8	54 48.0	96 19	128.0	40
1	45 53.6	97 19	130.3	46 51.9	97 19	130.0	48 19.4	97 19	129.4	49 46.7	97 19	128.9	51 42.9	97 19	128.1	52 11.9	97 19	127.9	52 40.9	97 19	127.7	54 36.5	96 20	126.8	1
2	45 42.4	97 19	129.2	46 40.7	97 19	128.8	48 08.1	97 19	128.3	49 35.4	97 19	127.7	51 31.4	97 19	126.9	52 00.3	96 20	126.7	52 29.3	96 20	126.5	54 24.8	96 20	125.6	2
3	45 31.1	97 19	128.1	46 29.3	97 19	127.7	47 56.6	97 19	127.2	49 23.8	97 20	126.6	51 19.7	96 20	125.8	51 48.6	96 20	125.6	52 17.5	96 20	125.4	54 12.9	96 20	124.4	3
4	45 19.5	97 19	126.9	46 17.8	97 20	126.6	47 45.0	97 20	126.0	49 12.0	97 20	125.5	51 07.8	96 20	124.7	51 36.7	96 20	124.4	52 05.6	96 20	124.2	54 00.8	96 20	123.3	4
45	45 07.9	97 20	125.8	46 06.0	97 20	125.5	47 33.2	97 20	124.9	49 00.1	97 20	124.3	50 55.8	96 20	123.5	51 24.7	96 20	123.3	51 53.5	96 20	123.1	53 48.6	96 21	122.1	45
6	44 56.0	97 20	124.7	45 54.1	97 20	124.4	47 21.2	97 20	123.8	48 48.1	96 20	123.2	50 43.6	96 21	122.4	51 12.5	96 21	122.2	51 41.3	96 21	121.9	53 36.2	96 21	121.0	6
7	44 44.0	97 20	123.6	45 42.1	97 20	123.2	47 09.0	97 20	122.7	48 35.9	96 21	122.1	50 31.3	96 21	121.3	51 00.1	96 21	121.0	51 28.9	96 21	120.8	53 23.7	95 21	119.9	7
8	44 31.8	97 21	122.5	45 29.8	97 21	122.1	46 56.8	96 21	121.6	48 23.5	96 21	121.0	50 18.8	96 21	120.1	50 47.6	96 21	119.9	51 16.3	96 21	119.7	53 11.1	95 21	118.7	8
9	44 19.5	97 21	121.4	45 17.5	97 21	121.0	46 44.3	96 21	120.5	48 11.0	96 21	119.9	50 06.2	96 21	119.0	50 34.9	96 21	118.8	51 03.7	96 21	118.6	52 58.3	95 22	117.6	9
50	44 07.0	97 21	120.3	45 05.0	96 21	120.0	46 31.7	96 21	119.4	47 58.3	96 21	118.8	49 53.4	96 22	117.9	50 22.2	96 22	117.7	50 50.9	96 22	117.5	52 45.3	95 22	116.5	50
1	43 54.4	97 21	119.2	44 52.3	96 21	118.9	46 19.0	96 21	118.3	47 45.5	96 22	117.7	49 40.6	96 22	116.8	50 09.2	96 22	116.6	50 37.9	96 22	116.4	52 32.3	95 22	115.4	1
2	43 41.7	96 21	118.1	44 39.6	96 22	117.8	46 06.2	96 22	117.2	47 32.6	96 22	116.6	49 27.5	96 22	115.7	49 56.2	96 22	115.5	50 24.8	95 22	115.3	52 19.1	95 22	114.3	2
3	43 28.9	96 22	117.1	44 26.6	96 22	116.7	45 53.2	96 22	116.1	47 19.6	96 22	115.5	49 14.4	96 22	114.6	49 43.0	95 22	114.4	50 11.7	95 22	114.2	52 05.8	95 22	113.2	3
4	43 15.9	96 22	116.0	44 13.6	96 22	115.6	45 40.1	96 22	115.0	47 06.4	96 22	114.4	49 01.1	95 22	113.5	49 29.8	95 22	113.3	49 58.4	95 22	113.1	51 52.4	95 22	112.1	4
55	43 02.8	96 22	114.9	44 00.5	96 22	114.6	45 26.9	96 22	114.0	46 53.1	96 22	113.3	48 47.8	95 22	112.5	49 16.4	95 22	112.2	49 45.0	95 22	112.0	51 38.9	95 23	111.0	55
6	42 49.5	96 22	113.9	43 47.2	96 22	113.5	45 13.6	96 22	112.9	46 39.8	96 22	112.3	48 34.3	95 23	111.4	49 02.9	95 23	111.2	49 31.4	95 23	110.9	51 25.3	95 23	109.9	6
7	42 36.2	96 22	112.8	43 33.9	96 22	112.4	45 00.2	96 23	111.8	46 26.3	96 23	111.2	48 20.8	95 23	110.3	48 49.3	95 23	110.1	49 17.8	95 23	109.9	51 11.6	95 23	108.9	7
8	42 22.8	96 23	111.8	43 20.4	96 23	111.4	44 46.6	96 23	110.8	46 12.7	96 23	110.2	48 07.1	95 23	109.3	48 35.6	95 23	109.0	49 04.1	95 23	108.8	50 57.9	95 23	107.8	8
9	42 09.3	96 23	110.7	43 06.8	96 23	110.3	44 33.0	96 23	109.7	45 59.0	95 23	109.1	47 53.4	95 23	108.2	48 21.9	95 23	108.0	48 50.4	95 23	107.7	50 44.0	94 23	106.7	9
60	41 55.6	96 23	109.7	42 53.2	96 23	109.3	44 19.3	96 23	108.7	45 45.3	95 23	108.0	47 39.5	95 23	107.2	48 08.0	95 23	106.9	48 36.5	95 23	106.7	50 30.1	94 23	105.7	60
1	41 41.9	96 23	108.6	42 39.4	96 23	108.2	44 05.5	96 23	107.6	45 31.4	95 23	107.0	47 25.6	95 23	106.1	47 54.1	95 23	105.9	48 22.5	95 23	105.6	50 16.0	94 23	104.6	1
2	41 28.1	96 23	107.6	42 25.6	96 23	107.2	43 51.6	96 23	106.6	45 17.5	95 23	106.0	47 11.6	95 23	105.1	47 40.1	95 23	104.8	48 08.5	95 23	104.6	50 02.0	94 24	103.6	2
3	41 14.2	96 23	106.5	42 11.7	96 23	106.2	43 37.7	95 23	105.6	45 03.5	95 23	104.9	46 57.6	95 24	104.0	47 26.0	95 24	103.8	47 54.5	95 24	103.6	49 47.8	94 24	102.6	3
4	41 00.3	96 23	105.5	41 57.7	96 23	105.1	43 23.7	95 23	104.5	44 49.5	95 24	103.9	46 43.5	95 24	103.0	47 11.9	95 24	102.8	47 40.3	95 24	102.5	49 33.6	94 24	101.5	4
65	40 46.3	96 23	104.5	41 43.7	96 24	104.1	43 09.6	95 24	103.5	44 35.3	95 24	102.9	46 29.3	95 24	102.0	46 57.7	95 24	101.7	47 26.1	95 24	101.5	49 19.4	94 24	100.5	65
6	40 32.2	96 24	103.5	41 29.6	96 24	103.1	42 55.5	95 24	102.5	44 21.2	95 24	101.8	46 15.1	95 24	101.0	46 43.5	95 24	100.7	47 11.9	95 24	100.5	49 05.1	94 24	99.5	6
7	40 18.0	96 24	102.5	41 15.4	96 24	102.1	42 41.3	95 24	101.5	44 06.9	95 24	100.8	46 00.8	95 24	99.9	46 29.2	95 24	99.7	46 57.6	95 24	99.5	48 50.8	94 24	98.5	7
8	40 03.8	96 24	101.4	41 01.2	95 24	101.1	42 27.0	95 24	100.5	43 52.6	95 24	99.8	45 46.5	95 24	98.9	46 14.9	95 24	98.7	46 43.2	94 24	98.5	48 36.4	94 24	97.5	8
9	39 49.6	96 24	100.4	40 46.9	95 24	100.0	42 12.7	95 24	99.4	43 38.3	95 24	98.8	45 32.1	95 24	97.9	46 00.5	95 24	97.7	46 28.9	94 24	97.5	48 22.0	94 24	96.5	9
70	39 35.3	96 24	99.4	40 32.6	95 24	99.0	41 58.4	95 24	98.4	43 24.0	95 24	97.8	45 17.7	95 24	96.9	45 46.1	95 24	96.7	46 14.5	94 24	96.5	48 07.5	94 24	95.5	70
1	39 21.0	96 24	98.4	40 18.2	95 24	98.0	41 44.0	95 24	97.4	43 09.6	95 24	96.8	45 03.3	95 24	95.9	45 31.7	95 24	95.7	46 00.0	94 24	95.5	47 53.1	94 24	94.5	1
2	39 06.6	96 24	97.4	40 03.8	95 24	97.0	41 29.6	95 24	96.4	42 55.1	95 24	95.8	44 48.9	95 24	94.9	45 17.2	95 24	94.7	45 45.6	94 24	94.5	47 38.6	94 24	93.5	2
3	38 52.2	96 24	96.4	39 49.4	96 24	96.1	41 15.1	95 24	95.5	42 40.7	95 24	94.8	44 34.4	95 24	93.9	45 02.7	94 24	93.7	45 31.1	94 24	93.5	47 24.1	94 24	92.5	3
4	38 37.7	96 24	95.4	39 35.0	95 24	95.1	41 00.7	95 24	94.5	42 26.2	95 24	93.8	44 19.9	95 24	93.0	44 48.3	94 24	92.7	45 16.6	94 24	92.5	47 09.6	94 24	91.5	4
75	38 23.3	95 24	94.5	39 20.5	95 24	94.1	40 46.2	95 24	93.5	42 11.7	95 24	92.9	44 05.4	95 24	92.0	44 33.7	94 24	91.7	45 02.1	94 24	91.5	46 55.1	94 24	90.5	75
6	38 08.8	95 24	93.5	39 06.0	95 24	93.1	40 31.7	95 24	92.5	41 57.2	95 24	91.9	43 50.9	95 24	91.0	44 19.2	94 24	90.8	44 47.6	94 24	90.5	46 40.6	94 24	89.6	6
7	37 54.3	95 24	92.5	38 51.5	95 24	92.1	40 17.2	95 24	91.5	41 42.7	95 24	90.9	43 36.4	95 24	90.0	44 04.7	94 24	89.8	44 33.0	94 24	89.6	46 26.1	94 24	88.6	7
8	37 39.8	95 24	91.5	38 37.0	95 24	91.1	40 02.7	95 24	90.5	41 28.2	95 24	89.9	43 21.9	95 24	89.1	43 50.2	94 24	88.8	44 18.5	94 24	88.6	46 11.5	94 24	87.6	8
9	37 25.3	95 24	90.5	38 22.5	95 24	90.2	39 48.2	95 24	89.6	41 13.7	95 24	89.0	43 07.3	95 24	88.1	43 35.7	94 24	87.9	44 04.0	94 24	87.6	45 57.0	94 24	86.7	9
80	37 10.8	95 24	89.6	38 08.0	95 24	89.2	39 33.7	95 24	88.6	40 59.2	95 24	88.0	42 52.8	95 24	87.1	43 21.2	94 24	86.9	43 49.5	94 24	86.7	45 42.6	94 24	85.7	80
1	36 56.2	95 24	88.6	37 53.5	95 24	88.2	39 19.2	95 24	87.6	40 44.7	95 24	87.0	42 38.4	95 24	86.2	43 06.7	94 24	86.0	43 35.0	94 24	85.7	45 28.1	94 24	84.8	1
2	36 41.7	95 24	87.6	37 39.0	95 24	87.3	39 04.7	95 24	86.7	40 30.2	95 24	86.1	42 23.9	95 24	85.2	42 52.2	95 24	85.0	43 20.6	94 24	84.8	45 13.7	94 24	83.8	2
3	36 27.2	95 24	86.7	37 24.5	95 24	86.3	38 50.2	95 24	85.7	40 15.7	95 24	85.1	42 09.4	95 24	84.3	42 37.8	95 24	84.1	43 06.1	94 24	83.8	44 59.2	94 24	82.9	3
4	36 12.8	95 24	85.7	37 10.0	95 24	85.4	38 35.7	95 24	84.8	40 01.2	95 24	84.2	41 55.0	95 24	83.3	42 23.4	95 24	83.1	42 51.7	94 24	82.9	44 44.9	94 24	82.0	4
85	35 58.3	95 24	84.8	36 55.5	95 24	84.4	38 21.3	95 24	83.8	39 46.8	95 24	83.2	41 40.6	95 24	82.4	42 09.0	95 24	82.2	42 37.3	94 24	81.9	44 30.5	94 24	81.0	85
6	35 43.8	95 24	83.8	36 41.1	95 24	83.4	38 06.8	95 24	82.9	39 32.4	95 24	82.3	41 26.2	95 24	81.4	41 54.6	95 24	81.2	42 23.0	95 24	81.0	44 16.2	94 24	80.1	6
7	35 29.4	95 24	82.9	36 26.7	95 24	82.5	37 52.5	95 24	81.9	39 18.1	95 24	81.3	41 11.9	95 24	80.5	41 40.3	95 24	80.3	42 08.7	95 24	80.1	44 01.9	94 24	79.2	7
8	35 15.0	95 24	81.9	36 12.3	95 24	81.6	37 38.1	95 24	81.0	39 03.7	95 24	80.4	40 57.6	95 24	79.6	41 26.0	95 24	79.4	41 54.4	95 24	79.1	43 47.7	94 24	78.2	8
9	35 00.7	96 24	81.0	35 58.0	95 24	80.6	37 23.8	95 24	80.0	38 49.4	95 24	79.5	40 43.3	95 24	78.6	41 11.8	95 24	78.4	41 40.1	95 24	78.2	43 33.5	94 24	77.3	9
90	34 46.4	96 24	80.0	35 43.7	95 24	79.7	37 09.5	95 24	79.1	38 35.2	95 24	78.5	40 29.1	95 24	77.7	40 57.6	95 24	77.5	41 26.0	95 24	77.3	43 19.3	94 23	76.4	90

Lat. 76°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	34 32.1	96 24	79.1	35 29.4	95 24	78.7	36 55.3	95 24	78.2	38 21.0	95 24	77.6	40 15.0	95 24	76.8	40 43.4	95 24	76.6	41 11.8	95 23	76.4	43 05.3	94 23	75.5	91
2	34 17.9	96 24	78.2	35 15.2	96 24	77.8	36 41.1	95 24	77.2	38 06.8	95 24	76.7	40 00.9	95 23	75.9	40 29.3	95 23	75.7	40 57.8	95 23	75.4	42 51.2	94 23	74.6	2
3	34 03.7	96 24	77.2	35 01.0	96 24	76.9	36 27.0	95 23	76.3	37 52.7	95 23	75.7	39 46.8	95 23	74.9	40 15.3	95 23	74.7	40 43.7	95 23	74.5	42 37.3	94 23	73.7	3
4	33 49.6	96 23	76.3	34 46.9	96 23	75.9	36 12.9	95 23	75.4	37 38.7	95 23	74.8	39 32.8	95 23	74.0	40 01.3	95 23	73.8	40 29.8	95 23	73.6	42 23.4	95 23	72.8	4
95	33 35.5	96 23	75.4	34 32.9	96 23	75.0	35 58.9	95 23	74.5	37 24.7	95 23	73.9	39 18.9	95 23	73.1	39 47.4	95 23	72.9	40 15.9	95 23	72.7	42 09.6	95 23	71.9	95
6	33 21.5	96 23	74.4	34 18.9	96 23	74.1	35 44.9	96 23	73.5	37 10.8	95 23	73.0	39 05.1	95 23	72.2	39 33.6	95 23	72.0	40 02.1	95 23	71.8	41 55.8	95 23	71.0	6
7	33 07.5	96 23	73.5	34 05.0	96 23	73.2	35 31.0	96 23	72.6	36 57.0	95 23	72.1	38 51.3	95 23	71.3	39 19.8	95 23	71.1	39 48.3	95 23	70.9	41 42.1	95 23	70.1	7
8	32 53.6	96 23	72.6	33 51.1	96 23	72.2	35 17.2	96 23	71.7	36 43.2	95 23	71.2	38 37.6	95 23	70.4	39 06.1	95 23	70.2	39 34.6	95 23	70.0	41 28.5	95 23	69.2	8
9	32 39.8	96 23	71.7	33 37.3	96 23	71.3	35 03.5	96 23	70.8	36 29.5	95 23	70.2	38 23.9	95 23	69.5	38 52.5	95 23	69.3	39 21.0	95 23	69.1	41 15.0	95 22	68.3	9
100	32 26.1	96 23	70.7	33 23.6	96 23	70.4	34 49.8	96 23	69.9	36 15.9	96 23	69.3	38 10.4	95 22	68.6	38 38.9	95 22	68.4	39 07.5	95 22	68.2	41 01.5	95 22	67.4	100
1	32 12.4	96 23	69.8	33 10.0	96 23	69.5	34 36.2	96 22	69.0	36 02.3	96 22	68.4	37 56.9	95 22	67.7	38 25.5	95 22	67.5	38 54.1	95 22	67.3	40 48.2	95 22	66.5	1
2	31 58.8	96 22	68.9	32 56.4	96 22	68.6	34 22.7	96 22	68.1	35 48.9	96 22	67.5	37 43.5	95 22	66.8	38 12.1	95 22	66.6	38 40.7	95 22	66.4	40 34.9	95 22	65.6	2
3	31 45.3	96 22	68.0	32 43.0	96 22	67.7	34 09.3	96 22	67.1	35 35.5	96 22	66.6	37 30.2	95 22	65.9	37 58.9	95 22	65.7	38 27.5	95 22	65.5	40 21.8	95 22	64.7	3
4	31 31.9	96 22	67.1	32 29.6	96 22	66.7	33 56.0	96 22	66.2	35 22.2	96 22	65.7	37 17.0	96 22	65.0	37 45.7	95 22	64.8	38 14.3	95 22	64.6	40 08.7	95 22	63.8	4
105	31 18.6	96 22	66.2	32 16.3	96 22	65.8	33 42.7	96 22	65.3	35 09.0	96 22	64.8	37 03.9	96 22	64.1	37 32.6	96 22	63.9	38 01.2	95 22	63.7	39 55.7	95 21	63.0	105
6	31 05.4	96 22	65.2	32 03.1	96 22	64.9	33 29.6	96 22	64.4	34 56.0	96 22	63.9	36 50.9	96 22	63.2	37 19.6	96 21	63.0	37 48.3	96 21	62.8	39 42.8	95 21	62.1	6
7	30 52.2	96 22	64.3	31 50.0	96 22	64.0	33 16.5	96 22	63.5	34 43.0	96 21	63.0	36 38.0	96 21	62.3	37 06.7	96 21	62.1	37 35.4	96 21	62.0	39 30.0	95 21	61.2	7
8	30 39.2	96 22	63.4	31 37.0	96 22	63.1	33 03.6	96 21	62,6	34 30.1	96 21	62.1	36 25.2	96 21	61.4	36 53.9	96 21	61.3	37 22.7	96 21	61.1	39 17.4	95 21	60.3	8
9	30 26.3	96 21	62.5	31 24.1	96 21	62.2	32 50.8	96 21	61.7	34 17.3	96 21	61.2	36 12.5	96 21	60.6	36 41.3	96 21	60.4	37 10.0	96 21	60.2	39 04.8	96 21	59.5	9
110	30 13.5	96 21	61.6	31 11.3	96 21	61.3	32 38.0	96 21	60.8	34 04.6	96 21	60.4	35 59.9	96 21	59.7	36 28.7	96 21	59.5	36 57.5	96 21	59.3	38 52.4	96 21	58.6	110
1	30 00.7	97 21	60.7	30 58.6	96 21	60.4	32 25.4	96 21	59.9	33 52.1	96 21	59.5	35 47.4	96 21	58.8	36 16.2	96 21	58.6	36 45.0	96 20	58.4	38 40.0	96 20	57.7	1
2	29 48.1	97 21	59.8	30 46.1	97 21	59.5	32 12.9	96 21	59.1	33 39.6	96 21	58.6	35 35.1	96 20	57.9	36 03.9	96 20	57.7	36 32.7	96 20	57.6	38 27.8	96 20	56.9	2
3	29 35.6	97 21	58.9	30 33.6	97 21	58.6	32 00.5	96 20	58.2	33 27.3	96 20	57.7	35 22.8	96 20	57.0	35 51.7	96 20	56.9	36 20.5	96 20	56.7	38 15.7	96 20	56.0	3
4	29 23.3	97 20	58.0	30 21.3	97 20	57.7	31 48.2	97 20	57.3	33 15.1	96 20	56.8	35 10.7	96 20	56.2	35 39.6	96 20	56.0	36 08.5	96 20	55.8	38 03.8	96 20	55.1	4
115	29 11.0	97 20	57.1	30 09.1	97 20	56.8	31 36.1	97 20	56.4	33 03.0	97 20	55.9	34 58.7	96 20	55.3	35 27.6	96 20	55.1	35 56.5	96 20	55.0	37 51.9	96 20	54.3	115
6	28 58.9	97 20	56.2	29 57.0	97 20	55.9	31 24.1	97 20	55.5	32 51.1	97 20	55.0	34 46.9	96 20	54.4	35 15.8	96 20	54.3	35 44.7	96 19	54.1	37 40.2	96 19	53.4	6
7	28 46.9	97 20	55.3	29 45.0	97 20	55.0	31 12.2	97 20	54.6	32 39.2	97 20	54.2	34 35.1	97 19	53.5	35 04.1	96 19	53.4	35 33.0	96 19	53.2	37 28.6	96 19	52.6	7
8	28 35.0	97 20	54.4	29 33.2	97 20	54.2	31 00.4	97 19	53.7	32 27.5	97 19	53.3	34 23.5	97 19	52.7	34 52.5	97 19	52.5	35 21.4	97 19	52.4	37 17.2	96 19	51.7	8
9	28 23.3	97 19	53.5	29 21.5	97 19	53.3	30 48.8	97 19	52.8	32 15.9	97 19	52.4	34 12.0	97 19	51.8	34 41.0	97 19	51.6	35 10.0	97 19	51.5	37 05.8	96 19	50.8	9
120	28 11.7	97 19	52.7	29 09.9	97 19	52.4	30 37.3	97 19	52.0	32 04.5	97 19	51.5	34 00.7	97 19	50.9	34 29.7	97 19	50.8	34 58.7	97 19	50.6	36 54.6	97 18	50.0	120
1	28 00.2	97 19	51.8	28 58.5	97 19	51.5	30 25.9	97 19	51.1	31 53.2	97 19	50.7	33 49.5	97 18	50.1	34 18.6	97 18	49.9	34 47.6	97 18	49.8	36 43.6	97 18	49.1	1
2	27 48.9	97 19	50.9	28 47.2	97 19	50.6	30 14.7	97 18	50.2	31 42.1	97 18	49.8	33 38.4	97 18	49.2	34 07.5	97 18	49.1	34 36.6	97 18	48.9	36 32.7	97 18	48.3	2
3	27 37.7	97 18	50.0	28 36.1	97 18	49.7	30 03.6	97 18	49.3	31 31.1	97 18	48.9	33 27.5	97 18	48.3	33 56.6	97 18	48.2	34 25.7	97 18	48.0	36 21.9	97 18	47.4	3
4	27 26.6	97 18	49.1	28 25.1	97 18	48.8	29 52.7	97 18	48.4	31 20.2	97 18	48.0	33 16.8	97 18	47.5	33 45.9	97 18	47.3	34 15.0	97 18	47.2	36 11.3	97 17	46.6	4
125	27 15.7	97 18	48.2	28 14.2	97 18	48.0	29 41.9	97 18	47.6	31 09.5	97 18	47.2	33 06.1	97 17	46.6	33 35.3	97 17	46.5	34 04.4	97 17	46.3	36 00.8	97 17	45.7	125
6	27 05.0	98 18	47.3	28 03.5	98 18	47.1	29 31.2	97 18	46.7	30 58.9	97 17	46.3	32 55.7	97 17	45.7	33 24.8	97 17	45.6	33 54.0	97 17	45.5	35 50.5	97 17	44.9	6
7	26 54.4	98 17	46.4	27 53.0	98 17	46.2	29 20.8	98 17	45.8	30 48.5	97 17	45.4	32 45.3	97 17	44.9	33 14.5	97 17	44.8	33 43.7	97 17	44.6	35 40.4	97 17	44.0	7
8	26 44.0	98 17	45.5	27 42.6	98 17	45.3	29 10.4	98 17	44.9	30 38.2	98 17	44.6	32 35.2	97 17	44.0	33 04.4	97 17	43.9	33 33.6	97 17	43.8	35 30.3	97 16	43.2	8
9	26 33.7	98 17	44.7	27 32.3	98 17	44.4	29 00.3	98 17	44.1	30 28.1	98 17	43.7	32 25.2	97 16	43.2	32 54.4	97 16	43.0	33 23.6	97 16	42.9	35 20.5	97 16	42.4	9
130	26 23.6	98 17	43.8	27 22.2	98 17	43.5	28 50.2	98 16	43.2	30 18.2	98 16	42.8	32 15.3	98 16	42.3	32 44.6	98 16	42.2	33 13.8	98 16	42.0	35 10.8	97 16	41.5	130
1	26 13.6	98 16	42.9	27 12.3	98 16	42.7	28 40.4	98 16	42.3	30 08.4	98 16	42.0	32 05.6	98 16	41.5	32 34.9	98 16	41.3	33 04.2	98 16	41.2	35 01.2	97 16	40.7	1
2	26 03.8	98 16	42.0	27 02.6	98 16	41.8	28 30.7	98 16	41.4	29 58.8	98 16	41.1	31 56.1	98 16	40.6	32 25.4	98 16	40.5	32 54.7	98 16	40.3	34 51.9	98 15	39.8	2
3	25 54.2	98 16	41.1	26 53.0	98 16	40.9	28 21.2	98 16	40.6	29 49.3	98 16	40.2	31 46.7	98 15	39.7	32 16.1	98 15	39.6	32 45.4	98 15	39.5	34 42.7	98 15	39.0	3
4	25 44.7	98 15	40.2	26 43.6	98 15	40.0	28 11.8	98 15	39.7	29 40.0	98 15	39.4	31 37.5	98 15	38.9	32 06.9	98 15	38.8	32 36.3	98 15	38.6	34 33.6	98 15	38.1	4
135	25 35.4	98 15	39.4	26 34.3	98 15	39.2	28 02.6	98 15	38.8	29 30.9	98 15	38.5	31 28.5	98 15	38.0	31 57.9	98 15	37.9	32 27.3	98 15	37.8	34 24.7	98 15	37.3	135
6	25 26.3	98 15	38.5	26 25.2	98 15	38.3	27 53.6	98 15	38.0	29 22.0	98 15	37.6	31 19.7	98 14	37.2	31 49.1	98 14	37.1	32 18.5	98 14	36.9	34 16.0	98 14	36.5	6
7	25 17.3	98 15	37.6	26 16.3	98 15	37.4	27 44.8	98 14	37.1	29 13.2	98 14	36.8	31 11.0	98 14	36.3	31 40.4	98 14	36.2	32 09.8	98 14	36.1	34 07.5	98 14	35.6	7
8	25 08.6	98 14	36.7	26 07.6	98 14	36.5	27 36.1	98 14	36.2	29 04.6	98 14	35.9	31 02.5	98 14	35.5	31 31.9	98 14	35.4	32 01.4	98 14	35.3	33 59.1	98 14	34.8	8
9	25 00.0	98 14	35.8	25 59.1	98 14	35.7	27 27.6	98 14	35.4	28 56.1	98 14	35.0	30 54.1	98 14	34.6	31 23.6	98 14	34.5	31 53.1	98 14	34.4	33 50.9	98 13	34.0	9
140	24 51.6	99 14	35.0	25 50.7	98 14	34.8	27 19.3	98 14	34.5	28 47.9	98 13	34.2	30 46.0	98 13	33.8	31 15.5	98 13	33.7	31 45.0	98 13	33.6	33 42.9	98 13	33.1	140
1	24 43.3	99 13	34.1	25 42.5	99 13	33.9	27 11.2	99 13	33.6	28 39.8	98 13	33.3	30 38.0	98 13	32.9	31 07.5	98 13	32.8	31 37.0	98 13	32.7	33 35.0	98 13	32.3	1
2	24 35.3	99 13	33.2	25 34.5	99 13	33.0	27 03.2	99 13	32.8	28 32.0	99 13	32.5	30 30.2	98 13	32.1	30 59.7	98 13	32.0	31 29.3	98 13	31.9	33 27.4	98 12	31.5	2
3	24 27.4	99 13	32.3	25 26.7	99 13	32.2	26 55.5	99 13	31.9	28 24.3	99 13	31.6	30 22.6	99 12	31.2	30 52.1	99 12	31.1	31 21.7	99 12	31.0	33 19.9	98 12	30.6	3
4	24 19.8	99 12	31.5	25 19.0	99 12	31.3	26 47.9	99 12	31.0	28 16.7	99 12	30.8	30 15.1	99 12	30.4	30 44.7	99 12	30.3	31 14.3	99 12	30.2	33 12.6	99 12	29.8	4
145	24 12.3	99 12	30.6	25 11.6	99 12	30.4	26 40.5	99 12	30.2	28 09.4	99 12	29.9	30 07.9	99 12	29.5	30 37.5	99 12	29.4	31 07.1	99 12	29.3	33 05.5	99 12	29.0	145
6	24 05.0	99 12	29.7	25 04.3	99 12	29.5	26 33.3	99 12	29.3	28 02.3	99 12	29.0	30 00.8	99 11	28.7	30 30.5	99 11	28.6	31 00.1	99 11	28.5	32 58.5	99 11	28.1	6
7	23 57.9	99 12	28.8	24 57.3	99 11	28.7	26 26.3	99 11	28.4	27 55.3	99 11	28.2	29 54.0	99 11	27.8	30 23.6	99 11	27.7	30 53.2	99 11	27.7	32 51.8	99 11	27.3	7
8	23 51.0	99 11	28.0	24 50.4	99 11	27.8	26 19.5	99 11	27.6	27 48.6	99 11	27.3	29 47.3	99 11	27.0	30 16.9	99 11	26.9	30 46.6	99 11	26.8	32 45.2	99 11	26.5	8
9	23 44.3	99 11	27.1	24 43.7	99 11	26.9	26 12.9	99 11	26.7	27 42.0	99 11	26.5	29 40.8	99 10	26.1	30 10.5	99 10	26.1	30 40.2	99 10	26.0	32 38.9	99 10	25.6	9
150	23 37.8	99 11	26.2	24 37.3	99 10	26.1	26 06.5	99 10	25.8	27 35.6	99 10	25.6	29 34.5	99 10	25.3	30 04.2	99 10	25.2	30 33.9	99 10	25.1	32 32.7	99 10	24.8	150
1	23 31.5	99 10	25.3	24 31.0	99 10	25.2	26 00.2	99 10	25.0	27 29.5	99 10	24.8	29 28.4	99 10	24.4	29 58.1	99 10	24.4	30 27.8	99 10	24.3	32 26.7	99 10	24.0	1
2	23 25.4	99 10	24.5	24 24.9	99 10	24.3	25 54.2	99 10	24.1	27 23.5	99 10	23.9	29 22.5	99 10	23.6	29 52.2	99 10	23.5	30 22.0	99 09	23.4	32 20.9	99 09	23.1	2
3	23 19.5	99 10	23.6	24 19.0	99 09	23.4	25 48.4	99 09	23.2	27 17.7	99 09	23.0	29 16.8	99 09	22.8	29 46.5	99 09	22.7	30 16.3	99 09	22.6	32 15.3	99 09	22.3	3
4	23 13.8	99 09	22.7	24 13.4	99 09	22.6	25 42.7	99 09	22.4	27 12.1	99 09	22.2	29 11.2	99 09	21.9	29 41.0	99 09	21.8	30 10.8	99 09	21.8	32 09.9	99 09	21.5	4
155	23 08.3	99 09	21.8	24 07.9	99 09	21.7	25 37.3	99 09	21.5	27 06.7	99 09	21.3	29 05.9	99 09	21.1	29 35.7	99 08	21.0	30 05.5	99 08	20.9	32 04.6	99 08	20.7	155
6	23 03.0	99 08	21.0	24 02.6	99 08	20.8	25 32.1	99 08	20.7	27 01.6	99 08	20.5	29 00.8	99 08	20.2	29 30.6	99 08	20.2	30 00.4	99 08	20.1	31 59.6	99 08	19.8	6
7	22 57.9	99 08	20.1	23 57.6	99 08	20.0	25 27.1	99 08	19.8	26 56.6	99 08	19.6	28 55.9	99 08	19.4	29 25.7	99 08	19.3	29 55.5	99 08	19.3	31 54.8	99 08	19.0	7
8	22 53.0	1.0 08	19.2	23 52.7	1.0 08	19.1	25 22.3	99 08	18.9	26 51.8	99 08	18.8	28 51.2	99 08	18.5	29 21.0	99 08	18.5	29 50.8	99 07	18.4	31 50.2	99 07	18.2	8
9	22 48.3	1.0 07	18.3	23 48.1	1.0 07	18.2	25 17.7	1.0 07	18.1	26 47.2	1.0 07	17.9	28 46.7	1.0 07	17.7	29 16.5	1.0 07	17.6	29 46.4	99 07	17.6	31 45.8	99 07	17.3	9
160	22 43.9	1.0 07	17.5	23 43.6	1.0 07	17.4	25 13.3	1.0 07	17.2	26 42.9	1.0 07	17.1	28 42.4	1.0 07	16.8	29 12.2	1.0 07	16.8	29 42.1	1.0 07	16.7	31 41.5	1.0 07	16.5	160
1	22 39.6	1.0 07	16.6	23 39.4	1.0 07	16.5	25 09.1	1.0 07	16.3	26 38.7	1.0 07	16.2	28 38.3	1.0 06	16.0	29 08.1	1.0 06	16.0	29 38.0	1.0 06	15.9	31 37.5	1.0 06	15.7	1
2	22 35.6	1.0 06	15.7	23 35.4	1.0 06	15.6	25 05.1	1.0 06	15.5	26 34.8	1.0 06	15.3	28 34.4	1.0 06	15.2	29 04.2	1.0 06	15.1	29 34.1	1.0 06	15.1	31 33.7	1.0 06	14.9	2
3	22 31.8	1.0 06	14.8	23 31.6	1.0 06	14.8	25 01.3	1.0 06	14.6	26 31.0	1.0 06	14.5	28 30.7	1.0 06	14.3	29 00.6	1.0 06	14.3	29 30.5	1.0 06	14.2	31 30.1	1.0 06	14.0	3
4	22 28.2	1.0 06	14.0	23 28.0	1.0 06	13.9	24 57.8	1.0 06	13.8	26 27.5	1.0 06	13.6	28 27.2	1.0 05	13.5	28 57.1	1.0 05	13.4	29 27.0	1.0 05	13.4	31 26.6	1.0 05	13.2	4
165	22 24.8	1.0 05	13.1	23 24.6	1.0 05	13.0	24 54.4	1.0 05	12.9	26 24.2	1.0 05	12.8	28 23.9	1.0 05	12.6	28 53.8	1.0 05	12.6	29 23.7	1.0 05	12.5	31 23.4	1.0 05	12.4	165
6	22 21.6	1.0 05	12.2	23 21.5	1.0 05	12.1	24 51.3	1.0 05	12.0	26 21.1	1.0 05	11.9	28 20.8	1.0 05	11.8	28 50.8	1.0 05	11.7	29 20.7	1.0 05	11.7	31 20.4	1.0 05	11.6	6
7	22 18.6	1.0 05	11.3	23 18.5	1.0 05	11.3	24 48.4	1.0 04	11.2	26 18.2	1.0 04	11.1	28 18.0	1.0 04	10.9	28 47.9	1.0 04	10.9	29 17.8	1.0 04	10.9	31 17.6	1.0 04	10.7	7
8	22 15.9	1.0 04	10.5	23 15.8	1.0 04	10.4	24 45.6	1.0 04	10.3	26 15.5	1.0 04	10.2	28 15.3	1.0 04	10.1	28 45.3	1.0 04	10.1	29 15.2	1.0 04	10.0	31 15.0	1.0 04	09.9	8
9	22 13.3	1.0 04	09.6	23 13.3	1.0 04	09.5	24 43.2	1.0 04	09.5	26 13.0	1.0 04	09.4	28 12.9	1.0 04	09.3	28 42.8	1.0 04	09.2	29 12.8	1.0 04	09.2	31 12.6	1.0 04	09.1	9
170	22 11.0	1.0 04	08.7	23 11.0	1.0 03	08.7	24 40.9	1.0 03	08.6	26 10.8	1.0 03	08.5	28 10.6	1.0 03	08.4	28 40.6	1.0 03	08.4	29 10.6	1.0 03	08.4	31 10.4	1.0 03	08.3	170
1	22 08.9	1.0 03	07.9	23 08.9	1.0 03	07.8	24 38.8	1.0 03	07.7	26 08.7	1.0 03	07.7	28 08.6	1.0 03	07.6	28 38.6	1.0 03	07.6	29 08.6	1.0 03	07.5	31 08.5	1.0 03	07.4	1
2	22 07.1	1.0 03	07.0	23 07.0	1.0 03	06.9	24 37.0	1.0 03	06.9	26 06.9	1.0 03	06.8	28 06.8	1.0 03	06.7	28 36.8	1.0 03	06.7	29 06.8	1.0 03	06.7	31 06.7	1.0 03	06.6	2
3	22 05.4	1.0 02	06.1	23 05.4	1.0 02	06.1	24 35.3	1.0 02	06.0	26 05.3	1.0 02	06.0	28 05.2	1.0 02	05.9	28 35.2	1.0 02	05.9	29 05.2	1.0 02	05.9	31 05.1	1.0 02	05.8	3
4	22 04.0	1.0 02	05.2	23 04.0	1.0 02	05.2	24 33.9	1.0 02	05.2	26 03.9	1.0 02	05.1	28 03.8	1.0 02	05.1	28 33.8	1.0 02	05.0	29 03.8	1.0 02	05.0	31 03.8	1.0 02	05.0	4
175	22 02.8	1.0 02	04.4	23 02.7	1.0 02	04.3	24 32.7	1.0 02	04.3	26 02.7	1.0 02	04.3	28 02.7	1.0 02	04.2	28 32.7	1.0 02	04.2	29 02.6	1.0 02	04.2	31 02.6	1.0 02	04.1	175
6	22 01.8	1.0 01	03.5	23 01.8	1.0 01	03.5	24 31.7	1.0 01	03.4	26 01.7	1.0 01	03.4	28 01.7	1.0 01	03.4	28 31.7	1.0 01	03.4	29 01.7	1.0 01	03.3	31 01.7	1.0 01	03.3	6
7	22 01.0	1.0 01	02.6	23 01.0	1.0 01	02.6	24 31.0	1.0 01	02.6	26 01.0	1.0 01	02.6	28 01.0	1.0 01	02.5	28 31.0	1.0 01	02.5	29 01.0	1.0 01	02.5	31 00.9	1.0 01	02.5	7
8	22 00.4	1.0 01	01.7	23 00.4	1.0 01	01.7	24 30.4	1.0 01	01.7	26 00.4	1.0 01	01.7	28 00.4	1.0 01	01.7	28 30.4	1.0 01	01.7	29 00.4	1.0 01	01.7	31 00.4	1.0 01	01.6	8
9	22 00.1	1.0 00	00.9	23 00.1	1.0 00	00.9	24 30.1	1.0 00	00.9	26 00.1	1.0 00	00.9	28 00.1	1.0 00	00.8	28 30.1	1.0 00	00.8	29 00.1	1.0 00	00.8	31 00.1	1.0 00	00.8	9
180	22 00.0	1.0 00	00.0	23 00.0	1.0 00	00.0	24 30.0	1.0 00	00.0	26 00.0	1.0 00	00.0	28 00.0	1.0 00	00.0	28 30.0	1.0 00	00.0	29 00.0	1.0 00	00.0	31 00.0	1.0 00	00.0	180

Lat. 76°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	60 00.0	1.0 00	180.0	61 00.0	1.0 00	180.0	62 30.0	1.0 00	180.0	63 30.0	1.0 00	180.0	64 30.0	1.0 00	180.0	65 30.0	1.0 00	180.0	66 30.0	1.0 00	180.0	68 00.0	1.0 00	180.0	00
1	59 59.8	1.0 01	178.6	60 59.8	1.0 01	178.6	62 29.8	1.0 01	178.6	63 29.8	1.0 01	178.5	64 29.8	1.0 01	178.5	65 29.8	1.0 01	178.5	66 29.8	1.0 01	178.5	67 59.8	1.0 01	178.4	1
2	59 59.3	1.0 01	177.2	60 59.3	1.0 01	177.2	62 29.3	1.0 01	177.1	63 29.3	1.0 02	177.1	64 29.3	1.0 02	177.0	65 29.2	1.0 02	177.0	66 29.2	1.0 02	176.9	67 59.2	1.0 02	176.9	2
3	59 58.4	1.0 02	175.8	60 58.4	1.0 02	175.8	62 28.4	1.0 02	175.7	63 28.3	1.0 02	175.6	64 28.3	1.0 02	175.6	65 28.3	1.0 02	175.5	66 28.3	1.0 02	175.4	67 58.2	1.0 02	175.3	3
4	59 57.2	1.0 03	174.4	60 57.2	1.0 03	174.4	62 27.1	1.0 03	174.3	63 27.1	1.0 03	174.2	64 27.0	1.0 03	174.1	65 27.0	1.0 03	174.0	66 26.9	1.0 03	173.9	67 56.8	1.0 03	173.7	4
05	59 55.6	1.0 03	173.1	60 55.6	1.0 03	173.0	62 25.5	1.0 03	172.8	63 25.4	1.0 03	172.7	64 25.3	1.0 03	172.6	65 25.3	1.0 03	172.5	66 25.2	1.0 04	172.4	67 55.0	1.0 04	172.2	05
6	59 53.7	1.0 04	171.7	60 53.6	1.0 04	171.6	62 23.5	1.0 04	171.4	63 23.4	1.0 04	171.3	64 23.3	1.0 04	171.2	65 23.2	1.0 04	171.0	66 23.1	1.0 04	170.9	67 52.9	1.0 04	170.6	6
7	59 51.4	1.0 04	170.3	60 51.3	1.0 04	170.2	62 21.1	1.0 05	170.0	63 21.0	1.0 05	169.8	64 20.9	1.0 05	169.7	65 20.7	1.0 05	169.5	66 20.6	1.0 05	169.3	67 50.3	1.0 05	169.1	7
8	59 48.8	1.0 05	168.9	60 48.6	1.0 05	168.8	62 18.4	1.0 05	168.6	63 18.3	1.0 05	168.4	64 18.1	1.0 05	168.2	65 17.9	1.0 05	168.0	66 17.7	1.0 05	167.8	67 47.4	1.0 06	167.5	8
9	59 45.8	1.0 06	167.5	60 45.7	1.0 06	167.4	62 15.4	1.0 06	167.1	63 15.2	1.0 06	167.0	64 14.9	1.0 06	166.8	65 14.7	1.0 06	166.6	66 14.4	1.0 06	166.3	67 44.0	99 06	166.0	9
10	59 42.5	1.0 06	166.2	60 42.3	1.0 06	166.0	62 12.0	1.0 06	165.7	63 11.7	1.0 06	165.5	64 11.4	1.0 06	165.3	65 11.1	99 07	165.1	66 10.8	99 07	164.8	67 40.3	99 07	164.4	10
1	59 38.9	1.0 07	164.8	60 38.6	1.0 07	164.6	62 08.2	1.0 07	164.3	63 07.9	99 07	164.1	64 07.6	99 07	163.9	65 07.2	99 07	163.6	66 06.9	99 07	163.3	67 36.2	99 07	162.9	1
2	59 34.9	1.0 07	163.4	60 34.6	99 07	163.2	62 04.1	99 07	162.9	63 03.7	99 08	162.7	64 03.4	99 08	162.4	65 03.0	99 08	162.1	66 02.5	99 08	161.8	67 31.8	99 08	161.4	2
3	59 30.6	99 08	162.1	60 30.2	99 08	161.8	61 59.7	99 08	161.5	62 59.2	99 08	161.2	63 58.8	99 08	161.0	64 58.3	99 08	160.7	65 57.8	99 08	160.4	67 26.9	99 09	159.8	3
4	59 26.0	99 08	160.7	60 25.6	99 08	160.5	61 54.9	99 09	160.1	62 54.4	99 09	159.8	63 53.9	99 09	159.5	64 53.3	99 09	159.2	65 52.7	99 09	158.9	67 21.8	99 09	158.3	4
15	59 21.0	99 09	159.3	60 20.5	99 09	159.1	61 49.8	99 09	158.7	62 49.2	99 09	158.4	63 48.6	99 09	158.1	64 48.0	99 09	157.8	65 47.3	99 10	157.4	67 16.2	99 10	156.8	15
6	59 15.7	99 09	158.0	60 15.2	99 09	157.7	61 44.3	99 10	157.3	62 43.7	99 10	157.0	63 43.1	99 10	156.7	64 42.4	99 10	156.3	65 41.6	99 10	155.9	67 10.3	99 10	155.3	6
7	59 10.1	99 10	156.7	60 09.5	99 10	156.4	61 38.6	99 10	155.9	62 37.9	99 10	155.6	63 37.2	99 10	155.3	64 36.4	99 11	154.9	65 35.5	99 11	154.5	67 04.1	98 11	153.8	7
8	59 04.2	99 10	155.3	60 03.6	99 10	155.0	61 32.5	99 11	154.6	62 31.7	99 11	154.2	63 30.9	99 11	153.8	64 30.0	98 11	153.5	65 29.1	98 11	153.0	66 57.5	98 12	152.3	8
9	58 58.0	99 11	154.0	59 57.3	99 11	153.7	61 26.1	99 11	153.2	62 25.3	99 11	152.8	63 24.4	98 11	152.4	64 23.4	98 12	152.0	65 22.4	98 12	151.6	66 50.6	98 12	150.9	9
20	58 51.5	99 11	152.7	59 50.7	99 11	152.3	61 19.4	99 12	151.8	62 18.5	98 12	151.4	63 17.5	98 12	151.1	64 16.4	98 12	150.6	65 15.3	98 12	150.2	66 43.4	98 13	149.4	20
1	58 44.7	99 12	151.3	59 43.8	99 12	151.0	61 12.4	98 12	150.5	62 11.4	98 12	150.1	63 10.3	98 12	149.7	64 09.2	98 13	149.2	65 07.9	98 13	148.7	66 35.9	98 13	148.0	1
2	58 37.6	98 12	150.0	59 36.6	98 12	149.7	61 05.1	98 13	149.1	62 04.0	98 13	148.7	63 02.8	98 13	148.3	64 01.6	98 13	147.8	65 00.2	98 13	147.3	66 28.0	97 14	146.5	2
3	58 30.2	98 13	148.7	59 29.2	98 13	148.3	60 57.5	98 13	147.8	61 56.3	98 13	147.4	62 55.1	98 13	146.9	63 53.7	98 14	146.4	64 52.2	97 14	145.9	66 19.9	97 14	145.1	3
4	58 22.5	98 13	147.4	59 21.4	98 13	147.0	60 49.6	98 14	146.4	61 48.3	98 14	146.0	62 47.0	98 14	145.6	63 45.5	97 14	145.1	64 44.0	97 14	144.5	66 11.4	97 15	143.7	4
25	58 14.5	98 14	146.1	59 13.4	98 14	145.7	60 41.5	98 14	145.1	61 40.1	98 14	144.7	62 38.6	97 14	144.2	63 37.1	97 15	143.7	64 35.4	97 15	143.2	66 02.7	97 15	142.3	25
6	58 06.3	98 14	144.8	59 05.0	98 14	144.4	60 33.0	98 15	143.8	61 31.6	97 15	143.3	62 30.0	97 15	142.9	63 28.3	97 15	142.3	64 26.6	97 15	141.8	65 53.6	97 16	140.9	6
7	57 57.8	98 15	143.5	58 56.5	98 15	143.1	60 24.3	97 15	142.5	61 22.8	97 15	142.0	62 21.1	97 15	141.5	63 19.3	97 15	141.0	64 17.5	97 16	140.4	65 44.4	96 16	139.5	7
8	57 49.0	98 15	142.2	58 47.6	98 15	141.8	60 15.3	97 15	141.2	61 13.7	97 16	140.7	62 11.9	97 16	140.2	63 10.1	97 16	139.6	64 06.1	97 16	139.1	65 34.8	96 16	138.1	8
9	57 40.0	98 15	141.0	58 38.5	97 16	140.6	60 06.1	97 16	139.9	61 04.4	97 16	139.4	62 02.5	97 16	138.9	63 00.5	97 16	138.3	63 58.4	96 16	137.7	65 25.0	96 17	136.8	9
30	57 30.8	97 16	139.7	58 29.2	97 16	139.3	59 56.6	97 16	138.6	60 54.8	97 16	138.1	61 52.8	97 17	137.6	62 50.8	96 17	137.0	63 48.6	96 17	136.4	65 14.9	96 17	135.4	30
1	57 21.3	97 16	138.5	58 19.6	97 16	138.0	59 46.9	97 17	137.3	60 45.0	97 17	136.8	61 42.9	96 17	136.3	62 40.8	96 17	135.7	63 38.4	96 17	135.1	65 04.6	96 18	134.1	1
2	57 11.5	97 17	137.2	58 09.8	97 17	136.8	59 36.9	97 17	136.0	60 34.9	97 17	135.5	61 32.8	96 17	135.0	62 30.5	96 17	134.4	63 28.1	96 18	133.8	64 54.1	95 18	132.8	2
3	57 01.5	97 17	136.0	57 59.7	97 17	135.5	59 26.8	97 17	134.8	60 24.6	96 18	134.2	61 22.4	96 18	133.7	62 20.0	96 18	133.1	63 17.5	96 18	132.5	64 43.3	95 18	131.4	3
4	56 51.3	97 17	134.7	57 49.4	97 18	134.3	59 16.3	96 18	133.5	60 14.1	96 18	133.0	61 11.8	96 18	132.4	62 09.3	96 18	131.8	63 06.6	95 18	131.2	64 32.3	95 19	130.1	4
35	56 40.9	97 18	133.5	57 38.9	97 18	133.0	59 05.7	96 18	132.3	60 03.4	96 18	131.7	61 01.0	96 18	131.2	61 58.4	96 19	130.5	62 55.6	95 19	129.9	64 21.1	95 19	128.8	35
6	56 30.3	97 18	132.3	57 28.2	96 18	131.8	58 54.9	96 18	131.0	59 52.5	96 19	130.5	60 49.9	96 19	129.9	61 47.2	95 19	129.3	62 44.4	95 19	128.6	64 09.7	95 19	127.6	6
7	56 19.4	96 18	131.1	57 17.3	96 19	130.6	58 43.8	96 19	129.8	59 41.3	96 19	129.2	60 38.7	95 19	128.7	61 35.9	95 19	128.0	62 32.9	95 19	127.4	63 58.1	94 20	126.3	7
8	56 08.4	96 19	129.9	57 06.1	96 19	129.4	58 32.6	96 19	128.6	59 30.0	96 19	128.0	60 27.3	95 19	127.4	61 24.4	95 20	126.8	62 21.3	95 20	126.1	63 46.3	94 20	125.0	8
9	55 57.2	96 19	128.7	56 54.8	96 19	128.2	58 21.1	96 19	127.4	59 18.5	95 20	126.8	60 15.6	95 20	126.2	61 12.7	95 20	125.6	62 09.5	95 20	124.9	63 34.3	94 20	123.8	9
40	55 45.7	96 19	127.5	56 43.3	96 20	127.0	58 09.5	96 20	126.2	59 06.7	95 20	125.6	60 03.8	95 20	125.0	61 00.8	95 20	124.3	61 57.5	94 20	123.7	63 22.2	94 21	122.6	40
1	55 34.1	96 20	126.3	56 31.6	96 20	125.8	57 57.7	95 20	125.0	58 54.9	95 20	124.4	59 51.9	95 20	123.8	60 48.7	95 20	123.1	61 45.3	94 21	122.4	63 09.9	94 21	121.3	1
2	55 22.3	96 20	125.1	56 19.8	96 20	124.6	57 45.7	95 20	123.8	58 42.8	95 20	123.2	59 39.7	95 21	122.6	60 36.5	94 21	121.9	61 33.0	94 21	121.2	62 57.4	93 21	120.1	2
3	55 10.4	96 20	123.9	56 07.7	96 20	123.4	57 33.6	95 20	122.6	58 30.6	95 21	122.0	59 27.4	95 21	121.4	60 24.1	94 21	120.7	61 20.5	94 21	120.0	62 44.7	93 21	118.9	3
4	54 58.2	96 20	122.8	55 55.6	96 21	122.3	57 21.2	95 21	121.4	58 18.2	95 21	120.8	59 14.9	94 21	120.2	60 11.5	94 21	119.6	61 07.9	94 21	118.9	62 32.0	93 22	117.7	4
45	54 46.0	96 21	121.6	55 43.2	95 21	121.1	57 08.8	95 21	120.3	58 05.6	95 21	119.7	59 02.3	94 21	119.0	59 58.8	94 21	118.4	60 55.1	94 22	117.7	62 19.0	93 22	116.5	45
6	54 33.5	95 21	120.5	55 30.7	95 21	120.0	56 56.2	95 21	119.1	57 53.0	94 21	118.5	58 49.6	94 21	117.9	59 46.0	94 22	117.2	60 42.2	93 22	116.5	62 06.0	93 22	115.4	6
7	54 21.0	95 21	119.3	55 18.1	95 21	118.8	56 43.4	95 21	118.0	57 40.1	94 22	117.4	58 36.7	94 22	116.7	59 33.0	94 22	116.1	60 29.1	93 22	115.3	61 52.8	93 22	114.2	7
8	54 08.2	95 21	118.2	55 05.3	95 22	117.7	56 30.5	95 22	116.8	57 27.2	94 22	116.2	58 23.6	94 22	115.6	59 19.9	94 22	114.9	60 15.9	93 22	114.2	61 39.5	93 22	113.1	8
9	53 55.4	95 22	117.1	54 52.3	95 22	116.6	56 17.5	94 22	115.7	57 14.1	94 22	115.1	58 10.5	94 22	114.4	59 06.7	93 22	113.8	60 02.6	93 22	113.1	61 26.1	92 23	111.9	9
50	53 42.4	95 22	116.0	54 39.3	95 22	115.4	56 04.4	94 22	114.6	57 00.9	94 22	114.0	57 57.2	94 22	113.3	58 53.3	93 22	112.6	59 49.2	93 23	111.9	61 12.6	92 23	110.8	50
1	53 29.3	95 22	114.9	54 26.1	95 22	114.3	55 51.1	94 22	113.5	56 47.6	94 22	112.8	57 43.8	94 22	112.2	58 39.9	93 23	111.5	59 35.7	93 23	110.8	60 59.0	92 23	109.7	1
2	53 16.0	95 22	113.8	54 12.8	95 22	113.2	55 37.7	94 22	112.3	56 34.1	94 22	111.7	57 30.3	93 23	111.1	58 26.3	93 23	110.4	59 22.1	93 23	109.7	60 45.3	92 23	108.5	2
3	53 02.7	95 22	112.7	53 59.4	94 22	112.1	55 24.3	94 23	111.2	56 20.6	94 23	110.6	57 16.7	93 23	110.0	58 12.7	93 23	109.3	59 08.4	93 23	108.6	60 31.4	92 23	107.4	3
4	52 49.3	95 23	111.6	53 46.0	94 23	111.0	55 10.7	94 23	110.2	56 07.0	94 23	109.5	57 03.0	93 23	108.9	57 58.9	93 23	108.2	58 54.6	93 23	107.5	60 17.6	92 23	106.4	4
55	52 35.7	95 23	110.5	53 32.4	94 23	109.9	54 57.0	94 23	109.1	55 53.2	94 23	108.4	56 49.3	93 23	107.8	57 45.1	93 23	107.1	58 40.7	92 23	106.4	60 03.6	92 23	105.3	55
6	52 22.1	94 23	109.4	53 18.7	94 23	108.9	54 43.3	94 23	108.0	55 39.4	93 23	107.4	56 35.4	93 23	106.7	57 31.2	93 23	106.0	58 26.7	92 23	105.3	59 49.6	92 24	104.2	6
7	52 08.3	94 23	108.3	53 04.9	94 23	107.8	54 29.4	94 23	106.9	55 25.5	93 23	106.3	56 21.5	93 23	105.7	57 17.2	93 23	105.0	58 12.7	92 24	104.3	59 35.4	92 24	103.1	7
8	51 54.5	94 23	107.3	52 51.0	94 23	106.7	54 15.5	94 23	105.8	55 11.6	93 23	105.2	56 07.5	93 23	104.6	57 03.1	93 23	103.9	57 58.6	92 24	103.2	59 21.3	92 24	102.1	8
9	51 40.6	94 23	106.2	52 37.1	94 23	105.7	54 01.5	94 23	104.8	54 57.5	93 23	104.2	55 53.4	93 24	103.5	56 49.0	93 24	102.9	57 44.4	92 24	102.1	59 07.1	91 24	101.0	9
60	51 26.6	94 23	105.2	52 23.1	94 23	104.6	53 47.4	93 24	103.7	54 43.4	93 24	103.1	55 39.2	93 24	102.5	56 34.8	92 24	101.8	57 30.2	92 24	101.1	58 52.8	91 24	100.0	60
1	51 12.6	94 24	104.1	52 09.0	94 24	103.6	53 33.3	93 24	102.7	54 29.3	93 24	102.1	55 25.0	93 24	101.4	56 20.6	92 24	100.8	57 15.9	92 24	100.1	58 38.5	91 24	98.9	1
2	50 58.5	94 24	103.1	51 54.8	94 24	102.5	53 19.1	93 24	101.7	54 15.0	93 24	101.0	55 10.8	93 24	100.4	56 06.3	92 24	99.7	57 01.6	92 24	99.0	58 24.1	91 24	97.9	2
3	50 44.3	94 24	102.0	51 40.7	94 24	101.5	53 04.9	93 24	100.6	54 00.8	93 24	100.0	54 56.5	93 24	99.4	55 52.0	92 24	98.7	56 47.3	92 24	98.0	58 09.7	91 24	96.9	3
4	50 30.1	94 24	101.0	51 26.4	94 24	100.5	52 50.6	93 24	99.6	53 46.4	93 24	99.0	54 42.1	93 24	98.3	55 37.6	92 24	97.7	56 32.9	92 24	97.0	57 55.3	91 24	95.9	4
65	50 15.8	94 24	100.0	51 12.1	94 24	99.4	52 36.2	93 24	98.6	53 32.1	93 24	98.0	54 27.8	93 24	97.3	55 23.2	92 24	96.7	56 18.5	92 24	96.0	57 40.8	91 24	94.9	65
6	50 01.5	94 24	99.0	50 57.8	94 24	98.4	52 21.9	93 24	97.6	53 17.7	93 24	97.0	54 13.3	93 24	96.3	55 08.8	92 24	95.7	56 04.0	92 24	95.0	57 26.4	91 24	93.9	6
7	49 47.1	94 24	98.0	50 43.4	94 24	97.4	52 07.5	93 24	96.5	53 03.3	93 24	95.9	53 58.9	93 24	95.3	54 54.3	92 24	94.7	55 49.5	92 24	94.0	57 11.9	91 24	92.9	7
8	49 32.8	94 24	96.9	50 29.0	94 24	96.4	51 53.0	93 24	95.5	52 48.8	93 24	94.9	53 44.4	93 24	94.3	54 39.9	92 24	93.7	55 35.0	92 24	93.0	56 57.4	91 24	91.9	8
9	49 18.3	94 24	95.9	50 14.5	94 24	95.4	51 38.6	93 24	94.5	52 34.4	93 24	94.0	53 30.0	93 24	93.3	54 25.4	92 24	92.7	55 20.5	92 24	92.0	56 42.9	91 24	90.9	9
70	49 03.9	94 24	94.9	50 00.1	94 24	94.4	51 24.1	93 24	93.6	52 19.9	93 24	93.0	53 15.5	92 24	92.3	54 10.9	92 24	91.7	55 06.0	92 24	91.0	56 28.3	91 24	89.9	70
1	48 49.4	94 24	94.0	49 45.6	94 24	93.4	51 09.6	93 24	92.6	52 05.4	93 24	92.0	53 01.0	92 24	91.4	53 56.3	92 24	90.7	54 51.5	92 24	90.0	56 13.8	91 24	89.0	1
2	48 34.9	94 24	93.0	49 31.1	94 24	92.4	50 55.1	93 24	91.6	51 50.9	93 24	91.0	52 46.4	92 24	90.4	53 41.8	92 24	89.7	54 37.0	92 24	89.1	55 59.3	91 24	88.0	2
3	48 20.4	94 24	92.0	49 16.6	94 24	91.5	50 40.6	93 24	90.6	51 36.3	93 24	90.0	52 31.9	92 24	89.4	53 27.3	92 24	88.8	54 22.5	92 24	88.1	55 44.8	91 24	87.0	3
4	48 05.9	94 24	91.0	49 02.1	93 24	90.5	50 26.1	93 24	89.6	51 21.8	93 24	89.1	52 17.4	92 24	88.4	53 12.8	92 24	87.8	54 08.0	92 24	87.2	55 30.3	91 24	86.1	4
75	47 51.4	94 24	90.0	48 47.6	93 24	89.5	50 11.5	93 24	88.7	51 07.3	93 24	88.1	52 02.9	92 24	87.5	52 58.3	92 24	86.9	53 53.5	92 24	86.2	55 15.9	91 24	85.2	75
6	47 36.9	94 24	89.1	48 33.1	93 24	88.5	49 57.0	93 24	87.7	50 52.8	93 24	87.1	51 48.4	93 24	86.5	52 43.8	92 24	85.9	53 39.0	92 24	85.3	55 01.4	91 24	84.2	6
7	47 22.4	94 24	88.1	48 18.5	93 24	87.6	49 42.5	93 24	86.8	50 38.3	93 24	86.2	51 33.9	93 24	85.6	52 29.4	92 24	85.0	53 24.6	92 24	84.3	54 47.0	91 24	83.3	7
8	47 07.9	94 24	87.1	48 04.1	94 24	86.6	49 28.0	93 24	85.8	50 23.8	93 24	85.2	51 19.5	93 24	84.6	52 14.9	92 24	84.0	53 10.1	92 24	83.4	54 32.6	91 24	82.4	8
9	46 53.4	94 24	86.2	47 49.6	94 24	85.7	49 13.6	93 24	84.9	50 09.4	93 24	84.3	51 05.0	93 24	83.7	52 00.5	92 24	83.1	52 55.7	92 24	82.4	54 18.2	91 24	81.4	9
80	46 38.9	94 24	85.2	47 35.1	94 24	84.7	48 59.1	93 24	83.9	49 55.0	93 24	83.4	50 50.6	93 24	82.8	51 46.1	92 24	82.2	52 41.4	92 24	81.5	54 03.9	91 24	80.5	80
1	46 24.4	94 24	84.3	47 20.7	94 24	83.8	48 44.7	93 24	83.0	49 40.6	93 24	82.4	50 36.2	93 24	81.8	51 31.7	92 24	81.2	52 27.0	92 24	80.6	53 49.6	91 24	79.6	1
2	46 10.0	94 24	83.3	47 06.2	94 24	82.8	48 30.3	93 24	82.0	49 26.2	93 24	81.5	50 21.9	93 24	80.9	51 17.4	92 24	80.3	52 12.7	92 24	79.7	53 35.3	91 24	78.7	2
3	45 55.6	94 24	82.4	46 51.9	94 24	81.9	48 16.0	93 24	81.1	49 11.8	93 24	80.6	50 07.6	93 24	80.0	51 03.1	92 24	79.4	51 58.5	92 24	78.8	53 21.1	92 24	77.8	3
4	45 41.2	94 24	81.5	46 37.5	94 24	81.0	48 01.6	93 24	80.2	48 57.6	93 24	79.6	49 53.3	93 24	79.1	50 48.9	92 24	78.5	51 44.2	92 24	77.9	53 06.9	92 24	76.9	4
85	45 26.9	94 24	80.5	46 23.2	94 24	80.0	47 47.4	93 24	79.3	48 43.3	93 24	78.7	49 39.1	93 24	78.2	50 34.7	93 24	77.6	51 30.1	92 24	77.0	52 52.8	92 23	76.0	85
6	45 12.6	94 24	79.6	46 08.9	94 24	79.1	47 33.1	93 24	78.3	48 29.1	93 24	77.8	49 24.9	93 24	77.2	50 20.5	93 24	76.7	51 16.0	92 23	76.1	52 38.8	92 23	75.1	6
7	44 58.4	94 24	78.7	45 54.7	94 24	78.2	47 18.9	93 24	77.4	48 14.9	93 24	76.9	49 10.8	93 23	76.3	50 06.4	93 23	75.8	51 01.9	92 23	75.2	52 24.8	92 23	74.2	7
8	44 44.1	94 24	77.8	45 40.5	94 24	77.3	47 04.8	93 23	76.5	48 00.8	93 24	76.0	48 56.7	93 23	75.4	49 52.4	93 23	74.9	50 47.9	92 23	74.0	52 10.8	92 23	73.3	8
9	44 30.0	94 24	76.9	45 26.4	94 23	76.4	46 50.7	94 23	75.6	47 46.8	93 23	75.1	48 42.7	93 23	74.5	49 38.4	93 23	74.0	50 34.0	92 23	73.4	51 57.0	92 23	72.5	9
90	44 15.9	94 23	75.9	45 12.3	94 23	75.5	46 36.7	94 23	74.7	47 32.8	93 23	74.2	48 28.7	93 23	73.6	49 24.5	93 23	73.1	50 20.1	93 23	72.5	51 43.2	92 23	71.6	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	44 01.8	94 23	75.0	44 58.3	94 23	74.5	46 22.7	94 23	73.8	47 18.8	93 23	73.3	48 14.8	93 23	72.8	49 10.6	93 23	72.2	50 06.3	93 23	71.6	51 29.4	92 23	70.7	91
2	43 47.8	94 23	74.1	44 44.3	94 23	73.6	46 08.8	94 23	72.9	47 05.0	93 23	72.4	48 01.0	93 23	71.9	48 56.8	93 23	71.3	49 52.5	93 23	70.7	51 15.8	92 23	69.8	2
3	43 33.9	94 23	73.2	44 30.4	94 23	72.7	45 55.0	94 23	72.0	46 51.2	94 23	71.5	47 47.2	93 23	71.0	48 43.1	93 23	70.4	49 38.9	93 23	69.9	51 02.2	92 22	69.0	3
4	43 20.0	94 23	72.3	44 16.6	94 23	71.8	45 41.2	94 23	71.1	46 37.4	94 23	70.6	47 33.5	93 23	70.1	48 29.5	93 23	69.6	49 25.3	93 23	69.0	50 48.7	92 22	68.1	4
95	43 06.2	94 23	71.4	44 02.8	94 23	70.9	45 27.5	94 23	70.2	46 23.8	94 23	69.7	47 19.9	93 23	69.2	48 15.9	93 22	68.7	49 11.8	93 22	68.1	50 35.2	93 22	67.3	95
6	42 52.5	94 23	70.5	43 49.1	94 23	70.1	45 13.9	94 23	69.3	46 10.2	94 22	68.9	47 06.4	94 22	68.3	48 02.4	93 22	67.8	48 58.3	93 22	67.3	50 21.9	93 22	66.4	6
7	42 38.9	95 23	69.6	43 35.5	94 23	69.2	45 00.3	94 22	68.5	45 56.7	94 22	68.0	46 52.9	94 22	67.5	47 49.0	93 22	66.9	48 45.0	93 22	66.4	50 08.6	93 22	65.6	7
8	42 25.3	95 22	68.7	43 22.0	94 22	68.3	44 46.9	94 22	67.6	45 43.3	94 22	67.1	46 39.6	94 22	66.6	47 35.7	93 22	66.1	48 31.7	93 22	65.5	49 55.5	93 22	64.7	8
9	42 11.8	95 22	67.8	43 08.6	94 22	67.4	44 33.5	94 22	66.7	45 30.0	94 22	66.2	46 26.3	94 22	65.7	47 22.5	94 22	65.2	48 18.6	93 22	64.7	49 42.4	93 22	63.9	9
100	41 58.4	95 22	67.0	42 55.2	95 22	66.5	44 20.2	94 22	65.8	45 16.7	94 22	65.4	46 13.1	94 22	64.9	47 09.4	94 22	64.4	48 05.5	93 22	63.8	49 29.4	93 21	63.0	100
1	41 45.1	95 22	66.1	42 41.9	95 22	65.6	44 07.0	94 22	65.0	45 03.6	94 22	64.5	46 00.0	94 22	64.0	46 56.3	94 22	63.5	47 52.5	94 21	63.0	49 16.5	93 21	62.2	1
2	41 31.9	95 22	65.2	42 28.8	95 22	64.8	43 53.9	94 22	64.1	44 50.5	94 22	63.6	45 47.0	94 22	63.1	46 43.4	94 21	62.7	47 39.6	94 21	62.1	49 03.7	93 21	61.3	2
3	41 18.8	95 22	64.3	42 15.7	95 22	63.9	43 40.9	95 22	63.2	44 37.6	94 21	62.8	45 34.1	94 21	62.3	46 30.5	94 21	61.8	47 26.9	94 21	61.3	48 51.0	93 21	60.5	3
4	41 05.7	95 22	63.4	42 02.7	95 21	63.0	43 28.0	95 21	62.4	44 24.7	94 21	61.9	45 21.3	94 21	61.4	46 17.8	94 21	61.0	47 14.2	94 21	60.5	48 38.5	93 21	59.7	4
105	40 52.8	95 21	62.6	41 49.8	95 21	62.1	43 15.2	95 21	61.5	44 11.9	95 21	61.0	45 08.6	94 21	60.6	46 05.2	94 21	60.1	47 01.6	94 21	59.6	48 26.0	94 21	58.8	105
6	40 40.0	95 21	61.7	41 37.0	95 21	61.3	43 02.5	95 21	60.6	43 59.3	95 21	60.2	44 56.0	94 21	59.7	45 52.6	94 21	59.3	46 49.1	94 21	58.8	48 13.6	94 20	58.0	6
7	40 27.2	95 21	60.8	41 24.4	95 21	60.4	42 49.9	95 21	59.8	43 46.8	95 21	59.3	44 43.5	95 21	58.9	45 40.2	94 21	58.4	46 36.8	94 20	57.9	48 01.4	94 20	57.2	7
8	40 14.6	95 21	59.9	41 11.8	95 21	59.5	42 37.4	95 21	58.9	43 34.3	95 21	58.5	44 31.2	95 20	58.0	45 27.9	94 20	57.6	46 24.5	94 20	57.1	47 49.2	94 20	56.4	8
9	40 02.1	95 21	59.1	40 59.3	95 21	58.7	42 25.0	95 20	58.1	43 22.0	95 20	57.6	44 18.9	95 20	57.2	45 15.7	95 20	56.7	46 12.4	94 20	56.3	47 37.2	94 20	55.5	9
110	39 49.7	96 20	58.2	40 47.0	95 20	57.8	42 12.7	95 20	57.2	43 09.8	95 20	56.8	44 06.8	95 20	56.4	45 03.6	95 20	55.9	46 00.4	94 20	55.4	47 25.3	94 20	54.7	110
1	39 37.4	96 20	57.3	40 34.8	95 20	57.0	42 00.6	95 20	56.4	42 57.7	95 20	55.9	43 54.7	95 20	55.5	44 51.7	95 20	55.1	45 48.5	95 20	54.6	47 13.5	94 19	53.9	1
2	39 25.3	96 20	56.5	40 22.7	96 20	56.1	41 48.6	95 20	55.5	42 45.8	95 20	55.1	43 42.8	95 20	54.7	44 39.8	95 20	54.2	45 36.7	95 19	53.8	47 01.8	94 19	53.1	2
3	39 13.2	96 20	55.6	40 10.7	96 20	55.3	41 36.7	95 20	54.7	42 33.9	95 20	54.3	43 31.1	95 19	53.8	44 28.1	95 19	53.4	45 25.1	95 19	53.0	46 50.3	95 19	52.3	3
4	39 01.3	96 20	54.8	39 58.8	96 20	54.4	41 24.9	96 19	53.8	42 22.2	95 19	53.4	43 19.4	95 19	53.0	44 16.5	95 19	52.6	45 13.5	95 19	52.1	46 38.9	95 19	51.5	4
115	38 49.5	96 19	53.9	39 47.1	96 19	53.5	41 13.2	96 19	53.0	42 10.6	96 19	52.6	43 07.9	95 19	52.2	44 05.1	95 19	51.8	45 02.1	95 19	51.3	46 27.6	95 19	50.7	115
6	38 37.9	96 19	53.1	39 35.5	96 19	52.7	41 01.7	96 19	52.1	41 59.1	96 19	51.7	42 56.5	95 19	51.3	43 53.7	95 19	50.9	44 50.9	95 19	50.5	46 16.4	95 18	49.8	6
7	38 26.3	96 19	52.2	39 24.0	96 19	51.8	40 50.3	96 19	51.3	41 47.8	96 19	50.9	42 45.2	96 19	50.5	43 42.5	95 18	50.1	44 39.7	95 18	49.7	46 05.4	95 18	49.0	7
8	38 14.9	96 19	51.4	39 12.6	96 19	51.0	40 39.1	96 19	50.5	41 36.6	96 18	50.1	42 34.1	96 18	49.7	43 31.4	96 18	49.3	44 28.7	95 18	48.9	45 54.5	95 18	48.2	8
9	38 03.7	96 19	50.5	39 01.4	96 18	50.2	40 27.9	96 18	49.6	41 25.5	96 18	49.2	42 23.1	96 18	48.9	43 20.5	96 18	48.5	44 17.9	96 18	48.1	45 43.7	95 18	47.4	9
120	37 52.5	96 18	49.7	38 50.3	96 18	49.3	40 17.0	96 18	48.8	41 14.6	96 18	48.4	42 12.2	96 18	48.0	43 09.7	96 18	47.7	44 07.1	96 18	47.3	45 33.1	95 17	46.6	120
1	37 41.5	97 18	48.8	38 39.4	96 18	48.5	40 06.1	96 18	47.9	41 03.8	96 18	47.6	42 01.5	96 18	47.2	42 59.1	96 18	46.8	43 56.6	96 17	46.4	45 22.6	96 17	45.8	1
2	37 30.7	97 18	48.0	38 28.6	97 18	47.6	39 55.4	96 18	47.1	40 53.2	96 18	46.8	41 50.9	96 17	46.4	42 48.5	96 17	46.0	43 46.1	96 17	45.6	45 12.3	96 17	45.0	2
3	37 20.0	97 18	47.1	38 18.0	97 18	46.8	39 44.8	96 17	46.3	40 42.7	96 17	45.9	41 40.5	96 17	45.6	42 38.2	96 17	45.2	43 35.8	96 17	44.8	45 02.1	96 17	44.2	3
4	37 09.4	97 17	46.3	38 07.5	97 17	45.9	39 34.4	97 17	45.5	40 32.3	96 17	45.1	41 30.2	96 17	44.8	42 27.9	96 17	44.4	43 25.6	96 17	44.0	44 52.0	96 16	43.4	4
125	36 59.0	97 17	45.4	37 57.1	97 17	45.1	39 24.1	97 17	44.6	40 22.1	97 17	44.3	41 20.0	96 17	43.9	42 17.9	96 17	43.6	43 15.6	96 16	43.2	44 42.1	96 16	42.6	125
6	36 48.7	97 17	44.6	37 46.9	97 17	44.3	39 14.0	97 17	43.8	40 12.0	97 17	43.5	41 10.0	97 16	43.1	42 07.9	96 16	42.8	43 05.8	96 16	42.4	44 32.4	96 16	41.8	6
7	36 38.6	97 17	43.7	37 36.8	97 17	43.4	39 04.1	97 16	43.0	40 02.1	97 16	42.6	41 00.2	97 16	42.3	41 58.1	97 16	42.0	42 56.0	96 16	41.6	44 22.8	96 16	41.1	7
8	36 28.7	97 16	42.9	37 26.9	97 16	42.6	38 54.2	97 16	42.1	39 52.4	97 16	41.8	40 50.5	97 16	41.5	41 48.5	97 16	41.2	42 46.5	97 16	40.8	44 13.3	96 16	40.3	8
9	36 18.9	97 16	42.1	37 17.2	97 16	41.8	38 44.6	97 16	41.3	39 42.8	97 16	41.0	40 40.9	97 16	40.7	41 39.0	97 16	40.4	42 37.1	97 15	40.0	44 04.0	97 15	39.5	9
130	36 09.2	97 16	41.2	37 07.6	97 16	40.9	38 35.1	97 16	40.5	39 33.3	97 15	40.2	40 31.6	97 15	39.9	41 29.7	97 15	39.5	42 27.8	97 15	39.2	43 54.9	97 15	38.7	130
1	35 59.7	97 16	40.4	36 58.2	97 15	40.1	38 25.7	97 15	39.7	39 24.0	97 15	39.4	40 22.3	97 15	39.1	41 20.6	97 15	38.7	42 18.7	97 15	38.4	43 45.9	97 15	37.9	1
2	35 50.4	98 15	39.6	36 48.9	97 15	39.3	38 16.5	97 15	38.8	39 14.9	97 15	38.6	40 13.3	97 15	38.2	41 11.5	97 15	37.9	42 09.8	97 15	37.6	43 37.0	97 14	37.1	2
3	35 41.2	98 15	38.7	36 39.8	98 15	38.4	38 07.5	97 15	38.0	39 06.0	97 15	37.7	40 04.4	97 15	37.4	41 02.7	97 14	37.1	42 01.0	97 14	36.8	43 28.4	97 14	36.3	3
4	35 32.2	98 15	37.9	36 30.8	98 15	37.6	37 58.7	98 14	37.2	38 57.2	97 14	36.9	39 55.6	97 14	36.6	40 54.0	97 14	36.3	41 52.4	97 14	36.0	43 19.8	97 14	35.5	4
135	35 23.4	98 14	37.1	36 22.1	98 14	36.8	37 50.0	98 14	36.4	38 48.5	98 14	36.1	39 47.0	97 14	35.8	40 45.5	97 14	35.5	41 43.9	97 14	35.2	43 11.5	97 14	34.8	135
6	35 14.7	98 14	36.2	36 13.4	98 14	36.0	37 41.4	98 14	35.6	38 40.0	98 14	35.3	39 38.6	98 14	35.0	40 37.2	98 14	34.7	41 35.6	97 14	34.4	43 03.3	97 13	34.0	6
7	35 06.3	98 14	35.4	36 05.0	98 14	35.1	37 33.1	98 14	34.8	38 31.7	98 14	34.5	39 30.4	98 13	34.2	40 29.0	98 13	33.9	41 27.5	98 13	33.6	42 55.3	97 13	33.2	7
8	34 57.9	98 14	34.6	35 56.7	98 13	34.3	37 24.9	98 13	33.9	38 23.6	98 13	33.7	39 22.3	98 13	33.4	40 20.9	98 13	33.1	41 19.6	98 13	32.8	42 47.4	98 13	32.4	8
9	34 49.8	98 13	33.7	35 48.6	98 13	33.5	37 16.9	98 13	33.1	38 15.6	98 13	32.9	39 14.4	98 13	32.6	40 13.1	98 13	32.3	41 11.8	98 13	32.1	42 39.7	98 13	31.6	9
140	34 41.8	98 13	32.9	35 40.7	98 13	32.7	37 09.0	98 13	32.3	38 07.9	98 13	32.1	39 06.7	98 13	31.8	40 05.4	98 12	31.5	41 04.2	98 12	31.3	42 32.2	98 12	30.8	140
1	34 34.0	98 13	32.1	35 33.0	98 13	31.8	37 01.4	98 12	31.5	38 00.2	98 12	31.2	38 59.1	98 12	31.0	39 57.9	98 12	30.7	40 56.7	98 12	30.5	42 24.8	98 12	30.1	1
2	34 26.4	98 12	31.2	35 25.4	98 12	31.0	36 53.9	98 12	30.7	37 52.8	98 12	30.4	38 51.7	98 12	30.2	39 50.6	98 12	29.9	40 49.4	98 12	29.7	42 17.6	98 12	29.3	2
3	34 19.0	98 12	30.4	35 18.0	98 12	30.2	36 46.5	98 12	29.9	37 45.5	98 12	29.6	38 44.5	98 12	29.4	39 43.4	98 12	29.1	40 42.3	98 12	28.9	42 10.6	98 11	28.5	3
4	34 11.7	99 12	29.6	35 10.8	98 12	29.4	36 39.4	98 12	29.0	37 38.4	98 12	28.8	38 37.5	98 11	28.6	39 36.4	98 11	28.4	40 35.4	98 11	28.1	42 03.8	98 11	27.7	4
145	34 04.6	99 11	28.8	35 03.8	99 11	28.5	36 32.5	98 11	28.2	37 31.5	98 11	28.0	38 30.6	98 11	27.8	39 29.6	98 11	27.6	40 28.6	98 11	27.3	41 57.1	98 11	27.0	145
6	33 57.8	99 11	27.9	34 56.9	99 11	27.7	36 25.7	99 11	27.4	37 24.8	99 11	27.2	38 23.9	98 11	27.0	39 23.0	98 11	26.8	40 22.1	98 11	26.5	41 50.6	98 11	26.2	6
7	33 51.0	99 11	27.1	34 50.3	99 11	26.9	36 19.1	99 11	26.6	37 18.3	99 11	26.4	38 17.4	99 11	26.2	39 16.6	99 10	26.0	40 15.7	98 10	25.8	41 44.3	98 10	25.4	7
8	33 44.5	99 11	26.3	34 43.8	99 10	26.1	36 12.7	99 10	25.8	37 11.9	99 10	25.6	38 11.1	99 10	25.4	39 10.3	99 10	25.2	40 09.5	99 10	25.0	41 38.2	99 10	24.6	8
9	33 38.2	99 10	25.5	34 37.5	99 10	25.3	36 06.5	99 10	25.0	37 05.7	99 10	24.8	38 05.0	99 10	24.6	39 04.2	99 10	24.4	40 03.4	99 10	24.2	41 32.2	99 10	23.9	9
150	33 32.0	99 10	24.6	34 31.4	99 10	24.4	36 00.4	99 10	24.2	36 59.7	99 10	24.0	37 59.0	99 10	23.8	38 58.3	99 10	23.6	39 57.6	99 09	23.4	41 26.4	99 09	23.1	150
1	33 26.1	99 10	23.8	34 25.5	99 10	23.6	35 54.6	99 09	23.4	36 53.9	99 09	23.2	37 53.3	99 09	23.0	38 52.6	99 09	22.8	39 51.9	99 09	22.6	41 20.8	99 09	22.3	1
2	33 20.3	99 09	23.0	34 19.8	99 09	22.8	35 48.9	99 09	22.6	36 48.3	99 09	22.4	37 47.7	99 09	22.2	38 47.1	99 09	22.0	39 46.4	99 09	21.8	41 15.4	99 09	21.5	2
3	33 14.8	99 09	22.2	34 14.2	99 09	22.0	35 43.4	99 09	21.7	36 42.9	99 09	21.6	37 42.3	99 09	21.4	38 41.7	99 09	21.2	39 41.1	99 09	21.0	41 10.2	99 08	20.8	3
4	33 09.4	99 09	21.3	34 08.9	99 09	21.2	35 38.1	99 08	20.9	36 37.6	99 08	20.8	37 37.1	99 08	20.6	38 36.5	99 08	20.4	39 36.0	99 08	20.3	41 05.1	99 08	20.0	4
155	33 04.2	99 08	20.5	34 03.8	99 08	20.4	35 33.1	99 08	20.1	36 32.6	99 08	20.0	37 32.1	99 08	19.8	38 31.6	99 08	19.7	39 31.0	99 08	19.5	41 00.2	99 08	19.2	155
6	32 59.2	99 08	19.7	33 58.8	99 08	19.5	35 28.2	99 08	19.3	36 27.7	99 08	19.2	37 27.2	99 08	19.0	38 26.8	99 08	18.9	39 26.3	99 08	18.7	40 55.5	99 08	18.4	6
7	32 54.4	99 08	18.9	33 54.0	99 08	18.7	35 23.4	99 08	18.5	36 23.0	99 07	18.4	37 22.6	99 07	18.2	38 22.2	99 07	18.1	39 21.7	99 07	17.9	40 51.0	99 07	17.7	7
8	32 49.8	99 07	18.0	33 49.5	99 07	17.9	35 18.9	99 07	17.7	36 18.6	99 07	17.6	37 18.2	99 07	17.4	38 17.8	99 07	17.3	39 17.4	99 07	17.1	40 46.7	99 07	16.9	8
9	32 45.4	99 07	17.2	33 45.1	99 07	17.1	35 14.6	99 07	16.9	36 14.3	99 07	16.8	37 13.9	99 07	16.6	38 13.6	99 07	16.5	39 13.2	99 07	16.4	40 42.6	99 07	16.1	9
160	32 41.2	1.0 07	16.4	33 40.9	1.0 07	16.3	35 10.5	99 07	16.1	36 10.2	99 06	16.0	37 09.9	99 06	15.8	38 09.5	99 06	15.7	39 09.2	99 06	15.6	40 38.7	99 06	15.4	160
1	32 37.2	1.0 06	15.6	33 37.0	1.0 06	15.5	35 06.6	1.0 06	15.3	36 06.3	1.0 06	15.2	37 06.0	1.0 06	15.0	38 05.7	99 06	14.9	39 05.4	99 06	14.8	40 34.9	99 06	14.6	1
2	32 33.4	1.0 06	14.8	33 33.2	1.0 06	14.6	35 02.8	1.0 06	14.5	36 02.6	1.0 06	14.4	37 02.3	1.0 06	14.3	38 02.1	1.0 06	14.1	39 01.8	1.0 06	14.0	40 31.4	1.0 06	13.8	2
3	32 29.8	1.0 06	13.9	33 29.6	1.0 06	13.8	34 59.3	1.0 06	13.7	35 59.1	1.0 06	13.6	36 58.8	1.0 05	13.5	37 58.6	1.0 05	13.4	38 58.4	1.0 05	13.2	40 28.0	1.0 05	13.1	3
4	32 26.5	1.0 05	13.1	33 26.3	1.0 05	13.0	34 56.0	1.0 05	12.9	35 55.8	1.0 05	12.8	36 55.6	1.0 05	12.7	37 55.4	1.0 05	12.6	38 55.1	1.0 05	12.5	40 24.8	1.0 05	12.3	4
165	32 23.3	1.0 05	12.3	33 23.1	1.0 05	12.2	34 52.8	1.0 05	12.1	35 52.7	1.0 05	12.0	36 52.5	1.0 05	11.9	37 52.3	1.0 05	11.8	38 52.1	1.0 05	11.7	40 21.8	1.0 05	11.5	165
6	32 20.3	1.0 05	11.5	33 20.1	1.0 05	11.4	34 49.9	1.0 05	11.3	35 49.7	1.0 05	11.2	36 49.6	1.0 04	11.1	37 49.4	1.0 04	11.0	38 49.3	1.0 04	10.9	40 19.0	1.0 04	10.7	6
7	32 17.5	1.0 04	10.7	33 17.4	1.0 04	10.6	34 47.2	1.0 04	10.5	35 47.0	1.0 04	10.4	36 46.9	1.0 04	10.3	37 46.8	1.0 04	10.2	38 46.6	1.0 04	10.1	40 16.4	1.0 04	10.0	7
8	32 14.9	1.0 04	09.8	33 14.8	1.0 04	09.8	34 44.6	1.0 04	09.7	35 44.5	1.0 04	09.6	36 44.4	1.0 04	09.5	37 44.3	1.0 04	09.4	38 44.2	1.0 04	09.3	40 14.0	1.0 04	09.2	8
9	32 12.5	1.0 04	09.0	33 12.4	1.0 04	08.9	34 42.3	1.0 04	08.8	35 42.2	1.0 04	08.8	36 42.1	1.0 04	08.7	37 42.0	1.0 03	08.6	38 41.9	1.0 03	08.6	40 11.7	1.0 03	08.4	9
170	32 10.4	1.0 03	08.2	33 10.3	1.0 03	08.1	34 40.2	1.0 03	08.0	35 40.1	1.0 03	08.0	36 40.0	1.0 03	07.9	37 39.9	1.0 03	07.8	38 39.8	1.0 03	07.8	40 09.7	1.0 03	07.7	170
1	32 08.4	1.0 03	07.4	33 08.3	1.0 03	07.3	34 38.2	1.0 03	07.2	35 38.2	1.0 03	07.2	36 38.1	1.0 03	07.1	37 38.0	1.0 03	07.1	38 38.0	1.0 03	07.0	40 07.9	1.0 03	06.9	1
2	32 06.6	1.0 03	06.6	33 06.6	1.0 03	06.5	34 36.5	1.0 03	06.4	35 36.5	1.0 03	06.4	36 36.4	1.0 02	06.3	37 36.4	1.0 02	06.3	38 36.3	1.0 02	06.2	40 06.2	1.0 02	06.1	2
3	32 05.1	1.0 02	05.7	33 05.0	1.0 02	05.7	34 35.0	1.0 02	05.6	35 34.9	1.0 02	05.6	36 34.9	1.0 02	05.5	37 34.9	1.0 02	05.5	38 34.8	1.0 02	05.4	40 04.8	1.0 02	05.4	3
4	32 03.7	1.0 02	04.9	33 03.7	1.0 02	04.9	34 33.7	1.0 02	04.8	35 33.6	1.0 02	04.8	36 33.6	1.0 02	04.7	37 33.6	1.0 02	04.7	38 33.5	1.0 02	04.7	40 03.5	1.0 02	04.6	4
175	32 02.6	1.0 02	04.1	33 02.6	1.0 02	04.1	34 32.5	1.0 02	04.0	35 32.5	1.0 02	04.0	36 32.5	1.0 02	04.0	37 32.5	1.0 02	03.9	38 32.5	1.0 01	03.9	40 02.4	1.0 01	03.8	175
6	32 01.7	1.0 01	03.3	33 01.6	1.0 01	03.3	34 31.6	1.0 01	03.2	35 31.6	1.0 01	03.2	36 31.6	1.0 01	03.2	37 31.6	1.0 01	03.1	38 31.6	1.0 01	03.1	40 01.6	1.0 01	03.1	6
7	32 00.9	1.0 01	02.5	33 00.9	1.0 01	02.4	34 30.9	1.0 01	02.4	35 30.9	1.0 01	02.4	36 30.9	1.0 01	02.4	37 30.9	1.0 01	02.4	38 30.9	1.0 01	02.3	40 00.9	1.0 01	02.3	7
8	32 00.4	1.0 01	01.6	33 00.4	1.0 01	01.6	34 30.4	1.0 00	01.6	35 30.4	1.0 00	01.6	36 30.4	1.0 00	01.6	37 30.4	1.0 00	01.6	38 30.4	1.0 00	01.6	40 00.4	1.0 00	01.5	8
9	32 00.1	1.0 00	00.8	33 00.1	1.0 00	00.8	34 30.1	1.0 00	00.8	35 30.1	1.0 00	00.8	36 30.1	1.0 00	00.8	37 30.1	1.0 00	00.8	38 30.1	1.0 00	00.8	40 00.1	1.0 00	00.8	9
180	32 00.0	1.0 00	00.0	33 00.0	1.0 00	00.0	34 30.0	1.0 00	00.0	35 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	38 30.0	1.0 00	00.0	40 00.0	1.0 00	00.0	180

Lat. 76°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	68 30.0	1.0 00	180.0	69 00.0	1.0 00	180.0	70 00.0	1.0 00	180.0	70 30.0	1.0 00	180.0	71 00.0	1.0 00	180.0	71 30.0	1.0 00	180.0	73 00.0	1.0 00	180.0	73 30.0	1.0 00	180.0	00
1	68 29.8	1.0 01	178.4	68 59.8	1.0 01	178.4	69 59.8	1.0 01	178.4	70 29.8	1.0 01	178.3	70 59.8	1.0 01	178.3	71 29.8	1.0 01	178.3	72 59.8	1.0 01	178.2	73 29.8	1.0 01	178.2	1
2	68 29.2	1.0 02	176.8	68 59.2	1.0 02	176.8	69 59.2	1.0 02	176.7	70 29.2	1.0 02	176.7	70 59.2	1.0 02	176.7	71 29.1	1.0 02	176.6	72 59.1	1.0 02	176.5	73 29.1	1.0 02	176.4	2
3	68 28.2	1.0 02	175.2	68 58.2	1.0 02	175.2	69 58.1	1.0 02	175.1	70 28.1	1.0 02	175.0	70 58.1	1.0 02	175.0	71 28.1	1.0 02	174.9	72 58.0	1.0 03	174.7	73 28.0	1.0 03	174.6	3
4	68 26.8	1.0 03	173.7	68 56.8	1.0 03	173.6	69 56.7	1.0 03	173.5	70 26.7	1.0 03	173.4	70 56.6	1.0 03	173.3	71 26.6	1.0 03	173.2	72 56.4	1.0 03	173.0	73 26.4	1.0 03	172.9	4
05	68 25.0	1.0 04	172.1	68 54.9	1.0 04	172.0	69 54.8	1.0 04	171.8	70 24.8	1.0 04	171.8	70 54.7	1.0 04	171.7	71 24.7	1.0 04	171.6	72 54.4	1.0 04	171.2	73 24.4	1.0 04	171.1	05
6	68 22.8	1.0 04	170.5	68 52.7	1.0 04	170.4	69 52.6	1.0 04	170.2	70 22.5	1.0 04	170.1	70 52.4	1.0 05	170.0	71 22.3	1.0 05	169.9	72 52.0	1.0 05	169.5	73 21.9	1.0 05	169.3	6
7	68 20.2	1.0 05	168.9	68 50.1	1.0 05	168.8	69 49.9	1.0 05	168.6	70 19.8	1.0 05	168.5	70 49.7	1.0 05	168.3	71 19.6	1.0 05	168.2	72 49.1	1.0 06	167.7	73 19.0	99 06	167.6	7
8	68 17.2	1.0 06	167.4	68 47.1	1.0 06	167.3	69 46.8	1.0 06	167.0	70 16.7	1.0 06	166.8	70 46.5	99 06	166.7	71 16.4	99 06	166.5	72 45.8	99 06	166.0	73 15.6	99 06	165.8	8
9	68 13.9	99 06	165.8	68 43.7	99 06	165.7	69 43.4	99 06	165.4	70 13.2	99 06	165.2	70 43.0	99 07	165.0	71 12.8	99 07	164.9	72 42.1	99 07	164.3	73 11.9	99 07	164.1	9
10	68 10.1	99 07	164.3	68 39.9	99 07	164.1	69 39.5	99 07	163.8	70 09.3	99 07	163.6	70 39.0	99 07	163.4	71 08.8	99 07	163.2	72 38.0	99 08	162.6	73 07.7	99 08	162.3	10
1	68 06.0	99 08	162.7	68 35.8	99 08	162.5	69 35.3	99 08	162.2	70 05.0	99 08	162.0	70 34.7	99 08	161.8	71 04.4	99 08	161.6	72 33.4	99 08	160.9	73 03.1	99 08	160.6	1
2	68 01.5	99 08	161.2	68 31.2	99 08	161.0	69 30.6	99 08	160.6	70 00.3	99 08	160.4	70 30.0	99 09	160.2	70 59.6	99 09	159.9	72 28.5	99 09	159.2	72 58.0	99 09	158.9	2
3	67 56.6	99 09	159.6	68 26.3	99 09	159.4	69 25.6	99 09	159.0	69 55.2	99 09	158.8	70 24.9	99 09	158.6	70 54.5	99 09	158.3	72 23.1	98 10	157.5	72 52.6	98 10	157.2	3
4	67 51.4	99 09	158.1	68 21.0	99 09	157.9	69 20.2	99 10	157.5	69 49.8	99 10	157.2	70 19.4	98 10	157.0	70 48.9	98 10	156.7	72 17.3	98 10	155.8	72 46.8	98 10	155.5	4
15	67 45.8	99 10	156.6	68 15.4	99 10	156.4	69 14.5	98 10	155.9	69 44.0	98 10	155.6	70 13.5	98 10	155.4	70 43.0	98 10	155.1	72 11.2	98 11	154.2	72 40.6	98 11	153.8	15
6	67 39.9	98 10	155.1	68 09.4	98 11	154.9	69 08.4	98 11	154.4	69 37.8	98 11	154.1	70 07.3	98 11	153.8	70 36.7	98 11	153.5	72 04.7	98 11	152.5	72 34.0	97 12	152.2	6
7	67 33.6	98 11	153.6	68 03.1	98 11	153.3	69 01.9	98 11	152.8	69 31.3	98 11	152.5	70 00.7	98 12	152.2	70 30.0	98 12	151.9	71 57.8	97 12	150.9	72 27.0	97 12	150.5	7
8	67 27.0	98 12	152.1	67 56.4	98 12	151.8	68 55.1	98 12	151.3	69 24.5	98 12	151.0	69 53.8	98 12	150.7	70 23.0	97 12	150.4	71 50.6	97 13	149.3	72 19.7	97 12	148.9	8
9	67 20.0	98 12	150.6	67 49.4	98 12	150.3	68 48.0	98 12	149.8	69 17.2	97 13	149.5	69 46.5	97 13	149.1	70 15.7	97 13	148.8	71 43.0	97 13	147.7	72 12.0	97 13	147.3	9
20	67 12.7	98 13	149.2	67 42.0	98 13	148.9	68 40.5	97 13	148.3	69 09.7	97 13	147.9	69 38.9	97 13	147.6	70 08.0	97 13	147.3	71 35.1	97 14	146.1	72 04.0	96 14	145.7	20
1	67 05.1	97 13	147.7	67 34.4	97 13	147.4	68 32.7	97 14	146.8	69 01.8	97 14	146.4	69 30.9	97 14	146.1	70 00.0	97 14	145.7	71 26.8	96 14	144.5	71 55.6	96 14	144.1	1
2	66 57.2	97 14	146.2	67 26.4	97 14	145.9	68 24.6	97 14	145.3	68 53.7	97 14	145.0	69 22.7	97 14	144.6	69 51.6	96 14	144.2	71 18.2	96 15	143.0	71 47.0	96 15	142.5	2
3	66 49.0	97 14	144.8	67 18.1	97 14	144.5	68 16.2	97 15	143.8	68 45.2	97 15	143.5	69 14.1	96 15	143.1	69 43.0	96 15	142.7	71 09.3	96 15	141.5	71 38.0	95 15	141.0	3
4	66 40.5	97 15	143.4	67 09.5	97 15	143.1	68 07.5	96 15	142.4	68 36.4	96 15	142.0	69 05.3	96 15	141.6	69 34.1	96 15	141.2	71 00.2	95 16	139.9	71 28.7	95 16	139.5	4
25	66 31.7	97 15	142.0	67 00.7	97 15	141.6	67 58.5	96 16	140.9	68 27.3	96 16	140.6	68 56.1	96 16	140.2	69 24.8	96 16	139.8	70 50.7	95 16	138.4	71 19.1	95 16	138.0	25
6	66 22.6	96 16	140.6	66 51.5	96 16	140.2	67 49.2	96 16	139.5	68 18.0	96 16	139.1	68 46.7	96 16	138.7	69 15.3	96 16	138.3	70 40.9	95 17	137.0	71 09.3	94 17	136.5	6
7	66 13.2	96 16	139.2	66 42.1	96 16	138.8	67 39.6	96 16	138.1	68 08.3	96 16	137.7	68 37.0	95 17	137.3	69 05.5	95 17	136.9	70 30.9	94 17	135.5	70 59.1	94 17	135.0	7
8	66 03.6	96 16	137.8	66 32.4	96 17	137.4	67 29.8	95 17	136.7	67 58.4	95 17	136.3	68 27.0	95 17	135.9	68 55.5	95 17	135.5	70 20.6	94 18	134.0	70 48.7	94 18	133.5	8
9	65 53.7	96 17	136.4	66 22.5	96 17	136.1	67 19.7	95 17	135.3	67 48.3	95 17	134.9	68 16.8	95 17	134.5	68 45.2	95 18	134.0	70 10.0	94 18	132.6	70 38.1	94 18	132.1	9
30	65 43.6	96 17	135.1	66 12.3	95 17	134.7	67 09.4	95 18	133.9	67 37.9	95 18	133.5	68 06.3	95 18	133.1	68 34.6	94 18	132.6	69 59.2	94 18	131.2	70 27.2	93 19	130.7	30
1	65 33.2	95 18	133.7	66 01.8	95 18	133.4	66 58.8	95 18	132.6	67 27.2	95 18	132.2	67 55.6	94 18	131.7	68 23.8	94 18	131.3	69 48.2	93 19	129.8	70 16.1	93 19	129.3	1
2	65 22.6	95 18	132.4	65 51.2	95 18	132.0	66 48.0	95 18	131.2	67 16.3	94 18	130.8	67 44.6	94 19	130.4	68 12.8	94 19	129.9	69 36.9	93 19	128.4	70 04.7	93 19	127.9	2
3	65 11.8	95 18	131.1	65 40.3	95 19	130.7	66 37.0	94 19	129.9	67 05.2	94 19	129.5	67 33.4	94 19	129.0	68 01.6	93 19	128.6	69 25.4	93 19	127.0	69 53.2	92 20	126.5	3
4	65 00.8	95 19	129.8	65 29.1	95 19	129.4	66 25.7	94 19	128.6	66 53.9	94 19	128.1	67 22.1	94 19	127.7	67 50.1	93 19	127.2	69 13.7	92 20	125.7	69 41.4	92 20	125.1	4
35	64 49.5	95 19	128.5	65 17.8	94 19	128.1	66 14.3	94 19	127.3	66 42.4	94 20	126.8	67 10.5	93 20	126.4	67 38.4	93 20	125.9	69 01.8	92 20	124.4	69 29.4	92 20	123.8	35
6	64 38.0	94 19	127.2	65 06.3	94 20	126.8	66 02.6	94 20	126.0	66 30.7	93 20	125.5	66 58.7	93 20	125.1	67 26.6	93 20	124.6	68 49.8	92 20	123.0	69 17.3	92 21	122.5	6
7	64 26.4	94 20	125.9	64 54.6	94 20	125.5	65 50.8	93 20	124.7	66 18.8	93 20	124.2	66 46.7	93 20	123.8	67 14.5	93 20	123.3	68 37.5	92 21	121.7	69 04.9	91 21	121.2	7
8	64 14.5	94 20	124.6	64 42.7	94 20	124.2	65 38.8	93 20	123.4	66 06.7	93 20	123.0	66 34.5	93 21	122.5	67 02.3	92 21	122.0	68 25.1	91 21	120.5	68 52.4	91 21	119.9	8
9	64 02.5	94 20	123.4	64 30.6	94 20	123.0	65 26.6	93 20	122.1	65 54.4	93 21	121.7	66 22.2	93 21	121.2	66 49.9	92 21	120.7	68 12.5	91 21	119.2	68 39.8	91 21	118.6	9
40	63 50.3	94 21	122.2	64 18.3	93 21	121.8	65 14.2	93 21	120.9	65 42.0	93 21	120.4	66 09.7	92 21	120.0	66 37.4	92 21	119.5	67 59.7	91 22	117.9	68 27.0	91 22	117.4	40
1	63 37.9	93 21	120.9	64 05.9	93 21	120.5	65 01.6	93 21	119.7	65 29.4	92 21	119.2	65 57.1	92 21	118.7	66 24.7	92 21	118.3	67 46.8	91 22	116.7	68 14.0	90 22	116.1	1
2	63 25.4	93 21	119.7	63 53.3	93 21	119.3	64 49.0	92 21	118.4	65 16.7	92 21	118.0	65 44.3	92 22	117.5	66 11.8	92 22	117.0	67 33.8	91 22	115.5	68 00.9	90 22	114.9	2
3	63 12.7	93 21	118.5	63 40.6	93 21	118.1	64 36.1	92 22	117.2	65 03.8	92 22	116.8	65 31.3	92 22	116.3	65 58.7	91 22	115.8	67 20.6	90 22	114.2	67 47.7	90 22	113.7	3
4	62 59.9	93 22	117.3	63 27.7	93 22	116.9	64 23.1	92 22	116.0	64 50.7	92 22	115.6	65 18.2	92 22	115.1	65 45.7	91 22	114.6	67 07.3	90 22	113.0	67 34.3	90 22	112.5	4
45	62 46.9	93 22	116.1	63 14.7	92 22	115.7	64 10.0	92 22	114.8	64 37.6	92 22	114.4	65 05.0	91 22	113.9	65 32.4	91 22	113.4	66 53.9	90 23	111.8	67 20.8	90 23	111.3	45
6	62 33.8	93 22	115.0	63 01.6	92 22	114.5	63 56.8	92 22	113.7	64 24.3	92 22	113.2	64 51.7	91 22	112.7	65 19.0	91 22	112.2	66 40.4	90 23	110.7	67 07.3	89 23	110.1	6
7	62 20.6	92 22	113.8	62 48.3	92 22	113.4	63 43.4	92 22	112.5	64 10.9	91 22	112.1	64 38.3	91 23	111.6	65 05.5	91 23	111.1	66 26.7	90 23	109.5	66 53.6	89 23	108.9	7
8	62 07.2	92 22	112.6	62 34.9	92 23	112.2	63 30.0	92 23	111.4	63 57.4	91 23	110.9	64 24.7	91 23	110.4	64 52.0	91 23	109.9	66 13.0	90 23	108.4	66 39.8	89 23	107.8	8
9	61 53.8	92 23	111.5	62 21.4	92 23	111.1	63 16.4	91 23	110.2	63 43.8	91 23	109.8	64 11.1	91 23	109.3	64 38.3	90 23	108.8	65 59.2	89 23	107.2	66 25.9	89 23	106.7	9
50	61 40.2	92 23	110.4	62 07.8	92 23	110.0	63 02.7	91 23	109.1	63 30.1	91 23	108.6	63 57.3	91 23	108.2	64 24.5	90 23	107.7	65 45.3	89 23	106.1	66 12.0	89 23	105.5	50
1	61 26.6	92 23	109.3	61 54.1	92 23	108.8	62 49.0	91 23	108.0	63 16.3	91 23	107.5	63 43.5	91 23	107.0	64 10.6	90 23	106.5	65 31.3	89 23	105.0	65 58.0	89 24	104.4	1
2	61 12.8	92 23	108.1	61 40.3	92 23	107.7	62 35.1	91 23	106.9	63 02.4	91 23	106.4	63 29.6	90 23	105.9	63 56.6	90 23	105.4	65 17.2	89 24	103.9	65 43.9	89 24	103.3	2
3	60 59.0	92 23	107.0	61 26.5	91 23	106.6	62 21.2	91 23	105.8	62 48.4	91 24	105.3	63 15.6	90 23	104.8	63 42.6	90 24	104.3	65 03.1	89 24	102.8	65 29.7	88 24	102.2	3
4	60 45.1	92 23	105.9	61 12.5	91 23	105.5	62 07.2	91 23	104.7	62 34.4	91 24	104.2	63 01.5	90 24	103.7	63 28.5	90 24	103.3	64 48.9	89 24	101.7	65 15.5	88 24	101.2	4
55	60 31.1	92 23	104.9	60 58.5	91 24	104.4	61 53.1	91 24	103.6	62 20.3	90 24	103.1	62 47.4	90 24	102.7	63 14.4	90 24	102.2	64 34.7	89 24	100.6	65 01.3	88 24	100.1	55
6	60 17.0	91 24	103.8	60 44.4	91 24	103.4	61 39.0	91 24	102.5	62 06.1	90 24	102.1	62 33.2	90 24	101.6	63 00.1	90 24	101.1	64 20.4	89 24	99.6	64 46.9	88 24	99.0	6
7	60 02.9	91 24	102.7	60 30.3	91 24	102.3	61 24.8	91 24	101.4	61 51.9	90 24	101.0	62 18.9	90 24	100.5	62 45.9	90 24	100.1	64 06.1	89 24	98.5	64 32.6	88 24	98.0	7
8	59 48.7	91 24	101.7	60 16.1	91 24	101.2	61 10.5	90 24	100.4	61 37.6	90 24	99.9	62 04.6	90 24	99.5	62 31.6	90 24	99.0	63 51.7	88 24	97.5	64 18.2	88 24	97.0	8
9	59 34.5	91 24	100.6	60 01.8	91 24	100.2	60 56.2	90 24	99.3	61 23.3	90 24	98.9	61 50.3	90 24	98.4	62 17.2	90 24	98.0	63 37.3	88 24	96.5	64 03.8	88 24	95.9	9
60	59 20.2	91 24	99.6	59 47.5	91 24	99.2	60 41.9	90 24	98.3	61 08.9	90 24	97.9	61 35.9	90 24	97.4	62 02.8	89 24	96.9	63 22.9	88 24	95.4	63 49.3	88 24	94.9	60
1	59 05.8	91 24	98.5	59 33.1	91 24	98.1	60 27.5	90 24	97.3	60 54.6	90 24	96.8	61 21.5	90 24	96.4	61 48.4	89 24	95.9	63 08.4	88 24	94.4	63 34.8	88 24	93.9	1
2	58 51.5	91 24	97.5	59 18.8	91 24	97.1	60 13.1	90 24	96.3	60 40.1	90 24	95.8	61 07.1	90 24	95.4	61 33.9	89 24	94.9	62 53.9	88 24	93.4	63 20.4	88 24	92.9	2
3	58 37.1	91 24	96.5	59 04.3	91 24	96.1	59 58.6	90 24	95.2	60 25.7	90 24	94.8	60 52.6	90 24	94.4	61 19.5	89 24	93.9	62 39.4	88 24	92.4	63 05.9	88 24	91.9	3
4	58 22.6	91 24	95.5	58 49.9	91 24	95.1	59 44.2	90 24	94.2	60 11.2	90 24	93.8	60 38.1	90 24	93.4	61 05.0	89 24	92.9	62 24.9	88 24	91.4	62 51.3	88 24	90.9	4
65	58 08.2	91 24	94.5	58 35.4	91 24	94.1	59 29.7	90 24	93.2	59 56.7	90 24	92.8	60 23.6	90 24	92.4	60 50.5	89 24	91.9	62 10.4	88 24	90.5	62 36.8	88 24	90.0	65
6	57 53.7	91 24	93.5	58 20.9	91 24	93.1	59 15.2	90 24	92.3	59 42.2	90 24	91.8	60 09.1	90 24	91.4	60 36.0	89 24	90.9	61 55.9	88 24	89.5	62 22.3	88 24	89.0	6
7	57 39.2	91 24	92.5	58 06.4	91 24	92.1	59 00.7	90 24	91.3	59 27.7	90 24	90.8	59 54.6	90 24	90.4	60 21.4	89 24	90.0	61 41.4	88 24	88.5	62 07.8	88 24	88.0	7
8	57 24.7	91 24	91.5	57 51.9	91 24	91.1	58 46.2	90 24	90.3	59 13.2	90 24	89.9	59 40.1	90 24	89.4	60 06.9	89 24	89.0	61 26.9	88 24	87.6	61 53.3	88 24	87.1	8
9	57 10.2	91 24	90.5	57 37.4	91 24	90.1	58 31.7	90 24	89.3	58 58.7	90 24	88.9	59 25.6	90 24	88.5	59 52.4	89 24	88.0	61 12.4	88 24	86.6	61 38.8	88 24	86.1	9
70	56 55.7	91 24	89.6	57 22.9	91 24	89.2	58 17.1	90 24	88.4	58 44.2	90 24	87.9	59 11.1	90 24	87.5	59 37.9	89 24	87.1	60 57.9	88 24	85.7	61 24.3	88 24	85.2	70
1	56 41.1	91 24	88.6	57 08.4	91 24	88.2	58 02.6	90 24	87.4	58 29.7	90 24	87.0	58 56.6	90 24	86.6	59 23.4	89 24	86.1	60 43.4	88 24	84.8	61 09.9	88 24	84.3	1
2	56 26.6	91 24	87.6	56 53.9	91 24	87.3	57 48.1	90 24	86.5	58 15.2	90 24	86.0	58 42.1	90 24	85.6	59 09.0	89 24	85.2	60 29.0	88 24	83.8	60 55.5	88 24	83.4	2
3	56 12.1	91 24	86.7	56 39.4	91 24	86.3	57 33.7	90 24	85.5	58 00.7	90 24	85.1	58 27.6	90 24	84.7	58 54.5	89 24	84.3	60 14.6	88 24	82.9	60 41.0	88 24	82.4	3
4	55 57.7	91 24	85.7	56 24.9	91 24	85.4	57 19.2	90 24	84.6	57 46.2	90 24	84.2	58 13.2	90 24	83.8	58 40.1	89 24	83.3	60 00.2	89 24	82.0	60 26.7	88 24	81.5	4
75	55 43.2	91 24	84.8	56 10.4	91 24	84.4	57 04.8	90 24	83.6	57 31.8	90 24	83.2	57 58.8	90 24	82.8	58 25.7	89 24	82.4	59 45.8	89 24	81.1	60 12.3	88 24	80.6	75
6	55 28.7	91 24	83.9	55 56.0	91 24	83.5	56 50.4	90 24	82.7	57 17.4	90 24	82.3	57 44.4	90 24	81.9	58 11.3	89 24	81.5	59 31.5	89 24	80.2	59 58.0	88 24	79.7	6
7	55 14.3	91 24	82.9	55 41.6	91 24	82.6	56 36.0	90 24	81.8	57 03.0	90 24	81.4	57 30.0	90 24	81.0	57 57.0	89 24	80.6	59 17.2	89 24	79.3	59 43.8	88 24	78.8	7
8	54 59.9	91 24	82.0	55 27.2	91 24	81.6	56 21.6	90 24	80.9	56 48.7	90 24	80.5	57 15.7	90 24	80.1	57 42.7	90 24	79.7	59 03.0	89 24	78.4	59 29.6	88 24	77.9	8
9	54 45.6	91 24	81.1	55 12.9	91 24	80.7	56 07.3	90 24	80.0	56 34.4	90 24	79.6	57 01.4	90 24	79.2	57 28.4	90 24	78.8	58 48.8	89 24	77.5	59 15.4	89 24	77.1	9
80	54 31.3	91 24	80.2	54 58.6	91 24	79.8	55 53.0	91 24	79.1	56 20.2	90 24	78.7	56 47.2	90 24	78.3	57 14.2	90 24	77.9	58 34.6	89 23	76.6	59 01.3	89 23	76.2	80
1	54 17.0	91 24	79.3	54 44.3	91 24	78.9	55 38.8	91 24	78.2	56 05.9	90 24	77.8	56 33.0	90 24	77.4	57 00.0	90 24	77.0	58 20.5	89 23	75.7	58 47.2	89 23	75.3	1
2	54 02.7	91 24	78.4	54 30.1	91 24	78.0	55 24.6	91 24	77.3	55 51.8	90 24	76.9	56 18.9	90 24	76.5	56 45.9	90 23	76.1	58 06.5	89 23	74.9	58 33.2	89 23	74.4	2
3	53 48.5	91 24	77.5	54 15.9	91 24	77.1	55 10.5	91 23	76.4	55 37.7	91 23	76.0	56 04.8	90 23	75.6	56 31.8	90 23	75.2	57 52.5	89 23	74.0	58 19.2	89 23	73.6	3
4	53 34.4	91 24	76.6	54 01.8	91 23	76.2	54 56.4	91 23	75.5	55 23.6	91 23	75.1	55 50.8	90 23	74.8	56 17.8	90 23	74.4	57 38.6	89 23	73.2	58 05.3	89 23	72.7	4
85	53 20.3	91 23	75.7	53 47.7	91 23	75.3	54 42.4	91 23	74.6	55 09.6	91 23	74.3	55 36.8	90 23	73.9	56 03.9	90 23	73.5	57 24.7	89 23	72.3	57 51.5	89 23	71.9	85
6	53 06.3	92 23	74.8	53 33.7	91 23	74.4	54 28.4	91 23	73.7	54 55.7	91 23	73.4	55 22.9	91 23	73.0	55 50.0	90 23	72.6	57 10.9	90 23	71.4	57 37.4	89 23	71.0	6
7	52 52.3	92 23	73.9	53 19.8	91 23	73.6	54 14.5	91 23	72.9	54 41.8	91 23	72.5	55 09.0	91 23	72.1	55 36.2	90 23	71.8	56 57.2	90 23	70.6	57 24.1	89 23	70.2	7
8	52 38.4	92 23	73.0	53 05.9	92 23	72.7	54 00.7	91 23	72.0	54 28.0	91 23	71.6	54 55.2	91 23	71.3	55 22.4	90 23	70.9	56 43.5	90 23	69.7	57 10.4	90 23	69.3	8
9	52 24.5	92 23	72.1	52 52.0	92 23	71.8	53 46.9	91 23	71.1	54 14.2	91 23	70.8	54 41.5	91 23	70.4	55 08.7	91 23	70.0	56 30.0	90 22	68.9	56 56.9	90 22	68.5	9
90	52 10.8	92 23	71.3	52 38.3	92 23	70.9	53 33.2	91 23	70.3	54 00.6	91 23	69.9	54 27.9	91 23	69.6	54 55.1	91 23	69.2	56 16.5	90 22	68.1	56 43.4	90 22	67.7	90

Lat. 76°

H.A.	54° 30′ Alt.		Az.	55° 00′ Alt.		Az.	56° 00′ Alt.		Az.	56° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	51 57.0	92 23	70.4	52 24.6	92 23	70.1	53 19.6	91 23	69.4	53 47.0	91 23	69.1
2	51 43.4	92 23	69.5	52 11.0	92 23	69.2	53 06.0	92 22	68.6	53 33.5	91 22	68.2
3	51 29.8	92 22	68.7	51 57.5	92 22	68.4	52 52.6	92 22	67.7	53 20.0	91 22	67.4
4	51 16.4	92 22	67.8	51 44.0	92 22	67.5	52 39.2	92 22	66.9	53 06.7	92 22	66.5
95	51 03.0	92 22	67.0	51 30.6	92 22	66.6	52 25.9	92 22	66.0	52 53.4	92 22	65.7
6	50 49.7	92 22	66.1	51 17.4	92 22	65.8	52 12.7	92 22	65.2	52 40.2	92 22	64.8
7	50 36.4	93 22	65.3	51 04.2	92 22	65.0	51 59.5	92 22	64.3	52 27.1	92 22	64.0
8	50 23.3	93 22	64.4	50 51.1	93 22	64.1	51 46.5	92 22	63.5	52 14.1	92 22	63.2
9	50 10.2	93 22	63.6	50 38.1	93 22	63.3	51 33.5	92 21	62.7	52 01.2	92 21	62.4
100	49 57.3	93 21	62.7	50 25.1	93 21	62.4	51 20.7	92 21	61.8	51 48.4	92 21	61.5
1	49 44.4	93 21	61.9	50 12.3	93 21	61.6	51 07.9	93 21	61.0	51 35.7	92 21	60.7
2	49 31.7	93 21	61.1	49 59.6	93 21	60.8	50 55.3	93 21	60.2	51 23.1	93 21	59.9
3	49 19.0	93 21	60.2	49 47.0	93 21	59.9	50 42.8	93 21	59.4	51 10.6	93 21	59.1
4	49 06.5	93 21	59.4	49 34.5	93 21	59.1	50 30.3	93 21	58.6	50 58.2	93 20	58.3
105	48 54.0	93 21	58.6	49 22.1	93 20	58.3	50 18.0	93 20	57.7	50 45.9	93 20	57.4
6	48 41.7	94 20	57.7	49 09.8	93 20	57.5	50 05.8	93 20	56.9	50 33.7	93 20	56.6
7	48 29.5	94 20	56.9	48 57.6	94 20	56.7	49 53.7	93 20	56.1	50 21.6	93 20	55.8
8	48 17.4	94 20	56.1	48 45.5	94 20	55.8	49 41.7	93 20	55.3	50 09.7	93 20	55.0
9	48 05.4	94 20	55.3	48 33.6	94 20	55.0	49 29.8	94 20	54.5	49 57.9	93 20	54.2
110	47 53.5	94 20	54.5	48 21.7	94 20	54.2	49 18.0	94 19	53.7	49 46.1	94 19	53.4
1	47 41.8	94 19	53.7	48 10.0	94 19	53.4	49 06.4	94 19	52.9	49 34.5	94 19	52.6
2	47 30.1	94 19	52.8	47 58.4	94 19	52.6	48 54.9	94 19	52.1	49 23.1	94 19	51.8
3	47 18.6	94 19	52.0	47 47.0	94 19	51.8	48 43.5	94 19	51.3	49 11.7	94 19	51.0
4	47 07.3	95 19	51.2	47 35.6	94 19	51.0	48 32.2	94 19	50.5	49 00.5	94 18	50.2
115	46 56.0	95 19	50.4	47 24.4	95 18	50.2	48 21.1	94 18	49.7	48 49.4	94 18	49.4
6	46 44.9	95 18	49.6	47 13.3	95 18	49.4	48 10.1	95 18	48.9	48 38.4	94 18	48.7
7	46 33.9	95 18	48.8	47 02.4	95 18	48.6	47 59.2	95 18	48.1	48 27.6	95 18	47.9
8	46 23.0	95 18	48.0	46 51.6	95 18	47.8	47 48.5	95 18	47.3	48 16.9	95 18	47.1
9	46 12.3	95 18	47.2	46 40.9	95 18	47.0	47 37.9	95 17	46.5	48 06.4	95 17	46.3
120	46 01.7	95 17	46.4	46 30.3	95 17	46.2	47 27.4	95 17	45.7	47 55.9	95 17	45.5
1	45 51.3	95 17	45.6	46 19.9	95 17	45.4	47 17.1	95 17	45.0	47 45.6	95 17	44.7
2	45 41.0	96 17	44.8	46 09.7	96 17	44.6	47 06.9	95 17	44.2	47 35.5	95 17	44.0
3	45 30.8	96 17	44.0	45 59.5	96 17	43.8	46 56.9	95 16	43.4	47 25.5	95 16	43.2
4	45 20.8	96 16	43.2	45 49.6	96 16	43.0	46 47.0	96 16	42.6	47 15.6	96 16	42.4
125	45 10.9	96 16	42.4	45 39.7	96 16	42.2	46 37.2	96 16	41.8	47 05.9	96 16	41.6
6	45 01.2	96 16	41.7	45 30.0	96 16	41.5	46 27.6	96 16	41.1	46 56.4	96 16	40.8
7	44 51.6	96 16	40.9	45 20.5	96 16	40.7	46 18.2	96 16	40.3	46 46.9	96 15	40.1
8	44 42.2	96 15	40.1	45 11.1	96 15	39.9	46 08.8	96 15	39.5	46 37.7	96 15	39.3
9	44 33.0	96 15	39.3	45 01.9	96 15	39.1	45 59.7	96 15	38.7	46 28.6	96 15	38.5
130	44 23.8	97 15	38.5	44 52.8	97 15	38.3	45 50.7	96 15	37.9	46 19.6	96 15	37.8
1	44 14.9	97 15	37.7	44 43.9	97 15	37.5	45 41.8	97 14	37.2	46 10.8	96 14	37.0
2	44 06.1	97 14	36.9	44 35.1	97 14	36.8	45 33.1	97 14	36.4	46 02.1	97 14	36.2
3	43 57.4	97 14	36.2	44 26.5	97 14	36.0	45 24.6	97 14	35.6	45 53.6	97 14	35.4
4	43 49.0	97 14	35.4	44 18.1	97 14	35.2	45 16.2	97 14	34.9	45 45.3	97 14	34.7
135	43 40.6	97 14	34.6	44 09.8	97 14	34.4	45 08.0	97 13	34.1	45 37.1	97 13	33.9
6	43 32.5	97 13	33.8	44 01.7	97 13	33.7	45 00.0	97 13	33.3	45 29.1	97 13	33.2
7	43 24.5	97 13	33.0	43 53.7	97 13	32.9	44 52.1	97 13	32.6	45 21.2	97 13	32.4
8	43 16.6	97 13	32.3	43 45.9	97 13	32.1	44 44.3	97 13	31.8	45 13.5	97 13	31.6
9	43 09.0	98 12	31.5	43 38.3	98 12	31.3	44 36.8	97 12	31.0	45 06.0	97 12	30.9
140	43 01.5	98 12	30.7	43 30.8	98 12	30.6	44 29.4	98 12	30.3	44 58.7	98 12	30.1
1	42 54.2	98 12	29.9	43 23.5	98 12	29.8	44 22.2	98 12	29.5	44 51.5	98 12	29.3
2	42 47.0	98 12	29.2	43 16.4	98 12	29.0	44 15.1	98 11	28.7	44 44.4	98 11	28.6
3	42 40.0	98 11	28.4	43 09.4	98 11	28.2	44 08.2	98 11	28.0	44 37.6	98 11	27.8
4	42 33.2	98 11	27.6	43 02.6	98 11	27.5	44 01.5	98 11	27.2	44 30.9	98 11	27.1
145	42 26.6	98 11	26.8	42 56.0	98 11	26.7	43 54.9	98 11	26.4	44 24.4	98 11	26.3
6	42 20.1	98 10	26.1	42 49.6	98 10	25.9	43 48.6	98 10	25.7	44 18.0	98 10	25.5
7	42 13.8	98 10	25.3	42 43.3	98 10	25.2	43 42.3	98 10	24.9	44 11.8	98 10	24.8
8	42 07.7	98 10	24.5	42 37.3	98 10	24.4	43 36.3	98 10	24.2	44 05.8	98 10	24.0
9	42 01.8	99 10	23.7	42 31.3	99 10	23.6	43 30.5	99 09	23.4	44 00.0	98 09	23.3
150	41 56.0	99 09	23.0	42 25.6	99 09	22.9	43 24.8	99 09	22.6	43 54.4	99 09	22.5
1	41 50.4	99 09	22.2	42 20.1	99 09	22.1	43 19.3	99 09	21.9	43 48.9	99 09	21.8
2	41 45.0	99 09	21.4	42 14.7	99 09	21.3	43 14.0	99 09	21.1	43 43.6	99 09	21.0
3	41 39.8	99 08	20.7	42 09.5	99 08	20.6	43 08.8	99 08	20.4	43 38.5	99 08	20.3
4	41 34.8	99 08	19.9	42 04.5	99 08	19.8	43 03.9	99 08	19.6	43 33.6	99 08	19.5
155	41 30.0	99 08	19.1	41 59.7	99 08	19.0	42 59.1	99 08	18.8	43 28.8	99 08	18.8
6	41 25.3	99 07	18.4	41 55.0	99 07	18.3	42 54.5	99 07	18.1	43 24.2	99 07	18.0
7	41 20.8	99 07	17.6	41 50.6	99 07	17.5	42 50.1	99 07	17.3	43 19.8	99 07	17.2
8	41 16.5	99 07	16.8	41 46.3	99 07	16.7	42 45.8	99 07	16.6	43 15.6	99 07	16.5
9	41 12.4	99 07	16.1	41 42.2	99 06	16.0	42 41.8	99 06	15.8	43 11.6	99 06	15.7
160	41 08.5	99 06	15.3	41 38.3	99 06	15.2	42 37.9	99 06	15.1	43 07.7	99 06	15.0
1	41 04.8	99 06	14.5	41 34.6	99 06	14.5	42 34.2	99 06	14.3	43 04.1	99 06	14.2
2	41 01.2	1.0 06	13.8	41 31.1	1.0 06	13.7	42 30.8	99 06	13.6	43 00.6	99 06	13.5
3	40 57.8	1.0 05	13.0	41 27.7	1.0 05	12.9	42 27.4	1.0 05	12.8	42 57.3	1.0 05	12.7
4	40 54.7	1.0 05	12.2	41 24.6	1.0 05	12.2	42 24.3	1.0 05	12.0	42 54.2	1.0 05	12.0
165	40 51.7	1.0 05	11.5	41 21.6	1.0 05	11.4	42 21.4	1.0 05	11.3	42 51.3	1.0 05	11.2
6	40 48.9	1.0 04	10.7	41 18.8	1.0 04	10.6	42 18.6	1.0 04	10.5	42 48.5	1.0 04	10.5
7	40 46.3	1.0 04	09.9	41 16.2	1.0 04	09.9	42 16.1	1.0 04	09.8	42 46.0	1.0 04	09.7
8	40 43.9	1.0 04	09.2	41 13.8	1.0 04	09.1	42 13.7	1.0 04	09.0	42 43.6	1.0 04	09.0
9	40 41.7	1.0 03	08.4	41 11.6	1.0 03	08.4	42 11.5	1.0 03	08.3	42 41.5	1.0 03	08.2
170	40 39.7	1.0 03	07.6	41 09.6	1.0 03	07.6	42 09.5	1.0 03	07.5	42 39.5	1.0 03	07.5
1	40 37.8	1.0 03	06.9	41 07.8	1.0 03	06.8	42 07.7	1.0 03	06.8	42 37.7	1.0 03	06.7
2	40 36.2	1.0 02	06.1	41 06.2	1.0 02	06.1	42 06.1	1.0 02	06.0	42 36.1	1.0 02	06.0
3	40 34.7	1.0 02	05.3	41 04.7	1.0 02	05.3	42 04.7	1.0 02	05.3	42 34.6	1.0 02	05.2
4	40 33.5	1.0 02	04.6	41 03.5	1.0 02	04.6	42 03.4	1.0 02	04.5	42 33.4	1.0 02	04.5
175	40 32.4	1.0 01	03.8	41 02.4	1.0 01	03.8	42 02.4	1.0 01	03.8	42 32.4	1.0 01	03.7
6	40 31.5	1.0 01	03.1	41 01.5	1.0 01	03.0	42 01.5	1.0 01	03.0	42 31.5	1.0 01	03.0
7	40 30.9	1.0 01	02.3	41 00.9	1.0 01	02.3	42 00.9	1.0 01	02.3	42 30.9	1.0 01	02.2
8	40 30.4	1.0 00	01.5	41 00.4	1.0 00	01.5	42 00.4	1.0 00	01.5	42 30.4	1.0 00	01.5
9	40 30.1	1.0 00	00.8	41 00.1	1.0 00	00.8	42 00.1	1.0 00	00.8	42 30.1	1.0 00	00.7
180	40 30.0	1.0 00	00.0	41 00.0	1.0 00	00.0	42 00.0	1.0 00	00.0	42 30.0	1.0 00	00.0

57° 00′ Alt.		Az.	57° 30′ Alt.		Az.	59° 00′ Alt.		Az.	59° 30′ Alt.		Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
54 14.3	91 22	68.7	54 41.6	91 22	68.4	56 03.0	90 22	67.2	56 30.0	90 22	66.8	91
54 00.8	91 22	67.9	54 28.1	91 22	67.5	55 49.7	90 22	66.4	56 16.7	90 22	66.0	2
53 47.4	91 22	67.0	54 14.8	91 22	66.7	55 36.4	90 22	65.6	56 03.5	90 22	65.2	3
53 34.1	91 22	66.2	54 01.5	91 22	65.8	55 23.3	91 22	64.8	55 50.4	90 22	64.4	4
53 20.9	91 22	65.4	53 48.3	91 22	65.0	55 10.2	91 22	63.9	55 37.3	90 22	63.6	95
53 07.7	92 22	64.5	53 35.2	91 22	64.2	54 57.2	91 22	63.1	55 24.4	91 21	62.8	6
52 54.7	92 22	63.7	53 22.2	92 22	63.4	54 44.3	91 21	62.3	55 11.5	91 21	61.9	7
52 41.7	92 21	62.9	53 09.2	92 21	62.5	54 31.5	91 21	61.5	54 58.8	91 21	61.1	8
52 28.8	92 21	62.0	52 56.4	92 21	61.7	54 18.8	91 21	60.7	54 46.1	91 21	60.3	9
52 16.1	92 21	61.2	52 43.7	92 21	60.9	54 06.2	91 21	59.9	54 33.5	91 21	59.5	100
52 03.4	92 21	60.4	52 31.0	92 21	60.1	53 53.7	92 21	59.1	54 21.1	91 21	58.7	1
51 50.8	92 21	59.6	52 18.5	92 21	59.3	53 41.3	92 20	58.3	54 08.7	91 20	57.9	2
51 38.4	93 21	58.8	52 06.1	92 21	58.5	53 29.0	92 20	57.5	53 56.5	92 20	57.2	3
51 26.0	93 20	58.0	51 53.8	92 20	57.7	53 16.8	92 20	56.7	53 44.3	92 20	56.4	4
51 13.7	93 20	57.2	51 41.6	93 20	56.9	53 04.7	92 20	55.9	53 32.3	92 20	55.6	105
51 01.6	93 20	56.3	51 29.5	93 20	56.0	52 52.7	92 20	55.1	53 20.4	92 20	54.8	6
50 49.6	93 20	55.5	51 17.5	93 20	55.2	52 40.9	92 20	54.3	53 08.6	92 19	54.0	7
50 37.7	93 20	54.7	51 05.6	93 20	54.5	52 29.1	93 19	53.5	52 56.9	92 19	53.2	8
50 25.9	93 19	53.9	50 53.9	93 19	53.7	52 17.5	93 19	52.8	52 45.3	93 19	52.5	9
50 14.2	93 19	53.1	50 42.2	93 19	52.9	52 06.0	93 19	52.0	52 33.9	93 19	51.7	110
50 02.7	94 19	52.3	50 30.7	93 19	52.1	51 54.7	93 19	51.2	52 22.6	93 19	50.9	1
49 51.2	94 19	51.6	50 19.3	94 19	51.3	51 43.4	93 19	50.4	52 11.4	93 18	50.1	2
49 39.9	94 19	50.8	50 08.1	94 19	50.5	51 32.3	93 18	49.7	52 00.3	93 18	49.4	3
49 28.7	94 18	50.0	49 56.9	94 18	49.7	51 21.3	94 18	48.9	51 49.3	93 18	48.6	4
49 17.7	94 18	49.2	49 45.9	94 18	48.9	51 10.4	94 18	48.1	51 38.5	94 18	47.8	115
49 06.8	94 18	48.4	49 35.0	94 18	48.1	50 59.7	94 18	47.3	51 27.8	94 18	47.1	6
48 56.0	94 18	47.6	49 24.3	94 18	47.4	50 49.1	94 17	46.6	51 17.2	94 17	46.3	7
48 45.3	95 18	46.8	49 13.7	94 17	46.6	50 38.6	94 17	45.8	51 06.8	94 17	45.5	8
48 34.8	95 17	46.1	49 03.2	95 17	45.8	50 28.2	94 17	45.1	50 56.5	94 17	44.8	9
48 24.4	95 17	45.3	48 52.9	95 17	45.0	50 18.0	94 17	44.3	50 46.4	94 17	44.0	120
48 14.2	95 17	44.5	48 42.7	95 17	44.3	50 08.0	95 17	43.5	50 36.3	95 16	43.3	1
48 04.1	95 17	43.7	48 32.6	95 17	43.5	49 58.0	95 16	42.8	50 26.5	95 16	42.5	2
47 54.1	95 16	42.9	48 22.7	95 16	42.7	49 48.3	95 16	42.0	50 16.7	95 16	41.8	3
47 44.3	95 16	42.2	48 12.9	95 16	42.0	49 38.6	95 16	41.3	50 07.1	95 16	41.0	4
47 34.6	96 16	41.4	48 03.3	96 16	41.2	49 29.1	95 16	40.5	49 57.7	95 16	40.3	125
47 25.1	96 16	40.6	47 53.8	96 16	40.4	49 19.8	95 15	39.7	49 48.4	95 15	39.5	6
47 15.7	96 15	39.9	47 44.5	96 15	39.6	49 10.6	96 15	39.0	49 39.2	95 15	38.8	7
47 06.5	96 15	39.1	47 35.3	96 15	38.9	49 01.5	96 15	38.2	49 30.2	96 15	38.0	8
46 57.4	96 15	38.3	47 26.2	96 15	38.1	48 52.6	96 15	37.5	49 21.3	96 15	37.3	9
46 48.5	96 15	37.6	47 17.4	96 15	37.4	48 43.8	96 14	36.7	49 12.6	96 14	36.5	130
46 39.7	96 14	36.8	47 08.6	96 14	36.6	48 35.2	96 14	36.0	49 04.0	96 14	35.8	1
46 31.1	97 14	36.0	47 00.0	96 14	35.8	48 26.8	96 14	35.2	48 55.6	96 14	35.0	2
46 22.6	97 14	35.3	46 51.6	97 14	35.1	48 18.5	96 14	34.5	48 47.4	96 14	34.3	3
46 14.3	97 14	34.5	46 43.4	97 14	34.3	48 10.3	97 13	33.7	48 39.3	96 13	33.6	4
46 06.2	97 13	33.7	46 35.3	97 13	33.6	48 02.3	97 13	33.0	48 31.3	97 13	32.8	135
45 58.2	97 13	33.0	46 27.3	97 13	32.8	47 54.5	97 13	32.3	48 23.6	97 13	32.1	6
45 50.4	97 13	32.2	46 19.5	97 13	32.0	47 46.8	97 12	31.5	48 15.9	97 12	31.3	7
45 42.7	97 12	31.5	46 11.9	97 12	31.3	47 39.3	97 12	30.8	48 08.5	97 12	30.6	8
45 35.2	97 12	30.7	46 04.4	97 12	30.5	47 32.0	97 12	30.0	48 01.1	97 12	29.9	9
45 27.9	98 12	29.9	45 57.2	97 12	29.8	47 24.8	97 12	29.3	47 54.0	97 12	29.1	140
45 20.7	98 12	29.2	45 50.0	98 12	29.0	47 17.8	97 11	28.5	47 47.0	97 11	28.4	1
45 13.8	98 11	28.4	45 43.1	98 11	28.3	47 10.9	98 11	27.8	47 40.2	98 11	27.6	2
45 06.9	98 11	27.7	45 36.3	98 11	27.5	47 04.3	98 11	27.1	47 33.6	98 11	26.9	3
45 00.3	98 11	26.9	45 29.7	98 11	26.8	46 57.7	98 11	26.3	47 27.1	98 11	26.2	4
44 53.8	98 11	26.2	45 23.2	98 10	26.0	46 51.4	98 10	25.6	47 20.7	98 10	25.4	145
44 47.5	98 10	25.4	45 16.9	98 10	25.3	46 45.2	98 10	24.9	47 14.6	98 10	24.7	6
44 41.3	98 10	24.7	45 10.8	98 10	24.5	46 39.2	98 10	24.1	47 08.6	98 10	24.0	7
44 35.4	98 10	23.9	45 04.9	98 10	23.8	46 33.3	98 09	23.4	47 02.8	98 09	23.2	8
44 29.6	98 09	23.2	44 59.1	98 09	23.0	46 27.6	98 09	22.6	46 57.2	98 09	22.5	9
44 23.9	99 09	22.4	44 53.5	99 09	22.3	46 22.1	98 09	21.9	46 51.7	98 09	21.8	150
44 18.5	99 09	21.7	44 48.1	99 09	21.5	46 16.8	99 09	21.2	46 46.4	99 09	21.1	1
44 13.2	99 08	20.9	44 42.8	99 08	20.8	46 11.7	99 08	20.4	46 41.2	99 08	20.3	2
44 08.1	99 08	20.2	44 37.8	99 08	20.0	46 06.7	99 08	19.7	46 36.3	99 08	19.6	3
44 03.2	99 08	19.4	44 32.9	99 08	19.3	46 01.9	99 08	19.0	46 31.5	99 08	18.9	4
43 58.5	99 08	18.7	44 28.2	99 08	18.6	45 57.2	99 07	18.2	46 26.9	99 07	18.1	155
43 53.9	99 07	17.9	44 23.7	99 07	17.8	45 52.8	99 07	17.5	46 22.5	99 07	17.4	6
43 49.6	99 07	17.2	44 19.3	99 07	17.1	45 48.5	99 07	16.8	46 18.2	99 07	16.7	7
43 45.4	99 07	16.4	44 15.1	99 07	16.3	45 44.4	99 07	16.0	46 14.1	99 06	16.0	8
43 41.4	99 06	15.7	44 11.2	99 06	15.6	45 40.5	99 06	15.3	46 10.2	99 06	15.2	9
43 37.5	99 06	14.9	44 07.3	99 06	14.8	45 36.7	99 06	14.6	46 06.5	99 06	14.5	160
43 33.9	99 06	14.2	44 03.7	99 06	14.1	45 33.2	99 06	13.9	46 03.0	99 06	13.8	1
43 30.4	99 05	13.4	44 00.3	99 05	13.3	45 29.8	99 05	13.1	45 59.6	99 05	13.0	2
43 27.2	1.0 05	12.7	43 57.0	1.0 05	12.6	45 26.6	99 05	12.4	45 56.4	99 05	12.3	3
43 24.1	1.0 05	11.9	43 53.9	1.0 05	11.9	45 23.5	1.0 05	11.7	45 53.4	1.0 05	11.6	4
43 21.2	1.0 05	11.2	43 51.1	1.0 04	11.1	45 20.7	1.0 04	10.9	45 50.6	1.0 04	10.9	165
43 18.4	1.0 04	10.4	43 48.3	1.0 04	10.4	45 18.0	1.0 04	10.2	45 47.9	1.0 04	10.1	6
43 15.9	1.0 04	09.7	43 45.8	1.0 04	09.6	45 15.6	1.0 04	09.5	45 45.5	1.0 04	09.4	7
43 13.6	1.0 04	08.9	43 43.5	1.0 04	08.9	45 13.3	1.0 04	08.7	45 43.2	1.0 04	08.7	8
43 11.4	1.0 03	08.2	43 41.3	1.0 03	08.2	45 11.1	1.0 03	08.0	45 41.1	1.0 03	08.0	9
43 09.4	1.0 03	07.4	43 39.4	1.0 03	07.4	45 09.2	1.0 03	07.3	45 39.2	1.0 03	07.2	170
43 07.6	1.0 03	06.7	43 37.6	1.0 03	06.7	45 07.5	1.0 03	06.6	45 37.4	1.0 03	06.5	1
43 06.0	1.0 02	06.0	43 36.0	1.0 02	05.9	45 05.9	1.0 02	05.8	45 35.9	1.0 02	05.8	2
43 04.6	1.0 02	05.2	43 34.6	1.0 02	05.2	45 04.5	1.0 02	05.1	45 34.5	1.0 02	05.1	3
43 03.4	1.0 02	04.5	43 33.4	1.0 02	04.4	45 03.3	1.0 02	04.4	45 33.3	1.0 02	04.3	4
43 02.4	1.0 01	03.7	43 32.3	1.0 01	03.7	45 02.3	1.0 01	03.6	45 32.3	1.0 01	03.6	175
43 01.5	1.0 01	03.0	43 31.5	1.0 01	03.0	45 01.5	1.0 01	02.9	45 31.5	1.0 01	02.9	6
43 00.8	1.0 01	02.2	43 30.8	1.0 01	02.2	45 00.8	1.0 01	02.2	45 30.8	1.0 01	02.2	7
43 00.4	1.0 00	01.5	43 30.4	1.0 00	01.5	45 00.4	1.0 00	01.5	45 30.4	1.0 00	01.4	8
43 00.1	1.0 00	00.7	43 30.1	1.0 00	00.7	45 00.1	1.0 00	00.7	45 30.1	1.0 00	00.7	9
43 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	180

Lat. 77°

Lat. 76°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	74 00.0	1.0 00	180.0	74 30.0	1.0 00	180.0	76 00.0	1.0 00	180.0	76 30.0	1.0 00	180.0	77 00.0	1.0 00	180.0	83 00.0	1.0 01	180.0	83 30.0	1.0 01	180.0	88 30.0	1.0 02	180.0	00
1	73 59.8	1.0 01	178.2	74 29.8	1.0 01	178.2	75 59.8	1.0 01	178.1	76 29.8	1.0 01	178.0	76 59.7	1.0 01	178.0	82 59.6	1.0 02	177.1	83 29.6	1.0 02	176.9	88 28.7	99 06	169.9	1
2	73 59.1	1.0 02	176.4	74 29.1	1.0 02	176.3	75 59.0	1.0 02	176.1	76 29.0	1.0 02	176.0	76 59.0	1.0 02	176.0	82 58.5	1.0 03	174.1	83 28.4	1.0 03	173.8	88 25.0	95 10	160.3	2
3	73 57.9	1.0 03	174.6	74 27.9	1.0 03	174.5	75 57.8	1.0 03	174.2	76 27.7	1.0 03	174.1	76 57.7	1.0 03	174.0	82 56.7	99 04	171.2	83 26.5	99 04	170.8	88 19.0	90 13	151.6	3
4	73 56.3	1.0 03	172.8	74 26.3	1.0 03	172.6	75 56.1	1.0 04	172.3	76 26.0	1.0 04	172.1	76 55.9	1.0 04	171.9	82 54.1	99 05	168.3	83 23.8	99 06	167.7	88 11.3	85 15	143.9	4
05	73 54.3	1.0 04	171.0	74 24.2	1.0 04	170.8	75 53.9	1.0 04	170.3	76 23.8	1.0 05	170.1	76 53.6	1.0 05	170.0	82 50.8	99 07	165.5	83 20.3	98 07	164.7	88 02.0	79 17	137.2	05
6	73 51.8	1.0 05	169.2	74 21.6	1.0 05	169.0	75 51.2	99 05	168.4	76 21.0	99 05	168.2	76 50.9	99 05	168.0	82 46.8	98 08	162.7	83 16.1	98 08	161.8	87 51.7	74 19	131.5	6
7	73 48.8	99 06	167.4	74 18.6	99 06	167.2	75 48.1	99 06	166.5	76 17.8	99 06	166.3	76 47.6	99 06	166.0	82 42.2	97 09	159.9	83 11.3	97 09	158.9	87 40.4	69 20	126.7	7
8	73 45.4	99 06	165.6	74 15.2	99 06	165.4	75 44.4	99 07	164.6	76 14.1	99 07	164.3	76 43.8	99 07	164.0	82 36.8	97 10	157.2	83 05.7	96 10	156.1	87 28.4	65 21	122.5	8
9	73 41.6	99 07	163.8	74 11.3	99 07	163.6	75 40.4	99 08	162.7	76 10.0	99 08	162.4	76 39.6	99 08	162.1	82 30.9	96 11	154.5	82 59.5	95 11	153.3	87 15.9	61 22	118.8	9
10	73 37.3	99 08	162.1	74 07.0	99 08	161.8	75 35.8	99 08	160.9	76 05.4	98 08	160.5	76 34.9	98 09	160.1	82 24.4	95 12	151.9	82 52.7	94 12	150.6	87 03.0	58 22	115.6	10
1	73 32.7	99 08	160.3	74 02.2	99 09	160.0	75 30.8	98 09	159.0	76 00.3	98 09	158.6	76 29.7	98 09	158.2	82 17.2	94 13	149.4	82 45.3	93 13	148.0	86 49.8	55 23	112.8	1
2	73 27.6	98 09	158.6	73 57.1	98 09	158.3	75 25.4	98 10	157.2	75 54.8	98 10	156.8	76 24.1	98 10	156.3	82 09.6	93 14	146.9	82 37.3	92 14	145.5	86 36.3	53 23	110.3	2
3	73 22.1	98 10	156.9	73 51.5	98 10	156.5	75 19.6	98 10	155.4	75 48.9	98 11	154.9	76 18.1	97 11	154.5	82 01.4	92 14	144.5	82 28.8	91 15	143.0	86 22.6	51 23	108.0	3
4	73 16.2	98 10	155.2	73 45.5	98 11	154.8	75 13.3	97 11	153.6	75 42.5	97 11	153.1	76 11.6	97 11	152.6	81 52.7	91 15	142.1	82 19.9	90 16	140.6	86 08.7	49 23	105.9	4
15	73 09.9	98 11	153.5	73 39.1	97 11	153.1	75 06.7	97 12	151.8	75 35.7	97 12	151.3	76 04.7	97 12	150.8	81 43.6	90 16	139.9	82 10.4	89 16	138.3	85 54.7	48 24	104.1	15
6	73 03.2	97 12	151.8	73 32.4	97 12	151.4	74 59.6	97 12	150.0	75 28.6	96 13	149.5	75 57.4	96 13	149.0	81 34.0	89 17	137.7	82 00.5	88 17	136.0	85 40.5	47 24	102.4	6
7	72 56.1	97 12	150.1	73 25.2	97 12	149.7	74 52.2	96 13	148.3	75 21.0	96 13	147.7	75 49.8	96 13	147.2	81 24.0	88 17	135.5	81 50.3	87 18	133.8	85 26.3	46 24	100.8	7
8	72 48.7	97 13	148.5	73 17.7	97 13	148.0	74 44.3	96 14	146.6	75 13.1	96 14	146.0	75 41.7	95 14	145.4	81 13.7	87 18	133.4	81 39.6	86 18	131.7	85 12.0	45 24	99.3	8
9	72 41.0	96 14	146.8	73 09.9	96 14	146.4	74 36.2	95 14	144.9	75 04.8	95 14	144.3	75 33.3	95 15	143.7	81 03.0	86 18	131.4	81 28.6	85 19	129.7	84 57.6	44 24	97.9	9
20	72 32.9	96 14	145.2	73 01.7	96 14	144.8	74 27.6	95 15	143.2	74 56.1	95 15	142.6	75 24.5	94 15	141.9	80 51.9	85 19	129.5	81 17.3	84 19	127.7	84 43.2	44 24	96.6	20
1	72 24.4	96 15	143.6	72 53.1	96 15	143.2	74 18.8	95 15	141.5	74 47.1	94 16	140.9	75 15.4	94 16	140.3	80 40.6	84 19	127.6	81 05.7	83 20	125.8	84 28.8	43 24	95.3	1
2	72 15.7	95 15	142.1	72 44.3	95 15	141.6	74 09.6	94 16	139.9	74 37.8	94 16	139.3	75 06.0	94 16	138.6	80 28.9	84 20	125.7	80 53.8	82 20	124.0	84 14.4	43 24	94.2	2
3	72 06.6	95 16	140.5	72 35.1	95 16	140.0	74 00.1	94 16	138.3	74 28.2	94 17	137.6	74 56.2	93 17	137.0	80 17.0	83 20	123.9	80 41.6	81 21	122.2	83 59.9	43 24	93.1	3
4	71 57.2	95 16	139.0	72 25.6	95 16	138.4	73 50.3	94 17	136.7	74 18.3	93 17	136.0	74 46.1	93 17	135.3	80 04.8	82 21	122.2	80 29.2	80 21	120.5	83 45.4	43 24	92.0	4
25	71 47.5	94 17	137.4	72 15.8	94 17	136.9	73 40.2	93 17	135.1	74 08.0	93 18	134.5	74 35.8	92 18	133.8	79 52.4	81 21	120.5	80 16.6	80 21	118.8	83 30.9	43 24	91.0	25
6	71 37.6	94 17	135.9	72 05.8	94 17	135.4	73 29.8	93 18	133.6	73 57.5	92 18	132.9	74 25.2	92 18	132.2	79 39.8	81 21	118.9	80 03.8	79 22	117.2	83 16.3	42 24	90.0	6
7	71 27.3	94 17	134.5	71 55.4	94 18	133.9	73 19.1	92 18	132.1	73 46.8	92 18	131.4	74 14.3	91 19	130.6	79 27.0	80 22	117.3	79 50.8	78 22	115.6	83 01.8	43 24	89.0	7
8	71 16.8	94 18	133.0	71 44.9	93 18	132.4	73 08.2	92 19	130.6	73 35.8	92 19	129.9	74 03.2	91 19	129.1	79 14.0	79 22	115.8	79 37.6	78 22	114.1	82 47.3	43 24	88.1	8
9	71 06.1	93 18	131.5	71 34.0	93 18	131.0	72 57.1	92 19	129.1	73 24.5	91 19	128.4	73 51.8	91 19	127.6	79 00.9	79 22	114.3	79 24.3	77 22	112.6	82 32.8	43 24	87.2	9
30	70 55.1	93 19	130.1	71 22.9	93 19	129.5	72 45.7	91 19	127.6	73 13.0	91 20	126.9	73 40.2	90 20	126.2	78 47.6	78 22	112.8	79 10.8	76 23	111.1	82 18.3	43 24	86.3	30
1	70 43.9	93 19	128.7	71 11.6	92 19	128.1	72 34.1	91 20	126.2	73 01.3	90 20	125.5	73 28.3	90 20	124.7	78 34.1	78 23	111.4	78 57.2	76 23	109.7	82 03.8	43 24	85.5	1
2	70 32.5	92 19	127.3	71 00.1	92 20	126.7	72 22.3	91 20	124.8	72 49.4	90 20	124.1	73 16.3	90 20	123.3	78 20.5	77 23	110.0	78 43.5	76 23	108.4	81 49.4	43 24	84.7	2
3	70 20.8	92 20	125.9	70 48.4	92 20	125.3	72 10.2	90 20	123.4	72 37.2	90 20	122.7	73 04.1	89 21	121.9	78 06.8	77 23	108.6	78 29.6	75 23	107.0	81 34.9	44 24	83.9	3
4	70 09.0	92 20	124.6	70 36.4	91 20	124.0	71 58.0	90 21	122.0	72 24.9	89 21	121.3	72 51.7	89 21	120.5	77 53.0	76 23	107.3	78 15.7	75 23	105.7	81 20.5	44 24	83.1	4
35	69 56.9	91 20	123.2	70 24.3	91 21	122.6	71 45.6	90 21	120.6	72 12.4	89 21	119.9	72 39.1	89 21	119.2	77 39.1	76 23	106.0	78 01.7	74 24	104.4	81 06.1	44 24	82.3	35
6	69 44.7	91 21	121.9	70 12.0	91 21	121.3	71 33.0	89 21	119.3	71 59.8	89 21	118.6	72 26.3	88 22	117.8	77 25.1	76 23	104.8	77 47.6	74 24	103.2	80 51.8	45 24	81.5	6
7	69 32.3	91 21	120.6	69 59.5	90 21	120.0	71 20.3	89 22	118.0	71 46.9	88 22	117.3	72 13.4	88 22	116.5	77 11.1	75 24	103.5	77 33.4	74 24	102.0	80 37.4	45 24	80.8	7
8	69 19.7	91 21	119.3	69 46.8	90 21	118.7	71 07.4	89 22	116.7	71 34.0	88 22	116.0	72 00.3	88 22	115.2	76 56.9	75 24	102.3	77 19.2	73 24	100.8	80 23.1	45 24	80.1	8
9	69 07.0	90 21	118.0	69 34.0	90 22	117.4	70 54.4	89 22	115.4	71 20.8	88 22	114.7	71 47.1	87 22	113.9	76 42.7	75 24	101.1	77 04.9	73 24	99.7	80 08.8	46 24	79.4	9
40	68 54.1	90 22	116.8	69 21.1	90 22	116.2	70 41.2	88 22	114.2	71 07.6	88 22	113.4	71 33.8	87 22	112.7	76 28.4	75 24	100.0	76 50.6	73 24	98.5	79 54.6	46 24	78.6	40
1	68 41.1	90 22	115.5	69 08.0	90 22	114.9	70 27.9	88 22	112.9	70 54.2	87 22	112.2	71 20.4	87 23	111.4	76 14.1	75 24	98.8	76 36.2	73 24	97.4	79 40.4	46 24	77.9	1
2	68 27.9	90 22	114.3	68 54.7	89 22	113.7	70 14.5	88 23	111.7	70 40.7	87 23	111.0	71 06.8	87 23	110.2	75 59.7	74 24	97.7	76 21.8	73 24	96.3	79 26.2	47 24	77.3	2
3	68 14.6	90 22	113.1	68 41.4	89 22	112.5	70 00.9	88 23	110.5	70 27.1	87 23	109.8	70 53.1	86 23	109.0	75 45.3	74 24	96.6	76 07.4	73 24	95.2	79 12.0	47 24	76.6	3
4	68 01.2	89 23	111.9	68 27.9	89 23	111.3	69 47.3	87 23	109.3	70 13.4	87 23	108.6	70 39.3	86 23	107.8	75 30.9	74 24	95.6	75 52.9	72 24	94.2	78 57.9	48 23	75.9	4
45	67 47.7	89 23	110.7	68 14.3	89 23	110.1	69 33.5	87 23	108.1	69 59.6	87 23	107.4	70 25.5	86 23	106.6	75 16.4	74 24	94.5	75 38.4	72 24	93.2	78 43.9	48 23	75.2	45
6	67 34.0	89 23	109.5	68 00.7	89 23	108.9	69 19.7	87 23	106.9	69 45.7	86 23	106.2	70 11.5	86 23	105.5	75 02.0	74 24	93.5	75 23.9	72 24	92.1	78 29.9	49 23	74.6	6
7	67 20.3	89 23	108.4	67 46.9	88 23	107.8	69 05.8	87 23	105.8	69 31.7	86 23	105.1	69 57.5	86 24	104.3	74 47.5	74 24	92.5	75 09.4	72 24	91.2	78 15.9	49 23	73.9	7
8	67 06.5	89 23	107.2	67 33.0	88 23	106.6	68 51.7	87 23	104.6	69 17.7	86 24	103.9	69 43.4	85 24	103.2	74 33.0	74 24	91.5	74 54.9	72 24	90.2	78 02.0	50 23	73.3	8
9	66 52.6	89 23	106.1	67 19.1	88 23	105.5	68 37.7	87 24	103.5	69 03.5	86 24	102.8	69 29.2	85 24	102.1	74 18.5	74 24	90.5	74 40.4	72 24	89.2	77 48.1	50 23	72.7	9
50	66 38.6	88 23	105.0	67 05.0	88 23	104.4	68 23.5	86 24	102.4	68 49.4	86 24	101.7	69 15.0	85 24	101.0	74 03.9	74 24	89.5	74 25.9	72 24	88.3	77 34.3	51 23	72.0	50
1	66 24.5	88 24	103.8	66 50.9	88 24	103.3	68 09.3	86 24	101.3	68 35.1	86 24	100.6	69 00.7	85 24	99.9	73 49.4	74 24	88.6	74 11.4	72 24	87.3	77 20.5	51 23	71.4	1
2	66 10.4	88 24	102.8	66 36.8	88 24	102.2	67 55.1	86 24	100.2	68 20.8	86 24	99.6	68 46.4	85 24	98.8	73 34.9	74 24	87.6	73 56.9	72 24	86.4	77 06.7	52 23	70.8	2
3	65 56.2	88 24	101.7	66 22.6	88 24	101.1	67 40.8	86 24	99.2	68 06.5	86 24	98.5	68 32.1	85 24	97.8	73 20.4	74 24	86.7	73 42.4	73 24	85.5	76 53.1	52 23	70.1	3
4	65 42.0	88 24	100.6	66 08.3	88 24	100.0	67 26.4	86 24	98.1	67 52.1	85 24	97.4	68 17.7	85 24	96.7	73 05.9	74 24	85.8	73 27.9	73 24	84.6	76 39.4	53 23	69.5	4
55	65 27.7	88 24	99.5	65 54.0	87 24	98.9	67 12.0	86 24	97.1	67 37.7	85 24	96.4	68 03.2	85 24	95.7	72 51.5	74 24	84.9	73 13.5	73 24	83.7	76 25.9	54 23	68.9	55
6	65 13.3	88 24	98.5	65 39.6	87 24	97.9	66 57.6	86 24	96.0	67 23.3	85 24	95.4	67 48.8	85 24	94.7	72 37.0	74 24	84.0	72 59.1	73 24	82.8	76 12.4	54 22	68.3	6
7	64 59.0	88 24	97.4	65 25.2	87 24	96.9	66 43.1	86 24	95.0	67 08.8	85 24	94.3	67 34.3	85 24	93.7	72 22.6	74 24	83.1	72 44.7	73 24	82.0	75 58.9	55 22	67.7	7
8	64 44.6	88 24	96.4	65 10.8	87 24	95.8	66 28.7	86 24	94.0	66 54.3	85 24	93.3	67 19.8	85 24	92.7	72 08.2	74 24	82.2	72 30.3	73 24	81.1	75 45.5	55 22	67.1	8
9	64 30.1	88 24	95.4	64 56.3	87 24	94.8	66 14.2	86 24	93.0	66 39.8	85 24	92.3	67 05.3	85 24	91.7	71 53.8	74 24	81.3	72 16.0	73 24	80.2	75 32.2	56 22	66.5	9
60	64 15.7	88 24	94.4	64 41.9	87 24	93.8	65 59.7	86 24	92.0	66 25.3	85 24	91.4	66 50.8	85 24	90.7	71 39.5	75 24	80.5	72 01.7	73 24	79.4	75 18.9	56 22	65.9	60
1	64 01.2	88 24	93.4	64 27.4	87 24	92.8	65 45.2	86 24	91.0	66 10.8	85 24	90.4	66 36.3	85 24	89.7	71 25.2	75 24	79.6	71 47.5	74 24	78.6	75 05.6	57 22	65.3	1
2	63 46.7	88 24	92.4	64 12.9	87 24	91.8	65 30.7	86 24	90.0	65 56.3	85 24	89.4	66 21.8	85 24	88.8	71 11.0	75 24	78.8	71 33.3	74 24	77.8	74 52.5	57 22	64.7	2
3	63 32.2	88 24	91.4	63 58.4	87 24	90.8	65 16.1	86 24	89.1	65 41.8	85 24	88.4	66 07.3	85 24	87.8	70 56.7	75 24	78.0	71 19.1	74 24	76.9	74 39.4	58 22	64.1	3
4	63 17.7	88 24	90.4	63 43.8	87 24	89.9	65 01.6	86 24	88.1	65 27.3	85 24	87.5	65 52.8	85 24	86.9	70 42.6	75 24	77.2	71 05.0	74 23	76.1	74 26.4	59 22	63.6	4
65	63 03.1	88 24	89.4	63 29.3	87 24	88.9	64 47.1	86 24	87.2	65 12.8	85 24	86.5	65 38.3	85 24	85.9	70 28.4	75 23	76.3	70 50.9	74 23	75.3	74 13.4	59 22	63.0	65
6	62 48.6	88 24	88.5	63 14.8	87 24	87.9	64 32.6	86 24	86.2	64 58.3	85 24	85.6	65 23.8	85 24	85.0	70 14.3	76 23	75.5	70 36.9	75 23	74.6	74 00.5	60 21	62.4	6
7	62 34.1	88 24	87.5	63 00.3	87 24	87.0	64 18.2	86 24	85.3	64 43.8	85 24	84.7	65 09.4	85 24	84.1	70 00.3	76 23	74.7	70 22.9	75 23	73.8	73 47.7	60 21	61.8	7
8	62 19.6	88 24	86.6	62 45.8	87 24	86.0	64 03.7	86 24	84.4	64 29.4	85 24	83.8	64 54.9	85 24	83.2	69 46.3	76 23	73.9	70 09.0	75 23	73.0	73 34.9	61 21	61.2	8
9	62 05.1	88 24	85.6	62 31.4	87 24	85.1	63 49.3	86 24	83.4	64 15.0	85 24	82.9	64 40.5	85 24	82.2	69 32.4	76 23	73.2	69 55.2	75 23	72.2	73 22.2	61 21	60.7	9
70	61 50.7	88 24	84.7	62 16.9	87 24	84.2	63 34.9	86 24	82.5	64 00.6	85 24	82.0	64 26.2	85 24	81.4	69 18.6	77 23	72.4	69 41.4	76 23	71.5	73 09.6	62 21	60.1	70
1	61 36.2	88 24	83.8	62 02.5	87 24	83.3	63 20.5	86 24	81.6	63 46.2	86 24	81.1	64 11.8	85 24	80.5	69 04.8	77 23	71.6	69 27.6	76 23	70.7	72 57.1	63 21	59.5	1
2	61 21.8	88 24	82.9	61 48.1	87 24	82.3	63 06.1	86 24	80.7	63 31.9	86 24	80.2	63 57.5	85 24	79.6	68 51.0	77 23	70.8	69 14.0	76 23	69.9	72 44.6	63 21	59.0	2
3	61 07.4	88 24	81.9	61 33.7	87 24	81.4	62 51.8	86 24	79.8	63 17.6	86 24	79.3	63 43.3	85 24	78.7	68 37.3	77 23	70.1	69 00.4	76 23	69.2	72 32.2	64 21	58.4	3
4	60 53.1	88 24	81.0	61 19.4	87 24	80.5	62 37.6	86 24	79.0	63 03.4	86 24	78.4	63 29.1	85 24	77.8	68 23.7	78 23	69.3	68 46.8	77 22	68.5	72 19.9	64 20	57.8	4
75	60 38.8	88 24	80.1	61 05.1	88 24	79.6	62 23.3	86 24	78.1	62 49.2	86 24	77.5	63 14.9	85 24	77.0	68 10.2	78 22	68.6	68 33.4	77 22	67.7	72 07.6	65 20	57.3	75
6	60 24.5	88 24	79.2	60 50.8	88 24	78.8	62 09.2	86 24	77.2	62 35.0	86 24	76.7	63 00.8	86 23	76.1	67 56.7	78 22	67.8	68 20.0	77 22	67.0	71 55.5	65 20	56.7	6
7	60 10.2	88 24	78.4	60 36.6	88 24	77.9	61 55.0	87 23	76.3	62 20.9	86 23	75.8	62 46.7	86 23	75.2	67 43.3	78 22	67.1	68 06.7	77 22	66.2	71 43.4	66 20	56.1	7
8	59 56.0	88 24	77.5	60 22.4	88 24	77.0	61 41.0	87 23	75.5	62 06.9	86 23	75.0	62 32.7	86 23	74.4	67 30.0	79 22	66.3	67 53.4	78 22	65.5	71 31.4	67 20	55.6	8
9	59 41.9	88 24	76.6	60 08.3	88 23	76.1	61 26.9	87 23	74.6	61 52.9	86 23	74.1	62 18.8	86 23	73.6	67 16.7	79 22	65.6	67 40.2	78 22	64.8	71 19.4	67 20	55.0	9
80	59 27.8	88 23	75.7	59 54.3	88 23	75.3	61 13.0	87 23	73.8	61 39.0	87 23	73.3	62 04.9	86 23	72.7	67 03.5	79 22	64.9	67 27.1	78 22	64.1	71 07.6	68 20	54.4	80
1	59 13.8	88 23	74.9	59 40.2	88 23	74.4	60 59.1	87 23	72.9	61 25.1	87 23	72.4	61 51.0	86 23	71.9	66 50.4	79 22	64.2	67 14.1	79 22	63.4	70 55.8	68 19	53.9	1
2	58 59.8	89 23	74.0	59 26.3	88 23	73.5	60 45.2	87 23	72.1	61 11.3	87 23	71.6	61 37.3	86 23	71.1	66 37.4	80 22	63.4	67 01.2	79 21	62.7	70 44.1	69 19	53.3	2
3	58 45.9	89 23	73.1	59 12.4	88 23	72.7	60 31.4	87 23	71.3	60 57.6	87 23	70.8	61 23.6	87 23	70.2	66 24.4	80 21	62.7	66 48.3	79 21	62.0	70 32.5	69 19	52.8	3
4	58 32.0	89 23	72.3	58 58.6	88 23	71.8	60 17.7	87 23	70.4	60 43.9	87 23	69.9	61 10.0	87 23	69.4	66 11.6	80 21	62.0	66 35.6	80 21	61.2	70 21.0	70 19	52.2	4
85	58 18.2	89 23	71.4	58 44.8	89 23	71.0	60 04.1	88 23	69.6	60 30.3	87 23	69.1	60 56.4	87 22	68.6	65 58.8	81 21	61.3	66 22.9	80 21	60.6	70 09.6	70 19	51.7	85
6	58 04.5	89 23	70.6	58 31.1	89 23	70.2	59 50.5	88 22	68.8	60 16.8	87 22	68.3	60 42.9	87 22	67.8	65 46.1	81 21	60.6	66 10.3	80 21	59.9	69 58.2	71 19	51.1	6
7	57 50.8	89 23	69.8	58 17.5	89 23	69.3	59 37.0	88 22	68.0	60 03.3	88 22	67.5	60 29.5	87 22	67.0	65 33.5	81 21	59.9	65 57.8	81 21	59.2	69 47.0	72 19	50.6	7
8	57 37.2	89 23	68.9	58 04.0	89 22	68.5	59 23.6	88 22	67.2	59 50.0	88 22	66.7	60 16.2	87 22	66.2	65 21.0	81 21	59.2	65 45.4	81 21	58.5	69 35.8	72 18	50.0	8
9	57 23.7	89 22	68.1	57 50.5	89 22	67.7	59 10.3	88 22	66.3	59 36.7	88 22	65.9	60 03.0	87 22	65.4	65 08.6	82 21	58.5	65 33.0	81 20	57.8	69 24.7	73 18	49.5	9
90	57 10.3	89 22	67.3	57 37.1	89 22	66.8	58 57.0	88 22	65.5	59 23.5	88 22	65.1	59 49.8	88 22	64.6	64 56.3	82 20	57.8	65 20.8	81 20	57.1	69 13.8	73 18	48.9	90

Lat. 76°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	56 57.0	90 22	66.4	57 23.8	89 22	66.0	58 43.8	88 22	64.7	59 10.3	88 22	64.3	59 36.7	88 22	63.8	64 44.0	82 20	57.1	65 08.7	82 20	56.4	69 02.9	74 18	48.3	91
2	56 43.7	90 22	65.6	57 10.6	89 22	65.2	58 30.8	89 22	63.9	58 57.3	88 22	63.5	59 23.8	88 22	63.0	64 31.9	83 20	56.4	64 56.6	82 20	55.7	68 52.1	74 18	47.8	2
3	56 30.5	90 22	64.8	56 57.5	90 22	64.4	58 17.8	89 22	63.1	58 44.4	89 22	62.7	59 10.9	88 21	62.2	64 19.9	83 20	55.7	64 44.7	82 20	55.1	68 41.4	75 18	47.2	3
4	56 17.4	90 22	64.0	56 44.4	90 22	63.6	58 04.9	89 21	62.3	58 31.5	89 21	61.9	58 58.1	88 21	61.5	64 07.9	83 20	55.0	64 32.8	83 20	54.4	68 30.7	75 18	46.7	4
95	56 04.4	90 22	63.2	56 31.5	90 21	62.8	57 52.1	89 21	61.6	58 18.8	89 21	61.1	58 45.4	89 21	60.7	63 56.1	84 20	54.3	64 21.1	83 19	53.7	68 20.2	76 17	46.2	95
6	55 51.5	90 21	62.4	56 18.6	90 21	62.0	57 39.3	89 21	60.8	58 06.1	89 21	60.3	58 32.8	89 21	59.9	63 44.3	84 19	53.7	64 09.4	83 19	53.0	68 09.8	76 17	45.6	6
7	55 38.7	90 21	61.6	56 05.8	90 21	61.2	57 26.7	89 21	60.0	57 53.5	89 21	59.6	58 20.2	89 21	59.1	63 32.7	84 19	53.0	63 57.9	84 19	52.4	67 59.5	77 17	45.1	7
8	55 26.0	91 21	60.8	55 53.2	90 21	60.4	57 14.2	90 21	59.2	57 41.1	89 21	58.8	58 07.8	89 20	58.4	63 21.2	85 19	52.3	63 46.4	84 19	51.7	67 49.3	77 17	44.5	8
9	55 13.4	91 21	60.0	55 40.6	91 21	59.6	57 01.8	90 21	58.4	57 28.7	90 20	58.0	57 55.5	89 20	57.6	63 09.7	85 19	51.6	63 35.1	84 19	51.0	67 39.1	78 17	44.0	9
100	55 00.9	91 21	59.2	55 28.1	91 21	58.8	56 49.5	90 20	57.7	57 16.4	90 20	57.3	57 43.3	89 20	56.8	62 58.4	85 19	51.0	63 23.9	85 19	50.4	67 29.1	78 17	43.4	100
1	54 48.4	91 20	58.4	55 15.8	91 20	58.0	56 37.3	90 20	56.9	57 04.3	90 20	56.5	57 31.2	90 20	56.1	62 47.2	85 18	50.3	63 12.7	85 18	49.7	67 19.2	79 16	42.9	1
2	54 36.1	91 20	57.6	55 03.5	91 20	57.2	56 25.2	90 20	56.1	56 52.2	90 20	55.7	57 19.2	90 20	55.3	62 36.1	86 18	49.6	63 01.7	85 18	49.1	67 09.4	79 16	42.3	2
3	54 23.9	91 20	56.8	54 51.3	91 20	56.5	56 13.2	91 20	55.4	56 40.3	90 20	55.0	57 07.4	90 20	54.6	62 25.1	86 18	49.0	62 50.8	86 18	48.4	66 59.6	80 16	41.8	3
4	54 11.8	92 20	56.0	54 39.3	91 20	55.7	56 01.3	91 20	54.6	56 28.5	91 20	54.2	56 55.6	90 19	53.8	62 14.2	86 18	48.3	62 40.0	86 18	47.7	66 50.0	80 16	41.2	4
105	53 59.9	92 20	55.2	54 27.4	92 20	54.9	55 49.5	91 19	53.8	56 16.7	91 19	53.5	56 43.9	90 19	53.1	62 03.4	87 18	47.6	62 29.3	86 18	47.1	66 40.5	81 16	40.7	105
6	53 48.0	92 20	54.5	54 15.5	92 20	54.1	55 37.8	91 19	53.1	56 05.1	91 19	52.7	56 32.4	91 19	52.3	61 52.7	87 18	47.0	62 18.8	87 17	46.4	66 31.1	81 16	40.1	6
7	53 36.2	92 19	53.7	54 03.8	92 19	53.4	55 26.3	91 19	52.3	55 53.6	91 19	52.0	56 20.9	91 19	51.6	61 42.2	87 17	46.3	62 08.3	87 17	45.8	66 21.8	82 15	39.6	7
8	53 24.6	92 19	52.9	53 52.2	92 19	52.6	55 14.9	91 19	51.6	55 42.3	91 19	51.2	56 09.6	91 19	50.8	61 31.7	88 17	45.6	61 58.0	87 17	45.1	66 12.6	82 15	39.1	8
9	53 13.1	92 19	52.1	53 40.8	92 19	51.8	55 03.5	92 19	50.8	55 31.0	91 19	50.5	55 58.4	91 18	50.1	61 21.4	88 17	45.0	61 47.7	88 17	44.5	66 03.5	83 15	38.5	9
110	53 01.7	93 19	51.4	53 29.4	92 19	51.1	54 52.4	92 18	50.1	55 19.9	92 18	49.7	55 47.4	91 18	49.4	61 11.2	88 17	44.3	61 37.6	88 17	43.8	65 54.5	83 15	38.0	110
1	52 50.4	93 19	50.6	53 18.2	93 18	50.3	54 41.3	92 18	49.3	55 08.9	92 18	49.0	55 36.4	92 18	48.6	61 01.1	88 17	43.7	61 27.6	88 16	43.2	65 45.6	84 15	37.4	1
2	52 39.2	93 18	49.8	53 07.1	93 18	49.5	54 30.3	92 18	48.6	54 58.0	92 18	48.2	55 25.6	92 18	47.9	60 51.2	89 16	43.0	61 17.8	88 16	42.5	65 36.9	84 14	36.9	2
3	52 28.2	93 18	49.1	52 56.1	93 18	48.8	54 19.5	92 18	47.8	54 47.2	92 18	47.5	55 14.9	92 18	47.1	60 41.3	89 16	42.4	61 08.0	89 16	41.9	65 28.2	84 14	36.3	3
4	52 17.3	93 18	48.3	52 45.3	93 18	48.0	54 08.8	93 18	47.1	54 36.6	92 18	46.8	55 04.3	92 17	46.4	60 31.6	89 16	41.7	60 58.4	89 16	41.2	65 19.7	85 14	35.8	4
115	52 06.5	93 18	47.5	52 34.5	93 18	47.3	53 58.3	93 17	46.3	54 26.1	93 17	46.0	54 53.8	92 17	45.7	60 22.0	90 16	41.1	60 48.9	89 16	40.6	65 11.2	85 14	35.2	115
6	51 55.9	94 18	46.8	52 23.9	93 17	46.5	53 47.8	93 17	45.6	54 15.7	93 17	45.3	54 43.5	93 17	45.0	60 12.5	90 16	40.4	60 39.5	90 15	40.0	65 02.9	86 14	34.7	6
7	51 45.4	94 17	46.0	52 13.5	94 17	45.7	53 37.5	93 17	44.9	54 05.5	93 17	44.5	54 33.3	93 17	44.2	60 03.2	90 15	39.8	60 30.2	90 15	39.3	64 54.7	86 13	34.2	7
8	51 35.0	94 17	45.3	52 03.2	94 17	45.0	53 27.4	93 17	44.1	53 55.3	93 17	43.8	54 23.3	93 17	43.5	59 54.0	90 15	39.1	60 21.1	90 15	38.7	64 46.6	87 13	33.6	8
9	51 24.8	94 17	44.5	51 53.0	94 17	44.2	53 17.3	94 16	43.4	53 45.4	93 16	43.1	54 13.3	93 16	42.8	59 44.9	91 15	38.5	60 12.1	90 15	38.0	64 38.6	87 13	33.1	9
120	51 14.6	94 17	43.8	51 42.9	94 17	43.5	53 07.4	94 16	42.7	53 35.5	94 16	42.4	54 03.6	93 16	42.1	59 35.9	91 15	37.8	60 03.2	91 15	37.4	64 30.8	87 13	32.5	120
1	51 04.7	94 16	43.0	51 33.0	94 16	42.7	52 57.7	94 16	41.9	53 25.8	94 16	41.6	53 53.9	94 16	41.3	59 27.1	91 14	37.2	59 54.4	91 14	36.8	64 23.0	88 13	32.0	1
2	50 54.8	95 16	42.3	51 23.2	94 16	42.0	52 48.0	94 16	41.2	53 16.2	94 16	40.9	53 44.4	94 16	40.6	59 18.4	92 14	36.5	59 45.8	91 14	36.1	64 15.4	88 13	31.5	2
3	50 45.2	95 16	41.5	51 13.6	95 16	41.3	52 38.5	94 16	40.5	53 06.8	94 15	40.2	53 35.0	94 15	39.9	59 09.8	92 14	35.9	59 37.3	92 14	35.5	64 07.9	89 12	30.9	3
4	50 35.6	95 16	40.8	51 04.0	95 16	40.5	52 29.2	94 15	39.7	52 57.5	94 15	39.5	53 25.8	94 15	39.2	59 01.3	92 14	35.3	59 28.9	92 14	34.9	64 00.5	89 12	30.4	4
125	50 26.2	95 15	40.0	50 54.7	95 15	39.8	52 20.0	95 15	39.0	52 48.3	94 15	38.7	53 16.7	94 15	38.5	58 53.0	92 14	34.6	59 20.7	92 14	34.2	63 53.2	89 12	29.8	125
6	50 16.9	95 15	39.3	50 45.5	95 15	39.0	52 10.9	95 15	38.3	52 39.3	95 15	38.0	53 07.7	95 15	37.7	58 44.9	93 13	34.0	59 12.6	92 13	33.6	63 46.0	90 12	29.3	6
7	50 07.8	95 15	38.5	50 36.4	95 15	38.3	52 02.0	95 15	37.6	52 30.5	95 15	37.3	52 58.9	95 14	37.0	58 36.8	93 13	33.3	59 04.6	93 13	33.0	63 39.0	90 12	28.7	7
8	49 58.9	96 15	37.8	50 27.5	95 15	37.6	51 53.2	95 14	36.8	52 21.7	95 14	36.6	52 50.2	95 14	36.3	58 28.9	93 13	32.7	58 56.8	93 13	32.3	63 32.1	90 11	28.2	8
9	49 50.0	96 14	37.0	50 18.7	96 14	36.8	51 44.6	95 14	36.1	52 13.2	95 14	35.9	52 41.7	95 14	35.6	58 21.1	93 13	32.1	58 49.1	93 13	31.7	63 25.3	91 11	27.7	9
130	49 41.4	96 14	36.3	50 10.1	96 14	36.1	51 36.1	95 14	35.4	52 04.7	95 14	35.1	52 33.3	95 14	34.9	58 13.5	94 12	31.4	58 41.5	93 12	31.1	63 18.6	91 11	27.1	130
1	49 32.8	96 14	35.6	50 01.6	96 14	35.3	51 27.8	96 14	34.7	51 56.5	96 14	34.4	52 25.1	96 13	34.2	58 06.0	94 12	30.8	58 34.1	94 12	30.5	63 12.0	91 11	26.6	1
2	49 24.5	96 14	34.8	49 53.3	96 14	34.6	51 19.6	96 13	33.9	51 48.3	96 13	33.7	52 17.0	96 13	33.5	57 58.6	94 12	30.1	58 26.8	94 12	29.8	63 05.6	92 11	26.0	2
3	49 16.3	96 13	34.1	49 45.1	96 13	33.9	51 11.6	96 13	33.2	51 40.4	96 13	33.0	52 09.1	96 13	32.8	57 51.4	94 12	29.5	58 19.7	94 12	29.2	62 59.3	92 10	25.5	3
4	49 08.2	96 13	33.3	49 37.1	96 13	33.1	51 03.7	96 13	32.5	51 32.5	96 13	32.3	52 01.3	96 13	32.1	57 44.3	95 12	28.9	58 12.7	94 11	28.6	62 53.1	92 10	24.9	4
135	49 00.3	97 13	32.6	49 29.3	96 13	32.4	50 56.0	96 13	31.8	51 24.8	96 13	31.6	51 53.7	96 12	31.3	57 37.4	95 11	28.2	58 05.8	95 11	27.9	62 47.1	93 10	24.4	135
6	48 52.6	97 13	31.9	49 21.6	97 13	31.7	50 48.4	96 12	31.1	51 17.3	96 12	30.9	51 46.2	96 12	30.6	57 30.6	95 11	27.6	57 59.1	95 11	27.3	62 41.1	93 10	23.9	6
7	48 45.0	97 12	31.1	49 14.0	97 12	31.0	50 41.0	97 12	30.4	51 10.0	96 12	30.1	51 38.9	96 12	29.9	57 23.9	95 11	27.0	57 52.5	95 11	26.7	62 35.3	93 09	23.3	7
8	48 37.6	97 12	30.4	49 06.6	97 12	30.2	50 33.7	97 12	29.6	51 02.7	97 12	29.4	51 31.7	97 12	29.2	57 17.4	95 11	26.3	57 46.0	95 11	26.1	62 29.6	94 09	22.8	8
9	48 30.3	97 12	29.7	48 59.4	97 12	29.5	50 26.6	97 12	28.9	50 55.7	97 11	28.7	51 24.7	97 11	28.5	57 11.1	96 10	25.7	57 39.7	95 10	25.4	62 24.1	94 09	22.2	9
140	48 23.2	97 12	28.9	48 52.3	97 12	28.8	50 19.7	97 11	28.2	50 48.8	97 11	28.0	51 17.9	97 11	27.8	57 04.8	96 10	25.1	57 33.6	96 10	24.8	62 18.6	95 09	21.7	140
1	48 16.2	97 11	28.2	48 45.4	97 11	28.0	50 12.9	97 11	27.5	50 42.1	97 11	27.3	51 11.2	97 11	27.1	56 58.8	96 10	24.4	57 27.5	96 10	24.2	62 13.3	95 09	21.2	1
2	48 09.5	97 11	27.5	48 38.7	97 11	27.3	50 06.3	97 11	26.8	50 35.5	97 11	26.6	51 04.6	97 11	26.4	56 52.8	96 10	23.8	57 21.7	96 10	23.6	62 08.2	95 08	20.6	2
3	48 02.8	98 11	26.8	48 32.1	98 11	26.6	49 59.8	97 10	26.1	50 29.1	97 10	25.9	50 58.2	97 10	25.7	56 47.0	96 09	23.2	57 15.9	96 09	22.9	62 03.1	95 08	20.1	3
4	47 56.4	98 10	26.0	48 25.7	98 10	25.9	49 53.5	98 10	25.4	50 22.8	97 10	25.2	50 52.0	97 10	25.0	56 41.4	97 09	22.6	57 10.4	96 09	22.3	61 58.2	95 08	19.5	4
145	47 50.1	98 10	25.3	48 19.4	98 10	25.1	49 47.4	98 10	24.7	50 16.7	98 10	24.5	50 46.0	98 10	24.3	56 35.9	97 09	21.9	57 04.9	97 09	21.7	61 53.4	96 08	19.0	145
6	47 44.0	98 10	24.6	48 13.4	98 10	24.4	49 41.4	98 10	23.9	50 10.8	98 10	23.8	50 40.1	98 10	23.6	56 30.5	97 09	21.3	56 59.6	97 09	21.1	61 48.8	96 08	18.4	6
7	47 38.0	98 10	23.8	48 07.5	98 10	23.7	49 35.6	98 09	23.2	50 05.0	98 09	23.1	50 34.3	98 09	22.9	56 25.4	97 08	20.7	56 54.5	97 08	20.4	61 44.2	96 07	17.9	7
8	47 32.3	98 09	23.0	48 01.7	98 09	23.0	49 30.0	98 09	22.5	49 59.4	98 09	22.4	50 28.8	98 09	22.2	56 20.3	97 08	20.0	56 49.5	97 08	19.8	61 39.8	96 07	17.4	8
9	47 26.6	98 09	22.4	47 56.1	98 09	22.2	49 24.5	98 09	21.8	49 53.9	98 09	21.7	50 23.4	98 09	21.5	56 15.4	97 08	19.4	56 44.6	97 08	19.2	61 35.6	97 07	16.8	9
150	47 21.2	98 09	21.7	47 50.7	98 09	21.5	49 19.2	98 09	21.1	49 48.7	98 08	21.0	50 18.1	98 08	20.8	56 10.7	98 08	18.8	56 39.9	98 08	18.6	61 31.4	97 07	16.3	150
1	47 15.9	98 08	20.9	47 45.5	98 08	20.8	49 14.1	98 08	20.4	49 43.6	98 08	20.3	50 13.1	98 08	20.1	56 06.1	98 07	18.2	56 35.4	98 07	18.0	61 27.4	97 06	15.7	1
2	47 10.8	99 08	20.2	47 40.4	99 08	20.1	49 09.1	98 08	19.7	49 38.6	98 08	19.6	50 08.1	98 08	19.4	56 01.6	98 07	17.5	56 31.0	98 07	17.3	61 23.6	97 06	15.2	2
3	47 05.9	99 08	19.5	47 35.5	99 08	19.4	49 04.3	99 08	19.0	49 33.8	99 08	18.9	50 03.4	99 08	18.7	55 57.3	98 07	16.9	56 26.7	98 07	16.7	61 19.8	97 06	14.6	3
4	47 01.1	99 08	18.8	47 30.8	99 08	18.6	48 59.6	99 07	18.3	49 29.2	99 07	18.2	49 58.8	99 07	18.0	55 53.2	98 07	16.3	56 22.6	98 07	16.1	61 16.2	98 06	14.1	4
155	46 56.6	99 07	18.0	47 26.2	99 07	17.9	48 55.2	99 07	17.6	49 24.8	99 07	17.5	49 54.4	99 07	17.3	55 49.2	98 06	15.6	56 18.7	98 06	15.5	61 12.8	98 06	13.6	155
6	46 52.2	99 07	17.3	47 21.8	99 07	17.2	48 50.9	99 07	16.9	49 20.5	99 07	16.8	49 50.2	99 07	16.6	55 45.4	98 06	15.0	56 14.9	98 06	14.9	61 09.4	98 05	13.0	6
7	46 47.9	99 07	16.6	47 17.6	99 07	16.5	48 46.7	99 07	16.2	49 16.4	99 07	16.1	49 46.1	99 06	15.9	55 41.7	99 06	14.4	56 11.2	99 06	14.2	61 06.2	98 05	12.5	7
8	46 43.9	99 06	15.9	47 13.6	99 06	15.8	48 42.8	99 06	15.5	49 12.5	99 06	15.4	49 42.2	99 06	15.2	55 38.1	99 06	13.8	56 07.7	99 06	13.6	61 03.1	98 05	11.9	8
9	46 40.0	99 06	15.1	47 09.8	99 06	15.0	48 39.0	99 06	14.8	49 08.7	99 06	14.7	49 38.5	99 06	14.6	55 34.8	99 05	13.1	56 04.4	99 05	13.0	61 00.2	98 05	11.4	9
160	46 36.3	99 06	14.4	47 06.1	99 06	14.3	48 35.4	99 06	14.0	49 05.2	99 06	14.0	49 34.9	99 06	13.9	55 31.5	99 05	12.5	56 01.2	99 05	12.4	60 57.4	99 04	10.9	160
1	46 32.8	99 06	13.7	47 02.6	99 06	13.6	48 32.0	99 05	13.3	49 01.7	99 05	13.3	49 31.5	99 05	13.2	55 28.5	99 05	11.9	55 58.2	99 05	11.8	60 54.7	99 04	10.3	1
2	46 29.4	99 05	13.0	46 59.2	99 05	12.9	48 28.7	99 05	12.6	48 58.5	99 05	12.6	49 28.3	99 05	12.5	55 25.6	99 05	11.3	55 55.3	99 05	11.1	60 52.2	99 04	09.8	2
3	46 26.3	99 05	12.2	46 56.1	99 05	12.2	48 25.6	99 05	11.9	48 55.4	99 05	11.9	49 25.3	99 05	11.8	55 22.8	99 04	10.6	55 52.6	99 04	10.5	60 49.8	99 04	09.2	3
4	46 23.3	1.0 05	11.5	46 53.1	1.0 05	11.5	48 22.7	99 05	11.2	48 52.5	99 05	11.2	49 22.4	99 04	11.1	55 20.2	99 04	10.0	55 50.0	99 04	09.9	60 47.6	99 04	08.7	4
165	46 20.5	1.0 04	10.8	46 50.3	1.0 04	10.7	48 19.9	1.0 04	10.5	48 49.8	1.0 04	10.5	49 19.7	1.0 04	10.4	55 17.8	99 04	09.4	55 47.6	99 04	09.3	60 45.4	99 03	08.1	165
6	46 17.8	1.0 04	10.1	46 47.7	1.0 04	10.0	48 17.4	1.0 04	09.8	48 47.3	1.0 04	09.8	49 17.1	1.0 04	09.7	55 15.5	99 04	08.8	55 45.3	99 04	08.7	60 43.5	99 03	07.6	6
7	46 15.4	1.0 04	09.4	46 45.3	1.0 04	09.3	48 15.0	1.0 04	09.1	48 44.9	1.0 04	09.1	49 14.8	1.0 04	09.0	55 13.4	1.0 03	08.1	55 43.2	1.0 03	08.0	60 41.6	99 03	07.1	7
8	46 13.1	1.0 03	08.6	46 43.0	1.0 03	08.6	48 12.8	1.0 03	08.4	48 42.7	1.0 03	08.4	49 12.6	1.0 03	08.3	55 11.4	1.0 03	07.5	55 41.3	1.0 03	07.4	60 39.9	99 03	06.5	8
9	46 11.0	1.0 03	07.9	46 40.9	1.0 03	07.9	48 10.7	1.0 03	07.7	48 40.7	1.0 03	07.7	49 10.6	1.0 03	07.6	55 09.6	1.0 03	06.9	55 39.5	1.0 03	06.8	60 38.3	1.0 02	06.0	9
170	46 09.1	1.0 03	07.2	46 39.0	1.0 03	07.2	48 08.9	1.0 03	07.0	48 38.8	1.0 03	07.0	49 08.8	1.0 03	06.9	55 07.9	1.0 02	06.2	55 37.8	1.0 02	06.2	60 36.9	1.0 02	05.4	170
1	46 07.4	1.0 03	06.5	46 37.3	1.0 03	06.4	48 07.2	1.0 03	06.3	48 37.1	1.0 02	06.3	49 07.1	1.0 02	06.2	55 06.4	1.0 02	05.6	55 36.3	1.0 02	05.6	60 35.6	1.0 02	04.9	1
2	46 05.8	1.0 02	05.8	46 35.8	1.0 02	05.7	48 05.7	1.0 02	05.6	48 35.6	1.0 02	05.6	49 05.6	1.0 02	05.5	55 05.1	1.0 02	05.0	55 35.0	1.0 02	04.9	60 34.4	1.0 02	04.3	2
3	46 04.5	1.0 02	05.0	46 34.4	1.0 02	05.0	48 04.4	1.0 02	04.9	48 34.3	1.0 02	04.9	49 04.3	1.0 02	04.8	55 03.9	1.0 02	04.4	55 33.8	1.0 02	04.3	60 33.4	1.0 02	03.8	3
4	46 03.3	1.0 02	04.3	46 33.3	1.0 02	04.3	48 03.2	1.0 02	04.2	48 33.2	1.0 02	04.2	49 03.2	1.0 02	04.2	55 02.8	1.0 01	03.7	55 32.8	1.0 01	03.7	60 32.5	1.0 01	03.3	4
175	46 02.3	1.0 01	03.6	46 32.3	1.0 01	03.6	48 02.2	1.0 01	03.5	48 32.2	1.0 01	03.5	49 02.2	1.0 01	03.5	55 02.0	1.0 01	03.1	55 32.0	1.0 01	03.1	60 31.7	1.0 01	02.7	175
6	46 01.5	1.0 01	02.9	46 31.4	1.0 01	02.9	48 01.4	1.0 01	02.8	48 31.4	1.0 01	02.8	49 01.4	1.0 01	02.8	55 01.3	1.0 01	02.5	55 31.3	1.0 01	02.5	60 31.1	1.0 01	02.2	6
7	46 00.8	1.0 01	02.2	46 30.8	1.0 01	02.1	48 00.8	1.0 01	02.1	48 30.8	1.0 01	02.1	49 00.8	1.0 01	02.1	55 00.7	1.0 01	01.9	55 30.7	1.0 01	01.9	60 30.6	1.0 01	01.6	7
8	46 00.4	1.0 00	01.4	46 30.4	1.0 00	01.4	48 00.4	1.0 00	01.4	48 30.4	1.0 00	01.4	49 00.4	1.0 00	01.4	55 00.3	1.0 00	01.2	55 30.3	1.0 00	01.2	60 30.2	1.0 00	01.1	8
9	46 00.1	1.0 00	00.7	46 30.1	1.0 00	00.7	48 00.1	1.0 00	00.7	48 30.1	1.0 00	00.7	49 00.1	1.0 00	00.7	55 00.1	1.0 00	00.6	55 30.1	1.0 00	00.6	60 30.1	1.0 00	00.5	9
180	46 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	48 00.0	1.0 00	00.0	48 30.0	1.0 00	00.0	49 00.0	1.0 00	00.0	55 00.0	1.0 00	00.0	55 30.0	1.0 00	00.0	60 30.0	1.0 00	00.0	180

Lat. 77°

Lat 78

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 76°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	18	180	22	180	26	180	30	180	34	180	38	180	42	180	46	180	50	180	54	180	58	180	00
4	18	176	22	176	26	176	30	176	34	175	38	175	42	175	46	175	50	175	54	175	58	175	4
8	18	172	22	171	26	171	30	171	34	171	38	171	42	171	46	170	50	170	54	170	58	169	8
12	18	167	22	167	26	167	30	167	34	166	38	166	42	166	46	165	50	165	54	164	58	164	12
16	17	163	21	163	25	163	29	162	33	162	37	162	41	161	45	161	49	160	53	159	57	158	16
20	17	159	21	159	25	158	29	158	33	157	37	157	41	156	45	156	49	155	53	154	57	153	20
24	17	155	21	154	25	154	29	154	33	153	37	152	41	152	45	151	49	150	52	149	56	148	24
28	16	151	20	150	24	150	28	149	32	149	36	148	40	147	44	146	48	145	52	144	56	143	28
32	16	147	20	146	24	146	28	145	32	144	36	143	40	143	43	142	47	141	51	139	55	138	32
36	15	143	19	142	23	141	27	141	31	140	35	139	39	138	43	137	47	136	51	135	55	133	36
40	15	138	19	138	23	137	26	136	30	136	34	135	38	134	42	133	46	131	50	130	54	128	40
44	14	134	18	134	22	133	26	132	30	131	34	130	38	129	41	128	45	127	49	125	53	124	44
48	13	130	17	130	21	129	25	128	29	127	33	126	37	125	41	124	45	128	48	121	52	119	48
52	12	126	16	126	20	125	24	124	28	123	32	122	36	121	40	120	44	118	48	117	51	115	52
56	12	122	16	122	20	121	23	120	27	119	31	118	35	117	39	115	43	114	47	112	50	110	56
60	11	118	15	118	19	117	23	116	26	115	30	114	34	112	38	111	42	110	46	108	50	106	60
64	10	114	14	114	18	113	22	112	26	111	29	109	33	108	37	107	41	106	45	104	49	102	64
68	09	110	13	110	17	109	21	108	25	107	29	105	32	104	36	103	40	101	44	100	48	98	68
72	08	107	12	106	16	105	20	104	24	103	28	101	31	100	35	99	39	97	43	96	47	94	72
76	07	103	11	102	15	101	19	100	23	99	27	97	30	96	34	95	38	93	42	92	46	90	76
80	06	99	10	98	14	97	18	96	22	95	26	94	30	92	33	91	37	90	41	88	45	86	80
84	05	95	09	94	13	93	17	92	21	91	25	90	29	88	32	87	36	86	40	84	44	82	84
88	04	91	08	90	12	89	16	88	20	87	24	86	28	85	31	83	35	82	39	80	43	79	88
92	03	87	07	86	11	85	15	84	19	83	23	82	27	81	30	80	34	78	38	77	42	75	92
96	02	83	06	82	10	81	14	80	18	79	22	78	26	77	30	76	33	74	37	73	41	71	96
100	01	79	05	78	09	77	13	76	17	75	21	74	25	73	29	72	32	71	36	69	40	68	100
104	01	75	04	75	08	74	12	73	16	72	20	71	24	69	28	68	32	67	35	66	39	64	104
108	*00*	72	03	71	07	70	11	69	15	68	19	67	23	66	27	65	31	63	35	62	38	61	108
112	*01*	68	03	67	06	66	10	65	14	64	18	63	22	62	26	61	30	60	34	59	38	57	112
116	*02*	64	02	63	06	62	10	61	13	60	17	59	21	58	25	57	29	56	33	55	37	54	116
120	*03*	60	01	59	05	58	09	57	13	57	17	56	20	55	24	54	28	53	32	52	36	50	120
124	*04*	56	00	55	04	54	08	54	12	53	16	52	20	51	24	50	27	49	31	48	35	47	124
128	*05*	52	*01*	51	03	51	07	50	11	49	15	48	19	47	23	46	27	46	31	45	35	43	128
132	*05*	48	*01*	47	02	47	06	46	10	45	14	44	18	44	22	43	26	42	30	41	34	40	132
136	*06*	44	*02*	44	02	43	06	42	10	41	14	41	18	40	22	39	25	38	29	38	33	37	136
140	*07*	40	*03*	40	01	39	05	38	09	38	13	37	17	36	21	36	25	35	29	34	33	33	140
144	*07*	36	*03*	36	01	35	05	35	09	34	12	33	16	33	20	32	24	31	28	31	32	30	144
148	*08*	32	*04*	32	00	31	04	31	08	30	12	30	16	29	20	29	24	28	28	27	32	27	148
152	*08*	28	*04*	28	*00*	27	04	27	08	26	12	26	15	25	19	25	23	24	27	24	31	23	152
156	*09*	24	*05*	24	*01*	23	03	23	07	23	11	22	15	22	19	21	23	21	27	20	31	20	156
160	*09*	20	*05*	20	*01*	20	03	19	07	19	11	19	15	18	19	18	23	17	27	17	31	17	160
164	*09*	16	*05*	16	*01*	16	03	15	07	15	10	15	14	15	18	14	22	14	26	14	30	13	164
168	*10*	12	*06*	12	*02*	12	02	12	06	11	10	11	14	11	18	11	22	10	26	10	30	10	168
172	*10*	08	*06*	08	*02*	08	02	08	06	08	10	07	14	07	18	07	22	07	26	07	30	07	172
176	*10*	04	*06*	04	*02*	04	02	04	06	04	10	04	14	04	18	04	22	03	26	03	30	03	176
180	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	26	00	30	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 76°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	62	180	66	180	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	00
4	62	174	66	174	70	173	74	173	78	172	82	169	86	163	89	88	86	10	82	03	78	01	4
8	62	169	66	168	70	167	74	166	78	163	82	159	85	147	88	86	86	19	82	06	78	01	8
12	62	163	66	162	70	161	73	159	77	155	81	149	85	135	87	84	85	26	82	09	78	02	12
16	61	157	65	156	69	154	73	152	77	148	81	140	84	124	86	82	85	32	82	11	78	03	16
20	61	152	65	150	69	148	73	145	76	141	80	132	83	116	85	80	84	37	81	14	78	03	20
24	60	147	64	145	68	142	72	139	76	134	79	125	82	109	84	78	84	40	81	16	78	04	24
28	60	141	64	139	67	137	71	133	75	128	78	119	81	103	83	76	83	42	81	18	78	04	28
32	59	136	63	134	67	131	71	127	74	122	78	113	80	98	82	74	82	44	81	20	78	05	32
36	58	131	62	129	66	126	70	122	73	116	77	108	80	94	81	73	82	45	80	21	78	05	36
40	58	126	61	124	65	121	69	117	72	111	76	103	79	90	81	71	81	46	80	22	77	06	40
44	57	122	61	119	64	116	68	112	72	106	75	98	78	86	80	69	80	46	79	23	77	06	44
48	56	117	60	115	64	111	67	107	71	102	74	94	77	83	79	67	80	46	79	24	77	07	48
52	55	113	59	110	63	107	66	103	70	97	73	90	76	79	78	65	79	45	79	25	77	07	52
56	54	108	58	106	62	103	65	98	69	93	72	86	75	76	77	63	78	45	78	25	77	07	56
60	53	104	57	101	61	98	64	94	68	89	71	83	74	73	76	61	78	44	78	25	77	08	60
64	52	100	56	97	60	94	63	90	67	86	70	79	73	70	75	59	77	44	77	26	77	08	64
68	51	96	55	93	59	90	62	87	66	82	69	76	72	68	74	57	76	43	77	26	77	08	68
72	50	92	54	89	58	86	61	83	65	78	68	73	71	65	74	55	76	42	77	25	76	08	72
76	49	88	53	86	57	83	60	79	64	75	67	69	70	62	73	53	75	40	76	25	76	08	76
80	49	84	52	82	56	79	59	76	63	72	66	66	69	60	72	51	74	39	76	25	76	08	80
84	48	80	51	78	55	75	59	72	62	68	65	63	69	57	71	49	74	38	75	24	76	08	84
88	47	77	50	75	54	72	58	69	61	65	65	61	68	55	71	47	73	37	75	24	76	08	88
92	46	73	49	71	53	69	57	66	60	62	64	58	67	52	70	45	73	35	75	23	76	08	92
96	45	70	48	68	52	65	56	62	59	59	63	55	66	50	69	43	72	34	74	22	76	08	96
100	44	66	48	64	51	62	55	59	59	56	62	52	65	47	69	41	71	33	74	22	76	08	100
104	43	63	47	61	51	59	54	56	58	53	61	49	65	45	68	39	71	31	74	21	75	08	104
108	42	59	46	57	50	55	53	53	57	50	61	47	64	42	67	37	70	30	73	20	75	07	108
112	41	56	45	54	49	52	53	50	56	47	60	44	63	40	67	35	70	28	73	19	75	07	112
116	41	52	44	51	48	49	52	47	56	44	59	41	63	38	66	33	70	27	73	18	75	07	116
120	40	49	44	47	47	46	51	44	55	41	59	39	62	35	66	31	69	25	72	17	75	07	120
124	39	46	43	44	47	43	51	41	54	39	58	36	62	33	65	29	69	23	72	16	75	06	124
128	38	42	42	41	46	39	50	38	54	36	58	33	61	30	65	27	68	22	72	15	75	06	128
132	38	39	42	38	46	36	49	35	53	33	57	31	61	28	64	25	68	20	71	14	75	06	132
136	37	36	41	35	45	33	49	32	53	30	57	28	60	26	64	23	68	19	71	13	74	05	136
140	37	32	41	31	44	30	48	29	52	27	56	26	60	23	64	21	67	17	71	12	74	05	140
144	36	29	40	28	44	27	48	26	52	25	56	23	60	21	63	19	67	15	71	11	74	04	144
148	36	26	40	25	44	24	48	23	51	22	55	20	59	19	63	16	67	14	71	10	74	04	148
152	35	23	39	22	43	21	47	20	51	19	55	18	59	16	63	14	67	12	70	08	74	03	152
156	35	19	39	19	43	18	47	17	51	16	55	15	59	14	63	12	67	10	70	07	74	03	156
160	35	16	39	16	43	15	47	14	51	14	55	13	58	12	62	10	66	09	70	06	74	02	160
164	34	13	38	13	42	12	46	12	50	11	54	10	58	09	62	08	66	07	70	05	74	02	164
168	34	10	38	09	42	09	46	09	50	08	54	08	58	07	62	06	66	05	70	04	74	02	168
172	34	06	38	06	42	06	46	06	50	05	54	05	58	05	62	04	66	03	70	02	74	01	172
176	34	03	38	03	42	03	46	03	50	03	54	03	58	02	62	02	66	02	70	01	74	01	176
180	34	00	38	00	42	00	46	00	50	00	54	00	58	00	62	00	66	00	70	00	74	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 77°

Lat. 78°

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 77°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		°
00	13 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	14 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	15 00.0 1.0 00	180.0	15 30.0 1.0 00	180.0	16 00.0 1.0 00	180.0	16 30.0 1.0 00	180.0	00
1	12 59.9 1.0 01	179.0	13 29.9 1.0 01	179.0	13 59.9 1.0 01	179.0	14 29.9 1.0 01	179.0	14 59.9 1.0 01	179.0	15 29.9 1.0 01	179.0	15 59.9 1.0 01	179.0	16 29.9 1.0 01	179.0	1
2	12 59.5 1.0 01	177.9	13 29.5 1.0 01	177.9	13 59.5 1.0 01	177.9	14 29.5 1.0 01	177.9	14 59.5 1.0 01	177.9	15 29.5 1.0 01	177.9	15 59.5 1.0 01	177.9	16 29.5 1.0 01	177.9	2
3	12 58.9 1.0 01	176.9	13 28.9 1.0 01	176.9	13 58.9 1.0 01	176.9	14 28.9 1.0 01	176.9	14 58.9 1.0 01	176.9	15 28.9 1.0 01	176.9	15 58.9 1.0 01	176.9	16 28.9 1.0 01	176.9	3
4	12 58.1 1.0 02	175.9	13 28.1 1.0 02	175.9	13 58.1 1.0 02	175.9	14 28.1 1.0 02	175.9	14 58.1 1.0 02	175.9	15 28.0 1.0 02	175.9	15 58.0 1.0 02	175.8	16 28.0 1.0 02	175.8	4
05	12 57.0 1.0 02	174.9	13 27.0 1.0 02	174.9	13 57.0 1.0 02	174.8	14 27.0 1.0 02	174.8	14 57.0 1.0 02	174.8	15 26.9 1.0 02	174.8	15 56.9 1.0 02	174.8	16 26.9 1.0 02	174.8	05
6	12 55.7 1.0 03	173.8	13 25.6 1.0 03	173.8	13 55.6 1.0 03	173.8	14 25.6 1.0 03	173.8	14 55.6 1.0 03	173.8	15 25.6 1.0 03	173.8	15 55.6 1.0 03	173.8	16 25.6 1.0 03	173.8	6
7	12 54.1 1.0 03	172.8	13 24.1 1.0 03	172.8	13 54.1 1.0 03	172.8	14 24.0 1.0 03	172.8	14 54.0 1.0 03	172.8	15 24.0 1.0 03	172.7	15 54.0 1.0 03	172.7	16 24.0 1.0 03	172.7	7
8	12 52.3 1.0 03	171.8	13 22.3 1.0 03	171.8	13 52.2 1.0 03	171.8	14 22.2 1.0 03	171.7	14 52.2 1.0 03	171.7	15 22.2 1.0 03	171.7	15 52.2 1.0 03	171.7	16 22.2 1.0 03	171.7	8
9	12 50.2 1.0 04	170.8	13 20.2 1.0 04	170.7	13 50.2 1.0 04	170.7	14 20.2 1.0 04	170.7	14 50.2 1.0 04	170.7	15 20.1 1.0 04	170.7	15 50.1 1.0 04	170.7	16 20.1 1.0 04	170.6	9
10	12 47.9 1.0 04	169.7	13 17.9 1.0 04	169.7	13 47.9 1.0 04	169.7	14 17.9 1.0 04	169.7	14 47.8 1.0 04	169.7	15 17.8 1.0 04	169.6	15 47.8 1.0 04	169.6	16 17.8 1.0 04	169.6	10
1	12 45.4 1.0 05	168.7	13 15.4 1.0 05	168.7	13 45.4 1.0 05	168.7	14 15.3 1.0 05	168.6	14 45.3 1.0 05	168.6	15 15.3 1.0 05	168.6	15 45.2 1.0 05	168.6	16 15.2 1.0 05	168.6	1
2	12 42.7 1.0 05	167.7	13 12.6 1.0 05	167.7	13 42.6 1.0 05	167.6	14 12.6 1.0 05	167.6	14 42.5 1.0 05	167.6	15 12.5 1.0 05	167.6	15 42.5 1.0 05	167.5	16 12.4 1.0 05	167.5	2
3	12 39.7 1.0 06	166.7	13 09.6 1.0 06	166.6	13 39.6 1.0 06	166.6	14 09.6 1.0 06	166.6	14 39.5 1.0 05	166.6	15 09.5 1.0 05	166.5	15 39.4 1.0 05	166.5	16 09.4 1.0 05	166.5	3
4	12 36.4 1.0 06	165.6	13 06.4 1.0 06	165.6	13 36.4 1.0 06	165.6	14 06.3 1.0 06	165.6	14 36.3 1.0 06	165.5	15 06.2 1.0 06	165.5	15 36.2 1.0 06	165.5	16 06.1 1.0 06	165.4	4
15	12 33.0 1.0 06	164.6	13 02.9 1.0 06	164.6	13 32.9 1.0 06	164.6	14 02.8 1.0 06	164.5	14 32.8 1.0 06	164.5	15 02.7 1.0 06	164.5	15 32.7 1.0 06	164.4	16 02.6 1.0 06	164.4	15
6	12 29.3 1.0 07	163.6	12 59.2 1.0 07	163.6	13 29.2 1.0 07	163.5	13 59.1 1.0 07	163.5	14 29.0 1.0 07	163.5	14 59.0 1.0 07	163.4	15 28.9 1.0 07	163.4	15 58.9 1.0 07	163.4	6
7	12 25.4 1.0 07	162.6	12 55.3 1.0 07	162.5	13 25.2 1.0 07	162.5	13 55.2 1.0 07	162.5	14 25.1 1.0 07	162.4	14 55.0 1.0 07	162.4	15 24.9 1.0 07	162.4	15 54.9 1.0 07	162.3	7
8	12 21.2 1.0 07	161.6	12 51.1 1.0 07	161.5	13 21.1 1.0 07	161.5	13 51.0 1.0 07	161.4	14 20.9 1.0 07	161.4	14 50.8 1.0 07	161.4	15 20.7 1.0 07	161.3	15 50.7 1.0 07	161.3	8
9	12 16.8 1.0 08	160.5	12 46.7 1.0 08	160.5	13 16.7 1.0 08	160.5	13 46.6 1.0 08	160.4	14 16.5 1.0 08	160.4	14 46.4 1.0 08	160.3	15 16.3 1.0 08	160.3	15 46.2 1.0 08	160.3	9
20	12 12.2 1.0 08	159.5	12 42.1 1.0 08	159.5	13 12.0 1.0 08	159.4	13 41.9 1.0 08	159.4	14 11.8 1.0 08	159.4	14 41.7 1.0 08	159.3	15 11.6 1.0 08	159.3	15 41.6 1.0 08	159.2	20
1	12 07.4 1.0 08	158.5	12 37.3 1.0 08	158.5	13 07.2 1.0 08	158.4	13 37.1 1.0 08	158.4	14 07.0 1.0 08	158.3	14 36.9 1.0 09	158.3	15 06.8 1.0 09	158.2	15 36.6 1.0 09	158.2	1
2	12 02.3 1.0 09	157.5	12 32.2 1.0 09	157.4	13 02.1 1.0 09	157.4	13 32.0 1.0 09	157.3	14 01.9 1.0 09	157.3	14 31.8 1.0 09	157.3	15 01.6 1.0 09	157.2	15 31.5 1.0 09	157.2	2
3	11 57.0 1.0 09	156.5	12 26.9 1.0 09	156.4	12 56.8 1.0 09	156.4	13 26.7 1.0 09	156.3	13 56.5 1.0 09	156.3	14 26.4 1.0 09	156.2	14 56.3 1.0 09	156.2	15 26.2 1.0 09	156.1	3
4	11 51.5 1.0 10	155.4	12 21.4 1.0 10	155.4	12 51.3 1.0 10	155.3	13 21.1 1.0 10	155.3	13 51.0 1.0 10	155.3	14 20.9 1.0 10	155.2	14 50.7 1.0 10	155.2	15 20.6 1.0 10	155.1	4
25	11 45.8 1.0 10	154.4	12 15.7 1.0 10	154.4	12 45.5 1.0 10	154.3	13 15.4 1.0 10	154.3	13 45.2 1.0 10	154.2	14 15.1 1.0 10	154.2	14 45.0 1.0 10	154.1	15 14.8 1.0 10	154.1	25
6	11 39.9 99 10	153.4	12 09.7 99 10	153.4	12 39.6 99 10	153.3	13 09.4 99 10	153.3	13 39.3 99 10	153.2	14 09.1 99 10	153.1	14 39.0 99 10	153.1	15 08.8 99 10	153.0	6
7	11 33.7 99 11	152.4	12 03.6 99 11	152.3	12 33.4 99 11	152.3	13 03.2 99 11	152.2	13 33.1 99 11	152.2	14 02.9 99 11	152.1	14 32.7 99 11	152.1	15 02.6 99 11	152.0	7
8	11 27.4 99 11	151.4	11 57.2 99 11	151.3	12 27.0 99 11	151.3	12 56.8 99 11	151.2	13 26.7 99 11	151.2	13 56.5 99 11	151.1	14 26.3 99 11	151.0	14 56.1 99 11	151.0	8
9	11 20.8 99 11	150.4	11 50.6 99 11	150.3	12 20.4 99 11	150.3	12 50.2 99 11	150.2	13 20.1 99 11	150.1	13 49.9 99 11	150.1	14 19.7 99 11	150.0	14 49.5 99 11	150.0	9
30	11 14.0 99 12	149.4	11 43.8 99 12	149.3	12 13.6 99 12	149.2	12 43.4 99 12	149.2	13 13.2 99 12	149.1	13 43.0 99 12	149.1	14 12.8 99 12	149.0	14 42.6 99 12	148.9	30
1	11 07.0 99 12	148.3	11 36.8 99 12	148.3	12 06.6 99 12	148.2	12 36.4 99 12	148.2	13 06.2 99 12	148.1	13 36.0 99 12	148.0	14 05.8 99 12	148.0	14 35.6 99 12	147.9	1
2	10 59.9 99 12	147.3	11 29.6 99 12	147.3	11 59.4 99 12	147.2	12 29.2 99 12	147.1	12 59.0 99 12	147.1	13 28.7 99 12	147.0	13 58.5 99 12	147.0	14 28.3 99 12	146.9	2
3	10 52.5 99 13	146.3	11 22.2 99 13	146.3	11 52.0 99 13	146.2	12 21.8 99 13	146.1	12 51.5 99 13	146.1	13 21.3 99 13	146.0	13 51.1 99 13	145.9	14 20.8 99 13	145.9	3
4	10 44.9 99 13	145.3	11 14.6 99 13	145.2	11 44.4 99 13	145.2	12 14.1 99 13	145.1	12 43.9 99 13	145.0	13 13.6 99 13	145.0	13 43.4 99 13	144.9	14 13.1 99 13	144.8	4
35	10 37.1 99 13	144.3	11 06.9 99 13	144.2	11 36.6 99 13	144.2	12 06.3 99 13	144.1	12 36.1 99 13	144.0	13 05.8 99 13	144.0	13 35.5 99 13	143.9	14 05.3 99 13	143.8	35
6	10 29.1 99 14	143.3	10 58.9 99 14	143.2	11 28.6 99 14	143.2	11 58.3 99 14	143.1	12 28.0 99 14	143.0	12 57.8 99 14	142.9	13 27.5 99 14	142.9	13 57.2 99 14	142.8	6
7	10 21.0 99 14	142.3	10 50.7 99 14	142.2	11 20.4 99 14	142.1	11 50.1 99 14	142.1	12 19.8 99 14	142.0	12 49.5 99 14	141.9	13 19.2 99 14	141.9	13 49.0 99 14	141.8	7
8	10 12.6 99 14	141.3	10 42.3 99 14	141.2	11 12.0 99 14	141.1	11 41.7 99 14	141.1	12 11.4 99 14	141.0	12 41.1 99 14	140.9	13 10.8 99 14	140.8	13 40.5 99 14	140.8	8
9	10 04.1 99 15	140.3	10 33.8 99 15	140.2	11 03.5 99 15	140.1	11 33.2 99 15	140.1	12 02.8 99 15	140.0	12 32.5 99 15	139.9	13 02.2 99 15	139.8	13 31.9 99 15	139.8	9
40	9 55.4 99 15	139.3	10 25.0 99 15	139.2	10 54.7 99 15	139.1	11 24.4 99 15	139.0	11 54.1 99 15	139.0	12 23.7 99 15	138.9	12 53.4 99 15	138.8	13 23.1 99 15	138.7	40
1	9 46.5 99 15	138.3	10 16.1 99 15	138.2	10 45.8 99 15	138.1	11 15.5 99 15	138.0	11 45.1 99 15	138.0	12 14.8 99 15	137.9	12 44.4 99 15	137.8	13 14.1 99 15	137.7	1
2	9 37.4 99 15	137.3	10 07.1 99 15	137.2	10 36.7 99 15	137.1	11 06.3 99 16	137.0	11 36.0 99 16	136.9	12 05.6 99 16	136.9	12 35.3 99 16	136.8	13 04.9 99 16	136.7	2
3	9 28.2 99 16	136.3	9 57.8 99 16	136.2	10 27.4 99 16	136.1	10 57.1 99 16	136.0	11 26.7 99 16	135.9	11 56.3 99 16	135.9	12 25.9 99 16	135.8	12 55.6 99 16	135.7	3
4	9 18.7 99 16	135.3	9 48.4 99 16	135.2	10 18.0 99 16	135.1	10 47.6 99 16	135.0	11 17.2 99 16	134.9	11 46.8 99 16	134.9	12 16.4 99 16	134.8	12 46.1 99 16	134.7	4
45	9 09.2 99 16	134.3	9 38.8 99 16	134.2	10 08.4 99 16	134.1	10 38.0 99 16	134.0	11 07.6 99 16	133.9	11 37.2 99 16	133.8	12 06.8 99 16	133.8	12 36.4 99 16	133.7	45
6	8 59.4 99 16	133.3	9 29.0 99 17	133.2	9 58.6 99 17	133.1	10 28.2 99 17	133.0	10 57.8 99 17	132.9	11 27.4 99 17	132.8	11 57.0 99 17	132.8	12 26.5 99 17	132.7	6
7	8 49.5 99 17	132.3	9 19.1 99 17	132.2	9 48.7 99 17	132.1	10 18.2 99 17	132.0	10 47.8 99 17	131.9	11 17.4 99 17	131.8	11 47.0 99 17	131.7	12 16.5 99 17	131.7	7
8	8 39.4 99 17	131.3	9 09.0 99 17	131.2	9 38.6 99 17	131.1	10 08.1 99 17	131.0	10 37.7 99 17	130.9	11 07.3 99 17	130.8	11 36.8 99 17	130.7	12 06.4 99 17	130.7	8
9	8 29.2 99 17	130.3	8 58.8 99 17	130.2	9 28.3 99 17	130.1	9 57.9 99 17	130.0	10 27.4 98 17	129.9	10 57.0 98 17	129.8	11 26.5 98 17	129.7	11 56.1 98 17	129.7	9
50	8 18.8 98 18	129.3	8 48.4 98 18	129.2	9 17.9 98 18	129.1	9 47.5 98 18	129.0	10 17.0 98 18	128.9	10 46.5 98 18	128.8	11 16.1 98 18	128.7	11 45.6 98 18	128.6	50
1	8 08.3 98 18	128.3	8 37.8 98 18	128.2	9 07.4 98 18	128.1	9 36.9 98 18	128.0	10 06.4 98 18	127.9	10 35.9 98 18	127.8	11 05.5 98 18	127.7	11 35.0 98 18	127.6	1
2	7 57.6 98 18	127.3	8 27.2 98 18	127.2	8 56.7 98 18	127.1	9 26.2 98 18	127.0	9 55.7 98 18	126.9	10 25.2 98 18	126.8	10 54.7 98 18	126.7	11 24.2 98 18	126.6	2
3	7 46.8 98 18	126.3	8 16.3 98 18	126.2	8 45.8 98 18	126.1	9 15.3 98 18	126.0	9 44.8 98 18	125.9	10 14.3 98 18	125.8	10 43.8 98 18	125.7	11 13.3 98 18	125.6	3
4	7 35.9 98 18	125.3	8 05.4 98 18	125.2	8 34.9 98 19	125.1	9 04.3 98 19	125.0	9 33.8 98 19	124.9	10 03.3 98 19	124.8	10 32.8 98 19	124.7	11 02.3 98 19	124.6	4
55	7 24.8 98 19	124.3	7 54.3 98 19	124.2	8 23.8 98 19	124.1	8 53.2 98 19	124.0	9 22.7 98 19	123.9	9 52.2 98 19	123.8	10 21.6 98 19	123.7	10 51.1 98 19	123.6	55
6	7 13.6 98 19	123.3	7 43.1 98 19	123.2	8 12.5 98 19	123.1	8 42.0 98 19	123.0	9 11.4 98 19	122.9	9 40.9 98 19	122.8	10 10.4 98 19	122.7	10 39.8 98 19	122.6	6
7	7 02.2 98 19	122.3	7 31.7 98 19	122.2	8 01.1 98 19	122.1	8 30.6 98 19	122.0	9 00.0 98 19	121.9	9 29.5 98 19	121.8	9 58.9 98 19	121.7	10 28.4 98 19	121.6	7
8	6 50.8 98 19	121.3	7 20.2 98 19	121.2	7 49.7 98 19	121.1	8 19.1 98 19	121.0	8 48.5 98 19	120.9	9 18.0 98 19	120.8	9 47.4 98 19	120.8	10 16.8 98 19	120.7	8
9	6 39.2 98 20	120.3	7 08.6 98 20	120.2	7 38.0 98 20	120.2	8 07.5 98 20	120.1	8 36.9 98 20	120.0	9 06.3 98 20	119.9	9 35.7 98 20	119.8	10 05.2 98 20	119.7	9
60	6 27.5 98 20	119.4	6 56.9 98 20	119.3	7 26.3 98 20	119.2	7 55.7 98 20	119.1	8 25.1 98 20	119.0	8 54.6 98 20	118.9	9 24.0 98 20	118.8	9 53.4 98 20	118.7	60
1	6 15.7 98 20	118.4	6 45.1 98 20	118.3	7 14.5 98 20	118.2	7 43.9 98 20	118.1	8 13.3 98 20	118.0	8 42.7 98 20	117.9	9 12.1 98 20	117.8	9 41.5 98 20	117.7	1
2	6 03.7 98 20	117.4	6 33.1 98 20	117.3	7 02.5 98 20	117.2	7 31.9 98 20	117.1	8 01.3 98 20	117.0	8 30.7 98 20	116.9	9 00.1 98 20	116.8	9 29.5 98 20	116.7	2
3	5 51.7 98 20	116.4	6 21.1 98 20	116.3	6 50.5 98 20	116.2	7 19.8 98 20	116.1	7 49.2 98 20	116.0	8 18.6 98 20	115.9	8 48.0 98 20	115.8	9 17.4 98 20	115.7	3
4	5 39.6 98 20	115.4	6 08.9 98 20	115.3	6 38.3 98 20	115.2	7 07.7 98 20	115.1	7 37.0 98 20	115.0	8 06.4 98 20	114.9	8 35.8 98 20	114.8	9 05.1 98 21	114.7	4
65	5 27.3 98 21	114.4	5 56.7 98 21	114.3	6 26.0 98 21	114.2	6 55.4 98 21	114.1	7 24.8 98 21	114.0	7 54.1 98 21	113.9	8 23.5 98 21	113.8	8 52.8 98 21	113.7	65
6	5 15.0 98 21	113.5	5 44.3 98 21	113.3	6 13.7 98 21	113.2	6 43.0 98 21	113.1	7 12.4 98 21	113.0	7 41.7 98 21	112.9	8 11.1 98 21	112.8	8 40.4 98 21	112.7	6
7	5 02.6 98 21	112.5	5 31.9 98 21	112.4	6 01.2 98 21	112.3	6 30.6 98 21	112.2	6 59.9 98 21	112.1	7 29.3 98 21	111.9	7 58.6 98 21	111.8	8 27.9 98 21	111.7	7
8			5 19.4 98 21	111.4	5 48.7 98 21	111.3	6 18.0 98 21	111.2	6 47.4 98 21	111.1	7 16.7 98 21	111.0	7 46.0 98 21	110.9	8 15.4 98 21	110.7	8
9			5 06.8 98 21	110.4	5 36.1 98 21	110.3	6 05.4 98 21	110.2	6 34.7 98 21	110.1	7 04.1 98 21	110.0	7 33.4 98 21	109.9	8 02.7 98 21	109.8	9
70					5 23.4 98 21	109.3	5 52.7 98 21	109.2	6 22.0 98 21	109.1	6 51.3 98 21	109.0	7 20.6 98 21	108.9	7 50.0 98 21	108.8	70
1					5 10.6 98 21	108.3	5 39.9 98 21	108.2	6 09.2 98 21	108.1	6 38.5 98 21	108.0	7 07.8 98 21	107.9	7 37.1 98 21	107.8	1
2							5 27.1 98 22	107.2	5 56.4 98 22	107.1	6 25.7 98 22	107.0	6 55.0 98 22	106.9	7 24.3 98 22	106.8	2
3							5 14.1 98 22	106.3	5 43.4 98 22	106.2	6 12.7 98 22	106.0	6 42.0 98 22	105.9	7 11.3 98 22	105.8	3
4							5 01.2 98 22	105.3	5 30.4 98 22	105.2	5 59.7 98 22	105.1	6 29.0 98 22	105.0	6 58.3 98 22	104.8	4
75									5 17.4 98 22	104.2	5 46.7 98 22	104.1	6 15.9 98 22	104.0	6 45.2 98 22	103.9	75
6									5 04.3 98 22	103.2	5 33.5 98 22	103.1	6 02.8 98 22	103.0	6 32.1 98 22	102.9	6
7											5 20.4 98 22	102.1	5 49.6 98 22	102.0	6 18.9 98 22	101.9	7
8											5 07.1 98 22	101.1	5 36.4 98 22	101.0	6 05.7 98 22	100.9	8
9													5 23.1 98 22	100.1	5 52.4 98 22	99.9	9
80													5 09.8 97 22	99.1	5 39.1 97 22	99.0	80
1															5 25.7 97 22	98.0	1
2															5 12.3 97 22	97.0	2

Lat. 77°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	d Δt	°	′	d Δt	°	′	d Δt	°	′	d Δt	°	′	d Δt	°	′	d Δt	°	′	d Δt	°	′	d Δt	°	
00	13 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	9 30.0	1.0 00	180.0	-00
1	12 59.9	1.0 01	179.0	12 29.9	1.0 01	179.0	11 59.9	1.0 01	179.0	11 29.9	1.0 01	179.0	10 59.9	1.0 01	179.0	10 29.9	1.0 01	179.0	9 59.9	1.0 01	179.0	9 29.9	1.0 01	179.0	1
2	12 59.5	1.0 01	177.9	12 29.5	1.0 01	178.0	11 59.5	1.0 01	178.0	11 29.5	1.0 01	178.0	10 59.5	1.0 01	178.0	10 29.5	1.0 01	178.0	9 59.5	1.0 01	178.0	9 29.5	1.0 01	178.0	2
3	12 58.9	1.0 01	176.9	12 28.9	1.0 01	176.9	11 58.9	1.0 01	176.9	11 28.9	1.0 01	176.9	10 58.9	1.0 01	176.9	10 28.9	1.0 01	177.0	9 58.9	1.0 01	177.0	9 28.9	1.0 01	177.0	3
4	12 58.1	1.0 02	175.9	12 28.1	1.0 02	175.9	11 58.1	1.0 02	175.9	11 28.1	1.0 02	175.9	10 58.1	1.0 02	175.9	10 28.1	1.0 02	175.9	9 58.1	1.0 02	175.9	9 28.1	1.0 02	176.0	4
05	12 57.0	1.0 02	174.9	12 27.0	1.0 02	174.9	11 57.0	1.0 02	174.9	11 27.0	1.0 02	174.9	10 57.0	1.0 02	174.9	10 27.0	1.0 02	174.9	9 57.0	1.0 02	174.9	9 27.0	1.0 02	174.9	05
6	12 55.7	1.0 03	173.8	12 25.7	1.0 03	173.9	11 55.7	1.0 03	173.9	11 25.7	1.0 03	173.9	10 55.7	1.0 03	173.9	10 25.7	1.0 03	173.9	9 55.7	1.0 03	173.9	9 25.7	1.0 03	173.9	6
7	12 54.1	1.0 03	172.8	12 24.1	1.0 03	172.8	11 54.1	1.0 03	172.8	11 24.1	1.0 03	172.9	10 54.1	1.0 03	172.9	10 24.1	1.0 03	172.9	9 54.2	1.0 03	172.9	9 24.2	1.0 03	172.9	7
8	12 52.3	1.0 03	171.8	12 22.3	1.0 03	171.8	11 52.3	1.0 03	171.8	11 22.3	1.0 03	171.8	10 52.3	1.0 03	171.9	10 22.4	1.0 03	171.9	9 52.4	1.0 03	171.9	9 22.4	1.0 03	171.9	8
9	12 50.2	1.0 04	170.8	12 20.3	1.0 04	170.8	11 50.3	1.0 04	170.8	11 20.3	1.0 04	170.8	10 50.3	1.0 04	170.8	10 20.3	1.0 04	170.9	9 50.3	1.0 04	170.9	9 20.4	1.0 04	170.9	9
10	12 47.9	1.0 04	169.7	12 18.0	1.0 04	169.8	11 48.0	1.0 04	169.8	11 18.0	1.0 04	169.8	10 48.0	1.0 04	169.8	10 18.1	1.0 04	169.8	9 48.1	1.0 04	169.9	9 18.1	1.0 04	169.9	10
1	12 45.4	1.0 05	168.7	12 15.5	1.0 05	168.7	11 45.5	1.0 05	168.8	11 15.5	1.0 05	168.8	10 45.5	1.0 05	168.8	10 15.6	1.0 05	168.8	9 45.6	1.0 05	168.9	9 15.6	1.0 05	168.9	1
2	12 42.7	1.0 05	167.7	12 12.7	1.0 05	167.7	11 42.7	1.0 05	167.7	11 12.8	1.0 05	167.8	10 42.8	1.0 05	167.8	10 12.8	1.0 05	167.8	9 42.9	1.0 05	167.8	9 12.9	1.0 06	167.9	2
3	12 39.7	1.0 05	166.7	12 09.7	1.0 05	166.7	11 39.8	1.0 05	166.7	11 09.8	1.0 05	166.7	10 39.8	1.0 05	166.8	10 09.9	1.0 05	166.8	9 39.9	1.0 05	166.8	9 10.0	1.0 05	166.9	3
4	12 36.4	1.0 06	165.6	12 06.5	1.0 06	165.7	11 36.5	1.0 06	165.7	11 06.6	1.0 06	165.7	10 36.6	1.0 06	165.8	10 06.7	1.0 06	165.8	9 36.7	1.0 06	165.8	9 06.8	1.0 06	165.8	4
15	12 33.0	1.0 06	164.6	12 03.0	1.0 06	164.7	11 33.1	1.0 06	164.7	11 03.1	1.0 06	164.7	10 33.2	1.0 06	164.7	10 03.2	1.0 06	164.8	9 33.3	1.0 06	164.8	9 03.4	1.0 06	164.8	15
6	12 29.3	1.0 07	163.6	11 59.3	1.0 07	163.6	11 29.4	1.0 06	163.7	10 59.5	1.0 06	163.7	10 29.5	1.0 06	163.7	9 59.6	1.0 06	163.8	9 29.6	1.0 06	163.8	8 59.7	1.0 06	163.8	6
7	12 25.4	1.0 07	162.6	11 55.4	1.0 07	162.6	11 25.5	1.0 07	162.6	10 55.6	1.0 07	162.7	10 25.6	1.0 07	162.7	9 55.7	1.0 07	162.8	9 25.8	1.0 07	162.8	8 55.8	1.0 07	162.8	7
8	12 21.2	1.0 07	161.6	11 51.3	1.0 07	161.6	11 21.4	1.0 07	161.6	10 51.4	1.0 07	161.7	10 21.5	1.0 07	161.7	9 51.6	1.0 07	161.7	9 21.7	1.0 07	161.8	8 51.7	1.0 07	161.8	8
9	12 16.8	1.0 08	160.5	11 46.9	1.0 08	160.6	11 17.0	1.0 08	160.6	10 47.1	1.0 08	160.7	10 17.2	1.0 08	160.7	9 47.2	1.0 08	160.7	9 17.3	1.0 08	160.8	8 47.4	1.0 08	160.8	9
20	12 12.2	1.0 08	159.5	11 42.3	1.0 08	159.6	11 12.4	1.0 08	159.6	10 42.5	1.0 08	159.6	10 12.6	1.0 08	159.7	9 42.7	1.0 08	159.7	9 12.8	1.0 08	159.8	8 42.9	1.0 08	159.8	20
1	12 07.4	1.0 08	158.5	11 37.5	1.0 08	158.5	11 07.6	1.0 08	158.6	10 37.7	1.0 08	158.6	10 07.8	1.0 08	158.7	9 37.9	1.0 08	158.7	9 08.0	1.0 08	158.7	8 38.1	1.0 08	158.8	1
2	12 02.3	1.0 09	157.5	11 32.4	1.0 09	157.5	11 02.5	1.0 09	157.6	10 32.7	1.0 09	157.6	10 02.8	1.0 09	157.7	9 32.9	1.0 09	157.7	9 03.0	1.0 09	157.7	8 33.1	1.0 09	157.8	2
3	11 57.0	1.0 09	156.5	11 27.2	1.0 09	156.5	10 57.3	1.0 09	156.6	10 27.4	1.0 09	156.6	9 57.5	1.0 09	156.6	9 27.6	1.0 09	156.7	8 57.8	1.0 09	156.7	8 27.9	1.0 09	156.8	3
4	11 51.5	1.0 10	155.4	11 21.7	1.0 10	155.5	10 51.8	1.0 10	155.5	10 21.9	1.0 09	155.6	9 52.1	1.0 09	155.6	9 22.2	1.0 09	155.7	8 52.3	1.0 09	155.7	8 22.4	1.0 09	155.8	4
25	11 45.8	1.0 10	154.4	11 16.0	1.0 10	154.5	10 46.1	1.0 10	154.5	10 16.2	1.0 10	154.6	9 46.4	1.0 10	154.6	9 16.5	1.0 10	154.7	8 46.7	1.0 10	154.7	8 16.8	1.0 10	154.8	25
6	11 39.9	99 10	153.4	11 10.0	99 10	153.5	10 40.2	99 10	153.5	10 10.3	99 10	153.6	9 40.5	99 10	153.6	9 10.6	99 10	153.7	8 40.8	1.0 10	153.7	8 10.9	1.0 10	153.8	6
7	11 33.7	99 11	152.4	11 03.9	99 11	152.4	10 34.1	99 11	152.5	10 04.2	99 11	152.6	9 34.4	99 11	152.6	9 04.5	99 10	152.7	8 34.7	99 10	152.7	8 04.9	99 10	152.8	7
8	11 27.4	99 11	151.4	10 57.6	99 11	151.4	10 27.7	99 11	151.5	9 57.9	99 11	151.5	9 28.1	99 11	151.6	8 58.2	99 11	151.7	8 28.4	99 11	151.7	7 58.6	99 11	151.8	8
9	11 20.8	99 11	150.4	10 51.0	99 11	150.4	10 21.2	99 11	150.5	9 51.4	99 11	150.5	9 21.5	99 11	150.6	8 51.7	99 11	150.6	8 21.9	99 11	150.7	7 52.1	99 11	150.8	9
30	11 14.0	99 12	149.4	10 44.2	99 12	149.4	10 14.4	99 12	149.5	9 44.6	99 12	149.5	9 14.8	99 12	149.6	8 45.0	99 12	149.6	8 15.2	99 12	149.7	7 45.4	99 12	149.8	30
1	11 07.0	99 12	148.3	10 37.3	99 12	148.4	10 07.5	99 12	148.5	9 37.7	99 12	148.5	9 07.9	99 12	148.6	8 38.1	99 12	148.6	8 08.3	99 12	148.7	7 38.5	99 12	148.8	1
2	10 59.9	99 12	147.3	10 30.1	99 12	147.4	10 00.3	99 12	147.5	9 30.5	99 12	147.5	9 00.7	99 12	147.6	8 31.0	99 12	147.6	8 01.2	99 12	147.7	7 31.4	99 12	147.8	2
3	10 52.5	99 13	146.3	10 22.7	99 13	146.4	9 52.9	99 13	146.4	9 23.2	99 13	146.5	8 53.4	99 13	146.6	8 23.6	99 13	146.6	7 53.9	99 12	146.7	7 24.1	99 12	146.8	3
4	10 44.9	99 13	145.3	10 15.1	99 13	145.4	9 45.4	99 13	145.4	9 15.6	99 13	145.5	8 45.9	99 13	145.6	8 16.1	99 13	145.6	7 46.4	99 13	145.7	7 16.6	99 13	145.8	4
35	10 37.1	99 13	144.3	10 07.4	99 13	144.4	9 37.6	99 13	144.4	9 07.9	99 13	144.5	8 38.1	99 13	144.6	8 08.4	99 13	144.6	7 38.7	99 13	144.7	7 08.9	99 13	144.8	35
6	10 29.1	99 14	143.3	9 59.4	99 14	143.4	9 29.7	99 14	143.4	9 00.0	99 14	143.5	8 30.2	99 14	143.6	8 00.5	99 13	143.6	7 30.8	99 14	143.7	7 01.0	99 13	143.8	6
7	10 21.0	99 14	142.3	9 51.3	99 14	142.4	9 21.5	99 14	142.4	8 51.8	99 14	142.5	8 22.1	99 14	142.6	7 52.4	99 14	142.6	7 22.7	99 14	142.7	6 53.0	99 14	142.8	7
8	10 12.6	99 14	141.3	9 42.9	99 14	141.3	9 13.2	99 14	141.4	8 43.5	99 14	141.5	8 13.8	99 14	141.6	7 44.1	99 14	141.6	7 14.4	99 14	141.7	6 44.7	99 14	141.8	8
9	10 04.1	99 15	140.3	9 34.4	99 14	140.3	9 04.7	99 14	140.4	8 35.0	99 14	140.5	8 05.3	99 14	140.6	7 35.6	99 14	140.6	7 05.9	99 14	140.7	6 36.3	99 14	140.8	9
40	9 55.4	99 15	139.3	9 25.7	99 15	139.3	8 56.0	99 15	139.4	8 26.3	99 15	139.5	7 56.7	99 15	139.6	7 27.0	99 15	139.6	6 57.3	99 15	139.7	6 27.6	99 15	139.8	40
1	9 46.5	99 15	138.3	9 16.8	99 15	138.3	8 47.2	99 15	138.4	8 17.5	99 15	138.5	7 47.8	99 15	138.6	7 18.2	99 15	138.6	6 48.5	99 15	138.7	6 18.8	99 15	138.8	1
2	9 37.4	99 15	137.3	9 07.8	99 15	137.3	8 38.1	99 15	137.4	8 08.5	99 15	137.5	7 38.8	99 15	137.6	7 09.1	99 15	137.6	6 39.5	99 15	137.7	6 09.8	99 15	137.8	2
3	9 28.2	99 16	136.3	8 58.5	99 16	136.3	8 28.9	99 16	136.4	7 59.2	99 16	136.5	7 29.6	99 16	136.6	7 00.0	99 16	136.6	6 30.3	99 16	136.7	6 00.7	99 16	136.8	3
4	9 18.7	99 16	135.3	8 49.1	99 16	135.3	8 19.5	99 16	135.4	7 49.9	99 16	135.5	7 20.2	99 16	135.6	6 50.6	99 16	135.7	6 21.0	99 16	135.7	5 51.4	99 16	135.8	4
45	9 09.2	99 16	134.3	8 39.5	99 16	134.3	8 09.9	99 16	134.4	7 40.3	99 16	134.5	7 10.7	99 16	134.6	6 41.1	99 16	134.7	6 11.5	99 16	134.7	5 41.9	99 16	134.8	45
6	8 59.4	99 16	133.3	8 29.8	99 16	133.3	8 00.2	99 16	133.4	7 30.6	99 16	133.5	7 01.0	99 16	133.6	6 31.4	99 16	133.7	6 01.8	99 16	133.8	5 32.2	99 16	133.8	6
7	8 49.5	99 17	132.3	8 19.9	99 17	132.3	7 50.3	99 17	132.4	7 20.7	99 17	132.5	6 51.2	99 17	132.6	6 21.6	99 17	132.7	5 52.0	99 17	132.8	5 22.4	99 17	132.8	7
8	8 39.4	99 17	131.3	8 09.9	99 17	131.3	7 40.3	99 17	131.4	7 10.7	99 17	131.5	6 41.1	99 17	131.6	6 11.6	99 17	131.7	5 42.0	99 17	131.8	5 12.4	99 17	131.9	8
9	8 29.2	99 17	130.3	7 59.7	99 17	130.4	7 30.1	99 17	130.4	7 00.5	99 17	130.5	6 31.0	99 17	130.6	6 01.4	99 17	130.7	5 31.9	99 17	130.8	5 02.3	99 17	130.9	9
50	8 18.8	98 18	129.3	7 49.3	98 18	129.4	7 19.7	98 18	129.4	6 50.2	98 17	129.5	6 20.7	98 17	129.6	5 51.1	98 17	129.7	5 21.6	98 17	129.8				50
1	8 08.3	98 18	128.3	7 38.8	98 18	128.4	7 09.3	98 18	128.5	6 39.7	98 18	128.5	6 10.2	98 18	128.6	5 40.7	98 18	128.7	5 11.1	98 18	128.8				1
2	7 57.6	98 18	127.3	7 28.1	98 18	127.4	6 58.6	98 18	127.5	6 29.1	98 18	127.6	5 59.6	98 18	127.6	5 30.1	98 18	127.7	5 00.5	98 18	127.8				2
3	7 46.8	98 18	126.3	7 17.3	98 18	126.4	6 47.8	98 18	126.5	6 18.3	98 18	126.6	5 48.8	98 18	126.7	5 19.3	98 18	126.7							3
4	7 35.9	98 18	125.3	7 06.4	98 18	125.4	6 36.9	98 18	125.5	6 07.4	98 18	125.6	5 37.9	98 18	125.7	5 08.4	98 18	125.8							4
55	7 24.8	98 19	124.3	6 55.3	98 19	124.4	6 25.8	98 19	124.5	5 56.4	98 19	124.6	5 26.9	98 19	124.7										55
6	7 13.6	98 19	123.3	6 44.1	98 19	123.4	6 14.7	98 19	123.5	5 45.2	98 19	123.6	5 15.7	98 19	123.7										6
7	7 02.2	98 19	122.3	6 32.8	98 19	122.4	6 03.3	98 19	122.5	5 33.9	98 19	122.6	5 04.4	98 19	122.7										7
8	6 50.8	98 19	121.3	6 21.3	98 19	121.4	5 51.9	98 19	121.5	5 22.4	98 19	121.6													8
9	6 39.2	98 20	120.3	6 09.8	98 20	120.4	5 40.3	98 19	120.5	5 10.9	98 19	120.6													9
60	6 27.5	98 20	119.4	5 58.1	98 20	119.5	5 28.6	98 20	119.6																60
1	6 15.7	98 20	118.4	5 46.3	98 20	118.5	5 16.8	98 20	118.6																1
2	6 03.7	98 20	117.4	5 34.3	98 20	117.5	5 04.9	98 20	117.6																2
3	5 51.7	98 20	116.4	5 22.3	98 20	116.5																			3
4	5 39.6	98 20	115.4	5 10.2	98 20	115.5																			4
65	5 27.3	98 21	114.4																						65
6	5 15.0	98 21	113.5																						6
7	5 02.6	98 21	112.5																						7

Lat. 77°

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	17 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	00
1	16 59.9	1.0 01	179.0	17 29.9	1.0 01	179.0	17 59.9	1.0 01	179.0	18 29.9	1.0 01	179.0	18 59.9	1.0 01	178.9	19 29.9	1.0 01	178.9	19 59.9	1.0 01	178.9	20 29.9	1.0 01	178.9	1
2	16 59.5	1.0 01	177.9	17 29.5	1.0 01	177.9	17 59.5	1.0 01	177.9	18 29.5	1.0 01	177.9	18 59.5	1.0 01	177.9	19 29.5	1.0 01	177.9	19 59.5	1.0 01	177.9	20 29.5	1.0 01	177.9	2
3	16 58.9	1.0 01	176.9	17 28.9	1.0 01	176.9	17 58.9	1.0 01	176.9	18 28.9	1.0 01	176.9	18 58.9	1.0 01	176.8	19 28.9	1.0 01	176.8	19 58.9	1.0 01	176.8	20 28.9	1.0 01	176.8	3
4	16 58.0	1.0 02	175.8	17 28.0	1.0 02	175.8	17 58.0	1.0 02	175.8	18 28.0	1.0 02	175.8	18 58.0	1.0 02	175.8	19 28.0	1.0 02	175.8	19 58.0	1.0 02	175.8	20 28.0	1.0 02	175.8	4
05	16 56.9	1.0 02	174.8	17 26.9	1.0 02	174.8	17 56.9	1.0 02	174.8	18 26.9	1.0 02	174.8	18 56.9	1.0 02	174.7	19 26.9	1.0 02	174.7	19 56.9	1.0 02	174.7	20 26.9	1.0 02	174.7	05
6	16 55.6	1.0 03	173.7	17 25.6	1.0 03	173.7	17 55.6	1.0 03	173.7	18 25.6	1.0 03	173.7	18 55.5	1.0 03	173.7	19 25.5	1.0 03	173.7	19 55.5	1.0 03	173.7	20 25.5	1.0 03	173.7	6
7	16 54.0	1.0 03	172.7	17 24.0	1.0 03	172.7	17 54.0	1.0 03	172.7	18 24.0	1.0 03	172.7	18 53.9	1.0 03	172.6	19 23.9	1.0 03	172.7	19 53.9	1.0 03	172.6	20 23.9	1.0 03	172.6	7
8	16 52.2	1.0 03	171.7	17 22.1	1.0 03	171.6	17 52.1	1.0 03	171.6	18 22.1	1.0 03	171.6	18 52.1	1.0 04	171.6	19 22.1	1.0 04	171.6	19 52.1	1.0 04	171.6	20 22.0	1.0 04	171.5	8
9	16 50.1	1.0 04	170.6	17 20.1	1.0 04	170.6	17 50.0	1.0 04	170.6	18 20.0	1.0 04	170.6	18 50.0	1.0 04	170.5	19 20.0	1.0 04	170.5	19 49.9	1.0 04	170.5	20 19.9	1.0 04	170.5	9
10	16 47.8	1.0 04	169.6	17 17.7	1.0 04	169.6	17 47.7	1.0 04	169.5	18 17.7	1.0 04	169.5	18 47.6	1.0 04	169.5	19 17.6	1.0 04	169.5	19 47.6	1.0 04	169.4	20 17.6	1.0 04	169.4	10
1	16 45.2	1.0 05	168.5	17 15.2	1.0 05	168.5	17 45.1	1.0 05	168.5	18 15.1	1.0 05	168.5	18 45.1	1.0 05	168.4	19 15.0	1.0 05	168.4	19 45.0	1.0 05	168.4	20 15.0	1.0 05	168.4	1
2	16 42.4	1.0 05	167.5	17 12.4	1.0 05	167.5	17 42.3	1.0 05	167.4	18 12.3	1.0 05	167.4	18 42.2	1.0 05	167.4	19 12.2	1.0 05	167.4	19 42.2	1.0 05	167.3	20 12.1	1.0 05	167.3	2
3	16 39.3	1.0 05	166.5	17 09.3	1.0 05	166.4	17 39.3	1.0 06	166.4	18 09.2	1.0 06	166.4	18 39.2	1.0 06	166.3	19 09.1	1.0 06	166.3	19 39.1	1.0 06	166.3	20 09.0	1.0 06	166.3	3
4	16 36.1	1.0 06	165.4	17 06.0	1.0 06	165.4	17 36.0	1.0 06	165.4	18 05.9	1.0 06	165.3	18 35.9	1.0 06	165.3	19 05.8	1.0 06	165.3	19 35.8	1.0 06	165.2	20 05.7	1.0 06	165.2	4
15	16 32.5	1.0 06	164.4	17 02.5	1.0 06	164.3	17 32.4	1.0 06	164.3	18 02.4	1.0 06	164.3	18 32.3	1.0 06	164.2	19 02.3	1.0 06	164.2	19 32.2	1.0 06	164.2	20 02.2	1.0 06	164.1	15
6	16 28.8	1.0 07	163.3	16 58.7	1.0 07	163.3	17 28.7	1.0 07	163.3	17 58.6	1.0 07	163.2	18 28.5	1.0 07	163.2	18 58.5	1.0 07	163.2	19 28.4	1.0 07	163.1	19 58.3	1.0 07	163.1	6
7	16 24.8	1.0 07	162.3	16 54.7	1.0 07	162.3	17 24.7	1.0 07	162.2	17 54.6	1.0 07	162.2	18 24.5	1.0 07	162.2	18 54.4	1.0 07	162.1	19 24.4	1.0 07	162.1	19 54.3	1.0 07	162.0	7
8	16 20.6	1.0 07	161.3	16 50.5	1.0 07	161.2	17 20.4	1.0 07	161.2	17 50.3	1.0 07	161.2	18 20.3	1.0 07	161.1	18 50.2	1.0 07	161.1	19 20.1	1.0 08	161.0	19 50.0	1.0 08	161.0	8
9	16 16.1	1.0 08	160.2	16 46.0	1.0 08	160.2	17 16.0	1.0 08	160.1	17 45.9	1.0 08	160.1	18 15.8	1.0 08	160.1	18 45.7	1.0 08	160.0	19 15.6	1.0 08	160.0	19 45.5	1.0 08	159.9	9
20	16 11.5	1.0 08	159.2	16 41.4	1.0 08	159.1	17 11.3	1.0 08	159.1	17 41.2	1.0 08	159.1	18 11.1	1.0 08	159.0	18 41.0	1.0 08	159.0	19 10.9	1.0 08	158.9	19 40.8	1.0 08	158.9	20
1	16 06.5	1.0 09	158.2	16 36.4	1.0 09	158.1	17 06.3	1.0 09	158.1	17 36.2	1.0 09	158.0	18 06.1	1.0 09	158.0	18 36.0	1.0 09	157.9	19 05.9	1.0 09	157.9	19 35.8	1.0 09	157.8	1
2	16 01.4	1.0 09	157.1	16 31.3	1.0 09	157.1	17 01.2	1.0 09	157.0	17 31.1	1.0 09	157.0	18 00.9	1.0 09	156.9	18 30.8	1.0 09	156.9	19 00.7	1.0 09	156.8	19 30.6	1.0 09	156.8	2
3	15 56.1	1.0 09	156.1	16 25.9	1.0 09	156.0	16 55.8	1.0 09	156.0	17 25.7	1.0 09	155.9	17 55.5	1.0 09	155.9	18 25.4	1.0 09	155.8	18 55.3	1.0 09	155.8	19 25.2	1.0 09	155.7	3
4	15 50.5	1.0 10	155.1	16 20.3	1.0 10	155.0	16 50.2	1.0 10	155.0	17 20.1	1.0 10	154.9	17 49.9	1.0 10	154.9	18 19.8	1.0 10	154.8	18 49.6	1.0 10	154.8	19 19.5	1.0 10	154.7	4
25	15 44.7	1.0 10	154.0	16 14.5	1.0 10	154.0	16 44.4	1.0 10	153.9	17 14.2	1.0 10	153.9	17 44.1	1.0 10	153.8	18 13.9	99 10	153.8	18 43.8	99 10	153.7	19 13.6	99 10	153.7	25
6	15 38.6	99 10	153.0	16 08.5	99 10	152.9	16 38.3	99 10	152.9	17 08.2	99 10	152.8	17 38.0	99 10	152.8	18 07.8	99 10	152.7	18 37.7	99 10	152.7	19 07.5	99 11	152.6	6
7	15 32.4	99 11	152.0	16 02.2	99 11	151.9	16 32.1	99 11	151.9	17 01.9	99 11	151.8	17 31.7	99 11	151.7	18 01.6	99 11	151.7	18 31.4	99 11	151.6	19 01.2	99 11	151.6	7
8	15 26.0	99 11	150.9	15 55.8	99 11	150.9	16 25.6	99 11	150.8	16 55.4	99 11	150.8	17 25.2	99 11	150.7	17 55.0	99 11	150.6	18 24.9	99 11	150.6	18 54.7	99 11	150.5	8
9	15 19.3	99 11	149.9	15 49.1	99 11	149.8	16 18.9	99 11	149.8	16 48.7	99 12	149.7	17 18.5	99 12	149.7	17 48.3	99 12	149.6	18 18.1	99 12	149.5	18 47.9	99 12	149.5	9
30	15 12.4	99 12	148.9	15 42.2	99 12	148.8	16 12.0	99 12	148.8	16 41.8	99 12	148.7	17 11.6	99 12	148.6	17 41.4	99 12	148.6	18 11.2	99 12	148.5	18 41.0	99 12	148.4	30
1	15 05.3	99 12	147.9	15 35.1	99 12	147.8	16 04.9	99 12	147.7	16 34.7	99 12	147.7	17 04.5	99 12	147.6	17 34.2	99 12	147.5	18 04.0	99 12	147.5	18 33.8	99 12	147.4	1
2	14 58.1	99 12	146.8	15 27.8	99 12	146.8	15 57.6	99 13	146.7	16 27.4	99 13	146.6	16 57.1	99 13	146.6	17 26.9	99 13	146.5	17 56.7	99 13	146.4	18 26.4	99 13	146.4	2
3	14 50.6	99 13	145.8	15 20.3	99 13	145.7	15 50.1	99 13	145.7	16 19.8	99 13	145.6	16 49.6	99 13	145.5	17 19.3	99 13	145.5	17 49.1	99 13	145.4	18 18.8	99 13	145.3	3
4	14 42.9	99 13	144.8	15 12.6	99 13	144.7	15 42.4	99 13	144.6	16 12.1	99 13	144.6	16 41.9	99 13	144.5	17 11.6	99 13	144.4	17 41.3	99 13	144.4	18 11.1	99 13	144.3	4
35	14 35.0	99 13	143.8	15 04.7	99 13	143.7	15 34.5	99 14	143.6	16 04.2	99 14	143.5	16 33.9	99 14	143.5	17 03.6	99 14	143.4	17 33.4	99 14	143.3	18 03.1	99 14	143.3	35
6	14 26.9	99 14	142.7	14 56.6	99 14	142.7	15 26.4	99 14	142.6	15 56.1	99 14	142.5	16 25.8	99 14	142.4	16 55.5	99 14	142.4	17 25.2	99 14	142.3	17 54.9	99 14	142.2	6
7	14 18.7	99 14	141.7	14 48.4	99 14	141.6	15 18.1	99 14	141.6	15 47.8	99 14	141.5	16 17.5	99 14	141.4	16 47.2	99 14	141.4	17 16.9	99 14	141.3	17 46.6	99 14	141.2	7
8	14 10.2	99 14	140.7	14 39.9	99 14	140.6	15 09.6	99 14	140.5	15 39.3	99 14	140.5	16 09.0	99 14	140.4	16 38.6	99 15	140.3	17 08.3	99 15	140.2	17 38.0	99 15	140.2	8
9	14 01.6	99 15	139.7	14 31.2	99 15	139.6	15 00.9	99 15	139.5	15 30.6	99 15	139.5	16 00.3	99 15	139.4	16 29.9	99 15	139.3	16 59.6	99 15	139.2	17 29.3	99 15	139.1	9
40	13 52.7	99 15	138.7	14 22.4	99 15	138.6	14 52.1	99 15	138.5	15 21.7	99 15	138.4	15 51.4	99 15	138.4	16 21.0	99 15	138.3	16 50.7	99 15	138.2	17 20.4	99 15	138.1	40
1	13 43.7	99 15	137.6	14 13.4	99 15	137.6	14 43.0	99 15	137.5	15 12.7	99 15	137.4	15 42.3	99 15	137.3	16 12.0	99 15	137.3	16 41.6	99 15	137.2	17 11.3	99 15	137.1	1
2	13 34.6	99 16	136.6	14 04.2	99 16	136.6	14 33.8	99 16	136.5	15 03.5	99 16	136.4	15 33.1	99 16	136.3	16 02.7	99 16	136.2	16 32.4	99 16	136.1	17 02.0	99 16	136.1	2
3	13 25.2	99 16	135.6	13 54.8	99 16	135.5	14 24.4	99 16	135.5	14 54.1	99 16	135.4	15 23.7	99 16	135.3	15 53.3	99 16	135.2	16 22.9	99 16	135.1	16 52.5	99 16	135.0	3
4	13 15.7	99 16	134.6	13 45.3	99 16	134.5	14 14.9	99 16	134.4	14 44.5	99 16	134.4	15 14.1	99 16	134.3	15 43.7	99 16	134.2	16 13.3	99 16	134.1	16 42.9	99 16	134.0	4
45	13 06.0	99 16	133.6	13 35.6	99 16	133.5	14 05.2	99 16	133.4	14 34.8	99 16	133.3	15 04.4	99 16	133.3	15 33.9	99 17	133.2	16 03.5	99 17	133.1	16 33.1	99 17	133.0	45
6	12 56.1	99 17	132.6	13 25.7	99 17	132.5	13 55.3	99 17	132.4	14 24.9	99 17	132.3	14 54.4	99 17	132.2	15 24.0	99 17	132.2	15 53.6	99 17	132.1	16 23.2	99 17	132.0	6
7	12 46.1	99 17	131.6	13 15.7	99 17	131.5	13 45.2	99 17	131.4	14 14.8	99 17	131.3	14 44.4	99 17	131.2	15 13.9	99 17	131.1	15 43.5	99 17	131.1	16 13.1	99 17	131.0	7
8	12 35.9	99 17	130.6	13 05.5	99 17	130.5	13 35.0	99 17	130.4	14 04.6	99 17	130.3	14 34.1	98 17	130.2	15 03.7	98 17	130.1	15 33.2	98 17	130.0	16 02.8	98 17	129.9	8
9	12 25.6	98 17	129.6	12 55.1	98 18	129.5	13 24.7	98 18	129.4	13 54.2	98 18	129.3	14 23.8	98 18	129.2	14 53.3	98 18	129.1	15 22.8	98 18	129.0	15 52.4	98 18	128.9	9
50	12 15.1	98 18	128.6	12 44.7	98 18	128.5	13 14.2	98 18	128.4	13 43.7	98 18	128.3	14 13.2	98 18	128.2	14 42.7	98 18	128.1	15 12.3	98 18	128.0	15 41.8	98 18	127.9	50
1	12 04.5	98 19	127.6	12 34.0	98 18	127.5	13 03.5	98 18	127.4	13 33.0	98 18	127.3	14 02.5	98 18	127.2	14 32.1	98 18	127.1	15 01.6	98 18	127.0	15 31.1	98 18	126.9	1
2	11 53.7	98 18	126.6	12 23.2	98 18	126.5	12 52.7	98 18	126.4	13 22.2	98 18	126.3	13 51.7	98 18	126.2	14 21.2	98 18	126.1	14 50.7	98 18	126.0	15 20.2	98 18	125.9	2
3	11 42.8	98 18	125.5	12 12.3	98 18	125.5	12 41.8	98 18	125.4	13 11.3	98 18	125.3	13 40.8	98 18	125.2	14 10.2	98 19	125.1	14 39.7	98 19	125.0	15 09.2	98 19	124.9	3
4	11 31.8	98 19	124.5	12 01.2	98 19	124.5	12 30.7	98 19	124.4	13 00.2	98 19	124.3	13 29.7	98 19	124.2	13 59.1	98 19	124.1	14 28.6	98 19	124.0	14 58.1	98 19	123.9	4
55	11 20.6	98 19	123.5	11 50.0	98 19	123.4	12 19.5	98 19	123.4	12 49.0	98 19	123.3	13 18.4	98 19	123.2	13 47.9	98 19	123.1	14 17.3	98 19	123.0	14 46.8	98 19	122.9	55
6	11 09.3	98 19	122.5	11 38.7	98 19	122.5	12 08.2	98 19	122.4	12 37.6	98 19	122.3	13 07.1	98 19	122.2	13 36.5	98 19	122.1	14 05.9	98 19	122.0	14 35.4	98 19	121.9	6
7	10 57.8	98 19	121.6	11 27.3	98 19	121.5	11 56.7	98 19	121.4	12 26.1	98 19	121.3	12 55.6	98 19	121.2	13 25.0	98 19	121.1	13 54.4	98 19	121.0	14 23.9	98 19	120.9	7
8	10 46.3	98 19	120.6	11 15.7	98 19	120.5	11 45.1	98 20	120.4	12 14.5	98 20	120.3	12 44.0	98 20	120.2	13 13.4	98 20	120.1	13 42.8	98 20	120.0	14 12.2	98 20	119.9	8
9	10 34.6	98 20	119.6	11 04.0	98 20	119.5	11 33.4	98 20	119.4	12 02.8	98 20	119.3	12 32.2	98 20	119.2	13 01.6	98 20	119.1	13 31.0	98 20	119.0	14 00.4	98 20	118.9	9
60	10 22.8	98 20	118.6	10 52.2	98 20	118.5	11 21.6	98 20	118.4	11 51.0	98 20	118.3	12 20.4	98 20	118.2	12 49.8	98 20	118.1	13 19.2	98 20	118.0	13 48.6	98 20	117.8	60
1	10 10.9	98 20	117.6	10 40.3	98 20	117.5	11 09.7	98 20	117.4	11 39.0	98 20	117.3	12 08.4	98 20	117.2	12 37.8	98 20	117.1	13 07.2	98 20	117.0	13 36.6	98 20	116.9	1
2	9 58.9	98 20	116.6	10 28.2	98 20	116.5	10 57.6	98 20	116.4	11 27.0	98 20	116.3	11 56.4	98 20	116.2	12 25.7	98 20	116.1	12 55.1	98 20	116.0	13 24.5	98 20	115.9	2
3	9 46.7	98 20	115.6	10 16.1	98 20	115.5	10 45.5	98 20	115.4	11 14.8	98 20	115.3	11 44.2	98 20	115.2	12 13.6	98 20	115.1	12 42.9	98 20	115.0	13 12.3	98 20	114.9	3
4	9 34.5	98 21	114.6	10 03.9	98 21	114.5	10 33.2	98 21	114.4	11 02.6	98 21	114.3	11 31.9	98 21	114.2	12 01.3	98 21	114.1	12 30.6	98 21	114.0	13 00.0	98 21	113.9	4
65	9 22.2	98 21	113.6	9 51.5	98 21	113.5	10 20.9	98 21	113.4	10 50.2	98 21	113.3	11 19.6	98 21	113.2	11 48.9	98 21	113.1	12 18.3	98 21	113.0	12 47.6	98 21	112.9	65
6	9 09.8	98 21	112.6	9 39.1	98 21	112.5	10 08.5	98 21	112.4	10 37.8	98 21	112.3	11 07.1	98 21	112.2	11 36.5	98 21	112.1	12 05.8	98 21	112.0	12 35.1	98 21	111.9	6
7	8 57.3	98 21	111.6	9 26.6	98 21	111.5	9 55.9	98 21	111.4	10 25.3	98 21	111.3	10 54.6	98 21	111.2	11 23.9	98 21	111.1	11 53.2	98 21	111.0	12 22.6	98 21	110.9	7
8	8 44.7	98 21	110.6	9 14.0	98 21	110.5	9 43.3	98 21	110.4	10 12.6	98 21	110.3	10 42.0	98 21	110.2	11 11.3	98 21	110.1	11 40.6	98 21	110.0	12 09.9	98 21	109.9	8
9	8 32.0	98 21	109.7	9 01.3	98 21	109.5	9 30.6	98 21	109.4	9 59.9	98 21	109.3	10 29.3	98 21	109.2	10 58.6	98 21	109.1	11 27.9	98 21	109.0	11 57.2	98 21	108.9	9
70	8 19.3	98 21	108.7	8 48.6	98 21	108.6	9 17.9	98 21	108.5	9 47.2	98 21	108.3	10 16.5	98 21	108.2	10 45.8	98 21	108.1	11 15.1	98 21	108.0	11 44.4	98 21	107.9	70
1	8 06.4	98 21	107.7	8 35.7	98 22	107.6	9 05.0	98 22	107.5	9 34.3	98 22	107.4	10 03.6	98 22	107.2	10 32.9	98 22	107.1	11 02.2	98 22	107.0	11 31.5	98 22	106.9	1
2	7 53.5	98 22	106.7	8 22.8	98 22	106.6	8 52.1	98 22	106.5	9 21.4	98 22	106.4	9 50.7	98 22	106.3	10 20.0	98 22	106.2	10 49.3	98 22	106.0	11 18.5	98 22	105.9	2
3	7 40.6	98 22	105.7	8 09.9	98 22	105.6	8 39.1	98 22	105.5	9 08.4	98 22	105.4	9 37.7	98 22	105.3	10 07.0	98 22	105.2	10 36.3	98 22	105.1	11 05.5	98 22	104.9	3
4	7 27.6	98 22	104.7	7 56.8	98 22	104.6	8 26.1	98 22	104.5	8 55.4	98 22	104.4	9 24.7	98 22	104.3	9 53.9	98 22	104.2	10 23.2	98 22	104.1	10 52.5	98 22	104.0	4
75	7 14.5	98 22	103.8	7 43.7	98 22	103.6	8 13.0	98 22	103.5	8 42.3	98 22	103.4	9 11.6	98 22	103.3	9 40.8	98 22	103.2	10 10.1	98 22	103.1	10 39.3	98 22	103.0	75
6	7 01.3	98 22	102.8	7 30.6	98 22	102.7	7 59.9	98 22	102.6	8 29.1	98 22	102.4	8 58.4	98 22	102.3	9 27.6	98 22	102.2	9 56.9	98 22	102.1	10 26.2	97 22	102.0	6
7	6 48.2	98 22	101.8	7 17.4	98 22	101.7	7 46.7	98 22	101.6	8 15.9	98 22	101.5	8 45.2	98 22	101.3	9 14.4	98 22	101.2	9 43.7	97 22	101.1	10 12.9	97 22	101.0	7
8	6 34.9	98 22	100.8	7 04.2	98 22	100.7	7 33.4	98 22	100.6	8 02.7	97 22	100.5	8 31.9	97 22	100.4	9 01.2	97 22	100.3	9 30.4	97 22	100.1	9 59.7	97 22	100.0	8
9	6 21.6	98 22	99.8	6 50.9	97 22	99.7	7 20.1	97 22	99.6	7 49.4	97 22	99.5	8 18.6	97 22	99.4	8 47.9	97 22	99.3	9 17.1	97 22	99.2	9 46.4	97 22	99.0	9
80	6 08.3	97 22	98.9	6 37.6	97 22	98.7	7 06.8	97 22	98.6	7 36.1	97 22	98.5	8 05.3	97 22	98.4	8 34.5	97 22	98.3	9 03.8	97 22	98.2	9 33.0	97 22	98.1	80
1	5 55.0	97 22	97.9	6 24.2	97 22	97.8	6 53.5	97 22	97.7	7 22.7	97 22	97.5	7 51.9	97 22	97.4	8 21.2	97 22	97.3	8 50.4	97 22	97.2	9 19.6	97 22	97.1	1
2	5 41.6	97 22	96.9	6 10.8	97 22	96.8	6 40.1	97 22	96.7	7 09.3	97 22	96.6	7 38.5	97 22	96.5	8 07.8	97 22	96.3	8 37.0	97 22	96.2	9 06.2	97 22	96.1	2
3	5 28.2	97 22	95.9	5 57.4	97 22	95.8	6 26.6	97 22	95.7	6 55.9	97 22	95.6	7 25.1	97 22	95.5	7 54.3	97 22	95.4	8 23.6	97 22	95.2	8 52.8	97 22	95.1	3
4	5 14.7	97 22	94.9	5 44.0	97 22	94.8	6 13.2	97 22	94.7	6 42.4	97 22	94.6	7 11.7	97 22	94.5	7 40.9	97 22	94.4	8 10.1	97 22	94.3	8 39.3	97 22	94.2	4
85	5 01.3	97 22	94.0	5 30.5	97 22	93.9	5 59.7	97 22	93.7	6 29.0	97 22	93.6	6 58.2	97 22	93.5	7 27.4	97 22	93.4	7 56.6	97 22	93.3	8 25.9	97 22	93.2	85
6				5 17.0	97 22	92.9	5 46.3	97 22	92.8	6 15.5	97 22	92.7	6 44.7	97 22	92.5	7 13.9	97 22	92.4	7 43.2	97 22	92.3	8 12.4	97 22	92.2	6
7				5 03.6	97 22	91.9	5 32.8	97 22	91.8	6 02.0	97 22	91.7	6 31.2	97 22	91.6	7 00.4	97 22	91.5	7 29.7	97 22	91.3	7 58.9	97 22	91.2	7
8							5 19.3	97 22	90.8	5 48.5	97 22	90.7	6 17.7	97 22	90.6	6 47.0	97 22	90.5	7 16.2	97 22	90.4	7 45.4	97 22	90.3	8
9							5 05.8	97 22	89.8	5 35.0	97 22	89.7	6 04.2	97 22	89.6	6 33.5	97 22	89.5	7 02.7	97 22	89.4	7 31.9	97 22	89.3	9
90										5 21.5	97 22	88.8	5 50.7	97 22	88.6	6 20.0	97 22	88.5	6 49.2	97 22	88.4	7 18.4	97 22	88.3	90

Lat. 77°

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	7 30.0 1.0 00	180.0	7 00.0 1.0 00	180.0	6 30.0 1.0 00	180.0	6 00.0 1.0 00	180.0	5 30.0 1.0 00	180.0	00
1	8 59.9 1.0 01	179.0	8 29.9 1.0 01	179.0	7 59.9 1.0 01	179.0	7 29.9 1.0 01	179.0	6 59.9 1.0 01	179.0	6 29.9 1.0 01	179.0	5 59.9 1.0 01	179.0	5 29.9 1.0 01	179.0	1
2	8 59.5 1.0 01	178.0	8 29.5 1.0 01	178.0	7 59.5 1.0 01	178.0	7 29.5 1.0 01	178.0	6 59.5 1.0 01	178.0	6 29.5 1.0 01	178.0	5 59.5 1.0 01	178.0	5 29.5 1.0 01	178.0	2
3	8 58.9 1.0 01	177.0	8 28.9 1.0 01	177.0	7 58.9 1.0 01	177.0	7 28.9 1.0 01	177.0	6 58.9 1.0 01	177.0	6 28.9 1.0 01	177.0	5 58.9 1.0 01	177.0	5 28.9 1.0 01	177.0	3
4	8 58.1 1.0 02	176.0	8 28.1 1.0 02	176.0	7 58.1 1.0 02	176.0	7 28.1 1.0 02	176.0	6 58.1 1.0 02	176.0	6 28.1 1.0 02	176.0	5 58.1 1.0 02	176.0	5 28.1 1.0 02	176.0	4
05	8 57.0 1.0 02	175.0	8 27.0 1.0 02	175.0	7 57.0 1.0 02	175.0	7 27.0 1.0 02	175.0	6 57.1 1.0 02	175.0	6 27.1 1.0 02	175.0	5 57.1 1.0 02	175.0	5 27.1 1.0 02	175.0	05
6	8 55.7 1.0 03	173.9	8 25.7 1.0 03	174.0	7 55.7 1.0 03	174.0	7 25.7 1.0 03	174.0	6 55.8 1.0 03	174.0	6 25.8 1.0 03	174.0	5 55.8 1.0 03	174.0	5 25.8 1.0 03	174.0	6
7	8 54.2 1.0 03	172.9	8 24.2 1.0 03	172.9	7 54.2 1.0 03	173.0	7 24.2 1.0 03	173.0	6 54.2 1.0 03	173.0	6 24.2 1.0 03	173.0	5 54.2 1.0 03	173.0	5 24.3 1.0 03	173.0	7
8	8 52.4 1.0 03	171.9	8 22.4 1.0 03	171.9	7 52.4 1.0 03	172.0	7 22.4 1.0 03	172.0	6 52.5 1.0 03	172.0	6 22.5 1.0 03	172.0	5 52.5 1.0 03	172.0	5 22.5 1.0 03	172.0	8
9	8 50.4 1.0 04	170.9	8 20.4 1.0 04	170.9	7 50.4 1.0 04	170.9	7 20.4 1.0 04	171.0	6 50.5 1.0 04	171.0	6 20.5 1.0 04	171.0	5 50.5 1.0 04	171.0	5 20.5 1.0 04	171.0	9
10	8 48.1 1.0 04	169.9	8 18.2 1.0 04	169.9	7 48.2 1.0 04	169.9	7 18.2 1.0 04	170.0	6 48.2 1.0 04	170.0	6 18.3 1.0 04	170.0	5 48.3 1.0 04	170.0	5 18.3 1.0 04	170.0	10
1	8 45.7 1.0 05	168.9	8 15.7 1.0 05	168.9	7 45.7 1.0 05	168.9	7 15.7 1.0 04	169.0	6 45.8 1.0 04	169.0	6 15.8 1.0 04	169.0	5 45.8 1.0 04	169.0	5 15.9 1.0 04	169.0	1
2	8 42.9 1.0 05	167.9	8 13.0 1.0 05	167.9	7 43.0 1.0 05	167.9	7 13.0 1.0 05	168.0	6 43.1 1.0 05	168.0	6 13.1 1.0 05	168.0	5 43.1 1.0 05	168.0	5 13.2 1.0 05	168.1	2
3	8 40.0 1.0 05	166.9	8 10.0 1.0 05	166.9	7 40.1 1.0 05	166.9	7 10.1 1.0 05	167.0	6 40.1 1.0 05	167.0	6 10.2 1.0 05	167.0	5 40.2 1.0 05	167.0	5 10.3 1.0 05	167.1	3
4	8 36.8 1.0 06	165.9	8 06.9 1.0 06	165.9	7 36.9 1.0 06	165.9	7 06.9 1.0 06	166.0	6 37.0 1.0 06	166.0	6 07.0 1.0 06	166.0	5 37.1 1.0 06	166.0	5 07.1 1.0 06	166.1	4
15	8 33.4 1.0 06	164.9	8 03.5 1.0 06	164.9	7 33.5 1.0 06	164.9	7 03.6 1.0 06	165.0	6 33.6 1.0 06	165.0	6 03.7 1.0 06	165.0	5 33.7 1.0 06	165.0	5 03.8 1.0 06	165.1	15
6	8 29.8 1.0 06	163.9	7 59.8 1.0 06	163.9	7 29.9 1.0 06	163.9	6 59.9 1.0 06	164.0	6 30.0 1.0 06	164.0	6 00.1 1.0 06	164.0	5 30.1 1.0 06	164.0	5 00.2 1.0 06	164.1	6
7	8 25.9 1.0 07	162.9	7 56.0 1.0 07	162.9	7 26.0 1.0 07	162.9	6 56.1 1.0 07	163.0	6 26.2 1.0 07	163.0	5 56.2 1.0 07	163.0	5 26.3 1.0 07	163.1			7
8	8 21.8 1.0 07	161.8	7 51.9 1.0 07	161.9	7 22.0 1.0 07	161.9	6 52.0 1.0 07	162.0	6 22.1 1.0 07	162.0	5 52.2 1.0 07	162.0	5 22.2 1.0 07	162.1			8
9	8 17.5 1.0 08	160.8	7 47.6 1.0 08	160.9	7 17.7 1.0 08	160.9	6 47.7 1.0 08	161.0	6 17.8 1.0 08	161.0	5 47.9 1.0 08	161.0	5 18.0 1.0 08	161.1			9
20	8 12.9 1.0 08	159.8	7 43.0 1.0 08	159.9	7 13.1 1.0 08	159.9	6 43.2 1.0 08	160.0	6 13.3 1.0 08	160.0	5 43.4 1.0 08	160.0	5 13.5 1.0 08	160.1			20
1	8 08.2 1.0 08	158.8	7 38.3 1.0 08	158.9	7 08.4 1.0 08	158.9	6 38.5 1.0 08	159.0	6 08.6 1.0 08	159.0	5 38.7 1.0 08	159.0	5 08.8 1.0 08	159.1			1
2	8 03.2 1.0 09	157.8	7 33.3 1.0 09	157.9	7 03.4 1.0 09	157.9	6 33.5 1.0 09	158.0	6 03.6 1.0 09	158.0	5 33.7 1.0 09	158.0	5 03.8 1.0 09	158.1			2
3	7 58.0 1.0 09	156.8	7 28.1 1.0 09	156.9	6 58.2 1.0 09	156.9	6 28.3 1.0 09	157.0	5 58.5 1.0 09	157.0	5 28.6 1.0 09	157.0					3
4	7 52.6 1.0 09	155.8	7 22.7 1.0 09	155.9	6 52.8 1.0 09	155.9	6 23.0 1.0 09	156.0	5 53.1 1.0 09	156.0	5 23.2 1.0 09	156.1					4
25	7 46.9 1.0 10	154.8	7 17.1 1.0 10	154.9	6 47.2 1.0 10	154.9	6 17.4 1.0 10	155.0	5 47.5 1.0 10	155.0	5 17.6 1.0 10	155.1					25
6	7 41.1 1.0 10	153.8	7 11.2 1.0 10	153.9	6 41.4 1.0 10	153.9	6 11.5 1.0 10	154.0	5 41.7 1.0 10	154.0	5 11.8 1.0 10	154.1					6
7	7 35.0 99 10	152.8	7 05.2 99 10	152.9	6 35.3 99 10	152.9	6 05.5 99 10	153.0	5 35.7 99 10	153.0	5 05.8 99 10	153.1					7
8	7 28.8 99 11	151.8	6 58.9 99 11	151.9	6 29.1 99 11	151.9	5 59.3 99 11	152.0	5 29.4 99 11	152.0							8
9	7 22.3 99 11	150.8	6 52.5 99 11	150.9	6 22.6 99 11	150.9	5 52.8 99 11	151.0	5 23.0 99 11	151.0							9
30	7 15.6 99 12	149.8	6 45.8 99 11	149.9	6 16.0 99 11	149.9	5 46.2 99 11	150.0	5 16.4 99 11	150.0							30
1	7 08.7 99 12	148.8	6 38.9 99 12	148.9	6 09.1 99 12	148.9	5 39.3 99 12	149.0	5 09.5 99 12	149.0							1
2	7 01.6 99 12	147.8	6 31.8 99 12	147.9	6 02.1 99 12	147.9	5 32.3 99 12	148.0	5 02.5 99 12	148.1							2
3	6 54.3 99 12	146.8	6 24.6 99 12	146.9	5 54.8 99 12	146.9	5 25.0 99 12	147.0									3
4	6 46.8 99 13	145.8	6 17.1 99 13	145.9	5 47.3 99 13	145.9	5 17.6 99 13	146.0									4
35	6 39.2 99 13	144.8	6 09.4 99 13	144.9	5 39.7 99 13	145.0	5 09.9 99 13	145.0									35
6	6 31.3 99 13	143.8	6 01.6 99 13	143.9	5 31.8 99 13	144.0	5 02.1 99 13	144.0									6
7	6 23.2 99 14	142.8	5 53.5 99 14	142.9	5 23.8 99 14	143.0											7
8	6 15.0 99 14	141.8	5 45.3 99 14	141.9	5 15.6 99 14	142.0											8
9	6 06.6 99 14	140.8	5 36.9 99 14	140.9	5 07.2 99 14	141.0											9
40	5 57.9 99 15	139.9	5 28.3 99 15	139.9													40
1	5 49.2 99 15	138.9	5 19.5 99 15	138.9													1
2	5 40.2 99 15	137.9	5 10.5 99 15	137.9													2
3	5 31.0 99 16	136.9	5 01.4 99 16	137.0													3
4	5 21.7 99 16	135.9															4
45	5 12.3 99 16	134.9															45
6	5 02.6 99 16	133.9															6

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91							5 08.0 97 22	87.8	5 37.3 97 22	87.7	6 06.5 97 22	87.6	6 35.7 97 22	87.4	7 04.9 97 22	87.3	91
2									5 23.8 97 22	86.7	5 53.0 97 22	86.6	6 22.2 97 22	86.5	6 51.4 97 22	86.4	2
3									5 10.3 97 22	85.7	5 39.5 97 22	85.6	6 08.8 97 22	85.5	6 38.0 97 22	85.4	3
4											5 26.1 97 22	84.6	5 55.3 97 22	84.5	6 24.5 97 22	84.4	4
95											5 12.7 97 22	83.7	5 41.9 97 22	83.6	6 11.1 97 22	83.4	95
6													5 28.5 97 22	82.6	5 57.7 97 22	82.5	6
7													5 15.1 97 22	81.6	5 44.4 97 22	81.5	7
8													5 01.8 97 22	80.6	5 31.0 97 22	80.5	8
9															5 17.7 97 22	79.6	9
100															5 04.5 97 22	78.6	10

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	00
1	20 59.9	1.0 01	178.9	21 29.9	1.0 01	178.9	21 59.9	1.0 01	178.9	22 29.9	1.0 01	178.9	22 59.9	1.0 01	178.9	23 29.9	1.0 01	178.9	23 59.9	1.0 01	178.9	24 29.9	1.0 01	178.9	1
2	20 59.5	1.0 01	177.9	21 29.5	1.0 01	177.9	21 59.5	1.0 01	177.9	22 29.5	1.0 01	177.9	22 59.5	1.0 01	177.9	23 29.5	1.0 01	177.9	23 59.5	1.0 01	177.9	24 29.5	1.0 01	177.8	2
3	20 58.9	1.0 01	176.8	21 28.9	1.0 01	176.8	21 58.9	1.0 01	176.8	22 28.9	1.0 01	176.8	22 58.9	1.0 01	176.8	23 28.9	1.0 01	176.8	23 58.9	1.0 01	176.8	24 28.9	1.0 01	176.8	3
4	20 58.0	1.0 02	175.8	21 28.0	1.0 02	175.7	21 58.0	1.0 02	175.7	22 28.0	1.0 02	175.7	22 58.0	1.0 02	175.7	23 28.0	1.0 02	175.7	23 58.0	1.0 02	175.7	24 28.0	1.0 02	175.7	4
05	20 56.9	1.0 02	174.7	21 26.9	1.0 02	174.7	21 56.9	1.0 02	174.7	22 26.9	1.0 02	174.7	22 56.9	1.0 02	174.7	23 26.8	1.0 02	174.6	23 56.8	1.0 02	174.6	24 26.8	1.0 02	174.6	05
6	20 55.5	1.0 03	173.6	21 25.5	1.0 03	173.6	21 55.5	1.0 03	173.6	22 25.5	1.0 03	173.6	22 55.5	1.0 03	173.6	23 25.5	1.0 03	173.6	23 55.4	1.0 03	173.6	24 25.4	1.0 03	173.5	6
7	20 53.9	1.0 03	172.6	21 23.9	1.0 03	172.6	21 53.9	1.0 03	172.5	22 23.8	1.0 03	172.5	22 53.8	1.0 03	172.5	23 23.8	1.0 03	172.5	23 53.8	1.0 03	172.5	24 23.8	1.0 03	172.5	7
8	20 52.0	1.0 04	171.5	21 22.0	1.0 04	171.5	21 52.0	1.0 04	171.5	22 22.0	1.0 04	171.5	22 52.0	1.0 04	171.4	23 21.9	1.0 04	171.4	23 51.9	1.0 04	171.4	24 21.9	1.0 04	171.4	8
9	20 49.9	1.0 04	170.5	21 19.9	1.0 04	170.4	21 49.9	1.0 04	170.4	22 19.8	1.0 04	170.4	22 49.8	1.0 04	170.4	23 19.8	1.0 04	170.4	23 49.8	1.0 04	170.3	24 19.8	1.0 04	170.3	9
10	20 47.5	1.0 04	169.4	21 17.5	1.0 04	169.4	21 47.5	1.0 04	169.4	22 17.5	1.0 04	169.3	22 47.4	1.0 04	169.3	23 17.4	1.0 04	169.3	23 47.4	1.0 04	169.3	24 17.4	1.0 04	169.2	10
1	20 44.9	1.0 05	168.3	21 14.9	1.0 05	168.3	21 44.9	1.0 05	168.3	22 14.8	1.0 05	168.3	22 44.8	1.0 05	168.2	23 14.8	1.0 05	168.2	23 44.7	1.0 05	168.2	24 14.7	1.0 05	168.2	1
2	20 42.1	1.0 05	167.3	21 12.1	1.0 05	167.3	21 42.0	1.0 05	167.2	22 12.0	1.0 05	167.2	22 41.9	1.0 05	167.2	23 11.9	1.0 05	167.1	23 41.9	1.0 05	167.1	24 11.8	1.0 05	167.1	2
3	20 39.0	1.0 06	166.2	21 09.0	1.0 06	166.2	21 38.9	1.0 06	166.2	22 08.9	1.0 06	166.1	22 38.8	1.0 06	166.1	23 08.8	1.0 06	166.1	23 38.7	1.0 06	166.1	24 08.7	1.0 06	166.0	3
4	20 35.7	1.0 06	165.2	21 05.6	1.0 06	165.1	21 35.6	1.0 06	165.1	22 05.5	1.0 06	165.1	22 35.5	1.0 06	165.0	23 05.4	1.0 06	165.0	23 35.4	1.0 06	165.0	24 05.3	1.0 06	164.9	4
15	20 32.1	1.0 06	164.1	21 02.0	1.0 06	164.1	21 32.0	1.0 06	164.0	22 01.9	1.0 06	164.0	22 31.9	1.0 06	164.0	23 01.8	1.0 06	163.9	23 31.7	1.0 06	163.9	24 01.7	1.0 06	163.9	15
6	20 28.3	1.0 07	163.1	20 58.2	1.0 07	163.0	21 28.1	1.0 07	163.0	21 58.1	1.0 07	163.0	22 28.0	1.0 07	162.9	22 57.9	1.0 07	162.9	23 27.9	1.0 07	162.8	23 57.8	1.0 07	162.8	6
7	20 24.2	1.0 07	162.0	20 54.2	1.0 07	162.0	21 24.1	1.0 07	161.9	21 54.0	1.0 07	161.9	22 23.9	1.0 07	161.9	22 53.9	1.0 07	161.8	23 23.8	1.0 07	161.8	23 53.7	1.0 07	161.7	7
8	20 19.9	1.0 08	161.0	20 49.9	1.0 08	160.9	21 19.8	1.0 08	160.9	21 49.7	1.0 08	160.8	22 19.6	1.0 08	160.8	22 49.5	1.0 08	160.8	23 19.4	1.0 08	160.7	23 49.3	1.0 08	160.7	8
9	20 15.4	1.0 08	159.9	20 45.3	1.0 08	159.9	21 15.2	1.0 08	159.8	21 45.1	1.0 08	159.8	22 15.0	1.0 08	159.7	22 45.0	1.0 08	159.7	23 14.9	1.0 08	159.6	23 44.8	1.0 08	159.6	9
20	20 10.7	1.0 08	158.8	20 40.6	1.0 08	158.8	21 10.5	1.0 08	158.8	21 40.4	1.0 08	158.7	22 10.3	1.0 08	158.7	22 40.2	1.0 08	158.6	23 10.0	1.0 08	158.6	23 39.9	1.0 08	158.5	20
1	20 05.7	1.0 09	157.8	20 35.6	1.0 09	157.8	21 05.5	1.0 09	157.7	21 35.3	1.0 09	157.7	22 05.2	1.0 09	157.6	22 35.1	1.0 09	157.6	23 05.0	1.0 09	157.5	23 34.9	1.0 09	157.5	1
2	20 00.5	1.0 09	156.7	20 30.3	1.0 09	156.7	21 00.2	1.0 09	156.7	21 30.1	1.0 09	156.6	22 00.0	1.0 09	156.6	22 29.9	1.0 09	156.5	22 59.7	1.0 09	156.5	23 29.6	1.0 09	156.4	2
3	19 55.0	1.0 09	155.7	20 24.9	1.0 09	155.6	20 54.8	1.0 10	155.6	21 24.6	1.0 10	155.5	21 54.5	1.0 10	155.5	22 24.4	1.0 10	155.4	22 54.2	1.0 10	155.4	23 24.1	1.0 10	155.3	3
4	19 49.4	1.0 10	154.7	20 19.2	1.0 10	154.6	20 49.1	1.0 10	154.5	21 18.9	1.0 10	154.5	21 48.8	1.0 10	154.4	22 18.6	1.0 10	154.4	22 48.5	1.0 10	154.3	23 18.3	1.0 10	154.3	4
25	19 43.5	99 10	153.6	20 13.3	99 10	153.5	20 43.2	99 10	153.5	21 13.0	99 10	153.4	21 42.8	99 10	153.4	22 12.7	99 10	153.3	22 42.5	99 10	153.3	23 12.4	99 10	153.2	25
6	19 37.4	99 11	152.6	20 07.2	99 11	152.5	20 37.0	99 11	152.4	21 06.9	99 11	152.4	21 36.7	99 11	152.3	22 06.5	99 11	152.3	22 36.3	99 11	152.2	23 06.2	99 11	152.2	6
7	19 31.0	99 11	151.6	20 00.8	99 11	151.5	20 30.7	99 11	151.4	21 00.5	99 11	151.3	21 30.3	99 11	151.3	22 00.1	99 11	151.2	22 29.9	99 11	151.2	22 59.7	99 11	151.1	7
8	19 24.5	99 11	150.5	19 54.3	99 11	150.4	20 24.1	99 11	150.3	20 53.9	99 11	150.3	21 23.7	99 11	150.2	21 53.5	99 11	150.2	22 23.3	99 11	150.1	22 53.1	99 11	150.0	8
9	19 17.7	99 12	149.4	19 47.5	99 12	149.4	20 17.3	99 12	149.3	20 47.1	99 12	149.2	21 16.9	99 12	149.2	21 46.7	99 12	149.1	22 16.5	99 12	149.1	22 46.3	99 12	149.0	9
30	19 10.8	99 12	148.4	19 40.5	99 12	148.3	20 10.3	99 12	148.3	20 40.1	99 12	148.2	21 09.9	99 12	148.1	21 39.7	99 12	148.1	22 09.4	99 12	148.0	22 39.2	99 12	147.9	30
1	19 03.6	99 12	147.3	19 33.3	99 12	147.3	20 03.1	99 12	147.2	20 32.9	99 12	147.1	21 02.7	99 12	147.1	21 32.4	99 12	147.0	22 02.2	99 12	146.9	22 32.0	99 12	146.9	1
2	18 56.2	99 13	146.3	19 25.9	99 13	146.2	19 55.7	99 13	146.2	20 25.5	99 13	146.1	20 55.2	99 13	146.0	21 25.0	99 13	146.0	21 54.7	99 13	145.9	22 24.5	99 13	145.8	2
3	18 48.6	99 13	145.3	19 18.3	99 13	145.2	19 48.1	99 13	145.1	20 17.8	99 13	145.1	20 47.6	99 13	145.0	21 17.3	99 13	144.9	21 47.1	99 13	144.8	22 16.8	99 13	144.8	3
4	18 40.8	99 13	144.2	19 10.5	99 13	144.2	19 40.3	99 13	144.1	20 10.0	99 13	144.0	20 39.7	99 13	143.9	21 09.5	99 13	143.9	21 39.2	99 13	143.8	22 08.9	99 13	143.7	4
35	18 32.8	99 14	143.2	19 02.5	99 14	143.1	19 32.3	99 14	143.0	20 02.0	99 14	143.0	20 31.7	99 14	142.9	21 01.4	99 14	142.8	21 31.1	99 14	142.8	22 00.8	99 14	142.7	35
6	18 24.6	99 14	142.2	18 54.3	99 14	142.1	19 24.0	99 14	142.0	19 53.7	99 14	141.9	20 23.4	99 14	141.9	20 53.1	99 14	141.8	21 22.8	99 14	141.7	21 52.5	99 14	141.6	6
7	18 16.3	99 14	141.1	18 46.0	99 14	141.1	19 15.6	99 14	141.0	19 45.3	99 14	140.9	20 15.0	99 14	140.8	20 44.7	99 14	140.7	21 14.4	99 14	140.7	21 44.1	99 14	140.6	7
8	18 07.7	99 15	140.1	18 37.4	99 15	140.0	19 07.0	99 15	139.9	19 36.7	99 15	139.9	20 06.4	99 15	139.8	20 36.1	99 15	139.7	21 05.7	99 15	139.6	21 35.4	99 15	139.5	8
9	17 58.9	99 15	139.1	18 28.6	99 15	139.0	18 58.3	99 15	138.9	19 27.9	99 15	138.8	19 57.6	99 15	138.7	20 27.2	99 15	138.7	20 56.9	99 15	138.6	21 26.6	99 15	138.5	9
40	17 50.0	99 15	138.0	18 19.7	99 15	138.0	18 49.3	99 15	137.9	19 19.0	99 15	137.8	19 48.6	99 15	137.7	20 18.2	99 15	137.6	20 47.9	99 15	137.5	21 17.5	99 15	137.5	40
1	17 40.9	99 16	137.0	18 10.5	99 16	136.9	18 40.2	99 16	136.8	19 09.8	99 16	136.8	19 39.4	99 16	136.7	20 09.1	99 16	136.6	20 38.7	99 16	136.5	21 08.3	99 16	136.4	1
2	17 31.6	99 16	136.0	18 01.2	99 16	135.9	18 30.8	99 16	135.8	19 00.5	99 16	135.7	19 30.1	99 16	135.6	19 59.7	99 16	135.6	20 29.3	99 16	135.5	20 58.9	99 16	135.4	2
3	17 22.1	99 16	135.0	17 51.7	99 16	134.9	18 21.4	99 16	134.8	18 51.0	99 16	134.7	19 20.6	99 16	134.6	19 50.2	99 16	134.5	20 19.8	99 16	134.4	20 49.3	99 16	134.4	3
4	17 12.5	99 16	133.9	17 42.1	99 16	133.8	18 11.7	99 16	133.8	18 41.3	99 16	133.7	19 10.9	99 16	133.6	19 40.5	99 16	133.5	20 10.0	99 16	133.4	20 39.6	99 16	133.3	4
45	17 02.7	99 17	132.9	17 32.3	99 17	132.8	18 01.9	99 17	132.7	18 31.4	99 17	132.6	19 01.0	99 17	132.6	19 30.6	99 17	132.5	20 00.1	99 17	132.4	20 29.7	99 17	132.3	45
6	16 52.7	99 17	131.9	17 22.3	99 17	131.8	17 51.9	99 17	131.7	18 21.4	99 17	131.6	18 51.0	99 17	131.5	19 20.5	99 17	131.4	19 50.1	99 17	131.4	20 19.6	98 17	131.3	6
7	16 42.6	99 17	130.9	17 12.2	99 17	130.8	17 41.7	98 17	130.7	18 11.3	98 17	130.6	18 40.8	98 17	130.5	19 10.3	98 17	130.4	19 39.9	98 17	130.3	20 09.4	98 17	130.2	7
8	16 32.3	98 17	129.9	17 01.9	98 17	129.8	17 31.4	98 17	129.7	18 00.9	98 17	129.6	18 30.5	98 18	129.5	19 00.0	98 18	129.4	19 29.5	98 18	129.3	19 59.0	98 18	129.2	8
9	16 21.9	98 18	128.8	16 51.4	98 18	128.7	17 20.9	98 18	128.7	17 50.5	98 18	128.6	18 20.0	98 18	128.5	18 49.5	98 18	128.4	19 19.0	98 18	128.3	19 48.5	98 18	128.2	9
50	16 11.3	98 18	127.8	16 40.8	98 18	127.7	17 10.3	98 18	127.6	17 39.8	98 18	127.5	18 09.3	98 18	127.4	18 38.8	98 18	127.3	19 08.3	98 18	127.3	19 37.8	98 18	127.2	50
1	16 00.6	98 18	126.8	16 30.1	98 18	126.7	16 59.6	98 18	126.6	17 29.0	98 18	126.5	17 58.5	98 18	126.4	18 28.0	98 18	126.3	18 57.5	98 18	126.2	19 27.0	98 18	126.1	1
2	15 49.7	98 18	125.8	16 19.2	98 18	125.7	16 48.7	98 18	125.6	17 18.1	98 18	125.5	17 47.6	98 18	125.4	18 17.1	98 18	125.3	18 46.6	98 18	125.2	19 16.0	98 18	125.1	2
3	15 38.7	98 19	124.8	16 08.1	98 19	124.7	16 37.6	98 19	124.6	17 07.1	98 19	124.5	17 36.5	98 19	124.4	18 06.0	98 19	124.3	18 35.5	98 19	124.2	19 04.9	98 19	124.1	3
4	15 27.5	98 19	123.8	15 57.0	98 19	123.7	16 26.4	98 19	123.6	16 55.9	98 19	123.5	17 25.3	98 19	123.4	17 54.8	98 19	123.3	18 24.2	98 19	123.2	18 53.7	98 19	123.1	4
55	15 16.2	98 19	122.8	15 45.7	98 19	122.7	16 15.1	98 19	122.6	16 44.6	98 19	122.5	17 14.0	98 19	122.4	17 43.4	98 19	122.3	18 12.9	98 19	122.2	18 42.3	98 19	122.1	55
6	15 04.8	98 19	121.8	15 34.3	98 19	121.7	16 03.7	98 19	121.6	16 33.1	98 19	121.5	17 02.5	98 19	121.4	17 32.0	98 19	121.3	18 01.4	98 19	121.2	18 30.8	98 19	121.0	6
7	14 53.3	98 19	120.8	15 22.7	98 19	120.7	15 52.1	98 19	120.6	16 21.5	98 19	120.5	16 51.0	98 20	120.3	17 20.4	98 20	120.2	17 49.8	98 20	120.1	18 19.2	98 20	120.0	7
8	14 41.6	98 20	119.8	15 11.0	98 20	119.6	15 40.4	98 20	119.5	16 09.8	98 20	119.4	16 39.2	98 20	119.3	17 08.6	98 20	119.2	17 38.0	98 20	119.1	18 07.4	98 20	119.0	8
9	14 29.8	98 20	118.7	14 59.2	98 20	118.6	15 28.6	98 20	118.5	15 58.0	98 20	118.4	16 27.4	98 20	118.3	16 56.8	98 20	118.2	17 26.2	98 20	118.1	17 55.6	98 20	118.0	9
60	14 18.0	98 20	117.7	14 47.3	98 20	117.6	15 16.7	98 20	117.5	15 46.1	98 20	117.4	16 15.5	98 20	117.3	16 44.9	98 20	117.2	17 14.2	98 20	117.1	17 43.6	98 20	117.0	60
1	14 06.0	98 20	116.7	14 35.3	98 20	116.6	15 04.7	98 20	116.5	15 34.1	98 20	116.4	16 03.4	98 20	116.3	16 32.8	98 20	116.2	17 02.2	98 20	116.1	17 31.5	98 20	116.0	1
2	13 53.9	98 20	115.7	14 23.2	98 20	115.6	14 52.6	98 20	115.5	15 21.9	98 20	115.4	15 51.3	98 20	115.3	16 20.6	98 20	115.2	16 50.0	98 20	115.1	17 19.3	98 20	115.0	2
3	13 41.6	98 21	114.7	14 11.0	98 21	114.6	14 40.3	98 21	114.5	15 09.7	98 21	114.4	15 39.0	98 21	114.3	16 08.4	98 21	114.2	16 37.7	98 21	114.1	17 07.1	98 21	114.0	3
4	13 29.3	98 21	113.8	13 58.7	98 21	113.6	14 28.0	98 21	113.5	14 57.4	98 21	113.4	15 26.7	98 21	113.3	15 56.0	98 21	113.2	16 25.4	98 21	113.1	16 54.7	98 21	113.0	4
65	13 16.9	98 21	112.8	13 46.3	98 21	112.6	14 15.6	98 21	112.5	14 44.9	98 21	112.4	15 14.3	98 21	112.3	15 43.6	98 21	112.2	16 12.9	98 21	112.1	16 42.2	98 21	112.0	65
6	13 04.4	98 21	111.8	13 33.8	98 21	111.7	14 03.1	98 21	111.5	14 32.4	98 21	111.4	15 01.7	98 21	111.3	15 31.0	98 21	111.2	16 00.3	98 21	111.1	16 29.6	98 21	111.0	6
7	12 51.9	98 21	110.8	13 21.2	98 21	110.7	13 50.5	98 21	110.6	14 19.8	98 21	110.4	14 49.1	98 21	110.3	15 18.4	98 21	110.2	15 47.7	98 21	110.1	16 17.0	98 21	110.0	7
8	12 39.2	98 21	109.8	13 08.5	98 21	109.7	13 37.8	98 21	109.6	14 07.1	98 21	109.4	14 36.4	98 21	109.3	15 05.7	98 21	109.2	15 35.0	98 21	109.1	16 04.3	98 21	109.0	8
9	12 26.5	98 21	108.8	12 55.8	98 21	108.7	13 25.1	98 21	108.6	13 54.4	98 21	108.5	14 23.6	98 21	108.3	14 52.9	98 21	108.2	15 22.2	98 21	108.1	15 51.5	98 21	108.0	9
70	12 13.7	98 21	107.8	12 42.9	98 22	107.7	13 12.2	98 22	107.6	13 41.5	98 22	107.5	14 10.8	98 22	107.4	14 40.1	98 22	107.2	15 09.3	98 22	107.1	15 38.6	98 22	107.0	70
1	12 00.8	98 22	106.8	12 30.0	98 22	106.7	12 59.3	98 22	106.6	13 28.6	98 22	106.5	13 57.9	98 22	106.4	14 27.1	98 22	106.2	14 56.4	98 22	106.1	15 25.7	98 22	106.0	1
2	11 47.8	98 22	105.8	12 17.1	98 22	105.7	12 46.4	98 22	105.6	13 15.6	98 22	105.5	13 44.9	98 22	105.4	14 14.2	98 22	105.3	14 43.4	98 22	105.1	15 12.7	98 22	105.0	2
3	11 34.8	98 22	104.8	12 04.1	98 22	104.7	12 33.3	98 22	104.6	13 02.6	98 22	104.5	13 31.8	98 22	104.4	14 01.1	98 22	104.3	14 30.4	98 22	104.2	14 59.6	97 22	104.0	3
4	11 21.7	98 22	103.8	11 51.0	98 22	103.7	12 20.2	98 22	103.6	12 49.5	98 22	103.5	13 18.7	97 22	103.4	13 48.0	97 22	103.3	14 17.2	97 22	103.2	14 46.5	97 22	103.1	4
75	11 08.6	98 22	102.9	11 37.8	98 22	102.8	12 07.1	97 22	102.6	12 36.3	97 22	102.5	13 05.6	97 22	102.4	13 34.8	97 22	102.3	14 04.1	97 22	102.2	14 33.3	97 22	102.1	75
6	10 55.4	97 22	101.9	11 24.7	97 22	101.8	11 53.9	97 22	101.7	12 23.1	97 22	101.5	12 52.4	97 22	101.4	13 21.6	97 22	101.3	13 50.9	97 22	101.2	14 20.1	97 22	101.1	6
7	10 42.2	97 22	100.9	11 11.4	97 22	100.8	11 40.7	97 22	100.7	12 09.9	97 22	100.6	12 39.1	97 22	100.4	13 08.4	97 22	100.3	13 37.6	97 22	100.2	14 06.8	97 22	100.1	7
8	10 28.9	97 22	99.9	10 58.1	97 22	99.8	11 27.4	97 22	99.7	11 56.6	97 22	99.6	12 25.8	97 22	99.5	12 55.1	97 22	99.3	13 24.3	97 22	99.2	13 53.5	97 22	99.1	8
9	10 15.6	97 22	98.9	10 44.8	97 22	98.8	11 14.1	97 22	98.7	11 43.3	97 22	98.6	12 12.5	97 22	98.5	12 41.7	97 22	98.4	13 10.9	97 22	98.2	13 40.2	97 22	98.1	9
80	10 02.2	97 22	98.0	10 31.5	97 22	97.8	11 00.7	97 22	97.7	11 29.9	97 22	97.6	11 59.1	97 22	97.5	12 28.4	97 22	97.4	12 57.6	97 22	97.3	13 26.8	97 22	97.1	80
1	9 48.9	97 22	97.0	10 18.1	97 22	96.9	10 47.3	97 22	96.7	11 16.5	97 22	96.6	11 45.7	97 22	96.5	12 15.0	97 22	96.4	12 44.2	97 22	96.3	13 13.4	97 22	96.2	1
2	9 35.4	97 22	96.0	10 04.7	97 22	95.9	10 33.9	97 22	95.8	11 03.1	97 22	95.7	11 32.3	97 22	95.5	12 01.5	97 22	95.4	12 30.7	97 22	95.3	12 59.9	97 22	95.2	2
3	9 22.0	97 22	95.0	9 51.2	97 22	94.9	10 20.4	97 22	94.8	10 49.7	97 22	94.7	11 18.9	97 22	94.6	11 48.1	97 22	94.4	12 17.3	97 22	94.3	12 46.5	97 22	94.2	3
4	9 08.6	97 22	94.0	9 37.8	97 22	93.9	10 07.0	97 22	93.8	10 36.2	97 22	93.7	11 05.4	97 22	93.6	11 34.6	97 22	93.5	12 03.8	97 22	93.3	12 33.0	97 22	93.2	4
85	8 55.1	97 22	93.1	9 24.3	97 22	92.9	9 53.5	97 22	92.8	10 22.7	97 22	92.7	10 51.9	97 22	92.6	11 21.1	97 22	92.5	11 50.3	97 22	92.4	12 19.5	97 22	92.3	85
6	8 41.6	97 22	92.1	9 10.8	97 22	92.0	9 40.0	97 22	91.9	10 09.2	97 22	91.7	10 38.4	97 22	91.6	11 07.7	97 22	91.5	11 36.9	97 22	91.4	12 06.1	97 22	91.3	6
7	8 28.1	97 22	91.1	8 57.3	97 22	91.0	9 26.5	97 22	90.9	9 55.7	97 22	90.8	10 25.0	97 22	90.7	10 54.2	97 22	90.5	11 23.4	97 22	90.4	11 52.6	97 22	90.3	7
8	8 14.6	97 22	90.1	8 43.8	97 22	90.0	9 13.0	97 22	89.9	9 42.2	97 22	89.8	10 11.5	97 22	89.7	10 40.7	97 22	89.6	11 09.9	97 22	89.4	11 39.1	97 22	89.3	8
9	8 01.1	97 22	89.2	8 30.3	97 22	89.0	8 59.5	97 22	88.9	9 28.8	97 22	88.8	9 58.0	97 22	88.7	10 27.2	97 22	88.6	10 56.4	97 22	88.5	11 25.6	97 22	88.4	9
90	7 47.6	97 22	88.2	8 16.8	97 22	88.1	8 46.0	97 22	88.0	9 15.3	97 22	87.8	9 44.5	97 22	87.7	10 13.7	97 22	87.6	10 42.9	97 22	87.5	11 12.1	97 22	87.4	90

Lat. 77°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	7 34.1	97 22	87.2	8 03.4	97 22	87.1	8 32.6	97 22	87.0	9 01.8	97 22	86.9	9 31.0	97 22	86.8	10 00.2	97 22	86.6	10 29.4	97 22	86.5	10 58.6	97 22	86.4	91
2	7 20.7	97 22	86.2	7 49.9	97 22	86.1	8 19.1	97 22	86.0	8 48.3	97 22	85.9	9 17.5	97 22	85.8	9 46.7	97 22	85.7	10 15.9	97 22	85.6	10 45.1	97 22	85.4	2
3	7 07.2	97 22	85.3	7 36.4	97 22	85.2	8 05.6	97 22	85.0	8 34.9	97 22	84.9	9 04.1	97 22	84.8	9 33.3	97 22	84.7	10 02.5	97 22	84.6	10 31.7	97 22	84.5	3
4	6 53.8	97 22	84.3	7 23.0	97 22	84.2	7 52.2	97 22	84.1	8 21.4	97 22	84.0	8 50.6	97 22	83.8	9 19.9	97 22	83.7	9 49.1	97 22	83.6	10 18.3	97 22	83.5	4
95	6 40.3	97 22	83.3	7 09.6	97 22	83.2	7 38.8	97 22	83.1	8 08.0	97 22	83.0	8 37.2	97 22	82.9	9 06.5	97 22	82.8	9 35.7	97 22	82.6	10 04.9	97 22	82.5	95
6	6 26.9	97 22	82.4	6 56.2	97 22	82.2	7 25.4	97 22	82.1	7 54.6	97 22	82.0	8 23.9	97 22	81.9	8 53.1	97 22	81.8	9 22.3	97 22	81.7	9 51.5	97 22	81.6	6
7	6 13.6	97 22	81.4	6 42.8	97 22	81.3	7 12.1	97 22	81.2	7 41.3	97 22	81.0	8 10.5	97 22	80.9	8 39.7	97 22	80.8	9 09.0	97 22	80.7	9 38.2	97 22	80.6	7
8	6 00.3	97 22	80.4	6 29.5	97 22	80.3	6 58.7	97 22	80.2	7 28.0	97 22	80.1	7 57.2	97 22	80.0	8 26.4	97 22	79.8	8 55.7	97 22	79.7	9 24.9	97 22	79.6	8
9	5 47.0	97 22	79.4	6 16.2	97 22	79.3	6 45.5	97 22	79.2	7 14.7	97 22	79.1	7 43.9	97 22	79.0	8 13.2	97 22	78.9	8 42.4	97 22	78.8	9 11.6	97 22	78.7	9
100	5 33.7	97 22	78.5	6 03.0	97 22	78.4	6 32.2	97 22	78.3	7 01.5	97 22	78.1	7 30.7	97 22	78.0	7 59.9	97 22	77.9	8 29.2	97 22	77.8	8 58.4	97 22	77.7	100
1	5 20.5	98 22	77.5	5 49.8	98 22	77.4	6 19.0	98 22	77.3	6 48.3	97 22	77.2	7 17.5	97 22	77.1	7 46.8	97 22	76.9	8 16.0	97 22	76.8	8 45.3	97 22	76.7	1
2	5 07.4	98 22	76.5	5 36.6	98 22	76.4	6 05.9	98 22	76.3	6 35.1	98 22	76.2	7 04.4	98 22	76.1	7 33.6	98 22	76.0	8 02.9	97 22	75.9	8 32.1	97 22	75.8	2
3				5 23.5	98 22	75.5	5 52.8	98 22	75.3	6 22.1	98 22	75.2	6 51.3	98 22	75.1	7 20.6	98 22	75.0	7 49.8	98 22	74.9	8 19.1	98 22	74.8	3
4				5 10.5	98 22	74.5	5 39.8	98 22	74.4	6 09.0	98 22	74.3	6 38.3	98 22	74.2	7 07.6	98 22	74.0	7 36.8	98 22	73.9	8 06.1	98 22	73.8	4
105							5 26.8	98 22	73.4	5 56.1	98 22	73.3	6 25.4	98 21	73.2	6 54.6	98 21	73.1	7 23.9	98 21	73.0	7 53.2	98 21	72.9	105
6							5 13.9	98 21	72.4	5 43.2	98 21	72.3	6 12.5	98 21	72.2	6 41.7	98 21	72.1	7 11.0	98 21	72.0	7 40.3	98 21	71.9	6
7							5 01.1	98 21	71.5	5 30.4	98 21	71.4	5 59.7	98 21	71.3	6 28.9	98 21	71.1	6 58.2	98 21	71.0	7 27.5	98 21	70.9	7
8										5 17.6	98 21	70.4	5 46.9	98 21	70.3	6 16.2	98 21	70.2	6 45.5	98 21	70.1	7 14.8	98 21	70.0	8
9										5 04.9	98 21	69.4	5 34.2	98 21	69.3	6 03.5	98 21	69.2	6 32.9	98 21	69.1	7 02.2	98 21	69.0	9
110													5 21.7	98 21	68.4	5 51.0	98 21	68.2	6 20.3	98 21	68.1	6 49.6	98 21	68.0	110
1													5 09.2	98 21	67.4	5 38.5	98 21	67.3	6 07.8	98 21	67.2	6 37.1	98 21	67.1	1
2																5 26.1	98 21	66.3	5 55,4	98 20	66.2	6 24.7	98 20	66.1	2
3																5 13.8	98 20	65.3	5 43.1	98 20	65.2	6 12.4	98 20	65.1	3
4																5 01.5	98 20	64.4	5 30.9	98 20	64.3	6 00.2	98 20	64.2	4
115																			5 18.8	98 20	63.3	5 48.1	98 20	63.2	115
6																			5 06.8	98 20	62.4	5 36.1	98 20	62.2	6
7																						5 24.3	98 20	61.3	7
8																						5 12.5	98 19	60.3	8
9																						5 00.8	98 19	59.4	9

Lat 78°

Lat 79°

H.A	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	00
1	24 59.9	1.0 01	178.9	25 29.9	1.0 01	178.9	25 59.9	1.0 01	178.9	26 29.9	1.0 01	178.9	1
2	24 59.5	1.0 01	177.8	25 29.5	1.0 01	177.8	25 59.5	1.0 01	177.8	26 29.5	1.0 01	177.8	2
3	24 58.9	1.0 01	176.8	25 28.9	1.0 01	176.8	25 58.9	1.0 01	176.7	26 28.8	1.0 02	176.7	3
4	24 58.0	1.0 02	175.7	25 28.0	1.0 02	175.7	25 58.0	1.0 02	175.7	26 28.0	1.0 02	175.7	4
05	24 56.8	1.0 02	174.6	25 26.8	1.0 02	174.6	25 56.8	1.0 02	174.6	26 26.8	1.0 02	174.6	05
6	24 55.4	1.0 03	173.5	25 25.4	1.0 03	173.5	25 55.4	1.0 03	173.5	26 25.4	1.0 03	173.5	6
7	24 53.8	1.0 03	172.4	25 23.8	1.0 03	172.4	25 53.8	1.0 03	172.4	26 23.7	1.0 03	172.4	7
8	24 51.9	1.0 04	171.4	25 21.9	1.0 04	171.4	25 51.8	1.0 04	171.3	26 21.8	1.0 04	171.3	8
9	24 49.7	1.0 04	170.3	25 19.7	1.0 04	170.3	25 49.7	1.0 04	170.3	26 19.7	1.0 04	170.2	9
10	24 47.3	1.0 04	169.2	25 17.3	1.0 04	169.2	25 47.3	1.0 04	169.2	26 17.2	1.0 04	169.1	10
1	24 44.7	1.0 05	168.1	25 14.6	1.0 05	168.1	25 44.6	1.0 05	168.1	26 14.6	1.0 05	168.1	1
2	24 41.8	1.0 05	167.1	25 11.7	1.0 05	167.0	25 41.7	1.0 05	167.0	26 11.7	1.0 05	167.0	2
3	24 38.6	1.0 06	166.0	25 08.6	1.0 05	166.0	25 38.5	1.0 06	165.9	26 08.5	1.0 06	165.9	3
4	24 35.2	1.0 06	164.9	25 05.2	1.0 06	164.9	25 35.1	1.0 06	164.8	26 05.1	1.0 06	164.8	4
15	24 31.6	1.0 06	163.8	25 01.6	1.0 06	163.8	25 31.5	1.0 06	163.8	26 01.4	1.0 06	163.7	15
6	24 27.7	1.0 07	162.8	24 57.7	1.0 07	162.7	25 27.6	1.0 07	162.7	25 57.5	1.0 07	162.7	6
7	24 23.6	1.0 07	161.7	24 53.5	1.0 07	161.7	25 23.5	1.0 07	161.6	25 53.4	1.0 07	161.6	7
8	24 19.3	1.0 08	160.6	24 49.2	1.0 08	160.6	25 19.1	1.0 08	160.5	25 49.0	1.0 08	160.5	8
9	24 14.7	1.0 08	159.6	24 44.6	1.0 08	159.5	25 14.5	1.0 08	159.5	25 44.4	1.0 08	159.4	9
20	24 09.8	1.0 08	158.5	24 39.7	1.0 08	158.4	25 09.6	1.0 08	158.4	25 39.5	1.0 08	158.3	20
1	24 04.8	1.0 09	157.4	24 34.7	1.0 09	157.4	25 04.5	1.0 09	157.3	25 34.4	1.0 09	157.3	1
2	23 59.5	1.0 09	156.4	24 29.3	1.0 09	156.3	24 59.2	1.0 09	156.3	25 29.1	1.0 09	156.2	2
3	23 53.9	1.0 10	155.3	24 23.8	1.0 10	155.2	24 53.7	1.0 10	155.2	25 23.5	1.0 10	155.1	3
4	23 48.2	99 10	154.2	24 18.0	99 10	154.2	24 47.9	99 10	154.1	25 17.7	99 10	154.1	4
25	23 42.2	99 10	153.2	24 12.0	99 10	153.1	24 41.9	99 10	153.0	25 11.7	99 10	153.0	25
6	23 36.0	99 11	152.1	24 05.8	99 11	152.0	24 35.7	99 11	152.0	25 05.5	99 11	151.9	6
7	23 29.6	99 11	151.0	23 59.4	99 11	151.0	24 29.2	99 11	150.9	24 59.0	99 11	150.9	7
8	23 22.9	99 11	150.0	23 52.7	99 11	149.9	24 22.5	99 11	149.9	24 52.3	99 12	149.8	8
9	23 16.1	99 12	148.9	23 45.9	99 12	148.9	24 15.6	99 12	148.8	24 45.4	99 12	148.7	9
30	23 09.0	99 12	147.9	23 38.8	99 12	147.8	24 08.5	99 12	147.7	24 38.3	99 12	147.7	30
1	23 01.7	99 12	146.8	23 31.5	99 12	146.7	24 01.2	99 13	146.7	24 31.0	99 13	146.6	1
2	22 54.2	99 13	145.8	23 24.0	99 13	145.7	23 53.7	99 13	145.6	24 23.5	99 13	145.5	2
3	22 46.5	99 13	144.7	23 16.3	99 13	144.6	23 46.0	99 13	144.6	24 15.7	99 13	144.5	3
4	22 38.6	99 14	143.7	23 08.3	99 14	143.6	23 38.1	99 14	143.5	24 07.8	99 14	143.4	4
35	22 30.5	99 14	142.6	23 00.2	99 14	142.5	23 29.9	99 14	142.5	23 59.6	99 14	142.4	35
6	22 22.2	99 14	141.6	22 51.9	99 14	141.5	23 21.6	99 14	141.4	23 51.3	99 14	141.3	6
7	22 13.7	99 14	140.5	22 43.4	99 14	140.4	23 13.1	99 14	140.4	23 42.8	99 15	140.3	7
8	22 05.1	99 15	139.5	22 34.7	99 15	139.4	23 04.4	99 15	139.3	23 34.0	99 15	139.2	8
9	21 56.2	99 15	138.4	22 25.9	99 15	138.3	22 55.5	99 15	138.3	23 25.1	99 15	138.2	9
40	21 47.2	99 15	137.4	22 16.8	99 15	137.3	22 46.4	99 15	137.2	23 16.0	99 15	137.1	40
1	21 37.9	99 16	136.3	22 07.5	99 16	136.3	22 37.2	99 16	136.2	23 06.8	99 16	136.1	1
2	21 28.5	99 16	135.3	21 58.1	99 16	135.2	22 27.7	99 16	135.1	22 57.3	99 16	135.0	2
3	21 18.9	99 16	134.3	21 48.5	99 16	134.2	22 18.1	99 16	134.1	22 47.7	99 16	134.0	3
4	21 09.2	99 16	133.2	21 38.8	99 17	133.1	22 08.3	99 17	133.1	22 37.9	99 17	133.0	4
45	20 59.3	99 17	132.2	21 28.8	99 17	132.1	21 58.4	99 17	132.0	22 27.9	99 17	131.9	45
6	20 49.2	98 17	131.2	21 18.7	98 17	131.1	21 48.3	98 17	131.0	22 17.8	98 17	130.9	6
7	20 39.0	98 17	130.1	21 08.5	98 17	130.0	21 38.0	98 17	129.9	22 07.5	98 17	129.9	7
8	20 28.6	98 18	129.1	20 58.1	98 18	129.0	21 27.6	98 18	128.9	21 57.1	98 18	128.8	8
9	20 18.0	98 18	128.1	20 47.5	98 18	128.0	21 17.0	98 18	127.9	21 46.5	98 18	127.8	9
50	20 07.3	98 18	127.1	20 36.8	98 18	127.0	21 06.3	98 18	126.9	21 35.8	98 18	126.8	50
1	19 56.5	98 18	126.0	20 25.9	98 18	125.9	20 55.4	98 18	125.8	21 24.9	98 18	125.7	1
2	19 45.5	98 18	125.0	20 14.9	98 19	124.9	20 44.4	98 18	124.8	21 13.9	98 19	124.7	2
3	19 34.4	98 19	124.0	20 03.8	98 19	123.9	20 33.3	98 19	123.8	21 02.7	98 19	123.7	3
4	19 23.1	98 19	123.0	19 52.5	98 19	122.9	20 22.0	98 19	122.8	20 51.4	98 19	122.7	4
55	19 11.7	98 19	122.0	19 41.1	98 19	121.9	20 10.6	98 19	121.8	20 40.0	98 19	121.6	55
6	19 00.2	98 19	120.9	19 29.6	98 19	120.8	19 59.0	98 19	120.7	20 28.4	98 19	120.6	6
7	18 48.6	98 20	119.9	19 18.0	98 20	119.8	19 47.4	98 20	119.7	20 16.7	98 20	119.6	7
8	18 36.8	98 20	118.9	19 06.2	98 20	118.8	19 35.6	98 20	118.7	20 05.0	98 20	118.6	8
9	18 24.9	98 20	117.9	18 54.3	98 20	117.8	19 23.7	98 20	117.7	19 53.0	98 20	117.6	9
60	18 13.0	98 20	116.9	18 42.3	98 20	116.8	19 11.7	98 20	116.7	19 41.0	98 20	116.6	60
1	18 00.9	98 20	115.9	18 30.2	98 20	115.8	18 59.6	98 20	115.7	19 28.9	98 20	115.6	1
2	17 48.7	98 20	114.9	18 18.0	98 20	114.8	18 47.4	98 20	114.7	19 16.7	98 21	114.6	2
3	17 36.4	98 21	113.9	18 05.7	98 21	113.8	18 35.0	98 21	113.7	19 04.4	98 21	113.6	3
4	17 24.0	98 21	112.9	17 53.3	98 21	112.8	18 22.6	98 21	112.7	18 51.9	98 21	112.5	4
65	17 11.5	98 21	111.9	17 40.8	98 21	111.8	18 10.1	98 21	111.7	18 39.4	98 21	111.5	65
6	16 58.9	98 21	110.9	17 28.2	98 21	110.8	17 57.5	98 21	110.7	18 26.8	98 21	110.5	6
7	16 46.3	98 21	109.9	17 15.6	98 21	109.8	17 44.9	98 21	109.7	18 14.2	98 21	109.5	7
8	16 33.6	98 21	108.9	17 02.8	98 21	108.8	17 32.1	98 21	108.7	18 01.4	98 21	108.5	8
9	16 20.8	98 21	107.9	16 50.0	98 22	107.8	17 19.3	98 22	107.7	17 48.6	98 22	107.5	9
70	16 07.9	98 22	106.9	16 37.1	98 22	106.8	17 06.4	98 22	106.7	17 35.7	98 22	106.6	70
1	15 54.9	98 22	105.9	16 24.2	98 22	105.8	16 53.4	97 22	105.7	17 22.7	97 22	105.6	1
2	15 41.9	97 22	104.9	16 11.2	97 22	104.8	16 40.4	97 22	104.7	17 09.7	97 22	104.6	2
3	15 28.8	97 22	103.9	15 58.1	97 22	103.8	16 27.3	97 22	103.7	16 56.6	97 22	103.6	3
4	15 15.7	97 22	102.9	15 45.0	97 22	102.8	16 14.2	97 22	102.7	16 43.4	97 22	102.6	4
75	15 02.5	97 22	101.9	15 31.8	97 22	101.8	16 01.0	97 22	101.7	16 30.2	97 22	101.6	75
6	14 49.3	97 22	101.0	15 18.5	97 22	100.8	15 47.8	97 22	100.7	16 17.0	97 22	100.6	6
7	14 36.0	97 22	100.0	15 05.3	97 22	99.9	15 34.5	97 22	99.7	16 03.7	97 22	99.6	7
8	14 22.7	97 22	99.0	14 51.9	97 22	98.9	15 21.2	97 22	98.8	15 50.4	97 22	98.6	8
9	14 09.4	97 22	98.0	14 38.6	97 22	97.9	15 07.8	97 22	97.8	15 37.0	97 22	97.7	9
80	13 56.0	97 22	97.0	14 25.2	97 22	96.9	14 54.4	97 22	96.8	15 23.6	97 22	96.7	80
1	13 42.6	97 22	96.0	14 11.8	97 22	95.9	14 41.0	97 22	95.8	15 10.2	97 22	95.7	1
2	13 29.2	97 22	95.1	13 58.4	97 22	94.9	14 27.6	97 22	94.8	14 56.7	97 22	94.7	2
3	13 15.7	97 22	94.1	13 44.9	97 22	94.0	14 14.1	97 22	93.9	14 43.3	97 22	93.7	3
4	13 02.2	97 22	93.1	13 31.4	97 22	93.0	14 00.6	97 22	92.9	14 29.8	97 22	92.8	4
85	12 48.7	97 22	92.1	13 17.9	97 22	92.0	13 47.1	97 22	91.9	14 16.3	97 22	91.8	85
6	12 35.3	97 22	91.2	13 04.4	97 22	91.0	13 33.6	97 22	90.9	14 02.8	97 22	90.8	6
7	12 21.8	97 22	90.2	12 51.0	97 22	90.1	13 20.1	97 22	89.9	13 49.3	97 22	89.8	7
8	12 08.3	97 22	89.2	12 37.5	97 22	89.1	13 06.6	97 22	89.0	13 35.8	97 22	88.9	8
9	11 54.8	97 22	88.2	12 24.0	97 22	88.1	12 53.2	97 22	88.0	13 22.3	97 22	87.9	9
90	11 41.3	97 22	87.3	12 10.5	97 22	87.1	12 39.7	97 22	87.0	13 08.9	97 22	86.9	90

H.A	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	27 00.0	1.0 00	180.0	27 30.0	1.0 00	180.0	28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	00
1	26 59.9	1.0 01	178.9	27 29.9	1.0 01	178.9	27 59.9	1.0 01	178.9	28 29.9	1.0 01	178.9	1
2	26 59.5	1.0 01	177.8	27 29.5	1.0 01	177.8	27 59.5	1.0 01	177.8	28 29.5	1.0 01	177.8	2
3	26 58.8	1.0 02	176.7	27 28.8	1.0 02	176.7	27 58.8	1.0 02	176.7	28 28.8	1.0 02	176.7	3
4	26 57.9	1.0 02	175.6	27 27.9	1.0 02	175.6	27 57.9	1.0 02	175.6	28 27.9	1.0 02	175.6	4
05	26 56.8	1.0 02	174.6	27 26.8	1.0 02	174.5	27 56.8	1.0 02	174.5	28 26.8	1.0 02	174.5	05
6	26 55.4	1.0 03	173.5	27 25.4	1.0 03	173.4	27 55.4	1.0 03	173.4	28 25.4	1.0 03	173.4	6
7	26 53.7	1.0 03	172.4	27 23.7	1.0 03	172.4	27 53.7	1.0 03	172.3	28 23.7	1.0 03	172.3	7
8	26 51.8	1.0 04	171.3	27 21.8	1.0 04	171.3	27 51.8	1.0 04	171.3	28 21.8	1.0 04	171.2	8
9	26 49.6	1.0 04	170.2	27 19.6	1.0 04	170.2	27 49.6	1.0 04	170.2	28 19.6	1.0 04	170.1	9
10	26 47.2	1.0 04	169.1	27 17.2	1.0 04	169.1	27 47.2	1.0 04	169.1	28 17.1	1.0 04	169.0	10
1	26 44.5	1.0 05	168.0	27 14.5	1.0 05	168.0	27 44.5	1.0 05	168.0	28 14.4	1.0 05	168.0	1
2	26 41.6	1.0 05	167.0	27 11.6	1.0 05	166.9	27 41.5	1.0 05	166.9	28 11.5	1.0 05	166.9	2
3	26 38.5	1.0 06	165.9	27 08.4	1.0 06	165.8	27 38.4	1.0 06	165.8	28 08.3	1.0 06	165.8	3
4	26 35.0	1.0 06	164.8	27 05.0	1.0 06	164.7	27 34.9	1.0 06	164.7	28 04.9	1.0 06	164.7	4
15	26 31.4	1.0 07	163.7	27 01.3	1.0 07	163.7	27 31.2	1.0 07	163.6	28 01.2	1.0 07	163.6	15
6	26 27.5	1.0 07	162.6	26 57.4	1.0 07	162.6	27 27.3	1.0 07	162.5	27 57.2	1.0 07	162.5	6
7	26 23.3	1.0 07	161.6	26 53.2	1.0 07	161.5	27 23.1	1.0 07	161.5	27 53.1	1.0 07	161.4	7
8	26 18.9	1.0 08	160.5	26 48.8	1.0 08	160.4	27 18.7	1.0 08	160.4	27 48.6	1.0 08	160.3	8
9	26 14.3	1.0 08	159.4	26 44.2	1.0 08	159.3	27 14.1	1.0 08	159.3	27 44.0	1.0 08	159.2	9
20	26 09.4	1.0 08	158.3	26 39.3	1.0 09	158.3	27 09.2	1.0 09	158.2	27 39.1	1.0 09	158.2	20
1	26 04.3	1.0 09	157.2	26 34.2	1.0 09	157.2	27 04.0	1.0 09	157.1	27 33.9	1.0 09	157.1	1
2	25 59.0	1.0 09	156 2	26 28.8	1.0 09	156.1	26 58.7	1.0 09	156.0	27 28.6	1.0 09	156.0	2
3	25 53.4	1.0 10	155.1	26 23.2	1.0 10	155.0	26 53.1	1.0 10	155.0	27 22.9	1.0 10	154.9	3
4	25 47.6	99 10	154.0	26 17.4	99 10	153.9	26 47.3	99 10	153.9	27 17.1	99 10	153.8	4
25	25 41.5	99 10	152.9	26 11.4	99 10	152.9	26 41.2	99 10	152.8	27 11.0	99 10	152.8	25
6	25 35.3	99 11	151.9	26 05.1	99 11	151.8	26 34.9	99 11	151.7	27 04.7	99 11	151.7	6
7	25 28.8	99 11	150.8	25 58.6	99 11	150.7	26 28.4	99 11	150.7	26 58.2	99 11	150.6	7
8	25 22.1	99 12	149.7	25 51.9	99 12	149.7	26 21.7	99 12	149.6	26 51.5	99 12	149.5	8
9	25 15.2	99 12	148.7	25 45.0	99 12	148.6	26 14.8	99 12	148.5	26 44.5	99 12	148.5	9
30	25 08.1	99 12	147.6	25 37.8	99 12	147.5	26 07.6	99 12	147.5	26 37.4	99 12	147.4	30
1	25 00.7	99 13	146.5	25 30.5	99 13	146.5	26 00.2	99 13	146.4	26 30.0	99 13	146.3	1
2	24 53.2	99 13	145.5	25 22.9	99 13	145.4	25 52.7	99 13	145.3	26 22.4	99 13	145.3	2
3	24 45.4	99 13	144.4	25 15.2	99 13	144.3	25 44.9	99 13	144.3	26 14.6	99 13	144.2	3
4	24 37.5	99 14	143.4	25 07.2	99 14	143.3	25 36.9	99 14	143.2	26 06.6	99 14	143.1	4
35	24 29.3	99 14	142.3	24 59.0	99 14	142.2	25 28.7	99 14	142.1	25 58.4	99 14	142.1	35
6	24 21.0	99 14	141.2	24 50.7	99 14	141.2	25 20.3	99 14	141.1	25 50.0	99 14	141.0	6
7	24 12.4	99 14	140.2	24 42.1	99 15	140.1	25 11.8	99 15	140.0	25 41.4	99 15	139.9	7
8	24 03.7	99 15	139.1	24 33.4	99 15	139.1	25 03.0	99 15	139.0	25 32.6	99 15	138.9	8
9	23 54.8	99 15	138.1	24 24.4	99 15	138.0	24 54.0	99 15	137.9	25 23.7	99 15	137.8	9
40	23 45.7	99 15	137.0	24 15.3	99 16	137.0	24 44.9	99 16	136.9	25 14.5	99 16	136.8	40
1	23 36.4	99 16	136.0	24 06.0	99 16	135.9	24 35.6	99 16	135.8	25 05.2	99 16	135.7	1
2	23 26.9	99 16	135.0	23 56.5	99 16	134.9	24 26.1	99 16	134.8	24 55.7	99 16	134.7	2
3	23 17.3	99 16	133.9	23 46.9	99 16	133.8	24 16.4	99 16	133.7	24 46.0	99 16	133.6	3
4	23 07.5	99 17	132.9	23 37.0	99 17	132.8	24 06.6	99 17	132.7	24 36.1	99 17	132.6	4
45	22 57.5	98 17	131.8	23 27.0	98 17	131.7	23 56.6	98 17	131.6	24 26.1	98 17	131.5	45
6	22 47.4	98 17	130.8	23 16.9	98 17	130.7	23 46.4	98 17	130.6	24 15.9	98 17	130.5	6
7	22 37.1	98 17	129.8	23 06.6	98 17	129.7	23 36.1	98 17	129.6	24 05.6	98 17	129.5	7
8	22 26.6	98 18	128.7	22 56.1	98 18	128.6	23 25.6	98 18	128.5	23 55.1	98 18	128.4	8
9	22 16.0	98 18	127.7	22 45.5	98 18	127.6	23 15.0	98 18	127.5	23 44.5	98 18	127.4	9
50	22 05.3	98 18	126.7	22 34.7	98 18	126.6	23 04.2	98 18	126.5	23 33.7	98 18	126.4	50
1	21 54.4	98 18	125.6	22 23.8	98 18	125.5	22 53.3	98 18	125.4	23 22.7	98 18	125.3	1
2	21 43.3	98 19	124.6	22 12.8	98 18	124.5	22 42.2	98 18	124.4	23 11.6	98 18	124.3	2
3	21 32.1	98 19	123.6	22 01.6	98 19	123.5	22 31.0	98 19	123.4	23 00.4	98 19	123.3	3
4	21 20.8	98 19	122.6	21 50.2	98 19	122.5	22 19.7	98 19	122.4	22 49.1	98 19	122.2	4
55	21 09.4	98 19	121.5	21 38.8	98 19	121.4	22 08.2	98 19	121.3	22 37.6	98 19	121.2	55
6	20 57.8	98 19	120.5	21 27.2	98 20	120.4	21 56.6	98 20	120.3	22 26.0	98 20	120.2	6
7	20 46.1	98 20	119.5	21 15.5	98 20	119.4	21 44.9	98 20	119.3	22 14.3	98 20	119.2	7
8	20 34.3	98 20	118.5	21 03.7	98 20	118.4	21 33.1	98 20	118.3	22 02.4	98 20	118.2	8
9	20 22.4	98 20	117.5	20 51.8	98 20	117.4	21 21.1	98 20	117.3	21 50.5	98 20	117.1	9
60	20 10.4	98 20	116.5	20 39.7	98 20	116.4	21 09.1	98 20	116.2	21 38.4	98 20	116.1	60
1	19 58.2	98 20	115.5	20 27.6	98 20	115.3	20 56.9	98 20	115.2	21 26.2	98 20	115.1	1
2	19 46.0	98 20	114.4	20 15.3	98 21	114.3	20 44.6	98 20	114.2	21 14.0	98 20	114.1	2
3	19 33.7	98 21	113.4	20 03.0	98 21	113.3	20 32.3	98 21	113.2	21 01.6	98 21	113.1	3
4	19 21.2	98 21	112.4	19 50.5	98 21	112.3	20 19.8	98 21	112.2	20 49.1	98 21	112.1	4
65	19 08.7	98 21	111.4	19 38.0	98 21	111.3	20 07.3	98 21	111.2	20 36.6	98 21	111.1	65
6	18 56.1	98 21	110.4	19 25.4	98 21	110.3	19 54.7	98 21	110.2	20 23.9	98 21	110.1	6
7	18 43.4	98 21	109.4	19 12.7	98 21	109.3	19 42.0	98 21	109.2	20 11.2	98 21	109.1	7
8	18 30.7	98 21	108.4	18 59.9	98 21	108.3	19 29.2	98 21	108.2	19 58.4	98 21	108.1	8
9	18 17.8	98 22	107.4	18 47.1	98 22	107.3	19 16.3	97 22	107.2	19 45.6	97 22	107.1	9
70	18 04.9	97 22	106.4	18 34.2	97 22	106.3	19 03.4	97 22	106.2	19 32.6	97 22	106.1	70
1	17 51.9	97 22	105.4	18 21.2	97 22	105.3	18 50.4	97 22	105.2	19 19.6	97 22	105.1	1
2	17 38.9	97 22	104.4	18 08.1	97 22	104.3	18 37.3	97 22	104.2	19 06.6	97 22	104.1	2
3	17 25.8	97 22	103.5	17 55.0	97 22	103.3	18 24.2	97 22	103.2	18 53.5	97 22	103.1	3
4	17 12.6	97 22	102.5	17 41.9	97 22	102.3	18 11.1	97 22	102.2	18 40.3	97 22	102.1	4
75	16 59.4	97 22	101.5	17 28.6	97 22	101.4	17 57.9	97 22	101.2	18 27.1	97 22	101.1	75
6	16 46.2	97 22	100.5	17 15.4	97 22	100.4	17 44.6	97 22	100.2	18 13.8	97 22	100.1	6
7	16 32.9	97 22	99.5	17 02.1	97 22	99.4	17 31.3	97 22	99.3	18 00.5	97 22	99.1	7
8	16 19.6	97 22	98.5	16 48.8	97 22	98.4	17 18.0	97 22	98.3	17 47.1	97 22	98.2	8
9	16 06.2	97 22	97.5	16 35.4	97 22	97.4	17 04.6	97 22	97.3	17 33.8	97 22	97.2	9
80	15 52.8	97 22	96.6	16 22.0	97 22	96.4	16 51.2	97 22	96.3	17 20.4	97 22	96.2	80
1	15 39.4	97 22	95.6	16 08.6	97 22	95.5	16 37.8	97 22	95.3	17 06.9	97 22	95.2	1
2	15 25.9	97 22	94.6	15 55.1	97 22	94.5	16 24.3	97 22	94.4	16 53.5	97 22	94.2	2
3	15 12.5	97 22	93.6	15 41.7	97 22	93.5	16 10.8	97 22	93.4	16 40.0	97 22	93.3	3
4	14 59.0	97 22	92.6	15 28.2	97 22	92.5	15 57.4	97 22	92.4	16 26.5	97 22	92.3	4
85	14 45.5	97 22	91.7	15 14.7	97 22	91.5	15 43.9	97 22	91.4	16 13.0	97 22	91.3	85
6	14 32.0	97 22	90.7	15 01.2	97 22	90.6	15 30.4	97 22	90.4	15 59.5	97 22	90.3	6
7	14 18.5	97 22	89.7	14 47.7	97 22	89.6	15 16.9	97 22	89.5	15 46.0	97 22	89.3	7
8	14 05.0	97 22	88.7	14 34.2	97 22	88.6	15 03.4	97 22	88.5	15 32.6	97 22	88.4	8
9	13 51.5	97 22	87.8	14 20.7	97 22	87.6	14 49.9	97 22	87.5	15 19.1	97 22	87.4	9
90	13 38.0	97 22	86.8	14 07.2	97 22	86.7	14 36.4	97 22	86.6	15 05.6	97 22	86.4	90

Lat. 77°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 27.8	97 22	86.3	11 57.0	97 22	86.2	12 26.2	97 22	86.1	12 55.4	97 22	85.9	13 24.6	97 22	85.8	13 53.8	97 22	85.7	14 22.9	97 22	85.6	14 52.1	97 22	85.5	91
2	11 14.3	97 22	85.3	11 43.5	97 22	85.2	12 12.7	97 22	85.1	12 41.9	97 22	85.0	13 11.1	97 22	84.8	13 40.3	97 22	84.7	14 09.5	97 22	84.6	14 38.7	97 22	84.5	2
3	11 00.9	97 22	84.3	11 30.1	97 22	84.2	11 59.3	97 22	84.1	12 28.5	97 22	84.0	12 57.7	97 22	83.9	13 26.9	97 22	83.8	13 56.1	97 22	83.6	14 25.3	97 22	83.5	3
4	10 47.5	97 22	83.4	11 16.7	97 22	83.3	11 45.9	97 22	83.1	12 15.1	97 22	83.0	12 44.3	97 22	82.9	13 13.5	97 22	82.8	13 42.7	97 22	82.7	14 11.9	97 22	82.6	4
95	10 34.1	97 22	82.4	11 03.3	97 22	82.3	11 32.5	97 22	82.2	12 01.7	97 22	82.1	12 30.9	97 22	81.9	13 00.1	97 22	81.8	13 29.3	97 22	81.7	13 58.5	97 22	81.6	95
6	10 20.7	97 22	81.4	10 49.9	97 22	81.3	11 19.2	97 22	81.2	11 48.4	97 22	81.1	12 17.6	97 22	81.0	12 46.8	97 22	80.9	13 16.0	97 22	80.7	13 45.2	97 22	80.6	6
7	10 07.4	97 22	80.5	10 36.6	97 22	80.4	11 05.8	97 22	80.2	11 35.0	97 22	80.1	12 04.3	97 22	80.0	12 33.5	97 22	79.9	13 02.7	97 22	79.8	13 31.9	97 22	79.7	7
8	9 54.1	97 22	79.5	10 23.3	97 22	79.4	10 52.5	97 22	79.3	11 21.8	97 22	79.2	11 51.0	97 22	79.0	12 20.2	97 22	78.9	12 49.4	97 22	78.8	13 18.6	97 22	78.7	8
9	9 40.9	97 22	78.5	10 10.1	97 22	78.4	10 39.3	97 22	78.3	11 08.5	97 22	78.2	11 37.7	97 22	78.1	12 07.0	97 22	78.0	12 36.2	97 22	77.8	13 05.4	97 22	77.7	9
100	9 27.7	97 22	77.6	9 56.9	97 22	77.5	10 26.1	97 22	77.3	10 55.3	97 22	77.2	11 24.6	97 22	77.1	11 53.8	97 22	77.0	12 23.0	97 22	76.9	12 52.2	97 22	76.8	100
1	9 14.5	97 22	76.6	9 43.7	97 22	76.5	10 13.0	97 22	76.4	10 42.2	97 22	76.3	11 11.4	97 22	76.2	11 40.7	97 22	76.0	12 09.9	97 22	75.9	12 39.1	97 22	75.8	1
2	9 01.4	97 22	75.6	9 30.6	97 22	75.5	9 59.9	97 22	75.4	10 29.1	97 22	75.3	10 58.4	97 22	75.2	11 27.6	97 22	75.1	11 56.8	97 22	75.0	12 26.1	97 22	74.8	2
3	8 48.3	93 22	74.7	9 17.6	98 22	74.6	9 46.8	97 22	74.5	10 16.1	97 22	74.3	10 45.3	97 22	74.2	11 14.6	97 22	74.1	11 43.8	97 22	74.0	12 13.1	97 22	73.9	3
4	8 35.4	98 22	73.7	9 04.6	98 22	73.6	9 33.9	98 22	73.5	10 03.1	98 22	73.4	10 32.4	98 21	73.3	11 01.6	97 21	73.1	11 30.9	97 21	73.0	12 00.1	97 21	72.9	4
105	8 22.4	98 21	72.7	8 51.7	98 21	72.6	9 21.0	98 21	72.5	9 50.2	98 21	72.4	10 19.5	98 21	72.3	10 48.8	98 21	72.2	11 18.0	98 21	72.1	11 47.3	98 21	72.0	105
6	8 09.6	98 21	71.8	8 38.9	98 21	71.7	9 08.1	98 21	71.6	9 37.4	98 21	71.4	10 06.7	98 21	71.3	10 35.9	98 21	71.2	11 05.2	98 21	71.1	11 34.5	98 21	71.0	6
7	7 56.8	98 21	70.8	8 26.1	98 21	70.7	8 55.4	98 21	70.6	9 24.6	98 21	70.5	9 53.9	98 21	70.4	10 23.2	98 21	70.3	10 52.5	98 21	70.2	11 21.7	98 21	70.0	7
8	7 44.1	98 21	69.9	8 13.4	98 21	69.7	8 42.7	98 21	69.6	9 12.0	98 21	69.5	9 41.2	98 21	69.4	10 10.5	98 21	69.3	10 39.8	98 21	69.2	11 09.1	98 21	69.1	8
9	7 31.5	98 21	68.9	8 00.8	98 21	68.8	8 30.1	98 21	68.7	8 59.4	98 21	68.6	9 28.6	98 21	68.5	9 57.9	98 21	68.3	10 27.2	98 21	68.2	10 56.5	98 21	68.1	9
110	7 18.9	98 21	67.9	7 48.2	98 21	67.8	8 17.5	98 21	67.7	8 46.8	98 21	67.6	9 16.1	98 21	67.5	9 45.4	98 21	67.4	10 14.7	98 21	67.3	10 44.0	98 21	67.2	110
1	7 06.4	98 21	67.0	7 35.8	98 21	66.9	8 05.1	98 21	66.7	8 34.4	98 21	66.6	9 03.7	98 21	66.5	9 33.0	98 21	66.4	10 02.3	98 21	66.3	10 31.6	98 21	66.2	1
2	6 54.1	98 20	66.0	7 23.4	98 20	65.9	7 52.7	98 20	65.8	8 22.1	98 20	65.7	8 51.4	98 20	65.6	9 20.7	98 20	65.5	9 50.0	98 20	65.4	10 19.3	98 20	65.3	2
3	6 41.8	98 20	65.0	7 11.1	98 20	64.9	7 40.5	98 20	64.8	8 09.8	98 20	64.7	8 39.1	98 20	64.6	9 08.5	98 20	64.5	9 37.8	98 20	64.4	10 07.1	98 20	64.3	3
4	6 29.6	98 20	64.1	6 58.9	98 20	64.0	7 28.3	98 20	63.9	7 57.6	98 20	63.8	8 27.0	98 20	63.7	8 56.3	98 20	63.5	9 25.7	98 20	63.4	9 55.0	98 20	63.3	4
115	6 17.5	98 20	63.1	6 46.9	98 20	63.0	7 16.2	98 20	62.9	7 45.6	98 20	62.8	8 14.9	98 20	62.7	8 44.3	98 20	62.6	9 13.7	98 20	62.5	9 43.0	98 20	62.4	115
6	6 05.5	98 20	62.1	6 34.9	98 20	62.0	7 04.3	98 20	61.9	7 33.6	98 20	61.8	8 03.0	98 20	61.7	8 32.4	98 20	61.6	9 01.7	98 20	61.5	9 31.1	98 20	61.4	6
7	5 53.6	98 20	61.2	6 23.0	98 20	61.1	6 52.4	98 20	61.0	7 21.8	98 20	60.9	7 51.2	98 20	60.8	8 20.5	98 20	60.7	8 49.9	98 20	60.6	9 19.3	98 19	60.5	7
8	5 41.9	98 19	60.2	6 11.3	98 19	60.1	6 40.7	98 19	60.0	7 10.1	98 19	59.9	7 39.4	98 19	59.8	8 08.8	98 19	59.7	8 38.2	98 19	59.6	9 07.6	98 19	59.5	8
9	5 30.2	98 19	59.3	5 59.6	98 19	59.2	6 29.0	98 19	59.1	6 58.4	98 19	59.0	7 27.8	98 19	58.9	7 57.2	98 19	58.8	8 26.6	98 19	58.7	8 56.0	98 19	58.6	9
120	5 18.7	98 19	58.3	5 48.1	98 19	58.2	6 17.5	98 19	58.1	6 46.9	98 19	58.0	7 16.3	98 19	57.9	7 45.8	98 19	57.8	8 15.2	98 19	57.7	8 44.6	98 19	57.6	120
1	5 07.2	98 19	57.3	5 36.7	98 19	57.2	6 06.1	98 19	57.1	6 35.5	98 19	57.0	7 05.0	98 19	56.9	7 34.4	98 19	56.8	8 03.8	98 19	56.7	8 33.3	98 19	56.6	1
2				5 25.4	98 19	56.3	5 54.8	98 19	56.2	6 24.3	98 19	56.1	6 53.7	98 19	56.0	7 23.2	98 19	55.9	7 52.6	98 18	55.8	8 22.0	98 18	55.7	2
3				5 14.2	98 18	55.3	5 43.7	98 18	55.2	6 13.1	98 18	55.1	6 42.6	98 18	55.0	7 12.1	98 18	54.9	7 41.5	98 18	54.8	8 11.0	98 18	54.7	3
4				5 03.2	98 18	54.3	5 32.7	98 18	54.3	6 02.1	98 18	54.2	6 31.6	98 18	54.1	7 01.1	98 18	54.0	7 30.5	98 18	53.9	8 00.0	98 18	53.8	4
125							5 21.8	98 18	53.3	5 51.3	98 18	53.2	6 20.7	98 18	53.1	6 50.2	98 18	53.0	7 19.7	98 18	52.9	7 49.2	98 18	52.8	125
6							5 11.0	98 18	52.3	5 40.5	98 18	52.2	6 10.0	98 18	52.1	6 39.5	98 18	52.1	7 09.0	98 18	52.0	7 38.5	98 18	51.9	6
7							5 00.4	98 17	51.4	5 29.9	98 17	51.3	5 59.4	98 17	51.2	6 28.9	98 17	51.1	6 58.4	98 17	51.0	7 27.9	98 17	50.9	7
8										5 19.5	98 17	50.3	5 49.0	98 17	50.2	6 18.5	98 17	50.1	6 48.0	98 17	50.0	7 17.5	98 17	50.0	8
9										5 09.2	98 17	49.4	5 38.7	98 17	49.3	6 08.2	98 17	49.2	6 37.8	98 17	49.1	7 07.3	98 17	49.0	9
130													5 28.5	98 17	48.3	5 58.1	98 17	48.2	6 27.6	98 17	48.1	6 57.2	98 17	48.0	130
1													5 18.5	99 16	47.3	5 48.1	99 16	47.3	6 17.6	99 16	47.2	6 47.2	99 16	47.1	1
2													5 08.7	99 16	46.4	5 38.3	99 16	46.3	6 07.8	99 16	46.2	6 37.4	99 16	46.1	2
3																5 28.6	99 16	45.3	5 58.2	99 16	45.3	6 27.7	99 16	45.2	3
4																5 19.1	99 16	44.4	5 48.7	99 16	44.3	6 18.3	99 16	44.2	4
135																5 09.7	99 15	43.4	5 39.3	99 15	43.3	6 08.9	99 15	43.3	135
6																5 00.5	99 15	42.5	5 30.1	99 15	42.4	5 59.8	99 15	42.3	6
7																			5 21.1	99 15	41.4	5 50.8	99 15	41.3	7
8																			5 12.3	99 14	40.5	5 41.9	99 14	40.4	8
9																			5 03.6	99 14	39.5	5 33.3	99 14	39.4	9
140																						5 24.8	99 14	38.5	140
1																						5 16.5	99 14	37.5	1
2																						5 08.3	99 13	36.6	2
3																						5 00.4	99 13	35.6	3

Lat. 78°

Lat. 79

Lat. 77°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	32 00.0	1.0 00	180.0	32 30.0	1.0 00	180.0	00
1	28 59.9	1.0 01	178.9	29 29.9	1.0 01	178.9	29 59.9	1.0 01	178.9	30 29.9	1.0 01	178.9	30 59.9	1.0 01	178.9	31 29.9	1.0 01	178.9	31 59.9	1.0 01	178.9	32 29.9	1.0 01	178.9	1
2	28 59.5	1.0 01	177.8	29 29.5	1.0 01	177.8	29 59.5	1.0 01	177.8	30 29.5	1.0 01	177.8	30 59.5	1.0 01	177.8	31 29.5	1.0 01	177.8	31 59.5	1.0 01	177.8	32 29.5	1.0 01	177.8	2
3	28 58.8	1.0 02	176.7	29 28.8	1.0 02	176.7	29 58.8	1.0 02	176.7	30 28.8	1.0 02	176.7	30 58.8	1.0 02	176.7	31 28.8	1.0 02	176.7	31 58.8	1.0 02	176.7	32 28.8	1.0 02	176.6	3
4	28 57.9	1.0 02	175.6	29 27.9	1.0 02	175.6	29 57.9	1.0 02	175.6	30 27.9	1.0 02	175.6	30 57.9	1.0 02	175.6	31 27.9	1.0 02	175.6	31 57.9	1.0 02	175.5	32 27.9	1.0 02	175.5	4
05	28 56.8	1.0 02	174.5	29 26.8	1.0 02	174.5	29 56.8	1.0 02	174.5	30 26.7	1.0 02	174.5	30 56.7	1.0 02	174.5	31 26.7	1.0 02	174.4	31 56.7	1.0 02	174.4	32 26.7	1.0 02	174.4	05
6	28 55.3	1.0 03	173.4	29 25.3	1.0 03	173.4	29 55.3	1.0 03	173.4	30 25.3	1.0 03	173.4	30 55.3	1.0 03	173.3	31 25.3	1.0 03	173.3	31 55.3	1.0 03	173.3	32 25.3	1.0 03	173.3	6
7	28 53.7	1.0 03	172.3	29 23.7	1.0 03	172.3	29 53.6	1.0 03	172.3	30 23.6	1.0 03	172.3	30 53.6	1.0 03	172.2	31 23.6	1.0 03	172.2	31 53.6	1.0 03	172.2	32 23.6	1.0 03	172.2	7
8	28 51.7	1.0 04	171.2	29 21.7	1.0 04	171.2	29 51.7	1.0 04	171.2	30 21.7	1.0 04	171.2	30 51.7	1.0 04	171.1	31 21.6	1.0 04	171.1	31 51.6	1.0 04	171.1	32 21.6	1.0 04	171.1	8
9	28 49.5	1.0 04	170.1	29 19.5	1.0 04	170.1	29 49.5	1.0 04	170.1	30 19.5	1.0 04	170.0	30 49.4	1.0 04	170.0	31 19.4	1.0 04	170.0	31 49.4	1.0 04	170.0	32 19.4	1.0 04	170.0	9
10	28 47.1	1.0 04	169.0	29 17.1	1.0 04	169.0	29 47.0	1.0 04	169.0	30 17.0	1.0 05	168.9	30 47.0	1.0 05	168.9	31 16.9	1.0 05	168.9	31 46.9	1.0 05	168.9	32 16.9	1.0 05	168.8	10
1	28 44.4	1.0 05	167.9	29 14.4	1.0 05	167.9	29 44.3	1.0 05	167.9	30 14.3	1.0 05	167.8	30 44.3	1.0 05	167.8	31 14.2	1.0 05	167.8	31 44.2	1.0 05	167.8	32 14.1	1.0 05	167.7	1
2	28 41.5	1.0 05	166.8	29 11.4	1.0 05	166.8	29 41.4	1.0 05	166.8	30 11.3	1.0 05	166.7	30 41.3	1.0 05	166.7	31 11.2	1.0 05	166.7	31 41.2	1.0 05	166.6	32 11.1	1.0 05	166.6	2
3	28 38.3	1.0 06	165.7	29 08.2	1.0 06	165.7	29 38.2	1.0 06	165.7	30 08.1	1.0 06	165.6	30 38.1	1.0 06	165.6	31 08.0	1.0 06	165.6	31 37.9	1.0 06	165.5	32 07.9	1.0 06	165.5	3
4	28 34.8	1.0 06	164.6	29 04.7	1.0 06	164.6	29 34.7	1.0 06	164.6	30 04.6	1.0 06	164.5	30 34.6	1.0 06	164.5	31 04.5	1.0 06	164.5	31 34.4	1.0 06	164.4	32 04.4	1.0 06	164.4	4
15	28 31.1	1.0 07	163.6	29 01.0	1.0 07	163.5	29 31.0	1.0 07	163.5	30 00.9	1.0 07	163.4	30 30.8	1.0 07	163.4	31 00.8	1.0 07	163.4	31 30.7	1.0 07	163.3	32 00.6	1.0 07	163.3	15
6	28 27.2	1.0 07	162.5	28 57.1	1.0 07	162.4	29 27.0	1.0 07	162.4	29 56.9	1.0 07	162.3	30 26.9	1.0 07	162.3	30 56.8	1.0 07	162.3	31 26.7	1.0 07	162.2	31 56.6	1.0 07	162.2	6
7	28 23.0	1.0 07	161.4	28 52.9	1.0 07	161.3	29 22.8	1.0 07	161.3	29 52.7	1.0 07	161.2	30 22.6	1.0 07	161.2	30 52.5	1.0 07	161.2	31 22.5	1.0 07	161.1	31 52.4	1.0 08	161.1	7
8	28 18.5	1.0 08	160.3	28 48.4	1.0 08	160.2	29 18.3	1.0 08	160.2	29 48.3	1.0 08	160.1	30 18.2	1.0 08	160.1	30 48.1	1.0 08	160.1	31 18.0	1.0 08	160.0	31 47.9	1.0 08	160.0	8
9	28 13.9	1.0 08	159.2	28 43.8	1.0 08	159.1	29 13.7	1.0 08	159.1	29 43.5	1.0 08	159.0	30 13.4	1.0 08	159.0	30 43.3	1.0 08	159.0	31 13.2	1.0 08	158.9	31 43.1	1.0 08	158.9	9
20	28 09.0	1.0 09	158.1	28 38.8	1.0 09	158.1	29 08.7	1.0 09	158.0	29 38.6	1.0 09	158.0	30 08.5	1.0 09	157.9	30 38.4	1.0 09	157.9	31 08.2	1.0 09	157.8	31 38.1	1.0 09	157.7	20
1	28 03.8	1.0 09	157.0	28 33.7	1.0 09	157.0	29 03.5	1.0 09	156.9	29 33.4	1.0 09	156.9	30 03.3	1.0 09	156.8	30 33.2	1.0 09	156.8	31 03.0	1.0 09	156.7	31 32.9	1.0 09	156.6	1
2	27 58.4	1.0 09	155.9	28 28.3	1.0 09	155.9	28 58.1	1.0 09	155.8	29 28.0	1.0 09	155.8	29 57.9	1.0 09	155.7	30 27.7	1.0 09	155.7	30 57.6	1.0 09	155.6	31 27.4	1.0 10	155.5	2
3	27 52.8	1.0 10	154.9	28 22.6	99 10	154.8	28 52.5	99 10	154.7	29 22.3	99 10	154.7	29 52.2	99 10	154.6	30 22.0	99 10	154.6	30 51.9	99 10	154.5	31 21.7	99 10	154.4	3
4	27 46.9	99 10	153.8	28 16.8	99 10	153.7	28 46.6	99 10	153.7	29 16.5	99 10	153.6	29 46.3	99 10	153.5	30 16.1	99 10	153.5	30 46.0	99 10	153.4	31 15.8	99 10	153.4	4
25	27 40.9	99 10	152.7	28 10.7	99 11	152.6	28 40.5	99 11	152.6	29 10.3	99 11	152.5	29 40.2	99 11	152.4	30 10.0	99 11	152.4	30 39.8	99 11	152.3	31 09.6	99 11	152.3	25
6	27 34.6	99 11	151.6	28 04.4	99 11	151.6	28 34.2	99 11	151.5	29 04.0	99 11	151.4	29 33.8	99 11	151.4	30 03.6	99 11	151.3	30 33.4	99 11	151.2	31 03.2	99 11	151.2	6
7	27 28.0	99 11	150.5	27 57.8	99 11	150.5	28 27.6	99 11	150.4	28 57.4	99 11	150.3	29 27.2	99 11	150.3	29 57.0	99 11	150.2	30 26.8	99 11	150.1	30 56.6	99 11	150.1	7
8	27 21.3	99 12	149.5	27 51.1	99 12	149.4	28 20.9	99 12	149.3	28 50.6	99 12	149.3	29 20.4	99 12	149.2	29 50.2	99 12	149.1	30 20.0	99 12	149.0	30 49.7	99 12	149.0	8
9	27 14.3	99 12	148.4	27 44.1	99 12	148.3	28 13.9	99 12	148.2	28 43.6	99 12	148.2	29 13.4	99 12	148.1	29 43.2	99 12	148.0	30 12.9	99 12	148.0	30 42.7	99 12	147.9	9
30	27 07.1	99 12	147.3	27 36.9	99 12	147.2	28 06.7	99 12	147.2	28 36.4	99 12	147.1	29 06.2	99 12	147.0	29 35.9	99 12	147.0	30 05.7	99 12	146.9	30 35.4	99 12	146.8	30
1	26 59.7	99 13	146.2	27 29.5	99 13	146.2	27 59.2	99 13	146.1	28 29.0	99 13	146.0	28 58.7	99 13	145.9	29 28.4	99 13	145.9	29 58.2	99 13	145.8	30 27.9	99 13	145.7	1
2	26 52.1	99 13	145.2	27 21.9	99 13	145.1	27 51.6	99 13	145.0	28 21.3	99 13	144.9	28 51.0	99 13	144.9	29 20.8	99 13	144.8	29 50.5	99 13	144.7	30 20.2	99 13	144.6	2
3	26 44.3	99 13	144.1	27 14.0	99 13	144.0	27 43.8	99 13	144.0	28 13.5	99 13	143.9	28 43.2	99 13	143.8	29 12.9	99 14	143.7	29 42.6	99 14	143.6	30 12.3	99 14	143.6	3
4	26 36.3	99 14	143.0	27 06.0	99 14	143.0	27 35.7	99 14	142.9	28 05.4	99 14	142.8	28 35.1	99 14	142.7	29 04.8	99 14	142.6	29 34.5	99 14	142.6	30 04.2	99 14	142.5	4
35	26 28.1	99 14	142.0	26 57.8	99 14	141.9	27 27.5	99 14	141.8	27 57.1	99 14	141.7	28 26.8	99 14	141.7	28 56.5	99 14	141.6	29 26.2	99 14	141.5	29 55.8	99 14	141.4	35
6	26 19.7	99 14	140.9	26 49.4	99 14	140.8	27 19.0	99 14	140.8	27 48.7	99 14	140.7	28 18.4	99 14	140.6	28 48.0	99 14	140.5	29 17.7	99 14	140.4	29 47.3	99 14	140.3	6
7	26 11.1	99 15	139.9	26 40.7	99 15	139.8	27 10.4	99 15	139.7	27 40.0	99 15	139.6	28 09.7	99 15	139.5	28 39.3	99 15	139.4	29 09.0	99 15	139.3	29 38.6	99 15	139.3	7
8	26 02.3	99 15	138.8	26 31.9	99 15	138.7	27 01.6	99 15	138.6	27 31.2	99 15	138.5	28 00.8	99 15	138.5	28 30.5	99 15	138.4	29 00.1	99 15	138.3	29 29.7	99 15	138.2	8
9	25 53.3	99 15	137.7	26 22.9	99 15	137.7	26 52.6	99 15	137.6	27 22.2	99 15	137.5	27 51.8	99 15	137.4	28 21.4	99 15	137.3	28 51.0	99 15	137.2	29 20.6	99 15	137.1	9
40	25 44.1	99 16	136.7	26 13.7	99 16	136.6	26 43.4	99 16	136.5	27 13.0	99 16	136.4	27 42.6	99 16	136.3	28 12.2	99 16	136.2	28 41.7	99 16	136.1	29 11.3	99 16	136.0	40
1	25 34.8	99 16	135.6	26 04.4	99 16	135.5	26 34.0	99 16	135.5	27 03.6	99 16	135.4	27 33.1	99 16	135.3	28 02.7	99 16	135.2	28 32.3	99 16	135.1	29 01.9	99 16	135.0	1
2	25 25.3	99 16	134.6	25 54.8	99 16	134.5	26 24.4	99 16	134.4	26 54.0	99 16	134.3	27 23.6	99 16	134.2	27 53.1	99 16	134.1	28 22.7	99 16	134.0	28 52.2	99 16	133.9	2
3	25 15.6	99 16	133.5	25 45.1	99 16	133.4	26 14.7	99 16	133.4	26 44.2	99 17	133.3	27 13.8	99 17	133.2	27 43.3	98 17	133.1	28 12.9	98 17	133.0	28 42.4	98 17	132.9	3
4	25 05.7	99 17	132.5	25 35.2	98 17	132.4	26 04.8	98 17	132.3	26 34.3	98 17	132.2	27 03.9	98 17	132.1	27 33.4	98 17	132.0	28 02.9	98 17	131.9	28 32.5	98 17	131.8	4
45	24 55.7	98 17	131.5	25 25.2	98 17	131.4	25 54.7	98 17	131.3	26 24.3	98 17	131.2	26 53.8	98 17	131.1	27 23.3	98 17	131.0	27 52.8	98 17	130.9	28 22.3	98 17	130.8	45
6	24 45.5	98 17	130.4	25 15.0	98 17	130.3	25 44.5	98 17	130.2	26 14.0	98 17	130.1	26 43.5	98 17	130.0	27 13.0	98 17	129.9	27 42.5	98 17	129.8	28 12.0	98 17	129.7	6
7	24 35.1	98 18	129.4	25 04.6	98 18	129.3	25 34.1	98 18	129.2	26 03.6	98 18	129.1	26 33.1	98 18	129.0	27 02.6	98 18	128.9	27 32.1	98 18	128.8	28 01.5	98 18	128.6	7
8	24 24.6	98 18	128.3	24 54.1	98 18	128.2	25 23.6	98 18	128.1	25 53.1	98 18	128.0	26 22.5	98 18	127.9	26 52.0	98 18	127.8	27 21.5	98 18	127.7	27 50.9	98 18	127.6	8
9	24 13.9	98 18	127.3	24 43.4	98 18	127.2	25 12.9	98 18	127.1	25 42.3	98 18	127.0	26 11.8	98 18	126.9	26 41.3	98 18	126.8	27 10.7	98 18	126.7	27 40.2	98 18	126.6	9
50	24 03.1	98 18	126.3	24 32.6	98 18	126.2	25 02.0	98 18	126.0	25 31.5	98 18	125.9	26 00.9	98 18	125.8	26 30.4	98 18	125.7	26 59.8	98 18	125.6	27 29.2	98 18	125.5	50
1	23 52.2	98 18	125.2	24 21.6	98 19	125.1	24 51.1	98 19	125.0	25 20.5	98 19	124.9	25 49.9	98 19	124.8	26 19.3	98 19	124.7	26 48.8	98 19	124.6	27 18.2	98 19	124.5	1
2	23 41.1	98 19	124.2	24 10.5	98 19	124.1	24 39.9	98 19	124.0	25 09.4	98 19	123.9	25 38.8	98 19	123.8	26 08.2	98 19	123.7	26 37.6	98 19	123.5	27 07.0	98 19	123.4	2
3	23 29.8	98 19	123.2	23 59.3	98 19	123.1	24 28.7	98 19	122.9	24 58.1	98 19	122.8	25 27.5	98 19	122.7	25 56.9	98 19	122.6	26 26.3	98 19	122.5	26 55.7	98 19	122.4	3
4	23 18.5	98 19	122.1	23 47.9	98 19	122.0	24 17.3	98 19	121.9	24 46.7	98 19	121.8	25 16.1	98 19	121.7	25 45.4	98 19	121.6	26 14.8	98 19	121.5	26 44.2	98 19	121.4	4
55	23 07.0	98 19	121.1	23 36.4	98 19	121.0	24 05.8	98 19	120.9	24 35.1	98 19	120.8	25 04.5	98 19	120.7	25 33.9	98 19	120.6	26 03.3	98 20	120.4	26 32.6	98 20	120.3	55
6	22 55.4	98 20	120.1	23 24.7	98 20	120.0	23 54.1	98 20	119.9	24 23.5	98 20	119.8	24 52.8	98 20	119.6	25 22.2	98 20	119.5	25 51.6	98 20	119.4	26 20.9	98 20	119.3	6
7	22 43.6	98 20	119.1	23 13.0	98 20	119.0	23 42.4	98 20	118.8	24 11.7	98 20	118.7	24 41.1	98 20	118.6	25 10.4	98 20	118.5	25 39.7	98 20	118.4	26 09.1	98 20	118.3	7
8	22 31.8	98 20	118.0	23 01.1	98 20	117.9	23 30.5	98 20	117.8	23 59.8	98 20	117.7	24 29.2	98 20	117.6	24 58.5	98 20	117.5	25 27.8	98 20	117.4	25 57.1	98 20	117.2	8
9	22 19.8	98 20	117.0	22 49.1	98 20	116.9	23 18.5	98 20	116.8	23 47.8	98 20	116.7	24 17.1	98 20	116.6	24 46.5	98 20	116.5	25 15.8	98 20	116.3	25 45.1	98 20	116.2	9
60	22 07.7	98 20	116.0	22 37.1	98 20	115.9	23 06.4	98 20	115.8	23 35.7	98 20	115.7	24 05.0	98 20	115.6	24 34.3	98 20	115.4	25 03.6	98 20	115.3	25 32.9	98 20	115.2	60
1	21 55.6	98 20	115.0	22 24.9	98 20	114.9	22 54.2	98 21	114.8	23 23.5	98 21	114.7	23 52.8	98 21	114.5	24 22.1	98 21	114.4	24 51.4	98 21	114.3	25 20.6	98 21	114.2	1
2	21 43.3	98 21	114.0	22 12.6	98 21	113.9	22 41.9	98 21	113.8	23 11.2	98 21	113.6	23 40.5	98 21	113.5	24 09.7	98 21	113.4	24 39.0	98 21	113.3	25 08.3	98 21	113.2	2
3	21 30.9	98 21	113.0	22 00.2	98 21	112.9	22 29.5	98 21	112.7	22 58.8	98 21	112.6	23 28.0	98 21	112.5	23 57.3	98 21	112.4	24 26.6	98 21	112.3	24 55.8	98 21	112.1	3
4	21 18.4	98 21	112.0	21 47.7	98 21	111.9	22 17.0	98 21	111.7	22 46.3	98 21	111.6	23 15.5	98 21	111.5	23 44.8	98 21	111.4	24 14.0	98 21	111.3	24 43.3	98 21	111.1	4
65	21 05.9	98 21	111.0	21 35.1	98 21	110.8	22 04.4	98 21	110.7	22 33.7	98 21	110.6	23 02.9	98 21	110.5	23 32.2	97 21	110.4	24 01.4	97 21	110.2	24 30.7	97 21	110.1	65
6	20 53.2	98 21	110.0	21 22.5	98 21	109.8	21 51.7	98 21	109.7	22 21.0	98 21	109.6	22 50.2	97 21	109.5	23 19.5	97 21	109.4	23 48.7	97 21	109.2	24 17.9	97 21	109.1	6
7	20 40.5	98 21	109.0	21 09.7	98 21	108.8	21 39.0	97 21	108.7	22 08.2	97 21	108.6	22 37.5	97 21	108.5	23 06.7	97 21	108.4	23 35.9	97 21	108.2	24 05.2	97 21	108.1	7
8	20 27.7	97 21	108.0	20 56.9	97 21	107.8	21 26.2	97 21	107.7	21 55.4	97 22	107.6	22 24.6	97 22	107.5	22 53.9	97 22	107.4	23 23.1	97 22	107.2	23 52.3	97 22	107.1	8
9	20 14.8	97 22	107.0	20 44.0	97 22	106.8	21 13.3	97 22	106.7	21 42.5	97 22	106.6	22 11.7	97 22	106.5	22 40.9	97 22	106.4	23 10.1	97 22	106.2	23 39.4	97 22	106.1	9
70	20 01.9	97 22	106.0	20 31.1	97 22	105.8	21 00.3	97 22	105.7	21 29.5	97 22	105.6	21 58.7	97 22	105.5	22 28.0	97 22	105.4	22 57.2	97 22	105.2	23 26.4	97 22	105.1	70
1	19 48.9	97 22	105.0	20 18.1	97 22	104.8	20 47.3	97 22	104.7	21 16.5	97 22	104.6	21 45.7	97 22	104.5	22 14.9	97 22	104.4	22 44.1	97 22	104.2	23 13.3	97 22	104.1	1
2	19 35.8	97 22	104.0	20 05.0	97 22	103.8	20 34.2	97 22	103.7	21 03.4	97 22	103.6	21 32.6	97 22	103.5	22 01.8	97 22	103.4	22 31.0	97 22	103.2	23 00.2	97 22	103.1	2
3	19 22.7	97 22	103.0	19 51.9	97 22	102.9	20 21.1	97 22	102.7	20 50.3	97 22	102.6	21 19.5	97 22	102.5	21 48.6	97 22	102.4	22 17.8	97 22	102.2	22 47.0	97 22	102.1	3
4	19 09.5	97 22	102.0	19 38.7	97 22	101.9	20 07.9	97 22	101.7	20 37.1	97 22	101.6	21 06.3	97 22	101.5	21 35.4	97 22	101.4	22 04.6	97 22	101.2	22 33.8	97 22	101.1	4
75	18 56.3	97 22	101.0	19 25.5	97 22	100.9	19 54.6	97 22	100.8	20 23.8	97 22	100.6	20 53.0	97 22	100.5	21 22.2	97 22	100.4	21 51.4	97 22	100.3	22 20.5	97 22	100.1	75
6	18 43.0	97 22	100.0	19 12.2	97 22	99.9	19 41.4	97 22	99.8	20 10.5	97 22	99.6	20 39.7	97 22	99.5	21 08.9	97 22	99.4	21 38.1	97 22	99.3	22 07.2	97 22	99.1	6
7	18 29.7	97 22	99.0	18 58.9	97 22	98.9	19 28.0	97 22	98.8	19 57.2	97 22	98.7	20 26.4	97 22	98.5	20 55.6	97 22	98.4	21 24.7	97 22	98.3	21 53.9	97 22	98.1	7
8	18 16.3	97 22	98.0	18 45.5	97 22	97.9	19 14.7	97 22	97.8	19 43.9	97 22	97.7	20 13.0	97 22	97.5	20 42.2	97 22	97.4	21 11.3	97 22	97.3	21 40.5	97 22	97.2	8
9	18 02.9	97 22	97.1	18 32.1	97 22	96.9	19 01.3	97 22	96.8	19 30.5	97 22	96.7	19 59.6	97 22	96.6	20 28.8	97 22	96.4	20 57.9	97 22	96.3	21 27.1	97 22	96.2	9
80	17 49.5	97 22	96.1	18 18.7	97 22	95.9	18 47.9	97 22	95.8	19 17.0	97 22	95.7	19 46.2	97 22	95.6	20 15.4	97 22	95.4	20 44.5	97 22	95.3	21 13.7	97 22	95.2	80
1	17 36.1	97 22	95.1	18 05.3	97 22	95.0	18 34.4	97 22	94.8	19 03.6	97 22	94.7	19 32.8	97 22	94.6	20 01.9	97 22	94.5	20 31.1	97 22	94.3	21 00.2	97 22	94.2	1
2	17 22.7	97 22	94.1	17 51.8	97 22	94.0	18 21.0	97 22	93.9	18 50.1	97 22	93.7	19 19.3	97 22	93.6	19 48.5	97 22	93.5	20 17.6	97 22	93.4	20 46.7	97 22	93.2	2
3	17 09.2	97 22	93.1	17 38.4	97 22	93.0	18 07.5	97 22	92.9	18 36.7	97 22	92.8	19 05.8	97 22	92.6	19 35.0	97 22	92.5	20 04.1	97 22	92.4	20 33.3	97 22	92.3	3
4	16 55.7	97 22	92.2	17 24.9	97 22	92.0	17 54.0	97 22	91.9	18 23.2	97 22	91.8	18 52.3	97 22	91.7	19 21.5	97 22	91.5	19 50.6	97 22	91.4	20 19.8	97 22	91.3	4
85	16 42.2	97 22	91.2	17 11.4	97 22	91.1	17 40.5	97 22	90.9	18 09.7	97 22	90.8	18 38.8	97 22	90.7	19 08.0	97 22	90.6	19 37.1	97 22	90.4	20 06.3	97 22	90.3	85
6	16 28.7	97 22	90.2	16 57.9	97 22	90.1	17 27.0	97 22	90.0	17 56.2	97 22	89.8	18 25.3	97 22	89.7	18 54.5	97 22	89.6	19 23.6	97 22	89.5	19 52.8	97 22	89.3	6
7	16 15.2	97 22	89.2	16 44.4	97 22	89.1	17 13.5	97 22	89.0	17 42.7	97 22	88.9	18 11.9	97 22	88.7	18 41.0	97 22	88.6	19 10.1	97 22	88.5	19 39.3	97 22	88.4	7
8	16 01.7	97 22	88.3	16 30.9	97 22	88.1	17 00.1	97 22	88.0	17 29.2	97 22	87.9	17 58.4	97 22	87.8	18 27.5	97 22	87.6	18 56.7	97 22	87.5	19 25.8	97 22	87.4	8
9	15 48.2	97 22	87.3	16 17.4	97 22	87.2	16 46.6	97 22	87.0	17 15.7	97 22	86.9	17 44.9	97 22	86.8	18 14.0	97 22	86.7	18 43.2	97 22	86.5	19 12.3	97 22	86.4	9
90	15 34.8	97 22	86.3	16 03.9	97 22	86.2	16 33.1	97 22	86.1	17 02.3	97 22	85.9	17 31.4	97 22	85.8	18 00.6	97 22	85.7	18 29.7	97 22	85.6	18 58.8	97 22	85.4	90

Lat. 77°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	15 21.3	97 22	85.3	15 50.5	97 22	85.2	16 19.6	97 22	85.1	16 48.8	97 22	85.0	17 18.0	97 22	84.9	17 47.1	97 22	84.7	18 16.3	97 22	84.6	18 45.4	97 22	84.5	91
2	15 07.9	97 22	84.4	15 37.0	97 22	84.3	16 06.2	97 22	84.1	16 35.4	97 22	84.0	17 04.5	97 22	83.9	17 33.7	97 22	83.8	18 02.8	97 22	83.6	18 32.0	97 22	83.5	2
3	14 54.4	97 22	83.4	15 23.6	97 22	83.3	15 52.8	97 22	83.2	16 22.0	97 22	83.0	16 51.1	97 22	82.9	17 20.3	97 22	82.8	17 49.4	97 22	82.7	18 18.6	97 22	82.5	3
4	14 41.0	97 22	82.4	15 10.2	97 22	82.3	15 39.4	97 22	82.2	16 08.6	97 22	82.1	16 37.7	97 22	82.0	17 06.9	97 22	81.8	17 36.1	97 22	81.7	18 05.2	97 22	81.6	4
95	14 27.7	97 22	81.5	14 56.9	97 22	81.3	15 26.0	97 22	81.2	15 55.2	97 22	81.1	16 24.4	97 22	81.0	16 53.6	97 22	80.9	17 22.7	97 22	80.7	17 51.9	97 22	80.6	95
6	14 14.3	97 22	80.5	14 43.5	97 22	80.4	15 12.7	97 22	80.3	15 41.9	97 22	80.1	16 11.1	97 22	80.0	16 40.3	97 22	79.9	17 09.4	97 22	79.8	17 38.6	97 22	79.7	6
7	14 01.1	97 22	79.5	14 30.2	97 22	79.4	14 59.4	97 22	79.3	15 28.6	97 22	79.2	15 57.8	97 22	79.1	16 27.0	97 22	78.9	16 56.2	97 22	78.8	17 25.3	97 22	78.7	7
8	13 47.8	97 22	78.6	14 17.0	97 22	78.5	14 46.2	97 22	78.3	15 15.4	97 22	78.2	15 44.6	97 22	78.1	16 13.8	97 22	78.0	16 42.9	97 22	77.9	17 12.1	97 22	77.7	8
9	13 34.6	97 22	77.6	14 03.8	97 22	77.5	14 33.0	97 22	77.4	15 02.2	97 22	77.3	15 31.4	97 22	77.1	16 00.6	97 22	77.0	16 29.8	97 22	76.9	16 59.0	97 22	76.8	9
100	13 21.4	97 22	76.7	13 50.7	97 22	76.5	14 19.9	97 22	76.4	14 49.1	97 22	76.3	15 18.3	97 22	76.2	15 47.5	97 22	76.1	16 16.6	97 22	75.9	16 45.8	97 22	75.8	100
1	13 08.3	97 22	75.7	13 37.6	97 22	75.6	14 06.8	97 22	75.5	14 36.0	97 22	75.3	15 05.2	97 22	75.2	15 34.4	97 22	75.1	16 03.6	97 22	75.0	16 32.8	97 22	74.9	1
2	12 55.3	97 22	74.7	13 24.5	97 22	74.6	13 53.7	97 22	74.5	14 22.9	97 22	74.4	14 52.2	97 22	74.3	15 21.4	97 22	74.1	15 50.6	97 22	74.0	16 19.8	97 22	73.9	2
3	12 42.3	97 22	73.8	13 11.5	97 22	73.7	13 40.8	97 22	73.5	14 10.0	97 22	73.4	14 39.2	97 22	73.3	15 08.4	97 21	73.2	15 37.6	97 21	73.1	16 06.8	97 21	72.9	3
4	12 29.4	97 21	72.8	12 58.6	97 21	72.7	13 27.8	97 21	72.6	13 57.1	97 21	72.5	14 26.3	97 21	72.3	14 55.5	97 21	72.2	15 24.8	97 21	72.1	15 54.0	97 21	72.0	4
105	12 16.5	97 21	71.8	12 45.8	97 21	71.7	13 15.0	97 21	71.6	13 44.2	97 21	71.5	14 13.5	97 21	71.4	14 42.7	97 21	71.3	15 11.9	97 21	71.2	15 41.2	97 21	71.0	105
6	12 03.7	98 21	70.9	12 33.0	98 21	70.8	13 02.2	98 21	70.7	13 31.5	97 21	70.5	14 00.7	97 21	70.4	14 30.0	97 21	70.3	14 59.2	97 21	70.2	15 28.4	97 21	70.1	6
7	11 51.0	98 21	69.9	12 20.3	98 21	69.8	12 49.5	98 21	69.7	13 18.8	98 21	69.6	13 48.0	98 21	69.5	14 17.3	98 21	69.4	14 46.6	97 21	69.2	15 15.8	97 21	69.1	7
8	11 38.4	98 21	69.0	12 07.6	98 21	68.9	12 36.9	98 21	68.7	13 06.2	98 21	68.6	13 35.4	98 21	68.5	14 04.7	98 21	68.4	14 34.0	98 21	68.3	15 03.2	98 21	68.2	8
9	11 25.8	98 21	68.0	11 55.1	98 21	67.9	12 24.4	98 21	67.8	12 53.7	98 21	67.7	13 22.9	98 21	67.6	13 52.2	98 21	67.5	14 21.5	98 21	67.3	14 50.7	98 21	67.2	9
110	11 13.3	98 21	67.1	11 42.6	98 21	66.9	12 11.9	98 21	66.8	12 41.2	98 21	66.7	13 10.5	98 21	66.6	13 39.8	98 21	66.5	14 09.1	98 21	66.4	14 38.3	98 21	66.3	110
1	11 01.0	98 20	66.1	11 30.3	98 20	66.0	11 59.6	98 20	65.9	12 28.9	98 20	65.8	12 58.2	98 20	65.7	13 27.4	98 20	65.6	13 56.7	98 20	65.4	14 26.0	98 20	65.3	1
2	10 48.7	98 20	65.1	11 18.0	98 20	65.0	11 47.3	98 20	64.9	12 16.6	98 20	64.8	12 45.9	98 20	64.7	13 15.2	98 20	64.6	13 44.5	98 20	64.5	14 13.8	98 20	64.4	2
3	10 36.5	98 20	64.2	11 05.8	98 20	64.1	11 35.1	98 20	64.0	12 04.4	98 20	63.9	12 33.7	98 20	63.8	13 03.1	98 20	63.6	13 32.4	98 20	63.5	14 01.7	98 20	63.4	3
4	10 24.4	98 20	63.2	10 53.7	98 20	63.1	11 23.0	98 20	63.0	11 52.4	98 20	62.9	12 21.7	98 20	62.8	12 51.0	98 20	62.7	13 20.3	98 20	62.6	13 49.7	98 20	62.5	4
115	10 12.4	98 20	62.3	10 41.7	98 20	62.2	11 11.1	98 20	62.1	11 40.4	98 20	62.0	12 09.7	98 20	61.9	12 39.1	98 20	61.7	13 08.4	98 20	61.6	13 37.7	98 20	61.5	115
6	10 00.5	98 20	61.3	10 29.8	98 20	61.2	10 59.2	98 20	61.1	11 28.5	98 20	61.0	11 57.9	98 20	60.9	12 27.2	98 20	60.8	12 56.6	98 20	60.7	13 25.9	98 20	60.6	6
7	9 48.7	98 19	60.4	10 18.0	98 19	60.3	10 47.4	98 19	60.2	11 16.8	98 19	60.1	11 46.2	98 19	60.0	12 15.5	98 19	59.8	12 44.9	98 19	59.7	13 14.2	98 19	59.6	7
8	9 37.0	98 19	59.4	10 06.4	98 19	59.3	10 35.8	98 19	59.2	11 05.1	98 19	59.1	11 34.5	98 19	59.0	12 03.9	98 19	58.9	12 33.3	98 19	58.8	13 02.6	98 19	58.7	8
9	9 25.4	98 19	58.5	9 54.8	98 19	58.4	10 24.2	98 19	58.3	10 53.6	98 19	58.2	11 23.0	98 19	58.1	11 52.4	98 19	57.9	12 21.8	98 19	57.8	12 51.2	98 19	57.7	9
120	9 14.0	98 19	57.5	9 43.4	98 19	57.4	10 12.8	98 19	57.3	10 42.2	98 19	57.2	11 11.6	98 19	57.1	11 41.0	98 19	57.0	12 10.4	98 19	56.9	12 39.8	98 19	56.8	120
1	9 02.7	98 19	56.5	9 32.1	98 19	56.4	10 01.5	98 19	56.3	10 30.9	98 19	56.2	11 00.4	98 19	56.1	11 29.8	98 19	56.0	11 59.2	98 19	55.9	12 28.6	98 18	55.8	1
2	8 51.5	98 18	55.6	9 20.9	98 18	55.5	9 50.3	98 18	55.4	10 19.8	98 18	55.3	10 49.2	98 18	55.2	11 18.6	98 18	55.1	11 48.1	98 18	55.0	12 17.5	98 18	54.9	2
3	8 40.4	98 18	54.6	9 09.9	98 18	54.5	9 39.3	98 18	54.4	10 08.7	98 18	54.3	10 38.2	98 18	54.2	11 07.6	98 18	54.2	11 37.1	98 18	54.1	12 06.5	98 18	54.0	3
4	8 29.5	98 18	53.7	8 58.9	98 18	53.6	9 28.4	98 18	53.5	9 57.8	98 18	53.4	10 27.3	98 18	53.3	10 56.8	98 18	53.2	11 26.2	98 18	53.1	11 55.7	98 18	53.0	4
125	8 18.7	98 18	52.7	8 48.1	98 18	52.6	9 17.6	98 18	52.5	9 47.1	98 18	52.4	10 16.5	98 18	52.4	10 46.0	98 18	52.3	11 15.5	98 18	52.2	11 44.9	98 18	52.1	125
6	8 08.0	98 18	51.8	8 37.5	98 18	51.7	9 07.0	98 18	51.6	9 36.4	98 18	51.5	10 05.9	98 17	51.4	10 35.4	98 17	51.3	11 04.9	98 17	51.2	11 34.4	98 17	51.1	6
7	7 57.4	98 17	50.8	8 27.0	98 17	50.7	8 56.5	98 17	50.6	9 26.0	98 17	50.5	9 55.4	98 17	50.5	10 24.9	98 17	50.4	10 54.4	98 17	50.3	11 23.9	98 17	50.2	7
8	7 47.1	98 17	49.9	8 16.6	98 17	49.8	8 46.1	98 17	49.7	9 15.6	98 17	49.6	9 45.1	98 17	49.5	10 14.6	98 17	49.4	10 44.1	98 17	49.3	11 13.6	98 17	49.2	8
9	7 36.8	98 17	48.9	8 06.3	98 17	48.8	8 35.9	98 17	48.7	9 05.4	98 17	48.6	9 34.9	98 17	48.6	10 04.4	98 17	48.5	10 34.0	98 17	48.4	11 03.5	98 17	48.3	9
130	7 26.7	98 17	48.0	7 56.3	98 17	47.9	8 25.8	98 17	47.8	8 55.3	98 16	47.7	9 24.9	98 16	47.6	9 54.4	98 16	47.5	10 24.0	98 16	47.4	10 53.5	98 16	47.3	130
1	7 16.8	99 16	47.0	7 46.3	99 16	46.9	8 15.9	99 16	46.8	8 45.4	99 16	46.7	9 15.0	99 16	46.7	9 44.5	99 16	46.6	10 14.1	99 16	46.5	10 43.6	98 16	46.4	1
2	7 07.0	99 16	46.0	7 36.5	99 16	46.0	8 06.1	99 16	45.9	8 35.7	99 16	45.8	9 05.2	99 16	45.7	9 34.8	99 16	45.6	10 04.4	99 16	45.5	10 33.9	99 16	45.4	2
3	6 57.3	99 16	45.1	7 26.9	99 16	45.0	7 56.5	99 16	44.9	8 26.1	99 16	44.8	8 55.7	99 16	44.8	9 25.2	99 16	44.7	9 54.8	99 16	44.6	10 24.4	99 16	44.5	3
4	6 47.9	99 16	44.1	7 17.5	99 16	44.1	7 47.1	99 15	44.0	8 16.6	99 15	43.9	8 46.2	99 15	43.8	9 15.8	99 15	43.7	9 45.4	99 15	43.6	10 15.0	99 15	43.6	4
135	6 38.5	99 15	43.2	7 08.1	99 15	43.1	7 37.8	99 15	43.0	8 07.4	99 15	42.9	8 37.0	99 15	42.9	9 06.6	99 15	42.8	9 36.2	99 15	42.7	10 05.8	99 15	42.6	135
6	6 29.4	99 15	42.2	6 59.0	99 15	42.1	7 28.6	99 15	42.1	7 58.3	99 15	42.0	8 27.9	99 15	41.9	8 57.5	99 15	41.8	9 27.1	99 15	41.7	9 56.7	99 15	41.7	6
7	6 20.4	99 15	41.3	6 50.0	99 15	41.2	7 19.7	99 15	41.1	7 49.3	99 15	41.0	8 19.0	99 15	41.0	8 48.6	99 15	40.9	9 18.2	99 15	40.8	9 47.9	99 15	40.7	7
8	6 11.6	99 14	40.3	6 41.2	99 14	40.2	7 10.9	99 14	40.2	7 40.5	99 14	40.1	8 10.2	99 14	40.0	8 39.8	99 14	39.9	9 09.5	99 14	39.9	9 39.1	99 14	39.8	8
9	6 02.9	99 14	39.4	6 32.6	99 14	39.3	7 02.3	99 14	39.2	7 31.9	99 14	39.1	8 01.6	99 14	39.1	8 31.3	99 14	39.0	9 00.9	99 14	38.9	9 30.6	99 14	38.8	9
140	5 54.5	99 14	38.4	6 24.1	99 14	38.3	6 53.8	99 14	38.3	7 23.5	99 14	38.2	7 53.2	99 14	38.1	8 22.9	99 14	38.0	8 52.5	99 14	38.0	9 22.2	99 14	37.9	140
1	5 46.2	99 14	37.4	6 15.9	99 14	37.4	6 45.6	99 13	37.3	7 15.2	99 13	37.2	7 44.9	99 13	37.2	8 14.6	99 13	37.1	8 44.3	99 13	37.0	9 14.0	99 13	36.9	1
2	5 38.0	99 13	36.5	6 07.8	99 13	36.4	6 37.5	99 13	36.3	7 07.2	99 13	36.3	7 36.9	99 13	36.2	8 06.6	99 13	36.1	8 36.3	99 13	36.1	9 06.0	99 13	36.0	2
3	5 30.1	99 13	35.5	5 59.8	99 13	35.5	6 29.6	99 13	35.4	6 59.3	99 13	35.3	7 29.0	99 13	35.3	7 58.7	99 13	35.2	8 28.4	99 13	35.1	8 58.1	99 13	35.1	3
4	5 22.4	99 13	34.6	5 52.1	99 13	34.5	6 21.8	99 13	34.4	6 51.6	99 13	34.4	7 21.3	99 13	34.3	7 51.0	99 13	34.2	8 20.8	99 12	34.2	8 50.5	99 12	34.1	4
145	5 14.8	99 12	33.6	5 44.5	99 12	33.6	6 14.3	99 12	33.5	6 44.0	99 12	33.4	7 13.8	99 12	33.4	7 43.5	99 12	33.3	8 13.3	99 12	33.2	8 43.0	99 12	33.2	145
6	5 07.4	99 12	32.7	5 37.2	99 12	32.6	6 06.9	99 12	32.5	6 36.7	99 12	32.5	7 06.5	99 12	32.4	7 36.2	99 12	32.3	8 06.0	99 12	32.3	8 35.7	99 12	32.2	6
7	5 00.2	99 12	31.7	5 30.0	99 12	31.6	5 59.8	99 12	31.6	6 29.5	99 12	31.5	6 59.3	99 12	31.5	7 29.1	99 12	31.4	7 58.9	99 12	31.3	8 28.6	99 12	31.3	7
8				5 23.0	99 11	30.7	5 52.8	99 11	30.6	6 22.6	99 11	30.6	6 52.4	99 11	30.5	7 22.1	99 11	30.4	7 51.9	99 11	30.4	8 21.7	99 11	30.3	8
9				5 16.2	99 11	29.7	5 46.0	99 11	29.7	6 15.8	99 11	29.6	6 45.6	99 11	29.6	7 15.4	99 11	29.5	7 45.2	99 11	29.4	8 15.0	99 11	29.4	9
150				5 09.6	99 11	28.8	5 39.4	99 11	28.7	6 09.2	99 11	28.7	6 39.0	99 11	28.6	7 08.9	99 11	28.5	7 38.7	99 11	28.5	8 08.5	99 11	28.4	150
1				5 03.2	99 10	27.8	5 33.0	99 10	27.8	6 02.9	99 10	27.7	6 32.7	99 10	27.7	7 02.5	99 10	27.6	7 32.3	99 10	27.5	8 02.1	99 10	27.5	1
2							5 26.9	99 10	26.8	5 56.7	99 10	26.8	6 26.5	99 10	26.7	6 56.4	99 10	26.6	7 26.2	99 10	26.6	7 56.0	99 10	26.5	2
3							5 20.9	99 10	25.9	5 50.7	99 10	25.8	6 20.6	99 10	25.7	6 50.4	99 10	25.7	7 20.2	99 10	25.6	7 50.1	99 10	25.6	3
4							5 15.1	1.0 09	24.9	5 44.9	1.0 09	24.8	6 14.8	1.0 09	24.8	6 44.6	1.0 09	24.7	7 14.5	1.0 09	24.7	7 44.4	1.0 09	24.6	4
155							5 09.5	1.0 09	23.9	5 39.4	1.0 09	23.9	6 09.2	1.0 09	23.8	6 39.1	1.0 09	23.8	7 09.0	1.0 09	23.7	7 38.8	1.0 09	23.7	155
6							5 04.1	1.0 09	23.0	5 34.0	1.0 09	22.9	6 03.9	1.0 09	22.9	6 33.8	1.0 09	22.8	7 03.6	1.0 09	22.8	7 33.5	1.0 09	22.8	6
7										5 28.9	1.0 08	22.0	5 58.7	1.0 08	21.9	6 28.6	1.0 08	21.9	6 58.5	1.0 08	21.9	7 28.4	1.0 08	21.8	7
8										5 23.9	1.0 08	21.0	5 53.8	1.0 08	21.0	6 23.7	1.0 08	20.9	6 53.6	1.0 08	20.9	7 23.5	1.0 08	20.9	8
9										5 19.2	1.0 08	20.1	5 49.1	1.0 08	20.0	6 19.0	1.0 08	20.0	6 48.9	1.0 08	20.0	7 18.8	1.0 07	19.9	9
160										5 14.6	1.0 07	19.1	5 44.6	1.0 07	19.1	6 14.5	1.0 07	19.0	6 44.4	1.0 07	19.0	7 14.3	1.0 07	19.0	160
1										5 10.3	1.0 07	18.2	5 40.2	1.0 07	18.1	6 10.2	1.0 07	18.1	6 40.1	1.0 07	18.1	7 10.0	1.0 07	18.0	1
2										5 06.2	1.0 06	17.2	5 36.2	1.0 06	17.2	6 06.1	1.0 06	17.1	6 36.0	1.0 06	17.1	7 05.9	1.0 06	17.1	2
3										5 02.3	1.0 06	16.3	5 32.3	1.0 06	16.2	6 02.2	1.0 06	16.2	6 32.1	1.0 06	16.2	7 02.1	1.0 06	16.1	3
4													5 28.6	1.0 06	15.3	5 58.6	1.0 06	15.2	6 28.5	1.0 06	15.2	6 58.4	1.0 06	15.2	4
165													5 25.2	1.0 05	14.3	5 55.1	1.0 05	14.3	6 25.1	1.0 05	14.3	6 55.0	1.0 05	14.2	165
6													5 21.9	1.0 05	13.4	5 51.9	1.0 05	13.3	6 21.8	1.0 05	13.3	6 51.8	1.0 05	13.3	6
7													5 18.9	1.0 05	12.4	5 48.9	1.0 05	12.4	6 18.8	1.0 05	12.4	6 48.8	1.0 05	12.3	7
8													5 16.1	1.0 04	11.5	5 46.1	1.0 04	11.4	6 16.1	1.0 04	11.4	6 46.0	1.0 04	11.4	8
9													5 13.6	1.0 04	10.5	5 43.5	1.0 04	10.5	6 13.5	1.0 04	10.5	6 43.5	1.0 04	10.4	9
170													5 11.2	1.0 04	09.5	5 41.2	1.0 04	09.5	6 11.2	1.0 04	09.5	6 41.1	1.0 04	09.5	170
1													5 09.1	1.0 03	08.6	5 39.1	1.0 03	08.6	6 09.1	1.0 03	08.6	6 39.0	1.0 03	08.5	1
2													5 07.2	1.0 03	07.6	5 37.2	1.0 03	07.6	6 07.2	1.0 03	07.6	6 37.1	1.0 03	07.6	2
3													5 05.5	1.0 02	06.7	5 35.5	1.0 02	06.7	6 05.5	1.0 02	06.7	6 35.5	1.0 02	06.6	3
4													5 04.0	1.0 02	05.7	5 34.0	1.0 02	05.7	6 04.0	1.0 02	05.7	6 34.0	1.0 02	05.7	4
175													5 02.8	1.0 02	04.8	5 32.8	1.0 02	04.8	6 02.8	1.0 02	04.8	6 32.8	1.0 02	04.7	175
6													5 01.8	1.0 01	03.8	5 31.8	1.0 01	03.8	6 01.8	1.0 01	03.8	6 31.8	1.0 01	03.8	6
7													5 01.0	1.0 01	02.9	5 31.0	1.0 01	02.9	6 01.0	1.0 01	02.9	6 31.0	1.0 01	02.8	7
8													5 00.4	1.0 01	01.9	5 30.4	1.0 01	01.9	6 00.4	1.0 01	01.9	6 30.4	1.0 01	01.9	8
9													5 00.1	1.0 00	01.0	5 30.1	1.0 00	01.0	6 00.1	1.0 00	01.0	6 30.1	1.0 00	00.9	9
180													5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	180

Lat. 78°

La 79

Lat. 77°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	33 00.0	1.0 00	180.0	33 30.0	1.0 00	180.0	34 00.0	1.0 00	180.0	34 30.0	1.0 00	180.0
1	32 59.9	1.0 01	178.9	33 29.9	1.0 01	178.9	33 59.9	1.0 01	178.9	34 29.9	1.0 01	178.9
2	32 59.5	1.0 01	177.8	33 29.5	1.0 01	177.8	33 59.5	1.0 01	177.7	34 29.5	1.0 01	177.7
3	32 58.8	1.0 02	176.6	33 28.8	1.0 02	176.6	33 58.8	1.0 02	176.6	34 28.8	1.0 02	176.6
4	32 57.9	1.0 02	175.5	33 27.9	1.0 02	175.5	33 57.9	1.0 02	175.5	34 27.9	1.0 02	175.5
05	32 56.7	1.0 02	174.4	33 26.7	1.0 02	174.4	33 56.7	1.0 02	174.4	34 26.7	1.0 02	174.4
6	32 55.3	1.0 03	173.3	33 25.2	1.0 03	173.3	33 55.2	1.0 03	173.2	34 25.2	1.0 03	173.2
7	32 53.5	1.0 03	172.2	33 23.5	1.0 03	172.1	33 53.5	1.0 03	172.1	34 23.5	1.0 03	172.1
8	32 51.6	1.0 04	171.0	33 21.6	1.0 04	171.0	33 51.5	1.0 04	171.0	34 21.5	1.0 04	171.0
9	32 49.3	1.0 04	169.9	33 19.3	1.0 04	169.9	33 49.3	1.0 04	169.9	34 19.3	1.0 04	169.8
10	32 46.9	1.0 05	168.8	33 16.8	1.0 05	168.8	33 46.8	1.0 05	168.8	34 16.8	1.0 05	168.7
1	32 44.1	1.0 05	167.7	33 14.1	1.0 05	167.7	33 44.0	1.0 05	167.6	34 14.0	1.0 05	167.6
2	32 41.1	1.0 05	166.6	33 11.1	1.0 05	166.5	33 41.0	1.0 05	166.5	34 11.0	1.0 05	166.5
3	32 37.8	1.0 06	165.5	33 07.8	1.0 06	165.4	33 37.7	1.0 06	165.4	34 07.7	1.0 06	165.4
4	32 34.3	1.0 06	164.4	33 04.3	1.0 06	164.3	33 34.2	1.0 06	164.3	34 04.1	1.0 06	164.2
15	32 30.6	1.0 07	163.2	33 00.5	1.0 07	163.2	33 30.4	1.0 07	163.2	34 00.3	1.0 07	163.1
6	32 26.5	1.0 07	162.1	32 56.5	1.0 07	162.1	33 26.4	1.0 07	162.0	33 56.3	1.0 07	162.0
7	32 22.3	1.0 08	161.0	32 52.2	1.0 08	161.0	33 22.1	1.0 08	160.9	33 52.0	1.0 08	160.9
8	32 17.8	1.0 08	159.9	32 47.7	1.0 08	159.9	33 17.6	1.0 08	159.8	33 47.4	1.0 08	159.8
9	32 13.0	1.0 08	158.8	32 42.9	1.0 08	158.7	33 12.8	1.0 08	158.7	33 42.7	1.0 08	158.6
20	32 08.0	1.0 09	157.7	32 37.9	1.0 09	157.6	33 07.7	1.0 09	157.6	33 37.6	1.0 09	157.5
1	32 02.8	1.0 09	156.6	32 32.6	1.0 09	156.5	33 02.5	1.0 09	156.5	33 32.3	1.0 09	156.4
2	31 57.3	1.0 10	155.5	32 27.1	1.0 10	155.4	32 57.0	99 10	155.4	33 26.8	99 10	155.3
3	31 51.6	99 10	154.4	32 21.4	99 10	154.3	32 51.2	99 10	154.3	33 21.1	99 10	154.2
4	31 45.6	99 10	153.3	32 15.4	99 10	153.2	32 45.3	99 10	153.2	33 15.1	99 10	153.1
25	31 39.4	99 11	152.2	32 09.2	99 11	152.1	32 39.0	99 11	152.1	33 08.9	99 11	152.0
6	31 33.0	99 11	151.1	32 02.8	99 11	151.0	32 32.6	99 11	151.0	33 02.4	99 11	150.9
7	31 26.4	99 11	150.0	31 56.2	99 11	149.9	32 25.9	99 11	149.9	32 55.7	99 12	149.8
8	31 19.5	99 12	148.9	31 49.3	99 12	148.8	32 19.1	99 12	148.8	32 48.8	99 12	148.7
9	31 12.4	99 12	147.8	31 42.2	99 12	147.7	32 11.9	99 12	147.7	32 41.7	99 12	147.6
30	31 05.1	99 12	146.7	31 34.9	99 13	146.6	32 04.6	99 13	146.6	32 34.3	99 13	146.5
1	30 57.6	99 13	145.6	31 27.4	99 13	145.6	31 57.1	99 13	145.5	32 26.8	99 13	145.4
2	30 49.9	99 13	144.6	31 19.6	99 13	144.5	31 49.3	99 13	144.4	32 19.0	99 13	144.3
3	30 42.0	99 14	143.5	31 11.7	99 14	143.4	31 41.4	99 14	143.3	32 11.0	99 14	143.2
4	30 33.8	99 14	142.4	31 03.5	99 14	142.3	31 33.2	99 14	142.2	32 02.9	99 14	142.1
35	30 25.5	99 14	141.3	30 55.2	99 14	141.2	31 24.8	99 14	141.1	31 54.5	99 14	141.0
6	30 17.0	99 15	140.2	30 46.6	99 15	140.1	31 16.3	99 15	140.1	31 45.9	99 15	140.0
7	30 08.2	99 15	139.2	30 37.9	99 15	139.1	31 07.5	99 15	139.0	31 37.1	99 15	138.9
8	29 59.3	99 15	138.1	30 28.9	99 15	138.0	30 58.5	99 15	137.9	31 28.1	99 15	137.8
9	29 50.2	99 15	137.0	30 19.8	99 16	136.9	30 49.4	99 16	136.8	31 19.0	99 16	136.7
40	29 40.9	99 16	136.0	30 10.5	99 16	135.9	30 40.1	99 16	135.8	31 09.6	99 16	135.7
1	29 31.4	99 16	134.9	30 01.0	99 16	134.8	30 30.6	99 16	134.7	31 00.1	99 16	134.6
2	29 21.8	98 16	133.8	29 51.3	98 16	133.7	30 20.9	98 16	133.6	30 50.4	98 16	133.5
3	29 12.0	98 17	132.8	29 41.5	98 17	132.7	30 11.0	98 17	132.6	30 40.5	98 17	132.5
4	29 02.0	98 17	131.7	29 31.5	98 17	131.6	30 01.0	98 17	131.5	30 30.5	98 17	131.4
45	28 51.8	98 17	130.6	29 21.3	98 17	130.5	29 50.8	98 17	130.4	30 20.3	98 17	130.3
6	28 41.5	98 17	129.6	29 11.0	98 18	129.5	29 40.5	98 18	129.4	30 09.9	98 18	129.3
7	28 31.0	98 18	128.5	29 00.5	98 18	128.4	29 29.9	98 18	128.3	29 59.4	98 18	128.2
8	28 20.4	98 18	127.5	28 49.8	98 18	127.4	29 19.3	98 18	127.3	29 48.7	98 18	127.2
9	28 09.6	98 18	126.4	28 39.0	98 18	126.3	29 08.5	98 18	126.2	29 37.9	98 18	126.1
50	27 58.7	98 18	125.4	28 28.1	98 18	125.3	28 57.5	98 18	125.2	29 26.9	98 19	125.1
1	27 47.6	98 19	124.4	28 17.0	98 19	124.2	28 46.4	98 19	124.1	29 15.8	98 19	124.0
2	27 36.4	98 19	123.3	28 05.8	98 19	123.2	28 35.2	98 19	123.1	29 04.5	98 19	123.0
3	27 25.0	98 19	122.3	27 54.4	98 19	122.2	28 23.8	98 19	122.1	28 53.2	98 19	121.9
4	27 13.6	98 19	121.2	27 42.9	98 19	121.1	28 12.3	98 19	121.0	28 41.6	98 19	120.9
55	27 02.0	98 20	120.2	27 31.3	98 20	120.1	28 00.7	98 20	120.0	28 30.0	98 20	119.9
6	26 50.2	98 20	119.2	27 19.6	98 20	119.1	27 48.9	98 20	118.9	28 18.2	98 20	118.8
7	26 38.4	98 20	118.2	27 07.7	98 20	118.0	27 37.0	98 20	117.9	28 06.3	98 20	117.8
8	26 26.4	98 20	117.1	26 55.8	98 20	117.0	27 25.1	98 20	116.9	27 54.3	98 20	116.8
9	26 14.4	98 20	116.1	26 43.7	98 20	116.0	27 13.0	98 20	115.9	27 42.2	98 20	115.7
60	26 02.2	98 20	115.1	26 31.5	98 20	115.0	27 00.8	98 20	114.8	27 30.0	98 21	114.7
1	25 49.9	98 21	114.1	26 19.2	98 21	113.9	26 48.5	98 21	113.8	27 17.7	98 21	113.7
2	25 37.6	98 21	113.0	26 06.8	98 21	112.9	26 36.1	98 21	112.8	27 05.3	97 21	112.7
3	25 25.1	98 21	112.0	25 54.3	97 21	111.9	26 23.6	97 21	111.8	26 52.8	97 21	111.7
4	25 12.5	97 21	111.0	25 41.8	97 21	110.9	26 11.0	97 21	110.8	26 40.2	97 21	110.6
65	24 59.9	97 21	110.0	25 29.1	97 21	109.9	25 58.3	97 21	109.8	26 27.6	97 21	109.6
6	24 47.2	97 21	109.0	25 16.4	97 21	108.9	25 45.6	97 21	108.7	26 14.8	97 21	108.6
7	24 34.4	97 21	108.0	25 03.6	97 21	107.9	25 32.8	97 22	107.7	26 02.0	97 22	107.6
8	24 21.5	97 22	107.0	24 50.7	97 22	106.9	25 19.9	97 22	106.7	25 49.1	97 22	106.6
9	24 08.6	97 22	106.0	24 37.7	97 22	105.9	25 06.9	97 22	105.7	25 36.1	97 22	105.6
70	23 55.5	97 22	105.0	24 24.7	97 22	104.8	24 53.9	97 22	104.7	25 23.1	97 22	104.6
1	23 42.5	97 22	104.0	24 11.7	97 22	103.8	24 40.8	97 22	103.7	25 10.0	97 22	103.6
2	23 29.4	97 22	103.0	23 58.5	97 22	102.9	24 27.7	97 22	102.7	24 56.8	97 22	102.6
3	23 16.2	97 22	102.0	23 45.3	97 22	101.9	24 14.5	97 22	101.7	24 43.6	97 22	101.6
4	23 02.9	97 22	101.0	23 32.1	97 22	100.9	24 01.3	97 22	100.7	24 30.4	97 22	100.6
75	22 49.7	97 22	100.0	23 18.8	97 22	99.9	23 48.0	97 22	99.7	24 17.1	97 22	99.6
6	22 36.4	97 22	99.0	23 05.5	97 22	98.9	23 34.7	97 22	98.8	24 03.8	97 22	98.6
7	22 23.0	97 22	98.0	22 52.2	97 22	97.9	23 21.3	97 22	97.8	23 50.4	97 22	97.6
8	22 09.6	97 22	97.0	22 38.8	97 22	96.9	23 07.9	97 22	96.8	23 37.0	97 22	96.6
9	21 56.2	97 22	96.1	22 25.4	97 22	95.9	22 54.5	97 22	95.8	23 23.6	97 22	95.7
80	21 42.8	97 22	95.1	22 11.9	97 22	94.9	22 41.0	97 22	94.8	23 10.2	97 22	94.7
1	21 29.3	97 22	94.1	21 58.5	97 22	94.0	22 27.6	97 22	93.8	22 56.7	97 22	93.7
2	21 15.9	97 22	93.1	21 45.0	97 22	93.0	22 14.1	97 22	92.8	22 43.2	97 22	92.7
3	21 02.4	97 22	92.1	21 31.5	97 22	92.0	22 00.6	97 22	91.9	22 29.7	97 22	91.7
4	20 48.9	97 22	91.2	21 18.0	97 22	91.0	21 47.1	97 22	90.9	22 16.3	97 22	90.8
85	20 35.4	97 22	90.2	21 04.5	97 22	90.0	21 33.6	97 22	89.9	22 02.8	97 22	89.8
6	20 21.9	97 22	89.2	20 51.0	97 22	89.1	21 20.1	97 22	88.9	21 49.3	97 22	88.8
7	20 08.4	97 22	88.2	20 37.5	97 22	88.1	21 06.7	97 22	88.0	21 35.8	97 22	87.8
8	19 54.9	97 22	87.3	20 24.0	97 22	87.1	20 53.2	97 22	87.0	21 22.3	97 22	86.9
9	19 41.4	97 22	86.3	20 10.6	97 22	86.2	20 39.7	97 22	86.0	21 08.8	97 22	85.9
90	19 28.0	97 22	85.3	19 57.1	97 22	85.2	20 26.2	97 22	85.1	20 55.4	97 22	84.9

H.A.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	35 00.0	1.0 00	180.0	35 30.0	1.0 00	180.0	36 00.0	1.0 00	180.0	36 30.0	1.0 00	180.0
1	34 59.9	1.0 01	178.9	35 29.9	1.0 01	178.9	35 59.9	1.0 01	178.9	36 29.9	1.0 01	178.9
2	34 59.5	1.0 01	177.7	35 29.5	1.0 01	177.7	35 59.5	1.0 01	177.7	36 29.5	1.0 01	177.7
3	34 58.8	1.0 02	176.6	35 28.8	1.0 02	176.6	35 58.8	1.0 02	176.6	36 28.8	1.0 02	176.6
4	34 57.9	1.0 02	175.5	35 27.9	1.0 02	175.5	35 57.9	1.0 02	175.4	36 27.9	1.0 02	175.4
05	34 56.7	1.0 02	174.3	35 26.7	1.0 02	174.3	35 56.7	1.0 02	174.3	36 26.6	1.0 02	174.3
6	34 55.2	1.0 03	173.2	35 25.2	1.0 03	173.2	35 55.2	1.0 03	173.2	36 25.2	1.0 03	173.2
7	34 53.5	1.0 03	172.1	35 23.5	1.0 03	172.1	35 53.4	1.0 03	172.0	36 23.4	1.0 03	172.0
8	34 51.5	1.0 04	171.0	35 21.5	1.0 04	170.9	35 51.4	1.0 04	170.9	36 21.4	1.0 04	170.9
9	34 49.2	1.0 04	169.8	35 19.2	1.0 04	169.8	35 49.2	1.0 04	169.8	36 19.2	1.0 04	169.7
10	34 46.7	1.0 05	168.7	35 16.7	1.0 05	168.7	35 46.7	1.0 05	168.6	36 16.6	1.0 05	168.6
1	34 43.9	1.0 05	167.6	35 13.9	1.0 05	167.5	35 43.9	1.0 05	167.5	36 13.8	1.0 05	167.5
2	34 40.9	1.0 06	166.4	35 10.9	1.0 06	166.4	35 40.8	1.0 06	166.4	36 10.8	1.0 06	166.3
3	34 37.6	1.0 06	165.3	35 07.6	1.0 06	165.3	35 37.5	1.0 06	165.2	36 07.4	1.0 06	165.2
4	34 34.1	1.0 06	164.2	35 04.0	1.0 06	164.2	35 33.9	1.0 06	164.1	36 03.9	1.0 06	164.1
15	34 30.3	1.0 07	163.1	35 00.2	1.0 07	163.0	35 30.1	1.0 07	163.0	36 00.0	1.0 07	162.9
6	34 26.2	1.0 07	161.9	34 56.1	1.0 07	161.9	35 26.0	1.0 07	161.9	35 55.9	1.0 07	161.8
7	34 21.9	1.0 08	160.8	34 51.8	1.0 08	160.8	35 21.7	1.0 08	160.7	35 51.6	1.0 08	160.7
8	34 17.3	1.0 08	159.7	34 47.2	1.0 08	159.7	35 17.1	1.0 08	159.6	35 47.0	1.0 08	159.6
9	34 12.5	1.0 08	158.6	34 42.4	1.0 08	158.5	35 12.3	1.0 08	158.5	35 42.2	1.0 08	158.4
20	34 07.5	1.0 09	157.5	34 37.4	1.0 09	157.4	35 07.2	1.0 09	157.4	35 37.1	1.0 09	157.3
1	34 02.2	1.0 09	156.4	34 32.1	1.0 09	156.3	35 01.9	1.0 09	156.2	35 31.8	1.0 09	156.2
2	33 56.7	99 10	155.2	34 26.5	99 10	155.2	34 56.4	99 10	155.1	35 26.2	99 10	155.1
3	33 50.9	99 10	154.1	34 20.7	99 10	154.1	34 50.6	99 10	154.0	35 20.4	99 10	153.9
4	33 44.9	99 10	153.0	34 14.7	99 10	153.0	34 44.5	99 10	152.9	35 14.3	99 10	152.8
25	33 38.7	99 11	151.9	34 08.5	99 11	151.9	34 38.3	99 11	151.8	35 08.1	99 11	151.7
6	33 32.2	99 11	150.8	34 02.0	99 11	150.7	34 31.8	99 11	150.7	35 01.5	99 11	150.6
7	33 25.5	99 12	149.7	33 55.3	99 12	149.6	34 25.0	99 12	149.6	34 54.8	99 12	149.5
8	33 18.6	99 12	148.6	33 48.3	99 12	148.5	34 18.1	99 12	148.5	34 47.8	99 12	148.4
9	33 11.4	99 12	147.5	33 41.2	99 12	147.4	34 10.9	99 12	147.4	34 40.7	99 12	147.3
30	33 04.1	99 13	146.4	33 33.8	99 13	146.3	34 03.5	99 13	146.3	34 33.2	99 13	146.2
1	32 56.5	99 13	145.3	33 26.2	99 13	145.2	33 55.9	99 13	145.2	34 25.6	99 13	145.1
2	32 48.7	99 13	144.2	33 18.4	99 13	144.1	33 48.1	99 13	144.1	34 17.8	99 13	144.0
3	32 40.7	99 14	143.1	33 10.4	99 14	143.0	33 40.1	99 14	143.0	34 09.7	99 14	142.9
4	32 32.5	99 14	142.0	33 02.2	99 14	142.0	33 31.8	99 14	141.9	34 01.5	99 14	141.8
35	32 24.1	99 14	141.0	32 53.8	99 14	140.9	33 23.4	99 14	140.8	33 53.0	99 14	140.7
6	32 15.5	99 15	139.9	32 45.2	99 15	139.8	33 14.8	99 15	139.7	33 44.4	99 15	139.6
7	32 06.7	99 15	138.8	32 36.3	99 15	138.7	33 05.9	99 15	138.6	33 35.6	99 15	138.5
8	31 57.7	99 15	137.7	32 27.3	99 15	137.6	32 56.9	99 15	137.5	33 26.5	99 15	137.4
9	31 48.6	99 16	136.6	32 18.1	99 16	136.5	32 47.7	99 16	136.4	33 17.3	99 16	136.3
40	31 39.2	99 16	135.6	32 08.8	99 16	135.5	32 38.3	99 16	135.4	33 07.9	98 16	135.3
1	31 29.7	98 16	134.5	31 59.2	98 16	134.4	32 28.8	98 16	134.3	32 58.3	98 16	134.2
2	31 20.0	98 16	133.4	31 49.5	98 17	133.3	32 19.0	98 17	133.2	32 48.5	98 17	133.1
3	31 10.1	98 17	132.4	31 39.6	98 17	132.2	32 09.1	98 17	132.1	32 38.6	98 17	132.0
4	31 00.0	98 17	131.3	31 29.5	98 17	131.2	31 59.0	98 17	131.1	32 28.5	98 17	131.0
45	30 49.8	98 17	130.2	31 19.3	98 17	130.1	31 48.7	98 17	130.0	32 18.2	98 17	129.9
6	30 39.4	98 18	129.2	31 08.9	98 18	129.1	31 38.3	98 18	128.9	32 07.8	98 18	128.8
7	30 28.9	98 18	128.1	30 58.3	98 18	128.0	31 27.7	98 18	127.9	31 57.2	98 18	127.8
8	30 18.2	98 18	127.1	30 47.6	98 18	126.9	31 17.0	98 18	126.8	31 46.4	98 18	126.7
9	30 07.3	98 18	126.0	30 36.7	98 18	125.9	31 06.1	98 18	125.8	31 35.5	98 18	125.7
50	29 56.3	98 19	125.0	30 25.7	98 19	124.8	30 55.1	98 19	124.7	31 24.5	98 19	124.6
1	29 45.2	98 19	123.9	30 14.6	98 19	123.8	30 43.9	98 19	123.7	31 13.3	98 19	123.6
2	29 33.9	98 19	122.9	30 03.3	98 19	122.7	30 32.6	98 19	122.6	31 02.0	98 19	122.5
3	29 22.5	98 19	121.8	29 51.9	98 19	121.7	30 21.2	98 19	121.6	30 50.5	98 19	121.5
4	29 11.0	98 19	120.8	29 40.3	98 19	120.7	30 09.6	98 19	120.5	30 39.0	98 20	120.4
55	28 59.3	98 20	119.7	29 28.6	98 20	119.6	29 58.0	98 20	119.5	30 27.3	98 20	119.4
6	28 47.5	98 20	118.7	29 16.9	98 20	118.6	29 46.2	98 20	118.5	30 15.4	98 20	118.3
7	28 35.6	98 20	117.7	29 04.9	98 20	117.5	29 34.2	98 20	117.4	30 03.5	98 20	117.3
8	28 23.6	98 20	116.6	28 52.9	98 20	116.5	29 22.2	98 20	116.4	29 51.5	98 20	116.3
9	28 11.5	98 20	115.6	28 40.8	98 20	115.5	29 10.1	98 20	115.4	29 39.3	98 20	115.2
60	27 59.3	98 21	114.6	28 28.6	98 21	114.5	28 57.8	97 21	114.3	29 27.0	97 21	114.2
1	27 47.0	97 21	113.6	28 16.2	97 21	113.4	28 45.5	97 21	113.3	29 14.7	97 21	113.2
2	27 34.6	97 21	112.5	28 03.8	97 21	112.4	28 33.0	97 21	112.3	29 02.2	97 21	112.2
3	27 22.0	97 21	111.5	27 51.3	97 21	111.4	28 20.5	97 21	111.3	28 49.7	97 21	111.1
4	27 09.4	97 21	110.5	27 38.7	97 21	110.4	28 07.9	97 21	110.3	28 37.1	97 21	110.1
65	26 56.8	97 21	109.5	27 26.0	97 21	109.4	27 55.2	97 21	109.2	28 24.3	97 21	109.1
6	26 44.0	97 21	108.5	27 13.2	97 21	108.4	27 42.4	97 21	108.2	28 11.6	97 21	108.1
7	26 31.2	97 22	107.5	27 00.3	97 22	107.3	27 29.5	97 22	107.2	27 58.7	97 22	107.1
8	26 18.3	97 22	106.5	26 47.4	97 22	106.3	27 16.6	97 22	106.2	27 45.8	97 22	106.1
9	26 05.3	97 22	105.5	26 34.4	97 22	105.3	27 03.6	97 22	105.2	27 32.8	97 22	105.1
70	25 52.2	97 22	104.5	26 21.4	97 22	104.3	26 50.5	97 22	104.2	27 19.7	97 22	104.1
1	25 39.1	97 22	103.5	26 08.3	97 22	103.3	26 37.4	97 22	103.2	27 06.6	97 22	103.1
2	25 26.0	97 22	102.5	25 55.1	97 22	102.3	26 24.3	97 22	102.2	26 53.4	97 22	102.1
3	25 12.8	97 22	101.5	25 41.9	97 22	101.3	26 11.0	97 22	101.2	26 40.2	97 22	101.1
4	24 59.5	97 22	100.5	25 28.7	97 22	100.3	25 57.8	97 22	100.2	26 26.9	97 22	100.1
75	24 46.2	97 22	99.5	25 15.4	97 22	99.3	25 44.5	97 22	99.2	26 13.6	97 22	99.1
6	24 32.9	97 22	98.5	25 02.0	97 22	98.4	25 31.1	97 22	98.2	26 00.2	97 22	98.1
7	24 19.5	97 22	97.5	24 48.7	97 22	97.4	25 17.8	97 22	97.2	25 46.9	97 22	97.1
8	24 06.1	97 22	96.5	24 35.3	97 22	96.4	25 04.4	97 22	96.2	25 33.5	97 22	96.1
9	23 52.7	97 22	95.5	24 21.8	97 22	95.4	24 50.9	97 22	95.3	25 20.0	97 22	95.1
80	23 39.3	97 22	94.5	24 08.4	97 22	94.4	24 37.5	97 22	94.3	25 06.6	97 22	94.1
1	23 25.8	97 22	93.6	23 54.9	97 22	93.4	24 24.0	97 22	93.3	24 53.1	97 22	93.2
2	23 12.3	97 22	92.6	23 41.4	97 22	92.5	24 10.5	97 22	92.3	24 39.6	97 22	92.2
3	22 58.9	97 22	91.6	23 28.0	97 22	91.5	23 57.0	97 22	91.3	24 26.1	97 22	91.2
4	22 45.4	97 22	90.6	23 14.5	97 22	90.5	23 43.6	97 22	90.4	24 12.6	97 22	90.2
85	22 31.9	97 22	89.7	23 01.0	97 22	89.5	23 30.1	97 22	89.4	23 59.1	97 22	89.3
6	22 18.4	97 22	88.7	22 47.5	97 22	88.6	23 16.6	97 22	88.4	23 45.6	97 22	88.3
7	22 04.9	97 22	87.7	22 34.0	97 22	87.6	23 03.1	97 22	87.4	23 32.2	97 22	87.3
8	21 51.4	97 22	86.7	22 20.5	97 22	86.6	22 49.6	97 22	86.5	23 18.7	97 22	86.3
9	21 37.9	97 22	85.8	22 07.0	97 22	85.6	22 36.1	97 22	85.5	23 05.2	97 22	85.4
90	21 24.5	97 22	84.8	21 53.6	97 22	84.7	22 22.7	97 22	84.5	22 51.8	97 22	84.4

Lat. 77°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.	22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	19 14.5	97 22	84.4	19 43.7	97 22	84.2	20 12.8	97 22	84.1	20 41.9	97 22	84.0	21 11.0	97 22	83.8	21 40.2	97 22	83.7	22 09.3	97 22	83.6	22 38.4	97 22	83.4	91
2	19 01.1	97 22	83.4	19 30.3	97 22	83.3	19 59.4	97 22	83.1	20 28.5	97 22	83.0	20 57.6	97 22	82.9	21 26.8	97 22	82.7	21 55.9	97 22	82.6	22 25.0	97 22	82.5	2
3	18 47.7	97 22	82.4	19 16.9	97 22	82.3	19 46.0	97 22	82.2	20 15.1	97 22	82.0	20 44.3	97 22	81.9	21 13.4	97 22	81.8	21 42.5	97 22	81.7	22 11.6	97 22	81.5	3
4	18 34.4	97 22	81.5	19 03.5	97 22	81.3	19 32.7	97 22	81.2	20 01.8	97 22	81.1	20 30.9	97 22	81.0	21 00.0	97 22	80.8	21 29.2	97 22	80.7	21 58.3	97 22	80.6	4
95	18 21.0	97 22	80.5	18 50.2	97 22	80.4	19 19.3	97 22	80.2	19 48.5	97 22	80.1	20 17.6	97 22	80.0	20 46.7	97 22	79.9	21 15.9	97 22	79.7	21 45.0	97 22	79.6	95
6	18 07.7	97 22	79.5	18 36.9	97 22	79.4	19 06.0	97 22	79.3	19 35.2	97 22	79.2	20 04.3	97 22	79.0	20 33.5	97 22	78.9	21 02.6	97 22	78.8	21 31.7	97 22	78.6	6
7	17 54.5	97 22	78.6	18 23.7	97 22	78.4	18 52.8	97 22	78.3	19 22.0	97 22	78.2	19 51.1	97 22	78.1	20 20.2	97 22	77.9	20 49.4	97 22	77.8	21 18.5	97 22	77.7	7
8	17 41.3	97 22	77.6	18 10.5	97 22	77.5	18 39.6	97 22	77.4	19 08.8	97 22	77.2	19 37.9	97 22	77.1	20 07.1	97 22	77.0	20 36.2	97 22	76.9	21 05.3	97 22	76.7	8
9	17 28.1	97 22	76.7	17 57.3	97 22	76.5	18 26.5	97 22	76.4	18 55.6	97 22	76.3	19 24.8	97 22	76.2	19 53.9	97 22	76.0	20 23.1	97 22	75.9	20 52.2	97 22	75.8	9
100	17 15.0	97 22	75.7	17 44.2	97 22	75.6	18 13.4	97 22	75.5	18 42.5	97 22	75.3	19 11.7	97 22	75.2	19 40.9	97 22	75.1	20 10.0	97 22	75.0	20 39.2	97 22	74.8	100
1	17 02.0	97 22	74.7	17 31.2	97 22	74.6	18 00.3	97 22	74.5	18 29.5	97 22	74.4	18 58.7	97 22	74.3	19 27.9	97 22	74.1	19 57.0	97 22	74.0	20 26.2	97 22	73.9	1
2	16 49.0	97 22	73.8	17 18.2	97 22	73.7	17 47.4	97 22	73.5	18 16.6	97 22	73.4	18 45.7	97 22	73.3	19 14.9	97 22	73.2	19 44.1	97 21	73.1	20 13.2	97 21	72.9	2
3	16 36.1	97 21	72.8	17 05.3	97 21	72.7	17 34.5	97 21	72.6	18 03.6	97 21	72.5	18 32.8	97 21	72.3	19 02.0	97 21	72.2	19 31.2	97 21	72.1	20 00.4	97 21	72.0	3
4	16 23.2	97 21	71.9	16 52.4	97 21	71.8	17 21.6	97 21	71.6	17 50.8	97 21	71.5	18 20.0	97 21	71.4	18 49.2	97 21	71.3	19 18.4	97 21	71.2	19 47.6	97 21	71.0	4
105	16 10.4	97 21	70.9	16 39.6	97 21	70.8	17 08.8	97 21	70.7	17 38.0	97 21	70.6	18 07.3	97 21	70.4	18 36.5	97 21	70.3	19 05.7	97 21	70.2	19 34.9	97 21	70.1	105
6	15 57.7	97 21	70.0	16 26.9	97 21	69.9	16 56.1	97 21	69.7	17 25.4	97 21	69.6	17 54.6	97 21	69.5	18 23.8	97 21	69.4	18 53.0	97 21	69.3	19 22.2	97 21	69.1	6
7	15 45.0	97 21	69.0	16 14.3	97 21	68.9	16 43.5	97 21	68.8	17 12.7	97 21	68.7	17 42.0	97 21	68.5	18 11.2	97 21	68.4	18 40.4	97 21	68.3	19 09.6	97 21	68.2	7
8	15 32.5	98 21	68.1	16 01.7	97 21	68.0	16 31.0	97 21	67.8	17 00.2	97 21	67.7	17 29.5	97 21	67.6	17 58.7	97 21	67.5	18 27.9	97 21	67.4	18 57.1	97 21	67.2	8
9	15 20.0	98 21	67.1	15 49.3	98 21	67.0	16 18.5	98 21	66.9	16 47.8	98 21	66.8	17 17.0	97 21	66.7	17 46.3	97 21	66.5	18 15.5	97 21	66.4	18 44.7	97 21	66.3	9
110	15 07.6	98 20	66.2	15 36.9	98 20	66.1	16 06.1	98 20	65.9	16 35.4	98 20	65.8	17 04.7	98 20	65.7	17 33.9	98 20	65.6	18 03.2	97 20	65.5	18 32.4	97 20	65.4	110
1	14 55.3	98 20	65.2	15 24.6	98 20	65.1	15 53.9	98 20	65.0	16 23.1	98 20	64.9	16 52.4	98 20	64.8	17 21.7	98 20	64.6	17 50.9	98 20	64.5	18 20.2	98 20	64.4	1
2	14 43.1	98 20	64.3	15 12.4	98 20	64.2	15 41.7	98 20	64.0	16 11.0	98 20	63.9	16 40.3	98 20	63.8	17 09.5	98 20	63.7	17 38.8	98 20	63.6	18 08.1	98 20	63.5	2
3	14 31.0	98 20	63.3	15 00.3	98 20	63.2	15 29.6	98 20	63.1	15 58.9	98 20	63.0	16 28.2	98 20	62.9	16 57.5	98 20	62.8	17 26.8	98 20	62.6	17 56.0	98 20	62.5	3
4	14 19.0	98 20	62.4	14 48.3	98 20	62.3	15 17.6	98 20	62.2	15 46.9	98 20	62.0	16 16.2	98 20	61.9	16 45.5	98 20	61.8	17 14.8	98 20	61.7	17 44.1	98 20	61.6	4
115	14 07.1	98 20	61.4	14 36.4	98 20	61.3	15 05.7	98 20	61.2	15 35.1	98 20	61.1	16 04.4	98 20	61.0	16 33.7	98 20	60.9	17 03.0	98 20	60.8	17 32.3	98 20	60.7	115
6	13 55.3	98 20	60.5	14 24.6	98 19	60.4	14 54.0	98 19	60.3	15 23.3	98 19	60.2	15 52.6	98 19	60.0	16 22.0	98 19	59.9	16 51.3	98 19	59.8	17 20.6	98 19	59.7	6
7	13 43.6	98 19	59.5	14 12.9	98 19	59.4	14 42.3	98 19	59.3	15 11.6	98 19	59.2	15 41.0	98 19	59.1	16 10.3	98 19	59.0	16 39.7	98 19	58.9	17 09.0	98 19	58.8	7
8	13 32.0	98 19	58.6	14 01.4	98 19	58.5	14 30.7	98 19	58.4	15 00.1	98 19	58.3	15 29.5	98 19	58.2	15 58.8	98 19	58.1	16 28.2	98 19	57.9	16 57.5	98 19	57.8	8
9	13 20.6	98 19	57.6	13 49.9	98 19	57.5	14 19.3	98 19	57.4	14 48.7	98 19	57.3	15 18.1	98 19	57.2	15 47.4	98 19	57.1	16 16.8	98 19	57.0	16 46.1	98 19	56.9	9
120	13 09.2	98 19	56.7	13 38.6	98 19	56.6	14 08.0	98 19	56.5	14 37.4	98 19	56.4	15 06.8	98 19	56.3	15 36.1	98 19	56.2	16 05.5	98 19	56.1	16 34.9	98 19	56.0	120
1	12 58.0	98 18	55.7	13 27.4	98 18	55.6	13 56.8	98 18	55.5	14 26.2	98 18	55.4	14 55.6	98 18	55.3	15 25.0	98 18	55.2	15 54.4	98 18	55.1	16 23.8	98 18	55.0	1
2	12 46.9	98 18	54.8	13 16.3	98 18	54.7	13 45.7	98 18	54.6	14 15.2	98 18	54.5	14 44.6	98 18	54.4	15 14.0	98 18	54.3	15 43.4	98 18	54.2	16 12.8	98 18	54.1	2
3	12 35.9	98 18	53.9	13 05.4	98 18	53.8	13 34.8	98 18	53.7	14 04.2	98 18	53.6	14 33.7	98 18	53.5	15 03.1	98 18	53.4	15 32.5	98 18	53.3	16 01.9	98 18	53.2	3
4	12 25.1	98 18	52.9	12 54.6	98 18	52.8	13 24.0	98 18	52.7	13 53.4	98 18	52.6	14 22.9	98 18	52.5	14 52.3	98 18	52.4	15 21.8	98 18	52.3	15 51.2	98 18	52.2	4
125	12 14.4	98 18	52.0	12 43.9	98 18	51.9	13 13.3	98 18	51.8	13 42.8	98 18	51.7	14 12.2	98 18	51.6	14 41.7	98 17	51.5	15 11.1	98 17	51.4	15 40.6	98 17	51.3	125
6	12 03.8	98 17	51.0	12 33.3	98 17	50.9	13 02.8	98 17	50.8	13 32.3	98 17	50.7	14 01.7	98 17	50.6	14 31.2	98 17	50.5	15 00.7	98 17	50.4	15 30.1	98 17	50.3	6
7	11 53.4	98 17	50.1	12 22.9	98 17	50.0	12 52.4	98 17	49.9	13 21.9	98 17	49.8	13 51.4	98 17	49.7	14 20.8	98 17	49.6	14 50.3	98 17	49.5	15 19.8	98 17	49.4	7
8	11 43.1	98 17	49.1	12 12.6	98 17	49.0	12 42.1	98 17	48.9	13 11.6	98 17	48.9	13 41.1	98 17	48.8	14 10.6	98 17	48.7	14 40.1	98 17	48.6	15 09.6	98 17	48.5	8
9	11 33.0	98 17	48.2	12 02.5	98 17	48.1	12 32.0	98 17	48.0	13 01.6	98 17	47.9	13 31.1	98 17	47.8	14 00.6	98 17	47.7	14 30.1	98 16	47.6	14 59.6	98 16	47.5	9
130	11 23.0	98 16	47.2	11 52.6	98 16	47.2	12 22.1	98 16	47.1	12 51.6	98 16	47.0	13 21.1	98 16	46.9	13 50.7	98 16	46.8	14 20.2	98 16	46.7	14 49.7	98 16	46.6	130
1	11 13.2	98 16	46.3	11 42.7	98 16	46.2	12 12.3	98 16	46.1	12 41.8	98 16	46.0	13 11.4	98 16	45.9	13 40.9	98 16	45.9	14 10.4	98 16	45.8	14 40.0	98 16	45.7	1
2	11 03.5	99 16	45.4	11 33.1	99 16	45.3	12 02.6	99 16	45.2	12 32.2	99 16	45.1	13 01.7	99 16	45.0	13 31.3	99 16	44.9	14 00.8	99 16	44.8	14 30.4	99 16	44.7	2
3	10 54.0	99 16	44.4	11 23.6	99 16	44.3	11 53.1	99 16	44.2	12 22.7	99 16	44.2	12 52.3	99 16	44.1	13 21.8	99 15	44.0	13 51.4	99 15	43.9	14 21.0	99 15	43.8	3
4	10 44.6	99 15	43.5	11 14.2	99 15	43.4	11 43.8	99 15	43.3	12 13.4	99 15	43.2	12 43.0	99 15	43.1	13 12.5	99 15	43.1	13 42.1	99 15	43.0	14 11.7	99 15	42.9	4
135	10 35.4	99 15	42.5	11 05.0	99 15	42.4	11 34.6	99 15	42.4	12 04.2	99 15	42.3	12 33.8	99 15	42.2	13 03.4	99 15	42.1	13 33.0	99 15	42.0	14 02.6	99 15	41.9	135
6	10 26.4	99 15	41.6	10 56.0	99 15	41.5	11 25.6	99 15	41.4	11 55.2	99 15	41.3	12 24.8	99 15	41.3	12 54.4	99 15	41.2	13 24.1	99 15	41.1	13 53.7	99 15	41.0	6
7	10 17.5	99 15	40.6	10 47.1	99 14	40.6	11 16.8	99 14	40.5	11 46.4	99 14	40.4	12 16.0	99 14	40.3	12 45.6	99 14	40.2	13 15.3	99 14	40.2	13 44.9	99 14	40.1	7
8	10 08.8	99 14	39.7	10 38.4	99 14	39.6	11 08.1	99 14	39.5	11 37.7	99 14	39.5	12 07.4	99 14	39.4	12 37.0	99 14	39.3	13 06.6	99 14	39.2	13 36.3	99 14	39.1	8
9	10 00.3	99 14	38.8	10 29.9	99 14	38.7	10 59.6	99 14	38.6	11 29.2	99 14	38.5	11 58.9	99 14	38.5	12 28.5	99 14	38.4	12 58.2	99 14	38.3	13 27.9	99 14	38.2	9
140	9 51.9	99 14	37.8	10 21.6	99 14	37.7	10 51.2	99 14	37.7	11 20.9	99 14	37.6	11 50.6	99 14	37.5	12 20.3	99 14	37.4	12 49.9	99 14	37.4	13 19.6	99 13	37.3	140
1	9 43.7	99 13	36.9	10 13.4	99 13	36.8	10 43.1	99 13	36.7	11 12.8	99 13	36.7	11 42.4	99 13	36.6	12 12.1	99 13	36.5	12 41.8	99 13	36.4	13 11.5	99 13	36.4	1
2	9 35.7	99 13	35.9	10 05.4	99 13	35.9	10 35.1	99 13	35.8	11 04.8	99 13	35.7	11 34.5	99 13	35.6	12 04.2	99 13	35.6	12 33.9	99 13	35.5	13 03.6	99 13	35.4	2
3	9 27.9	99 13	35.0	9 57.6	99 13	34.9	10 27.3	99 13	34.8	10 57.0	99 13	34.8	11 26.7	99 13	34.7	11 56.4	99 13	34.6	12 26.1	99 13	34.6	12 55.9	99 13	34.5	3
4	9 20.2	99 12	34.0	9 49.9	99 13	34.0	10 19.7	99 13	33.9	10 49.4	99 12	33.8	11 19.1	99 12	33.8	11 48.9	99 12	33.7	12 18.6	99 12	33.6	12 48.3	99 12	33.6	4
145	9 12.8	99 12	33.1	9 42.5	99 12	33.0	10 12.2	99 12	33.0	10 42.0	99 12	32.9	11 11.7	99 12	32.8	11 41.5	99 12	32.8	12 11.2	99 12	32.7	12 40.9	99 12	32.6	145
6	9 05.5	99 12	32.2	9 35.2	99 12	32.1	10 05.0	99 12	32.0	10 34.7	99 12	32.0	11 04.5	99 12	31.9	11 34.2	99 12	31.8	12 04.0	99 12	31.8	12 33.7	99 12	31.7	6
7	8 58.4	99 11	31.2	9 28.2	99 12	31.1	9 57.9	99 11	31.1	10 27.7	99 11	31.0	10 57.5	99 11	31.0	11 27.2	99 11	30.9	11 57.0	99 11	30.8	12 26.8	99 11	30.8	7
8	8 51.5	99 11	30.3	9 21.3	99 11	30.2	9 51.1	99 11	30.1	10 20.8	99 11	30.1	10 50.6	99 11	30.0	11 20.4	99 11	30.0	11 50.2	99 11	29.9	12 19.9	99 11	29.8	8
9	8 44.8	99 11	29.3	9 14.6	99 11	29.3	9 44.4	99 11	29.2	10 14.2	99 11	29.1	10 44.0	99 11	29.1	11 13.7	99 11	29.0	11 43.5	99 11	29.0	12 13.3	99 11	28.9	9
150	8 38.3	99 11	28.4	9 08.1	99 11	28.3	9 37.9	99 10	28.3	10 07.7	99 10	28.2	10 37.5	99 10	28.1	11 07.3	99 10	28.1	11 37.1	99 10	28.0	12 06.9	99 10	28.0	150
1	8 32.0	99 10	27.4	9 01.8	99 10	27.4	9 31.6	99 10	27.3	10 01.4	99 10	27.3	10 31.2	99 10	27.2	11 01.0	99 10	27.1	11 30.9	99 10	27.1	12 00.7	99 10	27.0	1
2	8 25.8	99 10	26.5	8 55.7	99 10	26.4	9 25.5	99 10	26.4	9 55.3	99 10	26.3	10 25.1	99 10	26.3	10 55.0	99 10	26.2	11 24.8	99 10	26.2	11 54.6	99 10	26.1	2
3	8 19.9	99 10	25.5	8 49.8	99 10	25.5	9 19.6	99 10	25.4	9 49.4	99 09	25.4	10 19.3	99 09	25.3	10 49.1	99 09	25.3	11 19.0	99 09	25.2	11 48.8	99 09	25.2	3
4	8 14.2	1.0 09	24.6	8 44.1	1.0 09	24.5	9 13.9	99 09	24.5	9 43.8	99 09	24.4	10 13.6	99 09	24.4	10 43.4	99 09	24.3	11 13.3	99 09	24.3	11 43.1	99 09	24.2	4
155	8 08.7	1.0 09	23.7	8 38.5	1.0 09	23.6	9 08.4	1.0 09	23.6	9 38.3	1.0 09	23.5	10 08.1	1.0 09	23.5	10 38.0	1.0 09	23.4	11 07.8	1.0 09	23.4	11 37.7	1.0 09	23.3	155
6	8 03.4	1.0 08	22.7	8 33.2	1.0 08	22.7	9 03.1	1.0 08	22.6	9 33.0	1.0 08	22.6	10 02.9	1.0 08	22.5	10 32.7	1.0 08	22.5	11 02.6	1.0 08	22.4	11 32.5	1.0 08	22.4	6
7	7 58.3	1.0 08	21.8	8 28.1	1.0 08	21.7	8 58.0	1.0 08	21.7	9 27.9	1.0 08	21.6	9 57.8	1.0 08	21.6	10 27.7	1.0 08	21.5	10 57.5	1.0 08	21.5	11 27.4	1.0 08	21.4	7
8	7 53.4	1.0 08	20.8	8 23.3	1.0 08	20.8	8 53.1	1.0 08	20.7	9 23.0	1.0 08	20.7	9 52.9	1.0 08	20.6	10 22.8	1.0 08	20.6	10 52.7	1.0 08	20.6	11 22.6	1.0 08	20.5	8
9	7 48.7	1.0 07	19.9	8 18.6	1.0 07	19.8	8 48.5	1.0 08	19.8	9 18.4	1.0 07	19.7	9 48.3	1.0 07	19.7	10 18.2	1.0 08	19.7	10 48.1	1.0 07	19.6	11 18.0	1.0 07	19.6	9
160	7 44.2	1.0 07	18.9	8 14.1	1.0 07	18.9	8 44.0	1.0 07	18.8	9 13.9	1.0 07	18.8	9 43.8	1.0 07	18.8	10 13.7	1.0 07	18.7	10 43.6	1.0 07	18.7	11 13.5	1.0 07	18.6	160
1	7 39.9	1.0 07	18.0	8 09.8	1.0 07	17.9	8 39.8	1.0 07	17.9	9 09.7	1.0 07	17.9	9 39.6	1.0 07	17.8	10 09.5	1.0 07	17.8	10 39.4	1.0 07	17.8	11 09.3	1.0 07	17.7	1
2	7 35.9	1.0 06	17.0	8 05.8	1.0 06	17.0	8 35.7	1.0 06	17.0	9 05.6	1.0 06	16.9	9 35.6	1.0 06	16.9	10 05.5	1.0 06	16.9	10 35.4	1.0 06	16.8	11 05.3	1.0 06	16.8	2
3	7 32.0	1.0 06	16.1	8 01.9	1.0 06	16.1	8 31.9	1.0 06	16.0	9 01.8	1.0 06	16.0	9 31.7	1.0 06	16.0	10 01.7	1.0 06	15.9	10 31.6	1.0 06	15.9	11 01.5	1.0 06	15.9	3
4	7 28.4	1.0 06	15.1	7 58.3	1.0 06	15.1	8 28.3	1.0 06	15.1	8 58.2	1.0 06	15.0	9 28.1	1.0 06	15.0	9 58.1	1.0 06	15.0	10 28.0	1.0 06	15.0	10 58.0	1.0 06	14.9	4
165	7 25.0	1.0 05	14.2	7 54.9	1.0 05	14.2	8 24.9	1.0 05	14.1	8 54.8	1.0 05	14.1	9 24.8	1.0 05	14.1	9 54.7	1.0 05	14.0	10 24.6	1.0 05	14.0	10 54.6	1.0 05	14.0	165
6	7 21.8	1.0 05	13.3	7 51.7	1.0 05	13.2	8 21.7	1.0 05	13.2	8 51.6	1.0 05	13.2	9 21.6	1.0 05	13.1	9 51.5	1.0 05	13.1	10 21.5	1.0 05	13.1	10 51.4	1.0 05	13.1	6
7	7 18.8	1.0 05	12.3	7 48.7	1.0 05	12.3	8 18.7	1.0 05	12.3	8 48.7	1.0 05	12.2	9 18.6	1.0 05	12.2	9 48.6	1.0 05	12.2	10 18.5	1.0 05	12.1	10 48.5	1.0 05	12.1	7
8	7 16.0	1.0 04	11.4	7 46.0	1.0 04	11.3	8 15.9	1.0 04	11.3	8 45.9	1.0 04	11.3	9 15.9	1.0 04	11.3	9 45.8	1.0 04	11.2	10 15.8	1.0 04	11.2	10 45.8	1.0 04	11.2	8
9	7 13.5	1.0 04	10.4	7 43.4	1.0 04	10.4	8 13.4	1.0 04	10.4	8 43.4	1.0 04	10.3	9 13.3	1.0 04	10.3	9 43.3	1.0 04	10.3	10 13.3	1.0 04	10.3	10 43.3	1.0 04	10.3	9
170	7 11.1	1.0 04	09.5	7 41.1	1.0 04	09.4	8 11.1	1.0 04	09.4	8 41.1	1.0 03	09.4	9 11.0	1.0 04	09.4	9 41.0	1.0 04	09.4	10 11.0	1.0 03	09.3	10 41.0	1.0 03	09.3	170
1	7 09.0	1.0 03	08.5	7 39.0	1.0 03	08.5	8 09.0	1.0 03	08.5	8 39.0	1.0 03	08.5	9 08.9	1.0 03	08.4	9 38.9	1.0 03	08.4	10 08.9	1.0 03	08.4	10 38.9	1.0 03	08.4	1
2	7 07.1	1.0 03	07.6	7 37.1	1.0 03	07.6	8 07.1	1.0 03	07.5	8 37.1	1.0 03	07.5	9 07.1	1.0 03	07.5	9 37.1	1.0 03	07.5	10 07.0	1.0 03	07.5	10 37.0	1.0 03	07.5	2
3	7 05.5	1.0 02	06.6	7 35.4	1.0 02	06.6	8 05.4	1.0 02	06.6	8 35.4	1.0 02	06.6	9 05.4	1.0 02	06.6	9 35.4	1.0 02	06.6	10 05.4	1.0 02	06.5	10 35.4	1.0 02	06.5	3
4	7 04.0	1.0 02	05.7	7 34.0	1.0 02	05.7	8 04.0	1.0 02	05.7	8 34.0	1.0 02	05.6	9 04.0	1.0 02	05.6	9 34.0	1.0 02	05.6	10 04.0	1.0 02	05.6	10 34.0	1.0 02	05.6	4
175	7 02.8	1.0 02	04.7	7 32.8	1.0 02	04.7	8 02.8	1.0 02	04.7	8 32.8	1.0 02	04.7	9 02.8	1.0 02	04.7	9 32.8	1.0 02	04.7	10 02.8	1.0 02	04.7	10 32.7	1.0 02	04.7	175
6	7 01.8	1.0 01	03.8	7 31.8	1.0 01	03.8	8 01.8	1.0 01	03.8	8 31.8	1.0 01	03.8	9 01.8	1.0 01	03.8	9 31.8	1.0 01	03.7	10 01.8	1.0 01	03.7	10 31.8	1.0 01	03.7	6
7	7 01.0	1.0 01	02.8	7 31.0	1.0 01	02.8	8 01.0	1.0 01	02.8	8 31.0	1.0 01	02.8	9 01.0	1.0 01	02.8	9 31.0	1.0 01	02.8	10 01.0	1.0 01	02.8	10 31.0	1.0 01	02.8	7
8	7 00.4	1.0 01	01.9	7 30.4	1.0 01	01.9	8 00.4	1.0 01	01.9	8 30.4	1.0 01	01.9	9 00.4	1.0 01	01.9	9 30.4	1.0 01	01.9	10 00.4	1.0 01	01.9	10 30.4	1.0 01	01.9	8
9	7 00.1	1.0 00	00.9	7 30.1	1.0 00	00.9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	9
180	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 77°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	
00	37 00.0	1.0 00	180.0	37 30.0	1.0 00	180.0	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	0
1	36 59.9	1.0 01	178.9	37 29.9	1.0 01	178.8	37 59.9	1.0 01	178.8	38 29.9	1.0 01	178.8	38 59.9	1.0 01	178.8	39 29.9	1.0 01	178.8	39 59.9	1.0 01	178.8	40 29.9	1.0 01	178.8	
2	36 59.5	1.0 01	177.7	37 29.5	1.0 01	177.7	37 59.5	1.0 01	177.7	38 29.5	1.0 01	177.7	38 59.5	1.0 01	177.7	39 29.5	1.0 01	177.7	39 59.5	1.0 01	177.7	40 29.5	1.0 01	177.7	
3	36 58.8	1.0 02	176.6	37 28.8	1.0 02	176.6	37 58.8	1.0 02	176.6	38 28.8	1.0 02	176.5	38 58.8	1.0 02	176.5	39 28.8	1.0 02	176.5	39 58.8	1.0 02	176.5	40 28.8	1.0 02	176.5	
4	36 57.8	1.0 02	175.4	37 27.8	1.0 02	175.4	37 57.8	1.0 02	175.4	38 27.8	1.0 02	175.4	38 57.8	1.0 02	175.4	39 27.8	1.0 02	175.4	39 57.8	1.0 02	175.3	40 27.8	1.0 02	175.3	
05	36 56.6	1.0 02	174.3	37 26.6	1.0 02	174.3	37 56.6	1.0 02	174.3	38 26.6	1.0 02	174.2	38 56.6	1.0 02	174.2	39 26.6	1.0 02	174.2	39 56.6	1.0 02	174.2	40 26.6	1.0 02	174.2	0
6	36 55.2	1.0 03	173.1	37 25.1	1.0 03	173.1	37 55.1	1.0 03	173.1	38 25.1	1.0 03	173.1	38 55.1	1.0 03	173.1	39 25.1	1.0 03	173.0	39 55.1	1.0 03	173.0	40 25.1	1.0 03	173.0	
7	36 53.4	1.0 03	172.0	37 23.4	1.0 03	172.0	37 53.4	1.0 03	172.0	38 23.4	1.0 03	171.9	38 53.3	1.0 03	171.9	39 23.3	1.0 03	171.9	39 53.3	1.0 03	171.9	40 23.3	1.0 03	171.8	
8	36 51.4	1.0 04	170.9	37 21.4	1.0 04	170.8	37 51.4	1.0 04	170.8	38 21.3	1.0 04	170.8	38 51.3	1.0 04	170.8	39 21.3	1.0 04	170.7	39 51.3	1.0 04	170.7	40 21.2	1.0 04	170.7	
9	36 49.1	1.0 04	169.7	37 19.1	1.0 04	169.7	37 49.1	1.0 04	169.7	38 19.0	1.0 04	169.6	38 49.0	1.0 04	169.6	39 19.0	1.0 04	169.6	39 48.9	1.0 04	169.5	40 18.9	1.0 04	169.5	
10	36 46.6	1.0 05	168.6	37 16.5	1.0 05	168.5	37 46.5	1.0 05	168.5	38 16.5	1.0 05	168.5	38 46.4	1.0 05	168.5	39 16.4	1.0 05	168.4	39 46.4	1.0 05	168.4	40 16.3	1.0 05	168.4	1
1	36 43.8	1.0 05	167.4	37 13.7	1.0 05	167.4	37 43.7	1.0 05	167.4	38 13.6	1.0 05	167.3	38 43.6	1.0 05	167.3	39 13.6	1.0 05	167.3	39 43.5	1.0 05	167.2	40 13.5	1.0 05	167.2	
2	36 40.7	1.0 06	166.3	37 10.7	1.0 06	166.3	37 40.6	1.0 06	166.2	38 10.6	1.0 06	166.2	38 40.5	1.0 06	166.2	39 10.4	1.0 06	166.1	39 40.4	1.0 06	166.1	40 10.3	1.0 06	166.0	
3	36 37.4	1.0 06	165.2	37 07.3	1.0 06	165.1	37 37.3	1.0 06	165.1	38 07.2	1.0 06	165.0	38 37.1	1.0 06	165.0	39 07.1	1.0 06	165.0	39 37.0	1.0 06	164.9	40 06.9	1.0 06	164.9	
4	36 33.8	1.0 06	164.0	37 03.7	1.0 06	164.0	37 33.7	1.0 06	163.9	38 03.6	1.0 06	163.9	38 33.5	1.0 06	163.9	39 03.4	1.0 06	163.8	39 33.4	1.0 06	163.8	40 03.3	1.0 07	163.7	
15	36 30.0	1.0 07	162.9	36 59.9	1.0 07	162.8	37 29.8	1.0 07	162.8	37 59.7	1.0 07	162.8	38 29.6	1.0 07	162.7	38 59.6	1.0 07	162.7	39 29.5	1.0 07	162.6	39 59.4	1.0 07	162.6	1
6	36 25.9	1.0 07	161.8	36 55.8	1.0 07	161.7	37 25.7	1.0 07	161.7	37 55.6	1.0 07	161.6	38 25.5	1.0 07	161.6	38 55.4	1.0 07	161.5	39 25.3	1.0 07	161.5	39 55.2	1.0 07	161.4	
7	36 21.5	1.0 08	160.6	36 51.4	1.0 08	160.6	37 21.3	1.0 08	160.5	37 51.2	1.0 08	160.5	38 21.1	1.0 08	160.4	38 51.0	1.0 08	160.4	39 20.9	1.0 08	160.3	39 50.8	1.0 08	160.3	
8	36 16.9	1.0 08	159.5	36 46.8	1.0 08	159.4	37 16.7	1.0 08	159.4	37 46.6	1.0 08	159.3	38 16.4	1.0 08	159.3	38 46.3	1.0 08	159.2	39 16.2	1.0 08	159.2	39 46.1	1.0 08	159.1	
9	36 12.1	1.0 08	158.4	36 41.9	1.0 09	158.3	37 11.8	1.0 09	158.3	37 41.7	1.0 09	158.2	38 11.5	1.0 09	158.1	38 41.4	1.0 09	158.1	39 11.3	1.0 09	158.0	39 41.1	1.0 09	158.0	
20	36 07.0	1.0 09	157.2	36 36.8	1.0 09	157.2	37 06.7	1.0 09	157.1	37 36.5	1.0 09	157.1	38 06.4	1.0 09	157.0	38 36.3	1.0 09	156.9	39 06.1	1.0 09	156.9	39 36.0	1.0 09	156.8	20
1	36 01.6	1.0 09	156.1	36 31.5	99 09	156.1	37 01.3	99 09	156.0	37 31.2	99 09	155.9	38 01.0	99 09	155.9	38 30.8	99 09	155.8	39 00.7	99 09	155.7	39 30.5	99 09	155.7	1
2	35 56.0	99 10	155.0	36 25.9	99 10	154.9	36 55.7	99 10	154.9	37 25.5	99 10	154.8	37 55.4	99 10	154.7	38 25.2	99 10	154.7	38 55.0	99 10	154.6	39 24.8	99 10	154.5	2
3	35 50.2	99 10	153.9	36 20.0	99 10	153.8	36 49.9	99 10	153.7	37 19.7	99 10	153.7	37 49.5	99 10	153.6	38 19.3	99 10	153.5	38 49.1	99 10	153.5	39 18.9	99 10	153.4	3
4	35 44.1	99 10	152.8	36 14.0	99 10	152.7	36 43.8	99 11	152.6	37 13.6	99 11	152.5	37 43.4	99 11	152.5	38 13.2	99 11	152.4	38 43.0	99 11	152.3	39 12.7	99 11	152.2	4
25	35 37.9	99 11	151.6	36 07.6	99 11	151.6	36 37.4	99 11	151.5	37 07.2	99 11	151.4	37 37.0	99 11	151.3	38 06.8	99 11	151.3	38 36.6	99 11	151.2	39 06.3	99 11	151.1	25
6	35 31.3	99 11	150.5	36 01.1	99 11	150.5	36 30.9	99 11	150.4	37 00.7	99 11	150.3	37 30.4	99 11	150.2	38 00.2	99 11	150.1	38 29.9	99 11	150.1	38 59.7	99 11	150.0	6
7	35 24.6	99 12	149.4	35 54.3	99 12	149.3	36 24.1	99 12	149.3	36 53.8	99 12	149.2	37 23.6	99 12	149.1	37 53.4	99 12	149.0	38 23.1	99 12	148.9	38 52.8	99 12	148.8	7
8	35 17.6	99 12	148.3	35 47.3	99 12	148.2	36 17.1	99 12	148.1	36 46.8	99 12	148.1	37 16.6	99 12	148.0	37 46.3	99 12	147.9	38 16.0	99 12	147.8	38 45.7	99 12	147.7	8
9	35 10.4	99 12	147.2	35 40.1	99 12	147.1	36 09.8	99 12	147.0	36 39.6	99 12	146.9	37 09.3	99 12	146.9	37 39.0	99 12	146.8	38 08.7	99 13	146.7	38 38.4	99 13	146.6	9
30	35 03.0	99 13	146.1	35 32.7	99 13	146.0	36 02.4	99 13	145.9	36 32.1	99 13	145.8	37 01.8	99 13	145.7	37 31.5	99 13	145.7	38 01.2	99 13	145.6	38 30.9	99 13	145.5	30
1	34 55.3	99 13	145.0	35 25.0	99 13	144.9	35 54.7	99 13	144.8	36 24.4	99 13	144.7	36 54.1	99 13	144.6	37 23.8	99 13	144.5	37 53.5	99 13	144.4	38 23.1	99 13	144.4	1
2	34 47.5	99 13	143.9	35 17.2	99 13	143.8	35 46.8	99 14	143.7	36 16.5	99 14	143.6	36 46.2	99 14	143.5	37 15.8	99 14	143.4	37 45.5	99 14	143.3	38 15.2	99 14	143.2	2
3	34 39.4	99 14	142.8	35 09.1	99 14	142.7	35 38.7	99 14	142.6	36 08.4	99 14	142.5	36 38.0	99 14	142.4	37 07.7	99 14	142.3	37 37.3	99 14	142.2	38 07.0	99 14	142.1	3
4	34 31.1	99 14	141.7	35 00.8	99 14	141.6	35 30.4	99 14	141.5	36 00.1	99 14	141.4	36 29.7	99 14	141.3	36 59.3	99 14	141.2	37 29.0	99 14	141.1	37 58.6	99 14	141.0	4
35	34 22.7	99 14	140.6	34 52.3	99 14	140.5	35 21.9	99 14	140.4	35 51.6	99 15	140.3	36 21.2	99 15	140.2	36 50.8	99 15	140.1	37 20.4	99 15	140.0	37 50.0	99 15	139.9	35
6	34 14.0	99 15	139.5	34 43.6	99 15	139.4	35 13.2	99 15	139.3	35 42.8	99 15	139.2	36 12.4	99 15	139.1	36 42.0	99 15	139.0	37 11.6	99 15	138.9	37 41.2	99 15	138.8	6
7	34 05.1	99 15	138.4	34 34.7	99 15	138.3	35 04.3	99 15	138.2	35 33.9	99 15	138.1	36 03.5	99 15	138.0	36 33.1	99 15	137.9	37 02.6	99 15	137.8	37 32.2	99 15	137.7	7
8	33 56.1	99 16	137.3	34 25.7	99 15	137.2	34 55.2	99 16	137.1	35 24.8	99 16	137.0	35 54.4	99 16	136.9	36 23.9	99 16	136.8	36 53.5	98 16	136.7	37 23.0	98 16	136.6	8
9	33 46.9	99 16	136.2	34 16.4	99 16	136.1	34 46.0	99 16	136.0	35 15.5	98 16	135.9	35 45.1	98 16	135.8	36 14.6	98 16	135.7	36 44.1	98 16	135.6	37 13.6	98 16	135.5	9
40	33 37.4	98 16	135.2	34 07.0	98 16	135.0	34 36.5	98 16	134.9	35 06.0	98 16	134.8	35 35.6	98 16	134.7	36 05.1	98 16	134.6	36 34.6	98 16	134.5	37 04.1	98 16	134.4	40
1	33 27.8	98 16	134.1	33 57.3	98 16	134.0	34 26.9	98 16	133.9	34 56.4	98 16	133.8	35 25.9	98 16	133.6	35 55.4	98 16	133.5	36 24.9	98 16	133.4	36 54.4	98 16	133.3	1
2	33 18.0	98 17	133.0	33 47.5	98 17	132.9	34 17.0	98 17	132.8	34 46.5	98 17	132.7	35 16.0	98 17	132.6	35 45.5	98 17	132.4	36 15.0	98 17	132.3	36 44.5	98 17	132.2	2
3	33 08.1	98 17	131.9	33 37.6	98 17	131.8	34 07.0	98 17	131.7	34 36.5	98 17	131.6	35 06.0	98 17	131.5	35 35.5	98 17	131.4	36 04.9	98 17	131.2	36 34.4	98 17	131.1	3
4	32 57.9	98 17	130.9	33 27.4	98 17	130.7	33 56.9	98 17	130.6	34 26.3	98 17	130.5	34 55.8	98 17	130.4	35 25.2	98 17	130.3	35 54.7	98 17	130.2	36 24.1	98 17	130.0	4
45	32 47.7	98 17	129.8	33 17.1	98 18	129.7	33 46.6	98 17	129.6	34 16.0	98 18	129.4	34 45.4	98 18	129.3	35 14.9	98 18	129.2	35 44.3	98 18	129.1	36 13.7	98 18	129.0	45
6	32 37.2	98 18	128.7	33 06.6	98 18	128.6	33 36.1	98 18	128.5	34 05.5	98 18	128.4	34 34.9	98 18	128.3	35 04.3	98 18	128.1	35 33.7	98 18	128.0	36 03.1	98 18	127.9	6
7	32 26.6	98 18	127.7	32 56.0	98 18	127.5	33 25.4	98 18	127.4	33 54.8	98 18	127.3	34 24.2	98 18	127.2	34 53.6	98 18	127.1	35 23.0	98 18	126.9	35 52.4	98 18	126.8	7
8	32 15.8	98 18	126.6	32 45.2	98 18	126.5	33 14.6	98 18	126.4	33 44.0	98 18	126.2	34 13.4	98 18	126.1	34 42.8	98 18	126.0	35 12.2	98 18	125.9	35 41.5	98 18	125.7	8
9	32 04.9	98 18	125.5	32 34.3	98 18	125.4	33 03.7	98 18	125.3	33 33.1	98 18	125.2	34 02.4	98 19	125.1	34 31.8	98 19	124.9	35 01.2	98 19	124.8	35 30.5	98 19	124.7	9
50	31 53.9	98 19	124.5	32 23.2	98 19	124.4	32 52.6	98 19	124.2	33 22.0	98 19	124.1	33 51.3	98 19	124.0	34 20.7	98 19	123.9	34 50.0	98 19	123.7	35 19.3	98 19	123.6	50
1	31 42.7	98 19	123.4	32 12.0	98 19	123.3	32 41.4	98 19	123.2	33 10.7	98 19	123.1	33 40.1	98 19	122.9	34 09.4	98 19	122.8	34 38.7	98 19	122.7	35 08.0	98 19	122.6	1
2	31 31.3	98 19	122.4	32 00.7	98 19	122.3	32 30.0	98 19	122.1	32 59.3	98 19	122.0	33 28.7	98 19	121.9	33 58.0	98 19	121.8	34 27.3	98 19	121.6	34 56.6	98 19	121.5	2
3	31 19.9	98 19	121.3	31 49.2	98 19	121.2	32 18.5	98 19	121.1	32 47.8	98 19	121.0	33 17.1	98 19	120.8	33 46.4	98 19	120.7	34 15.7	98 19	120.6	34 45.0	98 20	120.4	3
4	31 08.3	98 20	120.3	31 37.6	98 20	120.2	32 06.9	98 20	120.0	32 36.2	98 20	119.9	33 05.5	98 20	119.8	33 34.8	98 20	119.7	34 04.0	98 20	119.5	34 33.3	98 20	119.4	4
55	30 56.6	98 20	119.2	31 25.9	98 20	119.1	31 55.2	98 20	119.0	32 24.4	98 20	118.9	32 53.7	98 20	118.7	33 23.0	98 20	118.6	33 52.2	98 20	118.5	34 21.5	97 20	118.3	55
6	30 44.7	98 20	118.2	31 14.0	98 20	118.1	31 43.3	98 20	118.0	32 12.6	98 20	117.8	32 41.8	98 20	117.7	33 11.1	97 20	117.6	33 40.3	97 20	117.4	34 09.5	97 20	117.3	6
7	39 32.8	98 20	117.2	31 02.1	98 20	117.0	31 31.3	98 20	116.9	32 09.6	97 20	116.8	32 29.8	97 20	116.7	32 59.0	97 20	116.5	33 28.3	97 20	116.4	33 57.5	97 20	116.2	7
8	30 20.7	98 20	116.1	30 50.0	98 20	116.0	31 19.2	97 20	115.9	31 48.5	97 20	115.8	32 17.7	97 20	115.6	32 46.9	97 20	115.5	33 16.1	97 20	115.3	33 45.3	97 20	115.2	8
9	30 08.6	97 20	115.1	30 37.8	97 20	115.0	31 07.0	97 20	114.8	31 36.3	97 20	114.7	32 05.5	97 20	114.6	32 34.7	97 21	114.4	33 03.9	97 21	114.3	33 33.1	97 21	114.2	9
60	29 56.3	97 21	114.1	30 25.5	97 21	114.0	30 54.7	97 21	113.8	31 23.9	97 21	113.7	31 53.1	97 21	113.6	32 22.3	97 21	113.4	32 51.5	97 21	113.3	33 20.7	97 21	113.1	60
1	29 43.9	97 21	113.1	30 13.1	97 21	112.9	30 42.3	97 21	112.8	31 11.5	97 21	112.7	31 40.7	97 21	112.5	32 09.9	97 21	112.4	32 39.1	97 21	112.2	33 08.2	97 21	112.1	1
2	29 31.4	97 21	112.0	30 00.7	97 21	111.9	30 29.8	97 21	111.8	30 59.0	97 21	111.6	31 28.2	97 21	111.5	31 57.4	97 21	111.4	32 26.5	97 21	111.2	32 55.7	97 21	111.1	2
3	29 18.9	97 21	111.0	29 48.1	97 21	110.9	30 17.3	97 21	110.7	30 46.4	97 21	110.6	31 15.6	97 21	110.5	31 44.8	97 21	110.3	32 13.9	97 21	110.2	32 43.1	97 21	110.1	3
4	29 06.2	97 21	110.0	29 35.4	97 21	109.9	30 04.6	97 21	109.7	30 33.8	97 21	109.6	31 02.9	97 21	109.5	31 32.1	97 21	109.3	32 01.2	97 21	109.2	32 30.3	97 21	109.0	4
65	28 53.5	97 21	109.0	29 22.7	97 21	108.8	29 51.9	97 21	108.7	30 21.0	97 21	108.6	30 50.2	97 21	108.4	31 19.3	97 21	108.3	31 48.4	97 21	108.2	32 17.5	97 21	108.0	65
6	28 40.7	97 21	108.0	29 09.9	97 21	107.8	29 39.0	97 21	107.7	30 08.2	97 22	107.6	30 37.3	97 22	107.4	31 06.4	97 22	107.3	31 35.6	97 22	107.1	32 04.7	97 22	107.0	6
7	28 27.8	97 22	107.0	28 57.0	97 22	106.8	29 26.1	97 22	106.7	29 55.3	97 22	106.5	30 24.4	97 22	106.4	30 53.5	97 22	106.3	31 22.6	97 22	106.1	31 51.7	97 22	106.0	7
8	28 14.9	97 22	105.9	28 44.0	97 22	105.8	29 13.2	97 22	105.7	29 42.3	97 22	105.5	30 11.4	97 22	105.4	30 40.5	97 22	105.3	31 09.6	97 22	105.1	31 38.7	97 22	105.0	8
9	28 01.9	97 22	104.9	28 31.0	97 22	104.8	29 00.2	97 22	104.7	29 29.3	97 22	104.5	29 58.4	97 22	104.4	30 27.5	97 22	104.2	30 56.6	97 22	104.1	31 25.7	97 22	104.0	9
70	27 48.8	97 22	103.9	28 17.9	97 22	103.8	28 47.1	97 22	103.7	29 16.2	97 22	103.5	29 45.3	97 22	103.4	30 14.4	97 22	103.2	30 43.5	97 22	103.1	31 12.5	97 22	103.0	70
1	27 35.7	97 22	102.9	28 04.8	97 22	102.8	28 33.9	97 22	102.7	29 03.0	97 22	102.5	29 32.1	97 22	102.4	30 01.2	97 22	102.2	30 30.3	97 22	102.1	30 59.4	97 22	101.9	1
2	27 22.5	97 22	101.9	27 51.6	97 22	101.8	28 20.7	97 22	101.7	28 49.8	97 22	101.5	29 18.9	97 22	101.4	29 48.0	97 22	101.2	30 17.1	97 22	101.1	30 46.1	97 22	100.9	2
3	27 09.3	97 22	100.9	27 38.4	97 22	100.8	28 07.5	97 22	100.7	28 36.6	97 22	100.5	29 05.7	97 22	100.4	29 34.7	97 22	100.2	30 03.8	97 22	100.1	30 32.8	97 22	100.0	3
4	26 56.0	97 22	99.9	27 25.1	97 22	99.8	27 54.2	97 22	99.7	28 23.3	97 22	99.5	28 52.4	97 22	99.4	29 21.4	97 22	99.2	29 50.5	97 22	99.1	30 19.5	97 22	99.0	4
75	26 42.7	97 22	98.9	27 11.8	97 22	98.8	27 40.9	97 22	98.7	28 10.0	97 22	98.5	28 39.0	97 22	98.4	29 08.1	97 22	98.2	29 37.1	97 22	98.1	30 06.2	97 22	98.0	75
6	26 29.3	97 22	98.0	26 58.4	97 22	97.8	27 27.5	97 22	97.7	27 56.6	97 22	97.5	28 25.7	97 22	97.4	28 54.7	97 22	97.3	29 23.8	97 22	97.1	29 52.8	97 22	97.0	6
7	26 16.0	97 22	97.0	26 45.1	97 22	96.8	27 14.1	97 22	96.7	27 43.2	97 22	96.6	28 12.3	97 22	96.4	28 41.3	97 22	96.3	29 10.4	97 22	96.1	29 39.4	97 22	96.0	7
8	26 02.6	97 22	96.0	26 31.6	97 22	95.8	27 00.7	97 22	95.7	27 29.8	97 22	95.6	27 58.8	97 22	95.4	28 27.9	97 22	95.3	28 56.9	97 22	95.1	29 26.0	97 22	95.0	8
9	25 49.1	97 22	95.0	26 18.2	97 22	94.9	26 47.3	97 22	94.7	27 16.3	97 22	94.6	27 45.4	97 22	94.4	28 14.4	97 22	94.3	28 43.5	97 22	94.2	29 12.5	97 22	94.0	9
80	25 35.7	97 22	94.0	26 04.7	97 22	93.9	26 33.8	97 22	93.7	27 02.9	97 22	93.6	27 31.9	97 22	93.5	28 01.0	97 22	93.3	28 30.0	97 22	93.2	28 59.0	97 22	93.0	80
1	25 22.2	97 22	93.0	25 51.3	97 22	92.9	26 20.3	97 22	92.8	26 49.4	97 22	92.6	27 18.4	97 22	92.5	27 47.5	97 22	92.3	28 16.5	97 22	92.2	28 45.5	97 22	92.0	1
2	25 08.7	97 22	92.1	25 37.8	97 22	91.9	26 06.8	97 22	91.8	26 35.9	97 22	91.6	27 05.0	97 22	91.5	27 34.0	97 22	91.4	28 03.0	97 22	91.2	28 32.1	97 22	91.1	2
3	24 55.2	97 22	91.1	25 24.3	97 22	90.9	25 53.4	97 22	90.8	26 22.4	97 22	90.7	26 51.5	97 22	90.5	27 20.5	97 22	90.4	27 49.5	97 22	90.2	28 18.6	97 22	90.1	3
4	24 41.7	97 22	90.1	25 10.8	97 22	90.0	25 39.9	97 22	89.8	26 08.9	97 22	89.7	26 38.0	97 22	89.5	27 07.0	97 22	89.4	27 36.0	97 22	89.3	28 05.1	97 22	89.1	4
85	24 28.2	97 22	89.1	24 57.3	97 22	89.0	25 26.4	97 22	88.9	25 55.4	97 22	88.7	26 24.5	97 22	88.6	26 53.5	97 22	88.4	27 22.5	97 22	88.3	27 51.6	97 22	88.1	85
6	24 14.7	97 22	88.2	24 43.8	97 22	88.0	25 12.9	97 22	87.9	25 41.9	97 22	87.7	26 11.0	97 22	87.6	26 40.0	97 22	87.5	27 09.1	97 22	87.3	27 38.1	97 22	87.2	6
7	24 01.2	97 22	87.2	24 30.3	97 22	87.0	24 59.4	97 22	86.9	25 28.4	97 22	86.8	25 57.5	97 22	86.6	26 26.5	97 22	86.5	26 55.6	97 22	86.4	27 24.6	97 22	86.2	7
8	23 47.8	97 22	86.2	24 16.8	97 22	86.1	24 45.9	97 22	85.9	25 15.0	97 22	85.8	25 44.0	97 22	85.7	26 13.1	97 22	85.5	26 42.1	97 22	85.4	27 11.1	97 22	85.2	8
9	23 34.3	97 22	85.2	24 03.4	97 22	85.1	24 32.5	97 22	85.0	25 01.5	97 22	84.8	25 30.6	97 22	84.7	25 59.6	97 22	84.6	26 28.7	97 22	84.4	26 57.7	97 22	84.3	9
90	23 20.9	97 22	84.3	23 50.0	97 22	84.1	24 19.0	97 22	84.0	24 48.1	97 22	83.9	25 17.2	97 22	83.7	25 46.2	97 22	83.6	26 15.3	97 22	83.5	26 44.3	97 22	83.3	90

Lat. 77°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	23 07.5	97 22	83.3	23 36.5	97 22	83.2	24 05.6	97 22	83.0	24 34.7	97 22	82.9	25 03.8	97 22	82.8	25 32.8	97 22	82.6	26 01.9	97 22	82.5	26 30.9	97 22	82.4	91
2	22 54.1	97 22	82.4	23 23.1	97 22	82.2	23 52.2	97 22	82.1	24 21.3	97 22	82.0	24 50.4	97 22	81.8	25 19.4	97 22	81.7	25 48.5	97 22	81.5	26 17.5	97 22	81.4	2
3	22 40.7	97 22	81.4	23 09.8	97 22	81.3	23 38.9	97 22	81.1	24 08.0	97 22	81.0	24 37.0	97 22	80.9	25 06.1	97 22	80.7	25 35.2	97 22	80.6	26 04.2	97 22	80.4	3
4	22 27.4	97 22	80.4	22 56.5	97 22	80.3	23 25.6	97 22	80.2	23 54.6	97 22	80.0	24 23.7	97 22	79.9	24 52.8	97 22	79.8	25 21.9	97 22	79.6	25 50.9	97 22	79.5	4
95	22 14.1	97 22	79.5	22 43.2	97 22	79.3	23 12.3	97 22	79.2	23 41.4	97 22	79.1	24 10.5	97 22	78.9	24 39.5	97 22	78.8	25 08.6	97 22	78.7	25 37.7	97 22	78.5	95
6	22 00.8	97 22	78.5	22 29.9	97 22	78.4	22 59.0	97 22	78.3	23 28.1	97 22	78.1	23 57.2	97 22	78.0	24 26.3	97 22	77.9	24 55.4	97 22	77.7	25 24.5	97 22	77.6	6
7	21 47.6	97 22	77.6	22 16.7	97 22	77.4	22 45.9	97 22	77.3	23 15.0	97 22	77.2	23 44.1	97 22	77.0	24 13.1	97 22	76.9	24 42.2	97 22	76.8	25 11.3	97 22	76.6	7
8	21 34.5	97 22	76.6	22 03.6	97 22	76.5	22 32.7	97 22	76.3	23 01.8	97 22	76.2	23 30.9	97 22	76.1	24 00.0	97 22	76.0	24 29.1	97 22	75.8	24 58.2	97 22	75.7	8
9	21 21.4	97 22	75.7	21 50.5	97 22	75.5	22 19.6	97 22	75.4	22 48.7	97 22	75.3	23 17.9	97 22	75.1	23 47.0	97 22	75.0	24 16.1	97 22	74.9	24 45.2	97 22	74.7	9
100	21 08.3	97 22	74.7	21 37.5	97 22	74.6	22 06.6	97 22	74.4	22 35.7	97 22	74.3	23 04.8	97 22	74.2	23 34.0	97 22	74.1	24 03.1	97 22	73.9	24 32.2	97 22	73.8	100
1	20 55.3	97 22	73.8	21 24.5	97 22	73.6	21 53.6	97 22	73.5	22 22.8	97 22	73.4	22 51.9	97 21	73.2	23 21.0	97 21	73.1	23 50.1	97 21	73.0	24 19.2	97 21	72.8	1
2	20 42.4	97 21	72.8	21 11.6	97 21	72.7	21 40.7	97 21	72.5	22 09.9	97 21	72.4	22 39.0	97 21	72.3	23 08.1	97 21	72.2	23 37.3	97 21	72.0	24 06.4	97 21	71.9	2
3	20 29.5	97 21	71.9	20 58.7	97 21	71.7	21 27.9	97 21	71.6	21 57.0	97 21	71.5	22 26.2	97 21	71.3	22 55.3	97 21	71.2	23 24.4	97 21	71.1	23 53.6	97 21	71.0	3
4	20 16.8	97 21	70.9	20 45.9	97 21	70.8	21 15.1	97 21	70.7	21 44.3	97 21	70.5	22 13.4	97 21	70.4	22 42.6	97 21	70.3	23 11.7	97 21	70.1	23 40.9	97 21	70.0	4
105	20 04.0	97 21	70.0	20 33.2	97 21	69.8	21 02.4	97 21	69.7	21 31.6	97 21	69.6	22 00.7	97 21	69.5	22 29.9	97 21	69.3	22 59.1	97 21	69.2	23 28.2	97 21	69.1	105
6	19 51.4	97 21	69.0	20 20.6	97 21	68.9	20 49.8	97 21	68.8	21 19.0	97 21	68.6	21 48.1	97 21	68.5	22 17.3	97 21	68.4	22 46.5	97 21	68.3	23 15.6	97 21	68.1	6
7	19 38.8	97 21	68.1	20 08.0	97 21	67.9	20 37.2	97 21	67.8	21 06.4	97 21	67.7	21 35.6	97 21	67.6	22 04.8	97 21	67.5	22 34.0	97 21	67.3	23 03.2	97 21	67.2	7
8	19 26.4	97 21	67.1	19 55.6	97 21	67.0	20 24.8	97 21	66.9	20 54.0	97 21	66.8	21 23.2	97 21	66.6	21 52.4	97 21	66.5	22 21.6	97 21	66.4	22 50.8	97 20	66.3	8
9	19 14.0	97 20	66.2	19 43.2	97 20	66.1	20 12.4	97 20	65.9	20 41.6	97 20	65.8	21 10.8	97 20	65.7	21 40.0	97 20	65.6	22 09.2	97 20	65.5	22 38.4	97 20	65.3	9
110	19 01.7	97 20	65.2	19 30.9	97 20	65.1	20 00.1	97 20	65.0	20 29.4	97 20	64.9	20 58.6	97 20	64.8	21 27.8	97 20	64.6	21 57.0	97 20	64.5	22 26.2	97 20	64.4	110
1	18 49.5	98 20	64.3	19 18.7	97 20	64.2	19 48.0	97 20	64.1	20 17.2	97 20	63.9	20 46.4	97 20	63.8	21 15.7	97 20	63.7	21 44.9	97 20	63.6	22 14.1	97 20	63.5	1
2	18 37.3	98 20	63.4	19 06.6	98 20	63.2	19 35.9	98 20	63.1	20 05.1	98 20	63.0	20 34.4	97 20	62.9	21 03.6	97 20	62.8	21 32.8	97 20	62.6	22 02.1	97 20	62.5	2
3	18 25.3	98 20	62.4	18 54.6	98 20	62.3	19 23.9	98 20	62.2	19 53.1	98 20	62.1	20 22.4	98 20	62.0	20 51.7	98 20	61.8	21 20.9	97 20	61.7	21 50.2	97 20	61.6	3
4	18 13.4	98 20	61.5	18 42.7	98 20	61.4	19 12.0	98 20	61.2	19 41.3	98 20	61.1	20 10.5	98 20	61.0	20 39.8	98 20	60.9	21 09.1	98 20	60.8	21 38.3	98 20	60.7	4
115	18 01.6	98 20	60.5	18 30.9	98 19	60.4	19 00.2	98 19	60.3	19 29.5	98 19	60.2	19 58.8	98 19	60.1	20 28.1	98 19	60.0	20 57.3	98 19	59.9	21 26.6	98 19	59.7	115
6	17 49.9	98 19	59.6	18 19.2	98 19	59.5	18 48.5	98 19	59.4	19 17.8	98 19	59.3	19 47.1	98 19	59.2	20 16.4	98 19	59.0	20 45.7	98 19	58.9	21 15.0	98 19	58.8	6
7	17 38.3	98 19	58.7	18 07.7	98 19	58.6	18 37.0	98 19	58.4	19 06.3	98 19	58.3	19 35.6	98 19	58.2	20 04.9	98 19	58.1	20 34.2	98 19	58.0	21 03.5	98 19	57.9	7
8	17 26.9	98 19	57.7	17 56.2	98 19	57.6	18 25.5	98 19	57.5	18 54.9	98 19	57.4	19 24.2	98 19	57.3	19 53.5	98 19	57.2	20 22.8	98 19	57.1	20 52.2	98 19	56.9	8
9	17 15.5	98 19	56.8	17 44.9	98 19	56.7	18 14.2	98 19	56.6	18 43.6	98 19	56.5	19 12.9	98 19	56.4	19 42.2	98 19	56.2	20 11.6	98 19	56.1	20 40.9	98 19	56.0	9
120	17 04.3	98 18	55.9	17 33.6	98 18	55.7	18 03.0	98 18	55.6	18 32.4	98 18	55.5	19 01.7	98 18	55.4	19 31.1	98 18	55.3	20 00.4	98 18	55.2	20 29.8	98 18	55.1	120
1	16 53.2	98 18	54.9	17 22.5	98 18	54.8	17 51.9	98 18	54.7	18 21.3	98 18	54.6	18 50.7	98 18	54.5	19 20.0	98 18	54.4	19 49:4	98 18	54.3	20 18.8	98 18	54.2	1
2	16 42.2	98 18	54.0	17 11.6	98 18	53.9	17 41.0	98 18	53.8	18 10.4	98 18	53.7	18 39.8	98 18	53.6	19 09.1	98 18	53.5	19 38.5	98 18	53.4	20 07.9	98 18	53.2	2
3	16 31.3	98 18	53.0	17 00.7	98 18	52.9	17 30.2	98 18	52.8	17 59.6	98 18	52.7	18 29.0	98 18	52.6	18 58.4	98 18	52.5	19 27.8	98 18	52.4	19 57.1	98 18	52.3	3
4	16 20.6	98 18	52.1	16 50.0	98 18	52.0	17 19.5	98 18	51.9	17 48.9	98 18	51.8	18 18.3	98 18	51.7	18 47.7	98 18	51.6	19 17.1	98 17	51.5	19 46.5	98 17	51.4	4
125	16 10.0	98 17	51.2	16 39.5	98 17	51.1	17 08.9	98 17	51.0	17 38.3	98 17	50.9	18 07.8	98 17	50.8	18 37.2	98 17	50.7	19 06.6	98 17	50.6	19 36.1	98 17	50.5	125
6	15 59.6	98 17	50.2	16 29.0	98 17	50.2	16 58.5	98 17	50.1	17 27.9	98 17	50.0	17 57.4	98 17	49.9	18 26.8	98 17	49.8	18 56.3	98 17	49.6	19 25.7	98 17	49.5	6
7	15 49.3	98 17	49.3	16 18.7	98 17	49.2	16 48.2	98 17	49.1	17 17.7	98 17	49.0	17 47.1	98 17	48.9	18 16.6	98 17	48.8	18 46.1	98 17	48.7	19 15.5	98 17	48.6	7
8	15 39.1	98 17	48.4	16 08.6	98 17	48.3	16 38.1	98 17	48.2	17 07.6	98 17	48.1	17 37.0	98 17	48.0	18 06.5	98 17	47.9	18 36.0	98 17	47.8	19 05.5	98 16	47.7	8
9	15 29.1	98 16	47.5	15 58.6	98 16	47.4	16 28.1	98 16	47.3	16 57.6	98 16	47.2	17 27.1	98 16	47.1	17 56.6	98 16	47.0	18 26.1	98 16	46.9	18 55.5	98 16	46.8	9
130	15 19.2	98 16	46.5	15 48.7	98 16	46.4	16 18.3	98 16	46.3	16 47.8	98 16	46.2	17 17.3	98 16	46.1	17 46.8	98 16	46.0	18 16.3	98 16	46.0	18 45.8	98 16	45.9	130
1	15 09.5	98 16	45.6	15 39.0	98 16	45.5	16 08.6	98 16	45.4	16 38.1	98 16	45.3	17 07.6	98 16	45.2	17 37.1	98 16	45.1	18 06.7	98 16	45.0	18 36.2	98 16	44.9	1
2	14 59.9	98 16	44.7	15 29.5	98 16	44.6	15 59.0	98 16	44.5	16 28.6	98 16	44.4	16 58.1	98 16	44.3	17 27.7	98 16	44.2	17 57.2	98 16	44.1	18 26.7	98 16	44.0	2
3	14 50.5	99 15	43.7	15 20.1	99 15	43.6	15 49.7	99 15	43.5	16 19.2	99 15	43.5	16 48.8	99 15	43.4	17 18.3	99 15	43.3	17 47.9	98 15	43.2	18 17.4	98 15	43.1	3
4	14 41.3	99 15	42.8	15 10.9	99 15	42.7	15 40.4	99 15	42.6	16 10.0	99 15	42.5	16 39.6	99 15	42.4	17 09.1	99 15	42.4	17 38.7	99 15	42.3	18 08.3	99 15	42.2	4
135	14 32.2	99 15	41.9	15 01.8	99 15	41.8	15 31.4	99 15	41.7	16 01.0	99 15	41.6	16 30.6	99 15	41.5	17 00.1	99 15	41.4	17 29.7	99 15	41.3	17 59.3	99 15	41.3	135
6	14 23.3	99 15	40.9	14 52.9	99 15	40.8	15 22.5	99 15	40.8	15 52.1	99 15	40.7	16 21.7	99 14	40.6	16 51.3	99 14	40.5	17 20.9	99 14	40.4	17 50.5	99 14	40.3	6
7	14 14.5	99 14	40.0	14 44.1	99 14	39.9	15 13.8	99 14	39.8	15 43.4	99 14	39.8	16 13.0	99 14	39.7	16 42.6	99 14	39.6	17 12.2	99 14	39.5	17 41.8	99 14	39.4	7
8	14 05.9	99 14	39.1	14 35.6	99 14	39.0	15 05.2	99 14	38.9	15 34.8	99 14	38.8	16 04.5	99 14	38.7	16 34.1	99 14	38.7	17 03.7	99 14	38.6	17 33.3	99 14	38.5	8
9	13 57.5	99 14	38.1	14 27.2	99 14	38.1	14 56.8	99 14	38.0	15 26.4	99 14	37.9	15 56.1	99 14	37.8	16 25.7	99 14	37.7	16 55.4	99 14	37.7	17 25.0	99 14	37.6	9
140	13 49.3	99 13	37.2	14 18.9	99 13	37.1	14 48.6	99 13	37.1	15 18.2	99 13	37.0	15 47.9	99 13	36.9	16 17.6	99 13	36.8	16 47.2	99 13	36.7	17 16.9	99 13	36.7	140
1	13 41.2	99 13	36.3	14 10.9	99 13	36.2	14 40.5	99 13	36.1	15 10.2	99 13	36.1	15 39.9	99 13	36.0	16 09.6	99 13	35.9	16 39.2	99 13	35.8	17 08.9	99 13	35.7	1
2	13 33.3	99 13	35.3	14 03.0	99 13	35.3	14 32.7	99 13	35.2	15 02.4	99 13	35.1	15 32.0	99 13	35.1	16 01.7	99 13	35.0	16 31.4	99 13	34.9	17 01.1	99 13	34.8	2
3	13 25.6	99 13	34.4	13 55.3	99 13	34.3	14 25.0	99 13	34.3	14 54.7	99 12	34.2	15 24.4	99 12	34.1	15 54.1	99 12	34.1	16 23.8	99 12	34.0	16 53.5	99 12	33.9	3
4	13 18.0	99 12	33.5	13 47.7	99 12	33.4	14 17.5	99 12	33.3	14 47.2	99 12	33.3	15 16.9	99 12	33.2	15 46.6	99 12	33.1	16 16.3	99 12	33.1	16 46.0	99 12	33.0	4
145	13 10.7	99 12	32.6	13 40.4	99 12	32.5	14 10.1	99 12	32.4	14 39.9	99 12	32.4	15 09.6	99 12	32.3	15 39.3	99 12	32.2	16 09.1	99 12	32.1	16 38.8	99 12	32.1	145
6	13 03.5	99 12	31.6	13 33.2	99 12	31.6	14 03.0	99 12	31.5	14 32.7	99 12	31.4	15 02.5	99 12	31.4	15 32.2	99 12	31.3	16 02.0	99 12	31.2	16 31.7	99 12	31.2	6
7	12 56.5	99 11	30.7	13 26.3	99 11	30.6	13 56.0	99 11	30.6	14 25.8	99 11	30.5	14 55.6	99 11	30.4	15 25.3	99 11	30.4	15 55.1	99 11	30.3	16 24.8	99 11	30.2	7
8	12 49.7	99 11	29.8	13 19.5	99 11	29.7	13 49.3	99 11	29.6	14 19.0	99 11	29.6	14 48.8	99 11	29.5	15 18.6	99 11	29.5	15 48.3	99 11	29.4	16 18.1	99 11	29.3	8
9	12 43.1	99 11	28.8	13 12.9	99 11	28.8	13 42.7	99 11	28.7	14 12.5	99 11	28.7	14 42.3	99 11	28.6	15 12.0	99 11	28.5	15 41.8	99 11	28.5	16 11.6	99 11	28.4	9
150	12 36.7	99 10	27.9	13 06.5	99 10	27.8	13 36.3	99 10	27.8	14 06.1	99 10	27.7	14 35.9	99 10	27.7	15 05.7	99 10	27.6	15 35.5	99 10	27.6	16 05.3	99 10	27.5	150
1	12 30.5	99 10	27.0	13 00.3	99 10	26.9	13 30.1	99 10	26.9	13 59.9	99 10	26.8	14 29.7	99 10	26.7	14 59.5	99 10	26.7	15 29.3	99 10	26.6	15 59.1	99 10	26.6	1
2	12 24.5	99 10	26.0	12 54.3	99 10	26.0	13 24.1	99 10	25.9	13 53.9	99 10	25.9	14 23.7	99 10	25.8	14 53.6	99 10	25.8	15 23.4	99 10	25.7	15 53.2	99 10	25.7	2
3	12 18.6	99 09	25.1	12 48.5	99 09	25.1	13 18.3	99 09	25.0	13 48.1	99 09	25.0	14 18.0	99 09	24.9	14 47.8	99 09	24.8	15 17.6	99 09	24.8	15 47.5	99 09	24.7	3
4	12 13.0	99 09	24.2	12 42.8	99 09	24.1	13 12.7	99 09	24.1	13 42.5	99 09	24.0	14 12.4	99 09	24.0	14 42.2	99 09	23.9	15 12.1	99 09	23.9	15 41.9	99 09	23.8	4
155	12 07.6	1.0 09	23.3	12 37.4	1.0 09	23.2	13 07.3	1.0 09	23.2	13 37.1	1.0 09	23.1	14 07.0	1.0 09	23.1	14 36.8	1.0 09	23.0	15 06.7	1.0 09	23.0	15 36.6	1.0 09	22.9	155
6	12 02.3	1.0 08	22.3	12 32.2	1.0 08	22.3	13 02.1	1.0 08	22.2	13 31.9	1.0 08	22.2	14 01.8	1.0 08	22.1	14 31.7	1.0 08	22.1	15 01.5	1.0 08	22.0	15 31.4	1.0 08	22.0	6
7	11 57.3	1.0 08	21.4	12 27.2	1.0 08	21.4	12 57.1	1.0 08	21.3	13 26.9	1.0 08	21.3	13 56.8	1.0 08	21.2	14 26.7	1.0 08	21.2	14 56.6	1.0 08	21.1	15 26.4	1.0 08	21.1	7
8	11 52.5	1.0 08	20.5	12 22.4	1.0 08	20.4	12 52.3	1.0 08	20.4	13 22.1	1.0 08	20.3	13 52.0	1.0 08	20.3	14 21.9	1.0 08	20.2	14 51.8	1.0 08	20.2	15 21.7	1.0 08	20.2	8
9	11 47.9	1.0 07	19.5	12 17.8	1.0 07	19.5	12 47.7	1.0 07	19.5	13 17.6	1.0 07	19.4	13 47.5	1.0 07	19.4	14 17.4	1.0 07	19.3	14 47.2	1.0 07	19.3	15 17.1	1.0 07	19.2	9
160	11 43.5	1.0 07	18.6	12 13.4	1.0 07	18.6	12 43.3	1.0 07	18.5	13 13.2	1.0 07	18.5	13 43.1	1.0 07	18.4	14 13.0	1.0 07	18.4	14 42.9	1.0 07	18.4	15 12.8	1.0 07	18.3	160
1	11 39.3	1.0 07	17.7	12 09.2	1.0 07	17.6	12 39.1	1.0 07	17.6	13 09.0	1.0 07	17.6	13 38.9	1.0 07	17.5	14 08.8	1.0 07	17.5	14 38.7	1.0 07	17.4	15 08.7	1.0 07	17.4	1
2	11 35.3	1.0 06	16.7	12 05.2	1.0 06	16.7	12 35.1	1.0 06	16.7	13 05.0	1.0 06	16.6	13 35.0	1.0 06	16.6	14 04.9	1.0 06	16.6	14 34.8	1.0 06	16.5	15 04.7	1.0 06	16.5	2
3	11 31.5	1.0 06	15.8	12 01.4	1.0 06	15.8	12 31.3	1.0 06	15.7	13 01.3	1.0 06	15.7	13 31.2	1.0 06	15.7	14 01.1	1.0 06	15.6	14 31.1	1.0 06	15.6	15 01.0	1.0 06	15.6	3
4	11 27.9	1.0 06	14.9	11 57.8	1.0 06	14.9	12 27.8	1.0 06	14.8	12 57.7	1.0 06	14.8	13 27.7	1.0 06	14.8	13 57.6	1.0 06	14.7	14 27.5	1.0 06	14.7	14 57.5	1.0 06	14.7	4
165	11 24.5	1.0 05	14.0	11 54.5	1.0 05	13.9	12 24.4	1.0 05	13.9	12 54.4	1.0 05	13.9	13 24.3	1.0 05	13.8	13 54.3	1.0 05	13.8	14 24.2	1.0 05	13.8	14 54.2	1.0 05	13.7	165
6	11 21.4	1.0 05	13.0	11 51.3	1.0 05	13.0	12 21.3	1.0 05	13.0	12 51.3	1.0 05	12.9	13 21.2	1.0 05	12.9	13 51.2	1.0 05	12.9	14 21.1	1.0 05	12.9	14 51.1	1.0 05	12.8	6
7	11 18.5	1.0 05	12.1	11 48.4	1.0 05	12.1	12 18.4	1.0 04	12.0	12 48.3	1.0 04	12.0	13 18.3	1.0 04	12.0	13 48.3	1.0 04	12.0	14 18.2	1.0 04	11.9	14 48.2	1.0 04	11.9	7
8	11 15.7	1.0 04	11.2	11 45.7	1.0 04	11.1	12 15.7	1.0 04	11.1	12 45.6	1.0 04	11.1	13 15.6	1.0 04	11.1	13 45.6	1.0 04	11.0	14 15.5	1.0 04	11.0	14 45.5	1.0 04	11.0	8
9	11 13.2	1.0 04	10.2	11 43.2	1.0 04	10.2	12 13.2	1.0 04	10.2	12 43.1	1.0 04	10.2	13 13.1	1.0 04	10.1	13 43.1	1.0 04	10.1	14 13.1	1.0 04	10.1	14 43.0	1.0 04	10.1	9
170	11 10.9	1.0 03	09.3	11 40.9	1.0 03	09.3	12 10.9	1.0 03	09.3	12 40.9	1.0 03	09.2	13 10.8	1.0 03	09.2	13 40.8	1.0 03	09.2	14 10.8	1.0 03	09.2	14 40.8	1.0 03	09.2	170
1	11 08.9	1.0 03	08.4	11 38.8	1.0 03	08.4	12 08.8	1.0 03	08.3	12 38.8	1.0 03	08.3	13 08.8	1.0 03	08.3	13 38.8	1.0 03	08.3	14 08.7	1.0 03	08.3	14 38.7	1.0 03	08.2	1
2	11 07.0	1.0 03	07.4	11 37.0	1.0 03	07.4	12 07.0	1.0 03	07.4	12 37.0	1.0 03	07.4	13 06.9	1.0 03	07.4	13 36.9	1.0 03	07.4	14 06.9	1.0 03	07.3	14 36.9	1.0 03	07.3	2
3	11 05.4	1.0 02	06.5	11 35.4	1.0 02	06.5	12 05.3	1.0 02	06.5	12 35.3	1.0 02	06.5	13 05.3	1.0 02	06.5	13 35.3	1.0 02	06.4	14 05.3	1.0 02	06.4	14 35.3	1.0 02	06.4	3
4	11 03.9	1.0 02	05.6	11 33.9	1.0 02	05.6	12 03.9	1.0 02	05.6	12 33.9	1.0 02	05.5	13 03.9	1.0 02	05.5	13 33.9	1.0 02	05.5	14 03.9	1.0 02	05.5	14 33.9	1.0 02	05.5	4
175	11 02.7	1.0 02	04.7	11 32.7	1.0 02	04.6	12 02.7	1.0 02	04.6	12 32.7	1.0 02	04.6	13 02.7	1.0 02	04.6	13 32.7	1.0 02	04.6	14 02.7	1.0 02	04.6	14 32.7	1.0 02	04.6	175
6	11 01.8	1.0 01	03.7	11 31.7	1.0 01	03.7	12 01.7	1.0 01	03.7	12 31.7	1.0 01	03.7	13 01.7	1.0 01	03.7	13 31.7	1.0 01	03.7	14 01.7	1.0 01	03.7	14 31.7	1.0 01	03.7	6
7	11 01.0	1.0 01	02.8	11 31.0	1.0 01	02.8	12 01.0	1.0 01	02.8	12 31.0	1.0 01	02.8	13 01.0	1.0 01	02.8	13 31.0	1.0 01	02.8	14 01.0	1.0 01	02.8	14 31.0	1.0 01	02.7	7
8	11 00.4	1.0 01	01.9	11 30.4	1.0 01	01.9	12 00.4	1.0 01	01.9	12 30.4	1.0 01	01.8	13 00.4	1.0 01	01.8	13 30.4	1.0 01	01.8	14 00.4	1.0 01	01.8	14 30.4	1.0 01	01.8	8
9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	12 00.1	1.0 00	00.9	12 30.1	1.0 00	00.9	13 00.1	1.0 00	00.9	13 30.1	1.0 00	00.9	14 00.1	1.0 00	00.9	14 30.1	1.0 00	00.9	9
180	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	180

Lat. 77°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°
00	41 00.0	1.000	180.0	41 30.0	1.000	180.0	42 00.0	1.000	180.0	43 00.0	1.000	180.0	45 00.0	1.000	180.0	47 00.0	1.000	180.0	47 30.0	1.000	180.0	48 30.0	1.000	180.0
1	40 59.9	1.001	178.8	41 29.9	1.001	178.8	41 59.9	1.001	178.8	42 59.9	1.001	178.8	44 59.9	1.001	178.8	46 59.9	1.001	178.8	47 29.9	1.001	178.8	48 29.9	1.001	178.8
2	40 59.4	1.001	177.7	41 29.4	1.001	177.7	41 59.4	1.001	177.6	42 59.4	1.001	177.6	44 59.4	1.001	177.6	46 59.4	1.001	177.6	47 29.4	1.001	177.6	48 29.4	1.001	177.5
3	40 58.8	1.002	176.5	41 28.8	1.002	176.5	41 58.8	1.002	176.5	42 58.7	1.002	176.4	44 58.7	1.002	176.4	46 58.7	1.002	176.4	47 28.7	1.002	176.3	48 28.7	1.002	176.3
4	40 57.8	1.002	175.3	41 27.8	1.002	175.3	41 57.8	1.002	175.3	42 57.8	1.002	175.3	44 57.7	1.002	175.2	46 57.7	1.002	175.1	47 27.7	1.002	175.1	48 27.7	1.002	175.1
05	40 56.6	1.002	174.2	41 26.5	1.003	174.1	41 56.5	1.003	174.1	42 56.5	1.003	174.1	44 56.5	1.003	174.0	46 56.4	1.003	173.9	47 26.4	1.003	173.9	48 26.4	1.003	173.9
6	40 55.0	1.003	173.0	41 25.0	1.003	173.0	41 55.0	1.003	172.9	42 55.0	1.003	172.9	44 54.9	1.003	172.8	46 54.9	1.003	172.7	47 24.8	1.003	172.7	48 24.8	1.003	172.6
7	40 53.3	1.003	171.8	41 23.2	1.003	171.8	41 53.2	1.003	171.8	42 53.2	1.003	171.7	44 53.1	1.004	171.6	46 53.0	1.004	171.5	47 23.0	1.004	171.5	48 22.9	1.004	171.4
8	40 51.2	1.004	170.7	41 21.2	1.004	170.6	41 51.2	1.004	170.6	42 51.1	1.004	170.5	44 51.0	1.004	170.4	46 50.9	1.004	170.3	47 20.8	1.004	170.3	48 20.8	1.004	170.2
9	40 48.9	1.004	169.5	41 18.8	1.004	169.5	41 48.8	1.004	169.4	42 48.7	1.004	169.4	44 48.6	1.004	169.2	46 48.4	1.004	169.1	47 18.4	1.004	169.0	48 18.3	1.005	169.0
10	40 46.3	1.005	168.3	41 16.2	1.005	168.3	41 46.2	1.005	168.3	42 46.1	1.005	168.2	44 45.9	1.005	168.0	46 45.8	1.005	167.9	47 15.7	1.005	167.8	48 15.6	1.005	167.7
1	40 43.4	1.005	167.2	41 13.4	1.005	167.1	41 43.3	1.006	167.1	42 43.2	1.005	167.0	44 43.0	1.005	166.8	46 42.8	1.005	166.7	47 12.7	1.005	166.6	48 12.6	1.006	166.5
2	40 40.3	1.006	166.0	41 10.2	1.006	166.0	41 40.2	1.006	165.9	42 40.0	1.006	165.8	44 39.8	1.006	165.6	46 39.5	1.006	165.5	47 09.5	1.006	165.4	48 09.3	1.006	165.3
3	40 36.9	1.006	164.8	41 06.8	1.006	164.8	41 36.7	1.006	164.7	42 36.6	1.006	164.7	44 36.3	1.006	164.5	46 36.0	1.006	164.3	47 05.9	1.006	164.2	48 05.7	1.006	164.1
4	40 33.2	1.007	163.7	41 03.1	1.007	163.6	41 33.1	1.007	163.6	42 32.9	1.007	163.5	44 32.6	1.007	163.3	46 32.2	1.007	163.0	47 02.1	1.007	163.0	48 01.9	1.007	162.9
15	40 29.3	1.007	162.5	40 59.2	1.007	162.5	41 29.1	1.007	162.4	42 28.9	1.007	162.3	44 28.5	1.007	162.1	46 28.1	1.007	161.8	46 58.0	1.007	161.8	47 57.8	1.007	161.7
6	40 25.1	1.007	161.4	40 55.0	1.007	161.3	41 24.9	1.007	161.2	42 24.7	1.008	161.1	44 24.3	1.008	160.9	46 23.8	1.008	160.6	46 53.7	1.008	160.6	47 53.4	1.008	160.4
7	40 20.7	1.008	160.2	40 50.6	1.008	160.1	41 20.4	1.008	160.1	42 20.2	1.008	160.0	44 19.7	1.008	159.7	46 19.2	1.008	159.5	46 49.0	1.008	159.4	47 48.8	1.008	159.2
8	40 16.0	1.008	159.0	40 45.8	1.008	159.0	41 15.7	1.008	158.9	42 15.4	1.008	158.8	44 14.9	1.008	158.5	46 14.3	99 09	158.3	46 44.2	99 09	158.2	47 43.8	99 09	158.0
9	40 11.0	1.009	157.9	40 40.9	1.009	157.8	41 10.7	1.009	157.8	42 10.4	1.009	157.6	44 09.8	99 09	157.4	46 09.2	99 00	157.1	46 39.0	99 09	157.0	47 38.7	99 09	156.8
20	40 05.8	99 09	156.7	40 35.7	99 09	156.7	41 05.5	99 00	156.6	42 05.2	99 09	156.5	44 04.5	99 09	156.2	46 03.8	99 09	155.9	46 33.6	99 09	155.8	47 33.2	99 10	155.6
1	40 00.4	99 10	155.6	40 30.2	99 10	155.5	41 00.0	99 10	155.5	41 59.7	99 10	155.3	43 58.9	99 10	155.0	45 58.2	99 10	154.7	46 28.0	99 10	154.6	47 27.5	99 10	154.4
2	39 54.7	99 10	154.5	40 24.5	99 10	154.4	40 54.3	99 10	154.3	41 53.9	99 10	154.2	43 53.1	99 10	153.8	45 52.3	99 10	153.5	46 22.0	99 10	153.4	47 21.6	99 10	153.2
3	39 48.7	99 10	153.3	40 18.5	99 10	153.2	40 48.3	99 10	153.2	41 47.9	99 10	153.0	43 47.0	99 11	152.7	45 46.1	99 11	152.3	46 15.9	99 11	152.2	47 15.4	99 11	152.1
4	39 42.5	99 11	152.2	40 12.3	99 11	152.1	40 42.1	99 11	152.0	41 41.7	99 11	151.9	43 40.7	99 11	151.5	45 39.7	99 11	151.2	46 09.5	99 11	151.1	47 08.9	99 11	150.9
25	39 36.1	99 11	151.0	40 05.9	99 11	151.0	40 35.7	99 11	150.9	41 35.2	99 11	150.7	43 34.2	99 11	150.4	45 33.1	99 11	150.0	46 02.8	99 12	149.9	47 02.2	99 12	149.7
6	39 29.5	99 11	149.9	39 59.2	99 12	149.8	40 29.0	99 12	149.7	41 28.5	99 12	149.6	43 27.4	99 12	149.2	45 26.2	99 12	148.8	45 55.9	99 12	148.7	46 55.3	99 12	148.5
7	39 22.6	99 12	148.8	39 52.3	99 12	148.7	40 22.0	99 12	148.6	41 21.5	99 12	148.4	43 20.3	99 12	148.0	45 19.1	99 12	147.6	45 48.8	99 12	147.5	46 48.1	99 12	147.3
8	39 15.5	99 12	147.6	39 45.2	99 12	147.5	40 14.9	99 12	147.5	41 14.3	99 12	147.3	43 13.1	99 12	146.9	45 11.8	99 13	146.5	45 41.4	99 13	146.4	46 40.7	99 13	146.1
9	39 08.1	99 13	146.5	39 37.8	99 13	146.4	40 07.5	99 13	146.3	41 06.9	99 13	146.1	43 05.6	99 13	145.7	45 04.2	99 13	145.3	45 33.8	99 13	145.2	46 33.1	99 13	145.0
30	39 00.6	99 13	145.4	39 30.3	99 13	145.3	39 59.9	99 13	145.2	40 59.3	99 13	145.0	42 57.9	99 13	144.6	44 56.4	99 13	144.2	45 26.0	99 13	144.0	46 25.2	99 13	143.8
1	38 52.8	99 13	144.3	39 22.5	99 13	144.2	39 52.1	99 13	144.1	40 51.4	99 13	143.9	42 50.0	99 14	143.4	44 48.4	99 14	143.0	45 18.0	99 14	142.9	46 17.2	99 14	142.6
2	38 44.8	99 14	143.1	39 14.4	99 14	143.0	39 44.1	99 14	142.9	40 43.4	99 14	142.7	42 41.8	99 14	142.3	44 40.2	99 14	141.8	45 09.7	99 14	141.7	46 08.9	99 14	141.5
3	38 36.6	99 14	142.0	39 06.2	99 14	141.9	39 35.8	99 14	141.8	40 35.1	99 14	141.6	42 33.5	99 14	141.2	44 31.7	99 14	140.7	45 01.3	98 14	140.6	46 00.3	98 15	140.3
4	38 28.2	99 14	140.9	38 57.8	99 14	140.8	39 27.4	99 14	140.7	40 26.6	99 14	140.5	42 24.9	99 15	140.0	44 23.1	98 15	139.6	44 52.6	98 15	139.4	45 51.6	98 15	139.2
35	38 19.6	99 15	139.8	38 49.2	99 15	139.7	39 18.7	99 15	139.6	40 17.9	99 15	139.4	42 16.1	98 15	138.9	44 14.2	98 15	138.4	44 43.7	98 15	138.3	45 42.7	98 15	138.0
6	38 10.8	99 15	138.7	38 40.3	99 15	138.6	39 09.9	99 15	138.5	40 09.0	98 15	138.2	42 07.1	98 15	137.8	44 05.2	98 15	137.3	44 34.6	98 15	137.2	45 33.6	98 16	136.9
7	38 01.8	99 15	137.6	38 31.3	98 15	137.5	39 00.9	98 15	137.4	39 59.9	98 15	137.1	41 58.0	98 16	136.7	43 55.9	98 16	136.1	44 25.4	98 16	136.0	45 24.3	98 16	135.7
8	37 52.6	98 16	136.5	38 22.1	98 16	136.4	38 51.6	98 16	136.2	39 50.6	98 16	136.0	41 48.6	98 16	135.5	43 46.5	98 16	135.0	44 15.9	98 16	134.9	45 14.7	98 16	134.6
9	37 43.2	98 16	135.4	38 12.7	98 16	135.3	38 42.2	98 16	135.1	39 41.2	98 16	134.9	41 39.1	98 16	134.4	43 36.8	98 16	133.9	44 06.2	98 16	133.8	45 05.0	98 16	133.5
40	37 33.6	98 16	134.3	38 03.1	98 16	134.2	38 32.6	98 16	134.0	39 31.5	98 16	133.8	41 29.3	98 17	133.3	43 27.0	98 17	132.8	43 56.4	98 17	132.6	44 55.2	98 17	132.4
1	37 23.8	98 17	133.2	37 53.3	98 17	133.1	38 22.8	98 17	132.9	39 21.7	98 17	132.7	41 19.4	98 17	132.2	43 17.0	98 17	131.7	43 46.4	98 17	131.5	44 45.1	98 17	131.2
2	37 13.9	98 17	132.1	37 43.4	98 17	132.0	38 12.8	98 17	131.9	39 11.7	98 17	131.6	41 09.3	98 17	131.1	43 06.8	98 17	130.5	43 36.2	98 17	130.4	44 34.9	98 17	130.1
3	37 03.8	98 17	131.0	37 33.2	98 17	130.9	38 02.7	98 17	130.8	39 01.5	98 17	130.5	40 59.1	98 17	130.0	42 56.5	98 18	129.4	43 25.8	98 18	129.3	44 24.4	98 18	129.0
4	36 53.5	98 17	129.9	37 23.0	98 17	129.8	37 52.4	98 17	129.7	38 51.2	98 18	129.4	40 48.7	98 18	128.9	42 46.0	98 18	128.3	43 15.3	98 18	128.2	44 13.9	98 18	127.9
45	36 43.1	98 18	128.8	37 12.5	98 18	128.7	37 41.9	98 18	128.6	38 40.7	98 18	128.3	40 38.1	98 18	127.8	42 35.3	98 18	127.2	43 04.6	98 18	127.1	44 03.1	98 18	126.8
6	36 32.5	98 18	127.8	37 01.9	98 18	127.6	37 31.3	98 18	127.5	38 30.0	98 18	127.2	40 27.3	98 18	126.7	42 24.5	98 18	126.1	42 53.8	98 18	126.0	43 52.3	97 18	125.7
7	36 21.8	98 18	126.7	36 51.1	98 18	126.6	37 20.5	98 18	126.4	38 19.2	98 18	126.2	40 16.4	98 18	125.6	42 13.5	98 19	125.0	42 42.8	97 19	124.9	43 41.2	97 19	124.6
8	36 10.9	98 18	125.6	36 40.2	98 18	125.5	37 09.6	98 18	125.4	38 08.2	98 19	125.1	40 05.4	98 19	124.5	42 02.4	97 19	123.9	42 31.6	97 19	123.8	43 30.0	97 19	123.5
9	35 59.8	98 19	124.5	36 29.2	98 19	124.4	36 58.5	98 19	124.3	37 57.1	98 19	124.0	39 54.2	98 19	123.5	41 51.1	97 19	122.9	42 20.3	97 19	122.7	43 18.7	97 19	122.4
50	35 48.6	98 19	123.5	36 18.0	98 19	123.4	36 47.3	98 19	123.2	37 45.8	98 19	122.9	39 42.9	97 19	122.4	41 39.7	97 19	121.8	42 08.9	97 19	121.6	43 07.2	97 19	121.3
1	35 37.3	98 19	122.4	36 06.6	98 19	122.3	36 35.9	98 19	122.2	37 34.4	98 19	121.9	39 31.4	97 19	121.3	41 28.2	97 19	120.7	41 57.4	97 19	120.5	42 55.6	97 20	120.2
2	35 25.9	98 19	121.4	35 55.1	98 19	121.2	36 24.4	98 19	121.1	37 22.9	97 19	120.8	39 19.8	97 20	120.2	41 16.5	97 20	119.6	41 45.7	97 20	119.5	42 43.9	97 20	119.1
3	35 14.3	98 20	120.3	35 43.5	98 20	120.2	36 12.8	97 20	120.0	37 11.3	97 20	119.8	39 08.1	97 20	119.2	41 04.7	97 20	118.6	41 33.9	97 20	118.4	42 32.1	97 20	118.1
4	35 02.6	97 20	119.3	35 31.8	97 20	119.1	36 01.0	97 20	119.0	36 59.5	97 20	118.7	38 56.2	97 20	118.1	40 52.8	97 20	117.5	41 21.9	97 20	117.3	42 20.1	97 20	117.0
55	34 50.7	97 20	118.2	35 19.9	97 20	118.1	35 49.2	97 20	117.9	36 47.6	97 20	117.6	38 44.3	97 20	117.1	40 40.8	97 20	116.4	41 09.9	97 20	116.3	42 08.0	97 20	115.9
6	34 38.8	97 20	117.2	35 08.0	97 20	117.0	35 37.2	97 20	116.9	36 35.6	97 20	116.6	38 32.2	97 20	116.0	40 28.6	97 20	115.4	40 57.7	97 20	115.2	41 55.8	97 20	114.9
7	34 26.7	97 20	116.1	34 55.9	97 20	116.0	35 25.1	97 20	115.8	36 23.4	97 20	115.5	38 20.0	97 20	114.9	40 16.4	97 21	114.3	40 45.4	97 21	114.2	41 43.5	97 21	113.8
8	34 14.5	97 20	115.1	34 43.7	97 20	114.9	35 12.9	97 20	114.8	36 11.2	97 21	114.5	38 07.7	97 21	113.9	40 04.0	97 21	113.3	40 33.1	97 21	113.1	41 31.1	97 21	112.8
9	34 02.3	97 21	114.0	34 31.4	97 21	113.9	35 00.6	97 21	113.7	35 58.9	97 21	113.5	37 55.3	97 21	112.9	39 51.6	97 21	112.2	40 20.6	97 21	112.1	41 18.6	97 21	111.7
60	33 49.9	97 21	113.0	34 19.0	97 21	112.9	34 48.2	97 21	112.7	35 46.4	97 21	112.4	37 42.8	97 21	111.8	39 39.0	97 21	111.2	40 08.1	97 21	111.0	41 06.1	97 21	110.7
1	33 37.4	97 21	112.0	34 06.6	97 21	111.8	34 35.7	97 21	111.7	35 33.9	97 21	111.4	37 30.3	97 21	110.8	39 26.4	97 21	110.1	39 55.4	97 21	110.0	40 53.4	97 21	109.6
2	33 24.8	97 21	110.9	33 54.0	97 21	110.8	34 23.1	97 21	110.6	35 21.3	97 21	110.4	37 17.6	97 21	109.7	39 13.7	97 21	109.1	39 42.7	97 21	108.9	40 40.6	97 21	108.6
3	33 12.2	97 21	109.9	33 41.3	97 21	109.8	34 10.4	97 21	109.6	35 08.6	97 21	109.3	37 04.9	97 21	108.7	39 00.9	97 21	108.1	39 29.9	97 21	107.9	40 27.8	96 22	107.6
4	32 59.5	97 21	108.9	33 28.6	97 21	108.7	33 57.7	97 21	108.6	34 55.8	97 21	108.3	36 52.0	97 22	107.7	38 48.0	97 22	107.0	39 17.0	97 22	106.9	40 14.9	96 22	106.5
65	32 46.7	97 21	107.9	33 15.8	97 21	107.7	33 44.8	97 22	107.6	34 43.0	97 22	107.3	36 39.1	97 22	106.7	38 35.1	97 22	106.0	39 04.1	96 22	105.8	40 01.9	96 22	105.5
6	32 33.8	97 22	106.9	33 02.9	97 22	106.7	33 31.9	97 22	106.6	34 30.1	97 22	106.3	36 26.2	97 22	105.6	38 22.1	97 22	105.0	38 51.0	96 22	104.8	39 48.9	96 22	104.5
7	32 20.8	97 22	105.8	32 49.9	97 22	105.7	33.19.0	97 22	105.5	34 17.1	97 22	105.2	36 13.2	97 22	104.6	38 09.0	96 22	104.0	38 38.9	96 22	103.8	39 35.8	96 22	103.5
8	32 07.8	97 22	104.8	32 36.9	97 22	104.7	33 05.9	97 22	104.5	34 04.0	97 22	104.2	36 00.1	97 22	103.6	37 55.9	96 22	103.0	38 24.8	96 22	102.8	39 22.6	96 22	102.4
9	31 54.7	97 22	103.8	32 23.8	97 22	103.7	32 52.8	97 22	103.5	33 50.9	97 22	103.2	35 46.9	97 22	102.6	37 42.7	96 22	101.9	38 11.6	96 22	101.8	39 09.4	96 22	101.4
70	31 41.6	97 22	102.8	32 10.6	97 22	102.7	32 39.7	97 22	102.5	33 37.7	97 22	102.2	35 33.7	97 22	101.6	37 29.5	96 22	100.9	37 58.4	96 22	100.8	38 56.2	96 22	100.4
1	31 28.4	97 22	101.8	31 57.5	97 22	101.7	32 26.5	97 22	101.5	33 24.5	97 22	101.2	35 20.5	97 22	100.6	37 16.2	96 22	99.9	37 45.1	96 22	99.8	38 42.9	96 22	99.4
2	31 15.2	97 22	100.8	31 44.2	97 22	100.7	32 13.2	97 22	100.5	33 11.3	97 22	100.2	35 07.2	97 22	99.6	37 02.9	96 22	98.9	37 31.8	96 22	98.8	38 29.5	96 22	98.4
3	31 01.9	97 22	99.8	31 30.9	97 22	99.7	32 00.9	97 22	99.5	32 58.0	97 22	99.2	34 53.9	96 22	98.6	36 49.6	96 22	97.9	37 18.4	96 22	97.8	38 16.2	96 22	97.4
4	30 48.6	97 22	98.8	31 17.6	97 22	98.7	31 46.6	97 22	98.5	32 44.6	97 22	98.2	34 40.5	96 22	97.6	36 36.2	96 22	96.9	37 05.1	96 22	96.8	38 02.8	96 22	96.4
75	30 35.2	97 22	97.8	31 04.2	97 22	97.7	31 33.3	97 22	97.5	32 31.3	97 22	97.2	34 27.1	96 22	96.6	36 22.8	96 22	95.9	36 51.6	96 22	95.8	37 49.4	96 22	95.4
6	30 21.8	97 22	96.8	30 50.9	97 22	96.7	31 19.9	97 22	96.5	32 17.8	97 22	96.2	34 13.7	96 22	95.6	36 09.3	96 22	94.9	36 38.2	96 22	94.8	37 35.9	96 22	94.4
7	30 08.4	97 22	95.8	30 37.4	97 22	95.7	31 06.4	97 22	95.5	32 04.4	97 22	95.2	34 00.2	96 22	94.6	35 55.9	96 22	94.0	36 24.7	96 22	93.8	37 22.4	96 22	93.4
8	29 55.0	97 22	94.8	30 24.0	97 22	94.7	30 53.0	97 22	94.6	31 51.0	97 22	94.3	33 46.8	96 22	93.6	35 42.4	96 22	93.0	36 11.3	96 22	92.8	37 09.0	96 22	92.5
9	29 41.5	97 22	93.9	30 10.5	97 22	93.7	30 39.5	97 22	93.6	31 37.5	97 22	93.3	33 33.3	96 22	92.6	35 28.9	96 22	92.0	35 57.8	96 22	91.8	36 55.5	96 22	91.5
80	29 28.0	97 22	92.9	29 57.1	97 22	92.7	30 26.1	97 22	92.6	31 24.0	97 22	92.3	33 19.8	96 22	91.7	35 15.4	96 22	91.0	35 44.3	96 22	90.8	36 42.0	96 22	90.5
1	29 14.6	97 22	91.9	29 43.6	97 22	91.8	30 12.6	97 22	91.6	31 10.5	97 22	91.3	33 06.3	96 22	90.7	35 01.9	96 22	90.0	35 30.8	96 22	89.9	36 28.5	96 22	89.5
2	29 01.1	97 22	90.9	29 30.1	97 22	90.8	29 59.1	97 22	90.6	30 57.0	97 22	90.3	32 52.8	96 22	89.7	34 48.4	96 22	89.1	35 17.3	96 22	88.9	36 15.0	96 22	88.6
3	28 47.6	97 22	90.0	29 16.6	97 22	89.8	29 45.6	97 22	89.7	30 43.5	97 22	89.4	32 39.3	96 22	88.7	34 34.9	96 22	88.1	35 03.8	96 22	87.9	36 01.5	96 22	87.6
4	28 34.1	97 22	89.0	29 03.1	97 22	88.8	29 32.1	97 22	88.7	30 30.0	97 22	88.4	32 25.8	96 22	87.8	34 21.4	96 22	87.1	34 50.3	96 22	87.0	35 48.0	96 22	86.6
85	28 20.6	97 22	88.0	28 49.6	97 22	87.9	29 18.6	97 22	87.7	30 16.6	97 22	87.4	32 12.4	96 22	86.8	34 08.0	96 22	86.2	34 36.8	96 22	86.0	35 34.6	96 22	85.7
6	28 07.1	97 22	87.0	28 36.1	97 22	86.9	29 05.1	97 22	86.7	30 03.1	97 22	86.4	31 58.9	96 22	85.8	33 54.5	96 22	85.2	34 23.4	96 22	85.0	35 21.1	96 22	84.7
7	27 53.6	97 22	86.1	28 22.6	97 22	85.9	28 51.6	97 22	85.8	29 49.6	97 22	85.5	31 45.4	96 22	84.9	33 41.1	96 22	84.2	34 10.0	96 22	84.1	35 07.7	96 22	83.7
8	27 40.2	97 22	85.1	28 09.2	97 22	85.0	28 38.2	97 22	84.8	29 36.2	97 22	84.5	31 32.0	96 22	83.9	33 27.7	96 22	83.3	33 56.5	96 22	83.1	34 54.3	96 22	82.8
9	27 26.7	97 22	84.1	27 55.7	97 22	84.0	28 24.8	97 22	83.9	29 22.7	97 22	83.6	31 18.6	96 22	83.0	33 14.3	96 22	82.3	33 43.2	96 22	82.2	34 40.9	96 22	81.8
90	27 13.3	97 22	83.2	27 42.3	97 22	83.0	28 11.3	97 22	82.9	29 09.3	97 22	82.6	31 05.2	96 22	82.0	33 00.9	96 22	81.4	33 29.8	96 22	81.2	34 27.6	96 22	80.9

Lat. 77°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	26 59.9	97 22	82.2	27 29.0	97 22	82.1	27 58.0	97 22	81.9	28 56.0	97 22	81.6	30 51.9	97 22	81.0	32 47.6	96 22	80.4	33 16.5	96 22	80.3	34 14.2	96 22	79.9	91
2	26 46.6	97 22	81.3	27 15.6	97 22	81.1	27 44.6	97 22	81.0	28 42.6	97 22	80.7	30 38.5	97 22	80.1	32 34.3	96 22	79.5	33 03.2	96 22	79.3	34 01.0	96 22	79.0	2
3	26 33.3	97 22	80.3	27 02.3	97 22	80.2	27 31.3	97 22	80.0	28 29.3	97 22	79.7	30 25.3	97 22	79.1	32 21.0	96 22	78.5	32 50.0	96 22	78.4	33 47.7	96 22	78.0	3
4	26 20.0	97 22	79.4	26 49.0	97 22	79.2	27 18.0	97 22	79.1	28 16.1	97 22	78.8	30 12.0	97 22	78.2	32 07.8	96 22	77.6	32 36.8	96 22	77.4	33 34.6	96 22	77.1	4
95	26 06.7	97 22	78.4	26 35.8	97 22	78.3	27 04.8	97 22	78.1	28 02.9	97 22	77.8	29 58.9	97 22	77.2	31 54.7	96 22	76.6	32 23.6	96 22	76.5	33 21.4	96 22	76.2	95
6	25 53.5	97 22	77.4	26 22.6	97 22	77.3	26 51.6	97 22	77.2	27 49.7	97 22	76.9	29 45.7	97 22	76.3	31 41.6	96 22	75.7	32 10.5	96 22	75.5	33 08.4	96 22	75.2	6
7	25 40.4	97 22	76.5	26 09.4	97 22	76.4	26 38.5	97 22	76.2	27 36.6	97 22	75.9	29 32.6	97 22	75.4	31 28.5	97 22	74.8	31 57.5	96 22	74.6	32 55.3	96 22	74.3	7
8	25 27.3	97 22	75.5	25 56.3	97 22	75.4	26 25.4	97 22	75.3	27 23.5	97 22	75.0	29 19.6	97 22	74.4	31 15.5	97 22	73.8	31 44.5	97 22	73.7	32 42.4	96 22	73.4	8
9	25 14.2	97 22	74.6	25 43.3	97 22	74.5	26 12.4	97 22	74.3	27 10.5	97 22	74.0	29 06.6	97 22	73.5	31 02.6	97 21	72.9	31 31.6	97 21	72.7	32 29.5	96 21	72.4	9
100	25 01.3	97 22	73.7	25 30.3	97 22	73.5	25 59.4	97 22	73.4	26 57.6	97 21	73.1	28 53.7	97 21	72.5	30 49.7	97 21	72.0	31 18.7	97 21	71.8	32 16.6	97 21	71.5	100
1	24 48.3	97 21	72.7	25 17.4	97 21	72.6	25 46.5	97 21	72.4	26 44.7	97 21	72.2	28 40.9	97 21	71.6	30 36.9	97 21	71.0	31 05.9	97 21	70.9	32 03.9	97 21	70.6	1
2	24 35.5	97 21	71.8	25 04.6	97 21	71.6	25 33.7	97 21	71.5	26 31.9	97 21	71.2	28 28.1	97 21	70.7	30 24.2	97 21	70.1	30 53.2	97 21	69.9	31 51.2	97 21	69.6	2
3	24 22.7	97 21	70.8	24 51.8	97 21	70.7	25 20.9	97 21	70.6	26 19.1	97 21	70.3	28 15.4	97 21	69.7	30 11.6	97 21	69.2	30 40.6	97 21	69.0	31 38.6	97 21	68.7	3
4	24 10.0	97 21	69.9	24 39.1	97 21	69.8	25 08.2	97 21	69.6	26 06.4	97 21	69.4	28 02.8	97 21	68.8	29 59.0	97 21	68.2	30 28.0	97 21	68.1	31 26.0	97 21	67.8	4
105	23 57.4	97 21	68.9	24 26.5	97 21	68.8	24 55.6	97 21	68.7	25 53.9	97 21	68.4	27 50.2	97 21	67.9	29 46.5	97 21	67.3	30 15.5	97 21	67.2	31 13.6	97 21	66.9	105
6	23 44.8	97 21	68.0	24 13.9	97 21	67.9	24 43.1	97 21	67.7	25 41.3	97 21	67.5	27 37.8	97 21	66.9	29 34.1	97 21	66.4	30 03.1	97 20	66.2	31 01.2	97 20	65.9	6
7	23 32.3	97 21	67.1	24 01.5	97 21	66.9	24 30.6	97 21	66.8	25 28.9	97 21	66.6	27 25.4	97 20	66.0	29 21.8	97 20	65.5	29 50.8	97 20	65.3	30 48.9	97 20	65.0	7
8	23 19.9	97 20	66.1	23 49.1	97 20	66.0	24 18.3	97 20	65.9	25 16.6	97 20	65.6	27 13.1	97 20	65.1	29 09.5	97 20	64.5	29 38.6	97 20	64.4	30 36.7	97 20	64.1	8
9	23 07.6	97 20	65.2	23 36.8	97 20	65.1	24 06.0	97 20	64.9	25 04.3	97 20	64.7	27 00.9	97 20	64.2	28 57.4	97 20	63.6	29 26.5	97 20	63.5	30 24.6	97 20	63.2	9
110	22 55.4	97 20	64.3	23 24.6	97 20	64.1	23 53.8	97 20	64.0	24 52.2	97 20	63.8	26 48.8	97 20	63.2	28 45.3	97 20	62.7	29 14.5	97 20	62.6	30 12.6	97 20	62.3	110
1	22 43.3	97 20	63.3	23 12.5	97 20	63.2	23 41.7	97 20	63.1	24 40.1	97 20	62.8	26 36.8	97 20	62.3	28 33.4	97 20	61.8	29 02.5	97 20	61.6	30 00.8	97 20	61.4	1
2	22 31.3	97 20	62.4	23 00.5	97 20	62.3	23 29.7	97 20	62.2	24 28.2	97 20	61.9	26 24.9	97 20	61.4	28 21.6	97 20	60.9	28 50.7	97 20	60.7	29 49.0	97 19	60.5	2
3	22 19.4	97 20	61.5	22 48.6	97 20	61.4	23 17.9	97 20	61.2	24 16.3	97 20	61.0	26 13.1	97 19	60.5	28 09.8	97 19	60.0	28 39.0	97 19	59.8	29 37.3	97 19	59.5	3
4	22 07.6	98 19	60.5	22 36.8	97 19	60.4	23 06.1	97 19	60.3	24 04.6	97 19	60.1	26 01.4	97 19	59.6	27 58.2	97 19	59.0	28 27.4	97 19	58.9	29 25.7	97 19	58.6	4
115	21 55.9	98 19	59.6	22 25.2	98 19	59.5	22 54.4	98 19	59.4	23 52.9	97 19	59.1	25 49.8	97 19	58.6	27 46.7	97 19	58.1	28 15.9	97 19	58.0	29 14.2	97 19	57.7	115
6	21 44.3	98 19	58.7	22 13.6	98 19	58.6	22 42.9	98 19	58.5	23 41.4	98 19	58.2	25 38.4	97 19	57.7	27 35.3	97 19	57.2	28 04.5	97 19	57.1	29 02.9	97 19	56.8	6
7	21 32.8	98 19	57.8	22 02.1	98 19	57.6	22 31.4	98 19	57.5	23 30.0	98 19	57.3	25 27.0	98 19	56.8	27 24.0	97 19	56.3	27 53.2	97 19	56.2	28 51.6	97 19	55.9	7
8	21 21.5	98 19	56.8	21 50.8	98 19	56.7	22 20.1	98 19	56.6	23 18.7	98 19	56.4	25 15.8	98 18	55.9	27 12.8	97 18	55.4	27 42.0	97 18	55.3	28 40.5	97 18	55.0	8
9	21 10.2	98 19	55.9	21 39.6	98 19	55.8	22 08.9	98 18	55.7	23 07.5	98 18	55.4	25 04.7	98 18	55.0	27 01.8	98 18	54.5	27 31.0	98 18	54.4	28 29.5	97 18	54.1	9
120	20 59.1	98 18	55.0	21 28.5	98 18	54.9	21 57.8	98 18	54.8	22 56.4	98 18	54.5	24 53.7	98 18	54.1	26 50.8	98 18	53.6	27 20.1	98 18	53.5	28 18.6	98 18	53.2	120
1	20 48.1	98 18	54.1	21 17.5	98 18	53.9	21 46.8	98 18	53.8	22 45.5	98 18	53.6	24 42.8	98 18	53.2	26 40.0	98 18	52.7	27 09.3	98 18	52.6	28 07.9	98 18	52.3	1
2	20 37.3	98 18	53.1	21 06.6	98 18	53.0	21 36.0	98 18	52.9	22 34.7	98 18	52.7	24 32.1	98 18	52.2	26 29.4	98 18	51.8	26 58.7	98 18	51.6	27 57.3	98 17	51.4	2
3	20 26.5	98 18	52.2	20 55.9	98 18	52.1	21 25.3	98 18	52.0	22 24.0	98 18	51.8	24 21.5	98 17	51.3	26 18.8	98 17	50.9	26 48.2	98 17	50.7	27 46.8	98 17	50.5	3
4	20 15.9	98 17	51.3	20 45.3	98 17	51.2	21 14.7	98 17	51.1	22 13.5	98 17	50.9	24 11.0	98 17	50.4	26 08.4	98 17	50.0	26 37.8	98 17	49.8	27 36.4	98 17	49.6	4
125	20 05.5	98 17	50.4	20 34.9	98 17	50.3	21 04.3	98 17	50.2	22 03.1	98 17	49.9	24 00.7	98 17	49.5	25 58.2	98 17	49.1	26 27.5	98 17	48.9	27 26.2	98 17	48.7	125
6	19 55.1	98 17	49.4	20 24.6	98 17	49.3	20 54.0	98 17	49.2	21 52.8	98 17	49.0	23 50.5	98 17	48.6	25 48.0	98 17	48.2	26 17.4	98 17	48.0	27 16.2	98 17	47.8	6
7	19 45.0	98 17	48.5	20 14.4	98 17	48.4	20 43.9	98 17	48.3	21 42.7	98 17	48.1	23 40.4	98 17	47.7	25 38.1	98 16	47.3	26 07.5	98 16	47.1	27 06.2	98 16	46.9	7
8	19 34.9	98 16	47.6	20 04.4	98 16	47.5	20 33.8	98 16	47.4	21 32.8	98 16	47.2	23 30.5	98 16	46.8	25 28.2	98 16	46.4	25 57.6	98 16	46.2	26 56.4	98 16	46.0	8
9	19 25.0	98 16	46.7	19 54.5	98 16	46.6	20 24.0	98 16	46.5	21 22.9	98 16	46.3	23 20.8	98 16	45.9	25 18.5	98 16	45.5	25 48.0	98 16	45.3	26 46.8	98 16	45.1	9
130	19 15.3	98 16	45.8	19 44.8	98 16	45.7	20 14.3	98 16	45.6	21 13.2	98 16	45.4	23 11.1	98 16	45.0	25 09.0	98 16	44.6	25 38.4	98 16	44.4	26 37.3	98 16	44.2	130
1	19 05.7	98 16	44.8	19 35.2	98 16	44.7	20 04.7	98 16	44.7	21 03.7	98 16	44.5	23 01.7	98 16	44.1	24 59.6	98 15	43.7	25 29.1	98 15	43.6	26 28.0	98 15	43.3	1
2	18 56.2	98 15	43.9	19 25.8	98 15	43.8	19 55.3	98 15	43.7	20 54.3	98 15	43.5	22 52.4	98 15	43.2	24 50.4	98 15	42.8	25 19.8	98 15	42.7	26 18.8	98 15	42.4	2
3	18 47.0	98 15	43.0	19 16.5	98 15	42.9	19 46.0	98 15	42.8	20 45.1	98 15	42.6	22 43.2	98 15	42.3	24 41.3	98 15	41.9	25 10.8	98 15	41.8	26 09.8	98 15	41.6	3
4	18 37.8	99 15	42.1	19 07.4	99 15	42.0	19 37.0	99 15	41.9	20 36.1	98 15	41.7	22 34.2	98 15	41.3	24 32.3	98 15	41.0	25 01.9	98 15	40.9	26 00.9	98 15	40.7	4
135	18 28.9	99 15	41.2	18 58.4	99 15	41.1	19 28.0	99 15	41.0	20 27.2	99 15	40.8	22 25.4	99 14	40.4	24 23.6	98 14	40.1	24 53.1	98 14	40.0	25 52.2	98 14	39.8	135
6	18 20.1	99 14	40.3	18 49.7	99 14	40.2	19 19.2	99 14	40.1	20 18.4	99 14	39.9	22 16.7	99 14	39.5	24 15.0	99 14	39.2	24 44.5	99 14	39.1	25 43.6	98 14	38.9	6
7	18 11.4	99 14	39.3	18 41.0	99 14	39.2	19 10.6	99 14	39.2	20 09.8	99 14	39.0	22 08.2	99 14	38.6	24 06.5	99 14	38.3	24 36.1	99 14	38.2	25 35.2	99 14	38.0	7
8	18 03.0	99 14	38.4	18 32.6	99 14	38.3	19 02.2	99 14	38.2	20 01.4	99 14	38.1	21 59.9	99 14	37.7	23 58.2	99 14	37.4	24 27.8	99 14	37.3	25 27.0	99 13	37.1	8
9	17 54.7	99 14	37.5	18 24.3	99 14	37.4	18 53.9	99 14	37.3	19 53.2	99 13	37.2	21 51.7	99 13	36.8	23 50.1	99 13	36.5	24 19.7	99 13	36.4	25 18.9	99 13	36.2	9
140	17 46.5	99 13	36.6	18 16.2	99 13	36.5	18 45.8	99 13	36.4	19 45.1	99 13	36.3	21 43.7	99 13	35.9	23 42.2	99 13	35.6	24 11.8	99 13	35.5	25 11.0	99 13	35.3	140
1	17 38.6	99 13	35.7	18 08.2	99 13	35.6	18 37.9	99 13	35.5	19 37.2	99 13	35.4	21 35.8	99 13	35.0	23 34.4	99 13	34.7	24 04.1	99 13	34.6	25 03.3	99 13	34.4	1
2	17 30.8	99 13	34.8	18 00.5	99 13	34.7	18 30.1	99 13	34.6	19 29.5	99 13	34.4	21 28.2	99 12	34.1	23 26.8	99 12	33.8	23 56.5	99 12	33.7	24 55.8	99 12	33.6	2
3	17 23.2	99 12	33.8	17 52.9	99 12	33.8	18 22.6	99 12	33.7	19 22.0	99 12	33.5	21 20.7	99 12	33.2	23 19.4	99 12	32.9	23 49.1	99 12	32.8	24 48.4	99 12	32.7	3
4	17 15.8	99 12	32.9	17 45.5	99 12	32.8	18 15.2	99 12	32.8	19 14.6	99 12	32.6	21 13.4	99 12	32.3	23 12.2	99 12	32.0	23 41.8	99 12	31.9	24 41.2	99 12	31.8	4
145	17 08.5	99 12	32.0	17 38.2	99 12	31.9	18 08.0	99 12	31.9	19 07.4	99 12	31.7	21 06.3	99 12	31.4	23 05.1	99 12	31.1	23 34.8	99 11	31.0	24 34.2	99 11	30.9	145
6	17 01.5	99 11	31.1	17 31.2	99 11	31.0	18 00.9	99 11	31.0	19 00.4	99 11	30.8	20 59.3	99 11	30.5	22 58.2	99 11	30.2	23 27.9	99 11	30.2	24 27.4	99 11	30.0	6
7	16 54.6	99 11	30.2	17 24.3	99 11	30.1	17 54.1	99 11	30.0	18 53.6	99 11	29.9	20 52.6	99 11	29.6	22 51.5	99 11	29.3	23 21.2	99 11	29.3	24 20.7	99 11	29.1	7
8	16 47.9	99 11	29.3	17 17.7	99 11	29.2	17 47.4	99 11	29.1	18 46.9	99 11	29.0	20 46.0	99 11	28.7	22 45.0	99 11	28.4	23 14.7	99 11	28.4	24 14.2	99 10	28.2	8
9	16 41.4	99 11	28.3	17 11.2	99 10	28.3	17 40.9	99 10	28.2	18 40.5	99 10	28.1	20 39.6	99 10	27.8	22 38.6	99 10	27.6	23 08.4	99 10	27.5	24 07.9	99 10	27.4	9
150	16 35.1	99 10	27.4	17 04.9	99 10	27.4	17 34.7	99 10	27.3	18 34.2	99 10	27.2	20 33.4	99 10	26.9	22 32.5	99 10	26.7	23 02.3	99 10	26.6	24 01.8	99 10	26.5	150
1	16 28.9	99 10	26.5	16 58.8	99 10	26.5	17 28.6	99 10	26.4	18 28.2	99 10	26.3	20 27.4	99 10	26.0	22 26.5	99 10	25.8	22 56.3	99 10	25.7	23 55.9	99 10	25.6	1
2	16 23.0	99 10	25.6	16 52.8	99 10	25.5	17 22.7	99 10	25.5	18 22.3	99 09	25.4	20 21.5	99 09	25.1	22 20.8	99 09	24.9	22 50.6	99 09	24.8	23 50.2	99 09	24.7	2
3	16 17.3	99 09	24.7	16 47.1	99 09	24.6	17 16.9	99 09	24.6	18 16.6	99 09	24.5	20 15.9	99 09	24.2	22 15.2	99 09	24.0	22 45.0	99 09	23.9	23 44.6	99 09	23.8	3
4	16 11.7	99 09	23.8	16 41.6	99 09	23.7	17 11.4	99 09	23.7	18 11.1	99 09	23.6	20 10.4	99 09	23.3	22 09.8	99 09	23.1	22 39.6	99 09	23.0	23 39.3	99 09	22.9	4
155	16 06.4	1.0 09	22.9	16 36.3	1.0 09	22.8	17 06.1	1.0 09	22.8	18 05.8	99 08	22.6	20 05.2	99 08	22.4	22 04.6	99 08	22.2	22 34.4	99 08	22.2	23 34.1	99 08	22.0	155
6	16 01.3	1.0 08	21.9	16 31.1	1.0 08	21.9	17 01.0	1.0 08	21.8	18 00.7	1.0 08	21.7	20 00.1	1.0 08	21.5	21 59.6	1.0 08	21.3	22 29.4	1.0 08	21.3	23 29.1	1.0 08	21.2	6
7	15 56.3	1.0 08	21.0	16 26.2	1.0 08	21.0	16 56.1	1.0 08	20.9	17 55.8	1.0 08	20.8	19 55.3	1.0 08	20.6	21 54.8	1.0 08	20.4	22 24.6	1.0 08	20.4	23 24.4	1.0 08	20.3	7
8	15 51.6	1.0 08	20.1	16 21.5	1.0 08	20.1	16 51.3	1.0 08	20.0	17 51.1	1.0 08	19.9	19 50.6	1.0 07	19.7	21 50.1	1.0 07	19.5	22 20.0	1.0 07	19.5	23 19.8	1.0 07	19.4	8
9	15 47.0	1.0 07	19.2	16 16.9	1.0 07	19.2	16 46.8	1.0 07	19.1	17 46.6	1.0 07	19.0	19 46.2	1.0 07	18.8	21 45.7	1.0 07	18.7	22 15.6	1.0 07	18.6	23 15.4	1.0 07	18.5	9
160	15 42.7	1.0 07	18.3	16 12.6	1.0 07	18.2	16 42.5	1.0 07	18.2	17 42.3	1.0 07	18.1	19 41.9	1.0 07	17.9	21 41.5	1.0 07	17.8	22 11.4	1.0 07	17.7	23 11.2	1.0 07	17.6	160
1	15 38.6	1.0 07	17.4	16 08.5	1.0 07	17.3	16 38.4	1.0 07	17.3	17 38.2	1.0 06	17.2	19 37.9	1.0 06	17.0	21 37.5	1.0 06	16.9	22 07.4	1.0 06	16.8	23 07.2	1.0 06	16.8	1
2	15 34.6	1.0 06	16.5	16 04.6	1.0 06	16.4	16 34.5	1.0 06	16.4	17 34.3	1.0 06	16.3	19 34.0	1.0 06	16.1	21 33.7	1.0 06	16.0	22 03.6	1.0 06	15.9	23 03.4	1.0 06	15.9	2
3	15 30.9	1.0 06	15.5	16 00.9	1.0 06	15.5	16 30.8	1.0 06	15.5	17 30.6	1.0 06	15.4	19 30.4	1.0 06	15.3	21 30.1	1.0 06	15.1	22 00.0	1.0 06	15.1	22 59.8	1.0 06	15.0	3
4	15 27.4	1.0 06	14.6	15 57.4	1.0 06	14.6	16 27.3	1.0 05	14.6	17 27.2	1.0 05	14.5	19 26.9	1.0 05	14.4	21 26.6	1.0 05	14.2	21 56.6	1.0 05	14.2	22 56.4	1.0 05	14.1	4
165	15 24.1	1.0 05	13.7	15 54.1	1.0 05	13.7	16 24.0	1.0 05	13.6	17 23.9	1.0 05	13.6	19 23.7	1.0 05	13.5	21 23.4	1.0 05	13.3	21 53.4	1.0 05	13.3	22 53.3	1.0 05	13.2	165
6	15 21.0	1.0 05	12.8	15 51.0	1.0 05	12.8	16 20.9	1.0 05	12.7	17 20.8	1.0 05	12.7	19 20.6	1.0 05	12.6	21 20.4	1.0 05	12.4	21 50.4	1.0 05	12.4	22 50.3	1.0 05	12.3	6
7	15 18.1	1.0 04	11.9	15 48.1	1.0 04	11.9	16 18.0	1.0 04	11.8	17 18.0	1.0 04	11.8	19 17.8	1.0 04	11.7	21 17.6	1.0 04	11.5	21 47.6	1.0 04	11.5	22 47.5	1.0 04	11.5	7
8	15 15.5	1.0 04	11.0	15 45.4	1.0 04	10.9	16 15.4	1.0 04	10.9	17 15.3	1.0 04	10.9	19 15.2	1.0 04	10.8	21 15.0	1.0 04	10.7	21 45.0	1.0 04	10.6	22 44.9	1.0 04	10.6	8
9	15 13.0	1.0 04	10.1	15 43.0	1.0 04	10.0	16 12.9	1.0 04	10.0	17 12.9	1.0 04	10.0	19 12.8	1.0 04	09.9	21 12.6	1.0 04	09.8	21 42.6	1.0 04	09.7	22 42.5	1.0 04	09.7	9
170	15 10.7	1.0 03	09.1	15 40.7	1.0 03	09.1	16 10.7	1.0 03	09.1	17 10.6	1.0 03	09.1	19 10.5	1.0 03	09.0	21 10.4	1.0 03	08.9	21 40.4	1.0 03	08.9	22 40.4	1.0 03	08.8	170
1	15 08.7	1.0 03	08.2	15 38.7	1.0 03	08.2	16 08.7	1.0 03	08.2	17 08.6	1.0 03	08.2	19 08.5	1.0 03	08.1	21 08.5	1.0 03	08.0	21 38.4	1.0 03	08.0	22 38.4	1.0 03	07.9	1
2	15 06.9	1.0 03	07.3	15 36.9	1.0 03	07.3	16 06.8	1.0 03	07.3	17 06.8	1.0 03	07.2	19 06.8	1.0 03	07.2	21 06.7	1.0 03	07.1	21 36.7	1.0 03	07.1	22 36.6	1.0 03	07.0	2
3	15 05.3	1.0 02	06.4	15 35.3	1.0 02	06.4	16 05.2	1.0 02	06.4	17 05.2	1.0 02	06.3	19 05.2	1.0 02	06.3	21 05.1	1.0 02	06.2	21 35.1	1.0 02	06.2	22 35.1	1.0 02	06.2	3
4	15 03.9	1.0 02	05.5	15 33.9	1.0 02	05.5	16 03.9	1.0 02	05.5	17 03.8	1.0 02	05.4	19 03.8	1.0 02	05.4	21 03.8	1.0 02	05.3	21 33.8	1.0 02	05.3	22 33.7	1.0 02	05.3	4
175	15 02.7	1.0 02	04.6	15 32.7	1.0 02	04.6	16 02.7	1.0 02	04.5	17 02.7	1.0 02	04.5	19 02.6	1.0 02	04.5	21 02.6	1.0 02	04.4	21 32.6	1.0 02	04.4	22 32.6	1.0 02	04.4	175
6	15 01.7	1.0 01	03.7	15 31.7	1.0 01	03.6	16 01.7	1.0 01	03.6	17 01.7	1.0 01	03.6	19 01.7	1.0 01	03.6	21 01.7	1.0 01	03.6	21 31.7	1.0 01	03.5	22 31.7	1.0 01	03.5	6
7	15 01.0	1.0 01	02.7	15 31.0	1.0 01	02.7	16 01.0	1.0 01	02.7	17 01.0	1.0 01	02.7	19 01.0	1.0 01	02.7	21 00.9	1.0 01	02.7	21 30.9	1.0 01	02.7	22 30.9	1.0 01	02.6	7
8	15 00.4	1.0 01	01.8	15 30.4	1.0 01	01.8	16 00.4	1.0 01	01.8	17 00.4	1.0 01	01.8	19 00.4	1.0 01	01.8	21 00.4	1.0 01	01.8	21 30.4	1.0 01	01.8	22 30.4	1.0 01	01.8	8
9	15 00.1	1.0 00	00.9	15 30.1	1.0 00	00.9	16 00.1	1.0 00	00.9	17 00.1	1.0 00	00.9	19 00.1	1.0 00	00.9	21 00.1	1.0 00	00.9	21 30.1	1.0 00	00.9	22 30.1	1.0 00	00.9	9
180	15 00.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 00.0	1.0 00	00.0	17 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	21 00.0	1.0 00	00.0	21 30.0	1.0 00	00.0	22 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 77°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	49 00.0	1.0 00	180.0	50 00.0	1.0 00	180.0	51 30.0	1.0 00	180.0	53 00.0	1.0 00	180.0	55 00.0	1.0 00	180.0	55 30.0	1.0 00	180.0	56 00.0	1.0 00	180.0	58 00.0	1.0 00	180.0
1	48 59.9	1.0 01	178.8	49 59.9	1.0 01	178.8	51 29.9	1.0 01	178.7	52 59.9	1.0 01	178.7	54 59.8	1.0 01	178.7	55 29.8	1.0 01	178.7	55 59.8	1.0 01	178.7	57 59.8	1.0 01	178.7
2	48 59.4	1.0 01	177.5	49 59.4	1.0 01	177.5	51 29.4	1.0 01	177.5	52 59.4	1.0 01	177.5	54 59.4	1.0 01	177.4	55 29.4	1.0 01	177.4	55 59.4	1.0 01	177.4	57 59.4	1.0 01	177.3
3	48 58.7	1.0 02	176.3	49 58.7	1.0 02	176.3	51 28.7	1.0 02	176.2	52 58.7	1.0 02	176.2	54 58.6	1.0 02	176.1	55 28.6	1.0 02	176.1	55 58.6	1.0 02	176.1	57 58.6	1.0 02	176.0
4	48 57.7	1.0 02	175.1	49 57.7	1.0 02	175.0	51 27.6	1.0 02	175.0	52 57.6	1.0 02	174.9	54 57.6	1.0 02	174.8	55 27.6	1.0 02	174.8	55 57.5	1.0 02	174.8	57 57.5	1.0 02	174.7
05	48 56.4	1.0 03	173.8	49 56.3	1.0 03	173.8	51 26.3	1.0 03	173.7	52 56.3	1.0 03	173.6	54 56.2	1.0 03	173.5	55 26.2	1.0 03	173.5	55 56.2	1.0 03	173.5	57 56.1	1.0 03	173.3
6	48 54.8	1.0 03	172.6	49 54.7	1.0 03	172.6	51 24.7	1.0 03	172.5	52 54.6	1.0 03	172.4	54 54.5	1.0 03	172.2	55 24.5	1.0 03	172.2	55 54.5	1.0 03	172.2	57 54.4	1.0 03	172.0
7	48 52.9	1.0 04	171.4	49 52.8	1.0 04	171.3	51 22.8	1.0 04	171.2	52 52.7	1.0 04	171.1	54 52.5	1.0 04	170.9	55 22.5	1.0 04	170.9	55 52.5	1.0 04	170.9	57 52.3	1.0 04	170.7
8	48 50.7	1.0 04	170.1	49 50.7	1.0 04	170.1	51 20.6	1.0 04	170.0	52 50.4	1.0 04	169.8	54 50.3	1.0 04	169.7	55 20.2	1.0 04	169.6	55 50.2	1.0 04	169.6	57 50.0	1.0 04	169.3
9	48 48.3	1.0 05	168.9	49 48.2	1.0 05	168.8	51 18.1	1.0 05	168.7	52 47.9	1.0 05	168.6	54 47.7	1.0 05	168.4	55 17.6	1.0 05	168.3	55 47.6	1.0 05	168.3	57 47.3	1.0 05	168.0
10	48 45.5	1.0 05	167.7	49 45.4	1.0 05	167.6	51 15.3	1.0 05	167.5	52 45.1	1.0 05	167.3	54 44.8	1.0 05	167.1	55 14.8	1.0 05	167.0	55 44.7	1.0 05	167.0	57 44.4	1.0 05	166.7
1	48 42.5	1.0 06	166.5	49 42.4	1.0 06	166.4	51 12.2	1.0 06	166.2	52 42.0	1.0 06	166.0	54 41.7	1.0 06	165.8	55 11.6	1.0 06	165.7	55 41.5	1.0 06	165.7	57 41.1	1.0 06	165.4
2	48 39.2	1.0 06	165.2	49 39.1	1.0 06	165.1	51 08.8	1.0 06	165.0	52 38.6	1.0 06	164.8	54 38.2	1.0 06	164.5	55 08.1	1.0 06	164.4	55 38.0	1.0 06	164.4	57 37.6	1.0 06	164.1
3	48 35.7	1.0 06	164.0	49 35.5	1.0 06	163.9	51 05.2	1.0 07	163.7	52 34.9	1.0 07	163.5	54 34.5	1.0 07	163.2	55 04.3	1.0 07	163.2	55 34.2	1.0 07	163.1	57 33.7	1.0 07	162.7
4	48 31.8	1.0 07	162.8	49 31.6	1.0 07	162.7	51 01.3	1.0 07	162.5	52 30.9	1.0 07	162.3	54 30.4	1.0 07	162.0	55 00.3	1.0 07	161.9	55 30.1	1.0 07	161.8	57 29.6	99 07	161.4
15	48 27.7	1.0 07	161.6	49 27.4	1.0 07	161.5	50 57.1	1.0 07	161.2	52 26.7	1.0 08	161.0	54 26.1	99 08	160.7	54 55.9	99 08	160.6	55 25.8	99 08	160.5	57 25.1	99 08	160.1
6	48 23.3	1.0 08	160.4	49 23.0	1.0 08	160.2	50 52.6	1.0 08	160.0	52 22.1	99 08	159.8	54 21.5	99 08	159.4	54 51.3	99 08	159.3	55 21.1	99 08	159.2	57 20.4	99 08	158.8
7	48 18.6	1.0 08	159.2	49 18.3	99 08	159.0	50 47.8	99 08	158.8	52 17.3	99 08	158.5	54 16.6	99 09	158.2	54 46.4	99 09	158.1	55 16.2	99 09	158.0	57 15.4	99 09	157.5
8	48 13.7	99 09	158.0	49 13.3	99 09	157.8	50 42.8	99 09	157.5	52 12.3	99 09	157.3	54 11.4	99 09	156.9	54 41.2	99 09	156.8	55 11.0	99 09	156.7	57 10.1	99 09	156.2
9	48 08.5	99 09	156.8	49 08.1	99 09	156.6	50 37.5	99 09	156.3	52 06.9	99 09	156.0	54 06.0	99 10	155.6	54 35.8	99 10	155.5	55 05.5	99 10	155.4	57 04.5	99 10	154.9
20	48 03.0	99 10	155.5	49 02.6	99 10	155.4	50 32.0	99 10	155.1	52 01.3	99 10	154.8	54 00.3	99 10	154.4	54 30.1	99 10	154.3	54 59.8	99 10	154.1	56 58.6	99 10	153.7
1	47 57.3	99 10	154.3	48 56.9	99 10	154.2	50 26.2	99 10	153.9	51 55.4	99 10	153.6	53 54.3	99 10	153.1	54 24.1	99 10	153.0	54 53.8	99 10	152.9	56 52.5	99 11	152.4
2	47 51.3	99 10	153.2	48 50.9	99 10	153.0	50 20.1	99 11	152.7	51 49.3	99 11	152.3	53 48.1	99 11	151.9	54 17.8	99 11	151.8	54 47.5	99 11	151.6	56 46.1	99 11	151.1
3	47 45.1	99 11	152.0	48 44.6	99 11	151.8	50 13.8	99 11	151.4	51 42.9	99 11	151.1	53 41.6	99 11	150.6	54 11.3	99 11	150.5	54 40.9	99 11	150.4	56 39.5	99 12	149.8
4	47 38.7	99 11	150.8	48 38.1	99 11	150.6	50 07.2	99 11	150.2	51 36.2	99 12	149.9	53 34.9	99 12	149.4	54 04.5	99 12	149.3	54 34.1	99 12	149.1	56 32.6	99 12	148.6
25	47 31.9	99 12	149.6	48 31.3	99 12	149.4	50 00.4	99 12	149.0	51 29.4	99 12	148.7	53 27.9	99 12	148.2	53 57.5	99 12	148.0	54 27.1	99 12	147.9	56 25.4	99 12	147.3
6	47 25.0	99 12	148.4	48 24.3	99 12	148.2	49 53.3	99 12	147.8	51 22.2	99 12	147.5	53 20.6	99 12	146.9	53 50.2	99 13	146.8	54 19.8	99 13	146.6	56 18.0	98 13	146.0
7	47 17.8	99 12	147.2	48 17.1	99 12	147.0	49 46.0	99 13	146.6	51 14.8	99 13	146.2	53 13.1	99 13	145.7	53 42.7	99 13	145.6	54 12.2	98 13	145.4	56 10.3	98 13	144.8
8	47 10.4	99 13	146.0	48 09.6	99 13	145.8	49 38.5	99 13	145.4	51 07.2	99 13	145.0	53 05.4	98 13	144.5	53 35.0	98 13	144.3	54 04.5	98 13	144.2	56 02.4	98 14	143.5
9	47 02.7	99 13	144.9	48 01.9	99 13	144.6	49 30.7	99 13	144.2	50 59.4	98 13	143.8	52 57.5	98 14	143.3	53 27.0	98 14	143.1	53 56.5	98 14	143.0	55 54.3	98 14	142.3
30	46 54.8	99 14	143.7	47 54.0	99 14	143.4	49 22.7	98 14	143.1	50 51.3	98 14	142.6	52 49.3	98 14	142.1	53 18.8	98 14	141.9	53 48.2	98 14	141.7	55 45.9	98 14	141.1
1	46 46.7	99 14	142.5	47 45.8	99 14	142.3	49 14.5	98 14	141.9	50 43.0	98 14	141.5	52 40.9	98 14	140.9	53 10.3	98 14	140.7	53 39.7	98 14	140.5	55 37.3	98 15	139.8
2	46 38.4	98 14	141.4	47 37.5	98 14	141.1	49 06.0	98 14	140.7	50 34.5	98 15	140.3	52 32.2	98 15	139.7	53 01.7	98 15	139.5	53 31.1	98 15	139.3	55 28.5	98 15	138.6
3	46 29.9	98 15	140.2	47 28.9	98 15	139.9	48 57.4	98 15	139.5	50 25.7	98 15	139.1	52 23.4	98 15	138.5	52 52.8	98 15	138.3	53 22.1	98 15	138.1	55 19.5	98 15	137.4
4	46 21.1	98 15	139.0	47 20.1	98 15	138.8	48 48.5	98 15	138.4	50 16.8	98 15	137.9	52 14.3	98 15	137.3	52 43.7	98 16	137.1	53 13.0	98 16	136.9	55 10.2	98 16	136.2
35	46 12.2	98 15	137.9	47 11.1	98 15	137.6	48 39.4	98 15	137.2	50 07.6	98 16	136.7	52 05.1	98 16	136.1	52 34.4	98 16	135.9	53 03.7	98 16	135.7	55 00.8	97 16	135.0
6	46 03.0	98 16	136.8	47 01.9	98 16	136.5	48 30.2	98 16	136.0	49 58.3	98 16	135.6	51 55.6	98 16	134.9	52 24.9	98 16	134.7	52 54.2	98 16	134.5	54 51.1	97 16	133.8
7	45 53.7	98 16	135.6	46 52.5	98 16	135.3	48 20.7	98 16	134.9	49 48.7	98 16	134.4	51 46.0	98 16	133.7	52 15.2	98 16	133.5	52 44.5	97 16	133.4	54 41.3	97 17	132.6
8	45 44.2	98 16	134.5	46 42.9	98 16	134.2	48 11.0	98 16	133.7	49 39.0	98 17	133.2	51 36.1	97 17	132.6	52 05.3	97 17	132.4	52 34.6	97 17	132.2	54 31.3	97 17	131.4
9	45 34.4	98 17	133.3	46 33.2	98 17	133.0	48 01.2	98 17	132.6	49 29.1	98 17	132.1	51 26.1	97 17	131.4	51 55.3	97 17	131.2	52 24.5	97 17	131.0	54 21.0	97 17	130.2
40	45 24.5	98 17	132.2	46 23.2	98 17	131.9	47 51.2	98 17	131.4	49 19.0	98 17	130.9	51 15.9	97 17	130.2	51 45.0	97 17	130.0	52 14.2	97 17	129.9	54 10.6	97 18	129.1
1	45 14.4	98 17	131.1	46 13.1	98 17	130.8	47 40.9	98 17	130.3	49 08.7	97 17	129.8	51 05.5	97 18	129.1	51 34.6	97 18	128.9	52 03.8	97 18	128.7	54 00.1	97 18	127.9
2	45 04.2	98 17	130.0	46 02.8	98 17	129.7	47 30.6	97 18	129.2	48 58.2	97 18	128.7	50 54.9	97 18	127.9	51 24.0	97 18	127.7	51 53.1	97 18	127.5	53 49.3	97 18	126.7
3	44 53.7	98 18	128.8	45 52.3	98 18	128.5	47 20.0	97 18	128.0	48 47.6	97 18	127.5	50 44.2	97 18	126.8	51 13.3	97 18	126.6	51 42.4	97 18	126.4	53 38.4	97 18	125.6
4	44 43.1	98 18	127.7	45 41.7	97 18	127.4	47 09.3	97 18	126.9	48 36.8	97 18	126.4	50 33.3	97 18	125.7	51 02.4	97 18	125.5	51 31.4	97 18	125.3	53 27.4	96 19	124.4
45	44 32.4	97 18	126.6	45 30.9	97 18	126.3	46 58.4	97 18	125.8	48 25.9	97 18	125.3	50 22.3	97 19	124.5	50 51.3	97 19	124.3	51 20.3	97 19	124.1	53 16.2	96 19	123.3
6	44 21.5	97 18	125.5	45 19.9	97 18	125.2	46 47.4	97 19	124.7	48 14.8	97 19	124.2	50 11.1	97 19	123.4	50 40.1	97 19	123.2	51 09.1	97 19	123.0	53 04.8	96 19	122.1
7	44 10.4	97 19	124.4	45 08.8	97 19	124.1	46 36.2	97 19	123.6	48 03.6	97 19	123.0	49 59.7	97 19	122.3	50 28.7	97 19	122.1	50 57.7	97 19	121.9	52 53.3	96 19	121.0
8	43 59.2	97 19	123.3	44 57.5	97 10	123.0	46 24.9	97 19	122.5	47 52.2	97 19	121.9	49 48.2	97 19	121.2	50 17.2	97 19	121.0	50 46.1	96 19	120.8	52 41.7	96 20	119.9
9	43 47.9	97 19	122.2	44 46.2	97 19	121.9	46 13.5	97 19	121.4	47 40.6	97 19	120.8	49 36.6	97 20	120.1	50 05.6	96 20	119.9	50 34.5	96 20	119.6	52 29.9	96 20	118.8
50	43 36.4	97 19	121.1	44 34.6	97 19	120.8	46 01.9	97 20	120.3	47 29.0	97 20	119.7	49 24.9	96 20	119.0	49 53.8	96 20	118.7	50 22.7	96 20	118.5	52 18.0	96 20	117.7
1	43 24.8	97 20	120.1	44 23.0	97 20	119.7	45 50.2	97 20	119.2	47 17.2	97 20	118.6	49 13.0	96 20	117.9	49 41.9	96 20	117.6	50 10.8	96 20	117.4	52 06.0	96 20	116.5
2	43 13.0	97 20	119.0	44 11.2	97 20	118.6	45 38.3	97 20	118.1	47 05.3	97 20	117.6	49 01.0	96 20	116.8	49 29.9	96 20	116.6	49 58.7	96 20	116.3	51 53.9	96 20	115.4
3	43 01.2	97 20	117.9	43 59.3	97 20	117.6	45 26.4	97 20	117.0	46 53.3	96 20	116.5	48 48.9	96 20	115.7	49 17.7	96 20	115.5	49 46.6	96 20	115.2	51 41.6	96 21	114.4
4	42 49.2	97 20	116.8	43 47.3	97 20	116.5	45 14.3	97 20	116.0	46 41.1	96 20	115.4	48 36.7	96 21	114.6	49 05.5	96 21	114.4	49 34.3	96 21	114.2	51 29.3	96 21	113.3
55	42 37.1	97 20	115.8	43 35.1	97 20	115.4	45 02.1	97 20	114.9	46 28.9	96 21	114.3	48 24.4	96 21	113.5	48 53.2	96 21	113.3	49 21.9	96 21	113.1	51 16.8	96 21	112.2
6	42 24.9	97 21	114.7	43 22.9	97 21	114.4	44 49.8	96 21	113.8	46 16.5	96 21	113.2	48 11.9	96 21	112.4	48 40.7	96 21	112.2	49 09.5	96 21	112.0	51 04.3	95 21	111.1
7	42 12.5	97 21	113.6	43 10.5	97 21	113.3	44 37.4	96 21	112.8	46 04.1	96 21	112.2	47 59.4	96 21	111.4	48 28.2	96 21	111.2	48 56.9	96 21	110.9	50 51.7	95 21	110.0
8	42 00.1	97 21	112.6	42 58.1	97 21	112.2	44 24.9	96 21	111.7	45 51.6	96 21	111.1	47 46.8	96 21	110.3	48 15.5	96 21	110.1	48 44.3	96 21	109.9	50 38.9	95 21	109.0
9	41 47.6	97 21	111.5	42 45.6	96 21	111.2	44 12.3	96 21	110.6	45 38.9	96 21	110.1	47 34.1	96 21	109.2	48 02.8	96 21	109.0	48 31.5	96 21	108.8	50 26.1	95 21	107.9
60	41 35.0	97 21	110.5	42 32.9	96 21	110.1	43 59.6	96 21	109.6	45 26.2	96 21	109.0	47 21.3	96 21	108.2	47 50.0	96 21	108.0	48 18.7	96 21	107.8	50 13.2	95 22	106.8
1	41 22.3	97 21	109.5	42 20.2	96 21	109.1	43 46.9	96 21	108.5	45 13.4	96 21	108.0	47 08.4	96 22	107.1	47 37.2	96 22	106.9	48 05.8	96 22	106.7	50 00.3	95 22	105.8
2	41 09.6	96 21	108.4	42 07.4	96 21	108.1	43 34.1	96 22	107.5	45 00.5	96 22	106.9	46 55.5	96 22	106.1	47 24.2	96 22	105.9	47 52.9	96 22	105.7	49 47.3	95 22	104.8
3	40 56.7	96 22	107.4	41 54.6	96 22	107.0	43 21.1	96 22	106.5	44 47.6	96 22	105.9	46 42.5	96 22	105.1	47 11.2	96 22	104.8	47 39.8	95 22	104.6	49 34.2	95 22	103.7
4	40 43.8	96 22	106.4	41 41.6	96 22	106.0	43 08.2	96 22	105.4	44 34.6	96 22	104.9	46 29.4	96 22	104.0	46 58.1	96 22	103.8	47 26.8	95 22	103.6	49 21.1	95 22	102.7
65	40 30.8	96 22	105.3	41 28.6	96 22	105.0	42 55.1	96 22	104.4	44 21.5	96 22	103.8	46 16.3	96 22	103.0	46 45.0	95 22	102.8	47 13.6	95 22	102.6	49 07.9	95 22	101.6
6	40 17.8	96 22	104.3	41 15.5	96 22	103.9	42 42.0	96 22	103.4	44 08.3	96 22	102.8	46 03.1	96 22	102.0	46 31.8	95 22	101.8	47 00.4	95 22	101.5	48 54.6	95 22	100.6
7	40 04.7	96 22	103.3	41 02.4	96 22	102.9	42 28.9	96 22	102.4	43 55.2	96 22	101.8	45 49.9	95 22	101.0	46 18.6	95 22	100.7	46 47.2	95 22	100.5	48 41.3	95 22	99.6
8	39 51.5	96 22	102.3	40 49.2	96 22	101.9	42 15.7	96 22	101.3	43 41.9	96 22	100.8	45 36.6	95 22	99.9	46 05.3	95 22	99.7	46 33.9	95 22	99.5	48 28.0	95 22	98.6
9	39 38.3	96 22	101.3	40 36.0	96 22	100.9	42 02.4	96 22	100.3	43 28.6	96 22	99.8	45 23.3	95 22	98.9	45 51.9	95 22	98.7	46 20.5	95 22	98.5	48 14.6	95 22	97.6
70	39 25.0	96 22	100.2	40 22.7	96 22	99.9	41 49.1	96 22	99.3	43 15.3	96 22	98.7	45 10.0	95 22	97.9	45 38.6	95 22	97.7	46 07.2	95 22	97.5	48 01.2	95 22	96.6
1	39 11.7	96 22	99.2	40 09.4	96 22	98.9	41 35.8	96 22	98.3	43 02.0	96 22	97.7	44 56.6	95 22	96.9	45 25.2	95 22	96.7	45 53.8	95 22	96.5	47 47.8	95 22	95.6
2	38 58.4	96 22	98.2	39 56.0	96 22	97.9	41 22.4	96 22	97.3	42 48.6	96 22	96.7	44 43.2	95 22	95.9	45 11.8	95 22	95.7	45 40.4	95 22	95.5	47 34.4	95 22	94.6
3	38 45.0	96 22	97.2	39 42.7	96 22	96.9	41 09.0	96 22	96.3	42 35.2	96 22	95.7	44 29.7	95 22	94.9	44 58.3	95 22	94.7	45 26.9	95 22	94.5	47 20.9	95 22	93.6
4	38 31.6	96 22	96.2	39 29.2	96 22	95.9	40 55.6	96 22	95.3	42 21.7	96 22	94.7	44 16.3	95 22	93.9	44 44.9	95 22	93.7	45 13.4	95 22	93.5	47 07.4	95 22	92.6
75	38 18.2	96 22	95.2	39 15.8	96 22	94.9	40 42.1	96 22	94.3	42 08.3	96 22	93.8	44 02.8	95 22	92.9	44 31.4	95 22	92.7	45 00.0	95 22	92.5	46 54.0	95 22	91.6
6	38 04.7	96 22	94.3	39 02.4	96 22	93.9	40 28.7	96 22	93.3	41 54.8	96 22	92.8	43 49.3	95 22	92.0	44 17.9	95 22	91.7	44 46.5	95 22	91.5	46 40.5	95 22	90.6
7	37 51.3	96 22	93.3	38 48.9	96 22	92.9	40 15.2	96 22	92.4	41 41.3	96 22	91.8	43 35.8	95 22	91.0	44 04.4	95 22	90.8	44 33.0	95 22	90.6	46 27.0	95 22	89.7
8	37 37.8	96 22	92.3	38 35.4	96 22	91.9	40 01.7	96 22	91.4	41 27.8	96 22	90.8	43 22.3	95 22	90.0	43 50.9	95 22	89.8	44 19.5	95 22	89.6	46 13.5	95 22	88.7
9	37 24.3	96 22	91.3	38 21.9	96 22	91.0	39 48.2	96 22	90.4	41 14.3	96 22	89.8	43 08.8	95 22	89.0	43 37.4	95 22	88.8	44 06.0	95 22	88.6	46 00.0	95 22	87.7
80	37 10.8	96 22	90.3	38 08.4	96 22	90.0	39 34.7	96 22	89.4	41 00.8	96 22	88.9	42 55.4	95 22	88.1	43 23.9	95 22	87.9	43 52.5	95 22	87.6	45 46.5	95 22	86.8
1	36 57.3	96 22	89.4	37 54.9	96 22	89.0	39 21.2	96 22	88.5	40 47.3	96 22	87.9	42 41.9	95 22	87.1	43 10.5	95 22	86.9	43 39.0	95 22	86.7	45 33.0	95 22	85.8
2	36 43.8	96 22	88.4	37 41.4	96 22	88.0	39 07.7	96 22	87.5	40 33.8	96 22	86.9	42 28.4	95 22	86.1	42 57.0	95 22	85.9	43 25.6	95 22	85.7	45 19.6	95 22	84.8
3	36 30.3	96 22	87.4	37 27.9	96 22	87.1	38 54.2	96 22	86.5	40 20.4	96 22	86.0	42 14.9	95 22	85.2	42 43.5	95 22	85.0	43 12.1	95 22	84.8	45 06.1	95 22	83.9
4	36 16.9	96 22	86.5	37 14.5	96 22	86.1	38 40.8	96 22	85.6	40 06.9	96 22	85.0	42 01.5	95 22	84.2	42 30.1	95 22	84.0	42 58.7	95 22	83.8	44 52.7	95 22	82.9
85	36 03.4	96 22	85.5	37 01.0	96 22	85.1	38 27.3	96 22	84.6	39 53.5	96 22	84.0	41 48.1	95 22	83.3	42 16.7	95 22	83.1	42 45.3	95 22	82.9	44 39.4	95 22	82.0
6	35 49.9	96 22	84.5	36 47.6	96 22	84.2	38 13.9	96 22	83.7	39 40.1	96 22	83.1	41 34.7	95 22	82.3	42 03.3	95 22	82.1	42 31.9	95 22	81.9	44 26.0	95 22	81.1
7	35 36.5	96 22	83.6	36 34.2	96 22	83.2	38 00.5	96 22	82.7	39 26.7	96 22	82.1	41 21.3	95 22	81.4	41 49.9	95 22	81.2	42 18.5	95 22	81.0	44 12.7	95 22	80.1
8	35 23.1	96 22	82.6	36 20.8	96 22	82.3	37 47.1	96 22	81.7	39 13.3	96 22	81.2	41 08.0	95 22	80.4	41 36.6	95 22	80.2	42 05.2	95 22	80.0	43 59.4	95 22	79.2
9	35 09.7	96 22	81.7	36 07.4	96 22	81.3	37 33.8	96 22	80.8	39 00.0	96 22	80.3	40 54.7	95 22	79.5	41 23.3	95 22	79.3	41 52.0	95 22	79.1	43 46.2	95 22	78.3
90	34 56.4	96 22	80.7	35 54.1	96 22	80.4	37 20.5	96 22	79.9	38 46.7	96 22	79.3	40 41.5	95 22	78.6	41 10.1	95 22	78.4	41 38.7	95 22	78.2	43 33.0	95 22	77.3

Lat. 77°

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
91	34 43.1	96 22	79.8	35 40.8	96 22	79.4	37 07.2	96 22	78.9	38 33.5	96 22	78.4
2	34 29.8	96 22	78.8	35 27.5	96 22	78.5	36 54.0	96 22	78.0	38 20.3	96 22	77.4
3	34 16.6	96 22	77.9	35 14.3	96 22	77.5	36 40.8	96 22	77.0	38 07.1	96 22	76.5
4	34 03.5	96 22	76.9	35 01.2	96 22	76.6	36 27.7	96 22	76.1	37 54.0	96 22	75.6
95	33 50.3	96 22	76.0	34 48.1	96 22	75.7	36 14.6	96 22	75.2	37 41.0	96 22	74.6
6	33 37.3	96 22	75.1	34 35.0	96 22	74.7	36 01.6	96 22	74.2	37 28.0	96 22	73.7
7	33 24.2	96 22	74.1	34 22.0	96 22	73.8	35 48.6	96 21	73.3	37 15.1	96 21	72.8
8	33 11.3	96 21	73.2	34 09.1	96 21	72.9	35 35.7	96 21	72.4	37 02.2	96 21	71.9
9	32 58.4	96 21	72.3	33 56.2	96 21	71.9	35 22.9	96 21	71.5	36 49.4	96 21	70.9
100	32 45.6	96 21	71.3	33 43.4	96 21	71.0	35 10.1	96 21	70.5	36 36.7	96 21	70.0
1	32 32.8	97 21	70.4	33 30.7	96 21	70.1	34 57.4	96 21	69.6	36 24.1	96 21	69.1
2	32 20.2	97 21	69.5	33 18.1	96 21	69.2	34 44.8	96 21	68.7	36 11.5	96 21	68.2
3	32 07.6	97 21	68.6	33 05.5	97 21	68.3	34 32.3	96 21	67.8	35 59.0	96 21	67.3
4	31 55.0	97 21	67.6	32 53.0	97 21	67.3	34 19.8	96 21	66.9	35 46.6	96 21	66.4
105	31 42.6	97 21	66.7	32 40.6	97 21	66.4	34 07.5	96 20	65.9	35 34.3	96 20	65.5
6	31 30.2	97 20	65.8	32 28.3	97 20	65.5	33 55.2	97 20	65.0	35 22.0	96 20	64.6
7	31 18.0	97 20	64.9	32 16.0	97 20	64.6	33 43.0	97 20	64.1	35 09.9	96 20	63.7
8	31 05.8	97 20	64.0	32 03.9	97 20	63.7	33 30.9	97 20	63.2	34 57.8	97 20	62.7
9	30 53.7	97 20	63.1	31 51.8	97 20	62.8	33 18.9	97 20	62.3	34 45.9	97 20	61.8
110	30 41.7	97 20	62.1	31 39.9	97 20	61.9	33 07.0	97 20	61.4	34 34.0	97 20	60.9
1	30 29.9	97 20	61.2	31 28.0	97 20	60.9	32 55.2	97 19	60.5	34 22.3	97 19	60.0
2	30 18.1	97 20	60.3	31 16.3	97 19	60.0	32 43.5	97 19	59.6	34 10.7	97 19	59.2
3	30 06.4	97 19	59.4	31 04.6	97 19	59.1	32 31.9	97 19	58.7	33 59.1	97 19	58.3
4	29 54.8	97 19	58.5	30 53.1	97 19	58.2	32 20.4	97 19	57.8	33 47.7	97 19	57.4
115	29 43.4	97 19	57.6	30 41.7	97 19	57.3	32 09.1	97 19	56.9	33 36.4	97 19	56.5
6	29 32.0	97 19	56.7	30 30.4	97 19	56.4	31 57.8	97 19	56.0	33 25.2	97 18	55.6
7	29 20.8	97 18	55.8	30 19.2	97 18	55.5	31 46.7	97 18	55.1	33 14.1	97 18	54.7
8	29 09.7	97 18	54.9	30 08.1	97 18	54.6	31 35.7	97 18	54.2	33 03.2	97 18	53.8
9	28 58.7	97 18	54.0	29 57.2	97 18	53.7	31 24.8	97 18	53.3	32 52.3	97 18	52.9
120	28 47.9	97 18	53.1	29 46.4	97 18	52.8	31 14.0	97 18	52.4	32 41.6	97 18	52.0
1	28 37.2	98 18	52.2	29 35.7	98 18	51.9	31 03.4	97 18	51.5	32 31.1	97 17	51.1
2	28 26.6	98 17	51.3	29 25.1	98 17	51.0	30 52.9	97 17	50.7	32 20.6	97 17	50.3
3	28 16.1	98 17	50.4	29 14.7	98 17	50.1	30 42.5	98 17	49.8	32 10.3	97 17	49.4
4	28 05.8	98 17	49.5	29 04.4	98 17	49.2	30 32.3	98 17	48.9	32 00.1	98 17	48.5
125	27 55.6	98 17	48.6	28 54.2	98 17	48.4	30 22.2	98 17	48.0	31 50.1	98 16	47.6
6	27 45.5	98 17	47.7	28 44.2	98 16	47.5	30 12.2	98 16	47.1	31 40.2	98 16	46.7
7	27 35.6	98 16	46.8	28 34.4	98 16	46.6	30 02.4	98 16	46.2	31 30.4	98 16	45.9
8	27 25.8	98 16	45.9	28 24.6	98 16	45.7	29 52.8	98 16	45.3	31 20.8	98 16	45.0
9	27 16.2	98 16	45.0	28 15.0	98 16	44.8	29 43.2	98 16	44.5	31 11.4	98 16	44.1
130	27 06.8	98 16	44.1	28 05.6	98 15	43.9	29 33.8	98 15	43.6	31 02.0	98 15	43.2
1	26 57.4	98 15	43.2	27 56.3	98 15	43.0	29 24.6	98 15	42.7	30 52.9	98 15	42.3
2	26 48.3	98 15	42.3	27 47.2	98 15	42.1	29 15.5	98 15	41.8	30 43.9	98 15	41.5
3	26 39.2	98 15	41.5	27 38.2	98 15	41.2	29 06.6	98 15	40.9	30 35.0	98 15	40.6
4	26 30.4	98 14	40.6	27 29.4	98 14	40.4	28 57.9	98 14	40.0	30 26.3	98 14	39.7
135	26 21.7	98 14	39.7	27 20.7	98 14	39.5	28 49.3	98 14	39.2	30 17.7	98 14	38.9
6	26 13.2	98 14	38.8	27 12.2	98 14	38.6	28 40.8	98 14	38.3	30 09.4	98 14	38.0
7	26 04.8	99 14	37.9	27 03.9	99 14	37.7	28 32.5	98 14	37.4	30 01.1	98 14	37.1
8	25 56.6	99 13	37.0	26 55.7	99 13	36.8	28 24.4	99 13	36.5	29 53.1	98 13	36.2
9	25 48.5	99 13	36.1	26 47.7	99 13	35.9	28 16.5	99 13	35.7	29 45.2	99 13	35.4
140	25 40.7	99 13	35.2	26 39.9	99 13	35.1	28 08.7	99 13	34.8	29 37.4	99 13	34.5
1	25 33.0	99 13	34.4	26 32.2	99 12	34.2	28 01.1	99 12	33.9	29 29.9	99 12	33.6
2	25 25.4	99 12	33.5	26 24.7	99 12	33.3	27 53.6	99 12	33.0	29 22.5	99 12	32.8
3	25 18.1	99 12	32.6	26 17.4	99 12	32.4	27 46.3	99 12	32.2	29 15.3	99 12	31.9
4	25 10.9	99 12	31.7	26 10.2	99 12	31.5	27 39.2	99 12	31.3	29 08.2	99 11	31.0
145	25 03.9	99 11	30.8	26 03.3	99 11	30.7	27 32.3	99 11	30.4	29 01.4	99 11	30.2
6	24 57.1	99 11	29.9	25 56.5	99 11	29.8	27 25.6	99 11	29.5	28 54.7	99 11	29.3
7	24 50.4	99 11	29.0	25 49.9	99 11	28.9	27 19.0	99 11	28.7	28 48.1	99 11	28.4
8	24 44.0	99 10	28.2	25 43.4	99 10	28.0	27 12.6	99 10	27.8	28 41.8	99 10	27.6
9	24 37.7	99 10	27.3	25 37.2	99 10	27.1	27 06.4	99 10	26.9	28 35.7	99 10	26.7
150	24 31.6	99 10	26.4	25 31.1	99 10	26.3	27 00.4	99 10	26.1	28 29.7	99 10	25.8
1	24 25.7	99 10	25.5	25 25.2	99 10	25.4	26 54.6	99 10	25.2	28 23.9	99 09	25.0
2	24 20.0	99 09	24.6	25 19.6	99 09	24.5	26 48.9	99 09	24.3	28 18.3	99 09	24.1
3	24 14.4	99 09	23.8	25 14.0	99 09	23.6	26 43.5	99 09	23.4	28 12.9	99 09	23.2
4	24 09.1	99 09	22.9	25 08.7	99 09	22.8	26 38.2	99 08	22.6	28 07.6	99 08	22.4
155	24 03.9	99 08	22.0	25 03.6	99 08	21.9	26 33.1	99 08	21.7	28 02.6	99 08	21.5
6	23 59.0	99 08	21.1	24 58.7	99 08	21.0	26 28.2	99 08	20.8	27 57.7	99 08	20.7
7	23 54.2	1.0 08	20.2	24 53.9	1.0 08	20.1	26 23.5	1.0 08	20.0	27 53.1	1.0 07	19.8
8	23 49.6	1.0 07	19.3	24 49.4	1.0 07	19.2	26 19.0	1.0 07	19.1	27 48.6	1.0 07	18.9
9	23 45.3	1.0 07	18.5	24 45.0	1.0 07	18.4	26 14.7	1.0 07	18.2	27 44.3	1.0 07	18.1
160	23 41.1	1.0 07	17.6	24 40.9	1.0 07	17.5	26 10.6	1.0 07	17.4	27 40.2	1.0 06	17.2
1	23 37.1	1.0 06	16.7	24 36.9	1.0 06	16.6	26 06.6	1.0 06	16.5	27 36.3	1.0 06	16.3
2	23 33.3	1.0 06	15.8	24 33.2	1.0 06	15.7	26 02.9	1.0 06	15.6	27 32.6	1.0 06	15.5
3	23 29.8	1.0 06	14.9	24 29.6	1.0 06	14.9	25 59.4	1.0 06	14.7	27 29.1	1.0 06	14.6
4	23 26.4	1.0 05	14.1	24 26.2	1.0 05	14.0	25 56.0	1.0 05	13.9	27 25.8	1.0 05	13.8
165	23 23.2	1.0 05	13.2	24 23.1	1.0 05	13.1	25 52.9	1.0 05	13.0	27 22.7	1.0 05	12.9
6	23 20.2	1.0 05	12.3	24 20.1	1.0 05	12.2	25 49.9	1.0 05	12.1	27 19.8	1.0 05	12.0
7	23 17.4	1.0 04	11.4	24 17.3	1.0 04	11.4	25 47.2	1.0 04	11.3	27 17.1	1.0 04	11.2
8	23 14.9	1.0 04	10.5	24 14.8	1.0 04	10.5	25 44.7	1.0 04	10.4	27 14.5	1.0 04	10.3
9	23 12.5	1.0 04	09.7	24 12.4	1.0 04	09.6	25 42.3	1.0 04	09.5	27 12.2	1.0 04	09.5
170	23 10.3	1.0 03	08.8	24 10.3	1.0 03	08.7	25 40.2	1.0 03	08.7	27 10.1	1.0 03	08.6
1	23 08.4	1.0 03	07.9	24 08.3	1.0 03	07.9	25 38.3	1.0 03	07.8	27 08.2	1.0 03	07.7
2	23 06.6	1.0 03	07.0	24 06.6	1.0 03	07.0	25 36.5	1.0 03	06.9	27 06.5	1.0 03	06.9
3	23 05.1	1.0 02	06.2	24 05.0	1.0 02	06.1	25 35.0	1.0 02	06.1	27 05.0	1.0 02	06.0
4	23 03.7	1.0 02	05.3	24 03.7	1.0 02	05.2	25 33.7	1.0 02	05.2	27 03.6	1.0 02	05.2
175	23 02.6	1.0 02	04.4	24 02.6	1.0 02	04.4	25 32.6	1.0 02	04.3	27 02.5	1.0 02	04.3
6	23 01.7	1.0 01	03.5	24 01.6	1.0 01	03.5	25 31.6	1.0 01	03.5	27 01.6	1.0 01	03.4
7	23 00.9	1.0 01	02.6	24 00.9	1.0 01	02.6	25 30.9	1.0 01	02.6	27 00.9	1.0 01	02.6
8	23 00.4	1.0 01	01.8	24 00.4	1.0 01	01.7	25 30.4	1.0 00	01.7	27 00.4	1.0 00	01.7
9	23 00.1	1.0 00	00.9	24 00.1	1.0 00	00.9	25 30.1	1.0 00	00.9	27 00.1	1.0 00	00.9
180	23 00.0	1.0 00	00.0	24 00.0	1.0 00	00.0	25 30.0	1.0 00	00.0	27 00.0	1.0 00	00.0

H.A.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	40 28.3	96 22	77.6	40 56.9	95 22	77.4	41 25.5	95 22	77.2	43 19.8	95 22	76.4	91
2	40 15.1	96 22	76.7	40 43.8	95 22	76.5	41 12.4	95 22	76.3	43 06.7	95 22	75.5	2
3	40 02.0	96 22	75.8	40 30.7	96 22	75.6	40 59.3	95 22	75.4	42 53.7	95 22	74.6	3
4	39 48.9	96 22	74.8	40 17.6	96 22	74.6	40 46.3	95 22	74.4	42 40.7	95 22	73.6	4
95	39 35.9	96 22	73.9	40 04.6	96 22	73.7	40 33.3	96 22	73.5	42 27.8	95 21	72.7	95
6	39 23.0	96 21	73.0	39 51.7	96 21	72.8	40 20.4	96 21	72.6	42 15.0	95 21	71.8	6
7	39 10.1	96 21	72.1	39 38.8	96 21	71.9	40 07.6	96 21	71.7	42 02.2	95 21	70.9	7
8	38 57.3	96 21	71.1	39 26.1	96 21	71.0	39 54.8	96 21	70.8	41 49.4	95 21	70.0	8
9	38 44.6	96 21	70.2	39 13.3	96 21	70.0	39 42.1	96 21	69.9	41 36.8	95 21	69.1	9
100	38 31.9	96 21	69.3	39 00.7	96 21	69.1	39 29.4	96 21	69.0	41 24.2	96 21	68.2	100
1	38 19.3	96 21	68.4	38 48.1	96 21	68.2	39 16.9	96 21	68.0	41 11.7	96 21	67.3	1
2	38 06.8	96 21	67.5	38 35.6	96 21	67.3	39 04.4	96 21	67.1	40 59.3	96 21	66.4	2
3	37 54.4	96 21	66.6	38 23.2	96 21	66.4	38 52.0	96 21	66.2	40 47.0	96 20	65.5	3
4	37 42.0	96 20	65.7	38 10.9	96 20	65.5	38 39.7	96 20	65.3	40 34.8	96 20	64.6	4
105	37 29.8	96 20	64.8	37 58.6	96 20	64.6	38 27.5	96 20	64.4	40 22.6	96 20	63.7	105
6	37 17.6	96 20	63.9	37 46.5	96 20	63.7	38 15.3	96 20	63.5	40 10.6	96 20	62.8	6
7	37 05.6	96 20	63.0	37 34.4	96 20	62.8	38 03.3	96 20	62.7	39 58.6	96 20	61.9	7
8	36 53.6	96 20	62.1	37 22.5	96 20	61.9	37 51.4	96 20	61.8	39 46.7	96 20	61.1	8
9	36 41.7	96 20	61.2	37 10.6	96 20	61.0	37 39.5	96 20	60.9	39 35.0	96 19	60.2	9
110	36 29.9	96 19	60.3	36 58.9	96 19	60.1	37 27.8	96 19	60.0	39 23.3	96 19	59.3	110
1	36 18.3	96 19	59.4	36 47.2	97 19	59.3	37 16.2	96 19	59.1	39 11.8	96 19	58.4	1
2	36 06.7	97 19	58.5	36 35.7	97 19	58.4	37 04.6	97 19	58.2	39 00.3	96 19	57.5	2
3	35 55.2	97 19	57.6	36 24.2	97 19	57.5	36 53.2	97 19	57.3	38 49.0	96 19	56.7	3
4	35 43.9	97 19	56.8	36 12.9	97 19	56.6	36 41.9	97 19	56.4	38 37.8	96 18	55.8	4
115	35 32.7	97 19	55.9	36 01.7	97 18	55.7	36 30.7	97 18	55.6	38 26.7	97 18	54.9	115
6	35 21.5	97 18	55.0	35 50.6	97 18	54.8	36 19.6	97 18	54.7	38 15.7	97 18	54.0	6
7	35 10.5	97 18	54.1	35 39.6	97 18	54.0	36 08.7	97 18	53.8	38 04.8	97 18	53.2	7
8	34 59.7	97 18	53.2	35 28.8	97 18	53.1	35 57.9	97 18	52.9	37 54.1	97 18	52.3	8
9	34 48.9	97 18	52.3	35 18.0	97 18	52.2	35 47.2	97 18	52.0	37 43.5	97 18	51.4	9
120	34 38.3	97 17	51.5	35 07.4	97 17	51.3	35 36.6	97 17	51.2	37 33.0	97 17	50.6	120
1	34 27.8	97 17	50.6	34 57.0	97 17	50.4	35 26.1	97 17	50.3	37 22.6	97 17	49.7	1
2	34 17.4	97 17	49.7	34 46.6	97 17	49.6	35 15.8	97 17	49.4	37 12.4	97 17	48.8	2
3	34 07.2	97 17	48.8	34 36.4	97 17	48.7	35 05.6	97 17	48.6	37 02.3	97 17	48.0	3
4	33 57.1	97 17	48.0	34 26.4	97 17	47.8	34 55.6	97 16	47.7	36 52.3	97 16	47.1	4
125	33 47.2	98 16	47.1	34 16.4	97 16	47.0	34 45.7	97 16	46.8	36 42.5	97 16	46.3	125
6	33 37.4	98 16	46.2	34 06.6	98 16	46.1	34 35.9	98 16	46.0	36 32.8	97 16	45.4	6
7	33 27.7	98 16	45.4	33 57.0	98 16	45.2	34 26.3	98 16	45.1	36 23.3	97 16	44.5	7
8	33 18.2	98 16	44.5	33 47.5	98 16	44.4	34 16.8	98 16	44.2	36 13.9	98 15	43.7	8
9	33 08.8	98 15	43.6	33 38.1	98 15	43.5	34 07.4	98 15	43.4	36 04.7	98 15	42.8	9
130	32 59.5	98 15	42.7	33 28.9	98 15	42.6	33 58.2	98 15	42.5	35 55.6	98 15	42.0	130
1	32 50.4	98 15	41.9	33 19.8	98 15	41.8	33 49.2	98 15	41.6	35 46.6	98 15	41.1	1
2	32 41.5	98 15	41.0	33 10.9	98 15	40.9	33 40.3	98 15	40.8	35 37.8	98 14	40.3	2
3	32 32.7	98 14	40.1	33 02.2	98 14	40.0	33 31.6	98 14	39.9	35 29.2	98 14	39.4	3
4	32 24.1	98 14	39.3	32 53.6	98 14	39.2	33 23.0	98 14	39.1	35 20.7	98 14	38.6	4
135	32 15.6	98 14	38.4	32 45.1	98 14	38.3	33 14.6	98 14	38.2	35 12.3	98 14	37.7	135
6	32 07.3	98 14	37.6	32 36.8	98 14	37.4	33 06.3	98 14	37.3	35 04.1	98 13	36.9	6
7	31 59.2	98 13	36.7	32 28.7	98 13	36.6	32 58.2	98 13	36.5	34 56.1	98 13	36.0	7
8	31 51.2	98 13	35.8	32 20.7	98 13	35.7	32 50.2	98 13	35.6	34 48.3	98 13	35.2	8
9	31 43.4	98 13	35.0	32 12.9	98 13	34.9	32 42.5	98 13	34.8	34 40.6	98 13	34.3	9
140	31 35.7	99 12	34.1	32 05.3	99 12	34.0	32 34.9	99 12	33.9	34 33.0	98 12	33.5	140
1	31 28.2	99 12	33.3	31 57.8	99 12	33.2	32 27.4	99 12	33.1	34 25.7	99 12	32.6	1
2	31 20.9	99 12	32.4	31 50.5	99 12	32.3	32 20.1	99 12	32.2	34 18.5	99 12	31.8	2
3	31 13.8	99 12	31.5	31 43.4	99 12	31.4	32 13.0	99 12	31.3	34 11.4	99 11	31.0	3
4	31 06.8	99 11	30.7	31 36.5	99 11	30.6	32 06.1	99 11	30.5	34 04.6	99 11	30.1	4
145	31 00.0	99 11	29.8	31 29.7	99 11	29.7	31 59.3	99 11	29.6	33 57.9	99 11	29.3	145
6	30 53.4	99 11	29.0	31 23.1	99 11	28.9	31 52.7	99 11	28.8	33 51.4	99 11	28.4	6
7	30 46.9	99 10	28.1	31 16.6	99 10	28.0	31 46.3	99 10	27.9	33 45.0	99 10	27.6	7
8	30 40.7	99 10	27.3	31 10.4	99 10	27.2	31 40.1	99 10	27.1	33 38.9	99 10	26.8	8
9	30 34.6	99 10	26.4	31 04.3	99 10	26.3	31 34.0	99 10	26.2	33 32.9	99 10	25.9	9
150	30 28.7	99 10	25.5	30 58.4	99 10	25.5	31 28.2	99 09	25.4	33 27.1	99 09	25.1	150
1	30 22.9	99 09	24.7	30 52.7	99 09	24.6	31 22.5	99 09	24.5	33 21.5	99 09	24.2	1
2	30 17.4	99 09	23.8	30 47.2	99 09	23.8	31 16.9	99 09	23.7	33 16.0	99 08	23.4	2
3	30 12.0	99 09	23.0	30 41.8	99 09	22.9	31 11.6	99 08	22.8	33 10.7	99 08	22.6	3
4	30 06.9	99 08	22.1	30 36.7	99 08	22.1	31 06.5	99 08	22.0	33 05.7	99 08	21.7	4
155	30 01.9	99 08	21.3	30 31.7	99 08	21.2	31 01.5	99 08	21.1	33 00.8	99 08	20.9	155
6	29 57.1	99 08	20.4	30 26.9	99 08	20.4	30 56.7	99 08	20.3	32 56.0	99 08	20.0	6
7	29 52.5	99 07	19.6	30 22.3	99 07	19.5	30 52.1	99 07	19.4	32 51.5	99 07	19.2	7
8	29 48.0	1.0 07	18.7	30 17.9	1.0 07	18.7	30 47.7	1.0 07	18.6	32 47.2	99 07	18.4	8
9	29 43.8	1.0 07	17.9	30 13.7	1.0 07	17.8	30 43.5	1.0 07	17.8	32 43.0	1.0 07	17.5	9
160	29 39.8	1.0 06	17.0	30 09.6	1.0 06	17.0	30 39.5	1.0 06	16.9	32 39.0	1.0 06	16.7	160
1	29 35.9	1.0 06	16.2	30 05.8	1.0 06	16.1	30 35.7	1.0 06	16.1	32 35.2	1.0 06	15.9	1
2	29 32.2	1.0 06	15.3	30 02.1	1.0 06	15.3	30 32.1	1.0 06	15.2	32 31.7	1.0 06	15.0	2
3	29 28.8	1.0 05	14.5	29 58.7	1.0 05	14.4	30 28.6	1.0 05	14.4	32 28.2	1.0 05	14.2	3
4	29 25.5	1.0 05	13.6	29 55.4	1.0 05	13.6	30 25.4	1.0 05	13.5	32 25.0	1.0 05	13.3	4
165	29 22.4	1.0 05	12.8	29 52.4	1.0 05	12.7	30 22.3	1.0 05	12.7	32 22.0	1.0 05	12.5	165
6	29 19.5	1.0 04	11.9	29 49.5	1.0 04	11.9	30 19.4	1.0 04	11.8	32 19.2	1.0 04	11.7	6
7	29 16.9	1.0 04	11.0	29 46.8	1.0 04	11.0	30 16.8	1.0 04	11.0	32 16.6	1.0 04	10.8	7
8	29 14.4	1.0 04	10.2	29 44.3	1.0 04	10.2	30 14.3	1.0 04	10.1	32 14.1	1.0 04	10.0	8
9	29 12.1	1.0 04	09.3	29 42.0	1.0 03	09.3	30 12.0	1.0 03	09.3	32 11.9	1.0 03	09.2	9
170	29 10.0	1.0 03	08.5	29 40.0	1.0 03	08.5	30 09.9	1.0 03	08.4	32 09.8	1.0 03	08.3	170
1	29 08.1	1.0 03	07.6	29 38.1	1.0 03	07.6	30 08.0	1.0 03	07.6	32 07.9	1.0 03	07.5	1
2	29 06.4	1.0 02	06.8	29 36.4	1.0 02	06.8	30 06.4	1.0 02	06.8	32 06.3	1.0 02	06.7	2
3	29 04.9	1.0 02	05.9	29 34.9	1.0 02	05.9	30 04.9	1.0 02	05.9	32 04.8	1.0 02	05.8	3
4	29 03.6	1.0 02	05.1	29 33.6	1.0 02	05.1	30 03.6	1.0 02	05.1	32 03.5	1.0 02	05.0	4
175	29 02.5	1.0 02	04.2	29 32.5	1.0 02	04.2	30 02.5	1.0 02	04.2	32 02.5	1.0 01	04.2	175
6	29 01.6	1.0 01	03.4	29 31.6	1.0 01	03.4	30 01.6	1.0 01	03.4	32 01.6	1.0 01	03.3	6
7	29 00.9	1.0 01	02.5	29 30.9	1.0 01	02.5	30 00.9	1.0 01	02.5	32 00.9	1.0 01	02.5	7
8	29 00.4	1.0 00	01.7	29 30.4	1.0 00	01.7	30 00.4	1.0 00	01.7	32 00.4	1.0 00	01.7	8
9	29 00.1	1.0 00	00.8	29 30.1	1.0 00	00.8	30 00.1	1.0 00	00.8	32 00.1	1.0 00	00.8	9
180	29 00.0	1.0 00	00.0	29 30.0	1.0 00	00.0	30 00.0	1.0 00	00.0	32 00.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 77°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	59 00.0	1.0 00	180.0	60 00.0	1.0 00	180.0	61 30.0	1.0 00	180.0	62 30.0	1.0 00	180.0	63 30.0	1.0 00	180.0	64 30.0	1.0 00	180.0	65 30.0	1.0 00	180.0	67 00.0	1.0 00	180.0	00
1	58 59.8	1.0 01	178.7	59 59.8	1.0 01	178.6	61 29.8	1.0 01	178.6	62 29.8	1.0 01	178.6	63 29.8	1.0 01	178.6	64 29.8	1.0 01	178.6	65 29.8	1.0 01	178.5	66 59.8	1.0 01	178.5	1
2	58 59.4	1.0 01	177.3	59 59.4	1.0 01	177.3	61 29.3	1.0 01	177.2	62 29.3	1.0 01	177.2	63 29.3	1.0 01	177.1	64 29.3	1.0 01	177.1	65 29.3	1.0 01	177.1	66 59.3	1.0 02	177.0	2
3	58 58.6	1.0 02	176.0	59 58.6	1.0 02	175.9	61 28.5	1.0 02	175.8	62 28.5	1.0 02	175.8	63 28.5	1.0 02	175.7	64 28.5	1.0 02	175.7	65 28.4	1.0 02	175.6	66 58.4	1.0 02	175.5	3
4	58 57.5	1.0 02	174.6	59 57.4	1.0 02	174.5	61 27.4	1.0 02	174.4	62 27.4	1.0 02	174.4	63 27.3	1.0 02	174.3	64 27.3	1.0 03	174.2	65 27.2	1.0 03	174.1	66 57.2	1.0 03	174.0	4
05	58 56.0	1.0 03	173.3	59 56.0	1.0 03	173.2	61 25.9	1.0 03	173.1	62 25.9	1.0 03	173.0	63 25.8	1.0 03	172.9	64 25.8	1.0 03	172.8	65 25.7	1.0 03	172.7	66 55.6	1.0 03	172.5	05
6	58 54.3	1.0 03	171.9	59 54.2	1.0 03	171.8	61 24.1	1.0 04	171.7	62 24.1	1.0 04	171.6	63 24.0	1.0 04	171.5	64 23.9	1.0 04	171.3	65 23.8	1.0 04	171.2	66 53.6	1.0 04	171.0	6
7	58 52.2	1.0 04	170.6	59 52.2	1.0 04	170.5	61 22.0	1.0 04	170.3	62 21.9	1.0 04	170.2	63 21.8	1.0 04	170.0	64 21.7	1.0 04	169.9	65 21.6	1.0 04	169.8	66 51.4	1.0 04	169.5	7
8	58 49.9	1.0 04	169.2	59 49.8	1.0 05	169.1	61 19.6	1.0 05	168.9	62 19.4	1.0 05	168.8	63 19.3	1.0 05	168.6	64 19.2	1.0 05	168.5	65 19.0	1.0 05	168.3	66 48.7	1.0 05	168.0	8
9	58 47.2	1.0 05	167.9	59 47.1	1.0 05	167.8	61 16.8	1.0 05	167.5	62 16.7	1.0 05	167.4	63 16.5	1.0 05	167.2	64 16.3	1.0 05	167.0	65 16.1	1.0 05	166.8	66 45.7	1.0 06	166.5	9
10	58 44.2	1.0 05	166.6	59 44.0	1.0 06	166.4	61 13.8	1.0 06	166.2	62 13.6	1.0 06	166.0	63 13.3	1.0 06	165.8	64 13.1	1.0 06	165.6	65 12.8	1.0 06	165.4	66 42.4	1.0 06	165.0	10
1	58 40.9	1.0 06	165.2	59 40.7	1.0 06	165.1	61 10.4	1.0 06	164.8	62 10.1	1.0 06	164.6	63 09.9	1.0 06	164.4	64 09.6	1.0 06	164.2	65 09.3	99 06	164.0	66 38.8	99 07	163.6	1
2	58 37.3	1.0 06	163.9	59 37.1	1.0 07	163.7	61 06.7	1.0 07	163.4	62 06.4	99 07	163.2	63 06.1	99 07	163.0	64 05.7	99 07	162.8	65 05.4	99 07	162.5	66 34.8	99 07	162.1	2
3	58 33.4	1.0 07	162.6	59 33.1	1.0 07	162.4	61 02.7	99 07	162.1	62 02.3	99 07	161.8	63 02.0	99 07	161.6	64 01.6	99 07	161.4	65 01.2	99 08	161.1	66 30.5	99 08	160.6	3
4	58 29.2	99 07	161.2	59 28.9	99 08	161.0	60 58.4	99 08	160.7	61 58.0	99 08	160.5	62 57.6	99 08	160.2	63 57.1	99 08	159.9	64 56.6	99 08	159.7	66 25.8	99 08	159.2	4
15	58 24.8	99 08	159.9	59 24.4	99 08	159.7	60 53.8	99 08	159.4	61 53.3	99 08	159.1	62 52.8	99 08	158.8	63 52.3	99 08	158.5	64 51.8	99 09	158.2	66 20.9	99 09	157.7	15
6	58 20.0	99 08	158.6	59 19.5	99 09	158.4	60 48.8	99 09	158.0	61 48.3	99 09	157.7	62 47.8	99 09	157.4	63 47.2	99 09	157.1	64 46.6	99 09	156.8	66 15.6	99 09	156.3	6
7	58 14.9	99 09	157.3	59 14.4	99 09	157.1	60 43.6	99 09	156.7	61 43.1	99 09	156.4	62 42.5	99 09	156.1	63 41.8	99 10	155.7	64 41.2	99 10	155.4	66 10.0	99 10	154.8	7
8	58 09.6	99 09	156.0	59 09.0	99 10	155.7	60 38.2	99 10	155.3	61 37.5	99 10	155.0	62 36.9	99 10	154.7	63 36.2	99 10	154.4	64 35.4	99 10	154.0	66 04.1	99 10	153.4	8
9	58 03.9	99 10	154.7	59 03.3	99 10	154.4	60 32.4	99 10	154.0	61 31.7	99 10	153.7	62 31.0	99 10	153.3	63 30.2	99 10	153.0	64 29.3	99 11	152.6	65 57.9	98 11	152.0	9
20	57 58.0	99 10	153.4	58 57.4	99 10	153.1	60 26.3	99 11	152.7	61 25.6	99 11	152.3	62 24.8	99 11	152.0	63 23.9	99 11	151.6	64 23.0	98 11	151.2	65 51.4	98 11	150.6	20
1	57 51.8	99 11	152.1	58 51.1	99 11	151.8	60 20.0	99 11	151.3	61 19.2	99 11	151.0	62 18.3	98 11	150.6	63 17.3	98 11	150.2	64 16.3	98 12	149.8	65 44.7	98 12	149.2	1
2	57 45.4	99 11	150.8	58 44.6	99 11	150.5	60 13.4	99 11	150.0	61 12.5	98 12	149.7	62 11.5	98 12	149.3	63 10.5	98 12	148.9	64 09.4	98 12	148.5	65 37.6	98 12	147.8	2
3	57 38.7	99 12	149.5	58 37.8	99 12	149.2	60 06.5	98 12	148.7	61 05.5	98 12	148.3	62 04.5	98 12	147.9	63 03.4	98 12	147.5	64 02.2	98 12	147.1	65 30.3	98 13	146.4	3
4	57 31.7	99 12	148.2	58 30.8	98 12	147.9	59 59.3	98 12	147.4	60 58.3	98 12	147.0	61 57.2	98 13	146.6	62 56.0	98 13	146.2	63 54.7	98 13	145.7	65 22.7	98 13	145.0	4
25	57 24.5	98 12	147.0	58 23.5	98 13	146.6	59 51.9	98 13	146.1	60 50.8	98 13	145.7	61 49.6	98 13	145.3	62 48.4	98 13	144.9	63 47.0	98 13	144.4	65 14.8	97 14	143.6	25
6	57 17.0	98 13	145.7	58 16.0	98 13	145.4	59 44.3	98 13	144.8	60 43.1	98 13	144.4	61 41.8	98 13	144.0	62 40.5	98 14	143.5	63 39.0	98 14	143.0	65 06.6	97 14	142.2	6
7	57 09.3	98 13	144.4	58 08.2	98 13	144.1	59 36.4	98 14	143.5	60 35.1	98 14	143.1	61 33.8	98 14	142.7	62 32.3	98 14	142.2	63 30.8	97 14	141.7	64 58.3	97 14	140.9	7
8	57 01.3	98 14	143.2	58 00.1	98 14	142.8	59 28.2	98 14	142.2	60 26.9	98 14	141.8	61 25.5	98 14	141.4	62 23.9	97 14	140.9	63 22.3	97 15	140.4	64 49.6	97 15	139.6	8
9	56 53.1	98 14	141.9	57 51.9	98 14	141.6	59 19.9	98 14	141.0	60 18.4	98 14	140.5	61 16.9	97 15	140.1	62 15.3	97 15	139.6	63 13.6	97 15	139.1	64 40.7	97 15	138.2	9
30	56 44.7	98 14	140.7	57 43.4	98 15	140.3	59 11.2	98 15	139.7	60 09.7	97 15	139.3	61 08.1	97 15	138.8	62 06.4	97 15	138.3	63 04.6	97 15	137.8	64 31.6	97 16	136.9	30
1	56 36.0	98 15	139.5	57 34.6	98 15	139.1	59 02.4	97 15	138.4	60 00.8	97 15	138.0	60 59.1	97 15	137.5	61 57.3	97 16	137.0	62 55.4	97 16	136.5	64 22.3	96 16	135.6	1
2	56 27.1	98 15	138.2	57 25.7	98 15	137.8	58 53.3	97 15	137.2	59 51.7	97 16	136.7	60 49.9	97 16	136.2	61 48.0	97 16	135.7	62 46.0	97 16	135.2	64 12.7	96 16	134.3	2
3	56 18.0	98 16	137.0	57 16.5	97 16	136.6	58 44.1	97 16	135.9	59 42.3	97 16	135.5	60 40.5	97 16	135.0	61 38.5	97 16	134.5	62 36.4	96 16	133.9	64 03.0	96 17	133.0	3
4	56 08.7	97 16	135.8	57 07.1	97 16	135.4	58 34.6	97 16	134.7	59 32.7	97 16	134.2	60 30.8	97 16	133.7	61 28.8	96 17	133.2	62 26.6	96 17	132.6	63 53.0	96 17	131.7	4
35	55 59.2	97 16	134.6	56 57.5	97 16	134.2	58 24.9	97 16	133.5	59 23.0	97 17	133.0	60 21.0	97 17	132.5	61 18.8	96 17	131.9	62 16.5	96 17	131.4	63 42.8	96 17	130.4	35
6	55 49.5	97 16	133.4	56 47.8	97 17	132.9	58 15.0	97 17	132.3	59 13.0	97 17	131.8	60 10.9	96 17	131.2	61 08.7	96 17	130.7	62 06.3	96 17	130.1	63 32.5	96 18	129.2	6
7	55 39.6	97 17	132.2	56 37.8	97 17	131.7	58 04.9	97 17	131.0	59 02.8	96 17	130.5	60 00.7	96 17	130.0	60 58.4	96 18	129.5	61 55.9	96 18	128.9	63 21.9	95 18	127.9	7
8	55 29.5	97 17	131.0	56 27.6	97 17	130.5	57 54.6	97 17	129.8	58 52.5	96 18	129.3	59 50.2	96 18	128.8	60 47.8	96 18	128.2	61 45.3	96 18	127.6	63 11.2	95 18	126.7	8
9	55 19.2	97 17	129.8	56 17.3	97 18	129.3	57 44.2	96 18	128.6	58 42.0	96 18	128.1	59 39.6	96 18	127.6	60 37.2	96 18	127.0	61 34.5	95 18	126.4	63 00.2	95 18	125.4	9
40	55 08.7	97 18	128.6	56 06.7	97 18	128.2	57 33.5	96 18	127.4	58 31.3	96 18	126.9	59 28.8	96 18	126.4	60 26.3	96 18	125.8	61 23.6	95 19	125.2	62 49.2	95 19	124.2	40
1	54 58.1	97 18	127.4	55 56.0	96 18	127.0	57 22.7	96 18	126.3	58 20.4	96 18	125.7	59 17.9	96 19	125.2	60 15.3	95 19	124.6	61 12.5	95 19	124.0	62 37.9	95 19	123.0	1
2	54 47.3	97 18	126.3	55 45.2	96 18	125.8	57 11.8	96 19	125.1	58 09.3	96 19	124.5	59 06.8	96 19	124.0	60 04.1	95 19	123.4	61 01.2	95 19	122.8	62 26.5	95 19	121.8	2
3	54 36.4	96 19	125.1	55 34.2	96 19	124.7	57 00.6	96 19	123.9	57 58.2	96 19	123.4	58 55.5	95 19	122.8	59 52.7	95 19	122.2	60 49.8	95 19	121.6	62 15.0	94 19	120.6	3
4	54 25.2	96 19	124.0	55 23.0	96 19	123.5	56 49.4	96 19	122.7	57 46.8	96 19	122.2	58 44.1	95 19	121.6	59 41.2	95 19	121.0	60 38.2	95 20	120.4	62 03.3	94 20	119.4	4
45	54 14.0	96 19	122.8	55 11.6	96 19	122.3	56 37.9	96 19	121.6	57 35.3	95 19	121.0	58 32.5	95 20	120.5	59 29.6	95 20	119.9	60 26.5	95 20	119.2	61 51.5	94 20	118.2	45
6	54 02.6	96 19	121.7	55 00.2	96 19	121.2	56 26.4	96 20	120.4	57 23.7	95 20	119.9	58 20.8	95 20	119.3	59 17.8	95 20	118.7	60 14.6	95 20	118.1	61 39.5	94 20	117.0	6
7	53 51.0	96 20	120.5	54 48.6	96 20	120.1	56 14.7	96 20	119.3	57 11.9	95 20	118.7	58 09.0	95 20	118.2	59 05.9	95 20	117.6	60 02.7	94 20	116.9	61 27.4	94 20	115.9	7
8	53 39.3	96 20	119.4	54 36.8	96 20	118.9	56 02.8	95 20	118.2	57 00.0	95 20	117.6	57 57.0	95 20	117.0	58 53.9	95 20	116.4	59 50.6	94 20	115.8	61 15.2	94 21	114.7	8
9	53 27.5	96 20	118.3	54 24.9	96 20	117.8	55 50.9	95 20	117.0	56 48.0	95 20	116.5	57 45.0	95 20	115.9	58 41.8	95 20	115.3	59 38.4	94 21	114.6	61 02.9	94 21	113.6	9
50	53 15.5	96 20	117.2	54 12.9	96 20	116.7	55 38.8	95 20	115.9	56 35.9	95 20	115.4	57 32.8	95 20	114.8	58 29.5	94 21	114.2	59 26.0	94 21	113.5	60 50.5	94 21	112.5	50
1	53 03.5	96 20	116.1	54 00.8	95 20	115.6	55 26.6	95 21	114.8	56 23.6	95 21	114.2	57 20.4	95 21	113.6	58 17.1	94 21	113.0	59 13.6	94 21	112.4	60 38.0	93 21	111.3	1
2	52 51.3	96 20	115.0	53 48.6	95 21	114.5	55 14.3	95 21	113.7	56 11.2	95 21	113.1	57 08.0	95 21	112.5	58 04.7	94 21	111.9	59 01.1	94 21	111.3	60 25.3	93 21	110.2	2
3	52 39.0	96 21	113.9	53 36.3	95 21	113.4	55 01.9	95 21	112.6	55 58.8	95 21	112.0	56 55.5	94 21	111.4	57 52.1	94 21	110.8	58 48.5	94 21	110.2	60 12.6	93 21	109.1	3
4	52 26.6	95 21	112.8	53 23.8	95 21	112.3	54 49.4	95 21	111.5	55 46.2	95 21	110.9	56 42.9	94 21	110.3	57 39.4	94 21	109.7	58 35.7	94 21	109.1	59 59.8	93 21	108.0	4
55	52 14.1	95 21	111.7	53 11.3	95 21	111.2	54 36.8	95 21	110.4	55 33.6	95 21	109.8	56 30.2	94 21	109.2	57 26.7	94 21	108.6	58 22.9	94 21	108.0	59 47.0	93 22	106.9	55
6	52 01.5	95 21	110.6	52 58.6	95 21	110.1	54 24.1	95 21	109.3	55 20.8	94 21	108.8	56 17.4	94 21	108.2	57 13.8	94 22	107.5	58 10.1	94 22	106.9	59 34.0	93 22	105.8	6
7	51 48.9	95 21	109.5	52 45.9	95 21	109.0	54 11.3	95 21	108.2	55 08.0	94 22	107.7	56 04.6	94 22	107.1	57 00.9	94 22	106.5	57 57.1	93 22	105.8	59 21.0	93 22	104.8	7
8	51 36.1	95 21	108.5	52 33.1	95 21	108.0	53 58.4	95 22	107.2	54 55.1	94 22	106.6	55 51.6	94 22	106.0	56 48.0	94 22	105.4	57 44.1	93 22	104.7	59 07.9	93 22	103.7	8
9	51 23.3	95 22	107.4	52 20.3	95 22	106.9	53 45.5	95 22	106.1	54 42.1	94 22	105.5	55 38.6	94 22	105.0	56 34.9	94 22	104.3	57 31.0	93 22	103.7	58 54.8	93 22	102.6	9
60	51 10.3	95 22	106.4	52 07.3	95 22	105.9	53 32.5	94 22	105.1	54 29.1	94 22	104.5	55 25.5	94 22	103.9	56 21.8	94 22	103.3	57 17.9	93 22	102.6	58 41.6	93 22	101.6	60
1	50 57.4	95 22	105.3	51 54.3	95 22	104.8	53 19.4	94 22	104.0	54 16.0	94 22	103.4	55 12.4	94 22	102.8	56 08.6	94 22	102.2	57 04.7	93 22	101.6	58 28.3	93 22	100.5	1
2	50 44.3	95 22	104.3	51 41.2	95 22	103.8	53 06.3	94 22	103.0	54 02.8	94 22	102.4	54 59.2	94 22	101.8	55 55.4	94 22	101.2	56 51.4	93 22	100.5	58 15.0	93 22	99.5	2
3	50 31.2	95 22	103.2	51 28.1	95 22	102.7	52 53.1	94 22	101.9	53 49.6	94 22	101.4	54 46.0	94 22	100.8	55 42.2	93 22	100.2	56 38.1	93 22	99.5	58 01.7	93 22	98.5	3
4	50 18.0	95 22	102.2	51 14.9	95 22	101.7	52 39.9	94 22	100.9	53 36.4	94 22	100.3	54 32.7	94 22	99.7	55 28.9	93 22	99.1	56 24.8	93 22	98.5	57 48.3	93 22	97.4	4
65	50 04.8	95 22	101.2	51 01.6	95 22	100.7	52 26.6	94 22	99.9	53 23.1	94 22	99.3	54 19.4	94 22	98.7	55 15.5	93 22	98.1	56 11.4	93 22	97.5	57 34.9	92 22	96.4	65
6	49 51.5	95 22	100.1	50 48.4	95 22	99.6	52 13.3	94 22	98.8	53 09.7	94 22	98.3	54 06.0	94 22	97.7	55 02.1	93 22	97.1	55 58.0	93 22	96.4	57 21.5	92 22	95.4	6
7	49 38.2	95 22	99.1	50 35.0	95 22	98.6	51 59.9	94 22	97.8	52 56.4	94 22	97.3	53 52.6	94 22	96.7	54 48.7	93 22	96.1	55 44.6	93 22	95.4	57 08.1	92 22	94.4	7
8	49 24.9	95 22	98.1	50 21.7	95 22	97.6	51 46.6	94 22	96.8	52 43.0	94 22	96.3	53 39.2	94 22	95.7	54 35.3	93 22	95.1	55 31.2	93 22	94.4	56 54.6	92 22	93.4	8
9	49 11.5	95 22	97.1	50 08.3	94 22	96.6	51 33.1	94 22	95.8	52 29.5	94 22	95.3	53 25.8	94 22	94.7	54 21.8	93 22	94.1	55 17.7	93 22	93.4	56 41.1	92 22	92.4	9
70	48 58.1	95 22	96.1	49 54.8	94 22	95.6	51 19.7	94 22	94.8	52 16.1	94 22	94.3	53 12.3	94 22	93.7	54 08.4	93 22	93.1	55 04.2	93 22	92.4	56 27.6	92 22	91.4	70
1	48 44.7	95 22	95.1	49 41.4	94 22	94.6	51 06.2	94 22	93.8	52 02.6	94 22	93.3	52 58.8	94 22	92.7	53 54.9	93 22	92.1	54 50.7	93 22	91.5	56 14.1	92 22	90.5	1
2	48 31.2	95 22	94.1	49 27.9	94 22	93.6	50 52.8	94 22	92.8	51 49.1	94 22	92.3	52 45.4	94 22	91.7	53 41.4	93 22	91.1	54 37.2	93 22	90.5	56 00.6	92 22	89.5	2
3	48 17.8	95 22	93.1	49 14.5	94 22	92.6	50 39.3	94 22	91.8	51 35.7	94 22	91.3	52 31.9	94 22	90.7	53 27.9	93 22	90.1	54 23.7	93 22	89.5	55 47.1	92 22	88.5	3
4	48 04.3	95 22	92.1	49 01.0	94 22	91.6	50 25.8	94 22	90.9	51 22.2	94 22	90.3	52 18.4	94 22	89.7	53 14.4	93 22	89.2	54 10.3	93 22	88.5	55 33.7	92 22	87.6	4
75	47 50.8	95 22	91.1	48 47.5	94 22	90.6	50 12.3	94 22	89.9	51 08.7	94 22	89.3	52 04.9	94 22	88.8	53 00.9	93 22	88.2	53 56.8	93 22	87.6	55 20.2	92 22	86.6	75
6	47 37.3	95 22	90.2	48 34.0	94 22	89.7	49 58.8	94 22	88.9	50 55.2	94 22	88.4	51 51.4	94 22	87.8	52 47.4	93 22	87.2	53 43.3	93 22	86.6	55 06.7	92 22	85.6	6
7	47 23.8	95 22	89.2	48 20.5	94 22	88.7	49 45.3	94 22	87.9	50 41.7	94 22	87.4	51 37.9	94 22	86.8	52 33.9	93 22	86.3	53 29.8	93 22	85.7	54 53.3	92 22	84.7	7
8	47 10.3	95 22	88.2	48 07.0	94 22	87.7	49 31.8	94 22	87.0	50 28.2	94 22	86.4	51 24.4	94 22	85.9	52 20.5	93 22	85.3	53 16.4	93 22	84.7	54 39.8	92 22	83.8	8
9	46 56.8	95 22	87.3	47 53.5	94 22	86.8	49 18.4	94 22	86.0	50 14.7	94 22	85.5	51 11.0	94 22	84.9	52 07.0	93 22	84.4	53 02.9	93 22	83.8	54 26.4	93 22	82.8	9
80	46 43.3	95 22	86.3	47 40.1	94 22	85.8	49 04.9	94 22	85.1	50 01.3	94 22	84.5	50 57.5	94 22	84.0	51 53.6	93 22	83.4	52 49.5	93 22	82.8	54 13.0	93 22	81.9	80
1	46 29.9	95 22	85.3	47 26.6	94 22	84.9	48 51.5	94 22	84.1	49 47.9	94 22	83.6	50 44.1	94 22	83.0	51 40.2	93 22	82.5	52 36.2	93 22	81.9	53 59.7	93 22	81.0	1
2	46 16.4	95 22	84.4	47 13.2	94 22	83.9	48 38.0	94 22	83.2	49 34.5	94 22	82.6	50 30.7	94 22	82.1	51 26.9	93 22	81.5	52 22.8	93 22	81.0	53 46.4	93 22	80.0	2
3	46 03.0	95 22	83.4	46 59.8	94 22	83.0	48 24.7	94 22	82.2	49 21.1	94 22	81.7	50 17.4	94 22	81.2	51 13.5	93 22	80.6	52 09.5	93 22	80.0	53 33.1	93 22	79.1	3
4	45 49.6	95 22	82.5	46 46.4	95 22	82.0	48 11.3	94 22	81.3	49 07.8	94 22	80.8	50 04.1	94 22	80.2	51 00.2	93 22	79.7	51 56.2	93 22	79.1	53 19.9	93 22	78.2	4
85	45 36.2	95 22	81.5	46 33.0	95 22	81.1	47 58.0	94 22	80.4	48 54.5	94 22	79.8	49 50.8	94 22	79.3	50 47.0	94 22	78.8	51 43.0	93 22	78.2	53 06.7	93 22	77.3	85
6	45 22.9	95 22	80.6	46 19.7	95 22	80.1	47 44.7	94 22	79.4	48 41.2	94 22	78.9	49 37.5	94 22	78.4	50 33.8	94 22	77.8	51 29.8	93 22	77.3	52 53.6	93 22	76.4	6
7	45 09.6	95 22	79.7	46 06.4	95 22	79.2	47 31.4	94 22	78.5	48 28.0	94 22	78.0	49 24.3	94 22	77.5	50 20.6	94 22	76.9	51 16.7	93 22	76.4	52 40.5	93 22	75.5	7
8	44 56.4	95 22	78.7	45 53.2	95 22	78.3	47 18.2	94 22	77.6	48 14.8	94 22	77.1	49 11.2	94 22	76.6	50 07.5	94 22	76.0	51 03.6	93 22	75.5	52 27.4	93 22	74.6	8
9	44 43.1	95 22	77.8	45 40.0	95 22	77.4	47 05.1	94 22	76.7	48 01.7	94 22	76.2	48 58.1	94 22	75.6	49 54.4	94 23	75.1	50 50.5	93 22	74.6	52 14.4	93 22	73.7	9
90	44 30.0	95 22	76.9	45 26.9	95 22	76.4	46 52.0	94 22	75.7	47 48.6	94 22	75.2	48 45.0	94 22	74.7	49 41.4	94 22	74.2	50 37.6	94 22	73.7	52 01.5	93 21	72.8	90

Lat. 77°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	44 16.9	95 22	76.0	45 13.8	95 22	75.5	46 38.9	95 22	74.8	47 35.6	94 22	74.3	48 32.0	94 22	73.8	49 28.4	94 22	73.3	50 24.6	94 21	72.8	51 48.7	93 21	71.9	91
2	44 03.8	95 22	75.0	45 00.7	95 22	74.6	46 25.9	95 22	73.9	47 22.6	94 22	73.4	48 19.1	94 21	72.9	49 15.5	94 21	72.4	50 11.8	94 21	71.9	51 35.9	93 21	71.0	2
3	43 50.8	95 22	74.1	44 47.7	95 22	73.7	46 13.0	95 21	73.0	47 09.7	94 21	72.5	48 06.2	94 21	72.0	49 02.7	94 21	71.5	49 59.0	94 21	71.0	51 23.1	93 21	70.1	3
4	43 37.8	95 21	73.2	44 34.8	95 21	72.8	46 00.1	95 21	72.1	46 56.8	94 21	71.6	47 53.4	94 21	71.1	48 49.9	94 21	70.6	49 46.2	94 21	70.1	51 10.5	93 21	69.3	4
95	43 24.9	95 21	72.3	44 22.0	95 21	71.9	45 47.3	95 21	71.2	46 44.1	95 21	70.7	47 40.7	94 21	70.2	48 37.2	94 21	69.7	49 33.6	94 21	69.2	50 57.9	93 21	68.4	95
6	43 12.1	95 21	71.4	44 09.2	95 21	71.0	45 34.6	95 21	70.3	46 31.4	95 21	69.8	47 28.0	94 21	69.4	48 24.6	94 21	68.9	49 21.0	94 21	68.3	50 45.4	94 21	67.5	6
7	42 59.3	95 21	70.5	43 56.4	95 21	70.1	45 21.9	95 21	69.4	46 18.7	95 21	68.9	47 15.4	94 21	68.5	48 12.0	94 21	68.0	49 08.5	94 21	67.5	50 32.9	94 21	66.7	7
8	42 46.7	95 21	69.6	43 43.8	95 21	69.2	45 09.3	95 21	68.5	46 06.2	95 21	68.1	47 02.9	95 21	67.6	47 59.6	94 21	67.1	48 56.1	94 21	66.6	50 20.6	94 20	65.8	8
9	42 34.0	95 21	68.7	43 31.2	95 21	68.3	44 56.8	95 21	67.6	45 53.7	95 21	67.2	46 50.5	95 21	66.7	47 47.2	94 21	66.2	48 43.7	94 20	65.7	50 08.3	94 20	64.9	9
100	42 21.5	95 21	67.8	43 18.7	95 21	67.4	44 44.3	95 21	66.7	45 41.3	95 21	66.3	46 38.1	95 20	65.8	47 34.9	94 20	65.3	48 31.5	94 20	64.8	49 56.1	94 20	64.1	100
1	42 09.1	95 21	66.9	43 06.3	95 21	66.5	44 32.0	95 20	65.8	45 29.0	95 20	65.4	46 25.9	95 20	64.9	47 22.6	95 20	64.5	48 19.3	94 20	64.0	49 44.0	94 20	63.2	1
2	41 56.7	95 20	66.0	42 54.0	95 20	65.6	44 19.7	95 20	65.0	45 16.7	95 20	64.5	46 13.7	95 20	64.1	47 10.5	95 20	63.6	48 07.2	94 20	63.1	49 32.0	94 20	62.4	2
3	41 44.4	96 20	65.1	42 41.7	95 20	64.7	44 07.5	95 20	64.1	45 04.6	95 20	63.7	46 01.6	95 20	63.2	46 58.5	95 20	62.7	47 55.2	95 20	62.3	49 20.1	94 20	61.5	3
4	41 32.2	96 20	64.2	42 29.6	96 20	63.8	43 55.4	95 20	63.2	44 52.6	95 20	62.8	45 49.6	95 20	62.3	46 46.5	95 20	61.9	47 43.3	95 20	61.4	49 08.3	94 20	60.7	4
105	41 20.1	96 20	63.3	42 17.5	96 20	62.9	43 43.4	95 20	62.3	44 40.6	95 20	61.9	45 37.7	95 20	61.5	46 34.7	95 20	61.0	47 31.5	95 20	60.6	48 56.6	94 19	59.8	105
6	41 08.1	96 20	62.4	42 05.5	96 20	62.1	43 31.5	95 20	61.5	44 28.7	95 20	61.0	45 25.9	95 20	60.6	46 22.9	95 19	60.2	47 19.8	95 19	59.7	48 45.0	94 19	59.0	6
7	40 56.2	96 20	61.6	41 53.6	96 20	61.2	43 19.7	96 20	60.6	44 17.0	95 20	60.2	45 14.2	95 19	59.7	46 11.2	95 19	59.3	47 08.2	95 19	58.8	48 33.5	95 19	58.1	7
8	40 44.3	96 20	60.7	41 41.9	96 19	60.3	43 08.0	96 19	59.7	44 05.3	95 19	59.3	45 02.6	95 19	58.9	45 59.7	95 19	58.5	46 56.7	95 19	58.0	48 22.1	95 19	57.3	8
9	40 32.6	96 19	59.8	41 30.2	96 19	59.4	42 56.4	96 19	58.9	43 53.8	96 19	58.4	44 51.0	95 19	58.0	45 48.2	95 19	57.6	46 45.3	95 19	57.2	48 10.8	95 19	56.5	9
110	40 21.0	96 19	58.9	41 18.6	96 19	58.6	42 44.9	96 19	58.0	43 42.3	96 19	57.6	44 39.7	95 19	57.2	45 36.9	95 19	56.8	46 34.0	95 19	56.3	47 59.6	95 18	55.6	110
1	40 09.5	96 19	58.1	41 07.2	96 19	57.7	42 33.5	96 19	57.1	43 31.0	96 19	56.7	44 28.4	96 19	56.3	45 25.7	95 19	55.9	46 22.9	95 18	55.5	47 48.5	95 18	54.8	1
2	39 58.1	96 19	57.2	40 55.8	96 19	56.8	42 22.2	96 19	56.3	43 19.8	96 19	55.9	44 17.2	96 18	55.5	45 14.5	96 18	55.1	46 11.8	95 18	54.6	47 37.5	95 18	54.0	2
3	39 46.8	96 19	56.3	40 44.6	96 19	56.0	42 11.1	96 18	55.4	43 08.6	96 18	55.0	44 06.1	96 18	54.6	45 03.5	96 18	54.2	46 00.9	96 18	53.8	47 26.6	95 18	53.1	3
4	39 35.6	96 18	55.4	40 33.4	96 18	55.1	42 00.0	96 18	54.5	42 57.6	96 18	54.2	43 55.2	96 18	53.8	44 52.6	96 18	53.4	45 50.0	96 18	53.0	47 15.9	95 18	52.3	4
115	39 24.6	96 18	54.6	40 22.4	96 18	54.2	41 49.1	96 18	53.7	42 46.8	96 18	53.3	43 44.4	96 18	52.9	44 41.9	96 18	52.5	45 39.3	96 18	52.1	47 05.3	95 18	51.5	115
6	39 13.7	97 18	53.7	40 11.5	96 18	53.4	41 38.3	96 18	52.8	42 36.0	96 18	52.5	43 33.6	96 18	52.1	44 31.2	96 18	51.7	45 28.7	96 17	51.3	46 54.8	96 17	50.7	6
7	39 02.8	97 18	52.8	40 00.8	97 18	52.5	41 27.6	96 18	52.0	42 25.3	96 18	51.6	43 23.1	96 17	51.2	44 20.7	96 17	50.9	45 18.2	96 17	50.5	46 44.4	96 17	49.8	7
8	38 52.1	97 18	52.0	39 50.1	97 18	51.6	41 17.0	96 17	51.1	42 14.8	96 17	50.8	43 12.6	96 17	50.4	44 10.3	96 17	50.0	45 07.9	96 17	49.6	46 34.2	96 17	49.0	8
9	38 41.6	97 17	51.1	39 39.6	97 17	50.8	41 06.6	97 17	50.3	42 04.4	96 17	49.9	43 02.3	96 17	49.6	44 00.0	96 17	49.2	44 57.7	96 17	48.8	46 24.0	96 17	48.2	9
120	38 31.1	97 17	50.3	39 29.2	97 17	49.9	40 56.2	97 17	49.4	41 54.2	97 17	49.1	42 52.0	96 17	48.7	43 49.9	96 17	48.4	44 47.6	96 17	48.0	46 14.0	96 16	47.4	120
1	38 20.8	97 17	49.4	39 18.9	97 17	49.1	40 46.0	97 17	48.6	41 44.0	97 17	48.2	42 42.0	96 17	47.9	43 39.8	96 16	47.5	44 37.6	96 16	47.2	46 04.2	96 16	46.6	1
2	38 10.6	97 17	48.5	39 08.8	97 17	48.2	40 36.0	97 17	47.7	41 34.0	97 16	47.4	42 32.0	97 16	47.1	43 29.9	96 16	46.7	44 27.8	96 16	46.3	45 54.4	96 16	45.8	2
3	38 00.6	97 17	47.7	38 58.8	97 16	47.4	40 26.1	97 16	46.9	41 24.2	97 16	46.6	42 22.2	97 16	46.2	43 20.2	97 16	45.9	44 18.1	96 16	45.5	45 44.8	96 16	44.9	3
4	37 50.7	97 16	46.8	38 49.0	97 16	46.5	40 16.3	97 16	46.1	41 14.4	97 16	45.7	42 12.5	97 16	45.4	43 10.6	97 16	45.0	44 08.5	97 16	44.7	45 35.4	96 16	44.1	4
125	37 40.9	97 16	46.0	38 39.2	97 16	45.7	40 06.6	97 16	45.2	41 04.8	97 16	44.9	42 03.0	97 16	44.6	43 01.1	97 16	44.2	43 59.1	97 15	43.9	45 26.0	96 15	43.3	125
6	37 31.3	97 16	45.1	38 29.6	97 16	44.8	39 57.1	97 16	44.4	40 55.4	97 16	44.1	41 53.6	97 15	43.7	42 51.7	97 15	43.4	43 49.8	97 15	43.1	45 16.8	97 15	42.5	6
7	37 21.8	97 16	44.3	38 20.2	97 16	44.0	39 47.8	97 15	43.5	40 46.1	97 15	43.2	41 44.3	97 15	42.9	42 42.5	97 15	42.6	43 40.7	97 15	42.2	45 07.8	97 15	41.7	7
8	37 12.4	97 15	43.4	38 10.9	97 15	43.1	39 38.5	97 15	42.7	40 36.9	97 15	42.4	41 35.2	97 15	42.1	42 33.5	97 15	41.8	43 31.7	97 15	41.4	44 58.9	97 15	40.9	8
9	37 03.2	98 15	42.6	38 01.7	98 15	42.3	39 29.5	97 15	41.9	40 27.9	97 15	41.6	41 26.2	97 15	41.3	42 24.6	97 15	40.9	43 22.8	97 15	40.6	44 50.1	97 14	40.1	9
130	36 54.2	98 15	41.7	37 52.7	98 15	41.4	39 20.5	97 15	41.0	40 19.0	97 15	40.7	41 17.4	97 14	40.4	42 15.8	97 14	40.1	43 14.1	97 14	39.8	44 41.5	97 14	39.3	130
1	36 45.3	98 15	40.9	37 43.9	98 15	40.6	39 11.7	98 14	40.2	40 10.3	98 14	39.9	41 08.7	97 14	39.6	42 07.2	97 14	39.3	43 05.5	97 14	39.0	44 33.0	97 14	38.5	1
2	36 36.5	98 14	40.0	37 35.2	98 14	39.8	39 03.1	98 14	39.4	40 01.7	98 14	39.1	41 00.2	98 14	38.8	41 58.7	97 14	38.5	42 57.1	97 14	38.2	44 24.7	97 14	37.7	2
3	36 27.9	98 14	39.2	37 26.6	98 14	38.9	38 54.6	98 14	38.5	39 53.2	98 14	38.2	40 51.8	98 14	38.0	41 50.4	98 14	37.7	42 48.9	97 14	37.4	44 16.5	97 13	36.9	3
4	36 19.4	98 14	38.3	37 18.2	98 14	38.1	38 46.3	98 14	37.7	39 45.0	98 14	37.4	40 43.6	98 13	37.1	41 42.2	98 13	36.9	42 40.7	98 13	36.6	44 08.5	97 13	36.1	4
135	36 11.2	98 14	37.5	37 10.0	98 13	37.2	38 38.1	98 13	36.9	39 36.8	98 13	36.6	40 35.5	98 13	36.3	41 34.2	98 13	36.0	42 32.8	98 13	35.8	44 00.6	98 13	35.3	135
6	36 03.0	98 13	36.6	37 01.9	98 13	36.4	38 30.1	98 13	36.0	39 28.9	98 13	35.8	40 27.6	98 13	35.5	41 26.3	98 13	35.2	42 25.0	98 13	34.9	43 52.9	98 13	34.5	6
7	35 55.0	98 13	35.8	36 53.9	98 13	35.6	38 22.2	98 13	35.2	39 21.1	98 13	34.9	40 19.9	98 13	34.7	41 18.6	98 13	34.4	42 17.3	98 12	34.1	43 45.3	98 12	33.7	7
8	35 47.2	98 13	35.0	36 46.2	98 13	34.7	38 14.5	98 13	34.4	39 13.4	98 12	34.1	40 12.3	98 12	33.9	41 11.1	98 12	33.6	42 09.8	98 12	33.3	43 37.9	98 12	32.9	8
9	35 39.6	98 12	34.1	36 38.6	98 12	33.9	38 07.0	98 12	33.5	39 05.9	98 12	33.3	40 04.8	98 12	33.1	41 03.7	98 12	32.8	42 02.5	98 12	32.5	43 30.7	98 12	32.1	9
140	35 32.1	98 12	33.3	36 31.1	98 12	33.1	37 59.6	98 12	32.7	38 58.6	98 12	32.5	39 57.5	98 12	32.2	40 56.4	98 12	32.0	41 55.3	98 12	31.7	43 23.6	98 12	31.3	140
1	35 24.8	98 12	32.4	36 23.8	98 12	32.2	37 52.4	98 12	31.9	38 51.4	98 12	31.7	39 50.4	98 12	31.4	40 49.4	98 12	31.2	41 48.3	98 11	30.9	43 16.6	98 11	30.5	1
2	35 17.6	99 12	31.6	36 16.7	99 12	31.4	37 45.4	98 11	31.1	38 44.4	98 11	30.8	39 43.5	98 11	30.6	40 42.5	98 11	30.4	41 41.4	98 11	30.1	43 09.8	98 11	29.7	2
3	35 10.6	99 11	30.8	36 09.8	99 11	30.6	37 38.5	99 11	30.2	38 37.6	98 11	30.0	39 36.7	98 11	29.8	40 35.7	98 11	29.6	41 34.7	98 11	29.3	43 03.2	98 11	29.0	3
4	35 03.8	99 11	29.9	36 03.0	99 11	29.7	37 31.8	99 11	29.4	38 30.9	99 11	29.2	39 30.0	99 11	29.0	40 29.1	98 11	28.8	41 28.2	98 11	28.5	42 56.8	98 10	28.2	4
145	34 57.2	99 11	29.1	35 56.4	99 11	28.9	37 25.2	99 11	28.6	38 24.4	99 11	28.4	39 23.6	99 10	28.2	40 22.7	99 10	28.0	41 21.9	99 10	27.7	42 50.5	98 10	27.4	145
6	34 50.7	99 10	28.2	35 50.0	99 10	28.1	37 18.9	99 10	27.8	38 18.1	99 10	27.6	39 17.3	99 10	27.4	40 16.5	99 10	27.1	41 15.7	99 10	26.9	42 44.4	99 10	26.6	6
7	34 44.4	99 10	27.4	35 43.7	99 10	27.2	37 12.7	99 10	26.9	38 11.9	99 10	26.7	39 11.2	99 10	26.5	40 10.4	99 10	26.3	41 09.6	99 10	26.1	42 38.4	99 10	25.8	7
8	34 38.3	99 10	26.6	35 37.6	99 10	26.4	37 06.6	99 10	26.1	38 05.9	99 10	25.9	39 05.2	99 10	25.7	40 04.5	99 10	25.5	41 03.8	99 09	25.3	42 32.6	99 09	25.0	8
9	34 32.3	99 10	25.7	35 31.7	99 10	25.6	37 00.8	99 09	25.3	38 00.1	99 09	25.1	38 59.5	99 09	24.9	39 58.8	99 09	24.7	40 58.1	99 09	24.5	42 27.0	99 09	24.2	9
150	34 26.5	99 09	24.9	35 26.0	99 09	24.7	36 55.1	99 09	24.5	37 54.5	99 09	24.3	38 53.9	99 09	24.1	39 53.2	99 09	23.9	40 52.6	99 09	23.7	42 21.5	99 09	23.4	150
1	34 20.9	99 09	24.1	35 20.4	99 09	23.9	36 49.6	99 09	23.7	37 49.0	99 09	23.5	38 48.4	99 09	23.3	39 47.8	99 09	23.1	40 47.2	99 09	22.9	42 16.3	99 08	22.7	1
2	34 15.5	99 09	23.2	35 15.0	99 09	23.1	36 44.3	99 09	22.8	37 43.7	99 09	22.7	38 43.2	99 08	22.5	39 42.6	99 08	22.3	40 42.0	99 08	22.1	42 11.1	99 08	21.9	2
3	34 10.3	99 08	22.4	35 09.8	99 08	22.3	36 39.1	99 08	22.0	37 38.6	99 08	21.9	38 38.1	99 08	21.7	39 37.6	99 08	21.5	40 37.0	99 08	21.4	42 06.2	99 08	21.1	3
4	34 05.2	99 08	21.6	35 04.8	99 08	21.4	36 34.1	99 08	21.2	37 33.7	99 08	21.0	38 33.2	99 08	20.9	39 32.7	99 08	20.7	40 32.2	99 08	20.6	42 01.4	99 08	20.3	4
155	34 00.4	99 08	20.7	35 00.0	99 08	20.6	36 29.3	99 08	20.4	37 28.9	99 08	20.2	38 28.5	99 08	20.1	39 28.0	99 08	19.9	40 27.6	99 07	19.8	41 56.8	99 07	19.5	155
6	33 55.7	99 08	19.9	34 55.3	99 07	19.8	36 24.7	99 07	19.6	37 24.3	99 07	19.4	38 23.9	99 07	19.3	39 23.5	99 07	19.1	40 23.1	99 07	19.0	41 52.4	99 07	18.7	6
7	33 51.2	99 07	19.1	34 50.8	99 07	18.9	36 20.3	99 07	18.7	37 19.9	99 07	18.6	38 19.6	99 07	18.5	39 19.2	99 07	18.3	40 18.8	99 07	18.2	41 48.2	99 07	17.9	7
8	33 46.8	99 07	18.2	34 46.5	99 07	18.1	36 16.1	99 07	17.9	37 15.7	99 07	17.8	38 15.4	99 07	17.7	39 15.0	99 07	17.5	40 14.7	99 07	17.4	41 44.1	99 06	17.2	8
9	33 42.7	1.0 07	17.4	34 42.4	1.0 07	17.3	36 12.0	99 06	17.1	37 11.7	99 06	17.0	38 11.4	99 06	16.9	39 11.1	99 06	16.7	40 10.7	99 06	16.6	41 40.2	99 06	16.4	9
160	33 38.8	1.0 06	16.6	34 38.5	1.0 06	16.5	36 08.1	1.0 06	16.3	37 07.8	1.0 06	16.2	38 07.6	1.0 06	16.1	39 07.3	1.0 06	15.9	40 07.0	99 06	15.8	41 36.5	99 06	15.6	160
1	33 35.0	1.0 06	15.8	34 34.8	1.0 06	15.6	36 04.4	1.0 06	15.5	37 04.2	1.0 06	15.4	38 03.9	1.0 06	15.3	39 03.6	1.0 06	15.1	40 03.4	1.0 06	15.0	41 33.0	1.0 06	14.8	1
2	33 31.4	1.0 06	14.9	34 31.2	1.0 06	14.8	36 00.9	1.0 06	14.7	37 00.7	1.0 06	14.6	38 00.5	1.0 05	14.4	39 00.2	1.0 05	14.3	40 00.0	1.0 05	14.2	41 29.6	1.0 05	14.0	2
3	33 28.1	1.0 05	14.1	34 27.9	1.0 05	14.0	35 57.6	1.0 05	13.8	36 57.4	1.0 05	13.7	37 57.2	1.0 05	13.6	38 57.0	1.0 05	13.5	39 56.7	1.0 05	13.4	41 26.4	1.0 05	13.3	3
4	33 24.9	1.0 05	13.3	34 24.7	1.0 05	13.2	35 54.4	1.0 05	13.0	36 54.3	1.0 05	12.9	37 54.1	1.0 05	12.8	38 53.9	1.0 05	12.7	39 53.7	1.0 05	12.6	41 23.4	1.0 05	12.5	4
165	33 21.9	1.0 05	12.4	34 21.7	1.0 05	12.3	35 51.5	1.0 05	12.2	36 51.3	1.0 05	12.1	37 51.2	1.0 05	12.0	38 51.0	1.0 04	11.9	39 50.8	1.0 04	11.8	41 20.6	1.0 04	11.7	165
6	33 19.1	1.0 04	11.6	34 18.9	1.0 04	11.5	35 48.7	1.0 04	11.4	36 48.6	1.0 04	11.3	37 48.5	1.0 04	11.2	38 48.3	1.0 04	11.1	39 48.2	1.0 04	11.1	41 17.9	1.0 04	10.9	6
7	33 16.4	1.0 04	10.8	34 16.3	1.0 04	10.7	35 46.2	1.0 04	10.6	36 46.0	1.0 04	10.5	37 45.9	1.0 04	10.4	38 45.8	1.0 04	10.3	39 45.7	1.0 04	10.3	41 15.5	1.0 04	10.1	7
8	33 14.0	1.0 04	09.9	34 13.9	1.0 04	09.9	35 43.8	1.0 04	09.8	36 43.7	1.0 04	09.7	37 43.6	1.0 04	09.6	38 43.5	1.0 04	09.5	39 43.4	1.0 04	09.5	41 13.2	1.0 04	09.4	8
9	33 11.8	1.0 03	09.1	34 11.7	1.0 03	09.1	35 41.6	1.0 03	09.0	36 41.5	1.0 03	08.9	37 41.4	1.0 03	08.8	38 41.3	1.0 03	08.8	39 41.2	1.0 03	08.7	41 11.1	1.0 03	08.6	9
170	33 09.7	1.0 03	08.3	34 09.7	1.0 03	08.2	35 39.6	1.0 03	08.1	36 39.5	1.0 03	08.1	37 39.4	1.0 03	08.0	38 39.4	1.0 03	08.0	39 39.3	1.0 03	07.9	41 09.2	1.0 03	07.8	170
1	33 07.9	1.0 03	07.5	34 07.8	1.0 03	07.4	35 37.8	1.0 03	07.3	36 37.7	1.0 03	07.3	37 37.6	1.0 03	07.2	38 37.6	1.0 03	07.2	39 37.5	1.0 03	07.1	41 07.4	1.0 03	07.0	1
2	33 06.2	1.0 02	06.6	34 06.2	1.0 02	06.6	35 36.1	1.0 02	06.5	36 36.1	1.0 02	06.5	37 36.0	1.0 02	06.4	38 36.0	1.0 02	06.4	39 35.9	1.0 02	06.3	41 05.9	1.0 02	06.2	2
3	33 04.8	1.0 02	05.8	34 04.7	1.0 02	05.8	35 34.7	1.0 02	05.7	36 34.7	1.0 02	05.7	37 34.6	1.0 02	05.6	38 34.6	1.0 02	05.6	39 34.6	1.0 02	05.5	41 04.5	1.0 02	05.5	3
4	33 03.5	1.0 02	05.0	34 03.5	1.0 02	04.9	35 33.4	1.0 02	04.9	36 33.4	1.0 02	04.8	37 33.4	1.0 02	04.8	38 33.4	1.0 02	04.8	39 33.3	1.0 02	04.7	41 03.3	1.0 02	04.7	4
175	33 02.4	1.0 01	04.1	34 02.4	1.0 01	04.1	35 32.4	1.0 01	04.1	36 32.4	1.0 01	04.0	37 32.4	1.0 01	04.0	38 32.3	1.0 01	04.0	39 32.3	1.0 01	03.9	41 02.3	1.0 01	03.9	175
6	33 01.6	1.0 01	03.3	34 01.5	1.0 01	03.3	35 31.5	1.0 01	03.3	36 31.5	1.0 01	03.2	37 31.5	1.0 01	03.2	38 31.5	1.0 01	03.2	39 31.5	1.0 01	03.2	41 01.5	1.0 01	03.1	6
7	33 00.9	1.0 01	02.5	34 00.9	1.0 01	02.5	35 30.9	1.0 01	02.4	36 30.9	1.0 01	02.4	37 30.9	1.0 01	02.4	38 30.8	1.0 01	02.4	39 30.8	1.0 01	02.4	41 00.8	1.0 01	02.3	7
8	33 00.4	1.0 00	01.7	34 00.4	1.0 00	01.6	35 30.4	1.0 00	01.6	36 30.4	1.0 00	01.6	37 30.4	1.0 00	01.6	38 30.4	1.0 00	01.6	39 30.4	1.0 00	01.6	41 00.4	1.0 00	01.6	8
9	33 00.1	1.0 00	00.8	34 00.1	1.0 00	00.8	35 30.1	1.0 00	00.8	36 30.1	1.0 00	00.8	37 30.1	1.0 00	00.8	38 30.1	1.0 00	00.8	39 30.1	1.0 00	00.8	41 00.1	1.0 00	00.8	9
180	33 00.0	1.0 00	00.0	34 00.0	1.0 00	00.0	35 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	38 30.0	1.0 00	00.0	39 30.0	1.0 00	00.0	41 00.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 77°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	67 30.0	1.0 00	180.0	68 00.0	1.0 00	180.0	69 00.0	1.0 00	180.0	69 30.0	1.0 00	180.0	70 00.0	1.0 00	180.0	70 30.0	1.0 00	180.0	72 00.0	1.0 00	180.0	72 30.0	1.0 00	180.0	00
1	67 29.8	1.0 01	178.5	67 59.8	1.0 01	178.5	68 59.8	1.0 01	178.4	69 29.8	1.0 01	178.4	69 59.8	1.0 01	178.4	70 29.8	1.0 01	178.4	71 59.8	1.0 01	178.3	72 29.8	1.0 01	178.3	1
2	67 29.3	1.0 01	177.0	67 59.3	1.0 02	176.9	68 59.3	1.0 02	176.9	69 29.3	1.0 02	176.8	69 59.3	1.0 02	176.8	70 29.2	1.0 02	176.8	71 59.2	1.0 02	176.7	72 29.2	1.0 02	176.6	2
3	67 28.4	1.0 02	175.5	67 58.4	1.0 02	175.4	68 58.3	1.0 02	175.3	69 28.3	1.0 02	175.3	69 58.3	1.0 02	175.2	70 28.3	1.0 02	175.2	71 58.2	1.0 02	175.0	72 28.2	1.0 02	174.9	3
4	67 27.1	1.0 03	173.9	67 57.1	1.0 03	173.9	68 57.1	1.0 03	173.8	69 27.0	1.0 03	173.7	69 57.0	1.0 03	173.6	70 27.0	1.0 03	173.6	71 56.9	1.0 03	173.3	72 26.8	1.0 03	173.3	4
05	67 25.5	1.0 03	172.4	67 55.5	1.0 03	172.4	68 55.4	1.0 03	172.2	69 25.4	1.0 03	172.1	69 55.3	1.0 03	172.1	70 25.3	1.0 03	172.0	71 55.1	1.0 04	171.7	72 25.0	1.0 04	171.6	05
6	67 23.6	1.0 04	170.9	67 53.5	1.0 04	170.9	68 53.4	1.0 04	170.7	69 23.3	1.0 04	170.6	69 53.3	1.0 04	170.5	70 23.2	1.0 04	170.4	71 53.0	1.0 04	170.0	72 22.9	1.0 04	169.9	6
7	67 21.3	1.0 04	169.4	67 51.2	1.0 04	169.3	68 51.0	1.0 05	169.1	69 20.9	1.0 05	169.0	69 50.9	1.0 05	168.9	70 20.8	1.0 05	168.8	71 50.4	1.0 05	168.4	72 20.3	1.0 05	168.2	7
8	67 18.6	1.0 05	167.9	67 48.5	1.0 05	167.8	68 48.3	1.0 05	167.6	69 18.2	1.0 05	167.4	69 48.1	1.0 05	167.3	70 17.9	1.0 05	167.2	71 47.5	99 06	166.7	72 17.4	99 06	166.6	8
9	67 15.6	1.0 06	166.4	67 45.5	1.0 06	166.3	68 45.2	1.0 06	166.0	69 15.1	1.0 06	165.9	69 44.9	99 06	165.8	70 14.8	99 06	165.6	71 44.2	99 06	165.1	72 14.0	99 06	164.9	9
10	67 12.3	99 06	164.9	67 42.1	99 06	164.8	68 41.8	99 06	164.5	69 11.6	99 06	164.3	69 41.4	99 06	164.2	70 11.2	99 06	164.0	71 40.6	99 07	163.5	72 10.3	99 07	163.3	10
1	67 08.6	99 07	163.4	67 38.4	99 07	163.3	68 38.0	99 07	163.0	69 07.8	99 07	162.8	69 37.6	99 07	162.6	70 07.3	99 07	162.5	71 36.6	99 07	161.9	72 06.3	99 07	161.6	1
2	67 04.6	99 07	161.9	67 34.4	99 07	161.8	68 33.9	99 07	161.4	69 03.6	99 08	161.3	69 33.4	99 08	161.1	70 03.1	99 08	160.9	71 32.2	99 08	160.2	72 01.8	99 08	160.0	2
3	67 00.2	99 08	160.5	67 30.0	99 08	160.3	68 29.4	99 08	159.9	68 59.1	99 08	159.7	69 28.8	99 08	159.5	69 58.5	99 08	159.3	71 27.4	99 08	158.6	71 57.0	99 09	158.4	3
4	66 55.6	99 08	159.0	67 25.3	99 08	158.8	68 24.6	99 09	158.4	68 54.3	99 09	158.2	69 23.9	99 09	158.0	69 53.6	99 09	157.8	71 22.4	99 09	157.0	71 51.9	98 09	156.8	4
15	66 50.6	99 09	157.5	67 20.2	99 09	157.3	68 19.5	99 09	156.9	68 49.1	99 09	156.7	69 18.7	99 09	156.5	69 48.3	99 09	156.2	71 16.9	98 10	155.5	71 46.4	98 10	155.2	15
6	66 45.2	99 09	156.1	67 14.9	99 09	155.9	68 14.1	99 10	155.4	68 43.6	99 10	155.2	69 13.2	98 10	155.0	69 42.7	98 10	154.7	71 11.1	98 10	153.9	71 40.6	98 10	153.6	6
7	66 39.6	99 10	154.6	67 09.2	99 10	154.4	68 08.3	98 10	154.0	68 37.8	98 10	153.7	69 07.3	98 10	153.5	69 36.8	98 10	153.2	71 05.0	98 11	152.3	71 34.4	98 11	152.0	7
8	66 33.7	98 10	153.2	67 03.2	98 10	153.0	68 02.2	98 11	152.5	68 31.7	98 11	152.2	69 01.1	98 11	152.0	69 30.5	98 11	151.7	70 58.6	98 11	150.8	71 27.9	98 11	150.4	8
9	66 27.4	98 11	151.8	66 56.9	98 11	151.5	67 55.8	98 11	151.0	68 25.2	98 11	150.8	68 54.6	98 11	150.5	69 24.0	98 11	150.2	70 51.9	97 12	149.2	71 21.1	97 12	148.9	9
20	66 20.9	98 11	150.3	66 50.3	98 11	150.1	67 49.1	98 12	149.6	68 18.5	98 12	149.3	68 47.8	98 12	149.0	69 17.1	98 12	148.7	70 44.8	97 12	147.7	71 13.9	97 12	147.3	20
1	66 14.1	98 12	148.9	66 43.5	98 12	148.7	67 42.1	98 12	148.1	68 11.4	98 12	147.8	68 40.7	98 12	147.5	69 09.9	97 12	147.2	70 37.4	97 13	146.2	71 06.5	97 13	145.8	1
2	66 07.0	98 12	147.5	66 36.3	98 12	147.2	67 34.9	98 13	146.7	68 04.1	97 13	146.4	68 33.3	97 13	146.1	69 02.5	97 13	145.8	70 29.8	97 13	144.7	70 58.8	97 13	144.3	2
3	65 59.6	98 13	146.1	66 28.9	98 13	145.8	67 27.3	97 13	145.3	67 56.5	97 13	145.0	68 25.7	97 13	144.6	68 54.8	97 13	144.3	70 21.8	97 14	143.2	70 50.8	96 14	142.8	3
4	65 51.9	97 13	144.7	66 21.1	97 13	144.4	67 19.5	97 13	143.8	67 48.6	97 14	143.5	68 17.7	97 14	143.2	68 46.8	97 14	142.9	70 13.6	96 14	141.7	70 42.5	96 14	141.3	4
25	65 44.0	97 14	143.3	66 13.2	97 14	143.0	67 11.4	97 14	142.4	67 40.5	97 14	142.1	68 09.5	97 14	141.8	68 38.5	97 14	141.4	70 05.1	96 15	140.3	70 33.9	96 15	139.9	25
6	65 35.8	97 14	142.0	66 04.9	97 14	141.7	67 03.0	97 14	141.0	67 32.0	97 14	140.7	68 01.0	96 15	140.4	68 29.9	96 15	140.0	69 56.4	96 15	138.8	70 25.1	96 15	138.4	6
7	65 27.4	97 14	140.6	65 56.4	97 15	140.3	66 54.4	97 15	139.7	67 23.4	96 15	139.3	67 52.3	96 15	139.0	68 21.1	96 15	138.6	69 47.4	96 15	137.4	70 16.0	95 16	137.0	7
8	65 18.7	97 15	139.3	65 47.7	97 15	138.9	66 45.6	96 15	138.3	67 14.4	96 15	137.9	67 43.3	96 15	137.6	68 12.1	96 15	137.2	69 38.1	95 16	136.0	70 06.7	95 16	135.5	8
9	65 09.7	97 15	137.9	65 38.7	96 15	137.6	66 36.5	96 16	136.9	67 05.3	96 16	136.6	67 34.1	96 16	136.2	68 02.8	96 16	135.8	69 28.6	95 16	134.6	69 57.1	95 16	134.1	9
30	65 00.6	96 16	136.6	65 29.5	96 16	136.3	66 27.1	96 16	135.6	66 55.9	96 16	135.2	67 24.6	96 16	134.9	67 53.3	95 16	134.5	69 18.9	95 17	133.2	69 47.3	95 17	132.7	30
1	64 51.2	96 16	135.3	65 20.0	96 16	134.9	66 17.6	96 16	134.2	66 46.3	96 16	133.9	67 14.9	96 16	133.5	67 43.5	95 17	133.1	69 08.9	95 17	131.8	69 37.3	94 17	131.4	1
2	64 41.6	96 16	134.0	65 10.4	96 16	133.6	66 07.8	96 17	132.9	66 36.4	95 17	132.6	67 05.0	95 17	132.2	67 33.6	95 17	131.8	68 58.8	94 17	130.5	69 27.0	94 17	130.0	2
3	64 31.8	96 17	132.7	65 00.5	96 17	132.3	65 57.8	96 17	131.6	66 26.4	95 17	131.2	66 54.9	95 17	130.8	67 23.4	95 17	130.4	68 48.4	94 18	129.1	69 16.6	94 18	128.6	3
4	64 21.7	96 17	131.4	64 50.4	96 17	131.0	65 47.6	95 17	130.3	66 16.1	95 17	129.9	66 44.6	95 18	129.5	67 13.0	95 18	129.1	68 37.8	94 18	127.8	69 05.9	94 18	127.3	4
35	64 11.5	96 17	130.1	64 40.1	95 17	129.7	65 37.2	95 18	129.0	66 05.7	95 18	128.6	66 34.1	95 18	128.2	67 02.4	94 18	127.8	68 27.1	94 18	126.5	68 55.1	93 18	126.0	35
6	64 01.1	95 18	128.8	64 29.7	95 18	128.5	65 26.6	95 18	127.7	65 55.1	95 18	127.3	66 23.4	94 18	126.9	66 51.7	94 18	126.5	68 16.1	93 19	125.2	68 44.1	93 19	124.7	6
7	63 50.5	95 18	127.6	64 19.0	95 18	127.2	65 15.9	95 18	126.5	65 44.2	94 18	126.1	66 12.5	94 18	125.7	66 40.8	94 18	125.2	68 05.0	93 19	123.9	68 32.9	93 19	123.4	7
8	63 39.7	95 18	126.3	64 08.2	95 18	126.0	65 04.9	94 18	125.2	65 33.2	94 19	124.8	66 01.5	94 19	124.4	66 29.6	94 19	124.0	67 53.7	93 19	122.6	68 21.6	93 19	122.1	8
9	63 28.7	95 19	125.1	63 57.1	95 19	124.7	64 53.8	94 19	124.0	65 22.1	94 19	123.6	65 50.3	94 19	123.1	66 18.4	94 19	122.7	67 42.2	93 19	121.3	68 10.0	92 19	120.8	9
40	63 17.6	95 19	123.8	63 46.0	94 19	123.5	64 42.6	94 19	122.7	65 10.7	94 19	122.3	65 38.9	94 19	121.9	66 06.9	93 19	121.5	67 30.6	93 20	120.1	67 58.4	92 20	119.6	40
1	63 06.3	95 19	122.6	63 34.6	94 19	122.3	64 31.1	94 19	121.5	64 59.3	94 19	121.1	65 27.3	93 19	120.7	65 55.3	93 20	120.2	67 18.9	92 20	118.8	67 46.6	92 20	118.3	1
2	62 54.9	94 19	121.4	63 23.1	94 19	121.0	64 19.5	94 20	120.3	64 47.6	94 20	119.9	65 15.7	93 20	119.4	65 43.6	93 20	118.9	67 07.0	92 20	117.6	67 34.6	92 20	117.1	2
3	62 43.3	94 20	120.2	63 11.5	94 20	119.8	64 07.8	94 20	119.1	64 35.9	93 20	118.7	65 03.8	93 20	118.2	65 31.7	93 20	117.8	66 55.0	92 20	116.4	67 22.5	92 20	115.9	3
4	62 31.5	94 20	119.0	62 59.7	94 20	118.7	63 55.9	93 20	117.9	64 23.9	93 20	117.5	64 51.9	93 20	117.0	65 19.7	93 20	116.6	66 42.8	92 20	115.2	67 10.3	92 21	114.7	4
45	62 19.7	94 20	117.9	62 47.8	94 20	117.5	63 43.9	93 20	116.7	64 11.9	93 20	116.3	64 39.8	93 20	115.9	65 07.6	93 20	115.4	66 30.5	92 21	114.0	66 58.0	91 21	113.5	45
6	62 07.7	94 20	116.7	62 35.8	94 20	116.3	63 31.8	93 20	115.5	63 59.7	93 20	115.1	64 27.6	93 21	114.7	64 55.4	92 21	114.2	66 18.1	92 21	112.8	66 45.6	91 21	112.3	6
7	61 55.6	94 20	115.5	62 23.6	93 20	115.1	63 19.6	93 21	114.4	63 47.5	93 21	113.9	64 15.3	93 21	113.5	64 43.0	92 21	113.1	66 05.7	91 21	111.6	66 33.0	91 21	111.1	7
8	61 43.3	94 21	114.4	62 11.4	93 21	114.0	63 07.2	93 21	113.2	63 35.1	93 21	112.8	64 02.8	92 21	112.4	64 30.5	92 21	111.9	65 53.1	91 21	110.5	66 20.4	91 21	110.0	8
9	61 31.0	93 21	113.2	61 59.0	93 21	112.8	62 54.8	93 21	112.1	63 22.6	93 21	111.6	63 50.3	92 21	111.2	64 18.0	92 21	110.8	65 40.4	91 21	109.3	66 07.7	91 21	108.8	9
50	61 18.5	93 21	112.1	61 46.5	93 21	111.7	62 42.2	93 21	110.9	63 10.0	92 21	110.5	63 37.7	92 21	110.1	64 05.3	92 21	109.6	65 27.6	91 21	108.2	65 54.8	91 22	107.7	50
1	61 06.0	93 21	111.0	61 33.9	93 21	110.6	62 29.6	93 21	109.8	62 57.3	92 21	109.4	63 25.0	92 21	108.9	63 52.5	92 21	108.5	65 14.7	91 22	107.1	65 41.9	91 22	106.6	1
2	60 53.3	93 21	109.9	61 21.2	93 21	109.5	62 16.8	93 21	108.7	62 44.5	92 21	108.3	63 12.1	92 22	107.8	63 39.7	92 22	107.4	65 01.8	91 22	106.0	65 29.0	90 22	105.5	2
3	60 40.6	93 21	108.7	61 08.4	93 21	108.4	62 04.0	92 22	107.6	62 31.7	92 22	107.2	62 59.3	92 22	106.7	63 26.8	92 22	106.3	64 48.8	91 22	104.9	65 15.9	90 22	104.4	3
4	60 27.7	93 22	107.6	60 55.6	93 21	107.3	61 51.1	92 22	106.5	62 18.7	92 22	106.1	62 46.3	92 22	105.6	63 13.8	91 22	105.2	64 35.7	91 22	103.8	65 02.8	90 22	103.3	4
55	60 14.8	93 22	106.6	60 42.7	93 22	106.2	61 38.1	92 22	105.4	62 05.7	92 22	105.0	62 33.3	92 22	104.5	63 00.7	91 22	104.1	64 22.6	90 22	102.7	64 49.7	90 22	102.2	55
6	60 01.9	93 22	105.5	60 29.7	92 22	105.1	61 25.1	92 22	104.3	61 52.7	92 22	103.9	62 20.2	92 22	103.5	62 47.6	91 22	103.0	64 09.4	90 22	101.6	64 36.4	90 22	101.1	6
7	59 48.8	93 22	104.4	60 16.6	92 22	104.0	61 12.0	92 22	103.2	61 39.5	92 22	102.8	62 07.0	92 22	102.4	62 34.4	91 22	102.0	63 56.1	90 22	100.6	64 23.2	90 22	100.1	7
8	59 35.7	93 22	103.3	60 03.5	92 22	103.0	60 58.8	92 22	102.2	61 26.3	92 22	101.8	61 53.8	91 22	101.3	62 21.2	91 22	100.9	63 42.8	90 22	99.5	64 09.9	90 22	99.0	8
9	59 22.6	93 22	102.3	59 50.3	92 22	101.9	60 45.6	92 22	101.1	61 13.1	92 22	100.7	61 40.5	91 22	100.3	62 07.9	91 22	99.8	63 29.5	90 22	98.5	63 56.5	90 22	98.0	9
60	59 09.3	93 22	101.2	59 37.1	92 22	100.8	60 32.3	92 22	100.1	60 59.8	92 22	99.7	61 27.2	91 22	99.2	61 54.6	91 22	98.8	63 16.1	90 22	97.4	63 43.1	90 22	96.9	60
1	58 56.1	92 22	100.2	59 23.8	92 22	99.8	60 19.0	92 22	99.0	60 46.5	92 22	98.6	61 13.9	91 22	98.2	61 41.2	91 22	97.8	63 02.7	90 22	96.4	63 29.7	90 22	95.9	1
2	58 42.8	92 22	99.1	59 10.5	92 22	98.8	60 05.6	92 22	98.0	60 33.1	91 22	97.6	61 00.5	91 22	97.2	61 27.8	91 22	96.7	62 49.3	90 22	95.4	63 16.3	90 22	94.9	2
3	58 29.4	92 22	98.1	58 57.1	92 22	97.7	59 52.3	92 22	97.0	60 19.7	91 22	96.6	60 47.1	91 22	96.1	61 14.4	91 22	95.7	62 35.9	90 22	94.4	63 02.8	90 22	93.9	3
4	58 16.1	92 22	97.1	58 43.7	92 22	96.7	59 38.8	92 22	95.9	60 06.3	91 22	95.5	60 33.7	91 22	95.1	61 01.0	91 22	94.7	62 22.4	90 22	93.4	62 49.3	90 22	92.9	4
65	58 02.6	92 22	96.1	58 30.3	92 22	95.7	59 25.4	92 22	94.9	59 52.9	91 22	94.5	60 20.2	91 22	94.1	60 47.5	91 22	93.7	62 08.9	90 22	92.4	62 35.9	90 22	91.9	65
6	57 49.2	92 22	95.1	58 16.9	92 22	94.7	59 12.0	92 22	93.9	59 39.4	91 22	93.5	60 06.8	91 22	93.1	60 34.1	91 22	92.7	61 55.4	90 22	91.4	62 22.4	90 22	90.9	6
7	57 35.8	92 22	94.1	58 03.4	92 22	93.7	58 58.5	92 22	92.9	59 25.9	91 22	92.5	59 53.3	91 22	92.1	60 20.6	91 22	91.7	61 41.9	90 22	90.4	62 08.9	90 22	89.9	7
8	57 22.3	92 22	93.1	57 49.9	92 22	92.7	58 45.0	92 22	91.9	59 12.4	91 22	91.6	59 39.8	91 22	91.1	60 07.1	91 22	90.7	61 28.4	90 22	89.4	61 55.4	90 22	89.0	8
9	57 08.8	92 22	92.1	57 36.4	92 22	91.7	58 31.5	92 22	91.0	58 58.9	91 22	90.6	59 26.3	91 22	90.2	59 53.6	91 22	89.8	61 14.9	90 22	88.5	61 41.9	90 22	88.0	9
70	56 55.3	92 22	91.1	57 22.9	92 22	90.7	58 18.0	92 22	90.0	58 45.4	91 22	89.6	59 12.8	91 22	89.2	59 40.1	91 22	88.8	61 01.4	90 22	87.5	61 28.4	90 22	87.0	70
1	56 41.8	92 22	90.1	57 09.4	92 22	89.8	58 04.5	92 22	89.0	58 31.9	91 22	88.6	58 59.3	91 22	88.2	59 26.6	91 22	87.8	60 48.0	90 22	86.5	61 14.9	90 22	86.1	1
2	56 28.3	92 22	89.1	56 56.0	92 22	88.8	57 51.0	92 22	88.0	58 18.5	91 22	87.7	58 45.8	91 22	87.3	59 13.1	91 22	86.9	60 34.5	90 22	85.6	61 01.5	90 22	85.1	2
3	56 14.8	92 22	88.2	56 42.5	92 22	87.8	57 37.5	92 22	87.1	58 05.0	91 22	86.7	58 32.3	91 22	86.3	58 59.6	91 22	85.9	60 21.1	90 22	84.7	60 48.0	90 22	84.2	3
4	56 01.3	92 22	87.2	56 29.0	92 22	86.9	57 24.1	92 22	86.1	57 51.5	91 22	85.8	58 18.9	91 22	85.4	58 46.2	91 22	85.0	60 07.6	90 22	83.7	60 34.6	90 22	83.3	4
75	55 47.9	92 22	86.3	56 15.5	92 22	85.9	57 10.6	92 22	85.2	57 38.1	91 22	84.8	58 05.4	91 22	84.4	58 32.8	91 22	84.0	59 54.2	90 22	82.8	60 21.2	90 22	82.4	75
6	55 34.4	92 22	85.3	56 02.1	92 22	85.0	56 57.2	92 22	84.2	57 24.6	91 22	83.9	57 52.0	91 22	83.5	58 19.3	91 22	83.1	59 40.9	90 22	81.9	60 07.9	90 22	81.4	6
7	55 21.0	92 22	84.4	55 48.6	92 22	84.0	56 43.7	92 22	83.3	57 11.2	91 22	82.9	57 38.6	91 22	82.6	58 06.0	91 22	82.2	59 27.5	90 22	80.9	59 54.5	90 22	80.5	7
8	55 07.5	92 22	83.4	55 35.2	92 22	83.1	56 30.4	92 22	82.4	56 57.8	91 22	82.0	57 25.3	91 22	81.6	57 52.6	91 22	81.3	59 14.2	90 22	80.0	59 41.2	90 22	79.6	8
9	54 54.2	92 22	82.5	55 21.8	92 22	82.2	56 17.0	92 22	81.5	56 44.5	92 22	81.1	57 11.9	91 22	80.7	57 39.3	91 22	80.3	59 00.9	90 22	79.1	59 28.0	90 22	78.7	9
80	54 40.8	92 22	81.6	55 08.5	92 22	81.2	56 03.7	92 22	80.5	56 31.2	92 22	80.2	56 58.6	91 22	79.8	57 26.0	91 22	79.4	58 47.7	90 22	78.2	59 14.8	90 22	77.8	80
1	54 27.5	92 22	80.6	54 55.1	92 22	80.3	55 50.4	92 22	79.6	56 17.9	92 22	79.3	56 45.3	91 22	78.9	57 12.7	91 22	78.5	58 34.5	90 22	77.3	59 01.6	90 22	76.9	1
2	54 14.2	92 22	79.7	54 41.9	92 22	79.4	55 37.1	92 22	78.7	56 04.6	92 22	78.3	56 32.1	91 22	78.0	56 59.5	91 22	77.6	58 21.3	91 22	76.4	58 48.5	90 22	76.0	2
3	54 00.9	92 22	78.8	54 28.6	92 22	78.5	55 23.9	92 22	77.8	55 51.5	92 22	77.4	56 18.9	92 22	77.1	56 46.4	91 22	76.7	58 08.3	91 22	75.6	58 35.4	90 22	75.2	3
4	53 47.7	93 22	77.9	54 15.4	92 22	77.6	55 10.7	92 22	76.9	55 38.3	92 22	76.5	56 05.8	92 22	76.2	56 33.3	91 22	75.8	57 55.2	91 22	74.7	58 22.4	90 22	74.3	4
85	53 34.5	93 22	77.0	54 02.3	92 22	76.7	54 57.6	92 22	76.0	55 25.2	92 22	75.6	55 52.7	92 22	75.3	56 20.2	91 22	74.9	57 42.2	91 22	73.8	58 09.4	91 22	73.4	85
6	53 21.4	93 22	76.1	53 49.1	92 22	75.8	54 44.5	92 22	75.1	55 12.2	92 22	74.8	55 39.7	92 22	74.4	56 07.2	92 22	74.0	57 29.3	91 21	72.9	57 56.5	91 21	72.5	6
7	53 08.3	93 22	75.2	53 36.1	93 22	74.9	54 31.5	92 22	74.2	54 59.2	92 22	73.9	55 26.7	92 22	73.5	55 54.2	92 21	73.2	57 16.4	91 21	72.1	57 43.7	91 21	71.7	7
8	52 55.3	93 22	74.3	53 23.1	93 22	74.0	54 18.6	92 22	73.3	54 46.2	92 22	73.0	55 13.8	92 21	72.6	55 41.4	92 21	72.3	57 03.6	91 21	71.2	57 30.9	91 21	70.8	8
9	52 42.3	93 22	73.4	53 10.2	93 21	73.1	54 05.7	92 21	72.4	54 33.3	92 21	72.1	55 01.0	92 21	71.8	55 28.5	92 21	71.4	56 50.9	91 21	70.3	57 18.2	91 21	70.0	9
90	52 29.4	93 21	72.5	52 57.3	93 21	72.2	53 52.8	92 21	71.6	54 20.5	92 21	71.2	54 48.2	92 21	70.9	55 15.8	92 21	70.6	56 38.2	91 21	69.5	57 05.5	91 21	69.1	90

Lat. 77°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	52 16.6	93 21	71.6	52 44.5	93 21	71.3	53 40.1	93 21	70.7	54 07.8	92 21	70.4
2	52 03.8	93 21	70.7	52 31.7	93 21	70.4	53 27.4	93 21	69.8	53 55.1	92 21	69.5
3	51 51.1	93 21	69.9	52 19.0	93 21	69.6	53 14.7	93 21	68.9	53 42.5	93 21	68.6
4	51 38.5	93 21	69.0	52 06.4	93 21	68.7	53 02.2	93 21	68.1	53 30.0	93 21	67.8
95	51 25.9	93 21	68.1	51 53.9	93 21	67.8	52 49.7	93 21	67.2	53 17.5	93 21	66.9
6	51 13.4	93 21	67.2	51 41.4	93 21	67.0	52 37.3	93 21	66.4	53 05.1	93 20	66.1
7	51 01.0	93 21	66.4	51 29.0	93 20	66.1	52 25.0	93 20	65.5	52 52.8	93 20	65.2
8	50 48.7	94 20	65.5	51 16.7	93 20	65.2	52 12.7	93 20	64.7	52 40.6	93 20	64.4
9	50 36.4	94 20	64.7	51 04.5	94 20	64.4	52 00.6	93 20	63.8	52 28.5	93 20	63.5
100	50 24.3	94 20	63.8	50 52.4	94 20	63.5	51 48.5	93 20	63.0	52 16.5	93 20	62.7
1	50 12.2	94 20	62.9	50 40.4	94 20	62.7	51 36.5	93 20	62.1	52 04.5	93 20	61.8
2	50 00.2	94 20	62.1	50 28.4	94 20	61.8	51 24.6	94 20	61.3	51 52.7	93 20	61.0
3	49 48.4	94 20	61.3	50 16.6	94 20	61.0	51 12.8	94 20	60.4	51 40.9	94 19	60.2
4	49 36.6	94 19	60.4	50 04.8	94 19	60.1	51 01.2	94 19	59.6	51 29.3	94 19	59.3
105	49 24.9	94 19	59.6	49 53.2	94 19	59.3	50 49.6	94 19	58.8	51 17.7	94 19	58.5
6	49 13.3	94 19	58.7	49 41.6	94 19	58.5	50 38.1	94 19	57.9	51 06.3	94 19	57.7
7	49 01.8	94 19	57.9	49 30.1	94 19	57.6	50 26.7	94 19	57.1	50 54.9	94 19	56.8
8	48 50.4	95 19	57.0	49 18.8	94 19	56.8	50 15.4	94 19	56.3	50 43.7	94 19	56.0
9	48 39.2	95 19	56.2	49 07.6	95 19	56.0	50 04.2	94 18	55.5	50 32.5	94 18	55.2
110	48 28.0	95 18	55.4	48 56.4	95 18	55.1	49 53.2	94 18	54.6	50 21.5	94 18	54.4
1	48 17.0	95 18	54.6	48 45.4	95 18	54.3	49 42.2	95 18	53.8	50 10.6	94 18	53.6
2	48 06.0	95 18	53.7	48 34.5	95 18	53.5	49 31.4	95 18	53.0	49 59.8	95 18	52.8
3	47 55.2	95 18	52.9	48 23.7	95 18	52.7	49 20.7	95 18	52.2	49 49.1	95 18	51.9
4	47 44.5	95 18	52.1	48 13.0	95 18	51.9	49 10.1	95 17	51.4	49 38.5	95 17	51.1
115	47 33.9	95 17	51.3	48 02.5	95 17	51.0	48 59.6	95 17	50.6	49 28.1	95 17	50.3
6	47 23.4	95 17	50.4	47 52.1	95 17	50.2	48 49.2	95 17	49.8	49 17.7	95 17	49.5
7	47 13.1	96 17	49.6	47 41.7	95 17	49.4	48 39.0	95 17	49.0	49 07.5	95 17	48.7
8	47 02.9	96 17	48.8	47 31.6	96 17	48.6	48 28.8	95 17	48.1	48 57.5	95 17	47.9
9	46 52.8	96 17	48.0	47 21.5	96 17	47.8	48 18.9	96 16	47.3	48 47.5	95 16	47.1
120	46 42.8	96 16	47.2	47 11.6	96 16	47.0	48 09.0	96 16	46.5	48 37.7	96 16	46.3
1	46 33.0	96 16	46.4	47 01.8	96 16	46.2	47 59.3	96 16	45.7	48 28.0	96 16	45.5
2	46 23.3	96 16	45.6	46 52.1	96 16	45.4	47 49.7	96 16	44.9	48 18.4	96 16	44.7
3	46 13.7	96 16	44.7	46 42.6	96 16	44.6	47 40.2	96 16	44.1	48 09.0	96 16	43.9
4	46 04.3	96 15	43.9	46 33.2	96 15	43.7	47 30.9	96 15	43.3	47 59.7	96 15	43.1
125	45 55.0	96 15	43.1	46 23.9	96 15	42.9	47 21.7	96 15	42.6	47 50.5	96 15	42.3
6	45 45.8	97 15	42.3	46 14.8	96 15	42.1	47 12.6	96 15	41.8	47 41.5	96 15	41.6
7	45 36.8	97 15	41.5	46 05.8	97 15	41.3	47 03.7	96 15	41.0	47 32.6	96 15	40.8
8	45 27.9	97 15	40.7	45 56.9	97 14	40.5	46 54.9	97 14	40.2	47 23.9	97 14	40.0
9	45 19.2	97 14	39.9	45 48.2	97 14	39.7	46 46.3	97 14	39.4	47 15.3	97 14	39.2
130	45 10.6	97 14	39.1	45 39.7	97 14	39.0	46 37.8	97 14	38.6	47 06.8	97 14	38.4
1	45 02.2	97 14	38.3	45 31.3	97 14	38.2	46 29.4	97 14	37.8	46 58.5	97 14	37.6
2	44 53.9	97 14	37.5	45 23.0	97 14	37.4	46 21.2	97 13	37.0	46 50.3	97 13	36.8
3	44 45.7	97 13	36.7	45 14.9	97 13	36.6	46 13.2	97 13	36.2	46 42.3	97 13	36.1
4	44 37.7	97 13	35.9	45 06.9	97 13	35.8	46 05.3	97 13	35.4	46 34.5	97 13	35.3
135	44 29.9	97 13	35.1	44 59.1	97 13	35.0	45 57.5	97 13	34.7	46 26.7	97 13	34.5
6	44 22.2	98 13	34.4	44 51.4	98 12	34.2	45 49.9	97 12	33.9	46 19.2	97 12	33.7
7	44 14.6	98 12	33.6	44 43.9	98 12	33.4	45 42.5	98 12	33.1	46 11.7	98 12	32.9
8	44 07.2	98 12	32.8	44 36.6	98 12	32.6	45 35.2	98 12	32.3	46 04.5	98 12	32.2
9	44 00.0	98 12	32.0	44 29.4	98 12	31.8	45 28.1	98 12	31.5	45 57.4	98 12	31.4
140	43 52.9	98 12	31.2	44 22.3	98 11	31.1	45 21.1	98 11	30.8	45 50.4	98 11	30.6
1	43 46.0	98 11	30.4	44 15.5	98 11	30.3	45 14.2	98 11	30.0	45 43.6	98 11	29.8
2	43 39.3	98 11	29.6	44 08.7	98 11	29.5	45 07.6	98 11	29.2	45 37.0	98 11	29.1
3	43 32.7	98 11	28.8	44 02.2	98 11	28.7	45 01.1	98 11	28.4	45 30.5	98 11	28.3
4	43 26.3	98 10	28.0	43 55.8	98 10	27.9	44 54.7	98 10	27.7	45 24.2	98 10	27.5
145	43 20.0	98 10	27.3	43 49.5	98 10	27.1	44 48.5	98 10	26.9	45 18.0	98 10	26.7
6	43 13.9	98 10	26.5	43 43.5	98 10	26.3	44 42.5	98 10	26.1	45 12.0	98 10	26.0
7	43 08.0	99 10	25.7	43 37.6	99 10	25.6	44 36.7	99 09	25.3	45 06.2	98 09	25.2
8	43 02.2	99 09	24.9	43 31.8	99 09	24.8	44 31.0	99 09	24.6	45 00.6	99 09	24.4
9	42 56.6	99 09	24.1	43 26.2	99 09	24.0	44 25.5	99 09	23.8	44 55.1	99 09	23.7
150	42 51.2	99 09	23.3	43 20.8	99 09	23.2	44 20.1	99 09	23.0	44 49.7	99 09	22.9
1	42 45.9	99 08	22.5	43 15.6	99 08	22.4	44 14.9	99 08	22.2	44 44.5	99 08	22.1
2	42 40.8	99 08	21.8	43 10.5	99 08	21.7	44 09.9	99 08	21.5	44 39.5	99 08	21.4
3	42 35.9	99 08	21.0	43 05.6	99 08	20.9	44 05.0	99 08	20.7	44 34.7	99 08	20.6
4	42 31.2	99 08	20.2	43 00.9	99 08	20.1	44 00.3	99 08	19.9	44 30.1	99 07	19.8
155	42 26.6	99 07	19.4	42 56.3	99 07	19.3	43 55.8	99 07	19.2	44 25.6	99 07	19.1
6	42 22.2	99 07	18.6	42 52.0	99 07	18.6	43 51.5	99 07	18.4	44 21.2	99 07	18.3
7	42 18.0	99 07	17.9	42 47.7	99 07	17.8	43 47.3	99 07	17.6	44 17.1	99 07	17.5
8	42 13.9	99 06	17.1	42 43.7	99 06	17.0	43 43.3	99 06	16.8	44 13.1	99 06	16.8
9	42 10.0	99 06	16.3	42 39.9	99 06	16.2	43 39.5	99 06	16.1	44 09.3	99 06	16.0
160	42 06.3	99 06	15.5	42 36.2	99 06	15.5	43 35.8	99 06	15.3	44 05.7	99 06	15.2
1	42 02.8	1.0 06	14.7	42 32.7	1.0 06	14.7	43 32.4	99 06	14.5	44 02.2	99 05	14.5
2	41 59.5	1.0 05	14.0	42 29.3	1.0 05	13.9	43 29.1	1.0 05	13.8	43 58.9	1.0 05	13.7
3	41 56.3	1.0 05	13.2	42 26.2	1.0 05	13.1	43 25.9	1.0 05	13.0	43 55.8	1.0 05	12.9
4	41 53.3	1.0 05	12.4	42 23.2	1.0 05	12.4	43 23.0	1.0 05	12.2	43 52.9	1.0 05	12.2
165	41 50.5	1.0 04	11.6	42 20.4	1.0 04	11.6	43 20.2	1.0 04	11.5	43 50.1	1.0 04	11.4
6	41 47.9	1.0 04	10.9	42 17.8	1.0 04	10.8	43 17.6	1.0 04	10.7	43 47.5	1.0 04	10.7
7	41 45.4	1.0 04	10.1	42 15.3	1.0 04	10.0	43 15.2	1.0 04	09.9	43 45.1	1.0 04	09.9
8	41 43.1	1.0 03	09.3	42 13.1	1.0 03	09.3	43 12.9	1.0 03	09.2	43 42.9	1.0 03	09.1
9	41 41.0	1.0 03	08.5	42 11.0	1.0 03	08.5	43 10.9	1.0 03	08.4	43 40.8	1.0 03	08.4
170	41 39.1	1.0 03	07.8	42 09.1	1.0 03	07.7	43 09.0	1.0 03	07.6	43 39.0	1.0 03	07.6
1	41 37.4	1.0 03	07.0	42 07.4	1.0 03	06.9	43 07.3	1.0 03	06.9	43 37.3	1.0 03	06.8
2	41 35.8	1.0 02	06.2	42 05.8	1.0 02	06.2	43 05.8	1.0 02	06.1	43 35.7	1.0 02	06.1
3	41 34.5	1.0 02	05.4	42 04.5	1.0 02	05.4	43 04.4	1.0 02	05.4	43 34.4	1.0 02	05.3
4	41 33.3	1.0 02	04.7	42 03.3	1.0 02	04.6	43 03.2	1.0 02	04.6	43 33.2	1.0 02	04.6
175	41 32.3	1.0 01	03.9	42 02.3	1.0 01	03.9	43 02.3	1.0 01	03.8	43 32.2	1.0 01	03.8
6	41 31.5	1.0 01	03.1	42 01.5	1.0 01	03.1	43 01.4	1.0 01	03.1	43 31.4	1.0 01	03.0
7	41 30.8	1.0 01	02.3	42 00.8	1.0 01	02.3	43 00.8	1.0 01	02.3	43 30.8	1.0 01	02.3
8	41 30.4	1.0 00	01.6	42 00.4	1.0 00	01.5	43 00.4	1.0 00	01.5	43 30.4	1.0 00	01.5
9	41 30.1	1.0 00	00.8	42 00.1	1.0 00	00.8	43 00.1	1.0 00	00.8	43 30.1	1.0 00	00.8
180	41 30.0	1.0 00	00.0	42 00.0	1.0 00	00.0	43 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0

57° 00′			57° 30′			59° 00′			59° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
54 35.5	92 21	70.0	55 03.1	92 21	69.7	56 25.6	91 21	68.6	56 53.0	91 21	68.3	91
54 22.8	92 21	69.2	54 50.5	92 21	68.8	56 13.1	91 21	67.8	56 40.5	91 21	67.4	2
54 10.2	92 21	68.3	54 37.9	92 21	68.0	56 00.6	92 21	66.9	56 28.0	91 21	66.6	3
53 57.7	92 21	67.4	54 25.4	92 21	67.1	55 48.2	92 20	66.1	56 15.7	91 20	65.7	4
53 45.3	93 21	66.6	54 13.0	92 21	66.3	55 35.9	92 20	65.2	56 03.4	92 20	64.9	95
53 33.0	93 20	65.7	54 00.7	92 20	65.4	55 23.7	92 20	64.4	55 51.2	92 20	64.1	6
53 20.7	93 20	64.9	53 48.5	93 20	64.6	55 11.6	92 20	63.6	55 39.2	92 20	63.2	7
53 08.5	93 20	64.0	53 36.4	93 20	63.7	54 59.5	92 20	62.8	55 27.2	92 20	62.4	8
52 56.4	93 20	63.2	53 24.3	93 20	62.9	54 47.6	92 20	61.9	55 15.2	92 20	61.6	9
52 44.4	93 20	62.4	53 12.3	93 20	62.1	54 35.7	92 20	61.1	55 03.4	92 20	60.8	100
52 32.5	93 20	61.5	53 00.4	93 20	61.2	54 23.9	93 19	60.3	54 51.7	92 19	60.0	1
52 20.7	93 20	60.7	52 48.7	93 20	60.4	54 12.3	93 19	59.5	54 40.0	92 19	59.1	2
52 09.0	93 19	59.9	52 37.0	93 19	59.6	54 00.7	93 19	58.7	54 28.5	93 19	58.3	3
51 57.4	94 19	59.0	52 25.4	93 19	58.7	53 49.2	93 19	57.8	54 17.1	93 19	57.5	4
51 45.8	94 19	58.2	52 13.9	93 19	57.9	53 37.8	93 19	57.0	54 05.7	93 19	56.7	105
51 34.4	94 19	57.4	52 02.5	94 19	57.1	53 26.6	93 19	56.2	53 54.5	93 19	55.9	6
51 23.1	94 19	56.6	51 51.2	94 19	56.3	53 15.4	93 18	55.4	53 43.4	93 18	55.1	7
51 11.9	94 19	55.8	51 40.1	94 18	55.5	53 04.3	93 18	54.6	53 32.4	93 18	54.3	8
51 00.8	94 18	54.9	51 29.0	94 18	54.7	52 53.4	94 18	53.8	53 21.4	93 18	53.5	9
50 49.8	94 18	54.1	51 18.0	94 18	53.9	52 42.6	94 18	53.0	53 10.7	94 18	52.7	110
50 38.9	94 18	53.3	51 07.2	94 18	53.0	52 31.8	94 18	52.2	53 00.0	94 18	51.9	1
50 28.1	94 18	52.5	50 56.5	94 18	52.2	52 21.2	94 17	51.4	52 49.4	94 17	51.1	2
50 17.5	95 18	51.7	50 45.9	94 18	51.4	52 10.7	94 17	50.6	52 38.9	94 17	50.4	3
50 07.0	95 17	50.9	50 35.4	95 17	50.6	52 00.4	94 17	49.8	52 28.6	94 17	49.6	4
49 56.5	95 17	50.1	50 25.0	95 17	49.8	51 50.1	94 17	49.1	52 18.4	94 17	48.8	115
49 46.3	95 17	49.3	50 14.7	95 17	49.0	51 40.0	95 17	48.3	52 08.3	94 17	48.0	6
49 36.1	95 17	48.5	50 04.6	95 17	48.2	51 30.0	95 16	47.5	51 58.3	95 16	47.2	7
49 26.0	95 17	47.7	49 54.6	95 16	47.4	51 20.1	95 16	46.7	51 48.5	95 16	46.5	8
49 16.1	95 16	46.9	49 44.7	95 16	46.7	51 10.3	95 16	45.9	51 38.8	95 16	45.7	9
49 06.3	95 16	46.1	49 35.0	95 16	45.9	51 00.7	95 16	45.1	51 29.2	95 16	44.9	120
48 56.7	96 16	45.3	49 25.3	96 16	45.1	50 51.2	95 16	44.4	51 19.7	95 16	44.1	1
48 47.1	96 16	44.5	49 15.8	96 16	44.3	50 41.8	95 15	43.6	51 10.4	95 15	43.4	2
48 37.8	96 15	43.7	49 06.5	96 15	43.5	50 32.6	95 15	42.8	51 01.2	95 15	42.6	3
48 28.5	96 15	42.9	48 57.3	96 15	42.7	50 23.4	96 15	42.0	50 52.1	96 15	41.8	4
48 19.4	96 15	42.1	48 48.2	96 15	41.9	50 14.5	96 15	41.3	50 43.2	96 15	41.0	125
48 10.4	96 15	41.4	48 39.2	96 15	41.1	50 05.6	96 14	40.5	50 34.4	96 14	40.3	6
48 01.5	96 15	40.6	48 30.4	96 14	40.4	49 56.9	96 14	39.7	50 25.7	96 14	39.5	7
47 52.8	96 14	39.8	48 21.7	96 14	39.6	49 48.4	96 14	39.0	50 17.2	96 14	38.8	8
47 44.3	97 14	39.0	48 13.2	96 14	38.8	49 40.0	96 14	38.2	50 08.8	96 14	38.0	9
47 35.8	97 14	38.2	48 04.8	97 14	38.0	49 31.7	96 14	37.4	50 00.6	96 13	37.2	130
47 27.6	97 14	37.4	47 56.6	97 14	37.3	49 23.6	97 13	36.7	49 52.5	96 13	36.5	1
47 19.4	97 13	36.7	47 48.5	97 13	36.5	49 15.6	97 13	35.9	49 44.6	97 13	35.7	2
47 11.4	97 13	35.9	47 40.5	97 13	35.7	49 07.7	97 13	35.1	49 36.8	97 13	35.0	3
47 03.6	97 13	35.1	47 32.7	97 13	34.9	49 00.0	97 13	34.4	49 29.1	97 13	34.2	4
46 55.9	97 13	34.3	47 25.1	97 12	34.2	48 52.5	97 12	33.6	49 21.6	97 12	33.4	135
46 48.4	97 12	33.6	47 17.6	97 12	33.4	48 45.1	97 12	32.9	49 14.2	97 12	32.7	6
46 41.0	97 12	32.8	47 10.2	97 12	32.6	48 37.8	97 12	32.1	49 07.0	97 12	31.9	7
46 33.8	98 12	32.0	47 03.0	98 12	31.8	48 30.7	97 12	31.3	49 00.0	97 12	31.2	8
46 26.7	98 12	31.2	46 56.0	98 11	31.1	48 23.8	97 11	30.6	48 53.0	97 11	30.4	9
46 19.8	98 11	30.5	46 49.1	98 11	30.3	48 17.0	98 11	29.8	48 46.3	98 11	29.7	140
46 13.0	98 11	29.7	46 42.4	98 11	29.5	48 10.4	98 11	29.1	48 39.7	98 11	28.9	1
46 06.4	98 11	28.9	46 35.8	98 11	28.8	48 03.9	98 11	28.3	48 33.2	98 10	28.2	2
45 59.9	98 10	28.2	46 29.4	98 10	28.0	47 57.6	98 10	27.6	48 26.9	98 10	27.4	3
45 53.7	98 10	27.4	46 23.1	98 10	27.2	47 51.4	98 10	26.8	48 20.8	98 10	26.7	4
45 47.5	98 10	26.6	46 17.0	98 10	26.5	47 45.4	98 10	26.1	48 14.8	98 10	25.9	145
45 41.6	98 10	25.8	46 11.1	98 10	25.7	47 39.5	98 10	25.3	48 09.0	98 09	25.2	6
45 35.8	98 09	25.1	46 05.3	98 09	25.0	47 33.8	98 09	24.6	48 03.3	98 09	24.4	7
45 30.1	99 09	24.3	45 59.7	99 09	24.2	47 28.3	98 09	23.8	47 57.8	98 09	23.7	8
45 24.6	99 09	23.6	45 54.2	99 09	23.4	47 22.9	99 09	23.1	47 52.5	98 09	22.9	9
45 19.3	99 09	22.8	45 48.9	99 09	22.7	47 17.7	99 08	22.3	47 47.3	99 08	22.2	150
45 14.2	99 08	22.0	45 43.8	99 08	21.9	47 12.7	99 08	21.6	47 42.3	99 08	21.4	1
45 09.2	99 08	21.3	45 38.9	99 08	21.2	47 07.8	99 08	20.8	47 37.4	99 08	20.7	2
45 04.4	99 08	20.5	45 34.1	99 08	20.4	47 03.1	99 08	20.1	47 32.8	99 08	20.0	3
44 59.8	99 07	19.7	45 29.5	99 07	19.6	46 58.5	99 07	19.3	47 28.2	99 07	19.2	4
44 55.3	99 07	19.0	45 25.0	99 07	18.9	46 54.2	99 07	18.6	47 23.9	99 07	18.5	155
44 51.0	99 07	18.2	45 20.7	99 07	18.1	46 49.9	99 07	17.8	47 19.7	99 07	17.7	6
44 46.9	99 07	17.4	45 16.6	99 07	17.4	46 45.9	99 06	17.1	47 15.6	99 06	17.0	7
44 42.9	99 06	16.7	45 12.7	99 06	16.6	46 42.0	99 06	16.3	47 11.8	99 06	16.2	8
44 39.1	99 06	15.9	45 08.9	99 06	15.8	46 38.3	99 06	15.6	47 08.1	99 06	15.5	9
44 35.5	99 06	15.2	45 05.3	99 06	15.1	46 34.8	99 06	14.8	47 04.6	99 06	14.8	160
44 32.0	99 05	14.4	45 01.9	99 05	14.3	46 31.4	99 05	14.1	47 01.2	99 05	14.0	1
44 28.8	1.0 05	13.6	44 58.6	1.0 05	13.6	46 28.2	99 05	13.4	46 58.0	99 05	13.3	2
44 25.7	1.0 05	12.9	44 55.5	1.0 05	12.8	46 25.1	1.0 05	12.6	46 55.0	1.0 05	12.5	3
44 22.8	1.0 05	12.1	44 52.6	1.0 05	12.1	46 22.3	1.0 04	11.9	46 52.2	1.0 04	11.8	4
44 20.0	1.0 04	11.4	44 49.9	1.0 04	11.3	46 19.6	1.0 04	11.1	46 49.5	1.0 04	11.1	165
44 17.4	1.0 04	10.6	44 47.3	1.0 04	10.6	46 17.1	1.0 04	10.4	46 47.0	1.0 04	10.3	6
44 15.0	1.0 04	09.8	44 45.0	1.0 04	09.8	46 14.7	1.0 04	09.6	46 44.6	1.0 04	09.6	7
44 12.8	1.0 03	09.1	44 42.8	1.0 03	09.0	46 12.6	1.0 03	08.9	46 42.5	1.0 03	08.9	8
44 10.8	1.0 03	08.3	44 40.7	1.0 03	08.3	46 10.6	1.0 03	08.2	46 40.5	1.0 03	08.1	9
44 08.9	1.0 03	07.6	44 38.9	1.0 03	07.5	46 08.7	1.0 03	07.4	46 38.7	1.0 03	07.4	170
44 07.2	1.0 03	06.8	44 37.2	1.0 03	06.8	46 07.1	1.0 02	06.7	46 37.0	1.0 02	06.6	1
44 05.7	1.0 02	06.1	44 35.7	1.0 02	06.0	46 05.6	1.0 02	05.9	46 35.6	1.0 02	05.9	2
44 04.4	1.0 02	05.3	44 34.3	1.0 02	05.3	46 04.3	1.0 02	05.2	46 34.3	1.0 02	05.2	3
44 03.2	1.0 02	04.5	44 33.2	1.0 02	04.5	46 03.1	1.0 02	04.4	46 33.1	1.0 02	04.4	4
44 02.2	1.0 01	03.8	44 32.2	1.0 01	03.8	46 02.2	1.0 01	03.7	46 32.2	1.0 01	03.7	175
44 01.4	1.0 01	03.0	44 31.4	1.0 01	03.0	46 01.4	1.0 01	03.0	46 31.4	1.0 01	02.9	6
44 00.8	1.0 01	02.3	44 30.8	1.0 01	02.3	46 00.8	1.0 01	02.2	46 30.8	1.0 01	02.2	7
44 00.4	1.0 00	01.5	44 30.4	1.0 00	01.5	46 00.3	1.0 00	01.5	46 30.3	1.0 00	01.5	8
44 00.1	1.0 00	00.8	44 30.1	1.0 00	00.8	46 00.1	1.0 00	00.7	46 30.1	1.0 00	00.7	9
44 00.0	1.0 00	00.0	44 30.0	1.0 00	00.0	46 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79

Lat. 77°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	73 00.0	1.0 00	180.0	73 30.0	1.0 00	180.0	75 00.0	1.0 00	180.0	75 30.0	1.0 00	180.0	76 00.0	1.0 00	180.0	82 00.0	1.0 00	180.0	82 30.0	1.0 01	180.0	87 30.0	1.0 01	180.0
1	72 59.8	1.0 01	178.3	73 29.8	1.0 01	178.3	74 59.8	1.0 01	178.2	75 29.8	1.0 01	178.2	75 59.8	1.0 01	178.1	81 59.7	1.0 02	177.4	82 29.7	1.0 02	177.3	87 29.3	1.0 04	173.9
2	72 59.2	1.0 02	176.6	73 29.2	1.0 02	176.5	74 59.1	1.0 02	176.4	75 29.1	1.0 02	176.3	75 59.1	1.0 02	176.2	81 58.8	1.0 03	174.9	82 28.7	1.0 03	174.6	87 27.1	98 06	167.9
3	72 58.2	1.0 02	174.9	73 28.2	1.0 02	174.8	74 58.1	1.0 02	174.6	75 28.0	1.0 03	174.5	75 58.0	1.0 03	174.4	81 57.3	1.0 04	172.3	82 27.2	1.0 04	172.0	87 23.6	97 08	162.1
4	72 56.8	1.0 03	173.2	73 26.7	1.0 03	173.1	74 56.6	1.0 03	172.8	75 26.5	1.0 03	172.6	75 56.5	1.0 03	172.5	81 55.2	99 04	169.8	82 25.0	99 05	169.3	87 18.9	94 10	156.6
05	72 55.0	1.0 04	171.5	73 24.9	1.0 04	171.4	74 54.7	1.0 04	171.0	75 24.6	1.0 04	170.8	75 54.5	1.0 04	170.6	81 52.5	99 05	167.2	82 22.2	99 06	166.7	87 12.9	91 12	151.3
6	72 52.8	1.0 04	169.8	73 22.7	1.0 04	169.6	74 52.3	1.0 05	169.2	75 22.2	1.0 05	169.0	75 52.1	1.0 05	168.8	81 49.2	99 06	164.7	82 18.8	98 07	164.1	87 06.0	89 13	146.5
7	72 50.2	1.0 05	168.1	73 20.1	1.0 05	167.9	74 49.6	99 05	167.4	75 19.4	99 05	167.2	75 49.2	99 05	166.9	81 45.4	98 07	162.3	82 14.8	98 08	161.6	86 58.1	86 14	142.0
8	72 47.2	99 06	166.4	73 17.0	99 06	166.2	74 46.4	99 06	165.6	75 16.2	99 06	165.4	75 46.0	99 06	165.1	81 41.0	98 08	159.8	82 10.2	97 08	159.0	86 49.4	83 16	137.8
9	72 43.8	99 06	164.7	73 13.6	99 06	164.5	74 42.9	99 07	163.8	75 12.6	99 07	163.6	75 42.3	99 07	163.3	81 36.1	97 09	157.4	82 05.1	97 09	156.6	86 40.0	80 17	134.0
10	72 40.1	99 07	163.1	73 09.8	99 07	162.8	74 38.9	99 07	162.1	75 08.6	99 07	161.8	75 38.2	99 08	161.5	81 30.6	96 10	155.1	81 59.5	96 10	154.1	86 30.0	77 18	130.5
1	72 36.0	99 08	161.4	73 05.7	99 08	161.1	74 34.6	99 08	160.8	75 04.2	99 08	160.0	75 33.7	99 08	159.7	81 24.7	96 11	152.7	81 53.4	95 11	151.7	86 19.5	74 18	127.3
2	72 31.5	99 08	159.7	73 01.1	99 08	159.5	74 29.8	98 09	158.6	74 59.4	98 09	158.2	75 28.9	98 09	157.9	81 18.3	95 11	150.5	81 46.7	94 12	149.4	86 08.6	72 19	124.3
3	72 26.6	99 09	158.1	72 56.2	99 09	157.8	74 24.7	98 09	156.9	74 54.2	98 09	156.5	75 23.6	98 09	156.1	81 11.4	94 12	148.2	81 39.6	94 13	147.1	85 57.2	70 19	121.6
4	72 21.4	98 09	156.5	72 50.9	98 09	156.2	74 19.2	98 10	155.1	74 48.6	98 10	154.8	75 17.9	98 10	154.4	81 04.1	94 13	146.1	81 32.1	93 13	144.9	85 45.6	68 20	119.0
15	72 15.9	98 10	154.9	72 45.3	98 10	154.5	74 13.4	98 10	153.5	74 42.7	98 10	153.0	75 11.9	97 11	152.6	80 56.3	93 14	143.9	81 24.1	92 14	142.7	85 33.6	66 20	116.7
6	72 10.0	98 10	153.3	72 39.3	98 11	152.9	74 07.2	97 11	151.8	74 36.4	97 11	151.4	75 05.5	97 11	150.9	80 48.2	92 14	141.8	81 15.7	91 15	140.6	85 21.5	64 21	114.5
7	72 03.7	98 11	151.7	72 33.0	98 11	151.3	74 00.6	97 11	150.1	74 29.7	97 12	149.7	74 58.8	97 12	149.2	80 39.7	91 15	139.8	81 07.0	90 15	138.5	85 09.1	63 21	112.4
8	71 57.1	97 12	150.1	72 26.4	97 12	149.7	73 53.7	97 12	148.5	74 22.7	97 12	148.0	74 51.7	96 12	147.5	80 30.8	91 15	137.8	80 57.8	90 16	136.4	84 56.5	62 21	110.5
9	71 50.3	97 12	148.5	72 19.4	97 12	148.1	73 46.5	97 13	146.8	74 15.4	96 13	146.4	74 44.3	96 13	145.8	80 21.5	90 16	135.8	80 48.4	89 16	134.5	84 43.8	60 21	108.7
20	71 43.1	97 12	147.0	72 12.1	97 13	146.6	73 39.0	96 13	145.2	74 07.8	96 13	144.7	74 36.5	96 13	144.2	80 12.0	89 16	133.9	80 38.6	88 17	132.5	84 31.0	59 22	107.0
1	71 35.5	97 13	145.4	72 04.5	97 13	145.0	73 31.1	96 14	143.6	73 59.8	96 14	143.1	74 28.5	95 14	142.6	80 02.1	88 17	132.1	80 28.5	87 17	130.7	84 18.0	58 22	105.4
2	71 27.7	96 13	143.9	71 56.6	96 14	143.5	73 23.0	96 14	142.1	73 51.6	95 14	141.5	74 20.1	95 14	141.0	79 51.9	88 17	130.3	80 18.1	87 18	128.9	84 04.9	58 22	103.8
3	71 19.6	96 14	142.4	71 48.5	96 14	142.0	73 14.5	95 15	140.5	73 43.0	95 15	139.9	74 11.5	95 15	139.4	79 41.5	87 18	128.5	80 07.5	86 18	127.1	83 51.8	57 22	102.4
4	71 11.3	96 14	140.9	71 40.0	96 15	140.5	73 05.8	95 15	138.9	73 34.2	95 15	138.4	74 02.6	94 15	137.8	79 30.8	86 18	126.8	79 56.6	85 19	125.3	83 38.6	56 22	101.0
25	71 02.6	96 15	139.4	71 31.3	95 15	139.0	72 56.8	95 15	137.4	73 25.1	94 16	136.9	73 53.4	94 16	136.3	79 19.9	86 19	125.1	79 45.4	85 19	123.7	83 25.3	56 22	99.7
6	70 53.7	96 15	138.0	71 22.3	95 15	137.5	72 47.5	94 16	135.9	73 15.8	94 16	135.3	73 43.9	94 16	134.7	79 08.7	85 19	123.5	79 34.1	84 19	122.0	83 12.0	55 22	98.4
7	70 44.5	95 16	136.5	71 13.0	95 16	136.0	72 38.0	94 16	134.4	73 06.2	94 16	133.8	73 34.2	93 17	133.2	78 57.4	85 19	121.9	79 22.6	83 20	120.4	82 58.6	55 22	97.2
8	70 35.1	95 16	135.1	71 03.5	95 16	134.6	72 28.3	94 17	133.0	72 56.3	93 17	132.4	73 24.2	93 17	131.7	78 45.8	84 20	120.3	79 10.8	83 20	118.9	82 45.2	55 22	96.0
9	70 25.5	95 16	133.7	70 53.8	94 17	133.2	72 18.3	93 17	131.5	72 46.2	93 17	130.9	73 14.0	93 17	130.3	78 34.1	84 20	118.8	78 58.9	82 20	117.3	82 31.7	54 22	94.8
30	70 15.6	94 17	132.3	70 43.9	94 17	131.7	72 08.0	93 17	130.1	72 35.9	93 18	129.5	73 03.6	92 18	128.8	78 22.2	83 20	117.3	78 46.9	82 20	115.8	82 18.3	54 22	93.7
1	70 05.5	94 17	130.9	70 33.7	94 17	130.4	71 57.6	93 18	128.7	72 25.4	92 18	128.0	72 53.0	92 18	127.4	78 10.1	83 20	115.8	78 34.6	81 21	114.4	82 04.8	54 22	92.7
2	69 55.2	94 18	129.5	70 23.3	93 18	129.0	71 47.0	92 18	127.3	72 14.6	92 18	126.6	72 42.2	92 18	126.0	77 57.9	82 21	114.4	78 22.3	81 21	113.0	81 51.3	54 22	91.6
3	69 44.7	94 18	128.1	70 12.7	93 18	127.6	71 36.1	92 18	125.9	72 03.7	92 19	125.3	72 31.2	91 19	124.6	77 45.5	82 21	113.0	78 09.8	80 21	111.6	81 37.8	54 22	90.6
4	69 34.0	93 18	126.8	70 01.9	93 18	126.3	71 25.1	92 19	124.5	71 52.6	91 19	123.9	72 20.0	91 19	123.2	77 33.0	81 21	111.6	77 57.2	80 21	110.2	81 24.3	54 22	89.7
35	69 23.1	93 18	125.5	69 50.9	93 19	124.9	71 13.9	92 19	123.2	71 41.3	91 19	122.5	72 08.6	91 19	121.9	77 20.4	81 21	110.3	77 44.5	79 21	108.9	81 10.8	54 22	88.7
6	69 12.0	93 19	124.1	69 39.8	92 19	123.6	71 02.5	91 19	121.9	71 29.9	91 19	121.2	71 57.1	90 20	120.5	77 07.7	80 21	109.0	77 31.6	79 22	107.6	80 57.3	54 22	87.8
7	69 00.7	93 19	122.8	69 28.4	92 19	122.3	70 51.0	91 20	120.5	71 18.2	91 20	119.9	71 45.4	90 20	119.2	76 54.9	80 22	107.7	77 18.7	79 22	106.3	80 43.9	54 22	86.9
8	68 49.3	92 19	121.6	69 17.0	92 19	121.0	70 39.3	91 20	119.2	71 06.5	90 20	118.6	71 33.5	90 20	117.9	76 42.0	80 22	106.5	77 05.7	78 22	105.1	80 30.4	54 22	86.0
9	68 37.7	92 20	120.3	69 05.3	92 20	119.7	70 27.4	91 20	118.0	70 54.5	90 20	117.3	71 21.5	90 20	116.6	76 29.0	80 22	105.2	76 52.7	78 22	103.9	80 16.9	54 22	85.1
40	68 26.0	92 20	119.0	68 53.5	92 20	118.5	70 15.4	90 20	116.7	70 42.5	90 20	116.1	71 09.4	89 20	115.4	76 16.0	79 22	104.0	76 39.5	78 22	102.7	80 03.5	55 22	84.2
1	68 14.1	92 20	117.8	68 41.6	91 20	117.2	70 03.3	90 20	115.5	70 30.3	90 21	114.8	70 57.1	89 21	114.1	76 02.8	79 22	102.8	76 26.3	78 22	101.5	79 50.1	55 22	83.4
2	68 02.1	92 20	116.6	68 29.5	91 20	116.0	69 51.1	90 21	114.2	70 18.0	89 21	113.6	70 44.7	89 21	112.9	75 49.6	79 22	101.7	76 13.1	78 22	100.4	79 36.7	55 22	82.6
3	67 50.0	91 20	115.3	68 17.3	91 20	114.8	69 38.7	90 21	113.0	70 05.5	89 21	112.4	70 32.3	89 21	111.7	75 36.4	79 22	100.5	75 59.8	77 22	99.2	79 23.3	55 22	81.8
4	67 37.7	91 21	114.1	68 05.0	91 21	113.6	69 26.2	90 21	111.8	69 53.0	89 21	111.2	70 19.7	89 21	110.5	75 23.1	79 22	99.4	75 46.4	77 22	98.1	79 10.0	56 22	81.0
45	67 25.4	91 21	112.9	67 52.6	91 21	112.4	69 13.6	89 21	110.6	69 40.4	89 21	110.0	70 07.0	88 21	109.3	75 09.8	78 22	98.3	75 33.1	77 22	97.0	78 56.7	56 22	80.2
6	67 12.9	91 21	111.8	67 40.1	90 21	111.2	69 00.9	89 21	109.4	69 27.6	89 21	108.8	69 54.2	88 21	108.1	74 56.4	78 22	97.2	75 19.7	77 22	96.0	78 43.4	56 22	79.4
7	67 00.3	91 21	110.6	67 27.4	90 21	110.1	68 48.2	89 21	108.3	69 14.8	89 22	107.6	69 41.3	88 22	107.0	74 43.0	78 22	96.1	75 06.2	77 22	94.9	78 30.1	56 22	78.7
8	66 47.6	91 21	109.4	67 14.7	90 21	108.9	68 35.3	89 22	107.1	69 01.9	88 22	106.5	69 28.4	88 22	105.8	74 29.5	78 22	95.1	74 52.8	77 22	93.9	78 16.9	57 22	77.9
9	66 34.8	90 21	108.3	67 01.9	90 22	107.8	68 22.4	89 22	106.0	68 48.9	88 22	105.3	69 15.3	88 22	104.7	74 16.1	78 22	94.0	74 39.3	77 22	92.9	78 03.7	57 22	77.2
50	66 22.0	90 22	107.2	66 49.0	90 22	106.6	68 09.4	89 22	104.9	68 35.9	88 22	104.2	69 02.3	88 22	103.6	74 02.6	78 22	93.0	74 25.8	77 22	91.8	77 50.6	57 22	76.4
1	66 00.0	90 22	106.0	66 36.0	90 22	105.5	67 56.3	89 22	103.7	68 22.8	88 22	103.1	68 49.1	88 22	102.5	73 49.1	78 22	92.0	74 12.3	77 22	90.8	77 37.5	58 22	75.7
2	65 56.0	90 22	104.9	66 23.0	90 22	104.4	67 43.2	88 22	102.6	68 09.6	88 22	102.0	68 35.9	87 22	101.4	73 35.6	78 22	91.0	73 58.8	77 22	89.9	77 24.4	58 22	75.0
3	65 43.0	90 22	103.8	66 09.9	90 22	103.3	67 30.0	88 22	101.6	67 56.4	88 22	100.9	68 22.6	87 22	100.3	73 22.1	78 22	90.0	73 45.3	77 22	88.9	77 11.4	59 22	74.3
4	65 29.8	90 22	102.8	65 56.7	89 22	102.2	67 16.7	88 22	100.5	67 43.1	88 22	99.9	68 09.3	87 22	99.2	73 08.6	78 22	89.1	73 31.8	77 22	88.0	76 58.4	59 22	73.6
55	65 16.6	90 22	101.7	65 43.5	89 22	101.1	67 03.4	88 22	99.4	67 29.8	88 22	98.8	67 56.0	87 22	98.2	72 55.2	78 22	88.1	73 18.3	77 22	87.0	76 45.5	59 21	72.9
6	65 03.4	90 22	100.6	65 30.2	89 22	100.1	66 50.1	88 22	98.4	67 16.4	88 22	97.7	67 42.6	87 22	97.1	72 41.7	78 22	87.2	73 04.9	77 22	86.1	76 32.6	60 21	72.2
7	64 50.1	90 22	99.5	65 16.9	89 22	99.0	66 36.7	88 22	97.3	67 03.0	88 22	96.7	67 29.2	87 22	96.1	72 28.2	78 22	86.2	72 51.4	77 22	85.2	76 19.8	60 21	71.5
8	64 36.8	90 22	98.5	65 03.6	89 22	98.0	66 23.3	88 22	96.3	66 49.6	87 22	95.7	67 15.8	87 22	95.0	72 14.7	78 22	85.3	72 38.0	77 22	84.3	76 07.0	61 21	70.8
9	64 23.4	89 22	97.5	64 50.2	89 22	96.9	66 09.9	88 22	95.3	66 36.2	87 22	94.6	67 02.3	87 22	94.0	72 01.3	78 22	84.4	72 24.6	77 22	83.4	75 54.3	61 21	70.2
60	64 10.0	89 22	96.4	64 36.8	89 22	95.9	65 56.4	88 22	94.2	66 22.7	87 22	93.6	66 48.9	87 22	93.0	71 47.9	78 22	83.5	72 11.2	77 22	82.5	75 41.6	62 21	69.5
1	63 56.6	89 22	95.4	64 23.4	89 22	94.9	65 43.0	88 22	93.2	66 09.2	87 22	92.6	66 35.4	87 22	92.0	71 34.5	78 22	82.6	71 57.8	77 22	81.6	75 29.0	62 21	68.8
2	63 43.1	89 22	94.4	64 09.9	89 22	93.9	65 29.5	88 22	92.2	65 55.7	87 22	91.6	66 21.9	87 22	91.0	71 21.1	78 22	81.7	71 44.5	77 22	80.7	75 16.5	62 21	68.2
3	63 29.7	89 22	93.4	63 56.4	89 22	92.9	65 16.0	88 22	91.2	65 42.2	87 22	90.7	66 08.4	87 22	90.1	71 07.8	78 22	80.8	71 31.2	77 22	79.9	75 04.0	63 21	67.5
4	63 16.2	89 22	92.4	63 42.9	89 22	91.9	65 02.5	88 22	90.3	65 28.8	87 22	89.7	65 54.9	87 22	89.1	70 54.5	79 22	80.0	71 17.9	78 22	79.0	74 51.5	63 21	66.9
65	63 02.7	89 22	91.4	63 29.4	89 22	90.9	64 49.0	88 22	89.3	65 15.3	87 22	88.7	65 41.4	87 22	88.1	70 41.2	79 22	79.1	71 04.7	78 22	78.2	74 39.2	64 21	66.2
6	62 49.2	89 22	90.4	63 16.0	89 22	89.9	64 35.5	88 22	88.3	65 01.8	87 22	87.8	65 27.9	87 22	87.2	70 27.9	79 22	78.3	70 51.5	78 22	77.3	74 26.8	64 20	65.6
7	62 35.7	89 22	89.4	63 02.5	89 22	88.9	64 22.0	88 22	87.4	64 48.3	87 22	86.8	65 14.4	87 22	86.2	70 14.8	79 22	77.4	70 38.3	78 22	76.5	74 14.6	65 20	64.9
8	62 22.2	89 22	88.5	62 49.0	89 22	88.0	64 08.5	88 22	86.4	64 34.8	87 22	85.9	65 01.0	87 22	85.3	70 01.6	79 22	76.6	70 25.2	78 22	75.7	74 02.4	65 20	64.3
9	62 08.7	89 22	87.5	62 35.5	89 22	87.0	63 55.1	88 22	85.5	64 21.4	87 22	84.9	64 47.5	87 22	84.4	69 48.5	79 22	75.8	70 12.2	78 22	74.9	73 50.2	66 20	63.7
70	61 55.3	89 22	86.6	62 22.0	89 22	86.1	63 41.6	88 22	84.5	64 07.9	87 22	84.0	64 34.1	87 22	83.4	69 35.4	80 22	74.9	69 59.2	79 22	74.1	73 38.2	66 20	63.0
1	61 41.8	89 22	85.6	62 08.5	89 22	85.1	63 28.2	88 22	83.6	63 54.5	88 22	83.1	64 20.7	87 22	82.5	69 22.4	80 22	74.1	69 46.2	79 22	73.3	73 26.2	67 20	62.4
2	61 28.3	89 22	84.7	61 55.1	89 22	84.2	63 14.8	88 22	82.7	63 41.1	88 22	82.2	64 07.3	87 22	81.6	69 09.5	80 22	73.3	69 33.3	79 21	72.5	73 14.3	67 20	61.8
3	61 14.9	89 22	83.7	61 41.7	89 22	83.3	63 01.4	88 22	81.8	63 27.8	88 22	81.2	63 54.0	87 22	80.7	68 56.6	80 21	72.5	69 20.5	79 21	71.7	73 02.4	68 20	61.2
4	61 01.5	89 22	82.8	61 28.3	89 22	82.4	62 48.1	88 22	80.9	63 14.5	88 22	80.3	63 40.7	87 22	79.8	68 43.7	80 21	71.7	69 07.7	79 21	70.9	72 50.6	68 20	60.6
75	60 48.1	90 22	81.9	61 14.9	89 22	81.4	62 34.8	88 22	80.0	63 01.2	88 22	79.4	63 27.4	87 22	78.9	68 30.9	80 21	70.9	68 55.0	80 21	70.1	72 38.9	68 19	59.9
6	60 34.8	90 22	81.0	61 01.6	89 22	80.5	62 21.5	88 22	79.1	62 47.9	88 22	78.6	63 14.2	87 22	78.0	68 18.2	81 21	70.1	68 42.3	80 21	69.3	72 27.2	69 19	59.3
7	60 21.5	90 22	80.1	60 48.3	89 22	79.6	62 08.3	88 22	78.2	62 34.7	88 22	77.7	63 01.0	88 22	77.1	68 05.5	81 21	69.4	68 29.7	80 21	68.6	72 15.7	69 19	58.7
8	60 08.2	90 22	79.2	60 35.1	89 22	78.7	61 55.1	88 22	77.3	62 21.5	88 22	76.8	62 47.9	88 22	76.3	67 53.0	81 21	68.6	68 17.2	80 21	67.8	72 04.2	70 19	58.1
9	59 55.0	90 22	78.3	60 21.8	89 22	77.8	61 41.9	88 22	76.4	62 08.4	88 22	75.9	62 34.8	88 22	75.4	67 40.4	81 21	67.8	68 04.7	81 21	67.0	71 52.8	70 19	57.5
80	59 41.8	90 22	77.4	60 08.7	90 22	76.9	61 28.8	89 22	75.5	61 55.4	88 22	75.1	62 21.8	88 22	74.5	67 28.0	82 21	67.1	67 52.3	81 21	66.3	71 41.4	71 19	56.9
1	59 28.6	90 22	76.5	59 55.5	90 22	76.1	61 15.8	89 22	74.7	61 42.4	88 22	74.2	62 08.8	88 22	73.7	67 15.6	82 21	66.3	67 40.0	81 20	65.5	71 30.1	71 19	56.3
2	59 15.5	90 22	75.6	59 42.5	90 22	75.2	61 02.8	89 22	73.8	61 29.4	88 22	73.3	61 55.9	88 21	72.8	67 03.2	82 20	65.5	67 27.8	81 20	64.8	71 19.0	72 18	55.7
3	59 02.5	90 22	74.7	59 29.5	90 22	74.3	60 49.9	89 21	73.0	61 16.5	89 21	72.5	61 43.0	88 21	72.0	66 51.0	82 20	64.8	67 15.6	82 20	64.1	71 07.8	72 18	55.1
4	58 49.5	90 22	73.9	59 16.5	90 22	73.4	60 37.0	89 21	72.1	61 03.7	89 21	71.6	61 30.2	88 21	71.1	66 38.8	83 20	64.0	67 03.5	82 20	63.3	70 56.8	73 18	54.5
85	58 36.5	90 21	73.0	59 03.6	90 21	72.6	60 24.2	89 21	71.3	60 50.9	89 21	70.8	61 17.5	88 21	70.3	66 26.7	83 20	63.3	66 51.5	82 20	62.6	70 45.9	73 18	53.9
6	58 23.7	90 21	72.1	58 50.7	90 21	71.7	60 11.4	89 21	70.4	60 38.2	89 21	69.9	61 04.8	89 21	69.5	66 14.7	83 20	62.6	66 39.5	82 20	61.9	70 35.0	74 18	53.3
7	58 10.8	90 21	71.3	58 37.9	90 21	70.9	59 58.8	89 21	69.6	60 25.5	89 21	69.1	60 52.2	89 21	68.6	66 02.8	83 20	61.8	66 27.7	83 20	61.1	70 24.2	74 18	52.7
8	57 58.1	91 21	70.4	58 25.2	90 21	70.0	59 46.1	89 21	68.7	60 12.9	89 21	68.3	60 39.6	89 21	67.8	65 50.9	84 20	61.1	66 15.9	83 20	60.4	70 13.5	75 18	52.1
9	57 45.4	91 21	69.6	58 12.6	90 21	69.2	59 33.6	90 21	67.9	60 00.4	89 21	67.5	60 27.2	89 21	67.0	65 39.1	84 19	60.4	66 04.2	83 19	59.7	70 02.9	75 18	51.5
90	57 32.8	91 21	68.7	58 00.0	91 21	68.3	59 21.1	90 21	67.1	59 48.0	89 21	66.6	60 14.8	89 20	66.2	65 27.4	84 19	59.6	65 52.6	83 19	59.0	69 52.4	76 17	51.0

Lat. 77°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	57 20.3	91 21	67.9	57 47.5	91 21	67.5	59 08.7	90 21	66.2	59 35.7	90 20	65.8	60 02.5	89 20	65.4	65 15.8	84 19	58.9	65 41.1	84 19	58.3	69 41.9	76 17	50.4	91
2	57 07.8	91 21	67.0	57 35.1	91 21	66.6	58 56.4	90 20	65.4	59 23.4	90 20	65.0	59 50.3	89 20	64.6	65 04.3	85 19	58.2	65 29.6	84 19	57.5	69 31.6	77 17	49.8	2
3	56 55.4	91 21	66.2	57 22.7	91 20	65.8	58 44.2	90 20	64.6	59 11.2	90 20	64.2	59 38.1	90 20	63.7	64 52.9	85 19	57.5	65 18.3	84 19	56.8	69 21.3	77 17	49.2	3
4	56 43.1	91 20	65.4	57 10.4	91 20	65.0	58 32.0	90 20	63.8	58 59.1	90 20	63.4	59 26.1	90 20	62.9	64 41.6	85 19	56.8	65 07.0	85 19	56.1	69 11.2	78 17	48.6	4
95	56 30.9	91 20	64.5	56 58.3	91 20	64.2	58 20.0	90 20	63.0	58 47.1	90 20	62.6	59 14.1	90 20	62.1	64 30.3	85 19	56.0	64 55.9	85 18	55.4	69 01.1	78 17	48.0	95
6	56 18.7	92 20	63.7	56 46.2	91 20	63.3	58 08.0	91 20	62.2	58 35.1	90 20	61.8	59 02.2	90 20	61.4	64 19.2	86 18	55.3	64 44.8	85 18	54.7	68 51.1	78 16	47.4	6
7	56 06.7	92 20	62.9	56 34.1	91 20	62.5	57 56.1	91 20	61.4	58 23.3	90 20	61.0	58 50.4	90 20	60.6	64 08.1	86 18	54.6	64 33.8	85 18	54.0	68 41.2	79 16	46.9	7
8	55 54.7	92 20	62.1	56 22.2	92 20	61.7	57 44.3	91 20	60.6	58 11.5	91 19	60.2	58 38.7	90 19	59.8	63 57.2	86 18	53.9	64 23.0	86 18	53.3	68 31.4	79 16	46.3	8
9	55 42.8	92 20	61.2	56 10.4	92 20	60.9	57 32.6	91 19	59.8	57 59.9	91 19	59.4	58 27.1	91 19	59.0	63 46.3	86 18	53.2	64 12.2	86 18	52.6	68 21.7	80 16	45.7	9
100	55 31.0	92 20	60.4	55 58.6	92 19	60.1	57 21.0	91 19	59.0	57 48.3	91 19	58.6	58 15.5	91 19	58.2	63 35.6	87 18	52.5	64 01.5	86 18	51.9	68 12.1	80 16	45.1	100
1	55 19.4	92 19	59.6	55 47.0	92 19	59.3	57 09.5	91 19	58.2	57 36.8	91 19	57.8	58 04.1	91 19	57.4	63 24.9	87 18	51.8	63 50.9	87 17	51.3	68 02.6	81 16	44.6	1
2	55 07.8	92 19	58.8	55 35.4	92 19	58.5	56 58.0	91 19	57.4	57 25.5	91 19	57.0	57 52.8	91 19	56.6	63 14.3	87 17	51.1	63 40.4	87 17	50.6	67 53.1	81 16	44.0	2
3	54 56.3	92 19	58.0	55 24.0	92 19	57.7	56 46.7	92 19	56.6	57 14.2	91 19	56.2	57 41.6	91 19	55.9	63 03.9	88 17	50.4	63 30.1	87 17	49.9	67 43.8	82 15	43.4	3
4	54 44.9	93 19	57.2	55 12.6	92 19	56.9	56 35.5	92 18	55.8	57 03.0	92 18	55.5	57 30.5	91 18	55.1	62 53.5	88 17	49.7	63 19.8	87 17	49.2	67 34.6	82 15	42.8	4
105	54 33.6	93 19	56.4	55 01.4	93 19	56.1	56 24.4	92 18	55.0	56 52.0	92 18	54.7	57 19.4	92 18	54.3	62 43.3	88 17	49.0	63 09.6	88 17	48.5	67 25.5	82 15	42.3	105
6	54 22.4	93 18	55.6	54 50.2	93 18	55.3	56 13.4	92 18	54.3	56 41.0	92 18	53.9	57 08.5	92 18	53.5	62 33.1	88 17	48.4	62 59.6	88 17	47.8	67 16.4	83 15	41.7	6
7	54 11.3	93 18	54.8	54 39.2	93 18	54.5	56 02.5	92 18	53.5	56 30.1	92 18	53.1	56 57.7	92 18	52.8	62 23.1	89 17	47.7	62 49.6	88 16	47.2	67 07.5	83 15	41.1	7
8	54 00.3	93 18	54.0	54 28.2	93 18	53.7	55 51.7	92 18	52.7	56 19.4	92 18	52.4	56 47.0	92 18	52.0	62 13.2	89 16	47.0	62 39.8	88 16	46.5	66 58.7	84 15	40.5	8
9	53 49.5	93 18	53.2	54 17.4	93 18	52.9	55 41.0	93 18	51.9	56 08.8	92 18	51.6	56 36.5	92 17	51.3	62 03.4	89 16	46.3	62 30.0	89 16	45.8	66 50.0	84 14	40.0	9
110	53 38.7	93 18	52.4	54 06.7	93 18	52.1	55 30.4	93 17	51.2	55 58.2	93 17	50.8	56 26.0	92 17	50.5	61 53.7	89 16	45.6	62 20.4	89 16	45.1	66 41.4	85 14	39.4	110
1	53 28.1	94 18	51.6	53 56.1	93 17	51.3	55 20.0	93 17	50.4	55 47.8	93 17	50.1	56 15.6	93 17	49.7	61 44.1	90 16	44.9	62 10.9	89 16	44.5	66 32.8	85 14	38.8	1
2	53 17.5	94 17	50.9	53 45.6	94 17	50.6	55 09.6	93 17	49.6	55 37.5	93 17	49.3	56 05.4	93 17	49.0	61 34.6	90 16	44.3	62 01.5	90 15	43.8	66 24.4	85 14	38.2	2
3	53 07.1	94 17	50.1	53 35.3	94 17	49.8	54 59.4	93 17	48.9	55 27.4	93 17	48.6	55 55.3	93 17	48.2	61 25.2	90 15	43.6	61 52.2	90 15	43.1	66 16.1	86 14	37.7	3
4	52 56.8	94 17	49.3	53 25.0	94 17	49.0	54 49.3	93 17	48.1	55 17.3	93 17	47.8	55 45.3	93 16	47.5	61 16.0	90 15	42.9	61 43.1	90 15	42.5	66 07.9	86 14	37.1	4
115	52 46.7	94 17	48.5	53 14.9	94 17	48.2	54 39.3	94 16	47.4	55 07.4	93 16	47.0	55 35.4	93 16	46.7	61 06.8	91 15	42.2	61 34.0	90 15	41.8	65 59.8	87 13	36.5	115
6	52 36.6	94 17	47.7	53 04.9	94 16	47.5	54 29.4	94 16	46.6	54 57.5	94 16	46.3	55 25.6	93 16	46.0	60 57.8	91 15	41.6	61 25.1	91 15	41.1	65 51.9	87 13	36.0	6
7	52 26.7	94 16	47.0	52 55.0	94 16	46.7	54 19.7	94 16	45.8	54 47.9	94 16	45.5	55 16.0	94 16	45.2	60 48.9	91 15	40.9	61 16.2	91 14	40.5	65 44.0	87 13	35.4	7
8	52 16.9	95 16	46.2	52 45.2	94 16	45.9	54 10.1	94 16	45.1	54 38.3	94 16	44.8	55 06.4	94 16	44.5	60 40.2	91 14	40.2	61 07.5	91 14	39.8	65 36.2	88 13	34.8	8
9	52 07.2	95 16	45.4	52 35.6	95 16	45.2	54 00.6	94 16	44.3	54 28.8	94 16	44.0	54 57.0	94 15	43.7	60 31.5	92 14	39.6	60 59.0	91 14	39.2	65 28.6	88 13	34.3	9
120	51 57.7	95 16	44.6	52 26.1	95 16	44.4	53 51.2	94 15	43.6	54 19.5	94 15	43.3	54 47.8	94 15	43.0	60 23.0	92 14	38.9	60 50.5	92 14	38.5	65 21.0	88 12	33.7	120
1	51 48.2	95 15	43.9	52 16.7	95 15	43.6	53 42.0	95 15	42.8	54 10.3	94 15	42.5	54 38.6	94 15	42.3	60 14.5	92 14	38.2	60 42.2	92 14	37.8	65 13.6	89 12	33.1	1
2	51 39.0	95 15	43.1	52 07.5	95 15	42.9	53 32.9	95 15	42.1	54 01.3	95 15	41.8	54 29.6	94 15	41.5	60 06.3	92 14	37.6	60 33.9	92 14	37.2	65 06.3	89 12	32.6	2
3	51 29.8	95 15	42.3	51 58.4	95 15	42.1	53 23.9	95 15	41.3	53 52.3	95 15	41.1	54 20.7	95 15	40.8	59 58.1	93 13	36.9	60 25.8	92 13	36.5	64 59.1	89 12	32.0	3
4	51 20.8	95 15	41.6	51 49.4	95 15	41.3	53 15.0	95 15	40.6	53 43.5	95 14	40.3	54 12.0	95 14	40.0	59 50.0	93 13	36.2	60 17.9	93 13	35.9	64 52.0	90 12	31.4	4
125	51 11.9	96 15	40.8	51 40.5	95 14	40.6	53 06.3	95 14	39.8	53 34.9	95 14	39.6	54 03.4	95 14	39.3	59 42.1	93 13	35.6	60 10.0	93 13	35.2	64 45.0	90 11	30.9	125
6	51 03.1	96 14	40.1	51 31.8	96 14	39.8	52 57.8	95 14	39.1	53 26.3	95 14	38.8	53 54.9	95 14	38.6	59 34.3	93 13	34.9	60 02.3	93 13	34.6	64 38.1	91 11	30.3	6
7	50 54.5	96 14	39.3	51 23.3	96 14	39.1	52 49.3	95 14	38.3	53 17.9	95 14	38.1	53 46.5	95 14	37.8	59 26.7	94 13	34.3	59 54.7	93 12	33.9	64 31.4	91 11	29.7	7
8	50 46.0	96 14	38.5	51 14.8	96 14	38.3	52 41.0	96 14	37.6	53 09.7	96 14	37.4	53 38.3	95 13	37.1	59 19.1	94 12	33.6	59 47.2	94 12	33.3	64 24.7	91 11	29.2	8
9	50 37.7	96 14	37.8	51 06.5	96 14	37.6	52 32.8	96 13	36.9	53 01.6	96 13	36.6	53 30.3	96 13	36.4	59 11.7	94 12	32.9	59 39.9	94 12	32.6	64 18.2	92 11	28.6	9
130	50 29.5	96 13	37.0	50 58.4	96 13	36.8	52 24.8	96 13	36.1	52 53.6	96 13	35.9	53 22.3	96 13	35.7	59 04.5	94 12	32.3	59 32.7	94 12	32.0	64 11.8	92 10	28.1	130
1	50 21.4	96 13	36.3	50 50.3	96 13	36.1	52 16.9	96 13	35.4	52 45.7	96 13	35.2	53 14.5	96 13	34.9	58 57.3	94 12	31.6	59 25.6	94 12	31.3	64 05.5	92 10	27.5	1
2	50 13.5	97 13	35.5	50 42.5	96 13	35.3	52 09.2	96 13	34.7	52 38.0	96 13	34.4	53 06.9	96 12	34.2	58 50.3	95 11	31.0	59 18.7	94 11	30.7	63 59.3	92 10	26.9	2
3	50 05.8	97 13	34.8	50 34.8	97 13	34.6	52 01.6	96 12	33.9	52 30.5	96 12	33.7	52 59.3	96 12	33.5	58 43.4	95 11	30.3	59 11.9	95 11	30.0	63 53.3	93 10	26.4	3
4	49 58.1	97 12	34.0	50 27.2	97 12	33.8	51 54.1	96 12	33.2	52 23.1	96 12	33.0	52 52.0	96 12	32.7	58 36.7	95 11	29.7	59 05.2	95 11	29.4	63 47.3	93 10	25.8	4
135	49 50.7	97 12	33.2	50 19.7	97 12	33.1	51 46.8	97 12	32.5	52 15.8	97 12	32.2	52 44.7	96 12	32.0	58 30.1	95 11	29.0	58 58.6	95 11	28.7	63 41.5	93 09	25.2	135
6	49 43.3	97 12	32.5	50 12.4	97 12	32.3	51 39.6	97 12	31.7	52 08.7	97 12	31.5	52 37.7	97 12	31.3	58 23.6	95 11	28.4	58 52.2	95 10	28.1	63 35.8	94 09	24.7	6
7	49 36.2	97 12	31.7	50 05.3	97 12	31.6	51 32.6	97 11	31.0	52 01.7	97 11	30.8	52 30.7	97 11	30.6	58 17.2	96 10	27.7	58 45.9	96 10	27.4	63 30.3	94 09	24.1	7
8	49 29.1	97 11	31.0	49 58.3	97 11	30.8	51 25.7	97 11	30.3	51 54.8	97 11	30.1	52 23.9	97 11	29.9	58 11.0	96 10	27.1	58 39.8	96 10	26.8	63 24.8	94 09	23.5	8
9	49 22.3	97 11	30.2	49 51.5	97 11	30.1	51 19.0	97 11	29.5	51 48.2	97 11	29.3	52 17.3	97 11	29.1	58 05.0	96 10	26.4	58 33.8	96 10	26.1	63 19.5	94 09	23.0	9
140	49 15.5	98 11	29.5	49 44.8	97 11	29.3	51 12.4	97 11	28.8	51 41.6	97 11	28.6	52 10.8	97 11	28.4	57 59.0	96 10	25.8	58 27.9	96 10	25.5	63 14.3	95 08	22.4	140
1	49 09.0	98 11	28.8	49 38.3	98 11	28.6	51 06.0	97 10	28.1	51 35.2	97 10	27.9	52 04.4	97 10	27.7	57 53.2	96 09	25.1	58 22.1	96 09	24.8	63 09.2	95 08	21.9	1
2	49 02.6	98 10	28.0	49 31.9	98 10	27.8	50 59.7	98 10	27.3	51 29.0	97 10	27.2	51 58.2	97 10	27.0	57 47.6	97 09	24.5	58 16.5	96 09	24.2	63 04.2	95 08	21.3	2
3	48 56.3	98 10	27.3	49 25.6	98 10	27.1	50 53.6	98 10	26.6	51 22.9	98 10	26.4	51 52.2	98 10	26.3	57 42.1	97 09	23.8	58 11.1	97 09	23.6	62 59.4	96 08	20.7	3
4	48 50.2	98 10	26.5	49 19.6	98 10	26.4	50 47.6	98 10	25.9	51 17.0	98 10	25.7	51 46.3	98 10	25.5	57 36.7	97 09	23.2	58 05.7	97 09	22.9	62 54.6	96 08	20.2	4
145	48 44.2	98 10	25.8	49 13.7	98 10	25.6	50 41.8	98 09	25.2	51 11.2	98 09	25.0	51 40.5	98 09	24.8	57 31.4	97 08	22.5	58 00.6	97 08	22.3	62 50.0	96 07	19.6	145
6	48 38.5	98 09	25.0	49 07.9	98 09	24.9	50 36.2	98 09	24.4	51 05.6	98 09	24.3	51 35.0	98 09	24.1	57 26.3	97 08	21.9	57 55.5	97 08	21.6	62 45.6	96 07	19.1	6
7	48 32.8	98 09	24.3	49 02.3	98 09	24.1	50 30.7	98 09	23.7	51 00.1	98 09	23.6	51 29.5	98 09	23.4	57 21.4	97 08	21.2	57 50.6	97 08	21.0	62 41.2	96 07	18.5	7
8	48 27.3	98 09	23.5	48 56.9	98 09	23.4	50 25.3	98 09	23.0	50 54.8	98 09	22.8	51 24.2	98 09	22.7	57 16.6	98 08	20.6	57 45.8	97 08	20.4	62 37.0	97 07	17.9	8
9	48 22.0	98 09	22.8	48 51.6	98 09	22.7	50 20.1	98 08	22.3	50 49.6	98 08	22.1	51 19.1	98 08	22.0	57 11.9	98 08	19.9	57 41.2	98 07	19.7	62 32.9	97 07	17.4	9
150	48 16.9	99 08	22.1	48 46.4	99 08	21.9	50 15.1	98 08	21.5	50 44.6	98 08	21.4	51 14.1	98 08	21.3	57 07.4	98 07	19.3	57 36.7	98 07	19.1	62 29.0	97 06	16.8	150
1	48 11.9	99 08	21.3	48 41.5	99 08	21.2	50 10.2	99 08	20.8	50 39.8	99 08	20.7	51 09.3	98 08	20.5	57 03.0	98 07	18.6	57 32.4	98 07	18.4	62 25.1	97 06	16.2	1
2	48 07.1	99 08	20.6	48 36.7	99 08	20.5	50 05.5	99 08	20.1	50 35.1	99 08	20.0	51 04.7	99 08	19.8	56 58.8	98 07	18.0	57 28.2	98 07	17.8	62 21.4	97 06	15.7	2
3	48 02.4	99 08	19.8	48 32.0	99 07	19.7	50 00.9	99 07	19.4	50 30.6	99 07	19.2	51 00.2	99 07	19.1	56 54.7	98 07	17.3	57 24.1	98 07	17.2	62 17.8	98 06	15.1	3
4	47 57.9	99 07	19.1	48 27.6	99 07	19.0	49 56.5	99 07	18.6	50 26.2	99 07	18.5	50 55.8	99 07	18.4	56 50.7	98 06	16.7	57 20.2	98 06	16.5	62 14.4	98 06	14.6	4
155	47 53.6	99 07	18.4	48 23.3	99 07	18.3	49 52.3	99 07	17.9	50 22.0	99 07	17.8	50 51.6	99 07	17.7	56 46.9	98 06	16.0	57 16.4	98 06	15.9	62 11.0	98 05	14.0	155
6	47 49.4	99 07	17.6	48 19.1	99 07	17.5	49 48.2	99 07	17.2	50 17.9	99 06	17.1	50 47.6	99 06	17.0	56 43.2	99 06	15.4	57 12.8	99 06	15.3	62 07.8	98 05	13.4	6
7	47 45.4	99 06	16.9	48 15.1	99 06	16.8	49 44.3	99 06	16.5	50 14.0	99 06	16.4	50 43.8	99 06	16.3	56 39.7	99 06	14.8	57 09.3	99 06	14.6	62 04.8	98 05	12.9	7
8	47 41.6	99 06	16.2	48 11.3	99 06	16.1	49 40.6	99 06	15.8	50 10.3	99 06	15.7	50 40.0	99 06	15.6	56 36.4	99 05	14.1	57 06.0	99 05	14.0	62 01.8	98 05	12.3	8
9	47 37.9	99 06	15.4	48 07.7	99 06	15.3	49 37.0	99 06	15.1	50 06.8	99 06	15.0	50 36.5	99 06	14.9	56 33.2	99 05	13.5	57 02.8	99 05	13.3	61 59.0	99 04	11.8	9
160	47 34.4	99 06	14.7	48 04.2	99 06	14.6	49 33.6	99 05	14.3	50 03.3	99 05	14.2	50 33.1	99 05	14.1	56 30.1	99 05	12.8	56 59.8	99 05	12.7	61 56.3	99 04	11.2	160
1	47 31.0	99 05	13.9	48 00.9	99 05	13.9	49 30.3	99 05	13.6	50 00.1	99 05	13.5	50 29.9	99 05	13.4	56 27.2	99 05	12.2	56 56.9	99 05	12.1	61 53.7	99 04	10.6	1
2	47 27.9	99 05	13.2	47 57.7	99 05	13.1	49 27.2	99 05	12.9	49 57.0	99 05	12.8	50 26.9	99 05	12.7	56 24.4	99 04	11.5	56 54.1	99 04	11.4	61 51.3	99 04	10.1	2
3	47 24.9	1.0 05	12.5	47 54.7	1.0 05	12.4	49 24.3	99 05	12.2	49 54.1	99 05	12.1	50 24.0	99 05	12.0	56 21.8	99 04	10.9	56 51.5	99 04	10.8	61 49.0	99 04	09.5	3
4	47 22.0	1.0 04	11.7	47 51.9	1.0 04	11.7	49 21.5	1.0 04	11.5	49 51.4	1.0 04	11.4	50 21.2	1.0 04	11.3	56 19.3	99 04	10.3	56 49.1	99 04	10.2	61 46.9	99 03	09.0	4
165	47 19.4	1.0 04	11.0	47 49.3	1.0 04	10.9	49 18.9	1.0 04	10.7	49 48.8	1.0 04	10.7	50 18.7	1.0 04	10.6	56 16.9	99 04	09.6	56 46.8	99 04	09.5	61 44.8	99 03	08.4	165
6	47 16.9	1.0 04	10.3	47 46.8	1.0 04	10.2	49 16.5	1.0 04	10.0	49 46.4	1.0 04	10.0	50 16.3	1.0 04	09.9	56 14.8	1.0 03	09.0	56 44.6	1.0 03	08.9	61 42.9	99 03	07.8	6
7	47 14.6	1.0 04	09.5	47 44.5	1.0 04	09.5	49 14.2	1.0 04	09.3	49 44.1	1.0 04	09.2	50 14.0	1.0 03	09.2	56 12.7	1.0 03	08.3	56 42.6	1.0 03	08.3	61 41.1	99 03	07.3	7
8	47 12.4	1.0 03	08.8	47 42.3	1.0 03	08.8	49 12.1	1.0 03	08.6	49 42.0	1.0 03	08.5	50 12.0	1.0 03	08.5	56 10.9	1.0 03	07.7	56 40.7	1.0 03	07.6	61 39.5	1.0 03	06.7	8
9	47 10.4	1.0 03	08.1	47 40.4	1.0 03	08.0	49 10.2	1.0 03	07.9	49 40.1	1.0 03	07.8	50 10.1	1.0 03	07.8	56 09.1	1.0 03	07.1	56 39.0	1.0 03	07.0	61 38.0	1.0 02	06.2	9
170	47 08.6	1.0 03	07.3	47 38.6	1.0 03	07.3	49 08.4	1.0 03	07.2	49 38.4	1.0 03	07.1	50 08.3	1.0 03	07.1	56 07.5	1.0 02	06.4	56 37.5	1.0 02	06.3	61 36.6	1.0 02	05.6	170
1	47 07.0	1.0 02	06.6	47 36.9	1.0 02	06.6	49 06.8	1.0 02	06.4	49 36.8	1.0 02	06.4	50 06.7	1.0 02	06.4	56 06.1	1.0 02	05.8	56 36.0	1.0 02	05.7	61 35.3	1.0 02	05.0	1
2	47 05.5	1.0 02	05.9	47 35.5	1.0 02	05.8	49 05.4	1.0 02	05.7	49 35.4	1.0 02	05.7	50 05.3	1.0 02	05.7	56 04.8	1.0 02	05.1	56 34.8	1.0 02	05.1	61 34.2	1.0 02	04.5	2
3	47 04.2	1.0 02	05.1	47 34.2	1.0 02	05.1	49 04.1	1.0 02	05.0	49 34.1	1.0 02	05.0	50 04.1	1.0 02	04.9	56 03.7	1.0 02	04.5	56 33.7	1.0 02	04.4	61 33.2	1.0 01	03.9	3
4	47 03.1	1.0 02	04.4	47 33.1	1.0 02	04.4	49 03.0	1.0 02	04.3	49 33.0	1.0 02	04.3	50 03.0	1.0 02	04.2	56 02.7	1.0 01	03.8	56 32.7	1.0 01	03.8	61 32.4	1.0 01	03.4	4
175	47 02.2	1.0 01	03.7	47 32.1	1.0 01	03.6	49 02.1	1.0 01	03.6	49 32.1	1.0 01	03.6	50 02.1	1.0 01	03.5	56 01.9	1.0 01	03.2	56 31.9	1.0 01	03.2	61 31.6	1.0 01	02.8	175
6	47 01.4	1.0 01	02.9	47 31.4	1.0 01	02.9	49 01.3	1.0 01	02.9	49 31.3	1.0 01	02.8	50 01.3	1.0 01	02.8	56 01.2	1.0 01	02.6	56 31.2	1.0 01	02.5	61 31.1	1.0 01	02.2	6
7	47 00.8	1.0 01	02.2	47 30.8	1.0 01	02.2	49 00.8	1.0 01	02.1	49 30.8	1.0 01	02.1	50 00.7	1.0 01	02.1	56 00.7	1.0 01	01.9	56 30.7	1.0 01	01.9	61 30.6	1.0 01	01.7	7
8	47 00.3	1.0 00	01.5	47 30.3	1.0 00	01.5	49 00.3	1.0 00	01.4	49 30.3	1.0 00	01.4	50 00.3	1.0 00	01.4	56 00.3	1.0 00	01.3	56 30.3	1.0 00	01.3	61 30.3	1.0 00	01.1	8
9	47 00.1	1.0 00	00.7	47 30.1	1.0 00	00.7	49 00.1	1.0 00	00.7	49 30.1	1.0 00	00.7	50 00.1	1.0 00	00.7	56 00.1	1.0 00	00.6	56 30.1	1.0 00	00.6	61 30.1	1.0 00	00.6	9
180	47 00.0	1.0 00	00.0	47 30.0	1.0 00	00.0	49 00.0	1.0 00	00.0	49 30.0	1.0 00	00.0	50 00.0	1.0 00	00.0	56 00.0	1.0 00	00.0	56 30.0	1.0 00	00.0	61 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 77°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	17	180	21	180	25	180	29	180	33	180	37	180	41	180	45	180	49	180	53	180	57	180	00
4	17	176	21	176	25	176	29	176	33	176	37	175	41	175	45	175	49	175	53	175	57	175	4
8	17	172	21	172	25	171	29	171	33	171	37	171	41	171	45	170	49	170	53	170	57	169	8
12	17	167	21	167	25	167	29	167	33	167	37	166	41	166	45	166	49	165	53	165	57	164	12
16	16	163	20	163	24	163	28	162	32	162	36	162	40	161	44	161	48	160	52	160	56	159	16
20	16	159	20	159	24	158	28	158	32	158	36	157	40	157	44	156	48	156	52	155	56	154	20
24	16	155	20	155	24	154	28	154	32	153	36	153	40	152	44	152	48	151	52	150	56	149	24
28	15	151	19	150	23	150	27	149	31	149	35	148	39	148	43	147	47	146	51	145	55	144	28
32	15	147	19	146	23	146	27	145	31	145	35	144	39	143	43	142	47	141	51	140	54	139	32
36	14	143	18	142	22	142	26	141	30	140	34	139	38	139	42	138	46	137	50	136	54	134	36
40	14	139	18	138	22	137	26	137	30	136	34	135	38	134	41	133	45	132	49	131	53	129	40
44	13	135	17	134	21	133	25	132	29	132	33	131	37	130	41	129	45	128	49	126	52	125	44
48	13	131	17	130	20	129	24	128	28	127	32	127	36	126	40	125	44	123	48	122	52	120	48
52	12	127	16	126	20	125	24	124	28	123	32	122	35	121	39	120	43	119	47	118	51	116	52
56	11	123	15	122	19	121	23	120	27	119	31	118	35	117	39	116	42	115	46	113	50	112	56
60	10	119	14	118	18	117	22	116	26	115	30	114	34	113	38	112	42	110	45	109	49	107	60
64	10	115	13	114	17	113	21	112	25	111	29	110	33	109	37	108	41	106	45	105	48	103	64
68	09	111	13	110	17	109	20	108	24	107	28	106	32	105	36	104	40	102	44	101	48	99	68
72	08	107	12	106	16	105	20	104	23	103	27	102	31	101	35	100	39	98	43	97	47	95	72
76	07	103	11	102	15	101	19	100	23	99	26	98	30	97	34	96	38	94	42	93	46	91	76
80	06	99	10	98	14	97	18	96	22	95	26	94	29	93	33	92	37	90	41	89	45	87	80
84	05	95	09	94	13	93	17	92	21	91	25	90	29	89	32	88	36	86	40	85	44	83	84
88	04	91	08	90	12	89	16	88	20	87	24	86	28	85	32	84	35	83	39	81	43	80	88
92	03	87	07	86	11	85	15	84	19	83	23	82	27	81	31	80	34	79	38	77	42	76	92
96	03	83	06	82	10	81	14	81	18	80	22	79	26	77	30	76	34	75	37	74	41	72	96
100	02	79	06	78	09	78	13	77	17	76	21	75	25	74	29	73	33	71	37	70	40	69	100
104	01	75	05	75	09	74	12	73	16	72	20	71	24	70	28	69	32	68	36	66	40	65	104
108	*00*	72	04	71	08	70	12	69	16	68	19	67	23	66	27	65	31	64	35	63	39	61	108
112	*01*	68	03	67	07	66	11	65	15	64	19	63	23	62	26	61	30	60	34	59	38	58	112
116	*02*	64	02	63	06	62	10	61	14	60	18	60	22	59	26	58	30	57	33	56	37	54	116
120	*03*	60	01	59	05	58	09	58	13	57	17	56	21	55	25	54	29	53	33	52	37	51	120
124	*03*	56	01	55	05	54	08	54	12	53	16	52	20	51	24	50	28	49	32	48	36	47	124
128	*04*	52	*00*	51	04	51	08	50	12	49	16	48	20	48	24	47	27	46	31	45	35	44	128
132	*05*	48	*01*	47	03	47	07	46	11	45	15	45	19	44	23	43	27	42	31	41	35	41	132
136	*05*	44	*01*	43	03	43	06	42	10	42	14	41	18	40	22	40	26	39	30	38	34	37	136
140	*06*	40	*02*	40	02	39	06	38	10	38	14	37	18	37	22	36	26	35	30	35	34	34	140
144	*07*	36	*03*	36	01	35	05	35	09	34	13	33	17	33	21	32	25	32	29	31	33	30	144
148	*07*	32	*03*	32	01	31	05	31	09	30	13	30	17	29	21	29	25	28	29	28	33	27	148
152	*07*	28	*04*	28	00	27	04	27	08	26	12	26	16	26	20	25	24	25	28	24	32	24	152
156	*08*	24	*04*	24	00	23	04	23	08	23	12	22	16	22	20	22	24	21	28	21	32	20	156
160	*08*	20	*04*	20	*00*	20	04	19	08	19	12	19	16	18	20	18	24	18	28	17	32	17	160
164	*08*	16	*05*	16	*01*	16	03	15	07	15	11	15	15	15	19	14	23	14	27	14	31	13	164
168	*09*	12	*05*	12	*01*	12	03	12	07	11	11	11	15	11	19	11	23	11	27	10	31	10	168
172	*09*	08	*05*	08	*01*	08	03	08	07	08	11	07	15	07	19	07	23	07	27	07	31	07	172
176	*09*	04	*05*	04	*01*	04	03	04	07	04	11	04	15	04	19	04	23	04	27	03	31	03	176
180	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	23	00	27	00	31	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—1880

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 77°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	61	180	65	180	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	00
4	61	174	65	174	69	174	73	173	77	172	81	170	85	166	89	135	87	13	83	03	79	01	4
8	61	169	65	168	69	168	73	166	77	165	81	161	85	153	88	114	87	24	83	07	79	01	8
12	61	164	65	163	69	161	73	160	76	157	80	152	84	141	87	104	86	33	83	10	79	02	12
16	60	158	64	157	68	155	72	153	76	150	80	144	83	132	86	97	86	39	83	13	79	03	16
20	60	153	64	151	68	150	72	147	76	143	79	136	83	123	85	92	85	44	82	16	79	04	20
24	59	148	63	146	67	144	71	141	75	137	79	129	82	116	84	88	84	47	82	18	79	04	24
28	59	142	63	141	67	138	71	135	74	130	78	123	81	110	83	85	84	48	82	20	79	05	28
32	58	137	62	135	66	133	70	129	74	125	77	117	80	104	83	82	83	50	81	22	79	05	32
36	58	132	62	130	65	128	69	124	73	119	76	111	79	99	82	79	82	50	81	23	79	06	36
40	57	128	61	125	65	123	68	119	72	114	75	106	79	95	81	76	82	51	81	25	78	06	40
44	56	123	60	121	64	118	68	114	71	109	75	102	78	91	80	74	81	50	80	26	78	07	44
48	56	118	59	116	63	113	67	109	70	104	74	97	77	87	79	71	80	50	80	27	78	07	48
52	55	114	59	112	62	109	66	105	69	100	73	93	76	83	78	69	80	49	80	27	78	08	52
56	54	110	58	107	61	104	65	101	69	96	72	89	75	80	77	67	79	49	79	27	78	08	56
60	53	105	57	103	61	100	64	96	68	92	71	85	74	77	77	64	78	48	79	28	78	08	60
64	52	101	56	99	60	96	63	92	67	88	70	82	73	74	76	62	78	47	78	28	78	08	64
68	51	97	55	95	59	92	62	88	66	84	69	78	72	71	75	60	77	46	78	28	78	09	68
72	50	93	54	91	58	88	61	85	65	80	68	75	71	68	74	58	76	44	78	27	77	09	72
76	50	89	53	87	57	84	61	81	64	77	67	72	71	65	73	56	76	43	77	27	77	09	76
80	49	85	52	83	56	81	60	77	63	73	67	69	70	62	73	53	75	42	77	27	77	09	80
84	48	82	51	79	55	77	59	74	62	70	66	65	69	59	72	51	74	40	76	26	77	09	84
88	47	78	51	76	54	73	58	70	62	67	65	62	68	57	71	49	74	39	76	25	77	09	88
92	46	74	50	72	53	70	57	67	61	64	64	59	68	54	71	47	73	37	76	25	77	09	92
96	45	71	49	69	53	66	56	64	60	60	63	56	67	51	70	45	73	36	75	24	77	09	96
100	44	67	48	65	52	63	56	60	59	57	63	54	66	49	69	43	72	34	75	23	77	08	100
104	43	63	47	62	51	60	55	57	58	54	62	51	65	46	69	40	72	33	74	22	76	08	104
108	43	60	46	58	50	56	54	54	58	51	61	48	65	44	68	38	71	31	74	21	76	08	108
112	42	56	46	55	50	53	53	51	57	48	61	45	64	41	68	36	71	29	74	20	76	08	112
116	41	53	45	51	49	50	53	48	56	45	60	42	64	39	67	34	70	28	74	19	76	07	116
120	40	50	44	48	48	47	52	45	56	42	59	40	63	36	67	32	70	26	73	18	76	07	120
124	40	46	44	45	48	43	51	42	55	39	59	37	63	34	66	30	70	24	73	17	76	07	124
128	39	43	43	42	47	40	51	39	55	37	58	34	62	31	66	28	69	23	73	16	76	06	128
132	39	39	42	38	46	37	50	36	54	34	58	32	62	29	65	26	69	21	72	15	76	06	132
136	38	36	42	35	46	34	50	32	54	31	57	29	61	27	65	23	69	19	72	14	75	06	136
140	38	33	41	32	45	31	49	30	54	28	57	26	61	24	65	21	68	18	72	13	75	05	140
144	37	30	41	29	45	28	49	27	53	25	57	24	61	22	64	19	68	16	72	11	75	05	144
148	37	26	41	25	45	25	48	24	52	22	56	21	60	19	64	17	68	14	72	10	75	04	148
152	36	23	40	22	44	21	48	21	52	20	56	18	60	17	64	15	68	12	72	09	75	04	152
156	36	20	40	19	44	18	48	18	52	17	56	16	60	14	64	13	68	11	71	08	75	03	156
160	36	16	40	16	44	15	48	15	52	14	56	13	59	12	63	11	67	09	71	06	75	03	160
164	35	13	39	13	43	12	47	12	51	11	55	10	59	10	63	09	67	07	71	05	75	02	164
168	35	10	39	10	43	09	47	09	51	08	55	08	59	07	63	06	67	05	71	04	75	02	168
172	35	07	39	06	43	06	47	06	51	06	55	05	59	05	63	04	67	04	71	03	75	01	172
176	35	03	39	03	43	03	47	03	51	03	55	03	59	02	63	02	67	02	71	01	75	01	176
180	35	00	39	00	43	00	47	00	51	00	55	00	59	00	63	00	67	00	71	00	75	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 78°

16—18508

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat 79

Lat. 78°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		°
00	12 00.0	1.0 0.0	180.0	12 30.0	1.0 0.0	180.0	13 00.0	1.0 0.0	180.0	13 30.0	1.0 0.0	180.0	14 00.0	1.0 0.0	180.0	14 30.0	1.0 0.0	180.0	15 00.0	1.0 0.0	180.0	15 30.0	1.0 0.0	180.0	00
1	11 59.9	1.0 0.1	179.0	12 29.9	1.0 0.1	179.0	12 59.9	1.0 0.1	179.0	13 29.9	1.0 0.1	179.0	13 59.9	1.0 0.1	179.0	14 29.9	1.0 0.1	179.0	14 59.9	1.0 0.1	179.0	15 29.9	1.0 0.1	179.0	1
2	11 59.6	1.0 0.1	178.0	12 29.6	1.0 0.1	178.0	12 59.6	1.0 0.1	177.9	13 29.6	1.0 0.1	177.9	13 59.6	1.0 0.1	177.9	14 29.6	1.0 0.1	177.9	14 59.5	1.0 0.1	177.9	15 29.5	1.0 0.1	177.9	2
3	11 59.0	1.0 0.1	176.9	12 29.0	1.0 0.1	176.9	12 59.0	1.0 0.1	176.9	13 29.0	1.0 0.1	176.9	13 59.0	1.0 0.1	176.9	14 29.0	1.0 0.1	176.9	14 59.0	1.0 0.1	176.9	15 29.0	1.0 0.1	176.9	3
4	11 58.2	1.0 0.2	175.9	12 28.2	1.0 0.2	175.9	12 58.2	1.0 0.2	175.9	13 28.2	1.0 0.2	175.9	13 58.2	1.0 0.2	175.9	14 28.2	1.0 0.2	175.9	14 58.2	1.0 0.2	175.9	15 28.2	1.0 0.2	175.9	4
05	11 57.2	1.0 0.2	174.9	12 27.2	1.0 0.2	174.9	12 57.2	1.0 0.2	174.9	13 27.2	1.0 0.2	174.9	13 57.2	1.0 0.2	174.9	14 27.2	1.0 0.2	174.8	14 57.2	1.0 0.2	174.8	15 27.2	1.0 0.2	174.8	05
6	11 56.0	1.0 0.2	173.9	12 26.0	1.0 0.2	173.9	12 56.0	1.0 0.2	173.8	13 26.0	1.0 0.2	173.8	13 56.0	1.0 0.2	173.8	14 26.0	1.0 0.2	173.8	14 56.0	1.0 0.2	173.8	15 25.9	1.0 0.2	173.8	6
7	11 54.6	1.0 0.3	172.8	12 24.5	1.0 0.3	172.8	12 54.5	1.0 0.3	172.8	13 24.5	1.0 0.3	172.8	13 54.5	1.0 0.3	172.8	14 24.5	1.0 0.3	172.8	14 54.5	1.0 0.3	172.8	15 24.5	1.0 0.3	172.8	7
8	11 52.9	1.0 0.3	171.8	12 22.9	1.0 0.3	171.8	12 52.9	1.0 0.3	171.8	13 22.9	1.0 0.3	171.8	13 52.8	1.0 0.3	171.8	14 22.8	1.0 0.3	171.7	14 52.8	1.0 0.3	171.7	15 22.8	1.0 0.3	171.7	8
9	11 51.0	1.0 0.4	170.8	12 21.0	1.0 0.4	170.8	12 51.0	1.0 0.4	170.8	13 21.0	1.0 0.4	170.8	13 50.9	1.0 0.4	170.7	14 20.9	1.0 0.4	170.7	14 50.9	1.0 0.4	170.7	15 20.9	1.0 0.4	170.7	9
10	11 48.9	1.0 0.4	169.8	12 18.9	1.0 0.4	169.8	12 48.9	1.0 0.4	169.7	13 18.8	1.0 0.4	169.7	13 48.8	1.0 0.4	169.7	14 18.8	1.0 0.4	169.7	14 48.8	1.0 0.4	169.7	15 18.8	1.0 0.4	169.6	10
1	11 46.6	1.0 0.4	168.8	12 16.6	1.0 0.4	168.7	12 46.5	1.0 0.4	168.7	13 16.5	1.0 0.4	168.7	13 46.5	1.0 0.4	168.7	14 16.5	1.0 0.4	168.7	14 46.4	1.0 0.4	168.6	15 16.4	1.0 0.4	168.6	1
2	11 44.0	1.0 0.5	167.7	12 14.0	1.0 0.5	167.7	12 44.0	1.0 0.5	167.7	13 14.0	1.0 0.6	167.7	13 43.9	1.0 0.5	167.6	14 13.9	1.0 0.5	167.6	14 43.9	1.0 0.5	167.6	15 13.8	1.0 0.6	167.6	2
3	11 41.3	1.0 0.5	166.7	12 11.2	1.0 0.5	166.7	12 41.2	1.0 0.5	166.7	13 11.2	1.0 0.5	166.6	13 41.1	1.0 0.5	166.6	14 11.1	1.0 0.6	166.6	14 41.1	1.0 0.5	166.6	15 11.0	1.0 0.6	166.5	3
4	11 38.3	1.0 0.5	165.7	12 08.3	1.0 0.5	165.7	12 38.2	1.0 0.5	165.6	13 08.2	1.0 0.5	165.6	13 38.1	1.0 0.5	165.6	14 08.1	1.0 0.6	165.6	14 38.1	1.0 0.6	165.5	15 08.0	1.0 0.6	165.5	4
15	11 35.1	1.0 0.6	164.7	12 05.1	1.0 0.6	164.7	12 35.0	1.0 0.6	164.6	13 05.0	1.0 0.6	164.6	13 34.9	1.0 0.6	164.6	14 04.9	1.0 0.6	164.5	14 34.8	1.0 0.6	164.5	15 04.8	1.0 0.6	164.5	15
6	11 31.7	1.0 0.6	163.7	12 01.7	1.0 0.6	163.6	12 31.6	1.0 0.6	163.6	13 01.6	1.0 0.6	163.6	13 31.5	1.0 0.6	163.5	14 01.5	1.0 0.6	163.5	14 31.4	1.0 0.6	163.5	15 01.4	1.0 0.6	163.4	6
7	11 28.1	1.0 0.6	162.6	11 58.0	1.0 0.6	162.6	12 28.0	1.0 0.6	162.6	12 57.9	1.0 0.6	162.5	13 27.9	1.0 0.6	162.5	13 57.8	1.0 0.6	162.5	14 27.8	1.0 0.6	162.5	14 57.7	1.0 0.6	162.4	7
8	11 24.3	1.0 0.7	161.6	11 54.2	1.0 0.7	161.6	12 24.1	1.0 0.7	161.6	12 54.1	1.0 0.7	161.5	13 24.0	1.0 0.7	161.5	13 53.9	1.0 0.7	161.5	14 23.9	1.0 0.7	161.4	14 53.8	1.0 0.7	161.4	8
9	11 20.2	1.0 0.7	160.6	11 50.2	1.0 0.7	160.6	12 20.1	1.0 0.7	160.5	12 50.0	1.0 0.7	160.5	13 19.9	1.0 0.7	160.5	13 49.9	1.0 0.7	160.4	14 19.8	1.0 0.7	160.4	14 49.7	1.0 0.7	160.4	9
20	11 16.0	1.0 0.7	159.6	11 45.9	1.0 0.7	159.6	12 15.8	1.0 0.7	159.5	12 45.8	1.0 0.7	159.5	13 15.7	1.0 0.7	159.4	13 45.6	1.0 0.8	159.4	14 15.5	1.0 0.8	159.4	14 45.4	1.0 0.8	159.3	20
1	11 11.5	1.0 0.8	158.6	11 41.5	1.0 0.8	158.5	12 11.4	1.0 0.8	158.5	12 41.3	1.0 0.8	158.5	13 11.2	1.0 0.8	158.4	13 41.1	1.0 0.8	158.4	14 11.0	1.0 0.8	158.3	14 40.9	1.0 0.8	158.3	1
2	11 06.9	1.0 0.8	157.6	11 36.8	1.0 0.8	157.5	12 06.7	1.0 0.8	157.5	12 36.6	1.0 0.8	157.4	13 06.5	1.0 0.8	157.4	13 36.4	1.0 0.8	157.4	14 06.3	1.0 0.8	157.3	14 36.2	1.0 0.8	157.3	2
3	11 02.0	1.0 0.8	156.5	11 31.9	1.0 0.8	156.5	12 01.8	1.0 0.8	156.5	12 31.7	1.0 0.8	156.4	13 01.6	1.0 0.8	156.4	13 31.5	1.0 0.9	156.3	14 01.4	1.0 0.9	156.3	14 31.3	1.0 0.9	156.2	3
4	10 56.9	1.0 0.9	155.5	11 26.8	1.0 0.9	155.5	11 56.7	1.0 0.9	155.4	12 26.6	1.0 0.9	155.4	12 56.5	1.0 0.9	155.3	13 26.4	1.0 0.9	155.3	13 56.3	1.0 0.9	155.3	14 26.2	1.0 0.9	155.2	4
25	10 51.7	1.0 0.9	154.5	11 21.6	1.0 0.9	154.5	11 51.4	1.0 0.9	154.4	12 21.3	1.0 0.9	154.4	12 51.2	1.0 0.9	154.3	13 21.1	1.0 0.9	154.3	13 50.9	1.0 0.9	154.2	14 20.8	1.0 0.9	154.2	25
6	10 46.2	1.0 0.9	153.5	11 16.1	1.0 0.9	153.5	11 46.0	1.0 0.9	153.4	12 15.8	1.0 0.9	153.4	12 45.7	1.0 1.0	153.3	13 15.6	1.0 1.0	153.3	13 45.4	1.0 1.0	153.2	14 15.3	1.0 1.0	153.2	6
7	10 40.5	1.0 1.0	152.5	11 10.4	1.0 1.0	152.4	11 40.3	1.0 1.0	152.4	12 10.1	1.0 1.0	152.3	12 40.0	1.0 1.0	152.3	13 09.8	1.0 1.0	152.2	13 39.7	1.0 1.0	152.2	14 09.6	1.0 1.0	152.1	7
8	10 34.7	1.0 1.0	151.5	11 04.5	1.0 1.0	151.4	11 34.4	1.0 1.0	151.4	12 04.2	1.0 1.0	151.3	12 34.1	99 1.0	151.3	13 03.9	99 1.0	151.2	13 33.8	99 1.0	151.2	14 03.6	99 1.0	151.1	8
9	10 28.6	99 1.0	150.5	10 58.5	99 1.0	150.4	11 28.3	99 1.0	150.4	11 58.2	99 1.0	150.3	12 28.0	99 1.0	150.2	12 57.8	99 1.0	150.2	13 27.7	99 1.0	150.1	13 57.5	99 1.1	150.1	9
30	10 22.4	99 1.1	149.4	10 52.2	99 1.1	149.4	11 22.0	99 1.1	149.3	11 51.9	99 1.1	149.3	12 21.7	99 1.1	149.2	12 51.5	99 1.1	149.2	13 21.4	99 1.1	149.1	13 51.2	99 1.1	149.1	30
1	10 15.9	99 1.1	148.4	10 45.8	99 1.1	148.4	11 15.6	99 1.1	148.3	11 45.4	99 1.1	148.3	12 15.2	99 1.1	148.2	12 45.1	99 1.1	148.2	13 14.9	99 1.1	148.1	13 44.7	99 1.1	148.0	1
2	10 09.3	99 1.1	147.4	10 39.1	99 1.1	147.4	11 08.9	99 1.1	147.3	11 38.8	99 1.1	147.3	12 08.6	99 1.1	147.2	12 38.4	99 1.1	147.1	13 08.2	99 1.1	147.1	13 38.0	99 1.1	147.0	2
3	10 02.5	99 1.2	146.4	10 32.3	99 1.2	146.4	11 02.1	99 1.2	146.3	11 31.9	99 1.2	146.2	12 01.7	99 1.2	146.2	12 31.5	99 1.2	146.1	13 01.3	99 1.2	146.1	13 31.1	99 1.2	146.0	3
4	9 55.5	99 1.2	145.4	10 25.3	99 1.2	145.4	10 55.1	99 1.2	145.3	11 24.9	99 1.2	145.2	11 54.7	99 1.2	145.2	12 24.5	99 1.2	145.1	12 54.3	99 1.2	145.0	13 24.0	99 1.2	145.0	4
35	9 48.4	99 1.2	144.4	10 18.1	99 1.2	144.3	10 47.9	99 1.2	144.3	11 17.7	99 1.2	144.2	11 47.5	99 1.2	144.2	12 17.2	99 1.2	144.1	12 47.0	99 1.2	144.0	13 16.8	99 1.2	144.0	35
6	9 41.0	99 1.3	143.4	10 10.8	99 1.3	143.3	10 40.5	99 1.3	143.3	11 10.3	99 1.3	143.2	11 40.1	99 1.3	143.1	12 09.8	99 1.3	143.1	12 39.6	99 1.3	143.0	13 09.4	99 1.3	143.0	6
7	9 33.5	99 1.3	142.4	10 03.2	99 1.3	142.3	10 33.0	99 1.3	142.3	11 02.7	99 1.3	142.2	11 32.5	99 1.3	142.1	12 02.3	99 1.3	142.1	12 32.0	99 1.3	142.0	13 01.8	99 1.3	141.9	7
8	9 25.8	99 1.3	141.4	9 55.5	99 1.3	141.3	10 25.3	99 1.3	141.3	10 55.0	99 1.3	141.2	11 24.8	99 1.3	141.1	11 54.5	99 1.3	141.1	12 24.2	99 1.3	141.0	12 54.0	99 1.3	140.9	8
9	9 17.9	99 1.3	140.4	9 47.6	99 1.3	140.3	10 17.4	99 1.3	140.2	10 47.1	99 1.3	140.2	11 16.8	99 1.3	140.1	11 46.6	99 1.3	140.0	12 16.3	99 1.4	140.0	12 46.0	99 1.4	139.9	9
40	9 09.9	99 1.4	139.4	9 39.6	99 1.4	139.3	10 09.3	99 1.4	139.2	10 39.0	99 1.4	139.2	11 08.8	99 1.4	139.1	11 38.5	99 1.4	139.0	12 08.2	99 1.4	139.0	12 37.9	99 1.4	138.9	40
1	9 01.7	99 1.4	138.4	9 31.4	99 1.4	138.3	10 01.1	99 1.4	138.2	10 30.8	99 1.4	138.2	11 00.5	99 1.4	138.1	11 30.2	99 1.4	138.0	11 59.9	99 1.4	137.9	12 29.6	99 1.4	137.9	1
2	8 53.3	99 1.4	137.4	9 23.0	99 1.4	137.3	9 52.7	99 1.4	137.2	10 22.4	99 1.4	137.2	10 52.1	99 1.4	137.1	11 21.8	99 1.4	137.0	11 51.5	99 1.4	136.9	12 21.2	99 1.4	136.9	2
3	8 44.8	99 1.4	136.4	9 14.5	99 1.4	136.3	9 44.1	99 1.5	136.2	10 13.8	99 1.5	136.1	10 43.5	99 1.5	136.1	11 13.2	99 1.5	136.0	11 42.9	99 1.5	135.9	12 12.6	99 1.5	135.9	3
4	8 36.1	99 1.5	135.4	9 05.8	99 1.5	135.3	9 35.4	99 1.5	135.2	10 05.1	99 1.5	135.1	10 34.8	99 1.5	135.1	11 04.5	99 1.5	135.0	11 34.1	99 1.5	134.9	12 03.8	99 1.5	134.8	4
45	8 27.2	99 1.5	134.4	8 56.9	99 1.5	134.3	9 26.6	99 1.5	134.2	9 56.2	99 1.5	134.1	10 25.9	99 1.5	134.1	10 55.6	99 1.5	134.0	11 25.2	99 1.5	133.9	11 54.9	99 1.5	133.8	45
6	8 18.2	99 1.5	133.4	8 47.9	99 1.5	133.3	9 17.6	99 1.5	133.2	9 47.2	99 1.5	133.1	10 16.9	99 1.5	133.1	10 46.5	99 1.5	133.0	11 16.2	99 1.5	132.9	11 45.8	99 1.5	132.8	6
7	8 09.1	99 1.6	132.4	8 38.7	99 1.6	132.3	9 08.4	99 1.6	132.2	9 38.0	99 1.6	132.1	10 07.7	99 1.6	132.1	10 37.3	99 1.6	132.0	11 07.0	99 1.6	131.9	11 36.6	99 1.6	131.8	7
8	7 59.8	99 1.6	131.4	8 29.4	99 1.6	131.3	8 59.1	99 1.6	131.2	9 28.7	99 1.6	131.1	9 58.3	99 1.6	131.1	10 28.0	99 1.6	131.0	10 57.6	99 1.6	130.9	11 27.2	99 1.6	130.8	8
9	7 50.4	99 1.6	130.4	8 20.0	99 1.6	130.3	8 49.6	99 1.6	130.2	9 19.2	99 1.6	130.1	9 48.9	99 1.6	130.1	10 18.5	99 1.6	130.0	10 48.1	99 1.6	129.9	11 17.7	99 1.6	129.8	9
50	7 40.8	99 1.6	129.4	8 10.4	99 1.6	129.3	8 40.0	99 1.6	129.2	9 09.6	99 1.6	129.1	9 39.2	99 1.6	129.1	10 08.8	99 1.6	129.0	10 38.5	99 1.6	128.9	11 08.1	99 1.6	128.8	50
1	7 31.1	99 1.6	128.4	8 00.7	99 1.6	128.3	8 30.3	99 1.6	128.2	8 59.9	99 1.6	128.1	9 29.5	99 1.6	128.1	9 59.1	99 1.6	128.0	10 28.7	99 1.6	127.9	10 58.3	99 1.7	127.8	1
2	7 21.3	99 1.7	127.4	7 50.8	99 1.7	127.3	8 20.4	99 1.7	127.2	8 50.0	99 1.7	127.1	9 19.6	99 1.7	127.1	9 49.2	99 1.7	127.0	10 18.8	99 1.7	126.9	10 48.3	99 1.7	126.8	2
3	7 11.3	99 1.7	126.4	7 40.9	99 1.7	126.3	8 10.4	99 1.7	126.2	8 40.0	99 1.7	126.1	9 09.6	99 1.7	126.1	9 39.1	99 1.7	126.0	10 08.7	99 1.7	125.9	10 38.3	99 1.7	125.8	3
4	7 01.2	99 1.7	125.4	7 30.7	99 1.7	125.3	8 00.3	99 1.7	125.2	8 29.9	99 1.7	125.1	8 59.4	99 1.7	125.1	9 29.0	99 1.7	125.0	9 58.5	99 1.7	124.9	10 28.1	99 1.7	124.8	4
55	6 50.9	99 1.7	124.4	7 20.5	99 1.7	124.3	7 50.0	99 1.7	124.2	8 19.6	99 1.7	124.1	8 49.2	99 1.7	124.1	9 18.7	98 1.7	124.0	9 48.3	98 1.7	123.9	10 17.8	98 1.7	123.8	55
6	6 40.6	98 1.7	123.4	7 10.1	98 1.7	123.3	7 39.7	98 1.8	123.2	8 09.2	98 1.8	123.2	8 38.8	98 1.8	123.1	9 08.3	98 1.8	123.0	9 37.8	98 1.8	122.9	10 07.4	98 1.8	122.8	6
7	6 30.1	98 1.8	122.4	6 59.7	98 1.8	122.3	7 29.2	98 1.8	122.2	7 58.7	98 1.8	122.2	8 28.2	98 1.8	122.1	8 57.8	98 1.8	122.0	9 27.3	98 1.8	121.9	9 56.8	98 1.8	121.8	7
8	6 19.5	98 1.8	121.4	6 49.1	98 1.8	121.3	7 18.6	98 1.8	121.3	7 48.1	98 1.8	121.2	8 17.6	98 1.8	121.1	8 47.1	98 1.8	121.0	9 16.7	98 1.8	120.9	9 46.2	98 1.8	120.8	8
9	6 08.8	98 1.8	120.4	6 38.3	98 1.8	120.4	7 07.9	98 1.8	120.3	7 37.4	98 1.8	120.2	8 06.9	98 1.8	120.1	8 36.4	98 1.8	120.0	9 05.9	98 1.8	119.9	9 35.4	98 1.8	119.9	9
60	5 58.0	98 1.8	119.5	6 27.5	98 1.8	119.4	6 57.0	98 1.8	119.3	7 26.5	98 1.8	119.2	7 56.0	98 1.8	119.1	8 25.5	98 1.8	119.0	8 55.0	98 1.8	118.9	9 24.5	98 1.8	118.8	60
1	5 47.1	98 1.8	118.5	6 16.6	98 1.8	118.4	6 46.1	98 1.8	118.3	7 15.6	98 1.8	118.2	7 45.1	98 1.8	118.1	8 14.6	98 1.8	118.0	8 44.1	98 1.8	117.9	9 13.5	98 1.8	117.8	1
2	5 36.1	98 1.9	117.5	6 05.6	98 1.9	117.4	6 35.1	98 1.9	117.3	7 04.5	98 1.9	117.2	7 34.0	98 1.9	117.1	8 03.5	98 1.9	117.0	8 33.0	98 1.9	116.9	9 02.5	98 1.9	116.8	2
3	5 25.0	98 1.9	116.5	5 54.4	98 1.9	116.4	6 23.9	98 1.9	116.3	6 53.4	98 1.9	116.2	7 22.9	98 1.9	116.1	7 52.3	98 1.9	116.0	8 21.8	98 1.9	115.9	8 51.3	98 1.9	115.8	3
4	5 13.8	98 1.9	115.5	5 43.2	98 1.9	115.4	6 12.7	98 1.9	115.3	6 42.2	98 1.9	115.2	7 11.6	98 1.9	115.1	7 41.1	98 1.9	115.0	8 10.5	98 1.9	114.9	8 40.0	98 1.9	114.8	4
65	5 02.5	98 1.9	114.5	5 31.9	98 1.9	114.4	6 01.4	98 1.9	114.3	6 30.8	98 1.9	114.2	7 00.3	98 1.9	114.1	7 29.7	98 1.9	114.0	7 59.2	98 1.9	113.9	8 28.6	98 1.9	113.8	65
6				5 20.5	98 1.9	113.4	5 50.0	98 1.9	113.3	6 19.4	98 1.9	113.2	6 48.9	98 1.9	113.1	7 18.3	98 1.9	113.1	7 47.7	98 1.9	113.0	8 17.2	98 1.9	112.9	6
7				5 09.0	98 1.9	112.5	5 38.5	98 1.9	112.4	6 07.9	98 1.9	112.3	6 37.3	98 1.9	112.2	7 06.8	98 1.9	112.1	7 36.2	98 1.9	112.0	8 05.7	98 1.9	111.9	7
8							5 26.9	98 1.9	111.4	5 56.3	98 1.9	111.3	6 25.7	98 1.9	111.2	6 55.2	98 1.9	111.1	7 24.6	98 1.9	111.0	7 54.0	98 2.0	110.9	8
9							5 15.2	98 2.0	110.4	5 44.7	98 2.0	110.3	6 14.1	98 2.0	110.2	6 43.5	98 2.0	110.1	7 12.9	98 2.0	110.0	7 42.3	98 2.0	109.9	9
70							5 03.5	98 2.0	109.4	5 32.9	98 2.0	109.3	6 02.3	98 2.0	109.2	6 31.7	98 2.0	109.1	7 01.2	98 2.0	109.0	7 30.6	98 2.0	108.9	70
1										5 21.1	98 2.0	108.3	5 50.5	98 2.0	108.2	6 19.9	98 2.0	108.1	6 49.3	98 2.0	108.0	7 18.7	98 2.0	107.9	1
2										5 09.2	98 2.0	107.3	5 38.6	98 2.0	107.2	6 08.0	98 2.0	107.1	6 37.4	98 2.0	107.0	7 06.8	98 2.0	106.9	2
3													5 26.7	98 2.0	106.2	5 56.1	98 2.0	106.1	6 25.5	98 2.0	106.0	6 54.9	98 2.0	105.9	3
4													5 14.7	98 2.0	105.3	5 44.1	98 2.0	105.2	6 13.5	98 2.0	105.1	6 42.8	98 2.0	105.0	4
75													5 02.6	98 2.0	104.3	5 32.0	98 2.0	104.2	6 01.4	98 2.0	104.1	6 30.8	98 2.0	104.0	75
6																5 19.9	98 2.0	103.2	5 49.3	98 2.0	103.1	6 18.6	98 2.0	103.0	6
7																5 07.7	98 2.0	102.2	5 37.1	98 2.0	102.1	6 06.5	98 2.0	102.0	7
8																			5 24.9	98 2.0	101.1	5 54.2	98 2.0	101.0	8
9																			5 12.6	98 2.0	100.2	5 42.0	98 2.0	100.0	9
80																			5 00.3	98 2.1	99.2	5 29.7	98 2.1	99.1	80
1																						5 17.3	98 2.1	98.1	1
2																						5 05.0	98 2.1	97.1	2

Lat. 78°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	12 00.0	1.0	00	180.0	11 30.0	1.0	00	180.0	11 00.0	1.0	00	180.0	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	00
1	11 59.9	1.0	01	179.0	11 29.9	1.0	01	179.0	10 59.9	1.0	01	179.0	10 29.9	1.0	01	179.0	9 59.9	1.0	01	179.0	9 29.9	1.0	01	179.0	8 59.9	1.0	01	179.0	8 29.9	1.0	01	179.0	1
2	11 59.6	1.0	01	178.0	11 29.6	1.0	01	178.0	10 59.6	1.0	01	178.0	10 29.6	1.0	01	178.0	9 59.6	1.0	01	178.0	9 29.6	1.0	01	178.0	8 59.6	1.0	01	178.0	8 29.6	1.0	01	178.0	2
3	11 59.0	1.0	01	176.9	11 29.0	1.0	01	176.9	10 59.0	1.0	01	176.9	10 29.0	1.0	01	177.0	9 59.0	1.0	01	177.0	9 29.0	1.0	01	177.0	8 59.0	1.0	01	177.0	8 29.0	1.0	01	177.0	3
4	11 58.2	1.0	02	175.9	11 28.2	1.0	02	175.9	10 58.2	1.0	02	175.9	10 28.2	1.0	02	175.9	9 58.2	1.0	02	175.9	9 28.2	1.0	02	175.9	8 58.2	1.0	02	176.0	8 28.2	1.0	02	176.0	4
05	11 57.2	1.0	02	174.9	11 27.2	1.0	02	174.9	10 57.2	1.0	02	174.9	10 27.2	1.0	02	174.9	9 57.2	1.0	02	174.9	9 27.2	1.0	02	174.9	8 57.3	1.0	02	174.9	8 27.3	1.0	02	175.0	05
6	11 56.0	1.0	02	173.9	11 26.0	1.0	02	173.9	10 56.0	1.0	02	173.9	10 26.0	1.0	02	173.9	9 56.0	1.0	02	173.9	9 26.0	1.0	02	173.9	8 56.0	1.0	02	173.9	8 26.0	1.0	02	173.9	6
7	11 54.6	1.0	03	172.8	11 24.6	1.0	03	172.9	10 54.6	1.0	03	172.9	10 24.6	1.0	03	172.9	9 54.6	1.0	03	172.9	9 24.6	1.0	03	172.9	8 54.6	1.0	03	172.9	8 24.6	1.0	03	172.9	7
8	11 52.9	1.0	03	171.8	11 22.9	1.0	03	171.8	10 52.9	1.0	03	171.9	10 22.9	1.0	03	171.9	9 52.9	1.0	03	171.9	9 23.0	1.0	03	171.9	8 53.0	1.0	03	171.9	8 23.0	1.0	03	171.9	8
9	11 51.0	1.0	04	170.8	11 21.0	1.0	04	170.8	10 51.0	1.0	03	170.8	10 21.1	1.0	03	170.9	9 51.1	1.0	03	170.9	9 21.1	1.0	03	170.9	8 51.1	1.0	03	170.9	8 21.1	1.0	03	170.9	9
10	11 48.9	1.0	04	169.8	11 18.9	1.0	04	169.8	10 48.9	1.0	04	169.8	10 19.0	1.0	04	169.8	9 49.0	1.0	04	169.9	9 19.0	1.0	04	169.9	8 49.0	1.0	04	169.9	8 19.0	1.0	04	169.9	10
1	11 46.6	1.0	04	168.8	11 16.6	1.0	04	168.8	10 46.6	1.0	04	168.8	10 16.7	1.0	04	168.8	9 46.7	1.0	04	168.8	9 16.7	1.0	04	168.9	8 46.7	1.0	04	168.9	8 16.8	1.0	04	168.9	1
2	11 44.0	1.0	05	167.7	11 14.1	1.0	05	167.8	10 44.1	1.0	05	167.8	10 14.1	1.0	05	167.8	9 44.2	1.0	05	167.8	9 14.2	1.0	05	167.9	8 44.2	1.0	05	167.9	8 14.2	1.0	05	167.9	2
3	11 41.3	1.0	05	166.7	11 11.3	1.0	05	166.7	10 41.4	1.0	05	166.8	10 11.4	1.0	05	166.8	9 41.4	1.0	05	166.8	9 11.5	1.0	05	166.8	8 41.5	1.0	05	166.9	8 11.5	1.0	05	166.9	3
4	11 38.3	1.0	05	165.7	11 08.3	1.0	05	165.7	10 38.4	1.0	05	165.8	10 08.4	1.0	05	165.8	9 38.5	1.0	05	165.8	9 08.5	1.0	05	165.8	8 38.5	1.0	05	165.9	8 08.6	1.0	05	165.9	4
15	11 35.1	1.0	06	164.7	11 05.2	1.0	06	164.7	10 35.2	1.0	06	164.7	10 05.3	1.0	06	164.8	9 35.3	1.0	06	164.8	9 05.3	1.0	06	164.8	8 35.4	1.0	06	164.8	8 05.4	1.0	06	164.9	15
6	11 31.7	1.0	06	163.7	11 01.8	1.0	06	163.7	10 31.8	1.0	06	163.7	10 01.9	1.0	06	163.8	9 31.9	1.0	06	163.8	9 02.0	1.0	06	163.8	8 32.0	1.0	06	163.8	8 02.1	1.0	06	163.9	6
7	11 28.1	1.0	06	162.6	10 58.2	1.0	06	162.7	10 28.2	1.0	06	162.7	9 58.3	1.0	06	162.7	9 28.3	1.0	06	162.8	8 58.4	1.0	06	162.8	8 28.4	1.0	06	162.8	7 58.5	1.0	06	162.9	7
8	11 24.3	1.0	07	161.6	10 54.3	1.0	07	161.7	10 24.4	1.0	07	161.7	9 54.5	1.0	07	161.7	9 24.5	1.0	07	161.8	8 54.6	1.0	07	161.8	8 24.7	1.0	07	161.8	7 54.7	1.0	07	161.9	8
9	11 20.2	1.0	07	160.6	10 50.3	1.0	07	160.6	10 20.4	1.0	07	160.7	9 50.5	1.0	07	160.7	9 20.5	1.0	07	160.7	8 50.6	1.0	07	160.8	8 20.7	1.0	07	160.8	7 50.7	1.0	07	160.9	9
20	11 16.0	1.0	07	159.6	10 46.1	1.0	07	159.6	10 16.1	1.0	07	159.7	9 46.2	1.0	07	159.7	9 16.3	1.0	07	159.7	8 46.4	1.0	07	159.8	8 16.5	1.0	07	159.8	7 46.5	1.0	07	159.8	20
1	11 11.5	1.0	08	158.6	10 41.6	1.0	08	158.6	10 11.7	1.0	08	158.7	9 41.8	1.0	08	158.7	9 11.9	1.0	08	158.7	8 42.0	1.0	08	158.8	8 12.1	1.0	08	158.8	7 42.1	1.0	08	158.8	1
2	11 06.9	1.0	08	157.6	10 37.0	1.0	08	157.6	10 07.1	1.0	08	157.6	9 37.2	1.0	08	157.7	9 07.3	1.0	08	157.7	8 37.3	1.0	08	157.8	8 07.4	1.0	08	157.8	7 37.5	1.0	08	157.8	2
3	11 02.0	1.0	08	156.5	10 32.1	1.0	08	156.6	10 02.2	1.0	08	156.6	9 32.3	1.0	08	156.7	9 02.4	1.0	08	156.7	8 32.5	1.0	08	156.8	8 02.6	1.0	08	156.8	7 32.7	1.0	08	156.8	3
4	10 56.9	1.0	09	155.5	10 27.1	1.0	09	155.6	9 57.2	1.0	09	155.6	9 27.3	1.0	09	155.7	8 57.4	1.0	09	155.7	8 27.5	1.0	09	155.7	7 57.6	1.0	09	155.8	7 27.7	1.0	09	155.8	4
25	10 51.7	1.0	09	154.5	10 21.8	1.0	09	154.6	9 51.9	1.0	09	154.6	9 22.0	1.0	09	154.6	8 52.2	1.0	09	154.7	8 22.3	1.0	09	154.7	7 52.4	1.0	09	154.8	7 22.5	1.0	09	154.8	25
6	10 46.2	1.0	09	153.5	10 16.3	1.0	09	153.5	9 46.5	1.0	09	153.6	9 16.6	1.0	09	153.6	8 46.7	1.0	09	153.7	8 16.9	1.0	09	153.7	7 47.0	1.0	09	153.8	7 17.1	1.0	09	153.8	6
7	10 40.5	1.0	10	152.5	10 10.7	1.0	10	152.5	9 40.8	1.0	10	152.6	9 11.0	1.0	10	152.6	8 41.1	1.0	10	152.7	8 11.2	1.0	10	152.7	7 41.4	1.0	10	152.8	7 11.5	1.0	10	152.8	7
8	10 34.7	1.0	10	151.5	10 04.8	1.0	10	151.5	9 35.0	1.0	10	151.6	9 05.1	1.0	10	151.6	8 35.3	1.0	10	151.7	8 05.4	1.0	10	151.7	7 35.6	1.0	10	151.8	7 05.7	1.0	10	151.8	8
9	10 28.6	99	10	150.5	9 58.8	99	10	150.5	9 28.9	99	10	150.6	8 59.1	99	10	150.6	8 29.3	99	10	150.7	7 59.4	99	10	150.7	7 29.6	99	10	150.8	6 59.7	99	10	150.8	9
30	10 22.4	99	11	149.4	9 52.6	99	11	149.5	9 22.7	99	11	149.6	8 52.9	99	11	149.6	8 23.1	99	11	149.7	7 53.2	99	11	149.7	7 23.4	99	11	149.8	6 53.5	99	11	149.8	30
1	10 15.9	99	11	148.4	9 46.1	99	11	148.5	9 16.3	99	11	148.5	8 46.5	99	11	148.6	8 16.7	99	11	148.7	7 46.8	99	11	148.7	7 17.0	99	11	148.8	6 47.2	99	11	148.8	1
2	10 09.3	99	11	147.4	9 39.5	99	11	147.5	9 09.7	99	11	147.5	8 39.9	99	11	147.6	8 10.1	99	11	147.7	7 40.3	99	11	147.7	7 10.4	99	11	147.8	6 40.6	99	11	147.8	2
3	10 02.5	99	12	146.4	9 32.7	99	12	146.5	9 02.9	99	12	146.5	8 33.1	99	12	146.6	8 03.3	99	12	146.7	7 33.5	99	12	146.7	7 03.7	99	12	146.8	6 33.9	99	12	146.8	3
4	9 55.5	99	12	145.4	9 25.7	99	12	145.5	8 55.9	99	12	145.5	8 26.2	99	12	145.6	7 56.4	99	12	145.6	7 26.6	99	12	145.7	6 56.8	99	12	145.8	6 27.0	99	12	145.8	4
35	9 48.4	99	12	144.4	9 18.6	99	12	144.5	8 48.8	99	12	144.5	8 19.0	99	12	144.6	7 49.2	99	12	144.6	7 19.5	99	12	144.7	6 49.7	99	12	144.8	6 19.9	99	12	144.8	35
6	9 41.0	99	13	143.4	9 11.2	99	13	143.5	8 41.5	99	12	143.5	8 11.7	99	12	143.6	7 41.9	99	12	143.6	7 12.2	99	12	143.7	6 42.4	99	12	143.8	6 12.6	99	12	143.8	6
7	9 33.5	99	13	142.4	9 03.7	99	13	142.5	8 34.0	99	13	142.5	8 04.2	99	13	142.6	7 34.4	99	13	142.6	7 04.7	99	13	142.7	6 34.9	99	13	142.8	6 05.2	99	13	142.8	7
8	9 25.8	99	13	141.4	8 56.0	99	13	141.4	8 26.3	99	13	141.5	7 56.5	99	13	141.6	7 26.8	99	13	141.6	6 57.0	99	13	141.7	6 27.3	99	13	141.8	5 57.5	99	13	141.8	8
9	9 17.9	99	13	140.4	8 48.2	99	13	140.4	8 18.4	99	13	140.5	7 48.7	99	13	140.6	7 19.0	99	13	140.6	6 49.2	99	13	140.7	6 19.5	99	13	140.8	5 49.7	99	13	140.8	9
40	9 09.9	99	14	139.4	8 40.1	99	14	139.4	8 10.4	99	14	139.5	7 40.7	99	14	139.6	7 11.0	99	14	139.6	6 41.2	99	14	139.7	6 11.5	99	14	139.8	5 41.8	99	14	139.9	40
1	9 01.7	99	14	138.4	8 32.0	99	14	138.4	8 02.2	99	14	138.5	7 32.5	99	14	138.6	7 02.8	99	14	138.7	6 33.1	99	14	138.7	6 03.4	99	14	138.8	5 33.7	99	14	138.9	1
2	8 53.3	99	14	137.4	8 23.6	99	14	137.4	7 53.9	99	14	137.5	7 24.2	99	14	137.6	6 54.5	99	14	137.7	6 24.8	99	14	137.7	5 55.1	99	14	137.8	5 25.4	99	14	137.9	2
3	8 44.8	99	14	136.4	8 15.1	99	14	136.4	7 45.4	99	14	136.5	7 15.7	99	14	136.6	6 46.0	99	14	136.7	6 16.3	99	14	136.7	5 46.6	99	14	136.8	5 16.9	99	14	136.9	3
4	8 36.1	99	15	135.4	8 06.4	99	15	135.4	7 36.7	99	15	135.5	7 07.0	99	15	135.6	6 37.4	99	15	135.7	6 07.7	99	15	135.7	5 38.0	99	15	135.8	5 08.3	99	15	135.9	4
45	8 27.2	99	15	134.4	7 57.6	99	15	134.4	7 27.9	99	15	134.5	6 58.2	99	15	134.6	6 28.6	99	15	134.7	5 58.9	99	15	134.7	5 29.2	99	15	134.8					45
6	8 18.2	99	15	133.4	7 48.6	99	15	133.4	7 18.9	99	15	133.5	6 49.3	99	15	133.6	6 19.6	99	15	133.7	5 50.0	99	15	133.7	5 20.3	99	15	133.8					6
7	8 09.1	99	15	132.4	7 39.5	99	15	132.4	7 09.8	99	15	132.5	6 40.2	99	15	132.6	6 10.5	99	15	132.7	5 40.9	99	15	132.8	5 11.2	99	15	132.8					7
8	7 59.8	99	16	131.4	7 30.2	99	16	131.5	7 00.5	99	16	131.5	6 30.9	99	16	131.6	6 01.3	99	16	131.7	5 31.6	99	16	131.8	5 02.0	99	16	131.8					8
9	7 50.4	99	16	130.4	7 20.8	99	16	130.5	6 51.1	99	16	130.5	6 21.5	99	16	130.6	5 51.9	99	16	130.7	5 22.3	99	16	130.8									9
50	7 40.8	99	16	129.4	7 11.2	99	16	129.5	6 41.6	99	16	129.5	6 12.0	99	16	129.6	5 42.4	99	16	129.7	5 12.7	99	16	129.8									50
1	7 31.1	99	16	128.4	7 01.5	99	16	128.5	6 31.9	99	16	128.5	6 02.3	99	16	128.6	5 32.7	99	16	128.7	5 03.1	99	16	128.8									1
2	7 21.3	99	17	127.4	6 51.7	99	17	127.5	6 22.1	99	17	127.6	5 52.5	99	17	127.6	5 22.9	99	17	127.7													2
3	7 11.3	99	17	126.4	6 41.7	99	17	126.5	6 12.1	99	17	126.6	5 42.5	99	17	126.6	5 13.0	99	17	126.7													3
4	7 01.2	99	17	125.4	6 31.6	99	17	125.5	6 02.0	99	17	125.6	5 32.5	99	17	125.7	5 02.9	99	17	125.7													4
55	6 50.9	99	17	124.4	6 21.4	99	17	124.5	5 51.8	99	17	124.6	5 22.3	99	17	124.7																	55
6	6 40.6	98	17	123.4	6 11.0	98	17	123.5	5 41.5	98	17	123.6	5 12.0	98	17	123.7																	6
7	6 30.1	98	18	122.4	6 00.6	98	18	122.5	5 31.0	98	18	122.6	5 01.5	98	18	122.7																	7
8	6 19.5	98	18	121.4	5 50.0	98	18	121.5	5 20.5	98	18	121.6																					8
9	6 08.8	98	18	120.4	5 39.3	98	18	120.5	5 09.8	98	18	120.6																					9
60	5 58.0	98	18	119.5	5 28.5	98	18	119.5																									60
1	5 47.1	98	18	118.5	5 17.6	98	18	118.6																									1
2	5 36.1	98	19	117.5	5 06.6	98	19	117.6																									2
3	5 25.0	98	19	116.5																													3
4	5 13.8	98	19	115.5																													4
65	5 02.5	98	19	114.5																													65

Lat. 78°

Lat 79°

Lat. 78°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	16 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0	17 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	00
1	15 59.9	1.0 01	179.0	16 29.9	1.0 01	179.0	16 59.9	1.0 01	179.0	17 29.9	1.0 01	179.0	17 59.9	1.0 01	179.0	18 29.9	1.0 01	179.0	18 59.9	1.0 01	179.0	19 29.9	1.0 01	178.9	1
2	15 59.5	1.0 01	177.9	16 29.5	1.0 01	177.9	16 59.5	1.0 01	177.9	17 29.5	1.0 01	177.9	17 59.5	1.0 01	177.9	18 29.5	1.0 01	177.9	18 59.5	1.0 01	177.9	19 29.5	1.0 01	177.9	2
3	15 59.0	1.0 01	176.9	16 29.0	1.0 01	176.9	16 59.0	1.0 01	176.9	17 29.0	1.0 01	176.9	17 59.0	1.0 01	176.9	18 29.0	1.0 01	176.9	18 59.0	1.0 01	176.9	19 29.0	1.0 01	176.8	3
4	15 58.2	1.0 02	175.8	16 28.2	1.0 02	175.8	16 58.2	1.0 02	175.8	17 28.2	1.0 02	175.8	17 58.2	1.0 02	175.8	18 28.2	1.0 02	175.8	18 58.2	1.0 02	175.8	19 28.2	1.0 02	175.8	4
05	15 57.2	1.0 02	174.8	16 27.2	1.0 02	174.8	16 57.2	1.0 02	174.8	17 27.2	1.0 02	174.8	17 57.2	1.0 02	174.8	18 27.2	1.0 02	174.8	18 57.1	1.0 02	174.8	19 27.1	1.0 02	174.7	05
6	15 55.9	1.0 02	173.8	16 25.9	1.0 03	173.8	16 55.9	1.0 03	173.8	17 25.9	1.0 02	173.7	17 55.9	1.0 02	173.7	18 25.9	1.0 02	173.7	18 55.9	1.0 02	173.7	19 25.9	1.0 02	173.7	6
7	15 54.5	1.0 03	172.7	16 24.5	1.0 03	172.7	16 54.5	1.0 03	172.7	17 24.4	1.0 03	172.7	17 54.4	1.0 03	172.7	18 24.4	1.0 03	172.7	18 54.4	1.0 03	172.7	19 24.4	1.0 03	172.6	7
8	15 52.8	1.0 03	171.7	16 22.8	1.0 03	171.7	16 52.8	1.0 03	171.7	17 22.7	1.0 03	171.7	17 52.7	1.0 03	171.6	18 22.7	1.0 03	171.6	18 52.7	1.0 03	171.6	19 22.7	1.0 03	171.6	8
9	15 50.9	1.0 04	170.7	16 20.9	1.0 04	170.6	16 50.8	1.0 04	170.6	17 20.8	1.0 04	170.6	17 50.8	1.0 04	170.6	18 20.8	1.0 04	170.6	18 50.8	1.0 04	170.6	19 20.7	1.0 04	170.5	9
10	15 48.7	1.0 04	169.6	16 18.7	1.0 04	169.6	16 48.7	1.0 04	169.6	17 18.7	1.0 04	169.6	17 48.7	1.0 04	169.5	18 18.6	1.0 04	169.5	18 48.6	1.0 04	169.5	19 18.6	1.0 04	169.5	10
1	15 46.4	1.0 04	168.6	16 16.4	1.0 04	168.6	16 46.3	1.0 04	168.5	17 16.3	1.0 04	168.5	17 46.3	1.0 04	168.5	18 16.3	1.0 04	168.5	18 46.2	1.0 04	168.5	19 16.2	1.0 04	168.4	1
2	15 43.8	1.0 05	167.6	16 13.8	1.0 05	167.5	16 43.7	1.0 05	167.5	17 13.7	1.0 05	167.5	17 43.7	1.0 05	167.5	18 13.6	1.0 05	167.4	18 43.6	1.0 05	167.4	19 13.6	1.0 05	167.4	2
3	15 41.0	1.0 05	166.5	16 11.0	1.0 05	166.5	16 40.9	1.0 05	166.5	17 10.9	1.0 05	166.4	17 40.9	1.0 05	166.4	18 10.8	1.0 05	166.4	18 40.8	1.0 05	166.4	19 10.8	1.0 05	166.3	3
4	15 38.0	1.0 05	165.5	16 07.9	1.0 05	165.5	16 37.9	1.0 05	165.4	17 07.9	1.0 05	165.4	17 37.8	1.0 05	165.4	18 07.8	1.0 05	165.3	18 37.7	1.0 05	165.3	19 07.7	1.0 05	165.3	4
15	15 34.8	1.0 06	164.5	16 04.7	1.0 06	164.4	16 34.7	1.0 06	164.4	17 04.6	1.0 06	164.4	17 34.6	1.0 06	164.3	18 04.5	1.0 06	164.3	18 34.5	1.0 06	164.3	19 04.4	1.0 06	164.2	15
6	15 31.3	1.0 06	163.4	16 01.2	1.0 06	163.4	16 31.2	1.0 06	163.4	17 01.1	1.0 06	163.3	17 31.1	1.0 06	163.3	18 01.0	1.0 06	163.3	18 31.0	1.0 06	163.2	19 00.9	1.0 06	163.2	6
7	15 27.6	1.0 06	162.4	15 57.6	1.0 06	162.4	16 27.5	1.0 06	162.3	16 57.5	1.0 06	162.3	17 27.4	1.0 07	162.3	17 57.3	1.0 07	162.2	18 27.3	1.0 07	162.2	18 57.2	1.0 07	162.2	7
8	15 23.8	1.0 07	161.4	15 53.7	1.0 07	161.3	16 23.6	1.0 07	161.3	16 53.5	1.0 07	161.2	17 23.5	1.0 07	161.2	17 53.4	1.0 07	161.2	18 23.3	1.0 07	161.1	18 53.3	1.0 07	161.1	8
9	15 19.7	1.0 07	160.3	15 49.6	1.0 07	160.3	16 19.5	1.0 07	160.2	16 49.4	1.0 07	160.2	17 19.4	1.0 07	160.2	17 49.3	1.0 07	160.1	18 19.2	1.0 07	160.1	18 49.1	1.0 07	160.1	9
20	15 15.4	1.0 08	159.3	15 45.3	1.0 08	159.3	16 15.2	1.0 08	159.2	16 45.1	1.0 08	159.2	17 15.0	1.0 08	159.1	17 44.9	1.0 08	159.1	18 14.9	1.0 08	159.1	18 44.8	1.0 08	159.0	20
1	15 10.8	1.0 08	158.3	15 40.7	1.0 08	158.2	16 10.7	1.0 08	158.2	16 40.6	1.0 08	158.1	17 10.5	1.0 08	158.1	17 40.4	1.0 08	158.1	18 10.3	1.0 08	158.0	18 40.2	1.0 08	158.0	1
2	15 06.1	1.0 08	157.2	15 36.0	1.0 08	157.2	16 05.9	1.0 08	157.1	16 35.8	1.0 08	157.1	17 05.7	1.0 08	157.1	17 35.6	1.0 08	157.0	18 05.5	1.0 08	157.0	18 35.4	1.0 08	156.9	2
3	15 01.2	1.0 09	156.2	15 31.1	1.0 09	156.2	16 01.0	1.0 08	156.1	16 30.9	1.0 09	156.1	17 00.7	1.0 09	156.0	17 30.6	1.0 09	156.0	18 00.5	1.0 09	155.9	18 30.4	1.0 08	155.9	3
4	14 56.0	1.0 09	155.2	15 25.9	1.0 09	155.1	15 55.8	1.0 09	155.1	16 25.7	1.0 09	155.0	16 55.6	1.0 09	155.0	17 25.5	1.0 09	154.9	17 55.3	1.0 09	154.9	18 25.2	1.0 09	154.8	4
25	14 50.7	1.0 09	154.1	15 20.6	1.0 09	154.1	15 50.5	1.0 09	154.0	16 20.3	1.0 09	154.0	16 50.2	1.0 09	154.0	17 20.1	1.0 09	153.9	17 49.9	1.0 09	153.9	18 19.8	1.0 09	153.8	25
6	14 45.2	1.0 10	153.1	15 15.0	1.0 10	153.1	15 44.9	1.0 10	153.0	16 14.8	1.0 10	153.0	16 44.6	1.0 10	152.9	17 14.5	1.0 10	152.9	17 44.3	1.0 10	152.8	18 14.2	1.0 10	152.8	6
7	14 39.4	1.0 10	152.1	15 09.3	1.0 10	152.0	15 39.1	1.0 10	152.0	16 09.0	1.0 10	151.9	16 38.8	1.0 10	151.9	17 08.7	1.0 10	151.8	17 38.5	1.0 10	151.8	18 08.4	1.0 10	151.7	7
8	14 33.5	99 10	151.1	15 03.3	99 10	151.0	15 33.2	99 10	151.0	16 03.0	99 10	150.9	16 32.9	99 10	150.9	17 02.7	99 10	150.8	17 32.5	99 10	150.7	18 02.4	99 10	150.7	8
9	14 27.3	99 11	150.0	14 57.2	99 11	150.0	15 27.0	99 11	149.9	15 56.9	99 11	149.9	16 26.7	99 11	149.8	16 56.5	99 11	149.8	17 26.4	99 11	149.7	17 56.2	99 11	149.7	9
30	14 21.0	99 11	149.0	14 50.8	99 11	149.0	15 20.7	99 11	148.9	15 50.5	99 11	148.8	16 20.3	99 11	148.8	16 50.1	99 11	148.7	17 20.0	99 11	148.7	17 49.8	99 11	148.6	30
1	14 14.5	99 11	148.0	14 44.3	99 11	147.9	15 14.1	99 11	147.9	15 43.9	99 11	147.8	16 13.8	99 11	147.8	16 43.6	99 11	147.7	17 13.4	99 11	147.6	17 43.2	99 11	147.6	1
2	14 07.8	99 12	147.0	14 37.6	99 12	146.9	15 07.4	99 12	146.8	15 37.2	99 12	146.8	16 07.0	99 12	146.7	16 36.8	99 12	146.7	17 06.6	99 12	146.6	17 36.4	99 12	146.6	2
3	14 00.9	99 12	145.9	14 30.7	99 12	145.9	15 00.5	99 12	145.8	15 30.3	99 12	145.8	16 00.1	99 12	145.7	16 29.9	99 12	145.6	16 59.7	99 12	145.6	17 29.4	99 12	145.5	3
4	13 53.8	99 12	144.9	14 23.6	99 12	144.9	14 53.4	99 12	144.8	15 23.2	99 12	144.7	15 53.0	99 12	144.7	16 22.7	99 12	144.6	16 52.5	99 12	144.5	17 22.3	99 12	144.5	4
35	13 46.6	99 12	143.9	14 16.3	99 12	143.8	14 46.1	99 12	143.8	15 15.9	99 12	143.7	15 45.7	99 12	143.7	16 15.4	99 12	143.6	16 45.2	99 12	143.5	17 15.0	99 13	143.5	35
6	13 39.1	99 13	142.9	14 08.9	99 13	142.8	14 38.6	99 13	142.8	15 08.4	99 13	142.7	15 38.2	99 13	142.6	16 07.9	99 13	142.6	16 37.7	99 13	142.5	17 07.4	99 13	142.4	6
7	13 31.5	99 13	141.9	14 01.3	99 13	141.8	14 31.0	99 13	141.7	15 00.8	99 13	141.7	15 30.5	99 13	141.6	16 00.3	99 13	141.5	16 30.0	99 13	141.5	16 59.7	99 13	141.4	7
8	13 23.7	99 13	140.9	13 53.5	99 13	140.8	14 23.2	99 13	140.7	14 52.9	99 13	140.6	15 22.7	99 13	140.6	15 52.4	99 13	140.5	16 22.1	99 13	140.4	16 51.9	99 13	140.4	8
9	13 15.8	99 14	139.8	13 45.5	99 14	139.8	14 15.2	99 14	139.7	14 44.9	99 14	139.6	15 14.7	99 14	139.6	15 44.4	99 14	139.5	16 14.1	99 14	139.4	16 43.8	99 14	139.3	9
40	13 07.6	99 14	138.8	13 37.3	99 14	138.7	14 07.1	99 14	138.7	14 36.8	99 14	138.6	15 06.5	99 14	138.5	15 36.2	99 14	138.5	16 05.9	99 14	138.4	16 35.6	99 14	138.3	40
1	12 59.3	99 14	137.8	13 29.0	99 14	137.7	13 58.7	99 14	137.7	14 28.4	99 14	137.6	14 58.1	99 14	137.5	15 27.8	99 14	137.4	15 57.5	99 14	137.4	16 27.2	99 14	137.3	1
2	12 50.9	99 14	136.8	13 20.6	99 14	136.7	13 50.3	99 14	136.6	14 20.0	99 14	136.6	14 49.6	99 14	136.5	15 19.3	99 14	136.4	15 49.0	99 14	136.3	16 18.7	99 14	136.3	2
3	12 42.3	99 15	135.8	13 11.9	99 15	135.7	13 41.6	99 15	135.6	14 11.3	99 15	135.6	14 41.0	99 15	135.5	15 10.6	99 15	135.4	15 40.3	99 15	135.3	16 10.0	99 15	135.3	3
4	12 33.5	99 15	134.8	13 03.1	99 15	134.7	13 32.8	99 15	134.6	14 02.5	99 15	134.5	14 32.1	99 15	134.5	15 01.8	99 15	134.4	15 31.5	99 15	134.3	16 01.1	99 15	134.2	4
45	12 24.5	99 15	133.8	12 54.2	99 15	133.7	13 23.9	99 15	133.6	13 53.5	99 15	133.5	14 23.2	99 15	133.4	14 52.8	99 15	133.4	15 22.5	99 15	133.3	15 52.1	99 15	133.2	45
6	12 15.5	99 15	132.7	12 45.1	99 15	132.7	13 14.7	99 15	132.6	13 44.4	99 15	132.5	14 14.0	99 15	132.4	14 43.7	99 15	132.4	15 13.3	99 16	132.3	15 42.9	99 16	132.2	6
7	12 06.2	99 16	131.7	12 35.9	99 16	131.7	13 05.5	99 16	131.6	13 35.1	99 16	131.5	14 04.8	99 16	131.4	14 34.4	99 16	131.3	15 04.0	99 16	131.3	15 33.6	99 16	131.2	7
8	11 56.8	99 16	130.7	12 26.5	99 16	130.7	12 56.1	99 16	130.6	13 25.7	99 16	130.5	13 55.3	99 16	130.4	14 24.9	99 16	130.3	14 54.6	99 16	130.2	15 24.2	99 16	130.2	8
9	11 47.3	99 16	129.7	12 16.9	99 16	129.6	12 46.5	99 16	129.6	13 16.1	99 16	129.5	13 45.8	99 16	129.4	14 15.4	99 16	129.3	14 45.0	99 16	129.2	15 14.6	99 16	129.1	9
50	11 37.7	99 16	128.7	12 07.3	99 16	128.6	12 36.9	99 16	128.6	13 06.5	99 16	128.5	13 36.0	99 16	128.4	14 05.6	99 16	128.3	14 35.2	99 16	128.2	15 04.8	99 16	128.1	50
1	11 27.9	99 17	127.7	11 57.4	99 17	127.6	12 27.0	99 17	127.5	12 56.6	99 17	127.5	13 26.2	99 17	127.4	13 55.8	99 17	127.3	14 25.4	99 17	127.2	14 54.9	99 17	127.1	1
2	11 17.9	99 17	126.7	11 47.5	99 17	126.6	12 17.1	99 17	126.5	12 46.6	99 17	126.5	13 16.2	99 17	126.4	13 45.8	99 17	126.3	14 15.4	99 17	126.2	14 44.9	99 17	126.1	2
3	11 07.9	99 17	125.7	11 37.4	99 17	125.6	12 07.0	99 17	125.5	12 36.6	99 17	125.5	13 06.1	99 17	125.4	13 35.7	99 17	125.3	14 05.2	99 17	125.2	14 34.8	99 17	125.1	3
4	10 57.7	99 17	124.7	11 27.2	99 17	124.6	11 56.8	99 17	124.5	12 26.3	99 17	124.4	12 55.9	98 17	124.4	13 25.4	98 17	124.3	13 55.0	98 17	124.2	14 24.5	98 17	124.1	4
55	10 47.3	98 17	123.7	11 16.9	98 17	123.6	11 46.4	98 17	123.5	12 16.0	98 17	123.4	12 45.5	98 17	123.4	13 15.1	98 17	123.3	13 44.6	98 18	123.2	14 14.1	98 18	123.1	55
6	10 36.9	98 18	122.7	11 06.4	98 18	122.6	11 36.0	98 18	122.5	12 05.5	98 18	122.4	12 35.0	98 18	122.4	13 04.6	98 18	122.3	13 34.1	98 18	122.2	14 03.6	98 18	122.1	6
7	10 26.4	98 18	121.7	10 55.9	98 18	121.6	11 25.4	98 18	121.5	11 54.9	98 18	121.4	12 24.4	98 18	121.3	12 54.0	98 18	121.3	13 23.5	98 18	121.2	13 53.0	98 18	121.1	7
8	10 15.7	98 18	120.7	10 45.2	98 18	120.6	11 14.7	98 18	120.5	11 44.2	98 18	120.4	12 13.7	98 18	120.3	12 43.2	98 18	120.3	13 12.7	98 18	120.2	13 42.2	98 18	120.1	8
9	10 04.9	98 18	119.7	10 34.4	98 18	119.6	11 03.9	98 18	119.5	11 33.4	98 18	119.4	12 02.9	98 18	119.3	12 32.4	98 18	119.3	13 01.9	98 18	119.2	13 31.4	98 18	119.1	9
60	9 54.0	98 18	118.7	10 23.5	98 18	118.6	10 53.0	98 18	118.5	11 22.5	98 18	118.4	11 52.0	98 18	118.3	12 21.5	98 18	118.3	12 51.0	98 18	118.2	13 20.4	98 18	118.1	60
1	9 43.0	98 18	117.7	10 12.5	98 18	117.6	10 42.0	98 19	117.5	11 11.5	98 19	117.4	11 41.0	98 19	117.3	12 10.4	98 19	117.3	12 39.9	98 19	117.2	13 09.4	98 19	117.1	1
2	9 31.9	98 19	116.7	10 01.4	98 19	116.6	10 30.9	98 19	116.5	11 00.4	98 19	116.4	11 29.8	98 19	116.4	11 59.3	98 19	116.3	12 28.8	98 19	116.2	12 58.2	98 19	116.1	2
3	9 20.7	98 19	115.7	9 50.2	98 19	115.6	10 19.7	98 19	115.5	10 49.1	98 19	115.4	11 18.6	98 19	115.4	11 48.1	98 19	115.3	12 17.5	98 19	115.2	12 47.0	98 19	115.1	3
4	9 09.5	98 19	114.7	9 38.9	98 19	114.6	10 08.4	98 19	114.6	10 37.8	98 19	114.5	11 07.3	98 19	114.4	11 36.7	98 19	114.3	12 06.2	98 19	114.2	12 35.6	98 19	114.1	4
65	8 58.1	98 19	113.8	9 27.5	98 19	113.7	9 57.0	98 19	113.6	10 26.4	98 19	113.5	10 55.9	98 19	113.4	11 25.3	98 19	113.3	11 54.8	98 19	113.2	12 24.2	98 19	113.1	65
6	8 46.6	98 19	112.8	9 16.1	98 19	112.7	9 45.5	98 19	112.6	10 14.9	98 19	112.5	10 44.4	98 19	112.4	11 13.8	98 19	112.3	11 43.2	98 19	112.2	12 12.7	98 19	112.1	6
7	8 35.1	98 19	111.8	9 04.5	98 19	111.7	9 33.9	98 19	111.6	10 03.4	98 19	111.5	10 32.8	98 19	111.4	11 02.2	98 19	111.3	11 31.7	98 19	111.2	12 01.1	98 19	111.1	7
8	8 23.5	98 20	110.8	8 52.9	98 20	110.7	9 22.3	98 20	110.6	9 51.7	98 20	110.5	10 21.1	98 20	110.4	10 50.6	98 20	110.3	11 20.0	98 20	110.2	11 49.4	98 20	110.1	8
9	8 11.8	98 20	109.8	8 41.2	98 20	109.7	9 10.6	98 20	109.6	9 40.0	98 20	109.5	10 09.4	98 20	109.4	10 38.8	98 20	109.3	11 08.2	98 20	109.2	11 37.6	98 20	109.1	9
70	8 00.0	98 20	108.8	8 29.4	98 20	108.7	8 58.8	98 20	108.6	9 28.2	98 20	108.5	9 57.6	98 20	108.4	10 27.0	98 20	108.3	10 56.4	98 20	108.2	11 25.8	98 20	108.1	70
1	7 48.1	98 20	107.8	8 17.5	98 20	107.7	8 46.9	98 20	107.6	9 16.3	98 20	107.5	9 45.7	98 20	107.4	10 15.1	98 20	107.3	10 44.5	98 20	107.2	11 13.9	98 20	107.1	1
2	7 36.2	98 20	106.8	8 05.6	98 20	106.7	8 35.0	98 20	106.6	9 04.4	98 20	106.5	9 33.8	98 20	106.4	10 03.2	98 20	106.3	10 32.6	98 20	106.2	11 02.0	98 20	106.1	2
3	7 24.3	98 20	105.8	7 53.7	98 20	105.7	8 23.0	98 20	105.6	8 52.4	98 20	105.5	9 21.8	98 20	105.4	9 51.2	98 20	105.3	10 20.6	98 20	105.2	10 50.0	98 20	105.1	3
4	7 12.2	98 20	104.9	7 41.6	98 20	104.8	8 11.0	98 20	104.7	8 40.4	98 20	104.6	9 09.8	98 20	104.5	9 39.1	98 20	104.4	10 08.5	98 20	104.2	10 37.9	98 20	104.1	4
75	7 00.2	98 20	103.9	7 29.5	98 20	103.8	7 58.9	98 20	103.7	8 28.3	98 20	103.6	8 57.7	98 20	103.5	9 27.0	98 20	103.4	9 55.4	98 20	103.3	10 25.8	98 20	103.2	75
6	6 48.0	98 20	102.9	7 17.4	98 20	102.8	7 46.8	98 20	102.7	8 16.1	98 20	102.6	8 45.5	98 20	102.5	9 14.9	98 20	102.4	9 44.2	98 20	102.3	10 13.6	98 20	102.2	6
7	6 35.8	98 20	101.9	7 05.2	98 20	101.8	7 34.6	98 20	101.7	8 03.9	98 20	101.6	8 33.3	98 20	101.5	9 02.7	98 20	101.4	9 32.0	98 20	101.3	10 01.4	98 20	101.2	7
8	6 23.6	98 20	100.9	6 53.0	98 20	100.8	7 22.3	98 20	100.7	7 51.7	98 20	100.6	8 21.1	98 20	100.5	8 50.4	98 20	100.4	9 19.8	98 20	100.3	9 49.1	98 20	100.2	8
9	6 11.3	98 20	99.9	6 40.7	98 21	99.8	7 10.1	98 21	99.7	7 39.4	98 21	99.6	8 08.8	98 21	99.5	8 38.1	98 21	99.4	9 07.5	98 21	99.3	9 36.8	98 21	99.2	9
80	5 59.0	98 21	99.0	6 28.4	98 21	98.9	6 57.7	98 21	98.8	7 27.1	98 21	98.7	7 56.4	98 21	98.5	8 25.8	98 21	98.4	8 55.1	98 21	98.3	9 24.5	98 21	98.2	80
1	5 46.7	98 21	98.0	6 16.0	98 21	97.9	6 45.4	98 21	97.8	7 14.7	98 21	97.7	7 44.1	98 21	97.6	8 13.4	98 21	97.5	8 42.8	98 21	97.4	9 12.1	98 21	97.2	1
2	5 34.3	98 21	97.0	6 03.7	98 21	96.9	6 33.0	98 21	96.8	7 02.4	98 21	96.7	7 31.7	98 21	96.6	8 01.1	98 21	96.5	8 30.4	98 21	96.4	8 59.7	98 21	96.3	2
3	5 21.9	98 21	96.0	5 51.3	98 21	95.9	6 20.6	98 21	95.8	6 50.0	98 21	95.7	7 19.3	98 21	95.6	7 48.7	98 21	95.5	8 18.0	98 21	95.4	8 47.3	98 21	95.3	3
4	5 09.5	98 21	95.0	5 38.9	98 21	94.9	6 08.2	98 21	94.8	6 37.5	98 21	94.7	7 06.9	98 21	94.6	7 36.2	98 21	94.5	8 05.6	98 21	94.4	8 34.9	98 21	94.3	4
85				5 26.4	98 21	94.0	5 55.8	98 21	93.9	6 25.1	98 21	93.7	6 54.4	98 21	93.6	7 23.8	98 21	93.5	7 53.1	98 21	93.4	8 22.5	98 21	93.3	85
6				5 14.0	98 21	93.0	5 43.3	98 21	92.9	6 12.7	98 21	92.8	6 42.0	98 21	92.7	7 11.3	98 21	92.6	7 40.7	98 21	92.5	8 10.0	98 21	92.3	6
7				5 01.5	98 21	92.0	5 30.8	98 21	91.9	6 00.2	98 21	91.8	6 29.5	98 21	91.7	6 58.9	98 21	91.6	7 28.2	98 21	91.5	7 57.5	98 21	91.4	7
8							5 18.4	98 21	90.9	5 47.7	98 21	90.8	6 17.1	98 21	90.7	6 46.4	98 21	90.6	7 15.7	98 21	90.5	7 45.1	98 21	90.4	8
9							5 05.9	98 21	89.9	5 35.2	98 21	89.8	6 04.6	98 21	89.7	6 33.9	98 21	89.6	7 03.3	98 21	89.5	7 32.6	98 21	89.4	9
90										5 22.8	98 21	88.9	5 52.1	98 21	88.7	6 21.4	98 21	88.6	6 50.8	98 21	88.5	7 20.1	98 21	88.4	90

Lat. 78°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0				00
1	7 59.9	1.0 01	179.0	7 29.9	1.0 01	179.0	6 59.9	1.0 01	179.0	6 29.9	1.0 01	179.0	5 59.9	1.0 01	179.0	5 29.9	1.0 01	179.0							1
2	7 59.6	1.0 01	178.0	7 29.6	1.0 01	178.0	6 59.6	1.0 01	178.0	6 29.6	1.0 01	178.0	5 59.6	1.0 01	178.0	5 29.6	1.0 01	178.0							2
3	7 59.0	1.0 01	177.0	7 29.0	1.0 01	177.0	6 59.0	1.0 01	177.0	6 29.0	1.0 01	177.0	5 59.0	1.0 01	177.0	5 29.0	1.0 01	177.0							3
4	7 58.2	1.0 02	176.0	7 28.2	1.0 02	176.0	6 58.3	1.0 02	176.0	6 28.3	1.0 02	176.0	5 58.3	1.0 02	176.0	5 28.3	1.0 02	176.0							4
05	7 57.3	1.0 02	175.0	7 27.3	1.0 02	175.0	6 57.3	1.0 02	175.0	6 27.3	1.0 02	175.0	5 57.3	1.0 02	175.0	5 27.3	1.0 02	175.0							05
6	7 56.1	1.0 02	174.0	7 26.1	1.0 02	174.0	6 56.1	1.0 02	174.0	6 26.1	1.0 02	174.0	5 56.1	1.0 02	174.0	5 26.1	1.0 02	174.0							6
7	7 54.6	1.0 03	172.9	7 24.6	1.0 03	173.0	6 54.7	1.0 03	173.0	6 24.7	1.0 03	173.0	5 54.7	1.0 03	173.0	5 24.7	1.0 03	173.0							7
8	7 53.0	1.0 03	171.9	7 23.0	1.0 03	172.0	6 53.0	1.0 03	172.0	6 23.0	1.0 03	172.0	5 53.0	1.0 03	172.0	5 23.1	1.0 03	172.0							8
9	7 51.1	1.0 03	170.9	7 21.2	1.0 03	171.0	6 51.2	1.0 03	171.0	6 21.2	1.0 03	171.0	5 51.2	1.0 03	171.0	5 21.2	1.0 03	171.0							9
10	7 49.1	1.0 04	169.9	7 19.1	1.0 04	169.9	6 49.1	1.0 04	170.0	6 19.1	1.0 04	170.0	5 49.1	1.0 04	170.0	5 19.2	1.0 04	170.0							10
1	7 46.8	1.0 04	168.9	7 16.8	1.0 04	168.9	6 46.8	1.0 04	169.0	6 16.8	1.0 04	169.0	5 46.9	1.0 04	169.0	5 16.9	1.0 04	169.0							1
2	7 44.3	1.0 05	167.9	7 14.3	1.0 05	167.9	6 44.3	1.0 05	168.0	6 14.4	1.0 04	168.0	5 44.4	1.0 04	168.0	5 14.4	1.0 04	168.0							2
3	7 41.6	1.0 05	166.9	7 11.6	1.0 05	166.9	6 41.6	1.0 05	167.0	6 11.7	1.0 05	167.0	5 41.7	1.0 05	167.0	5 11.7	1.0 05	167.0							3
4	7 38.6	1.0 05	165.9	7 08.7	1.0 05	165.9	6 38.7	1.0 05	166.0	6 08.7	1.0 05	166.0	5 38.8	1.0 05	166.0	5 08.8	1.0 05	166.0							4
15	7 35.5	1.0 06	164.9	7 05.5	1.0 06	164.9	6 35.6	1.0 06	165.0	6 05.6	1.0 06	165.0	5 35.7	1.0 06	165.0	5 05.7	1.0 06	165.0							15
6	7 32.1	1.0 06	163.9	7 02.2	1.0 06	163.9	6 32.2	1.0 06	164.0	6 02.3	1.0 06	164.0	5 32.3	1.0 06	164.0	5 02.4	1.0 06	164.0							6
7	7 28.6	1.0 06	162.9	6 58.6	1.0 06	162.9	6 28.7	1.0 06	163.0	5 58.7	1.0 06	163.0	5 28.8	1.0 06	163.0										7
8	7 24.8	1.0 07	161.9	6 54.8	1.0 07	161.9	6 24.9	1.0 07	162.0	5 55.0	1.0 07	162.0	5 25.0	1.0 07	162.0										8
9	7 20.8	1.0 07	160.9	6 50.9	1.0 07	160.9	6 20.9	1.0 07	161.0	5 51.0	1.0 07	161.0	5 21.1	1.0 07	161.0										9
20	7 16.6	1.0 07	159.9	6 46.7	1.0 07	159.9	6 16.8	1.0 07	160.0	5 46.8	1.0 07	160.0	5 16.9	1.0 07	160.0										20
1	7 12.2	1.0 08	158.9	6 42.3	1.0 08	158.9	6 12.4	1.0 08	159.0	5 42.5	1.0 08	159.0	5 12.6	1.0 08	159.0										1
2	7 07.6	1.0 08	157.9	6 37.7	1.0 08	157.9	6 07.8	1.0 08	158.0	5 37.9	1.0 08	158.0	5 08.0	1.0 08	158.0										2
3	7 02.8	1.0 08	156.9	6 32.9	1.0 08	156.9	6 03.0	1.0 08	157.0	5 33.1	1.0 08	157.0	5 03.2	1.0 08	157.0										3
4	6 57.8	1.0 09	155.9	6 27.9	1.0 09	155.9	5 58.0	1.0 09	156.0	5 28.2	1.0 09	156.0													4
25	6 52.6	1.0 09	154.9	6 22.7	1.0 09	154.9	5 52.9	1.0 09	155.0	5 23.0	1.0 09	155.0													25
6	6 47.2	1.0 09	153.9	6 17.4	1.0 09	153.9	5 47.5	1.0 09	154.0	5 17.6	1.0 09	154.0													6
7	6 41.6	1.0 10	152.9	6 11.8	1.0 10	152.9	5 41.9	1.0 10	153.0	5 12.0	1.0 10	153.0													7
8	6 35.9	1.0 10	151.9	6 06.0	1.0 10	151.9	5 36.1	1.0 10	152.0	5 06.3	1.0 10	152.0													8
9	6 29.9	99 10	150.9	6 00.0	99 10	150.9	5 30.2	99 10	151.0	5 00.3	99 10	151.0													9
30	6 23.7	99 11	149.9	5 53.9	99 11	149.9	5 24.0	99 11	150.0																30
1	6 17.4	99 11	148.9	5 47.5	99 11	148.9	5 17.7	99 11	149.0																1
2	6 10.8	99 11	147.9	5 41.0	99 11	147.9	5 11.2	99 11	148.0																2
3	6 04.1	99 12	146.9	5 34.3	99 11	146.9	5 04.5	99 11	147.0																3
4	5 57.2	99 12	145.9	5 27.4	99 12	145.9																			4
35	5 50.1	99 12	144.9	5 20.3	99 12	144.9																			35
6	5 42.8	99 12	143.9	5 13.1	99 12	144.0																			6
7	5 35.4	99 13	142.9	5 05.6	99 13	143.0																			7
8	5 27.8	99 13	141.9																						8
9	5 20.0	99 13	140.9																						9
40	5 12.1	99 14	139.9																						40
1	5 03.9	99 14	138.9																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91										5 10.3	98 21	87.9	5 39.6	98 21	87.8	6 09.0	98 21	87.7	6 38.3	98 21	87.6	7 07.6	98 21	87.5	91
2													5 27.2	98 21	86.8	5 56.5	98 21	86.7	6 25.9	98 21	86.6	6 55.2	98 21	86.5	2
3													5 14.7	98 21	85.8	5 44.1	98 21	85.7	6 13.4	98 21	85.6	6 42.7	98 21	85.5	3
4													5 02.3	98 21	84.8	5 31.6	98 21	84.7	6 01.0	98 21	84.6	6 30.3	98 21	84.5	4
95																5 19.2	98 21	83.8	5 48.6	98 21	83.7	6 17.9	98 21	83.6	95
6																5 06.8	98 21	82.8	5 36.2	98 21	82.7	6 05.5	98 21	82.6	6
7																			5 23.8	98 21	81.7	5 53.2	98 21	81.6	7
8																			5 11.5	98 20	80.7	5 40.8	98 20	80.6	8
9																						5 28.6	98 20	79.6	9
100																						5 16.3	98 20	78.7	100
1																						5 04.1	98 20	77.7	1

Lat. 78°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	00
1	19 59.9	1.0 01	178.9	20 29.9	1.0 01	178.9	20 59.9	1.0 01	178.9	21 29.9	1.0 01	178.9	21 59.9	1.0 01	178.9	22 29.9	1.0 01	178.9	22 59.9	1.0 01	178.9	23 29.9	1.0 01	178.9	1
2	19 59.5	1.0 01	177.9	20 29.5	1.0 01	177.9	20 59.5	1.0 01	177.9	21 29.5	1.0 01	177.9	21 59.5	1.0 01	177.9	22 29.5	1.0 01	177.9	22 59.5	1.0 01	177.9	23 29.5	1.0 01	177.9	2
3	19 59.0	1.0 01	176.8	20 29.0	1.0 01	176.8	20 59.0	1.0 01	176.8	21 29.0	1.0 01	176.8	21 59.0	1.0 01	176.8	22 29.0	1.0 01	176.8	22 59.0	1.0 01	176.8	23 29.0	1.0 01	176.8	3
4	19 58.2	1.0 02	175.8	20 28.2	1.0 02	175.8	20 58.2	1.0 02	175.8	21 28.2	1.0 02	175.8	21 58.2	1.0 02	175.8	22 28.1	1.0 02	175.7	22 58.1	1.0 02	175.7	23 28.1	1.0 02	175.7	4
05	19 57.1	1.0 02	174.7	20 27.1	1.0 02	174.7	20 57.1	1.0 02	174.7	21 27.1	1.0 02	174.7	21 57.1	1.0 02	174.7	22 27.1	1.0 02	174.7	22 57.1	1.0 02	174.7	23 27.1	1.0 02	174.7	05
6	19 55.9	1.0 02	173.7	20 25.9	1.0 02	173.7	20 55.9	1.0 02	173.7	21 25.9	1.0 02	173.6	21 55.8	1.0 02	173.6	22 25.8	1.0 02	173.6	22 55.8	1.0 03	173.6	23 25.8	1.0 02	173.6	6
7	19 54.4	1.0 03	172.6	20 24.4	1.0 03	172.6	20 54.4	1.0 03	172.6	21 24.4	1.0 03	172.6	21 54.3	1.0 03	172.6	22 24.3	1.0 03	172.6	22 54.3	1.0 03	172.5	23 24.3	1.0 03	172.5	7
8	19 52.7	1.0 03	171.6	20 22.7	1.0 03	171.6	20 52.6	1.0 03	171.5	21 22.6	1.0 03	171.5	21 52.6	1.0 03	171.5	22 22.6	1.0 03	171.5	22 52.6	1.0 03	171.5	23 22.6	1.0 03	171.5	8
9	19 50.7	1.0 04	170.5	20 20.7	1.0 04	170.5	20 50.7	1.0 04	170.5	21 20.7	1.0 04	170.5	21 50.7	1.0 04	170.4	22 20.6	1.0 04	170.4	22 50.6	1.0 04	170.4	23 20.6	1.0 04	170.4	9
10	19 48.6	1.0 04	169.5	20 18.5	1.0 04	169.4	20 48.5	1.0 04	169.4	21 18.5	1.0 04	169.4	21 48.5	1.0 04	169.4	22 18.5	1.0 04	169.4	22 48.4	1.0 04	169.3	23 18.4	1.0 04	169.3	10
1	19 46.2	1.0 04	168.4	20 16.1	1.0 04	168.4	20 46.1	1.0 04	168.4	21 16.1	1.0 04	168.3	21 46.1	1.0 04	168.3	22 16.0	1.0 04	168.3	22 46.0	1.0 04	168.3	23 16.0	1.0 04	168.3	1
2	19 43.6	1.0 05	167.4	20 13.5	1.0 05	167.3	20 43.5	1.0 05	167.3	21 13.5	1.0 05	167.3	21 43.4	1.0 05	167.3	22 13.4	1.0 05	167.2	22 43.4	1.0 05	167.2	23 13.3	1.0 05	167.2	2
3	19 40.7	1.0 05	166.3	20 10.7	1.0 05	166.3	20 40.6	1.0 05	166.3	21 10.6	1.0 05	166.2	21 40.6	1.0 05	166.2	22 10.5	1.0 05	166.2	22 40.5	1.0 05	166.2	23 10.4	1.0 05	166.1	3
4	19 37.7	1.0 05	165.3	20 07.6	1.0 06	165.2	20 37.6	1.0 06	165.2	21 07.5	1.0 06	165.2	21 37.5	1.0 06	165.2	22 07.4	1.0 06	165.1	22 37.4	1.0 06	165.1	23 07.3	1.0 06	165.1	4
15	19 34.4	1.0 06	164.2	20 04.3	1.0 06	164.2	20 34.3	1.0 06	164.2	21 04.2	1.0 06	164.1	21 34.2	1.0 06	164.1	22 04.1	1.0 06	164.1	22 34.1	1.0 05	164.0	23 04.0	1.0 06	164.0	15
6	19 30.9	1.0 06	163.2	20 00.8	1.0 06	163.1	20 30.8	1.0 06	163.1	21 00.7	1.0 06	163.1	21 30.6	1.0 06	163.0	22 00.6	1.0 06	163.0	22 30.5	1.0 06	163.0	23 00.5	1.0 06	162.9	6
7	19 27.1	1.0 07	162.1	19 57.1	1.0 07	162.1	20 27.0	1.0 07	162.0	20 57.0	1.0 07	162.0	21 26.9	1.0 07	162.0	21 56.8	1.0 07	161.9	22 26.8	1.0 07	161.9	22 56.7	1.0 07	161.9	7
8	19 23.2	1.0 07	161.1	19 53.1	1.0 07	161.0	20 23.1	1.0 07	161.0	20 53.0	1.0 07	161.0	21 22.9	1.0 07	160.9	21 52.9	1.0 07	160.9	22 22.8	1.0 07	160.8	22 52.7	1.0 07	160.8	8
9	19 19.1	1.0 07	160.0	19 49.0	1.0 07	160.0	20 18.9	1.0 07	159.9	20 48.8	1.0 07	159.9	21 18.7	1.0 07	159.9	21 48.7	1.0 07	159.8	22 18.6	1.0 07	159.8	22 48.5	1.0 07	159.8	9
20	19 14.7	1.0 08	159.0	19 44.6	1.0 08	158.9	20 14.5	1.0 08	158.9	20 44.4	1.0 08	158.9	21 14.3	1.0 08	158.8	21 44.3	1.0 08	158.8	22 14.2	1.0 08	158.7	22 44.1	1.0 08	158.7	20
1	19 10.1	1.0 08	157.9	19 40.0	1.0 08	157.9	20 09.9	1.0 08	157.8	20 39.8	1.0 08	157.8	21 09.7	1.0 08	157.8	21 39.6	1.0 08	157.7	22 09.5	1.0 08	157.7	22 39.4	1.0 08	157.6	1
2	19 05.3	1.0 08	156.9	19 35.2	1.0 08	156.8	20 05.1	1.0 08	156.8	20 35.0	1.0 08	156.8	21 04.9	1.0 08	156.7	21 34.8	1.0 08	156.7	22 04.7	1.0 08	156.6	22 34.6	1.0 08	156.6	2
3	19 00.3	1.0 09	155.8	19 30.2	1.0 09	155.8	20 00.1	1.0 09	155.8	20 30.0	1.0 09	155.7	20 59.9	1.0 09	155.7	21 29.7	1.0 09	155.6	21 59.6	1.0 09	155.6	22 29.5	1.0 09	155.5	3
4	18 55.1	1.0 09	154.8	19 25.0	1.0 09	154.8	19 54.9	1.0 09	154.7	20 24.7	1.0 09	154.7	20 54.6	1.0 09	154.6	21 24.5	1.0 09	154.6	21 54.4	1.0 09	154.5	22 24.2	1.0 09	154.5	4
25	18 49.7	1.0 09	153.8	19 19.6	1.0 09	153.7	19 49.4	1.0 09	153.7	20 19.3	1.0 09	153.6	20 49.2	1.0 09	153.6	21 19.0	1.0 09	153.5	21 48.9	1.0 09	153.5	22 18.8	1.0 10	153.4	25
6	18 44.1	1.0 10	152.7	19 13.9	1.0 10	152.7	19 43.8	1.0 10	152.6	20 13.6	1.0 10	152.6	20 43.5	1.0 10	152.5	21 13.4	1.0 10	152.5	21 43.2	1.0 10	152.4	22 13.1	1.0 10	152.4	6
7	18 38.3	1.0 10	151.7	19 08.1	99 10	151.6	19 38.0	99 10	151.6	20 07.8	99 10	151.5	20 37.6	99 10	151.5	21 07.5	99 10	151.4	21 37.3	99 10	151.4	22 07.2	99 10	151.3	7
8	18 32.2	99 10	150.6	19 02.1	99 10	150.6	19 31.9	99 10	150.5	20 01.8	99 10	150.5	20 31.6	99 10	150.4	21 01.4	99 10	150.4	21 31.3	99 10	150.3	22 01.1	99 10	150.2	8
9	18 26.0	99 11	149.6	18 55.8	99 11	149.5	19 25.7	99 11	149.5	19 55.5	99 11	149.4	20 25.3	99 11	149.4	20 55.2	99 11	149.3	21 25.0	99 11	149.3	21 54.8	99 11	149.2	9
30	18 19.6	99 11	148.6	18 49.4	99 11	148.5	19 19.2	99 11	148.4	19 49.1	99 11	148.4	20 18.9	99 11	148.3	20 48.7	99 11	148.3	21 18.5	99 11	148.2	21 48.3	99 11	148.1	30
1	18 13.0	99 11	147.5	18 42.8	99 11	147.5	19 12.6	99 11	147.4	19 42.4	99 11	147.3	20 12.2	99 11	147.3	20 42.0	99 11	147.2	21 11.8	99 11	147.2	21 41.6	99 11	147.1	1
2	18 06.2	99 12	146.5	18 36.0	99 12	146.4	19 05.8	99 12	146.4	19 35.6	99 12	146.3	20 05.4	99 12	146.2	20 35.2	99 12	146.2	21 05.0	99 12	146.1	21 34.8	99 12	146.1	2
3	17 59.2	99 12	145.5	18 29.0	99 12	145.4	18 58.8	99 12	145.3	19 28.6	99 12	145.3	19 58.4	99 12	145.2	20 28.1	99 12	145.1	20 57.9	99 12	145.1	21 27.7	99 12	145.0	3
4	17 52.1	99 12	144.4	18 21.8	99 12	144.4	18 51.6	99 12	144.3	19 21.4	99 12	144.2	19 51.2	99 12	144.2	20 20.9	99 12	144.1	20 50.7	99 12	144.0	21 20.5	99 12	144.0	4
35	17 44.7	99 13	143.4	18 14.5	99 13	143.3	18 44.2	99 13	143.3	19 14.0	99 13	143.2	19 43.8	99 13	143.1	20 13.5	99 13	143.1	20 43.3	99 13	143.0	21 13.0	99 13	142.9	35
6	17 37.2	99 13	142.4	18 06.9	99 13	142.3	18 36.7	99 13	142.2	19 06.4	99 13	142.2	19 36.2	99 13	142.1	20 05.9	99 13	142.0	20 35.7	99 13	141.9	21 05.4	99 13	141.9	6
7	17 29.5	99 13	141.3	17 59.2	99 13	141.3	18 29.0	99 13	141.2	18 58.7	99 13	141.1	19 28.4	99 13	141.1	19 58.2	99 13	141.0	20 27.9	99 13	140.9	20 57.6	99 13	140.8	7
8	17 21.6	99 13	140.3	17 51.3	99 13	140.2	18 21.1	99 13	140.2	18 50.8	99 14	140.1	19 20.5	99 14	140.0	19 50.2	99 14	139.9	20 19.9	99 14	139.9	20 49.7	99 14	139.8	8
9	17 13.5	99 14	139.3	17 43.3	99 14	139.2	18 13.0	99 14	139.1	18 42.7	99 14	139.1	19 12.4	99 14	139.0	19 42.1	99 14	138.9	20 11.8	99 14	138.8	20 41.5	99 14	138.8	9
40	17 05.3	99 14	138.2	17 35.0	99 14	138.2	18 04.7	99 14	138.1	18 34.4	99 14	138.0	19 04.1	99 14	138.0	19 33.8	99 14	137.9	20 03.5	99 14	137.8	20 33.2	99 14	137.7	40
1	16 56.9	99 14	137.2	17 26.6	99 14	137.1	17 56.3	99 14	137.1	18 26.0	99 14	137.0	18 55.7	99 14	136.9	19 25.4	99 14	136.8	19 55.1	99 14	136.8	20 24.7	99 14	136.7	1
2	16 48.4	99 15	136.2	17 18.1	99 15	136.1	17 47.7	99 15	136.0	18 17.4	99 15	136.0	18 47.1	99 15	135.9	19 16.8	99 15	135.8	19 46.4	99 15	135.7	20 16.1	99 15	135.7	2
3	16 39.7	99 15	135.2	17 09.3	99 15	135.1	17 39.0	99 15	135.0	18 08.7	99 15	134.9	18 38.3	99 15	134.9	19 08.0	99 15	134.8	19 37.6	99 15	134.7	20 07.3	99 15	134.6	3
4	16 30.8	99 15	134.2	17 00.4	99 15	134.1	17 30.1	99 15	134.0	17 59.8	99 15	133.9	18 29.4	99 15	133.8	18 59.1	99 15	133.8	19 28.7	99 15	133.7	19 58.3	99 15	133.6	4
45	16 21.8	99 15	133.1	16 51.4	99 15	133.1	17 21.0	99 15	133.0	17 50.7	99 15	132.9	18 20.3	99 15	132.8	18 50.0	99 15	132.7	19 19.6	99 15	132.6	19 49.2	99 15	132.6	45
6	16 12.6	99 16	132.1	16 42.2	99 16	132.0	17 11.8	99 16	131.9	17 41.5	99 16	131.9	18 11.1	99 16	131.8	18 40.7	99 16	131.7	19 10.4	99 16	131.6	19 40.0	99 16	131.5	6
7	16 03.3	99 16	131.1	16 32.9	99 16	131.0	17 02.5	99 16	130.9	17 32.1	99 16	130.8	18 01.7	99 16	130.8	18 31.3	99 16	130.7	19 01.0	99 16	130.6	19 30.6	99 16	130.5	7
8	15 53.8	99 16	130.1	16 23.4	99 16	130.0	16 53.0	99 16	129.9	17 22.6	99 16	129.8	17 52.2	99 16	129.7	18 21.8	99 16	129.7	18 51.4	99 16	129.6	19 21.0	99 16	129.5	8
9	15 44.2	99 16	129.1	16 13.8	99 16	129.0	16 43.4	99 16	128.9	17 13.0	99 16	128.8	17 42.5	99 16	128.7	18 12.1	99 16	128.6	18 41.7	99 16	128.5	19 11.3	99 16	128.5	9
50	15 34.4	99 16	128.0	16 04.0	99 16	128.0	16 33.6	99 17	127.9	17 03.2	99 17	127.8	17 32.7	99 17	127.7	18 02.3	99 17	127.6	18 31.9	99 17	127.5	19 01.5	99 17	127.4	50
1	15 24.5	99 17	127.0	15 54.1	99 17	126.9	16 23.7	99 17	126.9	16 53.2	99 17	126.8	17 22.8	99 17	126.7	17 52.4	99 17	126.6	18 21.9	99 17	126.5	18 51.5	99 17	126.4	1
2	15 14.5	99 17	126.0	15 44.1	99 17	125.9	16 13.6	99 17	125.8	16 43.2	99 17	125.8	17 12.7	99 17	125.7	17 42.3	99 17	125.6	18 11.8	99 17	125.5	18 41.4	98 17	125.4	2
3	15 04.3	99 17	125.0	15 33.9	99 17	124.9	16 03.4	98 17	124.8	16 33.0	98 17	124.7	17 02.5	98 17	124.7	17 32.1	98 17	124.6	18 01.6	98 17	124.5	18 31.2	98 17	124.4	3
4	14 54.1	98 17	124.0	15 23.6	98 17	123.9	15 53.1	98 17	123.8	16 22.7	98 17	123.7	16 52.2	98 17	123.6	17 21.7	98 17	123.5	17 51.3	98 17	123.5	18 20.8	98 17	123.4	4
55	14 43.7	98 18	123.0	15 13.2	98 18	122.9	15 42.7	98 18	122.8	16 12.2	98 18	122.7	16 41.8	98 18	122.6	17 11.3	98 18	122.5	17 40.8	98 18	122.4	18 10.3	98 18	122.3	55
6	14 33.1	98 18	122.0	15 02.7	98 18	121.9	15 32.2	98 18	121.8	16 01.7	98 18	121.7	16 31.2	98 18	121.6	17 00.7	98 18	121.5	17 30.2	98 18	121.4	17 59.7	98 18	121.3	6
7	14 22.5	98 18	121.0	14 52.0	98 18	120.9	15 21.5	98 18	120.8	15 51.0	98 18	120.7	16 20.5	98 18	120.6	16 50.0	98 18	120.5	17 19.5	98 18	120.4	17 49.0	98 18	120.3	7
8	14 11.7	98 18	120.0	14 41.2	98 18	119.9	15 10.7	98 18	119.8	15 40.2	98 18	119.7	16 09.7	98 18	119.6	16 39.2	98 18	119.5	17 08.7	98 18	119.4	17 38.2	98 18	119.3	8
9	14 00.9	98 18	119.0	14 30.4	98 18	118.9	14 59.9	98 18	118.8	15 29.3	98 18	118.7	15 58.8	98 18	118.6	16 28.3	98 18	118.5	16 57.8	98 18	118.4	17 27.3	98 18	118.3	9
60	13 49.9	98 18	118.0	14 19.4	98 18	117.9	14 48.9	98 18	117.8	15 18.3	98 18	117.7	15 47.8	98 18	117.6	16 17.3	98 19	117.5	16 46.8	98 19	117.4	17 16.2	98 19	117.3	60
1	13 38.9	98 19	117.0	14 08.3	98 19	116.9	14 37.8	98 19	116.8	15 07.3	98 19	116.7	15 36.7	98 19	116.6	16 06.2	98 19	116.5	16 35.6	98 19	116.4	17 05.1	98 19	116.3	1
2	13 27.7	98 19	116.0	13 57.1	98 19	115.9	14 26.6	98 19	115.8	14 56.1	98 19	115.7	15 25.5	98 19	115.6	15 55.0	98 19	115.5	16 24.4	98 19	115.4	16 53.8	98 19	115.3	2
3	13 16.4	98 19	115.0	13 45.9	98 19	114.9	14 15.3	98 19	114.8	14 44.8	98 19	114.7	15 14.2	98 19	114.6	15 43.6	98 19	114.5	16 13.1	98 19	114.4	16 42.5	98 19	114.3	3
4	13 05.1	98 19	114.0	13 34.5	98 19	113.9	14 03.9	98 19	113.8	14 33.4	98 19	113.7	15 02.8	98 19	113.6	15 32.3	98 19	113.5	16 01.7	98 19	113.4	16 31.1	98 19	113.3	4
65	12 53.6	98 19	113.0	13 23.1	98 19	112.9	13 52.5	98 19	112.8	14 21.9	98 19	112.7	14 51.3	98 19	112.6	15 20.8	98 19	112.5	15 50.2	98 19	112.4	16 19.6	98 19	112.3	65
6	12 42.1	98 19	112.0	13 11.5	98 19	111.9	13 40.9	98 19	111.8	14 10.4	98 19	111.7	14 39.8	98 19	111.6	15 00.2	98 19	111.5	15 38.6	98 19	111.4	16 08.0	98 19	111.3	6
7	12 30.5	98 19	111.0	12 59.9	98 19	110.9	13 29.3	98 20	110.8	13 58.7	98 20	110.7	14 28.1	98 20	110.6	14 57.6	98 20	110.5	15 27.0	98 20	110.4	15 56.4	98 20	110.3	7
8	12 18.8	98 20	110.0	12 48.2	98 20	109.9	13 17.6	98 20	109.8	13 47.0	98 20	109.7	14 16.4	98 20	109.6	14 45.8	98 20	109.5	15 15.2	98 20	109.4	15 44.6	98 20	109.3	8
9	12 07.0	98 20	109.0	12 36.4	98 20	108.9	13 05.8	98 20	108.8	13 35.2	98 20	108.7	14 04.6	98 20	108.6	14 34.0	98 20	108.5	15 03.4	98 20	108.4	15 32.8	98 20	108.3	9
70	11 55.2	98 20	108.0	12 24.6	98 20	107.9	12 54.0	98 20	107.8	13 23.4	98 20	107.7	13 52.8	98 20	107.6	14 22.2	98 20	107.5	14 51.5	98 20	107.4	15 20.9	98 20	107.3	70
1	11 43.3	98 20	107.0	12 12.7	98 20	106.9	12 42.1	98 20	106.8	13 11.5	98 20	106.7	13 40.9	98 20	106.6	14 10.2	98 20	106.5	14 39.6	98 20	106.4	15 09.0	98 20	106.3	1
2	11 31.4	98 20	106.0	12 00.7	98 20	105.9	12 30.1	98 20	105.8	12 59.5	98 20	105.7	13 28.9	98 20	105.6	13 58.2	98 20	105.5	14 27.6	98 20	105.4	14 57.0	98 20	105.3	2
3	11 19.3	98 20	105.0	11 48.7	98 20	104.9	12 18.1	98 20	104.8	12 47.5	98 20	104.7	13 16.8	98 20	104.6	13 46.2	98 20	104.5	14 15.6	98 20	104.4	14 44.9	98 20	104.3	3
4	11 07.3	98 20	104.0	11 36.6	98 20	103.9	12 06.0	98 20	103.8	12 35.4	98 20	103.7	13 04.7	98 20	103.6	13 34.1	98 20	103.5	14 03.4	98 20	103.4	14 32.8	98 20	103.3	4
75	10 55.1	98 20	103.1	11 24.5	98 20	102.9	11 53.9	98 20	102.8	12 23.2	98 20	102.7	12 52.6	98 20	102.6	13 21.9	98 20	102.5	13 51.3	98 20	102.4	14 20.6	98 20	102.3	75
6	10 43.0	98 20	102.1	11 12.3	98 20	102.0	11 41.7	98 20	101.9	12 11.0	98 20	101.8	12 40.4	98 20	101.6	13 09.7	98 20	101.5	13 39.1	98 20	101.4	14 08.4	98 20	101.3	6
7	10 30.7	98 20	101.1	11 00.1	98 20	101.0	11 29.4	98 20	100.9	11 58.8	98 20	100.8	12 28.1	98 20	100.7	12 57.5	98 20	100.6	13 26.8	98 20	100.4	13 56.2	98 20	100.3	7
8	10 18.5	98 20	100.1	10 47.8	98 21	100.0	11 17.2	98 21	99.9	11 46.5	98 20	99.8	12 15.9	98 21	99.7	12 45.2	98 21	99.6	13 14.5	98 21	99.5	13 43.9	98 21	99.4	8
9	10 06.2	98 21	99.1	10 35.5	98 21	99.0	11 04.9	98 21	98.9	11 34.2	98 21	98.8	12 03.6	98 21	98.7	12 32.9	98 21	98.6	13 02.2	98 21	98.5	13 31.6	98 21	98.4	9
80	9 53.8	98 21	98.1	10 23.2	98 21	98.0	10 52.5	98 21	97.9	11 21.9	98 21	97.8	11 51.2	98 21	97.7	12 20.5	98 21	97.6	12 49.9	98 21	97.5	13 19.2	98 21	97.4	80
1	9 41.5	98 21	97.1	10 10.8	98 21	97.0	10 40.2	98 21	96.9	11 00.5	98 21	96.8	11 38.8	98 21	96.7	12 08.2	98 21	96.6	12 37.5	98 21	96.5	13 06.8	98 21	96.4	1
2	9 29.1	98 21	96.2	9 58.4	98 21	96.1	10 27.8	98 21	96.0	10 57.1	98 21	95.8	11 26.4	98 21	95.7	11 55.8	98 21	95.6	12 25.1	98 21	95.5	12 54.4	98 21	95.4	2
3	9 16.7	98 21	95.2	9 46.0	98 21	95.1	10 15.3	98 21	95.0	10 44.7	98 21	94.9	11 14.0	98 21	94.8	11 43.3	98 21	94.6	12 12.7	98 21	94.5	12 42.0	98 21	94.4	3
4	9 04.2	98 21	94.2	9 33.6	98 21	94.1	10 02.9	98 21	94.0	10 32.2	98 21	93.9	11 01.6	98 21	93.8	11 30.9	98 21	93.7	12 00.2	98 21	93.6	12 29.5	98 21	93.4	4
85	8 51.8	98 21	93.2	9 21.1	98 21	93.1	9 50.5	98 21	93.0	10 19.8	98 21	92.9	10 49.1	98 21	92.8	11 18.4	98 21	92.7	11 47.8	98 21	92.6	12 17.1	98 21	92.5	85
6	8 39.3	98 21	92.2	9 08.7	98 21	92.1	9 38.0	98 21	92.0	10 07.3	98 21	91.9	10 36.6	98 21	91.8	11 06.0	98 21	91.7	11 35.3	98 21	91.6	12 04.6	98 21	91.5	6
7	8 26.9	98 21	91.3	8 56.2	98 21	91.2	9 25.5	98 21	91.0	9 54.9	98 21	90.9	10 24.2	98 21	90.8	10 53.5	98 21	90.7	11 22.8	98 21	90.6	11 52.1	98 21	90.5	7
8	8 14.4	98 21	90.3	8 43.7	98 21	90.2	9 13.1	98 21	90.1	9 42.4	98 21	90.0	10 11.7	98 21	89.9	10 41.0	98 21	89.7	11 10.3	98 21	89.6	11 39.7	98 21	89.5	8
9	8 01.9	98 21	89.3	8 31.2	98 21	89.2	9 00.6	98 21	89.1	9 29.9	98 21	89.0	9 59.2	98 21	88.9	10 28.6	98 21	88.8	10 57.9	98 21	88.7	11 27.2	98 21	88.6	9
90	7 49.4	98 21	88.3	8 18.8	98 21	88.2	8 48.1	98 21	88.1	9 17.4	98 21	88.0	9 46.8	98 21	87.9	10 16.1	98 21	87.8	10 45.4	98 21	87.7	11 14.7	98 21	87.6	90

Lat. 78°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	7 37.0	98	21	87.3	8 06.3	98	21	87.2	8 35.6	98	21	87.1	9 05.0	98	21	87.0	9 34.3	98	21	86.9	10 03.6	98	21	86.8	10 32.9	98	21	86.7	11 02.3	98	21	86.6	91
2	7 24.5	98	21	86.4	7 53.9	98	21	86.3	8 23.2	98	21	86.2	8 52.5	98	21	86.1	9 21.8	98	21	85.9	9 51.2	98	21	85.8	10 20.5	98	21	85.7	10 49.8	98	21	85.6	2
3	7 12.1	98	21	85.4	7 41.4	98	21	85.3	8 10.7	98	21	85.2	8 40.1	98	21	85.1	9 09.4	98	21	85.0	9 38.7	98	21	84.9	10 08.1	98	21	84.8	10 37.4	98	21	84.7	3
4	6 59.7	98	21	84.4	7 29.0	98	21	84.3	7 58.3	98	21	84.2	8 27.7	98	21	84.1	8 57.0	98	21	84.0	9 26.3	98	21	83.9	9 55.7	98	21	83.8	10 25.0	98	21	83.7	4
95	6 47.3	98	21	83.4	7 16.6	98	21	83.3	7 45.9	98	21	83.2	8 15.3	98	21	83.1	8 44.6	98	21	83.0	9 13.9	98	21	82.9	9 43.3	98	21	82.8	10 12.6	98	21	82.7	95
6	6 34.9	98	21	82.5	7 04.2	98	21	82.4	7 33.6	98	21	82.3	8 02.9	98	21	82.2	8 32.2	98	21	82.0	9 01.6	98	21	81.9	9 30.9	98	21	81.8	10 00.2	98	21	81.7	6
7	6 22.5	98	21	81.5	6 51.9	98	21	81.4	7 21.2	98	20	81.3	7 50.6	98	21	81.2	8 19.9	98	20	81.1	8 49.2	98	20	81.0	9 18.6	98	20	80.9	9 47.9	98	20	80.8	7
8	6 10.2	98	20	80.5	6 39.5	98	20	80.4	7 08.9	98	20	80.3	7 38.2	98	20	80.2	8 07.6	98	20	80.1	8 36.9	98	20	80.0	9 06.3	98	20	79.9	9 35.6	98	20	79.8	8
9	5 57.9	98	20	79.5	6 27.3	98	20	79.4	6 56.6	98	20	79.3	7 26.0	98	20	79.2	7 55.3	98	20	79.1	8 24.7	98	20	79.0	8 54.0	98	20	78.9	9 23.4	98	20	78.8	9
100	5 45.7	98	20	78.6	6 15.0	98	20	78.5	6 44.4	98	20	78.4	7 13.7	98	20	78.3	7 43.1	98	20	78.2	8 12.4	98	20	78.1	8 41.8	98	20	77.9	9 11.1	98	20	77.8	100
1	5 33.5	98	20	77.6	6 02.8	98	20	77.5	6 32.2	98	20	77.4	7 01.5	98	20	77.3	7 30.9	98	20	77.2	8 00.3	98	20	77.1	8 29.6	98	20	77.0	8 59.0	98	20	76.9	1
2	5 21.3	98	20	76.6	5 50.7	98	20	76.5	6 20.0	98	20	76.4	6 49.4	98	20	76.3	7 18.8	98	20	76.2	7 48.1	98	20	76.1	8 17.5	98	20	76.0	8 46.8	98	20	75.9	2
3	5 09.2	98	20	75.7	5 38.6	98	20	75.5	6 07.9	98	20	75.4	6 37.3	98	20	75.3	7 06.7	98	20	75.2	7 36.0	98	20	75.1	8 05.4	98	20	75.0	8 34.8	98	20	74.9	3
4					5 26.5	98	20	74.6	5 55.9	98	20	74.5	6 25.3	98	20	74.4	6 54.6	98	20	74.3	7 24.0	98	20	74.2	7 53.4	98	20	74.1	8 22.7	98	20	74.0	4
105					5 14.5	98	20	73.6	5 43.9	98	20	73.5	6 13.3	98	20	73.4	6 42.7	98	20	73.3	7 12.0	98	20	73.2	7 41.4	98	20	73.1	8 10.8	98	20	73.0	105
6					5 02.6	98	20	72.6	5 32.0	98	20	72.5	6 01.3	98	20	72.4	6 30.7	98	20	72.3	7 00.1	98	20	72.2	7 29.5	98	20	72.1	7 58.9	98	20	72.0	6
7									5 20.1	98	20	71.6	5 49.5	98	20	71.5	6 18.9	98	20	71.4	6 48.3	98	20	71.3	7 17.7	98	20	71.2	7 47.1	98	20	71.1	7
8									5 08.3	98	20	70.6	5 37.7	98	20	70.5	6 07.1	98	20	70.4	6 36.5	98	20	70.3	7 05.9	98	20	70.2	7 35.3	98	20	70.1	8
9													5 26.0	98	19	69.5	5 55.4	98	19	69.4	6 24.8	98	19	69.3	6 54.2	98	19	69.2	7 23.6	98	19	69.1	9
110													5 14.3	98	19	68.5	5 43.7	98	19	68.4	6 13.2	98	19	68.3	6 42.6	98	19	68.2	7 12.0	98	19	68.1	110
1													5 02.8	98	19	67.6	5 32.2	98	19	67.5	6 01.6	98	19	67.4	6 31.0	98	19	67.3	7 00.4	98	19	67.2	1
2																	5 20.7	98	19	66.5	5 50.1	98	19	66.4	6 19.6	98	19	66.3	6 49.0	98	19	66.2	2
3																	5 09.3	98	19	65.5	5 38.7	98	19	65.4	6 08.2	98	19	65.3	6 37.6	98	19	65.2	3
4																					5 27.4	98	19	64.5	5 56.9	98	19	64.4	6 26.3	98	19	64.3	4
115																					5 16.2	98	19	63.5	5 45.7	98	18	63.4	6 15.1	98	18	63.3	115
6																					5 05.1	98	18	62.5	5 34.6	98	18	62.4	6 04.0	98	18	62.3	6
7																									5 23.6	98	18	61.5	5 53.0	98	18	61.4	7
8																									5 12.7	98	18	60.5	5 42.1	98	18	60.4	8
9																									5 01.9	98	18	59.5	5 31.4	98	18	59.4	9
120																													5 20.7	98	18	58.5	120
1																													5 10.1	98	17	57.5	1

Lat. 79

Lat. 78°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	°
00	24 00.0	1.00	180.0	24 30.0	1.00	180.0	25 00.0	1.00	180.0	25 30.0	1.00	180.0	26 00.0	1.00	180.0	26 30.0	1.00	180.0	27 00.0	1.00	180.0	27 30.0	1.00	180.0	00
1	23 59.9	1.00	178.9	24 29.9	1.00	178.9	24 59.9	1.00	173.9	25 29.9	1.00	178.9	25 59.9	1.00	178.9	26 29.9	1.00	178.9	26 59.9	1.00	178.9	27 29.9	1.00	178.9	1
2	23 59.5	1.00	177.9	24 29.5	1.00	177.9	24 59.5	1.00	177.8	25 29.5	1.00	177.8	25 59.5	1.00	177.8	26 29.5	1.00	177.8	26 59.5	1.00	177.8	27 29.5	1.00	177.8	2
3	23 59.0	1.00	176.8	24 28.9	1.00	176.8	24 58.9	1.00	176.8	25 28.9	1.00	176.8	25 58.9	1.00	176.8	26 28.9	1.00	176.8	26 58.9	1.00	176.7	27 28.9	1.00	176.7	3
4	23 58.1	1.00	175.7	24 28.1	1.00	175.7	24 58.1	1.00	175.7	25 28.1	1.00	175.7	25 58.1	1.00	175.7	26 28.1	1.00	175.7	26 58.1	1.00	175.7	27 28.1	1.00	175.7	4
05	23 57.1	1.00	174.6	24 27.1	1.00	174.6	24 57.1	1.00	174.6	25 27.1	1.00	174.6	25 57.1	1.00	174.6	26 27.1	1.00	174.6	26 57.1	1.00	174.6	27 27.0	1.00	174.6	05
6	23 55.8	1.00	173.6	24 25.8	1.00	173.6	24 55.8	1.00	173.6	25 25.8	1.00	173.5	25 55.8	1.00	173.5	26 25.8	1.00	173.5	26 55.8	1.00	173.5	27 25.7	1.00	173.5	6
7	23 54.3	1.00	172.5	24 24.3	1.00	172.5	24 54.3	1.00	172.5	25 24.3	1.00	172.5	25 54.3	1.00	172.4	26 24.2	1.00	172.4	26 54.2	1.00	172.4	27 24.2	1.00	172.4	7
8	23 52.6	1.00	171.4	24 22.5	1.00	171.4	24 52.5	1.00	171.4	25 22.5	1.00	171.4	25 52.5	1.00	171.4	26 22.5	1.00	171.4	26 52.5	1.00	171.3	27 22.4	1.00	171.3	8
9	23 50.6	1.00	170.4	24 20.6	1.00	170.4	24 50.5	1.00	170.3	25 20.5	1.00	170.3	25 50.5	1.00	170.3	26 20.5	1.00	170.3	26 50.5	1.00	170.2	27 20.4	1.00	170.2	9
10	23 48.4	1.00	169.3	24 18.4	1.00	169.3	24 48.3	1.00	169.3	25 18.3	1.00	169.2	25 48.3	1.00	169.2	26 18.3	1.00	169.2	26 48.2	1.00	169.2	27 18.2	1.00	169.1	10
1	23 46.0	1.00	168.2	24 15.9	1.00	168.2	24 45.9	1.00	168.2	25 15.9	1.00	168.2	25 45.8	1.00	168.1	26 15.8	1.00	168.1	26 45.8	1.00	168.1	27 15.7	1.00	168.1	1
2	23 43.3	1.00	167.2	24 13.3	1.00	167.1	24 43.2	1.00	167.1	25 13.2	1.00	167.1	25 43.2	1.00	167.1	26 13.1	1.00	167.0	26 43.1	1.00	167.0	27 13.1	1.00	167.0	2
3	23 40.4	1.00	166.1	24 10.4	1.00	166.1	24 40.3	1.00	166.0	25 10.3	1.00	166.0	25 40.3	1.00	166.0	26 10.2	1.00	166.0	26 40.2	1.00	165.9	27 10.1	1.00	165.9	3
4	23 37.3	1.00	165.0	24 07.3	1.00	165.0	24 37.2	1.00	165.0	25 07.2	1.00	164.9	25 37.1	1.00	164.9	26 07.1	1.00	164.9	26 37.0	1.00	164.8	27 07.0	1.00	164.8	4
15	23 34.0	1.00	164.0	24 03.9	1.00	163.9	24 33.9	1.00	163.9	25 03.8	1.00	163.9	25 33.8	1.00	163.8	26 03.7	1.00	163.8	26 33.6	1.00	163.8	27 03.6	1.00	163.7	15
6	23 30.4	1.00	162.9	24 00.4	1.00	162.9	24 30.3	1.00	162.8	25 00.2	1.00	162.8	25 30.2	1.00	162.8	26 00.1	1.00	162.7	26 30.0	1.00	162.7	27 00.0	1.00	162.7	6
7	23 26.6	1.00	161.8	23 56.6	1.00	161.8	24 26.5	1.00	161.8	24 56.4	1.00	161.7	25 26.4	1.00	161.7	25 56.3	1.00	161.7	26 26.2	1.00	161.6	26 56.2	1.00	161.6	7
8	23 22.6	1.00	160.8	23 52.6	1.00	160.7	24 22.5	1.00	160.7	24 52.4	1.00	160.7	25 22.3	1.00	160.6	25 52.3	1.00	160.6	26 22.2	1.00	160.5	26 52.1	1.00	160.5	8
9	23 18.4	1.00	159.7	23 48.3	1.00	159.7	24 18.3	1.00	159.6	24 48.2	1.00	159.6	25 18.1	1.00	159.5	25 48.0	1.00	159.5	26 17.9	1.00	159.5	26 47.8	1.00	159.4	9
20	23 14.0	1.00	158.6	23 43.9	1.00	158.6	24 13.8	1.00	158.6	24 43.7	1.00	158.5	25 13.6	1.00	158.5	25 43.5	1.00	158.4	26 13.4	1.00	158.4	26 43.3	1.00	158.3	20
1	23 09.3	1.00	157.6	23 39.2	1.00	157.5	24 09.1	1.00	157.5	24 39.0	1.00	157.5	25 08.9	1.00	157.4	25 38.8	1.00	157.4	26 08.7	1.00	157.3	26 38.6	1.00	157.3	1
2	23 04.5	1.00	156.5	23 34.4	1.00	156.5	24 04.3	1.00	156.4	24 34.1	1.00	156.4	25 04.0	1.00	156.3	25 33.9	1.00	156.3	26 03.8	1.00	156.2	26 33.7	1.00	156.2	2
3	22 59.4	1.00	155.5	23 29.3	1.00	155.4	23 59.2	1.00	155.4	24 29.0	1.00	155.3	24 58.9	1.00	155.3	25 28.8	1.00	155.2	25 58.7	1.00	155.2	26 28.6	1.00	155.1	3
4	22 54.1	1.00	154.4	23 24.0	1.00	154.4	23 53.9	1.00	154.3	24 23.7	1.00	154.3	24 53.6	1.00	154.2	25 23.5	1.00	154.2	25 53.3	1.00	154.1	26 23.2	1.00	154.1	4
25	22 48.6	1.00	153.4	23 18.5	1.00	153.3	23 48.3	1.00	153.3	24 18.2	1.00	153.2	24 48.1	1.00	153.1	25 17.9	1.00	153.1	25 47.8	1.00	153.0	26 17.6	1.00	153.0	25
6	22 42.9	1.00	152.3	23 12.8	1.00	152.2	23 42.6	1.00	152.2	24 12.5	99	152.1	24 42.3	99	152.1	25 12.2	99	152.0	25 42.0	99	152.0	26 11.9	99	151.9	6
7	22 37.0	99	151.2	23 06.9	99	151.2	23 36.7	99	151.1	24 06.5	99	151.1	24 36.4	99	151.0	25 06.2	99	151.0	25 36.1	99	150.9	26 05.9	99	150.8	7
8	22 30.9	99	150.2	23 00.8	99	150.1	23 30.6	99	150.1	24 00.4	99	150.0	24 30.2	99	150.0	25 00.1	99	149.9	25 29.9	99	149.8	25 59.7	99	149.8	8
9	22 24.6	99	149.1	22 54.4	99	149.1	23 24.3	99	149.0	23 54.1	99	149.0	24 23.9	99	148.9	24 53.7	99	148.8	25 23.5	99	148.8	25 53.3	99	148.7	9
30	22 18.1	99	148.1	22 47.9	99	148.0	23 17.7	99	148.0	23 47.6	99	147.9	24 17.4	99	147.8	24 47.2	99	147.8	25 17.0	99	147.7	25 46.8	99	147.7	30
1	22 11.4	99	147.0	22 41.2	99	147.0	23 11.0	99	146.9	23 40.8	99	146.8	24 10.6	99	146.8	24 40.4	99	146.7	25 10.2	99	146.7	25 40.0	99	146.6	1
2	22 04.6	99	146.0	22 34.3	99	145.9	23 04.1	99	145.9	23 33.9	99	145.8	24 03.7	99	145.7	24 33.5	99	145.7	25 03.2	99	145.6	25 33.0	99	145.5	2
3	21 57.5	99	144.9	22 27.3	99	144.9	22 57.0	99	144.8	23 26.8	99	144.7	23 56.6	99	144.7	24 26.3	99	144.6	24 56.1	99	144.5	25 25.9	99	144.5	3
4	21 50.2	99	143.9	22 20.0	99	143.8	22 49.7	99	143.8	23 19.5	99	143.7	23 49.3	99	143.6	24 19.0	99	143.6	24 48.8	99	143.5	25 18.5	99	143.4	4
35	21 42.8	99	142.9	22 12.5	99	142.8	22 42.3	99	142.7	23 12.0	99	142.6	23 41.8	99	142.6	24 11.5	99	142.5	24 41.3	99	142.4	25 11.0	99	142.4	35
6	21 35.2	99	141.8	22 04.9	99	141.7	22 34.6	99	141.7	23 04.4	99	141.6	23 34.1	99	141.5	24 03.8	99	141.4	24 33.6	99	141.4	25 03.3	99	141.3	6
7	21 27.4	99	140.8	21 57.1	99	140.7	22 26.8	99	140.6	22 56.5	99	140.5	23 26.3	99	140.5	23 56.0	99	140.4	24 25.7	99	140.3	24 55.4	99	140.2	7
8	21 19.4	99	139.7	21 49.1	99	139.7	22 18.8	99	139.6	22 48.5	99	139.5	23 18.2	99	139.4	23 47.9	99	139.3	24 17.6	99	139.3	24 47.3	99	139.2	8
9	21 11.2	99	138.7	21 40.9	99	138.6	22 10.6	99	138.5	22 40.3	99	138.5	23 10.0	99	138.4	23 39.7	99	138.3	24 09.4	99	138.2	24 39.1	99	138.1	9
40	21 02.9	99	137.6	21 32.6	99	137.6	22 02.3	99	137.5	22 32.0	99	137.4	23 01.7	99	137.3	23 31.3	99	137.3	24 01.0	99	137.2	24 30.7	99	137.1	40
1	20 54.4	99	136.6	21 24.1	99	136.5	21 53.8	99	136.5	22 23.4	99	136.4	22 53.1	99	136.3	23 22.8	99	136.2	23 52.5	99	136.1	24 22.1	99	136.0	1
2	20 45.8	99	135.6	21 15.4	99	135.5	21 45.1	99	135.4	22 14.8	99	135.3	22 44.4	99	135.3	23 14.1	99	135.2	23 43.7	99	135.1	24 13.4	99	135.0	2
3	20 37.0	99	134.5	21 06.6	99	134.5	21 36.3	99	134.4	22 05.9	99	134.3	22 35.6	99	134.2	23 05.2	99	134.1	23 34.8	99	134.0	24 04.5	99	134.0	3
4	20 28.0	99	133.5	20 57.6	99	133.4	21 27.3	99	133.3	21 56.9	99	133.3	22 26.5	99	133.2	22 56.2	99	133.1	23 25.8	99	133.0	23 55.4	99	132.9	4
45	20 18.9	99	132.5	20 48.5	99	132.4	21 18.1	99	132.3	21 47.7	99	132.2	22 17.4	99	132.1	22 47.0	99	132.1	23 16.6	99	132.0	23 46.2	99	131.9	45
6	20 09.6	99	131.4	20 39.2	99	131.4	21 08.8	99	131.3	21 38.4	99	131.2	22 08.0	99	131.1	22 37.6	99	131.0	23 07.2	99	130.9	23 36.8	99	130.8	6
7	20 00.2	99	130.4	20 29.8	99	130.3	20 59.4	99	130.2	21 29.0	99	130.2	21 58.6	99	130.1	22 28.2	99	130.0	22 57.7	99	129.9	23 27.3	99	129.8	7
8	19 50.6	99	129.4	20 20.2	99	129.3	20 49.8	99	129.2	21 19.4	99	129.1	21 48.9	99	129.0	22 18.5	99	129.0	22 48.1	99	128.9	23 17.7	99	128.8	8
9	19 40.9	99	128.4	20 10.5	99	128.3	20 40.0	99	128.2	21 09.6	99	128.1	21 39.2	99	128.0	22 08.8	99	127.9	22 38.3	99	127.8	23 07.9	99	127.7	9
50	19 31.0	99	127.3	20 00.6	99	127.3	20 30.2	99	127.2	20 59.7	99	127.1	21 29.3	99	127.0	21 58.8	99	126.9	22 28.4	99	126.8	22 57.9	98	126.7	50
1	19 21.1	99	126.3	19 50.6	99	126.2	20 20.2	99	126.1	20 49.7	98	126.0	21 19.3	98	126.0	21 48.8	98	125.9	22 18.3	98	125.8	22 47.9	98	125.7	1
2	19 10.9	98	125.3	19 40.5	98	125.2	20 10.0	98	125.1	20 39.6	98	125.0	21 09.1	98	124.9	21 38.6	98	124.8	22 08.2	98	124.7	22 37.7	98	124.6	2
3	19 00.7	98	124.3	19 30.2	98	124.2	19 59.8	98	124.1	20 29.3	98	124.0	20 58.8	98	123.9	21 28.3	98	123.8	21 57.8	98	123.7	22 27.4	98	123.6	3
4	18 50.3	98	123.3	19 19.8	98	123.2	19 49.4	98	123.1	20 18.9	98	123.0	20 48.4	98	122.9	21 17.9	98	122.8	21 47.4	98	122.7	22 16.9	98	122.6	4
55	18 39.8	98	122.2	19 09.3	98	122.2	19 38.8	98	122.1	20 08.4	98	122.0	20 37.9	98	121.9	21 07.4	98	121.8	21 36.8	98	121.7	22 06.3	98	121.6	55
6	18 29.2	98	121.2	18 58.7	98	121.1	19 28.2	98	121.0	19 57.7	98	120.9	20 27.2	98	120.8	20 56.7	98	120.7	21 26.2	98	120.7	21 55.6	98	120.6	6
7	18 18.5	98	120.2	18 48.0	98	120.1	19 17.5	98	120.0	19 47.0	98	119.9	20 16.4	98	119.8	20 45.9	98	119.7	21 15.4	98	119.6	21 44.9	98	119.5	7
8	18 07.7	98	119.2	18 37.1	98	119.1	19 06.6	98	119.0	19 36.1	98	118.9	20 05.6	98	118.8	20 35.0	98	118.7	21 04.5	98	118.6	21 33.9	98	118.5	8
9	17 56.7	98	118.2	18 26.2	98	118.1	18 55.7	98	118.0	19 25.1	98	117.9	19 54.6	98	117.8	20 24.0	98	117.7	20 53.5	98	117.6	21 22.9	98	117.5	9
60	17 45.7	98	117.2	18 15.1	98	117.1	18 44.6	98	117.0	19 14.0	98	116.9	19 43.5	98	116.8	20 12.9	98	116.7	20 42.4	98	116.6	21 11.8	98	116.5	60
1	17 34.5	98	116.2	18 04.0	98	116.1	18 33.4	98	116.0	19 02.9	98	115.9	19 32.3	98	115.8	20 01.7	98	115.7	20 31.2	98	115.6	21 00.6	98	115.5	1
2	17 23.3	98	115.2	17 52.7	98	115.1	18 22.2	98	115.0	18 51.6	98	114.9	19 21.0	98	114.8	19 50.4	98	114.7	20 19.9	98	114.6	20 49.3	98	114.5	2
3	17 12.0	98	114.2	17 41.4	98	114.1	18 10.8	98	114.0	18 40.2	98	113.9	19 09.7	98	113.8	19 39.1	98	113.7	20 08.5	98	113.6	20 37.9	98	113.4	3
4	17 00.5	98	113.2	17 29.9	98	113.1	17 59.4	98	113.0	18 28.8	98	112.9	18 58.2	98	112.8	19 27.6	98	112.6	19 57.0	98	112.5	20 26.4	98	112.4	4
65	16 49.0	98	112.2	17 18.4	98	112.1	17 47.8	98	112.0	18 17.2	98	111.9	18 46.6	98	111.7	19 16.0	98	111.6	19 45.4	98	111.5	20 14.8	98	111.4	65
6	16 37.4	98	111.2	17 06.8	98	111.1	17 36.2	98	111.0	18 05.6	98	110.8	18 35.0	98	110.7	19 04.4	98	110.6	19 33.8	98	110.5	20 03.2	98	110.4	6
7	16 25.8	98	110.2	16 55.1	98	110.1	17 24.5	98	110.0	17 53.9	98	109.8	18 23.3	98	109.7	18 52.7	98	109.6	19 22.1	98	109.5	19 51.4	98	109.4	7
8	16 14.0	98	109.2	16 43.4	98	109.1	17 12.8	98	109.0	17 42.2	98	108.8	18 11.5	98	108.7	18 40.9	98	108.6	19 10.3	98	108.5	19 39.6	98	108.4	8
9	16 02.2	98	108.2	16 31.6	98	108.1	17 00.9	98	108.0	17 30.3	98	107.8	17 59.7	98	107.7	18 29.1	98	107.6	18 58.4	98	107.5	19 27.8	98	107.4	9
70	15 50.3	98	107.2	16 19.7	98	107.1	16 49.0	98	107.0	17 18.4	98	106.9	17 47.8	98	106.7	18 17.1	98	106.6	18 46.5	98	106.5	19 15.8	98	106.4	70
1	15 38.4	98	106.2	16 07.7	98	106.1	16 37.1	98	106.0	17 06.4	98	105.9	17 35.8	98	105.7	18 05.2	98	105.6	18 34.5	98	105.5	19 03.8	98	105.4	1
2	15 26.3	98	105.2	15 55.7	98	105.1	16 25.1	98	105.0	16 54.4	98	104.9	17 23.8	98	104.8	17 53.1	98	104.6	18 22.5	98	104.5	18 51.8	98	104.4	2
3	15 14.3	98	104.2	15 43.6	98	104.1	16 13.0	98	104.0	16 42.3	98	103.9	17 11.7	98	103.8	17 41.0	98	103.6	18 10.4	98	103.5	18 39.7	98	103.4	3
4	15 02.2	98	103.2	15 31.5	98	103.1	16 00.8	98	103.0	16 30.2	98	102.9	16 59.5	98	102.8	17 28.9	98	102.7	17 58.2	98	102.5	18 27.5	98	102.4	4
75	14 50.0	98	102.2	15 19.3	98	102.1	15 48.7	98	102.0	16 18.0	98	101.9	16 47.3	98	101.8	17 16.7	98	101.7	17 46.0	98	101.6	18 15.3	98	101.4	75
6	14 37.8	98	101.2	15 07.1	98	101.1	15 36.4	98	101.0	16 05.8	98	100.9	16 35.1	98	100.8	17 04.4	98	100.7	17 33.8	98	100.6	18 03.1	98	100.5	6
7	14 25.5	98	100.2	14 54.8	98	100.1	15 24.2	98	100.0	15 53.5	98	99.9	16 22.8	98	21 99.8	16 52.2	98	21 99.7	17 21.5	98	21 99.6	17 50.8	98	21 99.5	7
8	14 13.2	98	21 99.2	14 42.5	98	21 99.1	15 11.9	98	21 99.0	15 41.2	98	21 98.9	16 10.5	98	21 98.8	16 39.8	98	21 98.7	17 09.2	98	21 98.6	17 38.5	98	21 98.5	8
9	14 00.9	98	21 98.3	14 30.2	98	21 98.1	14 59.5	98	21 98.0	15 28.9	98	21 97.9	15 58.2	98	21 97.8	16 27.5	98	21 97.7	16 56.8	98	21 97.6	17 26.1	98	21 97.5	9
80	13 48.5	98	21 97.3	14 17.9	98	21 97.2	14 47.2	98	21 97.1	15 16.5	98	21 96.9	15 45.8	98	21 96.8	16 15.1	98	21 96.7	16 44.4	98	21 96.6	17 13.7	98	21 96.5	80
1	13 36.1	98	21 96.3	14 05.5	98	21 96.2	14 34.8	98	21 96.1	15 04.1	98	21 96.0	15 33.4	98	21 95.8	16 02.7	98	21 95.7	16 32.0	98	21 95.6	17 01.3	98	21 95.5	1
2	13 23.7	98	21 95.3	13 53.0	98	21 95.2	14 22.4	98	21 95.1	14 51.7	98	21 95.0	15 21.0	98	21 94.9	15 50.3	98	21 94.8	16 19.6	98	21 94.6	16 48.9	98	21 94.5	2
3	13 11.3	98	21 94.3	13 40.6	98	21 94.2	14 09.9	98	21 94.1	14 39.2	98	21 94.0	15 08.6	98	21 93.9	15 37.9	98	21 93.8	16 07.2	98	21 93.7	16 36.5	98	21 93.5	3
4	12 58.9	98	21 93.3	13 28.2	98	21 93.2	13 57.5	98	21 93.1	14 26.8	98	21 93.0	14 56.1	98	21 92.9	15 25.4	98	21 92.8	15 54.7	98	21 92.7	16 24.0	98	21 92.6	4
85	12 46.4	98	21 92.4	13 15.7	98	21 92.3	13 45.0	98	21 92.1	14 14.3	98	21 92.0	14 43.6	98	21 91.9	15 12.9	98	21 91.8	15 42.2	98	21 91.7	16 11.5	98	21 91.6	85
6	12 33.9	98	21 91.4	13 03.2	98	21 91.3	13 32.6	98	21 91.2	14 01.9	98	21 91.1	14 31.2	98	21 90.9	15 00.5	98	21 90.8	15 29.8	98	21 90.7	15 59.1	98	21 90.6	6
7	12 21.5	98	21 90.4	12 50.8	98	21 90.3	13 20.1	98	21 90.2	13 49.4	98	21 90.1	14 18.7	98	21 90.0	14 48.0	98	21 89.9	15 17.3	98	21 89.7	15 46.6	98	21 89.6	7
8	12 09.0	98	21 89.4	12 38.3	98	21 89.3	13 07.6	98	21 89.2	13 36.9	98	21 89.1	14 06.2	98	21 89.0	14 35.5	98	21 88.9	15 04.8	98	21 88.8	15 34.1	98	21 88.7	8
9	11 56.5	98	21 88.4	12 25.8	98	21 88.3	12 55.1	98	21 88.2	13 24.4	98	21 88.1	13 53.7	98	21 88.0	14 23.0	98	21 87.9	14 52.3	98	21 87.8	15 21.6	98	21 87.7	9
90	11 44.0	98	21 87.5	12 13.4	98	21 87.4	12 42.7	98	21 87.3	13 12.0	98	21 87.1	13 41.3	98	21 87.0	14 10.6	98	21 86.9	14 39.9	98	21 86.8	15 09.2	98	21 86.7	9

Lat. 78°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	11 31.6	98 21	86.5	12 00.9	98 21	86.4	12 30.2	98 21	86.3	12 59.5	98 21	86.2	13 28.8	98 21	86.1	13 58.1	98 21	85.9	14 27.4	98 21	85.8	14 56.7	98 21	85.7	91
2	11 19.1	98 21	85.5	11 48.5	98 21	85.4	12 17.8	98 21	85.3	12 47.1	98 21	85.2	13 16.4	98 21	85.1	13 45.7	98 21	85.0	14 15.0	98 21	84.9	14 44.3	98 21	84.8	2
3	11 06.7	98 21	84.5	11 36.0	98 21	84.4	12 05.3	98 21	84.3	12 34.7	98 21	84.2	13 04.0	98 21	84.1	13 33.3	98 21	84.0	14 02.6	98 21	83.9	14 31.9	98 21	83.8	3
4	10 54.3	98 21	83.6	11 23.6	98 21	83.5	11 52.9	98 21	83.4	12 22.3	98 21	83.2	12 51.6	98 21	83.1	13 20.9	98 21	83.0	13 50.2	98 21	82.9	14 19.5	98 21	82.8	4
95	10 41.9	98 21	82.6	11 11.2	98 21	82.5	11 40.6	98 21	82.4	12 09.9	98 21	82.3	12 39.2	98 21	82.2	13 08.5	98 21	82.1	13 37.8	98 21	81.9	14 07.1	98 21	81.8	95
6	10 29.6	98 21	81.6	10 58.9	98 21	81.5	11 28.2	98 21	81.4	11 57.5	98 20	81.3	12 26.9	98 21	81.2	12 56.2	98 21	81.1	13 25.5	98 20	81.0	13 54.8	98 20	80.9	6
7	10 17.2	98 20	80.7	10 46.6	98 20	80.5	11 15.9	98 20	80.4	11 45.2	98 20	80.3	12 14.6	98 20	80.2	12 43.9	98 20	80.1	13 13.2	98 20	80.0	13 42.5	98 20	79.9	7
8	10 04.9	98 20	79.7	10 34.3	98 20	79.6	11 03.6	98 20	79.5	11 32.9	98 20	79.4	12 02.3	98 20	79.3	12 31.6	98 20	79.1	13 00.9	98 20	79.0	13 30.2	98 20	78.9	8
9	9 52.7	98 20	78.7	10 22.0	98 20	78.6	10 51.4	98 20	78.5	11 20.7	98 20	78.4	11 50.0	98 20	78.3	12 19.4	98 20	78.2	12 48.7	98 20	78.1	13 18.0	98 20	78.0	9
100	9 40.5	98 20	77.7	10 09.8	98 20	77.6	10 39.2	98 20	77.5	11 08.5	98 20	77.4	11 37.8	98 20	77.3	12 07.2	98 20	77.2	12 36.5	98 20	77.1	13 05.8	98 20	77.0	100
1	9 28.3	98 20	76.8	9 57.7	98 20	76.7	10 27.0	98 20	76.6	10 56.4	98 20	76.5	11 25.7	98 20	76.3	11 55.0	98 20	76.2	12 24.4	98 20	76.1	12 53.7	98 20	76.0	1
2	9 16.2	98 20	75.8	9 45.6	98 20	75.7	10 14.9	98 20	75.6	10 44.3	98 20	75.5	11 13.6	98 20	75.4	11 43.0	98 20	75.3	12 12.3	98 20	75.2	12 41.6	98 20	75.1	2
3	9 04.1	98 20	74.8	9 33.5	98 20	74.7	10 02.8	98 20	74.6	10 32.2	98 20	74.5	11 01.6	98 20	74.4	11 30.9	98 20	74.3	12 00.3	98 20	74.2	12 29.6	98 20	74.1	3
4	8 52.1	98 20	73.9	9 21.5	98 20	73.8	9 50.8	98 20	73.7	10 20.2	98 20	73.5	10 49.6	98 20	73.4	11 18.9	98 20	73.3	11 48.3	98 20	73.2	12 17.6	98 20	73.1	4
105	8 40.2	98 20	72.9	9 09.5	98 20	72.8	9 38.9	98 20	72.7	10 08.3	98 20	72.6	10 37.6	98 20	72.5	11 07.0	98 20	72.4	11 36.4	98 20	72.3	12 05.7	98 20	72.2	105
6	8 28.3	98 20	71.9	8 57.7	98 20	71.8	9 27.0	98 20	71.7	9 56.4	98 20	71.6	10 25.8	98 20	71.5	10 55.2	98 20	71.4	11 24.5	98 20	71.3	11 53.9	98 20	71.2	6
7	8 16.4	98 20	71.0	8 45.8	98 20	70.9	9 15.2	98 20	70.7	9 44.6	98 20	70.6	10 14.0	98 20	70.5	10 43.4	98 20	70.4	11 12.7	98 20	70.3	11 42.1	98 20	70.2	7
8	8 04.7	98 19	70.0	8 34.1	98 19	69.9	9 03.5	98 19	69.8	9 32.9	98 19	69.7	10 02.3	98 19	69.6	10 31.6	98 19	69.5	11 01.0	98 19	69.4	11 30.4	98 19	69.3	8
9	7 53.0	98 19	69.0	8 22.4	98 19	68.9	8 51.8	98 19	68.8	9 21.2	98 19	68.7	9 50.6	98 19	68.6	10 20.0	98 19	68.5	10 49.4	98 19	68.4	11 18.8	98 19	68.3	9
110	7 41.4	98 19	68.0	8 10.8	98 19	67.9	8 40.2	98 19	67.8	9 09.6	98 19	67.7	9 39.0	98 19	67.6	10 08.4	98 19	67.5	10 37.8	98 19	67.4	11 07.2	98 19	67.3	110
1	7 29.9	98 19	67.1	7 59.3	98 19	67.0	8 28.7	98 19	66.9	8 58.1	98 19	66.8	9 27.5	98 19	66.7	9 56.9	98 19	66.6	10 26.4	98 19	66.5	10 55.8	98 19	66.4	1
2	7 18.4	98 19	66.1	7 47.8	98 19	66.0	8 17.3	98 19	65.9	8 46.7	98 19	65.8	9 16.1	98 19	65.7	9 45.5	98 19	65.6	10 15.0	98 19	65.5	10 44.4	98 19	65.4	2
3	7 07.1	98 19	65.1	7 36.5	98 19	65.0	8 05.9	98 19	65.0	8 35.4	98 19	64.9	9 04.8	98 19	64.8	9 34.2	98 19	64.7	10 03.6	98 19	64.6	10 33.1	98 19	64.5	3
4	6 55.8	98 19	64.2	7 25.2	98 19	64.1	7 54.7	98 19	64.0	8 24.1	98 19	63.9	8 53.6	98 19	63.8	9 23.0	98 19	63.7	9 52.4	98 19	63.6	10 21.9	98 19	63.5	4
115	6 44.6	98 18	63.2	7 14.1	98 18	63.1	7 43.5	98 18	63.0	8 13.0	98 18	62.9	8 42.4	98 18	62.8	9 11.9	98 18	62.7	9 41.3	98 18	62.6	10 10.8	98 18	62.5	115
6	6 33.5	98 18	62.2	7 03.0	98 18	62.2	7 32.4	98 18	62.1	8 01.9	98 18	62.0	8 31.4	98 18	61.9	9 00.8	98 18	61.8	9 30.3	98 18	61.7	9 59.7	98 18	61.6	6
7	6 22.5	98 18	61.3	6 52.0	98 18	61.2	7 21.5	98 18	61.1	7 50.9	98 18	61.0	8 20.4	98 18	60.9	8 49.9	98 18	60.8	9 19.3	98 18	60.7	9 48.8	98 18	60.6	7
8	6 11.6	98 18	60.3	6 41.1	98 18	60.2	7 10.6	98 18	60.1	7 40.1	98 18	60.0	8 09.6	98 18	59.9	8 39.0	98 18	59.8	9 08.5	98 18	59.8	9 38.0	98 18	59.7	8
9	6 00.8	98 18	59.3	6 30.3	98 18	59.3	6 59.8	98 18	59.2	7 29.3	98 18	59.1	7 58.8	98 18	59.0	8 28.3	98 18	58.9	8 57.8	98 18	58.8	9 27.3	98 18	58.7	9
120	5 50.2	98 18	58.4	6 19.7	98 18	58.3	6 49.2	98 18	58.2	7 18.7	98 18	58.1	7 48.2	98 18	58.0	8 17.7	98 18	57.9	8 47.2	98 18	57.8	9 16.7	98 18	57.7	120
1	5 39.6	98 17	57.4	6 09.1	98 17	57.3	6 38.6	98 17	57.2	7 08.1	98 17	57.1	7 37.7	98 17	57.0	8 07.2	98 17	57.0	8 36.7	98 17	56.9	9 06.2	98 17	56.8	1
2	5 29.1	98 17	56.4	5 58.7	98 17	56.4	6 28.2	98 17	56.3	6 57.7	98 17	56.2	7 27.2	98 17	56.1	7 56.8	98 17	56.0	8 26.3	98 17	55.9	8 55.8	98 17	55.8	2
3	5 18.8	98 17	55.5	5 48.3	98 17	55.4	6 17.9	98 17	55.3	6 47.4	98 17	55.2	7 17.0	98 17	55.1	7 46.5	98 17	55.0	8 16.0	98 17	54.9	8 45.5	98 17	54.9	3
4	5 08.6	98 17	54.5	5 38.1	98 17	54.4	6 07.7	98 17	54.3	6 37.2	98 17	54.2	7 06.8	98 17	54.2	7 36.3	98 17	54.1	8 05.9	98 17	54.0	8 35.4	98 17	53.9	4
125				5 28.1	99 17	53.5	5 57.6	99 17	53.4	6 27.2	99 17	53.3	6 56.7	99 17	53.2	7 26.3	99 17	53.1	7 55.8	99 16	53.0	8 25.4	99 16	52.9	125
6				5 18.1	99 16	52.5	5 47.7	99 16	52.4	6 17.2	99 16	52.3	6 46.8	99 16	52.2	7 16.4	99 16	52.1	7 45.9	99 16	52.1	8 15.5	99 16	52.0	6
7				5 08.3	99 16	51.5	5 37.8	99 16	51.4	6 07.4	99 16	51.4	6 37.0	99 16	51.3	7 06.6	99 16	51.2	7 36.2	99 16	51.1	8 05.7	99 16	51.0	7
8							5 28.2	99 16	50.5	5 57.7	99 16	50.4	6 27.3	99 16	50.3	6 56.9	99 16	50.2	7 26.5	99 16	50.1	7 56.1	99 16	50.1	8
9							5 18.6	99 16	49.5	5 48.2	99 16	49.4	6 17.8	99 16	49.3	6 47.4	99 16	49.3	7 17.0	99 16	49.2	7 46.6	99 16	49.1	9
130							5 09.2	99 15	48.5	5 38.8	99 15	48.5	6 08.4	99 15	48.4	6 38.0	99 15	48.3	7 07.6	99 15	48.2	7 37.2	99 15	48.1	130
1										5 29.5	99 15	47.5	5 59.2	99 15	47.4	6 28.8	99 15	47.3	6 58.4	99 15	47.3	7 28.0	99 15	47.2	1
2										5 20.4	99 15	46.5	5 50.0	99 15	46.5	6 19.7	99 15	46.4	6 49.3	99 15	46.3	7 18.9	99 15	46.2	2
3										5 11.4	99 15	45.6	5 41.1	99 15	45.5	6 10.7	99 15	45.4	6 40.4	99 15	45.3	7 10.0	99 15	45.3	3
4										5 02.6	99 14	44.6	5 32.3	99 14	44.5	6 01.9	99 14	44.5	6 31.6	99 14	44.4	7 01.2	99 14	44.3	4
135													5 23.6	99 14	43.6	5 53.3	99 14	43.5	6 22.9	99 14	43.4	6 52.6	99 14	43.3	135
6													5 15.1	99 14	42.6	5 44.7	99 14	42.5	6 14.4	99 14	42.5	6 44.1	99 14	42.4	6
7													5 06.7	99 14	41.6	5 36.4	99 14	41.6	6 06.1	99 14	41.5	6 35.8	99 14	41.4	7
8																5 28.2	99 13	40.6	5 57.9	99 13	40.5	6 27.6	99 13	40.5	8
9																5 20.2	99 13	39.6	5 49.9	99 13	39.6	6 19.6	99 13	39.5	9
140																5 12.3	99 13	38.7	5 42.0	99 13	38.6	6 11.7	99 13	38.5	140
1																5 04.6	99 13	37.7	5 34.3	99 13	37.6	6 04.0	99 13	37.6	1
2																			5 26.8	99 12	36.7	5 56.5	99 12	36.6	2
3																			5 19.4	99 12	35.7	5 49.2	99 12	35.7	3
4																			5 12.2	99 12	34.8	5 42.0	99 12	34.7	4
145																			5 05.2	99 11	33.8	5 35.0	99 11	33.7	145
6																						5 28.1	99 11	32.8	6
7																						5 21.5	99 11	31.8	7
8																						5 15.0	99 10	30.9	8
9																						5 08.7	99 10	29.9	9
150																						5 02.5	99 10	28.9	150

Lat. 79°

Lat. 78°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	28 00.0	1.0 00	180.0	28 30.0	1.0 00	180.0	29 00.0	1.0 00	180.0	29 30.0	1.0 00	180.0	30 00.0	1.0 00	180.0	30 30.0	1.0 00	180.0	31 00.0	1.0 00	180.0	31 30.0	1.0 00	180.0	00
1	27 59.9	1.0 01	178.9	28 29.9	1.0 01	178.9	28 59.9	1.0 01	178.9	29 29.9	1.0 01	178.9	29 59.9	1.0 01	178.9	30 29.9	1.0 01	178.9	30 59.9	1.0 01	178.9	31 29.9	1.0 01	178.9	1
2	27 59.5	1.0 01	177.8	28 29.5	1.0 01	177.8	28 59.5	1.0 01	177.8	29 29.5	1.0 01	177.8	29 59.5	1.0 01	177.8	30 29.5	1.0 01	177.8	30 59.5	1.0 01	177.8	31 29.5	1.0 01	177.8	2
3	27 58.9	1.0 01	176.7	28 28.9	1.0 01	176.7	28 58.9	1.0 01	176.7	29 28.9	1.0 01	176.7	29 58.9	1.0 01	176.7	30 28.9	1.0 01	176.7	30 58.9	1.0 01	176.7	31 28.9	1.0 01	176.7	3
4	27 58.1	1.0 02	175.6	28 28.1	1.0 02	175.6	28 58.1	1.0 02	175.6	29 28.1	1.0 02	175.6	29 58.1	1.0 02	175.6	30 28.1	1.0 02	175.6	30 58.1	1.0 02	175.6	31 28.1	1.0 02	175.6	4
05	27 57.0	1.0 02	174.6	28 27.0	1.0 02	174.5	28 57.0	1.0 02	174.5	29 27.0	1.0 02	174.5	29 57.0	1.0 02	174.5	30 27.0	1.0 02	174.5	30 57.0	1.0 02	174.5	31 27.0	1.0 02	174.5	05
6	27 55.7	1.0 03	173.5	28 25.7	1.0 03	173.5	28 55.7	1.0 03	173.4	29 25.7	1.0 03	173.4	29 55.7	1.0 03	173.4	30 25.7	1.0 03	173.4	30 55.7	1.0 03	173.4	31 25.7	1.0 03	173.4	6
7	27 54.2	1.0 03	172.4	28 24.2	1.0 03	172.4	28 54.2	1.0 03	172.3	29 24.2	1.0 03	172.3	29 54.2	1.0 03	172.3	30 24.1	1.0 03	172.3	30 54.1	1.0 03	172.3	31 24.1	1.0 03	172.3	7
8	27 52.4	1.0 03	171.3	28 22.4	1.0 03	171.3	28 52.4	1.0 03	171.3	29 22.4	1.0 03	171.2	29 52.4	1.0 03	171.2	30 22.3	1.0 03	171.2	30 52.3	1.0 03	171.2	31 22.3	1.0 03	171.2	8
9	27 50.4	1.0 04	170.2	28 20.4	1.0 04	170.2	28 50.4	1.0 04	170.2	29 20.4	1.0 04	170.1	29 50.3	1.0 04	170.1	30 20.3	1.0 04	170.1	30 50.3	1.0 04	170.1	31 20.3	1.0 04	170.1	9
10	27 48.2	1.0 04	169.1	28 18.2	1.0 04	169.1	28 48.1	1.0 04	169.1	29 18.1	1.0 04	169.1	29 48.1	1.0 04	169.0	30 18.1	1.0 04	169.0	30 48.0	1.0 04	169.0	31 18.0	1.0 04	169.0	10
1	27 45.7	1.0 04	168.0	28 15.7	1.0 04	168.0	28 45.7	1.0 05	168.0	29 15.6	1.0 05	168.0	29 45.6	1.0 05	167.9	30 15.6	1.0 05	167.9	30 45.5	1.0 06	167.9	31 15.5	1.0 06	167.9	1
2	27 43.0	1.0 05	167.0	28 13.0	1.0 05	166.9	28 42.9	1.0 05	166.9	29 12.9	1.0 05	166.9	29 42.9	1.0 05	166.8	30 12.8	1.0 05	166.8	30 42.8	1.0 05	166.8	31 12.8	1.0 05	166.8	2
3	27 40.1	1.0 05	165.9	28 10.0	1.0 05	165.8	28 40.0	1.0 05	165.8	29 10.0	1.0 05	165.8	29 39.9	1.0 05	165.7	30 09.9	1.0 05	165.7	30 39.8	1.0 05	165.7	31 09.8	1.0 05	165.7	3
4	27 36.9	1.0 06	164.8	28 06.9	1.0 06	164.8	28 36.8	1.0 06	164.7	29 06.8	1.0 06	164.7	29 36.7	1.0 06	164.7	30 06.7	1.0 06	164.6	30 36.6	1.0 06	164.6	31 06.6	1.0 06	164.6	4
15	27 33.5	1.0 06	163.7	28 03.5	1.0 06	163.7	28 33.4	1.0 06	163.6	29 03.4	1.0 06	163.6	29 33.3	1.0 06	163.6	30 03.3	1.0 06	163.5	30 33.2	1.0 06	163.5	31 03.1	1.0 06	163.5	15
6	27 29.9	1.0 06	162.6	27 59.9	1.0 06	162.6	28 29.8	1.0 06	162.5	28 59.7	1.0 06	162.5	29 29.7	1.0 06	162.5	29 59.6	1.0 06	162.4	30 29.5	1.0 06	162.4	30 59.5	1.0 06	162.4	6
7	27 26.1	1.0 07	161.5	27 56.0	1.0 07	161.5	28 25.9	1.0 07	161.5	28 55.9	1.0 07	161.4	29 25.8	1.0 07	161.4	29 55.7	1.0 07	161.3	30 25.7	1.0 07	161.3	30 55.6	1.0 07	161.3	7
8	27 22.0	1.0 07	160.5	27 51.9	1.0 07	160.4	28 21.9	1.0 07	160.4	28 51.8	1.0 07	160.3	29 21.7	1.0 07	160.3	29 51.6	1.0 07	160.3	30 21.5	1.0 07	160.2	30 51.5	1.0 07	160.2	8
9	27 17.7	1.0 08	159.4	27 47.7	1.0 08	159.3	28 17.6	1.0 08	159.3	28 47.5	1.0 08	159.2	29 17.4	1.0 08	159.2	29 47.3	1.0 08	159.2	30 17.2	1.0 08	159.1	30 47.1	1.0 08	159.1	9
20	27 13.2	1.0 08	158.3	27 43.1	1.0 08	158.3	28 13.0	1.0 08	158.2	28 42.9	1.0 08	158.2	29 12.8	1.0 08	158.1	29 42.7	1.0 08	158.1	30 12.6	1.0 08	158.0	30 42.5	1.0 08	158.0	20
1	27 08.5	1.0 08	157.2	27 38.4	1.0 08	157.2	28 08.3	1.0 08	157.1	28 38.2	1.0 08	157.1	29 08.1	1.0 08	157.0	29 38.0	1.0 08	157.0	30 07.9	1.0 08	156.9	30 37.8	1.0 08	156.9	1
2	27 03.6	1.0 09	156.1	27 33.5	1.0 09	156.1	28 03.4	1.0 09	156.1	28 33.2	1.0 09	156.0	29 03.1	1.0 09	155.9	29 33.0	1.0 09	155.9	30 02.9	1.0 09	155.8	30 32.8	1.0 09	155.8	2
3	26 58.4	1.0 09	155.1	27 28.3	1.0 09	155.0	27 58.2	1.0 09	155.0	28 28.1	1.0 09	154.9	28 57.9	1.0 09	154.9	29 27.8	1.0 09	154.8	29 57.7	1.0 09	154.8	30 27.5	1.0 09	154.7	3
4	26 53.1	1.0 09	154.0	27 22.9	1.0 09	153.9	27 52.8	1.0 09	153.9	28 22.7	1.0 09	153.8	28 52.5	1.0 09	153.8	29 22.4	1.0 09	153.7	29 52.2	1.0 09	153.7	30 22.1	1.0 09	153.6	4
25	26 47.5	1.0 10	152.9	27 17.3	1.0 10	152.9	27 47.2	1.0 10	152.8	28 17.1	1.0 10	152.8	28 46.9	99 10	152.7	29 16.7	99 10	152.6	29 46.6	99 10	152.6	30 16.4	99 10	152.5	25
6	26 41.7	99 10	151.9	27 11.6	99 10	151.8	27 41.4	99 10	151.7	28 11.2	99 10	151.7	28 41.1	99 10	151.6	29 10.9	99 10	151.6	29 40.7	99 10	151.5	30 10.6	99 10	151.4	6
7	26 35.7	99 10	150.8	27 05.6	99 10	150.7	27 35.4	99 10	150.7	28 05.2	99 10	150.6	28 35.0	99 10	150.5	29 04.9	99 10	150.5	29 34.7	99 10	150.4	30 04.5	99 10	150.4	7
8	26 29.5	99 11	149.7	26 59.4	99 11	149.7	27 29.2	99 11	149.6	27 59.0	99 11	149.5	28 28.8	99 11	149.5	28 58.6	99 11	149.4	29 28.4	99 11	149.3	29 58.2	99 11	149.3	8
9	26 23.1	99 11	148.7	26 53.0	99 11	148.6	27 22.8	99 11	148.5	27 52.6	99 11	148.5	28 22.4	99 11	148.4	28 52.2	99 11	148.3	29 22.0	99 11	148.3	29 51.8	99 11	148.2	9
30	26 16.6	99 11	147.6	26 46.4	99 11	147.5	27 16.2	99 11	147.5	27 45.9	99 11	147.4	28 15.7	99 11	147.3	28 45.5	99 11	147.3	29 15.3	99 11	147.2	29 45.1	99 11	147.1	30
1	26 09.8	99 12	146.5	26 39.6	99 12	146.5	27 09.3	99 12	146.4	27 39.1	99 12	146.3	28 08.9	99 12	146.3	28 38.7	99 12	146.2	29 08.5	99 12	146.1	29 38.2	99 12	146.0	1
2	26 02.8	99 12	145.5	26 32.6	99 12	145.4	27 02.3	99 12	145.3	27 32.1	99 12	145.3	28 01.9	99 12	145.2	28 31.6	99 12	145.1	29 01.4	99 12	145.0	29 31.2	99 12	145.0	2
3	25 55.6	99 12	144.4	26 25.4	99 12	144.3	26 55.1	99 12	144.3	27 24.9	99 12	144.2	27 54.7	99 12	144.1	28 24.4	99 12	144.0	28 54.2	99 12	144.0	29 23.9	99 12	143.9	3
4	25 48.3	99 13	143.3	26 18.0	99 13	143.3	26 47.8	99 13	143.2	27 17.5	99 13	143.1	27 47.3	99 13	143.0	28 17.0	99 13	143.0	28 46.7	99 13	142.9	29 16.5	99 13	142.8	4
35	25 40.7	99 13	142.3	26 10.5	99 13	142.2	26 40.2	99 13	142.1	27 09.9	99 13	142.1	27 39.7	99 13	142.0	28 09.4	99 13	141.9	28 39.1	99 13	141.8	29 08.8	99 13	141.8	35
6	25 33.0	99 13	141.2	26 02.7	99 13	141.2	26 32.5	99 13	141.1	27 02.2	99 13	141.0	27 31.9	99 13	140.9	28 01.6	99 13	140.8	28 31.3	99 13	140.8	29 01.0	99 13	140.7	6
7	25 25.1	99 13	140.2	25 54.8	99 13	140.1	26 24.5	99 14	140.0	26 54.2	99 14	139.9	27 23.9	99 14	139.9	27 53.6	99 14	139.8	28 23.3	99 14	139.7	28 53.0	99 14	139.6	7
8	25 17.0	99 14	139.1	25 46.7	99 14	139.0	26 16.4	99 14	139.0	26 46.1	99 14	138.9	27 15.8	99 14	138.8	27 45.5	99 14	138.7	28 15.2	99 14	138.6	28 44.9	99 14	138.6	8
9	25 08.8	99 14	138.1	25 38.5	99 14	138.0	26 08.1	99 14	137.9	26 37.8	99 14	137.8	27 07.5	99 14	137.7	27 37.2	99 14	137.7	28 06.8	99 14	137.6	28 36.5	99 14	137.5	9
40	25 00.4	99 14	137.0	25 30.0	99 14	136.9	25 59.7	99 14	136.9	26 29.4	99 14	136.8	26 59.0	99 14	136.7	27 28.7	99 14	136.6	27 58.3	99 14	136.5	28 28.0	99 14	136.4	40
1	24 51.8	99 15	136.0	25 21.4	99 15	135.9	25 51.1	99 15	135.8	26 20.7	99 15	135.7	26 50.4	99 15	135.6	27 20.0	99 15	135.5	27 49.7	99 15	135.5	28 19.3	99 15	135.4	1
2	24 43.0	99 15	134.9	25 12.7	99 15	134.8	25 42.3	99 15	134.8	26 11.9	99 15	134.7	26 41.6	99 15	134.6	27 11.2	99 15	134.5	27 40.8	99 15	134.4	28 10.5	99 15	134.3	2
3	24 34.1	99 15	133.9	25 03.7	99 15	133.8	25 33.4	99 15	133.7	26 03.0	99 15	133.6	26 32.6	99 15	133.5	27 02.2	99 15	133.4	27 31.9	99 15	133.3	28 01.5	99 15	133.3	3
4	24 25.0	99 15	132.8	24 54.7	99 15	132.7	25 24.3	99 15	132.7	25 53.9	99 15	132.6	26 23.5	99 15	132.5	26 53.1	99 15	132.4	27 22.7	99 16	132.3	27 52.3	99 16	132.2	4
45	24 15.8	99 16	131.8	24 45.4	99 16	131.7	25 15.0	99 16	131.6	25 44.6	99 16	131.5	26 14.2	99 16	131.4	26 43.8	99 16	131.3	27 13.4	99 16	131.2	27 43.0	99 16	131.2	45
6	24 06.4	99 16	130.8	24 36.0	99 16	130.7	25 05.6	99 16	130.6	25 35.2	99 16	130.5	26 04.8	99 16	130.4	26 34.4	99 16	130.3	27 03.9	99 16	130.2	27 33.5	99 16	130.1	6
7	23 56.9	99 16	129.7	24 26.5	99 16	129.6	24 56.1	99 16	129.5	25 25.6	99 16	129.4	25 55.2	99 16	129.3	26 24.8	99 16	129.2	26 54.3	99 16	129.2	27 23.9	99 16	129.1	7
8	23 47.2	99 16	128.7	24 16.8	99 16	128.6	24 46.4	99 16	128.5	25 15.9	99 16	128.4	25 45.5	99 16	128.3	26 15.0	99 16	128.2	26 44.6	98 16	128.1	27 14.1	98 16	128.0	8
9	23 37.4	99 17	127.6	24 07.0	99 17	127.5	24 36.5	98 17	127.5	25 06.1	98 17	127.4	25 35.6	98 17	127.3	26 05.2	98 17	127.2	26 34.7	98 17	127.1	27 04.2	98 17	127.0	9
50	23 27.5	98 17	126.6	23 57.0	98 17	126.5	24 26.6	98 17	126.4	24 56.1	98 17	126.3	25 25.6	98 17	126.2	25 55.2	98 17	126.1	26 24.7	98 17	126.0	26 54.2	98 17	125.9	50
1	23 17.4	98 17	125.6	23 46.9	98 17	125.5	24 16.5	98 17	125.4	24 46.0	98 17	125.3	25 15.5	98 17	125.2	25 45.0	98 17	125.1	26 14.5	98 17	125.0	26 44.0	98 17	124.9	1
2	23 07.2	98 17	124.6	23 36.7	98 17	124.5	24 06.2	98 17	124.4	24 35.7	98 17	124.3	25 05.3	98 17	124.2	25 34.8	98 17	124.1	26 04.3	98 17	124.0	26 33.7	98 17	123.9	2
3	22 56.9	98 17	123.5	23 26.4	98 17	123.4	23 55.9	98 17	123.3	24 25.4	98 17	123.2	24 54.9	98 18	123.1	25 24.4	98 18	123.0	25 53.8	98 18	122.9	26 23.3	98 18	122.8	3
4	22 46.4	98 18	122.5	23 15.9	98 18	122.4	23 45.4	98 18	122.3	24 14.9	98 18	122.2	24 44.4	98 18	122.1	25 13.8	98 18	122.0	25 43.3	98 18	121.9	26 12.8	98 18	121.8	4
55	22 35.8	98 18	121.5	23 05.3	98 18	121.4	23 34.8	98 18	121.3	24 04.3	98 18	121.2	24 33.7	98 18	121.1	25 03.2	98 18	121.0	25 32.7	98 18	120.9	26 02.1	98 18	120.8	55
6	22 25.1	98 18	120.5	22 54.6	98 18	120.3	23 24.1	98 18	120.2	23 53.5	98 18	120.1	24 23.0	98 18	120.0	24 52.4	98 18	119.9	25 21.9	98 18	119.8	25 51.3	98 18	119.7	6
7	22 14.3	98 18	119.4	22 43.8	98 18	119.3	23 13.2	98 18	119.2	23 42.7	98 18	119.1	24 12.1	98 18	119.0	24 41.6	98 18	118.9	25 11.0	98 18	118.8	25 40.5	98 18	118.7	7
8	22 03.4	98 18	118.4	22 32.8	98 18	118.3	23 02.3	98 18	118.2	23 31.7	98 18	118.1	24 01.2	98 18	118.0	24 30.6	98 18	117.9	25 00.0	98 18	117.8	25 29.5	98 18	117.7	8
9	21 52.4	98 19	117.4	22 21.8	98 19	117.3	22 51.2	98 19	117.2	23 20.7	98 19	117.1	23 50.1	98 19	117.0	24 19.5	98 19	116.9	24 48.9	98 19	116.8	25 18.4	98 19	116.6	9
60	21 41.2	98 19	116.4	22 10.7	98 19	116.3	22 40.1	98 19	116.2	23 09.5	98 19	116.1	23 38.9	98 19	116.0	24 08.4	98 19	115.8	24 37.8	98 19	115.7	25 07.2	98 19	115.6	60
1	21 30.0	98 19	115.4	21 59.4	98 19	115.3	22 28.9	98 19	115.2	22 58.3	98 19	115.0	23 27.7	98 19	114.9	23 57.1	98 19	114.8	24 26.5	98 19	114.7	24 55.9	98 19	114.6	1
2	21 18.7	98 19	114.4	21 48.1	98 19	114.2	22 17.5	98 19	114.1	22 46.9	98 19	114.0	23 16.3	98 19	113.9	23 45.7	98 19	113.8	24 15.1	98 19	113.7	24 44.5	98 19	113.6	2
3	21 07.3	98 19	113.3	21 36.7	98 19	113.2	22 06.1	98 19	113.1	22 35.5	98 19	113.0	23 04.9	98 19	112.9	23 34.3	98 19	112.8	24 03.6	98 19	112.7	24 33.0	98 19	112.6	3
4	20 55.8	98 19	112.3	21 25.2	98 19	112.2	21 54.6	98 19	112.1	22 24.0	98 19	112.0	22 53.3	98 19	111.9	23 22.7	98 19	111.8	23 52.1	98 19	111.7	24 21.4	98 19	111.6	4
65	20 44.2	98 19	111.3	21 13.6	98 19	111.2	21 43.0	98 19	111.1	22 12.3	98 19	111.0	22 41.7	98 19	110.9	23 11.1	98 20	110.8	23 40.4	98 20	110.7	24 09.8	98 20	110.5	65
6	20 32.6	98 20	110.3	21 01.9	98 20	110.2	21 31.3	98 20	110.1	22 00.7	98 20	110.0	22 30.0	98 20	109.9	22 59.4	98 20	109.8	23 28.7	98 20	109.7	23 58.1	98 20	109.5	6
7	20 20.8	98 20	109.3	20 50.2	98 20	109.2	21 19.5	98 20	109.1	21 48.9	98 20	109.0	22 18.3	98 20	108.9	22 47.6	98 20	108.8	23 17.0	98 20	108.6	23 46.3	98 20	108.5	7
8	20 09.0	98 20	108.3	20 38.4	98 20	108.2	21 07.7	98 20	108.1	21 37.1	98 20	108.0	22 06.4	98 20	107.9	22 35.8	98 20	107.8	23 05.1	98 20	107.6	23 34.4	98 20	107.5	8
9	19 57.1	98 20	107.3	20 26.5	98 20	107.2	20 55.8	98 20	107.1	21 25.2	98 20	107.0	21 54.5	98 20	106.9	22 23.8	98 20	106.8	22 53.2	98 20	106.6	23 22.5	98 20	106.5	9
70	19 45.2	98 20	106.3	20 14.5	98 20	106.2	20 43.9	98 20	106.1	21 13.2	98 20	106.0	21 42.5	98 20	105.9	22 11.9	98 20	105.7	22 41.2	98 20	105.6	23 10.5	98 20	105.5	70
1	19 33.2	98 20	105.3	20 02.5	98 20	105.2	20 31.9	98 20	105.1	21 01.2	98 20	105.0	21 30.5	98 20	104.9	21 59.8	98 20	104.7	22 29.2	98 20	104.6	22 58.5	98 20	104.5	1
2	19 21.1	98 20	104.3	19 50.5	98 20	104.2	20 19.8	98 20	104.1	20 49.1	98 20	104.0	21 18.4	98 20	103.9	21 47.7	98 20	103.7	22 17.1	98 20	103.6	22 46.4	98 20	103.5	2
3	19 09.0	98 20	103.3	19 38.3	98 20	103.2	20 07.7	98 20	103.1	20 37.0	98 20	103.0	21 06.3	98 20	102.9	21 35.6	98 20	102.8	22 04.9	98 20	102.6	22 34.2	98 20	102.5	3
4	18 56.9	98 20	102.3	19 26.2	98 20	102.2	19 55.5	98 20	102.1	20 24.8	98 20	102.0	20 54.1	98 20	101.9	21 23.4	98 20	101.8	21 52.7	98 20	101.6	22 22.0	98 20	101.5	4
75	18 44.6	98 20	101.3	19 14.0	98 20	101.2	19 43.3	98 20	101.1	20 12.6	98 20	101.0	20 41.9	98 20	100.9	21 11.2	98 20	100.8	21 40.5	98 20	100.6	22 09.8	98 20	100.5	75
6	18 32.4	98 20	100.3	19 01.7	98 20	100.2	19 31.0	98 20	100.1	20 00.3	98 21	100.0	20 29.6	98 21	99.9	20 58.9	98 21	99.8	21 28.2	98 21	99.7	21 57.5	98 21	99.5	6
7	18 20.1	98 21	99.3	18 49.4	98 21	99.2	19 18.7	98 21	99.1	19 48.0	98 21	99.0	20 17.3	98 21	98.9	20 46.6	98 21	98.8	21 15.9	98 21	98.7	21 45.2	98 21	98.5	7
8	18 07.8	98 21	98.4	18 37.1	98 21	98.2	19 06.4	98 21	98.1	19 35.7	98 21	98.0	20 05.0	98 21	97.9	20 34.2	98 21	97.8	21 03.5	98 21	97.7	21 32.8	98 21	97.6	8
9	17 55.4	98 21	97.4	18 24.7	98 21	97.3	18 54.0	98 21	97.1	19 23.3	98 21	97.0	19 52.6	98 21	96.9	20 21.9	98 21	96.8	20 51.2	98 21	96.7	21 20.4	98 21	96.6	9
80	17 43.0	98 21	96.4	18 12.3	98 21	96.3	18 41.6	98 21	96.2	19 10.9	98 21	96.0	19 40.2	98 21	95.9	20 09.5	98 21	95.8	20 38.7	98 21	95.7	21 08.0	98 21	95.6	80
1	17 30.6	98 21	95.4	17 59.9	98 21	95.3	18 29.2	98 21	95.2	18 58.5	98 21	95.1	19 27.8	98 21	94.9	19 57.1	98 21	94.8	20 26.3	98 21	94.7	20 55.6	98 21	94.6	1
2	17 18.2	98 21	94.4	17 47.5	98 21	94.3	18 16.8	98 21	94.2	18 46.1	98 21	94.1	19 15.3	98 21	94.0	19 44.6	98 21	93.8	20 13.9	98 21	93.7	20 43.2	98 21	93.6	2
3	17 05.7	98 21	93.4	17 35.0	98 21	93.3	18 04.3	98 21	93.2	18 33.6	98 21	93.1	19 02.9	98 21	93.0	19 32.2	98 21	92.9	20 01.4	98 21	92.7	20 30.7	98 21	92.6	3
4	16 53.3	98 21	92.5	17 22.6	98 21	92.3	17 51.9	98 21	92.2	18 21.1	98 21	92.1	18 50.4	98 21	92.0	19 19.7	98 21	91.9	19 49.0	98 21	91.8	20 18.2	98 21	91.6	4
85	16 40.8	98 21	91.5	17 10.1	98 21	91.4	17 39.4	98 21	91.2	18 08.7	98 21	91.1	18 38.0	98 21	91.0	19 07.2	98 21	90.9	19 36.5	98 21	90.8	20 05.8	98 21	90.7	85
6	16 28.4	98 21	90.5	16 57.6	98 21	90.4	17 26.9	98 21	90.3	17 56.2	98 21	90.2	18 25.5	98 21	90.0	18 54.8	98 21	89.9	19 24.0	98 21	89.8	19 53.3	98 21	89.7	6
7	16 15.9	98 21	89.5	16 45.2	98 21	89.4	17 14.4	98 21	89.3	17 43.7	98 21	89.2	18 13.0	98 21	89.1	18 42.3	98 21	88.9	19 11.5	98 21	88.8	19 40.8	98 21	88.7	7
8	16 03.4	98 21	88.5	16 32.7	98 21	88.4	17 02.0	98 21	88.3	17 31.3	98 21	88.2	18 00.5	98 21	88.1	18 29.8	98 21	88.0	18 59.1	98 21	87.9	19 28.3	98 21	87.7	8
9	15 50.9	98 21	87.6	16 20.2	98 21	87.5	16 49.5	98 21	87.3	17 18.8	98 21	87.2	17 48.1	98 21	87.1	18 17.3	98 21	87.0	18 46.6	98 21	86.9	19 15.9	98 21	86.8	9
90	15 38.5	98 21	86.6	16 07.8	98 21	86.5	16 37.1	98 21	86.4	17 06.3	98 21	86.2	17 35.6	98 21	86.1	18 04.9	98 21	86.0	18 34.2	98 21	85.9	19 03.4	98 21	85.8	90

Lat. 78°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	
91	15 28.0	98 21	85.6	15 55.3	98 21	85.5	16 24.6	98 21	85.4	16 53.9	98 21	85.3	17 23.2	98 21	85.2	17 52.5	98 21	85.0	18 21.7	98 21	84.9	18 51.0	98 21	84.8	91
2	15 13.6	98 21	84.6	15 42.9	98 21	84.5	16 12.2	98 21	84.4	16 41.5	98 21	84.3	17 10.8	98 21	84.2	17 40.0	98 21	84.1	18 09.3	98 21	84.0	18 38.6	98 21	83.8	2
3	15 01.2	98 21	83.7	15 30.5	98 21	83.6	15 59.8	98 21	83.4	16 29.1	98 21	83.3	16 58.4	98 21	83.2	17 27.6	98 21	83.1	17 56.9	98 21	83.0	18 26.2	98 21	82.9	3
4	14 48.8	98 21	82.7	15 18.1	98 21	82.6	15 47.4	98 21	82.5	16 16.7	98 21	82.4	16 46.0	98 21	82.2	17 15.3	98 21	82.1	17 44.6	98 21	82.0	18 13.8	98 21	81.9	4
95	14 36.4	98 21	81.7	15 05.8	98 21	81.6	15 35.1	98 21	81.5	16 04.3	98 21	81.4	16 33.6	98 20	81.3	17 02.9	98 21	81.2	17 32.2	98 20	81.1	18 01.5	98 20	80.9	95
6	14 24.1	98 20	80.8	14 53.4	98 20	80.6	15 22.7	98 20	80.5	15 52.0	98 20	80.4	16 21.3	98 20	80.3	16 50.6	98 20	80.2	17 19.9	98 20	80.1	17 49.2	98 20	80.0	6
7	14 11.8	98 20	79.8	14 41.1	98 20	79.7	15 10.4	98 20	79.6	15 39.7	98 20	79.5	16 09.0	98 20	79.3	16 38.3	98 20	79.2	17 07.6	98 20	79.1	17 36.9	98 20	79.0	7
8	13 59.6	98 20	78.8	14 28.9	98 20	78.7	14 58.2	98 20	78.6	15 27.5	98 20	78.5	15 56.8	98 20	78.4	16 26.1	98 20	78.3	16 55.4	98 20	78.2	17 24.7	98 20	78.0	8
9	13 47.3	98 20	77.9	14 16.7	98 20	77.7	14 46.0	98 20	77.6	15 15.3	98 20	77.5	15 44.6	98 20	77.4	16 13.9	98 20	77.3	16 43.2	98 20	77.2	17 12.5	98 20	77.1	9
100	13 35.2	98 20	76.9	14 04.5	98 20	76.8	14 33.8	98 20	76.7	15 03.1	98 20	76.6	15 32.5	98 20	76.4	16 01.8	98 20	76.3	16 31.1	98 20	76.2	17 00.4	98 20	76.1	100
1	13 23.1	98 20	75.9	13 52.4	98 20	75.8	14 21.7	98 20	75.7	14 51.0	98 20	75.6	15 20.4	98 20	75.5	15 49.7	98 20	75.4	16 19.0	98 20	75.3	16 48.3	98 20	75.1	1
2	13 11.0	98 20	75.0	13 40.3	98 20	74.8	14 09.6	98 20	74.7	14 39.0	98 20	74.6	15 08.3	98 20	74.5	15 37.6	98 20	74.4	16 07.0	98 20	74.3	16 36.3	98 20	74.2	2
3	12 59.0	98 20	74.0	13 28.3	98 20	73.9	13 57.6	98 20	73.8	14 27.0	98 20	73.7	14 56.3	98 20	73.6	15 25.6	98 20	73.4	15 55.0	98 20	73.3	16 24.3	98 20	73.2	3
4	12 47.0	98 20	73.0	13 16.3	98 20	72.9	13 45.7	98 20	72.8	14 15.0	98 20	72.7	14 44.4	98 20	72.6	15 13.7	98 20	72.5	15 43.1	98 20	72.4	16 12.4	98 20	72.3	4
105	12 35.1	98 20	72.1	13 04.5	98 20	72.0	13 33.8	98 20	71.8	14 03.2	98 20	71.7	14 32.5	98 20	71.6	15 01.9	98 20	71.5	15 31.2	98 20	71.4	16 00.5	98 20	71.3	105
6	12 23.3	98 20	71.1	12 52.6	98 20	71.0	13 22.0	98 20	70.9	13 51.3	98 20	70.8	14 20.7	98 20	70.7	14 50.1	98 20	70.6	15 19.4	98 20	70.5	15 48.8	98 20	70.3	6
7	12 11.5	98 20	70.1	12 40.9	98 19	70.0	13 10.2	98 19	69.9	13 39.6	98 19	69.8	14 09.0	98 19	69.7	14 38.3	98 19	69.6	15 07.7	98 19	69.5	15 37.0	98 19	69.4	7
8	11 59.8	98 19	69.2	12 29.2	98 19	69.1	12 58.6	98 19	69.0	13 27.9	98 19	68.9	13 57.3	98 19	68.8	14 26.7	98 19	68.6	14 56.0	98 19	68.5	15 25.4	98 19	68.4	8
9	11 48.2	98 19	68.2	12 17.6	98 19	68.1	12 47.0	98 19	68.0	13 16.3	98 19	67.9	13 45.7	98 19	67.8	14 15.1	98 19	67.7	14 44.5	98 19	67.6	15 13.8	98 19	67.5	9
110	11 36.6	98 19	67.2	12 06.0	98 19	67.1	12 35.4	98 19	67.0	13 04.8	98 19	66.9	13 34.2	98 19	66.8	14 03.6	98 19	66.7	14 33.0	98 19	66.6	15 02.4	98 19	66.5	110
1	11 25.2	98 19	66.3	11 54.6	98 19	66.2	12 24.0	98 19	66.1	12 53.4	98 19	66.0	13 22.8	98 19	65.9	13 52.2	98 19	65.8	14 21.6	98 19	65.7	14 51.0	98 19	65.6	1
2	11 13.8	98 19	65.3	11 43.2	98 19	65.2	12 12.6	98 19	65.1	12 42.0	98 19	65.0	13 11.4	98 19	64.9	13 40.8	98 19	64.8	14 10.2	98 19	64.7	14 39.6	98 19	64.6	2
3	11 02.5	98 19	64.4	11 31.9	98 19	64.3	12 01.3	98 19	64.2	12 30.8	98 19	64.1	13 00.2	98 19	64.0	13 29.6	98 19	63.9	13 59.0	98 19	63.8	14 28.4	98 19	63.7	3
4	10 51.3	98 18	63.4	11 20.7	98 18	63.3	11 50.2	98 18	63.2	12 19.6	98 18	63.1	12 49.0	98 18	63.0	13 18.4	98 18	62.9	13 47.9	98 18	62.8	14 17.3	98 18	62.7	4
115	10 40.2	98 18	62.4	11 09.6	98 18	62.3	11 39.1	98 18	62.2	12 08.5	98 18	62.1	12 38.0	98 18	62.0	13 07.4	98 18	61.9	13 36.8	98 18	61.8	14 06.2	98 18	61.7	115
6	10 29.2	98 18	61.5	10 58.6	98 18	61.4	11 28.1	98 18	61.3	11 57.5	98 18	61.2	12 27.0	98 18	61.1	12 56.4	98 18	61.0	13 25.9	98 18	60.9	13 55.3	98 18	60.8	6
7	10 18.3	98 18	60.5	10 47.7	98 18	60.4	11 17.2	98 18	60.3	11 46.7	98 18	60.2	12 16.1	98 18	60.1	12 45.6	98 18	60.0	13 15.0	98 18	59.9	13 44.5	98 18	59.8	7
8	10 07.5	98 18	59.6	10 36.9	98 18	59.5	11 06.4	98 18	59.4	11 35.9	98 18	59.3	12 05.3	98 18	59.2	12 34.8	98 18	59.1	13 04.3	98 18	59.0	13 33.7	98 18	58.9	8
9	9 56.8	98 18	58.6	10 26.2	98 18	58.5	10 55.7	98 18	58.4	11 25.2	98 18	58.3	11 54.7	98 18	58.2	12 24.2	98 18	58.1	12 53.6	98 18	58.0	13 23.1	98 18	57.9	9
120	9 46.2	98 17	57.6	10 15.7	98 17	57.6	10 45.2	98 17	57.5	11 14.6	98 17	57.4	11 44.1	98 17	57.3	12 13.6	98 17	57.2	12 43.1	98 17	57.1	13 12.6	98 17	57.0	120
1	9 35.7	98 17	56.7	10 05.2	98 17	56.6	10 34.7	98 17	56.5	11 04.2	98 17	56.4	11 33.7	98 17	56.3	12 03.2	98 17	56.2	12 32.7	98 17	56.1	13 02.2	98 17	56.0	1
2	9 25.3	98 17	55.7	9 54.8	98 17	55.6	10 24.4	98 17	55.5	10 53.9	98 17	55.5	11 23.4	98 17	55.4	11 52.9	98 17	55.3	12 22.4	98 17	55.2	12 51.9	98 17	55.1	2
3	9 15.1	98 17	54.8	9 44.6	98 17	54.7	10 14.1	98 17	54.6	10 43.7	98 17	54.5	11 13.2	98 17	54.4	11 42.7	98 17	54.3	12 12.2	98 17	54.2	12 41.7	98 17	54.1	3
4	9 04.9	98 17	53.8	9 34.5	98 17	53.7	10 04.0	98 17	53.6	10 33.6	98 17	53.5	11 03.1	98 17	53.5	11 32.6	98 17	53.4	12 02.2	98 17	53.3	12 31.7	98 17	53.2	4
125	8 54.9	99 16	52.8	9 24.5	98 16	52.8	9 54.0	98 16	52.7	10 23.6	98 16	52.6	10 53.1	98 16	52.5	11 22.7	98 16	52.4	11 52.2	98 16	52.3	12 21.8	98 16	52.2	125
6	8 45.1	99 16	51.9	9 14.6	99 16	51.8	9 44.2	99 16	51.7	10 13.7	99 16	51.6	10 43.3	99 16	51.5	11 12.9	99 16	51.5	11 42.4	99 16	51.4	12 12.0	99 16	51.3	6
7	8 35.3	99 16	50.9	9 04.9	99 16	50.8	9 34.5	99 16	50.8	10 04.0	99 16	50.7	10 33.6	99 16	50.6	11 03.2	99 16	50.5	11 32.7	99 16	50.4	12 02.3	99 16	50.3	7
8	8 25.7	99 16	50.0	8 55.3	99 16	49.9	9 24.9	99 16	49.8	9 54.4	99 16	49.7	10 24.0	99 16	49.6	10 53.6	99 16	49.6	11 23.2	99 16	49.5	11 52.8	99 16	49.4	8
9	8 16.2	99 16	49.0	8 45.8	99 16	48.9	9 15.4	99 16	48.9	9 45.0	99 16	48.8	10 14.6	99 16	48.7	10 44.2	99 16	48.6	11 13.8	99 15	48.5	11 43.4	99 15	48.4	9
130	8 06.9	99 15	48.1	8 36.5	99 15	48.0	9 06.1	99 15	47.9	9 35.7	99 15	47.8	10 05.3	99 15	47.7	10 34.9	99 15	47.6	11 04.5	99 15	47.6	11 34.1	99 15	47.5	130
1	7 57.6	99 15	47.1	8 27.3	99 15	47.0	8 56.9	99 15	46.9	9 26.5	99 15	46.9	9 56.1	99 15	46.8	10 25.7	99 15	46.7	10 55.4	99 15	46.6	11 25.0	99 15	46.5	1
2	7 48.6	99 15	46.1	8 18.2	99 15	46.1	8 47.8	99 15	46.0	9 17.5	99 15	45.9	9 47.1	99 15	45.8	10 16.7	99 15	45.7	10 46.4	99 15	45.7	11 16.0	99 15	45.6	2
3	7 39.7	99 15	45.2	8 09.3	99 15	45.1	8 38.9	99 15	45.0	9 08.6	99 15	44.9	9 38.2	99 15	44.9	10 07.9	99 15	44.8	10 37.5	99 15	44.7	11 07.1	99 14	44.6	3
4	7 30.9	99 14	44.2	8 00.5	99 14	44.1	8 30.2	99 14	44.1	8 59.9	99 14	44.0	9 29.5	99 14	43.9	9 59.2	99 14	43.8	10 28.8	99 14	43.8	10 58.5	99 14	43.7	4
135	7 22.3	99 14	43.3	7 51.9	99 14	43.2	8 21.6	99 14	43.1	8 51.3	99 14	43.0	9 20.9	99 14	43.0	9 50.6	99 14	42.9	10 20.3	99 14	42.8	10 49.9	99 14	42.7	135
6	7 13.8	99 14	42.3	7 43.5	99 14	42.2	8 13.1	99 14	42.2	8 42.8	99 14	42.1	9 12.5	99 14	42.0	9 42.2	99 14	41.9	10 11.9	99 14	41.9	10 41.5	99 14	41.8	6
7	7 05.5	99 14	41.3	7 35.2	99 14	41.3	8 04.8	99 14	41.2	8 34.5	99 14	41.1	9 04.2	99 14	41.1	9 33.9	99 14	41.0	10 03.6	99 13	40.9	10 33.3	99 13	40.8	7
8	6 57.3	99 13	40.4	7 27.0	99 13	40.3	7 56.7	99 13	40.2	8 26.4	99 13	40.2	8 56.1	99 13	40.1	9 25.8	99 13	40.0	9 55.5	99 13	40.0	10 25.2	99 13	39.9	8
9	6 49.3	99 13	39.4	7 19.0	99 13	39.4	7 48.7	99 13	39.3	8 18.4	99 13	39.2	8 48.2	99 13	39.2	9 17.9	99 13	39.1	9 47.6	99 13	39.0	10 17.3	99 13	38.9	9
140	6 41.5	99 13	38.5	7 11.2	99 13	38.4	7 40.9	99 13	38.3	8 10.6	99 13	38.3	8 40.4	99 13	38.2	9 10.1	99 13	38.1	9 39.8	99 13	38.1	10 09.5	99 13	38.0	140
1	6 33.8	99 13	37.5	7 03.5	99 12	37.4	7 33.3	99 12	37.4	8 03.0	99 12	37.3	8 32.7	99 12	37.2	9 02.5	99 12	37.2	9 32.2	99 12	37.1	10 01.9	99 12	37.0	1
2	6 26.3	99 12	36.6	6 56.0	99 12	36.5	7 25.8	99 12	36.4	7 55.5	99 12	36.4	8 25.3	99 12	36.3	8 55.0	99 12	36.2	9 24.8	99 12	36.2	9 54.5	99 12	36.1	2
3	6 18.9	99 12	35.6	6 48.7	99 12	35.5	7 18.4	99 12	35.5	7 48.2	99 12	35.4	8 18.0	99 12	35.3	8 47.7	99 12	35.3	9 17.5	99 12	35.2	9 47.2	99 12	35.1	3
4	6 11.7	99 12	34.6	6 41.5	99 12	34.6	7 11.3	99 12	34.5	7 41.1	99 12	34.4	8 10.8	99 12	34.4	8 40.6	99 12	34.3	9 10.4	99 12	34.3	9 40.1	99 12	34.2	4
145	6 04.7	99 11	33.7	6 34.5	99 11	33.6	7 04.3	99 11	33.6	7 34.1	99 11	33.5	8 03.9	99 11	33.4	8 33.7	99 11	33.4	9 03.4	99 11	33.3	9 33.2	99 11	33.2	145
6	5 57.9	99 11	32.7	6 27.7	99 11	32.7	6 57.5	99 11	32.6	7 27.3	99 11	32.5	7 57.1	99 11	32.5	8 26.9	99 11	32.4	8 56.7	99 11	32.4	9 26.5	99 11	32.3	6
7	5 51.3	99 11	31.8	6 21.1	99 11	31.7	6 50.9	99 11	31.6	7 20.7	99 11	31.6	7 50.5	99 11	31.5	8 20.3	99 11	31.5	8 50.1	99 11	31.4	9 19.9	99 11	31.4	7
8	5 44.8	99 10	30.8	6 14.6	99 10	30.7	6 44.4	99 10	30.7	7 14.2	99 10	30.6	7 44.0	99 10	30.6	8 13.9	99 10	30.5	8 43.7	99 10	30.5	9 13.5	99 10	30.4	8
9	5 38.5	99 10	29.8	6 08.3	99 10	29.8	6 38.1	99 10	29.7	7 08.0	99 10	29.7	7 37.8	99 10	29.6	8 07.6	99 10	29.6	8 37.4	99 10	29.5	9 07.3	99 10	29.5	9
150	5 32.4	99 10	28.9	6 02.2	99 10	28.8	6 32.0	99 10	28.8	7 01.9	99 10	28.7	7 31.7	99 10	28.7	8 01.5	99 10	28.6	8 31.4	99 10	28.6	9 01.2	99 10	28.5	150
1	5 26.4	99 10	27.9	5 56.3	99 10	27.9	6 26.1	99 10	27.8	6 56.0	99 10	27.8	7 25.8	99 10	27.7	7 55.7	99 10	27.7	8 25.5	99 09	27.6	8 55.4	99 09	27.6	1
2	5 20.7	1.0 09	27.0	5 50.5	1.0 09	26.9	6 20.4	1.0 09	26.9	6 50.3	1.0 09	26.8	7 20.1	1.0 09	26.8	7 50.0	1.0 09	26.7	8 19.8	1.0 09	26.7	8 49.7	1.0 09	26.6	2
3	5 15.1	1.0 09	26.0	5 45.0	1.0 09	25.9	6 14.9	1.0 09	25.9	6 44.7	1.0 09	25.8	7 14.6	1.0 09	25.8	7 44.5	1.0 09	25.8	8 14.3	1.0 09	25.7	8 44.2	1.0 09	25.7	3
4	5 09.8	1.0 09	25.0	5 39.6	1.0 09	25.0	6 09.5	1.0 09	24.9	6 39.4	1.0 09	24.9	7 09.3	1.0 09	24.8	7 39.1	1.0 09	24.8	8 09.0	1.0 09	24.8	8 38.9	1.0 09	24.7	4
155	5 04.6	1.0 08	24.1	5 34.5	1.0 08	24.0	6 04.3	1.0 08	24.0	6 34.2	1.0 08	23.9	7 04.1	1.0 08	23.9	7 34.0	1.0 08	23.8	8 03.9	1.0 08	23.8	8 33.8	1.0 08	23.8	155
6				5 29.5	1.0 08	23.1	5 59.4	1.0 08	23.0	6 29.3	1.0 08	23.0	6 59.1	1.0 08	22.9	7 29.0	1.0 08	22.9	7 58.9	1.0 08	22.9	8 28.8	1.0 08	22.8	6
7				5 24.7	1.0 08	22.1	5 54.6	1.0 08	22.1	6 24.5	1.0 08	22.0	6 54.4	1.0 08	22.0	7 24.3	1.0 08	21.9	7 54.2	1.0 08	21.9	8 24.1	1.0 08	21.9	7
8				5 20.1	1.0 07	21.1	5 50.0	1.0 07	21.1	6 19.9	1.0 07	21.1	6 49.8	1.0 07	21.0	7 19.7	1.0 07	21.0	7 49.6	1.0 07	20.9	8 19.5	1.0 07	20.9	8
9				5 15.7	1.0 07	20.2	5 45.6	1.0 07	20.1	6 15.5	1.0 07	20.1	6 45.4	1.0 07	20.1	7 15.3	1.0 07	20.0	7 45.3	1.0 07	20.0	8 15.2	1.0 07	20.0	9
160				5 11.5	1.0 07	19.2	5 41.4	1.0 07	19.2	6 11.3	1.0 07	19.2	6 41.2	1.0 07	19.1	7 11.2	1.0 07	19.1	7 41.1	1.0 07	19.0	8 11.0	1.0 07	19.0	160
1				5 07.5	1.0 06	18.3	5 37.4	1.0 06	18.2	6 07.3	1.0 06	18.2	6 37.3	1.0 06	18.2	7 07.2	1.0 06	18.1	7 37.1	1.0 06	18.1	8 07.1	1.0 06	18.1	1
2				5 03.7	1.0 06	17.3	5 33.6	1.0 06	17.3	6 03.5	1.0 06	17.2	6 33.5	1.0 06	17.2	7 03.4	1.0 06	17.2	7 33.3	1.0 06	17.1	8 03.3	1.0 06	17.1	2
3				5 00.0	1.0 06	16.3	5 30.0	1.0 06	16.3	5 59.9	1.0 06	16.3	6 29.9	1.0 06	16.3	6 59.8	1.0 06	16.2	7 29.8	1.0 06	16.2	7 59.7	1.0 06	16.2	3
4							5 26.6	1.0 05	15.4	5 56.5	1.0 05	15.3	6 26.5	1.0 05	15.3	6 56.4	1.0 05	15.3	7 26.4	1.0 05	15.2	7 56.3	1.0 05	15.2	4
165							5 23.4	1.0 05	14.4	5 53.3	1.0 05	14.4	6 23.3	1.0 05	14.3	6 53.3	1.0 05	14.3	7 23.2	1.0 05	14.3	7 53.2	1.0 05	14.3	165
6							5 20.4	1.0 05	13.4	5 50.3	1.0 05	13.4	6 20.3	1.0 05	13.4	6 50.3	1.0 05	13.4	7 20.2	1.0 05	13.3	7 50.2	1.0 05	13.3	6
7							5 17.6	1.0 04	12.5	5 47.6	1.0 04	12.5	6 17.5	1.0 04	12.4	6 47.5	1.0 04	12.4	7 17.5	1.0 04	12.4	7 47.4	1.0 04	12.4	7
8							5 15.0	1.0 04	11.5	5 45.0	1.0 04	11.5	6 14.9	1.0 04	11.5	6 44.9	1.0 04	11.5	7 14.9	1.0 04	11.4	7 44.9	1.0 04	11.4	8
9							5 12.6	1.0 04	10.6	5 42.6	1.0 04	10.5	6 12.6	1.0 04	10.5	6 42.5	1.0 04	10.5	7 12.5	1.0 04	10.5	7 42.5	1.0 04	10.5	9
170							5 10.4	1.0 03	09.6	5 40.4	1.0 03	09.6	6 10.4	1.0 03	09.6	6 40.4	1.0 03	09.5	7 10.3	1.0 03	09.5	7 40.3	1.0 03	09.5	170
1							5 08.4	1.0 03	08.6	5 38.4	1.0 03	08.6	6 08.4	1.0 03	08.6	6 38.4	1.0 03	08.6	7 08.4	1.0 03	08.6	7 38.4	1.0 03	08.6	1
2							5 06.7	1.0 03	07.7	5 36.7	1.0 03	07.7	6 06.7	1.0 03	07.6	6 36.6	1.0 03	07.6	7 06.6	1.0 03	07.6	7 36.6	1.0 03	07.6	2
3							5 05.1	1.0 02	06.7	5 35.1	1.0 02	06.7	6 05.1	1.0 02	06.7	6 35.1	1.0 02	06.7	7 05.1	1.0 02	06.7	7 35.1	1.0 02	06.7	3
4							5 03.8	1.0 02	05.8	5 33.8	1.0 02	05.7	6 03.7	1.0 02	05.7	6 33.7	1.0 02	05.7	7 03.7	1.0 02	05.7	7 33.7	1.0 02	05.7	4
175							5 02.6	1.0 02	04.8	5 32.6	1.0 02	04.8	6 02.6	1.0 02	04.8	6 32.6	1.0 02	04.8	7 02.6	1.0 02	04.8	7 32.6	1.0 02	04.8	175
6							5 01.7	1.0 01	03.8	5 31.7	1.0 01	03.8	6 01.7	1.0 01	03.8	6 31.7	1.0 01	03.8	7 01.7	1.0 01	03.8	7 31.7	1.0 01	03.8	6
7							5 00.9	1.0 01	02.9	5 30.9	1.0 01	02.9	6 00.9	1.0 01	02.9	6 30.9	1.0 01	02.9	7 00.9	1.0 01	02.9	7 30.9	1.0 01	02.9	7
8							5 00.4	1.0 01	01.9	5 30.4	1.0 01	01.9	6 00.4	1.0 01	01.9	6 30.4	1.0 01	01.9	7 00.4	1.0 01	01.9	7 30.4	1.0 01	01.9	8
9							5 00.1	1.0 00	01.0	5 30.1	1.0 00	01.0	6 00.1	1.0 00	01.0	6 30.1	1.0 00	01.0	7 00.1	1.0 00	01.0	7 30.1	1.0 00	01.0	9
180							5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	180

Lat. 79

Lat. 78°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	32 00.0	1.00	180.0	32 30.0	1.00	180.0	33 00.0	1.00	180.0	33 30.0	1.00	180.0	34 00.0	1.00	180.0	34 30.0	1.00	180.0	35 00.0	1.00	180.0	35 30.0	1.00	180.0	00
1	31 59.9	1.00	178.9	32 29.9	1.00	178.9	32 59.9	1.00	178.9	33 29.9	1.00	178.9	33 59.9	1.00	178.9	34 29.9	1.00	178.9	34 59.9	1.00	178.9	35 29.9	1.00	178.9	1
2	31 59.5	1.00	177.8	32 29.5	1.00	177.8	32 59.5	1.00	177.8	33 29.5	1.00	177.8	33 59.5	1.00	177.8	34 29.5	1.00	177.8	34 59.5	1.00	177.8	35 29.5	1.00	177.7	2
3	31 58.9	1.00	176.7	32 28.9	1.00	176.7	32 58.9	1.00	176.7	33 28.9	1.00	176.7	33 58.9	1.00	176.6	34 28.9	1.00	176.6	34 58.9	1.00	176.6	35 28.9	1.00	176.6	3
4	31 58.1	1.00	175.6	32 28.1	1.00	175.6	32 58.1	1.00	175.5	33 28.1	1.00	175.5	33 58.1	1.00	175.5	34 28.0	1.00	175.5	34 58.0	1.00	175.5	35 28.0	1.00	175.5	4
05	31 57.0	1.00	174.5	32 27.0	1.00	174.4	32 57.0	1.00	174.4	33 27.0	1.00	174.4	33 57.0	1.00	174.4	34 27.0	1.00	174.4	34 56.9	1.00	174.4	35 26.9	1.00	174.4	05
6	31 55.7	1.00	173.4	32 25.7	1.00	173.3	32 55.6	1.00	173.3	33 25.6	1.00	173.3	33 55.6	1.00	173.3	34 25.6	1.00	173.3	34 55.6	1.00	173.3	35 25.6	1.00	173.2	6
7	31 54.1	1.00	172.2	32 24.1	1.00	172.2	32 54.1	1.00	172.2	33 24.1	1.00	172.2	33 54.0	1.00	172.2	34 24.0	1.00	172.2	34 54.0	1.00	172.1	35 24.0	1.00	172.1	7
8	31 52.3	1.00	171.1	32 22.3	1.00	171.1	32 52.3	1.00	171.1	33 22.2	1.00	171.1	33 52.2	1.00	171.1	34 22.2	1.00	171.0	34 52.2	1.00	171.0	35 22.2	1.00	171.0	8
9	31 50.3	1.00	170.0	32 20.2	1.00	170.0	32 50.2	1.00	170.0	33 20.2	1.00	170.0	33 50.2	1.00	169.9	34 20.1	1.00	169.9	34 50.1	1.00	169.9	35 20.1	1.00	169.9	9
10	31 48.0	1.00	168.9	32 18.0	1.00	168.9	32 47.9	1.00	168.9	33 17.9	1.00	168.9	33 47.9	1.00	168.8	34 17.8	1.00	168.8	34 47.8	1.00	168.8	35 17.8	1.00	168.7	10
1	31 45.5	1.00	167.8	32 15.4	1.00	167.8	32 45.4	1.00	167.8	33 15.4	1.00	167.7	33 45.3	1.00	167.7	34 15.3	1.00	167.7	34 45.3	1.00	167.7	35 15.2	1.00	167.6	1
2	31 42.7	1.00	166.7	32 12.7	1.00	166.7	32 42.6	1.00	166.7	33 12.6	1.00	166.6	33 42.6	1.00	166.6	34 12.5	1.00	166.6	34 42.5	1.00	166.5	35 12.4	1.00	166.5	2
3	31 39.7	1.00	165.6	32 09.7	1.00	165.6	32 39.6	1.00	165.6	33 09.6	1.00	165.5	33 39.6	1.00	165.5	34 09.5	1.00	165.5	34 39.5	1.00	165.4	35 09.4	1.00	165.4	3
4	31 36.5	1.00	164.5	32 06.5	1.00	164.5	32 36.4	1.00	164.4	33 06.4	1.00	164.4	33 36.3	1.00	164.4	34 06.3	1.00	164.3	34 36.2	1.00	164.3	35 06.1	1.00	164.3	4
15	31 33.1	1.00	163.4	32 03.0	1.00	163.4	32 33.0	1.00	163.3	33 02.9	1.00	163.3	33 32.8	1.00	163.3	34 02.8	1.00	163.2	34 32.7	1.00	163.2	35 02.6	1.00	163.1	15
6	31 29.4	1.00	162.3	31 59.3	1.00	162.3	32 29.3	1.00	162.2	32 59.2	1.00	162.2	33 29.1	1.00	162.2	33 59.1	1.00	162.1	34 29.0	1.00	162.1	34 58.9	1.00	162.0	6
7	31 25.5	1.00	161.2	31 55.4	1.00	161.2	32 25.3	1.00	161.1	32 55.3	1.00	161.1	33 25.2	1.00	161.0	33 55.1	1.00	161.0	34 25.0	1.00	161.0	34 54.9	1.00	160.9	7
8	31 21.4	1.00	160.1	31 51.3	1.00	160.1	32 21.2	1.00	160.0	32 51.1	1.00	160.0	33 21.0	1.00	159.9	33 50.9	1.00	159.9	34 20.8	1.00	159.8	34 50.8	1.00	159.8	8
9	31 17.0	1.00	159.0	31 46.9	1.00	159.0	32 16.8	1.00	158.9	32 46.7	1.00	158.9	33 16.6	1.00	158.8	33 46.5	1.00	158.8	34 16.4	1.00	158.7	34 46.3	1.00	158.7	9
20	31 12.4	1.00	157.9	31 42.3	1.00	157.9	32 12.2	1.00	157.8	32 42.1	1.00	157.8	33 12.0	1.00	157.7	33 41.9	1.00	157.7	34 11.8	1.00	157.6	34 41.7	1.00	157.6	20
1	31 07.6	1.00	156.8	31 37.5	1.00	156.8	32 07.4	1.00	156.7	32 37.3	1.00	156.7	33 07.2	1.00	156.6	33 37.1	1.00	156.6	34 06.9	1.00	156.5	34 36.8	1.00	156.5	1
2	31 02.6	1.00	155.7	31 32.5	1.00	155.7	32 02.4	1.00	155.6	32 32.2	1.00	155.6	33 02.1	1.00	155.5	33 32.0	1.00	155.5	34 01.9	1.00	155.4	34 31.7	1.00	155.4	2
3	30 57.4	1.00	154.6	31 27.3	1.00	154.6	31 57.1	1.00	154.5	32 27.0	1.00	154.5	32 56.8	1.00	154.4	33 26.7	1.00	154.4	33 56.6	1.00	154.3	34 26.4	1.00	154.2	3
4	30 51.9	1.00	153.6	31 21.8	1.00	153.5	31 51.7	1.00	153.4	32 21.5	99 10	153.4	32 51.3	99 10	153.3	33 21.2	99 10	153.3	33 51.0	99 10	153.2	34 20.9	99 10	153.1	4
25	30 46.3	99 10	152.5	31 16.1	99 10	152.4	31 46.0	99 10	152.4	32 15.8	99 10	152.3	32 45.6	99 10	152.2	33 15.5	99 10	152.2	33 45.3	99 10	152.1	34 15.1	99 10	152.0	25
6	30 40.4	99 10	151.4	31 10.2	99 10	151.3	31 40.1	99 10	151.3	32 09.9	99 10	151.2	32 39.7	99 10	151.1	33 09.5	99 10	151.1	33 39.4	99 10	151.0	34 09.2	99 10	150.9	6
7	30 34.3	99 10	150.3	31 04.2	99 10	150.2	31 34.0	99 10	150.2	32 03.8	99 11	150.1	32 33.6	99 11	150.0	33 03.4	99 11	150.0	33 33.2	99 11	149.9	34 03.0	99 11	149.8	7
8	30 28.1	99 11	149.2	30 57.9	99 11	149.1	31 27.7	99 11	149.1	31 57.5	99 11	149.0	32 27.3	99 11	148.9	32 57.1	99 11	148.9	33 26.9	99 11	148.8	33 56.7	99 11	148.7	8
9	30 21.6	99 11	148.1	30 51.4	99 11	148.1	31 21.2	99 11	148.0	31 50.9	99 11	147.9	32 20.7	99 11	147.9	32 50.5	99 11	147.8	33 20.3	99 11	147.7	33 50.1	99 11	147.6	9
30	30 14.9	99 11	147.1	30 44.7	99 12	147.0	31 14.4	99 12	146.9	31 44.2	99 12	146.8	32 14.0	99 12	146.8	32 43.8	99 12	146.7	33 13.5	99 12	146.6	33 43.3	99 12	146.5	30
1	30 08.0	99 12	146.0	30 37.8	99 12	145.9	31 07.5	99 12	145.8	31 37.3	99 12	145.8	32 07.1	99 12	145.7	32 36.8	99 12	145.6	33 06.6	99 12	145.5	33 36.3	99 12	145.5	1
2	30 00.9	99 12	144.9	30 30.7	99 12	144.8	31 00.4	99 12	144.7	31 30.2	99 12	144.7	31 59.9	99 12	144.6	32 29.7	99 12	144.5	32 59.4	99 12	144.4	33 29.2	99 12	144.4	2
3	29 53.7	99 12	143.8	30 23.4	99 12	143.7	30 53.1	99 12	143.7	31 22.9	99 12	143.6	31 52.6	99 13	143.5	32 22.3	99 13	143.4	32 52.1	99 13	143.4	33 21.8	99 13	143.3	3
4	29 46.2	99 13	142.7	30 15.9	99 13	142.7	30 45.6	99 13	142.6	31 15.4	99 13	142.5	31 45.1	99 13	142.4	32 14.8	99 13	142.3	32 44.5	99 13	142.3	33 14.2	99 13	142.2	4
35	29 38.5	99 13	141.7	30 08.3	99 13	141.6	30 38.0	99 13	141.5	31 07.7	99 13	141.4	31 37.4	99 13	141.4	32 07.1	99 13	141.3	32 36.8	99 13	141.2	33 06.5	99 13	141.1	35
6	29 30.7	99 13	140.6	30 00.4	99 13	140.5	30 30.1	99 13	140.4	30 59.8	99 13	140.4	31 29.5	99 13	140.3	31 59.2	99 13	140.2	32 28.9	99 13	140.1	32 58.6	99 14	140.0	6
7	29 22.7	99 14	139.5	29 52.4	99 14	139.5	30 22.1	99 14	139.4	30 51.8	99 14	139.3	31 21.4	99 14	139.2	31 51.1	99 14	139.1	32 20.8	99 14	139.0	32 50.5	99 14	138.9	7
8	29 14.5	99 14	138.5	29 44.2	99 14	138.4	30 13.9	99 14	138.3	30 43.5	99 14	138.2	31 13.2	99 14	138.1	31 42.9	99 14	138.0	32 12.5	99 14	137.9	32 42.2	99 14	137.9	8
9	29 06.2	99 14	137.4	29 35.8	99 14	137.3	30 05.5	99 14	137.2	30 35.1	99 14	137.1	31 04.8	99 14	137.1	31 34.4	99 14	137.0	32 04.1	99 14	136.9	32 33.7	99 14	136.8	9
40	28 57.6	99 14	136.3	29 27.3	99 15	136.3	29 56.9	99 15	136.2	30 26.6	99 15	136.1	30 56.2	99 15	136.0	31 25.8	99 15	135.9	31 55.5	99 15	135.8	32 25.1	99 15	135.7	40
1	28 49.0	99 15	135.3	29 18.6	99 15	135.2	29 48.2	99 15	135.1	30 17.8	99 15	135.0	30 47.5	99 15	134.9	31 17.1	99 15	134.8	31 46.7	99 15	134.7	32 16.3	99 15	134.6	1
2	28 40.1	99 15	134.2	29 09.7	99 15	134.1	29 39.3	99 15	134.0	30 08.9	99 15	133.9	30 38.5	99 15	133.9	31 08.1	99 15	133.8	31 37.7	99 15	133.7	32 07.3	99 15	133.6	2
3	28 31.1	99 15	133.2	29 00.7	99 15	133.1	29 30.3	99 15	133.0	29 59.9	99 15	132.9	30 29.5	99 15	132.8	30 59.1	99 15	132.7	31 28.6	99 15	132.6	31 58.2	99 15	132.5	3
4	28 21.9	99 16	132.1	28 51.5	99 16	132.0	29 21.1	99 16	131.9	29 50.7	99 16	131.8	30 20.2	99 16	131.7	30 49.8	99 16	131.6	31 19.4	99 16	131.5	31 48.9	99 16	131.4	4
45	28 12.6	99 16	131.1	28 42.1	99 16	131.0	29 11.7	99 16	130.9	29 41.3	99 16	130.8	30 10.9	99 16	130.7	30 40.4	99 16	130.6	31 10.0	99 16	130.5	31 39.5	98 16	130.4	45
6	28 03.1	99 16	130.0	28 32.6	99 16	129.9	29 02.2	99 16	129.8	29 31.8	99 16	129.7	30 01.3	98 16	129.6	30 30.9	98 16	129.5	31 00.4	98 16	129.4	31 29.9	98 16	129.3	6
7	27 53.5	99 16	129.0	28 23.0	98 16	128.9	28 52.6	98 16	128.8	29 22.1	98 16	128.7	29 51.6	98 16	128.6	30 21.2	98 16	128.5	30 50.7	98 16	128.4	31 20.2	98 16	128.3	7
8	27 43.7	98 16	127.9	28 13.2	98 17	127.8	28 42.8	98 17	127.7	29 12.3	98 17	127.6	29 41.8	98 17	127.5	30 11.3	98 17	127.4	30 40.8	98 17	127.3	31 10.4	98 17	127.2	8
9	27 33.8	98 17	126.9	28 03.3	98 17	126.8	28 32.8	98 17	126.7	29 02.3	98 17	126.6	29 31.8	98 17	126.5	30 01.4	98 17	126.4	30 30.9	98 17	126.3	31 00.3	98 17	126.1	9
50	27 23.7	98 17	125.8	27 53.2	98 17	125.7	28 22.7	98 17	125.6	28 52.2	98 17	125.5	29 21.7	98 17	125.4	29 51.2	98 17	125.3	30 20.7	98 17	125.2	30 50.2	98 17	125.1	50
1	27 13.5	98 17	124.8	27 43.0	98 17	124.7	28 12.5	98 17	124.6	28 42.0	98 17	124.5	29 11.5	98 17	124.4	29 41.0	98 17	124.3	30 10.5	98 17	124.2	30 39.9	98 17	124.0	1
2	27 03.2	98 17	123.8	27 32.7	98 17	123.6	28 02.2	98 17	123.5	28 31.7	98 17	123.4	29 01.2	98 17	123.3	29 30.6	98 18	123.2	30 00.1	98 18	123.1	30 29.5	98 18	123.0	2
3	26 52.8	98 18	122.7	27 22.3	98 18	122.6	27 51.7	98 18	122.5	28 21.2	98 18	122.4	28 50.7	98 18	122.3	29 20.1	98 18	122.2	29 49.6	98 18	122.1	30 19.0	98 18	122.0	3
4	26 42.2	98 18	121.7	27 11.7	98 18	121.6	27 41.2	98 18	121.5	28 10.6	98 18	121.4	28 40.1	98 18	121.3	29 09.5	98 18	121.1	29 38.9	98 18	121.0	30 08.4	98 18	120.9	4
55	26 31.6	98 18	120.6	27 01.0	98 18	120.5	27 30.5	98 18	120.4	27 59.9	98 18	120.3	28 29.3	98 18	120.2	28 58.8	98 18	120.1	29 28.2	98 18	120.0	29 57.6	98 18	119.9	55
6	26 20.8	98 18	119.6	26 50.2	98 18	119.5	27 19.7	98 18	119.4	27 49.1	98 18	119.3	28 18.5	98 18	119.2	28 47.9	98 18	119.1	29 17.3	98 18	119.0	29 46.7	98 18	118.8	6
7	26 09.9	98 18	118.6	26 39.3	98 18	118.5	27 08.7	98 18	118.4	27 38.1	98 18	118.3	28 07.6	98 18	118.1	28 37.0	98 18	118.0	29 06.4	98 18	117.9	29 35.8	98 18	117.8	7
8	25 58.9	98 19	117.6	26 28.3	98 19	117.5	26 57.7	98 19	117.3	27 27.1	98 19	117.2	27 56.5	98 19	117.1	28 25.9	98 19	117.0	28 55.3	98 19	116.9	29 24.7	98 19	116.8	8
9	25 47.8	98 19	116.5	26 17.2	98 19	116.4	26 46.6	98 19	116.3	27 16.0	98 19	116.2	27 45.4	98 19	116.1	28 14.7	98 19	116.0	28 44.1	98 19	115.9	29 13.5	98 19	115.7	9
60	25 36.6	98 19	115.5	26 06.0	98 19	115.4	26 35.3	98 19	115.3	27 04.7	98 19	115.2	27 34.1	98 19	115.1	28 03.5	98 19	115.0	28 32.8	98 19	114.8	29 02.2	98 19	114.7	60
1	25 25.3	98 19	114.5	25 54.6	98 19	114.4	26 24.0	98 19	114.3	26 53.4	98 19	114.2	27 22.8	98 19	114.0	27 52.1	98 19	113.9	28 21.5	98 19	113.8	28 50.8	98 19	113.7	1
2	25 13.9	98 19	113.5	25 43.2	98 19	113.4	26 12.6	98 19	113.3	26 42.0	98 19	113.1	27 11.3	98 19	113.0	27 40.7	98 19	112.9	28 10.0	98 19	112.8	28 39.4	98 19	112.7	2
3	25 02.4	98 19	112.5	25 31.7	98 19	112.4	26 01.1	98 19	112.2	26 30.4	98 19	112.1	26 59.8	98 19	112.0	27 29.1	98 19	111.9	27 58.5	98 19	111.8	28 27.8	98 19	111.7	3
4	24 50.8	98 19	111.4	25 20.2	98 19	111.3	25 49.5	98 19	111.2	26 18.8	98 19	111.1	26 48.2	98 19	111.0	27 17.5	98 20	110.9	27 46.8	98 20	110.8	28 16.2	98 20	110.6	4
65	24 39.2	98 20	110.4	25 08.5	98 20	110.3	25 37.8	98 20	110.2	26 07.2	98 20	110.1	26 36.5	98 20	110.0	27 05.8	98 20	109.9	27 35.1	98 20	109.7	28 04.5	98 20	109.6	65
6	24 27.4	98 20	109.4	24 56.8	98 20	109.3	25 26.1	98 20	109.2	25 55.4	98 20	109.1	26 24.7	98 20	109.0	26 54.1	98 20	108.8	27 23.4	98 20	108.7	27 52.7	98 20	108.6	6
7	24 15.6	98 20	108.4	24 45.0	98 20	108.3	25 14.3	98 20	108.2	25 43.6	98 20	108.1	26 12.9	98 20	107.9	26 42.2	98 20	107.8	27 11.5	98 20	107.7	27 40.8	98 20	107.6	7
8	24 03.8	98 20	107.4	24 33.1	98 20	107.3	25 02.4	98 20	107.2	25 31.7	98 20	107.1	26 01.0	98 20	106.9	26 30.3	98 20	106.8	26 59.6	98 20	106.7	27 28.9	98 20	106.6	8
9	23 51.8	98 20	106.4	24 21.1	98 20	106.3	24 50.4	98 20	106.2	25 19.7	98 20	106.1	25 49.0	98 20	105.9	26 18.3	98 20	105.8	26 47.6	98 20	105.7	27 16.9	98 20	105.6	9
70	23 39.8	98 20	105.4	24 09.1	98 20	105.3	24 38.4	98 20	105.2	25 07.7	98 20	105.0	25 37.0	98 20	104.9	26 06.3	98 20	104.8	26 35.6	98 20	104.7	27 04.9	98 20	104.6	70
1	23 27.8	98 20	104.4	23 57.1	98 20	104.3	24 26.4	98 20	104.2	24 55.7	98 20	104.0	25 24.9	98 20	103.9	25 54.2	98 20	103.8	26 23.5	98 20	103.7	26 52.8	98 20	103.6	1
2	23 15.7	98 20	103.4	23 45.0	98 20	103.3	24 14.2	98 20	103.2	24 43.5	98 20	103.0	25 12.8	98 20	102.9	25 42.1	98 20	102.8	26 11.3	98 20	102.7	26 40.6	98 20	102.6	2
3	23 03.5	98 20	102.4	23 32.8	98 20	102.3	24 02.1	98 20	102.2	24 31.3	98 20	102.0	25 00.6	98 20	101.9	25 29.9	98 20	101.8	25 59.1	98 20	101.7	26 28.4	98 20	101.6	3
4	22 51.3	98 20	101.4	23 20.6	98 20	101.3	23 49.9	98 20	101.2	24 19.1	98 20	101.0	24 48.4	98 20	100.9	25 17.7	98 20	100.8	25 46.9	98 20	100.7	26 16.2	97 20	100.6	4
75	22 39.0	98 20	100.4	23 08.3	98 20	100.3	23 37.6	98 20	100.2	24 06.9	98 20	100.1	24 36.1	98 21	99.9	25 05.4	98 21	99.8	25 34.6	97 21	99.7	26 03.9	97 21	99.6	75
6	22 26.8	98 21	99.4	22 56.0	98 21	99.3	23 25.3	98 21	99.2	23 54.6	98 21	99.1	24 23.8	98 21	98.9	24 53.1	97 21	98.8	25 22.3	97 21	98.7	25 51.6	97 21	98.6	6
7	22 14.4	98 21	98.4	22 43.7	98 21	98.3	23 13.0	98 21	98.2	23 42.2	98 21	98.1	24 11.5	98 21	97.9	24 40.7	97 21	97.8	25 10.0	97 21	97.7	25 39.2	97 21	97.6	7
8	22 02.1	98 21	97.4	22 31.3	98 21	97.3	23 00.6	98 21	97.2	23 29.9	98 21	97.1	23 59.1	97 21	97.0	24 28.4	97 21	96.8	24 57.6	97 21	96.7	25 26.8	97 21	96.6	8
9	21 49.7	98 21	96.5	22 19.0	98 21	96.3	22 48.2	98 21	96.2	23 17.5	98 21	96.1	23 46.7	97 21	96.0	24 16.0	97 21	95.8	24 45.2	97 21	95.7	25 14.4	97 21	95.6	9
80	21 37.3	98 21	95.5	22 06.5	98 21	95.3	22 35.8	98 21	95.2	23 05.1	97 21	95.1	23 34.3	97 21	95.0	24 03.5	97 21	94.9	24 32.8	97 21	94.7	25 02.0	97 21	94.6	80
1	21 24.9	98 21	94.5	21 54.1	98 21	94.4	22 23.4	98 21	94.2	22 52.6	97 21	94.1	23 21.9	97 21	94.0	23 51.1	97 21	93.9	24 20.3	97 21	93.8	24 49.6	97 21	93.6	1
2	21 12.4	98 21	93.5	21 41.7	98 21	93.4	22 10.9	97 21	93.3	22 40.2	97 21	93.1	23 09.4	97 21	93.0	23 38.6	97 21	92.9	24 07.9	97 21	92.8	24 37.1	97 21	92.6	2
3	21 00.0	98 21	92.5	21 29.2	98 21	92.4	21 58.5	97 21	92.3	22 27.7	97 21	92.2	22 56.9	97 21	92.0	23 26.2	97 21	91.9	23 55.4	97 21	91.8	24 24.6	97 21	91.7	3
4	20 47.5	98 21	91.5	21 16.7	98 21	91.4	21 46.0	97 21	91.3	22 15.2	97 21	91.2	22 44.5	97 21	91.1	23 13.7	97 21	90.9	23 42.9	97 21	90.8	24 12.2	97 21	90.7	4
85	20 35.0	98 21	90.6	21 04.3	98 21	90.4	21 33.5	97 21	90.3	22 02.8	97 21	90.2	22 32.0	97 21	90.1	23 01.2	97 21	90.0	23 30.5	97 21	89.8	23 59.7	97 21	89.7	85
6	20 22.5	98 21	89.6	20 51.8	98 21	89.5	21 21.0	97 21	89.3	21 50.3	97 21	89.2	22 19.5	97 21	89.1	22 48.8	97 21	89.0	23 18.0	97 21	88.9	23 47.2	97 21	88.7	6
7	20 10.1	98 21	88.6	20 39.3	98 21	88.5	21 08.6	97 21	88.4	21 37.8	97 21	88.2	22 07.1	97 21	88.1	22 36.3	97 21	88.0	23 05.5	97 21	87.9	23 34.7	97 21	87.8	7
8	19 57.6	98 21	87.6	20 26.9	98 21	87.5	20 56.1	97 21	87.4	21 25.4	97 21	87.3	21 54.6	97 21	87.1	22 23.8	97 21	87.0	22 53.1	97 21	86.9	23 22.3	97 21	86.8	8
9	19 45.1	98 21	86.6	20 14.4	98 21	86.5	20 43.7	97 21	86.4	21 12.9	97 21	86.3	21 42.1	97 21	86.2	22 11.4	97 21	86.0	22 40.6	97 21	85.9	23 09.8	97 21	85.8	9
90	19 32.7	98 21	85.7	20 02.0	98 21	85.6	20 31.2	98 21	85.4	21 00.5	97 21	85.3	21 29.7	97 21	85.2	21 58.9	97 21	85.1	22 28.2	97 21	85.0	22 57.4	97 21	84.8	90

H.A.	20° 00′			20° 30′			21° 00′			21° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	19 20.3	98 21	84.7	19 49.5	98 21	84.6	20 18.8	98 21	84.5	20 48.0	97 21	84.3
2	19 07.9	98 21	83.7	19 37.1	98 21	83.6	20 06.4	98 21	83.5	20 35.6	98 21	83.4
3	18 55.5	98 21	82.8	19 24.7	98 21	82.6	19 54.0	98 21	82.5	20 23.3	98 21	82.4
4	18 43.1	98 21	81.8	19 12.4	98 21	81.7	19 41.6	98 21	81.6	20 10.9	98 21	81.4
95	18 30.8	98 20	80.8	19 00.0	98 20	80.7	19 29.3	98 20	80.6	19 58.6	98 20	80.5
6	18 18.5	98 20	79.9	18 47.8	98 20	79.7	19 17.0	98 20	79.6	19 46.3	98 20	79.5
7	18 06.2	98 20	78.9	18 35.5	98 20	78.8	19 04.8	98 20	78.7	19 34.1	98 20	78.5
8	17 54.0	98 20	77.9	18 23.3	98 20	77.8	18 52.6	98 20	77.7	19 21.8	98 20	77.6
9	17 41.8	98 20	77.0	18 11.1	98 20	76.8	18 40.4	98 20	76.7	19 09.7	98 20	76.6
100	17 29.7	98 20	76.0	17 59.0	98 20	75.9	18 28.3	98 20	75.8	18 57.6	98 20	75.7
1	17 17.6	98 20	75.0	17 46.9	98 20	74.9	18 16.2	98 20	74.8	18 45.5	98 20	74.7
2	17 05.6	98 20	74.1	17 34.9	98 20	74.0	18 04.2	98 20	73.9	18 33.5	98 20	73.7
3	16 53.6	98 20	73.1	17 22.9	98 20	73.0	17 52.3	98 20	72.9	18 21.6	98 20	72.8
4	16 41.7	98 20	72.2	17 11.0	98 20	72.0	17 40.4	98 20	71.9	18 09.7	98 20	71.8
105	16 29.9	98 20	71.2	16 59.2	98 20	71.1	17 28.5	98 20	71.0	17 57.9	98 20	70.9
6	16 18.1	98 20	70.2	16 47.4	98 20	70.1	17 16.8	98 20	70.0	17 46.1	98 19	69.9
7	16 06.4	98 19	69.3	16 35.7	98 19	69.2	17 05.1	98 19	69.1	17 34.4	98 19	69.0
8	15 54.8	98 19	68.3	16 24.1	98 19	68.2	16 53.5	98 19	68.1	17 22.8	98 19	68.0
9	15 43.2	98 19	67.4	16 12.6	98 19	67.3	16 41.9	98 19	67.2	17 11.3	98 19	67.1
110	15 31.7	98 19	66.4	16 01.1	98 19	66.3	16 30.5	98 19	66.2	16 59.9	98 19	66.1
1	15 20.3	98 19	65.5	15 49.7	98 19	65.4	16 19.1	98 19	65.3	16 48.5	98 19	65.1
2	15 09.0	98 19	64.5	15 38.4	98 19	64.4	16 07.8	98 19	64.3	16 37.2	98 19	64.2
3	14 57.8	98 19	63.6	15 27.2	98 19	63.5	15 56.6	98 18	63.3	16 26.0	98 18	63.2
4	14 46.7	98 18	62.6	15 16.1	98 18	62.5	15 45.5	98 18	62.4	16 14.9	98 18	62.3
115	14 35.7	98 18	61.6	15 05.1	98 18	61.5	15 34.5	98 18	61.4	16 03.9	98 18	61.3
6	14 24.7	98 18	60.7	14 54.2	98 18	60.6	15 23.6	98 18	60.5	15 53.0	98 18	60.4
7	14 13.9	98 18	59.7	14 43.4	98 18	59.6	15 12.8	98 18	59.5	15 42.2	98 18	59.4
8	14 03.2	98 18	58.8	14 32.7	98 18	58.7	15 02.1	98 18	58.6	15 31.6	98 18	58.5
9	13 52.6	98 18	57.8	14 22.0	98 18	57.7	14 51.5	98 17	57.6	15 21.0	98 17	57.6
120	13 42.1	98 17	56.9	14 11.6	98 17	56.8	14 41.0	98 17	56.7	15 10.5	98 17	56.6
1	13 31.7	98 17	55.9	14 01.2	98 17	55.8	14 30.7	98 17	55.8	15 00.1	98 17	55.7
2	13 21.4	98 17	55.0	13 50.9	98 17	54.9	14 20.4	98 17	54.8	14 49.9	98 17	54.7
3	13 11.2	98 17	54.0	13 40.8	98 17	53.9	14 10.3	98 17	53.9	14 39.8	98 17	53.8
4	13 01.2	98 17	53.1	13 30.7	98 16	53.0	14 00.3	98 16	52.9	14 29.8	98 16	52.8
125	12 51.3	98 16	52.1	13 20.8	98 16	52.1	13 50.4	98 16	52.0	14 19.9	98 16	51.9
6	12 41.5	99 16	51.2	13 11.1	98 16	51.1	13 40.6	98 16	51.0	14 10.2	98 16	50.9
7	12 31.9	99 16	50.2	13 01.4	99 16	50.2	13 31.0	99 16	50.1	14 00.5	99 16	50.0
8	12 22.3	99 16	49.3	12 51.9	99 16	49.2	13 21.5	99 16	49.1	13 51.1	99 16	49.0
9	12 12.9	99 16	48.3	12 42.5	99 15	48.3	13 12.1	99 15	48.2	13 41.7	99 15	48.1
130	12 03.7	99 15	47.4	12 33.3	99 15	47.3	13 02.9	99 15	47.2	13 32.5	99 15	47.1
1	11 54.6	99 15	46.5	12 24.2	99 15	46.4	12 53.8	99 15	46.3	13 23.4	99 15	46.2
2	11 45.6	99 15	45.5	12 15.2	99 15	45.4	12 44.9	99 15	45.3	13 14.5	99 15	45.3
3	11 36.8	99 14	44.6	12 06.4	99 14	44.5	12 36.1	99 14	44.4	13 05.7	99 14	44.3
4	11 28.1	99 14	43.6	11 57.8	99 14	43.5	12 27.4	99 14	43.5	12 57.0	99 14	43.4
135	11 19.6	99 14	42.7	11 49.2	99 14	42.6	12 18.9	99 14	42.5	12 48.6	99 14	42.4
6	11 11.2	99 14	41.7	11 40.9	99 14	41.6	12 10.5	99 14	41.6	12 40.2	99 14	41.5
7	11 03.0	99 13	40.8	11 32.7	99 13	40.7	12 02.3	99 13	40.6	12 32.0	99 13	40.5
8	10 54.9	99 13	39.8	11 24.6	99 13	39.7	11 54.3	99 13	39.7	12 24.0	99 13	39.6
9	10 47.0	99 13	38.9	11 16.7	99 13	38.8	11 46.4	99 13	38.7	12 16.1	99 13	38.7
140	10 39.3	99 13	37.9	11 09.0	99 13	37.9	11 38.7	99 13	37.8	12 08.4	99 13	37.7
1	10 31.7	99 12	37.0	11 01.4	99 12	36.9	11 31.1	99 12	36.8	12 00.9	99 12	36.8
2	10 24.2	99 12	36.0	10 54.0	99 12	36.0	11 23.7	99 12	35.9	11 53.5	99 12	35.8
3	10 17.0	99 12	35.1	10 46.8	99 12	35.0	11 16.5	99 12	35.0	11 46.3	99 12	34.9
4	10 09.9	99 12	34.1	10 39.7	99 12	34.1	11 09.4	99 12	34.0	11 39.2	99 12	33.9
145	10 03.0	99 11	33.2	10 32.8	99 11	33.1	11 02.6	99 11	33.1	11 32.3	99 11	33.0
6	9 56.3	99 11	32.2	10 26.0	99 11	32.2	10 55.8	99 11	32.1	11 25.6	99 11	32.1
7	9 49.7	99 11	31.3	10 19.5	99 11	31.2	10 49.3	99 11	31.2	11 19.1	99 11	31.1
8	9 43.3	99 10	30.3	10 13.1	99 10	30.3	10 42.9	99 10	30.2	11 12.7	99 10	30.2
9	9 37.1	99 10	29.4	10 06.9	99 10	29.3	10 36.7	99 10	29.3	11 06.5	99 10	29.2
150	9 31.0	99 10	28.5	10 00.9	99 10	28.4	10 30.7	99 10	28.3	11 00.5	99 10	28.3
1	9 25.2	99 09	27.5	9 55.0	99 09	27.5	10 24.9	99 09	27.4	10 54.7	99 09	27.3
2	9 19.5	1.0 09	26.6	9 49.4	1.0 09	26.5	10 19.2	1.0 09	26.5	10 49.1	1.0 09	26.4
3	9 14.0	1.0 09	25.6	9 43.9	1.0 09	25.6	10 13.8	1.0 09	25.5	10 43.6	1.0 09	25.5
4	9 08.7	1.0 09	24.7	9 38.6	1.0 08	24.6	10 08.5	1.0 08	24.6	10 38.4	1.0 08	24.5
155	9 03.6	1.0 08	23.7	9 33.5	1.0 08	23.7	10 03.4	1.0 08	23.6	10 33.3	1.0 08	23.6
6	8 58.7	1.0 08	22.8	9 28.6	1.0 08	22.7	9 58.5	1.0 08	22.7	10 28.4	1.0 08	22.6
7	8 54.0	1.0 08	21.8	9 23.9	1.0 08	21.8	9 53.8	1.0 08	21.7	10 23.7	1.0 08	21.7
8	8 49.4	1.0 07	20.9	9 19.3	1.0 07	20.8	9 49.3	1.0 07	20.8	10 19.2	1.0 07	20.7
9	8 45.1	1.0 07	19.9	9 15.0	1.0 07	19.9	9 44.9	1.0 07	19.8	10 14.8	1.0 07	19.8
160	8 40.9	1.0 07	19.0	9 10.9	1.0 07	18.9	9 40.8	1.0 07	18.9	10 10.7	1.0 07	18.9
1	8 37.0	1.0 06	18.0	9 06.9	1.0 06	18.0	9 36.8	1.0 06	18.0	10 06.8	1.0 06	17.9
2	8 33.2	1.0 06	17.1	9 03.2	1.0 06	17.0	9 33.1	1.0 06	17.0	10 03.0	1.0 06	17.0
3	8 29.7	1.0 06	16.1	8 59.6	1.0 06	16.1	9 29.5	1.0 06	16.1	9 59.5	1.0 06	16.0
4	8 26.3	1.0 05	15.2	8 56.2	1.0 05	15.2	9 26.2	1.0 05	15.1	9 56.1	1.0 05	15.1
165	8 23.1	1.0 05	14.2	8 53.1	1.0 05	14.2	9 23.0	1.0 05	14.2	9 53.0	1.0 05	14.1
6	8 20.2	1.0 05	13.3	8 50.1	1.0 05	13.3	9 20.1	1.0 05	13.2	9 50.0	1.0 05	13.2
7	8 17.4	1.0 04	12.3	8 47.4	1.0 04	12.3	9 17.3	1.0 04	12.3	9 47.3	1.0 04	12.3
8	8 14.8	1.0 04	11.4	8 44.8	1.0 04	11.4	9 14.8	1.0 04	11.3	9 44.7	1.0 04	11.3
9	8 12.5	1.0 04	10.4	8 42.4	1.0 04	10.4	9 12.4	1.0 04	10.4	9 42.4	1.0 04	10.4
170	8 10.3	1.0 03	09.5	8 40.3	1.0 03	09.5	9 10.3	1.0 03	09.5	9 40.2	1.0 03	09.4
1	8 08.4	1.0 03	08.5	8 38.3	1.0 03	08.5	9 08.3	1.0 03	08.5	9 38.3	1.0 03	08.5
2	8 06.6	1.0 03	07.6	8 36.6	1.0 03	07.6	9 06.6	1.0 03	07.6	9 36.6	1.0 03	07.5
3	8 05.1	1.0 02	06.6	8 35.0	1.0 02	06.6	9 05.0	1.0 02	06.6	9 35.0	1.0 02	06.6
4	8 03.7	1.0 02	05.7	8 33.7	1.0 02	05.7	9 03.7	1.0 02	05.7	9 33.7	1.0 02	05.7
175	8 02.6	1.0 02	04.7	8 32.6	1.0 02	04.7	9 02.6	1.0 02	04.7	9 32.6	1.0 02	04.7
6	8 01.7	1.0 01	03.8	8 31.6	1.0 01	03.8	9 01.6	1.0 01	03.8	9 31.6	1.0 01	03.8
7	8 00.9	1.0 01	02.8	8 30.9	1.0 01	02.8	9 00.9	1.0 01	02.8	9 30.9	1.0 01	02.8
8	8 00.4	1.0 01	01.9	8 30.4	1.0 01	01.9	9 00.4	1.0 01	01.9	9 30.4	1.0 01	01.9
9	8 00.1	1.0 00	00.9	8 30.1	1.0 00	00.9	9 00.1	1.0 00	00.9	9 30.1	1.0 00	00.9
180	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0

22° 00′			22° 30′			23° 00′			23° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
21 17.3	97 21	84.2	21 46.5	97 21	84.1	22 15.8	97 21	84.0	22 45.0	97 21	83.9	91
21 04.9	97 21	83.3	21 34.1	97 21	83.1	22 03.4	97 21	83.0	22 32.6	97 21	82.9	2
20 52.5	97 21	82.3	21 21.8	97 21	82.2	21 51.0	97 21	82.1	22 20.2	97 21	81.9	3
20 40.2	98 20	81.3	21 09.4	97 21	81.2	21 38.7	97 20	81.1	22 07.9	97 20	81.0	4
20 27.8	98 20	80.4	20 57.1	98 20	80.2	21 26.3	97 20	80.1	21 55.6	97 20	80.0	95
20 15.6	98 20	79.4	20 44.8	98 20	79.3	21 14.1	98 20	79.2	21 43.3	97 20	79.0	6
20 03.3	98 20	78.4	20 32.6	98 20	78.3	21 01.8	98 20	78.2	21 31.1	98 20	78.1	7
19 51.1	98 20	77.5	20 20.4	98 20	77.4	20 49.7	98 20	77.2	21 18.9	98 20	77.1	8
19 39.0	98 20	76.5	20 08.2	98 20	76.4	20 37.5	98 20	76.3	21 06.8	98 20	76.2	9
19 26.9	98 20	75.5	19 56.1	98 20	75.4	20 25.4	98 20	75.3	20 54.7	98 20	75.2	100
19 14.8	98 20	74.6	19 44.1	98 20	74.5	20 13.4	98 20	74.4	20 42.7	98 20	74.2	1
19 02.8	98 20	73.6	19 32.1	98 20	73.5	20 01.4	98 20	73.4	20 30.7	98 20	73.3	2
18 50.9	98 20	72.7	19 20.2	98 20	72.6	19 49.5	98 20	72.4	20 18.8	98 20	72.3	3
18 39.0	98 20	71.7	19 08.3	98 20	71.6	19 37.6	98 20	71.5	20 06.9	98 20	71.4	4
18 27.2	98 20	70.8	18 56.5	98 20	70.6	19 25.8	98 20	70.5	19 55.1	98 20	70.4	105
18 15.4	98 19	69.8	18 44.8	98 19	69.7	19 14.1	98 19	69.6	19 43.4	98 19	69.5	6
18 03.8	98 19	68.8	18 33.1	98 19	68.7	19 02.4	98 19	68.6	19 31.8	98 19	68.5	7
17 52.2	98 19	67.9	18 21.5	98 19	67.8	18 50.9	98 19	67.7	19 20.2	98 19	67.6	8
17 40.7	98 19	66.9	18 10.0	98 19	66.8	18 39.4	98 19	66.7	19 08.7	98 19	66.6	9
17 29.2	98 19	66.0	17 58.6	98 19	65.9	18 27.9	98 19	65.8	18 57.3	98 19	65.7	110
17 17.9	98 19	65.0	17 47.2	98 19	64.9	18 16.6	98 18	64.8	18 46.0	98 19	64.7	1
17 06.6	98 19	64.1	17 36.0	98 19	64.0	18 05.4	98 19	63.9	18 34.7	98 19	63.8	2
16 55.4	98 18	63.1	17 24.8	98 18	63.0	17 54.2	98 18	62.9	18 23.6	98 18	62.8	3
16 44.3	98 18	62.2	17 13.7	98 18	62.1	17 43.1	98 18	62.0	18 12.5	98 18	61.9	4
16 33.4	98 18	61.2	17 02.8	98 18	61.1	17 32.2	98 18	61.0	18 01.6	98 18	60.9	115
16 22.5	98 18	60.3	16 51.9	98 18	60.2	17 21.3	98 18	60.1	17 50.7	98 18	60.0	6
16 11.7	98 18	59.3	16 41.1	98 18	59.2	17 10.6	98 18	59.1	17 40.0	98 18	59.0	7
16 01.0	98 18	58.4	16 30.5	98 18	58.3	16 59.9	98 18	58.2	17 29.3	98 18	58.1	8
15 50.4	98 17	57.5	16 19.9	98 17	57.4	16 49.4	98 17	57.3	17 18.8	98 17	57.2	9
15 40.0	98 17	56.5	16 09.4	98 17	56.4	16 38.9	98 17	56.3	17 08.4	98 17	56.2	120
15 29.6	98 17	55.6	15 59.1	98 17	55.5	16 28.6	98 17	55.4	16 58.1	98 17	55.3	1
15 19.4	98 17	54.6	15 48.9	98 17	54.5	16 18.4	98 17	54.4	16 47.9	98 17	54.3	2
15 09.3	98 17	53.7	15 38.8	98 17	53.6	16 08.3	98 17	53.5	16 37.8	98 17	53.4	3
14 59.3	98 16	52.7	15 28.8	98 16	52.6	15 58.3	98 16	52.5	16 27.8	98 16	52.4	4
14 49.4	98 16	51.8	15 19.0	98 16	51.7	15 48.5	98 16	51.6	16 18.0	98 16	51.5	125
14 39.7	98 16	50.8	15 09.2	98 16	50.7	15 38.8	98 16	50.7	16 08.3	98 16	50.6	6
14 30.1	99 16	49.9	14 59.7	99 16	49.8	15 29.2	99 16	49.7	15 58.8	98 16	49.6	7
14 20.6	99 16	49.0	14 50.2	99 16	48.9	15 19.8	99 16	48.8	15 49.3	99 16	48.7	8
14 11.3	99 15	48.0	14 40.9	99 15	47.9	15 10.4	99 15	47.8	15 40.0	99 15	47.7	9
14 02.1	99 15	47.1	14 31.7	99 15	47.0	15 01.3	99 15	46.9	15 30.9	99 15	46.8	130
13 53.0	99 15	46.1	14 22.6	99 15	46.0	14 52.2	99 15	46.0	15 21.8	99 15	45.9	1
13 44.1	99 15	45.2	14 13.7	99 15	45.1	14 43.3	99 15	45.0	15 12.9	99 15	44.9	2
13 35.3	99 14	44.2	14 05.0	99 14	44.2	14 34.6	99 14	44.1	15 04.2	99 14	44.0	3
13 26.7	99 14	43.3	13 56.3	99 14	43.2	14 26.0	99 14	43.1	14 55.6	99 14	43.1	4
13 18.2	99 14	42.4	13 47.9	99 14	42.3	14 17.5	99 14	42.2	14 47.2	99 14	42.1	135
13 09.9	99 14	41.4	13 39.6	99 14	41.3	14 09.2	99 14	41.3	14 38.9	99 14	41.2	6
13 01.7	99 13	40.5	13 31.4	99 13	40.4	14 01.1	99 13	40.3	14 30.7	99 13	40.2	7
12 53.7	99 13	39.5	13 23.4	99 13	39.5	13 53.1	99 13	39.4	14 22.8	99 13	39.3	8
12 45.8	99 13	38.6	13 15.5	99 13	38.5	13 45.2	99 13	38.4	14 14.9	99 13	38.4	9
12 38.1	99 13	37.6	13 07.8	99 13	37.6	13 37.6	99 13	37.5	14 07.3	99 12	37.4	140
12 30.6	99 12	36.7	13 00.3	99 12	36.6	13 30.1	99 12	36.6	13 59.8	99 12	36.5	1
12 23.2	99 12	35.8	12 53.0	99 12	35.7	13 22.7	99 12	35.6	13 52.4	99 12	35.6	2
12 16.0	99 12	34.8	12 45.8	99 12	34.8	13 15.5	99 12	34.7	13 45.3	99 12	34.6	3
12 09.0	99 11	33.9	12 38.7	99 11	33.8	13 08.5	99 11	33.8	13 38.3	99 11	33.7	4
12 02.1	99 11	32.9	12 31.9	99 11	32.9	13 01.7	99 11	32.8	13 31.4	99 11	32.8	145
11 55.4	99 11	32.0	12 25.2	99 11	31.9	12 55.0	99 11	31.9	13 24.8	99 11	31.8	6
11 48.9	99 11	31.1	12 18.7	99 11	31.0	12 48.5	99 11	30.9	13 18.3	99 11	30.9	7
11 42.5	99 10	30.1	12 12.3	99 10	30.1	12 42.2	99 10	30.0	13 12.0	99 10	29.9	8
11 36.4	99 10	29.2	12 06.2	99 10	29.1	12 36.0	99 10	29.1	13 05.8	99 10	29.0	9
11 30.4	99 10	28.2	12 00.2	99 10	28.2	12 30.0	99 10	28.1	12 59.9	99 10	28.1	150
11 24.6	99 09	27.3	11 54.4	99 09	27.2	12 24.2	99 09	27.2	12 54.1	99 09	27.1	1
11 18.9	1.0 09	26.4	11 48.8	1.0 09	26.3	12 18.6	99 09	26.3	12 48.5	99 09	26.2	2
11 13.5	1.0 09	25.4	11 43.3	1.0 09	25.4	12 13.2	1.0 09	25.3	12 43.1	1.0 09	25.3	3
11 08.2	1.0 08	24.5	11 38.1	1.0 08	24.4	12 08.0	1.0 08	24.4	12 37.8	1.0 08	24.3	4
11 03.2	1.0 08	23.5	11 33.0	1.0 08	23.5	12 02.9	1.0 08	23.4	12 32.8	1.0 08	23.4	155
10 58.3	1.0 08	22.6	11 28.2	1.0 08	22.5	11 58.0	1.0 08	22.5	12 27.9	1.0 08	22.5	6
10 53.6	1.0 08	21.6	11 23.5	1.0 08	21.6	11 53.4	1.0 08	21.6	12 23.3	1.0 07	21.5	7
10 49.1	1.0 07	20.7	11 19.0	1.0 07	20.7	11 48.9	1.0 07	20.6	12 18.8	1.0 07	20.6	8
10 44.7	1.0 07	19.8	11 14.7	1.0 07	19.7	11 44.6	1.0 07	19.7	12 14.5	1.0 07	19.7	9
10 40.6	1.0 07	18.8	11 10.5	1.0 07	18.8	11 40.5	1.0 07	18.8	12 10.4	1.0 06	18.7	160
10 36.7	1.0 06	17.9	11 06.6	1.0 06	17.9	11 36.6	1.0 06	17.8	12 06.5	1.0 06	17.8	1
10 33.0	1.0 06	16.9	11 02.9	1.0 06	16.9	11 32.8	1.0 06	16.9	12 02.8	1.0 06	16.8	2
10 29.4	1.0 06	16.0	10 59.4	1.0 06	16.0	11 29.3	1.0 06	15.9	11 59.3	1.0 06	15.9	3
10 26.1	1.0 05	15.1	10 56.0	1.0 05	15.0	11 26.0	1.0 05	15.0	11 55.9	1.0 05	15.0	4
10 22.9	1.0 05	14.1	10 52.9	1.0 05	14.1	11 22.9	1.0 05	14.1	11 52.8	1.0 05	14.0	165
10 20.0	1.0 05	13.2	10 50.0	1.0 05	13.2	11 19.9	1.0 05	13.1	11 49.9	1.0 05	13.1	6
10 17.3	1.0 04	12.2	10 47.2	1.0 04	12.2	11 17.2	1.0 04	12.2	11 47.2	1.0 04	12.2	7
10 14.7	1.0 04	11.3	10 44.7	1.0 04	11.3	11 14.7	1.0 04	11.3	11 44.6	1.0 04	11.2	8
10 12.4	1.0 04	10.4	10 42.3	1.0 04	10.3	11 12.3	1.0 04	10.3	11 42.3	1.0 04	10.3	9
10 10.2	1.0 03	09.4	10 40.2	1.0 03	09.4	11 10.2	1.0 03	09.4	11 40.2	1.0 03	09.4	170
10 08.3	1.0 03	08.5	10 38.3	1.0 03	08.5	11 08.3	1.0 03	08.4	11 38.2	1.0 03	08.4	1
10 06.5	1.0 03	07.5	10 36.5	1.0 03	07.5	11 06.5	1.0 03	07.5	11 36.5	1.0 03	07.5	2
10 05.0	1.0 02	06.6	10 35.0	1.0 02	06.6	11 05.0	1.0 02	06.6	11 35.0	1.0 02	06.6	3
10 03.7	1.0 02	05.6	10 33.7	1.0 02	05.6	11 03.7	1.0 02	05.6	11 33.7	1.0 02	05.6	4
10 02.6	1.0 02	04.7	10 32.6	1.0 02	04.7	11 02.5	1.0 02	04.7	11 32.5	1.0 02	04.7	175
10 01.6	1.0 01	03.8	10 31.6	1.0 01	03.8	11 01.6	1.0 01	03.8	11 31.6	1.0 01	03.7	6
10 00.9	1.0 01	02.8	10 30.9	1.0 01	02.8	11 00.9	1.0 01	02.8	11 30.9	1.0 01	02.8	7
10 00.4	1.0 01	01.9	10 30.4	1.0 01	01.9	11 00.4	1.0 01	01.9	11 30.4	1.0 00	01.9	8
10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	9
10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 78°

H.A.	24° 00′ Alt.	Az.	24° 30′ Alt.	Az.	25° 00′ Alt.	Az.	25° 30′ Alt.	Az.	26° 00′ Alt.	Az.	26° 30′ Alt.	Az.	27° 00′ Alt.	Az.	27° 30′ Alt.	Az.	H.A.
°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	′ Δd Δt	°	°
00	36 00.0 1.0 00	180.0	36 30.0 1.0 00	180.0	37 00.0 1.0 00	180.0	37 30.0 1.0 00	180.0	38 00.0 1.0 00	180.0	38 30.0 1.0 00	180.0	39 00.0 1.0 00	180.0	39 30.0 1.0 00	180.0	00
1	35 59.9 1.0 01	178.9	36 29.9 1.0 01	178.9	36 59.9 1.0 01	178.9	37 29.9 1.0 01	178.9	37 59.9 1.0 01	178.9	38 29.9 1.0 01	178.9	38 59.9 1.0 01	178.9	39 29.9 1.0 01	178.9	1
2	35 59.5 1.0 01	177.7	36 29.5 1.0 01	177.7	36 59.5 1.0 01	177.7	37 29.5 1.0 01	177.7	37 59.5 1.0 01	177.7	38 29.5 1.0 01	177.7	38 59.5 1.0 01	177.7	39 29.5 1.0 01	177.7	2
3	35 58.9 1.0 01	176.6	36 28.9 1.0 01	176.6	36 58.9 1.0 01	176.6	37 28.9 1.0 01	176.6	37 58.9 1.0 01	176.6	38 28.9 1.0 01	176.6	38 58.9 1.0 01	176.6	39 28.9 1.0 01	176.6	3
4	35 58.8 1.0 02	175.5	36 28.8 1.0 02	175.5	36 58.8 1.0 02	175.5	37 28.8 1.0 02	175.5	37 58.8 1.0 02	175.4	38 28.8 1.0 02	175.4	38 58.8 1.0 02	175.4	39 28.8 1.0 02	175.4	4
05	35 56.9 1.0 02	174.4	36 26.9 1.0 02	174.3	36 56.9 1.0 02	174.3	37 26.9 1.0 02	174.3	37 56.9 1.0 02	174.3	38 26.9 1.0 02	174.3	38 56.9 1.0 02	174.3	39 26.9 1.0 02	174.3	05
6	35 55.6 1.0 03	173.2	36 25.6 1.0 03	173.2	36 55.6 1.0 03	173.2	37 25.5 1.0 03	173.2	37 55.5 1.0 03	173.2	38 25.5 1.0 03	173.1	38 55.5 1.0 03	173.1	39 25.5 1.0 03	173.1	6
7	35 54.0 1.0 03	172.1	36 24.0 1.0 03	172.1	36 54.0 1.0 03	172.1	37 23.9 1.0 03	172.0	37 53.9 1.0 03	172.0	38 23.9 1.0 03	172.0	38 53.9 1.0 03	172.0	39 23.9 1.0 03	172.0	7
8	35 52.2 1.0 03	171.0	36 22.1 1.0 03	171.0	36 52.1 1.0 03	170.9	37 22.1 1.0 04	170.9	37 52.1 1.0 03	170.9	38 22.1 1.0 04	170.9	38 52.0 1.0 04	170.8	39 22.0 1.0 04	170.8	8
9	35 50.1 1.0 04	169.8	36 20.0 1.0 04	169.8	36 50.0 1.0 04	169.8	37 20.0 1.0 04	169.8	37 50.0 1.0 04	169.7	38 19.9 1.0 04	169.7	38 49.9 1.0 04	169.7	39 19.9 1.0 04	169.7	9
10	35 47.8 1.0 04	168.7	36 17.7 1.0 04	168.7	36 47.7 1.0 04	168.7	37 17.7 1.0 04	168.6	37 47.6 1.0 04	168.6	38 17.6 1.0 04	168.6	38 47.6 1.0 04	168.6	39 17.5 1.0 04	168.5	10
1	35 45.2 1.0 05	167.6	36 15.2 1.0 05	167.6	36 45.1 1.0 05	167.5	37 15.1 1.0 05	167.5	37 45.0 1.0 05	167.5	38 15.0 1.0 05	167.4	38 45.0 1.0 05	167.4	39 14.9 1.0 05	167.4	1
2	35 42.4 1.0 05	166.5	36 12.4 1.0 05	166.4	36 42.3 1.0 05	166.4	37 12.3 1.0 05	166.4	37 42.2 1.0 05	166.3	38 12.2 1.0 05	166.3	38 42.1 1.0 05	166.3	39 12.1 1.0 05	166.2	2
3	35 39.4 1.0 05	165.3	36 09.3 1.0 05	165.3	36 39.3 1.0 06	165.3	37 09.2 1.0 05	165.2	37 39.2 1.0 06	165.2	38 09.1 1.0 06	165.2	38 39.0 1.0 06	165.1	39 09.0 1.0 06	165.1	3
4	35 36.1 1.0 06	164.2	36 06.0 1.0 06	164.2	36 36.0 1.0 06	164.2	37 05.9 1.0 06	164.1	37 35.8 1.0 06	164.1	38 05.8 1.0 06	164.0	38 35.7 1.0 06	164.0	39 05.7 1.0 06	163.9	4
15	35 32.6 1.0 06	163.1	36 02.5 1.0 06	163.1	36 32.4 1.0 06	163.0	37 02.4 1.0 06	163.0	37 32.3 1.0 06	162.9	38 02.2 1.0 06	162.9	38 32.2 1.0 06	162.9	39 02.1 1.0 06	162.8	15
6	35 28.8 1.0 07	162.0	35 58.8 1.0 07	161.9	36 28.7 1.0 07	161.9	36 58.6 1.0 07	161.9	37 28.5 1.0 07	161.8	37 58.5 1.0 07	161.8	38 28.4 1.0 07	161.7	38 58.3 1.0 07	161.7	6
7	35 24.9 1.0 07	160.9	35 54.8 1.0 07	160.8	36 24.7 1.0 07	160.8	36 54.6 1.0 07	160.7	37 24.5 1.0 07	160.7	37 54.4 1.0 07	160.6	38 24.3 1.0 07	160.6	38 54.3 1.0 07	160.5	7
8	35 20.7 1.0 07	159.8	35 50.6 1.0 07	159.7	36 20.5 1.0 07	159.7	36 50.4 1.0 07	159.6	37 20.3 1.0 07	159.6	37 50.2 1.0 07	159.5	38 20.1 1.0 08	159.5	38 50.0 1.0 08	159.4	8
9	35 16.2 1.0 08	158.6	35 46.1 1.0 08	158.6	36 16.0 1.0 08	158.5	36 45.9 1.0 08	158.5	37 15.8 1.0 08	158.4	37 45.7 1.0 08	158.4	38 15.6 1.0 08	158.3	38 45.5 1.0 08	158.3	9
20	35 11.6 1.0 08	157.5	35 41.5 1.0 08	157.5	36 11.3 1.0 08	157.4	36 41.2 1.0 08	157.4	37 11.1 1.0 08	157.3	37 41.0 1.0 08	157.2	38 10.9 1.0 08	157.2	38 40.7 1.0 08	157.1	20
1	35 06.7 1.0 08	156.4	35 36.6 1.0 09	156.4	36 06.4 1.0 09	156.3	36 36.3 1.0 09	156.2	37 06.2 1.0 09	156.2	37 36.0 1.0 09	156.1	38 05.9 1.0 09	156.1	38 35.8 1.0 09	156.0	1
2	35 01.6 1.0 09	155.3	35 31.5 1.0 09	155.2	36 01.3 1.0 09	155.2	36 31.2 1.0 09	155.1	37 01.0 1.0 09	155.1	37 30.9 1.0 09	155.0	38 00.7 1.0 09	154.9	38 30.6 1.0 09	154.9	2
3	34 56.3 1.0 09	154.2	35 26.1 1.0 09	154.1	35 56.0 99 09	154.1	36 25.8 99 09	154.0	36 55.7 99 09	153.9	37 25.5 99 09	153.9	37 55.3 99 09	153.8	38 25.2 99 09	153.7	3
4	34 50.7 99 10	153.1	35 20.6 99 10	153.0	35 50.4 99 10	153.0	36 20.2 99 10	152.9	36 50.1 99 10	152.8	37 19.9 99 10	152.8	37 49.7 99 10	152.7	38 19.6 99 10	152.6	4
25	34 45.0 99 10	152.0	35 14.8 99 10	151.9	35 44.6 99 10	151.8	36 14.4 99 10	151.8	36 44.3 99 10	151.7	37 14.1 99 10	151.6	37 43.9 99 10	151.6	38 13.7 99 10	151.5	25
6	34 39.0 99 10	150.9	35 08.8 99 10	150.8	35 38.6 99 10	150.7	36 08.4 99 10	150.7	36 38.2 99 10	150.6	37 08.0 99 10	150.5	37 37.9 99 10	150.4	38 07.7 99 10	150.4	6
7	34 32.8 99 11	149.8	35 02.6 99 11	149.7	35 32.4 99 11	149.6	36 02.2 99 11	149.6	36 32.0 99 11	149.5	37 01.8 99 11	149.4	37 31.6 99 11	149.3	38 01.4 99 11	149.3	7
8	34 26.4 99 11	148.7	34 56.2 99 11	148.6	35 26.0 99 11	148.5	35 55.8 99 11	148.4	36 25.6 99 11	148.4	36 55.4 99 11	148.3	37 25.1 99 11	148.2	37 54.9 99 11	148.1	8
9	34 19.9 99 11	147.6	34 49.6 99 11	147.5	35 19.4 99 11	147.4	35 49.2 99 11	147.3	36 18.9 99 11	147.3	36 48.7 99 11	147.2	37 18.5 99 11	147.1	37 48.2 99 12	147.0	9
30	34 13.1 99 12	146.5	34 42.8 99 12	146.4	35 12.6 99 12	146.3	35 42.3 99 12	146.2	36 12.1 99 12	146.2	36 41.8 99 12	146.1	37 11.6 99 12	146.0	37 41.3 99 12	145.9	30
1	34 06.1 99 12	145.4	34 35.8 99 12	145.3	35 05.6 99 12	145.2	35 35.3 99 12	145.1	36 05.0 99 12	145.1	36 34.8 99 12	145.0	37 04.5 99 12	144.9	37 34.2 99 12	144.8	1
2	33 58.9 99 12	144.3	34 28.6 99 12	144.2	34 58.3 99 12	144.1	35 28.1 99 12	144.0	35 57.8 99 12	144.0	36 27.5 99 12	143.9	36 57.2 99 12	143.8	37 26.9 99 12	143.7	2
3	33 51.5 99 13	143.2	34 21.2 99 13	143.1	34 50.9 99 13	143.0	35 20.6 99 13	142.9	35 50.4 99 13	142.9	36 20.1 99 13	142.8	36 49.8 99 13	142.7	37 19.5 99 13	142.6	3
4	33 43.9 99 13	142.1	34 13.6 99 13	142.0	34 43.3 99 13	141.9	35 13.0 99 13	141.8	35 42.7 99 13	141.8	36 12.4 99 13	141.7	36 42.1 99 13	141.6	37 11.8 99 13	141.5	4
35	33 36.2 99 13	141.0	34 05.9 99 13	140.9	34 35.6 99 13	140.8	35 05.2 99 13	140.8	35 34.9 99 13	140.7	36 04.6 99 13	140.6	36 34.3 99 13	140.5	37 03.9 99 13	140.4	35
6	33 28.2 99 14	139.9	33 57.9 99 14	139.8	34 27.6 99 14	139.8	34 57.3 99 14	139.7	35 26.9 99 14	139.6	35 56.6 99 14	139.5	36 26.2 99 14	139.4	36 55.9 99 14	139.3	6
7	33 20.1 99 14	138.8	33 49.8 99 14	138.8	34 19.4 99 14	138.7	34 49.1 99 14	138.6	35 18.7 99 14	138.5	35 48.4 99 14	138.4	36 18.0 99 14	138.3	36 47.7 99 14	138.2	7
8	33 11.8 99 14	137.8	33 41.5 99 14	137.7	34 11.1 99 14	137.6	34 40.7 99 14	137.5	35 10.4 99 14	137.4	35 40.0 99 14	137.3	36 09.6 99 14	137.2	36 39.2 99 14	137.1	8
9	33 03.4 99 14	136.7	33 33.0 99 14	136.6	34 02.6 99 14	136.5	34 32.2 99 14	136.4	35 01.8 99 14	136.3	35 31.5 99 15	136.2	36 01.1 99 15	136.1	36 30.7 99 15	136.0	9
40	32 54.7 99 15	135.6	33 24.3 99 15	135.5	33 53.9 99 15	135.4	34 23.5 99 15	135.3	34 53.1 99 15	135.2	35 22.7 99 15	135.1	35 52.3 99 15	135.0	36 21.9 99 15	134.9	40
1	32 45.9 99 15	134.5	33 15.5 99 15	134.4	33 45.1 99 15	134.3	34 14.7 99 15	134.2	34 44.3 99 15	134.1	35 13.9 99 15	134.0	35 43.4 99 15	133.9	36 13.0 99 15	133.8	1
2	32 36.9 99 15	133.5	33 06.5 99 15	133.4	33 36.1 99 15	133.3	34 05.7 99 15	133.2	34 35.2 99 15	133.1	35 04.8 99 15	133.0	35 34.4 99 15	132.9	36 03.9 99 15	132.8	2
3	32 27.8 99 15	132.4	32 57.4 99 16	132.3	33 26.9 99 16	132.2	33 56.5 99 16	132.1	34 26.1 99 16	132.0	34 55.6 99 16	131.9	35 25.1 99 16	131.8	35 54.7 99 16	131.7	3
4	32 18.5 99 16	131.3	32 48.1 99 16	131.2	33 17.6 99 16	131.1	33 47.2 99 16	131.0	34 16.7 99 16	130.9	34 46.2 99 16	130.8	35 15.8 99 16	130.7	35 45.3 99 16	130.6	4
45	32 09.1 98 16	130.3	32 38.6 98 16	130.2	33 08.1 98 16	130.1	33 37.7 98 16	130.0	34 07.2 98 16	129.9	34 36.7 98 16	129.7	35 06.2 98 16	129.6	35 35.7 98 16	129.5	45
6	31 59.5 98 16	129.2	32 29.0 98 16	129.1	32 58.5 98 16	129.0	33 28.0 98 16	128.9	33 57.6 98 16	128.8	34 27.1 98 16	128.7	34 56.6 98 16	128.6	35 26.1 98 16	128.5	6
7	31 49.7 98 16	128.2	32 19.2 98 16	128.0	32 48.8 98 16	127.9	33 18.3 98 17	127.8	33 47.8 98 17	127.7	34 17.2 98 17	127.6	34 46.7 98 17	127.5	35 16.2 98 17	127.4	7
8	31 39.9 98 17	127.1	32 09.4 98 17	127.0	32 38.8 98 17	126.9	33 08.3 98 17	126.8	33 37.8 98 17	126.7	34 07.3 98 17	126.5	34 36.8 98 17	126.4	35 06.2 98 17	126.3	8
9	31 29.8 98 17	126.0	31 59.3 98 17	125.9	32 28.8 98 17	125.8	32 58.3 98 17	125.7	33 27.7 98 17	125.6	33 57.2 98 17	125.5	34 26.7 98 17	125.4	34 56.1 98 17	125.3	9
50	31 19.7 98 17	125.0	31 49.2 98 17	124.9	32 18.6 98 17	124.8	32 48.1 98 17	124.7	33 17.5 98 17	124.5	33 47.0 98 17	124.4	34 16.4 98 17	124.3	34 45.9 98 17	124.2	50
1	31 09.4 98 17	123.9	31 38.9 98 17	123.8	32 08.3 98 17	123.7	32 37.8 98 17	123.6	33 07.2 98 17	123.5	33 36.6 98 17	123.4	34 06.1 98 17	123.3	34 35.5 98 18	123.1	1
2	30 59.0 98 18	122.9	31 28.4 98 18	122.8	31 57.9 98 18	122.7	32 27.3 98 18	122.6	32 56.7 98 18	122.4	33 26.1 98 18	122.3	33 55.6 98 18	122.2	34 25.0 98 18	122.1	2
3	30 48.4 98 18	121.8	31 17.9 98 18	121.7	31 47.3 98 18	121.6	32 16.7 98 18	121.5	32 46.1 98 18	121.4	33 15.5 98 18	121.3	33 44.9 98 18	121.2	34 14.3 98 18	121.0	3
4	30 37.8 98 18	120.8	31 07.2 98 18	120.7	31 36.6 98 18	120.6	32 06.0 98 18	120.5	32 35.4 98 18	120.3	33 04.8 98 18	120.2	33 34.2 98 18	120.1	34 03.6 98 18	120.0	4
55	30 27.0 98 18	119.8	30 56.4 98 18	119.6	31 25.8 98 18	119.5	31 55.2 98 18	119.4	32 24.6 98 18	119.3	32 54.0 98 18	119.2	33 23.4 98 18	119.1	33 52.7 98 18	118.9	55
6	30 16.1 98 18	118.7	30 45.5 98 18	118.6	31 14.9 98 18	118.5	31 44.3 98 18	118.4	32 13.7 98 18	118.3	32 43.0 98 18	118.1	33 12.4 98 18	118.0	33 41.8 98 18	117.9	6
7	30 05.1 98 18	117.7	30 34.5 98 19	117.6	31 03.9 98 19	117.5	31 33.3 98 19	117.3	32 02.6 98 19	117.2	32 32.0 98 19	117.1	33 01.3 98 19	117.0	33 30.7 98 19	116.8	7
8	29 54.0 98 19	116.7	30 23.4 98 19	116.5	30 52.8 98 19	116.4	31 22.1 98 19	116.3	31 51.5 98 19	116.2	32 20.8 98 19	116.1	32 50.2 98 19	115.9	33 19.5 98 19	115.8	8
9	29 42.8 98 19	115.6	30 12.2 98 19	115.5	30 41.6 98 19	115.4	31 10.9 98 19	115.3	31 40.2 98 19	115.1	32 09.6 98 19	115.0	32 38.9 98 19	114.9	33 08.2 98 19	114.8	9
60	29 31.6 98 19	114.6	30 00.9 98 19	114.5	30 30.2 98 19	114.4	30 59.6 98 19	114.2	31 28.9 98 19	114.1	31 58.2 98 19	114.0	32 27.5 98 19	113.9	32 56.8 98 19	113.7	60
1	29 20.2 98 19	113.6	29 49.5 98 19	113.5	30 18.8 98 19	113.3	30 48.2 98 19	113.2	31 17.5 98 19	113.1	31 46.8 98 19	113.0	32 16.1 98 19	112.8	32 45.4 98 19	112.7	1
2	29 08.7 98 19	112.6	29 38.0 98 19	112.4	30 07.3 98 19	112.3	30 36.6 98 19	112.2	31 06.0 98 19	112.1	31 35.3 98 19	111.9	32 04.5 98 19	111.8	32 33.8 98 19	111.7	2
3	28 57.1 98 19	111.5	29 26.4 98 19	111.4	29 55.8 98 19	111.3	30 25.1 98 19	111.2	30 54.4 98 19	111.0	31 23.6 98 19	110.9	31 52.9 98 20	110.8	32 22.2 98 20	110.7	3
4	28 45.5 98 20	110.5	29 14.8 98 20	110.4	29 44.1 98 20	110.3	30 13.4 98 20	110.1	30 42.7 98 20	110.0	31 11.9 98 20	109.9	31 41.2 98 20	109.8	32 10.5 98 20	109.6	4
65	28 33.8 98 20	109.5	29 03.1 98 20	109.4	29 32.3 98 20	109.2	30 01.6 98 20	109.1	30 30.9 98 20	109.0	31 00.2 98 20	108.9	31 29.4 98 20	108.7	31 58.7 98 20	108.6	65
6	28 22.0 98 20	108.5	28 51.3 98 20	108.4	29 20.5 98 20	108.2	29 49.8 98 20	108.1	30 19.1 98 20	108.0	30 48.3 98 20	107.8	31 17.6 97 20	107.7	31 46.8 97 20	107.6	6
7	28 10.1 98 20	107.5	28 39.4 98 20	107.3	29 08.7 98 20	107.2	29 37.9 98 20	107.1	30 07.2 98 20	107.0	30 36.4 97 20	106.8	31 05.7 97 20	106.7	31 34.9 97 20	106.6	7
8	27 58.2 98 20	106.5	28 27.4 98 20	106.3	28 56.7 98 20	106.2	29 26.0 98 20	106.1	29 55.2 97 20	106.0	30 24.5 97 20	105.8	30 53.7 97 20	105.7	31 22.9 97 20	105.6	8
9	27 46.2 98 20	105.4	28 15.4 98 20	105.3	28 44.7 98 20	105.2	29 13.9 97 20	105.1	29 43.2 97 20	104.9	30 12.4 97 20	104.8	30 41.7 97 20	104.7	31 10.9 97 20	104.6	9
70	27 34.1 98 20	104.4	28 03.4 98 20	104.3	28 32.6 97 20	104.2	29 01.9 97 20	104.1	29 31.1 97 20	103.9	30 00.3 97 20	103.8	30 29.6 97 20	103.7	30 58.8 97 20	103.5	70
1	27 22.0 98 20	103.4	27 51.3 97 20	103.3	28 20.5 97 20	103.2	28 49.7 97 20	103.1	29 19.0 97 20	102.9	29 48.2 97 20	102.8	30 17.4 97 20	102.7	30 46.6 97 20	102.5	1
2	27 09.9 97 20	102.4	27 39.1 97 20	102.3	28 08.3 97 20	102.2	28 37.6 97 20	102.1	29 06.8 97 20	101.9	29 36.0 97 20	101.8	30 05.2 97 20	101.7	30 34.4 97 20	101.5	2
3	26 57.6 97 20	101.4	27 26.9 97 20	101.3	27 56.1 97 20	101.2	28 25.3 97 20	101.1	28 54.6 97 20	100.9	29 23.8 97 20	100.8	29 53.0 97 20	100.7	30 22.2 97 20	100.5	3
4	26 45.4 97 20	100.4	27 14.6 97 20	100.3	27 43.9 97 20	100.2	28 13.1 97 20	100.1	28 42.3 97 20	99.9	29 11.5 97 20	99.8	29 40.7 97 20	99.7	30 09.9 97 21	99.5	4
75	26 33.1 97 21	99.4	27 02.3 97 21	99.3	27 31.6 97 21	99.2	28 00.8 97 21	99.1	28 30.0 97 21	98.9	28 59.2 97 21	98.8	29 28.4 97 21	98.7	29 57.6 97 21	98.5	75
6	26 20.8 97 21	98.4	26 50.0 97 21	98.3	27 19.2 97 21	98.2	27 48.4 97 21	98.1	28 17.7 97 21	97.9	28 46.9 97 21	97.8	29 16.0 97 21	97.7	29 45.2 97 21	97.5	6
7	26 08.4 97 21	97.5	26 37.7 97 21	97.3	27 06.9 97 21	97.2	27 36.1 97 21	97.1	28 05.3 97 21	96.9	28 34.5 97 21	96.8	29 03.7 97 21	96.7	29 32.8 97 21	96.5	7
8	25 56.1 97 21	96.5	26 25.3 97 21	96.3	26 54.5 97 21	96.2	27 23.7 97 21	96.1	27 52.9 97 21	96.0	28 22.1 97 21	95.8	28 51.3 97 21	95.7	29 20.4 97 21	95.6	8
9	25 43.6 97 21	95.5	26 12.9 97 21	95.3	26 42.1 97 21	95.2	27 11.3 97 21	95.1	27 40.5 97 21	95.0	28 09.7 97 21	94.8	28 38.8 97 21	94.7	29 08.0 97 21	94.6	9
80	25 31.2 97 21	94.5	26 00.4 97 21	94.4	26 29.6 97 21	94.2	26 58.8 97 21	94.1	27 28.0 97 21	94.0	27 57.2 97 21	93.8	28 26.4 97 21	93.7	28 55.6 97 21	93.6	80
1	25 18.8 97 21	93.5	25 48.0 97 21	93.4	26 17.2 97 21	93.2	26 46.4 97 21	93.1	27 15.6 97 21	93.0	27 44.8 97 21	92.9	28 13.9 97 21	92.7	28 43.1 97 21	92.6	1
2	25 06.3 97 21	92.5	25 35.5 97 21	92.4	26 04.7 97 21	92.3	26 33.9 97 21	92.1	27 03.1 97 21	92.0	27 32.3 97 21	91.9	28 01.5 97 21	91.7	28 30.6 97 21	91.6	2
3	24 53.8 97 21	91.5	25 23.1 97 21	91.4	25 52.3 97 21	91.3	26 21.5 97 21	91.2	26 50.6 97 21	91.0	27 19.8 97 21	90.9	27 49.0 97 21	90.8	28 18.2 97 21	90.6	3
4	24 41.4 97 21	90.6	25 10.6 97 21	90.4	25 39.8 97 21	90.3	26 09.0 97 21	90.2	26 38.2 97 21	90.0	27 07.4 97 21	89.9	27 36.5 97 21	89.8	28 05.7 97 21	89.7	4
85	24 28.9 97 21	89.6	24 58.1 97 21	89.5	25 27.3 97 21	89.3	25 56.5 97 21	89.2	26 25.7 97 21	89.1	26 54.9 97 21	88.9	27 24.1 97 21	88.8	27 53.2 97 21	88.7	85
6	24 16.4 97 21	88.6	24 45.6 97 21	88.5	25 14.8 97 21	88.4	25 44.0 97 21	88.2	26 13.2 97 21	88.1	26 42.4 97 21	88.0	27 11.6 97 21	87.8	27 40.8 97 21	87.7	6
7	24 04.0 97 21	87.6	24 33.2 97 21	87.5	25 02.4 97 21	87.4	25 31.6 97 21	87.2	26 00.8 97 21	87.1	26 30.0 97 21	87.0	26 59.1 97 21	86.9	27 28.3 97 21	86.7	7
8	23 51.5 97 21	86.7	24 20.7 97 21	86.5	24 49.9 97 21	86.4	25 19.1 97 21	86.3	25 48.3 97 21	86.1	26 17.5 97 21	86.0	26 46.7 97 21	85.9	27 15.9 97 21	85.8	8
9	23 39.1 97 21	85.7	24 08.3 97 21	85.6	24 37.5 97 21	85.4	25 06.7 97 21	85.3	25 35.9 97 21	85.2	26 05.1 97 21	85.1	26 34.2 97 21	84.9	27 03.4 97 21	84.8	9
90	23 26.6 97 21	84.7	23 55.8 97 21	84.6	24 25.1 97 21	84.5	24 54.3 97 21	84.3	25 23.5 97 21	84.2	25 52.6 97 21	84.1	26 21.8 97 21	84.0	26 51.0 97 21	83.8	90

Lat. 78°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	23 14.2	97 21	83.7	23 43.4	97 21	83.6	24 12.6	97 21	83.5	24 41.9	97 21	83.4	25 11.1	97 21	83.2	25 40.2	97 21	83.1	26 09.4	97 21	83.0	26 38.6	97 21	82.9	91
2	23 01.8	97 21	82.8	23 31.0	97 21	82.7	24 00.3	97 21	82.5	24 29.5	97 21	82.4	24 58.7	97 21	82.3	25 27.9	97 21	82.1	25 57.1	97 21	82.0	26 26.3	97 21	81.9	2
3	22 49.5	97 21	81.8	23 18.7	97 21	81.7	23 47.9	97 21	81.6	24 17.1	97 21	81.4	24 46.3	97 21	81.3	25 15.5	97 21	81.2	25 44.7	97 21	81.1	26 13.9	97 20	80.9	3
4	22 37.1	97 20	80.8	23 06.4	97 20	80.7	23 35.6	97 20	80.6	24 04.8	97 20	80.5	24 34.0	97 20	80.3	25 03.2	97 20	80.2	25 32.4	97 20	80.1	26 01.6	97 20	80.0	4
95	22 24.8	97 20	79.9	22 54.1	97 20	79.8	23 23.3	97 20	79.6	23 52.5	97 20	79.5	24 21.7	97 20	79.4	24 50.9	97 20	79.3	25 20.2	97 20	79.1	25 49.4	97 20	79.0	95
6	22 12.6	97 20	78.9	22 41.8	97 20	78.8	23 11.0	97 20	78.7	23 40.3	97 20	78.6	24 09.5	97 20	78.4	24 38.7	97 20	78.3	25 07.9	97 20	78.2	25 37.1	97 20	78.1	6
7	22 00.4	97 20	78.0	22 29.6	97 20	77.8	22 58.8	97 20	77.7	23 28.1	97 20	77.6	23 57.3	97 20	77.5	24 26.5	97 20	77.3	24 55.7	97 20	77.2	25 24.9	97 20	77.1	7
8	21 48.2	98 20	77.0	22 17.4	97 20	76.9	22 46.7	97 20	76.8	23 15.9	97 20	76.6	23 45.1	97 20	76.5	24 14.4	97 20	76.4	24 43.6	97 20	76.3	25 12.8	97 20	76.1	8
9	21 36.0	98 20	76.0	22 05.3	98 20	75.9	22 34.5	97 20	75.8	23 03.8	97 20	75.7	23 33.0	97 20	75.6	24 02.3	97 20	75.4	24 31.5	97 20	75.3	25 00.7	97 20	75.2	9
100	21 24.0	98 20	75.1	21 53.2	98 20	75.0	22 22.5	98 20	74.8	22 51.7	97 20	74.7	23 21.0	97 20	74.6	23 50.2	97 20	74.5	24 19.5	97 20	74.4	24 48.7	97 20	74.2	100
1	21 11.9	98 20	74.1	21 41.2	98 20	74.0	22 10.5	98 20	73.9	22 39.7	98 20	73.8	23 09.0	98 20	73.6	23 38.2	97 20	73.5	24 07.5	97 20	73.4	24 36.7	97 20	73.3	1
2	21 00.0	98 20	73.2	21 29.2	98 20	73.1	21 58.5	98 20	72.9	22 27.8	98 20	72.8	22 57.0	98 20	72.7	23 26.3	98 20	72.6	23 55.6	97 20	72.5	24 24.8	97 20	72.3	2
3	20 48.1	98 20	72.2	21 17.3	98 20	72.1	21 46.6	98 20	72.0	22 15.9	98 20	71.9	22 45.2	98 20	71.7	23 14.4	98 20	71.6	23 43.7	98 20	71.5	24 12.9	98 20	71.4	3
4	20 36.2	98 20	71.3	21 05.5	98 20	71.1	21 34.8	98 20	71.0	22 04.1	98 20	70.9	22 33.4	98 20	70.8	23 02.6	98 20	70.7	23 31.9	98 20	70.6	24 01.2	98 20	70.4	4
105	20 24.4	98 20	70.3	20 53.7	98 20	70.2	21 23.0	98 20	70.1	21 52.3	98 19	70.0	22 21.6	98 19	69.8	22 50.9	98 19	69.7	23 20.2	98 19	69.6	23 49.4	98 19	69.5	105
6	20 12.7	98 19	69.4	20 42.0	98 19	69.2	21 11.3	98 19	69.1	21 40.6	98 19	69.0	22 09.9	98 19	68.9	22 39.2	98 19	68.8	23 08.5	98 19	68.7	23 37.8	98 19	68.5	6
7	20 01.1	98 19	68.4	20 30.4	98 19	68.3	20 59.7	98 19	68.2	21 29.0	98 19	68.1	21 58.3	98 19	67.9	22 27.6	98 19	67.8	22 56.9	98 19	67.7	23 26.2	98 19	67.6	7
8	19 49.5	98 19	67.5	20 18.9	98 19	67.3	20 48.2	98 19	67.2	21 17.5	98 19	67.1	21 46.8	98 19	67.0	22 16.1	98 19	66.9	22 45.4	98 19	66.8	23 14.7	98 19	66.7	8
9	19 38.0	98 19	66.5	20 07.4	98 19	66.4	20 36.7	98 19	66.3	21 06.0	98 19	66.2	21 35.4	98 19	66.1	22 04.7	98 19	65.9	22 34.0	98 19	65.8	23 03.3	98 19	65.7	9
110	19 26.6	98 19	65.6	19 56.0	98 19	65.4	20 25.3	98 19	65.3	20 54.7	98 19	65.2	21 24.0	98 19	65.1	21 53.3	98 19	65.0	22 22.7	98 19	64.9	22 52.0	98 19	64.8	110
1	19 15.3	98 19	64.6	19 44.7	98 19	64.5	20 14.0	98 19	64.4	20 43.4	98 19	64.3	21 12.7	98 19	64.2	21 42.1	98 19	64.1	22 11.4	98 19	63.9	22 40.7	98 19	63.8	1
2	19 04.1	98 19	63.7	19 33.5	98 19	63.6	20 02.8	98 19	63.4	20 32.2	98 18	63.3	21 01.6	98 18	63.2	21 30.9	98 18	63.1	22 00.2	98 18	63.0	22 29.6	98 18	62.9	2
3	18 53.0	98 18	62.7	19 22.3	98 18	62.6	19 51.7	98 18	62.5	20 21.1	98 18	62.4	20 50.5	98 18	62.3	21 19.8	98 18	62.2	21 49.2	98 18	62.1	22 18.5	98 18	62.0	3
4	18 41.9	98 18	61.8	19 11.3	98 18	61.7	19 40.7	98 18	61.6	20 10.1	98 18	61.5	20 39.5	98 18	61.3	21 08.8	98 18	61.2	21 38.2	98 18	61.1	22 07.6	98 18	61.0	4
115	18 31.0	98 18	60.8	19 00.4	98 18	60.7	19 29.8	98 18	60.6	19 59.2	98 18	60.5	20 28.6	98 18	60.4	20 58.0	98 18	60.3	21 27.3	98 18	60.2	21 56.7	98 18	60.1	115
6	18 20.1	98 18	59.9	18 49.6	98 18	59.8	19 19.0	98 18	59.7	19 48.4	98 18	59.6	20 17.8	98 18	59.5	20 47.2	98 18	59.4	21 16.6	98 18	59.3	21 46.0	98 18	59.1	6
7	18 09.4	98 18	58.9	18 38.8	98 18	58.8	19 08.3	98 18	58.7	19 37.7	98 18	58.6	20 07.1	98 18	58.5	20 36.5	98 18	58.4	21 05.9	98 18	58.3	21 35.3	98 18	58.2	7
8	17 58.8	98 18	58.0	18 28.2	98 18	57.9	18 57.6	98 18	57.8	19 27.1	98 17	57.7	19 56.5	98 17	57.6	20 25.9	98 17	57.5	20 55.3	98 17	57.4	21 24.7	98 17	57.3	8
9	17 48.3	98 17	57.1	18 17.7	98 17	57.0	18 47.1	98 17	56.9	19 16.6	98 17	56.8	19 46.0	98 17	56.6	20 15.5	98 17	56.5	20 44.9	98 17	56.4	21 14.3	98 17	56.3	9
120	17 37.8	98 17	56.1	18 07.3	98 17	56.0	18 36.8	98 17	55.9	19 06.2	98 17	55.8	19 35.7	98 17	55.7	20 05.1	98 17	55.6	20 34.5	98 17	55.5	21 04.0	98 17	55.4	120
1	17 27.5	98 17	55.2	17 57.0	98 17	55.1	18 26.5	98 17	55.0	18 55.9	98 17	54.9	19 25.4	98 17	54.8	19 54.9	98 17	54.7	20 24.3	98 17	54.6	20 53.8	98 17	54.5	1
2	17 17.4	98 17	54.2	17 46.8	98 17	54.1	18 16.3	98 17	54.0	18 45.8	98 17	53.9	19 15.3	98 17	53.8	19 44.7	98 17	53.7	20 14.2	98 17	53.6	20 43.7	98 17	53.5	2
3	17 07.3	98 17	53.3	17 36.8	98 17	53.2	18 06.3	98 17	53.1	18 35.8	98 16	53.0	19 05.3	98 16	52.9	19 34.7	98 16	52.8	20 04.2	98 16	52.7	20 33.7	98 16	52.6	3
4	16 57.4	98 16	52.4	17 26.9	98 16	52.3	17 56.4	98 16	52.2	18 25.9	98 16	52.1	18 55.4	98 16	52.0	19 24.9	98 16	51.9	19 54.4	98 16	51.8	20 23.9	98 16	51.7	4
125	16 47.5	98 16	51.4	17 17.1	98 16	51.3	17 46.6	98 16	51.2	18 16.1	98 16	51.1	18 45.6	98 16	51.0	19 15.1	98 16	50.9	19 44.6	98 16	50.8	20 14.1	98 16	50.8	125
6	16 37.9	98 16	50.5	17 07.4	98 16	50.4	17 36.9	98 16	50.3	18 06.4	98 16	50.2	18 36.0	98 16	50.1	19 05.5	98 16	50.0	19 35.0	98 16	49.9	20 04.5	98 16	49.8	6
7	16 28.3	98 16	49.5	16 57.8	98 16	49.4	17 27.4	98 16	49.4	17 56.9	98 16	49.3	18 26.5	98 16	49.2	18 56.0	98 16	49.1	19 25.5	98 16	49.0	19 55.1	98 16	48.9	7
8	16 18.9	99 16	48.6	16 48.4	99 15	48.5	17 18.0	99 15	48.4	17 47.5	99 15	48.3	18 17.1	99 15	48.2	18 46.6	98 15	48.1	19 16.2	98 15	48.1	19 45.7	98 15	48.0	8
9	16 09.6	99 15	47.7	16 39.2	99 15	47.6	17 08.7	99 15	47.5	17 38.3	99 15	47.4	18 07.9	99 15	47.3	18 37.4	99 15	47.2	19 07.0	99 15	47.1	19 36.5	99 15	47.0	9
130	16 00.4	99 15	46.7	16 30.0	99 15	46.6	16 59.6	99 15	46.5	17 29.2	99 15	46.5	17 58.8	99 15	46.4	18 28.3	99 15	46.3	18 57.9	99 15	46.2	19 27.5	99 15	46.1	130
1	15 51.4	99 15	45.8	16 21.0	99 15	45.7	16 50.6	99 15	45.6	17 20.2	99 15	45.5	17 49.8	99 15	45.4	18 19.4	99 15	45.4	18 49.0	99 15	45.3	19 18.6	99 15	45.2	1
2	15 42.6	99 15	44.8	16 12.2	99 15	44.8	16 41.8	99 14	44.7	17 11.4	99 14	44.6	17 41.0	99 14	44.5	18 10.6	99 14	44.4	18 40.2	99 14	44.3	19 09.8	99 14	44.3	2
3	15 33.8	99 14	43.9	16 03.5	99 14	43.8	16 33.1	99 14	43.7	17 02.7	99 14	43.7	17 32.3	99 14	43.6	18 01.9	99 14	43.5	18 31.5	99 14	43.4	19 01.1	99 14	43.3	3
4	15 25.3	99 14	43.0	15 54.9	99 14	42.9	16 24.5	99 14	42.8	16 54.2	99 14	42.7	17 23.8	99 14	42.7	17 53.4	99 14	42.6	18 23.0	99 14	42.5	18 52.7	99 14	42.4	4
135	15 16.8	99 14	42.0	15 46.5	99 14	42.0	16 16.1	99 14	41.9	16 45.8	99 14	41.8	17 15.4	99 14	41.7	17 45.0	99 14	41.6	18 14.7	99 14	41.6	18 44.3	99 14	41.5	135
6	15 08.5	99 14	41.1	15 38.2	99 14	41.0	16 07.9	99 14	40.9	16 37.5	99 14	40.9	17 07.2	99 13	40.8	17 36.8	99 13	40.7	18 06.5	99 13	40.6	18 36.1	99 13	40.6	6
7	15 00.4	99 13	40.2	15 30.1	99 13	40.1	15 59.8	99 13	40.0	16 29.4	99 13	39.9	16 59.1	99 13	39.9	17 28.8	99 13	39.8	17 58.4	99 13	39.7	18 28.1	99 13	39.6	7
8	14 52.5	99 13	39.2	15 22.1	99 13	39.2	15 51.8	99 13	39.1	16 21.5	99 13	39.0	16 51.2	99 13	38.9	17 20.9	99 13	38.9	17 50.5	99 13	38.8	18 20.2	99 13	38.7	8
9	14 44.6	99 13	38.3	15 14.3	99 13	38.2	15 44.0	99 13	38.2	16 13.7	99 13	38.1	16 43.4	99 13	38.0	17 13.1	99 13	37.9	17 42.8	99 13	37.9	18 12.5	99 13	37.8	9
140	14 37.0	99 12	37.4	15 06.7	99 12	37.3	15 36.4	99 12	37.2	16 06.1	99 12	37.1	16 35.8	99 12	37.1	17 05.5	99 12	37.0	17 35.2	99 12	36.9	18 04.9	99 12	36.9	140
1	14 29.5	99 12	36.4	14 59.2	99 12	36.4	15 29.0	99 12	36.3	15 58.7	99 12	36.2	16 28.4	99 12	36.1	16 58.1	99 12	36.1	17 27.8	99 12	36.0	17 57.5	99 12	35.9	1
2	14 22.2	99 12	35.5	14 51.9	99 12	35.4	15 21.6	99 12	35.4	15 51.4	99 12	35.3	16 21.1	99 12	35.2	16 50.8	99 12	35.1	17 20.6	99 12	35.1	17 50.3	99 12	35.0	2
3	14 15.0	99 12	34.6	14 44.8	99 12	34.5	15 14.5	99 12	34.4	15 44.3	99 12	34.4	16 14.0	99 12	34.3	16 43.7	99 12	34.2	17 13.5	99 12	34.2	17 43.2	99 12	34.1	3
4	14 08.0	99 11	33.6	14 37.8	99 11	33.6	15 07.5	99 11	33.5	15 37.3	99 11	33.4	16 07.1	99 11	33.4	16 36.8	99 11	33.3	17 06.6	99 11	33.2	17 36.3	99 11	33.2	4
145	14 01.2	99 11	32.7	14 31.0	99 11	32.6	15 00.7	99 11	32.6	15 30.5	99 11	32.5	16 00.3	99 11	32.4	16 30.1	99 11	32.4	16 59.8	99 11	32.3	17 29.6	99 11	32.2	145
6	13 54.6	99 11	31.8	14 24.3	99 11	31.7	14 54.1	99 11	31.6	15 23.9	99 11	31.6	15 53.7	99 11	31.5	16 23.5	99 11	31.4	16 53.2	99 11	31.4	17 23.0	99 11	31.3	6
7	13 48.1	99 10	30.8	14 17.9	99 10	30.8	14 47.7	99 10	30.7	15 17.5	99 10	30.6	15 47.2	99 10	30.6	16 17.0	99 10	30.5	16 46.8	99 10	30.5	17 16.6	99 10	30.4	7
8	13 41.8	99 10	29.9	14 11.6	99 10	29.8	14 41.4	99 10	29.8	15 11.2	99 10	29.7	15 41.0	99 10	29.7	16 10.8	99 10	29.6	16 40.6	99 10	29.5	17 10.4	99 10	29.5	8
9	13 35.6	99 10	29.0	14 05.5	99 10	28.9	14 35.3	99 10	28.8	15 05.1	99 10	28.8	15 34.9	99 10	28.7	16 04.7	99 10	28.7	16 34.5	99 10	28.6	17 04.3	99 10	28.5	9
150	13 29.7	99 10	28.0	13 59.5	99 10	28.0	14 29.3	99 10	27.9	14 59.2	99 10	27.9	15 29.0	99 10	27.8	15 58.8	99 10	27.7	16 28.6	99 10	27.7	16 58.5	99 10	27.6	150
1	13 23.9	99 09	27.1	13 53.8	99 09	27.0	14 23.6	99 09	27.0	14 53.4	99 09	26.9	15 23.3	99 09	26.9	15 53.1	99 09	26.8	16 22.9	99 09	26.8	16 52.8	99 09	26.7	1
2	13 18.3	99 09	26.1	13 48.2	99 09	26.1	14 18.0	99 09	26.0	14 47.9	99 09	26.0	15 17.7	99 09	25.9	15 47.6	99 09	25.9	16 17.4	99 09	25.8	16 47.3	99 09	25.8	2
3	13 12.9	1.0 09	25.2	13 42.8	1.0 09	25.2	14 12.6	1.0 09	25.1	14 42.5	1.0 09	25.1	15 12.4	1.0 09	25.0	15 42.2	1.0 09	25.0	16 12.1	1.0 09	24.9	16 41.9	1.0 09	24.9	3
4	13 07.7	1.0 08	24.3	13 37.6	1.0 08	24.2	14 07.4	1.0 08	24.2	14 37.3	1.0 08	24.1	15 07.2	1.0 08	24.1	15 37.0	1.0 08	24.0	16 06.9	1.0 08	24.0	16 36.8	1.0 08	23.9	4
155	13 02.7	1.0 08	23.3	13 32.5	1.0 08	23.3	14 02.4	1.0 08	23.3	14 32.3	1.0 08	23.2	15 02.2	1.0 08	23.2	15 32.1	1.0 08	23.1	16 01.9	1.0 08	23.1	16 31.8	1.0 08	23.0	155
6	12 57.8	1.0 08	22.4	13 27.7	1.0 08	22.4	13 57.6	1.0 08	22.3	14 27.5	1.0 08	22.3	14 57.4	1.0 08	22.2	15 27.2	1.0 08	22.2	15 57.1	1.0 08	22.1	16 27.0	1.0 08	22.1	6
7	12 53.2	1.0 07	21.5	13 23.1	1.0 07	21.4	13 52.9	1.0 07	21.4	14 22.8	1.0 07	21.4	14 52.7	1.0 07	21.3	15 22.6	1.0 07	21.3	15 52.5	1.0 07	21.2	16 22.4	1.0 07	21.2	7
8	12 48.7	1.0 07	20.5	13 18.6	1.0 07	20.5	13 48.5	1.0 07	20.5	14 18.4	1.0 07	20.4	14 48.3	1.0 07	20.4	15 18.2	1.0 07	20.3	15 48.1	1.0 07	20.3	16 18.0	1.0 07	20.3	8
9	12 44.4	1.0 07	19.6	13 14.3	1.0 07	19.6	13 44.2	1.0 07	19.5	14 14.1	1.0 07	19.5	14 44.0	1.0 07	19.5	15 14.0	1.0 07	19.4	15 43.9	1.0 07	19.4	16 13.8	1.0 07	19.3	9
160	12 40.3	1.0 06	18.7	13 10.2	1.0 06	18.6	13 40.1	1.0 06	18.6	14 10.1	1.0 06	18.6	14 40.0	1.0 06	18.5	15 09.9	1.0 06	18.5	15 39.8	1.0 06	18.5	16 09.7	1.0 06	18.4	160
1	12 36.4	1.0 06	17.7	13 06.3	1.0 06	17.7	13 36.3	1.0 06	17.7	14 06.2	1.0 06	17.6	14 36.1	1.0 06	17.6	15 06.0	1.0 06	17.6	15 36.0	1.0 06	17.5	16 05.9	1.0 06	17.5	1
2	12 32.7	1.0 06	16.8	13 02.6	1.0 06	16.8	13 32.6	1.0 06	16.7	14 02.5	1.0 06	16.7	14 32.4	1.0 06	16.7	15 02.4	1.0 06	16.6	15 32.3	1.0 06	16.6	16 02.2	1.0 06	16.6	2
3	12 29.2	1.0 06	15.9	12 59.1	1.0 06	15.8	13 29.1	1.0 06	15.8	13 59.0	1.0 06	15.8	14 29.0	1.0 06	15.7	14 58.9	1.0 05	15.7	15 28.8	1.0 05	15.7	15 58.8	1.0 05	15.6	3
4	12 25.9	1.0 05	14.9	12 55.8	1.0 05	14.9	13 25.8	1.0 05	14.9	13 55.7	1.0 05	14.9	14 25.7	1.0 05	14.8	14 55.6	1.0 05	14.8	15 25.6	1.0 05	14.8	15 55.5	1.0 05	14.7	4
165	12 22.8	1.0 05	14.0	12 52.7	1.0 05	14.0	13 22.7	1.0 05	14.0	13 52.6	1.0 05	13.9	14 22.6	1.0 05	13.9	14 52.5	1.0 05	13.9	15 22.5	1.0 05	13.8	15 52.4	1.0 05	13.8	165
6	12 19.8	1.0 05	13.1	12 49.8	1.0 05	13.0	13 19.8	1.0 05	13.0	13 49.7	1.0 04	13.0	14 19.7	1.0 04	13.0	14 49.6	1.0 04	12.9	15 19.6	1.0 04	12.9	15 49.6	1.0 04	12.9	6
7	12 17.1	1.0 04	12.1	12 47.1	1.0 04	12.1	13 17.0	1.0 04	12.1	13 47.0	1.0 04	12.1	14 17.0	1.0 04	12.0	14 46.9	1.0 04	12.0	15 16.9	1.0 04	12.0	15 46.9	1.0 04	12.0	7
8	12 14.6	1.0 04	11.2	12 44.6	1.0 04	11.2	13 14.5	1.0 04	11.2	13 44.5	1.0 04	11.1	14 14.5	1.0 04	11.1	14 44.4	1.0 04	11.1	15 14.4	1.0 04	11.1	15 44.4	1.0 04	11.0	8
9	12 12.3	1.0 04	10.3	12 42.2	1.0 04	10.3	13 12.2	1.0 04	10.2	13 42.2	1.0 04	10.2	14 12.2	1.0 04	10.2	14 42.1	1.0 04	10.2	15 12.1	1.0 04	10.1	15 42.1	1.0 04	10.1	9
170	12 10.1	1.0 03	09.3	12 40.1	1.0 03	09.3	13 10.1	1.0 03	09.3	13 40.1	1.0 03	09.3	14 10.1	1.0 03	09.3	14 40.0	1.0 03	09.2	15 10.0	1.0 03	09.2	15 40.0	1.0 03	09.2	170
1	12 08.2	1.0 03	08.4	12 38.2	1.0 03	08.4	13 08.2	1.0 03	08.4	13 38.2	1.0 03	08.4	14 08.2	1.0 03	08.3	14 38.1	1.0 03	08.3	15 08.1	1.0 03	08.3	15 38.1	1.0 03	08.3	1
2	12 06.5	1.0 03	07.5	12 36.5	1.0 03	07.5	13 06.5	1.0 03	07.4	13 36.5	1.0 02	07.4	14 06.4	1.0 03	07.4	14 36.4	1.0 02	07.4	15 06.4	1.0 02	07.4	15 36.4	1.0 02	07.4	2
3	12 05.0	1.0 02	06.5	12 35.0	1.0 02	06.5	13 05.0	1.0 02	06.5	13 34.9	1.0 02	06.5	14 04.9	1.0 02	06.5	14 34.9	1.0 02	06.5	15 04.9	1.0 02	06.5	15 34.9	1.0 02	06.4	3
4	12 03.7	1.0 02	05.6	12 33.6	1.0 02	05.6	13 03.6	1.0 02	05.6	13 33.6	1.0 02	05.6	14 03.6	1.0 02	05.6	14 33.6	1.0 02	05.5	15 03.6	1.0 02	05.5	15 33.6	1.0 02	05.5	4
175	12 02.5	1.0 02	04.7	12 32.5	1.0 02	04.7	13 02.5	1.0 02	04.7	13 32.5	1.0 02	04.6	14 02.5	1.0 02	04.6	14 32.5	1.0 02	04.6	15 02.5	1.0 02	04.6	15 32.5	1.0 02	04.6	175
6	12 01.6	1.0 01	03.7	12 31.6	1.0 01	03.7	13 01.6	1.0 01	03.7	13 31.6	1.0 01	03.7	14 01.6	1.0 01	03.7	14 31.6	1.0 01	03.7	15 01.6	1.0 01	03.7	15 31.6	1.0 01	03.7	6
7	12 00.9	1.0 01	02.8	12 30.9	1.0 01	02.8	13 00.9	1.0 01	02.8	13 30.9	1.0 01	02.8	14 00.9	1.0 01	02.8	14 30.9	1.0 01	02.8	15 00.9	1.0 01	02.8	15 30.9	1.0 01	02.8	7
8	12 00.4	1.0 00	01.9	12 30.4	1.0 00	01.9	13 00.4	1.0 00	01.9	13 30.4	1.0 00	01.9	14 00.4	1.0 00	01.9	14 30.4	1.0 00	01.8	15 00.4	1.0 00	01.8	15 30.4	1.0 00	01.8	8
9	12 00.1	1.0 00	00.9	12 30.1	1.0 00	00.9	13 00.1	1.0 00	00.9	13 30.1	1.0 00	00.9	14 00.1	1.0 00	00.9	14 30.1	1.0 00	00.9	15 00.1	1.0 00	00.9	15 30.1	1.0 00	00.9	9
180	12 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	13 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 00.0	1.0 00	00.0	15 30.0	1.0 00	00.0	180

Lat. 79°

Lat. 78°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	41 00.0	1.0 00	180.0	42 00.0	1.0 00	180.0	44 00.0	1.0 00	180.0	46 00.0	1.0 00	180.0	46 30.0	1.0 00	180.0	47 30.0	1.0 00	180.0	00
1	39 59.9	1.0 01	178.8	40 29.9	1.0 01	178.8	40 59.9	1.0 01	178.8	41 59.9	1.0 01	178.8	43 59.9	1.0 01	178.8	45 59.9	1.0 01	178.8	46 29.9	1.0 01	178.8	47 29.9	1.0 01	178.8	1
2	39 59.5	1.0 01	177.7	40 29.5	1.0 01	177.7	40 59.5	1.0 01	177.7	41 59.5	1.0 01	177.7	43 59.5	1.0 01	177.6	45 59.5	1.0 01	177.6	46 29.5	1.0 01	177.6	47 29.5	1.0 01	177.6	2
3	39 58.9	1.0 01	176.5	40 28.9	1.0 01	176.5	40 58.9	1.0 01	176.5	41 58.9	1.0 02	176.5	43 58.8	1.0 01	176.5	45 58.8	1.0 02	176.4	46 28.8	1.0 02	176.4	47 28.8	1.0 02	176.4	3
4	39 58.0	1.0 02	175.4	40 28.0	1.0 02	175.4	40 58.0	1.0 02	175.4	41 58.0	1.0 02	175.3	43 57.9	1.0 02	175.3	45 57.9	1.0 02	175.2	46 27.9	1.0 02	175.2	47 27.9	1.0 02	175.2	4
05	39 56.9	1.0 02	174.2	40 26.9	1.0 02	174.2	40 56.9	1.0 02	174.2	41 56.8	1.0 02	174.2	43 56.8	1.0 02	174.1	45 56.8	1.0 02	174.0	46 26.7	1.0 02	174.0	47 26.7	1.0 02	174.0	05
6	39 55.5	1.0 03	173.1	40 25.5	1.0 03	173.1	40 55.5	1.0 03	173.1	41 55.4	1.0 03	173.0	43 55.4	1.0 03	172.9	45 55.3	1.0 03	172.8	46 25.3	1.0 03	172.8	47 25.3	1.0 03	172.8	6
7	39 53.9	1.0 03	171.9	40 23.8	1.0 03	171.9	40 53.8	1.0 03	171.9	41 53.8	1.0 03	171.8	43 53.7	1.0 03	171.8	45 53.6	1.0 03	171.7	46 23.6	1.0 03	171.6	47 23.6	1.0 03	171.6	7
8	39 52.0	1.0 04	170.8	40 22.0	1.0 04	170.8	40 51.9	1.0 04	170.7	41 51.9	1.0 04	170.7	43 51.8	1.0 04	170.6	45 51.7	1.0 04	170.5	46 21.7	1.0 04	170.4	47 21.6	1.0 04	170.4	8
9	39 49.9	1.0 04	169.6	40 19.8	1.0 04	169.6	40 49.8	1.0 04	169.6	41 49.8	1.0 04	169.5	43 49.6	1.0 04	169.4	45 49.5	1.0 04	169.3	46 19.5	1.0 04	169.2	47 19.4	1.0 04	169.2	9
10	39 47.5	1.0 04	168.5	40 17.5	1.0 04	168.5	40 47.4	1.0 04	168.4	41 47.4	1.0 04	168.4	43 47.2	1.0 04	168.2	45 47.1	1.0 04	168.1	46 17.0	1.0 05	168.0	47 16.9	1.0 05	168.0	10
1	39 44.9	1.0 05	167.3	40 14.9	1.0 05	167.3	40 44.8	1.0 05	167.3	41 44.7	1.0 05	167.2	43 44.6	1.0 05	167.1	45 44.4	1.0 05	166.9	46 14.3	1.0 05	166.9	47 14.2	1.0 05	166.8	1
2	39 42.0	1.0 05	166.2	40 12.0	1.0 05	166.2	40 41.9	1.0 05	166.1	41 41.8	1.0 05	166.0	43 41.6	1.0 05	165.9	45 41.4	1.0 05	165.7	46 11.4	1.0 05	165.7	47 11.2	1.0 05	165.6	2
3	39 38.9	1.0 06	165.1	40 08.9	1.0 06	165.0	40 38.8	1.0 05	165.0	41 38.7	1.0 06	164.9	43 38.5	1.0 06	164.7	45 38.2	1.0 06	164.5	46 08.1	1.0 06	164.5	47 08.0	1.0 06	164.4	3
4	39 35.6	1.0 06	163.9	40 05.5	1.0 06	163.9	40 35.5	1.0 06	163.8	41 35.3	1.0 06	163.7	43 35.1	1.0 06	163.5	45 34.8	1.0 06	163.3	46 04.7	1.0 06	163.3	47 04.5	1.0 06	163.2	4
15	39 32.0	1.0 06	162.8	40 02.0	1.0 06	162.7	40 31.9	1.0 06	162.7	41 31.7	1.0 06	162.6	43 31.4	1.0 06	162.4	45 31.1	1.0 07	162.2	46 01.0	1.0 07	162.1	47 00.8	1.0 07	162.0	15
6	39 28.2	1.0 07	161.6	39 58.1	1.0 07	161.6	40 28.0	1.0 07	161.5	41 27.9	1.0 07	161.4	43 27.5	1.0 07	161.2	45 27.1	1.0 07	161.0	45 57.0	1.0 07	160.9	46 56.8	1.0 07	160.8	6
7	39 24.2	1.0 07	160.5	39 54.1	1.0 07	160.4	40 24.0	1.0 07	160.4	41 23.8	1.0 07	160.3	43 23.4	1.0 07	160.1	45 22.9	1.0 07	159.8	45 52.8	1.0 07	159.8	46 52.6	1.0 07	159.6	7
8	39 19.9	1.0 08	159.3	39 49.8	1.0 08	159.3	40 19.7	1.0 08	159.2	41 19.4	1.0 08	159.1	43 19.0	1.0 08	158.9	45 18.5	1.0 08	158.6	45 48.4	1.0 08	158.6	46 48.1	1.0 08	158.4	8
9	39 15.4	1.0 08	158.2	39 45.2	1.0 08	158.2	40 15.1	1.0 08	158.1	41 14.9	1.0 08	158.0	43 14.4	1.0 08	157.7	45 13.8	1.0 08	157.5	45 43.7	1.0 08	157.4	46 43.4	1.0 08	157.3	9
20	39 10.6	1.0 08	157.1	39 40.5	1.0 08	157.0	40 10.4	1.0 08	157.0	41 10.1	1.0 08	156.8	43 09.5	1.0 08	156.6	45 08.9	99 09	156.3	45 38.8	99 09	156.2	46 38.5	99 09	156.1	20
1	39 05.6	1.0 09	155.9	39 35.5	1.0 09	155.9	40 05.4	1.0 09	155.8	41 05.1	1.0 09	155.7	43 04.5	99 09	155.4	45 03.8	99 09	155.1	45 33.6	99 09	155.1	46 33.3	99 09	154.9	1
2	39 00.4	99 09	154.8	39 30.3	99 09	154.7	40 00.1	99 09	154.7	40 59.8	99 09	154.5	42 59.2	99 09	154.3	44 58.5	99 09	154.0	45 28.3	99 09	153.9	46 27.9	99 09	153.7	2
3	38 55.0	99 09	153.7	39 24.9	99 09	153.6	39 54.7	99 09	153.5	40 54.3	99 10	153.4	42 53.6	99 10	153.1	44 52.9	99 10	152.8	45 22.7	99 10	152.7	46 22.3	99 10	152.5	3
4	38 49.4	99 10	152.6	39 19.2	99 10	152.5	39 49.0	99 10	152.4	40 48.7	99 10	152.3	42 47.9	99 10	152.0	44 47.0	99 10	151.6	45 16.8	99 10	151.6	46 16.4	99 10	151.4	4
25	38 43.5	99 10	151.4	39 13.3	99 10	151.4	39 43.1	99 10	151.3	40 42.7	99 10	151.1	42 41.9	99 10	150.8	44 41.0	99 10	150.5	45 10.8	99 10	150.4	46 10.3	99 10	150.2	25
6	38 37.4	99 10	150.3	39 07.2	99 10	150.2	39 37.0	99 11	150.2	40 36.6	99 11	150.0	42 35.7	99 11	149.7	44 34.8	99 11	149.3	45 04.5	99 11	149.2	46 04.0	99 11	149.0	6
7	38 31.2	99 11	149.2	39 00.9	99 11	149.1	39 30.7	99 11	149.0	40 30.3	99 11	148.9	42 29.3	99 11	148.5	44 28.3	99 11	148.2	44 58.0	99 11	148.1	45 57.5	99 11	147.9	7
8	38 24.7	99 11	148.1	38 54.4	99 11	148.0	39 24.2	99 11	147.9	40 23.7	99 11	147.7	42 22.7	99 11	147.4	44 21.6	99 12	147.0	44 51.3	99 12	146.9	45 50.7	99 12	146.7	8
9	38 18.0	99 12	146.9	38 47.7	99 12	146.9	39 17.5	99 12	146.8	40 16.9	99 12	146.6	42 15.9	99 12	146.3	44 14.7	99 12	145.9	44 44.4	99 12	145.8	45 43.8	99 12	145.6	9
30	38 11.1	99 12	145.8	38 40.8	99 12	145.7	39 10.5	99 12	145.7	40 10.0	99 12	145.5	42 08.8	99 12	145.1	44 07.6	99 12	144.7	44 37.3	99 12	144.6	45 36.6	99 12	144.4	30
1	38 04.0	99 12	144.7	38 33.7	99 12	144.6	39 03.4	99 12	144.5	40 02.8	99 12	144.4	42 01.6	99 12	144.0	44 00.3	99 12	143.6	44 30.0	99 13	143.5	45 29.3	99 13	143.3	1
2	37 56.6	99 12	143.6	38 26.4	99 13	143.5	38 56.1	99 13	143.4	39 55.4	99 13	143.2	41 54.2	99 13	142.9	43 52.8	99 13	142.4	44 22.4	99 13	142.3	45 21.7	99 13	142.1	2
3	37 49.2	99 13	142.5	38 18.8	99 13	142.4	38 48.5	99 13	142.3	39 47.9	99 13	142.1	41 46.5	99 13	141.7	43 45.1	99 13	141.3	44 14.7	99 13	141.2	45 13.9	99 13	141.0	3
4	37 41.5	99 13	141.4	38 11.1	99 13	141.3	38 40.8	99 13	141.2	39 40.1	99 13	141.0	41 38.7	99 13	140.6	43 37.2	99 13	140.2	44 06.8	99 14	140.1	45 06.0	99 14	139.8	4
35	37 33.6	99 13	140.3	38 03.2	99 13	140.2	38 32.9	99 14	140.1	39 32.2	99 14	139.9	41 30.7	99 14	139.5	43 29.1	99 14	139.1	43 58.7	99 14	138.9	44 57.9	99 14	138.7	35
6	37 25.5	99 14	139.2	37 55.2	99 14	139.1	38 24.8	99 14	139.0	39 24.1	99 14	138.8	41 22.5	99 14	138.4	43 20.8	99 14	137.9	43 50.4	99 14	137.8	44 49.5	99 14	137.6	6
7	37 17.3	99 14	138.1	37 46.9	99 14	138.0	38 16.5	99 14	137.9	39 15.7	99 14	137.7	41 14.1	99 14	137.3	43 12.4	99 14	136.8	43 41.9	98 14	136.7	44 41.0	98 14	136.4	7
8	37 08.9	99 14	137.0	37 38.5	99 14	136.9	38 08.1	99 14	136.8	39 07.3	99 14	136.6	41 05.6	99 15	136.2	43 03.8	98 15	135.7	43 33.3	98 15	135.6	44 32.3	98 15	135.3	8
9	37 00.3	99 15	135.9	37 29.9	99 15	135.8	37 59.4	99 15	135.7	38 58.6	99 15	135.5	40 56.8	98 15	135.0	42 55.0	98 15	134.6	43 24.5	98 15	134.4	44 23.5	98 15	134.2	9
40	36 51.5	99 15	134.8	37 21.1	99 15	134.7	37 50.6	99 15	134.6	38 49.8	99 15	134.4	40 47.9	98 15	133.9	42 46.0	98 15	133.5	43 15.5	98 15	133.3	44 14.5	98 15	133.1	40
1	36 42.6	99 15	133.7	37 12.1	99 15	133.6	37 41.7	99 15	133.5	38 40.8	98 15	133.3	40 38.9	98 15	132.8	42 36.9	98 16	132.3	43 06.3	98 16	132.2	44 05.3	98 16	132.0	1
2	36 33.5	98 15	132.6	37 03.0	98 15	132.5	37 32.6	98 16	132.4	38 31.6	98 16	132.2	40 29.6	98 16	131.7	42 27.6	98 16	131.2	42 57.0	98 16	131.1	43 55.9	98 16	130.9	2
3	36 24.2	98 16	131.6	36 53.8	98 16	131.5	37 23.3	98 16	131.3	38 22.3	98 16	131.1	40 20.3	98 16	130.6	42 18.1	98 16	130.1	42 47.5	98 16	130.0	43 46.4	98 16	129.7	3
4	36 14.8	98 16	130.5	36 44.3	98 16	130.4	37 13.8	98 16	130.3	38 12.8	98 16	130.0	40 10.7	98 16	129.6	42 08.5	98 16	129.0	42 37.9	98 16	128.9	43 36.7	98 16	128.6	4
45	36 05.2	98 16	129.4	36 34.7	98 16	129.3	37 04.2	98 16	129.2	38 03.2	98 16	129.0	40 01.0	98 16	128.5	41 58.7	98 16	127.9	42 28.1	98 17	127.8	43 26.9	98 17	127.5	45
6	35 55.5	98 16	128.3	36 25.0	98 16	128.2	36 54.5	98 16	128.1	37 53.4	98 17	127.9	39 51.2	98 17	127.4	41 48.8	98 17	126.9	42 18.2	98 17	126.7	43 16.9	98 17	126.4	6
7	35 45.7	98 17	127.3	36 15.1	98 17	127.2	36 44.6	98 17	127.0	37 43.5	98 17	126.8	39 41.2	98 17	126.3	41 38.8	98 17	125.8	42 08.1	98 17	125.6	43 06.8	98 17	125.4	7
8	35 35.7	98 17	126.2	36 05.1	98 17	126.1	36 34.6	98 17	126.0	37 33.4	98 17	125.7	39 31.1	98 17	125.2	41 28.6	98 17	124.7	41 57.9	98 17	124.5	42 56.6	98 17	124.3	8
9	35 25.6	98 17	125.1	35 55.0	98 17	125.0	36 24.4	98 17	124.9	37 23.2	98 17	124.7	39 20.8	98 17	124.1	41 18.2	98 17	123.6	41 47.6	98 17	123.5	42 46.2	98 18	123.2	9
50	35 15.3	98 17	124.1	35 44.7	98 17	124.0	36 14.1	98 17	123.8	37 12.9	98 17	123.6	39 10.4	98 18	123.1	41 07.8	98 18	122.5	41 37.1	98 18	122.4	42 35.7	98 18	122.1	50
1	35 04.9	98 18	123.0	35 34.3	98 18	122.9	36 03.7	98 18	122.8	37 02.5	98 18	122.5	38 59.9	98 18	122.0	40 57.2	98 18	121.5	41 26.5	98 18	121.3	42 25.1	98 18	121.0	1
2	34 54.4	98 18	122.0	35 23.8	98 18	121.8	35 53.1	98 18	121.7	36 51.9	98 18	121.5	38 49.3	98 18	120.9	40 46.5	98 18	120.4	41 15.8	98 18	120.2	42 14.3	98 18	119.9	2
3	34 43.7	98 18	120.9	35 13.1	98 18	120.8	35 42.5	98 18	120.7	36 41.2	98 18	120.4	38 38.5	98 18	119.9	40 35.7	98 18	119.3	41 05.0	98 18	119.2	42 03.5	97 18	118.9	3
4	34 33.0	98 18	119.9	35 02.3	98 18	119.7	35 31.7	98 18	119.6	36 30.4	98 18	119.3	38 27.6	98 18	118.8	40 24.8	98 18	118.3	40 54.0	97 18	118.1	41 52.5	97 18	117.8	4
55	34 22.1	98 18	118.8	34 51.4	98 18	118.7	35 20.8	98 18	118.6	36 19.4	98 18	118.3	38 16.7	98 18	117.8	40 13.7	97 19	117.2	40 43.0	97 19	117.0	41 41.4	97 19	116.7	55
6	34 11.1	98 18	117.8	34 40.4	98 18	117.6	35 09.8	98 19	117.5	36 08.4	98 19	117.2	38 05.6	98 19	116.7	40 02.6	97 19	116.1	40 31.8	97 19	116.0	41 30.2	97 19	115.7	6
7	34 00.0	98 19	116.7	34 29.3	98 19	116.6	34 58.7	98 19	116.5	35 57.3	98 19	116.2	37 54.4	98 19	115.7	39 51.3	97 19	115.1	40 20.5	97 19	114.9	41 18.9	97 19	114.6	7
8	33 48.8	98 19	115.7	34 18.1	98 19	115.6	34 47.4	98 19	115.4	35 46.0	98 19	115.2	37 43.1	97 19	114.6	39 40.0	97 19	114.0	40 09.2	97 19	113.9	41 07.5	97 19	113.6	8
9	33 37.5	98 19	114.6	34 06.8	98 19	114.5	34 36.1	98 19	114.4	35 34.7	98 19	114.1	37 31.7	97 19	113.6	39 28.5	97 19	113.0	39 57.7	97 19	112.8	40 56.0	97 19	112.5	9
60	33 26.1	98 19	113.6	33 55.4	98 19	113.5	34 24.7	98 19	113.3	35 23.2	98 19	113.1	37 20.2	97 19	112.5	39 17.0	97 19	111.9	39 46.2	97 19	111.8	40 44.5	97 19	111.5	60
1	33 14.7	98 19	112.6	33 43.9	98 19	112.4	34 13.2	98 19	112.3	35 11.7	97 19	112.0	37 08.6	97 19	111.5	39 05.4	97 19	110.9	39 34.6	97 20	110.7	40 32.8	97 20	110.4	1
2	33 03.1	98 19	111.5	33 32.4	98 19	111.4	34 01.6	98 19	111.3	35 00.1	97 19	111.0	36 57.0	97 20	110.5	38 53.7	97 20	109.9	39 22.8	97 20	109.7	40 21.1	97 20	109.4	2
3	32 51.5	98 20	110.5	33 20.7	98 20	110.4	33 50.0	97 20	110.3	34 48.4	97 20	110.0	36 45.3	97 20	109.4	38 41.9	97 20	108.8	39 11.1	97 20	108.7	40 09.3	97 20	108.4	3
4	32 39.7	98 20	109.5	33 09.0	97 20	109.4	33 38.2	97 20	109.2	34 36.7	97 20	109.0	36 33.5	97 20	108.4	38 30.1	97 20	107.8	38 59.2	97 20	107.6	39 57.4	97 20	107.3	4
65	32 27.9	97 20	108.5	32 57.2	97 20	108.3	33 26.4	97 20	108.2	34 24.8	97 20	107.9	36 21.6	97 20	107.4	38 18.2	97 20	106.8	38 47.3	97 20	106.6	39 45.5	97 20	106.3	65
6	32 16.1	97 20	107.5	32 45.3	97 20	107.3	33 14.5	97 20	107.2	34 12.9	97 20	106.9	36 09.7	97 20	106.3	38 06.2	97 20	105.7	38 35.3	97 20	105.6	39 33.5	97 20	105.3	6
7	32 04.1	97 20	106.4	32 33.4	97 20	106.3	33 02.6	97 20	106.2	34 01.0	97 20	105.9	35 57.7	97 20	105.3	37 54.2	97 20	104.7	38 23.3	97 20	104.6	39 21.4	97 20	104.3	7
8	31 52.1	97 20	105.4	32 21.4	97 20	105.3	32 50.6	97 20	105.2	33 48.9	97 20	104.9	35 45.6	97 20	104.3	37 42.1	97 20	103.7	38 11.2	97 20	103.6	39 09.3	97 20	103.2	8
9	31 40.1	97 20	104.4	32 09.3	97 20	104.3	32 38.5	97 20	104.1	33 36.9	97 20	103.9	35 33.5	97 20	103.3	37 29.9	97 20	102.7	37 59.0	97 20	102.5	38 57.1	97 20	102.2	9
70	31 28.0	97 20	103.4	31 57.2	97 20	103.3	32 26.4	97 20	103.1	33 24.7	97 20	102.9	35 21.3	97 20	102.3	37 17.7	97 20	101.7	37 46.8	97 20	101.5	38 44.9	97 20	101.2	70
1	31 15.8	97 20	102.4	31 45.0	97 20	102.3	32 14.2	97 20	102.1	33 12.5	97 20	101.9	35 09.1	97 20	101.3	37 05.5	97 20	100.7	37 34.6	97 20	100.5	38 32.7	97 20	100.2	1
2	31 03.6	97 20	101.4	31 32.8	97 20	101.3	32 02.0	97 20	101.1	33 00.3	97 20	100.8	34 56.8	97 20	100.3	36 53.2	97 21	99.7	37 22.3	97 21	99.5	38 20.4	97 21	99.2	2
3	30 51.4	97 20	100.4	31 20.6	97 20	100.3	31 49.7	97 20	100.1	32 48.0	97 20	99.8	34 44.6	97 21	99.3	36 40.9	97 21	98.7	37 10.0	97 21	98.5	38 08.0	97 21	98.2	3
4	30 39.1	97 21	99.4	31 08.3	97 21	99.3	31 37.4	97 21	99.1	32 35.7	97 20	98.8	34 32.2	97 21	98.3	36 28.6	97 21	97.7	36 57.6	97 21	97.5	37 55.7	97 21	97.2	4
75	30 26.8	97 21	98.4	30 55.9	97 21	98.3	31 25.1	97 21	98.1	32 23.4	97 21	97.8	34 19.9	97 21	97.3	36 16.2	97 21	96.7	36 45.2	97 21	96.5	37 43.3	97 21	96.2	75
6	30 14.4	97 21	97.4	30 43.6	97 21	97.3	31 12.7	97 21	97.1	32 11.0	97 21	96.9	34 07.5	97 21	96.3	36 03.8	97 21	95.7	36 32.8	97 21	95.5	37 30.9	97 21	95.2	6
7	30 02.0	97 21	96.4	30 31.2	97 21	96.3	31 00.3	97 21	96.1	31 58.6	97 21	95.9	33 55.1	97 21	95.3	35 51.3	97 21	94.7	36 20.4	97 21	94.5	37 18.4	97 21	94.2	7
8	29 49.6	97 21	95.4	30 18.8	97 21	95.3	30 47.9	97 21	95.1	31 46.2	97 21	94.9	33 42.6	97 21	94.3	35 38.9	97 21	93.7	36 07.9	97 21	93.5	37 06.0	97 21	93.2	8
9	29 37.2	97 21	94.4	30 06.3	97 21	94.3	30 35.5	97 21	94.2	31 33.8	97 21	93.9	33 30.2	97 21	93.3	35 26.5	97 21	92.7	35 55.5	97 21	92.6	36 53.5	97 21	92.2	9
80	29 24.7	97 21	93.4	29 53.9	97 21	93.3	30 23.0	97 21	93.2	31 21.3	97 21	92.9	33 17.7	97 21	92.3	35 14.0	97 21	91.7	35 43.0	97 21	91.6	36 41.1	97 21	91.3	80
1	29 12.3	97 21	92.5	29 41.4	97 21	92.3	30 10.6	97 21	92.2	31 08.8	97 21	91.9	33 05.3	97 21	91.3	35 01.5	97 21	90.7	35 30.6	97 21	90.6	36 28.6	97 21	90.3	1
2	28 59.8	97 21	91.5	29 29.0	97 21	91.3	29 58.1	97 21	91.2	30 56.4	97 21	90.9	32 52.8	97 21	90.4	34 49.0	97 21	89.8	35 18.1	97 21	89.6	36 16.1	97 21	89.3	2
3	28 47.3	97 21	90.5	29 16.5	97 21	90.4	29 45.6	97 21	90.2	30 43.9	97 21	90.0	32 40.3	97 21	89.4	34 36.6	97 21	88.8	35 05.6	97 21	88.6	36 03.6	97 21	88.3	3
4	28 34.9	97 21	89.5	29 04.0	97 21	89.4	29 33.2	97 21	89.3	30 31.4	97 21	89.0	32 27.8	97 21	88.4	34 24.1	97 21	87.8	34 53.1	97 21	87.7	35 51.2	97 21	87.3	4
85	28 22.4	97 21	88.5	28 51.5	97 21	88.4	29 20.7	97 21	88.3	30 19.0	97 21	88.0	32 15.4	97 21	87.4	34 11.6	97 21	86.8	34 40.7	97 21	86.7	35 38.7	97 21	86.4	85
6	28 09.9	97 21	87.6	28 39.1	97 21	87.4	29 08.2	97 21	87.3	30 06.5	97 21	87.0	32 02.9	97 21	86.5	33 59.2	97 21	85.9	34 28.2	97 21	85.7	35 26.3	97 21	85.4	6
7	27 57.5	97 21	86.6	28 26.6	97 21	86.5	28 55.8	97 21	86.3	29 54.0	97 21	86.1	31 50.5	97 21	85.5	33 46.8	97 21	84.9	34 15.8	97 21	84.8	35 13.8	97 21	84.4	7
8	27 45.0	97 21	85.6	28 14.2	97 21	85.5	28 43.3	97 21	85.4	29 41.6	97 21	85.1	31 38.0	97 21	84.5	33 34.3	97 21	83.9	34 03.4	97 21	83.8	35 01.4	97 21	83.5	8
9	27 32.6	97 21	84.6	28 01.7	97 21	84.5	28 30.9	97 21	84.4	29 29.2	97 21	84.1	31 25.6	97 21	83.6	33 21.9	97 21	83.0	33 51.0	97 21	82.8	34 49.1	97 21	82.5	9
90	27 20.2	97 21	83.7	27 49.3	97 21	83.6	28 18.5	97 21	83.4	29 16.8	97 21	83.2	31 13.3	97 21	82.6	33 09.6	97 21	82.0	33 38.6	97 21	81.9	34 36.7	97 21	81.6	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	27 07.8	97 21	82.7	27 37.0	97 21	82.6	28 06.1	97 21	82.5	29 04.4	97 21	82.2	31 00.9	97 21	81.6	32 57.2	97 20	81.1	33 26.3	97 20	80.9	34 24.4	97 20	80.6	91
2	26 55.4	97 21	81.8	27 24.6	97 21	81.6	27 53.8	97 21	81.5	28 52.1	97 21	81.2	30 48.6	97 20	80.7	32 44.9	97 20	80.1	33 14.0	97 20	80.0	34 12.1	97 20	79.7	2
3	26 43.1	97 20	80.8	27 12.3	97 20	80.7	27 41.4	97 20	80.5	28 39.8	97 20	80.3	30 36.3	97 20	79.7	32 32.7	97 20	79.1	33 01.7	97 20	79.0	33 59.8	97 20	78.7	3
4	26 30.8	97 20	79.8	27 00.0	97 20	79.7	27 29.2	97 20	79.6	28 27.5	97 20	79.3	30 24.0	97 20	78.8	32 20.4	97 20	78.2	32 49.5	97 20	78.1	33 47.6	97 20	77.8	4
95	26 18.5	97 20	78.9	26 47.7	97 20	78.8	27 16.9	97 20	78.6	28 15.2	97 20	78.4	30 11.8	97 20	77.8	32 08.2	97 20	77.2	32 37.3	97 20	77.1	33 35.5	97 20	76.8	95
6	26 06.3	97 20	77.9	26 35.5	97 20	77.8	27 04.7	97 20	77.7	28 03.0	97 20	77.4	29 59.6	97 20	76.9	31 56.1	97 20	76.3	32 25.2	97 20	76.2	33 23.3	97 20	75.9	6
7	25 54.1	97 20	77.0	26 23.3	97 20	76.8	26 52.5	97 20	76.7	27 50.9	97 20	76.4	29 47.5	97 20	75.9	31 44.0	97 20	75.4	32 13.1	97 20	75.2	33 11.3	97 20	74.9	7
8	25 42.0	97 20	76.0	26 11.2	97 20	75.9	26 40.4	97 20	75.8	27 38.8	97 20	75.5	29 35.4	97 20	75.0	31 32.0	97 20	74.4	32 01.1	97 20	74.3	32 59.2	97 20	74.0	8
9	25 29.9	97 20	75.1	25 59.1	97 20	74.9	26 28.4	97 20	74.8	27 26.7	97 20	74.5	29 23.4	97 20	74.0	31 20.0	97 20	73.5	31 49.1	97 20	73.3	32 47.3	97 20	73.0	9
100	25 17.9	97 20	74.1	25 47.1	97 20	74.0	26 16.3	97 20	73.9	27 14.7	97 20	73.6	29 11.5	97 20	73.1	31 08.0	97 20	72.5	31 37.2	97 20	72.4	32 35.4	97 20	72.1	100
1	25 05.9	97 20	73.2	25 35.2	97 20	73.0	26 04.4	97 20	72.9	27 02.8	97 20	72.6	28 59.6	97 20	72.1	30 56.2	97 20	71.6	31 25.3	97 20	71.4	32 23.6	97 20	71.2	1
2	24 54.0	97 20	72.2	25 23.3	97 20	72.1	25 52.5	97 20	72.0	26 50.9	97 20	71.7	28 47.7	97 20	71.2	30 44.4	97 20	70.6	31 13.5	97 20	70.5	32 11.8	97 20	70.2	2
3	24 42.2	97 20	71.3	25 11.4	97 20	71.1	25 40.7	97 20	71.0	26 39.1	97 20	70.8	28 35.9	97 20	70.2	30 32.6	97 19	69.7	31 01.8	97 19	69.6	32 00.1	97 19	69.3	3
4	24 30.4	98 20	70.3	24 59.7	97 20	70.2	25 28.9	97 19	70.1	26 27.4	97 19	69.8	28 24.2	97 19	69.3	30 21.0	97 19	68.8	30 50.1	97 19	68.6	31 48.4	97 19	68.4	4
105	24 18.7	98 19	69.4	24 48.0	98 19	69.2	25 17.2	98 19	69.1	26 15.7	97 19	68.9	28 12.6	97 19	68.4	30 09.4	97 19	67.8	30 38.6	97 19	67.7	31 36.9	97 19	67.4	105
6	24 07.1	98 19	68.4	24 36.3	98 19	68.3	25 05.6	98 19	68.2	26 04.1	97 19	67.9	28 01.0	97 19	67.4	29 57.9	97 19	66.9	30 27.1	97 19	66.8	31 25.4	97 19	66.5	6
7	23 55.5	98 19	67.5	24 24.8	98 19	67.4	24 54.1	98 19	67.2	25 52.6	98 19	67.0	27 49.6	97 19	66.5	29 46.4	97 19	66.0	30 15.6	97 19	65.8	31 14.0	97 19	65.6	7
8	23 44.0	98 19	66.5	24 13.3	98 19	66.4	24 42.6	98 19	66.3	25 41.1	98 19	66.1	27 38.2	97 19	65.6	29 35.1	97 19	65.0	30 04.3	97 19	64.9	31 02.7	97 19	64.7	8
9	23 32.6	98 19	65.6	24 01.9	98 19	65.5	24 31.2	98 19	65.4	25 29.8	98 19	65.1	27 26.8	98 19	64.6	29 23.8	97 19	64.1	29 53.0	97 19	64.0	30 51.5	97 19	63.7	9
110	23 21.3	98 19	64.7	23 50.6	98 19	64.5	24 19.9	98 19	64.4	25 18.5	98 19	64.2	27 15.6	98 19	63.7	29 12.6	97 18	63.2	29 41.9	97 18	63.1	30 40.3	97 18	62.8	110
1	23 10.1	98 19	63.7	23 39.4	98 19	63.6	24 08.7	98 19	63.5	25 07.3	98 18	63.2	27 04.5	98 18	62.8	29 01.5	98 18	62.3	29 30.8	97 18	62.1	30 29.3	97 18	61.9	1
2	22 58.9	98 18	62.8	23 28.3	98 18	62.7	23 57.6	98 18	62.5	24 56.2	98 18	62.3	26 53.4	98 18	61.8	28 50.5	98 18	61.3	29 19.8	98 18	61.2	30 18.3	97 18	61.0	2
3	22 47.9	98 18	61.8	23 17.2	98 18	61.7	23 46.6	98 18	61.6	24 45.2	98 18	61.4	26 42.5	98 18	60.9	28 39.7	98 18	60.4	29 08.9	98 18	60.3	30 07.5	98 18	60.0	3
4	22 36.9	98 18	60.9	23 06.3	98 18	60.8	23 35.6	98 18	60.7	24 34.3	98 18	60.5	26 31.6	98 18	60.0	28 28.9	98 18	59.5	28 58.1	98 18	59.4	29 56.7	98 18	59.1	4
115	22 26.1	98 18	60.0	22 55.4	98 18	59.9	23 24.8	98 18	59.7	24 23.5	98 18	59.5	26 20.9	98 18	59.1	28 18.2	98 18	58.6	28 47.5	98 18	58.5	29 46.0	98 18	58.2	115
6	22 15.3	98 18	59.0	22 44.7	98 18	58.9	23 14.1	98 18	58.8	24 12.8	98 18	58.6	26 10.2	98 18	58.1	28 07.6	98 18	57.7	28 36.9	98 17	57.5	29 35.5	98 17	57.3	6
7	22 04.7	98 18	58.1	22 34.1	98 18	58.0	23 03.5	98 18	57.9	24 02.2	98 17	57.7	25 59.7	98 17	57.2	27 57.1	98 17	56.7	28 26.4	98 17	56.6	29 25.0	98 17	56.4	7
8	21 54.2	98 17	57.2	22 23.6	98 17	57.1	22 53.0	98 17	57.0	23 51.7	98 17	56.7	25 49.3	98 17	56.3	27 46.7	98 17	55.8	28 16.0	98 17	55.7	29 14.7	98 17	55.5	8
9	21 43.7	98 17	56.2	22 13.1	98 17	56.1	22 42.6	98 17	56.0	23 41.4	98 17	55.8	25 38.9	98 17	55.4	27 36.4	98 17	54.9	28 05.8	98 17	54.8	29 04.5	98 17	54.6	9
120	21 33.4	98 17	55.3	22 02.8	98 17	55.2	22 32.3	98 17	55.1	23 31.1	98 17	54.9	25 28.7	98 17	54.4	27 26.3	98 17	54.0	27 55.7	98 17	53.9	28 54.4	98 17	53.6	120
1	21 23.2	98 17	54.4	21 52.7	98 17	54.3	22 22.1	98 17	54.2	23 21.0	98 17	54.0	25 18.6	98 17	53.5	27 16.3	98 17	53.1	27 45.6	98 16	53.0	28 44.4	98 16	52.7	1
2	21 13.1	98 17	53.4	21 42.6	98 17	53.3	22 12.0	98 17	53.2	23 10.9	98 16	53.0	25 08.7	98 16	52.6	27 06.3	98 16	52.2	27 35.7	98 16	52.1	28 34.5	98 16	51.8	2
3	21 03.2	98 16	52.5	21 32.6	98 16	52.4	22 02.1	98 16	52.3	23 01.0	98 16	52.1	24 58.8	98 16	51.7	26 56.5	98 16	51.3	27 26.0	98 16	51.1	28 24.8	98 16	50.9	3
4	20 53.3	98 16	51.6	21 22.8	98 16	51.5	21 52.3	98 16	51.4	22 51.3	98 16	51.2	24 49.1	98 16	50.8	26 46.9	98 16	50.3	27 16.3	98 16	50.2	28 15.2	98 16	50.0	4
125	20 43.6	98 16	50.7	21 13.1	98 16	50.6	21 42.6	98 16	50.5	22 41.6	98 16	50.3	24 39.5	98 16	49.9	26 37.3	98 16	49.4	27 06.8	98 16	49.3	28 05.7	98 16	49.1	125
6	20 34.0	98 16	49.7	21 03.6	98 16	49.6	21 33.1	98 16	49.5	22 32.1	98 16	49.3	24 30.0	98 16	48.9	26 27.9	98 15	48.5	26 57.4	98 15	48.4	27 56.3	98 15	48.2	6
7	20 24.6	98 16	48.8	20 54.1	98 16	48.7	21 23.6	98 16	48.6	22 22.7	98 15	48.4	24 20.7	98 15	48.0	26 18.6	98 15	47.6	26 48.1	98 15	47.5	27 47.1	98 15	47.3	7
8	20 15.3	98 15	47.9	20 44.8	98 15	47.8	21 14.3	98 15	47.7	22 13.4	98 15	47.5	24 11.5	98 15	47.1	26 09.5	98 15	46.7	26 39.0	98 15	46.6	27 38.0	98 15	46.4	8
9	20 06.1	99 15	46.9	20 35.6	98 15	46.9	21 05.2	98 15	46.8	22 04.3	98 15	46.6	24 02.4	98 15	46.2	26 00.5	98 15	45.8	26 30.0	98 15	45.7	27 29.0	98 15	45.5	9
130	19 57.0	99 15	46.0	20 26.6	99 15	45.9	20 56.2	99 15	45.8	21 55.3	99 15	45.7	23 53.5	98 15	45.3	25 51.6	98 15	44.9	26 21.1	98 15	44.8	27 20.2	98 14	44.6	130
1	19 48.1	99 15	45.1	20 17.7	99 15	45.0	20 47.3	99 15	44.9	21 46.4	99 14	44.7	23 44.7	99 14	44.4	25 42.9	98 14	44.0	26 12.4	98 14	43.9	27 11.5	98 14	43.7	1
2	19 39.4	99 14	44.2	20 09.0	99 14	44.1	20 38.6	99 14	44.0	21 37.7	99 14	43.8	23 36.0	99 14	43.5	25 34.3	99 14	43.1	26 03.8	99 14	43.0	27 02.9	98 14	42.8	2
3	19 30.8	99 14	43.2	20 09.4	99 14	43.2	20 30.0	99 14	43.1	21 29.2	99 14	42.9	23 27.5	99 14	42.5	25 25.8	99 14	42.2	25 55.4	99 14	42.1	26 54.5	99 14	41.9	3
4	19 22.3	99 14	42.3	19 51.9	99 14	42.2	20 21.5	99 14	42.1	21 20.7	99 14	42.0	23 19.2	99 14	41.6	25 17.5	99 14	41.3	25 47.1	99 14	41.2	26 46.3	99 14	41.0	4
135	19 14.0	99 14	41.4	19 43.6	99 14	41.3	20 13.2	99 14	41.2	21 12.5	99 14	41.1	23 11.0	99 13	40.7	25 09.4	99 13	40.4	25 39.0	99 13	40.3	26 38.2	99 13	40.1	135
6	19 05.8	99 13	40.5	19 35.4	99 13	40.4	20 05.1	99 13	40.3	21 04.4	99 13	40.1	23 02.9	99 13	39.8	25 01.4	99 13	39.5	25 31.0	99 13	39.4	26 30.2	99 13	39.2	6
7	18 57.8	99 13	39.5	19 27.4	99 13	39.5	19 57.1	99 13	39.4	20 56.4	99 13	39.2	22 55.0	99 13	38.9	24 53.5	99 13	38.6	25 23.2	99 13	38.5	26 22.4	99 13	38.3	7
8	18 49.9	99 13	38.6	19 19.6	99 13	38.5	19 49.2	99 13	38.5	20 48.6	99 13	38.3	22 47.2	99 13	38.0	24 45.8	99 13	37.7	25 15.5	99 13	37.6	26 14.8	99 12	37.4	8
9	18 42.2	99 13	37.7	19 11.9	99 13	37.6	19 41.6	99 13	37.5	20 40.9	99 12	37.4	22 39.6	99 12	37.1	24 38.3	99 12	36.8	25 07.9	99 12	36.7	26 07.3	99 12	36.5	9
140	18 34.6	99 12	36.8	19 04.3	99 12	36.7	19 34.0	99 12	36.6	20 33.4	99 12	36.5	22 32.2	99 12	36.2	24 30.9	99 12	35.9	25 00.6	99 12	35.8	25 59.9	99 12	35.6	140
1	18 27.3	99 12	35.9	18 57.0	99 12	35.8	19 26.7	99 12	35.7	20 26.1	99 12	35.6	22 24.9	99 12	35.3	24 23.7	99 12	35.0	24 53.4	99 12	34.9	25 52.7	99 12	34.7	1
2	18 20.0	99 12	34.9	18 49.8	99 12	34.9	19 19.5	99 12	34.8	20 18.9	99 12	34.6	22 17.8	99 12	34.4	24 16.6	99 12	34.1	24 46.3	99 12	34.0	25 45.7	99 11	33.8	2
3	18 13.0	99 11	34.0	18 42.7	99 11	33.9	19 12.4	99 11	33.9	20 11.9	99 11	33.7	22 10.8	99 11	33.4	24 09.7	99 11	33.2	24 39.4	99 11	33.1	25 38.8	99 11	32.9	3
4	18 06.1	99 11	33.1	18 35.8	99 11	33.0	19 05.6	99 11	33.0	20 05.1	99 11	32.8	22 04.0	99 11	32.5	24 03.0	99 11	32.3	24 32.7	99 11	32.2	25 32.2	99 11	32.0	4
145	17 59.3	99 11	32.2	18 29.1	99 11	32.1	18 58.9	99 11	32.0	19 58.4	99 11	31.9	21 57.4	99 11	31.6	23 56.4	99 11	31.4	24 26.1	99 11	31.3	25 25.6	99 11	31.1	145
6	17 52.8	99 11	31.3	18 22.6	99 11	31.2	18 52.3	99 11	31.1	19 51.9	99 11	31.0	21 50.9	99 10	30.7	23 50.0	99 10	30.5	24 19.7	99 10	30.4	25 19.3	99 10	30.2	6
7	17 46.4	99 10	30.3	18 16.2	99 10	30.3	18 46.0	99 10	30.2	19 45.5	99 10	30.1	21 44.7	99 10	29.8	23 43.8	99 10	29.6	24 13.5	99 10	29.5	25 13.1	99 10	29.3	7
8	17 40.2	99 10	29.4	18 10.0	99 10	29.3	18 39.8	99 10	29.3	19 39.4	99 10	29.2	21 38.5	99 10	28.9	23 37.7	99 10	28.7	24 07.5	99 10	28.6	25 07.0	99 10	28.5	8
9	17 34.2	99 10	28.5	18 04.0	99 10	28.4	18 33.8	99 10	28.4	19 33.4	99 10	28.3	21 32.6	99 10	28.0	23 31.8	99 10	27.8	24 01.6	99 10	27.7	25 01.2	99 09	27.6	9
150	17 28.3	99 10	27.6	17 58.1	99 09	27.5	18 27.9	99 09	27.5	19 27.6	99 09	27.3	21 26.8	99 09	27.1	23 26.1	99 09	26.9	23 55.9	99 09	26.8	24 55.5	99 09	26.7	150
1	17 22.6	99 09	26.6	17 52.4	99 09	26.6	18 22.3	99 09	26.5	19 21.9	99 09	26.4	21 21.2	99 09	26.2	23 20.5	99 09	26.0	23 50.3	99 09	25.9	24 50.0	99 09	25.8	1
2	17 17.1	99 09	25.7	17 46.9	99 09	25.7	18 16.8	99 09	25.6	19 16.5	99 09	25.5	21 15.8	99 09	25.3	23 15.1	99 09	25.1	23 45.0	99 09	25.0	24 44.6	99 09	24.9	2
3	17 11.8	1.0 09	24.8	17 41.6	1.0 09	24.8	18 11.5	1.0 09	24.7	19 11.2	99 08	24.6	21 10.6	99 08	24.4	23 09.9	99 08	24.2	23 39.8	99 08	24.1	24 39.5	99 08	24.0	3
4	17 06.6	1.0 08	23.9	17 36.5	1.0 08	23.8	18 06.4	1.0 08	23.8	19 06.1	1.0 08	23.7	21 05.5	1.0 08	23.5	23 04.9	1.0 08	23.3	23 34.8	1.0 08	23.2	24 34.5	99 08	23.1	4
155	17 01.7	1.0 08	23.0	17 31.5	1.0 08	22.9	18 01.4	1.0 08	22.9	19 01.2	1.0 08	22.8	21 00.6	1.0 08	22.6	23 00.1	1.0 08	22.4	23 30.0	1.0 08	22.3	24 29.7	1.0 08	22.2	155
6	16 56.9	1.0 08	22.1	17 26.8	1.0 08	22.0	17 56.7	1.0 08	22.0	18 56.4	1.0 08	21.9	20 55.9	1.0 08	21.7	22 55.4	1.0 07	21.5	23 25.3	1.0 07	21.4	24 25.1	1.0 07	21.3	6
7	16 52.3	1.0 07	21.1	17 22.2	1.0 07	21.1	17 52.1	1.0 07	21.0	18 51.9	1.0 08	21.0	20 51.4	1.0 07	20.8	22 51.0	1.0 07	20.6	23 20.8	1.0 07	20.5	24 20.6	1.0 07	20.4	7
8	16 47.9	1.0 07	20.2	17 17.8	1.0 07	20.2	17 47.7	1.0 07	20.1	18 47.5	1.0 07	20.0	20 47.1	1.0 07	19.9	22 46.7	1.0 07	19.7	23 16.6	1.0 07	19.6	24 16.3	1.0 07	19.5	8
9	16 43.7	1.0 07	19.3	17 13.6	1.0 07	19.3	17 43.5	1.0 07	19.2	18 43.3	1.0 07	19.1	20 42.9	1.0 07	19.0	22 42.6	1.0 07	18.8	23 12.5	1.0 07	18.7	24 12.3	1.0 06	18.7	9
160	16 39.7	1.0 06	18.4	17 09.6	1.0 06	18.3	17 39.5	1.0 06	18.3	18 39.3	1.0 06	18.2	20 39.0	1.0 06	18.1	22 38.6	1.0 06	17.9	23 08.5	1.0 06	17.9	24 08.4	1.0 06	17.8	160
1	16 35.8	1.0 06	17.5	17 05.7	1.0 06	17.4	17 35.7	1.0 06	17.4	18 35.5	1.0 06	17.3	20 35.2	1.0 06	17.2	22 34.9	1.0 06	17.0	23 04.8	1.0 06	17.0	24 04.6	1.0 06	16.9	1
2	16 32.2	1.0 06	16.5	17 02.1	1.0 06	16.5	17 32.0	1.0 06	16.5	18 31.9	1.0 06	16.4	20 31.6	1.0 06	16.2	22 31.3	1.0 06	16.1	23 01.3	1.0 06	16.1	24 01.1	1.0 06	16.0	2
3	16 28.7	1.0 05	15.6	16 58.7	1.0 05	15.6	17 28.6	1.0 05	15.6	18 28.5	1.0 05	15.5	20 28.2	1.0 05	15.3	22 28.0	1.0 05	15.2	22 57.9	1.0 05	15.2	23 57.8	1.0 05	15.1	3
4	16 25.5	1.0 05	14.7	16 55.4	1.0 05	14.7	17 25.4	1.0 05	14.6	18 25.2	1.0 05	14.6	20 25.0	1.0 05	14.4	22 24.8	1.0 05	14.3	22 54.7	1.0 05	14.3	23 54.6	1.0 05	14.2	4
165	16 22.4	1.0 05	13.8	16 52.3	1.0 05	13.8	17 22.3	1.0 05	13.7	18 22.2	1.0 05	13.7	20 22.0	1.0 05	13.5	22 21.8	1.0 05	13.4	22 51.8	1.0 05	13.4	23 51.6	1.0 05	13.3	165
6	16 19.5	1.0 04	12.9	16 49.5	1.0 04	12.8	17 19.4	1.0 04	12.8	18 19.4	1.0 04	12.8	20 19.2	1.0 04	12.6	22 19.0	1.0 04	12.5	22 49.0	1.0 04	12.5	23 48.9	1.0 04	12.4	6
7	16 16.8	1.0 04	11.9	16 46.8	1.0 04	11.9	17 16.8	1.0 04	11.9	18 16.7	1.0 04	11.8	20 16.5	1.0 04	11.7	22 16.4	1.0 04	11.6	22 46.4	1.0 04	11.6	23 46.3	1.0 04	11.5	7
8	16 14.4	1.0 04	11.0	16 44.3	1.0 04	11.0	17 14.3	1.0 04	11.0	18 14.2	1.0 04	10.9	20 14.1	1.0 04	10.8	22 14.0	1.0 04	10.7	22 43.9	1.0 04	10.7	23 43.9	1.0 04	10.7	8
9	16 12.1	1.0 03	10.1	16 42.0	1.0 04	10.1	17 12.0	1.0 03	10.1	18 12.0	1.0 03	10.0	20 11.9	1.0 03	09.9	22 11.8	1.0 03	09.8	22 41.7	1.0 03	09.8	23 41.7	1.0 03	09.8	9
170	16 10.0	1.0 03	09.2	16 40.0	1.0 03	09.2	17 09.9	1.0 03	09.1	18 09.9	1.0 03	09.1	20 09.8	1.0 03	09.0	22 09.7	1.0 03	08.9	22 39.7	1.0 03	08.9	23 39.6	1.0 03	08.9	170
1	16 08.1	1.0 03	08.3	16 38.1	1.0 03	08.3	17 08.1	1.0 03	08.2	18 08.0	1.0 03	08.2	20 07.9	1.0 03	08.1	22 07.9	1.0 03	08.0	22 37.9	1.0 03	08.0	23 37.8	1.0 03	08.0	1
2	16 06.4	1.0 02	07.3	16 36.4	1.0 02	07.3	17 06.4	1.0 02	07.3	18 06.3	1.0 02	07.3	20 06.3	1.0 02	07.2	22 06.2	1.0 02	07.2	22 36.2	1.0 02	07.1	23 36.2	1.0 02	07.1	2
3	16 04.9	1.0 02	06.4	16 34.9	1.0 02	06.4	17 04.9	1.0 02	06.4	18 04.9	1.0 02	06.4	20 04.8	1.0 02	06.3	22 04.8	1.0 02	06.3	22 34.8	1.0 02	06.2	23 34.7	1.0 02	06.2	3
4	16 03.6	1.0 02	05.5	16 33.6	1.0 02	05.5	17 03.6	1.0 02	05.5	18 03.6	1.0 02	05.5	20 03.5	1.0 02	05.4	22 03.5	1.0 02	05.4	22 33.5	1.0 02	05.4	23 33.5	1.0 02	05.3	4
175	16 02.5	1.0 02	04.6	16 32.5	1.0 02	04.6	17 02.5	1.0 01	04.6	18 02.5	1.0 02	04.6	20 02.5	1.0 01	04.5	22 02.4	1.0 01	04.5	22 32.4	1.0 01	04.5	23 32.4	1.0 01	04.4	175
6	16 01.6	1.0 01	03.7	16 31.6	1.0 01	03.7	17 01.6	1.0 01	03.7	18 01.6	1.0 01	03.6	20 01.6	1.0 01	03.6	22 01.6	1.0 01	03.6	22 31.6	1.0 01	03.6	23 31.5	1.0 01	03.6	6
7	16 00.9	1.0 01	02.8	16 30.9	1.0 01	02.7	17 00.9	1.0 01	02.7	18 00.9	1.0 01	02.7	20 00.9	1.0 01	02.7	22 00.9	1.0 01	02.7	22 30.9	1.0 01	02.7	23 30.9	1.0 01	02.7	7
8	16 00.4	1.0 00	01.8	16 30.4	1.0 00	01.8	17 00.4	1.0 00	01.8	18 00.4	1.0 00	01.8	20 00.4	1.0 00	01.8	22 00.4	1.0 00	01.8	22 30.4	1.0 00	01.8	23 30.4	1.0 00	01.8	8
9	16 00.1	1.0 00	00.9	16 30.1	1.0 00	00.9	17 00.1	1.0 00	00.9	18 00.1	1.0 00	00.9	20 00.1	1.0 00	00.9	22 00.1	1.0 00	00.9	22 30.1	1.0 00	00.9	23 30.1	1.0 00	00.9	9
180	16 00.0	1.0 00	00.0	16 30.0	1.0 00	00.0	17 00.0	1.0 00	00.0	18 00.0	1.0 00	00.0	20 00.0	1.0 00	00.0	22 00.0	1.0 00	00.0	22 30.0	1.0 00	00.0	23 30.0	1.0 00	00.0	180

Lat. 78°

Lat. 79°

Lat. 78°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	48 80.0	1.00	180.0	49 00.0	1.00	180.0	50 30.0	1.00	180.0	52 00.0	1.00	180.0	54 00.0	1.00	180.0	54 30.0	1.00	180.0	55 00.0	1.00	180.0	57 00.0	1.00	180.0	00
1	47 59.9	1.00	178.8	48 59.9	1.00	178.8	50 29.9	1.00	178.8	51 59.9	1.00	178.8	53 59.9	1.00	178.7	54 29.9	1.00	178.7	54 59.9	1.00	178.7	56 59.9	1.00	178.7	1
2	47 59.5	1.00	177.6	48 59.5	1.00	177.6	50 29.5	1.00	177.5	51 59.5	1.00	177.5	53 59.4	1.00	177.5	54 29.4	1.00	177.5	54 59.4	1.00	177.5	56 59.4	1.00	177.4	2
3	47 58.8	1.00	176.4	48 58.8	1.00	176.3	50 28.8	1.00	176.3	51 58.8	1.00	176.3	53 58.8	1.00	176.2	54 28.8	1.00	176.2	54 58.8	1.00	176.2	56 58.7	1.00	176.1	3
4	47 57.9	1.00	175.2	48 57.9	1.00	175.1	50 27.9	1.00	175.1	51 57.8	1.00	175.0	53 57.8	1.00	174.9	54 27.8	1.00	174.9	54 57.8	1.00	174.9	56 57.7	1.00	174.8	4
05	47 56.7	1.00	174.0	48 56.7	1.00	173.9	50 26.7	1.00	173.9	51 56.6	1.00	173.8	53 56.6	1.00	173.7	54 26.6	1.00	173.7	54 56.5	1.00	173.6	56 56.5	1.00	173.5	05
6	47 55.3	1.00	172.8	48 55.2	1.00	172.7	50 25.2	1.00	172.6	51 55.1	1.00	172.5	53 55.1	1.00	172.4	54 25.0	1.00	172.4	54 55.0	1.00	172.4	56 54.9	1.00	172.2	6
7	47 53.6	1.00	171.5	48 53.5	1.00	171.5	50 23.5	1.00	171.4	51 53.4	1.00	171.3	53 53.3	1.00	171.2	54 23.2	1.00	171.1	54 53.2	1.00	171.1	56 53.1	1.00	170.9	7
8	47 51.6	1.00	170.3	48 51.5	1.00	170.3	50 21.5	1.00	170.2	51 51.4	1.00	170.1	53 51.2	1.00	169.9	54 21.2	1.00	169.9	54 51.1	1.00	169.8	56 51.0	1.00	169.6	8
9	47 49.4	1.00	169.1	48 49.3	1.00	169.1	50 19.2	1.00	168.9	51 49.1	1.00	168.8	53 48.9	1.00	168.6	54 18.9	1.00	168.6	54 48.8	1.00	168.5	56 48.6	1.00	168.3	9
10	47 46.9	1.00	167.9	48 46.8	1.00	167.9	50 16.7	1.00	167.7	51 46.5	1.00	167.6	53 46.3	1.00	167.4	54 16.3	1.00	167.3	54 46.2	1.00	167.3	56 45.9	1.00	167.1	10
1	47 44.2	1.00	166.7	48 44.1	1.00	166.6	50 13.9	1.00	166.5	51 43.7	1.00	166.4	53 43.5	1.00	166.1	54 13.4	1.00	166.1	54 43.3	1.00	166.0	56 43.0	1.00	165.8	1
2	47 41.2	1.00	165.5	48 41.0	1.00	165.4	50 10.8	1.00	165.3	51 40.6	1.00	165.1	53 40.3	1.00	164.9	54 10.2	1.00	164.8	54 40.2	1.00	164.8	56 39.8	1.00	164.5	2
3	47 37.9	1.00	164.3	48 37.8	1.00	164.2	50 07.6	1.00	164.1	51 37.3	1.00	163.9	53 36.9	1.00	163.6	54 06.8	1.00	163.6	54 36.8	1.00	163.5	56 36.3	1.00	163.2	3
4	47 34.4	1.00	163.1	48 34.3	1.00	163.0	50 04.0	1.00	162.8	51 33.7	1.00	162.7	53 33.3	1.00	162.4	54 03.2	1.00	162.3	54 33.1	1.00	162.2	56 32.6	1.00	161.9	4
15	47 30.7	1.00	161.9	48 30.5	1.00	161.8	50 00.2	1.00	161.6	51 29.9	1.00	161.4	53 29.4	1.00	161.1	53 59.3	1.00	161.1	54 29.1	1.00	161.0	56 28.6	1.00	160.6	15
6	47 26.7	1.00	160.7	48 26.5	1.00	160.6	49 56.1	1.00	160.4	51 25.8	1.00	160.2	53 25.2	1.00	159.9	53 55.1	1.00	159.8	54 24.9	1.00	159.7	56 24.3	99 08	159.4	6
7	47 22.5	1.00	159.6	48 22.2	1.00	159.4	49 51.8	1.00	159.2	51 21.4	1.00	159.0	53 20.8	99 08	158.7	53 50.7	99 08	158.6	54 20.5	99 08	158.5	56 19.8	99 08	158.1	7
8	47 18.0	1.00	158.4	48 17.7	1.00	158.2	49 47.3	1.00	158.0	51 16.8	99 08	157.8	53 16.2	99 08	157.4	53 46.0	99 08	157.3	54 15.8	99 08	157.2	56 15.0	99 08	156.8	8
9	47 13.3	1.00	157.2	48 13.0	99 08	157.0	49 42.5	99 08	156.8	51 12.0	99 08	156.5	53 11.2	99 09	156.2	53 41.0	99 09	156.1	54 10.8	99 09	156.0	56 10.0	99 09	155.6	9
20	47 08.3	99 09	156.0	48 08.0	99 09	155.8	49 37.5	99 09	155.6	51 06.9	99 09	155.3	53 06.1	99 09	155.0	53 35.9	99 09	154.9	54 05.7	99 09	154.8	56 04.7	99 09	154.3	20
1	47 03.1	99 09	154.8	48 02.8	99 09	154.7	49 32.2	99 09	154.4	51 01.6	99 09	154.1	53 00.7	99 09	153.7	53 30.4	99 09	153.6	54 00.2	99 09	153.5	55 59.2	99 10	153.1	1
2	46 57.7	99 09	153.6	47 57.3	99 09	153.5	49 26.7	99 10	153.2	50 56.0	99 10	152.9	52 55.0	99 10	152.5	53 24.8	99 10	152.4	53 54.5	99 10	152.3	55 53.4	99 10	151.8	2
3	46 52.0	99 10	152.5	47 51.6	99 10	152.3	49 20.9	99 10	152.0	50 50.2	99 10	151.7	52 49.2	99 10	151.3	53 18.9	99 10	151.2	53 48.6	99 10	151.1	55 47.4	99 10	150.6	3
4	46 46.2	99 10	151.3	47 45.7	99 10	151.1	49 15.0	99 10	150.8	50 44.2	99 10	150.5	52 43.1	99 11	150.1	53 12.8	99 11	150.0	53 42.4	99 11	149.8	55 41.2	99 11	149.3	4
25	46 40.1	99 11	150.1	47 39.6	99 11	149.9	49 08.8	99 11	149.6	50 37.9	99 11	149.3	52 36.7	99 11	148.9	53 06.4	99 11	148.7	53 36.1	99 11	148.6	55 34.7	99 11	148.1	25
6	46 33.7	99 11	148.9	47 33.2	99 11	148.8	49 02.3	99 11	148.4	50 31.4	99 11	148.1	52 30.2	99 11	147.6	52 59.8	99 11	147.5	53 29.5	99 11	147.4	55 28.0	99 12	146.9	6
7	46 27.2	99 11	147.8	47 26.6	99 11	147.6	48 55.7	99 11	147.3	50 24.7	99 12	146.9	52 23.4	99 12	146.4	52 53.0	99 12	146.3	53 22.6	99 12	146.2	55 21.0	99 12	145.6	7
8	46 20.4	99 12	146.6	47 19.8	99 12	146.4	48 48.9	99 12	146.1	50 17.8	99 12	145.7	52 16.4	99 12	145.2	52 46.0	99 12	145.1	53 15.6	99 12	145.0	55 13.9	99 12	144.4	8
9	46 13.5	99 12	145.5	47 12.8	99 12	145.2	48 41.8	99 12	144.9	50 10.7	99 12	144.6	52 09.1	99 12	144.0	52 38.7	99 12	143.9	53 08.3	99 12	143.8	55 06.5	99 13	143.2	9
30	46 06.3	99 12	144.3	47 05.6	99 12	144.1	48 34.5	99 12	143.7	50 03.4	99 13	143.4	52 01.7	99 13	142.8	52 31.3	99 13	142.7	53 00.8	98 13	142.6	54 58.9	98 13	142.0	30
1	45 58.9	99 13	143.2	46 58.2	99 13	142.9	48 27.0	99 13	142.6	49 55.8	99 13	142.2	51 54.1	98 13	141.7	52 23.6	98 13	141.5	52 53.1	98 13	141.4	54 51.1	98 13	140.8	1
2	45 51.3	99 13	142.0	46 50.6	99 13	141.8	48 19.4	99 13	141.4	49 48.1	99 13	141.0	51 46.2	98 13	140.5	52 15.7	98 13	140.3	52 45.3	98 13	140.2	54 43.2	98 14	139.6	2
3	45 43.6	99 13	140.9	46 42.7	99 13	140.6	48 11.5	99 13	140.3	49 40.1	98 14	139.9	51 38.2	98 14	139.3	52 07.7	98 14	139.1	52 37.2	98 14	139.0	54 35.0	98 14	138.4	3
4	45 35.6	99 14	139.7	46 34.7	99 14	139.5	48 03.4	98 14	139.1	49 32.0	98 14	138.7	51 30.0	98 14	138.1	51 59.4	98 14	138.0	52 28.9	98 14	137.8	54 26.6	98 14	137.2	4
35	45 27.4	99 14	138.6	46 26.5	98 14	138.3	47 55.1	98 14	137.9	49 23.7	98 14	137.5	51 21.5	98 14	137.0	51 51.0	98 14	136.8	52 20.4	98 14	136.6	54 18.0	98 15	136.0	35
6	45 19.1	98 14	137.4	46 18.2	98 14	137.2	47 46.7	98 14	136.8	49 15.1	98 14	136.4	51 12.9	98 15	135.8	51 42.4	98 15	135.6	52 11.8	98 15	135.5	54 09.2	98 15	134.8	6
7	45 10.6	98 14	136.3	46 09.6	98 15	136.1	47 38.1	98 15	135.7	49 06.5	98 15	135.2	51 04.1	98 15	134.6	51 33.5	98 15	134.5	52 02.9	98 15	134.3	54 00.3	98 15	133.6	7
8	45 01.8	98 15	135.2	46 00.8	98 15	134.9	47 29.3	98 15	134.5	48 57.6	98 15	134.1	50 55.2	98 15	133.5	51 24.5	98 15	133.3	51 53.9	98 15	133.1	53 51.2	98 15	132.4	8
9	44 53.0	98 15	134.1	45 51.9	98 15	133.8	47 20.3	98 15	133.4	48 48.5	98 15	132.9	50 46.0	98 16	132.3	51 15.4	98 16	132.2	51 44.7	98 16	132.0	53 41.9	98 16	131.3	9
40	44 43.9	98 15	132.9	45 42.8	98 15	132.7	47 11.1	98 16	132.3	48 39.3	98 16	131.8	50 36.7	98 16	131.2	51 06.1	98 16	131.0	51 35.4	98 16	130.8	53 32.4	97 16	130.1	40
1	44 34.7	98 16	131.8	45 33.6	98 16	131.6	47 01.8	98 16	131.1	48 29.9	98 16	130.7	50 27.3	98 16	130.0	50 56.6	98 16	129.9	51 25.8	98 16	129.7	53 22.8	97 16	128.9	1
2	44 25.3	98 16	130.7	45 24.2	98 16	130.4	46 52.3	98 16	130.0	48 20.4	98 16	129.5	50 17.6	98 16	128.9	50 46.9	98 16	128.7	51 16.2	97 16	128.5	53 13.0	97 17	127.8	2
3	44 15.8	98 16	129.6	45 14.6	98 16	129.3	46 42.7	98 16	128.9	48 10.7	98 16	128.4	50 07.8	98 17	127.8	50 37.1	97 17	127.6	51 06.3	97 17	127.4	53 03.1	97 17	126.7	3
4	44 06.1	98 16	128.5	45 04.9	98 16	128.2	46 32.9	98 17	127.8	48 00.8	98 17	127.3	49 57.9	97 17	126.6	50 27.1	97 17	126.5	50 56.3	97 17	126.3	52 53.0	97 17	125.5	4
45	43 56.3	98 17	127.4	44 55.0	98 17	127.1	46 23.0	98 17	126.7	47 50.9	98 17	126.2	49 47.8	97 17	125.5	50 17.0	97 17	125.3	50 46.2	97 17	125.1	52 42.8	97 17	124.4	45
6	43 46.3	98 17	126.3	44 45.0	98 17	126.0	46 12.9	98 17	125.6	47 40.7	98 17	125.1	49 37.6	97 17	124.4	50 06.8	97 17	124.2	50 35.9	97 17	124.0	52 32.4	97 18	123.2	6
7	43 36.2	98 17	125.2	44 34.8	98 17	124.9	46 02.7	98 17	124.5	47 30.4	97 17	124.0	49 27.2	97 18	123.3	49 56.4	97 18	123.1	50 25.5	97 18	122.9	52 21.9	97 18	122.1	7
8	43 25.9	98 17	124.1	44 24.5	98 17	123.8	45 52.3	98 17	123.4	47 20.0	97 18	122.9	49 16.7	97 18	122.2	49 45.9	97 18	122.0	50 15.0	97 18	121.8	52 11.3	97 18	121.0	8
9	43 15.5	98 18	123.0	44 14.1	98 18	122.7	45 41.8	97 18	122.3	47 09.5	97 18	121.8	49 06.1	97 18	121.1	49 35.2	97 18	120.9	50 04.3	97 18	120.7	52 00.5	97 18	119.9	9
50	43 05.0	98 18	121.9	44 03.5	98 18	121.6	45 31.2	97 18	121.2	46 58.8	97 18	120.7	48 55.4	97 18	120.0	49 24.5	97 18	119.8	49 53.5	97 18	119.6	51 49.7	97 18	118.8	50
1	42 54.3	98 18	120.9	43 52.8	97 18	120.6	45 20.5	97 18	120.1	46 48.0	97 18	119.6	48 44.5	97 18	118.9	49 13.6	97 18	118.7	49 42.6	97 18	118.5	51 38.7	97 18	117.7	1
2	42 43.6	97 18	119.8	43 42.0	97 18	119.5	45 09.6	97 18	119.0	46 37.1	97 18	118.5	48 33.5	97 18	117.8	49 02.6	97 19	117.6	49 31.6	97 19	117.4	51 27.6	98 19	116.6	2
3	42 32.7	97 18	118.7	43 31.1	97 18	118.4	44 58.7	97 18	117.9	46 26.1	97 19	117.4	48 22.4	97 19	116.7	48 51.5	97 19	116.5	49 20.5	97 19	116.3	51 16.4	98 19	115.5	3
4	42 21.7	97 18	117.7	43 20.1	97 19	117.3	44 47.6	97 19	116.9	46 15.0	97 19	116.3	48 11.2	97 19	115.6	48 40.2	97 19	115.4	49 09.2	97 19	115.2	51 05.0	98 19	114.4	4
55	42 10.6	97 19	116.6	43 09.0	97 19	116.3	44 36.4	97 19	115.8	46 03.7	97 19	115.3	47 59.9	97 19	114.5	48 28.9	97 19	114.3	48 57.9	97 19	114.1	50 53.6	98 19	113.3	55
6	41 59.4	97 19	115.5	42 57.7	97 19	115.2	44 25.1	97 19	114.7	45 52.4	97 19	114.2	47 48.5	97 19	113.5	48 17.5	97 19	113.3	48 46.5	97 19	113.1	50 42.1	98 19	112.2	6
7	41 48.1	97 19	114.5	42 46.4	97 19	114.2	44 13.8	97 19	113.7	45 41.0	97 19	113.1	47 37.0	97 19	112.4	48 06.0	97 19	112.2	48 35.0	98 19	112.0	50 30.5	98 19	111.2	7
8	41 36.7	97 19	113.4	42 35.0	97 19	113.1	44 02.3	97 19	112.6	45 29.5	97 19	112.1	47 25.5	97 19	111.3	47 54.4	98 19	111.1	48 23.4	98 19	110.9	50 18.9	98 20	110.1	8
9	41 25.2	97 19	112.4	42 23.4	97 19	112.0	43 50.7	97 19	111.5	45 17.9	97 19	111.0	47 13.8	98 20	110.3	47 42.7	98 20	110.1	48 11.7	98 20	109.9	50 07.1	98 20	109.0	9
60	41 13.6	97 19	111.3	42 11.8	97 20	111.0	43 39.1	97 20	110.5	45 06.2	97 20	110.0	47 02.1	98 20	109.2	47 31.0	98 20	109.0	47 59.9	98 20	108.8	49 55.3	98 20	108.0	60
1	41 02.0	97 20	110.3	42 00.2	97 20	110.0	43 27.4	97 20	109.4	44 54.4	97 20	108.9	46 50.2	98 20	108.2	47 19.2	98 20	108.0	47 48.0	98 20	107.8	49 43.4	98 20	106.9	1
2	40 50.2	97 20	109.2	41 48.4	97 20	108.9	43 15.6	97 20	108.4	44 42.6	97 20	107.9	46 38.4	98 20	107.1	47 07.3	98 20	106.9	47 36.1	98 20	106.7	49 31.4	98 20	105.9	2
3	40 38.4	97 20	108.2	41 36.6	97 20	107.9	43 03.7	97 20	107.4	44 30.7	97 20	106.8	46 26.4	98 20	106.1	46 55.3	98 20	105.9	47 24.2	98 20	105.7	49 19.4	98 20	104.8	3
4	40 26.5	97 20	107.2	41 24.6	97 20	106.8	42 51.7	97 20	106.3	44 18.7	97 20	105.8	46 14.4	98 20	105.0	46 43.3	98 20	104.8	47 12.1	98 20	104.6	49 07.3	98 20	103.8	4
65	40 14.6	97 20	106.1	41 12.7	97 20	105.8	42 39.7	97 20	105.3	44 06.7	98 20	104.8	46 02.3	98 20	104.0	46 31.2	98 20	103.8	47 00.0	98 20	103.6	48 55.2	98 20	102.8	65
6	40 02.5	97 20	105.1	41 00.6	97 20	104.8	42 27.7	97 20	104.3	43 54.6	98 20	103.7	45 50.2	98 20	103.0	46 19.0	98 20	102.8	46 47.9	98 20	102.6	48 43.0	98 20	101.7	6
7	39 50.5	97 20	104.1	40 48.6	97 20	103.8	42 15.6	97 20	103.3	43 42.4	98 20	102.7	45 38.0	98 20	102.0	46 06.8	98 20	101.8	46 35.7	98 20	101.6	48 30.7	98 20	100.7	7
8	39 38.4	97 20	103.1	40 36.4	97 20	102.7	42 03.4	97 20	102.2	43 30.2	98 20	101.7	45 25.8	98 20	100.9	45 54.6	98 20	100.7	46 23.4	98 20	100.5	48 18.5	98 21	99.7	8
9	39 26.2	97 20	102.1	40 24.2	97 20	101.7	41 51.2	97 20	101.2	43 18.0	98 20	100.7	45 13.5	98 20	99.9	45 42.3	98 21	99.7	46 11.1	98 21	99.5	48 06.1	98 21	98.7	9
70	39 14.0	97 20	101.0	40 12.0	97 20	100.7	41 38.9	97 20	100.2	43 05.7	98 21	99.7	45 01.2	98 21	98.9	45 30.0	98 21	98.7	45 58.8	98 21	98.5	47 53.8	98 21	97.7	70
1	39 01.7	97 20	100.0	39 59.7	97 21	99.7	41 26.6	97 21	99.2	42 53.4	98 21	98.7	44 48.9	98 21	97.9	45 17.7	98 21	97.7	45 46.5	98 21	97.5	47 41.4	98 21	96.7	1
2	38 49.4	97 21	99.0	39 47.4	97 21	98.7	41 14.3	98 21	98.2	42 41.1	98 21	97.7	44 36.5	98 21	96.9	45 05.3	98 21	96.7	45 34.1	98 21	96.5	47 29.0	98 21	95.7	2
3	38 37.1	97 21	98.0	39 35.0	97 21	97.7	41 01.9	98 21	97.2	42 28.7	98 21	96.7	44 24.1	98 21	95.9	44 52.9	98 21	95.7	45 21.7	98 21	95.5	47 16.6	98 21	94.7	3
4	38 24.7	97 21	97.0	39 22.7	97 21	96.7	40 49.5	98 21	96.2	42 16.3	98 21	95.7	44 11.7	98 21	94.9	44 40.5	98 21	94.7	45 09.3	98 21	94.5	47 04.2	98 21	93.7	4
75	38 12.3	97 21	96.0	39 10.3	97 21	95.7	40 37.1	98 21	95.2	42 03.9	98 21	94.7	43 59.2	98 21	93.9	44 28.0	98 21	93.7	44 56.8	98 21	93.5	46 51.7	98 21	92.7	75
6	37 59.9	97 21	95.0	38 57.8	97 21	94.7	40 24.7	98 21	94.2	41 51.4	98 21	93.7	43 46.8	98 21	92.9	44 15.6	98 21	92.7	44 44.4	98 21	92.5	46 39.2	98 21	91.7	6
7	37 47.4	97 21	94.0	38 45.4	97 21	93.7	40 12.3	98 21	93.2	41 39.0	98 21	92.7	43 34.3	98 21	91.9	44 03.1	98 21	91.7	44 31.9	98 21	91.5	46 26.8	98 21	90.7	7
8	37 35.0	97 21	93.1	38 33.0	97 21	92.7	39 59.8	98 21	92.2	41 26.5	98 21	91.7	43 21.8	98 21	90.9	43 50.6	98 21	90.8	44 19.4	98 21	90.6	46 14.3	98 21	89.7	8
9	37 22.5	97 21	92.1	38 20.5	97 21	91.7	39 47.3	98 21	91.2	41 14.0	98 21	90.7	43 09.4	98 21	90.0	43 38.2	98 21	89.8	44 06.9	98 21	89.6	46 01.8	98 21	88.8	9
80	37 10.1	97 21	91.1	38 08.0	97 21	90.8	39 34.8	98 21	90.3	41 01.5	98 21	89.7	42 56.9	98 21	89.0	43 25.7	98 21	88.8	43 54.5	98 21	88.6	45 49.3	98 21	87.8	80
1	36 57.6	97 21	90.1	37 55.5	97 21	89.8	39 22.4	98 21	89.3	40 49.1	98 21	88.8	42 44.4	98 21	88.0	43 13.2	98 21	87.8	43 42.0	98 21	87.6	45 36.9	98 21	86.8	1
2	36 45.1	97 21	89.1	37 43.1	97 21	88.8	39 09.9	98 21	88.3	40 36.6	98 21	87.8	42 32.0	98 21	87.0	43 00.8	98 21	86.9	43 29.5	98 21	86.7	45 24.4	98 21	85.9	2
3	36 32.6	97 21	88.2	37 30.6	97 21	87.8	38 57.4	98 21	87.3	40 24.1	98 21	86.8	42 19.5	98 21	86.1	42 48.3	98 21	85.9	43 17.1	98 21	85.7	45 12.0	98 21	84.9	3
4	36 20.2	97 21	87.2	37 18.1	97 21	86.9	38 45.0	98 21	86.4	40 11.7	98 21	85.8	42 07.1	98 21	85.1	42 35.9	98 21	84.9	43 04.7	98 21	84.7	44 59.6	98 21	83.9	4
85	36 07.7	97 21	86.2	37 05.7	97 21	85.9	38 32.5	98 21	85.4	39 59.3	98 21	84.9	41 54.7	98 21	84.2	42 23.5	98 21	84.0	42 52.2	98 21	83.8	44 47.2	98 21	83.0	85
6	35 55.3	97 21	85.3	36 53.3	97 21	84.9	38 20.1	98 21	84.4	39 46.8	98 21	83.9	41 42.3	98 21	83.2	42 11.1	98 21	83.0	42 39.9	98 21	82.8	44 34.8	98 21	82.0	6
7	35 42.9	97 21	84.3	36 40.8	97 21	84 0	38 07.7	98 21	83.5	39 34.5	98 21	83.0	41 29.9	98 21	82.2	41 58.7	98 21	82.1	42 27.5	98 21	81.9	44 22.5	98 20	81.1	7
8	35 30.5	97 21	83.3	36 28.4	97 21	83.0	37 55.3	98 21	82.5	39 22.1	98 21	82.0	41 17.5	98 21	81.3	41 46.4	98 21	81.1	42 15.2	98 20	80.9	44 10.2	98 20	80.1	8
9	35 18.1	97 21	82.4	36 16.1	97 21	82.1	37 43.0	98 21	81.6	39 09.7	98 21	81.1	41 05.2	98 20	80.3	41 34.1	98 20	80.2	42 02.9	98 20	80.0	43 57.9	98 20	79.2	9
90	35 05.7	97 21	81.4	36 03.7	97 20	81.1	37 30.6	97 20	80.6	38 57.4	98 20	80.1	40 52.9	98 20	79.4	41 21.8	98 20	79.2	41 50.6	98 20	79.0	43 45.7	98 20	78.3	90

Lat. 78°

H.A.	36° 00′ Alt.	Δd Δt	Az.	37° 00′ Alt.	Δd Δt	Az.	38° 30′ Alt.	Δd Δt	Az.	40° 00′ Alt.	Δd Δt	Az.	42° 00′ Alt.	Δd Δt	Az.	42° 30′ Alt.	Δd Δt	Az.	43° 00′ Alt.	Δd Δt	Az.	45° 00′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	34 53.4	97 20	80.5	35 51.4	97 20	80.1	37 18.4	97 20	79.7	38 45.2	96 20	79.2	40 40.7	96 20	78.5	41 09.5	96 20	78.3	41 38.4	96 20	78.1	43 33.5	96 20	77.3	91
2	34 41.1	97 20	79.5	35 39.2	97 20	79.2	37 06.1	97 20	78.7	38 32.9	96 20	78.2	40 28.5	96 20	77.5	40 57.4	96 20	77.3	41 26.2	96 20	77.1	43 21.3	96 20	76.4	2
3	34 28.9	97 20	78.6	35 26.9	97 20	78.2	36 53.9	97 20	77.8	38 20.7	96 20	77.3	40 16.3	96 20	76.6	40 45.2	96 20	76.4	41 14.0	96 20	76.2	43 09.2	96 20	75.5	3
4	34 16.7	97 20	77.6	35 14.7	97 20	77.3	36 41.7	97 20	76.8	38 08.6	96 20	76.3	40 04.2	96 20	75.6	40 33.1	96 20	75.5	41 02.0	96 20	75.3	42 57.2	96 20	74.5	4
95	34 04.5	97 20	76.7	35 02.6	97 20	76.4	36 29.6	97 20	75.9	37 56.5	96 20	75.4	39 52.2	96 20	74.7	40 21.1	96 20	74.5	40 49.9	96 20	74.3	42 45.2	96 20	73.6	95
6	33 52.4	97 20	75.7	34 50.5	97 20	75.4	36 17.5	97 20	74.9	37 44.5	97 20	74.5	39 40.2	96 20	73.8	40 09.1	96 20	73.6	40 37.9	96 20	73.4	42 33.3	96 20	72.7	6
7	33 40.3	97 20	74.8	34 38.4	97 20	74.5	36 05.5	97 20	74.0	37 32.5	97 20	73.5	39 28.2	96 20	72.8	39 57.1	96 20	72.7	40 26.0	96 20	72.5	42 21.4	96 20	71.8	7
8	33 28.3	97 20	73.8	34 26.4	97 20	73.5	35 53.5	97 20	73.1	37 20.5	97 20	72.6	39 16.3	96 20	71.9	39 45.2	96 20	71.7	40 14.1	96 20	71.6	42 09.6	96 20	70.8	8
9	33 16.4	97 20	72.9	34 14.5	97 20	72.6	35 41.6	97 20	72.1	37 08.7	97 20	71.7	39 04.5	96 20	71.0	39 33.4	96 20	70.8	40 02.3	96 20	70.6	41 57.8	96 20	69.9	9
100	33 04.5	97 20	72.0	34 02.6	97 20	71.7	35 29.8	97 20	71.2	36 56.9	97 20	70.7	38 52.7	96 20	70.1	39 21.7	96 19	69.9	39 50.6	96 19	69.7	41 46.1	96 19	69.0	100
1	32 52.7	97 20	71.0	33 50.8	97 20	70.7	35 18.0	97 20	70.3	36 45.1	97 20	69.8	38 41.0	97 19	69.2	39 10.0	96 19	69.0	39 38.9	96 19	68.8	41 34.5	96 19	68.1	1
2	32 40.9	97 20	70.1	33 39.1	97 19	69.8	35 06.3	97 19	69.3	36 33.4	97 19	68.9	38 29.4	97 19	68.2	38 58.4	97 19	68.1	39 27.3	96 19	67.9	41 23.0	96 19	67.2	2
3	32 29.2	97 19	69.2	33 27.4	97 19	68.9	34 54.7	97 19	68.4	36 21.8	97 19	68.0	38 17.9	97 19	67.3	38 46.9	97 19	67.2	39 15.8	96 19	67.0	41 11.5	96 19	66.3	3
4	32 17.6	97 19	68.2	33 15.8	97 19	67.9	34 43.1	97 19	67.5	36 10.3	97 19	67.0	38 06.4	97 19	66.4	38 35.4	97 19	66.2	39 04.4	97 19	66.1	41 00.1	96 19	65.4	4
105	32 06.0	97 19	67.3	33 04.3	97 19	67.0	34 31.6	97 19	66.6	35 58.9	97 19	66.1	37 55.0	97 19	65.5	38 24.0	97 19	65.3	38 53.0	97 19	65.2	40 48.8	96 19	64.5	105
6	31 54.6	97 19	66.4	32 52.9	97 19	66.1	34 20.2	97 19	65.7	35 47.5	97 19	65.2	37 43.7	97 19	64.6	38 12.7	97 19	64.4	38 41.7	97 19	64.3	40 37.6	96 19	63.6	6
7	31 43.2	97 19	65.4	32 41.5	97 19	65.2	34 08.9	97 19	64.7	35 36.2	97 19	64.3	37 32.5	97 19	63.7	38 01.5	97 19	63.5	38 30.5	97 18	63.4	40 26.5	97 18	62.7	7
8	31 31.9	97 19	64.5	32 30.2	97 19	64.2	33 57.7	97 19	63.8	35 25.0	97 18	63.4	37 21.3	97 18	62.8	37 50.4	97 18	62.6	38 19.4	97 18	62.4	40 15.5	97 18	61.8	8
9	31 20.7	97 19	63.6	32 19.0	97 18	63.3	33 46.5	97 18	62.9	35 13.9	97 18	62.5	37 10.3	97 18	61.9	37 39.4	97 18	61.7	38 08.4	97 18	61.5	40 04.5	97 18	60.9	9
110	31 09.5	97 18	62.7	32 07.9	97 18	62.4	33 35.5	97 18	62.0	35 02.9	97 18	61.6	36 59.3	97 18	61.0	37 28.4	97 18	60.8	37 57.5	97 18	60.6	39 53.7	97 18	60.0	110
1	30 58.5	97 18	61.8	31 56.9	97 18	61.5	33 24.5	97 18	61.1	34 52.0	97 18	60.6	36 48.5	97 18	60.1	37 17.6	97 18	59.9	37 46.7	97 18	59.8	39 42.9	97 18	59.1	1
2	30 47.5	97 18	60.8	31 46.0	97 18	60.6	33 13.6	97 18	60.2	34 41.2	97 18	59.7	36 37.7	97 18	59.2	37 06.8	97 18	59.0	37 35.9	97 18	58.9	39 32.2	97 18	58.2	2
3	30 36.7	97 18	59.9	31 35.2	97 18	59.7	33 02.8	97 18	59.3	34 30.4	97 18	58.8	36 27.1	97 18	58.3	36 56.2	97 18	58.1	37 25.3	97 18	58.0	39 21.7	97 17	57.3	3
4	30 26.0	98 18	59.0	31 24.5	97 18	58.7	32 52.2	97 18	58.3	34 19.8	97 18	57.9	36 16.5	97 17	57.4	36 45.7	97 17	57.2	37 14.8	97 17	57.1	39 11.2	97 17	56.5	4
115	30 15.3	98 18	58.1	31 13.9	98 18	57.8	32 41.6	97 17	57.4	34 09.3	97 17	57.0	36 06.1	97 17	56.5	36 35.2	97 17	56.3	37 04.4	97 17	56.2	39 00.9	97 17	55.6	115
6	30 04.8	98 17	57.2	31 03.4	98 17	56.9	32 31.2	98 17	56.5	33 58.9	97 17	56.1	35 55.7	97 17	55.6	36 24.9	97 17	55.4	36 54.1	97 17	55.3	38 50.7	97 17	54.7	6
7	29 54.4	98 17	56.3	30 53.0	98 17	56.0	32 20.8	98 17	55.6	33 48.6	97 17	55.2	35 45.5	97 17	54.7	36 14.7	97 17	54.5	36 43.9	97 17	54.4	38 40.5	97 17	53.8	7
8	29 44.0	98 17	55.3	30 42.7	98 17	55.1	32 10.6	98 17	54.7	33 38.4	98 17	54.3	35 35.4	97 17	53.8	36 04.6	97 17	53.7	36 33.8	97 17	53.5	38 30.5	97 16	52.9	8
9	29 33.8	98 17	54.4	30 32.5	98 17	54.2	32 00.4	98 17	53.8	33 28.3	98 17	53.4	35 25.4	97 16	52.9	35 54.6	97 16	52.8	36 23.8	97 16	52.6	38 20.6	97 16	52.0	9
120	29 23.7	98 17	53.5	30 22.4	98 17	53.3	31 50.4	98 16	52.9	33 18.3	98 16	52.5	35 15.5	98 16	52.0	35 44.7	98 16	51.9	36 14.0	97 16	51.7	38 10.9	97 16	51.2	120
1	29 13.8	98 16	52.6	30 12.5	98 16	52.4	31 40.5	98 16	52.0	33 08.5	98 16	51.6	35 05.7	98 16	51.1	35 35.0	98 16	51.0	36 04.2	98 16	50.9	38 01.2	97 16	50.3	1
2	29 03.9	98 16	51.7	30 02.7	98 16	51.5	31 30.8	98 16	51.1	32 58.8	98 16	50.8	34 56.0	98 16	50.2	35 25.3	98 16	50.1	35 54.6	98 16	50.0	37 51.7	97 16	49.4	2
3	28 54.2	98 16	50.8	29 53.0	98 16	50.6	31 21.1	98 16	50.2	32 49.2	98 16	49.9	34 46.5	98 16	49.4	35 15.8	98 16	49.2	35 45.1	98 16	49.1	37 42.2	98 15	48.6	3
4	28 44.6	98 16	49.9	29 43.4	98 16	49.7	31 11.6	98 16	49.3	32 39.7	98 16	49.0	34 37.1	98 15	48.5	35 06.4	98 15	48.3	35 35.8	98 15	48.2	37 33.0	98 15	47.7	4
125	28 35.1	98 16	49.0	29 34.0	98 16	48.8	31 02.2	98 15	48.4	32 30.4	98 15	48.1	34 27.8	98 15	47.6	34 57.2	98 15	47.5	35 26.5	98 15	47.3	37 23.8	98 15	46.8	125
6	28 25.8	98 15	48.1	29 24.6	98 15	47.9	30 52.9	98 15	47.5	32 21.1	98 15	47.2	34 18.7	98 15	46.7	34 48.1	98 15	46.6	35 17.4	98 15	46.5	37 14.8	98 15	45.9	6
7	28 16.5	98 15	47.2	29 15.4	98 15	47.0	30 43.8	98 15	46.6	32 12.1	98 15	46.3	34 09.7	98 15	45.8	34 39.1	98 15	45.7	35 08.4	98 15	45.6	37 05.9	98 15	45.1	7
8	28 07.4	98 15	46.3	29 06.4	98 15	46.1	30 34.8	98 15	45.8	32 03.1	98 15	45.4	34 00.8	98 15	44.9	34 30.2	98 15	44.8	34 59.6	98 15	44.7	36 57.1	98 14	44.2	8
9	27 58.5	98 15	45.4	28 57.5	98 15	45.2	30 25.9	98 15	44.9	31 54.3	98 14	44.5	33 52.0	98 14	44.1	34 21.5	98 14	44.0	34 50.9	98 14	43.8	36 48.5	98 14	43.3	9
130	27 49.7	98 14	44.5	28 48.7	98 14	44.3	30 17.2	98 14	44.0	31 45.6	98 14	43.6	33 43.4	98 14	43.2	34 12.9	98 14	43.1	34 42.3	98 14	43.0	36 40.0	98 14	42.5	130
1	27 41.0	98 14	43.6	28 40.1	98 14	43.4	30 08.6	98 14	43.1	31 37.1	98 14	42.8	33 35.0	98 14	42.3	34 04.4	98 14	42.2	34 33.9	98 14	42.1	36 31.6	98 14	41.6	1
2	27 32.5	98 14	42.7	28 31.6	98 14	42.5	30 00.1	98 14	42.2	31 28.7	98 14	41.9	33 26.6	98 14	41.4	33 56.1	98 14	41.3	34 25.6	98 14	41.2	36 23.4	98 13	40.8	2
3	27 24.1	99 14	41.8	28 23.2	98 14	41.6	29 51.8	98 14	41.3	31 20.4	98 14	41.0	33 18.5	98 13	40.6	33 48.0	98 13	40.5	34 17.4	98 13	40.3	36 15.3	98 13	39.9	3
4	27 15.9	99 14	40.9	28 15.0	99 13	40.7	29 43.7	99 13	40.4	31 12.3	98 13	40.1	33 10.4	98 13	39.7	33 39.9	98 13	39.6	34 09.4	98 13	39.5	36 07.4	98 13	39.0	4
135	27 07.8	99 13	40.0	28 06.9	99 13	39.8	29 35.7	99 13	39.5	31 04.3	99 13	39.2	33 02.5	98 13	38.8	33 32.1	98 13	38.7	34 01.6	98 13	38.6	35 59.6	98 13	38.2	135
6	26 59.8	99 13	39.1	27 59.0	99 13	38.9	29 27.8	99 13	38.6	30 56.5	99 13	38.3	32 54.8	99 13	37.9	33 24.3	98 13	37.8	33 53.9	98 13	37.7	35 52.0	98 12	37.3	6
7	26 52.0	99 13	38.2	27 51.3	99 13	38.0	29 20.1	99 13	37.8	30 48.9	99 13	37.5	32 47.2	99 12	37.1	33 16.7	99 12	37.0	33 46.3	99 12	36.9	35 44.5	98 12	36.5	7
8	26 44.4	99 12	37.3	27 43.7	99 12	37.1	29 12.5	99 12	36.9	30 41.4	99 12	36.6	32 39.7	99 12	36.2	33 09.3	99 12	36.1	33 38.9	99 12	36.0	35 37.2	99 12	35.6	8
9	26 36.9	99 12	36.4	27 36.2	99 12	36.2	29 05.1	99 12	36.0	30 34.0	99 12	35.7	32 32.4	99 12	35.3	33 02.0	99 12	35.2	33 31.6	99 12	35.1	35 30.0	99 12	34.7	9
140	26 29.6	99 12	35.5	27 28.9	99 12	35.4	28 57.9	99 12	35.1	30 26.8	99 12	34.8	32 25.3	99 12	34.5	32 54.9	99 12	34.4	33 24.5	99 12	34.3	35 23.0	99 11	33.9	140
1	26 22.4	99 12	34.6	27 21.8	99 12	34.5	28 50.8	99 12	34.2	30 19.7	99 12	34.0	32 18.3	99 11	33.6	32 48.0	99 11	33.5	33 17.6	99 11	33.4	35 16.1	99 11	33.0	1
2	26 15.4	99 11	33.7	27 14.8	99 11	33.6	28 43.8	99 11	33.3	30 12.9	99 11	33.1	32 11.5	99 11	32.7	32 41.2	99 11	32.6	33 10.8	99 11	32.5	35 09.4	99 11	32.2	2
3	26 08.6	99 11	32.8	27 08.0	99 11	32.7	28 37.1	99 11	32.4	30 06.1	99 11	32.2	32 04.8	99 11	31.9	32 34.5	99 11	31.8	33 04.2	99 11	31.7	35 02.8	99 11	31.3	3
4	26 01.9	99 11	32.0	27 01.3	99 11	31.8	28 30.4	99 11	31.6	29 59.6	99 11	31.3	31 58.3	99 11	31.0	32 28.0	99 11	30.9	32 57.7	99 11	30.8	34 56.4	99 10	30.5	4
145	25 55.4	99 11	31.1	26 54.8	99 11	30.9	28 24.0	99 10	30.7	29 53.2	99 10	30.4	31 52.0	99 10	30.1	32 21.7	99 10	30.0	32 51.4	99 10	30.0	34 50.1	99 10	29.6	145
6	25 49.0	99 10	30.2	26 48.5	99 10	30.0	28 17.7	99 10	29.8	29 46.9	99 10	29.6	31 45.8	99 10	29.3	32 15.5	99 10	29.2	32 45.2	99 10	29.1	34 44.1	99 10	28.8	6
7	25 42.8	99 10	29.3	26 42.3	99 10	29.1	28 11.6	99 10	28.9	29 40.8	99 10	28.7	31 39.8	99 10	28.4	32 09.5	99 10	28.3	32 39.3	99 10	28.2	34 38.1	99 10	27.9	7
8	25 36.8	99 10	28.4	26 36.3	99 10	28.3	28 05.7	99 10	28.0	29 34.9	99 10	27.8	31 33.9	99 09	27.5	32 03.7	99 09	27.5	32 33.4	99 09	27.4	34 32.4	99 09	27.1	8
9	25 31.0	99 10	27.5	26 30.5	99 09	27.4	27 59.9	99 09	27.2	29 29.2	99 09	27.0	31 28.3	99 09	26.7	31 58.0	99 09	26.6	32 27.8	99 09	26.5	34 26.8	99 09	26.2	9
150	25 25.3	99 09	26.6	26 24.9	99 09	26.5	27 54.3	99 09	26.3	29 23.6	99 09	26.1	31 22.8	99 09	25.8	31 52.5	99 09	25.7	32 22.3	99 09	25.7	34 21.4	99 09	25.4	150
1	25 19.8	99 09	25.7	26 19.4	99 09	25.6	27 48.8	99 09	25.4	29 18.2	99 09	25.2	31 17.4	99 09	24.9	31 47.2	99 09	24.9	32 17.0	99 08	24.8	34 16.1	99 08	24.5	1
2	25 14.5	99 09	24.8	26 14.1	99 09	24.7	27 43.6	99 08	24.5	29 13.0	99 08	24.3	31 12.2	99 08	24.1	31 42.0	99 08	24.0	32 11.8	99 08	23.9	34 11.0	99 08	23.7	2
3	25 09.3	99 08	23.9	26 09.0	99 08	23.8	27 38.5	99 08	23.6	29 07.9	99 08	23.5	31 07.2	99 08	23.2	31 37.0	99 08	23.1	32 06.9	99 08	23.1	34 06.1	99 08	22.8	3
4	25 04.3	99 08	23.1	26 04.0	99 08	22.9	27 33.6	99 08	22.8	29 03.1	99 08	22.6	31 02.4	99 08	22.3	31 32.2	99 08	22.3	32 02.1	99 08	22.2	34 01.3	99 08	22.0	4
155	24 59.5	1.0 08	22.2	25 59.3	1.0 08	22.1	27 28.8	1.0 08	21.9	28 58.4	99 08	21.7	30 57.7	99 07	21.5	31 27.6	99 07	21.4	31 57.4	99 07	21.4	33 56.8	99 07	21.1	155
6	24 54.9	1.0 07	21.3	25 54.7	1.0 07	21.2	27 24.3	1.0 07	21.0	28 53.8	1.0 07	20.8	30 53.3	1.0 07	20.6	31 23.1	1.0 07	20.6	31 53.0	1.0 07	20.5	33 52.4	99 07	20.3	6
7	24 50.5	1.0 07	20.4	25 50.2	1.0 07	20.3	27 19.9	1.0 07	20.1	28 49.5	1.0 07	20.0	30 49.0	1.0 07	19.8	31 18.8	1.0 07	19.7	31 48.7	1.0 07	19.6	33 48.1	1.0 07	19.4	7
8	24 46.2	1.0 07	19.5	25 46.0	1.0 07	19.4	27 15.7	1.0 07	19.3	28 45.3	1.0 07	19.1	30 44.8	1.0 07	18.9	31 14.7	1.0 07	18.8	31 44.6	1.0 07	18.8	33 44.1	1.0 06	18.6	8
9	24 42.2	1.0 06	18.6	25 42.0	1.0 06	18.5	27 11.6	1.0 06	18.4	28 41.3	1.0 06	18.2	30 40.9	1.0 06	18.0	31 10.8	1.0 06	18.0	31 40.7	1.0 06	17.9	33 40.2	1.0 06	17.7	9
160	24 38.3	1.0 06	17.7	25 38.1	1.0 06	17.6	27 07.8	1.0 06	17.5	28 37.5	1.0 06	17.4	30 37.1	1.0 06	17.2	31 07.0	1.0 06	17.1	31 36.9	1.0 06	17.1	33 36.5	1.0 06	16.9	160
1	24 34.6	1.0 06	16.8	25 34.4	1.0 06	16.8	27 04.1	1.0 06	16.6	28 33.9	1.0 06	16.5	30 33.5	1.0 06	16.3	31 03.4	1.0 06	16.3	31 33.3	1.0 06	16.2	33 32.9	1.0 06	16.0	1
2	24 31.0	1.0 06	15.9	25 30.9	1.0 06	15.9	27 00.7	1.0 06	15.8	28 30.4	1.0 05	15.6	30 30.1	1.0 05	15.5	31 00.0	1.0 05	15.4	31 29.9	1.0 05	15.4	33 29.6	1.0 05	15.2	2
3	24 27.7	1.0 05	15.1	25 27.6	1.0 05	15.0	26 57.4	1.0 05	14.9	28 27.2	1.0 05	14.8	30 26.9	1.0 05	14.6	30 56.8	1.0 05	14.6	31 26.7	1.0 05	14.5	33 26.4	1.0 05	14.3	3
4	24 24.6	1.0 05	14.2	25 24.4	1.0 05	14.1	26 54.3	1.0 05	14.0	28 24.1	1.0 05	13.9	30 23.8	1.0 05	13.7	30 53.7	1.0 05	13.7	31 23.7	1.0 05	13.7	33 23.4	1.0 05	13.5	4
165	24 21.6	1.0 05	13.3	25 21.5	1.0 05	13.2	26 51.3	1.0 05	13.1	28 21.2	1.0 05	13.0	30 20.9	1.0 04	12.9	30 50.9	1.0 04	12.8	31 20.8	1.0 04	12.8	33 20.6	1.0 04	12.7	165
6	24 18.8	1.0 04	12.4	25 18.7	1.0 04	12.3	26 48.6	1.0 04	12.2	28 18.4	1.0 04	12.2	30 18.2	1.0 04	12.0	30 48.2	1.0 04	12.0	31 18.1	1.0 04	12.0	33 17.9	1.0 04	11.8	6
7	24 16.2	1.0 04	11.5	25 16.2	1.0 04	11.5	26 46.0	1.0 04	11.4	28 15.9	1.0 04	11.3	30 15.7	1.0 04	11.2	30 45.7	1.0 04	11.1	31 15.7	1.0 04	11.1	33 15.5	1.0 04	11.0	7
8	24 13.8	1.0 04	10.6	25 13.8	1.0 04	10.6	26 43.7	1.0 04	10.5	28 13.6	1.0 04	10.4	30 13.4	1.0 04	10.3	30 43.4	1.0 04	10.3	31 13.3	1.0 04	10.2	33 13.2	1.0 04	10.1	8
9	24 11.6	1.0 03	09.7	25 11.6	1.0 03	09.7	26 41.5	1.0 03	09.6	28 11.4	1.0 03	09.5	30 11.3	1.0 03	09.4	30 41.2	1.0 03	09.4	31 11.2	1.0 03	09.4	33 11.1	1.0 03	09.3	9
170	24 09.6	1.0 03	08.9	25 09.6	1.0 03	08.8	26 39.5	1.0 03	08.7	28 09.4	1.0 03	08.7	30 09.3	1.0 03	08.6	30 39.3	1.0 03	08.6	31 09.3	1.0 03	08.5	33 09.2	1.0 03	08.4	170
1	24 07.8	1.0 03	08.0	25 07.8	1.0 03	07.9	26 37.7	1.0 03	07.9	28 07.6	1.0 03	07.8	30 07.6	1.0 03	07.7	30 37.5	1.0 03	07.7	31 07.5	1.0 03	07.7	33 07.4	1.0 03	07.6	1
2	24 06.2	1.0 02	07.1	25 06.1	1.0 02	07.1	26 36.1	1.0 02	07.0	28 06.0	1.0 02	06.9	30 06.0	1.0 02	06.9	30 36.0	1.0 02	06.8	31 05.9	1.0 02	06.8	33 05.9	1.0 02	06.7	2
3	24 04.7	1.0 02	06.2	25 04.7	1.0 02	06.2	26 34.7	1.0 02	06.1	28 04.6	1.0 02	06.1	30 04.6	1.0 02	06.0	30 34.6	1.0 02	06.0	31 04.5	1.0 02	06.0	33 04.5	1.0 02	05.9	3
4	24 03.5	1.0 02	05.3	25 03.5	1.0 02	05.3	26 33.4	1.0 02	05.2	28 03.4	1.0 02	05.2	30 03.4	1.0 02	05.1	30 33.4	1.0 02	05.1	31 03.3	1.0 02	05.1	33 03.3	1.0 02	05.1	4
175	24 02.4	1.0 01	04.4	25 02.4	1.0 01	04.4	26 32.4	1.0 01	04.4	28 02.4	1.0 01	04.3	30 02.3	1.0 01	04.3	30 32.3	1.0 01	04.3	31 02.3	1.0 01	04.3	33 02.3	1.0 01	04.2	175
6	24 01.5	1.0 01	03.5	25 01.5	1.0 01	03.5	26 31.5	1.0 01	03.5	28 01.5	1.0 01	03.5	30 01.5	1.0 01	03.4	30 31.5	1.0 01	03.4	31 01.5	1.0 01	03.4	33 01.5	1.0 01	03.4	6
7	24 00.9	1.0 01	02.7	25 00.9	1.0 01	02.6	26 30.9	1.0 01	02.6	28 00.8	1.0 01	02.6	30 00.8	1.0 01	02.6	30 30.8	1.0 01	02.6	31 00.8	1.0 01	02.6	33 00.8	1.0 01	02.5	7
8	24 00.4	1.0 00	01.8	25 00.4	1.0 00	01.8	26 30.4	1.0 00	01.7	28 00.4	1.0 00	01.7	30 00.4	1.0 00	01.7	30 30.4	1.0 00	01.7	31 00.4	1.0 00	01.7	33 00.4	1.0 00	01.7	8
9	24 00.1	1.0 00	00.9	25 00.1	1.0 00	00.9	26 30.1	1.0 00	00.9	28 00.1	1.0 00	00.9	30 00.1	1.0 00	00.9	30 30.1	1.0 00	00.9	31 00.1	1.0 00	00.9	33 00.1	1.0 00	00.8	9
180	24 00.0	1.0 00	00.0	25 00.0	1.0 00	00.0	26 30.0	1.0 00	00.0	28 00.0	1.0 00	00.0	30 00.0	1.0 00	00.0	30 30.0	1.0 00	00.0	31 00.0	1.0 00	00.0	33 00.0	1.0 00	00.0	180

Lat 79

Lat. 78°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	58 00.0	1.0 00	180.0	59 00.0	1.0 00	180.0	60 30.0	1.0 00	180.0	61 30.0	1.0 00	180.0
1	57 59.9	1.0 01	178.7	58 59.9	1.0 01	178.7	60 29.9	1.0 01	178.7	61 29.9	1.0 01	178.6
2	57 59.4	1.0 01	177.4	58 59.4	1.0 01	177.4	60 29.4	1.0 01	177.3	61 29.4	1.0 01	177.3
3	57 58.7	1.0 02	176.1	58 58.7	1.0 02	176.0	60 28.7	1.0 02	176.0	61 28.7	1.0 02	175.9
4	57 57.7	1.0 02	174.8	58 57.7	1.0 02	174.7	60 27.7	1.0 02	174.6	61 27.6	1.0 02	174.6
05	57 56.4	1.0 03	173.5	58 56.4	1.0 03	173.4	60 26.3	1.0 03	173.3	61 26.3	1.0 03	173.2
6	57 54.9	1.0 03	172.1	58 54.8	1.0 03	172.1	60 24.7	1.0 03	171.9	61 24.7	1.0 03	171.8
7	57 53.0	1.0 04	170.8	58 53.0	1.0 04	170.7	60 22.8	1.0 04	170.6	61 22.8	1.0 04	170.5
8	57 50.9	1.0 04	169.5	58 50.8	1.0 04	169.4	60 20.7	1.0 04	169.3	61 20.6	1.0 04	169.1
9	57 48.5	1.0 04	168.2	58 48.4	1.0 05	168.1	60 18.2	1.0 05	167.9	61 18.1	1.0 05	167.8
10	57 45.8	1.0 05	166.9	58 45.7	1.0 05	166.8	60 15.4	1.0 05	166.6	61 15.3	1.0 05	166.4
1	57 42.9	1.0 05	165.6	58 42.7	1.0 05	165.5	60 12.4	1.0 06	165.3	61 12.2	1.0 06	165.1
2	57 39.6	1.0 06	164.3	58 39.4	1.0 06	164.2	60 09.1	1.0 06	163.9	61 08.9	1.0 06	163.8
3	57 36.1	1.0 06	163.0	58 35.9	1.0 06	162.9	60 05.5	1.0 06	162.6	61 05.2	1.0 07	162.4
4	57 32.3	1.0 07	161.8	58 32.1	1.0 07	161.6	60 01.6	99 07	161.3	61 01.3	99 07	161.1
15	57 28.3	99 07	160.5	58 28.0	99 07	160.3	59 57.5	99 07	160.0	60 57.1	99 07	159.7
6	57 24.0	99 08	159.2	58 23.7	99 08	159.0	59 53.1	99 08	158.7	60 52.7	99 08	158.4
7	57 19.4	99 08	157.9	58 19.0	99 08	157.7	59 48.4	99 08	157.3	60 48.0	99 08	157.1
8	57 14.6	99 08	156.6	58 14.2	99 09	156.4	59 43.5	99 09	156.0	60 43.0	99 09	155.8
9	57 09.5	99 09	155.4	58 09.1	99 09	155.1	59 38.3	99 09	154.7	60 37.7	99 09	154.5
20	57 04.2	99 09	154.1	58 03.7	99 09	153.8	59 32.8	99 10	153.4	60 32.2	99 10	153.2
1	56 58.6	99 10	152.8	57 58.1	99 10	152.6	59 27.1	99 10	152.1	60 26.5	99 10	151.8
2	56 52.8	99 10	151.6	57 52.2	99 10	151.3	59 21.2	99 10	150.9	60 20.5	99 10	150.6
3	56 46.8	99 10	150.3	57 46.1	99 11	150.0	59 15.0	99 11	149.6	60 14.2	99 11	149.3
4	56 40.5	99 11	149.1	57 39.7	99 11	148.8	59 08.5	99 11	148.3	60 07.7	99 11	148.0
25	56 33.9	99 11	147.8	57 33.1	99 11	147.5	59 01.9	99 12	147.0	60 01.0	98 12	146.7
6	56 27.2	99 12	146.6	57 26.3	99 12	146.3	58 55.0	98 12	145.8	59 54.0	98 12	145.4
7	56 20.2	99 12	145.3	57 19.3	98 12	145.0	58 47.8	98 12	144.5	59 46.8	98 12	144.1
8	56 13.0	98 12	144.1	57 12.0	98 12	143.8	58 40.5	98 13	143.2	59 39.4	98 13	142.9
9	56 05.6	98 13	142.9	57 04.5	98 13	142.5	58 32.9	98 13	142.0	59 31.8	98 13	141.6
30	55 57.9	98 13	141.6	56 56.8	98 13	141.3	58 25.1	98 13	140.8	59 23.9	98 13	140.4
1	55 50.1	98 13	140.4	56 48.9	98 14	140.1	58 17.1	98 14	139.5	59 15.8	98 14	139.1
2	55 42.0	98 14	139.2	56 40.8	98 14	138.9	58 08.9	98 14	138.3	59 07.6	98 14	137.9
3	55 33.8	98 14	138.0	56 32.5	98 14	137.6	58 00.5	98 14	137.1	58 59.1	98 14	136.6
4	55 25.3	98 14	136.8	56 24.0	98 14	136.4	57 51.9	98 15	135.8	58 50.4	97 15	135.4
35	55 16.7	98 15	135.6	56 15.3	98 15	135.2	57 43.2	97 15	134.6	58 41.6	97 15	134.2
6	55 07.9	98 15	134.4	56 06.5	98 15	134.0	57 34.2	97 15	133.4	58 32.6	97 15	133.0
7	54 58.9	98 15	133.2	55 57.4	97 15	132.8	57 25.0	97 16	132.2	58 23.3	97 16	131.8
8	54 49.7	97 16	132.1	55 48.2	97 16	131.7	57 15.7	97 16	131.0	58 14.0	97 16	130.6
9	54 40.4	97 16	130.9	55 38.8	97 16	130.5	57 06.2	97 16	129.8	58 04.4	97 16	129.4
40	54 30.8	97 16	129.7	55 29.2	97 16	129.3	56 56.6	97 16	128.7	57 54.7	97 16	128.2
1	54 21.2	97 16	128.6	55 19.5	97 16	128.1	56 46.7	97 17	127.5	57 44.8	97 17	127.0
2	54 11.3	97 17	127.4	55 09.6	97 17	127.0	56 36.8	97 17	126.3	57 34.8	97 17	125.8
3	54 01.4	97 17	126.3	54 59.5	97 17	125.8	56 26.6	97 17	125.2	57 24.6	96 17	124.7
4	53 51.2	97 17	125.1	54 49.3	97 17	124.7	56 16.4	97 17	124.0	57 14.2	96 17	123.5
45	53 40.9	97 17	124.0	54 39.0	97 17	123.5	56 06.0	96 18	122.9	57 03.8	96 18	122.4
6	53 30.5	97 18	122.8	54 28.6	97 18	122.4	55 55.4	96 18	121.7	56 53.2	96 18	121.2
7	53 20.0	97 18	121.7	54 18.0	97 18	121.3	55 44.7	96 18	120.6	56 42.4	96 18	120.1
8	53 09.3	97 18	120.6	54 07.2	96 18	120.1	55 33.9	96 18	119.4	56 31.6	96 18	119.0
9	52 58.5	97 18	119.5	53 56.4	96 18	119.0	55 23.0	96 18	118.3	56 20.6	96 18	117.8
50	52 47.6	96 18	118.4	53 45.4	96 18	117.9	55 12.0	96 19	117.2	56 09.5	96 19	116.7
1	52 36.5	96 19	117.3	53 34.3	96 19	116.8	55 00.8	96 19	116.1	55 58.3	96 19	115.6
2	52 25.4	96 19	116.2	53 23.2	96 19	115.7	54 49.6	96 19	115.0	55 47.0	96 19	114.5
3	52 14.2	96 19	115.1	53 11.9	96 19	114.6	54 38.2	96 19	113.9	55 35.6	96 19	113.4
4	52 02.8	96 19	114.0	53 00.5	96 19	113.5	54 26.8	96 19	112.8	55 24.1	96 19	112.3
55	51 51.4	96 19	112.9	52 49.0	96 19	112.4	54 15.2	96 19	111.7	55 12.5	95 19	111.2
6	51 39.8	96 19	111.8	52 37.4	96 19	111.3	54 03.6	96 20	110.6	55 00.9	95 20	110.1
7	51 28.2	95 20	110.7	52 25.7	96 20	110.3	53 51.9	96 20	109.5	54 49.1	96 20	109.0
8	51 16.5	96 20	109.7	52 14.0	96 20	109.2	53 40.1	96 20	108.5	54 37.3	95 20	108.0
9	51 04.7	96 20	108.6	52 02.2	96 20	108.1	53 28.2	95 20	107.4	54 25.4	95 20	106.9
60	50 52.8	96 20	107.5	51 50.3	96 20	107.1	53 16.3	95 20	106.4	54 13.4	95 20	105.8
1	50 40.9	96 20	106.5	51 38.3	96 20	106.0	53 04.3	95 20	105.3	54 01.4	95 20	104.8
2	50 28.9	96 20	105.4	51 26.3	96 20	105.0	52 52.2	95 20	104.2	53 49.3	95 20	103.7
3	50 16.9	96 20	104.4	51 14.2	96 20	103.9	52 40.1	96 20	103.2	53 37.1	95 20	102.7
4	50 04.8	96 20	103.4	51 02.1	95 20	102.9	52 27.9	95 20	102.2	53 24.9	95 20	101.7
65	49 52.6	96 20	102.3	50 49.9	95 20	101.9	52 15.7	95 20	101.1	53 12.7	95 20	100.6
6	49 40.4	96 20	101.3	50 37.7	95 20	100.8	52 03.4	95 20	100.1	53 00.4	95 21	99.6
7	49 28.1	96 20	100.3	50 25.4	95 21	99.8	51 51.1	95 21	99.1	52 48.1	95 21	98.6
8	49 15.8	96 21	99.3	50 13.1	95 21	98.8	51 38.8	95 21	98.1	52 35.8	95 21	97.6
9	49 03.5	96 21	98.2	50 00.8	95 21	97.8	51 26.4	95 21	97.1	52 23.4	95 21	96.5
70	48 51.1	95 21	97.2	49 48.4	95 21	96.8	51 14.0	95 21	96.0	52 11.0	95 21	95.5
1	48 38.8	95 21	96.2	49 36.0	95 21	95.8	51 01.6	95 21	95.0	51 58.5	95 21	94.5
2	48 26.3	95 21	95.2	49 23.6	95 21	94.8	50 49.2	96 21	94.0	51 46.1	95 21	93.5
3	48 13.9	95 21	94.2	49 11.1	95 21	93.8	50 36.7	95 21	93.1	51 33.6	95 21	92.5
4	48 01.5	95 21	93.2	48 58.7	95 21	92.8	50 24.3	95 21	92.1	51 21.2	95 21	91.6
75	47 49.0	95 21	92.2	48 46.2	95 21	91.8	50 11.8	95 21	91.1	51 08.7	95 21	90.6
6	47 36.5	95 21	91.3	48 33.7	95 21	90.8	49 59.3	95 21	90.1	50 56.2	95 21	89.6
7	47 24.1	95 21	90.3	48 21.3	95 21	89.8	49 46.8	95 21	89.1	50 43.8	95 21	88.6
8	47 11.6	95 21	89.3	48 08.8	95 21	88.9	49 34.4	95 21	88.1	50 31.3	95 21	87.7
9	46 59.1	95 21	88.3	47 56.3	95 21	87.9	49 21.9	95 21	87.2	50 18.8	95 21	86.7
80	46 46.7	95 21	87.4	47 43.9	95 21	86.9	49 09.5	95 21	86.2	50 06.4	95 21	85.7
1	46 34.2	95 21	86.4	47 31.4	95 21	85.9	48 57.0	95 21	85.3	49 54.0	95 21	84.8
2	46 21.8	95 21	85.4	47 19.0	95 21	85.0	48 44.6	95 21	84.3	49 41.5	96 21	83.8
3	46 09.3	95 21	84.5	47 06.6	95 21	84.0	48 32.2	95 21	83.3	49 29.1	95 21	82.9
4	45 56.9	96 21	83.5	46 54.2	96 21	83.1	48 19.8	95 21	82.4	49 16.8	95 21	81.9
85	45 44.5	95 21	82.6	46 41.8	95 21	82.1	48 07.5	95 21	81.5	49 04.4	95 20	81.0
6	45 32.2	96 21	81.6	46 29.4	95 21	81.2	47 55.1	95 20	80.5	48 52.1	95 20	80.0
7	45 19.9	96 20	80.7	46 17.1	95 20	80.2	47 42.9	95 20	79.6	48 39.9	95 20	79.1
8	45 07.6	96 20	79.7	46 04.9	95 20	79.3	47 30.6	95 20	78.6	48 27.6	95 20	78.2
9	44 55.3	96 20	78.8	45 52.6	95 20	78.4	47 18.4	95 20	77.7	48 15.5	95 20	77.2
90	44 43.1	96 20	77.9	45 40.4	95 20	77.4	47 06.2	95 20	76.8	48 03.3	95 20	76.3

50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
62 30.0	1.0 00	180.0	63 30.0	1.0 00	180.0	64 30.0	1.0 00	180.0	66 00.0	1.0 00	180.0	00
62 29.8	1.0 01	178.6	63 29.8	1.0 01	178.6	64 29.8	1.0 01	178.6	65 59.8	1.0 01	178.6	1
62 29.4	1.0 01	177.2	63 29.4	1.0 01	177.2	64 29.4	1.0 01	177.2	65 59.4	1.0 01	177.1	2
62 28.7	1.0 02	175.9	63 28.6	1.0 02	175.8	64 28.6	1.0 02	175.8	65 58.6	1.0 02	175.7	3
62 27.6	1.0 02	174.5	63 27.6	1.0 02	174.4	64 27.5	1.0 02	174.3	65 57.5	1.0 02	174.2	4
62 26.3	1.0 03	173.1	63 26.2	1.0 03	173.0	64 26.2	1.0 03	172.9	65 56.1	1.0 03	172.8	05
62 24.6	1.0 03	171.7	63 24.5	1.0 03	171.6	64 24.5	1.0 03	171.5	65 54.4	1.0 03	171.3	6
62 22.7	1.0 04	170.4	63 22.6	1.0 04	170.3	64 22.5	1.0 04	170.1	65 52.3	1.0 04	169.9	7
62 20.4	1.0 04	169.0	63 20.3	1.0 04	168.9	64 20.2	1.0 04	168.7	65 50.0	1.0 04	168.5	8
62 17.9	1.0 05	167.6	63 17.8	1.0 05	167.5	64 17.6	1.0 05	167.3	65 47.3	1.0 05	167.0	9
62 15.1	1.0 05	166.3	63 14.9	1.0 05	166.1	64 14.7	1.0 05	165.9	65 44.4	1.0 05	165.6	10
62 12.0	1.0 06	164.9	63 11.8	1.0 06	164.7	64 11.5	1.0 06	164.5	65 41.1	1.0 06	164.2	1
62 08.6	1.0 06	163.6	63 08.3	1.0 06	163.4	64 08.1	1.0 06	163.1	65 37.6	99 06	162.8	2
62 04.9	99 07	162.2	63 04.6	99 07	162.0	64 04.3	99 07	161.7	65 33.8	99 07	161.4	3
62 01.0	99 07	160.9	63 00.6	99 07	160.6	64 00.2	99 07	160.4	65 29.6	99 07	160.0	4
61 56.8	99 08	159.5	62 56.4	99 08	159.3	63 55.9	99 08	159.0	65 25.2	99 08	158.5	15
61 52.3	99 08	158.2	62 51.8	99 08	157.9	63 51.3	99 08	157.6	65 20.5	99 08	157.1	6
61 47.5	99 08	156.8	62 47.0	99 08	156.6	63 46.4	99 09	156.2	65 15.5	99 09	155.8	7
61 42.4	99 09	155.5	62 41.9	99 09	155.2	63 41.3	99 09	154.9	65 10.3	99 09	154.4	8
61 37.1	99 09	154.2	62 36.5	99 09	153.9	63 35.8	99 10	153.5	65 04.7	99 10	153.0	9
61 31.6	99 10	152.8	62 30.9	99 10	152.5	63 30.1	99 10	152.2	64 58.9	99 10	151.6	20
61 25.8	99 10	151.5	62 25.0	99 10	151.2	63 24.2	99 10	150.8	64 52.9	98 11	150.2	1
61 19.7	99 11	150.2	62 18.9	99 11	149.9	63 18.0	98 11	149.5	64 46.5	98 11	148.9	2
61 13.4	99 11	148.9	62 12.5	98 11	148.6	63 11.5	98 11	148.2	64 40.0	98 11	147.5	3
61 06.8	98 11	147.6	62 05.8	98 11	147.2	63 04.8	98 12	146.8	64 33.2	98 12	146.2	4
61 00.0	98 12	146.3	61 59.0	98 12	145.9	62 57.9	98 12	145.5	64 26.1	98 12	144.9	25
60 53.0	98 12	145.0	61 51.9	98 12	144.6	62 50.7	98 12	144.2	64 18.8	98 13	143.5	6
60 45.7	98 12	143.8	61 44.5	98 13	143.3	62 43.3	98 13	142.9	64 11.3	98 13	142.2	7
60 38.2	98 13	142.5	61 37.0	98 13	142.1	62 35.7	98 13	141.6	64 03.5	97 13	140.9	8
60 30.5	98 13	141.2	61 29.2	98 13	140.8	62 27.8	98 13	140.3	63 55.5	97 14	139.6	9
60 22.6	98 14	140.0	61 21.2	98 14	139.5	62 19.7	97 14	139.0	63 47.3	97 14	138.3	30
60 14.5	98 14	138.7	61 13.0	97 14	138.3	62 11.5	97 14	137.8	63 38.9	97 14	137.0	1
60 06.1	98 14	137.4	61 04.6	97 14	137.0	62 03.0	97 14	136.5	63 30.3	97 15	135.7	2
59 57.6	97 15	136.2	60 56.0	97 15	135.7	61 54.3	97 15	135.2	63 21.5	97 15	134.4	3
59 48.9	97 15	135.0	60 47.2	97 15	134.5	61 45.4	97 15	134.0	63 12.5	97 15	133.2	4
59 39.9	97 15	133.7	60 38.2	97 15	133.3	61 36.3	97 15	132.8	63 03.3	96 16	131.9	35
59 30.8	97 15	132.5	60 29.0	97 16	132.0	61 27.1	97 16	131.5	62 53.9	96 16	130.7	6
59 21.6	97 16	131.3	60 19.7	97 16	130.8	61 17.7	97 16	130.3	62 44.4	96 16	129.4	7
59 12.1	97 16	130.1	60 10.1	97 16	129.6	61 08.1	96 16	129.1	62 34.7	96 16	128.2	8
59 02.5	97 16	128.9	60 00.4	97 16	128.4	60 58.3	96 17	127.9	62 24.8	96 17	127.0	9
58 52.7	97 17	127.7	59 50.6	96 17	127.2	60 48.4	96 17	126.7	62 14.8	96 17	125.8	40
58 42.7	96 17	126.5	59 40.6	96 17	126.0	60 38.3	96 17	125.5	62 04.6	96 17	124.6	1
58 32.6	96 17	125.4	59 30.4	96 17	124.8	60 28.0	96 17	124.3	61 54.2	96 18	123.4	2
58 22.4	96 17	124.2	59 20.1	96 17	123.7	60 17.7	96 18	123.1	61 43.7	95 18	122.2	3
58 12.0	96 18	123.0	59 09.6	96 18	122.5	60 07.1	96 18	121.9	61 33.1	95 18	121.0	4
58 01.5	96 18	121.9	58 59.1	96 18	121.3	59 56.5	96 18	120.8	61 22.3	95 18	119.8	45
57 50.8	96 18	120.7	58 48.3	96 18	120.2	59 45.7	95 18	119.6	61 11.5	95 18	118.7	6
57 40.0	96 18	119.6	58 37.5	96 18	119.0	59 34.8	95 18	118.4	61 00.5	95 19	117.5	7
57 29.1	96 18	118.4	58 26.5	96 18	117.9	59 23.8	95 19	117.3	60 49.3	95 19	116.4	8
57 18.1	96 19	117.3	58 15.4	95 19	116.7	59 12.6	95 19	116.2	60 38.1	95 19	115.2	9
57 07.0	96 19	116.2	58 04.2	95 19	115.6	59 01.4	95 19	115.0	60 26.8	95 19	114.1	50
56 55.7	96 19	115.1	57 52.9	95 19	114.5	58 50.0	95 19	113.9	60 15.3	95 19	113.0	1
56 44.4	95 19	113.9	57 41.5	95 19	113.4	58 38.6	95 19	112.8	60 03.8	94 19	111.9	2
56 32.9	95 19	112.8	57 30.0	95 19	112.3	58 27.0	95 19	111.7	59 52.2	94 20	110.7	3
56 21.4	95 19	111.7	57 18.5	95 19	111.2	58 15.4	95 20	110.6	59 40.5	94 20	109.6	4
56 09.7	95 20	110.7	57 06.8	95 20	110.1	58 03.7	95 20	109.5	59 28.7	94 20	108.5	55
55 58.0	95 20	109.6	56 55.0	95 20	109.0	57 51.9	95 20	108.4	59 16.8	94 20	107.5	6
55 46.2	95 20	108.5	56 43.2	95 20	107.9	57 40.0	95 20	107.3	59 04.9	94 20	106.4	7
55 34.4	95 20	107.4	56 31.3	95 20	106.9	57 28.1	94 20	106.3	58 52.9	94 20	105.3	8
55 22.4	95 20	106.4	56 19.3	95 20	105.8	57 16.1	94 20	105.2	58 40.8	94 20	104.2	9
55 10.4	95 20	105.3	56 07.3	95 20	104.7	57 04.0	94 20	104.1	58 28.7	94 20	103.2	60
54 58.4	95 20	104.2	55 55.2	96 20	103.7	56 51.9	94 20	103.1	58 16.5	94 20	102.1	1
54 46.2	95 20	103.2	55 43.0	95 20	102.6	56 39.7	94 20	102.0	58 04.3	94 20	101.1	2
54 34.1	95 20	102.2	55 30.8	94 20	101.6	56 27.5	94 20	101.0	57 52.0	94 20	100.0	3
54 21.8	95 20	101.1	55 18.6	94 20	100.6	56 15.2	94 20	100.0	57 39.7	94 21	99.0	4
54 09.6	95 20	100.1	55 06.3	94 21	99.5	56 02.9	94 21	98.9	57 27.4	94 21	98.0	65
53 57.3	95 21	99.1	54 54.0	94 21	98.5	55 50.5	94 21	97.9	57 15.0	94 21	97.0	6
53 45.0	95 21	98.0	54 41.6	94 21	97.5	55 38.2	94 21	96.9	57 02.6	94 21	96.0	7
53 32.6	95 21	97.0	54 29.3	94 21	96.5	55 25.8	94 21	95.9	56 50.2	94 21	94.9	8
53 20.2	95 21	96.0	54 16.9	94 21	95.5	55 13.4	94 21	94.9	56 37.8	94 21	93.9	9
53 07.8	95 21	95.0	54 04.4	94 21	94.5	55 00.9	94 21	93.9	56 25.3	94 21	92.9	70
52 55.3	95 21	94.0	53 52.0	94 21	93.5	54 48.5	94 21	92.9	56 12.9	94 21	92.0	1
52 42.9	95 21	93.0	53 39.5	94 21	92.5	54 36.0	94 21	91.9	56 00.4	94 21	91.0	2
52 30.4	95 21	92.0	53 27.1	94 21	91.5	54 23.5	94 21	90.9	55 47.9	94 21	90.0	3
52 18.0	95 21	91.0	53 14.6	94 21	90.5	54 11.1	94 21	89.9	55 35.4	94 21	89.0	4
52 05.5	95 21	90.1	53 02.1	94 21	89.5	53 58.6	94 21	88.9	55 23.0	94 21	88.0	75
51 53.0	95 21	89.1	52 49.6	94 21	88.5	53 46.1	94 21	88.0	55 10.5	94 21	87.1	6
51 40.5	95 21	88.1	52 37.2	94 21	87.6	53 33.7	94 21	87.0	54 58.1	94 21	86.1	7
51 28.1	95 21	87.1	52 24.7	94 21	86.6	53 21.2	94 21	86.0	54 45.6	94 21	85.2	8
51 15.6	95 21	86.2	52 12.3	94 21	85.6	53 08.8	94 21	85.1	54 33.2	94 21	84.2	9
51 03.2	95 21	85.2	51 59.8	94 21	84.7	52 56.3	94 21	84.1	54 20.8	94 21	83.3	80
50 50.8	95 21	84.3	51 47.4	94 21	83.7	52 43.9	94 21	83.2	54 08.4	94 21	82.3	1
50 38.4	95 21	83.3	51 35.0	94 21	82.8	52 31.6	94 21	82.2	53 56.1	94 21	81.4	2
50 26.0	95 21	82.4	51 22.7	94 21	81.8	52 19.2	94 21	81.3	53 43.8	94 20	80.5	3
50 13.6	95 21	81.4	51 10.3	94 20	80.9	52 06.9	94 20	80.4	53 31.5	94 20	79.5	4
50 01.3	95 20	80.5	50 58.0	94 20	80.0	51 54.6	94 20	79.4	53 19.2	94 20	78.6	85
49 49.0	95 20	79.5	50 45.8	94 20	79.0	51 42.4	94 20	78.5	53 07.0	94 20	77.7	6
49 36.8	95 20	78.6	50 33.5	95 20	78.1	51 30.2	94 20	77.6	52 54.9	94 20	76.8	7
49 24.6	95 20	77.7	50 21.4	95 20	77.2	51 18.0	94 20	76.7	52 42.7	94 20	75.8	8
49 12.4	95 20	76.8	50 09.2	95 20	76.3	51 05.9	94 20	75.8	52 30.7	94 20	74.9	9
49 00.3	95 20	75.8	49 57.1	95 20	75.4	50 53.8	94 20	74.8	52 18.6	94 20	74.0	90

Lat. 78°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	44 30.9	96 20	76.9	45 28.3	96 20	76.5	46 54.1	95 20	75.8	47 51.2	95 20	75.4	48 48.2	95 20	74.9	49 45.1	95 20	74.4	50 41.8	94 20	73.9	52 06.7	94 20	73.1	91
2	44 18.8	96 20	76.0	45 16.2	96 20	75.6	46 42.0	95 20	74.9	47 39.2	95 20	74.5	48 36.2	95 20	74.0	49 33.1	95 20	73.5	50 29.9	95 20	73.0	51 54.8	94 20	72.2	2
3	44 06.7	96 20	75.1	45 04.1	96 20	74.6	46 30.0	95 20	74.0	47 27.2	95 20	73.6	48 24.2	95 20	73.1	49 21.2	95 20	72.6	50 18.0	95 20	72.1	51 42.9	94 20	71.3	3
4	43 54.7	96 20	74.1	44 52.1	96 20	73.7	46 18.1	95 20	73.1	47 15.2	95 20	72.7	48 12.3	95 20	72.2	49 09.3	95 20	71.7	50 06.1	95 20	71.2	51 31.1	94 20	70.4	4
95	43 42.7	96 20	73.2	44 40.2	96 20	72.8	46 06.2	95 20	72.2	47 03.4	95 20	71.7	48 00.5	95 20	71.3	48 57.5	95 20	70.8	49 54.3	95 20	70.3	51 19.4	94 19	69.6	95
6	43 30.8	96 20	72.3	44 28.3	96 20	71.9	45 54.3	95 20	71.3	46 51.6	95 20	70.8	47 48.7	95 20	70.4	48 45.7	95 19	69.9	49 42.6	95 19	69.4	51 07.8	94 19	68.7	6
7	43 18.9	96 20	71.4	44 16.4	96 20	71.0	45 42.5	95 20	70.4	46 39.8	95 19	69.9	47 37.0	95 19	69.5	48 34.0	95 19	69.0	49 31.0	95 19	68.5	50 56.2	94 19	67.8	7
8	43 07.2	96 20	70.5	44 04.7	96 20	70.1	45 30.8	96 19	69.5	46 28.1	95 19	69.0	47 25.3	95 19	68.6	48 22.4	95 19	68.1	49 19.4	95 19	67.7	50 44.7	95 19	66.9	8
9	42 55.4	96 19	69.5	43 53.0	96 19	69.2	45 19.2	96 19	68.6	46 16.5	95 19	68.1	47 13.7	95 19	67.7	48 10.9	95 19	67.2	49 07.9	95 19	66.8	50 33.2	95 19	66.0	9
100	42 43.8	96 19	68.6	43 41.4	96 19	68.3	45 07.6	96 19	67.7	46 05.0	96 19	67.2	47 02.2	95 19	66.8	47 59.4	95 19	66.4	48 56.5	95 19	65.9	50 21.9	95 19	65.2	100
1	42 32.2	96 19	67.7	43 29.8	96 19	67.4	44 56.1	96 19	66.8	45 53.5	96 19	66.3	46 50.8	95 19	65.9	47 48.0	95 19	65.5	48 45.1	95 19	65.0	50 10.6	95 19	64.3	1
2	42 20.7	96 19	66.8	43 18.3	96 19	66.4	44 44.7	96 19	65.9	45 42.1	96 19	65.5	46 39.5	96 19	65.0	47 36.7	95 19	64.6	48 33.9	95 19	64.1	49 59.4	95 19	63.4	2
3	42 09.3	96 19	65.9	43 06.9	96 19	65.6	44 33.3	96 19	65.0	45 30.8	96 19	64.6	46 28.2	96 19	64.1	47 25.5	95 19	63.7	48 22.7	95 18	63.3	49 48.3	95 19	62.5	3
4	41 57.9	96 19	65.0	42 55.6	96 19	64.7	44 22.1	96 19	64.1	45 19.6	96 19	63.7	46 17.0	96 18	63.3	47 14.4	95 18	62.8	48 11.6	95 18	62.4	49 37.2	95 18	61.7	4
105	41 46.6	96 19	64.1	42 44.4	96 19	63.8	44 10.9	96 18	63.2	45 08.4	96 18	62.8	46 05.9	96 18	62.4	47 03.3	96 18	62.0	48 00.6	95 18	61.5	49 26.3	95 18	60.8	105
6	41 35.5	96 18	63.2	42 33.3	96 18	62.9	43 59.8	96 18	62.3	44 57.4	96 18	61.9	45 54.9	96 18	61.5	46 52.3	96 18	61.1	47 49.7	95 18	60.6	49 15.5	95 18	60.0	6
7	41 24.4	96 18	62.3	42 22.2	96 18	62.0	43 48.8	96 18	61.4	44 46.4	96 18	61.0	45 44.0	96 18	60.6	46 41.5	96 18	60.2	47 38.8	96 18	59.8	49 04.7	95 18	59.1	7
8	41 13.4	96 18	61.4	42 11.2	96 18	61.1	43 37.9	96 18	60.5	44 35.6	96 18	60.2	45 33.2	96 18	59.8	46 30.7	96 18	59.3	47 28.1	96 18	58.9	48 54.1	95 18	58.3	8
9	41 02.5	97 18	60.6	42 00.4	96 18	60.2	43 27.1	96 18	59.7	44 24.8	96 18	59.3	45 22.4	96 18	58.9	46 20.0	96 18	58.5	47 17.5	96 18	58.1	48 43.5	96 17	57.4	9
110	40 51.6	97 18	59.7	41 49.6	97 18	59.3	43 16.4	96 18	58.8	44 14.1	96 18	58.4	45 11.8	96 18	58.0	46 09.4	96 17	57.6	47 06.9	96 17	57.2	48 33.0	96 17	56.6	110
1	40 40.9	97 18	58.8	41 38.9	97 18	58.4	43 05.7	96 18	57.9	44 03.5	96 17	57.5	45 01.3	96 17	57.2	45 58.9	96 17	56.8	46 56.5	96 17	56.3	48 22.7	96 17	55.7	1
2	40 30.3	97 18	57.9	41 28.3	97 17	57.6	42 55.2	96 17	57.0	43 53.1	96 17	56.7	44 50.8	96 17	56.3	45 48.5	96 17	55.9	46 46.2	96 17	55.5	48 12.4	96 17	54.9	2
3	40 19.8	97 17	57.0	41 17.8	97 17	56.7	42 44.8	97 17	56.2	43 42.7	96 17	55.8	44 40.5	96 17	55.4	45 38.3	96 17	55.0	46 35.9	96 17	54.6	48 02.3	96 17	54.0	3
4	40 09.4	97 17	56.1	41 07.5	97 17	55.8	42 34.5	97 17	55.3	43 32.4	97 17	54.9	44 30.3	96 17	54.6	45 28.1	96 17	54.2	46 25.8	96 17	53.8	47 52.2	96 17	53.2	4
115	39 59.1	97 17	55.3	40 57.2	97 17	54.9	42 24.3	97 17	54.4	43 22.3	97 17	54.1	44 20.2	96 17	53.7	45 18.0	96 17	53.3	46 15.8	96 16	52.9	47 42.3	96 16	52.3	115
6	39 48.9	97 17	54.4	40 47.1	97 17	54.1	42 14.2	97 17	53.6	43 12.2	97 17	53.2	44 10.2	97 16	52.8	45 08.1	96 16	52.5	46 05.9	96 16	52.1	47 32.5	96 16	51.5	6
7	39 38.8	97 17	53.5	40 37.0	97 16	53.2	42 04.2	97 16	52.7	43 02.3	97 16	52.3	44 00.3	97 16	52.0	44 58.3	97 16	51.6	45 56.1	96 16	51.3	47 22.8	96 16	50.7	7
8	39 28.8	97 16	52.6	40 27.1	97 16	52.3	41 54.4	97 16	51.8	42 52.5	97 16	51.5	43 50.5	97 16	51.1	44 48.5	97 16	50.8	45 46.4	96 16	50.4	47 13.2	96 16	49.8	8
9	39 19.0	97 16	51.7	40 17.3	97 16	51.4	41 44.6	97 16	51.0	42 42.8	97 16	50.6	43 40.9	97 16	50.3	44 38.9	97 16	49.9	45 36.9	97 16	49.6	47 03.7	96 16	49.0	9
120	39 09.2	97 16	50.9	40 07.6	97 16	50.6	41 35.0	97 16	50.1	42 33.2	97 16	49.8	43 31.3	97 16	49.4	44 29.4	97 16	49.1	45 27.5	97 16	48.7	46 54.4	96 15	48.2	120
1	38 59.6	97 16	50.0	39 58.0	97 16	49.7	41 25.5	97 16	49.2	42 23.7	97 16	48.9	43 21.9	97 16	48.6	44 20.1	97 15	48.2	45 18.1	97 15	47.9	46 45.1	97 15	47.3	1
2	38 50.1	97 16	49.1	39 48.5	97 16	48.8	41 16.1	97 16	48.4	42 14.4	97 15	48.1	43 12.6	97 16	47.7	44 10.8	97 15	47.4	45 09.0	97 15	47.1	46 36.0	97 15	46.5	2
3	38 40.8	97 15	48.3	39 39.2	97 15	48.0	41 06.8	97 15	47.5	42 05.2	97 15	47.2	43 03.5	97 15	46.9	44 01.7	97 15	46.6	44 59.9	97 15	46.2	46 27.0	97 15	45.7	3
4	38 31.5	98 15	47.4	39 30.0	97 15	47.1	40 57.7	97 15	46.7	41 56.1	97 15	46.4	42 54.4	97 15	46.0	43 52.7	97 15	45.7	44 50.9	97 15	45.4	46 18.2	97 15	44.9	4
125	38 22.4	98 15	46.5	39 20.9	98 15	46.3	40 48.7	97 15	45.8	41 47.1	97 15	45.5	42 45.5	97 15	45.2	43 43.8	97 15	44.9	44 42.1	97 14	44.6	46 09.4	97 14	44.0	125
6	38 13.4	98 15	45.7	39 12.0	98 15	45.4	40 39.8	98 15	45.0	41 38.3	97 14	44.7	42 36.7	97 14	44.4	43 35.1	97 14	44.0	44 33.4	97 14	43.7	46 00.8	97 14	43.2	6
7	38 04.5	98 15	44.8	39 03.2	98 14	44.5	40 31.0	98 14	44.1	41 29.6	98 14	43.8	42 28.1	97 14	43.5	43 26.5	97 14	43.2	44 24.9	97 14	42.9	45 52.3	97 14	42.4	7
8	37 55.8	98 14	43.9	38 54.5	98 14	43.7	40 22.4	98 14	43.3	41 21.0	98 14	43.0	42 19.5	98 14	42.7	43 18.0	97 14	42.4	44 16.5	97 14	42.1	45 44.0	97 14	41.6	8
9	37 47.2	98 14	43.1	38 45.9	98 14	42.8	40 13.9	98 14	42.4	41 12.6	98 14	42.1	42 11.1	98 14	41.8	43 09.7	98 14	41.5	44 08.2	97 14	41.2	45 35.8	97 13	40.8	9
130	37 38.8	98 14	42.2	38 37.5	98 14	42.0	40 05.6	98 14	41.6	41 04.3	98 14	41.3	42 02.9	98 14	41.0	43 01.5	98 13	40.7	44 00.0	98 13	40.4	45 27.7	97 13	39.9	130
1	37 30.5	98 14	41.4	38 29.3	98 14	41.1	39 57.4	98 13	40.7	40 56.1	98 13	40.5	41 54.8	98 13	40.2	42 53.4	98 13	39.9	43 52.0	98 13	39.6	45 19.8	97 13	39.1	1
2	37 22.3	98 13	40.5	38 21.1	98 13	40.3	39 49.3	98 13	39.9	40 48.1	98 13	39.6	41 46.8	98 13	39.3	42 45.5	98 13	39.1	43 44.1	98 13	38.8	45 12.0	98 13	38.3	2
3	37 14.3	98 13	39.7	38 13.1	98 13	39.4	39 41.4	98 13	39.0	40 40.2	98 13	38.8	41 39.0	98 13	38.5	42 37.7	98 13	38.2	43 36.4	98 13	37.9	45 04.3	98 13	37.5	3
4	37 06.4	98 13	38.8	38 05.3	98 13	38.6	39 33.6	98 13	38.2	40 32.5	98 13	37.9	41 31.3	98 13	37.7	42 30.0	98 12	37.4	43 28.8	98 12	37.1	44 56.8	98 12	36.7	4
135	36 58.6	98 13	37.9	37 57.6	98 13	37.7	39 26.0	98 12	37.3	40 24.9	98 12	37.1	41 23.7	98 12	36.8	42 22.5	98 12	36.6	43 21.3	98 12	36.3	44 49.4	98 12	35.9	135
6	36 51.0	98 12	37.1	37 50.0	98 12	36.9	39 18.5	98 12	36.5	40 17.4	98 12	36.3	41 16.3	98 12	36.0	42 15.2	98 12	35.7	43 14.0	98 12	35.5	44 42.2	98 12	35.1	6
7	36 43.6	98 12	36.2	37 42.6	98 12	36.0	39 11.1	98 12	35.7	40 10.1	98 12	35.4	41 09.0	98 12	35.2	42 08.0	98 12	34.9	43 06.8	98 12	34.7	44 35.1	98 12	34.3	7
8	36 36.3	98 12	35.4	37 35.4	98 12	35.2	39 03.9	98 12	34.8	40 02.9	98 12	34.6	41 01.9	98 12	34.3	42 00.9	98 12	34.1	42 59.8	98 11	33.8	44 28.1	98 11	33.4	8
9	36 29.1	99 12	34.5	37 28.2	99 12	34.3	38 56.9	98 12	34.0	39 55.9	98 11	33.8	40 55.0	98 11	33.5	41 54.0	98 11	33.3	42 52.9	98 11	33.0	44 21.3	98 11	32.6	9
140	36 22.1	99 11	33.7	37 21.3	99 11	33.5	38 50.0	99 11	33.1	39 49.1	98 11	32.9	40 48.2	98 11	32.7	41 47.2	98 11	32.5	42 46.2	98 11	32.2	44 14.7	98 11	31.8	140
1	36 15.3	99 11	32.8	37 14.5	99 11	32.6	38 43.2	99 11	32.3	39 42.4	99 11	32.1	40 41.5	98 11	31.9	41 40.6	98 11	31.6	42 39.6	98 11	31.4	44 08.2	98 11	31.0	1
2	36 08.6	99 11	32.0	37 07.8	99 11	31.8	38 36.7	99 11	31.5	39 35.8	99 11	31.3	40 35.0	99 11	31.0	41 34.1	99 11	30.8	42 33.2	98 10	30.6	44 01.8	98 10	30.2	2
3	36 02.1	99 11	31.1	37 01.4	99 11	30.9	38 30.2	99 10	30.6	39 29.4	99 10	30.4	40 28.6	99 10	30.2	41 27.8	99 10	30.0	42 26.9	99 10	29.8	43 55.6	98 10	29.4	3
4	35 55.7	99 10	30.3	36 55.0	99 10	30.1	38 23.9	99 10	29.8	39 23.2	99 10	29.6	40 22.4	99 10	29.4	41 21.6	99 10	29.2	42 20.8	99 10	29.0	43 49.6	99 10	28.6	4
145	35 49.5	99 10	29.4	36 48.8	99 10	29.2	38 17.8	99 10	29.0	39 17.1	99 10	28.8	40 16.4	99 10	28.6	41 15.6	99 10	28.4	42 14.9	99 10	28.1	43 43.7	99 10	27.8	145
6	35 43.5	99 10	28.6	36 42.8	99 10	28.4	38 11.9	99 10	28.1	39 11.2	99 10	27.9	40 10.5	99 10	27.7	41 09.8	99 09	27.5	42 09.1	99 09	27.3	43 37.9	99 09	27.0	6
7	35 37.6	99 10	27.7	36 37.0	99 09	27.6	38 06.1	99 09	27.3	39 05.4	99 09	27.1	40 04.8	99 09	26.9	41 04.1	99 09	26.7	42 03.4	99 09	26.5	43 32.3	99 09	26.2	7
8	35 31.8	99 09	26.9	36 31.3	99 09	26.7	38 00.4	99 09	26.5	38 59.8	99 09	26.3	39 59.2	99 09	26.1	40 58.6	99 09	25.9	41 57.9	99 09	25.7	43 26.9	99 09	25.4	8
9	35 26.3	99 09	26.0	36 25.8	99 09	25.9	37 54.9	99 09	25.6	38 54.4	99 09	25.5	39 53.8	99 09	25.3	40 53.2	99 09	25.1	41 52.6	99 09	24.9	43 21.6	99 09	24.6	9
150	35 20.9	99 09	25.2	36 20.4	99 09	25.0	37 49.6	99 09	24.8	38 49.1	99 09	24.6	39 48.6	99 08	24.5	40 48.0	99 08	24.3	41 47.4	99 08	24.1	43 16.5	99 08	23.8	150
1	35 15.7	99 08	24.4	36 15.2	99 08	24.2	37 44.5	99 08	24.0	38 44.0	99 08	23.8	39 43.5	99 08	23.6	40 42.9	99 08	23.5	41 42.4	99 08	23.3	43 11.6	99 08	23.0	1
2	35 10.6	99 08	23.5	36 10.2	99 08	23.4	37 39.5	99 08	23.1	38 39.0	99 08	23.0	39 38.5	99 08	22.8	40 38.1	99 08	22.7	41 37.5	99 08	22.5	43 06.8	99 08	22.2	2
3	35 05.7	99 08	22.7	36 05.3	99 08	22.5	37 34.7	99 08	22.3	38 34.2	99 08	22.2	39 33.8	99 08	22.0	40 33.3	99 08	21.8	41 32.9	99 08	21.7	43 02.1	99 07	21.4	3
4	35 01.0	99 08	21.8	36 00.6	99 08	21.7	37 30.0	99 07	21.5	38 29.6	99 07	21.3	39 29.2	99 07	21.2	40 28.8	99 07	21.0	41 28.3	99 07	20.9	42 57.7	99 07	20.6	4
155	34 56.4	99 07	21.0	35 56.1	99 07	20.9	37 25.5	99 07	20.6	38 25.2	99 07	20.5	39 24.8	99 07	20.4	40 24.4	99 07	20.2	41 24.0	99 07	20.1	42 53.3	99 07	19.8	155
6	34 52.0	99 07	20.1	35 51.7	99 07	20.0	37 21.2	99 07	19.8	38 20.9	99 07	19.7	39 20.5	99 07	19.5	40 20.2	99 07	19.4	41 19.8	99 07	19.3	42 49.2	99 07	19.0	6
7	34 47.8	1.00 07	19.3	35 47.5	99 07	19.2	37 17.1	99 07	19.0	38 16.8	99 07	18.9	39 16.4	99 07	18.7	40 16.1	99 06	18.6	41 15.7	99 06	18.4	42 45.2	99 06	18.2	7
8	34 43.8	1.00 06	18.5	35 43.5	1.00 06	18.3	37 13.1	1.00 06	18.2	38 12.8	1.00 06	18.0	39 12.5	99 06	17.9	40 12.2	99 06	17.8	41 11.9	99 06	17.6	42 41.4	99 06	17.4	8
9	34 39.9	1.00 06	17.6	35 39.7	1.00 06	17.5	37 09.3	1.00 06	17.3	38 09.0	1.00 06	17.2	39 08.8	1.00 06	17.1	40 08.5	1.00 06	17.0	41 08.2	1.00 06	16.8	42 37.7	99 06	16.6	9
160	34 36.2	1.00 06	16.8	35 36.0	1.00 06	16.7	37 05.7	1.00 06	16.5	38 05.4	1.00 06	16.4	39 05.2	1.00 06	16.3	40 04.9	1.00 06	16.2	41 04.7	1.00 06	16.0	42 34.2	1.00 06	15.8	160
1	34 32.7	1.00 06	15.9	35 32.5	1.00 06	15.8	37 02.2	1.00 06	15.7	38 02.0	1.00 06	15.6	39 01.8	1.00 06	15.5	40 01.5	1.00 05	15.3	41 01.3	1.00 05	15.2	42 30.9	1.00 05	15.0	1
2	34 29.4	1.00 05	15.1	35 29.2	1.00 05	15.0	36 58.9	1.00 05	14.9	37 58.7	1.00 05	14.8	38 58.5	1.00 05	14.6	39 58.3	1.00 05	14.5	40 58.1	1.00 05	14.4	42 27.8	1.00 05	14.3	2
3	34 26.2	1.00 05	14.3	35 26.1	1.00 05	14.2	36 55.8	1.00 05	14.0	37 55.6	1.00 05	13.9	38 55.5	1.00 05	13.8	39 55.3	1.00 05	13.7	40 55.1	1.00 05	13.6	42 24.8	1.00 05	13.5	3
4	34 23.3	1.00 05	13.4	35 23.1	1.00 05	13.3	36 52.9	1.00 05	13.2	37 52.7	1.00 05	13.1	38 52.6	1.00 05	13.0	39 52.4	1.00 04	12.9	40 52.2	1.00 04	12.8	42 22.0	1.00 04	12.7	4
165	34 20.4	1.00 04	12.6	35 20.3	1.00 04	12.5	36 50.1	1.00 04	12.4	37 50.0	1.00 04	12.3	38 49.8	1.00 04	12.2	39 49.7	1.00 04	12.1	40 49.5	1.00 04	12.0	42 19.3	1.00 04	11.9	165
6	34 17.8	1.00 04	11.7	35 17.7	1.00 04	11.7	36 47.5	1.00 04	11.5	37 47.4	1.00 04	11.5	38 47.3	1.00 04	11.4	39 47.2	1.00 04	11.3	40 47.0	1.00 04	11.2	42 16.8	1.00 04	11.1	6
7	34 15.4	1.00 04	10.9	35 15.3	1.00 04	10.8	36 45.1	1.00 04	10.7	37 45.0	1.00 04	10.6	38 44.9	1.00 04	10.6	39 44.8	1.00 04	10.5	40 44.7	1.00 04	10.4	42 14.5	1.00 04	10.3	7
8	34 13.1	1.00 03	10.1	35 13.0	1.00 03	10.0	36 42.9	1.00 03	09.9	37 42.8	1.00 03	09.8	38 42.7	1.00 03	09.8	39 42.6	1.00 03	09.7	40 42.5	1.00 03	09.6	42 12.4	1.00 03	09.5	8
9	34 11.0	1.00 03	09.2	35 10.9	1.00 03	09.2	36 40.8	1.00 03	09.1	37 40.8	1.00 03	09.0	38 40.7	1.00 03	08.9	39 40.6	1.00 03	08.9	40 40.5	1.00 03	08.8	42 10.4	1.00 03	08.7	9
170	34 09.1	1.00 03	08.4	35 09.0	1.00 03	08.3	36 39.0	1.00 03	08.2	37 38.9	1.00 03	08.2	38 38.8	1.00 03	08.1	39 38.8	1.00 03	08.1	40 38.7	1.00 03	08.0	42 08.6	1.00 03	07.9	170
1	34 07.4	1.00 03	07.5	35 07.3	1.00 03	07.5	36 37.3	1.00 03	07.4	37 37.2	1.00 03	07.4	38 37.2	1.00 03	07.3	39 37.1	1.00 02	07.3	40 37.1	1.00 02	07.2	42 07.0	1.00 02	07.1	1
2	34 05.8	1.00 02	06.7	35 05.8	1.00 02	06.7	36 35.7	1.00 02	06.6	37 35.7	1.00 02	06.6	38 35.7	1.00 02	06.5	39 35.6	1.00 02	06.5	40 35.6	1.00 02	06.4	42 05.5	1.00 02	06.3	2
3	34 04.5	1.00 02	05.9	35 04.4	1.00 02	05.8	36 34.4	1.00 02	05.8	37 34.4	1.00 02	05.7	38 34.3	1.00 02	05.7	39 34.3	1.00 02	05.6	40 34.3	1.00 02	05.6	42 04.2	1.00 02	05.5	3
4	34 03.3	1.00 02	05.0	35 03.3	1.00 02	05.0	36 33.2	1.00 02	04.9	37 33.2	1.00 02	04.9	38 33.2	1.00 02	04.9	39 33.2	1.00 02	04.8	40 33.1	1.00 02	04.8	42 03.1	1.00 02	04.7	4
175	34 02.3	1.00 01	04.2	35 02.3	1.00 01	04.2	36 32.2	1.00 01	04.1	37 32.2	1.00 01	04.1	38 32.2	1.00 01	04.1	39 32.2	1.00 01	04.0	40 32.2	1.00 01	04.0	42 02.2	1.00 01	04.0	175
6	34 01.5	1.00 01	03.4	35 01.4	1.00 01	03.3	36 31.4	1.00 01	03.3	37 31.4	1.00 01	03.3	38 31.4	1.00 01	03.3	39 31.4	1.00 01	03.2	40 31.4	1.00 01	03.2	42 01.4	1.00 01	03.2	6
7	34 00.8	1.00 01	02.5	35 00.8	1.00 01	02.5	36 30.8	1.00 01	02.5	37 30.8	1.00 01	02.5	38 30.8	1.00 01	02.4	39 30.8	1.00 01	02.4	40 30.8	1.00 01	02.4	42 00.8	1.00 01	02.4	7
8	34 00.4	1.00 00	01.7	35 00.4	1.00 00	01.7	36 30.4	1.00 00	01.6	37 30.4	1.00 00	01.6	38 30.4	1.00 00	01.6	39 30.4	1.00 00	01.6	40 30.3	1.00 00	01.6	42 00.3	1.00 00	01.6	8
9	34 00.1	1.00 00	00.8	35 00.1	1.00 00	00.8	36 30.1	1.00 00	00.8	37 30.1	1.00 00	00.8	38 30.1	1.00 00	00.8	39 30.1	1.00 00	00.8	40 30.1	1.00 00	00.8	42 00.1	1.00 00	00.8	9
180	34 00.0	1.00 00	00.0	35 00.0	1.00 00	00.0	36 30.0	1.00 00	00.0	37 30.0	1.00 00	00.0	38 30.0	1.00 00	00.0	39 30.0	1.00 00	00.0	40 30.0	1.00 00	00.0	42 00.0	1.00 00	00.0	180

Lat. 79°

Lat. 78°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	66 30.0	1.0 00	180.0	67 00.0	1.0 00	180.0	68 00.0	1.0 00	180.0	68 30.0	1.0 00	180.0
1	66 29.8	1.0 01	178.5	66 59.8	1.0 01	178.5	67 59.8	1.0 01	178.5	68 29.8	1.0 01	178.5
2	66 29.4	1.0 01	177.1	66 59.4	1.0 01	177.1	67 59.4	1.0 01	177.0	68 29.3	1.0 01	177.0
3	66 28.6	1.0 02	175.6	66 58.6	1.0 02	175.6	67 58.5	1.0 02	175.5	68 28.5	1.0 02	175.5
4	66 27.5	1.0 02	174.2	66 57.4	1.0 02	174.1	67 57.4	1.0 02	174.0	68 27.4	1.0 02	174.0
05	66 26.0	1.0 03	172.7	66 56.0	1.0 03	172.7	67 55.9	1.0 03	172.5	68 25.9	1.0 03	172.5
6	66 24.3	1.0 03	171.3	66 54.3	1.0 03	171.2	67 54.2	1.0 04	171.1	68 24.1	1.0 04	171.0
7	66 22.3	1.0 04	169.8	66 52.2	1.0 04	169.7	67 52.1	1.0 04	169.6	68 22.0	1.0 04	169.5
8	66 19.9	1.0 04	168.4	66 49.8	1.0 04	168.3	67 49.7	1.0 05	168.1	68 19.6	1.0 05	168.0
9	66 17.2	1.0 05	166.9	66 47.1	1.0 05	166.8	67 46.9	1.0 05	166.6	68 16.8	1.0 05	166.5
10	66 14.3	1.0 05	165.5	66 44.1	1.0 06	165.4	67 43.9	1.0 06	165.2	68 13.7	1.0 06	165.0
1	66 11.0	1.0 06	164.1	66 40.8	99 06	164.0	67 40.5	99 06	163.7	68 10.4	99 06	163.5
2	66 07.4	99 06	162.6	66 37.2	99 06	162.5	67 36.9	99 07	162.2	68 06.7	99 07	162.1
3	66 03.6	99 07	161.2	66 33.4	99 07	161.1	67 32.9	99 07	160.8	68 02.7	99 07	160.6
4	65 59.4	99 07	159.8	66 29.2	99 07	159.6	67 28.7	99 08	159.3	67 58.4	99 08	159.1
15	65 54.9	99 08	158.4	66 24.7	99 08	158.2	67 24.1	99 08	157.9	67 53.8	99 08	157.7
6	65 50.2	99 08	157.0	66 19.9	99 08	156.8	67 19.3	99 09	156.4	67 48.9	99 09	156.2
7	65 45.2	99 09	155.6	66 14.8	99 09	155.4	67 14.1	99 09	155.0	67 43.8	99 09	154.8
8	65 39.9	99 09	154.2	66 09.5	99 09	154.0	67 08.7	99 09	153.6	67 38.3	99 10	153.4
9	65 34.3	99 10	152.8	66 03.9	99 10	152.6	67 03.0	98 10	152.2	67 32.6	98 10	151.9
20	65 28.5	99 10	151.4	65 58.0	98 10	151.2	66 57.1	98 10	150.8	67 26.6	98 10	150.5
1	65 22.4	98 11	150.0	65 51.9	98 11	149.8	66 50.8	98 11	149.4	67 20.3	98 11	149.1
2	65 16.0	98 11	148.7	65 45.5	98 11	148.4	66 44.4	98 11	148.0	67 13.8	98 11	147.7
3	65 09.4	98 11	147.3	65 38.8	98 12	147.1	66 37.6	98 12	146.6	67 07.0	98 12	146.3
4	65 02.6	98 12	146.0	65 31.9	98 12	145.7	66 30.6	98 12	145.2	66 59.9	98 12	144.9
25	64 55.5	98 12	144.6	65 24.8	98 12	144.4	66 23.4	98 12	143.8	66 52.6	97 13	143.6
6	64 48.1	98 13	143.3	65 17.4	98 13	143.0	66 15.9	97 13	142.5	66 45.1	97 13	142.2
7	64 40.5	98 13	142.0	65 09.8	97 13	141.7	66 08.2	97 13	141.1	66 37.3	97 13	140.8
8	64 32.7	97 13	140.6	65 01.9	97 13	140.4	66 00.2	97 14	139.8	66 29.4	97 14	139.5
9	64 24.7	97 14	139.3	64 53.9	97 14	139.0	65 52.1	97 14	138.5	66 21.1	97 14	138.2
30	64 16.5	97 14	138.0	64 45.6	97 14	137.7	65 43.7	97 14	137.1	66 12.7	97 14	136.8
1	64 08.0	97 14	136.7	64 37.1	97 14	136.4	65 35.1	97 15	135.8	66 04.1	96 15	135.5
2	63 59.4	97 15	135.4	64 28.4	97 15	135.1	65 26.3	96 15	134.5	65 55.2	96 15	134.2
3	63 50.5	97 15	134.2	64 19.5	97 15	133.9	65 17.3	96 15	133.2	65 46.2	96 15	132.9
4	63 41.5	96 15	132.9	64 10.4	96 15	132.6	65 08.2	96 16	132.0	65 37.0	96 16	131.6
35	63 32.2	96 16	131.6	64 01.1	96 16	131.3	64 58.8	96 16	130.7	65 27.5	96 16	130.3
6	63 22.8	96 16	130.4	63 51.7	96 16	130.1	64 49.2	96 16	129.4	65 17.9	96 16	129.1
7	63 13.2	96 16	129.1	63 42.0	96 16	128.8	64 39.5	96 16	128.2	65 08.2	95 17	127.8
8	63 03.5	96 17	127.9	63 32.2	96 17	127.6	64 29.6	95 17	126.9	64 58.2	95 17	126.6
9	62 53.6	96 17	126.7	63 22.3	96 17	126.4	64 19.6	95 17	125.7	64 48.1	95 17	125.3
40	62 43.5	96 17	125.5	63 12.1	96 17	125.1	64 09.4	95 17	124.5	64 37.9	95 17	124.1
1	62 33.2	96 17	124.3	63 01.9	95 17	123.9	63 59.0	95 18	123.2	64 27.5	95 18	122.9
2	62 22.9	95 18	123.1	62 51.4	95 18	122.7	63 48.5	95 18	122.0	64 16.9	95 18	121.7
3	62 12.3	95 18	121.9	62 40.9	95 18	121.5	63 37.8	95 18	120.8	64 06.2	95 18	120.5
4	62 01.7	95 18	120.7	62 30.2	95 18	120.3	63 27.1	95 18	119.6	63 55.4	94 18	119.3
45	61 50.9	95 18	119.5	62 19.4	95 18	119.2	63 16.2	95 18	118.5	63 44.5	94 18	118.1
6	61 40.0	95 18	118.3	62 08.4	95 18	118.0	63 05.1	94 19	117.3	63 33.4	94 19	116.9
7	61 28.9	95 19	117.2	61 57.3	95 19	116.8	62 54.0	94 19	116.1	63 22.2	94 19	115.8
8	61 17.8	95 19	116.0	61 46.1	95 19	115.7	62 42.7	94 19	115.0	63 11.0	94 19	114.6
9	61 06.5	95 19	114.9	61 34.8	94 19	114.6	62 31.4	94 19	113.8	62 59.6	94 19	113.5
50	60 55.1	94 19	113.8	61 23.4	94 19	113.4	62 19.9	94 19	112.7	62 48.1	94 19	112.3
1	60 43.7	94 19	112.6	61 12.0	94 19	112.3	62 08.4	94 19	111.6	62 36.5	94 19	111.2
2	60 32.1	94 19	111.5	61 00.4	94 19	111.2	61 56.7	94 20	110.5	62 24.8	94 20	110.1
3	60 20.5	94 20	110.4	60 48.7	94 20	110.1	61 45.0	94 20	109.3	62 13.1	93 20	109.0
4	60 08.7	94 20	109.3	60 36.9	94 20	109.0	61 33.2	94 20	108.2	62 01.2	93 20	107.9
55	59 56.9	94 20	108.2	60 25.1	94 20	107.9	61 21.3	93 20	107.2	61 49.3	93 20	106.8
6	59 45.0	94 20	107.1	60 13.2	94 20	106.8	61 09.3	93 20	106.1	61 37.3	93 20	105.7
7	59 33.1	94 20	106.0	60 01.2	94 20	105.7	60 57.3	93 20	105.0	61 25.3	93 20	104.6
8	59 21.0	94 20	105.0	59 49.2	94 20	104.6	60 45.2	93 20	103.9	61 13.2	93 20	103.5
9	59 09.0	94 20	103.9	59 37.1	94 20	103.6	60 33.1	93 20	102.9	61 01.0	93 20	102.5
60	58 56.8	94 20	102.9	59 24.9	94 20	102.5	60 20.9	93 20	101.8	60 48.8	93 20	101.4
1	58 44.6	94 20	101.8	59 12.7	93 20	101.5	60 08.7	93 20	100.7	60 36.6	93 20	100.4
2	58 32.4	94 20	100.8	59 00.5	93 20	100.4	59 56.4	93 21	99.7	60 24.3	93 21	99.3
3	58 20.1	94 21	99.7	58 48.2	93 21	99.4	59 44.1	93 21	98.7	60 12.0	93 21	98.3
4	58 07.8	94 21	98.7	58 35.9	93 21	98.3	59 31.8	93 21	97.6	59 59.6	93 21	97.3
65	57 55.5	93 21	97.7	58 23.5	93 21	97.3	59 19.4	93 21	96.6	59 47.2	93 21	96.2
6	57 43.1	93 21	96.6	58 11.1	93 21	96.3	59 07.0	93 21	95.6	59 34.8	93 21	95.2
7	57 30.7	93 21	95.6	57 58.7	93 21	95.3	58 54.5	93 21	94.6	59 22.4	93 21	94.2
8	57 18.3	93 21	94.6	57 46.3	93 21	94.3	58 42.1	93 21	93.6	59 09.9	93 21	93.2
9	57 05.8	93 21	93.6	57 33.8	93 21	93.3	58 29.6	93 21	92.6	58 57.5	93 21	92.2
70	56 53.4	93 21	92.6	57 21.4	93 21	92.3	58 17.2	93 21	91.6	58 45.0	93 21	91.2
1	56 40.9	93 21	91.6	57 08.9	93 21	91.3	58 04.7	93 21	90.6	58 32.5	93 21	90.3
2	56 28.4	93 21	90.6	56 56.4	93 21	90.3	57 52.2	93 21	89.6	58 20.1	93 21	89.3
3	56 16.0	93 21	89.7	56 43.9	93 21	89.3	57 39.8	93 21	88.7	58 07.6	93 21	88.3
4	56 03.5	93 21	88.7	56 31.5	93 21	88.4	57 27.3	93 21	87.7	57 55.1	93 21	87.3
75	55 51.0	93 21	87.7	56 19.0	93 21	87.4	57 14.8	93 21	86.7	57 42.7	93 21	86.4
6	55 38.6	93 21	86.8	56 06.6	93 21	86.4	57 02.4	93 21	85.8	57 30.2	93 21	85.4
7	55 26.1	93 21	85.8	55 54.1	93 21	85.5	56 49.9	93 21	84.8	57 17.8	93 21	84.5
8	55 13.7	93 21	84.9	55 41.7	93 21	84.5	56 37.5	93 21	83.9	57 05.4	93 21	83.5
9	55 01.3	93 21	83.9	55 29.3	93 21	83.6	56 25.1	93 21	82.9	56 53.0	93 21	82.6
80	54 48.9	93 21	83.0	55 16.9	93 21	82.6	56 12.8	93 21	82.0	56 40.6	93 21	81.7
1	54 36.5	94 21	82.0	55 04.5	93 21	81.7	56 00.4	93 20	81.1	56 28.3	93 20	80.7
2	54 24.2	94 21	81.1	54 52.2	93 20	80.8	55 48.1	93 20	80.1	56 16.0	93 20	79.8
3	54 11.9	94 20	80.2	54 39.9	93 20	79.8	55 35.9	93 20	79.2	56 03.8	93 20	78.9
4	53 59.6	94 20	79.2	54 27.6	93 20	78.9	55 23.6	93 20	78.3	55 51.5	93 20	78.0
85	53 47.3	94 20	78.3	54 15.4	94 20	78.0	55 11.4	93 20	77.4	55 39.4	93 20	77.1
6	53 35.2	94 20	77.4	54 03.2	94 20	77.1	54 59.3	93 20	76.5	55 27.2	93 20	76.2
7	53 23.0	94 20	76.5	53 51.1	94 20	76.2	54 47.2	93 20	75.6	55 15.1	93 20	75.2
8	53 10.9	94 20	75.6	53 39.0	94 20	75.3	54 35.1	93 20	74.7	55 03.1	93 20	74.3
9	52 58.8	94 20	74.7	53 27.0	94 20	74.4	54 23.1	93 20	73.8	54 51.1	93 20	73.5
90	52 46.8	94 20	73.7	53 15.0	94 20	73.5	54 11.2	93 20	72.9	54 39.2	93 20	72.6

57° 00′			57° 30′			59° 00′			59° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
69 00.0	1.0 00	180.0	69 30.0	1.0 00	180.0	71 00.0	1.0 00	180.0	71 30.0	1.0 00	180.0	00
68 59.8	1.0 01	178.5	69 29.8	1.0 01	178.5	70 59.8	1.0 01	178.4	71 29.8	1.0 01	178.4	1
68 59.3	1.0 01	177.0	69 29.3	1.0 01	176.9	70 59.3	1.0 01	176.8	71 29.3	1.0 01	176.8	2
68 58.5	1.0 02	175.4	69 28.5	1.0 02	175.4	70 58.5	1.0 02	175.3	71 28.4	1.0 02	175.2	3
68 57.4	1.0 02	173.9	69 27.3	1.0 02	173.9	70 57.2	1.0 03	173.7	71 27.2	1.0 03	173.6	4
68 55.9	1.0 03	172.4	69 25.8	1.0 03	172.3	70 55.7	1.0 03	172.1	71 25.7	1.0 03	172.0	05
68 54.1	1.0 04	170.9	69 24.0	1.0 04	170.8	70 53.8	1.0 04	170.5	71 23.8	1.0 04	170.4	6
68 51.9	1.0 04	169.4	69 21.8	1.0 04	169.3	70 51.6	1.0 04	169.0	71 21.5	1.0 04	168.8	7
68 49.5	1.0 05	167.9	69 19.4	1.0 05	167.8	70 49.0	1.0 05	167.4	71 18.9	1.0 05	167.3	8
68 46.7	1.0 05	166.4	69 16.6	1.0 05	166.3	70 46.2	1.0 05	165.8	71 16.0	99 05	165.7	9
68 43.6	1.0 06	164.9	69 13.4	99 06	164.7	70 42.9	99 06	164.3	71 12.8	99 06	164.1	10
68 40.2	99 06	163.4	69 10.0	99 06	163.2	70 39.4	99 06	162.7	71 09.2	99 06	162.6	1
68 36.5	99 07	161.9	69 06.3	99 07	161.7	70 35.5	99 07	161.2	71 05.3	99 07	161.0	2
68 32.4	99 07	160.4	69 02.2	99 07	160.3	70 31.4	99 07	159.7	71 01.1	99 08	159.5	3
68 28.1	99 08	159.0	68 57.8	99 08	158.8	70 26.9	99 08	158.1	70 56.5	99 08	157.9	4
68 23.5	99 08	157.5	68 53.2	99 08	157.3	70 22.1	99 08	156.6	70 51.7	99 09	156.4	15
68 18.6	99 09	156.0	68 48.2	99 09	155.8	70 17.0	99 09	155.1	70 46.5	98 09	154.9	6
68 13.4	99 09	154.6	68 42.9	99 09	154.4	70 11.6	98 09	153.6	70 41.1	98 10	153.3	7
68 07.9	99 10	153.1	68 37.4	98 10	152.9	70 05.9	98 10	152.1	70 35.3	98 10	151.8	8
68 02.1	98 10	151.7	68 31.6	98 10	151.5	69 59.9	98 10	150.6	70 29.3	98 11	150.3	9
67 56.0	98 11	150.3	68 25.5	98 11	150.0	69 53.7	98 11	149.2	70 23.0	98 11	148.9	20
67 49.7	98 11	148.9	68 19.1	98 11	148.6	69 47.1	98 11	147.7	70 16.4	98 11	147.4	1
67 43.1	98 11	147.4	68 12.5	98 11	147.2	69 40.3	97 12	146.3	70 09.6	97 12	145.9	2
67 36.3	98 12	146.0	68 05.6	98 12	145.8	69 33.3	97 12	144.8	70 02.4	97 12	144.5	3
67 29.2	98 12	144.7	67 58.4	97 12	144.4	69 26.0	97 13	143.4	69 55.1	97 13	143.0	4
67 21.9	97 13	143.3	67 51.1	97 13	143.0	69 18.4	97 13	142.0	69 47.4	97 13	141.6	25
67 14.3	97 13	141.9	67 43.4	97 13	141.6	69 10.6	97 13	140.6	69 39.6	97 13	140.2	6
67 06.5	97 13	140.5	67 35.6	97 14	140.2	69 02.6	96 14	139.2	69 31.5	96 14	138.8	7
66 58.4	97 14	139.2	67 27.5	97 14	138.9	68 54.3	96 14	137.8	69 23.1	96 14	137.4	8
66 50.2	97 14	137.8	67 19.1	97 14	137.5	68 45.8	96 14	136.4	69 14.6	96 15	136.0	9
66 41.7	96 14	136.5	67 10.6	96 15	136.2	68 37.1	96 15	135.1	69 05.8	96 15	134.7	30
66 33.0	96 15	135.2	67 01.9	96 15	134.8	68 28.2	96 15	133.7	68 56.8	95 15	133.3	1
66 24.1	96 15	133.9	66 52.9	96 15	133.5	68 19.1	95 16	132.4	68 47.7	95 16	132.0	2
66 15.0	96 15	132.6	66 43.8	96 16	132.2	68 09.8	95 16	131.1	68 38.3	95 16	130.6	3
66 05.7	96 16	131.3	66 34.4	96 16	130.9	68 00.3	95 16	129.7	68 28.7	95 16	129.3	4
65 56.3	96 16	130.0	66 24.9	95 16	129.6	67 50.6	95 16	128.4	68 19.0	95 17	128.0	35
65 46.6	95 16	128.7	66 15.2	95 16	128.3	67 40.7	95 17	127.1	68 09.1	94 17	126.7	6
65 36.8	95 17	127.5	66 05.4	95 17	127.1	67 30.7	94 17	125.9	67 59.0	94 17	125.4	7
65 26.8	95 17	126.2	65 55.3	95 17	125.8	67 20.5	94 17	124.6	67 48.8	94 17	124.2	8
65 16.7	95 17	125.0	65 45.1	95 17	124.6	67 10.2	94 17	123.3	67 38.4	94 18	122.9	9
65 06.4	95 17	123.7	65 34.8	95 18	123.3	66 59.7	94 18	122.1	67 27.8	94 18	121.7	40
64 55.9	95 18	122.5	65 24.3	94 18	122.1	66 49.0	94 18	120.9	67 17.1	94 18	120.4	1
64 45.3	95 18	121.3	65 13.6	94 18	120.9	66 38.2	94 18	119.6	67 06.3	93 18	119.2	2
64 34.6	94 18	120.1	65 02.9	94 18	119.7	66 27.3	93 18	118.4	66 55.3	93 18	118.0	3
64 23.7	94 18	118.9	64 52.0	94 18	118.5	66 16.3	93 19	117.2	66 44.3	93 19	116.8	4
64 12.8	94 18	117.7	64 41.0	94 19	117.3	66 05.2	93 19	116.0	66 33.1	93 19	115.6	45
64 01.7	94 19	116.5	64 29.8	94 19	116.1	65 53.9	93 19	114.9	66 21.8	93 19	114.4	6
63 50.4	94 19	115.4	64 18.6	94 19	115.0	65 42.5	93 19	113.7	66 10.4	93 19	113.2	7
63 39.1	94 19	114.2	64 07.2	94 19	113.8	65 31.1	93 19	112.5	65 58.8	93 19	112.1	8
63 27.7	94 19	113.1	63 55.7	93 19	112.7	65 19.5	93 19	111.4	65 47.2	92 20	110.9	9
63 16.2	94 19	111.9	63 44.2	93 19	111.5	65 07.8	93 20	110.3	65 35.5	92 20	109.8	50
63 04.5	93 20	110.8	63 32.5	93 20	110.4	64 56.1	92 20	109.1	65 23.8	92 20	108.7	1
62 52.8	93 20	109.7	63 20.8	93 20	109.3	64 44.3	92 20	108.0	65 11.9	92 20	107.6	2
62 41.1	93 20	108.6	63 09.0	93 20	108.2	64 32.4	92 20	106.9	65 00.0	92 20	106.4	3
62 29.2	93 20	107.5	62 57.1	93 20	107.1	64 20.4	92 20	105.8	64 48.0	92 20	105.3	4
62 17.3	93 20	106.4	62 45.1	93 20	106.0	64 08.4	92 20	104.7	64 35.9	92 20	104.3	55
62 05.3	93 20	105.3	62 33.1	93 20	104.9	63 56.3	92 20	103.6	64 23.8	92 20	103.2	6
61 53.2	93 20	104.2	62 21.0	93 20	103.8	63 44.1	92 20	102.6	64 11.6	92 20	102.1	7
61 41.1	93 20	103.2	62 08.9	93 20	102.8	63 31.9	92 20	101.5	63 59.4	92 20	101.0	8
61 28.9	93 20	102.1	61 56.7	93 20	101.7	63 19.7	92 20	100.4	63 47.1	92 21	100.0	9
61 16.7	93 20	101.0	61 44.5	92 20	100.6	63 07.4	92 21	99.4	63 34.8	91 21	98.9	60
61 04.4	93 20	100.0	61 32.2	92 21	99.6	62 55.0	92 21	98.3	63 22.5	91 21	97.9	1
60 52.1	93 21	99.0	61 19.9	92 21	98.6	62 42.7	92 21	97.3	63 10.1	91 21	96.9	2
60 39.8	93 21	97.9	61 07.5	92 21	97.5	62 30.3	92 21	96.3	62 57.7	91 21	95.8	3
60 27.4	93 21	96.9	60 55.1	92 21	96.5	62 17.9	92 21	95.3	62 45.3	91 21	94.8	4
60 15.0	93 21	95.9	60 42.7	92 21	95.5	62 05.5	92 21	94.2	62 32.9	91 21	93.8	65
60 02.6	92 21	94.9	60 30.3	92 21	94.5	61 53.0	92 21	93.2	62 20.4	91 21	92.8	6
59 50.1	92 21	93.9	60 17.9	92 21	93.5	61 40.5	92 21	92.3	62 08.0	91 21	91.8	7
59 37.7	92 21	92.9	60 05.4	92 21	92.5	61 28.1	91 21	91.3	61 55.5	91 21	90.8	8
59 25.2	92 21	91.9	59 52.9	92 21	91.5	61 15.6	91 21	90.3	61 43.0	91 21	89.9	9
59 12.8	92 21	90.9	59 40.5	92 21	90.5	61 03.1	91 21	89.3	61 30.5	91 21	88.9	70
59 00.3	92 21	89.9	59 28.0	92 21	89.5	60 50.7	91 21	88.3	61 18.1	91 21	87.9	1
58 47.8	92 21	88.9	59 15.5	92 21	88.5	60 38.2	92 21	87.4	61 05.6	91 21	86.9	2
58 35.3	92 21	88.0	59 03.0	92 21	87.6	60 25.7	92 21	86.4	60 53.2	91 21	86.0	3
58 22.9	92 21	87.0	58 50.6	92 21	86.6	60 13.3	92 21	85.5	60 40.7	91 21	85.0	4
58 10.4	92 21	86.0	58 38.1	92 21	85.7	60 00.9	92 21	84.5	60 28.3	91 21	84.1	75
57 58.0	92 21	85.1	58 25.7	92 21	84.7	59 48.5	92 21	83.6	60 15.9	91 21	83.2	6
57 45.6	93 21	84.1	58 13.3	92 21	83.8	59 36.1	92 21	82.6	60 03.5	91 21	82.2	7
57 33.2	93 21	83.2	58 00.9	92 21	82.8	59 23.7	92 21	81.7	59 51.2	91 21	81.3	8
57 20.8	93 21	82.3	57 48.5	92 21	81.9	59 11.4	92 20	80.8	59 38.9	91 20	80.4	9
57 08.5	93 21	81.3	57 36.2	92 20	81.0	58 59.1	92 20	79.9	59 26.6	92 20	79.5	80
56 56.1	93 20	80.4	57 23.9	92 20	80.0	58 46.8	92 20	78.9	59 14.3	92 20	78.6	1
56 43.9	93 20	79.5	57 11.6	92 20	79.1	58 34.6	92 20	78.0	59 02.1	92 20	77.6	2
56 31.6	93 20	78.6	56 59.4	93 20	78.2	58 22.4	92 20	77.1	58 50.0	92 20	76.7	3
56 19.4	93 20	77.6	56 47.2	93 20	77.3	58 10.3	92 20	76.2	58 37.8	92 20	75.9	4
56 07.2	93 20	76.7	56 35.1	93 20	76.4	57 58.2	92 20	75.3	58 25.8	92 20	75.0	85
55 55.1	93 20	75.8	56 23.0	93 20	75.5	57 46.1	92 20	74.4	58 13.8	92 20	74.1	6
55 43.0	93 20	74.9	56 10.9	93 20	74.6	57 34.2	92 20	73.6	58 01.8	92 20	73.2	7
55 31.0	93 20	74.0	55 58.9	93 20	73.7	57 22.2	92 20	72.7	57 49.9	92 20	72.3	8
55 19.1	93 20	73.1	55 47.0	93 20	72.8	57 10.3	92 20	71.8	57 38.0	92 20	71.4	9
55 07.2	93 20	72.2	55 35.1	93 20	71.9	56 58.5	92 20	70.9	57 26.2	92 20	70.6	90

Lat. 78°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	52 34.9	94 20	72.8	53 03.1	94 20	72.6	53 59.3	94 20	72.0	54 27.3	93 20	71.7	54 55.3	93 20	71.4	55 23.2	93 20	71.0	56 46.8	93 20	70.0	57 14.5	92 19	69.7	91
2	52 23.0	94 20	72.0	52 51.2	94 20	71.7	53 47.4	94 20	71.1	54 15.5	93 20	70.8	54 43.5	93 20	70.5	55 11.5	93 20	70.2	56 35.1	93 19	69.2	57 02.8	92 19	68.8	2
3	52 11.2	94 20	71.1	52 39.4	94 20	70.8	53 35.7	94 20	70.2	54 03.8	94 19	69.9	54 31.8	93 19	69.6	54 59.8	93 19	69.3	56 23.4	93 19	68.3	56 51.2	93 19	68.0	3
4	51 59.4	94 20	70.2	52 27.6	94 19	69.9	53 24.0	94 19	69.3	53 52.1	94 19	69.0	54 20.1	93 19	68.7	54 48.1	93 19	68.4	56 11.9	93 19	67.4	56 39.7	93 19	67.1	4
95	51 47.7	94 19	69.3	52 15.9	94 19	69.0	53 12.3	94 19	68.4	53 40.5	94 19	68.2	54 08.5	94 19	67.9	54 36.6	93 19	67.5	56 00.4	93 19	66.6	56 28.2	93 19	66.3	95
6	51 36.1	94 19	68.4	52 04.3	94 19	68.1	53 00.8	94 19	67.6	53 28.9	94 19	67.3	53 57.0	94 19	67.0	54 25.1	93 19	66.7	55 49.0	93 19	65.7	56 16.9	93 19	65.4	6
7	51 24.5	94 19	67.5	51 52.8	94 19	67.3	52 49.3	94 19	66.7	53 17.4	94 19	66.4	53 45.6	94 19	66.1	54 13.7	94 19	65.8	55 37.7	93 19	64.9	56 05.6	93 19	64.6	7
8	51 13.0	94 19	66.6	51 41.3	94 19	66.4	52 37.8	94 19	65.8	53 06.0	94 19	65.5	53 34.2	94 19	65.3	54 02.3	94 19	65.0	55 26.4	93 19	64.0	55 54.3	93 19	63.7	8
9	51 01.6	95 19	65.8	51 29.9	94 19	65.5	52 26.5	94 19	65.0	52 54.7	94 19	64.7	53 22.9	94 19	64.4	53 51.1	94 19	64.1	55 15.2	93 18	63.2	55 43.2	93 18	62.9	9
100	50 50.3	95 19	64.9	51 18.6	94 19	64.6	52 15.2	94 19	64.1	52 43.5	94 19	63.8	53 11.7	94 19	63.5	53 39.9	94 18	63.3	55 04.1	93 18	62.4	55 32.1	93 18	62.0	100
1	50 39.0	95 19	64.0	51 07.4	95 19	63.8	52 04.1	94 18	63.2	52 32.3	94 18	63.0	53 00.6	94 18	62.7	53 28.8	94 18	62.4	54 53.1	93 18	61.5	55 21.2	93 18	61.2	1
2	50 27.8	95 18	63.2	50 56.2	95 19	62.9	51 53.0	94 18	62.4	52 21.3	94 18	62.1	52 49.5	94 18	61.8	53 17.8	94 18	61.6	54 42.2	93 18	60.7	55 10.3	93 18	60.4	2
3	50 16.7	95 18	62.3	50 45.2	95 18	62.1	51 42.0	95 18	61.5	52 10.3	94 18	61.3	52 38.6	94 18	61.0	53 06.8	94 18	60.7	54 31.4	94 18	59.8	54 59.5	94 18	59.5	3
4	50 05.7	95 18	61.4	50 34.2	95 18	61.2	51 31.0	95 18	60.7	51 59.4	94 18	60.4	52 27.7	94 18	60.2	52 56.0	94 18	59.9	54 20.6	94 18	59.0	54 48.8	94 18	58.7	4
105	49 54.8	95 18	60.6	50 23.3	95 18	60.3	51 20.2	95 18	59.8	51 48.6	95 18	59.6	52 16.9	94 18	59.3	52 45.3	94 18	59.0	54 10.0	94 18	58.2	54 38.1	94 18	57.9	105
6	49 44.0	95 18	59.7	50 12.5	95 18	59.5	51 09.5	95 18	59.0	51 37.9	95 18	58.7	52 06.3	95 18	58.5	52 34.6	94 18	58.2	53 59.4	94 17	57.4	54 27.6	94 17	57.1	6
7	49 33.3	95 18	58.9	50 01.8	95 18	58.6	50 58.8	95 18	58.1	51 27.3	95 18	57.9	51 55.7	95 18	57.6	52 24.1	95 17	57.4	53 49.0	94 17	56.5	54 17.2	94 17	56.3	7
8	49 22.6	95 18	58.0	49 51.2	95 18	57.8	50 48.3	95 17	57.3	51 16.7	95 17	57.1	51 45.2	95 17	56.8	52 13.6	95 17	56.5	53 38.6	94 17	55.7	54 06.9	94 17	55.4	8
9	49 12.1	95 17	57.2	49 40.7	95 17	56.9	50 37.8	95 17	56.5	51 06.3	95 17	56.2	51 34.8	95 17	56.0	52 03.2	95 17	55.7	53 28.4	94 17	54.9	53 56.7	94 17	54.6	9
110	49 01.7	95 17	56.3	49 30.3	95 17	56.1	50 27.5	95 17	55.6	50 56.0	95 17	55.4	51 24.5	95 17	55.1	51 53.0	95 17	54.9	53 18.2	95 17	54.1	53 46.5	94 17	53.8	110
1	48 51.4	96 17	55.5	49 20.0	95 17	55.3	50 17.2	95 17	54.8	50 45.8	95 17	54.6	51 14.3	95 17	54.3	51 42.8	95 17	54.1	53 08.2	95 17	53.3	53 36.5	94 17	53.0	1
2	48 41.1	96 17	54.6	49 09.8	96 17	54.4	50 07.1	95 17	54.0	50 35.7	95 17	53.7	51 04.3	95 17	53.5	51 32.8	95 17	53.2	52 58.2	95 16	52.5	53 26.6	95 16	52.2	2
3	48 31.0	96 17	53.8	48 59.7	96 17	53.6	49 57.1	95 17	53.1	50 25.7	95 16	52.9	50 54.3	95 16	52.7	51 22.9	95 16	52.4	52 48.4	95 16	51.7	53 16.8	95 16	51.4	3
4	48 21.0	96 16	53.0	48 49.7	96 16	52.7	49 47.1	96 16	52.3	50 15.8	95 16	52.1	50 44.4	95 16	51.8	51 13.0	95 16	51.6	52 38.6	95 16	50.8	53 07.1	95 16	50.6	4
115	48 11.1	96 16	52.1	48 39.9	96 16	51.9	49 37.3	96 16	51.5	50 06.0	96 16	51.2	50 34.7	95 16	51.0	51 03.3	95 16	50.8	52 29.0	95 16	50.0	52 57.5	95 16	49.8	115
6	48 01.3	96 16	51.3	48 30.1	96 16	51.1	49 27.6	96 16	50.6	49 56.3	96 16	50.4	50 25.0	96 16	50.2	50 53.7	96 16	50.0	52 19.5	95 16	49.2	52 48.1	95 16	49.0	6
7	47 51.6	96 16	50.5	48 20.4	96 16	50.3	49 18.0	96 16	49.8	49 46.8	96 16	49.6	50 15.5	96 16	49.4	50 44.2	96 16	49.2	52 10.1	95 15	48.4	52 38.7	95 15	48.2	7
8	47 42.1	96 16	49.6	48 10.9	96 16	49.4	49 08.6	96 16	49.0	49 37.3	96 16	48.8	50 06.1	96 15	48.6	50 34.8	96 15	48.3	52 00.9	95 15	47.6	52 29.5	95 15	47.4	8
9	47 32.6	96 16	48.8	48 01.5	96 16	48.6	48 59.2	96 15	48.2	49 28.0	96 15	48.0	49 56.8	96 15	47.8	50 25.6	96 15	47.5	51 51.7	96 15	46.8	52 20.4	95 15	46.6	9
120	47 23.3	96 15	48.0	47 52.2	96 15	47.8	48 50.0	96 15	47.4	49 18.8	96 15	47.2	49 47.6	96 15	46.9	50 16.4	96 15	46.7	51 42.7	96 15	46.0	52 11.3	96 15	45.8	120
1	47 14.1	96 15	47.1	47 43.0	96 15	47.0	48 40.8	96 15	46.5	49 09.7	96 15	46.3	49 38.6	96 15	46.1	50 07.4	96 15	45.9	51 33.7	96 15	45.2	52 02.5	96 15	45.0	1
2	47 05.0	97 15	46.3	47 34.0	97 15	46.1	48 31.8	96 15	45.7	49 00.8	96 15	45.5	49 29.6	96 15	45.3	49 58.5	96 15	45.1	51 24.9	96 15	44.5	51 53.7	96 14	44.2	2
3	46 56.0	97 15	45.5	47 25.0	97 15	45.3	48 23.0	96 15	44.9	48 51.9	96 15	44.7	49 20.8	96 14	44.5	49 49.7	96 14	44.3	51 16.3	96 14	43.7	51 45.1	96 14	43.4	3
4	46 47.2	97 14	44.7	47 16.2	97 14	44.5	48 14.2	97 14	44.1	48 43.2	97 14	43.9	49 12.1	96 14	43.7	49 41.1	96 14	43.5	51 07.7	96 14	42.9	51 36.5	96 14	42.7	4
125	46 38.5	97 14	43.9	47 07.6	97 14	43.7	48 05.6	97 14	43.3	48 34.6	97 14	43.1	49 03.6	97 14	42.9	49 32.5	96 14	42.7	50 59.3	96 14	42.1	51 28.2	96 14	41.9	125
6	46 29.9	97 14	43.0	46 59.0	97 14	42.9	47 57.1	97 14	42.5	48 26.1	97 14	42.3	48 55.2	97 14	42.1	49 24.1	97 14	41.9	50 51.0	96 14	41.3	51 19.9	96 14	41.1	6
7	46 21.5	97 14	42.2	46 50.6	97 14	42.0	47 48.8	97 14	41.7	48 17.8	97 14	41.5	48 46.9	97 14	41.3	49 15.9	97 14	41.1	50 42.8	97 13	40.5	51 11.8	96 13	40.3	7
8	46 13.2	97 14	41.4	46 42.3	97 14	41.2	47 40.5	97 14	40.9	48 09.6	97 13	40.7	48 38.7	97 13	40.5	49 07.7	97 13	40.3	50 34.8	97 13	39.7	51 03.8	97 13	39.5	8
9	46 05.0	97 13	40.6	46 34.1	97 13	40.4	47 32.4	97 13	40.1	48 01.5	97 13	39.9	48 30.7	97 13	39.7	48 59.7	97 13	39.5	50 26.9	97 13	38.9	50 55.9	97 13	38.7	9
130	45 56.9	97 13	39.8	46 26.1	97 13	39.6	47 24.5	97 13	39.3	47 53.6	97 13	39.1	48 22.7	97 13	38.9	48 51.9	97 13	38.7	50 19.1	97 13	38.2	50 48.1	97 13	38.0	130
1	45 49.0	97 13	39.0	46 18.2	97 13	38.8	47 16.6	97 13	38.5	47 45.8	97 13	38.3	48 15.0	97 13	38.1	48 44.1	97 13	37.9	50 11.5	97 12	37.4	50 40.5	97 12	37.2	1
2	45 41.2	98 13	38.2	46 10.5	97 13	38.0	47 08.9	97 13	37.7	47 38.2	97 13	37.5	48 07.3	97 12	37.3	48 36.5	97 12	37.1	50 04.0	97 12	36.6	50 33.1	97 12	36.4	2
3	45 33.6	98 12	37.3	46 02.9	98 12	37.2	47 01.4	97 12	36.9	47 30.6	97 12	36.7	47 59.9	97 12	36.5	48 29.1	97 12	36.4	49 56.6	97 12	35.8	50 25.7	97 12	35.6	3
4	45 26.1	98 12	36.5	45 55.4	98 12	36.4	46 54.0	98 12	36.1	47 23.2	98 12	35.9	47 52.5	97 12	35.7	48 21.7	97 12	35.6	49 49.4	97 12	35.0	50 18.5	97 12	34.9	4
135	45 18.7	98 12	35.7	45 48.1	98 12	35.6	46 46.7	98 12	35.3	47 16.0	98 12	35.1	47 45.3	98 12	34.9	48 14.5	98 12	34.8	49 42.3	97 12	34.3	50 11.5	97 12	34.1	135
6	45 11.5	98 12	34.9	45 40.9	98 12	34.8	46 39.6	98 12	34.5	47 08.9	98 12	34.3	47 38.2	98 12	34.2	48 07.5	98 12	34.0	49 35.3	97 11	33.5	50 04.5	97 11	33.3	6
7	45 04.5	98 12	34.1	45 33.9	98 12	34.0	46 32.6	98 11	33.7	47 01.9	98 11	33.5	47 31.3	98 11	33.4	48 00.6	98 11	33.2	49 28.5	98 11	32.7	49 57.8	98 11	32.6	7
8	44 57.5	98 11	33.3	45 27.0	98 11	33.2	46 25.7	98 11	32.9	46 55.1	98 11	32.7	47 24.5	98 11	32.6	47 53.8	98 11	32.4	49 21.8	98 11	31.9	49 51.1	98 11	31.8	8
9	44 50.8	98 11	32.5	45 20.2	98 11	32.4	46 19.0	98 11	32.1	46 48.4	98 11	31.9	47 17.8	98 11	31.8	47 47.2	98 11	31.6	49 15.3	98 11	31.2	49 44.6	98 11	31.0	9
140	44 44.1	98 11	31.7	45 13.6	98 11	31.6	46 12.5	98 11	31.3	46 41.9	98 11	31.2	47 11.3	98 11	31.0	47 40.7	98 11	30.9	49 08.9	98 10	30.4	49 38.3	98 10	30.2	140
1	44 37.7	98 11	30.9	45 07.1	98 11	30.8	46 06.1	98 10	30.5	46 35.5	98 10	30.4	47 05.0	98 10	30.2	47 34.4	98 10	30.1	49 02.7	98 10	29.6	49 32.1	98 10	29.5	1
2	44 31.3	98 10	30.1	45 00.8	98 10	30.0	45 59.8	98 10	29.7	46 29.3	98 10	29.6	46 58.8	98 10	29.4	47 28.2	98 10	29.3	48 56.6	98 10	28.9	49 26.0	98 10	28.7	2
3	44 25.1	98 10	29.3	44 54.7	98 10	29.2	45 53.7	98 10	28.9	46 23.2	98 10	28.8	46 52.7	98 10	28.7	47 22.2	98 10	28.5	48 50.6	98 10	28.1	49 20.1	98 10	28.0	3
4	44 19.1	99 10	28.5	44 48.7	99 10	28.4	45 47.8	98 10	28.1	46 17.3	98 10	28.0	46 46.8	98 10	27.9	47 16.3	98 10	27.7	48 44.8	98 09	27.3	49 14.3	98 09	27.2	4
145	44 13.2	99 10	27.7	44 42.8	99 09	27.6	45 42.0	99 09	27.3	46 11.5	99 09	27.2	46 41.1	98 09	27.1	47 10.6	98 09	27.0	48 39.2	98 09	26.6	49 08.7	98 09	26.4	145
6	44 07.5	99 09	26.9	44 37.1	99 09	26.8	45 36.3	99 09	26.5	46 05.9	99 09	26.4	46 35.5	99 09	26.3	47 05.0	99 09	26.2	48 33.7	98 09	25.8	49 03.2	98 09	25.7	6
7	44 02.0	99 09	26.1	44 31.6	99 09	26.0	45 30.8	99 09	25.8	46 00.4	99 09	25.6	46 30.0	99 09	25.5	46 59.6	99 09	25.4	48 28.3	99 09	25.0	48 57.9	99 09	24.9	7
8	43 56.6	99 09	25.3	44 26.2	99 09	25.2	45 25.5	99 09	25.0	45 55.1	99 09	24.9	46 24.7	99 09	24.7	46 54.3	99 09	24.6	48 23.1	99 08	24.3	48 52.7	99 08	24.1	8
9	43 51.3	99 08	24.5	44 21.0	99 08	24.4	45 20.3	99 08	24.2	45 49.9	99 08	24.1	46 19.6	99 08	24.0	46 49.2	99 08	23.9	48 18.1	99 08	23.5	48 47.7	99 08	23.4	9
150	43 46.2	99 08	23.7	44 15.9	99 08	23.6	45 15.2	99 08	23.4	45 44.9	99 08	23.3	46 14.6	99 08	23.2	46 44.2	99 08	23.1	48 13.2	99 08	22.7	48 42.8	99 08	22.6	150
1	43 41.3	99 08	22.9	44 11.0	99 08	22.8	45 10.4	99 08	22.6	45 40.1	99 08	22.5	46 09.7	99 08	22.4	46 39.4	99 08	22.3	48 08.4	99 08	22.0	48 38.1	99 08	21.9	1
2	43 36.5	99 08	22.1	44 06.2	99 08	22.0	45 05.6	99 08	21.8	45 35.4	99 08	21.7	46 05.1	99 08	21.6	46 34.8	99 07	21.5	48 03.8	99 07	21.2	48 33.5	99 07	21.1	2
3	43 31.9	99 07	21.3	44 01.6	99 07	21.2	45 01.1	99 07	21.0	45 30.8	99 07	21.0	46 00.5	99 07	20.9	46 30.3	99 07	20.8	47 59.4	99 07	20.4	48 29.1	99 07	20.3	3
4	43 27.4	99 07	20.5	43 57.2	99 07	20.4	44 56.7	99 07	20.3	45 26.4	99 07	20.2	45 56.2	99 07	20.1	46 25.9	99 07	20.0	47 55.1	99 07	19.7	48 24.8	99 07	19.6	4
155	43 23.1	99 07	19.7	43 52.9	99 07	19.7	44 52.4	99 07	19.5	45 22.2	99 07	19.4	45 52.0	99 07	19.3	46 21.7	99 07	19.2	47 51.0	99 07	18.9	48 20.7	99 07	18.8	155
6	43 19.0	99 07	18.9	43 48.8	99 07	18.9	44 48.4	99 07	18.7	45 18.2	99 06	18.6	45 47.9	99 06	18.5	46 17.7	99 06	18.4	47 47.0	99 06	18.2	48 16.8	99 06	18.1	6
7	43 15.0	99 06	18.2	43 44.8	99 06	18.1	44 44.4	99 06	17.9	45 14.2	99 06	17.8	45 44.0	99 06	17.8	46 13.8	99 06	17.7	47 43.2	99 06	17.4	48 13.0	99 06	17.3	7
8	43 11.2	99 06	17.4	43 41.0	99 06	17.3	44 40.7	99 06	17.1	45 10.5	99 06	17.1	45 40.3	99 06	17.0	46 10.1	99 06	16.9	47 39.5	99 06	16.6	48 09.3	99 06	16.6	8
9	43 07.6	99 06	16.6	43 37.4	99 06	16.5	44 37.1	99 06	16.4	45 06.9	99 06	16.3	45 36.8	99 06	16.2	46 06.6	99 06	16.1	47 36.1	99 06	15.9	48 05.9	99 06	15.8	9
160	43 04.1	1.0 06	15.8	43 34.0	1.0 06	15.7	44 33.7	1.0 05	15.6	45 03.5	99 05	15.5	45 33.4	99 05	15.4	46 03.2	99 05	15.4	47 32.7	99 05	15.1	48 02.6	99 05	15.0	160
1	43 00.8	1.0 05	15.0	43 30.7	1.0 05	14.9	44 30.4	1.0 05	14.8	45 00.3	1.0 05	14.7	45 30.1	1.0 05	14.7	46 00.0	1.0 05	14.6	47 29.5	99 05	14.4	47 59.4	99 05	14.3	1
2	42 57.7	1.0 05	14.2	43 27.5	1.0 05	14.1	44 27.3	1.0 05	14.0	44 57.2	1.0 05	13.9	45 27.1	1.0 05	13.9	45 56.9	1.0 05	13.8	47 26.5	1.0 05	13.6	47 56.4	1.0 05	13.5	2
3	42 54.7	1.0 05	13.4	43 24.6	1.0 05	13.3	44 24.4	1.0 05	13.2	44 54.3	1.0 05	13.2	45 24.1	1.0 05	13.1	45 54.0	1.0 05	13.0	47 23.7	1.0 04	12.9	47 53.6	1.0 05	12.8	3
4	42 51.9	1.0 04	12.6	43 21.8	1.0 04	12.6	44 21.6	1.0 04	12.4	44 51.5	1.0 04	12.4	45 21.4	1.0 04	12.3	45 51.3	1.0 04	12.3	47 21.0	1.0 04	12.1	47 50.9	1.0 04	12.0	4
165	42 49.2	1.0 04	11.8	43 19.2	1.0 04	11.8	44 19.0	1.0 04	11.7	44 48.9	1.0 04	11.6	45 18.8	1.0 04	11.6	45 48.7	1.0 04	11.5	47 18.4	1.0 04	11.3	47 48.3	1.0 04	11.3	165
6	42 46.8	1.0 04	11.0	43 16.7	1.0 04	11.0	44 16.5	1.0 04	10.9	44 46.5	1.0 04	10.8	45 16.4	1.0 04	10.8	45 46.3	1.0 04	10.7	47 16.1	1.0 04	10.6	47 46.0	1.0 04	10.5	6
7	42 44.5	1.0 04	10.2	43 14.4	1.0 04	10.2	44 14.3	1.0 04	10.1	44 44.2	1.0 04	10.1	45 14.1	1.0 03	10.0	45 44.1	1.0 03	10.0	47 13.9	1.0 03	09.8	47 43.8	1.0 03	09.8	7
8	42 42.3	1.0 03	09.5	43 12.3	1.0 03	09.4	44 12.2	1.0 03	09.3	44 42.1	1.0 03	09.3	45 12.1	1.0 03	09.2	45 42.0	1.0 03	09.2	47 11.8	1.0 03	09.1	47 41.8	1.0 03	09.0	8
9	42 40.4	1.0 03	08.7	43 10.3	1.0 03	08.6	44 10.2	1.0 03	08.6	44 40.2	1.0 03	08.5	45 10.1	1.0 03	08.5	45 40.1	1.0 03	08.4	47 09.9	1.0 03	08.3	47 39.9	1.0 03	08.3	9
170	42 38.6	1.0 03	07.9	43 08.5	1.0 03	07.8	44 08.5	1.0 03	07.8	44 38.4	1.0 03	07.7	45 08.4	1.0 03	07.7	45 38.3	1.0 03	07.7	47 08.2	1.0 03	07.6	47 38.2	1.0 03	07.5	170
1	42 36.9	1.0 02	07.1	43 06.9	1.0 02	07.1	44 06.8	1.0 02	07.0	44 36.8	1.0 02	07.0	45 06.8	1.0 02	06.9	45 36.8	1.0 02	06.9	47 06.7	1.0 02	06.8	47 36.6	1.0 02	06.8	1
2	42 35.5	1.0 02	06.3	43 05.5	1.0 02	06.3	44 05.4	1.0 02	06.2	44 35.4	1.0 02	06.2	45 05.4	1.0 02	06.2	45 35.3	1.0 02	06.1	47 05.3	1.0 02	06.0	47 35.2	1.0 02	06.0	2
3	42 34.2	1.0 02	05.5	43 04.2	1.0 02	05.5	44 04.1	1.0 02	05.4	44 34.1	1.0 02	05.4	45 04.1	1.0 02	05.4	45 34.1	1.0 02	05.4	47 04.0	1.0 02	05.3	47 34.0	1.0 02	05.3	3
4	42 33.1	1.0 02	04.7	43 03.1	1.0 02	04.7	44 03.0	1.0 02	04.7	44 33.0	1.0 02	04.6	45 03.0	1.0 02	04.6	45 33.0	1.0 02	04.6	47 03.0	1.0 02	04.5	47 32.9	1.0 01	04.5	4
175	42 32.1	1.0 01	03.9	43 02.1	1.0 01	03.9	44 02.1	1.0 01	03.9	44 32.1	1.0 01	03.9	45 02.1	1.0 01	03.9	45 32.1	1.0 01	03.8	47 02.1	1.0 01	03.8	47 32.0	1.0 01	03.8	175
6	42 31.4	1.0 01	03.2	43 01.4	1.0 01	03.1	44 01.4	1.0 01	03.1	44 31.3	1.0 01	03.1	45 01.3	1.0 01	03.1	45 31.3	1.0 01	03.1	47 01.3	1.0 01	03.0	47 31.3	1.0 01	03.0	6
7	42 30.8	1.0 01	02.4	43 00.8	1.0 01	02.4	44 00.8	1.0 01	02.3	44 30.8	1.0 01	02.3	45 00.8	1.0 01	02.3	45 30.8	1.0 01	02.3	47 00.7	1.0 01	02.3	47 30.7	1.0 01	02.3	7
8	42 30.3	1.0 00	01.6	43 00.3	1.0 00	01.6	44 00.3	1.0 00	01.6	44 30.3	1.0 00	01.5	45 00.3	1.0 00	01.5	45 30.3	1.0 00	01.5	47 00.3	1.0 00	01.5	47 30.3	1.0 00	01.5	8
9	42 30.1	1.0 00	00.8	43 00.1	1.0 00	00.8	44 00.1	1.0 00	00.8	44 30.1	1.0 00	00.8	45 00.1	1.0 00	00.8	45 30.1	1.0 00	00.8	47 00.1	1.0 00	00.8	47 30.1	1.0 00	00.8	9
180	42 30.0	1.0 00	00.0	43 00.0	1.0 00	00.0	44 00.0	1.0 00	00.0	44 30.0	1.0 00	00.0	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	47 00.0	1.0 00	00.0	47 30.0	1.0 00	00.0	180

Lat. 79°

Lat. 78°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	° ′	Δ	°	°
00	72 00.0	1.0	00 180.0	72 30.0	1.0	00 180.0	74 00.0	1.0	00 180.0	74 30.0	1.0	00 180.0	75 00.0	1.0	00 180.0	81 00.0	1.0	00 180.0	81 30.0	1.0	00 180.0	86 30.0	1.0	01 180.0	00
1	71 59.8	1.0	01 178.4	72 29.8	1.0	01 178.4	73 59.8	1.0	01 178.3	74 29.8	1.0	01 178.3	74 59.8	1.0	01 178.2	80 59.8	1.0	01 177.7	81 29.7	1.0	01 177.6	86 29.5	1.0	02 175.6	1
2	71 59.3	1.0	01 176.8	72 29.3	1.0	01 176.7	73 59.3	1.0	02 176.6	74 29.2	1.0	02 176.5	74 59.2	1.0	02 176.5	80 59.0	1.0	02 175.4	81 29.0	1.0	02 175.3	86 28.1	99	04 171.3	2
3	71 58.4	1.0	02 175.1	72 28.4	1.0	02 175.1	73 58.3	1.0	02 174.9	74 28.3	1.0	02 174.8	74 58.3	1.0	02 174.7	80 57.8	1.0	03 173.1	81 27.7	1.0	03 172.9	86 25.8	98	05 167.0	3
4	71 57.2	1.0	03 173.5	72 27.2	1.0	03 173.5	73 57.0	1.0	03 173.2	74 27.0	1.0	03 173.1	74 57.0	1.0	03 173.0	80 56.0	1.0	04 170.9	81 25.9	1.0	04 170.6	86 22.5	97	07 162.9	4
05	71 55.6	1.0	03 171.9	72 25.6	1.0	03 171.8	73 55.4	1.0	03 171.5	74 25.3	1.0	03 171.4	74 55.2	1.0	04 171.3	80 53.8	99	04 168.6	81 23.6	99	05 168.2	86 18.4	96	08 158.8	05
6	71 53.7	1.0	04 170.3	72 23.6	1.0	04 170.2	73 53.4	1.0	04 169.8	74 23.3	1.0	04 169.7	74 53.2	1.0	04 169.5	80 51.1	99	05 166.4	81 20.8	99	05 165.9	86 13.5	94	09 154.9	6
7	71 51.4	1.0	04 168.7	72 21.3	1.0	04 168.6	73 51.0	1.0	05 168.1	74 20.8	1.0	05 168.0	74 50.7	1.0	05 167.8	80 47.9	99	06 164.1	81 17.5	99	06 163.6	86 07.8	93	11 151.1	7
8	71 48.8	1.0	05 167.1	72 18.7	1.0	05 167.0	73 48.2	99	05 166.5	74 18.1	99	05 166.3	74 47.9	99	05 166.1	80 44.3	98	07 161.9	81 13.8	98	07 161.4	86 01.5	91	12 147.6	8
9	71 45.9	99	05 165.5	72 15.7	99	06 165.4	73 45.1	99	06 164.8	74 14.9	99	06 164.6	74 44.7	99	06 164.3	80 40.2	98	08 159.8	81 09.6	98	08 159.1	85 54.5	89	13 144.1	9
10	71 42.6	99	06 163.9	72 12.4	99	06 163.8	73 41.7	99	06 163.1	74 11.4	99	06 162.9	74 41.1	99	06 162.6	80 35.7	98	08 157.6	81 04.9	97	09 156.9	85 46.9	87	14 140.9	10
1	71 39.0	99	07 162.4	72 08.7	99	07 162.2	73 37.9	99	07 161.5	74 07.6	99	07 161.2	74 37.2	99	07 160.9	80 30.7	97	09 155.5	80 59.8	97	09 154.7	85 38.8	85	14 137.8	1
2	71 35.0	99	07 160.8	72 04.7	99	07 160.6	73 33.8	99	07 159.8	74 03.4	99	08 159.5	74 33.0	99	08 159.2	80 25.3	97	10 153.4	80 54.2	96	10 152.6	85 30.2	83	15 134.9	2
3	71 30.7	99	08 159.2	72 00.4	99	08 159.0	73 29.3	99	08 158.2	73 58.9	99	08 157.9	74 28.4	98	08 157.6	80 19.5	96	10 151.3	80 48.3	96	11 150.5	85 21.1	82	16 132.1	3
4	71 26.2	99	08 157.7	71 55.8	99	08 157.4	73 24.5	98	09 156.6	73 54.0	98	09 156.2	74 23.5	98	09 155.9	80 13.4	96	11 149.3	80 41.9	95	11 148.4	85 11.6	80	16 129.5	4
15	71 21.3	99	09 156.1	71 50.8	98	09 155.9	73 19.4	98	09 155.0	73 48.8	98	09 154.6	74 18.2	98	09 154.3	80 06.8	95	12 147.3	80 35.2	94	12 146.3	85 01.9	78	17 127.0	15
6	71 16.1	98	09 154.6	71 45.6	98	09 154.3	73 13.9	98	10 153.4	73 43.3	98	10 153.0	74 12.6	98	10 152.6	79 59.9	94	12 145.3	80 28.1	94	12 144.3	84 51.7	77	17 124.7	6
7	71 10.6	98	10 153.1	71 40.0	98	10 152.8	73 08.2	98	10 151.8	73 37.5	98	10 151.4	74 06.8	98	10 151.0	79 52.6	94	13 143.4	80 20.7	93	13 142.4	84 41.3	75	18 122.4	7
8	71 04.8	98	10 151.5	71 34.1	98	10 151.2	73 02.1	98	11 150.2	73 31.4	97	11 149.8	74 00.6	97	11 149.4	79 45.0	93	13 141.5	80 12.9	93	14 140.4	84 30.7	74	18 120.3	8
9	70 58.7	98	11 150.0	71 28.0	98	11 149.7	72 55.8	97	11 148.6	73 24.9	97	11 148.2	73 54.1	97	11 147.8	79 37.1	93	14 139.7	80 04.8	92	14 138.6	84 19.8	73	18 118.3	9
20	70 52.3	98	11 148.5	71 21.6	97	11 148.2	72 49.1	97	12 147.1	73 18.2	97	12 146.7	73 47.3	97	12 146.2	79 28.9	92	14 137.8	79 56.4	91	14 136.7	84 08.7	72	19 116.4	20
1	70 45.7	97	12 147.1	71 14.9	97	12 146.7	72 42.2	97	12 145.5	73 11.2	97	12 145.1	73 40.2	96	12 144.6	79 20.4	92	15 136.0	79 47.7	91	15 134.9	83 57.5	71	19 114.5	1
2	70 38.7	97	12 145.6	71 07.9	97	12 145.2	72 35.0	97	12 144.0	73 04.0	96	13 143.6	73 32.8	96	13 143.1	79 11.6	91	15 134.3	79 38.7	90	15 133.1	83 46.0	70	19 112.8	2
3	70 31.6	97	12 144.1	71 00.6	97	13 143.8	72 27.6	96	13 142.5	72 56.4	96	13 142.0	73 25.2	96	13 141.6	79 02.5	90	16 132.6	79 29.5	90	16 131.4	83 34.5	69	20 111.1	3
4	70 24.1	97	13 142.7	70 53.1	97	13 142.3	72 19.8	96	13 141.0	72 48.6	96	13 140.5	73 17.3	96	14 140.0	78 53.2	90	16 130.9	79 20.0	89	16 129.7	83 22.8	68	20 109.5	4
25	70 16.4	97	13 141.2	70 45.4	96	13 140.8	72 11.9	96	14 139.5	72 40.6	96	14 139.1	73 09.2	95	14 138.5	78 43.6	89	16 129.2	79 10.3	88	17 128.0	83 11.0	67	20 107.9	25
6	70 08.5	96	14 139.8	70 37.4	96	14 139.4	72 03.6	96	14 138.1	72 32.3	95	14 137.6	73 00.8	95	14 137.1	78 33.8	89	17 127.6	79 00.4	88	17 126.4	82 59.0	67	20 106.5	6
7	70 00.3	96	14 138.4	70 29.1	96	14 138.0	71 55.2	95	14 136.6	72 23.7	95	15 136.1	72 52.2	95	15 135.6	78 23.9	88	17 126.0	78 50.2	87	17 124.8	82 47.0	66	20 105.0	7
8	69 51.9	96	14 137.0	70 20.7	96	14 136.6	71 46.5	95	15 135.2	72 15.0	95	15 134.7	72 43.3	94	15 134.1	78 13.7	88	17 124.4	78 39.9	87	18 123.2	82 34.9	65	20 103.6	8
9	69 43.3	96	15 135.6	70 12.0	95	15 135.2	71 37.6	95	15 133.8	72 06.0	94	15 133.3	72 34.3	94	15 132.7	78 03.3	87	18 122.9	78 29.3	86	18 121.7	82 22.8	65	20 102.3	9
30	69 34.5	95	15 134.2	70 03.1	95	15 133.8	71 28.5	94	16 132.4	71 56.8	94	16 131.8	72 25.0	94	16 131.3	77 52.7	87	18 121.4	78 18.6	86	18 120.2	82 10.6	65	20 101.0	30
1	69 25.5	95	15 132.9	69 54.0	95	16 132.4	71 19.2	94	16 131.0	71 47.4	94	16 130.4	72 15.5	94	16 129.9	77 42.0	86	18 120.0	78 07.8	85	18 118.7	81 58.3	64	21 99.8	1
2	69 16.2	95	16 131.5	69 44.7	95	16 131.1	71 09.7	94	16 129.6	71 37.8	94	16 129.1	72 06.9	93	16 128.5	77 31.1	86	18 118.5	77 56.8	85	19 117.3	81 46.0	64	21 98.6	2
3	69 06.8	95	16 130.2	69 35.2	95	16 129.7	71 00.0	94	16 128.2	71 28.0	93	17 127.7	71 56.0	93	17 127.1	77 20.1	86	19 117.1	77 45.6	85	19 115.9	81 33.6	64	21 97.4	3
4	68 57.2	95	16 128.9	69 25.5	94	16 128.4	70 50.1	94	17 126.9	71 18.1	93	17 126.4	71 46.0	93	17 125.8	77 08.9	85	19 115.7	77 34.3	84	19 114.5	81 21.2	63	21 96.2	4
35	68 47.4	94	17 127.6	69 15.6	94	17 127.1	70 40.0	93	17 125.6	71 07.9	93	17 125.0	71 35.8	93	17 124.4	76 57.6	85	19 114.4	77 22.9	84	19 113.1	81 08.8	63	21 95.1	35
6	68 37.4	94	17 126.3	69 05.6	94	17 125.8	70 29.8	93	17 124.3	70 57.6	93	17 123.7	71 25.4	92	18 123.1	76 46.2	85	19 113.0	77 11.4	83	19 111.8	80 56.4	63	21 94.1	6
7	68 27.2	94	17 125.0	68 55.4	94	17 124.5	70 19.4	93	18 123.0	70 47.2	92	18 122.4	71 14.9	92	18 121.8	76 34.7	84	19 111.7	76 59.8	83	20 110.5	80 43.9	63	21 93.0	7
8	68 16.9	94	17 123.7	68 45.1	94	18 123.2	70 08.8	93	18 121.7	70 36.6	92	18 121.1	71 04.2	92	18 120.5	76 23.0	84	20 110.4	76 48.0	83	20 109.2	80 31.5	63	21 92.0	8
9	68 06.5	94	18 122.4	68 34.5	93	18 122.0	69 58.2	92	18 120.4	70 25.8	92	18 119.8	70 53.4	92	18 119.2	76 11.3	84	20 109.1	76 36.2	83	20 108.0	80 19.0	63	21 91.0	9
40	67 55.9	93	18 121.2	68 23.9	93	18 120.7	69 47.3	92	18 119.1	70 14.9	92	18 118.6	70 42.4	91	18 118.0	75 59.4	83	20 107.9	76 24.3	82	20 106.7	80 06.5	63	21 90.0	40
1	67 45.2	93	18 120.0	68 13.1	93	18 119.5	69 36.4	92	18 117.9	70 03.9	92	19 117.3	70 31.4	91	19 116.7	75 47.5	83	20 106.7	76 12.3	82	20 105.5	79 54.1	63	21 89.0	1
2	67 34.3	93	18 118.7	68 02.2	93	18 118.2	69 25.3	92	19 116.7	69 52.8	91	19 116.1	70 20.2	91	19 115.5	75 35.5	83	20 105.5	76 00.3	82	20 104.3	79 41.6	63	21 88.0	2
3	67 23.3	93	19 117.5	67 51.1	93	19 117.0	69 14.1	92	19 115.4	69 41.5	91	19 114.9	70 08.8	91	19 114.3	75 23.5	83	20 104.3	75 48.1	82	20 103.1	79 29.1	63	21 87.1	3
4	67 12.2	93	19 116.3	67 39.9	92	19 115.8	69 02.8	91	19 114.2	69 30.1	91	19 113.7	69 57.4	91	19 113.0	75 11.4	83	20 103.1	75 36.0	81	20 102.0	79 16.7	63	21 86.2	4
45	67 00.9	93	19 115.1	67 28.7	92	19 114.6	68 51.3	91	19 113.0	69 18.7	91	19 112.5	69 45.9	91	19 111.9	74 59.2	82	20 102.0	75 23.7	81	20 100.9	79 04.2	63	21 85.3	45
6	66 49.6	92	19 113.9	67 17.3	92	19 113.4	68 39.8	91	19 111.9	69 07.1	91	19 111.3	69 34.3	90	20 110.7	74 47.0	82	20 100.8	75 11.5	81	21 99.7	78 51.8	63	21 84.4	6
7	66 38.1	92	19 112.8	67 05.8	92	19 112.3	68 28.2	91	20 110.7	68 55.4	91	20 110.1	69 22.5	90	20 109.5	74 34.7	82	21 99.7	74 59.1	81	21 98.6	78 39.4	63	21 83.6	7
8	66 26.6	92	19 111.6	66 54.2	92	19 111.1	68 16.5	91	20 109.5	68 43.7	90	20 108.9	69 10.7	90	20 108.3	74 22.4	82	21 98.6	74 46.8	81	21 97.5	78 27.0	64	21 82.7	8
9	66 14.9	92	20 110.5	66 42.5	92	20 110.0	68 04.7	91	20 108.4	68 31.8	90	20 107.8	68 58.9	90	20 107.2	74 10.0	82	21 97.6	74 34.4	81	21 96.5	78 14.7	64	21 81.9	9
50	66 03.2	92	20 109.3	66 30.7	92	20 108.8	67 52.8	91	20 107.2	68 19.9	90	20 106.7	68 46.9	90	20 106.1	73 57.6	82	21 96.5	74 22.0	81	21 95.4	78 02.3	64	21 81.0	50
1	65 51.4	92	20 108.2	66 18.9	92	20 107.7	67 40.8	90	20 106.1	68 07.9	90	20 105.5	68 34.9	90	20 105.0	73 45.2	82	21 95.4	74 09.6	81	21 94.4	77 50.0	64	20 80.2	1
2	65 39.5	92	20 107.1	66 07.0	91	20 106.6	67 28.8	90	20 105.0	67 55.9	90	20 104.4	68 22.8	90	20 103.8	73 32.8	82	21 94.4	73 57.1	81	21 93.4	77 37.7	64	20 79.4	2
3	65 27.5	92	20 106.0	65 55.0	91	20 105.5	67 16.7	90	20 103.9	67 43.8	90	20 103.3	68 10.7	89	20 102.7	73 20.4	82	21 93.4	73 44.7	81	21 92.3	77 25.5	65	20 78.6	3
4	65 15.5	92	20 104.9	65 42.9	91	20 104.4	67 04.6	90	20 102.8	67 31.6	90	20 102.2	67 58.5	89	20 101.7	73 07.9	81	21 92.4	73 32.2	80	21 91.3	77 13.3	65	20 77.8	4
55	65 03.4	91	20 103.8	65 30.8	91	20 103.3	66 52.4	90	20 101.7	67 19.4	90	20 101.2	67 46.2	89	20 100.6	72 55.4	81	21 91.4	73 19.7	80	21 90.3	77 01.1	65	20 77.0	55
6	64 51.3	91	20 102.7	65 18.6	91	20 102.2	66 40.2	90	20 100.7	67 07.1	90	20 100.1	67 33.9	89	21 99.5	72 43.0	81	21 90.4	73 07.3	80	21 89.4	76 49.0	65	20 76.3	6
7	64 39.1	91	20 101.6	65 06.4	91	20 101.1	66 27.9	90	21 99.6	66 54.8	90	21 99.0	67 21.6	89	21 98.5	72 30.5	81	21 89.4	72 54.8	80	21 88.4	76 36.9	66	20 75.5	7
8	64 26.8	91	20 100.6	64 54.2	91	20 100.1	66 15.6	90	21 98.5	66 42.5	90	21 98.0	67 09.3	89	21 97.4	72 18.0	81	21 88.4	72 42.3	81	21 87.5	76 24.8	66	20 74.7	8
9	64 14.6	91	21 99.5	64 41.9	91	21 99.0	66 03.2	90	21 97.5	66 30.1	89	21 96.9	66 56.9	89	21 96.4	72 05.6	81	21 87.5	72 29.9	81	21 86.5	76 12.8	66	20 74.0	9
60	64 02.2	91	21 98.5	64 29.5	91	21 98.0	65 50.8	90	21 96.5	66 17.7	89	21 95.9	66 44.5	89	21 95.3	71 53.1	82	21 86.5	72 17.4	81	21 85.6	76 00.8	67	20 73.3	60
1	63 49.9	91	21 97.4	64 17.2	91	21 97.0	65 38.4	90	21 95.4	66 05.3	89	21 94.9	66 32.0	89	21 94.3	71 40.7	82	21 85.6	72 05.0	81	21 84.7	75 48.9	67	20 72.5	1
2	63 37.5	91	21 96.4	64 04.8	91	21 95.9	65 26.0	90	21 94.4	65 52.9	89	21 93.9	66 19.6	89	21 93.3	71 28.2	82	21 84.7	71 52.6	81	21 83.7	75 37.0	67	20 71.8	2
3	63 25.1	91	21 95.4	63 52.3	91	21 94.9	65 13.5	90	21 93.4	65 40.4	89	21 92.9	66 07.1	89	21 92.3	71 15.8	82	21 83.8	71 40.2	81	21 82.8	75 25.2	68	20 71.1	3
4	63 12.7	91	21 94.4	63 39.9	91	21 93.9	65 01.1	90	21 92.4	65 27.9	89	21 91.9	65 54.7	89	21 91.3	71 03.4	82	21 82.8	71 27.8	81	21 81.9	75 13.4	68	20 70.4	4
65	63 00.2	91	21 93.4	63 27.5	91	21 92.9	64 48.6	90	21 91.4	65 15.5	89	21 90.9	65 42.2	89	21 90.3	70 51.1	82	21 81.9	71 15.5	81	20 81.1	75 01.7	68	19 69.6	65
6	62 47.8	91	21 92.4	63 15.0	91	21 91.9	64 36.2	90	21 90.4	65 03.0	89	21 89.9	65 29.7	89	21 89.4	70 38.7	82	20 81.1	71 03.2	81	20 80.2	74 50.0	69	19 68.9	6
7	62 35.3	91	21 91.4	63 02.5	91	21 90.9	64 23.7	90	21 89.5	64 50.5	89	21 88.9	65 17.3	89	21 88.4	70 26.4	82	20 80.2	70 50.9	81	20 79.3	74 38.4	69	19 68.2	7
8	62 22.8	91	21 90.4	62 50.1	91	21 89.9	64 11.2	90	21 88.5	64 38.0	89	21 88.0	65 04.8	89	21 87.4	70 14.1	82	20 79.3	70 38.7	81	20 78.4	74 26.9	70	19 67.5	8
9	62 10.3	91	21 89.4	62 37.6	91	21 89.0	63 58.7	90	21 87.5	64 25.6	89	21 87.0	64 52.3	89	21 86.5	70 01.9	82	20 78.4	70 26.5	81	20 77.6	74 15.4	70	19 66.9	9
70	61 57.9	91	21 88.4	62 25.1	91	21 88.0	63 46.3	90	21 86.6	64 13.1	89	21 86.1	64 39.9	89	21 85.5	69 49.7	82	20 77.6	70 14.3	82	20 76.7	74 03.9	70	19 66.2	70
1	61 45.4	91	21 87.5	62 12.6	91	21 87.0	63 33.8	90	21 85.6	64 00.7	89	21 85.1	64 27.5	89	21 84.6	69 37.5	83	20 76.7	70 02.2	82	20 75.9	73 52.5	71	19 65.5	1
2	61 32.9	91	21 86.5	62 00.2	91	21 86.1	63 21.4	90	21 84.7	63 48.3	89	21 84.2	64 15.0	89	21 83.7	69 25.4	83	20 75.9	69 50.1	82	20 75.1	73 41.2	71	19 64.8	2
3	61 20.5	91	21 85.6	61 47.8	91	21 85.1	63 09.0	90	21 83.7	63 35.9	89	21 83.2	64 02.7	89	21 82.7	69 13.3	83	20 75.0	69 38.1	82	20 74.2	73 30.0	71	19 64.1	3
4	61 08.1	91	21 84.6	61 35.3	91	21 84.2	62 56.6	90	21 82.8	63 23.5	89	21 82.3	63 50.3	89	21 81.8	69 01.3	83	20 74.2	69 26.1	82	20 73.4	73 18.8	72	19 63.5	4
75	60 55.7	91	21 83.7	61 22.9	91	21 83.3	62 44.2	90	21 81.9	63 11.2	90	21 81.4	63 38.0	89	20 80.9	68 49.3	83	20 73.4	69 14.2	82	20 72.6	73 07.7	72	18 62.8	75
6	60 43.3	91	21 82.7	61 10.6	91	21 82.3	62 31.9	90	20 81.0	62 58.8	90	20 80.5	63 25.7	89	20 80.0	68 37.4	83	20 72.6	69 02.3	83	20 71.8	72 56.6	73	18 62.1	6
7	60 30.9	91	21 81.8	60 58.2	91	21 81.4	62 19.6	90	20 80.0	62 46.6	90	20 79.6	63 13.4	89	20 79.1	68 25.5	83	20 71.7	68 50.5	83	20 71.0	72 45.6	73	18 61.5	7
8	60 18.6	91	20 80.9	60 45.9	91	20 80.5	62 07.3	90	20 79.1	62 34.3	90	20 78.7	63 01.2	89	20 78.2	68 13.7	84	20 70.9	68 38.7	83	20 70.2	72 34.7	73	18 60.8	8
9	60 06.3	91	20 80.0	60 33.6	91	20 79.6	61 55.1	90	20 78.2	62 22.1	90	20 77.8	62 49.0	89	20 77.3	68 02.0	84	20 70.1	68 27.0	83	19 69.4	72 23.8	74	18 60.2	9
80	59 54.0	91	20 79.1	60 21.4	91	20 78.7	61 42.9	90	20 77.3	62 09.9	90	20 76.9	62 36.8	90	20 76.4	67 50.2	84	19 69.3	68 15.4	83	19 68.6	72 13.0	74	18 59.5	80
1	59 41.8	91	20 78.2	60 09.1	91	20 77.7	61 30.8	90	20 76.5	61 57.8	90	20 76.0	62 24.7	90	20 75.5	67 38.6	84	19 68.5	68 03.8	84	19 67.8	72 02.3	75	18 58.9	1
2	59 29.6	91	20 77.3	59 57.0	91	20 76.9	61 18.7	90	20 75.6	61 45.7	90	20 75.1	62 12.7	90	20 74.6	67 27.0	84	19 67.7	67 52.3	84	19 67.0	71 51.7	75	18 58.2	2
3	59 17.4	91	20 76.4	59 44.8	91	20 76.0	61 06.6	90	20 74.7	61 33.7	90	20 74.2	62 00.7	90	20 73.8	67 15.5	85	19 66.9	67 40.8	84	19 66.2	71 41.1	75	18 57.6	3
4	59 05.3	92	20 75.5	59 32.8	91	20 75.1	60 54.6	91	20 73.8	61 21.7	90	20 73.4	61 48.7	90	20 72.9	67 04.1	85	19 66.2	67 29.4	84	19 65.5	71 30.6	76	17 56.9	4
85	58 53.3	92	20 74.6	59 20.7	91	20 74.2	60 42.6	91	20 72.9	61 09.8	90	20 72.5	61 36.8	90	20 72.0	66 52.7	85	19 65.4	67 18.1	84	19 64.7	71 20.2	76	17 56.3	85
6	58 41.3	92	20 73.7	59 08.8	91	20 73.3	60 30.7	91	20 72.1	60 57.9	90	20 71.6	61 25.0	90	20 71.2	66 41.4	85	19 64.6	67 06.9	85	19 63.9	71 09.9	77	17 55.7	6
7	58 29.4	92	20 72.8	58 56.8	92	20 72.4	60 18.9	91	20 71.2	60 46.1	91	20 70.8	61 13.2	90	20 70.3	66 30.2	85	19 63.8	66 55.7	85	18 63.2	70 59.6	77	17 55.0	7
8	58 17.5	92	20 71.9	58 45.0	92	20 71.6	60 07.1	91	20 70.3	60 34.4	91	19 69.9	61 01.5	90	19 69.5	66 19.0	86	18 63.1	66 44.6	85	18 62.4	70 49.4	77	17 54.4	8
9	58 05.6	92	20 71.1	58 33.2	92	20 70.7	59 55.4	91	19 69.5	60 22.7	91	19 69.1	60 49.8	90	19 68.6	66 07.9	86	18 62.3	66 33.6	85	18 61.7	70 39.3	78	17 53.8	9
90	57 53.9	92	20 70.2	58 21.4	92	19 69.8	59 43.8	91	19 68.6	60 11.0	91	19 68.2	60 38.3	91	19 67.8	65 56.9	86	18 61.6	66 22.6	85	18 60.9	70 29.3	78	17 53.1	90

Lat. 78°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	° ′	d Δt	°	
91	57 42.2	92 19	69.3	58 09.8	92 19	69.0	59 32.2	91 19	67.8	59 59.5	91 19	67.4	60 26.7	91 19	67.0	65 46.0	86 18	60.8	66 11.8	86 18	60.2	70 19.4	79 16	52.5	91
2	57 30.5	92 19	68.5	57 58.2	92 19	68.1	59 20.7	91 19	67.0	59 48.0	91 19	66.5	60 15.3	91 19	66.1	65 35.1	86 18	60.1	66 01.0	86 18	59.4	70 09.5	79 16	51.9	2
3	57 19.0	92 19	67.6	57 46.6	92 19	67.3	59 09.2	91 19	66.1	59 36.6	91 19	65.7	60 03.9	91 19	65.3	65 24.4	87 18	59.3	65 50.3	86 18	58.7	69 59.7	79 16	51.3	3
4	57 07.5	92 19	66.8	57 35.1	92 19	66.4	58 57.8	92 19	65.3	59 25.3	91 19	64.9	59 52.6	91 19	64.5	65 13.7	87 18	58.6	65 39.7	86 18	58.0	69 50.0	80 16	50.7	4
95	56 56.0	93 19	65.9	57 23.8	92 19	65.6	58 46.6	92 19	64.4	59 14.0	91 19	64.1	59 41.4	91 19	63.7	65 03.1	87 18	57.8	65 29.1	87 17	57.2	69 40.4	80 16	50.0	95
6	56 44.7	93 19	65.1	57 12.4	92 19	64.7	58 35.3	92 19	63.6	59 02.8	92 18	63.2	59 30.3	91 18	62.8	64 52.6	87 17	57.1	65 18.7	87 17	56.5	69 30.9	81 16	49.4	6
7	56 33.4	93 19	64.2	57 01.2	93 19	63.9	58 24.2	92 18	62.8	58 51.7	92 18	62.4	59 19.2	91 18	62.0	64 42.1	88 17	56.3	65 08.3	87 17	55.8	69 21.5	81 16	48.8	7
8	56 22.2	93 18	63.4	56 50.0	93 18	63.0	58 13.1	92 18	62.0	58 40.7	92 18	61.6	59 08.2	92 18	61.2	64 31.8	88 17	55.6	64 58.1	87 17	55.0	69 12.1	81 15	48.2	8
9	56 11.1	93 18	62.5	56 39.0	93 18	62.2	58 02.2	92 18	61.2	58 29.8	92 18	60.8	58 57.4	92 18	60.4	64 21.5	88 17	54.9	64 47.9	88 17	54.3	69 02.9	82 15	47.6	9
100	56 00.1	93 18	61.7	56 28.0	93 18	61.4	57 51.3	92 18	60.3	58 19.0	92 18	60.0	58 46.5	92 18	59.6	64 11.4	88 17	54.2	64 37.8	88 17	53.6	68 53.7	82 15	47.0	100
1	55 49.1	93 18	60.9	56 17.1	93 18	60.6	57 40.5	92 18	59.5	58 08.2	92 18	59.2	58 35.8	92 18	58.8	64 01.3	88 17	53.4	64 27.8	88 16	52.9	68 44.7	83 15	46.4	1
2	55 38.3	93 18	60.1	56 06.2	93 18	59.7	57 29.8	93 18	58.7	57 57.5	92 18	58.4	58 25.2	92 18	58.0	63 51.4	89 16	52.7	64 17.9	88 16	52.2	68 35.7	83 15	45.7	2
3	55 27.5	93 18	59.2	55 55.5	93 18	58.9	57 19.2	93 18	57.9	57 47.0	92 17	57.6	58 14.7	92 17	57.2	63 41.5	89 16	52.0	64 08.1	89 16	51.5	68 26.8	83 15	45.1	3
4	55 16.8	94 18	58.4	55 44.9	93 18	58.1	57 08.7	93 17	57.1	57 36.5	93 17	56.8	58 04.2	92 17	56.4	63 31.7	89 16	51.3	63 58.4	89 16	50.8	68 18.0	84 14	44.5	4
105	55 06.3	94 17	57.6	55 34.3	93 17	57.3	56 58.2	93 17	56.3	57 26.1	93 17	56.0	57 53.9	93 17	55.6	63 22.0	89 16	50.6	63 48.8	89 16	50.0	68 09.3	84 14	43.9	105
6	54 55.8	94 17	56.8	55 23.9	94 17	56.5	56 47.9	93 17	55.5	57 15.8	93 17	55.2	57 43.7	93 17	54.8	63 12.4	90 16	49.8	63 39.3	89 16	49.3	68 00.7	85 14	43.3	6
7	54 45.4	94 17	56.0	55 13.5	94 17	55.7	56 37.7	93 17	54.7	57 05.6	93 17	54.4	57 33.5	93 17	54.0	63 02.9	90 16	49.1	63 29.9	90 16	48.6	67 52.2	85 14	42.7	7
8	54 35.1	94 17	55.1	55 03.3	94 17	54.8	56 27.5	93 17	53.9	56 55.5	93 17	53.6	57 23.5	93 17	53.2	62 53.6	90 15	48.4	63 20.5	90 15	47.9	67 43.8	85 14	42.1	8
9	54 24.9	94 17	54.3	54 53.1	94 17	54.0	56 17.5	94 17	53.1	56 45.5	93 16	52.8	57 13.5	93 16	52.5	62 44.3	90 15	47.7	63 11.3	90 15	47.2	67 35.4	86 14	41.5	9
110	54 14.8	94 17	53.5	54 43.1	94 17	53.2	56 07.6	94 16	52.3	56 35.7	93 16	52.0	57 03.7	93 16	51.7	62 35.1	91 15	47.0	63 02.2	90 15	46.5	67 27.2	86 14	40.9	110
1	54 04.9	94 16	52.7	54 33.1	94 16	52.4	55 57.8	94 16	51.5	56 25.9	94 16	51.2	56 53.9	93 16	50.9	62 26.0	91 15	46.3	62 53.2	90 15	45.8	67 19.1	86 13	40.3	1
2	53 55.0	94 16	51.9	54 23.3	94 16	51.6	55 48.0	94 16	50.8	56 16.2	94 16	50.4	56 44.3	94 16	50.1	62 17.1	91 15	45.6	62 44.3	91 15	45.1	67 11.1	87 13	39.7	2
3	53 45.2	95 16	51.1	54 13.6	94 16	50.8	55 38.4	94 16	50.0	56 06.6	94 16	49.7	56 34.8	94 16	49.4	62 08.2	91 15	44.9	62 35.5	91 14	44.5	67 03.2	87 13	39.1	3
4	53 35.6	95 16	50.3	54 04.0	95 16	50.0	55 28.9	94 16	49.2	55 57.2	94 16	48.9	56 25.4	94 16	48.6	61 59.5	91 14	44.2	62 26.9	91 14	43.8	66 55.3	87 13	38.5	4
115	53 26.0	95 16	49.5	53 54.5	95 16	49.3	55 19.6	94 15	48.4	55 47.8	94 15	48.1	56 16.1	94 15	47.8	61 50.8	92 14	43.5	62 18.3	91 14	43.1	66 47.6	88 13	37.9	115
6	53 16.6	95 16	48.7	53 45.1	95 15	48.5	55 10.3	94 15	47.6	55 38.6	94 15	47.3	56 06.9	94 15	47.0	61 42.3	92 14	42.8	62 09.8	92 14	42.4	66 40.0	88 13	37.3	6
7	53 07.3	95 15	47.9	53 35.8	95 15	47.7	55 01.1	95 15	46.9	55 29.5	95 15	46.6	55 57.8	94 15	46.3	61 33.9	92 14	42.1	62 01.5	92 14	41.7	66 32.5	89 12	36.7	7
8	52 58.1	95 15	47.1	53 26.6	95 15	46.9	54 52.1	95 15	46.1	55 20.5	95 15	45.8	55 48.9	95 15	45.5	61 25.6	92 14	41.4	61 53.2	92 14	41.0	66 25.1	89 12	36.1	8
9	52 49.0	95 15	46.4	53 17.6	95 15	46.1	54 43.2	95 15	45.3	55 11.6	95 15	45.0	55 40.0	95 15	44.8	61 17.4	93 13	40.7	61 45.1	92 13	40.3	66 17.8	89 12	35.6	9
120	52 40.0	95 15	45.6	53 08.6	95 15	45.3	54 34.3	95 14	44.5	55 02.8	95 14	44.3	55 31.3	95 14	44.0	61 09.3	93 13	40.0	61 37.1	93 13	39.6	66 10.6	90 12	35.0	120
1	52 31.2	96 15	44.8	52 59.8	96 14	44.5	54 25.7	95 14	43.8	54 54.2	95 14	43.5	55 22.7	95 14	43.2	61 01.3	93 13	39.3	61 29.2	93 13	39.0	66 03.5	90 12	34.4	1
2	52 22.4	96 14	44.0	52 51.1	96 14	43.8	54 17.1	95 14	43.0	54 45.7	95 14	42.7	55 14.2	95 14	42.5	60 53.5	93 13	38.7	61 21.4	93 13	38.3	65 56.5	90 11	33.8	2
3	52 13.8	96 14	43.2	52 42.6	96 14	43.0	54 08.6	95 14	42.2	54 37.3	95 14	42.0	55 05.9	95 14	41.7	60 45.7	93 13	38.0	61 13.7	93 13	37.6	65 49.6	90 11	33.2	3
4	52 05.4	96 14	42.4	52 34.1	96 14	42.2	54 00.3	96 14	41.5	54 29.0	95 14	41.2	54 57.6	95 14	41.0	60 38.1	94 12	37.3	61 06.2	93 12	36.9	65 42.8	91 11	32.6	4
125	51 57.0	96 14	41.6	52 25.8	96 14	41.4	53 52.1	96 13	40.7	54 20.8	96 13	40.5	54 49.5	96 13	40.2	60 30.6	94 12	36.6	60 58.7	94 12	36.3	65 36.2	91 11	32.0	125
6	51 48.8	96 14	40.9	52 17.6	96 13	40.6	53 44.0	96 13	39.9	54 12.8	96 13	39.7	54 41.5	96 13	39.5	60 23.2	94 12	35.9	60 51.4	94 12	35.6	65 29.6	91 11	31.4	6
7	51 40.7	96 13	40.1	52 09.6	96 13	39.9	53 36.1	96 13	39.2	54 04.9	96 13	38.9	54 33.6	96 13	38.7	60 16.0	94 12	35.2	60 44.2	94 12	34.9	65 23.2	92 11	30.8	7
8	51 32.7	96 13	39.3	52 01.6	96 13	39.1	53 28.3	96 13	38.4	53 57.1	96 13	38.2	54 25.9	96 13	38.0	60 08.8	94 12	34.6	60 37.1	94 12	34.2	65 16.8	92 10	30.2	8
9	51 24.9	97 13	38.5	51 53.8	97 13	38.3	53 20.6	96 13	37.7	53 49.5	96 13	37.4	54 18.3	96 12	37.2	60 01.8	95 12	33.9	60 30.2	94 11	33.6	65 10.6	92 10	29.6	9
130	51 17.2	97 13	37.8	51 46.2	97 13	37.6	53 13.0	96 12	36.9	53 41.9	96 12	36.7	54 10.8	96 12	36.5	59 54.9	95 11	33.2	60 23.3	95 11	32.9	65 04.5	93 10	29.1	130
1	51 09.6	97 12	37.0	51 38.6	97 12	36.8	53 05.6	97 12	36.2	53 34.6	96 12	35.9	54 03.5	96 12	35.7	59 48.2	95 11	32.5	60 16.6	95 11	32.2	64 58.5	93 10	28.5	1
2	51 02.2	97 12	36.2	51 31.2	97 12	36.0	52 58.3	97 12	35.4	53 27.3	97 12	35.2	53 56.3	96 12	35.0	59 41.5	95 11	31.9	60 10.0	95 11	31.5	64 52.6	93 10	27.9	2
3	50 54.9	97 12	35.5	51 24.0	97 12	35.3	52 51.2	97 12	34.7	53 20.2	97 12	34.4	53 49.2	97 12	34.2	59 35.0	95 11	31.2	60 03.6	95 11	30.9	64 46.8	93 09	27.3	3
4	50 47.7	97 12	34.7	51 16.8	97 12	34.5	52 44.1	97 12	33.9	53 13.2	97 11	33.7	53 42.2	97 11	33.5	59 28.6	96 10	30.5	59 57.2	95 10	30.2	64 41.1	94 09	26.7	4
135	50 40.7	97 11	33.9	51 09.8	97 11	33.7	52 37.2	97 11	33.1	53 06.3	97 11	32.9	53 35.4	97 11	32.7	59 22.3	96 10	29.8	59 51.0	96 10	29.5	64 35.6	94 09	26.1	135
6	50 33.8	97 11	33.1	51 03.0	97 11	33.0	52 30.5	97 11	32.4	52 59.6	97 11	32.2	53 28.7	97 11	32.0	59 16.2	96 10	29.2	59 44.9	96 10	28.9	64 30.2	94 09	25.5	6
7	50 27.0	97 11	32.4	50 56.3	97 11	32.2	52 23.9	97 11	31.7	52 53.0	97 11	31.5	53 22.2	97 11	31.3	59 10.2	96 10	28.5	59 39.0	96 10	28.2	64 24.8	94 09	25.0	7
8	50 20.4	98 11	31.6	50 49.7	98 11	31.4	52 17.4	97 11	30.9	52 46.6	97 10	30.7	53 15.8	97 10	30.5	59 04.3	96 10	27.8	59 33.1	96 10	27.5	64 19.6	95 08	24.4	8
9	50 13.9	98 11	30.9	50 43.2	98 10	30.7	52 11.1	97 10	30.2	52 40.3	97 10	30.0	53 09.5	97 10	29.8	58 58.5	96 09	27.1	59 27.4	96 09	26.9	64 14.5	95 08	23.8	9
140	50 07.6	98 10	30.1	50 36.9	98 10	29.9	52 04.9	98 10	29.4	52 34.1	98 10	29.2	53 03.4	97 10	29.0	58 52.9	97 09	26.5	59 21.9	96 09	26.2	64 09.6	95 08	23.2	140
1	50 01.4	98 10	29.3	50 30.8	98 10	29.2	51 58.8	98 10	28.7	52 28.1	98 10	28.5	52 57.4	98 10	28.3	58 47.4	97 09	25.8	59 16.4	97 09	25.6	64 04.7	95 08	22.6	1
2	49 55.4	98 10	28.6	50 24.8	98 10	28.4	51 52.9	98 10	27.9	52 22.2	98 10	27.7	52 51.6	98 10	27.6	58 42.0	97 09	25.1	59 11.1	97 09	24.9	64 00.0	96 08	22.0	2
3	49 49.5	98 10	27.8	50 18.9	98 10	27.7	51 47.1	98 09	27.2	52 16.5	98 09	27.0	52 45.9	98 09	26.8	58 36.8	97 08	24.5	59 05.9	97 08	24.2	63 55.3	96 08	21.5	3
4	49 43.8	98 09	27.0	50 13.2	98 09	26.9	51 41.5	98 09	26.4	52 10.9	98 09	26.3	52 40.3	98 09	26.1	58 31.7	97 08	23.8	59 00.9	97 08	23.6	63 50.8	96 07	20.9	4
145	49 38.2	98 09	26.3	50 07.6	98 09	26.1	51 36.0	98 09	25.7	52 05.5	98 09	25.5	52 34.9	98 09	25.4	58 26.7	97 08	23.1	58 55.9	97 08	22.9	63 46.4	96 07	20.3	145
6	49 32.7	98 09	25.5	50 02.2	98 09	25.4	51 30.7	98 09	24.9	52 00.1	98 09	24.8	52 29.6	98 09	24.6	58 21.9	98 08	22.5	58 51.2	97 08	22.2	63 42.2	96 07	19.7	6
7	49 27.4	98 09	24.8	49 56.9	98 09	24.6	51 25.5	98 08	24.2	51 55.0	98 06	24.1	52 24.5	98 08	23.9	58 17.2	98 08	21.8	58 46.5	98 08	21.6	63 38.0	97 07	19.1	7
8	49 22.3	99 08	24.0	49 51.8	99 08	23.9	51 20.5	98 08	23.5	51 50.0	98 08	23.3	52 19.5	98 08	23.2	58 12.6	98 07	21.1	58 42.0	98 07	20.9	63 34.0	97 06	18.6	8
9	49 17.3	99 08	23.3	49 46.8	99 08	23.1	51 15.6	99 08	22.7	51 45.1	98 08	22.6	52 14.7	98 08	22.4	58 08.2	98 07	20.5	58 37.6	98 07	20.3	63 30.1	97 06	18.0	9
150	49 12.4	99 08	22.5	49 42.0	99 08	22.4	51 10.8	99 08	22.0	51 40.4	99 08	21.9	52 10.0	99 08	21.7	58 03.9	98 07	19.8	58 33.3	98 07	19.6	63 26.3	97 06	17.4	150
1	49 07.7	99 08	21.7	49 37.3	99 08	21.6	51 06.2	99 07	21.3	51 35.8	99 07	21.1	52 05.4	99 07	21.0	57 59.8	98 07	19.1	58 29.2	98 07	19.0	63 22.6	97 06	16.8	1
2	49 03.2	99 07	21.0	49 32.8	99 07	20.9	51 01.8	99 07	20.5	51 31.4	99 07	20.4	52 01.0	99 07	20.3	57 55.7	98 06	18.5	58 25.2	98 06	18.3	63 19.1	98 06	16.2	2
3	48 58.8	99 07	20.2	49 28.5	99 07	20.1	50 57.5	99 07	19.8	51 27.1	99 07	19.7	51 56.8	99 07	19.5	57 51.9	98 06	17.8	58 21.4	98 06	17.6	63 15.7	98 06	15.6	3
4	48 54.5	99 07	19.5	49 24.2	99 07	19.4	50 53.3	99 07	19.0	51 23.0	99 07	18.9	51 52.7	99 07	18.8	57 48.1	99 06	17.1	58 17.7	98 06	17.0	63 12.4	98 05	15.1	4
155	48 50.5	99 07	18.7	49 20.2	99 07	18.6	50 49.3	99 06	18.3	51 19.0	99 06	18.2	51 48.7	99 06	18.1	57 44.5	99 06	16.5	58 14.1	99 06	16.3	63 09.2	98 05	14.5	155
6	48 46.5	99 06	18.0	49 16.3	99 06	17.9	50 45.5	99 06	17.6	51 15.2	99 06	17.5	51 44.9	99 06	17.4	57 41.0	99 06	15.8	58 10.7	99 06	15.7	63 06.1	98 05	13.9	6
7	48 42.8	99 06	17.2	49 12.5	99 06	17.1	50 41.8	99 06	16.8	51 11.6	99 06	16.7	51 41.3	99 06	16.6	57 37.7	99 05	15.2	58 07.4	99 05	15.0	63 03.2	98 05	13.3	7
8	48 39.1	99 06	16.5	49 08.9	99 06	16.4	50 38.3	99 06	16.1	51 08.0	99 06	16.0	51 37.8	99 06	15.9	57 34.5	99 05	14.5	58 04.2	99 05	14.4	63 00.4	99 04	12.7	8
9	48 35.7	99 06	15.7	49 05.5	99 05	15.6	50 34.9	99 05	15.4	51 04.7	99 05	15.3	51 34.5	99 05	15.2	57 31.5	99 05	13.8	58 01.2	99 05	13.7	62 57.7	99 04	12.2	9
160	48 32.4	99 05	15.0	49 02.2	99 05	14.9	50 31.7	99 05	14.6	51 01.5	99 05	14.5	51 31.3	99 05	14.5	57 28.5	99 05	13.2	57 58.3	99 05	13.1	62 55.1	99 04	11.6	160
1	48 29.2	99 05	14.2	48 59.1	99 05	14.1	50 28.6	99 05	13.9	50 58.4	99 05	13.8	51 28.2	99 05	13.7	57 25.8	99 04	12.5	57 55.5	99 04	12.4	62 52.7	99 04	11.0	1
2	48 26.3	1.0 05	13.5	48 56.1	1.0 05	13.4	50 25.7	99 05	13.2	50 55.5	99 05	13.1	51 25.4	99 05	13.0	57 23.1	99 04	11.9	57 52.9	99 04	11.7	62 50.4	99 04	10.4	2
3	48 23.4	1.0 04	12.7	48 53.3	1.0 04	12.6	50 22.9	1.0 04	12.4	50 52.8	1.0 04	12.4	51 22.6	1.0 04	12.3	57 20.6	99 04	11.2	57 50.4	99 04	11.1	62 48.2	99 03	09.8	3
4	48 20.8	1.0 04	12.0	48 50.6	1.0 04	11.9	50 20.3	1.0 04	11.7	50 50.2	1.0 04	11.6	51 20.0	1.0 04	11.6	57 18.3	99 04	10.5	57 48.1	99 04	10.4	62 46.1	99 03	09.3	4
165	48 18.3	1.0 04	11.2	48 48.2	1.0 04	11.2	50 17.8	1.0 04	11.0	50 47.7	1.0 04	10.9	51 17.6	1.0 04	10.8	57 16.1	1.0 03	09.9	57 45.9	99 03	09.8	62 44.2	99 03	08.7	165
6	48 15.9	1.0 04	10.5	48 45.8	1.0 04	10.4	50 15.5	1.0 04	10.2	50 45.5	1.0 04	10.2	51 15.4	1.0 04	10.1	57 14.0	1.0 03	09.2	57 43.9	1.0 03	09.1	62 42.3	99 03	08.1	6
7	48 13.7	1.0 03	09.7	48 43.6	1.0 03	09.7	50 13.4	1.0 03	09.5	50 43.3	1.0 03	09.4	51 13.2	1.0 03	09.4	57 12.1	1.0 03	08.6	57 42.0	1.0 03	08.5	62 40.6	99 03	07.5	7
8	48 11.7	1.0 03	09.0	48 41.6	1.0 03	08.9	50 11.4	1.0 03	08.8	50 41.4	1.0 03	08.7	51 11.3	1.0 03	08.7	57 10.3	1.0 03	07.9	57 40.2	1.0 03	07.8	62 39.1	1.0 02	06.9	8
9	48 09.8	1.0 03	08.2	48 39.8	1.0 03	08.2	50 09.6	1.0 03	08.0	50 39.5	1.0 03	08.0	51 09.5	1.0 03	07.9	57 08.7	1.0 02	07.2	57 38.6	1.0 02	07.2	62 37.6	1.0 02	06.4	9
170	48 08.1	1.0 03	07.5	48 38.1	1.0 03	07.4	50 07.9	1.0 03	07.3	50 37.9	1.0 02	07.3	51 07.8	1.0 02	07.2	57 07.2	1.0 02	06.6	57 37.1	1.0 02	06.5	62 36.3	1.0 02	05.8	170
1	48 06.6	1.0 02	06.7	48 36.5	1.0 02	06.7	50 06.4	1.0 02	06.6	50 36.4	1.0 02	06.5	51 06.4	1.0 02	06.5	57 05.8	1.0 02	05.9	57 35.7	1.0 02	05.9	62 35.1	1.0 02	05.2	1
2	48 05.2	1.0 02	06.0	48 35.2	1.0 02	05.9	50 05.1	1.0 02	05.8	50 35.1	1.0 02	05.8	51 05.0	1.0 02	05.8	57 04.6	1.0 02	05.3	57 34.5	1.0 02	05.2	62 34.0	1.0 02	04.6	2
3	48 04.0	1.0 02	05.2	48 34.0	1.0 02	05.2	50 03.9	1.0 02	05.1	50 33.9	1.0 02	05.1	51 03.8	1.0 02	05.1	57 03.5	1.0 02	04.6	57 33.5	1.0 02	04.6	62 33.1	1.0 01	04.1	3
4	48 02.9	1.0 02	04.5	48 32.9	1.0 02	04.5	50 02.9	1.0 01	04.4	50 32.8	1.0 01	04.4	51 02.8	1.0 01	04.3	57 02.6	1.0 01	03.9	57 32.6	1.0 01	03.9	62 32.3	1.0 01	03.5	4
175	48 02.0	1.0 01	03.7	48 32.0	1.0 01	03.7	50 02.0	1.0 01	03.7	50 32.0	1.0 01	03.6	51 02.0	1.0 01	03.6	57 01.8	1.0 01	03.3	57 31.8	1.0 01	03.3	62 31.6	1.0 01	02.9	175
6	48 01.3	1.0 01	03.0	48 31.3	1.0 01	03.0	50 01.3	1.0 01	02.9	50 31.3	1.0 01	02.9	51 01.3	1.0 01	02.9	57 01.1	1.0 01	02.6	57 31.1	1.0 01	02.6	62 31.0	1.0 01	02.3	6
7	48 00.7	1.0 01	02.2	48 30.7	1.0 01	02.2	50 00.7	1.0 01	02.2	50 30.7	1.0 01	02.2	51 00.7	1.0 01	02.2	57 00.6	1.0 01	02.0	57 30.6	1.0 01	02.0	62 30.6	1.0 01	01.7	7
8	48 00.3	1.0 00	01.5	48 30.3	1.0 00	01.5	50 00.3	1.0 00	01.5	50 30.3	1.0 00	01.5	51 00.3	1.0 00	01.4	57 00.3	1.0 00	01.3	57 30.3	1.0 00	01.3	62 30.3	1.0 00	01.2	8
9	48 00.1	1.0 00	00.7	48 30.1	1.0 00	00.7	50 00.1	1.0 00	00.7	50 30.1	1.0 00	00.7	51 00.1	1.0 00	00.7	57 00.1	1.0 00	00.7	57 30.1	1.0 00	00.7	62 30.1	1.0 00	00.6	9
180	48 00.0	1.0 00	00.0	48 30.0	1.0 00	00.0	50 00.0	1.0 00	00.0	50 30.0	1.0 00	00.0	51 00.0	1.0 00	00.0	57 00.0	1.0 00	00.0	57 30.0	1.0 00	00.0	62 30.0	1.0 00	00.0	180

Lat. 79°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 78°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	16	180	20	180	24	180	28	180	32	180	36	180	40	180	44	180	48	180	52	180	56	180	00
4	16	176	20	176	24	176	28	176	32	176	36	175	40	175	44	175	48	175	52	175	56	175	4
8	16	172	20	172	24	171	28	171	32	171	36	171	40	171	44	171	48	170	52	170	56	170	8
12	16	168	20	167	24	167	28	167	32	167	36	166	40	166	44	166	48	166	52	165	56	165	12
16	16	163	20	163	24	163	27	163	31	162	35	162	39	162	43	161	47	161	51	160	55	160	16
20	15	159	19	159	23	159	27	158	31	158	35	158	39	157	43	157	47	156	51	155	55	155	20
24	15	155	19	155	23	154	27	154	31	154	35	153	39	153	43	152	47	151	51	151	55	150	24
28	15	151	19	151	23	150	26	150	30	149	34	149	38	148	42	147	46	147	50	146	54	145	28
32	14	147	18	146	22	146	26	145	30	145	34	144	38	144	42	143	46	142	50	141	54	140	32
36	14	143	18	142	22	142	26	141	30	141	33	140	37	139	41	138	45	137	49	136	53	135	36
40	13	139	17	138	21	138	25	137	29	136	33	136	37	135	41	134	45	133	49	132	53	130	40
44	13	135	17	134	20	134	24	133	28	132	32	131	36	130	40	130	44	129	48	127	52	126	44
48	12	131	16	130	20	129	24	129	28	128	32	127	36	126	40	125	43	124	47	123	51	121	48
52	11	127	15	126	19	125	23	125	27	124	31	123	35	122	39	121	43	120	47	118	50	117	52
56	11	123	15	122	18	121	22	120	26	120	30	119	34	118	38	117	42	116	46	114	50	113	56
60	10	119	14	118	18	117	22	116	26	116	30	115	33	114	37	113	41	111	45	110	49	108	60
64	09	115	13	114	17	113	21	112	25	111	29	111	33	109	37	108	40	107	44	106	48	104	64
68	08	111	12	110	16	109	20	108	24	107	28	106	32	105	36	104	40	103	44	102	47	100	68
72	08	107	12	106	15	105	19	104	23	103	27	102	31	101	35	100	39	99	43	98	47	96	72
76	07	103	11	102	15	101	19	100	22	99	26	98	30	97	34	96	38	95	42	94	46	92	76
80	06	99	10	98	14	97	18	96	22	95	26	94	29	93	33	92	37	91	41	90	45	88	80
84	05	95	09	94	13	93	17	92	21	92	25	91	29	90	32	88	36	87	40	86	44	84	84
88	04	91	08	90	12	89	16	89	20	88	24	87	28	86	32	85	36	83	39	82	43	81	88
92	03	87	07	86	11	86	15	85	19	84	23	83	27	82	31	81	35	80	39	78	42	77	92
96	03	83	07	82	10	82	14	81	18	80	22	79	26	78	30	77	34	76	38	74	42	73	96
100	02	79	06	79	10	78	14	77	17	76	21	75	25	74	29	73	33	72	37	71	41	69	100
104	01	75	05	75	09	74	13	73	17	72	21	71	25	70	28	69	32	68	36	67	40	66	104
108	00	72	04	71	08	70	12	69	16	68	20	67	24	67	28	66	32	65	35	63	39	62	108
112	*01*	68	03	67	07	66	11	65	15	65	19	64	23	63	27	62	31	61	35	60	39	59	112
116	*01*	64	03	63	07	62	10	61	14	61	18	60	22	59	26	58	30	57	34	56	38	55	116
120	*02*	60	02	59	06	58	10	58	14	57	18	56	22	55	25	54	29	54	33	53	37	51	120
124	*03*	56	01	55	05	55	09	54	13	53	17	52	21	52	25	51	29	50	33	49	37	48	124
128	*03*	52	01	51	04	51	08	50	12	49	16	49	20	48	24	47	28	46	32	45	36	44	128
132	*04*	48	*00*	47	04	47	08	46	12	46	16	45	20	44	24	43	28	43	31	42	35	41	132
136	*05*	44	*01*	43	03	43	07	42	11	42	15	41	19	40	23	40	27	39	31	38	35	38	136
140	*05*	40	*01*	40	03	39	07	38	11	38	15	37	19	37	23	36	26	36	30	35	34	34	140
144	*06*	36	*02*	36	02	35	06	35	10	34	14	34	18	33	22	33	26	32	30	31	34	31	144
148	*06*	32	*02*	32	02	31	06	31	10	30	14	30	18	29	22	29	26	28	30	28	34	27	148
152	*07*	28	*03*	28	01	27	05	27	09	27	13	26	17	26	21	25	25	25	29	24	33	24	152
156	*07*	24	*03*	24	01	23	05	23	09	23	13	22	17	22	21	22	25	21	29	21	33	20	156
160	*07*	20	*03*	20	01	20	05	19	09	19	13	19	17	18	21	18	25	18	29	17	33	17	160
164	*08*	16	*04*	16	00	16	04	15	08	15	12	15	16	15	20	14	24	14	28	14	32	14	164
168	*08*	12	*04*	12	00	12	04	12	08	11	12	11	16	11	20	11	24	11	28	10	32	10	168
172	*08*	08	*04*	08	00	08	04	08	08	08	12	07	16	07	20	07	24	07	28	07	32	07	172
176	*08*	04	*04*	04	00	04	04	04	08	04	12	04	16	04	20	04	24	04	28	03	32	03	176
180	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	28	00	32	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 78°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	60	180	64	180	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	00
4	60	175	64	174	68	174	72	174	76	173	80	171	84	168	88	154	88	19	84	04	80	01	4
8	60	169	64	169	68	168	72	167	76	166	80	163	84	157	87	134	88	33	84	08	80	02	8
12	60	164	64	163	68	162	72	161	76	159	79	155	83	147	87	121	87	43	84	12	80	02	12
16	59	159	63	158	67	156	71	155	75	152	79	147	83	137	86	111	86	49	84	15	80	03	16
20	59	154	63	152	67	151	71	149	75	145	79	140	82	129	85	104	86	53	83	18	80	04	20
24	59	148	63	147	67	145	70	143	74	139	78	133	81	122	84	98	85	55	83	21	80	05	24
28	58	143	62	142	66	140	70	137	74	133	77	127	81	115	83	94	84	56	83	23	80	05	28
32	58	138	62	137	65	135	69	132	73	127	77	121	80	110	83	90	84	57	82	25	80	06	32
36	57	134	61	132	65	129	69	126	72	122	76	115	79	104	82	86	83	57	82	26	80	06	36
40	56	129	60	127	64	124	68	121	72	117	75	110	78	100	81	83	82	56	82	28	79	07	40
44	56	124	60	122	63	120	67	116	71	112	74	105	78	95	80	79	82	56	81	29	79	08	44
48	55	120	59	118	63	115	66	112	70	107	74	101	77	91	79	76	81	55	81	29	79	08	48
52	54	115	58	113	62	110	66	107	69	103	73	96	76	87	79	74	80	54	80	30	79	08	52
56	54	111	57	109	61	106	65	103	68	98	72	92	75	84	78	71	80	53	80	30	79	09	56
60	53	107	57	104	60	102	64	98	68	94	71	88	74	80	77	68	79	51	80	30	79	09	60
64	52	102	56	100	60	98	63	94	67	90	70	85	73	77	76	66	78	50	79	30	79	09	64
68	51	98	55	96	59	94	62	90	66	86	69	81	73	74	75	63	78	49	79	30	79	09	68
72	50	94	54	92	58	90	62	87	65	83	69	77	72	70	75	61	77	47	78	30	78	10	72
76	50	90	53	88	57	86	61	83	64	79	68	74	71	67	74	58	76	46	78	29	78	10	76
80	49	86	52	84	56	82	60	79	64	75	67	71	70	64	73	56	76	44	78	29	78	10	80
84	48	83	52	81	55	78	59	75	63	72	66	67	70	62	73	54	75	43	77	28	78	10	84
88	47	79	51	77	55	75	58	72	62	69	65	64	69	59	72	51	75	41	77	27	78	10	88
92	46	75	50	73	54	71	58	68	61	65	65	61	68	56	71	49	74	39	76	26	78	09	92
96	45	71	49	70	53	68	57	65	60	62	64	58	67	53	71	47	74	38	76	26	78	09	96
100	45	68	48	66	52	64	56	62	60	59	63	55	67	51	70	44	73	36	76	25	77	09	100
104	44	64	48	63	52	61	55	58	59	56	63	52	66	48	70	42	73	34	75	24	77	09	104
108	43	61	47	59	51	57	55	55	58	53	62	49	66	45	69	40	72	33	75	23	77	09	108
112	42	57	46	56	50	54	54	52	58	49	61	46	65	43	68	38	72	31	75	22	77	08	112
116	42	54	46	52	49	51	53	49	57	46	61	44	64	40	68	35	71	29	74	20	77	08	116
120	41	50	45	49	49	47	53	46	56	43	60	41	64	37	68	33	71	27	74	19	77	08	120
124	40	47	44	46	48	44	52	42	56	40	60	38	63	35	67	31	71	26	74	18	77	07	124
128	40	43	44	42	48	41	52	39	55	37	59	35	63	32	67	29	70	24	74	17	77	07	128
132	39	40	43	39	47	38	51	36	55	35	59	32	63	30	66	27	70	22	73	16	77	06	132
136	39	37	43	36	47	34	51	33	54	32	58	30	62	27	66	24	70	20	73	15	76	06	136
140	38	33	42	32	46	31	50	30	54	29	58	27	62	25	66	22	69	18	73	13	76	05	140
144	38	30	42	29	46	28	50	27	54	26	58	24	61	22	65	20	69	17	73	12	76	05	144
148	38	27	41	26	45	25	49	24	53	23	57	22	61	20	65	18	69	15	73	11	76	04	148
152	37	23	41	23	45	22	49	21	53	20	57	19	61	17	65	15	69	13	72	09	76	04	152
156	37	20	41	19	45	19	49	18	53	17	57	16	61	15	65	13	68	11	72	08	76	03	156
160	37	17	41	16	45	16	49	15	53	14	56	13	60	12	64	11	68	09	72	07	76	03	160
164	36	13	40	13	44	12	48	12	52	11	56	11	60	10	64	09	68	07	72	05	76	02	164
168	36	10	40	10	44	09	48	09	52	09	56	08	60	07	64	07	68	06	72	04	76	02	168
172	36	07	40	06	44	06	48	06	52	06	56	05	60	05	64	04	68	04	72	03	76	01	172
176	36	03	40	03	44	03	48	03	52	03	56	03	60	02	64	02	68	02	72	01	76	01	176
180	36	00	40	00	44	00	48	00	52	00	56	00	60	00	64	00	68	00	72	00	76	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 79°

Lat. 79°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	11 00.0 1.0 00	180.0	11 30.0 1.0 00	180.0	12 00.0 1.0 00	180.0	12 30.0 1.0 00	180.0	13 00.0 1.0 00	180.0	13 30.0 1.0 00	180.0	14 00.0 1.0 00	180.0	14 30.0 1.0 00	180.0	00
1	10 59.9 1.0 00	179.0	11 29.9 1.0 00	179.0	11 59.9 1.0 00	179.0	12 29.9 1.0 00	179.0	12 59.9 1.0 01	179.0	13 29.9 1.0 01	179.0	13 59.9 1.0 01	179.0	14 29.9 1.0 01	179.0	1
2	10 59.6 1.0 01	178.0	11 29.6 1.0 01	178.0	11 59.6 1.0 01	178.0	12 29.6 1.0 01	178.0	12 59.6 1.0 01	177.9	13 29.6 1.0 01	177.9	13 59.6 1.0 01	177.9	14 29.6 1.0 01	177.9	2
3	10 59.1 1.0 01	176.9	11 29.1 1.0 01	176.9	11 59.1 1.0 01	176.9	12 29.1 1.0 01	176.9	12 59.1 1.0 01	176.9	13 29.1 1.0 01	176.9	13 59.1 1.0 01	176.9	14 29.1 1.0 01	176.9	3
4	10 58.4 1.0 02	175.9	11 28.4 1.0 02	175.9	11 58.4 1.0 02	175.9	12 28.4 1.0 02	175.9	12 58.4 1.0 02	175.9	13 28.4 1.0 02	175.9	13 58.4 1.0 02	175.9	14 28.4 1.0 02	175.9	4
05	10 57.5 1.0 02	174.9	11 27.5 1.0 02	174.9	11 57.4 1.0 02	174.9	12 27.4 1.0 02	174.9	12 57.4 1.0 02	174.9	13 27.4 1.0 02	174.9	13 57.4 1.0 02	174.9	14 27.4 1.0 02	174.8	05
6	10 56.3 1.0 02	173.9	11 26.3 1.0 02	173.9	11 56.3 1.0 02	173.9	12 26.3 1.0 02	173.9	12 56.3 1.0 02	173.8	13 26.3 1.0 02	173.8	13 56.3 1.0 02	173.8	14 26.3 1.0 02	173.8	6
7	10 55.0 1.0 03	172.9	11 25.0 1.0 03	172.9	11 55.0 1.0 03	172.8	12 25.0 1.0 03	172.8	12 55.0 1.0 03	172.8	13 25.0 1.0 03	172.8	13 55.0 1.0 03	172.8	14 25.0 1.0 03	172.8	7
8	10 53.5 1.0 03	171.9	11 23.5 1.0 03	171.8	11 53.5 1.0 03	171.8	12 23.5 1.0 03	171.8	12 53.5 1.0 03	171.8	13 23.4 1.0 03	171.8	13 53.4 1.0 03	171.8	14 23.4 1.0 03	171.8	8
9	10 51.8 1.0 03	170.8	11 21.8 1.0 03	170.8	11 51.7 1.0 03	170.8	12 21.7 1.0 03	170.8	12 51.7 1.0 03	170.8	13 21.7 1.0 03	170.8	13 51.7 1.0 03	170.7	14 21.7 1.0 03	170.7	9
10	10 49.9 1.0 04	169.8	11 19.8 1.0 04	169.8	11 49.8 1.0 04	169.8	12 19.8 1.0 04	169.8	12 49.8 1.0 04	169.7	13 19.8 1.0 04	169.7	13 49.7 1.0 04	169.7	14 19.7 1.0 04	169.7	10
1	10 47.7 1.0 04	168.8	11 17.7 1.0 04	168.8	11 47.7 1.0 04	168.8	12 17.7 1.0 04	168.7	12 47.6 1.0 04	168.7	13 17.6 1.0 04	168.7	13 47.6 1.0 04	168.7	14 17.6 1.0 04	168.7	1
2	10 45.4 1.0 04	167.8	11 15.4 1.0 04	167.8	11 45.4 1.0 04	167.7	12 15.3 1.0 04	167.7	12 45.3 1.0 04	167.7	13 15.3 1.0 04	167.7	13 45.3 1.0 04	167.7	14 15.2 1.0 04	167.6	2
3	10 42.9 1.0 05	166.8	11 12.9 1.0 05	166.7	11 42.8 1.0 05	166.7	12 12.8 1.0 05	166.7	12 42.8 1.0 05	166.7	13 12.7 1.0 05	166.7	13 42.7 1.0 05	166.6	14 12.7 1.0 05	166.6	3
4	10 40.2 1.0 05	165.7	11 10.1 1.0 05	165.7	11 40.1 1.0 05	165.7	12 10.1 1.0 05	165.7	12 40.0 1.0 05	165.7	13 10.0 1.0 05	165.6	13 40.0 1.0 05	165.6	14 09.9 1.0 05	165.6	4
15	10 37.2 1.0 05	164.7	11 07.2 1.0 05	164.7	11 37.2 1.0 05	164.7	12 07.1 1.0 05	164.7	12 37.1 1.0 05	164.6	13 07.1 1.0 05	164.6	13 37.0 1.0 05	164.6	14 07.0 1.0 05	164.6	15
6	10 34.1 1.0 06	163.7	11 04.1 1.0 06	163.7	11 34.0 1.0 06	163.7	12 04.0 1.0 06	163.6	12 34.0 1.0 06	163.6	13 03.9 1.0 06	163.6	13 33.9 1.0 06	163.6	14 03.8 1.0 06	163.5	6
7	10 30.8 1.0 06	162.7	11 00.8 1.0 06	162.7	11 30.7 1.0 06	162.6	12 00.7 1.0 06	162.6	12 30.6 1.0 06	162.6	13 00.6 1.0 06	162.6	13 30.5 1.0 06	162.5	14 00.5 1.0 06	162.5	7
8	10 27.3 1.0 06	161.7	10 57.3 1.0 06	161.7	11 27.2 1.0 06	161.6	11 57.2 1.0 06	161.6	12 27.1 1.0 06	161.6	12 57.1 1.0 06	161.5	13 27.0 1.0 06	161.5	13 56.9 1.0 06	161.5	8
9	10 23.6 1.0 06	160.7	10 53.6 1.0 06	160.6	11 23.5 1.0 06	160.6	11 53.5 1.0 06	160.6	12 23.4 1.0 06	160.5	12 53.3 1.0 07	160.5	13 23.3 1.0 07	160.5	13 53.2 1.0 07	160.4	9
20	10 19.7 1.0 07	159.7	10 49.7 1.0 07	159.6	11 19.6 1.0 07	159.6	11 49.5 1.0 07	159.6	12 19.5 1.0 07	159.5	12 49.4 1.0 07	159.5	13 19.3 1.0 07	159.5	13 49.3 1.0 07	159.4	20
1	10 15.7 1.0 07	158.6	10 45.6 1.0 07	158.6	11 15.5 1.0 07	158.6	11 45.5 1.0 07	158.5	12 15.4 1.0 07	158.5	12 45.3 1.0 07	158.5	13 15.2 1.0 07	158.4	13 45.2 1.0 07	158.4	1
2	10 11.4 1.0 07	157.6	10 41.3 1.0 07	157.6	11 11.2 1.0 07	157.6	11 41.2 1.0 07	157.5	12 11.1 1.0 07	157.5	12 41.0 1.0 07	157.4	13 10.9 1.0 08	157.4	13 40.8 1.0 08	157.4	2
3	10 07.0 1.0 08	156.6	10 36.9 1.0 08	156.6	11 06.8 1.0 08	156.5	11 36.7 1.0 08	156.5	12 06.6 1.0 08	156.5	12 36.5 1.0 08	156.4	13 06.4 1.0 08	156.4	13 36.3 1.0 08	156.3	3
4	10 02.3 1.0 08	155.6	10 32.2 1.0 08	155.6	11 02.1 1.0 08	155.5	11 32.0 1.0 08	155.5	12 01.9 1.0 08	155.4	12 31.8 1.0 08	155.4	13 01.8 1.0 08	155.4	13 31.7 1.0 08	155.3	4
25	9 57.5 1.0 08	154.6	10 27.4 1.0 08	154.5	10 57.3 1.0 08	154.5	11 27.2 1.0 08	154.5	11 57.1 1.0 08	154.4	12 27.0 1.0 08	154.4	12 56.9 1.0 08	154.3	13 26.8 1.0 08	154.3	25
6	9 52.5 1.0 09	153.6	10 22.4 1.0 09	153.5	10 52.3 1.0 09	153.5	11 22.2 1.0 09	153.4	11 52.1 1.0 09	153.4	12 21.9 1.0 09	153.4	12 51.8 1.0 09	153.3	13 21.7 1.0 09	153.3	6
7	9 47.3 1.0 09	152.6	10 17.2 1.0 09	152.5	10 47.1 1.0 09	152.5	11 17.0 1.0 09	152.4	11 46.8 1.0 09	152.4	12 16.7 1.0 09	152.3	12 46.6 1.0 09	152.3	13 16.5 1.0 09	152.3	7
8	9 41.9 1.0 09	151.6	10 11.8 1.0 09	151.5	10 41.7 1.0 09	151.5	11 11.6 1.0 09	151.4	11 41.4 1.0 09	151.4	12 11.3 1.0 09	151.3	12 41.2 1.0 09	151.3	13 11.1 1.0 09	151.2	8
9	9 36.4 1.0 10	150.5	10 06.3 1.0 10	150.5	10 36.1 1.0 10	150.5	11 06.0 1.0 10	150.4	11 35.9 1.0 10	150.4	12 05.7 1.0 10	150.3	12 35.6 1.0 10	150.3	13 05.5 1.0 10	150.2	9
30	9 30.7 1.0 10	149.5	10 00.5 1.0 10	149.5	10 30.4 1.0 10	149.4	11 00.3 1.0 10	149.4	11 30.1 1.0 10	149.3	12 00.0 1.0 10	149.3	12 29.8 1.0 10	149.2	12 59.7 1.0 10	149.2	30
1	9 24.8 1.0 10	148.5	9 54.6 1.0 10	148.5	10 24.5 99 10	148.4	10 54.3 99 10	148.4	11 24.2 99 10	148.3	11 54.0 99 10	148.3	12 23.9 99 10	148.2	12 53.7 99 10	148.2	1
2	9 18.7 99 10	147.5	9 48.6 99 10	147.5	10 18.4 99 10	147.4	10 48.3 99 10	147.4	11 18.1 99 10	147.3	11 47.9 99 10	147.3	12 17.8 99 10	147.2	12 47.6 99 10	147.2	2
3	9 12.5 99 11	146.5	9 42.3 99 11	146.5	10 12.2 99 11	146.4	10 42.0 99 11	146.4	11 11.8 99 11	146.3	11 41.7 99 11	146.2	12 11.5 99 11	146.2	12 41.3 99 11	146.1	3
4	9 06.1 99 11	145.5	9 35.9 99 11	145.5	10 05.8 99 11	145.4	10 35.6 99 11	145.3	11 05.4 99 11	145.3	11 35.2 99 11	145.2	12 05.0 99 11	145.2	12 34.9 99 11	145.1	4
35	8 59.5 99 11	144.5	9 29.4 99 11	144.4	9 59.2 99 11	144.4	10 29.0 99 11	144.3	10 58.8 99 11	144.3	11 28.6 99 11	144.2	11 58.4 99 11	144.2	12 28.2 99 11	144.1	35
6	8 52.8 99 11	143.5	9 22.6 99 12	143.4	9 52.4 99 12	143.4	10 22.2 99 12	143.3	10 52.0 99 12	143.3	11 21.8 99 12	143.2	11 51.6 99 12	143.1	12 21.4 99 12	143.1	6
7	8 45.9 99 12	142.5	9 15.7 99 12	142.4	9 45.5 99 12	142.4	10 15.3 99 12	142.3	10 45.1 99 12	142.3	11 14.9 99 12	142.2	11 44.7 99 12	142.1	12 14.5 99 12	142.1	7
8	8 38.9 99 12	141.5	9 08.7 99 12	141.4	9 38.4 99 12	141.4	10 08.2 99 12	141.3	10 38.0 99 12	141.2	11 07.8 99 12	141.2	11 37.6 99 12	141.1	12 07.4 99 12	141.1	8
9	8 31.7 99 12	140.5	9 01.4 99 12	140.4	9 31.2 99 12	140.4	10 01.0 99 12	140.3	10 30.8 99 12	140.2	11 00.5 99 12	140.2	11 30.3 99 12	140.1	12 00.1 99 12	140.0	9
40	8 24.3 99 13	139.5	8 54.1 99 13	139.4	9 23.8 99 13	139.4	9 53.6 99 13	139.3	10 23.4 99 13	139.2	10 53.1 99 13	139.2	11 22.9 99 13	139.1	11 52.7 99 13	139.0	40
1	8 16.8 99 13	138.5	8 46.5 99 13	138.4	9 16.3 99 13	138.3	9 46.1 99 13	138.3	10 15.8 99 13	138.2	10 45.6 99 13	138.2	11 15.3 99 13	138.1	11 45.1 99 13	138.0	1
2	8 09.1 99 13	137.5	8 38.9 99 13	137.4	9 08.6 99 13	137.3	9 38.4 99 13	137.3	10 08.1 99 13	137.2	10 37.9 99 13	137.1	11 07.6 99 13	137.1	11 37.3 99 13	137.0	2
3	8 01.3 99 13	136.5	8 31.0 99 13	136.4	9 00.8 99 13	136.3	9 30.5 99 13	136.3	10 00.3 99 13	136.2	10 30.0 99 13	136.1	10 59.7 99 13	136.1	11 29.5 99 13	136.0	3
4	7 53.3 99 14	135.5	8 23.1 99 14	135.4	8 52.8 99 14	135.3	9 22.5 99 14	135.3	9 52.3 99 14	135.2	10 22.0 99 14	135.1	10 51.7 99 14	135.1	11 21.4 99 14	135.0	4
45	7 45.2 99 14	134.5	8 15.0 99 14	134.4	8 44.7 99 14	134.3	9 14.4 99 14	134.3	9 44.1 99 14	134.2	10 13.8 99 14	134.1	10 43.6 99 14	134.1	11 13.3 99 14	134.0	45
6	7 37.0 99 14	133.5	8 06.7 99 14	133.4	8 36.4 99 14	133.3	9 06.1 99 14	133.3	9 35.8 99 14	133.2	10 05.6 99 14	133.1	10 35.3 99 14	133.0	11 05.0 99 14	133.0	6
7	7 28.6 99 14	132.5	7 58.3 99 14	132.4	8 28.0 99 14	132.3	8 57.7 99 14	132.3	9 27.4 99 14	132.2	9 57.1 99 14	132.1	10 26.8 99 14	132.0	10 56.5 99 14	132.0	7
8	7 20.1 99 14	131.5	7 49.8 99 14	131.4	8 19.5 99 14	131.3	8 49.2 99 14	131.3	9 18.9 99 14	131.2	9 48.6 99 14	131.1	10 18.3 99 14	131.0	10 47.9 99 15	131.0	8
9	7 11.5 99 15	130.5	7 41.2 99 15	130.4	8 10.8 99 15	130.3	8 40.5 99 15	130.3	9 10.2 99 15	130.2	9 39.9 99 15	130.1	10 09.6 99 15	130.0	10 39.2 99 15	130.0	9
50	7 02.7 99 15	129.5	7 32.4 99 15	129.4	8 02.0 99 15	129.3	8 31.7 99 15	129.3	9 01.4 99 15	129.2	9 31.1 99 15	129.1	10 00.7 99 15	129.0	10 30.4 99 15	129.0	50
1	6 53.8 99 15	128.5	7 23.5 99 15	128.4	7 53.1 99 15	128.3	8 22.8 99 15	128.3	8 52.5 99 15	128.2	9 22.1 99 15	128.1	9 51.8 99 15	128.0	10 21.4 99 15	128.0	1
2	6 44.8 99 15	127.5	7 14.4 99 15	127.4	7 44.1 99 15	127.3	8 13.7 99 15	127.3	8 43.4 99 15	127.2	9 13.0 99 15	127.1	9 42.7 99 15	127.0	10 12.3 99 15	126.9	2
3	6 35.6 99 15	126.5	7 05.3 99 15	126.4	7 34.9 99 15	126.3	8 04.6 99 15	126.3	8 34.2 99 16	126.2	9 03.8 99 16	126.1	9 33.5 99 16	126.0	10 03.1 99 16	125.9	3
4	6 26.4 99 16	125.5	6 56.0 99 16	125.4	7 25.6 99 16	125.3	7 55.3 99 16	125.3	8 24.9 99 16	125.2	8 54.5 99 16	125.1	9 24.2 99 16	125.0	9 53.8 99 16	124.9	4
55	6 17.0 99 16	124.5	6 46.6 99 16	124.4	7 16.2 99 16	124.3	7 45.9 99 16	124.3	8 15.5 99 16	124.2	8 45.1 99 16	124.1	9 14.7 99 16	124.0	9 44.4 99 16	123.9	55
6	6 07.5 99 16	123.5	6 37.1 99 16	123.4	7 06.7 99 16	123.3	7 36.4 99 16	123.3	8 06.0 99 16	123.2	8 35.6 99 16	123.1	9 05.2 99 16	123.0	9 34.8 99 16	122.9	6
7	5 57.9 99 16	122.5	6 27.5 99 16	122.4	6 57.1 99 16	122.4	7 26.7 99 16	122.3	7 56.3 99 16	122.2	8 25.9 99 16	122.1	8 55.5 99 16	122.0	9 25.1 99 16	121.9	7
8	5 48.2 99 16	121.5	6 17.8 99 16	121.4	6 47.4 99 16	121.4	7 17.0 99 16	121.3	7 46.6 99 16	121.2	8 16.2 99 16	121.1	8 45.8 99 16	121.0	9 15.4 99 16	120.9	8
9	5 38.4 99 16	120.5	6 08.0 99 17	120.5	6 37.6 99 17	120.4	7 07.2 99 17	120.3	7 36.7 99 17	120.2	8 06.3 99 17	120.1	8 35.9 99 17	120.0	9 05.5 99 17	120.0	9
60	5 28.5 99 17	119.5	5 58.1 99 17	119.5	6 27.6 99 17	119.4	6 57.2 99 17	119.3	7 26.8 99 17	119.2	7 56.4 99 17	119.1	8 26.0 99 17	119.0	8 55.5 99 17	119.0	60
1	5 18.5 99 17	118.6	5 48.0 99 17	118.5	6 17.6 99 17	118.4	6 47.2 99 17	118.3	7 16.8 99 17	118.2	7 46.3 99 17	118.1	8 15.9 99 17	118.0	8 45.5 99 17	118.0	1
2	5 08.4 99 17	117.6	5 37.9 99 17	117.5	6 07.5 99 17	117.4	6 37.1 99 17	117.3	7 06.6 99 17	117.2	7 36.2 99 17	117.1	8 05.8 99 17	117.0	8 35.3 99 17	117.0	2
3			5 27.7 99 17	116.5	5 57.3 99 17	116.4	6 26.8 99 17	116.3	6 56.4 99 17	116.2	7 26.0 99 17	116.1	7 55.5 99 17	116.1	8 25.1 99 17	116.0	3
4			5 17.4 99 17	115.5	5 47.0 99 17	115.4	6 16.5 99 17	115.3	6 46.1 98 17	115.2	7 15.6 98 17	115.2	7 45.2 98 17	115.1	8 14.7 98 17	115.0	4
65			5 07.1 98 17	114.5	5 36.6 98 17	114.4	6 06.2 98 17	114.3	6 35.7 98 17	114.2	7 05.2 98 17	114.2	7 34.8 98 17	114.1	8 04.3 98 18	114.0	65
6					5 26.1 98 18	113.4	5 55.7 98 18	113.3	6 25.2 98 18	113.3	6 54.7 98 18	113.2	7 24.3 98 18	113.1	7 53.8 98 18	113.0	6
7					5 15.6 98 18	112.4	5 45.1 98 18	112.4	6 14.7 98 18	112.3	6 44.2 98 18	112.2	7 13.7 98 18	112.1	7 43.2 98 18	112.0	7
8					5 05.0 98 18	111.5	5 34.5 98 18	111.4	6 04.0 98 18	111.3	6 33.5 98 18	111.2	7 03.1 98 18	111.1	7 32.6 98 18	111.0	8
9							5 23.8 98 18	110.4	5 53.3 98 18	110.3	6 22.8 98 18	110.2	6 52.4 98 18	110.1	7 21.9 98 18	110.0	9
70							5 13.0 98 18	109.4	5 42.5 98 18	109.3	6 12.1 98 18	109.2	6 41.6 98 18	109.1	7 11.1 98 18	109.0	70
1							5 02.2 98 18	108.4	5 31.7 98 18	108.3	6 01.2 98 18	108.2	6 30.7 98 18	108.1	7 00.2 98 18	108.0	1
2									5 20.8 98 18	107.3	5 50.3 98 18	107.2	6 19.8 98 18	107.1	6 49.3 98 18	107.1	2
3									5 09.9 98 18	106.3	5 39.3 98 18	106.2	6 08.8 98 18	106.2	6 38.3 98 18	106.1	3
4											5 28.3 98 18	105.3	5 57.8 98 18	105.2	6 27.3 98 18	105.1	4
75											5 17.3 98 19	104.3	5 46.7 98 19	104.2	6 16.2 98 19	104.1	75
6											5 06.1 98 19	103.3	5 35.6 98 19	103.2	6 05.1 98 19	103.1	6
7													5 24.4 98 19	102.2	5 53.9 98 19	102.1	7
8													5 13.2 98 19	101.2	5 42.7 98 19	101.1	8
9													5 02.0 98 19	100.2	5 31.5 98 19	100.1	9
80															5 20.2 98 19	99.2	80
1															5 08.9 98 19	98.2	1

Lat. 79°

H.A.	0° 00′		0° 30′		1° 00′		1° 30′		2° 00′		2° 30′		3° 00′		3° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	11 00.0 1.0 00 180.0		10 30.0 1.0 00 180.0		10 00.0 1.0 00 180.0		9 30.0 1.0 00 180.0		9 00.0 1.0 00 180.0		8 30.0 1.0 00 180.0		8 00.0 1.0 00 180.0		7 30.0 1.0 00 180.0		00
1	10 59.9 1.0 00 179.0		10 29.9 1.0 00 179.0		9 59.9 1.0 00 179.0		9 29.9 1.0 00 179.0		8 59.9 1.0 00 179.0		8 29.9 1.0 00 179.0		7 59.9 1.0 00 179.0		7 29.9 1.0 00 179.0		1
2	10 59.6 1.0 01 178.0		10 29.6 1.0 01 178.0		9 59.6 1.0 01 178.0		9 29.6 1.0 01 178.0		8 59.6 1.0 01 178.0		8 29.6 1.0 01 178.0		7 59.6 1.0 01 178.0		7 29.6 1.0 01 178.0		2
3	10 59.1 1.0 01 176.9		10 29.1 1.0 01 176.9		9 59.1 1.0 01 177.0		9 29.1 1.0 01 177.0		8 59.1 1.0 01 177.0		8 29.1 1.0 01 177.0		7 59.1 1.0 01 177.0		7 29.1 1.0 01 177.0		3
4	10 58.4 1.0 02 175.9		10 28.4 1.0 02 175.9		9 58.4 1.0 02 175.9		9 28.4 1.0 02 175.9		8 58.4 1.0 02 176.0		8 28.4 1.0 02 176.0		7 58.4 1.0 02 176.0		7 28.4 1.0 02 176.0		4
05	10 57.5 1.0 02 174.9		10 27.5 1.0 02 174.9		9 57.5 1.0 02 174.9		9 27.5 1.0 02 174.9		8 57.5 1.0 02 174.9		8 27.5 1.0 02 174.9		7 57.5 1.0 02 175.0		7 27.5 1.0 02 175.0		05
6	10 56.3 1.0 02 173.9		10 26.3 1.0 02 173.9		9 56.4 1.0 02 173.9		9 26.4 1.0 02 173.9		8 56.4 1.0 02 173.9		8 26.4 1.0 02 173.9		7 56.4 1.0 02 174.0		7 26.4 1.0 02 174.0		6
7	10 55.0 1.0 03 172.9		10 25.0 1.0 03 172.9		9 55.0 1.0 03 172.9		9 25.0 1.0 03 172.9		8 55.1 1.0 02 172.9		8 25.1 1.0 03 172.9		7 55.1 1.0 02 172.9		7 25.1 1.0 03 173.0		7
8	10 53.5 1.0 03 171.9		10 23.5 1.0 03 171.9		9 53.5 1.0 03 171.9		9 23.5 1.0 03 171.9		8 53.5 1.0 03 171.9		8 23.6 1.0 03 171.9		7 53.6 1.0 03 171.9		7 23.6 1.0 03 171.9		8
9	10 51.8 1.0 03 170.8		10 21.8 1.0 03 170.8		9 51.8 1.0 03 170.9		9 21.8 1.0 03 170.9		8 51.8 1.0 03 170.9		8 21.8 1.0 03 170.9		7 51.9 1.0 03 170.9		7 21.9 1.0 03 170.9		9
10	10 49.9 1.0 04 169.8		10 19.9 1.0 04 169.8		9 49.9 1.0 04 169.9		9 19.9 1.0 04 169.9		8 49.9 1.0 04 169.9		8 19.9 1.0 04 169.9		7 50.0 1.0 04 169.9		7 20.0 1.0 04 169.9		10
1	10 47.7 1.0 04 168.8		10 17.7 1.0 04 168.8		9 47.8 1.0 04 168.8		9 17.8 1.0 04 168.9		8 47.8 1.0 04 168.9		8 17.8 1.0 04 168.9		7 47.8 1.0 04 168.9		7 17.9 1.0 04 168.9		1
2	10 45.4 1.0 04 167.8		10 15.4 1.0 04 167.8		9 45.5 1.0 04 167.8		9 15.5 1.0 04 167.8		8 45.5 1.0 04 167.9		8 15.5 1.0 04 167.9		7 45.5 1.0 04 167.9		7 15.6 1.0 04 167.9		2
3	10 42.9 1.0 05 166.8		10 12.9 1.0 05 166.8		9 42.9 1.0 04 166.8		9 13.0 1.0 04 166.8		8 43.0 1.0 04 166.9		8 13.0 1.0 04 166.9		7 43.1 1.0 04 166.9		7 13.1 1.0 04 166.9		3
4	10 40.2 1.0 05 165.7		10 10.2 1.0 05 165.8		9 40.2 1.0 05 165.8		9 10.3 1.0 05 165.8		8 40.3 1.0 05 165.8		8 10.3 1.0 05 165.9		7 40.4 1.0 05 165.9		7 10.4 1.0 05 165.9		4
15	10 37.2 1.0 05 164.7		10 07.3 1.0 05 164.8		9 37.3 1.0 05 164.8		9 07.4 1.0 05 164.8		8 37.4 1.0 05 164.8		8 07.4 1.0 05 164.9		7 37.5 1.0 05 164.9		7 07.5 1.0 05 164.9		15
6	10 34.1 1.0 06 163.7		10 04.2 1.0 06 163.7		9 34.2 1.0 06 163.8		9 04.3 1.0 06 163.8		8 34.3 1.0 05 163.8		8 04.3 1.0 05 163.9		7 34.4 1.0 05 163.9		7 04.4 1.0 05 163.9		6
7	10 30.8 1.0 06 162.7		10 00.9 1.0 06 162.7		9 30.9 1.0 06 162.8		9 01.0 1.0 06 162.8		8 31.0 1.0 06 162.8		8 01.1 1.0 06 162.8		7 31.1 1.0 06 162.9		7 01.2 1.0 06 162.9		7
8	10 27.3 1.0 06 161.7		9 57.4 1.0 06 161.7		9 27.4 1.0 06 161.7		8 57.5 1.0 06 161.8		8 27.5 1.0 06 161.8		7 57.6 1.0 06 161.8		7 27.6 1.0 06 161.9		6 57.7 1.0 06 161.9		8
9	10 23.6 1.0 06 160.7		9 53.7 1.0 06 160.7		9 23.8 1.0 06 160.7		8 53.8 1.0 06 160.8		8 23.9 1.0 06 160.8		7 53.9 1.0 06 160.8		7 24.0 1.0 06 160.9		6 54.0 1.0 06 160.9		9
20	10 19.7 1.0 07 159.7		9 49.8 1.0 07 159.7		9 19.9 1.0 07 159.7		8 49.9 1.0 07 159.8		8 20.0 1.0 07 159.8		7 50.1 1.0 07 159.8		7 20.1 1.0 07 159.9		6 50.2 1.0 07 159.9		20
1	10 15.7 1.0 07 158.6		9 45.7 1.0 07 158.7		9 15.8 1.0 07 158.7		8 45.9 1.0 07 158.7		8 16.0 1.0 07 158.8		7 46.0 1.0 07 158.8		7 16.1 1.0 07 158.9		6 46.2 1.0 07 158.9		1
2	10 11.4 1.0 07 157.6		9 41.5 1.0 07 157.7		9 11.6 1.0 07 157.7		8 41.6 1.0 07 157.7		8 11.7 1.0 07 157.8		7 41.8 1.0 07 157.8		7 11.9 1.0 07 157.8		6 42.0 1.0 07 157.9		2
3	10 07.0 1.0 08 156.6		9 37.0 1.0 08 156.7		9 07.1 1.0 08 156.7		8 37.2 1.0 08 156.7		8 07.3 1.0 08 156.8		7 37.4 1.0 08 156.8		7 07.5 1.0 08 156.8		6 37.6 1.0 08 156.9		3
4	10 02.3 1.0 08 155.6		9 32.4 1.0 08 155.6		9 02.5 1.0 08 155.7		8 32.6 1.0 08 155.7		8 02.7 1.0 08 155.8		7 32.8 1.0 08 155.8		7 02.9 1.0 08 155.8		6 33.0 1.0 08 155.9		4
25	9 57.5 1.0 08 154.6		9 27.6 1.0 08 154.6		8 57.7 1.0 08 154.7		8 27.8 1.0 08 154.7		7 57.9 1.0 08 154.8		7 28.0 1.0 08 154.8		6 58.1 1.0 08 154.8		6 28.2 1.0 08 154.9		25
6	9 52.5 1.0 09 153.6		9 22.6 1.0 09 153.6		8 52.7 1.0 09 153.7		8 22.8 1.0 09 153.7		7 52.9 1.0 09 153.8		7 23.0 1.0 09 153.8		6 53.1 1.0 09 153.8		6 23.2 1.0 09 153.9		6
7	9 47.3 1.0 09 152.6		9 17.4 1.0 09 152.6		8 47.5 1.0 09 152.7		8 17.7 1.0 09 152.7		7 47.8 1.0 09 152.7		7 17.9 1.0 09 152.8		6 48.0 1.0 09 152.8		6 18.1 1.0 09 152.9		7
8	9 41.9 1.0 09 151.6		9 12.1 1.0 09 151.6		8 42.2 1.0 09 151.6		8 12.3 1.0 09 151.7		7 42.4 1.0 09 151.7		7 12.6 1.0 09 151.8		6 42.7 1.0 09 151.8		6 12.8 1.0 09 151.9		8
9	9 36.4 1.0 10 150.5		9 06.5 1.0 10 150.6		8 36.7 1.0 10 150.6		8 06.8 1.0 09 150.7		7 36.9 1.0 09 150.7		7 07.1 1.0 09 150.8		6 37.2 1.0 09 150.8		6 07.3 1.0 09 150.9		9
30	9 30.7 1.0 10 149.5		9 00.8 1.0 10 149.6		8 31.0 1.0 10 149.6		8 01.1 1.0 10 149.7		7 31.2 1.0 10 149.7		7 01.4 1.0 10 149.8		6 31.5 1.0 10 149.8		6 01.7 1.0 10 149.9		30
1	9 24.8 1.0 10 148.5		8 54.9 1.0 10 148.6		8 25.1 1.0 10 148.6		7 55.2 1.0 10 148.7		7 25.4 1.0 10 148.7		6 55.5 1.0 10 148.8		6 25.7 1.0 10 148.8		5 55.8 1.0 10 148.9		1
2	9 18.7 99 10 147.5		8 48.9 99 10 147.6		8 19.1 99 10 147.6		7 49.2 99 10 147.7		7 19.4 99 10 147.7		6 49.5 99 10 147.8		6 19.7 99 10 147.8		5 49.8 99 10 147.9		2
3	9 12.5 99 11 146.5		8 42.7 99 11 146.6		8 12.8 99 11 146.6		7 43.0 99 11 146.7		7 13.2 99 11 146.7		6 43.3 99 11 146.8		6 13.5 99 11 146.8		5 43.7 99 11 146.9		3
4	9 06.1 99 11 145.5		8 36.3 99 11 145.6		8 06.5 99 11 145.6		7 36.6 99 11 145.7		7 06.8 99 11 145.7		6 37.0 99 11 145.8		6 07.2 99 11 145.8		5 37.3 99 11 145.9		4
35	8 59.5 99 11 144.5		8 29.7 99 11 144.6		7 59.9 99 11 144.6		7 30.1 99 11 144.7		7 00.3 99 11 144.7		6 30.5 99 11 144.8		6 00.6 99 11 144.8		5 30.8 99 11 144.9		35
6	8 52.8 99 11 143.5		8 23.0 99 11 143.6		7 53.2 99 11 143.6		7 23.4 99 11 143.7		6 53.6 99 11 143.7		6 23.8 99 11 143.8		5 54.0 99 11 143.8		5 24.2 99 11 143.9		6
7	8 45.9 99 12 142.5		8 16.1 99 12 142.5		7 46.3 99 12 142.6		7 16.5 99 12 142.7		6 46.7 99 12 142.7		6 16.9 99 12 142.8		5 47.1 99 12 142.8		5 17.3 99 12 142.9		7
8	8 38.9 99 12 141.5		8 09.1 99 12 141.5		7 39.3 99 12 141.6		7 09.5 99 12 141.7		6 39.7 99 12 141.7		6 09.9 99 12 141.8		5 40.1 99 12 141.8		5 10.3 99 12 141.9		8
9	8 31.7 99 12 140.5		8 01.9 99 12 140.5		7 32.1 99 12 140.6		7 02.3 99 12 140.7		6 32.5 99 12 140.7		6 02.8 99 12 140.8		5 33.0 99 12 140.8		5 03.2 99 12 140.9		9
40	8 24.3 99 13 139.5		7 54.5 99 13 139.5		7 24.8 99 12 139.6		6 55.0 99 12 139.7		6 25.2 99 12 139.7		5 55.4 99 12 139.8		5 25.7 99 12 139.8				40
1	8 16.8 99 13 138.5		7 47.0 99 13 138.5		7 17.3 99 13 138.6		6 47.5 99 13 138.7		6 17.7 99 13 138.7		5 48.0 99 13 138.8		5 18.2 99 13 138.9				1
2	8 09.1 99 13 137.5		7 39.4 99 13 137.5		7 09.6 99 13 137.6		6 39.9 99 13 137.7		6 10.1 99 13 137.7		5 40.4 99 13 137.8		5 10.6 99 13 137.9				2
3	8 01.3 99 13 136.5		7 31.6 99 13 136.5		7 01.8 99 13 136.6		6 32.1 99 13 136.7		6 02.3 99 13 136.7		5 32.6 99 13 136.8		5 02.9 99 13 136.9				3
4	7 53.3 99 14 135.5		7 23.6 99 13 135.5		6 53.9 99 13 135.6		6 24.2 99 13 135.7		5 54.4 99 13 135.7		5 24.7 99 13 135.8						4
45	7 45.2 99 14 134.5		7 15.5 99 14 134.5		6 45.8 99 14 134.6		6 16.1 99 14 134.7		5 46.4 99 14 134.7		5 16.6 99 14 134.8						45
6	7 37.0 99 14 133.5		7 07.3 99 14 133.5		6 37.6 99 14 133.6		6 07.9 99 14 133.7		5 38.2 99 14 133.7		5 08.4 99 14 133.8						6
7	7 28.6 99 14 132.5		6 58.9 99 14 132.5		6 29.2 99 14 132.6		5 59.5 99 14 132.7		5 29.8 99 14 132.8		5 00.1 99 14 132.8						7
8	7 20.1 99 14 131.5		6 50.4 99 14 131.5		6 20.7 99 14 131.6		5 51.0 99 14 131.7		5 21.3 99 14 131.8								8
9	7 11.5 99 15 130.5		6 41.8 99 15 130.5		6 12.1 99 15 130.6		5 42.4 99 15 130.7		5 12.7 99 15 130.8								9
50	7 02.7 99 15 129.5		6 33.0 99 15 129.6		6 03.4 99 15 129.6		5 33.7 99 15 129.7		5 04.0 99 15 129.8								50
1	6 53.8 99 15 128.5		6 24.1 99 15 128.6		5 54.5 99 15 128.6		5 24.8 99 15 128.7										1
2	6 44.8 99 15 127.5		6 15.1 99 15 127.6		5 45.5 99 15 127.6		5 15.8 99 15 127.7										2
3	6 35.6 99 15 126.5		6 06.0 99 15 126.6		5 36.3 99 15 126.6		5 06.7 99 15 126.7										3
4	6 26.4 99 16 125.5		5 56.7 99 16 125.6		5 27.1 99 16 125.7												4
55	6 17.0 99 16 124.5		5 47.4 99 16 124.6		5 17.7 99 16 124.7												55
6	6 07.5 99 16 123.5		5 37.9 99 16 123.6		5 08.3 99 16 123.7												6
7	5 57.9 99 16 122.5		5 28.3 99 16 122.6														7
8	5 48.2 99 16 121.5		5 18.6 99 16 121.6														8
9	5 38.4 99 16 120.5		5 08.8 99 16 120.6														9
60	5 28.5 99 17 119.5																60
1	5 18.5 99 17 118.6																1
2	5 08.4 99 17 117.6																2

Lat. 79°

Lat. 79°

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	15 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	16 00.0	1.0 00	180.0	16 30.0	1.0 00	180.0
1	14 59.9	1.0 01	179.0	15 29.9	1.0 01	179.0	15 59.9	1.0 01	179.0	16 29.9	1.0 01	179.0
2	14 59.6	1.0 01	177.9	15 29.6	1.0 01	177.9	15 59.6	1.0 01	177.9	16 29.6	1.0 01	177.9
3	14 59.1	1.0 01	176.9	15 29.1	1.0 01	176.9	15 59.1	1.0 01	176.9	16 29.1	1.0 01	176.9
4	14 58.4	1.0 02	175.9	15 28.3	1.0 02	175.9	15 58.3	1.0 02	175.9	16 28.3	1.0 02	175.8
05	14 57.4	1.0 02	174.8	15 27.4	1.0 02	174.8	15 57.4	1.0 02	174.8	16 27.4	1.0 02	174.8
6	14 56.3	1.0 02	173.8	15 26.3	1.0 02	173.8	15 56.3	1.0 02	173.8	16 26.3	1.0 02	173.8
7	14 55.0	1.0 03	172.8	15 24.9	1.0 03	172.8	15 54.9	1.0 03	172.7	16 24.9	1.0 03	172.7
8	14 53.4	1.0 03	171.7	15 23.4	1.0 03	171.7	15 53.4	1.0 03	171.7	16 23.4	1.0 03	171.7
9	14 51.7	1.0 03	170.7	15 21.6	1.0 03	170.7	15 51.6	1.0 03	170.7	16 21.6	1.0 03	170.7
10	14 49.7	1.0 04	169.7	15 19.7	1.0 04	169.7	15 49.7	1.0 04	169.6	16 19.7	1.0 04	169.6
1	14 47.6	1.0 04	168.6	15 17.5	1.0 04	168.6	15 47.5	1.0 04	168.6	16 17.5	1.0 04	168.6
2	14 45.2	1.0 04	167.6	15 15.2	1.0 04	167.6	15 45.2	1.0 04	167.6	16 15.1	1.0 04	167.6
3	14 42.6	1.0 05	166.6	15 12.6	1.0 05	166.6	15 42.6	1.0 05	166.5	16 12.6	1.0 05	166.5
4	14 39.9	1.0 05	165.6	15 09.9	1.0 05	165.5	15 39.8	1.0 05	165.5	16 09.8	1.0 05	165.5
15	14 36.9	1.0 05	164.5	15 06.9	1.0 05	164.5	15 36.9	1.0 05	164.5	16 06.8	1.0 05	164.4
6	14 33.8	1.0 06	163.5	15 03.7	1.0 06	163.5	15 33.7	1.0 06	163.4	16 03.6	1.0 06	163.4
7	14 30.4	1.0 06	162.5	15 00.4	1.0 06	162.4	15 30.3	1.0 06	162.4	16 00.3	1.0 06	162.4
8	14 26.9	1.0 06	161.4	14 56.8	1.0 06	161.4	15 26.8	1.0 06	161.4	15 56.7	1.0 06	161.3
9	14 23.1	1.0 07	160.4	14 53.1	1.0 07	160.4	15 23.0	1.0 07	160.3	15 53.0	1.0 07	160.3
20	14 19.2	1.0 07	159.4	14 49.1	1.0 07	159.3	15 19.1	1.0 07	159.3	15 49.0	1.0 07	159.3
1	14 15.1	1.0 07	158.4	14 45.0	1.0 07	158.3	15 14.9	1.0 07	158.3	15 44.9	1.0 07	158.2
2	14 10.8	1.0 08	157.3	14 40.7	1.0 08	157.3	15 10.6	1.0 08	157.3	15 40.5	1.0 08	157.2
3	14 06.3	1.0 08	156.3	14 36.2	1.0 08	156.3	15 06.1	1.0 08	156.3	15 36.0	1.0 08	156.2
4	14 01.6	1.0 08	155.3	14 31.5	1.0 08	155.2	15 01.4	1.0 08	155.2	15 31.3	1.0 08	155.2
25	13 56.7	1.0 08	154.3	14 26.6	1.0 08	154.2	14 56.5	1.0 08	154.2	15 26.4	1.0 08	154.1
6	13 51.6	1.0 09	153.2	14 21.5	1.0 09	153.2	14 51.4	1.0 09	153.1	15 21.3	1.0 09	153.1
7	13 46.4	1.0 09	152.2	14 16.3	1.0 09	152.2	14 46.1	1.0 09	152.1	15 16.0	1.0 09	152.1
8	13 40.9	1.0 09	151.2	14 10.8	1.0 09	151.1	14 40.7	1.0 09	151.1	15 10.6	1.0 09	151.0
9	13 35.3	1.0 10	150.2	14 05.2	1.0 10	150.1	14 35.1	1.0 10	150.1	15 04.9	1.0 10	150.0
30	13 29.5	1.0 10	149.1	13 59.4	1.0 10	149.1	14 29.3	1.0 10	149.0	14 59.1	1.0 10	149.0
1	13 23.6	99 10	148.1	13 53.4	99 10	148.1	14 23.3	99 10	148.0	14 53.1	99 10	148.0
2	13 17.5	99 10	147.1	13 47.3	99 11	147.0	14 17.1	99 11	147.0	14 47.0	99 11	146.9
3	13 11.2	99 11	146.1	13 41.0	99 11	146.0	14 10.8	99 11	146.0	14 40.6	99 11	145.9
4	13 04.7	99 11	145.1	13 34.5	99 11	145.0	14 04.3	99 11	144.9	14 34.1	99 11	144.9
35	12 58.0	99 11	144.0	13 27.9	99 11	144.0	13 57.7	99 11	143.9	14 27.5	99 11	143.9
6	12 51.2	99 12	143.0	13 21.0	99 12	143.0	13 50.8	99 12	142.9	14 20.6	99 12	142.8
7	12 44.3	99 12	142.0	13 14.1	99 12	142.0	13 43.9	99 12	141.9	14 13.6	99 12	141.8
8	12 37.1	99 12	141.0	13 06.9	99 12	140.9	13 36.7	99 12	140.9	14 06.5	99 12	140.8
9	12 29.9	99 12	140.0	12 59.6	99 12	139.9	13 29.4	99 12	139.9	13 59.2	99 12	139.8
40	12 22.4	99 13	139.0	12 52.2	99 13	138.9	13 21.9	99 13	138.8	13 51.7	99 13	138.8
1	12 14.8	99 13	138.0	12 44.6	99 13	137.9	13 14.3	99 13	137.8	13 44.1	99 13	137.8
2	12 07.1	99 13	136.9	12 36.8	99 13	136.9	13 06.6	99 13	136.8	13 36.3	99 13	136.7
3	11 59.2	99 13	135.9	12 28.9	99 13	135.9	12 58.7	99 13	135.8	13 28.4	99 13	135.7
4	11 51.2	99 14	134.9	12 20.9	99 14	134.9	12 50.6	99 14	134.8	13 20.3	99 14	134.7
45	11 43.0	99 14	133.9	12 12.7	99 14	133.8	12 42.4	99 14	133.8	13 12.1	99 14	133.7
6	11 34.7	99 14	132.9	12 04.4	99 14	132.8	12 34.1	99 14	132.8	13 03.8	99 14	132.7
7	11 26.2	99 14	131.9	11 55.9	99 14	131.8	12 25.6	99 14	131.8	12 55.3	99 14	131.7
8	11 17.6	99 15	130.9	11 47.3	99 15	130.8	12 17.0	99 15	130.7	12 46.7	99 15	130.7
9	11 08.9	99 15	129.9	11 38.6	99 15	129.8	12 08.3	99 15	129.7	12 37.9	99 15	129.7
50	11 00.1	99 15	128.9	11 29.7	99 15	128.8	11 59.4	99 15	128.7	12 29.0	99 15	128.6
1	10 51.1	99 15	127.9	11 20.7	99 15	127.8	11 50.4	99 15	127.7	12 20.0	99 15	127.6
2	10 42.0	99 15	126.9	11 11.6	99 15	126.8	11 41.3	99 15	126.7	12 10.9	99 15	126.6
3	10 32.8	99 16	125.9	11 02.4	99 16	125.8	11 32.0	99 16	125.7	12 01.7	99 16	125.6
4	10 23.4	99 16	124.9	10 53.1	99 16	124.8	11 22.7	99 16	124.7	11 52.3	99 16	124.6
55	10 14.0	99 16	123.9	10 43.6	99 16	123.8	11 13.2	99 16	123.7	11 42.8	99 16	123.6
6	10 04.4	99 16	122.9	10 34.0	99 16	122.8	11 03.6	99 16	122.7	11 33.2	99 16	122.6
7	9 54.7	99 16	121.9	10 24.3	99 16	121.8	10 53.9	99 16	121.7	11 23.5	99 16	121.6
8	9 45.0	99 16	120.9	10 14.6	99 16	120.8	10 44.2	99 16	120.7	11 13.7	99 16	120.6
9	9 35.1	99 17	119.9	10 04.7	99 17	119.8	10 34.3	99 17	119.7	11 03.8	99 17	119.6
60	9 25.1	99 17	118.9	9 54.7	99 17	118.8	10 24.3	99 17	118.7	10 53.8	99 17	118.6
1	9 15.0	99 17	117.9	9 44.6	99 17	117.8	10 14.2	99 17	117.7	10 43.7	99 17	117.6
2	9 04.9	99 17	116.9	9 34.4	99 17	116.8	10 04.0	99 17	116.7	10 33.6	99 17	116.6
3	8 54.6	99 17	115.9	9 24.2	99 17	115.8	9 53.7	98 17	115.7	10 23.3	98 17	115.6
4	8 44.3	98 17	114.9	9 13.8	98 17	114.8	9 43.4	98 17	114.7	10 12.9	98 17	114.6
65	8 33.9	98 18	113.9	9 03.4	98 18	113.8	9 32.9	98 18	113.7	10 02.5	98 18	113.6
6	8 23.3	98 18	112.9	8 52.9	98 18	112.8	9 22.4	98 18	112.7	9 51.9	98 18	112.6
7	8 12.8	98 18	111.9	8 42.3	98 18	111.8	9 11.8	98 18	111.7	9 41.3	98 18	111.6
8	8 02.1	98 18	110.9	8 31.6	98 18	110.8	9 01.1	98 18	110.7	9 30.6	98 18	110.6
9	7 51.4	98 18	109.9	8 20.9	98 18	109.8	8 50.4	98 18	109.7	9 19.9	98 18	109.6
70	7 40.6	98 18	108.9	8 10.1	98 18	108.8	8 39.6	98 18	108.8	9 09.1	98 18	108.7
1	7 29.7	98 18	107.9	7 59.2	98 18	107.9	8 28.7	98 18	107.8	8 58.2	98 18	107.7
2	7 18.8	98 18	107.0	7 48.3	98 18	106.9	8 17.8	98 18	106.8	8 47.3	98 18	106.7
3	7 07.8	98 18	106.0	7 37.3	98 18	105.9	8 06.8	98 18	105.8	8 36.3	98 18	105.7
4	6 56.8	98 18	105.0	7 26.3	98 18	104.9	7 55.7	98 18	104.8	8 25.2	98 18	104.7
75	6 45.7	98 19	104.0	7 15.2	98 19	103.9	7 44.7	98 19	103.8	8 14.1	98 19	103.7
6	6 34.6	98 19	103.0	7 04.0	98 19	102.9	7 33.5	98 19	102.8	8 03.0	98 19	102.7
7	6 23.4	98 19	102.0	6 52.9	98 19	101.9	7 22.3	98 19	101.8	7 51.8	98 19	101.7
8	6 12.2	98 19	101.0	6 41.6	98 19	100.9	7 11.1	98 19	100.8	7 40.6	98 19	100.8
9	6 00.9	98 19	100.1	6 30.4	98 19	100.0	6 59.8	98 19	99.9	7 29.3	98 19	99.8
80	5 49.6	98 19	99.1	6 19.1	98 19	99.0	6 48.5	98 19	98.9	7 18.0	98 19	98.8
1	5 38.3	98 19	98.1	6 07.8	98 19	98.0	6 37.2	98 19	97.9	7 06.7	98 19	97.8
2	5 27.0	98 19	97.1	5 56.4	98 19	97.0	6 25.9	98 19	96.9	6 55.3	98 19	96.8
3	5 15.6	98 19	96.1	5 45.0	98 19	96.0	6 14.5	98 19	95.9	6 43.9	98 19	95.8
4	5 04.2	98 19	95.1	5 33.6	98 19	95.0	6 03.1	98 19	94.9	6 32.5	98 19	94.8
85				5 22.2	98 19	94.1	5 51.7	98 19	94.0	6 21.1	98 19	93.9
6				5 10.8	98 19	93.1	5 40.3	98 19	93.0	6 09.7	98 19	92.9
7							5 28.8	98 19	92.0	5 58.3	98 19	91.9
8							5 17.4	98 19	91.0	5 46.8	98 19	90.9
9							5 05.9	98 19	90.0	5 35.4	98 19	89.9
90										5 23.9	98 19	88.9

H.A.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	17 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	18 00.0	1.0 00	180.0	18 30.0	1.0 00	180.0	00
1	16 59.9	1.0 01	179.0	17 29.9	1.0 01	179.0	17 59.9	1.0 01	179.0	18 29.9	1.0 01	179.0	1
2	16 59.6	1.0 01	177.9	17 29.6	1.0 01	177.9	17 59.6	1.0 01	177.9	18 29.6	1.0 01	177.9	2
3	16 59.1	1.0 01	176.9	17 29.1	1.0 01	176.9	17 59.1	1.0 01	176.9	18 29.1	1.0 01	176.9	3
4	16 58.3	1.0 02	175.8	17 28.3	1.0 02	175.8	17 58.3	1.0 02	175.8	18 28.3	1.0 02	175.8	4
05	16 57.4	1.0 02	174.8	17 27.4	1.0 02	174.8	17 57.4	1.0 02	174.8	18 27.4	1.0 02	174.8	05
6	16 56.3	1.0 02	173.8	17 26.3	1.0 02	173.8	17 56.3	1.0 02	173.7	18 26.2	1.0 02	173.7	6
7	16 54.9	1.0 03	172.7	17 24.9	1.0 03	172.7	17 54.9	1.0 03	172.7	18 24.9	1.0 03	172.7	7
8	16 53.4	1.0 03	171.7	17 23.4	1.0 03	171.7	17 53.3	1.0 03	171.7	18 23.3	1.0 03	171.6	8
9	16 51.6	1.0 03	170.6	17 21.6	1.0 03	170.6	17 51.6	1.0 03	170.6	18 21.6	1.0 03	170.6	9
10	16 49.6	1.0 04	169.6	17 19.6	1.0 04	169.6	17 49.6	1.0 04	169.6	18 19.6	1.0 04	169.6	10
1	16 47.5	1.0 04	168.6	17 17.5	1.0 04	168.5	17 47.4	1.0 04	168.5	18 17.4	1.0 04	168.5	1
2	16 45.1	1.0 04	167.5	17 15.1	1.0 04	167.5	17 45.1	1.0 04	167.5	18 15.0	1.0 04	167.5	2
3	16 42.5	1.0 05	166.5	17 12.5	1.0 05	166.5	17 42.5	1.0 05	166.4	18 12.4	1.0 05	166.4	3
4	16 39.8	1.0 05	165.5	17 09.7	1.0 05	165.4	17 39.7	1.0 05	165.4	18 09.6	1.0 05	165.4	4
15	16 36.8	1.0 05	164.4	17 06.7	1.0 05	164.4	17 36.7	1.0 05	164.4	18 06.7	1.0 05	164.3	15
6	16 33.6	1.0 06	163.4	17 03.6	1.0 06	163.4	17 33.5	1.0 06	163.3	18 03.5	1.0 06	163.3	6
7	16 30.2	1.0 06	162.3	17 00.2	1.0 06	162.3	17 30.1	1.0 06	162.3	18 00.1	1.0 06	162.3	7
8	16 26.7	1.0 06	161.3	16 56.6	1.0 06	161.3	17 26.5	1.0 06	161.2	17 56.5	1.0 06	161.2	8
9	16 22.9	1.0 07	160.3	16 52.8	1.0 07	160.2	17 22.8	1.0 07	160.2	17 52.7	1.0 07	160.2	9
20	16 18.9	1.0 07	159.2	16 48.9	1.0 07	159.2	17 18.8	1.0 07	159.2	17 48.7	1.0 07	159.1	20
1	16 14.8	1.0 07	158.2	16 44.7	1.0 07	158.2	17 14.6	1.0 07	158.1	17 44.6	1.0 07	158.1	1
2	16 10.4	1.0 08	157.2	16 40.4	1.0 08	157.1	17 10.3	1.0 08	157.1	17 40.2	1.0 08	157.1	2
3	16 05.9	1.0 08	156.1	16 35.8	1.0 08	156.1	17 05.7	1.0 08	156.1	17 35.6	1.0 08	156.0	3
4	16 01.2	1.0 08	155.1	16 31.1	1.0 08	155.1	17 01.0	1.0 08	155.0	17 30.9	1.0 08	155.0	4
25	15 56.3	1.0 08	154.1	16 26.2	1.0 08	154.0	16 56.1	1.0 09	154.0	17 25.9	1.0 09	153.9	25
6	15 51.2	1.0 09	153.1	16 21.1	1.0 09	153.0	16 50.9	1.0 09	153.0	17 20.8	1.0 09	152.9	6
7	15 45.9	1.0 09	152.0	16 15.8	1.0 09	152.0	16 45.6	1.0 09	151.9	17 15.5	1.0 09	151.9	7
8	15 40.4	1.0 09	151.0	16 10.3	1.0 09	150.9	16 40.2	1.0 09	150.9	17 10.0	1.0 09	150.8	8
9	15 34.8	1.0 10	150.0	16 04.6	1.0 10	149.9	16 34.5	1.0 10	149.9	17 04.4	1.0 10	149.8	9
30	15 29.0	1.0 10	148.9	15 58.8	1.0 10	148.9	16 28.7	1.0 10	148.8	16 58.5	1.0 10	148.8	30
1	15 23.0	99 10	147.9	15 52.8	99 10	147.9	16 22.7	99 10	147.8	16 52.5	99 10	147.8	1
2	15 16.8	99 11	146.9	15 46.6	99 11	146.8	16 16.5	99 11	146.8	16 46.3	99 11	146.7	2
3	15 10.5	99 11	145.9	15 40.3	99 11	145.8	16 10.1	99 11	145.7	16 39.9	99 11	145.7	3
4	15 04.0	99 11	144.8	15 33.8	99 11	144.8	16 03.6	99 11	144.7	16 33.4	99 11	144.7	4
35	14 57.3	99 11	143.8	15 27.1	99 11	143.8	15 56.9	99 11	143.7	16 26.7	99 11	143.6	35
6	14 50.4	99 12	142.8	15 20.2	99 12	142.7	15 50.0	99 12	142.7	16 19.8	99 12	142.6	6
7	14 43.4	99 12	141.8	15 13.2	99 12	141.7	15 43.0	99 12	141.6	16 12.8	99 12	141.6	7
8	14 36.3	99 12	140.7	15 06.0	99 12	140.7	15 35.8	99 12	140.6	16 05.6	99 12	140.6	8
9	14 28.9	99 12	139.7	14 58.7	99 12	139.7	15 28.5	99 12	139.6	15 58.2	99 12	139.5	9
40	14 21.5	99 13	138.7	14 51.2	99 13	138.6	15 21.0	99 13	138.6	15 50.7	99 13	138.5	40
1	14 13.8	99 13	137.7	14 43.6	99 13	137.6	15 13.3	99 13	137.6	15 43.1	99 13	137.5	1
2	14 06.1	99 13	136.7	14 35.8	99 13	136.6	15 05.5	99 13	136.5	15 35.3	99 13	136.5	2
3	13 58.1	99 13	135.7	14 27.9	99 13	135.6	14 57.6	99 14	135.5	15 27.3	99 14	135.5	3
4	13 50.1	99 14	134.6	14 19.8	99 14	134.6	14 49.5	99 14	134.5	15 19.2	99 14	134.4	4
45	13 41.8	99 14	133.6	14 11.5	99 14	133.6	14 41.3	99 14	133.5	15 11.0	99 14	133.4	45
6	13 33.5	99 14	132.6	14 03.2	99 14	132.5	14 32.9	99 14	132.5	15 02.6	99 14	132.4	6
7	13 25.0	99 14	131.6	13 54.7	99 14	131.5	14 24.4	99 14	131.5	14 54.0	99 14	131.4	7
8	13 16.4	99 15	130.6	13 46.0	99 15	130.5	14 15.7	99 15	130.4	14 45.4	99 15	130.4	8
9	13 07.6	99 15	129.6	13 37.3	99 15	129.5	14 06.9	99 15	129.4	14 36.6	99 15	129.4	9
50	12 58.7	99 15	128.6	13 28.4	99 15	128.5	13 58.0	99 15	128.4	14 27.7	99 15	128.3	50
1	12 49.7	99 15	127.6	13 19.3	99 15	127.5	13 49.0	99 15	127.4	14 18.6	99 15	127.3	1
2	12 40.6	99 15	126.6	13 10.2	99 15	126.5	13 39.8	99 15	126.4	14 09.5	99 15	126.3	2
3	12 31.3	99 16	125.5	13 00.9	99 16	125.5	13 30.6	99 16	125.4	14 00.2	99 16	125.3	3
4	12 21.9	99 16	124.5	12 51.6	99 16	124.5	13 21.2	99 16	124.4	13 50.8	99 16	124.3	4
55	12 12.4	99 16	123.5	12 42.1	99 16	123.5	13 11.7	99 16	123.4	13 41.3	99 16	123.3	55
6	12 02.8	99 16	122.5	12 32.5	99 16	122.5	13 02.1	99 16	122.4	13 31.7	99 16	122.3	6
7	11 53.1	99 16	121.5	12 22.7	99 16	121.4	12 52.3	99 16	121.4	13 21.9	99 16	121.3	7
8	11 43.3	99 17	120.5	12 12.9	99 17	120.4	12 42.5	99 17	120.4	13 12.1	99 17	120.3	8
9	11 33.4	99 17	119.5	12 03.0	99 17	119.4	12 32.6	99 17	119.4	13 02.2	99 17	119.3	9
60	11 23.4	99 17	118.5	11 53.0	99 17	118.4	12 22.6	99 17	118.4	12 52.1	99 17	118.3	60
1	11 13.3	99 17	117.5	11 42.9	99 17	117.4	12 12.4	99 17	117.4	12 42.0	99 17	117.3	1
2	11 03.1	99 17	116.5	11 32.7	99 17	116.4	12 02.2	99 17	116.4	12 31.8	99 17	116.3	2
3	10 52.8	98 17	115.5	11 22.4	98 17	115.4	11 51.9	98 17	115.4	12 21.5	98 17	115.3	3
4	10 42.4	98 17	114.5	11 12.0	98 17	114.4	11 41.5	98 17	114.4	12 11.1	98 17	114.3	4
65	10 32.0	98 18	113.5	11 01.5	98 18	113.4	11 31.1	98 18	113.4	12 00.6	98 18	113.3	65
6	10 21.5	98 18	112.5	10 51.0	98 18	112.5	11 20.5	98 18	112.4	11 50.0	98 18	112.3	6
7	10 10.8	98 18	111.5	10 40.4	98 18	111.5	11 09.9	98 18	111.4	11 39.4	98 18	111.3	7
8	10 00.2	98 18	110.6	10 29.7	98 18	110.5	10 59.2	98 18	110.4	11 28.7	98 18	110.3	8
9	9 49.4	98 18	109.6	10 18.9	98 18	109.5	10 48.4	98 18	109.4	11 17.9	98 18	109.3	9
70	9 38.6	98 18	108.6	10 08.1	98 18	108.5	10 37.6	98 18	108.4	11 07.1	98 18	108.3	70
1	9 27.7	98 18	107.6	9 57.2	98 18	107.5	10 26.7	98 18	107.4	10 56.2	98 18	107.3	1
2	9 16.8	98 18	106.6	9 46.2	98 18	106.5	10 15.7	98 18	106.4	10 45.2	98 18	106.3	2
3	9 05.8	98 18	105.6	9 35.2	98 18	105.5	10 04.7	98 18	105.4	10 34.2	98 18	105.3	3
4	8 54.7	98 18	104.6	9 24.2	98 18	104.5	9 53.7	98 19	104.4	10 23.1	98 19	104.3	4
75	8 43.6	98 19	103.6	9 13.1	98 19	103.5	9 42.6	98 19	103.4	10 12.0	98 19	103.3	75
6	8 32.5	98 19	102.6	9 01.9	98 19	102.5	9 31.4	98 19	102.4	10 00.9	98 19	102.3	6
7	8 21.3	98 19	101.6	8 50.7	98 19	101.5	9 20.2	98 19	101.5	9 49.7	98 19	101.4	7
8	8 10.0	98 19	100.7	8 39.5	98 19	100.6	9 09.0	98 19	100.5	9 38.4	98 19	100.4	8
9	7 58.8	98 19	99.7	8 28.2	98 19	99.6	8 57.7	98 19	99.5	9 27.1	98 19	99.4	9
80	7 47.5	98 19	98.7	8 16.9	98 19	98.6	8 46.4	98 19	98.5	9 15.8	98 19	98.4	80
1	7 36.1	98 19	97.7	8 05.6	98 19	97.6	8 35.0	98 19	97.5	9 04.5	98 19	97.4	1
2	7 24.8	98 19	96.7	7 54.2	98 19	96.6	8 23.7	98 19	96.5	8 53.1	98 19	96.4	2
3	7 13.4	98 19	95.7	7 42.8	98 19	95.6	8 12.3	98 19	95.5	8 41.7	98 19	95.4	3
4	7 02.0	98 19	94.7	7 31.4	98 19	94.6	8 00.9	98 19	94.6	8 30.3	98 19	94.5	4
85	6 50.6	98 19	93.8	7 20.0	98 19	93.7	7 49.5	98 19	93.6	8 18.9	98 19	93.5	85
6	6 39.1	98 19	92.8	7 08.6	98 19	92.7	7 38.0	98 19	92.6	8 07.5	98 19	92.5	6
7	6 27.7	98 19	91.8	6 57.1	98 19	91.7	7 26.6	98 19	91.6	7 56.0	98 19	91.5	7
8	6 16.3	98 19	90.8	6 45.7	98 19	90.7	7 15.1	98 19	90.6	7 44.6	98 19	90.5	8
9	6 04.8	98 19	89.8	6 34.3	98 19	89.7	7 03.7	98 19	89.6	7 33.1	98 19	89.5	9
90	5 53.4	98 19	88.9	6 22.8	98 19	88.8	6 52.2	98 19	88.7	7 21.7	98 19	88.6	90

Lat. 79°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	7 00.0	1.0	00	180.0	6 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	5 00.0	1.0	00	180.0													00
1	6 59.9	1.0	00	179.0	6 29.9	1.0	00	179.0	5 59.9	1.0	00	179.0	5 29.9	1.0	00	179.0																	1
2	6 59.6	1.0	01	178.0	6 29.6	1.0	01	178.0	5 59.6	1.0	01	178.0	5 29.6	1.0	01	178.0																	2
3	6 59.1	1.0	01	177.0	6 29.1	1.0	01	177.0	5 59.1	1.0	01	177.0	5 29.1	1.0	01	177.0																	3
4	6 58.4	1.0	02	176.0	6 28.4	1.0	02	176.0	5 58.4	1.0	02	176.0	5 28.4	1.0	02	176.0																	4
05	6 57.5	1.0	02	175.0	6 27.5	1.0	02	175.0	5 57.5	1.0	02	175.0	5 27.5	1.0	02	175.0																	05
6	6 56.4	1.0	02	174.0	6 26.4	1.0	02	174.0	5 56.4	1.0	02	174.0	5 26.4	1.0	02	174.0																	6
7	6 55.1	1.0	02	173.0	6 25.1	1.0	02	173.0	5 55.1	1.0	02	173.0	5 25.1	1.0	02	173.0																	7
8	6 53.6	1.0	03	172.0	6 23.6	1.0	03	172.0	5 53.6	1.0	03	172.0	5 23.6	1.0	03	172.0																	8
9	6 51.9	1.0	03	171.0	6 21.9	1.0	03	171.0	5 51.9	1.0	03	171.0	5 21.9	1.0	03	171.0																	9
10	6 50.0	1.0	04	170.0	6 20.0	1.0	03	170.0	5 50.0	1.0	03	170.0	5 20.0	1.0	03	170.0																	10
1	6 47.9	1.0	04	168.9	6 17.9	1.0	04	169.0	5 47.9	1.0	04	169.0	5 18.0	1.0	04	169.0																	1
2	6 45.6	1.0	04	167.9	6 15.6	1.0	04	168.0	5 45.6	1.0	04	168.0	5 15.7	1.0	04	168.0																	2
3	6 43.1	1.0	04	166.9	6 13.1	1.0	04	167.0	5 43.2	1.0	04	167.0	5 13.2	1.0	04	167.0																	3
4	6 40.4	1.0	05	165.9	6 10.5	1.0	05	166.0	5 40.5	1.0	05	166.0	5 10.5	1.0	05	166.0																	4
15	6 37.5	1.0	05	164.9	6 07.6	1.0	05	165.0	5 37.6	1.0	05	165.0	5 07.7	1.0	05	165.0																	15
6	6 34.5	1.0	05	163.9	6 04.5	1.0	05	164.0	5 34.6	1.0	05	164.0	5 04.6	1.0	05	164.0																	6
7	6 31.2	1.0	06	162.9	6 01.3	1.0	06	163.0	5 31.3	1.0	06	163.0	5 01.3	1.0	06	163.0																	7
8	6 27.8	1.0	06	161.9	5 57.8	1.0	06	162.0	5 27.9	1.0	06	162.0																					8
9	6 24.1	1.0	06	160.9	5 54.2	1.0	06	161.0	5 24.2	1.0	06	161.0																					9
20	6 20.3	1.0	07	159.9	5 50.3	1.0	07	160.0	5 20.4	1.0	07	160.0																					20
1	6 16.2	1.0	07	158.9	5 46.3	1.0	07	159.0	5 16.4	1.0	07	159.0																					1
2	6 12.0	1.0	07	157.9	5 42.1	1.0	07	158.0	5 12.2	1.0	07	158.0																					2
3	6 07.6	1.0	08	156.9	5 37.7	1.0	08	157.0	5 07.8	1.0	08	157.0																					3
4	6 03.1	1.0	08	155.9	5 33.2	1.0	08	156.0	5 03.2	1.0	08	156.0																					4
25	5 58.3	1.0	08	154.9	5 28.4	1.0	08	155.0																									25
6	5 53.4	1.0	09	153.9	5 23.5	1.0	09	154.0																									6
7	5 48.2	1.0	09	152.9	5 18.3	1.0	09	153.0																									7
8	5 42.9	1.0	09	151.9	5 13.1	1.0	09	152.0																									8
9	5 37.5	1.0	09	150.9	5 07.6	1.0	09	151.0																									9
30	5 31.8	1.0	10	149.9	5 01.9	1.0	10	150.0																									30
1	5 26.0	1.0	10	148.9																													1
2	5 20.0	99	10	147.9																													2
3	5 13.8	99	11	146.9																													3
4	5 07.5	99	11	145.9																													4
35	5 01.0	99	11	144.9																													35

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30 Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91													5 12.5	98	19	88.0	5 41.9	98	19	87.9	6 11.4	98	19	87.8	6 40.8	98	19	87.7	7 10.2	98	19	87.6	91
2													5 01.0	98	19	87.0	5 30.5	98	19	86.9	5 59.9	98	19	86.8	6 29.4	98	19	86.7	6 58.8	98	19	86.6	2
3																	5 19.1	98	19	85.9	5 48.5	98	19	85.8	6 17.9	98	19	85.7	6 47.4	98	19	85.6	3
4																	5 07.6	98	19	84.9	5 37.1	98	19	84.8	6 06.5	98	19	84.7	6 36.0	98	19	84.6	4
95																					5 25.7	98	19	83.9	5 55.1	98	19	83.8	6 24.6	98	19	83.7	95
6																					5 14.3	98	19	82.9	5 43.8	98	19	82.8	6 13.2	98	19	82.7	6
7																					5 03.0	98	19	81.9	5 32.4	98	19	81.8	6 01.9	98	19	81.7	7
8																									5 21.1	98	19	80.8	5 50.6	98	19	80.7	8
9																									5 09.8	98	19	79.8	5 39.3	98	19	79.7	9
100																													5 28.0	98	19	78.8	100
1																													5 16.8	98	19	77.8	1
2																													5 05.7	98	19	76.8	2

Lat. 79°

H.A.	8° 00′ Alt.	Δd Δt	Az.	8° 30′ Alt.	Δd Δt	Az.	9° 00′ Alt.	Δd Δt	Az.	9° 30′ Alt.	Δd Δt	Az.	10° 00′ Alt.	Δd Δt	Az.	10° 30′ Alt.	Δd Δt	Az.	11° 00′ Alt.	Δd Δt	Az.	11° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	19 00.0	1.0 00	180.0	19 30.0	1.0 00	180.0	20 00.0	1.0 00	180.0	20 30.0	1.0 00	180.0	21 00.0	1.0 00	180.0	21 30.0	1.0 00	180.0	22 00.0	1.0 00	180.0	22 30.0	1.0 00	180.0	00
1	18 59.9	1.0 01	179.0	19 29.9	1.0 01	179.0	19 59.9	1.0 01	178.9	20 29.9	1.0 01	178.9	20 59.9	1.0 01	178.9	21 29.9	1.0 01	178.9	21 59.9	1.0 01	178.9	22 29.9	1.0 01	178.9	1
2	18 59.6	1.0 01	177.9	19 29.6	1.0 01	177.9	19 59.6	1.0 01	177.9	20 29.6	1.0 01	177.9	20 59.6	1.0 01	177.9	21 29.6	1.0 01	177.9	21 59.6	1.0 01	177.9	22 29.6	1.0 01	177.9	2
3	18 59.1	1.0 01	176.9	19 29.1	1.0 01	176.9	19 59.1	1.0 01	176.8	20 29.1	1.0 01	176.8	20 59.1	1.0 01	176.8	21 29.1	1.0 01	176.8	21 59.0	1.0 01	176.8	22 29.0	1.0 01	176.8	3
4	18 58.3	1.0 02	175.8	19 28.3	1.0 02	175.8	19 58.3	1.0 02	175.8	20 28.3	1.0 02	175.8	20 58.3	1.0 02	175.8	21 28.3	1.0 02	175.8	21 58.3	1.0 02	175.8	22 28.3	1.0 02	175.8	4
05	18 57.4	1.0 02	174.8	19 27.4	1.0 02	174.8	19 57.4	1.0 02	174.7	20 27.4	1.0 02	174.7	20 57.4	1.0 02	174.7	21 27.4	1.0 02	174.7	21 57.4	1.0 02	174.7	22 27.4	1.0 02	174.7	05
6	18 56.2	1.0 02	173.7	19 26.2	1.0 02	173.7	19 56.2	1.0 02	173.7	20 26.2	1.0 02	173.7	20 56.2	1.0 02	173.7	21 26.2	1.0 02	173.7	21 56.2	1.0 02	173.6	22 26.2	1.0 02	173.6	6
7	18 54.9	1.0 03	172.7	19 24.9	1.0 03	172.7	19 54.9	1.0 03	172.6	20 24.9	1.0 03	172.6	20 54.8	1.0 03	172.6	21 24.8	1.0 03	172.6	21 54.8	1.0 03	172.6	22 24.8	1.0 03	172.6	7
8	18 53.3	1.0 03	171.6	19 23.3	1.0 03	171.6	19 53.3	1.0 03	171.6	20 23.3	1.0 03	171.6	20 53.3	1.0 03	171.6	21 23.3	1.0 03	171.5	21 53.2	1.0 03	171.5	22 23.2	1.0 03	171.5	8
9	18 51.5	1.0 03	170.6	19 21.5	1.0 03	170.6	19 51.5	1.0 03	170.5	20 21.5	1.0 03	170.5	20 51.5	1.0 03	170.5	21 21.5	1.0 03	170.5	21 51.5	1.0 03	170.5	22 21.4	1.0 03	170.5	9
10	18 49.6	1.0 04	169.5	19 19.5	1.0 04	169.5	19 49.5	1.0 04	169.5	20 19.5	1.0 04	169.5	20 49.5	1.0 04	169.5	21 19.5	1.0 04	169.4	21 49.5	1.0 04	169.4	22 19.4	1.0 04	169.4	10
1	18 47.4	1.0 04	168.5	19 17.4	1.0 04	168.5	19 47.3	1.0 04	168.4	20 17.3	1.0 04	168.4	20 47.3	1.0 04	168.4	21 17.3	1.0 04	168.4	21 47.2	1.0 04	168.4	22 17.2	1.0 04	168.3	1
2	18 45.0	1.0 04	167.4	19 15.0	1.0 04	167.4	19 44.9	1.0 04	167.4	20 14.9	1.0 04	167.4	20 44.9	1.0 04	167.4	21 14.9	1.0 04	167.3	21 44.8	1.0 04	167.3	22 14.8	1.0 04	167.3	2
3	18 42.4	1.0 05	166.4	19 12.4	1.0 05	166.4	19 42.3	1.0 05	166.3	20 12.3	1.0 05	166.3	20 42.3	1.0 05	166.3	21 12.3	1.0 05	166.3	21 42.2	1.0 05	166.3	22 12.2	1.0 05	166.2	3
4	18 39.6	1.0 05	165.4	19 09.6	1.0 05	165.3	19 39.5	1.0 05	165.3	20 09.5	1.0 05	165.3	20 39.5	1.0 05	165.2	21 09.4	1.0 05	165.2	21 39.4	1.0 05	165.2	22 09.4	1.0 05	165.2	4
15	18 36.6	1.0 05	164.3	19 06.6	1.0 05	164.3	19 36.5	1.0 05	164.3	20 06.5	1.0 05	164.2	20 36.5	1.0 05	164.2	21 06.4	1.0 05	164.2	21 36.4	1.0 05	164.1	22 06.3	1.0 05	164.1	15
6	18 33.4	1.0 06	163.3	19 03.4	1.0 06	163.2	19 33.3	1.0 06	163.2	20 03.3	1.0 06	163.2	20 33.2	1.0 06	163.1	21 03.2	1.0 06	163.1	21 33.1	1.0 06	163.1	22 03.1	1.0 06	163.1	6
7	18 30.0	1.0 06	162.2	19 00.0	1.0 06	162.2	19 29.9	1.0 06	162.2	19 59.9	1.0 06	162.1	20 29.8	1.0 06	162.1	20 59.8	1.0 06	162.1	21 29.7	1.0 06	162.0	21 59.7	1.0 06	162.0	7
8	18 26.4	1.0 06	161.2	18 56.4	1.0 06	161.1	19 26.3	1.0 06	161.1	19 56.3	1.0 06	161.1	20 26.2	1.0 06	161.0	20 56.1	1.0 06	161.0	21 26.1	1.0 06	161.0	21 56.0	1.0 06	160.9	8
9	18 22.6	1.0 07	160.1	18 52.6	1.0 07	160.1	19 22.5	1.0 07	160.1	19 52.4	1.0 07	160.0	20 22.4	1.0 07	160.0	20 52.3	1.0 07	160.0	21 22.2	1.0 07	159.9	21 52.2	1.0 07	159.9	9
20	18 18.7	1.0 07	159.1	18 48.6	1.0 07	159.1	19 18.5	1.0 07	159.0	19 48.4	1.0 07	159.0	20 18.4	1.0 07	159.0	20 48.3	1.0 07	158.9	21 18.2	1.0 07	158.9	21 48.1	1.0 07	158.8	20
1	18 14.5	1.0 07	158.1	18 44.4	1.0 07	158.0	19 14.3	1.0 07	158.0	19 44.2	1.0 07	157.9	20 14.2	1.0 07	157.9	20 44.1	1.0 07	157.9	21 14.0	1.0 07	157.8	21 43.9	1.0 07	157.8	1
2	18 10.1	1.0 08	157.0	18 40.0	1.0 08	157.0	19 09.9	1.0 08	156.9	19 39.8	1.0 08	156.9	20 09.8	1.0 08	156.9	20 39.7	1.0 08	156.8	21 09.6	1.0 08	156.8	21 39.5	1.0 08	156.7	2
3	18 05.5	1.0 08	156.0	18 35.4	1.0 08	155.9	19 05.3	1.0 08	155.9	19 35.3	1.0 08	155.9	20 05.2	1.0 08	155.8	20 35.1	1.0 08	155.8	21 05.0	1.0 08	155.7	21 34.9	1.0 08	155.7	3
4	18 00.8	1.0 08	154.9	18 30.7	1.0 08	154.9	19 00.6	1.0 08	154.9	19 30.5	1.0 08	154.8	20 00.4	1.0 08	154.8	20 30.3	1.0 08	154.7	21 00.2	1.0 08	154.7	21 30.1	1.0 08	154.6	4
25	17 55.8	1.0 09	153.9	18 25.7	1.0 09	153.9	18 55.6	1.0 09	153.8	19 25.5	1.0 09	153.8	19 55.4	1.0 09	153.7	20 25.3	1.0 09	153.7	20 55.2	1.0 09	153.6	21 25.1	1.0 09	153.6	25
6	17 50.7	1.0 09	152.9	18 20.6	1.0 09	152.8	18 50.5	1.0 09	152.8	19 20.4	1.0 09	152.7	19 50.2	1.0 09	152.7	20 20.1	1.0 09	152.6	20 50.0	1.0 09	152.6	21 19.9	1.0 09	152.5	6
7	17 45.4	1.0 09	151.8	18 15.3	1.0 09	151.8	18 45.1	1.0 09	151.7	19 15.0	1.0 09	151.7	19 44.9	1.0 09	151.6	20 14.8	1.0 09	151.6	20 44.6	1.0 09	151.5	21 14.5	1.0 09	151.5	7
8	17 39.9	1.0 09	150.8	18 09.8	1.0 09	150.7	18 39.6	1.0 10	150.7	19 09.5	1.0 10	150.6	19 39.4	1.0 10	150.6	20 09.2	1.0 10	150.5	20 39.1	1.0 10	150.5	21 09.0	1.0 10	150.4	8
9	17 34.2	1.0 10	149.8	18 04.1	1.0 10	149.7	18 33.9	1.0 10	149.7	19 03.8	1.0 10	149.6	19 33.6	1.0 10	149.6	20 03.5	1.0 10	149.5	20 33.4	1.0 10	149.5	21 03.2	1.0 10	149.4	9
30	17 28.4	99 10	148.7	17 58.2	99 10	148.7	18 28.1	99 10	148.6	18 57.9	99 10	148.6	19 27.8	99 10	148.5	19 57.6	99 10	148.5	20 27.4	99 10	148.4	20 57.3	99 10	148.4	30
1	17 22.3	99 10	147.7	17 52.2	99 10	147.6	18 22.0	99 10	147.6	18 51.9	99 10	147.5	19 21.7	99 10	147.5	19 51.5	99 10	147.4	20 21.4	99 10	147.4	20 51.2	99 10	147.3	1
2	17 16.1	99 11	146.7	17 46.0	99 11	146.6	18 15.8	99 11	146.6	18 45.6	99 11	146.5	19 15.5	99 11	146.4	19 45.3	99 11	146.4	20 15.1	99 11	146.3	20 44.9	99 11	146.3	2
3	17 09.8	99 11	145.6	17 39.6	99 11	145.6	18 09.4	99 11	145.5	18 39.2	99 11	145.5	19 09.0	99 11	145.4	19 38.9	99 11	145.3	20 08.7	99 11	145.3	20 38.5	99 11	145.2	3
4	17 03.2	99 11	144.6	17 33.0	99 11	144.5	18 02.8	99 11	144.5	18 32.6	99 11	144.4	19 02.5	99 11	144.4	19 32.3	99 11	144.3	20 02.1	99 11	144.2	20 31.9	99 11	144.2	4
35	16 56.5	99 11	143.6	17 26.3	99 12	143.5	17 56.1	99 12	143.5	18 25.9	99 12	143.4	18 55.7	99 12	143.3	19 25.5	99 12	143.3	19 55.3	99 12	143.2	20 25.1	99 12	143.1	35
6	16 49.6	99 12	142.5	17 19.4	99 12	142.5	17 49.2	99 12	142.4	18 19.0	99 12	142.4	18 48.8	99 12	142.3	19 18.6	99 12	142.2	19 48.4	99 12	142.2	20 18.1	99 12	142.1	6
7	16 42.6	99 12	141.5	17 12.4	99 12	141.5	17 42.1	99 12	141.4	18 11.9	99 12	141.3	18 41.7	99 12	141.3	19 11.5	99 12	141.2	19 41.3	99 12	141.1	20 11.0	99 12	141.1	7
8	16 35.4	99 12	140.5	17 05.1	99 12	140.4	17 34.9	99 12	140.4	18 04.7	99 12	140.3	18 34.5	99 12	140.2	19 04.2	99 12	140.2	19 34.0	99 12	140.1	20 03.8	99 12	140.0	8
9	16 28.0	99 13	139.5	16 57.8	99 13	139.4	17 27.5	99 13	139.3	17 57.3	99 13	139.3	18 27.1	99 13	139.2	18 56.8	99 13	139.1	19 26.6	99 13	139.1	19 56.3	99 13	139.0	9
40	16 20.5	99 13	138.4	16 50.2	99 13	138.4	17 20.0	99 13	138.3	17 49.7	99 13	138.2	18 19.5	99 13	138.2	18 49.2	99 13	138.1	19 19.0	99 13	138.0	19 48.7	99 13	138.0	40
1	16 12.8	99 13	137.4	16 42.6	99 13	137.4	17 12.3	99 13	137.3	17 42.0	99 13	137.2	18 11.8	99 13	137.1	18 41.5	99 13	137.1	19 11.3	99 13	137.0	19 41.0	99 13	136.9	1
2	16 05.0	99 13	136.4	16 34.7	99 13	136.3	17 04.5	99 13	136.3	17 34.2	99 13	136.2	18 03.9	99 13	136.1	18 33.7	99 13	136.1	19 03.4	99 13	136.0	19 33.1	99 13	135.9	2
3	15 57.0	99 14	135.4	16 26.8	99 14	135.3	16 56.5	99 14	135.2	17 26.2	99 14	135.2	17 55.9	99 14	135.1	18 25.6	99 14	135.0	18 55.3	99 14	135.0	19 25.1	99 14	134.9	3
4	15 48.9	99 14	134.4	16 18.6	99 14	134.3	16 48.3	99 14	134.2	17 18.1	99 14	134.1	17 47.8	99 14	134.1	18 17.5	99 14	134.0	18 47.2	99 14	133.9	19 16.9	99 14	133.8	4
45	15 40.7	99 14	133.3	16 10.4	99 14	133.3	16 40.1	99 14	133.2	17 09.8	99 14	133.1	17 39.5	99 14	133.0	18 09.2	99 14	133.0	18 38.9	99 14	132.9	19 08.6	99 14	132.8	45
6	15 32.3	99 14	132.3	16 02.0	99 14	132.2	16 31.7	99 14	132.2	17 01.3	99 14	132.1	17 31.0	99 14	132.0	18 00.7	99 14	131.9	18 30.4	99 14	131.9	19 00.1	99 14	131.8	6
7	15 23.7	99 14	131.3	15 53.4	99 14	131.2	16 23.1	99 14	131.2	16 52.8	99 14	131.1	17 22.5	99 14	131.0	17 52.1	99 15	130.9	18 21.8	99 15	130.8	18 51.5	99 15	130.8	7
8	15 15.1	99 15	130.3	15 44.7	99 15	130.2	16 14.4	99 15	130.1	16 44.1	99 15	130.1	17 13.7	99 15	130.0	17 43.4	99 15	129.9	18 13.1	99 15	129.8	18 42.7	99 15	129.7	8
9	15 06.3	99 15	129.3	15 35.9	99 15	129.2	16 05.6	99 15	129.1	16 35.3	99 15	129.0	17 04.9	99 15	129.0	17 34.6	99 15	128.9	18 04.2	99 15	128.8	18 33.9	99 15	128.7	9
50	14 57.3	99 15	128.3	15 27.0	99 15	128.2	15 56.6	99 15	128.1	16 26.3	99 15	128.0	16 55.9	99 15	127.9	17 25.6	99 15	127.9	17 55.2	99 15	127.8	18 24.9	99 15	127.7	50
1	14 48.3	99 15	127.2	15 17.9	99 15	127.2	15 47.6	99 15	127.1	16 17.2	99 15	127.0	16 46.9	99 15	126.9	17 16.5	99 15	126.8	17 46.1	99 15	126.8	18 15.8	99 15	126.7	1
2	14 39.1	99 16	126.2	15 08.8	99 16	126.2	15 38.4	99 16	126.1	16 08.0	99 16	126.0	16 37.6	99 16	125.9	17 07.3	99 16	125.8	17 36.9	99 16	125.7	18 06.5	99 16	125.7	2
3	14 29.8	99 16	125.2	14 59.4	99 16	125.1	15 29.1	99 16	125.1	15 58.7	99 16	125.0	16 28.3	99 16	124.9	16 57.9	99 16	124.8	17 27.5	99 16	124.7	17 57.2	99 16	124.6	3
4	14 20.4	99 16	124.2	14 50.0	99 16	124.1	15 19.6	99 16	124.1	15 49.3	99 16	124.0	16 18.9	99 16	123.9	16 48.5	99 16	123.8	17 18.1	99 16	123.7	17 47.7	99 16	123.6	4
55	14 10.9	99 16	123.2	14 40.5	99 16	123.1	15 10.1	99 16	123.0	15 39.7	99 16	123.0	16 09.3	99 16	122.9	16 38.9	99 16	122.8	17 08.5	99 16	122.7	17 38.1	99 16	122.6	55
6	14 01.3	99 16	122.2	14 30.9	99 16	122.1	15 00.5	99 16	122.0	15 30.0	99 16	121.9	15 59.6	99 16	121.9	16 29.2	99 16	121.8	16 58.8	99 16	121.7	17 28.4	99 16	121.6	6
7	13 51.5	99 16	121.2	14 21.1	99 16	121.1	14 50.7	99 16	121.0	15 20.3	99 16	120.9	15 49.9	99 16	120.9	16 19.4	99 16	120.8	16 49.0	99 16	120.7	17 18.6	99 17	120.6	7
8	13 41.7	99 17	120.2	14 11.3	99 17	120.1	14 40.8	99 17	120.0	15 10.4	99 17	119.9	15 40.0	99 17	119.8	16 09.6	99 17	119.8	16 39.1	99 17	119.7	17 08.7	99 17	119.6	8
9	13 31.7	99 17	119.2	14 01.3	99 17	119.1	14 30.9	99 17	119.0	15 00.4	99 17	118.9	15 30.0	99 17	118.8	15 59.6	99 17	118.7	16 29.1	99 17	118.7	16 58.7	99 17	118.6	9
60	13 21.7	99 17	118.2	13 51.2	99 17	118.1	14 20.8	99 17	118.0	14 50.4	99 17	117.9	15 19.9	99 17	117.8	15 49.5	99 17	117.7	16 19.0	99 17	117.6	16 48.6	98 17	117.6	60
1	13 11.5	99 17	117.2	13 41.1	99 17	117.1	14 10.7	99 17	117.0	14 40.2	99 17	116.9	15 09.8	98 17	116.8	15 39.3	98 17	116.7	16 08.8	98 17	116.6	16 38.4	98 17	116.6	1
2	13 01.3	98 17	116.2	13 30.9	98 17	116.1	14 00.4	98 17	116.0	14 30.0	98 17	115.9	14 59.5	98 17	115.8	15 29.0	98 17	115.7	15 58.6	98 17	115.6	16 28.1	98 17	115.5	2
3	12 51.0	98 17	115.2	13 20.5	98 17	115.1	13 50.1	98 17	115.0	14 19.6	98 17	114.9	14 49.1	98 17	114.8	15 18.7	98 17	114.7	15 48.2	98 17	114.6	16 17.7	98 17	114.5	3
4	12 40.6	98 17	114.2	13 10.1	98 18	114.1	13 39.7	98 18	114.0	14 09.2	98 18	113.9	14 38.7	98 18	113.8	15 08.2	98 18	113.7	15 37.8	98 18	113.6	16 07.3	98 18	113.5	4
65	12 30.1	98 18	113.2	12 59.6	98 18	113.1	13 29.2	98 18	113.0	13 58.7	98 18	112.9	14 28.2	98 18	112.8	14 57.7	98 18	112.7	15 27.2	98 18	112.6	15 56.7	98 18	112.5	65
6	12 19.5	98 18	112.2	12 49.1	98 18	112.1	13 18.6	98 18	112.0	13 48.1	98 18	111.9	14 17.6	98 18	111.8	14 47.1	98 18	111.7	15 16.6	98 18	111.6	15 46.1	98 18	111.5	6
7	12 08.9	98 18	111.2	12 38.4	98 18	111.1	13 07.9	98 18	111.0	13 37.4	98 18	110.9	14 06.9	98 18	110.8	14 36.4	98 18	110.7	15 05.9	98 18	110.6	15 35.4	98 18	110.5	7
8	11 58.2	98 18	110.2	12 27.7	98 18	110.1	12 57.2	98 18	110.0	13 26.7	98 18	109.9	13 56.2	98 18	109.8	14 25.7	98 18	109.7	14 55.2	98 18	109.6	15 24.7	98 18	109.5	8
9	11 47.4	98 18	109.2	12 16.9	98 18	109.1	12 46.4	98 18	109.0	13 15.9	98 18	108.9	13 45.4	98 18	108.8	14 14.9	98 18	108.7	14 44.4	98 18	108.6	15 13.9	98 18	108.5	9
70	11 36.6	98 18	108.2	12 06.1	98 18	108.1	12 35.6	98 18	108.0	13 05.0	98 18	107.9	13 34.5	98 18	107.8	14 04.0	98 18	107.7	14 33.5	98 18	107.6	15 03.0	98 18	107.5	70
1	11 25.7	98 18	107.2	11 55.2	98 18	107.1	12 24.6	98 18	107.0	12 54.1	98 18	106.9	13 23.6	98 18	106.8	13 53.1	98 18	106.7	14 22.6	98 18	106.6	14 52.0	98 18	106.5	1
2	11 14.7	98 18	106.2	11 44.2	98 18	106.1	12 13.7	98 18	106.0	12 43.1	98 18	105.9	13 12.6	98 18	105.8	13 42.1	98 18	105.7	14 11.6	98 18	105.6	14 41.0	98 18	105.5	2
3	11 03.7	98 18	105.2	11 33.2	98 18	105.1	12 02.6	98 18	105.0	12 32.1	98 18	104.9	13 01.6	98 18	104.8	13 31.0	98 18	104.7	14 00.5	98 19	104.6	14 30.0	98 18	104.5	3
4	10 52.6	98 19	104.2	11 22.1	98 19	104.1	11 51.6	98 19	104.0	12 21.0	98 19	103.9	12 50.5	98 19	103.8	13 19.9	98 19	103.8	13 49.4	98 19	103.7	14 18.9	98 19	103.6	4
75	10 41.5	98 19	103.2	11 11.0	98 19	103.1	11 40.4	98 19	103.0	12 09.9	98 19	103.0	12 39.3	98 19	102.9	13 08.8	98 19	102.8	13 38.3	98 19	102.7	14 07.7	98 19	102.6	75
6	10 30.3	98 19	102.2	10 59.8	98 19	102.2	11 29.2	98 19	102.1	11 58.7	98 19	102.0	12 28.2	98 19	101.9	12 57.6	98 19	101.8	13 27.1	98 19	101.7	13 56.5	98 19	101.6	6
7	10 19.1	98 19	101.3	10 48.6	98 19	101.2	11 18.0	98 19	101.1	11 47.5	98 19	101.0	12 16.9	98 19	100.9	12 46.4	98 19	100.8	13 15.8	98 19	100.7	13 45.3	98 19	100.6	7
8	10 07.9	98 19	100.3	10 37.3	98 19	100.2	11 06.8	98 19	100.1	11 36.2	98 19	100.0	12 05.7	98 19	99.9	12 35.1	98 19	99.8	13 04.6	98 19	99.7	13 34.0	98 19	99.6	8
9	9 56.6	98 19	99.3	10 26.0	98 19	99.2	10 55.5	98 19	99.1	11 24.9	98 19	99.0	11 54.4	98 19	98.9	12 23.8	98 19	98.8	12 53.3	98 19	98.7	13 22.7	98 19	98.6	9
80	9 45.3	98 19	98.3	10 14.7	98 19	98.2	10 44.2	98 19	98.1	11 13.6	98 19	98.0	11 43.1	98 19	97.9	12 12.5	98 19	97.8	12 41.9	98 19	97.7	13 11.4	98 19	97.6	80
1	9 33.9	98 19	97.3	10 03.4	98 19	97.2	10 32.8	98 19	97.1	11 02.3	98 19	97.0	11 31.7	98 19	96.9	12 01.1	98 19	96.8	12 30.6	98 19	96.7	13 00.0	98 19	96.6	1
2	9 22.6	98 19	96.3	9 52.0	98 19	96.2	10 21.4	98 19	96.1	10 50.9	98 19	96.0	11 20.3	98 19	95.9	11 49.8	98 19	95.8	12 19.2	98 19	95.7	12 48.6	98 19	95.6	2
3	9 11.2	98 19	95.3	9 40.6	98 19	95.2	10 10.1	98 19	95.1	10 39.5	98 19	95.0	11 08.9	98 19	95.0	11 38.4	98 19	94.9	12 07.8	98 19	94.8	12 37.2	98 19	94.7	3
4	8 59.8	98 19	94.4	9 29.2	98 19	94.3	9 58.6	98 19	94.2	10 28.1	98 19	94.1	10 57.5	98 19	94.0	11 27.0	98 19	93.9	11 56.4	98 19	93.8	12 25.8	98 19	93.7	4
85	8 48.3	98 19	93.4	9 17.8	98 19	93.3	9 47.2	98 19	93.2	10 16.7	98 19	93.1	10 46.1	98 19	93.0	11 15.5	98 19	92.9	11 45.0	98 19	92.8	12 14.4	98 19	92.7	85
6	8 36.9	98 19	92.4	9 06.3	98 19	92.3	9 35.8	98 19	92.2	10 05.2	98 19	92.1	10 34.7	98 19	92.0	11 04.1	98 19	91.9	11 33.5	98 19	91.8	12 02.9	98 19	91.7	6
7	8 25.5	98 19	91.4	8 54.9	98 19	91.3	9 24.3	98 19	91.2	9 53.8	98 19	91.1	10 23.2	98 19	91.0	10 52.6	98 19	90.9	11 22.1	98 19	90.8	11 51.5	98 19	90.7	7
8	8 14.0	98 19	90.4	8 43.5	98 19	90.3	9 12.9	98 19	90.2	9 42.3	98 19	90.1	10 11.8	98 19	90.0	10 41.2	98 19	89.9	11 10.6	98 19	89.8	11 40.0	98 19	89.7	8
9	8 02.6	98 19	89.4	8 32.0	98 19	89.3	9 01.4	98 19	89.2	9 30.9	98 19	89.2	10 00.3	98 19	89.1	10 29.7	98 19	89.0	10 59.2	98 19	88.9	11 28.6	98 19	88.8	9
90	7 51.1	98 19	88.5	8 20.6	98 19	88.4	8 50.0	98 19	88.3	9 19.4	98 19	88.2	9 48.9	98 19	88.1	10 18.3	98 19	88.0	10 47.7	98 19	87.9	11 17.2	98 19	87.8	90

Lat. 79°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	7 39.7	98	19	87.5	8 09.1	98	19	87.4	8 38.6	98	19	87.3	9 08.0	98	19	87.2	9 37.4	98	19	87.1	10 06.9	98	19	87.0	10 36.3	98	19	86.9	11 05.7	98	19	86.8	91
2	7 28.3	98	19	86.5	7 57.7	98	19	86.4	8 27.1	98	19	86.3	8 56.6	98	19	86.2	9 26.0	98	19	86.1	9 55.4	98	19	86.0	10 24.9	98	19	85.9	10 54.3	98	19	85.8	2
3	7 16.8	98	19	85.5	7 46.3	98	19	85.4	8 15.7	98	19	85.3	8 45.1	98	19	85.2	9 14.6	98	19	85.1	9 44.0	98	19	85.0	10 13.5	98	19	84.9	10 42.9	98	19	84.8	3
4	7 05.4	98	19	84.5	7 34.9	98	19	84.4	8 04.3	98	19	84.4	8 33.7	98	19	84.3	9 03.2	98	19	84.2	9 32.6	98	19	84.1	10 02.1	98	19	84.0	10 31.5	98	19	83.9	4
95	6 54.0	98	19	83.6	7 23.5	98	19	83.5	7 52.9	98	19	83.4	8 22.4	98	19	83.3	8 51.8	98	19	83.2	9 21.2	98	19	83.1	9 50.7	98	19	83.0	10 20.1	98	19	82.9	95
6	6 42.7	98	19	82.6	7 12.1	98	19	82.5	7 41.6	98	19	82.4	8 11.0	98	19	82.3	8 40.5	98	19	82.2	9 09.9	98	19	82.1	9 39.3	98	19	82.0	10 08.8	98	19	81.9	6
7	6 31.3	98	19	81.6	7 00.8	98	19	81.5	7 30.2	98	19	81.4	7 59.7	98	19	81.3	8 29.1	98	19	81.2	8 58.6	98	19	81.1	9 28.0	98	19	81.0	9 57.5	98	19	80.9	7
8	6 20.0	98	19	80.6	6 49.5	98	19	80.5	7 18.9	98	19	80.4	7 48.4	98	19	80.3	8 17.8	98	19	80.2	8 47.3	98	19	80.1	9 16.7	98	19	80.0	9 46.2	98	19	80.0	8
9	6 08.7	98	19	79.7	6 38.2	98	19	79.6	7 07.7	98	19	79.5	7 37.1	98	19	79.4	8 06.6	98	19	79.3	8 36.0	98	19	79.2	9 05.5	98	19	79.1	9 34.9	98	19	79.0	9
100	5 57.5	98	19	78.7	6 27.0	98	19	78.6	6 56.4	98	19	78.5	7 25.9	98	19	78.4	7 55.3	98	19	78.3	8 24.8	98	19	78.2	8 54.2	98	19	78.1	9 23.7	98	19	78.0	100
1	5 46.3	98	19	77.7	6 15.8	98	19	77.6	6 45.2	98	19	77.5	7 14.7	98	19	77.4	7 44.1	98	19	77.3	8 13.6	98	19	77.2	8 43.1	98	19	77.1	9 12.5	98	19	77.0	1
2	5 35.1	98	19	76.7	6 04.6	98	19	76.6	6 34.1	98	19	76.5	7 03.5	98	19	76.4	7 33.0	98	19	76.3	8 02.5	98	18	76.2	8 31.9	98	18	76.1	9 01.4	98	18	76.1	2
3	5 24.0	98	18	75.7	5 53.5	98	18	75.6	6 23.0	98	18	75.6	6 52.4	98	18	75.5	7 21.9	98	18	75.4	7 51.4	98	18	75.3	8 20.8	98	18	75.2	8 50.3	98	18	75.1	3
4	5 12.9	98	18	74.8	5 42.4	98	18	74.7	6 11.9	98	18	74.6	6 41.4	98	18	74.5	7 10.8	98	18	74.4	7 40.3	98	18	74.3	8 09.8	98	18	74.2	8 39.3	98	18	74.1	4
105	5 01.9	98	18	73.8	5 31.4	98	18	73.7	6 00.9	98	18	73.6	6 30.4	98	18	73.5	6 59.8	98	18	73.4	7 29.3	98	18	73.3	7 58.8	98	18	73.2	8 28.3	98	18	73.1	105
6					5 20.4	98	18	72.7	5 49.9	98	18	72.6	6 19.4	98	18	72.5	6 48.9	98	18	72.4	7 18.4	98	18	72.3	7 47.9	98	18	72.3	8 17.3	98	18	72.2	6
7					5 09.5	98	18	71.7	5 39.0	98	18	71.6	6 08.5	98	18	71.6	6 38.0	98	18	71.5	7 07.5	98	18	71.4	7 37.0	98	18	71.3	8 06.5	98	18	71.2	7
8									5 28.2	98	18	70.7	5 57.7	98	18	70.6	6 27.2	98	18	70.5	6 56.7	98	18	70.4	7 26.2	98	18	70.3	7 55.7	98	18	70.2	8
9									5 17.4	98	18	69.7	5 46.9	98	18	69.6	6 16.4	98	18	69.5	6 45.9	98	18	69.4	7 15.4	98	18	69.3	7 44.9	98	18	69.2	9
110									5 06.7	98	18	68.7	5 36.2	98	18	68.6	6 05.7	98	18	68.5	6 35.2	98	18	68.5	7 04.8	98	18	68.4	7 34.3	98	18	68.3	110
1													5 25.6	98	18	67.7	5 55.1	98	18	67.6	6 24.6	98	18	67.5	6 54.1	98	18	67.4	7 23.7	98	18	67.3	1
2													5 15.1	98	17	66.7	5 44.6	98	17	66.6	6 14.1	98	17	66.5	6 43.6	98	17	66.4	7 13.1	98	17	66.3	2
3													5 04.6	98	17	65.7	5 34.1	98	17	65.6	6 03.6	98	17	65.5	6 33.2	98	17	65.4	7 02.7	98	17	65.4	3
4																	5 23.7	98	17	64.6	5 53.3	98	17	64.6	6 22.8	98	17	64.5	6 52.3	98	17	64.4	4
115																	5 13.4	98	17	63.7	5 43.0	98	17	63.6	6 12.5	98	17	63.5	6 42.0	98	17	63.4	115
6																	5 03.2	99	17	62.7	5 32.8	99	17	62.6	6 02.3	99	17	62.5	6 31.9	98	17	62.4	6
7																					5 22.6	99	17	61.6	5 52.2	99	17	61.6	6 21.8	99	17	61.5	7
8																					5 12.6	99	17	60.7	5 42.2	99	17	60.6	6 11.7	99	17	60.5	8
9																					5 02.7	99	16	59.7	5 32.2	99	16	59.6	6 01.8	99	16	59.5	9
120																									5 22.4	99	16	58.6	5 52.0	99	16	58.6	120
1																									5 12.7	99	16	57.7	5 42.3	99	16	57.6	1
2																									5 03.1	99	16	56.7	5 32.7	99	16	56.6	2
3																													5 23.2	99	16	55.6	3
4																													5 13.8	99	15	54.7	4
125																													5 04.5	99	15	53.7	125

Lat. 79°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	23 00.0	1.0 00	180.0	23 30.0	1.0 00	180.0	24 00.0	1.0 00	180.0	24 30.0	1.0 00	180.0	25 00.0	1.0 00	180.0	25 30.0	1.0 00	180.0	26 00.0	1.0 00	180.0	26 30.0	1.0 00	180.0	00
1	22 59.9	1.0 01	178.9	23 29.9	1.0 01	178.9	23 59.9	1.0 01	178.9	24 29.9	1.0 01	178.9	24 59.9	1.0 01	178.9	25 29.9	1.0 01	178.9	25 59.9	1.0 01	178.9	26 29.9	1.0 01	178.9	1
2	22 59.6	1.0 01	177.9	23 29.6	1.0 01	177.9	23 59.6	1.0 01	177.9	24 29.6	1.0 01	177.9	24 59.6	1.0 01	177.9	25 29.6	1.0 01	177.9	25 59.6	1.0 01	177.9	26 29.6	1.0 01	177.8	2
3	22 59.0	1.0 01	176.8	23 29.0	1.0 01	176.8	23 59.0	1.0 01	176.8	24 29.0	1.0 01	176.8	24 59.0	1.0 01	176.8	25 29.0	1.0 01	176.8	25 59.0	1.0 01	176.8	26 29.0	1.0 01	176.8	3
4	22 58.3	1.0 02	175.8	23 28.3	1.0 02	175.7	23 58.3	1.0 02	175.7	24 28.3	1.0 02	175.7	24 58.3	1.0 02	175.7	25 28.3	1.0 02	175.7	25 58.3	1.0 02	175.7	26 28.3	1.0 02	175.7	4
05	22 57.3	1.0 02	174.7	23 27.3	1.0 02	174.7	23 57.3	1.0 02	174.7	24 27.3	1.0 02	174.7	24 57.3	1.0 02	174.6	25 27.3	1.0 02	174.6	25 57.3	1.0 02	174.6	26 27.3	1.0 02	174.6	05
6	22 56.2	1.0 02	173.6	23 26.2	1.0 02	173.6	23 56.2	1.0 02	173.6	24 26.2	1.0 02	173.6	24 56.2	1.0 02	173.6	25 26.1	1.0 02	173.6	25 56.1	1.0 02	173.6	26 26.1	1.0 02	173.5	6
7	22 54.8	1.0 03	172.6	23 24.8	1.0 03	172.6	23 54.8	1.0 03	172.5	24 24.8	1.0 03	172.5	24 54.8	1.0 03	172.5	25 24.8	1.0 03	172.5	25 54.7	1.0 03	172.5	26 24.7	1.0 03	172.5	7
8	22 53.2	1.0 03	171.5	23 23.2	1.0 03	171.5	23 53.2	1.0 03	171.5	24 23.2	1.0 03	171.5	24 53.2	1.0 03	171.4	25 23.2	1.0 03	171.4	25 53.1	1.0 03	171.4	26 23.1	1.0 03	171.4	8
9	22 51.4	1.0 03	170.4	23 21.4	1.0 03	170.4	23 51.4	1.0 03	170.4	24 21.4	1.0 03	170.4	24 51.4	1.0 03	170.4	25 21.3	1.0 03	170.4	25 51.3	1.0 03	170.3	26 21.3	1.0 03	170.3	9
10	22 49.4	1.0 04	169.4	23 19.4	1.0 04	169.4	23 49.4	1.0 04	169.3	24 19.4	1.0 04	169.3	24 49.3	1.0 04	169.3	25 19.3	1.0 04	169.3	25 49.3	1.0 04	169.3	26 19.3	1.0 04	169.2	10
1	22 47.2	1.0 04	168.3	23 17.2	1.0 04	168.3	23 47.2	1.0 04	168.3	24 17.1	1.0 04	168.3	24 47.1	1.0 04	168.2	25 17.1	1.0 04	168.2	25 47.1	1.0 04	168.2	26 17.0	1.0 04	168.2	1
2	22 44.8	1.0 04	167.3	23 14.8	1.0 04	167.2	23 44.7	1.0 04	167.2	24 14.7	1.0 04	167.2	24 44.7	1.0 04	167.2	25 14.6	1.0 04	167.1	25 44.6	1.0 04	167.1	26 14.6	1.0 04	167.1	2
3	22 42.2	1.0 05	166.2	23 12.1	1.0 05	166.2	23 42.1	1.0 05	166.2	24 12.1	1.0 05	166.1	24 42.0	1.0 05	166.1	25 12.0	1.0 05	166.1	25 42.0	1.0 05	166.0	26 11.9	1.0 05	166.0	3
4	22 39.3	1.0 05	165.1	23 09.3	1.0 05	165.1	23 39.2	1.0 05	165.1	24 09.2	1.0 05	165.1	24 39.2	1.0 05	165.0	25 09.1	1.0 05	165.0	25 39.1	1.0 05	165.0	26 09.1	1.0 05	164.9	4
15	22 36.3	1.0 05	164.1	23 06.2	1.0 05	164.1	23 36.2	1.0 05	164.0	24 06.2	1.0 05	164.0	24 36.1	1.0 05	164.0	25 06.1	1.0 05	163.9	25 36.0	1.0 05	163.9	26 06.0	1.0 05	163.9	15
6	22 33.0	1.0 06	163.0	23 03.0	1.0 06	163.0	23 32.9	1.0 06	163.0	24 02.9	1.0 06	162.9	24 32.8	1.0 06	162.9	25 02.8	1.0 06	162.9	25 32.7	1.0 06	162.8	26 02.7	1.0 06	162.8	6
7	22 29.6	1.0 06	162.0	22 59.5	1.0 06	161.9	23 29.5	1.0 06	161.9	23 59.4	1.0 06	161.9	24 29.4	1.0 06	161.8	24 59.3	1.0 06	161.8	25 29.3	1.0 06	161.8	25 59.2	1.0 06	161.7	7
8	22 26.0	1.0 06	160.9	22 55.9	1.0 06	160.9	23 25.8	1.0 06	160.8	23 55.8	1.0 06	160.8	24 25.7	1.0 06	160.8	24 55.6	1.0 06	160.7	25 25.6	1.0 06	160.7	25 55.5	1.0 06	160.7	8
9	22 22.1	1.0 07	159.9	22 52.0	1.0 07	159.8	23 22.0	1.0 07	159.8	23 51.9	1.0 07	159.7	24 21.8	1.0 07	159.7	24 51.8	1.0 07	159.7	25 21.7	1.0 07	159.6	25 51.6	1.0 07	159.6	9
20	22 18.1	1.0 07	158.8	22 48.0	1.0 07	158.8	23 17.9	1.0 07	158.7	23 47.8	1.0 07	158.7	24 17.8	1.0 07	158.6	24 47.7	1.0 07	158.6	25 17.6	1.0 07	158.6	25 47.5	1.0 07	158.5	20
1	22 13.8	1.0 07	157.7	22 43.8	1.0 07	157.7	23 13.7	1.0 07	157.7	23 43.6	1.0 07	157.6	24 13.5	1.0 07	157.6	24 43.4	1.0 07	157.5	25 13.3	1.0 07	157.5	25 43.2	1.0 08	157.5	1
2	22 09.4	1.0 08	156.7	22 39.3	1.0 08	156.7	23 09.2	1.0 08	156.6	23 39.1	1.0 08	156.6	24 09.0	1.0 08	156.5	24 38.9	1.0 08	156.5	25 08.9	1.0 08	156.4	25 38.8	1.0 08	156.4	2
3	22 04.8	1.0 08	155.6	22 34.7	1.0 08	155.6	23 04.6	1.0 08	155.6	23 34.5	1.0 08	155.5	24 04.4	1.0 08	155.5	24 34.3	1.0 08	155.4	25 04.2	1.0 08	155.4	25 34.1	1.0 08	155.3	3
4	22 00.0	1.0 08	154.6	22 29.9	1.0 08	154.5	22 59.7	1.0 08	154.5	23 29.6	1.0 08	154.5	23 59.5	1.0 08	154.4	24 29.4	1.0 08	154.4	24 59.3	1.0 08	154.3	25 29.2	1.0 08	154.3	4
25	21 55.0	1.0 09	153.5	22 24.8	1.0 09	153.5	22 54.7	1.0 09	153.4	23 24.6	1.0 09	153.4	23 54.5	1.0 09	153.3	24 24.4	1.0 09	153.3	24 54.3	1.0 09	153.3	25 24.1	1.0 09	153.2	25
6	21 49.8	1.0 09	152.5	22 19.6	1.0 09	152.4	22 49.5	1.0 09	152.4	23 19.4	1.0 09	152.3	23 49.3	1.0 09	152.3	24 19.1	1.0 09	152.2	24 49.0	1.0 09	152.2	25 18.9	1.0 09	152.1	6
7	21 44.4	1.0 09	151.4	22 14.2	1.0 09	151.4	22 44.1	1.0 09	151.3	23 14.0	1.0 09	151.3	23 43.8	1.0 09	151.2	24 13.7	1.0 09	151.2	24 43.6	1.0 09	151.1	25 13.4	1.0 09	151.1	7
8	21 38.8	1.0 10	150.4	22 08.7	1.0 10	150.3	22 38.5	1.0 10	150.3	23 08.4	1.0 10	150.2	23 38.2	1.0 10	150.2	24 08.1	1.0 10	150.1	24 38.0	1.0 10	150.1	25 07.8	1.0 10	150.0	8
9	21 33.1	1.0 10	149.3	22 02.9	1.0 10	149.3	22 32.8	99 10	149.2	23 02.6	99 10	149.2	23 32.5	99 10	149.1	24 02.3	99 10	149.1	24 32.2	99 10	149.0	25 02.0	99 10	149.0	9
30	21 27.1	99 10	148.3	21 57.0	99 10	148.2	22 26.8	99 10	148.2	22 56.7	99 10	148.1	23 26.5	99 10	148.1	23 56.3	99 10	148.0	24 26.2	99 10	148.0	24 56.0	99 10	147.9	30
1	21 21.0	99 10	147.3	21 50.9	99 10	147.2	22 20.7	99 10	147.1	22 50.5	99 11	147.1	23 20.4	99 11	147.0	23 50.2	99 11	147.0	24 20.0	99 11	146.9	24 49.8	99 11	146.8	1
2	21 14.8	99 11	146.2	21 44.6	99 11	146.2	22 14.4	99 11	146.1	22 44.2	99 11	146.0	23 14.0	99 11	146.0	23 43.9	99 11	145.9	24 13.7	99 11	145.9	24 43.5	99 11	145.8	2
3	21 08.3	99 11	145.2	21 38.1	99 11	145.1	22 07.9	99 11	145.0	22 37.7	99 11	145.0	23 07.5	99 11	144.9	23 37.3	99 11	144.9	24 07.2	99 11	144.8	24 37.0	99 11	144.7	3
4	21 01.7	99 11	144.1	21 31.5	99 11	144.1	22 01.3	99 11	144.0	22 31.1	99 11	143.9	23 00.9	99 11	143.9	23 30.7	99 11	143.8	24 00.5	99 11	143.8	24 30.3	99 11	143.7	4
35	20 54.9	99 12	143.1	21 24.7	99 12	143.0	21 54.5	99 12	143.0	22 24.3	99 12	142.9	22 54.0	99 12	142.8	23 23.8	99 12	142.8	23 53.6	99 12	142.7	24 23.4	99 12	142.6	35
6	20 47.9	99 12	142.0	21 17.7	99 12	142.0	21 47.5	99 12	141.9	22 17.3	99 12	141.9	22 47.0	99 12	141.8	23 16.8	99 12	141.7	23 46.6	99 12	141.7	24 16.4	99 12	141.6	6
7	20 40.8	99 12	141.0	21 10.6	99 12	140.9	21 40.3	99 12	140.9	22 10.1	99 12	140.8	22 39.9	99 12	140.7	23 09.6	99 12	140.7	23 39.4	99 12	140.6	24 09.2	99 12	140.5	7
8	20 33.5	99 12	140.0	21 03.3	99 12	139.9	21 33.0	99 12	139.8	22 02.8	99 12	139.8	22 32.6	99 12	139.7	23 02.3	99 12	139.6	23 32.1	99 12	139.6	24 01.8	99 13	139.5	8
9	20 26.1	99 13	138.9	20 55.8	99 13	138.9	21 25.6	99 13	138.8	21 55.3	99 13	138.7	22 25.1	99 13	138.7	22 54.8	99 13	138.6	23 24.6	99 13	138.5	23 54.3	99 13	138.4	9
40	20 18.5	99 13	137.9	20 48.2	99 13	137.8	21 18.0	99 13	137.8	21 47.7	99 13	137.7	22 17.4	99 13	137.6	22 47.2	99 13	137.5	23 16.9	99 13	137.5	23 46.6	99 13	137.4	40
1	20 10.7	99 13	136.9	20 40.5	99 13	136.8	21 10.2	99 13	136.7	21 39.9	99 13	136.7	22 09.6	99 13	136.6	22 39.4	99 13	136.5	23 09.1	99 13	136.4	23 38.8	99 13	136.4	1
2	20 02.8	99 13	135.8	20 32.5	99 13	135.8	21 02.3	99 13	135.7	21 32.0	99 13	135.6	22 01.7	99 14	135.5	22 31.4	99 14	135.5	23 01.1	99 14	135.4	23 30.8	99 14	135.3	2
3	19 54.8	99 14	134.8	20 24.5	99 14	134.7	20 54.2	99 14	134.7	21 23.9	99 14	134.6	21 53.6	99 14	134.5	22 23.3	99 14	134.4	22 53.0	99 14	134.4	23 22.7	99 14	134.3	3
4	19 46.6	99 14	133.8	20 16.3	99 14	133.7	20 46.0	99 14	133.6	21 15.7	99 14	133.5	21 45.4	99 14	133.5	22 15.1	99 14	133.4	22 44.7	99 14	133.3	23 14.4	99 14	133.2	4
45	19 38.2	99 14	132.7	20 07.9	99 14	132.7	20 37.6	99 14	132.6	21 07.3	99 14	132.5	21 37.0	99 14	132.4	22 06.7	99 14	132.4	22 36.3	99 14	132.3	23 06.0	99 14	132.2	45
6	19 29.8	99 14	131.7	19 59.4	99 14	131.6	20 29.1	99 14	131.6	20 58.8	99 14	131.5	21 28.5	99 14	131.4	21 58.1	99 14	131.3	22 27.8	99 14	131.2	22 57.5	99 14	131.2	6
7	19 21.2	99 15	130.7	19 50.8	99 15	130.6	20 20.5	99 15	130.5	20 50.2	99 15	130.5	21 19.8	99 15	130.4	21 49.5	99 15	130.3	22 19.1	99 15	130.2	22 48.8	99 15	130.1	7
8	19 12.4	99 15	129.7	19 42.1	99 15	129.6	20 11.7	99 15	129.5	20 41.4	99 15	129.4	21 11.0	99 15	129.3	21 40.7	99 15	129.3	22 10.3	99 15	129.2	22 40.0	99 15	129.1	8
9	19 03.5	99 15	128.6	19 33.2	99 15	128.6	20 02.8	99 15	128.5	20 32.5	99 15	128.4	21 02.1	99 15	128.3	21 31.7	99 15	128.2	22 01.4	99 15	128.2	22 31.0	99 15	128.1	9
50	18 54.5	99 15	127.6	19 24.2	99 15	127.5	19 53.8	99 15	127.5	20 23.4	99 15	127.4	20 53.1	99 15	127.3	21 22.7	99 15	127.2	21 52.3	99 15	127.1	22 21.9	99 15	127.0	50
1	18 45.4	99 15	126.6	19 15.0	99 15	126.5	19 44.6	99 15	126.4	20 14.3	99 15	126.4	20 43.9	99 16	126.3	21 13.5	99 16	126.2	21 43.1	99 16	126.1	22 12.7	99 16	126.0	1
2	18 36.1	99 16	125.6	19 05.8	99 16	125.5	19 35.4	99 16	125.4	20 05.0	99 16	125.3	20 34.6	99 16	125.2	21 04.2	99 16	125.2	21 33.8	99 16	125.1	22 03.4	99 16	125.0	2
3	18 26.8	99 16	124.6	18 56.4	99 16	124.5	19 26.0	99 16	124.4	19 55.6	99 16	124.3	20 25.2	99 16	124.2	20 54.8	99 16	124.1	21 24.4	99 16	124.0	21 54.0	99 16	124.0	3
4	18 17.3	99 16	123.5	18 46.9	99 16	123.5	19 16.5	99 16	123.4	19 46.1	99 16	123.3	20 15.7	99 16	123.2	20 45.3	99 16	123.1	21 14.8	99 16	123.0	21 44.4	99 16	122.9	4
55	18 07.7	99 16	122.5	18 37.3	99 16	122.4	19 06.9	99 16	122.4	19 36.5	99 16	122.3	20 06.0	99 16	122.2	20 35.6	99 16	122.1	21 05.2	99 16	122.0	21 34.8	99 16	121.9	55
6	17 58.0	99 16	121.5	18 27.6	99 16	121.4	18 57.1	99 16	121.3	19 26.7	99 16	121.3	19 56.3	99 16	121.2	20 25.9	99 16	121.1	20 55.4	99 16	121.0	21 25.0	99 16	120.9	6
7	17 48.2	99 17	120.5	18 17.7	99 17	120.4	18 47.3	99 17	120.3	19 16.9	99 17	120.2	19 46.4	99 17	120.1	20 16.0	99 17	120.1	20 45.6	99 17	120.0	21 15.1	99 17	119.9	7
8	17 38.3	99 17	119.5	18 07.8	99 17	119.4	18 37.4	99 17	119.3	19 06.9	99 17	119.2	19 36.5	99 17	119.1	20 06.0	99 17	119.0	20 35.6	99 17	118.9	21 05.1	99 17	118.9	8
9	17 28.2	99 17	118.5	17 57.8	99 17	118.4	18 27.3	99 17	118.3	18 56.9	98 17	118.2	19 26.4	98 17	118.1	19 56.0	98 17	118.0	20 25.5	98 17	117.9	20 55.1	98 17	117.8	9
60	17 18.1	98 17	117.5	17 47.7	98 17	117.4	18 17.2	98 17	117.3	18 46.8	98 17	117.2	19 16.3	98 17	117.1	19 45.8	98 17	117.0	20 15.4	98 17	116.9	20 44.9	98 17	116.8	60
1	17 07.9	98 17	116.5	17 37.5	98 17	116.4	18 07.0	98 17	116.3	18 36.5	98 17	116.2	19 06.1	98 17	116.1	19 35.6	98 17	116.0	20 05.1	98 17	115.9	20 34.6	98 17	115.8	1
2	16 57.6	98 17	115.5	17 27.2	98 17	115.4	17 56.7	98 17	115.3	18 26.2	98 17	115.2	18 55.7	98 17	115.1	19 25.3	98 17	115.0	19 54.8	98 17	114.9	20 24.3	98 17	114.8	2
3	16 47.3	98 17	114.4	17 16.8	98 17	114.4	17 46.3	98 17	114.3	18 15.8	98 17	114.2	18 45.3	98 18	114.1	19 14.8	98 18	114.0	19 44.3	98 18	113.9	20 13.9	98 18	113.8	3
4	16 36.8	98 18	113.4	17 06.3	98 18	113.3	17 35.8	98 18	113.3	18 05.3	98 18	113.2	18 34.8	98 18	113.1	19 04.3	98 18	113.0	19 33.8	98 18	112.9	20 03.3	98 18	112.8	4
65	16 26.2	98 18	112.4	16 55.8	98 18	112.3	17 25.3	98 18	112.3	17 54.8	98 18	112.2	18 24.3	98 18	112.1	18 53.8	98 18	112.0	19 23.3	98 18	111.9	19 52.7	98 18	111.8	65
6	16 15.6	98 18	111.4	16 45.1	98 18	111.3	17 14.6	98 18	111.2	17 44.1	98 18	111.2	18 13.6	98 18	111.1	18 43.1	98 18	111.0	19 12.6	98 18	110.9	19 42.1	98 18	110.8	6
7	16 04.9	98 18	110.4	16 34.4	98 18	110.3	17 03.9	98 18	110.2	17 33.4	98 18	110.1	18 02.9	98 18	110.1	18 32.4	98 18	110.0	19 01.9	98 18	109.9	19 31.3	98 18	109.8	7
8	15 54.2	98 18	109.4	16 23.7	98 18	109.3	16 53.1	98 18	109.2	17 22.6	98 18	109.1	17 52.1	98 18	109.0	18 21.6	98 18	109.0	18 51.1	98 18	108.9	19 20.5	98 18	108.8	8
9	15 43.3	98 18	108.4	16 12.8	98 18	108.3	16 42.3	98 18	108.2	17 11.8	98 18	108.1	17 41.3	98 18	108.0	18 10.7	98 18	108.0	18 40.2	98 18	107.9	19 09.7	98 18	107.8	9
70	15 32.5	98 18	107.4	16 01.9	98 18	107.3	16 31.4	98 18	107.2	17 00.9	98 18	107.1	17 30.3	98 18	107.0	17 59.8	98 18	106.9	18 29.3	98 18	106.9	18 58.7	98 18	106.7	70
1	15 21.5	98 18	106.4	15 51.0	98 18	106.3	16 20.4	98 18	106.2	16 49.9	98 18	106.1	17 19.4	98 18	106.0	17 48.8	98 18	106.0	18 18.3	98 18	105.9	18 47.7	98 18	105.8	1
2	15 10.5	98 18	105.4	15 40.0	98 18	105.3	16 09.4	98 18	105.3	16 38.9	98 18	105.2	17 08.3	98 18	105.1	17 37.8	98 18	105.0	18 07.2	98 18	104.9	18 36.7	98 18	104.8	2
3	14 59.4	98 18	104.5	15 28.9	98 19	104.4	15 58.3	98 19	104.3	16 27.8	98 19	104.2	16 57.3	98 19	104.1	17 26.7	98 19	104.0	17 56.1	98 19	103.9	18 25.6	98 19	103.8	3
4	14 48.3	98 19	103.5	15 17.8	98 19	103.4	15 47.2	98 19	103.3	16 16.7	98 19	103.2	16 46.1	98 19	103.1	17 15.6	98 19	103.0	17 45.0	98 19	102.9	18 14.4	98 19	102.8	4
75	14 37.2	98 19	102.5	15 06.6	98 19	102.4	15 36.1	98 19	102.3	16 05.5	98 19	102.2	16 34.9	98 19	102.1	17 04.4	98 19	102.0	17 33.8	98 19	101.9	18 03.3	98 19	101.8	75
6	14 26.0	98 19	101.5	14 55.4	98 19	101.4	15 24.9	98 19	101.3	15 54.3	98 19	101.2	16 23.7	98 19	101.1	16 53.2	98 19	101.0	17 22.6	98 19	100.9	17 52.0	98 19	100.8	6
7	14 14.7	98 19	100.5	14 44.2	98 19	100.4	15 13.6	98 19	100.3	15 43.0	98 19	100.2	16 12.5	98 19	100.1	16 41.9	98 19	100.0	17 11.3	98 19	99.9	17 40.8	98 19	99.8	7
8	14 03.5	98 19	99.5	14 32.9	98 19	99.4	15 02.3	98 19	99.3	15 31.8	98 19	99.2	16 01.2	98 19	99.1	16 30.6	98 19	99.0	17 00.0	98 19	98.9	17 29.5	98 19	98.8	8
9	13 52.1	98 19	98.5	14 21.6	98 19	98.4	14 51.0	98 19	98.3	15 20.4	98 19	98.2	15 49.9	98 19	98.1	16 19.3	98 19	98.0	16 48.7	98 19	97.9	17 18.1	98 19	97.8	9
80	13 40.8	98 19	97.5	14 10.2	98 19	97.4	14 39.7	98 19	97.3	15 09.1	98 19	97.2	15 38.5	98 19	97.1	16 07.9	98 19	97.0	16 37.4	98 19	96.9	17 06.8	98 19	96.8	80
1	13 29.4	98 19	96.5	13 58.9	98 19	96.4	14 28.3	98 19	96.3	14 57.7	98 19	96.2	15 27.2	98 19	96.1	15 56.6	98 19	96.0	16 26.0	98 19	95.9	16 55.4	98 19	95.8	1
2	13 18.1	98 19	95.5	13 47.5	98 19	95.4	14 16.9	98 19	95.3	14 46.3	98 19	95.2	15 15.8	98 19	95.1	15 45.2	98 19	95.0	16 14.6	98 19	94.9	16 44.0	98 19	94.8	2
3	13 06.7	98 19	94.6	13 36.1	98 19	94.5	14 05.5	98 19	94.4	14 34.9	98 19	94.3	15 04.3	98 19	94.2	15 33.8	98 19	94.1	16 03.2	98 19	93.9	16 32.6	98 19	93.8	3
4	12 55.2	98 19	93.6	13 24.7	98 19	93.5	13 54.1	98 19	93.4	14 23.5	98 19	93.3	14 52.9	98 19	93.2	15 22.3	98 19	93.1	15 51.7	98 19	93.0	16 21.2	98 19	92.9	4
85	12 43.8	98 19	92.6	13 13.2	98 19	92.5	13 42.7	98 19	92.4	14 12.1	98 19	92.3	14 41.5	98 19	92.2	15 10.9	98 19	92.1	15 40.3	98 19	92.0	16 09.7	98 19	91.9	85
6	12 32.4	98 19	91.6	13 01.8	98 19	91.5	13 31.2	98 19	91.4	14 00.6	98 19	91.3	14 30.0	98 19	91.2	14 59.5	98 19	91.1	15 28.9	98 19	91.0	15 58.3	98 19	90.9	6
7	12 20.9	98 19	90.6	12 50.3	98 19	90.5	13 19.8	98 19	90.4	13 49.2	98 19	90.3	14 18.6	98 19	90.2	14 48.0	98 19	90.1	15 17.4	98 19	90.0	15 46.8	98 19	89.9	7
8	12 09.5	98 19	89.6	12 38.9	98 19	89.5	13 08.3	98 19	89.4	13 37.7	98 19	89.3	14 07.1	98 19	89.2	14 36.6	98 19	89.1	15 06.0	98 19	89.0	15 35.4	98 19	88.9	8
9	11 58.0	98 19	88.7	12 27.4	98 19	88.6	12 56.9	98 19	88.5	13 26.3	98 19	88.4	13 55.7	98 19	88.3	14 25.1	98 19	88.2	14 54.5	98 19	88.1	15 23.9	98 19	88.0	9
90	11 46.6	98 19	87.7	12 16.0	98 19	87.6	12 45.4	98 19	87.5	13 14.8	98 19	87.4	13 44.3	98 19	87.3	14 13.7	98 19	87.2	14 43.1	98 19	87.1	15 12.5	98 19	87.0	90

Lat. 79°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 35.1	98 19	86.7	12 04.6	98 19	86.6	12 34.0	98 19	86.5	13 03.4	98 19	86.4	13 32.8	98 19	86.3	14 02.2	98 19	86.2	14 31.7	98 19	86.1	15 01.1	98 19	86.0	91
2	11 23.7	98 19	85.7	11 53.1	98 19	85.6	12 22.6	98 19	85.5	12 52.0	98 19	85.4	13 21.4	98 19	85.3	13 50.8	98 19	85.2	14 20.2	98 19	85.1	14 49.7	98 19	85.0	2
3	11 12.3	98 19	84.7	11 41.7	98 19	84.6	12 11.2	98 19	84.5	12 40.6	98 19	84.4	13 10.0	98 19	84.3	13 39.4	98 19	84.2	14 08.8	98 19	84.1	14 38.3	98 19	84.0	3
4	11 00.9	98 19	83.8	11 30.4	98 19	83.7	11 59.8	98 19	83.6	12 29.2	98 19	83.5	12 58.6	98 19	83.4	13 28.0	98 19	83.3	13 57.5	98 19	83.2	14 26.9	98 19	83.1	4
95	10 49.6	98 19	82.8	11 19.0	98 19	82.7	11 48.4	98 19	82.6	12 17.8	98 19	82.5	12 47.3	98 19	82.4	13 16.7	98 19	82.3	13 46.1	98 19	82.2	14 15.5	98 19	82.1	95
6	10 38.2	98 19	81.8	11 07.6	98 19	81.7	11 37.1	98 19	81.6	12 06.5	98 19	81.5	12 35.9	98 19	81.4	13 05.4	98 19	81.3	13 34.8	98 19	81.2	14 04.2	98 19	81.1	6
7	10 26.9	98 19	80.8	10 56.3	98 19	80.7	11 25.8	98 19	80.6	11 55.2	98 19	80.5	12 24.6	98 19	80.4	12 54.1	98 19	80.3	13 23.5	98 19	80.2	13 52.9	98 19	80.1	7
8	10 15.6	98 19	79.9	10 45.0	98 19	79.8	11 14.5	98 19	79.7	11 43.9	98 19	79.6	12 13.4	98 19	79.5	12 42.8	98 19	79.4	13 12.2	98 19	79.3	13 41.6	98 19	79.2	8
9	10 04.4	98 19	78.9	10 33.8	98 19	78.8	11 03.2	98 19	78.7	11 32.7	98 19	78.6	12 02.1	98 19	78.5	12 31.6	98 19	78.4	13 01.0	98 19	78.3	13 30.4	98 19	78.2	9
100	9 53.1	98 19	77.9	10 22.6	98 19	77.8	10 52.0	98 19	77.7	11 21.5	98 19	77.6	11 50.9	98 19	77.5	12 20.4	98 19	77.4	12 49.8	98 19	77.3	13 19.2	98 19	77.2	100
1	9 42.0	98 19	76.9	10 11.4	98 19	76.8	10 40.9	98 19	76.7	11 10.3	98 19	76.6	11 39.8	98 19	76.5	12 09.2	98 19	76.4	12 38.7	98 18	76.3	13 08.1	98 18	76.2	1
2	9 30.8	98 18	76.0	10 00.3	98 18	75.9	10 29.7	98 18	75.8	10 59.2	98 18	75.7	11 28.7	98 18	75.6	11 58.1	98 18	75.5	12 27.6	98 18	75.4	12 57.0	98 18	75.3	2
3	9 19.8	98 18	75.0	9 49.2	98 18	74.9	10 18.7	98 18	74.8	10 48.1	98 18	74.7	11 17.6	98 18	74.6	11 47.0	98 18	74.5	12 16.5	98 18	74.4	12 45.9	98 18	74.3	3
4	9 08.7	98 18	74.0	9 38.2	98 18	73.9	10 07.7	98 18	73.8	10 37.1	98 18	73.7	11 06.6	98 18	73.6	11 36.0	98 18	73.5	12 05.5	98 18	73.4	12 35.0	98 18	73.3	4
105	8 57.7	98 18	73.0	9 27.2	98 18	72.9	9 56.7	98 18	72.8	10 26.2	98 18	72.8	10 55.6	98 18	72.7	11 25.1	98 18	72.6	11 54.6	98 18	72.5	12 24.0	98 18	72.4	105
6	8 46.8	98 18	72.1	9 16.3	98 18	72.0	9 45.8	98 18	71.9	10 15.3	98 18	71.8	10 44.7	98 18	71.7	11 14.2	98 18	71.6	11 43.7	98 18	71.5	12 13.1	98 18	71.4	6
7	8 36.0	98 18	71.1	9 05.4	98 18	71.0	9 34.9	98 18	70.9	10 04.4	98 18	70.8	10 33.9	98 18	70.7	11 03.4	98 18	70.6	11 32.8	98 18	70.5	12 02.3	98 18	70.4	7
8	8 25.2	98 18	70.1	8 54.7	98 18	70.0	9 24.1	98 18	69.9	9 53.6	98 18	69.8	10 23.1	98 18	69.7	10 52.6	98 18	69.7	11 22.1	98 18	69.6	11 51.6	98 18	69.5	8
9	8 14.4	98 18	69.1	8 43.9	98 18	69.1	9 13.4	98 18	69.0	9 42.9	98 18	68.9	10 12.4	98 18	68.8	10 41.9	98 18	68.7	11 11.4	98 18	68.6	11 40.9	98 18	68.5	9
110	8 03.8	98 18	68.2	8 33.3	98 18	68.1	9 02.8	98 18	68.0	9 32.3	98 18	67.9	10 01.8	98 18	67.8	10 31.3	98 18	67.7	11 00.8	98 18	67.6	11 30.3	98 18	67.5	110
1	7 53.2	98 18	67.2	8 22.7	98 18	67.1	8 52.2	98 18	67.0	9 21.7	98 18	66.9	9 51.2	98 17	66.8	10 20.7	98 17	66.7	10 50.2	98 17	66.7	11 19.7	98 17	66.6	1
2	7 42.7	98 17	66.2	8 12.2	98 17	66.1	8 41.7	98 17	66.1	9 11.2	98 17	66.0	9 40.7	98 17	65.9	10 10.2	98 17	65.8	10 39.7	98 17	65.7	11 09.3	98 17	65.6	2
3	7 32.2	98 17	65.3	8 01.7	98 17	65.2	8 31.3	98 17	65.1	9 00.8	98 17	65.0	9 30.3	98 17	64.9	9 59.8	98 17	64.8	10 29.3	98 17	64.7	10 58.9	98 17	64.6	3
4	7 21.9	98 17	64.3	7 51.4	98 17	64.2	8 20.9	98 17	64.1	8 50.5	98 17	64.0	9 20.0	98 17	63.9	9 49.5	98 17	63.8	10 19.0	98 17	63.8	10 48.6	98 17	63.7	4
115	7 11.6	98 17	63.3	7 41.1	98 17	63.2	8 10.7	98 17	63.1	8 40.2	98 17	63.1	9 09.7	98 17	63.0	9 39.3	98 17	62.9	10 08.8	98 17	62.8	10 38.3	98 17	62.7	115
6	7 01.4	98 17	62.4	7 31.0	98 17	62.3	8 00.5	98 17	62.2	8 30.0	98 17	62.1	8 59.6	98 17	62.0	9 29.1	98 17	61.9	9 58.7	98 17	61.8	10 28.2	98 17	61.7	6
7	6 51.3	99 17	61.4	7 20.9	99 17	61.3	7 50.4	99 17	61.2	8 20.0	99 17	61.1	8 49.5	99 17	61.0	9 19.1	99 17	60.9	9 48.6	99 17	60.9	10 18.2	98 17	60.8	7
8	6 41.3	99 16	60.4	7 10.9	99 16	60.3	7 40.4	99 16	60.2	8 10.0	99 16	60.2	8 39.6	99 16	60.1	9 09.1	99 16	60.0	9 38.7	99 16	59.9	10 08.2	99 16	59.8	8
9	6 31.4	99 16	59.4	7 01.0	99 16	59.4	7 30.5	99 16	59.3	8 00.1	99 16	59.2	8 29.7	99 16	59.1	8 59.3	99 16	59.0	9 28.8	99 16	58.9	9 58.4	99 16	58.8	9
120	6 21.6	99 16	58.5	6 51.2	99 16	58.4	7 20.8	99 16	58.3	7 50.3	99 16	58.2	8 19.9	99 16	58.1	8 49.5	99 16	58.0	9 19.1	99 16	58.0	9 48.6	99 16	57.9	120
1	6 11.9	99 16	57.5	6 41.5	99 16	57.4	7 11.1	99 16	57.3	7 40.7	99 16	57.2	8 10.2	99 16	57.2	8 39.8	99 16	57.1	9 09.4	99 16	57.0	9 39.0	99 16	56.9	1
2	6 02.3	99 16	56.5	6 31.9	99 16	56.4	7 01.5	99 16	56.4	7 31.1	99 16	56.3	8 00.7	99 16	56.2	8 30.3	99 16	56.1	8 59.9	99 16	56.0	9 29.5	99 16	55.9	2
3	5 52.8	99 16	55.6	6 22.4	99 16	55.5	6 52.0	99 16	55.4	7 21.6	99 16	55.3	7 51.2	99 16	55.2	8 20.8	99 16	55.1	8 50.4	99 16	55.1	9 20.0	99 16	55.0	3
4	5 43.4	99 15	54.6	6 13.0	99 15	54.5	6 42.6	99 15	54.4	7 12.2	99 15	54.3	7 41.9	99 15	54.3	8 11.5	99 15	54.2	8 41.1	99 15	54.1	9 10.7	99 15	54.0	4
125	5 34.1	99 15	53.6	6 03.8	99 15	53.5	6 33.4	99 15	53.5	7 03.0	99 15	53.4	7 32.6	99 15	53.3	8 02.3	99 15	53.2	8 31.9	99 15	53.1	9 01.5	99 15	53.1	125
6	5 25.0	99 15	52.6	5 54.6	99 15	52.6	6 24.2	99 15	52.5	6 53.9	99 15	52.4	7 23.5	99 15	52.3	7 53.1	99 15	52.3	8 22.8	99 15	52.2	8 52.4	99 15	52.1	6
7	5 15.9	99 15	51.7	5 45.6	99 15	51.6	6 15.2	99 15	51.5	6 44.9	99 15	51.4	7 14.5	99 15	51.4	7 44.1	99 15	51.3	8 13.8	99 15	51.2	8 43.4	99 15	51.1	7
8	5 07.0	99 15	50.7	5 36.7	99 15	50.6	6 06.3	99 15	50.6	6 36.0	99 15	50.5	7 05.6	99 15	50.4	7 35.3	99 15	50.3	8 04.9	99 15	50.2	8 34.6	99 15	50.2	8
9				5 27.9	99 14	49.7	5 57.5	99 14	49.6	6 27.2	99 14	49.5	6 56.9	99 14	49.4	7 26.5	99 14	49.4	7 56.2	99 14	49.3	8 25.9	99 14	49.2	9
130				5 19.2	99 14	48.7	5 48.9	99 14	48.6	6 18.6	99 14	48.5	6 48.2	99 14	48.5	7 17.9	99 14	48.4	7 47.6	99 14	48.3	8 17.2	99 14	48.2	130
1				5 10.7	99 14	47.7	5 40.4	99 14	47.6	6 10.0	99 14	47.6	6 39.7	99 14	47.5	7 09.4	99 14	47.4	7 39.1	99 14	47.4	8 08.8	99 14	47.3	1
2				5 02.3	99 14	46.7	5 32.0	99 14	46.7	6 01.7	99 14	46.6	6 31.4	99 14	46.5	7 01.0	99 14	46.5	7 30.7	99 14	46.4	8 00.4	99 14	46.3	2
3							5 23.7	99 14	45.7	5 53.4	99 14	45.6	6 23.1	99 14	45.6	6 52.8	99 14	45.5	7 22.5	99 13	45.4	7 52.2	99 13	45.4	3
4							5 15.6	99 13	44.7	5 45.3	99 13	44.7	6 15.0	99 13	44.6	6 44.7	99 13	44.5	7 14.4	99 13	44.5	7 44.1	99 13	44.4	4
135							5 07.6	99 13	43.8	5 37.3	99 13	43.7	6 07.0	99 13	43.6	6 36.8	99 13	43.6	7 06.5	99 13	43.5	7 36.2	99 13	43.4	135
6										5 29.5	99 13	42.7	5 59.2	99 13	42.7	6 28.9	99 13	42.6	6 58.7	99 13	42.5	7 28.4	99 13	42.5	6
7										5 21.8	99 13	41.8	5 51.5	99 13	41.7	6 21.3	99 13	41.6	6 51.0	99 13	41.6	7 20.7	99 12	41.5	7
8										5 14.2	99 12	40.8	5 44.0	99 12	40.7	6 13.7	99 12	40.7	6 43.5	99 12	40.6	7 13.2	99 12	40.5	8
9										5 06.8	99 12	39.8	5 36.6	99 12	39.8	6 06.3	99 12	39.7	6 36.1	99 12	39.6	7 05.9	99 12	39.6	9
140													5 29.3	99 12	38.8	5 59.1	99 12	38.7	6 28.9	99 12	38.7	6 58.6	99 12	38.6	140
1													5 22.2	99 12	37.8	5 52.0	99 12	37.8	6 21.8	99 12	37.7	6 51.6	99 12	37.6	1
2													5 15.3	99 11	36.9	5 45.1	99 11	36.8	6 14.9	99 11	36.7	6 44.7	99 11	36.7	2
3													5 08.5	99 11	35.9	5 38.3	99 11	35.8	6 08.1	99 11	35.8	6 37.9	99 11	35.7	3
4													5 01.9	99 11	34.9	5 31.7	99 11	34.9	6 01.5	99 11	34.8	6 31.3	99 11	34.8	4
145																5 25.2	99 10	33.9	5 55.0	99 10	33.8	6 24.8	99 10	33.8	145
6																5 18.9	99 10	32.9	5 48.7	99 10	32.9	6 18.6	99 10	32.8	6
7																5 12.8	99 10	32.0	5 42.6	99 10	31.9	6 12.4	99 10	31.9	7
8																5 06.8	99 10	31.0	5 36.6	99 10	31.0	6 06.5	99 10	30.9	8
9																5 01.0	1.0 09	30.0	5 30.8	1.0 09	30.0	6 00.7	1.0 09	29.9	9
150																			5 25.2	1.0 09	29.0	5 55.0	1.0 09	29.0	150
1																			5 19.7	1.0 09	28.1	5 49.6	1.0 09	28.0	1
2																			5 14.4	1.0 09	27.1	5 44.3	1.0 09	27.0	2
3																			5 09.3	1.0 08	26.1	5 39.2	1.0 08	26.1	3
4																			5 04.3	1.0 08	25.2	5 34.2	1.0 08	25.1	4
155																						5 29.4	1.0 08	24.2	155
6																						5 24.9	1.0 07	23.2	6
7																						5 20.4	1.0 07	22.2	7
8																						5 16.2	1.0 07	21.3	8
9																						5 12.1	1.0 06	20.3	9
160																						5 08.3	1.0 06	19.3	160
1																						5 04.6	1.0 06	18.4	1
2																						5 01.0	1.0 06	17.4	2

Lat. 79°

H.A.	16° 00′ Alt.	Az.	16° 30′ Alt.	Az.	17° 00′ Alt.	Az.	17° 30′ Alt.	Az.	18° 00′ Alt.	Az.	18° 30′ Alt.	Az.	19° 00′ Alt.	Az.	19° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	27 00.0 1.00 00	180.0	27 30.0 1.00 00	180.0	28 00.0 1.00 00	180.0	28 30.0 1.00 00	180.0	29 00.0 1.00 00	180.0	29 30.0 1.00 00	180.0	30 00.0 1.00 00	180.0	30 30.0 1.00 00	180.0	00
1	26 59.9 1.00 01	178.9	27 29.9 1.00 01	178.9	27 59.9 1.00 01	178.9	28 29.9 1.00 01	178.9	28 59.9 1.00 01	178.9	29 29.9 1.00 01	178.9	29 59.9 1.00 01	178.9	30 29.9 1.00 01	178.9	1
2	26 59.6 1.00 01	177.8	27 29.6 1.00 01	177.8	27 59.6 1.00 01	177.8	28 29.6 1.00 01	177.8	28 59.6 1.00 01	177.8	29 29.6 1.00 01	177.8	29 59.6 1.00 01	177.8	30 29.6 1.00 01	177.8	2
3	26 59.0 1.00 01	176.8	27 29.0 1.00 01	176.8	27 59.0 1.00 01	176.8	28 29.0 1.00 01	176.7	28 59.0 1.00 01	176.7	29 29.0 1.00 01	176.7	29 59.0 1.00 01	176.7	30 29.0 1.00 01	176.7	3
4	26 58.3 1.00 02	175.7	27 28.3 1.00 02	175.7	27 58.3 1.00 02	175.7	28 28.3 1.00 02	175.7	28 58.3 1.00 02	175.7	29 28.3 1.00 02	175.6	29 58.3 1.00 02	175.6	30 28.3 1.00 02	175.6	4
05	26 57.3 1.00 02	174.6	27 27.3 1.00 02	174.6	27 57.3 1.00 02	174.6	28 27.3 1.00 02	174.6	28 57.3 1.00 02	174.6	29 27.3 1.00 02	174.6	29 57.3 1.00 02	174.5	30 27.3 1.00 02	174.5	05
6	26 56.1 1.00 02	173.5	27 26.1 1.00 02	173.5	27 56.1 1.00 02	173.5	28 26.1 1.00 02	173.5	28 56.1 1.00 02	173.5	29 26.1 1.00 02	173.5	29 56.1 1.00 02	173.5	30 26.1 1.00 02	173.4	6
7	26 54.7 1.00 03	172.5	27 24.7 1.00 03	172.4	27 54.7 1.00 03	172.4	28 24.7 1.00 03	172.4	28 54.7 1.00 03	172.4	29 24.7 1.00 03	172.4	29 54.7 1.00 03	172.4	30 24.7 1.00 03	172.3	7
8	26 53.1 1.00 03	171.4	27 23.1 1.00 03	171.4	27 53.1 1.00 03	171.3	28 23.1 1.00 03	171.3	28 53.1 1.00 03	171.3	29 23.0 1.00 03	171.3	29 53.0 1.00 03	171.3	30 23.0 1.00 03	171.3	8
9	26 51.3 1.00 03	170.3	27 21.3 1.00 03	170.3	27 51.3 1.00 03	170.3	28 21.2 1.00 03	170.2	28 51.2 1.00 03	170.2	29 21.2 1.00 03	170.2	29 51.2 1.00 03	170.2	30 21.2 1.00 03	170.2	9
10	26 49.3 1.00 04	169.2	27 19.2 1.00 04	169.2	27 49.2 1.00 04	169.2	28 19.2 1.00 04	169.2	28 49.2 1.00 04	169.1	29 19.2 1.00 04	169.1	29 49.1 1.00 04	169.1	30 19.1 1.00 04	169.1	10
1	26 47.0 1.00 04	168.1	27 17.0 1.00 04	168.1	27 47.0 1.00 04	168.1	28 16.9 1.00 04	168.1	28 46.9 1.00 04	168.1	29 16.9 1.00 04	168.0	29 46.9 1.00 04	168.0	30 16.8 1.00 04	168.0	1
2	26 44.6 1.00 04	167.1	27 14.5 1.00 04	167.0	27 44.5 1.00 04	167.0	28 14.5 1.00 04	167.0	28 44.4 1.00 04	167.0	29 14.4 1.00 04	166.9	29 44.4 1.00 04	166.9	30 14.3 1.00 04	166.9	2
3	26 41.9 1.00 05	166.0	27 11.9 1.00 05	166.0	27 41.8 1.00 05	165.9	28 11.8 1.00 05	165.9	28 41.7 1.00 05	165.9	29 11.7 1.00 05	165.9	29 41.7 1.00 05	165.8	30 11.6 1.00 05	165.8	3
4	26 39.0 1.00 05	164.9	27 09.0 1.00 05	164.9	27 38.9 1.00 05	164.9	28 08.9 1.00 05	164.8	28 38.8 1.00 05	164.8	29 08.8 1.00 05	164.8	29 38.8 1.00 05	164.7	30 08.7 1.00 05	164.7	4
15	26 35.9 1.00 06	163.8	27 05.9 1.00 06	163.8	27 35.8 1.00 06	163.8	28 05.8 1.00 06	163.8	28 35.7 1.00 06	163.7	29 05.7 1.00 06	163.7	29 35.6 1.00 06	163.7	30 05.6 1.00 06	163.6	15
6	26 32.6 1.00 06	162.8	27 02.6 1.00 06	162.7	27 32.5 1.00 06	162.7	28 02.5 1.00 06	162.7	28 32.4 1.00 06	162.6	29 02.4 1.00 06	162.6	29 32.3 1.00 06	162.6	30 02.3 1.00 06	162.5	6
7	26 29.1 1.00 06	161.7	26 59.1 1.00 06	161.7	27 29.0 1.00 06	161.6	27 59.0 1.00 06	161.6	28 28.9 1.00 06	161.6	28 58.8 1.00 06	161.5	29 28.8 1.00 06	161.5	29 58.7 1.00 06	161.4	7
8	26 25.5 1.00 06	160.6	26 55.4 1.00 06	160.6	27 25.3 1.00 06	160.6	27 55.3 1.00 07	160.5	28 25.2 1.00 07	160.5	28 55.1 1.00 07	160.4	29 25.1 1.00 07	160.4	29 55.0 1.00 07	160.4	8
9	26 21.6 1.00 07	159.6	26 51.5 1.00 07	159.5	27 21.4 1.00 07	159.5	27 51.3 1.00 07	159.4	28 21.3 1.00 07	159.4	28 51.2 1.00 07	159.4	29 21.1 1.00 07	159.3	29 51.0 1.00 07	159.3	9
20	26 17.5 1.00 07	158.5	26 47.4 1.00 07	158.4	27 17.3 1.00 07	158.4	27 47.2 1.00 07	158.4	28 17.1 1.00 07	158.3	28 47.0 1.00 07	158.3	29 17.0 1.00 07	158.2	29 46.9 1.00 07	158.2	20
1	26 13.2 1.00 08	157.4	26 43.1 1.00 08	157.4	27 13.0 1.00 08	157.3	27 42.9 1.00 08	157.3	28 12.8 1.00 08	157.2	28 42.7 1.00 08	157.2	29 12.6 1.00 08	157.2	29 42.5 1.00 08	157.1	1
2	26 08.7 1.00 08	156.4	26 38.6 1.00 08	156.3	27 08.5 1.00 08	156.3	27 38.4 1.00 08	156.2	28 08.3 1.00 08	156.2	28 38.2 1.00 08	156.1	29 08.1 1.00 08	156.1	29 38.0 1.00 08	156.0	2
3	26 04.0 1.00 08	155.3	26 33.9 1.00 08	155.2	27 03.8 1.00 08	155.2	27 33.7 1.00 08	155.1	28 03.6 1.00 08	155.1	28 33.4 1.00 08	155.0	29 03.3 1.00 08	155.0	29 33.2 1.00 08	155.0	3
4	25 59.1 1.00 08	154.2	26 29.0 1.00 08	154.2	26 58.9 1.00 08	154.1	27 28.8 1.00 08	154.1	27 58.6 1.00 09	154.0	28 28.5 1.00 09	154.0	28 58.4 1.00 09	153.9	29 28.3 1.00 09	153.9	4
25	25 54.0 1.00 09	153.2	26 23.9 1.00 09	153.1	26 53.8 1.00 09	153.1	27 23.6 1.00 09	153.0	27 53.5 1.00 09	153.0	28 23.4 1.00 09	152.9	28 53.3 1.00 09	152.8	29 23.1 1.00 09	152.8	25
6	25 48.8 1.00 09	152.1	26 18.6 1.00 09	152.0	26 48.5 1.00 09	152.0	27 18.4 1.00 09	151.9	27 48.2 1.00 09	151.9	28 18.1 1.00 09	151.8	28 48.0 1.00 09	151.8	29 17.8 1.00 09	151.7	6
7	25 43.3 1.00 09	151.0	26 13.2 1.00 09	151.0	26 43.0 1.00 09	150.9	27 12.9 1.00 09	150.9	27 42.7 1.00 09	150.8	28 12.6 1.00 09	150.8	28 42.4 1.00 10	150.7	29 12.3 1.00 10	150.6	7
8	25 37.7 1.00 10	150.0	26 07.5 1.00 10	149.9	26 37.4 99 10	149.9	27 07.2 99 10	149.8	27 37.1 99 10	149.7	28 06.9 99 10	149.7	28 36.7 99 10	149.6	29 06.6 99 10	149.6	8
9	25 31.8 99 10	148.9	26 01.7 99 10	148.8	26 31.5 99 10	148.8	27 01.4 99 10	148.7	27 31.2 99 10	148.7	28 01.0 99 10	148.6	28 30.9 99 10	148.6	29 00.7 99 10	148.5	9
30	25 25.8 99 10	147.8	25 55.7 99 10	147.8	26 25.5 99 10	147.7	26 55.3 99 10	147.7	27 25.2 99 10	147.6	27 55.0 99 10	147.5	28 24.8 99 10	147.5	28 54.6 99 10	147.4	30
1	25 19.7 99 11	146.8	25 49.5 99 11	146.7	26 19.3 99 11	146.7	26 49.1 99 11	146.6	27 18.9 99 11	146.5	27 48.7 99 11	146.5	28 18.6 99 11	146.4	28 48.4 99 11	146.4	1
2	25 13.3 99 11	145.7	25 43.1 99 11	145.7	26 12.9 99 11	145.6	26 42.7 99 11	145.5	27 12.5 99 11	145.5	27 42.3 99 11	145.4	28 12.1 99 11	145.4	28 41.9 99 11	145.3	2
3	25 06.8 99 11	144.7	25 36.6 99 11	144.6	26 06.4 99 11	144.5	26 36.2 99 11	144.5	27 06.0 99 11	144.4	27 35.7 99 11	144.4	28 05.5 99 11	144.3	28 35.3 99 11	144.2	3
4	25 00.1 99 11	143.6	25 29.8 99 11	143.6	25 59.6 99 12	143.5	26 29.4 99 12	143.4	26 59.2 99 12	143.4	27 29.0 99 12	143.3	27 58.8 99 12	143.2	28 28.6 99 12	143.2	4
35	24 53.2 99 12	142.6	25 23.0 99 12	142.5	25 52.7 99 12	142.4	26 22.5 99 12	142.4	26 52.3 99 12	142.3	27 22.1 99 12	142.2	27 51.8 99 12	142.2	28 21.6 99 12	142.1	35
6	24 46.1 99 12	141.5	25 15.9 99 12	141.5	25 45.7 99 12	141.4	26 15.4 99 12	141.3	26 45.2 99 12	141.2	27 15.0 99 12	141.2	27 44.7 99 12	141.1	28 14.5 99 12	141.0	6
7	24 38.9 99 12	140.5	25 08.7 99 12	140.4	25 38.4 99 12	140.3	26 08.2 99 12	140.3	26 38.0 99 12	140.2	27 07.7 99 12	140.1	27 37.5 99 12	140.0	28 07.2 99 12	140.0	7
8	24 31.6 99 13	139.4	25 01.3 99 13	139.3	25 31.1 99 13	139.3	26 00.8 99 13	139.2	26 30.5 99 13	139.1	27 00.3 99 13	139.1	27 30.0 99 13	139.0	27 59.8 99 13	138.9	8
9	24 24.0 99 13	138.4	24 53.8 99 13	138.3	25 23.5 99 13	138.2	25 53.2 99 13	138.2	26 23.0 99 13	138.1	26 52.7 99 13	138.0	27 22.4 99 13	137.9	27 52.2 99 13	137.9	9
40	24 16.4 99 13	137.3	24 46.1 99 13	137.3	25 15.8 99 13	137.2	25 45.5 99 13	137.1	26 15.2 99 13	137.0	26 45.0 99 13	137.0	27 14.7 99 13	136.9	27 44.4 99 13	136.8	40
1	24 08.5 99 13	136.3	24 38.2 99 13	136.2	25 08.0 99 13	136.1	25 37.7 99 13	136.1	26 07.4 99 13	136.0	26 37.1 99 13	135.9	27 06.8 99 13	135.8	27 36.5 99 13	135.7	1
2	24 00.5 99 14	135.2	24 30.2 99 14	135.2	24 59.9 99 14	135.1	25 29.6 99 14	135.0	25 59.3 99 14	134.9	26 29.0 99 14	134.9	26 58.7 99 14	134.8	27 28.4 99 14	134.7	2
3	23 52.4 99 14	134.2	24 22.1 99 14	134.1	24 51.8 99 14	134.0	25 21.5 99 14	134.0	25 51.2 99 14	133.9	26 20.8 99 14	133.8	26 50.5 99 14	133.7	27 20.2 99 14	133.6	3
4	23 44.1 99 14	133.2	24 13.8 99 14	133.1	24 43.5 99 14	133.0	25 13.2 99 14	132.9	25 42.8 99 14	132.8	26 12.5 99 14	132.8	26 42.2 99 14	132.7	27 11.8 99 14	132.6	4
45	23 35.7 99 14	132.1	24 05.4 99 14	132.0	24 35.0 99 14	132.0	25 04.7 99 14	131.9	25 34.4 99 14	131.8	26 04.0 99 14	131.7	26 33.7 99 14	131.6	27 03.3 99 14	131.5	45
6	23 27.1 99 14	131.1	23 56.8 99 14	131.0	24 26.5 99 15	130.9	24 56.1 99 15	130.8	25 25.8 99 15	130.8	25 55.4 99 15	130.7	26 25.1 99 15	130.6	26 54.7 99 15	130.5	6
7	23 18.4 99 15	130.1	23 48.1 99 15	130.0	24 17.7 99 15	129.9	24 47.4 99 15	129.8	25 17.0 99 15	129.7	25 46.7 99 15	129.6	26 16.3 99 15	129.5	26 45.9 99 15	129.5	7
8	23 09.6 99 15	129.0	23 39.3 99 15	128.9	24 08.9 99 15	128.8	24 38.5 99 15	128.8	25 08.2 99 15	128.7	25 37.8 99 15	128.6	26 07.4 99 15	128.5	26 37.0 99 15	128.4	8
9	23 00.7 99 15	128.0	23 30.3 99 15	127.9	23 59.9 99 15	127.8	24 29.5 99 15	127.7	24 95.2 99 15	127.6	25 28.8 99 15	127.6	25 58.4 99 15	127.5	26 28.0 99 15	127.4	9
50	22 51.6 99 15	127.0	23 21.2 99 15	126.9	23 50.8 99 15	126.8	24 20.4 99 15	126.7	24 50.0 99 15	126.6	25 19.6 99 15	126.5	25 49.2 99 15	126.4	26 18.8 99 15	126.3	50
1	22 42.4 99 16	125.9	23 12.0 99 16	125.8	23 41.6 99 16	125.7	24 11.2 99 16	125.7	24 40.8 99 16	125.6	25 10.4 99 16	125.5	25 40.0 99 16	125.4	26 09.5 99 16	125.3	1
2	22 33.0 99 16	124.9	23 02.6 99 16	124.8	23 32.2 99 16	124.7	24 01.8 99 16	124.6	24 31.4 99 16	124.5	25 01.0 99 16	124.4	25 30.6 99 16	124.4	26 00.1 99 16	124.3	2
3	22 23.6 99 16	123.9	22 53.2 99 16	123.8	23 22.8 99 16	123.7	23 52.3 99 16	123.6	24 21.9 99 16	123.5	24 51.5 99 16	123.4	25 21.1 99 16	123.3	25 50.6 99 16	123.2	3
4	22 14.0 99 16	122.8	22 43.6 99 16	122.8	23 13.2 99 16	122.7	23 42.7 99 16	122.6	24 12.3 99 16	122.5	24 41.9 99 16	122.4	25 11.4 99 16	122.3	25 41.0 99 16	122.2	4
55	22 04.3 99 16	121.8	22 33.9 99 16	121.7	23 03.5 99 16	121.6	23 33.0 99 16	121.5	24 02.6 99 16	121.5	24 32.2 99 16	121.4	25 01.7 99 16	121.3	25 31.3 99 16	121.2	55
6	21 54.6 99 16	120.8	22 24.1 99 16	120.7	22 53.7 99 16	120.6	23 23.2 99 17	120.5	23 52.8 98 17	120.4	24 22.3 98 17	120.3	24 51.9 98 17	120.2	25 21.4 98 17	120.1	6
7	21 44.7 99 17	119.8	22 14.2 98 17	119.7	22 43.8 98 17	119.6	23 13.3 98 17	119.5	23 42.9 98 17	119.4	24 12.4 98 17	119.3	24 41.9 98 17	119.2	25 11.5 98 17	119.1	7
8	21 34.7 98 17	118.8	22 04.2 98 17	118.7	22 33.8 98 17	118.6	23 03.3 98 17	118.5	23 32.8 98 17	118.4	24 02.4 98 17	118.3	24 31.9 98 17	118.2	25 01.4 98 17	118.1	8
9	21 24.6 98 17	117.7	21 54.1 98 17	117.6	22 23.7 98 17	117.6	22 53.2 98 17	117.5	23 22.7 98 17	117.4	23 52.2 98 17	117.3	24 21.7 98 17	117.2	24 51.3 98 17	117.1	9
60	21 14.4 98 17	116.7	21 43.9 98 17	116.6	22 13.5 98 17	116.5	22 43.0 98 17	116.4	23 12.5 98 17	116.3	23 42.0 98 17	116.2	24 11.5 98 17	116.1	24 41.0 98 17	116.0	60
1	21 04.2 98 17	115.7	21 33.7 98 17	115.6	22 03.2 98 17	115.5	22 32.7 98 17	115.4	23 02.2 98 17	115.3	23 31.7 98 17	115.2	24 01.2 98 17	115.1	24 30.7 98 17	115.0	1
2	20 53.8 98 17	114.7	21 23.3 98 17	114.6	21 52.8 98 17	114.5	22 22.3 98 17	114.4	22 51.8 98 17	114.3	23 21.3 98 17	114.2	23 50.8 98 18	114.1	24 20.3 98 18	114.0	2
3	20 43.4 98 18	113.7	21 12.9 98 18	113.6	21 42.3 98 18	113.5	22 11.8 98 18	113.4	22 41.3 98 18	113.3	23 10.8 98 18	113.2	23 40.3 98 18	113.1	24 09.8 98 18	113.0	3
4	20 32.8 98 18	112.7	21 02.3 98 18	112.6	21 31.8 98 18	112.5	22 01.3 98 18	112.4	22 30.8 98 18	112.3	23 00.2 98 18	112.2	23 29.7 98 18	112.1	23 59.2 98 18	112.0	4
65	20 22.2 98 18	111.7	20 51.7 98 18	111.6	21 21.2 98 18	111.5	21 50.7 98 18	111.4	22 20.1 98 18	111.3	22 49.6 98 18	111.2	23 19.1 98 18	111.1	23 48.5 98 18	111.0	65
6	20 11.6 98 18	110.7	20 41.0 98 18	110.6	21 10.5 98 18	110.5	21 40.0 98 18	110.4	22 09.4 98 18	110.3	22 38.9 98 18	110.2	23 08.4 98 18	110.1	23 37.8 98 18	110.0	6
7	20 00.8 98 18	109.7	20 30.3 98 18	109.6	20 59.7 98 18	109.5	21 29.2 98 18	109.4	21 58.7 98 18	109.3	22 28.1 98 18	109.2	22 57.6 98 18	109.1	23 27.0 98 18	108.9	7
8	19 50.0 98 18	108.7	20 19.5 98 18	108.6	20 48.9 98 18	108.5	21 18.4 98 18	108.4	21 47.8 98 18	108.2	22 17.3 98 18	108.1	22 46.7 98 18	108.0	23 16.2 98 18	107.9	8
9	19 39.1 98 18	107.7	20 08.6 98 18	107.6	20 38.0 98 18	107.5	21 07.5 98 18	107.3	21 36.9 98 18	107.2	22 06.4 98 18	107.1	22 35.8 98 18	107.0	23 05.2 98 18	106.9	9
70	19 28.2 98 18	106.6	19 57.6 98 18	106.5	20 27.1 98 18	106.4	20 56.5 98 18	106.3	21 26.0 98 18	106.2	21 55.4 98 18	106.1	22 24.8 98 18	106.0	22 54.2 98 18	105.9	70
1	19 17.2 98 18	105.6	19 46.6 98 18	105.5	20 16.1 98 18	105.4	20 45.5 98 18	105.3	21 14.9 98 18	105.2	21 44.4 98 18	105.1	22 13.8 98 18	105.0	22 43.2 98 18	104.9	1
2	19 06.1 98 18	104.7	19 35.6 98 18	104.5	20 05.0 98 19	104.4	20 34.4 98 19	104.3	21 03.9 98 19	104.2	21 33.3 98 19	104.1	22 02.7 98 19	104.0	22 32.1 98 19	103.9	2
3	18 55.0 98 19	103.7	19 24.5 98 19	103.6	19 53.9 98 19	103.4	20 23.3 98 19	103.3	20 52.7 98 19	103.2	21 22.2 98 19	103.1	21 51.6 98 19	103.0	22 21.0 98 19	102.9	3
4	18 43.9 98 19	102.7	19 13.3 98 19	102.6	19 42.7 98 19	102.5	20 12.2 98 19	102.3	20 41.6 98 19	102.2	21 11.0 98 19	102.1	21 40.4 98 19	102.0	22 09.8 98 19	101.9	4
75	18 32.7 98 19	101.7	19 02.1 98 19	101.6	19 31.5 98 19	101.5	20 01.0 98 19	101.4	20 30.4 98 19	101.2	20 59.8 98 19	101.1	21 29.2 98 19	101.0	21 58.6 98 19	100.9	75
6	18 21.5 98 19	100.7	18 50.9 98 19	100.6	19 20.3 98 19	100.5	19 49.7 98 19	100.4	20 19.1 98 19	100.3	20 48.5 98 19	100.1	21 17.9 98 19	100.0	21 47.3 98 19	99.9	6
7	18 10.2 98 19	99.7	18 39.6 98 19	99.6	19 09.0 98 19	99.5	19 38.4 98 19	99.4	20 07.8 98 19	99.3	20 37.2 98 19	99.2	21 06.6 98 19	99.0	21 36.0 98 19	98.9	7
8	17 58.9 98 19	98.7	18 28.3 98 19	98.6	18 57.7 98 19	98.5	19 27.1 98 19	98.4	19 56.5 98 19	98.3	20 25.9 98 19	98.2	20 55.3 98 19	98.1	21 24.7 98 19	97.9	8
9	17 47.6 98 19	97.7	18 17.0 98 19	97.6	18 46.4 98 19	97.5	19 15.8 98 19	97.4	19 45.2 98 19	97.3	20 14.6 98 19	97.2	20 44.0 98 19	97.1	21 13.4 98 19	97.0	9
80	17 36.2 98 19	96.7	18 05.6 98 19	96.6	18 35.0 98 19	96.5	19 04.4 98 19	96.4	19 33.8 98 19	96.3	20 03.2 98 19	96.2	20 32.6 98 19	96.1	21 02.0 98 19	96.0	80
1	17 24.8 98 19	95.7	17 54.2 98 19	95.6	18 23.6 98 19	95.5	18 53.0 98 19	95.4	19 22.4 98 19	95.3	19 51.8 98 19	95.2	20 21.2 98 19	95.1	20 50.6 98 19	95.0	1
2	17 13.4 98 19	94.7	17 42.8 98 19	94.6	18 12.2 98 19	94.5	18 41.6 98 19	94.4	19 11.0 98 19	94.3	19 40.4 98 19	94.2	20 09.8 98 19	94.1	20 39.2 98 19	94.0	2
3	17 02.0 98 19	93.7	17 31.4 98 19	93.6	18 00.8 98 19	93.5	18 30.2 98 19	93.4	18 59.6 98 19	93.3	19 29.0 98 19	93.2	19 58.4 98 19	93.1	20 27.7 98 19	93.0	3
4	16 50.6 98 19	92.8	17 20.0 98 19	92.7	17 49.4 98 19	92.5	18 18.8 98 19	92.4	18 48.2 98 19	92.3	19 17.5 98 19	92.2	19 46.9 98 19	92.1	20 16.3 98 19	92.0	4
85	16 39.1 98 19	91.8	17 08.5 98 19	91.7	17 37.9 98 19	91.6	18 07.3 98 19	91.5	18 36.7 98 19	91.4	19 06.1 98 19	91.2	19 35.5 98 19	91.1	20 04.9 98 19	91.0	85
6	16 27.7 98 19	90.8	16 57.1 98 19	90.7	17 26.5 98 19	90.6	17 55.9 98 19	90.5	18 25.3 98 19	90.4	18 54.7 98 19	90.3	19 24.0 98 19	90.2	19 53.4 98 19	90.1	6
7	16 16.2 98 19	89.8	16 45.6 98 19	89.7	17 15.0 98 19	89.6	17 44.4 98 19	89.5	18 13.8 98 19	89.4	18 43.2 98 19	89.3	19 12.6 98 19	89.2	19 42.0 98 19	89.1	7
8	16 04.8 98 19	88.8	16 34.2 98 19	88.7	17 03.6 98 19	88.6	17 33.0 98 19	88.5	18 02.4 98 19	88.4	18 31.8 98 19	88.3	19 01.1 98 19	88.2	19 30.5 98 19	88.1	8
9	15 53.3 98 19	87.8	16 22.7 98 19	87.7	16 52.1 98 19	87.6	17 21.5 98 19	87.5	17 50.9 98 19	87.4	18 20.3 98 19	87.3	18 49.7 98 19	87.2	19 19.1 98 19	87.1	9
90	15 41.9 98 19	86.9	16 11.3 98 19	86.8	16 40.7 98 19	86.7	17 10.1 98 19	86.6	17 39.5 98 19	86.5	18 08.9 98 19	86.3	18 38.3 98 19	86.2	19 07.7 98 19	86.1	90

Lat. 79°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	15 30.5	98 19	85.9	15 59.9	98 19	85.8	16 29.3	98 19	85.7	16 58.7	98 19	85.6	91
2	15 19.1	98 19	84.9	15 48.5	98 19	84.8	16 17.9	98 19	84.7	16 47.3	98 19	84.6	2
3	15 07.7	98 19	83.9	15 37.1	98 19	83.8	16 06.5	98 19	83.7	16 35.9	98 19	83.6	3
4	14 56.3	98 19	83.0	15 25.7	98 19	82.9	15 55.1	98 19	82.8	16 24.5	98 19	82.7	4
95	14 44.9	98 19	82.0	15 14.4	98 19	81.9	15 43.8	98 19	81.8	16 13.2	98 19	81.7	95
6	14 33.6	98 19	81.0	15 03.0	98 19	80.9	15 32.5	98 19	80.8	16 01.9	98 19	80.7	6
7	14 22.3	98 19	80.0	14 51.8	98 19	79.9	15 21.2	98 19	79.8	15 50.6	98 19	79.7	7
8	14 11.1	98 19	79.1	14 40.5	98 19	79.0	15 09.9	98 19	78.9	15 39.3	98 19	78.8	8
9	13 59.9	98 19	78.1	14 29.3	98 19	78.0	14 58.7	98 19	77.9	15 28.1	98 19	77.8	9
100	13 48.7	98 19	77.1	14 18.1	98 19	77.0	14 47.5	98 19	76.9	15 17.0	98 19	76.8	100
1	13 37.5	98 18	76.2	14 07.0	98 18	76.1	14 36.4	98 18	76.0	15 05.8	98 18	75.9	1
2	13 26.4	98 18	75.2	13 55.9	98 18	75.1	14 25.3	98 18	75.0	14 54.8	98 18	74.9	2
3	13 15.4	98 18	74.2	13 44.8	98 18	74.1	14 14.3	98 18	74.0	14 43.7	98 18	73.9	3
4	13 04.4	98 18	73.2	13 33.9	98 18	73.1	14 03.3	98 18	73.0	14 32.8	98 18	72.9	4
105	12 53.5	98 18	72.3	13 22.9	98 18	72.2	13 52.4	98 18	72.1	14 21.8	98 18	72.0	105
6	12 42.6	98 18	71.3	13 12.1	98 18	71.2	13 41.5	98 18	71.1	14 11.0	98 18	71.0	6
7	12 31.8	98 18	70.3	13 01.3	98 18	70.2	13 30.7	98 18	70.1	14 00.2	98 18	70.0	7
8	12 21.0	98 18	69.4	12 50.5	98 18	69.3	13 20.0	98 18	69.2	13 49.5	98 18	69.1	8
9	12 10.4	98 18	68.4	12 39.8	98 18	68.3	13 09.3	98 18	68.2	13 38.8	98 18	68.1	9
110	11 59.8	98 18	67.4	12 29.2	98 18	67.3	12 58.7	98 18	67.2	13 28.2	98 18	67.2	110
1	11 49.2	98 18	66.5	12 18.7	98 17	66.4	12 48.2	98 17	66.3	13 17.7	98 17	66.2	1
2	11 38.8	98 17	65.5	12 08.3	98 17	65.4	12 37.8	98 17	65.3	13 07.3	98 17	65.2	2
3	11 28.4	98 17	64.5	11 57.9	98 17	64.4	12 27.4	98 17	64.4	12 56.9	98 17	64.3	3
4	11 18.1	98 17	63.6	11 47.6	98 17	63.5	12 17.1	98 17	63.4	12 46.6	98 17	63.3	4
115	11 07.9	98 17	62.6	11 37.4	98 17	62.5	12 06.9	98 17	62.4	12 36.5	98 17	62.3	115
6	10 57.8	98 17	61.6	11 27.3	98 17	61.6	11 56.8	98 17	61.5	12 26.4	98 17	61.4	6
7	10 47.7	98 17	60.7	11 17.3	98 17	60.6	11 46.8	98 17	60.5	12 16.4	98 17	60.4	7
8	10 37.8	99 16	59.7	11 07.3	99 16	59.6	11 36.9	99 16	59.5	12 06.5	99 16	59.5	8
9	10 28.0	99 16	58.8	10 57.5	99 16	58.7	11 27.1	99 16	58.6	11 56.6	99 16	58.5	9
120	10 18.2	99 16	57.8	10 47.8	99 16	57.7	11 17.4	99 16	57.6	11 46.9	99 16	57.5	120
1	10 08.6	99 16	56.8	10 38.2	99 16	56.7	11 07.7	99 16	56.7	11 37.3	99 16	56.6	1
2	9 59.1	99 16	55.9	10 28.6	99 16	55.8	10 58.2	99 16	55.7	11 27.8	99 16	55.6	2
3	9 49.6	99 16	54.9	10 19.2	99 16	54.8	10 48.8	99 16	54.7	11 18.4	99 15	54.7	3
4	9 40.3	99 15	53.9	10 09.9	99 15	53.9	10 39.5	99 15	53.8	11 09.1	99 15	53.7	4
125	9 31.1	99 15	53.0	10 00.7	99 15	52.9	10 30.4	99 15	52.8	11 00.0	99 15	52.7	125
6	9 22.0	99 15	52.0	9 51.7	99 15	51.9	10 21.3	99 15	51.9	10 50.9	99 15	51.8	6
7	9 13.1	99 15	51.1	9 42.7	99 15	51.0	10 12.4	99 15	50.9	10 42.0	99 15	50.8	7
8	9 04.2	99 15	50.1	9 33.9	99 15	50.0	10 03.5	99 14	49.9	10 33.2	99 14	49.9	8
9	8 55.5	99 14	49.1	9 25.2	99 14	49.1	9 54.8	99 14	49.0	10 24.5	99 14	48.9	9
130	8 46.9	99 14	48.2	9 16.6	99 14	48.1	9 46.3	99 14	48.0	10 15.9	99 14	47.9	130
1	8 38.5	99 14	47.2	9 08.1	99 14	47.1	9 37.8	99 14	47.1	10 07.5	99 14	47.0	1
2	8 30.1	99 14	46.2	8 59.8	99 14	46.2	9 29.5	99 14	46.1	9 59.2	99 14	46.0	2
3	8 21.9	99 13	45.3	8 51.6	99 13	45.2	9 21.3	99 13	45.1	9 51.0	99 13	45.1	3
4	8 13.8	99 13	44.3	8 43.6	99 13	44.2	9 13.3	99 13	44.2	9 43.0	99 13	44.1	4
135	8 05.9	99 13	43.4	8 35.6	99 13	43.3	9 05.4	99 13	43.2	9 35.1	99 13	43.2	135
6	7 58.1	99 13	42.4	8 27.9	99 13	42.3	8 57.6	99 13	42.3	9 27.3	99 13	42.2	6
7	7 50.5	99 12	41.4	8 20.2	99 12	41.4	8 50.0	99 12	41.3	9 19.7	99 12	41.2	7
8	7 43.0	99 12	40.5	8 12.7	99 12	40.4	8 42.5	99 12	40.3	9 12.2	99 12	40.3	8
9	7 35.6	99 12	39.5	8 05.4	99 12	39.4	8 35.1	99 12	39.4	9 04.9	99 12	39.3	9
140	7 28.4	99 12	38.5	7 58.2	99 12	38.5	8 27.9	99 12	38.4	8 57.7	99 12	38.4	140
1	7 21.4	99 12	37.6	7 51.1	99 12	37.5	8 20.9	99 11	37.5	8 50.7	99 11	37.4	1
2	7 14.4	99 11	36.6	7 44.2	99 11	36.6	8 14.0	99 11	36.5	8 43.8	99 11	36.4	2
3	7 07.7	99 11	35.7	7 37.5	99 11	35.6	8 07.3	99 11	35.5	8 37.1	99 11	35.5	3
4	7 01.1	99 11	34.7	7 30.9	99 11	34.6	8 00.7	99 11	34.6	8 30.5	99 11	34.5	4
145	6 54.7	99 10	33.7	7 24.5	99 10	33.7	7 54.3	99 10	33.6	8 24.1	99 10	33.6	145
6	6 48.4	99 10	32.8	7 18.2	99 10	32.7	7 48.0	99 10	32.7	8 17.9	99 10	32.6	6
7	6 42.3	99 10	31.8	7 12.1	99 10	31.8	7 41.9	99 10	31.7	8 11.8	99 10	31.7	7
8	6 36.3	99 10	30.9	7 06.2	99 10	30.8	7 36.0	99 10	30.7	8 05.8	99 10	30.7	8
9	6 30.5	1.0 09	29.9	7 00.4	1.0 09	29.8	7 30.2	1.0 09	29.8	8 00.1	1.0 09	29.7	9
150	6 24.9	1.0 09	28.9	6 54.8	1.0 09	28.9	7 24.6	1.0 09	28.8	7 54.5	1.0 09	28.8	150
1	6 19.4	1.0 09	28.0	6 49.3	1.0 09	27.9	7 19.2	1.0 09	27.9	7 49.1	1.0 09	27.8	1
2	6 14.2	1.0 09	27.0	6 44.0	1.0 08	27.0	7 13.9	1.0 08	26.9	7 43.8	1.0 08	26.9	2
3	6 09.1	1.0 08	26.0	6 38.9	1.0 08	26.0	7 08.8	1.0 08	25.9	7 38.7	1.0 08	25.9	3
4	6 04.1	1.0 08	25.1	6 34.0	1.0 08	25.0	7 03.9	1.0 08	25.0	7 33.8	1.0 08	24.9	4
155	5 59.3	1.0 08	24.1	6 29.3	1.0 08	24.1	6 59.2	1.0 08	24.0	7 29.1	1.0 08	24.0	155
6	5 54.8	1.0 07	23.1	6 24.7	1.0 07	23.1	6 54.6	1.0 07	23.1	7 24.5	1.0 07	23.0	6
7	5 50.4	1.0 07	22.2	6 20.3	1.0 07	22.1	6 50.2	1.0 07	22.1	7 20.1	1.0 07	22.1	7
8	5 46.1	1.0 07	21.2	6 16.0	1.0 07	21.2	6 46.0	1.0 07	21.1	7 15.9	1.0 07	21.1	8
9	5 42.1	1.0 06	20.3	6 12.0	1.0 06	20.2	6 41.9	1.0 06	20.2	7 11.8	1.0 06	20.2	9
160	5 38.2	1.0 06	19.3	6 08.1	1.0 06	19.3	6 38.1	1.0 06	19.2	7 08.0	1.0 06	19.2	160
1	5 34.5	1.0 06	18.3	6 04.4	1.0 06	18.3	6 34.4	1.0 06	18.3	7 04.3	1.0 06	18.2	1
2	5 31.0	1.0 06	17.4	6 00.9	1.0 06	17.3	6 30.9	1.0 06	17.3	7 00.8	1.0 06	17.3	2
3	5 27.7	1.0 05	16.4	5 57.6	1.0 05	16.4	6 27.6	1.0 05	16.3	6 57.5	1.0 05	16.3	3
4	5 24.5	1.0 05	15.4	5 54.5	1.0 05	15.4	6 24.4	1.0 05	15.4	6 54.4	1.0 05	15.4	4
165	5 21.6	1.0 05	14.5	5 51.5	1.0 05	14.4	6 21.5	1.0 05	14.4	6 51.5	1.0 05	14.4	165
6	5 18.8	1.0 04	13.5	5 48.8	1.0 04	13.5	6 18.7	1.0 04	13.5	6 48.7	1.0 04	13.4	6
7	5 16.2	1.0 04	12.5	5 46.2	1.0 04	12.5	6 16.2	1.0 04	12.5	6 46.1	1.0 04	12.5	7
8	5 13.8	1.0 04	11.6	5 43.8	1.0 04	11.6	6 13.8	1.0 04	11.5	6 43.8	1.0 04	11.5	8
9	5 11.6	1.0 03	10.6	5 41.6	1.0 03	10.6	6 11.6	1.0 03	10.6	6 41.6	1.0 03	10.6	9
170	5 09.6	1.0 03	09.6	5 39.6	1.0 03	09.6	6 09.6	1.0 03	09.6	6 39.6	1.0 03	09.6	170
1	5 07.8	1.0 03	08.7	5 37.8	1.0 03	08.7	6 07.8	1.0 03	08.7	6 37.8	1.0 03	08.6	1
2	5 06.2	1.0 02	07.7	5 36.1	1.0 02	07.7	6 06.1	1.0 02	07.7	6 36.1	1.0 02	07.7	2
3	5 04.7	1.0 02	06.8	5 34.7	1.0 02	06.7	6 04.7	1.0 02	06.7	6 34.7	1.0 02	06.7	3
4	5 03.5	1.0 02	05.8	5 33.5	1.0 02	05.8	6 03.5	1.0 02	05.8	6 33.4	1.0 02	05.8	4
175	5 02.4	1.0 01	04.8	5 32.4	1.0 01	04.8	6 02.4	1.0 01	04.8	6 32.4	1.0 01	04.8	175
6	5 01.5	1.0 01	03.9	5 31.5	1.0 01	03.9	6 01.5	1.0 01	03.8	6 31.5	1.0 01	03.8	6
7	5 00.9	1.0 01	02.9	5 30.9	1.0 01	02.9	6 00.9	1.0 01	02.9	6 30.9	1.0 01	02.9	7
8	5 00.4	1.0 00	01.9	5 30.4	1.0 00	01.9	6 00.4	1.0 00	01.9	6 30.4	1.0 00	01.9	8
9	5 00.1	1.0 00	01.0	5 30.1	1.0 00	01.0	6 00.1	1.0 00	01.0	6 30.1	1.0 00	01.0	9
180	5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	180

H.A.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	17 28.1	98 19	85.5	17 57.5	98 19	85.4	18 26.9	98 19	85.3	18 56.2	98 19	85.2	91
2	17 16.7	98 19	84.5	17 46.1	98 19	84.4	18 15.5	98 19	84.3	18 44.8	98 19	84.2	2
3	17 05.3	98 19	83.5	17 34.7	98 19	83.4	18 04.1	98 19	83.3	18 33.5	98 19	83.2	3
4	16 53.9	98 19	82.5	17 23.3	98 19	82.4	17 52.7	98 19	82.3	18 22.1	98 19	82.2	4
95	16 42.6	98 19	81.6	17 12.0	98 19	81.5	17 41.4	98 19	81.4	18 10.8	98 19	81.3	95
6	16 31.3	98 19	80.6	17 00.7	98 19	80.5	17 30.1	98 19	80.4	17 59.5	98 19	80.3	6
7	16 20.0	98 19	79.6	16 49.4	98 19	79.5	17 18.8	98 19	79.4	17 48.2	98 19	79.3	7
8	16 08.8	98 19	78.7	16 38.2	98 19	78.6	17 07.6	98 19	78.5	17 37.0	98 19	78.3	8
9	15 57.5	98 19	77.7	16 27.0	98 19	77.6	16 56.4	98 19	77.5	17 25.8	98 19	77.4	9
100	15 46.4	98 19	76.7	16 15.8	98 19	76.6	16 45.2	98 18	76.5	17 14.6	98 18	76.4	100
1	15 35.3	98 18	75.8	16 04.7	98 18	75.6	16 34.1	98 18	75.5	17 03.5	98 18	75.4	1
2	15 24.2	98 18	74.8	15 53.6	98 18	74.7	16 23.1	98 18	74.6	16 52.5	98 18	74.5	2
3	15 13.2	98 18	73.8	15 42.6	98 18	73.7	16 12.0	98 18	73.6	16 41.5	98 18	73.5	3
4	15 02.2	98 18	72.8	15 31.6	98 18	72.7	16 01.1	98 18	72.6	16 30.5	98 18	72.5	4
105	14 51.3	98 18	71.9	15 20.7	98 18	71.8	15 50.2	98 18	71.7	16 19.6	98 18	71.6	105
6	14 40.4	98 18	70.9	15 09.9	98 18	70.8	15 39.3	98 18	70.7	16 08.8	98 18	70.6	6
7	14 29.7	98 18	70.0	14 59.1	98 18	69.9	15 28.6	98 18	69.8	15 58.0	98 18	69.7	7
8	14 18.9	98 18	69.0	14 48.4	98 18	68.9	15 17.9	98 18	68.8	15 47.3	98 18	68.7	8
9	14 08.3	98 18	68.0	14 37.8	98 18	67.9	15 07.2	98 18	67.8	15 36.7	98 18	67.7	9
110	13 57.7	98 18	67.1	14 27.2	98 18	67.0	14 56.7	98 18	66.9	15 26.1	98 17	66.8	110
1	13 47.2	98 17	66.1	14 16.7	98 17	66.0	14 46.2	98 17	65.9	15 15.7	98 17	65.8	1
2	13 36.8	98 17	65.1	14 06.3	98 17	65.0	14 35.8	98 17	64.9	15 05.3	98 17	64.9	2
3	13 26.4	98 17	64.2	13 55.9	98 17	64.1	14 25.4	98 17	64.0	14 54.9	98 17	63.9	3
4	13 16.2	98 17	63.2	13 45.7	98 17	63.1	14 15.2	98 17	63.0	14 44.7	98 17	62.9	4
115	13 06.0	98 17	62.2	13 35.5	98 17	62.2	14 05.0	98 17	62.1	14 34.5	98 17	62.0	115
6	12 55.9	98 17	61.3	13 25.4	98 17	61.2	13 55.0	98 17	61.1	14 24.5	98 17	61.0	6
7	12 45.9	98 16	60.3	13 15.4	98 16	60.2	13 45.0	98 16	60.1	14 14.5	98 16	60.1	7
8	12 36.0	98 16	59.4	13 05.6	98 16	59.3	13 35.1	98 16	59.2	14 04.6	98 16	59.1	8
9	12 26.2	99 16	58.4	12 55.8	99 16	58.3	13 25.3	99 16	58.2	13 54.9	99 16	58.1	9
120	12 16.5	99 16	57.4	12 46.1	99 16	57.4	13 15.6	99 16	57.3	13 45.2	99 16	57.2	120
1	12 06.9	99 16	56.5	12 36.5	99 16	56.4	13 06.1	99 16	56.3	13 35.6	99 16	56.2	1
2	11 57.4	99 16	55.5	12 27.0	99 16	55.4	12 56.6	99 16	55.4	13 26.2	99 16	55.3	2
3	11 48.0	99 15	54.6	12 17.6	99 15	54.5	12 47.2	99 15	54.4	13 16.8	99 15	54.3	3
4	11 38.8	99 15	53.6	12 08.4	99 15	53.5	12 38.0	99 15	53.4	13 07.6	99 15	53.4	4
125	11 29.6	99 15	52.7	11 59.2	99 15	52.6	12 28.8	99 15	52.5	12 58.4	99 15	52.4	125
6	11 20.6	99 15	51.7	11 50.2	99 15	51.6	12 19.8	99 15	51.5	12 49.4	99 15	51.5	6
7	11 11.6	99 15	50.7	11 41.3	99 15	50.7	12 10.9	99 15	50.6	12 40.5	99 15	50.5	7
8	11 02.8	99 14	49.8	11 32.5	99 14	49.7	12 02.1	99 14	49.6	12 31.8	99 14	49.5	8
9	10 54.1	99 14	48.8	11 23.8	99 14	48.7	11 53.5	99 14	48.7	12 23.1	99 14	48.6	9
130	10 45.6	99 14	47.9	11 15.3	99 14	47.8	11 44.9	99 14	47.7	12 14.6	99 14	47.6	130
1	10 37.2	99 14	46.9	11 06.8	99 14	46.8	11 36.5	99 14	46.8	12 06.2	99 14	46.7	1
2	10 28.9	99 14	46.0	10 58.6	99 14	45.9	11 28.2	99 14	45.8	11 57.9	99 14	45.7	2
3	10 20.7	99 13	45.0	10 50.4	99 13	44.9	11 20.1	99 13	44.9	11 49.8	99 13	44.8	3
4	10 12.7	99 13	44.0	10 42.4	99 13	44.0	11 12.1	99 13	43.9	11 41.8	99 13	43.8	4
135	10 04.8	99 13	43.1	10 34.5	99 13	43.0	11 04.2	99 13	42.9	11 33.9	99 13	42.9	135
6	9 57.0	99 13	42.1	10 26.8	99 13	42.1	10 56.5	99 13	42.0	11 26.2	99 13	41.9	6
7	9 49.4	99 12	41.2	10 19.2	99 12	41.1	10 48.9	99 12	41.0	11 18.6	99 12	41.0	7
8	9 42.0	99 12	40.2	10 11.7	99 12	40.1	10 41.5	99 12	40.1	11 11.2	99 12	40.0	8
9	9 34.7	99 12	39.3	10 04.4	99 12	39.2	10 34.2	99 12	39.1	11 03.9	99 12	39.1	9
140	9 27.5	99 12	38.3	9 57.2	99 12	38.2	10 27.0	99 12	38.2	10 56.8	99 12	38.1	140
1	9 20.5	99 11	37.3	9 50.2	99 11	37.3	10 20.0	99 11	37.2	10 49.8	99 11	37.2	1
2	9 13.6	99 11	36.4	9 43.4	99 11	36.3	10 13.2	99 11	36.3	10 43.0	99 11	36.2	2
3	9 06.9	99 11	35.4	9 36.7	99 11	35.4	10 06.5	99 11	35.3	10 36.3	99 11	35.3	3
4	9 00.3	99 11	34.5	9 30.1	99 11	34.4	9 59.9	99 11	34.4	10 29.7	99 11	34.3	4
145	8 53.9	99 10	33.5	9 23.7	99 10	33.5	9 53.6	99 10	33.4	10 23.4	99 10	33.3	145
6	8 47.7	99 10	32.6	9 17.5	99 10	32.5	9 47.3	99 10	32.4	10 17.2	99 10	32.4	6
7	8 41.6	99 10	31.6	9 11.4	99 10	31.5	9 41.3	99 10	31.5	10 11.1	99 10	31.4	7
8	8 35.7	99 10	30.6	9 05.5	99 10	30.6	9 35.4	99 10	30.5	10 05.2	99 10	30.5	8
9	8 29.9	1.0 09	29.7	8 59.8	1.0 09	29.6	9 29.6	1.0 09	29.6	9 59.5	1.0 09	29.5	9
150	8 24.3	1.0 09	28.7	8 54.2	1.0 09	28.7	9 24.1	1.0 09	28.6	9 53.9	1.0 09	28.6	150
1	8 18.9	1.0 09	27.8	8 48.8	1.0 09	27.7	9 18.7	1.0 09	27.7	9 48.5	1.0 09	27.6	1
2	8 13.7	1.0 08	26.8	8 43.6	1.0 08	26.8	9 13.4	1.0 08	26.7	9 43.3	1.0 08	26.7	2
3	8 08.6	1.0 08	25.9	8 38.5	1.0 08	25.8	9 08.4	1.0 08	25.8	9 38.2	1.0 08	25.7	3
4	8 03.7	1.0 08	24.9	8 33.6	1.0 08	24.9	9 03.5	1.0 08	24.8	9 33.4	1.0 08	24.8	4
155	7 59.0	1.0 08	23.9	8 28.9	1.0 08	23.9	8 58.8	1.0 08	23.9	9 28.7	1.0 08	23.8	155
6	7 54.4	1.0 07	23.0	8 24.3	1.0 07	22.9	8 54.2	1.0 07	22.9	9 24.1	1.0 07	22.9	6
7	7 50.0	1.0 07	22.0	8 19.9	1.0 07	22.0	8 49.8	1.0 07	22.0	9 19.8	1.0 07	21.9	7
8	7 45.8	1.0 07	21.1	8 15.7	1.0 07	21.0	8 45.6	1.0 07	21.0	9 15.6	1.0 07	21.0	8
9	7 41.8	1.0 06	20.1	8 11.7	1.0 06	20.1	8 41.6	1.0 06	20.0	9 11.6	1.0 06	20.0	9
160	7 37.9	1.0 06	19.2	8 07.9	1.0 06	19.1	8 37.8	1.0 06	19.1	9 07.7	1.0 06	19.1	160
1	7 34.3	1.0 06	18.2	8 04.2	1.0 06	18.2	8 34.1	1.0 06	18.1	9 04.1	1.0 06	18.1	1
2	7 30.8	1.0 06	17.2	8 00.7	1.0 06	17.2	8 30.7	1.0 05	17.2	9 00.6	1.0 05	17.2	2
3	7 27.5	1.0 05	16.3	7 57.4	1.0 05	16.3	8 27.4	1.0 05	16.2	8 57.3	1.0 05	16.2	3
4	7 24.4	1.0 05	15.3	7 54.3	1.0 05	15.3	8 24.3	1.0 05	15.3	8 54.2	1.0 05	15.2	4
165	7 21.4	1.0 05	14.4	7 51.4	1.0 05	14.3	8 21.3	1.0 05	14.3	8 51.3	1.0 05	14.3	165
6	7 18.7	1.0 04	13.4	7 48.6	1.0 04	13.4	8 18.6	1.0 04	13.4	8 48.6	1.0 04	13.3	6
7	7 16.1	1.0 04	12.5	7 46.1	1.0 04	12.4	8 16.1	1.0 04	12.4	8 46.0	1.0 04	12.4	7
8	7 13.7	1.0 04	11.5	7 43.7	1.0 04	11.5	8 13.7	1.0 04	11.5	8 43.7	1.0 04	11.4	8
9	7 11.6	1.0 03	10.5	7 41.5	1.0 03	10.5	8 11.5	1.0 03	10.5	8 41.5	1.0 03	10.5	9
170	7 09.6	1.0 03	09.6	7 39.5	1.0 03	09.6	8 09.5	1.0 03	09.5	8 39.5	1.0 03	09.5	170
1	7 07.7	1.0 03	08.6	7 37.7	1.0 03	08.6	8 07.7	1.0 03	08.6	8 37.7	1.0 03	08.6	1
2	7 06.1	1.0 02	07.7	7 36.1	1.0 02	07.7	8 06.1	1.0 02	07.6	8 36.1	1.0 02	07.6	2
3	7 04.7	1.0 02	06.7	7 34.7	1.0 02	06.7	8 04.7	1.0 02	06.7	8 34.7	1.0 02	06.7	3
4	7 03.4	1.0 02	05.7	7 33.4	1.0 02	05.7	8 03.4	1.0 02	05.7	8 33.4	1.0 02	05.7	4
175	7 02.4	1.0 01	04.8	7 32.4	1.0 01	04.8	8 02.4	1.0 01	04.8	8 32.4	1.0 01	04.8	175
6	7 01.5	1.0 01	03.8	7 31.5	1.0 01	03.8	8 01.5	1.0 01	03.8	8 31.5	1.0 01	03.8	6
7	7 00.9	1.0 01	02.9	7 30.9	1.0 01	02.9	8 00.9	1.0 01	02.9	8 30.9	1.0 01	02.9	7
8	7 00.4	1.0 00	01.9	7 30.4	1.0 00	01.9	8 00.4	1.0 00	01.9	8 30.4	1.0 00	01.9	8
9	7 00.1	1.0 00	01.0	7 30.1	1.0 00	01.0	8 00.1	1.0 00	01.0	8 30.1	1.0 00	01.0	9
180	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	20° 00′ Alt.	Az.	20° 30′ Alt.	Az.	21° 00′ Alt.	Az.	21° 30′ Alt.	Az.	22° 00′ Alt.	Az.	22° 30′ Alt.	Az.	23° 00′ Alt.	Az.	23° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	31 00.0 1.00 00	180.0	31 30.0 1.00 00	180.0	32 00.0 1.00 00	180.0	32 30.0 1.00 00	180.0	33 00.0 1.00 00	180.0	33 30.0 1.00 00	180.0	34 00.0 1.00 00	180.0	34 30.0 1.00 00	180.0	00
1	30 59.9 1.00 01	178.9	31 29.9 1.00 01	178.9	31 59.9 1.00 01	178.9	32 29.9 1.00 01	178.9	32 59.9 1.00 01	178.9	33 29.9 1.00 01	178.9	33 59.9 1.00 01	178.9	34 29.9 1.00 01	177.8	1
2	30 59.6 1.00 01	177.8	31 29.6 1.00 01	177.8	31 59.6 1.00 01	177.8	32 29.6 1.00 01	177.8	32 59.6 1.00 01	177.8	33 29.6 1.00 01	177.8	33 59.6 1.00 01	177.8	34 29.6 1.00 01	177.8	2
3	30 59.0 1.00 01	176.7	31 29.0 1.00 01	176.7	31 59.0 1.00 01	176.7	32 29.0 1.00 01	176.7	32 59.0 1.00 01	176.7	33 29.0 1.00 01	176.7	33 59.0 1.00 01	176.7	34 29.0 1.00 01	176.7	3
4	30 58.2 1.00 02	175.6	31 28.2 1.00 02	175.6	31 58.2 1.00 02	175.6	32 28.2 1.00 02	175.6	32 58.2 1.00 02	175.6	33 28.2 1.00 02	175.6	33 58.2 1.00 02	175.6	34 28.2 1.00 02	175.5	4
05	30 57.3 1.00 02	174.5	31 27.3 1.00 02	174.5	31 57.3 1.00 02	174.5	32 27.2 1.00 02	174.5	32 57.2 1.00 02	174.5	33 27.2 1.00 02	174.5	33 57.2 1.00 02	174.4	34 27.2 1.00 02	174.4	05
6	30 56.1 1.00 02	173.4	31 26.1 1.00 02	173.4	31 56.0 1.00 02	173.4	32 26.0 1.00 02	173.4	32 56.0 1.00 02	173.4	33 26.0 1.00 02	173.4	33 56.0 1.00 02	173.3	34 26.0 1.00 02	173.3	6
7	30 54.6 1.00 03	172.3	31 24.6 1.00 03	172.3	31 54.6 1.00 03	172.3	32 24.6 1.00 03	172.3	32 54.6 1.00 03	172.3	33 24.6 1.00 03	172.2	33 54.6 1.00 03	172.2	34 24.6 1.00 03	172.2	7
8	30 53.0 1.00 03	171.2	31 23.0 1.00 03	171.2	31 53.0 1.00 03	171.2	32 23.0 1.00 03	171.2	32 52.9 1.00 03	171.2	33 22.9 1.00 03	171.1	33 52.9 1.00 03	171.1	34 22.9 1.00 03	171.1	8
9	30 51.2 1.00 03	170.1	31 21.1 1.00 03	170.1	31 51.1 1.00 03	170.1	32 21.1 1.00 03	170.1	32 51.1 1.00 03	170.1	33 21.1 1.00 04	170.0	33 51.0 1.00 03	170.0	34 21.0 1.00 04	170.0	9
10	30 49.1 1.00 04	169.0	31 19.1 1.00 04	169.0	31 49.0 1.00 04	169.0	32 19.0 1.00 04	169.0	32 49.0 1.00 04	169.0	33 19.0 1.00 04	168.9	33 48.9 1.00 04	168.9	34 18.9 1.00 04	168.9	10
1	30 46.8 1.00 04	168.0	31 16.8 1.00 04	167.9	31 46.7 1.00 04	167.9	32 16.7 1.00 04	167.9	32 46.7 1.00 04	167.9	33 16.7 1.00 04	167.8	33 46.6 1.00 04	167.8	34 16.6 1.00 04	167.8	1
2	30 44.3 1.00 04	166.9	31 14.3 1.00 05	166.8	31 44.2 1.00 05	166.8	32 14.2 1.00 05	166.8	32 44.2 1.00 05	166.8	33 14.1 1.00 05	166.7	33 44.1 1.00 05	166.7	34 14.1 1.00 05	166.7	2
3	30 41.6 1.00 05	165.8	31 11.6 1.00 05	165.7	31 41.5 1.00 05	165.7	32 11.5 1.00 05	165.7	32 41.4 1.00 05	165.7	33 11.4 1.00 05	165.6	33 41.4 1.00 05	165.6	34 11.3 1.00 05	165.6	3
4	30 38.7 1.00 05	164.7	31 08.6 1.00 05	164.6	31 38.6 1.00 05	164.6	32 08.5 1.00 05	164.6	32 38.5 1.00 05	164.6	33 08.5 1.00 05	164.5	33 38.4 1.00 05	164.5	34 08.4 1.00 05	164.5	4
15	30 35.6 1.00 06	163.6	31 05.5 1.00 06	163.6	31 35.5 1.00 06	163.5	32 05.4 1.00 06	163.5	32 35.3 1.00 06	163.5	33 05.3 1.00 06	163.4	33 35.2 1.00 06	163.4	34 05.2 1.00 06	163.3	15
6	30 32.2 1.00 06	162.5	31 02.2 1.00 06	162.5	31 32.1 1.00 06	162.4	32 02.0 1.00 06	162.4	32 32.0 1.00 06	162.4	33 01.9 1.00 06	162.3	33 31.9 1.00 06	162.3	34 01.8 1.00 06	162.2	6
7	30 28.7 1.00 06	161.4	30 58.6 1.00 06	161.4	31 28.5 1.00 06	161.3	31 58.5 1.00 06	161.3	32 28.4 1.00 06	161.3	32 58.3 1.00 06	161.2	33 28.3 1.00 06	161.2	33 58.2 1.00 06	161.1	7
8	30 24.9 1.00 07	160.3	30 54.8 1.00 07	160.3	31 24.8 1.00 07	160.2	31 54.7 1.00 07	160.2	32 24.6 1.00 07	160.2	32 54.6 1.00 07	160.1	33 24.5 1.00 07	160.1	33 54.4 1.00 07	160.0	8
9	30 21.0 1.00 07	159.2	30 50.9 1.00 07	159.2	31 20.8 1.00 07	159.2	31 50.7 1.00 07	159.1	32 20.6 1.00 07	159.1	32 50.6 1.00 07	159.0	33 20.5 1.00 07	159.0	33 50.4 1.00 07	158.9	9
20	30 16.8 1.00 07	158.2	30 46.7 1.00 07	158.1	31 16.6 1.00 07	158.1	31 46.5 1.00 07	158.0	32 16.4 1.00 07	158.0	32 46.4 1.00 07	157.9	33 16.3 1.00 07	157.9	33 46.2 1.00 07	157.8	20
1	30 12.4 1.00 08	157.1	30 42.3 1.00 08	157.0	31 12.2 1.00 08	157.0	31 42.1 1.00 08	156.9	32 12.1 1.00 08	156.9	32 42.0 1.00 08	156.8	33 11.9 1.00 08	156.8	33 41.8 1.00 08	156.7	1
2	30 07.9 1.00 08	156.0	30 37.8 1.00 08	155.9	31 07.7 1.00 08	155.9	31 37.6 1.00 08	155.8	32 07.5 1.00 08	155.8	32 37.3 1.00 08	155.7	33 07.2 1.00 08	155.7	33 37.1 1.00 08	155.6	2
3	30 03.1 1.00 08	154.9	30 33.0 1.00 08	154.9	31 02.9 1.00 08	154.8	31 32.8 1.00 08	154.7	32 02.7 1.00 08	154.7	32 32.5 1.00 08	154.6	33 02.4 1.00 08	154.6	33 32.3 1.00 08	154.5	3
4	29 58.2 1.00 09	153.8	30 28.0 1.00 09	153.8	30 57.9 1.00 09	153.7	31 27.8 1.00 09	153.7	31 57.7 1.00 09	153.6	32 27.5 1.00 09	153.6	32 57.4 1.00 09	153.5	33 27.3 1.00 09	153.4	4
25	29 53.0 1.00 09	152.7	30 22.9 1.00 09	152.7	30 52.8 1.00 09	152.6	31 22.6 1.00 09	152.6	31 52.5 1.00 09	152.5	32 22.3 1.00 09	152.5	32 52.2 1.00 09	152.4	33 22.1 1.00 09	152.4	25
6	29 47.7 1.00 09	151.7	30 17.5 1.00 09	151.6	30 47.4 1.00 09	151.5	31 17.2 1.00 09	151.5	31 47.1 1.00 09	151.4	32 17.0 1.00 09	151.4	32 46.8 1.00 09	151.3	33 16.7 99 09	151.3	6
7	29 42.1 1.00 10	150.6	30 12.0 99 10	150.5	30 41.8 99 10	150.5	31 11.7 99 10	150.4	31 41.5 99 10	150.4	32 11.4 99 10	150.3	32 41.2 99 10	150.2	33 11.1 99 10	150.2	7
8	29 36.4 99 10	149.5	30 06.3 99 10	149.4	30 36.1 99 10	149.4	31 05.9 99 10	149.3	31 35.8 99 10	149.3	32 05.6 99 10	149.2	32 35.4 99 10	149.1	33 05.3 99 10	149.1	8
9	29 30.5 99 10	148.4	30 00.4 99 10	148.4	30 30.2 99 10	148.3	31 00.0 99 10	148.2	31 29.8 99 10	148.2	31 59.7 99 10	148.1	32 29.5 99 10	148.1	32 59.3 99 10	148.0	9
30	29 24.4 99 10	147.4	29 54.3 99 10	147.3	30 24.1 99 10	147.2	30 53.9 99 10	147.2	31 23.7 99 10	147.1	31 53.5 99 11	147.0	32 23.3 99 11	147.0	32 53.1 99 11	146.9	30
1	29 18.2 99 11	146.3	29 48.0 99 11	146.2	30 17.8 99 11	146.2	30 47.6 99 11	146.1	31 17.4 99 11	146.0	31 47.2 99 11	146.0	32 17.0 99 11	145.9	32 46.8 99 11	145.8	1
2	29 11.7 99 11	145.2	29 41.5 99 11	145.2	30 11.3 99 11	145.1	30 41.1 99 11	145.0	31 10.9 99 11	144.9	31 40.7 99 11	144.9	32 10.5 99 11	144.8	32 40.3 99 11	144.7	2
3	29 05.1 99 11	144.2	29 34.9 99 11	144.1	30 04.7 99 11	144.0	30 34.5 99 11	143.9	31 04.2 99 11	143.9	31 34.0 99 11	143.8	32 03.8 99 11	143.7	32 33.6 99 11	143.7	3
4	28 58.3 99 12	143.1	29 28.1 99 12	143.0	29 57.9 99 12	142.9	30 27.6 99 12	142.9	30 57.4 99 12	142.8	31 27.2 99 12	142.7	31 56.9 99 12	142.7	32 26.7 99 12	142.6	4
35	28 51.4 99 12	142.0	29 21.1 99 12	141.9	29 50.9 99 12	141.9	30 20.7 99 12	141.8	30 50.4 99 12	141.7	31 20.2 99 12	141.7	31 49.9 99 12	141.6	32 19.7 99 12	141.5	35
6	28 44.2 99 12	141.0	29 14.0 99 12	140.9	29 43.7 99 12	140.8	30 13.5 99 12	140.7	30 43.2 99 12	140.7	31 13.0 99 12	140.6	31 42.7 99 12	140.5	32 12.5 99 12	140.4	6
7	28 36.9 99 12	139.9	29 06.7 99 12	139.8	29 36.4 99 12	139.7	30 06.2 99 12	139.7	30 35.9 99 13	139.6	31 05.6 99 12	139.5	31 35.4 99 13	139.4	32 05.1 99 13	139.4	7
8	28 29.5 99 13	138.8	28 59.2 99 13	138.8	29 28.9 99 13	138.7	29 58.7 99 13	138.6	30 28.4 99 13	138.5	30 58.1 99 13	138.4	31 27.8 99 13	138.4	31 57.5 99 13	138.3	8
9	28 21.9 99 13	137.8	28 51.6 99 13	137.7	29 21.3 99 13	137.6	29 51.0 99 13	137.5	30 20.7 99 13	137.5	30 50.4 99 13	137.4	31 20.1 99 13	137.3	31 49.8 99 13	137.2	9
40	28 14.1 99 13	136.7	28 43.8 99 13	136.6	29 13.5 99 13	136.6	29 43.2 99 13	136.5	30 12.9 99 13	136.4	30 42.6 99 13	136.3	31 12.3 99 13	136.2	31 42.0 99 13	136.1	40
1	28 06.2 99 13	135.7	28 35.9 99 13	135.6	29 05.6 99 14	135.5	29 35.3 99 14	135.4	30 04.9 99 14	135.3	30 34.6 99 14	135.2	31 04.3 99 14	135.2	31 34.0 99 14	135.1	1
2	27 58.1 99 14	134.6	28 27.8 99 14	134.5	28 57.5 99 14	134.4	29 27.1 99 14	134.4	29 56.8 99 14	134.3	30 26.5 99 14	134.2	30 56.2 99 14	134.1	31 25.8 99 14	134.0	2
3	27 49.9 99 14	133.6	28 19.5 99 14	133.5	28 49.2 99 14	133.4	29 18.9 99 14	133.3	29 48.5 99 14	133.2	30 18.2 99 14	133.1	30 47.9 99 14	133.0	31 17.5 99 14	133.0	3
4	27 41.5 99 14	132.5	28 11.2 99 14	132.4	28 40.8 99 14	132.3	29 10.5 99 14	132.2	29 40.1 99 14	132.2	30 09.8 99 14	132.1	30 39.4 99 14	132.0	31 09.1 99 14	131.9	4
45	27 33.0 99 14	131.5	28 02.6 99 14	131.4	28 32.3 99 14	131.3	29 01.9 99 14	131.2	29 31.6 99 14	131.1	30 01.2 99 15	131.0	30 30.8 99 15	130.9	31 00.5 99 15	130.8	45
6	27 24.3 99 15	130.4	27 54.0 99 15	130.3	28 23.6 99 15	130.2	28 53.3 99 15	130.1	29 22.9 99 15	130.1	29 52.5 99 15	130.0	30 22.1 99 15	129.9	30 51.7 99 15	129.8	6
7	27 15.6 99 15	129.4	27 45.2 99 15	129.3	28 14.8 99 15	129.2	28 44.4 99 15	129.1	29 14.0 99 15	129.0	29 43.7 99 15	128.9	30 13.3 99 15	128.8	30 42.9 99 15	128.7	7
8	27 06.6 99 15	128.3	27 36.3 99 15	128.2	28 05.9 99 15	128.1	28 35.5 99 15	128.1	29 05.1 99 15	128.0	29 34.7 99 15	127.9	30 04.3 99 15	127.8	30 33.9 99 15	127.7	8
9	26 57.6 99 15	127.3	27 27.2 99 15	127.2	27 56.8 99 15	127.1	28 26.4 99 15	127.0	28 56.0 99 15	126.9	29 25.6 99 15	126.8	29 55.2 99 15	126.7	30 24.8 99 15	126.6	9
50	26 48.4 99 16	126.2	27 18.0 99 16	126.1	27 47.6 99 16	126.1	28 17.2 99 16	126.0	28 46.8 99 16	125.9	29 16.4 99 16	125.8	29 45.9 99 16	125.7	30 15.5 99 16	125.6	50
1	26 39.1 99 16	125.2	27 08.7 99 16	125.1	27 38.3 99 16	125.0	28 07.9 99 16	124.9	28 37.4 99 16	124.8	29 07.0 99 16	124.7	29 36.6 99 16	124.6	30 06.1 99 16	124.5	1
2	26 29.7 99 16	124.2	26 59.3 99 16	124.1	27 28.9 99 16	124.0	27 58.4 99 16	123.9	28 28.0 99 16	123.8	28 57.5 99 16	123.7	29 27.1 98 16	123.6	29 56.6 98 16	123.5	2
3	26 20.2 99 16	123.1	26 49.8 99 16	123.0	27 19.3 99 16	122.9	27 48.9 99 16	122.8	28 18.4 98 16	122.7	28 48.0 98 16	122.6	29 17.5 98 16	122.6	29 47.0 98 16	122.4	3
4	26 10.5 99 16	122.1	26 40.1 98 16	122.0	27 09.6 98 16	121.9	27 39.2 98 16	121.8	28 08.7 98 16	121.7	28 38.3 98 16	121.6	29 07.8 98 16	121.5	29 37.3 98 16	121.4	4
55	26 00.8 98 16	121.1	26 30.3 98 16	121.0	26 59.9 98 16	120.9	27 29.4 98 16	120.8	27 58.9 98 16	120.7	28 28.5 98 17	120.6	28 58.0 98 17	120.5	29 27.5 98 17	120.4	55
6	25 50.9 98 17	120.0	26 20.5 98 17	119.9	26 50.0 98 17	119.8	27 19.5 98 17	119.7	27 49.0 98 17	119.6	28 18.6 98 17	119.5	28 48.1 98 17	119.4	29 17.6 98 17	119.3	6
7	25 41.0 98 17	119.0	26 10.5 98 17	118.9	26 40.0 98 17	118.8	27 09.5 98 17	118.7	27 39.0 98 17	118.6	28 08.5 98 17	118.5	28 38.0 98 17	118.4	29 07.5 98 17	118.3	7
8	25 30.9 98 17	118.0	26 00.4 98 17	117.9	26 29.9 98 17	117.8	26 59.4 98 17	117.7	27 28.9 98 17	117.6	27 58.4 98 17	117.5	28 27.9 98 17	117.4	28 57.4 98 17	117.3	8
9	25 20.8 98 17	117.0	25 50.3 98 17	116.9	26 19.8 98 17	116.8	26 49.3 98 17	116.7	27 18.7 98 17	116.6	27 48.2 98 17	116.5	28 17.7 98 17	116.4	28 47.2 98 17	116.2	9
60	25 10.5 98 17	115.9	25 40.0 98 17	115.8	26 09.5 98 17	115.7	26 39.0 98 17	115.6	27 08.5 98 17	115.5	27 37.9 98 17	115.4	28 07.4 98 17	115.3	28 36.9 98 17	115.2	60
1	25 00.2 98 17	114.9	25 29.7 98 17	114.8	25 59.1 98 17	114.7	26 28.6 98 17	114.6	26 58.1 98 17	114.5	27 27.6 98 17	114.4	27 57.0 98 17	114.3	28 26.5 98 17	114.2	1
2	24 49.7 98 18	113.9	25 19.2 98 18	113.8	25 48.7 98 18	113.7	26 18.2 98 18	113.6	26 47.6 98 18	113.5	27 17.1 98 18	113.4	27 46.5 98 18	113.3	28 16.0 98 18	113.2	2
3	24 39.2 98 18	112.9	25 08.7 98 18	112.8	25 38.2 98 18	112.7	26 07.6 98 18	112.6	26 37.1 98 18	112.5	27 06.5 98 18	112.4	27 36.0 98 18	112.3	28 05.4 98 18	112.1	3
4	24 28.7 98 18	111.9	24 58.1 98 18	111.8	25 27.6 98 18	111.7	25 57.0 98 18	111.6	26 26.5 98 18	111.5	26 55.9 98 18	111.3	27 25.3 98 18	111.2	27 54.8 98 18	111.1	4
65	24 18.0 98 18	110.9	24 47.4 98 18	110.8	25 16.9 98 18	110.7	25 46.3 98 18	110.5	26 15.8 98 18	110.4	26 45.2 98 18	110.3	27 14.6 98 18	110.2	27 44.1 98 18	110.1	65
6	24 07.3 98 18	109.9	24 36.7 98 18	109.7	25 06.1 98 18	109.6	25 35.6 98 18	109.5	26 05.0 98 18	109.4	26 34.4 98 18	109.3	27 03.9 98 18	109.2	27 33.3 98 18	109.1	6
7	23 56.5 98 18	108.8	24 25.9 98 18	108.7	24 55.3 98 18	108.6	25 24.8 98 18	108.5	25 54.2 98 18	108.4	26 23.6 98 18	108.3	26 53.0 98 18	108.2	27 22.4 98 18	108.1	7
8	23 45.6 98 18	107.8	24 15.0 98 18	107.7	24 44.4 98 18	107.6	25 13.9 98 18	107.5	25 43.3 98 18	107.4	26 12.7 98 18	107.3	26 42.1 98 18	107.2	27 11.5 98 18	107.1	8
9	23 34.7 98 18	106.8	24 04.1 98 18	106.7	24 33.5 98 18	106.6	25 02.9 98 18	106.5	25 32.3 98 18	106.4	26 01.7 98 18	106.3	26 31.1 98 18	106.2	27 00.5 98 18	106.1	9
70	23 23.7 98 18	105.8	23 53.1 98 18	105.7	24 22.5 98 18	105.6	24 51.9 98 18	105.5	25 21.3 98 18	105.4	25 50.7 98 18	105.3	26 20.1 98 18	105.2	26 49.5 98 18	105.1	70
1	23 12.6 98 18	104.8	23 42.0 98 18	104.7	24 11.5 98 18	104.6	24 40.9 98 19	104.5	25 10.3 98 19	104.4	25 39.7 98 19	104.3	26 09.0 98 19	104.2	26 38.4 98 19	104.1	1
2	23 01.5 98 19	103.8	23 30.9 98 19	103.7	24 00.4 98 19	103.6	24 29.8 98 19	103.5	24 59.1 98 19	103.4	25 28.5 98 19	103.3	25 57.9 98 19	103.2	26 27.3 98 19	103.0	2
3	22 50.4 98 19	102.8	23 19.8 98 19	102.7	23 49.2 98 19	102.6	24 18.6 98 19	102.5	24 48.0 98 19	102.4	25 17.4 98 19	102.3	25 46.8 98 19	102.2	26 16.1 98 19	102.0	3
4	22 39.2 98 19	101.8	23 08.6 98 19	101.7	23 38.0 98 19	101.6	24 07.4 98 19	101.5	24 36.8 98 19	101.4	25 06.2 98 19	101.3	25 35.5 98 19	101.2	26 04.9 98 19	101.0	4
75	22 28.0 98 19	100.8	22 57.4 98 19	100.7	23 26.8 98 19	100.6	23 56.2 98 19	100.5	24 25.5 98 19	100.4	24 54.9 98 19	100.3	25 24.3 98 19	100.2	25 53.7 98 19	100.0	75
6	22 16.7 98 19	99.8	22 46.1 98 19	99.7	23 15.5 98 19	99.6	23 44.9 98 19	99.5	24 14.3 98 19	99.4	24 43.6 98 19	99.3	25 13.0 98 19	99.2	25 42.4 98 19	99.0	6
7	22 05.4 98 19	98.8	22 34.8 98 19	98.7	23 04.2 98 19	98.6	23 33.6 98 19	98.5	24 03.0 98 19	98.4	24 32.3 98 19	98.3	25 01.7 98 19	98.2	25 31.0 98 19	98.1	7
8	21 54.1 98 19	97.8	22 23.5 98 19	97.7	22 52.9 98 19	97.6	23 22.2 98 19	97.5	23 51.6 98 19	97.4	24 21.0 98 19	97.3	24 50.3 98 19	97.2	25 19.7 98 19	97.1	8
9	21 42.7 98 19	96.8	22 12.1 98 19	96.7	22 41.5 98 19	96.6	23 10.9 98 19	96.5	23 40.2 98 19	96.4	24 09.6 98 19	96.3	24 39.0 98 19	96.2	25 08.3 98 19	96.1	9
80	21 31.4 98 19	95.9	22 00.7 98 19	95.7	22 30.1 98 19	95.6	22 59.5 98 19	95.5	23 28.9 98 19	95.4	23 58.2 98 19	95.3	24 27.6 98 19	95.2	24 56.9 98 19	95.1	80
1	21 20.0 98 19	94.9	21 49.3 98 19	94.8	22 18.7 98 19	94.6	22 48.1 98 19	94.5	23 17.5 98 19	94.4	23 46.8 98 19	94.3	24 16.2 98 19	94.2	24 45.5 98 19	94.1	1
2	21 08.6 98 19	93.9	21 37.9 98 19	93.8	22 07.3 98 19	93.7	22 36.7 98 19	93.6	23 06.0 98 19	93.4	23 35.4 98 19	93.3	24 04.7 98 19	93.2	24 34.1 98 19	93.1	2
3	20 57.1 98 19	92.9	21 26.5 98 19	92.8	21 55.9 98 19	92.7	22 25.2 98 19	92.6	22 54.6 98 19	92.5	23 24.0 98 19	92.3	23 53.3 98 19	92.2	24 22.7 98 19	92.1	3
4	20 45.7 98 19	91.9	21 15.1 98 19	91.8	21 44.4 98 19	91.7	22 13.8 98 19	91.6	22 43.2 98 19	91.5	23 12.5 98 19	91.4	23 41.9 98 19	91.2	24 11.2 98 19	91.1	4
85	20 34.2 98 19	90.9	21 03.6 98 19	90.8	21 33.0 98 19	90.7	22 02.4 98 19	90.6	22 31.7 98 19	90.5	23 01.1 98 19	90.4	23 30.4 98 19	90.3	23 59.8 98 19	90.1	85
6	20 22.8 98 19	89.9	20 52.2 98 19	89.8	21 21.5 98 19	89.7	21 50.9 98 19	89.6	22 20.3 98 19	89.5	22 49.6 98 19	89.4	23 19.0 98 19	89.3	23 48.3 98 19	89.2	6
7	20 11.3 98 19	89.0	20 40.7 98 19	88.9	21 10.1 98 19	88.7	21 39.5 98 19	88.6	22 08.8 98 19	88.5	22 38.2 98 19	88.4	23 07.5 98 19	88.3	23 36.9 98 19	88.2	7
8	19 59.9 98 19	88.0	20 29.3 98 19	87.9	20 58.6 98 19	87.8	21 28.0 98 19	87.7	21 57.4 98 19	87.5	22 26.7 98 19	87.4	22 56.1 98 19	87.3	23 25.4 98 19	87.2	8
9	19 48.5 98 19	87.0	20 17.8 98 19	86.9	20 47.2 98 19	86.8	21 16.6 98 19	86.7	21 45.9 98 19	86.6	22 15.3 98 19	86.5	22 44.7 98 19	86.3	23 14.0 98 19	86.2	9
90	19 37.0 98 19	86.0	20 06.4 98 19	85.9	20 35.8 98 19	85.8	21 05.2 98 19	85.7	21 34.5 98 19	85.6	22 03.9 98 19	85.5	22 33.2 98 19	85.4	23 02.6 98 19	85.3	90

Lat. 79°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	19 25.6	98 19	85.1	19 55.0	98 19	84.9	20 24.4	98 19	84.8	20 53.7	98 19	84.7	21 23.1	98 19	84.6	21 52.5	98 19	84.5	22 21.8	98 19	84.4	22 51.2	98 19	84.3	91
2	19 14.2	98 19	84.1	19 43.6	98 19	84.0	20 13.0	98 19	83.9	20 42.4	98 19	83.8	21 11.7	98 19	83.6	21 41.1	98 19	83.5	22 10.4	98 19	83.4	22 39.8	98 19	83.3	2
3	19 02.9	98 19	83.1	19 32.2	98 19	83.0	20 01.6	98 19	82.9	20 31.0	98 19	82.8	21 00.4	98 19	82.7	21 29.7	98 19	82.6	21 59.1	98 19	82.4	22 28.4	98 19	82.3	3
4	18 51.5	98 19	82.1	19 20.9	98 19	82.0	19 50.3	98 19	81.9	20 19.6	98 19	81.8	20 49.0	98 19	81.7	21 18.4	98 19	81.6	21 47.8	98 19	81.5	22 17.1	98 19	81.4	4
95	18 40.2	98 19	81.2	19 09.6	98 19	81.0	19 38.9	98 19	80.9	20 08.3	98 19	80.8	20 37.7	98 19	80.7	21 07.1	98 19	80.6	21 36.4	98 19	80.5	22 05.8	98 19	80.4	95
6	18 28.9	98 19	80.2	18 58.3	98 19	80.1	19 27.7	98 19	80.0	19 57.0	98 19	79.9	20 26.4	98 19	79.8	20 55.8	98 19	79.6	21 25.2	98 19	79.5	21 54.5	98 19	79.4	6
7	18 17.6	98 19	79.2	18 47.0	98 19	79.1	19 16.4	98 19	79.0	19 45.8	98 19	78.9	20 15.2	98 19	78.8	20 44.6	98 19	78.7	21 13.9	98 19	78.6	21 43.3	98 19	78.5	7
8	18 06.4	98 19	78.2	18 35.8	98 19	78.1	19 05.2	98 19	78.0	19 34.6	98 19	77.9	20 04.0	98 19	77.8	20 33.3	98 19	77.7	21 02.7	98 19	77.6	21 32.1	98 19	77.5	8
9	17 55.2	98 19	77.3	18 24.6	98 19	77.2	18 54.0	98 19	77.1	19 23.4	98 19	77.0	19 52.8	98 19	76.9	20 22.2	98 19	76.7	20 51.6	98 19	76.6	21 20.9	98 19	76.5	9
100	17 44.0	98 18	76.3	18 13.5	98 18	76.2	18 42.9	98 18	76.1	19 12.3	98 18	76.0	19 41.7	98 18	75.9	20 11.1	98 18	75.8	20 40.4	98 18	75.7	21 09.8	98 18	75.6	100
1	17 32.9	98 18	75.3	18 02.4	98 18	75.2	18 31.8	98 18	75.1	19 01.2	98 18	75.0	19 30.6	98 18	74.9	20 00.0	98 18	74.8	20 29.4	98 18	74.7	20 58.8	98 18	74.6	1
2	17 21.9	98 18	74.4	17 51.3	98 18	74.3	18 20.7	98 18	74.2	18 50.1	98 18	74.1	19 19.6	98 18	74.0	19 49.0	98 18	73.9	20 18.4	98 18	73.8	20 47.8	98 18	73.6	2
3	17 10.9	98 18	73.4	17 40.3	98 18	73.3	18 09.7	98 18	73.2	18 39.2	98 18	73.1	19 08.6	98 18	73.0	19 38.0	98 18	72.9	20 07.4	98 18	72.8	20 36.8	98 18	72.7	3
4	17 00.0	98 18	72.4	17 29.4	98 18	72.3	17 58.8	98 18	72.2	18 28.2	98 18	72.1	18 57.7	98 18	72.0	19 27.1	98 18	71.9	19 56.5	98 18	71.8	20 25.9	98 18	71.7	4
105	16 49.1	98 18	71.5	17 18.5	98 18	71.4	17 47.9	98 18	71.3	18 17.4	98 18	71.2	18 46.8	98 18	71.1	19 16.2	98 18	71.0	19 45.6	98 18	70.9	20 15.1	98 18	70.8	105
6	16 38.2	98 18	70.5	17 07.7	98 18	70.4	17 37.1	98 18	70.3	18 06.6	98 18	70.2	18 36.0	98 18	70.1	19 05.4	98 18	70.0	19 34.9	98 18	69.9	20 04.3	98 18	69.8	6
7	16 27.5	98 18	69.6	16 56.9	98 18	69.5	17 26.4	98 18	69.4	17 55.8	98 18	69.3	18 25.3	98 18	69.2	18 54.7	98 18	69.1	19 24.1	98 18	69.0	19 53.6	98 18	68.9	7
8	16 16.8	98 18	68.6	16 46.2	98 18	68.5	17 15.7	98 18	68.4	17 45.2	98 18	68.3	18 14.6	98 18	68.2	18 44.0	98 18	68.1	19 13.5	98 18	68.0	19 42.9	98 18	67.9	8
9	16 06.2	98 18	67.6	16 35.6	98 18	67.5	17 05.1	98 18	67.4	17 34.6	98 18	67.3	18 04.0	98 18	67.2	18 33.5	98 18	67.1	19 02.9	98 18	67.0	19 32.4	98 18	66.9	9
110	15 55.6	98 17	66.7	16 25.1	98 17	66.6	16 54.6	98 17	66.5	17 24.0	98 17	66.4	17 53.5	98 17	66.3	18 23.0	98 17	66.2	18 52.4	98 17	66.1	19 21.9	98 17	66.0	110
1	15 45.1	98 17	65.7	16 14.6	98 17	65.6	16 44.1	98 17	65.5	17 13.6	98 17	65.4	17 43.0	98 17	65.3	18 12.5	98 17	65.2	18 42.0	98 17	65.1	19 11.4	98 17	65.0	1
2	15 34.7	98 17	64.8	16 04.2	98 17	64.7	16 33.7	98 17	64.6	17 03.2	98 17	64.5	17 32.7	98 17	64.4	18 02.2	98 17	64.3	18 31.6	98 17	64.2	19 01.1	98 17	64.1	2
3	15 24.4	98 17	63.8	15 53.9	98 17	63.7	16 23.4	98 17	63.6	16 52.9	98 17	63.5	17 22.4	98 17	63.4	17 51.9	98 17	63.3	18 21.4	98 17	63.2	18 50.9	98 17	63.1	3
4	15 14.2	98 17	62.8	15 43.7	98 17	62.7	16 13.2	98 17	62.7	16 42.7	98 17	62.6	17 12.2	98 17	62.5	17 41.7	98 17	62.4	18 11.2	98 17	62.3	18 40.7	98 17	62.2	4
115	15 04.1	98 17	61.9	15 33.6	98 17	61.8	16 03.1	98 17	61.7	16 32.6	98 17	61.6	17 02.1	98 17	61.5	17 31.6	98 17	61.4	18 01.1	98 17	61.3	18 30.6	98 17	61.2	115
6	14 54.0	98 17	60.9	15 23.5	98 17	60.8	15 53.1	98 17	60.7	16 22.6	98 17	60.6	16 52.1	98 17	60.6	17 21.6	98 17	60.5	17 51.1	98 17	60.4	18 20.6	98 16	60.3	6
7	14 44.1	98 16	60.0	15 13.6	98 16	59.9	15 43.1	98 16	59.8	16 12.6	98 16	59.7	16 42.2	98 16	59.6	17 11.7	98 16	59.5	17 41.2	98 16	59.4	18 10.7	98 16	59.3	7
8	14 34.2	98 16	59.0	15 03.7	98 16	58.9	15 33.3	98 16	58.8	16 02.8	98 16	58.7	16 32.3	98 16	58.6	17 01.9	98 16	58.6	17 31.4	98 16	58.5	18 00.9	98 16	58.4	8
9	14 24.4	99 16	58.1	14 54.0	98 16	58.0	15 23.5	98 16	57.9	15 53.1	98 16	57.8	16 22.6	98 16	57.7	16 52.2	98 16	57.6	17 21.7	98 16	57.5	17 51.2	98 16	57.4	9
120	14 14.8	99 16	57.1	14 44.3	99 16	57.0	15 13.9	99 16	56.9	15 43.4	99 16	56.8	16 13.0	99 16	56.7	16 42.5	99 16	56.7	17 12.1	98 16	56.6	17 41.6	98 16	56.5	120
1	14 05.2	99 16	56.1	14 34.8	99 16	56.1	15 04.3	99 16	56.0	15 33.9	99 16	55.9	16 03.5	99 16	55.8	16 33.0	99 16	55.7	17 02.6	99 16	55.6	17 32.1	99 16	55.5	1
2	13 55.7	99 16	55.2	14 25.3	99 16	55.1	14 54.9	99 16	55.0	15 24.5	99 16	54.9	15 54.1	99 16	54.8	16 23.6	99 15	54.8	16 53.2	99 15	54.7	17 22.8	99 16	54.6	2
3	13 46.4	99 15	54.2	14 16.0	99 16	54.1	14 45.6	99 15	54.1	15 15.2	99 15	54.0	15 44.7	99 15	53.9	16 14.3	99 15	53.8	16 43.9	99 15	53.7	17 13.5	99 15	53.6	3
4	13 37.2	99 15	53.3	14 06.8	99 15	53.2	14 36.4	99 15	53.1	15 06.0	99 15	53.0	15 35.6	99 15	52.9	16 05.1	99 15	52.9	16 34.7	99 15	52.8	17 04.3	99 15	52.7	4
125	13 28.0	99 15	52.3	13 57.7	99 15	52.2	14 27.3	99 15	52.2	14 56.9	99 15	52.1	15 26.5	99 15	52.0	15 56.1	99 15	51.9	16 25.7	99 15	51.8	16 55.3	99 15	51.7	125
6	13 19.0	99 15	51.4	13 48.7	99 15	51.3	14 18.3	99 15	51.2	14 47.9	99 15	51.1	15 17.5	99 15	51.0	15 47.1	99 15	51.0	16 16.7	99 15	50.9	16 46.3	99 15	50.8	6
7	13 10.2	99 15	50.4	13 39.8	99 15	50.3	14 09.4	99 15	50.3	14 39.0	99 15	50.2	15 08.7	99 15	50.1	15 38.3	99 14	50.0	16 07.9	99 14	49.9	16 37.5	99 14	49.8	7
8	13 01.4	99 14	49.5	13 31.0	99 14	49.4	14 00.7	99 14	49.3	14 30.3	99 14	49.2	14 59.9	99 14	49.1	15 29.6	99 14	49.1	15 59.2	99 14	49.0	16 28.8	99 14	48.9	8
9	12 52.8	99 14	48.5	13 22.4	99 14	48.4	13 52.1	99 14	48.4	14 21.7	99 14	48.3	14 51.4	99 14	48.2	15 21.0	99 14	48.1	15 50.6	99 14	48.0	16 20.3	99 14	48.0	9
130	12 44.2	99 14	47.6	13 13.9	99 14	47.5	13 43.6	99 14	47.4	14 13.2	99 14	47.3	14 42.9	99 14	47.3	15 12.5	99 14	47.2	15 42.2	99 14	47.1	16 11.8	99 14	47.0	130
1	12 35.9	99 14	46.6	13 05.5	99 14	46.5	13 35.2	99 14	46.5	14 04.9	99 14	46.4	14 34.5	99 14	46.3	15 04.2	99 14	46.2	15 33.9	99 14	46.2	16 03.5	99 14	46.1	1
2	12 27.6	99 14	45.7	12 57.3	99 14	45.6	13 27.0	99 14	45.5	13 56.6	99 14	45.4	14 26.3	99 13	45.4	14 56.0	99 13	45.3	15 25.7	99 13	45.2	15 55.3	99 13	45.1	2
3	12 19.5	99 13	44.7	12 49.2	99 13	44.6	13 18.9	99 13	44.6	13 48.6	99 13	44.5	14 18.2	99 13	44.4	14 47.9	99 13	44.3	15 17.6	99 13	44.3	15 47.3	99 13	44.2	3
4	12 11.5	99 13	43.8	12 41.2	99 13	43.7	13 10.9	99 13	43.6	13 40.6	99 13	43.5	14 10.3	99 13	43.5	14 40.0	99 13	43.4	15 09.7	99 13	43.3	15 39.4	99 13	43.2	4
135	12 03.7	99 13	42.8	12 33.4	99 13	42.7	13 03.1	99 13	42.7	13 32.8	99 13	42.6	14 02.5	99 13	42.5	14 32.2	99 13	42.4	15 01.9	99 13	42.4	15 31.6	99 13	42.3	135
6	11 55.9	99 13	41.9	12 25.7	99 13	41.8	12 55.4	99 13	41.7	13 25.1	99 13	41.6	13 54.8	99 13	41.6	14 24.5	99 13	41.5	14 54.3	99 12	41.4	15 24.0	99 12	41.4	6
7	11 48.4	99 12	40.9	12 18.1	99 12	40.8	12 47.8	99 12	40.8	13 17.6	99 12	40.7	13 47.3	99 12	40.6	14 17.0	99 12	40.6	14 46.8	99 12	40.5	15 16.5	99 12	40.4	7
8	11 41.0	99 12	39.9	12 10.7	99 12	39.9	12 40.4	99 12	39.8	13 10.2	99 12	39.7	13 39.9	99 12	39.7	14 09.7	99 12	39.6	14 39.4	99 12	39.5	15 09.1	99 12	39.5	8
9	11 33.7	99 12	39.0	12 03.4	99 12	38.9	12 33.2	99 12	38.9	13 02.9	99 12	38.8	13 32.7	99 12	38.7	14 02.4	99 12	38.7	14 32.2	99 12	38.6	15 01.9	99 12	38.5	9
140	11 26.5	99 12	38.0	11 56.3	99 12	38.0	12 26.1	99 12	37.9	12 55.8	99 12	37.9	13 25.6	99 12	37.8	13 55.4	99 12	37.7	14 25.1	99 12	37.7	14 54.9	99 12	37.6	140
1	11 19.6	99 11	37.1	11 49.3	99 11	37.0	12 19.1	99 11	37.0	12 48.9	99 11	36.9	13 18.7	99 11	36.8	13 48.4	99 11	36.8	14 18.2	99 11	36.7	14 48.0	99 11	36.7	1
2	11 12.7	99 11	36.1	11 42.5	99 11	36.1	12 12.3	99 11	36.0	12 42.1	99 11	36.0	13 11.9	99 11	35.9	13 41.6	99 11	35.8	14 11.4	99 11	35.8	14 41.2	99 11	35.7	2
3	11 06.1	99 11	35.2	11 35.9	99 11	35.1	12 05.6	99 11	35.1	12 35.4	99 11	35.0	13 05.2	99 11	35.0	13 35.0	99 11	34.9	14 04.8	99 11	34.8	14 34.6	99 11	34.8	3
4	10 59.5	99 11	34.2	11 29.3	99 11	34.2	11 59.1	99 11	34.1	12 28.9	99 11	34.1	12 58.7	99 11	34.0	13 28.6	99 11	33.9	13 58.3	99 10	33.9	14 28.1	99 10	33.8	4
145	10 53.2	99 10	·33.3	11 23.0	99 10	33.2	11 52.8	99 10	33.2	12 22.6	99 10	33.1	12 52.4	99 10	33.1	13 22.2	99 10	33.0	13 52.0	99 10	32.9	14 21.9	99 10	32.9	145
6	10 47.0	99 10	32.3	11 16.8	99 10	32.3	11 46.6	99 10	32.2	12 16.4	99 10	32.2	12 46.3	99 10	32.1	13 16.1	99 10	32.1	13 45.9	99 10	32.0	14 15.7	99 10	31.9	6
7	10 40.9	99 10	31.4	11 10.8	99 10	31.3	11 40.6	99 10	31.3	12 10.4	99 10	31.2	12 40.3	99 10	31.2	13 10.1	99 10	31.1	13 39.9	99 10	31.1	14 09.7	99 10	31.0	7
8	10 35.1	99 10	30.4	11 04.9	99 10	30.4	11 34.7	99 10	30.3	12 04.6	99 09	30.3	12 34.4	99 09	30.2	13 04.2	99 09	30.2	13 34.1	99 09	30.1	14 03.9	99 09	30.1	8
9	10 29.3	99 09	29.5	10 59.2	99 09	29.4	11 29.0	99 09	29.4	11 58.9	99 09	29.3	12 28.7	99 09	29.3	12 58.6	99 09	29.2	13 28.4	99 09	29.2	13 58.3	99 09	29.1	9
150	10 23.8	1.0 09	28.5	10 53.6	1.0 09	28.5	11 23.5	1.0 09	28.4	11 53.4	1.0 09	28.4	12 23.2	1.0 09	28.3	12 53.1	1.0 09	28.3	13 22.9	1.0 09	28.2	13 52.8	1.0 09	28.2	150
1	10 18.4	1.0 09	27.6	10 48.3	1.0 09	27.5	11 18.1	1.0 09	27.5	11 48.0	1.0 09	27.4	12 17.9	1.0 09	27.4	12 47.7	1.0 08	27.3	13 17.6	1.0 09	27.3	13 47.5	1.0 09	27.2	1
2	10 13.2	1.0 08	26.6	10 43.1	1.0 08	26.6	11 12.9	1.0 08	26.5	11 42.8	1.0 08	26.5	12 12.7	1.0 08	26.4	12 42.6	1.0 08	26.4	13 12.4	1.0 08	26.4	13 42.3	1.0 08	26.3	2
3	10 08.1	1.0 08	25.7	10 38.0	1.0 08	25.6	11 07.9	1.0 08	25.6	11 37.8	1.0 08	25.6	12 07.7	1.0 08	25.5	12 37.5	1.0 08	25.5	13 07.4	1.0 08	25.4	13 37.3	1.0 08	25.4	3
4	10 03.3	1.0 08	24.7	10 33.1	1.0 08	24.7	11 03.0	1.0 08	24.6	11 32.9	1.0 08	24.6	12 02.8	1.0 08	24.6	12 32.7	1.0 08	24.5	13 02.6	1.0 08	24.5	13 32.5	1.0 08	24.4	4
155	9 58.6	1.0 08	23.8	10 28.5	1.0 08	23.7	10 58.4	1.0 08	23.7	11 28.2	1.0 08	23.7	11 58.1	1.0 08	23.6	12 28.0	1.0 08	23.6	12 57.9	1.0 08	23.5	13 27.8	1.0 07	23.5	155
6	9 54.0	1.0 07	22.8	10 23.9	1.0 07	22.8	10 53.8	1.0 07	22.7	11 23.7	1.0 07	22.7	11 53.6	1.0 07	22.7	12 23.6	1.0 07	22.6	12 53.5	1.0 07	22.6	13 23.4	1.0 07	22.5	6
7	9 49.7	1.0 07	21.9	10 19.6	1.0 07	21.8	10 49.5	1.0 07	21.8	11 19.4	1.0 07	21.8	11 49.3	1.0 07	21.7	12 19.2	1.0 07	21.7	12 49.1	1.0 07	21.6	13 19.1	1.0 07	21.6	7
8	9 45.5	1.0 06	20.9	10 15.4	1.0 07	20.9	10 45.3	1.0 07	20.9	11 15.3	1.0 07	20.8	11 45.2	1.0 07	20.8	12 15.1	1.0 07	20.7	12 45.0	1.0 07	20.7	13 14.9	1.0 07	20.7	8
9	9 41.5	1.0 06	20.0	10 11.4	1.0 06	19.9	10 41.3	1.0 06	19.9	11 11.3	1.0 06	19.9	11 41.2	1.0 06	19.8	12 11.1	1.0 06	19.8	12 41.1	1.0 06	19.8	13 11.0	1.0 06	19.7	9
160	9 37.7	1.0 06	19.0	10 07.6	1.0 06	19.0	10 37.5	1.0 06	19.0	11 07.5	1.0 06	18.9	11 37.4	1.0 06	18.9	12 07.3	1.0 06	18.9	12 37.3	1.0 06	18.8	13 07.2	1.0 06	18.8	160
1	9 34.0	1.0 06	18.1	10 04.0	1.0 06	18.0	10 33.9	1.0 06	18.0	11 03.8	1.0 06	18.0	11 33.8	1.0 06	17.9	12 03.7	1.0 06	17.9	12 33.7	1.0 06	17.9	13 03.6	1.0 06	17.8	1
2	9 30.6	1.0 05	17.1	10 00.5	1.0 05	17.1	10 30.5	1.0 05	17.1	11 00.4	1.0 05	17.0	11 30.4	1.0 05	17.0	12 00.3	1.0 05	17.0	12 30.2	1.0 05	16.9	13 00.2	1.0 05	16.9	2
3	9 27.3	1.0 05	16.2	9 57.2	1.0 05	16.1	10 27.2	1.0 05	16.1	10 57.1	1.0 05	16.1	11 27.1	1.0 05	16.1	11 57.0	1.0 05	16.0	12 27.0	1.0 05	16.0	12 56.9	1.0 05	16.0	3
4	9 24.2	1.0 05	15.2	9 54.1	1.0 05	15.2	10 24.1	1.0 05	15.2	10 54.1	1.0 05	15.1	11 24.0	1.0 05	15.1	11 54.0	1.0 05	15.1	12 23.9	1.0 05	15.1	12 53.9	1.0 05	15.0	4
165	9 21.3	1.0 05	14.3	9 51.2	1.0 05	14.2	10 21.2	1.0 05	14.2	10 51.2	1.0 05	14.2	11 21.1	1.0 04	14.2	11 51.1	1.0 04	14.1	12 21.0	1.0 04	14.1	12 51.0	1.0 04	14.1	165
6	9 18.5	1.0 04	13.3	9 48.5	1.0 04	13.3	10 18.5	1.0 04	13.3	10 48.4	1.0 04	13.2	11 18.4	1.0 04	13.2	11 48.4	1.0 04	13.2	12 18.3	1.0 04	13.2	12 48.3	1.0 04	13.2	6
7	9 16.0	1.0 04	12.4	9 46.0	1.0 04	12.3	10 15.9	1.0 04	12.3	10 45.9	1.0 04	12.3	11 15.9	1.0 04	12.3	11 45.9	1.0 04	12.3	12 15.8	1.0 04	12.2	12 45.8	1.0 04	12.2	7
8	9 13.6	1.0 04	11.4	9 43.6	1.0 04	11.4	10 13.6	1.0 04	11.4	10 43.6	1.0 04	11.4	11 13.5	1.0 04	11.3	11 43.5	1.0 04	11.3	12 13.5	1.0 04	11.3	12 43.5	1.0 04	11.3	8
9	9 11.5	1.0 03	10.5	9 41.4	1.0 03	10.4	10 11.4	1.0 03	10.4	10 41.4	1.0 03	10.4	11 11.4	1.0 03	10.4	11 41.4	1.0 03	10.4	12 11.3	1.0 03	10.4	12 41.3	1.0 03	10.3	9
170	9 09.5	1.0 03	09.5	9 39.5	1.0 03	09.5	10 09.4	1.0 03	09.5	10 39.4	1.0 03	09.5	11 09.4	1.0 03	09.4	11 39.4	1.0 03	09.4	12 09.4	1.0 03	09.4	12 39.4	1.0 03	09.4	170
1	9 07.7	1.0 03	08.6	9 37.7	1.0 03	08.5	10 07.7	1.0 03	08.5	10 37.6	1.0 03	08.5	11 07.6	1.0 03	08.5	11 37.6	1.0 03	08.5	12 07.6	1.0 03	08.5	12 37.6	1.0 03	08.5	1
2	9 06.1	1.0 02	07.6	9 36.1	1.0 02	07.6	10 06.1	1.0 02	07.6	10 36.0	1.0 02	07.6	11 06.0	1.0 02	07.6	11 36.0	1.0 02	07.5	12 06.0	1.0 02	07.5	12 36.0	1.0 02	07.5	2
3	9 04.7	1.0 02	06.7	9 34.6	1.0 02	06.6	10 04.6	1.0 02	06.6	10 34.6	1.0 02	06.6	11 04.6	1.0 02	06.6	11 34.6	1.0 02	06.6	12 04.6	1.0 02	06.6	12 34.6	1.0 02	06.6	3
4	9 03.4	1.0 02	05.7	9 33.4	1.0 02	05.7	10 03.4	1.0 02	05.7	10 33.4	1.0 02	05.7	11 03.4	1.0 02	05.7	11 33.4	1.0 02	05.7	12 03.4	1.0 02	05.6	12 33.4	1.0 02	05.6	4
175	9 02.4	1.0 01	04.8	9 32.4	1.0 01	04.7	10 02.4	1.0 01	04.7	10 32.4	1.0 01	04.7	11 02.4	1.0 01	04.7	11 32.4	1.0 01	04.7	12 02.3	1.0 01	04.7	12 32.3	1.0 01	04.7	175
6	9 01.5	1.0 01	03.8	9 31.5	1.0 01	03.8	10 01.5	1.0 01	03.8	10 31.5	1.0 01	03.8	11 01.5	1.0 01	03.8	11 31.5	1.0 01	03.8	12 01.5	1.0 01	03.8	12 31.5	1.0 01	03.8	6
7	9 00.9	1.0 01	02.9	9 30.9	1.0 01	02.8	10 00.9	1.0 01	02.8	10 30.8	1.0 01	02.8	11 00.8	1.0 01	02.8	11 30.8	1.0 01	02.8	12 00.8	1.0 01	02.8	12 30.8	1.0 01	02.8	7
8	9 00.4	1.0 00	01.9	9 30.4	1.0 00	01.9	10 00.4	1.0 00	01.9	10 30.4	1.0 00	01.9	11 00.4	1.0 00	01.9	11 30.4	1.0 00	01.9	12 00.4	1.0 00	01.9	12 30.4	1.0 00	01.9	8
9	9 00.1	1.0 00	01.0	9 30.1	1.0 00	00.9	10 00.1	1.0 00	00.9	10 30.1	1.0 00	00.9	11 00.1	1.0 00	00.9	11 30.1	1.0 00	00.9	12 00.1	1.0 00	00.9	12 30.1	1.0 00	00.9	9
180	9 00.0	1.0 00	00.0	9 30.0	1.0 00	00.0	10 00.0	1.0 00	00.0	10 30.0	1.0 00	00.0	11 00.0	1.0 00	00.0	11 30.0	1.0 00	00.0	12 00.0	1.0 00	00.0	12 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	24° 00′ Alt.	Az.	24° 30′ Alt.	Az.	25° 00′ Alt.	Az.	25° 30′ Alt.	Az.	26° 00′ Alt.	Az.	26° 30′ Alt.	Az.	27° 00′ Alt.	Az.	27° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	35 00.0 1.0 00	180.0	35 30.0 1.0 00	180.0	36 00.0 1.0 00	180.0	36 30.0 1.0 00	180.0	37 00.0 1.0 00	180.0	37 30.0 1.0 00	180.0	38 00.0 1.0 00	180.0	38 30.0 1.0 00	180.0	00
1	34 59.9 1.0 01	178.9	35 29.9 1.0 01	178.9	35 59.9 1.0 01	178.9	36 29.9 1.0 01	178.9	36 59.9 1.0 01	178.9	37 29.9 1.0 01	178.9	37 59.9 1.0 01	178.9	38 29.9 1.0 01	178.9	1
2	34 59.6 1.0 01	177.8	35 29.6 1.0 01	177.8	35 59.6 1.0 01	177.8	36 29.6 1.0 01	177.8	36 59.6 1.0 01	177.7	37 29.6 1.0 01	177.7	37 59.5 1.0 01	177.7	38 29.5 1.0 01	177.7	2
3	34 59.0 1.0 01	176.7	35 29.0 1.0 01	176.6	35 59.0 1.0 01	176.6	36 29.0 1.0 01	176.6	36 59.0 1.0 01	176.6	37 29.0 1.0 01	176.6	37 59.0 1.0 01	176.6	38 29.0 1.0 01	176.6	3
4	34 58.2 1.0 02	175.5	35 28.2 1.0 02	175.5	35 58.2 1.0 02	175.5	36 28.2 1.0 02	175.5	36 58.2 1.0 02	175.5	37 28.2 1.0 02	175.5	37 58.2 1.0 02	175.5	38 28.2 1.0 02	175.5	4
05	34 57.2 1.0 02	174.4	35 27.2 1.0 02	174.4	35 57.2 1.0 02	174.4	36 27.2 1.0 02	174.4	36 57.2 1.0 02	174.4	37 27.2 1.0 02	174.4	37 57.2 1.0 02	174.3	38 27.2 1.0 02	174.3	05
6	34 56.0 1.0 02	173.3	35 26.0 1.0 02	173.3	35 56.0 1.0 02	173.3	36 26.0 1.0 02	173.3	36 56.0 1.0 02	173.3	37 25.9 1.0 02	173.2	37 55.9 1.0 02	173.2	38 25.9 1.0 02	173.2	6
7	34 54.5 1.0 03	172.2	35 24.5 1.0 03	172.2	35 54.5 1.0 03	172.2	36 24.5 1.0 03	172.1	36 54.5 1.0 03	172.1	37 24.5 1.0 03	172.1	37 54.5 1.0 03	172.1	38 24.5 1.0 03	172.1	7
8	34 52.9 1.0 03	171.1	35 22.9 1.0 03	171.1	35 52.9 1.0 03	171.0	36 22.8 1.0 03	171.0	36 52.8 1.0 03	171.0	37 22.8 1.0 03	171.0	37 52.8 1.0 03	171.0	38 22.8 1.0 03	170.9	8
9	34 51.0 1.0 04	170.0	35 21.0 1.0 04	169.9	35 51.0 1.0 04	169.9	36 20.9 1.0 04	169.9	36 50.9 1.0 04	169.9	37 20.9 1.0 04	169.9	37 50.9 1.0 04	169.8	38 20.9 1.0 04	169.8	9
10	34 48.9 1.0 04	168.9	35 18.9 1.0 04	168.8	35 48.8 1.0 04	168.8	36 18.8 1.0 04	168.8	36 48.8 1.0 04	168.8	37 18.8 1.0 04	168.7	37 48.7 1.0 04	168.7	38 18.7 1.0 04	168.7	10
1	34 46.6 1.0 04	167.7	35 16.5 1.0 04	167.7	35 46.5 1.0 04	167.7	36 16.5 1.0 04	167.7	36 46.5 1.0 04	167.6	37 16.4 1.0 04	167.6	37 46.4 1.0 04	167.6	38 16.4 1.0 04	167.6	1
2	34 44.0 1.0 05	166.6	35 14.0 1.0 05	166.6	35 44.0 1.0 05	166.6	36 13.9 1.0 05	166.5	36 43.9 1.0 05	166.5	37 13.9 1.0 05	166.5	37 43.8 1.0 05	166.5	38 13.8 1.0 05	166.4	2
3	34 41.3 1.0 05	165.5	35 11.2 1.0 05	165.5	35 41.2 1.0 05	165.5	36 11.2 1.0 05	165.4	36 41.1 1.0 05	165.4	37 11.1 1.0 05	165.4	37 41.0 1.0 05	165.3	38 11.0 1.0 05	165.3	3
4	34 38.3 1.0 05	164.4	35 08.3 1.0 05	164.4	35 38.2 1.0 05	164.3	36 08.2 1.0 05	164.3	36 38.1 1.0 05	164.3	37 08.1 1.0 05	164.2	37 38.0 1.0 05	164.2	38 08.0 1.0 05	164.2	4
15	34 35.1 1.0 06	163.3	35 05.1 1.0 06	163.3	35 35.0 1.0 06	163.2	36 05.0 1.0 06	163.2	36 34.9 1.0 06	163.2	37 04.9 1.0 06	163.1	37 34.8 1.0 06	163.1	38 04.7 1.0 06	163.0	15
6	34 31.7 1.0 06	162.2	35 01.7 1.0 06	162.2	35 31.6 1.0 06	162.1	36 01.6 1.0 06	162.1	36 31.5 1.0 06	162.0	37 01.4 1.0 06	162.0	37 31.4 1.0 06	162.0	38 01.3 1.0 06	161.9	6
7	34 28.1 1.0 06	161.1	34 58.1 1.0 06	161.1	35 28.0 1.0 06	161.0	35 57.9 1.0 06	161.0	36 27.9 1.0 06	160.9	36 57.8 1.0 06	160.9	37 27.7 1.0 06	160.8	37 57.6 1.0 06	160.8	7
8	34 24.3 1.0 07	160.0	34 54.2 1.0 07	159.9	35 24.2 1.0 07	159.9	35 54.1 1.0 07	159.9	36 24.0 1.0 07	159.8	36 53.9 1.0 07	159.8	37 23.8 1.0 07	159.7	37 53.8 1.0 07	159.7	8
9	34 20.3 1.0 07	158.9	34 50.2 1.0 07	158.8	35 20.1 1.0 07	158.8	35 50.0 1.0 07	158.7	36 20.0 1.0 07	158.7	36 49.9 1.0 07	158.7	37 19.8 1.0 07	158.6	37 49.7 1.0 07	158.6	9
20	34 16.1 1.0 07	157.8	34 46.0 1.0 07	157.7	35 15.9 1.0 07	157.7	35 45.8 1.0 07	157.6	36 15.7 1.0 07	157.6	36 45.6 1.0 07	157.5	37 15.5 1.0 07	157.5	37 45.4 1.0 08	157.4	20
1	34 11.6 1.0 08	156.7	34 41.5 1.0 08	156.6	35 11.4 1.0 08	156.6	35 41.3 1.0 08	156.5	36 11.2 1.0 08	156.5	36 41.1 1.0 08	156.4	37 11.0 1.0 08	156.4	37 40.9 1.0 08	156.3	1
2	34 07.0 1.0 08	155.6	34 36.9 1.0 08	155.5	35 06.8 1.0 08	155.5	35 36.7 1.0 08	155.4	36 06.6 1.0 08	155.4	36 36.4 1.0 08	155.3	37 06.3 1.0 08	155.3	37 36.2 1.0 08	155.2	2
3	34 02.2 1.0 08	154.5	34 32.1 1.0 08	154.4	35 01.9 1.0 08	154.4	35 31.8 1.0 08	154.3	36 01.7 1.0 08	154.3	36 31.6 1.0 08	154.2	37 01.4 1.0 08	154.1	37 31.3 1.0 08	154.1	3
4	33 57.2 1.0 09	153.4	34 27.0 1.0 09	153.3	34 56.9 1.0 09	153.3	35 26.8 1.0 09	153.2	35 56.6 1.0 09	153.2	36 26.5 1.0 09	153.1	36 56.3 1.0 09	153.0	37 26.2 1.0 09	153.0	4
25	33 51.9 1.0 09	152.3	34 21.8 1.0 09	152.2	34 51.6 1.0 09	152.2	35 21.5 1.0 09	152.1	35 51.3 1.0 09	152.1	36 21.2 99 09	152.0	36 51.0 99 09	151.9	37 20.9 99 09	151.9	25
6	33 46.5 99 09	151.2	34 16.4 99 09	151.1	34 46.2 99 09	151.1	35 16.0 99 09	151.0	35 45.9 99 09	151.0	36 15.7 99 09	150.9	36 45.6 99 09	150.8	37 15.4 99 10	150.8	6
7	33 40.9 99 10	150.1	34 10.7 99 10	150.0	34 40.6 99 10	150.0	35 10.4 99 10	149.9	35 40.2 99 10	149.8	36 10.1 99 10	149.8	36 39.9 99 10	149.7	37 09.7 99 10	149.6	7
8	33 35.1 99 10	149.0	34 04.9 99 10	148.9	34 34.7 99 10	148.9	35 04.6 99 10	148.8	35 34.4 99 10	148.8	36 04.2 99 10	148.7	36 34.0 99 10	148.6	37 03.8 99 10	148.5	8
9	33 29.1 99 10	147.9	33 58.9 99 10	147.9	34 28.7 99 10	147.8	34 58.5 99 10	147.7	35 28.4 99 10	147.7	35 58.2 99 10	147.6	36 28.0 99 10	147.5	36 57.8 99 10	147.4	9
30	33 22.9 99 11	146.8	33 52.7 99 11	146.8	34 22.5 99 11	146.7	34 52.3 99 11	146.6	35 22.1 99 11	146.6	35 51.9 99 11	146.5	36 21.7 99 11	146.4	36 51.5 99 11	146.3	30
1	33 16.6 99 11	145.8	33 46.4 99 11	145.7	34 16.2 99 11	145.6	34 46.0 99 11	145.5	35 15.7 99 11	145.5	35 45.5 99 11	145.4	36 15.3 99 11	145.3	36 45.1 99 11	145.2	1
2	33 10.1 99 11	144.7	33 39.8 99 11	144.6	34 09.6 99 11	144.5	34 39.4 99 11	144.4	35 09.2 99 11	144.4	35 38.9 99 11	144.3	36 08.7 99 11	144.2	36 38.4 99 11	144.1	2
3	33 03.3 99 11	143.6	33 33.1 99 12	143.5	34 02.9 99 12	143.4	34 32.6 99 12	143.4	35 02.4 99 12	143.3	35 32.2 99 12	143.2	36 01.9 99 12	143.1	36 31.7 99 12	143.0	3
4	32 56.5 99 12	142.5	33 26.2 99 12	142.4	33 56.0 99 12	142.4	34 25.7 99 12	142.3	34 55.5 99 12	142.2	35 25.2 99 12	142.1	35 54.9 99 12	142.0	36 24.7 99 12	142.0	4
35	32 49.4 99 12	141.4	33 19.2 99 12	141.3	33 48.9 99 12	141.3	34 18.6 99 12	141.2	34 48.4 99 12	141.1	35 18.1 99 12	141.0	35 47.8 99 12	140.9	36 17.5 99 12	140.9	35
6	32 42.2 99 12	140.3	33 11.9 99 12	140.3	33 41.6 99 12	140.2	34 11.4 99 12	140.1	34 41.1 99 12	140.0	35 10.8 99 12	139.9	35 40.5 99 12	139.9	36 10.2 99 12	139.8	6
7	32 34.8 99 13	139.3	33 04.5 99 13	139.2	33 34.2 99 13	139.1	34 03.9 99 13	139.0	34 33.7 99 13	138.9	35 03.4 99 13	138.9	35 33.1 99 13	138.8	36 02.8 99 13	138.7	7
8	32 27.2 99 13	138.2	32 57.0 99 13	138.1	33 26.7 99 13	138.0	33 56.4 99 13	137.9	34 26.1 99 13	137.9	34 55.7 99 13	137.8	35 25.4 99 13	137.7	35 55.1 99 13	137.6	8
9	32 19.5 99 13	137.1	32 49.2 99 13	137.0	33 18.9 99 13	137.0	33 48.6 99 13	136.9	34 18.3 99 13	136.8	34 48.0 99 13	136.7	35 17.6 99 13	136.6	35 47.3 99 13	136.5	9
40	32 11.7 99 13	136.1	32 41.4 99 13	136.0	33 11.0 99 13	135.9	33 40.7 99 13	135.8	34 10.4 99 13	135.7	34 40.0 99 13	135.6	35 09.7 99 14	135.5	35 39.4 99 14	135.4	40
1	32 03.6 99 14	135.0	32 33.3 99 14	134.9	33 03.0 99 14	134.8	33 32.6 99 14	134.7	34 02.3 99 14	134.6	34 32.0 99 14	134.5	35 01.6 99 14	134.5	35 31.3 99 14	134.4	1
2	31 55.5 99 14	133.9	32 25.1 99 14	133.8	32 54.8 99 14	133.7	33 24.4 99 14	133.7	33 54.1 99 14	133.6	34 23.7 99 14	133.5	34 53.4 99 14	133.4	35 23.0 99 14	133.3	2
3	31 47.2 99 14	132.9	32 16.8 99 14	132.8	32 46.4 99 14	132.7	33 16.1 99 14	132.6	33 45.7 99 14	132.5	34 15.3 99 14	132.4	34 45.0 99 14	132.3	35 14.6 99 14	132.2	3
4	31 38.7 99 14	131.8	32 08.3 99 14	131.7	32 38.0 99 14	131.6	33 07.6 99 14	131.5	33 37.2 99 14	131.4	34 06.8 99 14	131.3	34 36.4 99 14	131.2	35 06.0 99 14	131.1	4
45	31 30.1 99 15	130.7	31 59.7 99 15	130.7	32 29.3 99 15	130.6	32 58.9 99 15	130.5	33 28.5 99 15	130.4	33 58.1 99 15	130.3	34 27.7 99 15	130.2	34 57.3 99 15	130.1	45
6	31 21.4 99 15	129.7	31 51.0 99 15	129.6	32 20.6 99 15	129.5	32 50.2 99 15	129.4	33 19.8 99 15	129.3	33 49.3 99 15	129.2	34 18.9 99 15	129.1	34 48.5 99 15	129.0	6
7	31 12.5 99 15	128.6	31 42.1 99 15	128.5	32 11.7 99 15	128.4	32 41.2 99 15	128.3	33 10.8 99 15	128.2	33 40.4 99 15	128.1	34 10.0 99 15	128.0	34 39.5 99 15	127.9	7
8	31 03.5 99 15	127.6	31 33.0 99 15	127.5	32 02.6 99 15	127.4	32 32.2 99 15	127.3	33 01.8 99 15	127.2	33 31.3 99 15	127.1	34 00.9 99 15	127.0	34 30.5 99 15	126.9	8
9	30 54.3 99 15	126.5	31 23.9 99 15	126.4	31 53.5 99 15	126.3	32 23.0 99 16	126.2	32 52.6 99 16	126.1	33 22.1 99 16	126.0	33 51.7 98 16	125.9	34 21.2 98 16	125.8	9
50	30 45.1 99 16	125.5	31 14.6 99 16	125.4	31 44.2 99 16	125.3	32 13.7 98 16	125.2	32 43.3 98 16	125.1	33 12.8 98 16	125.0	33 42.4 98 16	124.9	34 11.9 98 16	124.8	50
1	30 35.7 99 16	124.4	31 05.2 98 16	124.3	31 34.8 98 16	124.2	32 04.3 98 16	124.1	32 33.9 98 16	124.0	33 03.4 98 16	123.9	33 32.9 98 16	123.8	34 02.4 98 16	123.7	1
2	30 26.2 98 16	123.4	30 55.7 98 16	123.3	31 25.3 98 16	123.2	31 54.8 98 16	123.1	32 24.3 98 16	123.0	32 53.8 98 16	122.9	33 23.3 98 16	122.8	33 52.8 98 16	122.7	2
3	30 16.6 98 16	122.3	30 46.1 98 16	122.2	31 15.6 98 16	122.1	31 45.1 98 16	122.0	32 14.6 98 16	121.9	32 44.2 98 16	121.8	33 13.7 98 16	121.7	33 43.1 98 16	121.6	3
4	30 06.8 98 16	121.3	30 36.4 98 16	121.2	31 05.9 98 16	121.1	31 35.4 98 16	121.0	32 04.9 98 16	120.9	32 34.4 98 16	120.8	33 03.9 98 16	120.7	33 33.3 98 17	120.6	4
55	29 57.0 98 17	120.3	30 26.5 98 17	120.2	30 56.0 98 17	120.1	31 25.5 98 17	120.0	31 55.0 98 17	119.8	32 24.5 98 17	119.7	32 54.0 98 17	119.6	33 23.4 98 17	119.5	55
6	29 47.1 98 17	119.2	30 16.6 98 17	119.1	30 46.1 98 17	119.0	31 15.5 98 17	118.9	31 45.0 98 17	118.8	32 14.5 98 17	118.7	32 44.0 98 17	118.6	33 13.4 98 17	118.5	6
7	29 37.0 98 17	118.2	30 06.5 98 17	118.1	30 36.0 98 17	118.0	31 05.5 98 17	117.9	31 34.9 98 17	117.8	32 04.4 98 17	117.7	32 33.9 98 17	117.5	33 03.3 98 17	117.4	7
8	29 26.9 98 17	117.2	29 56.4 98 17	117.1	30 25.8 98 17	117.0	30 55.3 98 17	116.8	31 24.8 98 17	116.7	31 54.2 98 17	116.6	32 23.7 98 17	116.5	32 53.1 98 17	116.4	8
9	29 16.7 98 17	116.1	29 46.1 98 17	116.0	30 15.6 98 17	115.9	30 45.0 98 17	115.8	31 14.5 98 17	115.7	31 43.9 98 17	115.6	32 13.4 98 17	115.5	32 42.8 98 17	115.4	9
60	29 06.3 98 17	115.1	29 35.8 98 17	115.0	30 05.2 98 17	114.9	30 34.7 98 17	114.8	31 04.1 98 17	114.7	31 33.6 98 17	114.6	32 03.0 98 17	114.4	32 32.4 98 17	114.3	60
1	28 55.9 98 17	114.1	29 25.4 98 18	114.0	29 54.8 98 18	113.9	30 24.2 98 18	113.8	30 53.7 98 18	113.6	31 23.1 98 18	113.5	31 52.5 98 18	113.4	32 21.9 98 18	113.3	1
2	28 45.4 98 18	113.1	29 14.9 98 18	113.0	29 44.3 98 18	112.8	30 13.7 98 18	112.7	30 43.2 98 18	112.6	31 12.6 98 18	112.5	31 42.0 98 18	112.4	32 11.4 98 18	112.3	2
3	28 34.9 98 18	112.0	29 04.3 98 18	111.9	29 33.7 98 18	111.8	30 03.1 98 18	111.7	30 32.5 98 18	111.6	31 01.9 98 18	111.5	31 31.4 98 18	111.4	32 00.7 98 18	111.2	3
4	28 24.2 98 18	111.0	28 53.6 98 18	110.9	29 23.0 98 18	110.8	29 52.5 98 18	110.7	30 21.9 98 18	110.6	30 51.3 98 18	110.5	31 20.7 98 18	110.3	31 50.0 98 18	110.2	4
65	28 13.5 98 18	110.0	28 42.9 98 18	109.9	29 12.3 98 18	109.8	29 41.7 98 18	109.7	30 11.1 98 18	109.5	30 40.5 98 18	109.4	31 09.9 98 18	109.3	31 39.3 98 18	109.2	65
6	28 02.7 98 18	109.0	28 32.1 98 18	108.9	29 01.5 98 18	108.8	29 30.9 98 18	108.6	30 00.3 98 18	108.5	30 29.7 98 18	108.4	30 59.0 98 18	108.3	31 28.4 98 18	108.2	6
7	27 51.8 98 18	108.0	28 21.2 98 18	107.9	28 50.6 98 18	107.7	29 20.0 98 18	107.6	29 49.4 98 18	107.5	30 18.8 98 18	107.4	30 48.1 98 18	107.3	31 17.5 98 18	107.2	7
8	27 40.9 98 18	107.0	28 10.3 98 18	106.8	28 39.7 98 18	106.7	29 09.1 98 18	106.6	29 38.4 98 18	106.5	30 07.8 98 18	106.4	30 37.2 98 18	106.3	31 06.5 98 18	106.1	8
9	27 29.9 98 18	106.0	27 59.3 98 18	105.8	28 28.7 98 18	105.7	28 58.1 98 18	105.6	29 27.4 98 18	105.5	29 56.8 98 18	105.4	30 26.2 98 18	105.3	30 55.5 98 18	105.1	9
70	27 18.9 98 18	104.9	27 48.3 98 18	104.8	28 17.7 98 18	104.7	28 47.0 98 18	104.6	29 16.4 98 18	104.5	29 45.7 98 18	104.4	30 15.1 98 19	104.2	30 44.4 98 19	104.1	70
1	27 07.8 98 19	103.9	27 37.2 98 19	103.8	28 06.6 98 19	103.7	28 35.9 98 19	103.6	29 05.3 98 19	103.5	29 34.6 98 19	103.4	30 04.0 98 19	103.2	30 33.3 98 19	103.1	1
2	26 56.7 98 19	102.9	27 26.0 98 19	102.8	27 55.4 98 19	102.7	28 24.8 98 19	102.6	28 54.1 98 19	102.5	29 23.5 98 19	102.3	29 52.8 98 19	102.2	30 22.1 98 19	102.1	2
3	26 45.5 98 19	101.9	27 14.9 98 19	101.8	27 44.2 98 19	101.7	28 13.6 98 19	101.6	28 42.9 98 19	101.5	29 12.3 98 19	101.3	29 41.6 98 19	101.2	30 10.9 98 19	101.1	3
4	26 34.3 98 19	100.9	27 03.6 98 19	100.8	27 33.0 98 19	100.7	28 02.3 98 19	100.6	28 31.7 98 19	100.5	29 01.0 98 19	100.3	29 30.3 98 19	100.2	29 59.7 98 19	100.1	4
75	26 23.0 98 19	99.9	26 52.4 98 19	99.8	27 21.7 98 19	99.7	27 51.1 98 19	99.6	28 20.4 98 19	99.5	28 49.7 98 19	99.3	29 19.1 98 19	99.2	29 48.4 98 19	99.1	75
6	26 11.7 98 19	98.9	26 41.1 98 19	98.8	27 10.4 98 19	98.7	27 39.8 98 19	98.6	28 09.1 98 19	98.5	28 38.4 98 19	98.3	29 07.7 98 19	98.2	29 37.1 98 19	98.1	6
7	26 00.4 98 19	97.9	26 29.7 98 19	97.8	26 59.1 98 19	97.7	27 28.4 98 19	97.6	27 57.8 98 19	97.5	28 27.1 98 19	97.4	28 56.4 98 19	97.2	29 25.7 98 19	97.1	7
8	25 49.0 98 19	96.9	26 18.4 98 19	96.8	26 47.7 98 19	96.7	27 17.1 98 19	96.6	27 46.4 98 19	96.5	28 15.7 98 19	96.4	28 45.0 98 19	96.2	29 14.3 98 19	96.1	8
9	25 37.7 98 19	96.0	26 07.0 98 19	95.8	26 36.4 98 19	95.7	27 05.7 98 19	95.6	27 35.0 98 19	95.5	28 04.3 98 19	95.4	28 33.6 98 19	95.2	29 02.9 98 19	95.1	9
80	25 26.3 98 19	95.0	25 55.6 98 19	94.8	26 25.0 98 19	94.7	26 54.3 98 19	94.6	27 23.6 98 19	94.5	27 52.9 98 19	94.4	28 22.2 98 19	94.3	28 51.5 98 19	94.1	80
1	25 14.9 98 19	94.0	25 44.2 98 19	93.9	26 13.5 98 19	93.7	26 42.9 98 19	93.6	27 12.2 98 19	93.5	27 41.5 98 19	93.4	28 10.8 98 19	93.3	28 40.1 98 19	93.1	1
2	25 03.4 98 19	93.0	25 32.8 98 19	92.9	26 02.1 98 19	92.8	26 31.4 98 19	92.6	27 00.7 98 19	92.5	27 30.1 98 19	92.4	27 59.4 98 19	92.3	28 28.7 98 19	92.2	2
3	24 52.0 98 19	92.0	25 21.3 98 19	91.9	25 50.7 98 19	91.8	26 20.0 98 19	91.7	26 49.3 98 19	91.5	27 18.6 98 19	91.4	27 47.9 98 19	91.3	28 17.2 98 19	91.2	3
4	24 40.6 98 19	91.0	25 09.9 98 19	90.9	25 39.2 98 19	90.8	26 08.5 98 19	90.7	26 37.9 98 19	90.5	27 07.2 98 19	90.4	27 36.5 98 19	90.3	28 05.8 98 19	90.2	4
85	24 29.1 98 19	90.0	24 58.4 98 19	89.9	25 27.8 98 19	89.8	25 57.1 98 19	89.7	26 26.4 98 19	89.6	26 55.7 98 19	89.4	27 25.0 98 19	89.3	27 54.3 98 19	89.2	85
6	24 17.7 98 19	89.1	24 47.0 98 19	88.9	25 16.3 98 19	88.8	25 45.6 98 19	88.7	26 15.0 98 19	88.6	26 44.3 98 19	88.5	27 13.6 98 19	88.3	27 42.9 98 19	88.2	6
7	24 06.2 98 19	88.1	24 35.5 98 19	88.0	25 04.9 98 19	87.8	25 34.2 98 19	87.7	26 03.5 98 19	87.6	26 32.8 98 19	87.5	27 02.1 98 19	87.4	27 31.5 98 19	87.3	7
8	23 54.8 98 19	87.1	24 24.1 98 19	87.0	24 53.4 98 19	86.9	25 22.8 98 19	86.7	25 52.1 98 19	86.6	26 21.4 98 19	86.5	26 50.7 98 19	86.4	27 20.0 98 19	86.3	8
9	23 43.3 98 19	86.1	24 12.7 98 19	86.0	24 42.0 98 19	85.9	25 11.3 98 19	85.8	25 40.7 98 19	85.7	26 10.0 98 19	85.5	26 39.3 98 19	85.4	27 08.6 98 19	85.3	9
90	23 31.9 98 19	85.1	24 01.3 98 19	85.0	24 30.6 98 19	84.9	24 59.9 98 19	84.8	25 29.3 98 19	84.7	25 58.6 98 19	84.6	26 27.9 98 19	84.4	26 57.2 98 19	84.3	90

Lat. 79°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.	26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	23 20.5	98 19	84.2	23 49.9	98 19	84.1	24 19.2	98 19	83.9	24 48.5	98 19	83.8	25 17.9	98 19	83.7	25 47.2	98 19	83.6	26 16.5	98 19	83.5	26 45.8	98 19	83.4	91
2	23 09.2	98 19	83.2	23 38.5	98 19	83.1	24 07.8	98 19	83.0	24 37.2	98 19	82.9	25 06.5	98 19	82.7	25 35.8	98 19	82.6	26 05.1	98 19	82.5	26 34.5	98 19	82.4	2
3	22 57.8	98 19	82.2	23 27.1	98 19	82.1	23 56.5	98 19	82.0	24 25.8	98 19	81.9	24 55.2	98 19	81.8	25 24.5	98 19	81.7	25 53.8	98 19	81.5	26 23.1	98 19	81.4	3
4	22 46.5	98 19	81.3	23 15.8	98 19	81.1	23 45.2	98 19	81.0	24 14.5	98 19	80.9	24 43.8	98 19	80.8	25 13.2	98 19	80.7	25 42.5	98 19	80.6	26 11.8	98 19	80.5	4
95	22 35.2	98 19	80.3	23 04.5	98 19	80.2	23 33.9	98 19	80.1	24 03.2	98 19	79.9	24 32.6	98 19	79.8	25 01.9	98 19	79.7	25 31.2	98 19	79.6	26 00.5	98 19	79.5	95
6	22 23.9	98 19	79.3	22 53.3	98 19	79.2	23 22.6	98 19	79.1	23 52.0	98 19	79.0	24 21.3	98 19	78.9	24 50.6	98 19	78.8	25 20.0	98 19	78.6	25 49.3	98 19	78.5	6
7	22 12.7	98 19	78.4	22 42.0	98 19	78.2	23 11.4	98 19	78.1	23 40.7	98 19	78.0	24 10.1	98 19	77.9	24 39.4	98 19	77.8	25 08.8	98 19	77.7	25 38.1	98 19	77.6	7
8	22 01.5	98 19	77.4	22 30.8	98 19	77.3	23 00.2	98 19	77.2	23 29.6	98 19	77.1	23 58.9	98 19	76.9	24 28.3	98 19	76.8	24 57.6	98 19	76.7	25 26.9	98 19	76.6	8
9	21 50.3	98 18	76.4	22 19.7	98 18	76.3	22 49.1	98 18	76.2	23 18.4	98 18	76.1	23 47.8	98 19	76.0	24 17.1	98 18	75.9	24 46.5	98 18	75.8	25 15.8	98 18	75.6	9
100	21 39.2	98 18	75.5	22 08.6	98 18	75.4	22 38.0	98 18	75.2	23 07.3	98 18	75.1	23 36.7	98 18	75.0	24 06.1	98 18	74.9	24 35.4	98 18	74.8	25 04.8	98 18	74.7	100
1	21 28.2	98 18	74.5	21 57.5	98 18	74.4	22 26.9	98 18	74.3	22 56.3	98 18	74.2	23 25.7	98 18	74.1	23 55.0	98 18	73.9	24 24.4	98 18	73.8	24 53.8	98 18	73.7	1
2	21 17.2	98 18	73.5	21 46.5	98 18	73.4	22 15.9	98 18	73.3	22 45.3	98 18	73.2	23 14.7	98 18	73.1	23 44.1	98 18	73.0	24 13.4	98 18	72.9	24 42.8	98 18	72.8	2
3	21 06.2	98 18	72.6	21 35.6	98 18	72.5	22 05.0	98 18	72.4	22 34.4	98 18	72.3	23 03.8	98 18	72.1	23 33.1	98 18	72.0	24 02.5	98 18	71.9	24 31.9	98 18	71.8	3
4	20 55.3	98 18	71.6	21 24.7	98 18	71.5	21 54.1	98 18	71.4	22 23.5	98 18	71.3	22 52.9	98 18	71.2	23 22.3	98 18	71.1	23 51.7	98 18	71.0	24 21.0	98 18	70.9	4
105	20 44.5	98 18	70.7	21 13.9	98 18	70.6	21 43.3	98 18	70.4	22 12.7	98 18	70.3	22 42.1	98 18	70.2	23 11.5	98 18	70.1	23 40.9	98 18	70.0	24 10.3	98 18	69.9	105
6	20 33.7	98 18	69.7	21 03.1	98 18	69.6	21 32.5	98 18	69.5	22 01.9	98 18	69.4	22 31.3	98 18	69.3	23 00.7	98 18	69.2	23 30.1	98 18	69.1	23 59.5	98 18	69.0	6
7	20 23.0	98 18	68.7	20 52.4	98 18	68.6	21 21.8	98 18	68.5	21 51.3	98 18	68.4	22 20.7	98 18	68.3	22 50.1	98 18	68.2	23 19.5	98 18	68.1	23 48.9	98 18	68.0	7
8	20 12.4	98 18	67.8	20 41.8	98 18	67.7	21 11.2	98 18	67.6	21 40.7	98 18	67.5	22 10.1	98 18	67.4	22 39.5	98 18	67.3	23 08.9	98 18	67.2	23 38.3	98 18	67.1	8
9	20 01.8	98 17	66.8	20 31.2	98 17	66.7	21 00.7	98 17	66.6	21 30.1	98 17	66.5	21 59.5	98 17	66.4	22 29.0	98 17	66.3	22 58.4	98 17	66.2	23 27.8	98 17	66.1	9
110	19 51.3	98 17	65.9	20 20.8	98 17	65.8	20 50.2	98 17	65.7	21 19.6	98 17	65.6	21 49.1	98 17	65.5	22 18.5	98 17	65.4	22 47.9	98 17	65.3	23 17.4	98 17	65.2	110
1	19 40.9	98 17	64.9	20 10.4	98 17	64.8	20 39.8	98 17	64.7	21 09.3	98 17	64.6	21 38.7	98 17	64.5	22 08.2	98 17	64.4	22 37.6	98 17	64.3	23 07.0	98 17	64.2	1
2	19 30.6	98 17	64.0	20 00.0	98 17	63.9	20 29.5	98 17	63.8	20 59.0	98 17	63.7	21 28.4	98 17	63.6	21 57.9	98 17	63.5	22 27.3	98 17	63.4	22 56.8	98 17	63.3	2
3	19 20.3	98 17	63.0	19 49.8	98 17	62.9	20 19.3	98 17	62.8	20 48.7	98 17	62.7	21 18.2	98 17	62.6	21 47.7	98 17	62.5	22 17.1	98 17	62.4	22 46.6	98 17	62.3	3
4	19 10.2	98 17	62.1	19 39.7	98 17	62.0	20 09.1	98 17	61.9	20 38.6	98 17	61.8	21 08.1	98 17	61.7	21 37.6	98 17	61.6	22 07.0	98 17	61.5	22 36.5	98 17	61.4	4
115	19 00.1	98 17	61.1	19 29.6	98 17	61.0	19 59.1	98 17	60.9	20 28.6	98 17	60.8	20 58.1	98 17	60.7	21 27.5	98 17	60.6	21 57.0	98 17	60.5	22 26.5	98 17	60.4	115
6	18 50.1	98 16	60.2	19 19.6	98 16	60.1	19 49.1	98 16	60.0	20 18.6	98 16	59.9	20 48.1	98 16	59.8	21 17.6	98 16	59.7	21 47.1	98 16	59.6	22 16.6	98 16	59.5	6
7	18 40.2	98 16	59.2	19 09.7	98 16	59.1	19 39.3	98 16	59.0	20 08.8	98 16	58.9	20 38.3	98 16	58.8	21 07.8	98 16	58.7	21 37.3	98 16	58.6	22 06.8	98 16	58.5	7
8	18 30.5	98 16	58.3	19 00.0	98 16	58.2	19 29.5	98 16	58.1	19 59.0	98 16	58.0	20 28.5	98 16	57.9	20 58.0	98 16	57.8	21 27.5	98 16	57.7	21 57.0	98 16	57.6	8
9	18 20.8	98 16	57.3	18 50.3	98 16	57.2	19 19.8	98 16	57.1	19 49.3	98 16	57.0	20 18.9	98 16	57.0	20 48.4	98 16	56.9	21 17.9	98 16	56.8	21 47.4	98 16	56.7	9
120	18 11.2	98 16	56.4	18 40.7	98 16	56.3	19 10.3	98 16	56.2	19 39.8	98 16	56.1	20 09.3	98 16	56.0	20 38.9	98 16	55.9	21 08.4	98 16	55.8	21 37.9	98 16	55.7	120
1	18 01.7	99 16	55.4	18 31.2	99 16	55.3	19 00.8	98 16	55.3	19 30.3	98 16	55.2	19 59.9	98 16	55.1	20 29.4	98 16	55.0	20 59.0	98 16	54.9	21 28.5	98 16	54.8	1
2	17 52.3	99 15	54.5	18 21.9	99 15	54.4	18 51.4	99 15	54.3	19 21.0	99 15	54.2	19 50.6	99 15	54.1	20 20.1	98 15	54.0	20 49.7	98 15	53.9	21 19.2	98 15	53.9	2
3	17 43.1	99 15	53.5	18 12.6	99 15	53.5	18 42.2	99 15	53.4	19 11.8	99 15	53.3	19 41.3	99 15	53.2	20 10.9	99 15	53.1	20 40.5	99 15	53.0	21 10.0	99 15	52.9	3
4	17 33.9	99 15	52.6	18 03.5	99 15	52.5	18 33.1	99 15	52.4	19 02.6	99 15	52.3	19 32.2	99 15	52.2	20 01.8	99 15	52.2	20 31.4	99 15	52.1	21 00.9	99 15	52.0	4
125	17 24.9	99 15	51.7	17 54.5	99 15	51.6	18 24.1	99 15	51.5	18 53.6	99 15	51.4	19 23.2	99 15	51.3	19 52.8	99 15	51.2	20 22.4	99 15	51.1	20 52.0	99 15	51.0	125
6	17 15.9	99 15	50.7	17 45.6	99 15	50.6	18 15.2	99 15	50.5	18 44.8	99 15	50.5	19 14.4	99 15	50.4	19 43.9	99 15	50.3	20 13.5	99 15	50.2	20 43.1	99 15	50.1	6
7	17 07.1	99 14	49.8	17 36.8	99 14	49.7	18 06.4	99 14	49.6	18 36.0	99 14	49.5	19 05.6	99 14	49.4	19 35.2	99 14	49.3	20 04.8	99 14	49.3	20 34.4	99 14	49.2	7
8	16 58.5	99 14	48.8	17 28.1	99 14	48.7	17 57.7	99 14	48.7	18 27.3	99 14	48.6	18 57.0	99 14	48.5	19 26.6	99 14	48.4	19 56.2	99 14	48.3	20 25.8	99 14	48.2	8
9	16 49.9	99 14	47.9	17 19.6	99 14	47.8	17 49.2	99 14	47.7	18 18.8	99 14	47.6	18 48.5	99 14	47.6	19 18.1	99 14	47.5	19 47.7	99 14	47.4	20 17.3	99 14	47.3	9
130	16 41.5	99 14	46.9	17 11.1	99 14	46.9	17 40.8	99 14	46.8	18 10.4	99 14	46.7	18 40.1	99 14	46.6	19 09.7	99 14	46.5	19 39.3	99 14	46.5	20 09.0	99 14	46.4	130
1	16 33.2	99 14	46.0	17 02.8	99 14	45.9	17 32.5	99 14	45.8	18 02.2	99 14	45.8	18 31.8	99 14	45.7	19 01.5	99 14	45.6	19 31.1	99 14	45.5	20 00.8	99 13	45.4	1
2	16 25.0	99 13	45.1	16 54.7	99 13	45.0	17 24.4	99 13	44.9	17 54.0	99 13	44.8	18 23.7	99 13	44.7	18 53.3	99 13	44.7	19 23.0	99 13	44.6	19 52.7	99 13	44.5	2
3	16 17.0	99 13	44.1	16 46.7	99 13	44.0	17 16.3	99 13	44.0	17 46.0	99 13	43.9	18 15.7	99 13	43.8	18 45.4	99 13	43.7	19 15.0	99 13	43.6	19 44.7	99 13	43.6	3
4	16 09.1	99 13	43.2	16 38.8	99 13	43.1	17 08.5	99 13	43.0	17 38.2	99 13	42.9	18 07.8	99 13	42.9	18 37.5	99 13	42.8	19 07.2	99 13	42.7	19 36.9	99 13	42.6	4
135	16 01.3	99 13	42.2	16 31.0	99 13	42.2	17 00.7	99 13	42.1	17 30.4	99 13	42.0	18 00.1	99 13	41.9	18 29.8	99 13	41.9	18 59.5	99 13	41.8	19 29.2	99 13	41.7	135
6	15 53.7	99 12	41.3	16 23.4	99 12	41.2	16 53.1	99 12	41.1	17 22.8	99 12	41.1	17 52.5	99 12	41.0	18 22.2	99 12	40.9	18 51.9	99 12	40.9	19 21.7	99 12	40.8	6
7	15 46.2	99 12	40.3	16 15.9	99 12	40.3	16 45.7	99 12	40.2	17 15.4	99 12	40.1	17 45.1	99 12	40.1	18 14.8	99 12	40.0	18 44.5	99 12	39.9	19 14.2	99 12	39.8	7
8	15 38.9	99 12	39.4	16 08.6	99 12	39.3	16 38.3	99 12	39.3	17 08.1	99 12	39.2	17 37.8	99 12	39.1	18 07.5	99 12	39.1	18 37.3	99 12	39.0	19 07.0	99 12	38.9	8
9	15 31.7	99 12	38.5	16 01.4	99 12	38.4	16 31.2	99 12	38.3	17 00.9	99 12	38.3	17 30.6	99 12	38.2	18 00.4	99 12	38.1	18 30.1	99 12	38.1	18 59.9	99 12	38.0	9
140	15 24.6	99 12	37.5	15 54.4	99 11	37.5	16 24.1	99 11	37.4	16 53.9	99 11	37.3	17 23.6	99 11	37.3	17 53.4	99 11	37.2	18 23.1	99 11	37.1	18 52.9	99 11	37.1	140
1	15 17.7	99 11	36.6	15 47.5	99 11	36.5	16 17.3	99 11	36.5	16 47.0	99 11	36.4	17 16.8	99 11	36.3	17 46.5	99 11	36.3	18 16.3	99 11	36.2	18 46.1	99 11	36.1	1
2	15 11.0	99 11	35.6	15 40.8	99 11	35.6	16 10.5	99 11	35.5	16 40.3	99 11	35.5	17 10.1	99 11	35.4	17 39.9	99 11	35.3	18 09.6	99 11	35.3	18 39.4	99 11	35.2	2
3	15 04.4	99 11	34.7	15 34.2	99 11	34.6	16 04.0	99 11	34.6	16 33.7	99 11	34.5	17 03.5	99 11	34.5	17 33.3	99 11	34.4	18 03.1	99 11	34.3	18 32.9	99 11	34.3	3
4	14 57.9	99 10	33.8	15 27.7	99 10	33.7	15 57.5	99 10	33.6	16 27.3	99 10	33.6	16 57.1	99 10	33.5	17 26.9	99 10	33.5	17 56.7	99 10	33.4	18 26.5	99 10	33.3	4
145	14 51.7	99 10	32.8	15 21.5	99 10	32.8	15 51.3	99 10	32.7	16 21.1	99 10	32.7	16 50.9	99 10	32.6	17 20.7	99 10	32.5	17 50.5	99 10	32.5	18 20.3	99 10	32.4	145
6	14 45.5	99 10	31.9	15 15.3	99 10	31.8	15 45.2	99 10	31.8	16 15.0	99 10	31.7	16 44.8	99 10	31.7	17 14.6	99 10	31.6	17 44.4	99 10	31.5	18 14.2	99 10	31.5	6
7	14 39.6	99 10	31.0	15 09.4	99 10	30.9	15 39.2	99 10	30.8	16 09.0	99 10	30.8	16 38.9	99 10	30.7	17 08.7	99 10	30.7	17 38.5	99 10	30.6	18 08.3	99 10	30.6	7
8	14 33.8	99 09	30.0	15 03.6	99 09	30.0	15 33.4	99 09	29.9	16 03.3	99 09	29.8	16 33.1	99 09	29.8	17 02.9	99 09	29.7	17 32.8	99 09	29.7	18 02.6	99 09	29.6	8
9	14 28.1	99 09	29.1	14 58.0	99 09	29.0	15 27.8	99 09	29.0	15 57.6	99 09	28.9	16 27.5	99 09	28.9	16 57.3	99 09	28.8	17 27.2	99 09	28.8	17 57.0	99 09	28.7	9
150	14 22.6	1.0 09	28.1	14 52.5	1.0 09	28.1	15 22.3	1.0 09	28.0	15 52.2	1.0 09	28.0	16 22.0	1.0 09	27.9	16 51.9	1.0 09	27.9	17 21.7	99 09	27.8	17 51.6	99 09	27.8	150
1	14 17.3	1.0 09	27.2	14 47.2	1.0 09	27.1	15 17.0	1.0 09	27.1	15 46.9	1.0 09	27.0	16 16.8	1.0 09	27.0	16 46.6	1.0 08	26.9	17 16.5	1.0 08	26.9	17 46.3	1.0 08	26.8	1
2	14 12.2	1.0 08	26.3	14 42.0	1.0 08	26.2	15 11.9	1.0 08	26.2	15 41.8	1.0 08	26.1	16 11.6	1.0 08	26.1	16 41.5	1.0 08	26.0	17 11.4	1.0 08	26.0	17 41.3	1.0 08	25.9	2
3	14 07.2	1.0 08	25.3	14 37.1	1.0 08	25.3	15 06.9	1.0 08	25.2	15 36.8	1.0 08	25.2	16 06.7	1.0 08	25.1	16 36.6	1.0 08	25.1	17 06.5	1.0 08	25.0	17 36.3	1.0 08	25.0	3
4	14 02.4	1.0 08	24.4	14 32.3	1.0 08	24.3	15 02.2	1.0 08	24.3	15 32.0	1.0 08	24.2	16 01.9	1.0 08	24.2	16 31.8	1.0 08	24.2	17 01.7	1.0 08	24.1	17 31.6	1.0 08	24.1	4
155	13 57.7	1.0 07	23.4	14 27.6	1.0 07	23.4	14 57.5	1.0 07	23.4	15 27.4	1.0 07	23.3	15 57.3	1.0 07	23.3	16 27.2	1.0 07	23.2	16 57.1	1.0 07	23.2	17 27.0	1.0 07	23.1	155
6	13 53.3	1.0 07	22.5	14 23.2	1.0 07	22.5	14 53.1	1.0 07	22.4	15 23.0	1.0 07	22.4	15 52.9	1.0 07	22.3	16 22.8	1.0 07	22.3	16 52.7	1.0 07	22.3	17 22.6	1.0 07	22.2	6
7	13 49.0	1.0 07	21.6	14 18.9	1.0 07	21.5	14 48.8	1.0 07	21.5	15 18.7	1.0 07	21.4	15 48.6	1.0 07	21.4	16 18.5	1.0 07	21.4	16 48.4	1.0 07	21.3	17 18.3	1.0 07	21.3	7
8	13 44.9	1.0 07	20.6	14 14.8	1.0 07	20.6	14 44.7	1.0 07	20.6	15 14.6	1.0 06	20.5	15 44.5	1.0 07	20.5	16 14.4	1.0 06	20.4	16 44.4	1.0 06	20.4	17 14.3	1.0 06	20.4	8
9	13 40.9	1.0 06	19.7	14 10.8	1.0 06	19.7	14 40.8	1.0 06	19.6	15 10.7	1.0 06	19.6	15 40.6	1.0 06	19.5	16 10.5	1.0 06	19.5	16 40.5	1.0 06	19.5	17 10.4	1.0 06	19.4	9
160	13 37.1	1.0 06	18.8	14 07.1	1.0 06	18.7	14 37.0	1.0 06	18.7	15 06.9	1.0 06	18.6	15 36.9	1.0 06	18.6	16 06.8	1.0 06	18.6	16 36.7	1.0 06	18.5	17 06.7	1.0 06	18.5	160
1	13 33.5	1.0 06	17.8	14 03.5	1.0 06	17.8	14 33.4	1.0 06	17.7	15 03.4	1.0 06	17.7	15 33.3	1.0 06	17.7	16 03.2	1.0 06	17.6	16 33.2	1.0 06	17.6	17 03.1	1.0 06	17.6	1
2	13 30.1	1.0 05	16.9	14 00.1	1.0 05	16.8	14 30.0	1.0 05	16.8	15 00.0	1.0 05	16.8	15 29.9	1.0 05	16.8	15 59.9	1.0 05	16.7	16 29.8	1.0 05	16.7	16 59.7	1.0 05	16.7	2
3	13 26.9	1.0 05	15.9	13 56.8	1.0 05	15.9	14 26.8	1.0 05	15.9	14 56.7	1.0 05	15.9	15 26.7	1.0 05	15.8	15 56.6	1.0 05	15.8	16 26.6	1.0 05	15.8	16 56.5	1.0 05	15.7	3
4	13 23.8	1.0 05	15.0	13 53.8	1.0 05	15.0	14 23.8	1.0 05	14.9	14 53.7	1.0 05	14.9	15 23.7	1.0 05	14.9	15 53.6	1.0 05	14.9	16 23.6	1.0 05	14.8	16 53.5	1.0 05	14.8	4
165	13 21.0	1.0 04	14.1	13 50.9	1.0 04	14.0	14 20.9	1.0 04	14.0	14 50.9	1.0 04	14.0	15 20.8	1.0 04	14.0	15 50.8	1.0 04	13.9	16 20.7	1.0 04	13.9	16 50.7	1.0 04	13.9	165
6	13 18.3	1.0 04	13.1	13 48.2	1.0 04	13.1	14 18.2	1.0 04	13.1	14 48.2	1.0 04	13.1	15 18.1	1.0 04	13.0	15 48.1	1.0 04	13.0	16 18.1	1.0 04	13.0	16 48.0	1.0 04	13.0	6
7	13 15.8	1.0 04	12.2	13 45.7	1.0 04	12.2	14 15.7	1.0 04	12.1	14 45.7	1.0 04	12.1	15 15.7	1.0 04	12.1	15 45.6	1.0 04	12.1	16 15.6	1.0 04	12.1	16 45.6	1.0 04	12.0	7
8	13 13.4	1.0 04	11.3	13 43.4	1.0 04	11.2	14 13.4	1.0 04	11.2	14 43.4	1.0 04	11.2	15 13.3	1.0 04	11.2	15 43.3	1.0 04	11.1	16 13.3	1.0 04	11.1	16 43.3	1.0 04	11.1	8
9	13 11.3	1.0 03	10.3	13 41.3	1.0 03	10.3	14 11.3	1.0 03	10.3	14 41.2	1.0 03	10.3	15 11.2	1.0 03	10.2	15 41.2	1.0 03	10.2	16 11.2	1.0 03	10.2	16 41.2	1.0 04	10.2	9
170	13 09.3	1.0 03	09.4	13 39.3	1.0 03	09.4	14 09.3	1.0 03	09.3	14 39.3	1.0 03	09.3	15 09.3	1.0 03	09.3	15 39.3	1.0 03	09.3	16 09.2	1.0 03	09.3	16 39.2	1.0 03	09.3	170
1	13 07.6	1.0 03	08.4	13 37.6	1.0 03	08.4	14 07.5	1.0 03	08.4	14 37.5	1.0 03	08.4	15 07.5	1.0 03	08.4	15 37.5	1.0 03	08.4	16 07.5	1.0 03	08.3	16 37.5	1.0 03	08.3	1
2	13 06.0	1.0 02	07.5	13 36.0	1.0 02	07.5	14 06.0	1.0 02	07.5	14 36.0	1.0 02	07.5	15 05.9	1.0 02	07.4	15 35.9	1.0 02	07.4	16 05.9	1.0 02	07.4	16 35.9	1.0 02	07.4	2
3	13 04.6	1.0 02	06.6	13 34.6	1.0 02	06.6	14 04.6	1.0 02	06.5	14 34.6	1.0 02	06.5	15 04.6	1.0 02	06.5	15 34.5	1.0 02	06.5	16 04.5	1.0 02	06.5	16 34.5	1.0 02	06.5	3
4	13 03.4	1.0 02	05.6	13 33.4	1.0 02	05.6	14 03.4	1.0 02	05.6	14 33.4	1.0 02	05.6	15 03.3	1.0 02	05.6	15 33.3	1.0 02	05.6	16 03.3	1.0 02	05.6	16 33.3	1.0 02	05.6	4
175	13 02.3	1.0 01	04.7	13 32.3	1.0 01	04.7	14 02.3	1.0 01	04.7	14 32.3	1.0 01	04.7	15 02.3	1.0 01	04.7	15 32.3	1.0 01	04.6	16 02.3	1.0 01	04.6	16 32.3	1.0 01	04.6	175
6	13 01.5	1.0 01	03.8	13 31.5	1.0 01	03.7	14 01.5	1.0 01	03.7	14 31.5	1.0 01	03.7	15 01.5	1.0 01	03.7	15 31.5	1.0 01	03.7	16 01.5	1.0 01	03.7	16 31.5	1.0 01	03.7	6
7	13 00.8	1.0 01	02.8	13 30.8	1.0 01	02.8	14 00.8	1.0 01	02.8	14 30.8	1.0 01	02.8	15 00.8	1.0 01	02.8	15 30.8	1.0 01	02.8	16 00.8	1.0 01	02.8	16 30.8	1.0 01	02.8	7
8	13 00.4	1.0 00	01.9	13 30.4	1.0 00	01.9	14 00.4	1.0 00	01.9	14 30.4	1.0 00	01.9	15 00.4	1.0 00	01.9	15 30.4	1.0 00	01.9	16 00.4	1.0 00	01.9	16 30.4	1.0 00	01.9	8
9	13 00.1	1.0 00	00.9	13 30.1	1.0 00	00.9	14 00.1	1.0 00	00.9	14 30.1	1.0 00	00.9	15 00.1	1.0 00	00.9	15 30.1	1.0 00	00.9	16 00.1	1.0 00	00.9	16 30.1	1.0 00	00.9	9
180	13 00.0	1.0 00	00.0	13 30.0	1.0 00	00.0	14 00.0	1.0 00	00.0	14 30.0	1.0 00	00.0	15 00.0	1.0 00	00.0	15 30.0	1.0 00	00.0	16 00.0	1.0 00	00.0	16 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	40 00.0	1.0 00	180.0	41 00.0	1.0 00	180.0	43 00.0	1.0 00	180.0	45 00.0	1.0 00	180.0	45 30.0	1.0 00	180.0	46 30.0	1.0 00	180.0	00
1	38 59.9	1.0 01	178.9	39 29.9	1.0 01	178.9	39 59.9	1.0 01	178.9	40 59.9	1.0 01	178.9	42 59.9	1.0 01	178.8	44 59.9	1.0 01	178.8	45 29.9	1.0 01	178.8	46 29.9	1.0 01	178.8	1
2	38 59.5	1.0 01	177.7	39 29.5	1.0 01	177.7	39 59.5	1.0 01	177.7	40 59.5	1.0 01	177.7	42 59.5	1.0 01	177.7	44 59.5	1.0 01	177.7	45 29.5	1.0 01	177.6	46 29.5	1.0 01	177.6	2
3	38 59.0	1.0 01	176.6	39 29.0	1.0 01	176.6	39 59.0	1.0 01	176.6	40 59.0	1.0 01	176.6	42 59.0	1.0 01	176.5	44 58.9	1.0 01	176.5	45 28.9	1.0 01	176.5	46 28.9	1.0 01	176.5	3
4	38 58.2	1.0 02	175.5	39 28.2	1.0 02	175.4	39 58.2	1.0 02	175.4	40 58.2	1.0 02	175.4	42 58.1	1.0 01	175.4	44 58.1	1.0 02	175.4	45 28.1	1.0 02	175.3	46 28.1	1.0 02	175.3	4
05	38 57.2	1.0 02	174.3	39 27.2	1.0 02	174.3	39 57.2	1.0 02	174.3	40 57.1	1.0 02	174.3	42 57.1	1.0 02	174.2	44 57.1	1.0 02	174.1	45 27.1	1.0 02	174.1	46 27.0	1.0 02	174.1	05
6	38 55.9	1.0 02	173.2	39 25.9	1.0 02	173.2	39 55.9	1.0 02	173.2	40 55.9	1.0 02	173.1	42 55.8	1.0 02	173.0	44 55.8	1.0 02	173.0	45 25.8	1.0 03	172.9	46 25.8	1.0 02	172.9	6
7	38 54.4	1.0 03	172.1	39 24.4	1.0 03	172.0	39 54.4	1.0 03	172.0	40 54.4	1.0 02	172.0	42 54.3	1.0 03	171.9	44 54.3	1.0 03	171.8	45 24.3	1.0 03	171.8	46 24.2	1.0 03	171.7	7
8	38 52.8	1.0 03	170.9	39 22.7	1.0 03	170.9	39 52.7	1.0 03	170.9	40 52.7	1.0 03	170.8	42 52.6	1.0 03	170.7	44 52.5	1.0 03	170.6	45 22.5	1.0 03	170.6	46 22.5	1.0 03	170.5	8
9	38 50.8	1.0 04	169.8	39 20.8	1.0 04	169.8	39 50.8	1.0 04	169.7	40 50.7	1.0 04	169.7	42 50.6	1.0 04	169.6	44 50.5	1.0 04	169.5	45 20.5	1.0 04	169.4	46 20.5	1.0 04	169.4	9
10	38 48.7	1.0 04	168.7	39 18.7	1.0 04	168.6	39 48.6	1.0 04	168.6	40 48.6	1.0 04	168.5	42 48.5	1.0 04	168.4	44 48.3	1.0 04	168.3	45 18.3	1.0 04	168.3	46 18.2	1.0 04	168.2	10
1	38 46.3	1.0 04	167.5	39 16.3	1.0 04	167.5	39 46.3	1.0 04	167.5	40 46.2	1.0 04	167.4	42 46.1	1.0 04	167.3	44 45.9	1.0 04	167.1	45 15.9	1.0 04	167.1	46 15.8	1.0 04	167.0	1
2	38 43.7	1.0 05	166.4	39 13.7	1.0 05	166.4	39 43.7	1.0 05	166.3	40 43.6	1.0 05	166.3	42 43.4	1.0 05	166.1	44 43.2	1.0 05	166.0	45 13.2	1.0 05	165.9	46 13.1	1.0 05	165.8	2
3	38 40.9	1.0 05	165.3	39 10.9	1.0 05	165.2	39 40.8	1.0 05	165.2	40 40.8	1.0 05	165.1	42 40.6	1.0 05	165.0	44 40.3	1.0 05	164.8	45 10.3	1.0 05	164.8	46 10.2	1.0 05	164.7	3
4	38 37.9	1.0 05	164.1	39 07.9	1.0 05	164.1	39 37.8	1.0 05	164.1	40 37.7	1.0 05	164.0	42 37.5	1.0 06	163.8	44 37.2	1.0 06	163.6	45 07.2	1.0 06	163.6	46 07.0	1.0 06	163.5	4
15	38 34.7	1.0 06	163.0	39 04.6	1.0 06	163.0	39 34.6	1.0 06	162.9	40 34.4	1.0 06	162.8	42 34.2	1.0 06	162.7	44 33.9	1.0 06	162.5	45 03.8	1.0 06	162.4	46 03.7	1.0 06	162.3	15
6	38 31.2	1.0 06	161.9	39 01.2	1.0 06	161.8	39 31.1	1.0 06	161.8	40 30.9	1.0 06	161.7	42 30.7	1.0 06	161.5	44 30.3	1.0 06	161.3	45 00.3	1.0 06	161.3	46 00.1	1.0 06	161.2	6
7	38 27.6	1.0 06	160.8	38 57.5	1.0 06	160.7	39 27.4	1.0 06	160.7	40 27.2	1.0 07	160.6	42 26.9	1.0 07	160.4	44 26.6	1.0 07	160.2	44 56.5	1.0 07	160.1	45 56.3	1.0 07	160.0	7
8	38 23.7	1.0 07	159.6	38 53.6	1.0 07	159.6	39 23.5	1.0 07	159.5	40 23.3	1.0 07	159.4	42 23.0	1.0 07	159.2	44 22.6	1.0 07	159.0	44 52.5	1.0 07	158.9	45 52.2	1.0 07	158.8	8
9	38 19.6	1.0 07	158.5	38 49.5	1.0 07	158.5	39 19.4	1.0 07	158.4	40 19.2	1.0 07	158.3	42 18.8	1.0 07	158.1	44 18.4	1.0 07	157.8	44 48.2	1.0 07	157.8	45 48.0	1.0 07	157.7	9
20	38 15.3	1.0 08	157.4	38 45.2	1.0 08	157.3	39 15.1	1.0 08	157.3	40 14.9	1.0 08	157.2	42 14.4	1.0 08	156.9	44 13.9	1.0 08	156.7	44 43.8	1.0 08	156.6	45 43.5	1.0 08	156.5	20
1	38 10.8	1.0 08	156.3	38 40.7	1.0 08	156.2	39 10.6	1.0 08	156.2	40 10.3	1.0 08	156.0	42 09.8	1.0 08	155.8	44 09.3	1.0 08	155.5	44 39.2	1.0 08	155.5	45 38.9	1.0 08	155.3	1
2	38 06.1	1.0 08	155.1	38 35.9	1.0 08	155.1	39 05.8	1.0 08	155.0	40 05.6	1.0 08	154.9	42 05.0	1.0 08	154.7	44 04.4	1.0 08	154.4	44 34.3	99 08	154.3	45 34.0	99 08	154.2	2
3	38 01.2	1.0 09	154.0	38 31.0	1.0 09	154.0	39 00.9	1.0 09	153.9	40 00.6	1.0 09	153.8	42 00.0	99 09	153.5	43 59.4	99 09	153.2	44 29.2	99 09	153.2	45 28.9	99 09	153.0	3
4	37 56.0	1.0 09	152.9	38 25.9	1.0 09	152.9	38 55.8	1.0 09	152.8	39 55.4	99 09	152.7	41 54.8	99 09	152.4	43 54.1	99 09	152.1	44 24.0	99 09	152.0	45 23.6	99 09	151.9	4
25	37 50.7	99 09	151.8	38 20.6	99 09	151.7	38 50.4	99 09	151.7	39 50.1	99 09	151.5	41 49.4	99 09	151.3	43 48.7	99 09	151.0	44 18.5	99 09	150.9	45 18.1	99 10	150.7	25
6	37 45.2	99 10	150.7	38 15.1	99 10	150.6	38 44.9	99 10	150.6	39 44.5	99 10	150.4	41 43.8	99 10	150.1	43 43.0	99 10	149.8	44 12.8	99 10	149.7	45 12.4	99 10	149.6	6
7	37 39.5	99 10	149.6	38 09.3	99 10	149.5	38 39.2	99 10	149.4	39 38.8	99 10	149.3	41 38.0	99 10	149.0	43 37.2	99 10	148.7	44 07.0	99 10	148.6	45 06.5	99 10	148.4	7
8	37 33.6	99 10	148.5	38 03.4	99 10	148.4	38 33.2	99 10	148.3	39 32.8	99 10	148.2	41 32.0	99 10	147.9	43 31.1	99 10	147.5	44 00.9	99 10	147.5	45 00.4	99 10	147.3	8
9	37 27.6	99 10	147.4	37 57.3	99 10	147.3	38 27.1	99 10	147.2	39 26.7	99 11	147.1	41 25.8	99 11	146.7	43 24.9	99 11	146.4	43 54.6	99 11	146.3	44 54.1	99 11	146.1	9
30	37 21.3	99 11	146.3	37 51.1	99 11	146.2	38 20.8	99 11	146.1	39 20.4	99 11	146.0	41 19.5	99 11	145.6	43 18.4	99 11	145.3	43 48.2	99 11	145.2	44 47.7	99 11	145.0	30
1	37 14.8	99 11	145.2	37 44.6	99 11	145.1	38 14.4	99 11	145.0	39 13.9	99 11	144.8	41 12.9	99 11	144.5	43 11.8	99 11	144.1	43 41.6	99 11	144.1	44 41.0	99 11	143.9	1
2	37 08.2	99 11	144.1	37 38.0	99 11	144.0	38 07.7	99 11	143.9	39 07.2	99 11	143.7	41 06.2	99 12	143.4	43 05.0	99 12	143.0	43 34.7	99 12	142.9	44 34.2	99 12	142.7	2
3	37 01.4	99 12	143.0	37 31.1	99 12	142.9	38 00.9	99 12	142.8	39 00.4	99 12	142.6	40 59.2	99 12	142.3	42 58.1	99 12	141.9	43 27.8	99 12	141.8	44 27.1	99 12	141.6	3
4	36 54.4	99 12	141.9	37 24.1	99 12	141.8	37 53.9	99 12	141.7	38 53.3	99 12	141.5	40 52.2	99 12	141.2	42 50.9	99 12	140.8	43 20.6	99 12	140.7	44 19.9	99 12	140.5	4
35	36 47.3	99 12	140.8	37 17.0	99 12	140.7	37 46.7	99 12	140.6	38 46.1	99 12	140.4	40 44.9	99 12	140.1	42 43.6	99 12	139.7	43 13.2	99 13	139.6	44 12.6	99 13	139.3	35
6	36 39.9	99 12	139.7	37 09.6	99 13	139.6	37 39.3	99 13	139.5	38 38.7	99 13	139.3	40 37.4	99 13	138.9	42 36.1	99 13	138.5	43 05.7	99 13	138.4	44 05.0	99 13	138.2	6
7	36 32.5	99 13	138.6	37 02.1	99 13	138.5	37 31.8	99 13	138.4	38 31.2	99 13	138.2	40 29.8	99 13	137.8	42 28.4	99 13	137.4	42 58.1	99 13	137.3	43 57.3	99 13	137.1	7
8	36 24.8	99 13	137.5	36 54.5	99 13	137.4	37 24.1	99 13	137.3	38 23.5	99 13	137.1	40 22.1	99 13	136.7	42 20.6	99 13	136.3	42 50.2	99 13	136.2	43 49.4	99 13	136.0	8
9	36 17.0	99 13	136.4	36 46.6	99 13	136.3	37 16.3	99 13	136.2	38 15.6	99 13	136.0	40 14.2	99 13	135.6	42 12.6	99 14	135.2	42 42.2	99 14	135.1	43 41.4	99 14	134.9	9
40	36 09.0	99 14	135.3	36 38.7	99 14	135.2	37 08.3	99 14	135.2	38 07.6	99 14	135.0	40 06.1	99 14	134.5	42 04.5	99 14	134.1	42 34.1	99 14	134.0	43 33.2	99 14	133.8	40
1	36 00.9	99 14	134.3	36 30.5	99 14	134.2	37 00.2	99 14	134.1	37 59.4	99 14	133.9	39 57.8	99 14	133.5	41 56.2	99 14	133.0	42 25.8	99 14	132.9	43 24.9	99 14	132.7	1
2	35 52.6	99 14	133.2	36 22.2	99 14	133.1	36 51.9	99 14	133.0	37 51.1	99 14	132.8	39 49.5	99 14	132.4	41 47.7	99 14	131.9	42 17.3	98 14	131.8	43 16.4	98 14	131.6	2
3	35 44.2	99 14	132.1	36 13.8	99 14	132.0	36 43.4	99 14	131.9	37 42.6	99 14	131.7	39 40.9	99 14	131.3	41 39.1	98 15	130.8	42 08.7	98 15	130.7	43 07.7	98 15	130.5	3
4	35 35.6	99 14	131.0	36 05.2	99 15	130.9	36 34.8	99 15	130.8	37 34.0	99 15	130.6	39 32.3	99 15	130.2	41 30.4	98 15	129.7	41 59.9	98 15	129.6	42 59.0	98 15	129.4	4
45	35 26.9	99 15	130.0	35 56.5	99 15	129.9	36 26.1	99 15	129.8	37 25.2	99 15	129.6	39 23.4	98 15	129.1	41 21.5	98 15	128.6	41 51.0	98 15	128.5	42 50.0	98 15	128.3	45
6	35 18.1	99 15	128.9	35 47.7	99 15	128.8	36 17.2	99 15	128.7	37 16.3	99 15	128.5	39 14.5	98 15	128.0	41 12.5	98 15	127.6	41 42.0	98 15	127.4	42 41.0	98 15	127.2	6
7	35 09.1	99 15	127.8	35 38.7	99 15	127.7	36 08.2	98 15	127.6	37 07.3	98 15	127.4	39 05.4	98 15	127.0	41 03.4	98 15	126.5	41 32.9	98 15	126.4	42 31.8	98 16	126.1	7
8	35 00.0	98 15	126.8	35 29.5	98 15	126.7	35 59.1	98 15	126.6	36 58.1	98 15	126.3	38 56.2	98 16	125.9	40 54.1	98 16	125.4	41 23.6	98 16	125.3	42 22.5	98 16	125.0	8
9	34 50.8	98 16	125.7	35 20.3	98 16	125.6	35 49.8	98 15	125.5	36 48.9	98 16	125.3	38 46.9	98 16	124.8	40 44.7	98 16	124.3	41 14.2	98 16	124.2	42 13.0	98 16	123.9	9
50	34 41.4	98 16	124.7	35 10.9	98 16	124.5	35 40.4	98 16	124.4	36 39.5	98 16	124.2	38 37.4	98 16	123.7	40 35.2	98 16	123.3	41 04.6	98 16	123.1	42 03.5	98 16	122.9	50
1	34 31.9	98 16	123.6	35 01.4	98 16	123.5	35 30.9	98 16	123.4	36 29.9	98 16	123.2	38 27.8	98 16	122.7	40 25.6	98 16	122.2	40 55.0	98 16	122.1	41 53.8	98 16	121.8	1
2	34 22.3	98 16	122.5	34 51.8	98 16	122.4	35 21.3	98 16	122.3	36 20.3	98 16	122.1	38 18.1	98 16	121.6	40 15.8	98 16	121.1	40 45.2	98 16	121.0	41 44.0	98 16	120.7	2
3	34 12.6	98 16	121.5	34 42.1	98 16	121.4	35 11.6	98 16	121.3	36 10.5	98 16	121.0	38 08.3	98 17	120.6	40 06.0	98 17	120.1	40 35.4	98 17	119.9	41 34.1	98 17	119.7	3
4	34 02.8	98 17	120.4	34 32.3	98 17	120.3	35 01.8	98 17	120.2	36 00.7	98 17	120.0	37 58.4	98 17	119.5	39 56.0	98 17	119.0	40 25.4	98 17	118.9	41 24.1	98 17	118.6	4
55	33 52.9	98 17	119.4	34 22.4	98 17	119.3	34 51.8	98 17	119.2	35 50.7	98 17	118.9	37 48.4	98 17	118.4	39 46.0	98 17	117.9	40 15.3	98 17	117.8	41 14.0	98 17	117.5	55
6	33 42.9	98 17	118.4	34 12.3	98 17	118.2	34 41.8	98 17	118.1	35 40.6	98 17	117.9	37 38.3	98 17	117.4	39 35.8	98 17	116.9	40 05.1	98 17	116.7	41 03.8	98 17	116.5	6
7	33 32.7	98 17	117.3	34 02.2	98 17	117.2	34 31.6	98 17	117.1	35 30.5	98 17	116.8	37 28.1	98 17	116.4	39 25.5	98 17	115.8	39 54.9	98 17	115.7	40 53.5	98 17	115.4	7
8	33 22.5	98 17	116.3	33 52.0	98 17	116.2	34 21.4	98 17	116.0	35 20.2	98 17	115.8	37 17.8	98 17	115.3	39 15.2	98 17	114.8	39 44.5	98 17	114.6	40 43.1	98 17	114.4	8
9	33 12.2	98 17	115.2	33 41.6	98 17	115.1	34 11.0	98 17	115.0	35 09.9	98 17	114.8	37 07.4	98 17	114.3	39 04.7	98 18	113.7	39 34.1	98 18	113.6	40 32.7	98 18	113.3	9
60	33 01.8	98 17	114.2	33 31.2	98 18	114.1	34 00.6	98 18	114.0	34 59.4	98 18	113.7	36 56.9	98 18	113.2	38 54.2	98 18	112.7	39 23.5	98 18	112.6	40 22.1	98 18	112.3	60
1	32 51.3	98 18	113.2	33 20.7	98 18	113.1	33 50.1	98 18	112.9	34 48.9	98 18	112.7	36 46.3	98 18	112.2	38 43.6	98 18	111.7	39 12.9	98 18	111.5	40 11.5	98 18	111.2	1
2	32 40.8	98 18	112.1	33 10.2	98 18	112.0	33 39.5	98 18	111.9	34 38.3	98 18	111.7	36 35.7	98 18	111.2	38 32.9	98 18	110.6	39 02.2	98 18	110.5	40 00.8	98 18	110.2	2
3	32 30.1	98 18	111.1	32 59.5	98 18	111.0	33 28.9	98 18	110.9	34 27.6	98 18	110.6	36 25.0	98 18	110.1	38 22.2	98 18	109.6	38 51.5	98 18	109.4	39 50.0	98 18	109.2	3
4	32 19.4	98 18	110.1	32 48.8	98 18	110.0	33 18.2	98 18	109.9	34 16.9	98 18	109.6	36 14.2	98 18	109.1	38 11.4	98 18	108.6	38 40.6	98 18	108.4	39 39.2	97 18	108.1	4
65	32 08.6	98 18	109.1	32 38.0	98 18	109.0	33 07.4	98 18	108.8	34 06.0	98 18	108.6	36 03.3	98 18	108.1	38 00.5	98 18	107.5	38 29.7	98 18	107.4	39 28.2	97 18	107.1	65
6	31 57.8	98 18	108.1	32 27.1	98 18	107.9	32 56.5	98 18	107.8	33 55.2	98 18	107.6	35 52.4	98 18	107.0	37 49.5	98 18	106.5	38 18.8	98 18	106.4	39 17.3	97 18	106.1	6
7	31 46.9	98 18	107.0	32 16.2	98 18	106.9	32 45.6	98 18	106.8	33 44.2	98 18	106.5	35 41.4	98 18	106.0	37 38.5	98 18	105.5	38 07.8	97 18	105.3	39 06.2	97 18	105.0	7
8	31 35.9	98 18	106.0	32 05.2	98 18	105.9	32 34.6	98 18	105.8	33 33.2	98 18	105.5	35 30.4	98 18	105.0	37 27.5	97 18	104.5	37 56.7	97 18	104.3	38 55.2	97 19	104.0	8
9	31 24.9	98 18	105.0	31 54.2	98 18	104.9	32 23.5	98 18	104.8	33 22.2	98 18	104.5	35 19.3	98 19	104.0	37 16.4	97 19	103.4	37 45.6	97 19	103.3	38 44.0	97 19	103.0	9
70	31 13.8	98 19	104.0	31 43.1	98 19	103.9	32 12.4	98 19	103.8	33 11.0	98 19	103.5	35 08.2	98 19	103.0	37 05.2	97 19	102.4	37 34.4	97 19	102.3	38 32.8	97 19	102.0	70
1	31 02.6	98 19	103.0	31 32.0	98 19	102.9	32 01.3	98 19	102.7	32 59.9	98 19	102.5	34 57.0	98 19	102.0	36 54.0	97 19	101.4	37 23.2	97 19	101.3	38 21.6	97 19	101.0	1
2	30 51.5	98 19	102.0	31 20.8	98 19	101.9	31 50.1	98 19	101.7	32 48.7	98 19	101.5	34 45.8	98 19	101.0	36 42.8	97 19	100.4	37 12.0	97 19	100.3	38 10.4	97 19	100.0	2
3	30 40.2	98 19	101.0	31 09.6	98 19	100.9	31 38.9	98 19	100.7	32 37.5	98 19	100.5	34 34.5	98 19	100.0	36 31.5	97 19	99.4	37 00.7	97 19	99.3	37 59.1	97 19	99.0	3
4	30 29.0	98 19	100.0	30 58.3	98 19	99.9	31 27.6	98 19	99.7	32 26.2	98 19	99.5	34 23.2	97 19	98.9	36 20.2	97 19	98.4	36 49.4	97 19	98.3	37 47.8	97 19	98.0	4
75	30 17.7	98 19	99.0	30 47.0	98 19	98.9	31 16.3	98 19	98.7	32 14.9	98 19	98.5	34 11.9	97 19	97.9	36 08.8	97 19	97.4	36 38.0	97 19	97.3	37 36.4	97 19	97.0	75
6	30 06.4	98 19	98.0	30 35.7	98 19	97.9	31 05.0	98 19	97.7	32 03.5	98 19	97.5	34 00.6	97 19	96.9	35 57.5	97 19	96.4	36 26.7	97 19	96.3	37 25.0	97 19	96.0	6
7	29 55.0	98 19	97.0	30 24.3	98 19	96.9	30 53.6	98 19	96.7	31 52.2	98 19	96.5	33 49.2	97 19	96.0	35 46.1	97 19	95.4	36 15.3	97 19	95.3	37 13.6	97 19	95.0	7
8	29 43.6	98 19	96.0	30 12.9	98 19	95.9	30 42.2	98 19	95.7	31 40.8	98 19	95.5	33 37.8	97 19	95.0	35 34.7	97 19	94.4	36 03.9	97 19	94.3	37 02.2	97 19	94.0	8
9	29 32.2	98 19	95.0	30 01.5	98 19	94.9	30 30.8	98 19	94.7	31 29.4	98 19	94.5	33 26.4	97 19	94.0	35 23.2	97 19	93.4	35 52.4	97 19	93.3	36 50.8	97 19	93.0	9
80	29 20.8	98 19	94.0	29 50.1	98 19	93.9	30 19.4	98 19	93.8	31 18.0	98 19	93.5	33 15.0	97 19	93.0	35 11.8	97 19	92.4	35 41.0	97 19	92.3	36 39.4	97 19	92.0	80
1	29 09.4	98 19	93.0	29 38.7	98 19	92.9	30 08.0	98 19	92.8	31 06.5	98 19	92.5	33 03.5	97 19	92.0	35 00.4	97 19	91.4	35 29.6	97 19	91.3	36 27.9	97 19	91.0	1
2	28 58.0	98 19	92.0	29 27.3	98 19	91.9	29 56.5	98 19	91.8	30 55.1	98 19	91.5	32 52.1	97 19	91.0	34 48.9	97 19	90.5	35 18.1	97 19	90.3	36 16.5	97 19	90.0	2
3	28 46.5	98 19	91.0	29 15.8	98 19	90.9	29 45.1	98 19	90.8	30 43.6	98 19	90.5	32 40.6	97 19	90.0	34 37.5	97 19	89.5	35 06.7	97 19	89.3	36 05.0	97 19	89.0	3
4	28 35.1	98 19	90.1	29 04.4	98 19	89.9	29 33.6	98 19	89.8	30 32.2	98 19	89.6	32 29.2	97 19	89.0	34 26.0	97 19	88.5	34 55.2	97 19	88.4	35 53.6	97 19	88.1	4
85	28 23.6	98 19	89.1	28 52.9	98 19	89.0	29 22.2	98 19	88.8	30 20.7	98 19	88.6	32 17.7	97 19	88.1	34 14.6	97 19	87.5	34 43.8	97 19	87.4	35 42.1	97 19	87.1	85
6	28 12.2	98 19	88.1	28 41.5	98 19	88.0	29 10.8	98 19	87.9	30 09.3	98 19	87.6	32 06.3	97 19	87.1	34 03.2	97 19	86.5	34 32.3	97 19	86.4	35 30.7	97 19	86.1	6
7	28 00.7	98 19	87.1	28 30.0	98 19	87.0	28 59.3	98 19	86.9	29 57.9	98 19	86.6	31 54.9	97 19	86.1	33 51.7	97 19	85.6	34 20.9	97 19	85.4	35 19.3	97 19	85.2	7
8	27 49.3	98 19	86.2	28 18.6	98 19	86.0	28 47.9	98 19	85.9	29 46.4	98 19	85.7	31 43.4	97 19	85.1	33 40.3	97 19	84.6	34 09.5	97 19	84.5	35 07.9	97 19	84.2	8
9	27 37.9	98 19	85.2	28 07.2	98 19	85.1	28 36.5	98 19	84.9	29 35.0	98 19	84.7	31 32.1	97 19	84.2	33 28.9	97 19	83.6	33 58.1	97 19	83.5	34 56.5	97 19	83.2	9
90	27 26.5	98 19	84.2	27 55.8	98 19	84.1	28 25.1	98 19	84.0	29 23.6	98 19	83.7	31 20.7	97 19	83.2	33 17.6	97 19	82.7	33 46.8	97 19	82.5	34 45.2	97 19	82.2	90

Lat. 79°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	27 15.1	98 19	83.2	27 44.4	98 19	83.1	28 13.7	98 19	83.0	29 12.3	98 19	82.7	31 09.3	97 19	82.2	33 06.2	97 19	81.7	33 35.4	97 19	81.6	34 33.8	97 19	81.3	91
2	27 03.8	98 19	82.3	27 33.1	98 19	82.1	28 02.4	98 19	82.0	29 00.9	98 19	81.8	30 58.0	97 19	81.3	32 54.9	97 19	80.7	33 24.1	97 19	80.6	34 22.5	97 19	80.3	2
3	26 52.4	98 19	81.3	27 21.7	98 19	81.2	27 51.0	98 19	81.1	28 49.6	98 19	80.8	30 46.7	98 19	80.3	32 43.6	97 19	79.8	33 12.8	97 19	79.6	34 11.3	97 19	79.4	3
4	26 41.1	98 19	80.3	27 10.4	98 19	80.2	27 39.7	98 19	80.1	28 38.3	98 19	79.8	30 35.4	98 19	79.3	32 32.4	97 19	78.8	33 01.6	97 19	78.7	34 00.0	97 19	78.4	4
95	26 29.9	98 19	79.4	26 59.2	98 19	79.2	27 28.5	98 19	79.1	28 27.1	98 19	78.9	30 24.2	98 19	78.4	32 21.2	97 19	77.9	32 50.4	97 19	77.7	33 48.8	97 19	77.5	95
6	26 18.6	98 19	78.4	26 47.9	98 19	78.3	27 17.3	98 19	78.2	28 15.9	98 19	77.9	30 13.0	98 19	77.4	32 10.0	97 19	76.9	32 39.2	97 19	76.8	33 37.7	97 18	76.5	6
7	26 07.4	98 19	77.4	26 36.8	98 19	77.3	27 06.1	98 19	77.2	28 04.7	98 19	77.0	30 01.8	98 18	76.5	31 58.9	97 18	76.0	32 28.1	97 18	75.8	33 26.6	97 18	75.6	7
8	25 56.3	98 19	76.5	26 25.6	98 19	76.4	26 54.9	98 18	76.2	27 53.6	98 18	76.0	29 50.7	98 18	75.5	31 47.8	97 18	75.0	32 17.0	97 18	74.9	33 15.5	97 18	74.6	8
9	25 45.2	98 18	75.5	26 14.5	98 18	75.4	26 43.8	98 18	75.3	27 42.5	98 18	75.1	29 39.7	98 18	74.6	31 36.8	98 18	74.1	32 06.0	97 18	73.9	33 04.5	97 18	73.7	9
100	25 34.1	98 18	74.6	26 03.5	98 18	74.4	26 32.8	98 18	74.3	27 31.4	98 18	74.1	29 28.7	98 18	73.6	31 25.8	98 18	73.1	31 55.0	98 18	73.0	32 53.5	97 18	72.7	100
1	25 23.1	98 18	73.6	25 52.4	98 18	73.5	26 21.8	98 18	73.4	27 20.5	98 18	73.1	29 17.7	98 18	72.7	31 14.8	98 18	72.2	31 44.1	98 18	72.0	32 42.6	97 18	71.8	1
2	25 12.1	98 18	72.7	25 41.5	98 18	72.5	26 10.8	98 18	72.4	27 09.5	98 18	72.2	29 06.8	98 18	71.7	31 04.0	98 18	71.2	31 33.3	98 18	71.1	32 31.8	98 18	70.8	2
3	25 01.2	98 18	71.7	25 30.6	98 18	71.6	26 00.0	98 18	71.5	26 58.7	98 18	71.2	28 56.0	98 18	70.8	30 53.2	98 18	70.3	31 22.5	98 18	70.1	32 21.0	98 18	69.9	3
4	24 50.4	98 18	70.7	25 19.8	98 18	70.6	25 49.1	98 18	70.5	26 47.8	98 18	70.3	28 45.2	98 18	69.8	30 42.4	98 18	69.3	31 11.7	98 18	69.2	32 10.3	98 18	68.9	4
105	24 39.6	98 18	69.8	25 09.0	98 18	69.7	25 38.4	98 18	69.6	26 37.1	98 18	69.3	28 34.5	98 18	68.9	30 31.8	98 18	68.4	31 01.1	98 18	68.3	31 59.6	98 18	68.0	105
6	24 28.9	98 18	68.8	24 58.3	98 18	68.7	25 27.7	98 18	68.6	26 26.4	98 18	68.4	28 23.8	98 18	67.9	30 21.1	98 18	67.4	30 50.5	98 18	67.3	31 49.1	98 18	67.1	6
7	24 18.3	98 18	67.9	24 47.7	98 18	67.8	25 17.1	98 18	67.7	26 15.8	98 18	67.4	28 13.3	98 18	67.0	30 10.6	98 17	66.5	30 39.9	98 17	66.4	31 38.5	98 17	66.1	7
8	24 07.7	98 18	66.9	24 37.1	98 18	66.8	25 06.5	98 17	66.7	26 05.3	98 17	66.5	28 02.8	98 17	66.0	30 00.1	98 17	65.6	30 29.5	98 17	65.4	31 28.1	98 17	65.2	8
9	23 57.2	98 17	66.0	24 26.6	98 17	65.9	24 56.0	98 17	65.8	25 54.8	98 17	65.6	27 52.3	98 17	65.1	29 49.8	98 17	64.6	30 19.1	98 17	64.5	31 17.8	98 17	64.3	9
110	23 46.8	98 17	65.1	24 16.2	98 17	64.9	24 45.6	98 17	64.8	25 44.4	98 17	64.6	27 42.0	98 17	64.2	29 39.5	98 17	63.7	30 08.8	98 17	63.6	31 07.5	98 17	63.3	110
1	23 36.5	98 17	64.1	24 05.9	98 17	64.0	24 35.3	98 17	63.9	25 34.1	98 17	63.7	27 31.7	98 17	63.2	29 29.2	98 17	62.8	29 58.6	98 17	62.6	30 57.3	98 17	62.4	1
2	23 26.2	98 17	63.2	23 55.6	98 17	63.1	24 25.1	98 17	62.9	25 23.9	98 17	62.7	27 21.5	98 17	62.3	29 19.1	98 17	61.8	29 48.5	98 17	61.7	30 47.2	98 17	61.5	2
3	23 16.0	98 17	62.2	23 45.5	98 17	62.1	24 14.9	98 17	62.0	25 13.8	98 17	61.8	27 11.5	98 17	61.4	29 09.0	98 17	60.9	29 38.4	98 17	60.8	30 37.2	98 17	60.6	3
4	23 05.9	98 17	61.3	23 35.4	98 17	61.2	24 04.8	98 17	61.1	25 03.7	98 17	60.9	27 01.5	98 16	60.4	28 59.1	98 16	60.0	29 28.5	98 16	59.9	30 27.3	98 16	59.6	4
115	22 55.9	98 16	60.3	23 25.4	98 16	60.2	23 54.9	98 16	60.1	24 53.8	98 16	59.9	26 51.5	98 16	59.5	28 49.2	98 16	59.0	29 18.6	98 16	58.9	30 17.4	98 16	58.7	115
6	22 46.0	98 16	59.4	23 15.5	98 16	59.3	23 45.0	98 16	59.2	24 43.9	98 16	59.0	26 41.7	98 16	58.6	28 39.5	98 16	58.1	29 08.9	98 16	58.0	30 07.7	98 16	57.8	6
7	22 36.2	98 16	58.4	23 05.7	98 16	58.3	23 35.2	98 16	58.2	24 34.2	98 16	58.0	26 32.0	98 16	57.6	28 29.8	98 16	57.2	28 59.2	98 16	57.1	29 58.1	98 16	56.9	7
8	22 26.5	98 16	57.5	22 56.0	98 16	57.4	23 25.5	98 16	57.3	24 24.5	98 16	57.1	26 22.4	98 16	56.7	28 20.2	98 16	56.3	28 49.7	98 16	56.2	29 48.5	98 16	55.9	8
9	22 16.9	98 16	56.6	22 46.4	98 16	56.5	23 15.9	98 16	56.4	24 14.9	98 16	56.2	26 12.9	98 16	55.8	28 10.7	98 16	55.3	28 40.2	98 16	55.2	29 39.1	98 16	55.0	9
120	22 07.4	98 16	55.6	22 36.9	98 16	55.5	23 06.5	98 16	55.4	24 05.5	98 16	55.2	26 03.5	98 16	54.8	28 01.4	98 15	54.4	28 30.8	98 15	54.3	29 29.8	98 15	54.1	120
1	21 58.0	98 15	54.7	22 27.6	98 15	54.6	22 57.1	98 15	54.5	23 56.1	98 15	54.3	25 54.2	98 15	53.9	27 52.1	98 15	53.5	28 21.6	98 15	53.4	29 20.5	98 15	53.2	1
2	21 48.7	98 15	53.8	22 18.3	98 15	53.7	22 47.8	98 15	53.6	23 46.9	98 15	53.4	25 45.0	98 15	53.0	27 43.0	98 15	52.6	28 12.5	98 15	52.5	29 11.4	98 15	52.3	2
3	21 39.6	99 15	52.8	22 09.1	98 15	52.7	22 38.7	98 15	52.6	23 37.7	98 15	52.4	25 35.9	98 15	52.1	27 33.9	98 15	51.7	28 03.4	98 15	51.6	29 02.4	98 15	51.3	3
4	21 30.5	99 15	51.9	22 00.1	99 15	51.8	22 29.6	99 15	51.7	23 28.7	99 15	51.5	25 26.9	98 15	51.1	27 25.0	98 15	50.7	27 54.5	98 15	50.6	28 53.6	98 15	50.4	4
125	21 21.5	99 15	51.0	21 51.1	99 15	50.9	22 20.7	99 15	50.8	23 19.8	99 15	50.6	25 18.0	98 15	50.2	27 16.2	98 14	49.8	27 45.7	98 14	49.7	28 44.8	98 14	49.5	125
6	21 12.7	99 15	50.0	21 42.3	99 14	49.9	22 11.9	99 14	49.8	23 11.0	99 14	49.7	25 09.3	99 14	49.3	27 07.5	98 14	48.9	27 37.1	98 14	48.8	28 36.1	98 14	48.6	6
7	21 04.0	99 14	49.1	21 33.6	99 14	49.0	22 03.2	99 14	48.9	23 02.4	99 14	48.7	25 00.7	99 14	48.4	26 59.0	99 14	48.0	27 28.5	99 14	47.9	28 27.6	98 14	47.7	7
8	20 55.4	99 14	48.1	21 25.0	99 14	48.1	21 54.6	99 14	48.0	22 53.8	99 14	47.8	24 52.2	99 14	47.4	26 50.5	99 14	47.1	27 20.1	99 14	47.0	28 19.2	99 14	46.8	8
9	20 47.0	99 14	47.2	21 16.6	99 14	47.1	21 46.2	99 14	47.0	22 45.4	99 14	46.9	24 43.8	99 14	46.5	26 42.2	99 14	46.2	27 11.8	99 14	46.1	28 10.9	99 14	45.9	9
130	20 38.6	99 14	46.3	21 08.2	99 14	46.2	21 37.9	99 14	46.1	22 37.1	99 14	45.9	24 35.6	99 14	45.6	26 34.0	99 13	45.2	27 03.6	99 13	45.1	28 02.8	99 13	45.0	130
1	20 30.4	99 13	45.4	21 00.0	99 13	45.3	21 29.7	99 13	45.2	22 29.0	99 13	45.0	24 27.5	99 13	44.7	26 25.9	99 13	44.3	26 55.5	99 13	44.2	27 54.7	99 13	44.1	1
2	20 22.3	99 13	44.4	20 52.0	99 13	44.3	21 21.6	99 13	44.3	22 20.9	99 13	44.1	24 19.5	99 13	43.8	26 18.0	99 13	43.4	26 47.6	99 13	43.3	27 46.9	99 13	43.1	2
3	20 14.4	99 13	43.5	20 44.0	99 13	43.4	21 13.7	99 13	43.3	22 13.0	99 13	43.2	24 11.6	99 13	42.8	26 10.2	99 13	42.5	26 39.8	99 13	42.4	27 39.1	99 13	42.2	3
4	20 06.6	99 13	42.6	20 36.2	99 13	42.5	21 05.9	99 13	42.4	22 05.3	99 13	42.2	24 03.9	99 13	41.9	26 02.5	99 13	41.6	26 32.2	99 13	41.5	27 31.5	99 12	41.3	4
135	19 58.9	99 13	41.6	20 28.6	99 13	41.6	20 58.3	99 13	41.5	21 57.6	99 12	41.3	23 56.3	99 12	41.0	25 55.0	99 12	40.7	26 24.7	99 12	40.6	27 24.0	99 12	40.4	135
6	19 51.4	99 12	40.7	20 21.1	99 12	40.6	20 50.8	99 12	40.6	21 50.1	99 12	40.4	23 48.9	99 12	40.1	25 47.6	99 12	39.8	26 17.3	99 12	39.7	27 16.6	99 12	39.5	6
7	19 44.0	99 12	39.8	20 13.7	99 12	39.7	20 43.4	99 12	39.6	21 42.8	99 12	39.5	23 41.6	99 12	39.2	25 40.4	99 12	38.9	26 10.0	99 12	38.8	27 09.4	99 12	38.6	7
8	19 36.7	99 12	38.8	20 06.4	99 12	38.8	20 36.1	99 12	38.7	21 35.6	99 12	38.6	23 34.4	99 12	38.3	25 33.2	99 12	37.9	26 02.9	99 12	37.9	27 02.3	99 12	37.7	8
9	19 29.6	99 12	37.9	19 59.3	99 12	37.8	20 29.1	99 12	37.8	21 28.5	99 12	37.6	23 27.4	99 11	37.3	25 26.3	99 11	37.0	25 56.0	99 11	37.0	26 55.4	99 11	36.8	9
140	19 22.6	99 11	37.0	19 52.4	99 11	36.9	20 22.1	99 11	36.8	21 21.6	99 11	36.7	23 20.5	99 11	36.4	25 19.5	99 11	36.1	25 49.2	99 11	36.1	26 48.6	99 11	35.9	140
1	19 15.8	99 11	36.1	19 45.6	99 11	36.0	20 15.3	99 11	35.9	21 14.8	99 11	35.8	23 13.8	99 11	35.5	25 12.8	99 11	35.2	25 42.5	99 11	35.1	26 42.0	99 11	35.0	1
2	19 09.2	99 11	35.1	19 38.9	99 11	35.1	20 08.7	99 11	35.0	21 08.2	99 11	34.9	23 07.2	99 11	34.6	25 06.2	99 11	34.3	25 36.0	99 11	34.2	26 35.5	99 11	34.1	2
3	19 02.6	99 11	34.2	19 32.4	99 11	34.1	20 02.2	99 11	34.1	21 01.7	99 11	33.9	23 00.8	99 10	33.7	24 59.9	99 10	33.4	25 29.6	99 10	33.3	26 29.1	99 10	33.2	3
4	18 56.3	99 10	33.3	19 26.1	99 10	33.2	19 55.9	99 10	33.2	20 55.4	99 10	33.0	22 54.6	99 10	32.8	24 53.6	99 10	32.5	25 23.4	99 10	32.4	26 22.9	99 10	32.3	4
145	18 50.1	99 10	32.4	19 19.9	99 10	32.3	19 49.7	99 10	32.2	20 49.3	99 10	32.1	22 48.4	99 10	31.8	24 47.6	99 10	31.6	25 17.4	99 10	31.5	26 16.9	99 10	31.4	145
6	18 44.0	99 10	31.4	19 13.8	99 10	31.4	19 43.7	99 10	31.3	20 43.3	99 10	31.2	22 42.5	99 10	30.9	24 41.7	99 10	30.7	25 11.4	99 10	30.6	26 11.0	99 10	30.5	6
7	18 38.1	99 10	30.5	19 08.0	99 10	30.4	19 37.8	99 10	30.4	20 37.4	99 09	30.3	22 36.7	99 09	30.0	24 35.9	99 09	29.8	25 05.7	99 09	29.7	26 05.3	99 09	29.6	7
8	18 32.4	99 09	29.6	19 02.2	99 09	29.5	19 32.1	99 09	29.5	20 31.7	99 09	29.3	22 31.0	99 09	29.1	24 30.3	99 09	28.9	25 00.1	99 09	28.8	25 59.7	99 09	28.7	8
9	18 26.8	99 09	28.6	18 56.7	99 09	28.6	19 26.5	99 09	28.5	20 26.2	99 09	28.4	22 25.5	99 09	28.2	24 24.8	99 09	28.0	24 54.7	99 09	27.9	25 54.3	99 09	27.8	9
150	18 21.4	99 09	27.7	18 51.3	99 09	27.7	19 21.1	99 09	27.6	20 20.8	99 09	27.5	22 20.2	99 09	27.3	24 19.5	99 09	27.1	24 49.4	99 09	27.0	25 49.0	99 08	26.9	150
1	18 16.2	1.0 08	26.8	18 46.1	1.0 08	26.7	19 15.9	1.0 08	26.7	20 15.6	1.0 08	26.6	22 15.0	99 08	26.4	24 14.4	99 08	26.2	24 44.3	99 08	26.1	25 44.0	99 08	26.0	1
2	18 11.1	1.0 08	25.9	18 41.0	1.0 08	25.8	19 10.9	1.0 08	25.8	20 10.6	1.0 08	25.7	22 10.0	1.0 08	25.5	24 09.5	1.0 08	25.2	24 39.3	1.0 08	25.2	25 39.0	1.0 08	25.1	2
3	18 06.2	1.0 08	24.9	18 36.1	1.0 08	24.9	19 06.0	1.0 08	24.8	20 05.7	1.0 08	24.7	22 05.2	1.0 08	24.6	24 04.7	1.0 08	24.3	24 34.5	1.0 08	24.3	25 34.2	1.0 08	24.2	3
4	18 01.5	1.0 08	24.0	18 31.3	1.0 08	24.0	19 01.2	1.0 08	23.9	20 01.0	1.0 08	23.8	22 00.5	1.0 08	23.6	24 00.0	1.0 07	23.4	24 29.9	1.0 07	23.4	25 29.6	1.0 07	23.3	4
155	17 56.9	1.0 07	23.1	18 26.8	1.0 07	23.0	18 56.7	1.0 07	23.0	19 56.5	1.0 07	22.9	21 56.0	1.0 07	22.7	23 55.5	1.0 07	22.5	24 25.4	1.0 07	22.5	25 25.2	1.0 07	22.4	155
6	17 52.5	1.0 07	22.2	18 22.4	1.0 07	22.1	18 52.3	1.0 07	22.1	19 52.1	1.0 07	22.0	21 51.7	1.0 07	21.8	23 51.2	1.0 07	21.6	24 21.1	1.0 07	21.6	25 20.9	1.0 07	21.5	6
7	17 48.2	1.0 07	21.2	18 18.2	1.0 07	21.2	18 48.1	1.0 07	21.2	19 47.9	1.0 07	21.1	21 47.5	1.0 07	20.9	23 47.1	1.0 07	20.7	24 17.0	1.0 07	20.7	25 16.8	1.0 07	20.6	7
8	17 44.2	1.0 06	20.3	18 14.1	1.0 06	20.3	18 44.0	1.0 06	20.2	19 43.8	1.0 06	20.2	21 43.5	1.0 06	20.0	23 43.1	1.0 06	19.8	24 13.0	1.0 06	19.8	25 12.9	1.0 06	19.7	8
9	17 40.3	1.0 06	19.4	18 10.2	1.0 06	19.4	18 40.1	1.0 06	19.3	19 40.0	1.0 06	19.2	21 39.7	1.0 06	19.1	23 39.3	1.0 06	18.9	24 09.3	1.0 06	18.9	25 09.1	1.0 06	18.8	9
160	17 36.6	1.0 06	18.5	18 06.5	1.0 06	18.4	18 36.4	1.0 06	18.4	19 36.3	1.0 06	18.3	21 36.0	1.0 06	18.2	23 35.7	1.0 06	18.0	24 05.6	1.0 06	18.0	25 05.5	1.0 06	17.9	160
1	17 33.0	1.0 06	17.5	18 03.0	1.0 06	17.5	18 32.9	1.0 06	17.5	19 32.8	1.0 06	17.4	21 32.5	1.0 06	17.3	23 32.2	1.0 05	17.1	24 02.2	1.0 05	17.1	25 02.0	1.0 05	17.0	1
2	17 29.7	1.0 05	16.6	17 59.6	1.0 05	16.6	18 29.6	1.0 05	16.6	19 29.4	1.0 05	16.5	21 29.2	1.0 05	16.4	23 29.0	1.0 05	16.2	23 58.9	1.0 05	16.2	24 58.8	1.0 05	16.1	2
3	17 26.5	1.0 05	15.7	17 56.4	1.0 05	15.7	18 26.4	1.0 05	15.6	19 26.3	1.0 05	15.6	21 26.1	1.0 05	15.4	23 25.9	1.0 05	15.3	23 55.8	1.0 05	15.3	24 55.7	1.0 05	15.2	3
4	17 23.5	1.0 05	14.8	17 53.4	1.0 05	14.7	18 23.4	1.0 05	14.7	19 23.3	1.0 05	14.7	21 23.1	1.0 05	14.5	23 22.9	1.0 05	14.4	23 52.9	1.0 05	14.4	24 52.8	1.0 05	14.3	4
165	17 20.7	1.0 04	13.9	17 50.6	1.0 04	13.8	18 20.6	1.0 04	13.8	19 20.5	1.0 04	13.7	21 20.3	1.0 04	13.6	23 20.2	1.0 04	13.5	23 50.1	1.0 04	13.5	24 50.0	1.0 04	13.4	165
6	17 18.0	1.0 04	12.9	17 48.0	1.0 04	12.9	18 17.9	1.0 04	12.9	19 17.9	1.0 04	12.8	21 17.7	1.0 04	12.7	23 17.6	1.0 04	12.6	23 47.5	1.0 04	12.6	24 47.5	1.0 04	12.5	6
7	17 15.5	1.0 04	12.0	17 45.5	1.0 04	12.0	18 15.5	1.0 04	12.0	19 15.4	1.0 04	11.9	21 15.3	1.0 04	11.8	23 15.2	1.0 04	11.7	23 45.1	1.0 04	11.7	24 45.1	1.0 04	11.6	7
8	17 13.2	1.0 04	11.1	17 43.2	1.0 04	11.1	18 13.2	1.0 04	11.0	19 13.1	1.0 03	11.0	21 13.0	1.0 03	10.9	23 12.9	1.0 03	10.8	23 42.9	1.0 03	10.8	24 42.8	1.0 03	10.7	8
9	17 11.1	1.0 03	10.2	17 41.1	1.0 03	10.1	18 11.1	1.0 03	10.1	19 11.0	1.0 03	10.1	21 11.0	1.0 03	10.0	23 10.9	1.0 03	09.9	23 40.8	1.0 03	09.9	24 40.8	1.0 03	09.8	9
170	17 09.2	1.0 03	09.2	17 39.2	1.0 03	09.2	18 09.2	1.0 03	09.2	19 09.1	1.0 03	09.2	21 09.1	1.0 03	09.1	23 09.0	1.0 03	09.0	23 39.0	1.0 03	09.0	24 38.9	1.0 03	08.9	170
1	17 07.5	1.0 03	08.3	17 37.4	1.0 03	08.3	18 07.4	1.0 03	08.3	19 07.4	1.0 03	08.2	21 07.3	1.0 03	08.2	23 07.3	1.0 03	08.1	23 37.3	1.0 03	08.1	24 37.2	1.0 03	08.1	1
2	17 05.9	1.0 02	07.4	17 35.9	1.0 02	07.4	18 05.9	1.0 02	07.4	19 05.8	1.0 02	07.3	21 05.8	1.0 02	07.3	23 05.8	1.0 02	07.2	23 35.7	1.0 02	07.2	24 35.7	1.0 02	07.2	2
3	17 04.5	1.0 02	06.5	17 34.5	1.0 02	06.5	18 04.5	1.0 02	06.4	19 04.5	1.0 02	06.4	21 04.4	1.0 02	06.4	23 04.4	1.0 02	06.3	23 34.4	1.0 02	06.3	24 34.4	1.0 02	06.3	3
4	17 03.3	1.0 02	05.5	17 33.3	1.0 02	05.5	18 03.3	1.0 02	05.5	19 03.3	1.0 02	05.5	21 03.3	1.0 02	05.5	23 03.2	1.0 02	05.4	23 33.2	1.0 02	05.4	24 33.2	1.0 02	05.4	4
175	17 02.3	1.0 01	04.6	17 32.3	1.0 01	04.6	18 02.3	1.0 01	04.6	19 02.3	1.0 01	04.6	21 02.3	1.0 01	04.5	23 02.2	1.0 01	04.5	23 32.2	1.0 01	04.5	24 32.2	1.0 01	04.5	175
6	17 01.5	1.0 01	03.7	17 31.5	1.0 01	03.7	18 01.5	1.0 01	03.7	19 01.5	1.0 01	03.7	21 01.5	1.0 01	03.6	23 01.4	1.0 01	03.6	23 31.4	1.0 01	03.6	24 31.4	1.0 01	03.6	6
7	17 00.8	1.0 01	02.8	17 30.8	1.0 01	02.8	18 00.8	1.0 01	02.8	19 00.8	1.0 01	02.7	21 00.8	1.0 01	02.7	23 00.8	1.0 01	02.7	23 30.8	1.0 01	02.7	24 30.8	1.0 01	02.7	7
8	17 00.4	1.0 00	01.8	17 30.4	1.0 00	01.8	18 00.4	1.0 00	01.8	19 00.4	1.0 00	01.8	21 00.4	1.0 00	01.8	23 00.4	1.0 00	01.8	23 30.4	1.0 00	01.8	24 30.4	1.0 00	01.8	8
9	17 00.1	1.0 00	00.9	17 30.1	1.0 00	00.9	18 00.1	1.0 00	00.9	19 00.1	1.0 00	00.9	21 00.1	1.0 00	00.9	23 00.1	1.0 00	00.9	23 30.1	1.0 00	00.9	24 30.1	1.0 00	00.9	9
180	17 00.0	1.0 00	00.0	17 30.0	1.0 00	00.0	18 00.0	1.0 00	00.0	19 00.0	1.0 00	00.0	21 00.0	1.0 00	00.0	23 00.0	1.0 00	00.0	23 30.0	1.0 00	00.0	24 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	47 00.0	1.0 00	180.0	48 00.0	1.0 00	180.0	49 30.0	1.0 00	180.0	51 00.0	1.0 00	180.0	53 00.0	1.0 00	180.0	53 30.0	1.0 00	180.0	54 00.0	1.0 00	180.0	56 00.0	1.0 00	180.0	00
1	46 59.9	1.0 01	178.8	47 59.9	1.0 01	178.8	49 29.9	1.0 01	178.8	50 59.9	1.0 01	178.8	52 59.9	1.0 01	178.8	53 29.9	1.0 01	178.8	53 59.9	1.0 01	178.8	55 59.9	1.0 01	178.7	1
2	46 59.5	1.0 01	177.6	47 59.5	1.0 01	177.6	49 29.5	1.0 01	177.6	50 59.5	1.0 01	177.6	52 59.5	1.0 01	177.5	53 29.5	1.0 01	177.5	53 59.5	1.0 01	177.5	55 59.5	1.0 01	177.5	2
3	46 58.9	1.0 01	176.4	47 58.9	1.0 01	176.4	49 28.9	1.0 01	176.4	50 58.9	1.0 01	176.3	52 58.9	1.0 01	176.3	53 28.9	1.0 01	176.3	53 58.9	1.0 01	176.3	55 58.9	1.0 01	176.2	3
4	46 58.1	1.0 02	175.3	47 58.1	1.0 02	175.2	49 28.1	1.0 02	175.2	50 58.1	1.0 02	175.1	52 58.0	1.0 02	175.1	53 28.0	1.0 02	175.0	53 58.0	1.0 02	175.0	55 58.0	1.0 02	174.9	4
05	46 57.0	1.0 02	174.1	47 57.0	1.0 02	174.0	49 27.0	1.0 02	174.0	50 57.0	1.0 02	173.9	52 56.9	1.0 02	173.8	53 26.9	1.0 02	173.8	53 56.9	1.0 02	173.8	55 56.8	1.0 02	173.7	05
6	46 55.7	1.0 03	172.9	47 55.7	1.0 03	172.8	49 25.7	1.0 03	172.8	50 55.6	1.0 03	172.7	52 55.6	1.0 03	172.6	53 25.5	1.0 03	172.6	53 55.5	1.0 03	172.5	55 55.5	1.0 03	172.4	6
7	46 54.2	1.0 03	171.7	47 54.2	1.0 03	171.7	49 24.1	1.0 03	171.6	50 54.1	1.0 03	171.5	52 54.0	1.0 03	171.4	53 23.9	1.0 03	171.3	53 53.9	1.0 03	171.3	55 53.8	1.0 03	171.2	7
8	46 52.4	1.0 03	170.5	47 52.4	1.0 03	170.5	49 22.3	1.0 03	170.4	50 52.2	1.0 03	170.3	52 52.1	1.0 03	170.1	53 22.1	1.0 03	170.1	53 52.1	1.0 04	170.1	55 51.9	1.0 04	169.9	8
9	46 50.4	1.0 04	169.3	47 50.4	1.0 04	169.3	49 20.3	1.0 04	169.2	50 50.2	1.0 04	169.1	52 50.0	1.0 04	168.9	53 20.0	1.0 04	168.9	53 50.0	1.0 04	168.8	55 49.8	1.0 04	168.6	9
10	46 48.2	1.0 04	168.2	47 48.1	1.0 04	168.1	49 18.0	1.0 04	168.0	50 47.9	1.0 04	167.9	52 47.7	1.0 04	167.7	53 17.7	1.0 04	167.6	53 47.6	1.0 04	167.6	55 47.4	1.0 04	167.4	10
1	46 45.7	1.0 04	167.0	47 45.6	1.0 05	166.9	49 15.5	1.0 05	166.8	50 45.4	1.0 05	166.6	52 45.2	1.0 05	166.5	53 15.1	1.0 05	166.4	53 45.0	1.0 05	166.3	55 44.8	1.0 05	166.1	1
2	46 43.0	1.0 05	165.8	47 42.9	1.0 05	165.7	49 12.8	1.0 05	165.6	50 42.6	1.0 05	165.4	52 42.4	1.0 05	165.2	53 12.3	1.0 05	165.2	53 42.2	1.0 05	165.1	55 41.9	1.0 05	164.9	2
3	46 40.1	1.0 05	164.6	47 40.0	1.0 05	164.5	49 09.8	1.0 05	164.4	50 39.6	1.0 05	164.2	52 39.3	1.0 05	164.0	53 09.2	1.0 05	163.9	53 39.2	1.0 06	163.9	55 38.8	1.0 06	163.6	3
4	46 37.0	1.0 06	163.4	47 36.8	1.0 06	163.3	49 06.6	1.0 06	163.2	50 36.4	1.0 06	163.0	52 36.0	1.0 06	162.8	53 06.0	1.0 06	162.7	53 35.9	1.0 06	162.7	55 35.5	1.0 06	162.4	4
15	46 33.6	1.0 06	162.3	47 33.4	1.0 06	162.2	49 03.2	1.0 06	162.0	50 32.9	1.0 06	161.8	52 32.5	1.0 06	161.6	53 02.4	1.0 06	161.5	53 32.3	1.0 06	161.4	55 31.9	1.0 06	161.1	15
6	46 30.0	1.0 06	161.1	47 29.8	1.0 06	161.0	48 59.5	1.0 06	160.8	50 29.2	1.0 06	160.6	52 28.8	1.0 07	160.3	52 58.7	1.0 07	160.3	53 28.6	1.0 07	160.2	55 28.1	1.0 07	159.9	6
7	46 26.2	1.0 07	159.9	47 26.0	1.0 07	159.8	48 55.7	1.0 07	159.6	50 25.3	1.0 07	159.4	52 24.8	1.0 07	159.1	52 54.7	1.0 07	159.1	53 24.6	1.0 07	159.0	55 24.0	1.0 07	158.6	7
8	46 22.1	1.0 07	158.8	47 21.9	1.0 07	158.6	48 51.6	1.0 07	158.4	50 21.2	1.0 07	158.2	52 20.7	1.0 07	157.9	52 50.5	1.0 07	157.8	53 20.4	1.0 07	157.8	55 19.8	99 08	157.4	8
9	46 17.9	1.0 07	157.6	47 17.6	1.0 08	157.5	48 47.2	1.0 08	157.2	50 16.8	1.0 08	157.0	52 16.2	99 08	156.7	52 46.1	99 08	156.6	53 15.9	99 08	156.5	55 15.2	99 08	156.2	9
20	46 13.4	1.0 08	156.4	47 13.1	1.0 08	156.3	48 42.7	1.0 08	156.1	50 12.3	99 08	155.8	52 11.6	99 08	155.5	52 41.4	99 08	155.4	53 11.3	99 08	155.3	55 10.5	99 08	154.9	20
1	46 08.7	1.0 08	155.3	47 08.4	99 08	155.1	48 38.0	99 08	154.9	50 07.5	99 08	154.6	52 06.7	99 08	154.3	52 36.6	99 08	154.2	53 06.4	99 08	154.1	55 05.5	99 09	153.7	1
2	46 03.8	99 08	154.1	47 03.5	99 09	154.0	48 33.0	99 09	153.7	50 02.4	99 09	153.5	52 01.7	99 09	153.1	52 31.5	99 09	153.0	53 01.3	99 09	152.9	55 00.4	99 09	152.5	2
3	45 58.7	99 09	152.9	46 58.4	99 09	152.8	48 27.8	99 09	152.5	49 57.2	99 09	152.3	51 56.4	99 09	151.9	52 26.2	99 09	151.8	52 55.9	99 09	151.7	54 55.0	99 09	151.3	3
4	45 53.4	99 09	151.8	46 53.0	99 09	151.6	48 22.4	99 09	151.4	49 51.8	99 09	151.1	51 50.9	99 10	150.7	52 20.6	99 10	150.6	52 50.4	99 10	150.5	54 49.4	99 10	150.1	4
25	45 47.9	99 10	150.6	46 47.5	99 10	150.5	48 16.8	99 10	150.2	49 46.2	99 10	149.9	51 45.2	99 10	149.5	52 14.9	99 10	149.4	52 44.7	99 10	149.3	54 43.5	99 10	148.8	25
6	45 42.2	99 10	149.5	46 41.7	99 10	149.3	48 11.1	99 10	149.0	49 40.3	99 10	148.7	51 39.3	99 10	148.3	52 09.0	99 10	148.2	52 38.7	99 10	148.1	54 37.5	99 10	147.6	6
7	45 36.3	99 10	148.3	46 35.8	99 10	148.2	48 05.1	99 10	147.9	49 34.3	99 10	147.6	51 33.2	99 11	147.1	52 02.9	99 11	147.0	52 32.6	99 11	146.9	54 31.3	99 11	146.4	7
8	45 30.2	99 10	147.2	46 29.7	99 11	147.0	47 58.9	99 11	146.7	49 28.0	99 11	146.4	51 26.9	99 11	146.0	51 56.5	99 11	145.8	52 26.2	99 11	145.7	54 24.9	99 11	145.2	8
9	45 23.9	99 11	146.0	46 23.3	99 11	145.9	47 52.5	99 11	145.6	49 21.6	99 11	145.2	51 20.3	99 11	144.8	51 50.0	99 11	144.7	52 19.7	99 11	144.5	54 18.2	99 11	144.0	9
30	45 17.4	99 11	144.9	46 16.8	99 11	144.7	47 45.9	99 11	144.4	49 15.0	99 11	144.1	51 13.6	99 11	143.6	51 43.3	99 12	143.5	52 12.9	99 12	143.4	54 11.4	99 12	142.8	30
1	45 10.7	99 11	143.8	46 10.1	99 11	143.6	47 39.2	99 12	143.2	49 08.2	99 12	142.9	51 06.8	99 12	142.4	51 36.4	99 12	142.3	52 06.0	99 12	142.2	54 04.4	99 12	141.6	1
2	45 03.8	99 12	142.6	46 03.2	99 12	142.4	47 32.2	99 12	142.1	49 01.2	99 12	141.8	50 59.7	99 12	141.3	51 29.3	99 12	141.1	51 58.9	99 12	141.0	53 57.2	99 12	140.4	2
3	44 56.8	99 12	141.5	45 56.1	99 12	141.3	47 25.1	99 12	141.0	48 54.0	99 12	140.6	50 52.4	99 12	140.1	51 22.0	99 12	140.0	51 51.6	99 12	139.8	53 49.8	99 13	139.3	3
4	44 49.6	99 12	140.4	45 48.9	99 12	140.2	47 17.8	99 13	139.8	48 46.7	99 13	139.5	50 45.0	99 13	138.9	51 14.6	99 13	138.8	51 44.1	99 13	138.7	53 42.2	98 13	138.1	4
35	44 42.2	99 13	139.2	45 41.5	99 13	139.0	47 10.3	99 13	138.7	48 39.1	99 13	138.3	50 37.4	99 13	137.8	51 06.9	98 13	137.7	51 36.5	98 13	137.5	53 34.5	98 13	136.9	35
6	44 34.6	99 13	138.1	45 33.9	99 13	137.9	47 02.7	99 13	137.5	48 31.4	99 13	137.2	50 29.6	98 13	136.6	50 59.1	98 13	136.5	51 28.7	98 13	136.4	53 26.6	98 13	135.7	6
7	44 26.9	99 13	137.0	45 26.1	99 13	136.8	46 54.9	99 13	136.4	48 23.6	98 13	136.0	50 21.7	98 14	135.5	50 51.2	98 14	135.3	51 20.7	98 14	135.2	53 18.5	98 14	134.6	7
8	44 19.0	99 13	135.9	45 18.2	99 13	135.6	46 46.9	99 14	135.3	48 15.5	98 14	134.9	50 13.6	98 14	134.3	50 43.1	98 14	134.2	51 12.5	98 14	134.1	53 10.3	98 14	133.4	8
9	44 11.0	99 14	134.8	45 10.1	99 14	134.5	46 38.8	98 14	134.2	48 07.3	98 14	133.8	50 05.3	98 14	133.2	50 34.8	98 14	133.1	51 04.2	98 14	132.9	53 01.9	98 14	132.3	9
40	44 02.8	99 14	133.7	45 01.9	98 14	133.4	46 30.5	98 14	133.0	47 59.0	98 14	132.6	49 56.9	98 14	132.1	50 26.3	98 14	131.9	50 55.8	98 14	131.8	52 53.4	98 14	131.1	40
1	43 54.4	98 14	132.5	44 53.5	98 14	132.3	46 22.0	98 14	131.9	47 50.5	98 14	131.5	49 48.3	98 15	130.9	50 17.7	98 15	130.8	50 47.1	98 15	130.6	52 44.7	98 15	130.0	1
2	43 45.9	98 14	131.4	44 44.9	98 14	131.2	46 13.4	98 15	130.8	47 41.9	98 15	130.4	49 39.6	98 15	129.8	59 09.0	98 15	129.7	50 38.4	98 15	129.5	52 35.8	98 15	128.8	2
3	43 37.3	98 15	130.3	44 36.3	98 15	130.1	46 04.7	98 15	129.7	47 33.1	98 15	129.3	49 30.7	98 15	128.7	50 00.1	98 15	128.5	50 29.5	98 15	128.4	52 26.8	98 15	127.7	3
4	43 28.5	98 15	129.2	44 27.4	98 15	129.0	45 55.8	98 15	128.6	47 24.1	98 15	128.2	49 21.7	98 15	127.6	49 51.1	98 15	127.4	50 20.4	98 15	127.2	52 17.7	98 15	126.6	4
45	43 19.5	98 15	128.2	44 18.5	98 15	127.9	45 46.8	98 15	127.5	47 15.1	98 15	127.1	49 12.6	98 15	126.5	49 41.9	98 15	126.3	50 11.3	98 16	126.1	52 08.4	98 16	125.4	45
6	43 10.5	98 15	127.1	44 09.4	98 15	126.8	45 37.7	98 15	126.4	47 05.9	98 16	126.0	49 03.3	98 16	125.3	49 32.6	98 16	125.2	50 01.9	98 16	125.0	51 59.0	97 16	124.3	6
7	43 01.3	98 16	126.0	44 00.1	98 16	125.7	45 28.4	98 16	125.3	46 56.5	98 16	124.9	48 53.9	98 16	124.2	49 23.2	98 16	124.1	49 52.5	98 16	123.9	51 49.5	97 16	123.2	7
8	42 51.9	98 16	124.9	43 50.8	98 16	124.6	45 19.0	98 16	124.2	46 47.1	98 16	123.8	48 44.4	98 16	123.1	49 13.7	98 16	123.0	49 42.9	98 16	122.8	51 39.9	97 16	122.1	8
9	42 42.5	98 16	123.8	43 41.3	98 16	123.5	45 09.4	98 16	123.1	46 37.5	98 16	122.7	48 34.7	98 16	122.0	49 04.0	98 16	121.9	49 33.3	98 16	121.7	51 30.1	97 16	121.0	9
50	42 32.9	98 16	122.7	43 31.7	98 16	122.5	44 59.8	98 16	122.0	46 27.8	98 16	121.6	48 25.0	98 16	120.9	48 54.2	97 16	120.8	49 23.5	97 16	120.6	51 20.3	97 17	119.9	50
1	42 23.2	98 16	121.7	43 22.0	98 16	121.4	44 50.0	98 16	120.9	46 18.0	98 17	120.5	48 15.1	97 17	119.8	48 44.3	97 17	119.7	49 13.5	97 17	119.5	51 10.3	97 17	118.8	1
2	42 13.4	98 17	120.6	43 12.1	98 17	120.3	44 40.2	98 17	119.9	46 08.1	98 17	119.4	48 05.1	97 17	118.8	48 34.3	97 17	118.6	49 03.5	97 17	118.4	51 00.2	97 17	117.7	2
3	42 03.5	98 17	119.5	43 02.2	98 17	119.2	44 30.2	98 17	118.8	45 58.0	98 17	118.3	47 55.0	97 17	117.7	48 24.2	97 17	117.5	48 53.4	97 17	117.3	50 50.0	97 17	116.6	3
4	41 53.5	98 17	118.5	42 52.2	98 17	118.2	44 20.1	98 17	117.7	45 47.9	98 17	117.3	47 44.8	97 17	116.6	48 14.0	97 17	116.4	48 43.2	97 17	116.3	50 39.7	97 17	115.5	4
55	41 43.4	98 17	117.4	42 42.0	98 17	117.1	44 09.9	98 17	116.7	45 37.7	97 17	116.2	47 34.5	97 17	115.5	48 03.7	97 17	115.4	48 32.9	97 17	115.2	50 29.3	97 17	114.4	55
6	41 33.2	98 17	116.3	42 31.8	98 17	116.0	43 59.6	98 17	115.6	45 27.4	97 17	115.1	47 24.2	97 17	114.5	47 53.3	97 17	114.3	48 22.5	97 17	114.1	50 18.9	97 18	113.4	6
7	41 22.8	98 17	115.3	42 21.4	98 17	115.0	43 49.3	98 17	114.5	45 17.0	97 18	114.1	47 13.7	97 18	113.4	47 42.8	97 18	113.2	48 12.0	97 18	113.0	50 08.3	97 18	112.3	7
8	41 12.5	98 17	114.2	42 11.0	98 18	113.9	43 38.8	97 18	113.5	45 06.5	97 18	113.0	47 03.2	97 18	112.3	47 32.3	97 18	112.2	48 01.4	97 18	112.0	49 57.7	97 18	111.2	8
9	41 02.0	98 18	113.2	42 00.5	98 18	112.9	43 28.3	97 18	112.4	44 55.9	97 18	112.0	46 52.5	97 18	111.3	47 21.6	97 18	111.1	47 50.7	97 18	110.9	49 47.0	97 18	110.2	9
60	40 51.4	98 18	112.1	41 49.9	98 18	111.8	43 17.6	97 18	111.4	44 45.2	97 18	110.9	46 41.8	97 18	110.2	47 10.9	97 18	110.0	47 40.0	97 18	109.9	49 36.2	97 18	109.1	60
1	40 40.8	98 18	111.1	41 39.3	97 18	110.8	43 06.9	97 18	110.3	44 34.5	97 18	109.9	46 31.0	97 18	109.2	47 00.1	97 18	109.0	47 29.2	97 18	108.8	49 25.4	97 18	108.1	1
2	40 30.0	98 18	110.0	41 28.5	97 18	109.8	42 56.2	97 18	109.3	44 23.7	97 18	108.8	46 20.2	97 18	108.1	46 49.3	97 18	107.9	47 18.3	97 18	107.8	49 14.4	97 18	107.0	2
3	40 19.3	97 18	109.0	41 17.7	97 18	108.7	42 45.3	97 18	108.3	44 12.8	97 18	107.8	46 09.3	97 18	107.1	46 38.4	97 18	106.7	47 07.4	97 18	106.7	49 03.5	97 18	106.0	3
4	40 08.4	97 18	108.0	41 06.8	97 18	107.7	42 34.4	97 18	107.2	44 01.9	97 18	106.7	45 58.3	97 18	106.0	46 27.4	97 18	105.9	46 56.4	97 18	105.7	48 52.4	97 18	104.9	4
65	39 57.5	97 18	107.0	40 55.9	97 18	106.7	42 23.5	97 18	106.2	43 50.9	97 18	105.7	45 47.3	97 18	105.0	46 16.3	97 18	104.8	46 45.4	97 18	104.6	48 41.3	97 19	103.9	65
6	39 46.5	97 18	105.9	40 44.9	97 18	105.6	42 12.4	97 18	105.2	43 39.8	97 18	104.7	45 36.2	97 19	104.0	46 05.2	97 19	103.8	46 34.3	97 19	103.6	48 30.2	96 19	102.9	6
7	39 35.5	97 18	104.9	40 33.9	97 18	104.6	42 01.4	97 19	104.1	43 28.7	97 19	103.6	45 25.1	97 19	103.0	45 54.1	97 19	102.8	46 23.1	97 19	102.6	48 19.0	96 19	101.8	7
8	39 24.4	97 19	103.9	40 22.8	97 18	103.6	41 50.2	97 19	103.1	43 17.6	97 19	102.6	45 13.9	97 19	101.9	45 42.9	97 19	101.8	46 11.9	97 19	101.6	48 07.8	96 19	100.8	8
9	39 13.2	97 19	102.9	40 11.6	97 19	102.6	41 39.1	97 19	102.1	43 06.4	97 19	101.6	45 02.7	97 19	100.9	45 31.7	97 19	100.7	46 00.7	97 19	100.5	47 56.5	96 19	99.8	9
70	39 02.0	97 19	101.8	40 00.4	97 19	101.5	41 27.8	97 19	101.1	42 55.2	97 19	100.6	44 51.4	97 19	99.9	45 20.4	97 19	99.7	45 49.4	97 19	99.5	47 45.2	96 19	98.8	70
1	38 50.8	97 19	100.8	39 49.2	97 19	100.5	41 16.6	97 19	100.1	42 43.9	97 19	99.6	44 40.1	97 19	98.9	45 09.1	97 19	98.7	45 38.1	97 19	98.5	47 33.9	96 19	97.8	1
2	38 39.6	97 19	99.8	39 37.9	97 19	99.5	41 05.3	97 19	99.1	42 32.6	97 19	98.6	44 28.8	97 19	97.9	44 57.8	97 19	97.7	45 26.8	97 19	97.5	47 22.5	96 19	96.7	2
3	38 28.3	97 19	98.8	39 26.6	97 19	98.5	40 54.0	97 19	98.0	42 21.3	97 19	97.6	44 17.4	97 19	96.9	44 46.4	97 19	96.7	45 15.4	97 19	96.5	47 11.2	96 19	95.7	3
4	38 16.9	97 19	97.8	39 15.2	97 19	97.5	40 42.6	97 19	97.0	42 09.9	97 19	96.6	44 06.0	97 19	95.9	44 35.0	97 19	95.7	45 04.0	97 19	95.5	46 59.8	96 19	94.7	4
75	38 05.6	97 19	96.8	39 03.9	97 19	96.5	40 31.3	97 19	96.0	41 58.5	97 19	95.6	43 54.6	97 19	94.9	44 23.6	97 19	94.7	44 52.6	97 19	94.5	46 48.3	96 19	93.7	75
6	37 54.2	97 19	95.8	38 52.5	97 19	95.5	40 19.9	97 19	95.0	41 47.1	97 19	94.6	43 43.2	97 19	93.9	44 12.2	97 19	93.7	44 41.2	97 19	93.5	46 36.9	96 19	92.8	6
7	37 42.8	97 19	94.8	38 41.1	97 19	94.5	40 08.5	97 19	94.1	41 35.7	97 19	93.6	43 31.8	97 19	92.9	44 00.8	97 19	92.7	44 29.8	97 19	92.5	46 25.5	96 19	91.8	7
8	37 31.4	97 19	93.8	38 29.7	97 19	93.5	39 57.0	97 19	93.1	41 24.3	97 19	92.6	43 20.4	97 19	91.9	43 49.4	97 19	91.7	44 18.3	97 19	91.5	46 14.0	96 19	90.8	8
9	37 20.0	97 19	92.8	38 18.2	97 19	92.5	39 45.6	97 19	92.1	41 12.8	97 19	91.6	43 08.9	97 19	90.9	43 37.9	97 19	90.7	44 06.9	97 19	90.5	46 02.6	96 19	89.8	9
80	37 08.5	97 19	91.9	38 06.8	97 19	91.6	39 34.1	97 19	91.1	41 01.4	97 19	90.6	42 57.5	97 19	89.9	43 26.5	97 19	89.7	43 55.4	97 19	89.6	45 51.1	96 19	88.8	80
1	36 57.1	97 19	90.9	37 55.4	97 19	90.6	39 22.7	97 19	90.1	40 49.9	97 19	89.6	42 46.0	97 19	88.9	43 15.0	97 19	88.8	43 44.0	97 19	88.6	45 39.7	96 19	87.8	1
2	36 45.6	97 19	89.9	37 43.9	97 19	89.6	39 11.2	97 19	89.1	40 38.5	97 19	88.6	42 34.6	97 19	88.0	43 03.6	97 19	87.8	43 32.5	97 19	87.6	45 28.2	96 19	86.9	2
3	36 34.2	97 19	88.9	37 32.5	97 19	88.6	38 59.8	97 19	88.1	40 27.0	97 19	87.7	42 23.1	97 19	87.0	42 52.1	97 19	86.8	43 21.1	97 19	86.6	45 16.8	96 19	85.9	3
4	36 22.7	97 19	87.9	37 21.0	97 19	87.6	38 48.4	97 19	87.2	40 15.6	97 19	86.7	42 11.7	97 19	86.0	42 40.7	97 19	85.8	43 09.7	97 19	85.7	45 05.4	96 19	84.9	4
85	36 11.3	97 19	87.0	37 09.6	97 19	86.7	38 36.9	97 19	86.2	40 04.2	97 19	85.7	42 00.3	97 19	85.1	42 29.3	97 19	84.9	42 58.3	97 19	84.7	44 54.0	96 19	84.0	85
6	35 59.9	97 19	86.0	36 58.2	97 19	85.7	38 25.5	97 19	85.2	39 52.8	97 19	84.8	41 48.9	97 19	84.1	42 17.9	97 19	83.9	42 46.9	97 19	83.7	44 42.6	96 19	83.0	6
7	35 48.5	97 19	85.0	36 46.8	97 19	84.7	38 14.1	97 19	84.3	39 41.4	97 19	83.8	41 37.5	97 19	83.1	42 06.5	97 19	83.0	42 35.5	97 19	82.8	44 31.3	96 19	82.1	7
8	35 37.1	97 19	84.0	36 35.4	97 19	83.7	38 02.7	97 19	83.3	39 30.0	97 19	82.8	41 26.2	97 19	82.2	41 55.2	97 19	82.0	42 24.2	97 19	81.8	44 20.0	96 19	81.1	8
9	35 25.7	97 19	83.1	36 24.0	97 19	82.8	37 51.4	97 19	82.3	39 18.7	97 19	81.9	41 14.8	97 19	81.2	41 43.9	97 19	81.0	42 12.8	97 19	80.9	44 08.7	96 19	80.1	9
90	35 14.3	97 19	82.1	36 12.6	97 19	81.8	37 40.0	97 19	81.4	39 07.3	97 19	80.9	41 03.5	97 19	80.3	41 32.6	97 19	80.1	42 01.6	97 19	79.9	43 57.4	96 19	79.2	90

Lat. 79°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	35 03.0	97 19	81.1	36 01.3	97 19	80.9	37 28.7	97 19	80.4	38 56.0	97 19	79.9	40 52.3	97 19	79.3	41 21.3	97 19	79.1	41 50.3	97 19	79.0	43 46.2	96 19	78.3	91
2	34 51.7	97 19	80.2	35 50.0	97 19	79.9	37 17.5	97 19	79.5	38 44.8	97 19	79.0	40 41.0	97 19	78.4	41 10.1	97 19	78.2	41 39.1	97 19	78.0	43 35.0	96 19	77.3	2
3	34 40.4	97 19	79.2	35 38.8	97 19	78.9	37 06.2	97 19	78.5	38 33.6	97 19	78.0	40 29.9	97 19	77.4	40 58.9	97 19	77.2	41 27.9	97 19	77.1	43 23.8	96 18	76.4	3
4	34 29.2	97 19	78.3	35 27.6	97 19	78.0	36 55.0	97 19	77.6	38 22.4	97 19	77.1	40 18.7	97 18	76.5	40 47.7	97 18	76.3	41 16.8	97 18	76.1	43 12.7	97 18	75.4	4
95	34 18.0	97 19	77.3	35 16.4	97 19	77.0	36 43.9	97 18	76.6	38 11.3	97 18	76.1	40 07.6	97 18	75.5	40 36.6	97 18	75.4	41 05.7	97 18	75.2	43 01.7	97 18	74.5	95
6	34 06.9	97 19	76.4	35 05.3	97 18	76.1	36 32.8	97 18	75.7	38 00.2	97 18	75.2	39 56.5	97 18	74.6	40 25.6	97 18	74.4	40 54.6	97 18	74.2	42 50.7	97 18	73.6	6
7	33 55.8	97 18	75.4	34 54.2	97 18	75.1	36 21.7	97 18	74.7	37 49.1	97 18	74.3	39 45.5	97 18	73.6	40 14.6	97 18	73.5	40 43.6	97 18	73.3	42 39.7	97 18	72.6	7
8	33 44.7	97 18	74.5	34 43.1	97 18	74.2	36 10.7	97 18	73.8	37 38.1	97 18	73.3	39 34.6	97 18	72.7	40 03.6	97 18	72.5	40 32.7	97 18	72.4	42 28.8	97 18	71.7	8
9	33 33.7	97 18	73.5	34 32.1	97 18	73.2	35 59.7	97 18	72.8	37 27.2	97 18	72.4	39 23.7	97 18	71.8	39 52.8	97 18	71.6	40 21.8	97 18	71.4	42 18.0	97 18	70.8	9
100	33 22.8	97 18	72.6	34 21.2	97 18	72.3	35 48.8	97 18	71.9	37 16.3	97 18	71.4	39 12.8	97 18	70.8	39 41.9	97 18	70.7	40 11.0	97 18	70.5	42 07.2	97 18	69.9	100
1	33 11.9	97 18	71.6	34 10.3	97 18	71.4	35 37.9	97 18	70.9	37 05.5	97 18	70.5	39 02.0	97 18	69.9	39 31.1	97 18	69.7	40 00.2	97 18	69.6	41 56.5	97 18	68.9	1
2	33 01.0	97 18	70.7	33 59.5	97 18	70.4	35 27.2	97 18	70.0	36 54.7	97 18	69.6	38 51.3	97 18	69.0	39 20.4	97 18	68.8	39 49.5	97 18	68.7	41 45.8	97 18	68.0	2
3	32 50.3	98 18	69.8	33 48.8	97 18	69.5	35 16.4	97 18	69.1	36 44.0	97 18	68.6	38 40.7	97 18	68.1	39 09.8	97 18	67.9	39 38.9	97 18	67.7	41 35.3	97 18	67.1	3
4	32 39.6	98 18	68.8	33 38.1	97 18	68.5	35 05.8	97 18	68.1	36 33.4	97 18	67.7	38 30.1	97 18	67.1	38 59.2	97 18	67.0	39 28.4	97 17	66.8	41 24.7	97 17	66.2	4
105	32 28.9	98 18	67.9	33 27.4	98 18	67.6	34 55.2	97 18	67.2	36 22.8	97 17	66.8	38 19.6	97 17	66.2	38 48.7	97 17	66.1	39 17.9	97 17	65.9	41 14.3	97 17	65.3	105
6	32 18.3	98 17	66.9	33 16.9	98 17	66.7	34 44.7	97 17	66.3	36 12.4	97 17	65.9	38 09.1	97 17	65.3	38 38.3	97 17	65.1	39 07.4	97 17	65.0	41 03.9	97 17	64.4	6
7	32 07.8	98 17	66.0	33 06.4	98 17	65.8	34 34.2	98 17	65.4	36 01.9	97 17	64.9	37 58.8	97 17	64.4	38 27.9	97 17	64.2	38 57.1	97 17	64.1	40 53.7	97 17	63.5	7
8	31 57.4	98 17	65.1	32 56.0	98 17	64.8	34 23.9	98 17	64.4	35 51.6	97 17	64.0	37 48.5	97 17	63.5	38 17.7	97 17	63.3	38 46.9	97 17	63.2	40 43.5	97 17	62.5	8
9	31 47.1	98 17	64.1	32 45.7	98 17	63.9	34 13.6	98 17	63.5	35 41.4	98 17	63.1	37 38.3	97 17	62.5	38 07.5	97 17	62.4	38 36.7	97 17	62.2	40 33.4	97 17	61.6	9
110	31 36.8	98 17	63.2	32 35.5	98 17	63.0	34 03.4	98 17	62.6	35 31.2	98 17	62.2	37 28.2	97 17	61.6	37 57.4	97 17	61.5	38 26.6	97 17	61.3	40 23.3	97 17	60.7	110
1	31 26.6	98 17	62.3	32 25.3	98 17	62.0	33 53.2	98 17	61.7	35 21.1	98 17	61.3	37 18.1	97 17	60.7	37 47.4	97 16	60.6	38 16.6	97 17	60.4	40 13.4	97 16	59.8	1
2	31 16.6	98 17	61.4	32 15.2	98 17	61.1	33 43.2	98 17	60.7	35 11.1	98 16	60.3	37 08.2	98 16	59.8	37 37.4	97 16	59.7	38 06.7	97 16	59.5	40 03.5	97 16	58.9	2
3	31 06.5	98 17	60.4	32 05.3	98 16	60.2	33 33.3	98 16	59.8	35 01.2	98 16	59.4	36 58.4	98 16	58.9	37 27.6	98 16	58.8	37 56.9	97 16	58.6	39 53.8	97 16	58.0	3
4	30 56.6	98 16	59.5	31 55.4	98 16	59.3	33 23.4	98 16	58.9	34 51.4	98 16	58.5	36 48.6	98 16	58.0	37 17.9	98 16	57.9	37 47.1	98 16	57.7	39 44.1	97 16	57.1	4
115	30 46.8	98 16	58.6	31 45.6	98 16	58.4	33 13.7	98 16	58.0	34 41.7	98 16	57.6	36 38.9	98 16	57.1	37 08.2	98 16	57.0	37 37.5	98 16	56.8	39 34.5	97 16	56.2	115
6	30 37.1	98 16	57.7	31 35.9	98 16	57.4	33 04.0	98 16	57.1	34 32.1	98 16	56.7	36 29.4	98 16	56.2	36 58.7	98 16	56.0	37 28.0	98 16	55.9	39 25.1	98 16	55.4	6
7	30 27.5	98 16	56.7	31 26.3	98 16	56.5	32 54.4	98 16	56.2	34 22.5	98 16	55.8	36 19.9	98 16	55.3	36 49.2	98 16	55.1	37 18.5	98 16	55.0	39 15.7	98 15	54.5	7
8	30 17.9	98 16	55.8	31 16.8	98 16	55.6	32 45.0	98 16	55.2	34 13.1	98 16	54.9	36 10.6	98 15	54.4	36 39.9	98 15	54.2	37 09.2	98 15	54.1	39 06.4	98 15	53.6	8
9	30 08.5	98 16	54.9	31 07.4	98 15	54.7	32 35.6	98 15	54.3	34 03.8	98 15	54.0	36 01.3	98 15	53.5	36 30.7	98 15	53.4	37 00.0	98 15	53.2	38 57.3	98 15	52.7	9
120	29 59.2	98 15	54.0	30 58.1	98 15	53.8	32 26.4	98 15	53.4	33 54.6	98 15	53.1	35 52.2	98 15	52.6	36 21.5	98 15	52.5	36 50.9	98 15	52.3	38 48.2	98 15	51.8	120
1	29 50.0	98 15	53.1	30 48.9	98 15	52.9	32 17.2	98 15	52.5	33 45.5	98 15	52.2	35 43.1	98 15	51.7	36 12.5	98 15	51.6	36 41.9	98 15	51.4	38 39.3	98 15	50.9	1
2	29 40.9	98 15	52.2	30 39.9	98 15	51.9	32 08.2	98 15	51.6	33 36.5	98 15	51.3	35 34.2	98 15	50.8	36 03.6	98 15	50.7	36 33.0	98 15	50.5	38 30.5	98 15	50.0	2
3	29 31.9	98 15	51.2	30 30.9	98 15	51.0	31 59.3	98 15	50.7	33 27.7	98 15	50.4	35 25.4	98 14	49.9	35 54.8	98 14	49.8	36 24.2	98 14	49.6	38 21.7	98 14	49.1	3
4	29 23.1	98 15	50.3	30 22.0	98 15	50.1	31 50.5	98 14	49.8	33 18.9	98 14	49.5	35 16.7	98 14	49.0	35 46.1	98 14	48.9	36 15.5	98 14	48.8	38 13.1	98 14	48.3	4
125	29 14.3	98 14	49.4	30 13.3	98 14	49.2	31 41.8	98 14	48.9	33 10.3	98 14	48.6	35 08.1	98 14	48.1	35 37.5	98 14	48.0	36 07.0	98 14	47.9	38 04.7	98 14	47.4	125
6	29 05.7	98 14	48.5	30 04.7	98 14	48.3	31 33.2	98 14	48.0	33 01.7	98 14	47.7	34 59.6	98 14	47.2	35 29.1	98 14	47.1	35 58.5	98 14	47.0	37 56.3	98 14	46.5	6
7	28 57.2	98 14	47.6	29 56.2	98 14	47.4	31 24.8	98 14	47.1	32 53.3	98 14	46.8	34 51.3	98 14	46.3	35 20.8	98 14	46.2	35 50.2	98 14	46.1	37 48.0	98 14	45.6	7
8	28 48.8	99 14	46.7	29 47.9	98 14	46.5	31 16.5	98 14	46.2	32 45.1	98 14	45.9	34 43.1	98 14	45.4	35 12.6	98 13	45.3	35 42.1	98 13	45.2	37 39.9	98 13	44.7	8
9	28 40.5	99 14	45.8	29 39.6	99 14	45.6	31 08.3	98 13	45.3	32 36.9	98 13	45.0	34 35.0	98 13	44.5	35 04.5	98 13	44.4	35 34.0	98 13	44.3	37 31.9	98 13	43.9	9
130	28 32.4	99 13	44.9	29 31.5	99 13	44.7	31 00.2	99 13	44.4	32 28.9	98 13	44.1	34 27.0	98 13	43.7	34 56.5	98 13	43.6	35 26.1	98 13	43.4	37 24.1	98 13	43.0	130
1	28 24.3	99 13	44.0	29 23.5	99 13	43.8	30 52.3	99 13	43.5	32 21.0	99 13	43.2	34 19.2	98 13	42.8	34 48.7	98 13	42.7	35 18.2	98 13	42.6	37 16.3	98 13	42.1	1
2	28 16.5	99 13	43.1	29 15.7	99 13	42.9	30 44.5	99 13	42.6	32 13.2	99 13	42.3	34 11.5	99 13	41.9	34 41.0	99 13	41.8	35 10.6	98 13	41.7	37 08.7	98 12	41.2	2
3	28 08.7	99 13	42.1	29 07.9	99 13	42.0	30 36.8	99 13	41.7	32 05.6	99 12	41.4	34 03.9	99 12	41.0	34 33.5	99 12	40.9	35 03.0	99 12	40.8	37 01.2	98 12	40.4	3
4	28 01.1	99 12	41.2	29 00.4	99 12	41.1	30 29.2	99 12	40.8	31 58.1	99 12	40.5	33 56.4	99 12	40.1	34 26.0	99 12	40.0	34 55.6	99 12	39.9	36 53.9	99 12	39.5	4
135	27 53.6	99 12	40.3	28 52.9	99 12	40.2	30 21.8	99 12	39.9	31 50.7	99 12	39.6	33 49.1	99 12	39.2	34 18.7	99 12	39.1	34 48.3	99 12	39.0	36 46.7	99 12	38.6	135
6	27 46.3	99 12	39.4	28 45.6	99 12	39.3	30 14.5	99 12	39.0	31 43.5	99 12	38.7	33 42.0	99 12	38.4	34 11.6	99 11	38.3	34 41.2	99 12	38.2	36 39.6	99 12	37.8	6
7	27 39.1	99 12	38.5	28 38.4	99 12	38.4	30 07.4	99 12	38.1	31 36.4	99 12	37.8	33 34.9	99 12	37.5	34 04.6	99 11	37.4	34 34.2	99 11	37.3	36 32.6	99 11	36.9	7
8	27 32.0	99 12	37.6	28 31.4	99 12	37.5	30 00.4	99 11	37.2	31 29.4	99 11	37.0	33 28.0	99 11	36.6	33 57.7	99 11	36.5	34 27.3	99 11	36.4	36 25.8	99 11	36.0	8
9	27 25.1	99 11	36.7	28 24.5	99 11	36.6	29 53.6	99 11	36.3	31 22.6	99 11	36.1	33 21.3	99 11	35.7	33 50.9	99 11	35.6	34 20.6	99 11	35.5	36 19.2	99 11	35.2	9
140	27 18.3	99 11	35.8	28 17.7	99 11	35.7	29 46.9	99 11	35.4	31 15.9	99 11	35.2	33 14.7	99 11	34.8	33 44.3	99 11	34.7	34 14.0	99 11	34.7	36 12.7	99 11	34.3	140
1	27 11.7	99 11	34.9	28 11.1	99 11	34.8	29 40.3	99 11	34.5	31 09.4	99 11	34.3	33 08.2	99 11	34.0	33 37.9	99 10	33.9	34 07.6	99 10	33.8	36 06.3	99 10	33.4	1
2	27 05.2	99 11	34.0	28 04.7	99 10	33.9	29 33.9	99 10	33.6	31 03.0	99 10	33.4	33 01.9	99 10	33.1	33 31.6	99 10	33.0	34 01.3	99 10	32.9	36 00.0	99 10	32.6	2
3	76 58.9	99 10	33.1	27 58.4	99 10	33.0	29 27.6	99 10	32.7	30 56.8	99 10	32.5	32 55.7	99 10	32.2	33 25.4	99 10	32.1	33 55.1	99 10	32.0	35 54.0	99 10	31.7	3
4	26 52.7	99 10	32.2	27 52.2	99 10	32.1	29 21.5	99 10	31.9	30 50.7	99 10	31.6	32 49.7	99 10	31.3	33 19.4	99 10	31.2	33 49.1	99 10	31.2	35 48.0	99 10	30.8	4
145	26 46.7	99 10	31.3	27 46.2	99 10	31.2	29 15.5	99 10	31.0	30 44.8	99 10	30.7	32 43.8	99 10	30.4	33 13.5	99 10	30.4	33 43.3	99 10	30.3	35 42.2	99 09	30.0	145
6	26 40.8	99 10	30.4	27 40.4	99 09	30.3	29 09.7	99 09	30.1	30 39.0	99 09	29.9	32 38.1	99 09	29.6	33 07.8	99 09	29.5	33 37.6	99 09	29.4	35 36.6	99 09	29.1	6
7	26 35.1	99 09	29.5	27 34.7	99 09	29.4	29 04.0	99 09	29.2	30 33.4	99 09	29.0	32 32.5	99 09	28.7	33 02.3	99 09	28.6	33 32.0	99 09	28.5	35 31.1	99 09	28.2	7
8	26 29.5	99 09	28.6	27 29.1	99 09	28.5	28 58.5	99 09	28.3	30 27.9	99 09	28.1	32 27.1	99 09	27.8	32 56.9	99 09	27.7	33 26.6	99 09	27.7	35 25.7	99 09	27.4	8
9	26 24.1	99 09	27.7	27 23.8	99 09	27.6	28 53.2	99 09	27.4	30 22.6	99 09	27.2	32 21.8	99 08	26.9	32 51.6	99 08	26.9	33 21.4	99 08	26.8	35 20.6	99 08	26.5	9
150	26 18.9	99 08	26.8	27 18.5	99 08	26.7	28 48.0	99 08	26.5	30 17.5	99 08	26.3	32 16.7	99 08	26.1	32 46.5	99 08	26.0	33 16.3	99 08	25.9	35 15.5	99 08	25.7	150
1	26 13.8	99 08	25.9	27 13.5	99 08	25.8	28 43.0	99 08	25.6	30 12.5	99 08	25.5	32 11.8	99 08	25.2	32 41.6	99 08	25.1	33 11.4	99 08	25.1	35 10.6	99 08	24.8	1
2	26 08.9	1.0 08	25.0	27 08.6	99 08	24.9	28 38.1	99 08	24.7	30 07.6	99 08	24.6	32 07.0	99 08	24.3	32 36.8	99 08	24.3	33 06.6	99 08	24.2	35 05.9	99 08	23.9	2
3	26 04.1	1.0 08	24.1	27 03.8	1.0 08	24.0	28 33.4	1.0 08	23.9	30 02.9	99 08	23.7	32 02.3	99 07	23.5	32 32.2	99 07	23.4	33 02.0	99 07	23.3	35 01.4	99 07	23.1	3
4	25 59.5	1.0 07	23.2	26 59.2	1.0 07	23.1	28 28.8	1.0 07	23.0	29 58.4	1.0 07	22.8	31 57.9	1.0 07	22.6	32 27.7	1.0 07	22.5	32 57.6	1.0 07	22.5	34 56.9	99 07	22.2	4
155	25 55.1	1.0 07	22.3	26 54.8	1.0 07	22.2	28 24.4	1.0 07	22.1	29 54.1	1.0 07	21.9	31 53.5	1.0 07	21.7	32 23.4	1.0 07	21.7	32 53.3	1.0 07	21.6	34 52.7	1.0 07	21.4	155
6	25 50.8	1.0 07	21.4	26 50.6	1.0 07	21.3	28 20.2	1.0 07	21.2	29 49.9	1.0 07	21.0	31 49.4	1.0 07	20.8	32 19.3	1.0 07	20.8	32 49.1	1.0 07	20.7	34 48.6	1.0 07	20.5	6
7	25 46.7	1.0 07	20.6	26 46.5	1.0 07	20.5	28 16.2	1.0 06	20.3	29 45.8	1.0 06	20.2	31 45.4	1.0 06	20.0	32 15.3	1.0 06	19.9	32 45.2	1.0 06	19.9	34 44.7	1.0 06	19.6	7
8	25 42.8	1.0 06	19.7	26 42.6	1.0 06	19.6	28 12.3	1.0 06	19.4	29 42.0	1.0 06	19.3	31 41.6	1.0 06	19.1	32 11.5	1.0 06	19.0	32 41.3	1.0 06	19.0	34 40.9	1.0 06	18.8	8
9	25 39.0	1.0 06	18.8	26 38.8	1.0 06	18.7	28 08.6	1.0 06	18.5	29 38.3	1.0 06	18.4	31 37.9	1.0 06	18.2	32 07.8	1.0 06	18.2	32 37.7	1.0 06	18.1	34 37.3	1.0 06	17.9	9
160	25 35.4	1.0 06	17.9	26 35.2	1.0 06	17.8	28 05.0	1.0 06	17.7	29 34.7	1.0 06	17.5	31 34.4	1.0 06	17.4	32 04.3	1.0 06	17.3	32 34.2	1.0 06	17.3	34 33.9	1.0 05	17.1	160
1	25 32.0	1.0 05	17.0	26 31.8	1.0 05	16.9	28 01.6	1.0 05	16.8	29 31.4	1.0 05	16.7	31 31.1	1.0 05	16.5	32 01.0	1.0 05	16.4	32 30.9	1.0 05	16.4	34 30.6	1.0 05	16.2	1
2	25 28.7	1.0 05	16.1	26 28.6	1.0 05	16.0	27 58.4	1.0 05	15.9	29 28.2	1.0 05	15.8	31 27.9	1.0 05	15.6	31 57.8	1.0 05	15.6	32 27.8	1.0 05	15.5	34 27.5	1.0 05	15.4	2
3	25 25.6	1.0 05	15.2	26 25.5	1.0 05	15.1	27 55.3	1.0 05	15.0	29 25.2	1.0 05	14.9	31 24.9	1.0 05	14.7	31 54.8	1.0 05	14.7	32 24.8	1.0 05	14.7	34 24.5	1.0 05	14.5	3
4	25 22.7	1.0 05	14.3	26 22.6	1.0 05	14.2	27 52.5	1.0 04	14.1	29 22.3	1.0 04	14.0	31 22.1	1.0 04	13.9	31 52.0	1.0 04	13.8	32 22.0	1.0 04	13.8	34 21.7	1.0 04	13.7	4
165	25 20.0	1.0 04	13.4	26 19.9	1.0 04	13.3	27 49.7	1.0 04	13.2	29 19.6	1.0 04	13.1	31 19.4	1.0 04	13.0	31 49.4	1.0 04	13.0	32 19.3	1.0 04	12.9	34 19.1	1.0 04	12.8	165
6	25 17.4	1.0 04	12.5	26 17.3	1.0 04	12.4	27 47.2	1.0 04	12.4	29 17.1	1.0 04	12.3	31 16.9	1.0 04	12.1	31 46.9	1.0 04	12.1	32 16.8	1.0 04	12.1	34 16.6	1.0 04	11.9	6
7	25 15.0	1.0 04	11.6	26 15.0	1.0 04	11.6	27 44.8	1.0 04	11.5	29 14.7	1.0 04	11.4	31 14.6	1.0 04	11.3	31 44.6	1.0 04	11.2	32 14.5	1.0 04	11.2	34 14.4	1.0 04	11.1	7
8	25 12.8	1.0 03	10.7	26 12.7	1.0 03	10.7	27 42.7	1.0 03	10.6	29 12.6	1.0 03	10.5	31 12.4	1.0 03	10.4	31 42.4	1.0 03	10.4	32 12.4	1.0 03	10.4	34 12.2	1.0 03	10.2	8
9	25 10.8	1.0 03	09.8	26 10.7	1.0 03	09.8	27 40.6	1.0 03	09.7	29 10.6	1.0 03	09.6	31 10.5	1.0 03	09.5	31 40.4	1.0 03	09.5	32 10.4	1.0 03	09.5	34 10.3	1.0 03	09.4	9
170	25 08.9	1.0 03	08.9	26 08.9	1.0 03	08.9	27 38.8	1.0 03	08.8	29 08.7	1.0 03	08.8	31 08.6	1.0 03	08.7	31 38.6	1.0 03	08.6	32 08.6	1.0 03	08.6	34 08.5	1.0 03	08.5	170
1	25 07.2	1.0 03	08.0	26 07.2	1.0 03	08.0	27 37.1	1.0 02	07.9	29 07.1	1.0 02	07.9	31 07.0	1.0 02	07.8	31 37.0	1.0 02	07.8	32 07.0	1.0 02	07.8	34 06.9	1.0 02	07.7	1
2	25 05.7	1.0 02	07.1	26 05.7	1.0 02	07.1	27 35.6	1.0 02	07.1	29 05.6	1.0 02	07.0	31 05.5	1.0 02	06.9	31 35.5	1.0 02	06.9	32 05.5	1.0 02	06.9	34 05.4	1.0 02	06.8	2
3	25 04.4	1.0 02	06.2	26 04.3	1.0 02	06.2	27 34.3	1.0 02	06.2	29 04.3	1.0 02	06.1	31 04.2	1.0 02	06.1	31 34.2	1.0 02	06.1	32 04.2	1.0 02	06.0	34 04.2	1.0 02	06.0	3
4	25 03.2	1.0 02	05.4	26 03.2	1.0 02	05.3	27 33.2	1.0 02	05.3	29 03.1	1.0 02	05.3	31 03.1	1.0 02	05.2	31 33.1	1.0 02	05.2	32 03.1	1.0 02	05.2	34 03.1	1.0 02	05.1	4
175	25 02.2	1.0 01	04.5	26 02.2	1.0 01	04.4	27 32.2	1.0 01	04.4	29 02.2	1.0 01	04.4	31 02.2	1.0 01	04.3	31 32.2	1.0 01	04.3	32 02.2	1.0 01	04.3	34 02.1	1.0 01	04.3	175
6	25 01.4	1.0 01	03.6	26 01.4	1.0 01	03.6	27 31.4	1.0 01	03.5	29 01.4	1.0 01	03.5	31 01.4	1.0 01	03.5	31 31.4	1.0 01	03.5	32 01.4	1.0 01	03.4	34 01.4	1.0 01	03.4	6
7	25 00.8	1.0 01	02.7	26 00.8	1.0 01	02.7	27 30.8	1.0 01	02.6	29 00.8	1.0 01	02.6	31 00.8	1.0 01	02.6	31 30.8	1.0 01	02.6	32 00.8	1.0 01	02.6	34 00.8	1.0 01	02.6	7
8	25 00.4	1.0 00	01.8	26 00.4	1.0 00	01.8	27 30.4	1.0 00	01.8	29 00.3	1.0 00	01.8	31 00.3	1.0 00	01.7	31 30.3	1.0 00	01.7	32 00.3	1.0 00	01.7	34 00.3	1.0 00	01.7	8
9	25 00.1	1.0 00	00.9	26 00.1	1.0 00	00.9	27 30.1	1.0 00	00.9	29 00.1	1.0 00	00.9	31 00.1	1.0 00	00.9	31 30.1	1.0 00	00.9	32 00.1	1.0 00	00.9	34 00.1	1.0 00	00.9	9
180	25 00.0	1.0 00	00.0	26 00.0	1.0 00	00.0	27 30.0	1.0 00	00.0	29 00.0	1.0 00	00.0	31 00.0	1.0 00	00.0	31 30.0	1.0 00	00.0	32 00.0	1.0 00	00.0	34 00.0	1.0 00	00.0	180

Lat. 79°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	57 00.0	1.0 00	180.0	58 00.0	1.0 00	180.0	59 30.0	1.0 00	180.0	60 30.0	1.0 00	180.0	61 30.0	1.0 00	180.0	62 30.0	1.0 00	180.0	63 30.0	1.0 00	180.0	65 00.0	1.0 00	180.0	00
1	56 59.9	1.0 01	178.7	57 59.9	1.0 01	178.7	59 29.9	1.0 01	178.7	60 29.9	1.0 01	178.7	61 29.9	1.0 01	178.7	62 29.9	1.0 01	178.7	63 29.9	1.0 01	178.6	64 59.9	1.0 01	178.6	1
2	56 59.5	1.0 01	177.4	57 59.5	1.0 01	177.4	59 29.5	1.0 01	177.4	60 29.5	1.0 01	177.4	61 29.5	1.0 01	177.3	62 29.5	1.0 01	177.3	63 29.5	1.0 01	177.3	64 59.4	1.0 01	177.2	2
3	56 58.9	1.0 01	176.2	57 58.8	1.0 02	176.1	59 28.8	1.0 02	176.1	60 28.8	1.0 02	176.0	61 28.8	1.0 02	176.0	62 28.8	1.0 02	176.0	63 28.8	1.0 02	175.9	64 58.8	1.0 02	175.8	3
4	56 58.0	1.0 02	174.9	57 57.9	1.0 02	174.9	59 27.9	1.0 02	174.8	60 27.9	1.0 02	174.7	61 27.9	1.0 02	174.7	62 27.8	1.0 02	174.6	63 27.8	1.0 02	174.5	64 57.8	1.0 02	174.4	4
05	56 56.8	1.0 02	173.6	57 56.8	1.0 02	173.6	59 26.7	1.0 02	173.5	60 26.7	1.0 02	173.4	61 26.7	1.0 02	173.3	62 26.6	1.0 02	173.3	63 26.6	1.0 02	173.2	64 56.5	1.0 03	173.1	05
6	56 55.4	1.0 03	172.4	57 55.4	1.0 03	172.3	59 25.3	1.0 03	172.2	60 25.3	1.0 03	172.1	61 25.2	1.0 03	172.0	62 25.2	1.0 03	171.9	63 25.1	1.0 03	171.8	64 55.0	1.0 03	171.7	6
7	56 53.8	1.0 03	171.1	57 53.7	1.0 03	171.0	59 23.6	1.0 03	170.9	60 23.6	1.0 03	170.8	61 23.5	1.0 03	170.7	62 23.4	1.0 03	170.6	63 23.3	1.0 03	170.5	64 53.2	1.0 03	170.3	7
8	56 51.9	1.0 04	169.8	57 51.8	1.0 04	169.7	59 21.7	1.0 04	169.6	60 21.6	1.0 04	169.5	61 21.5	1.0 04	169.4	62 21.4	1.0 04	169.2	63 21.3	1.0 04	169.1	64 51.1	1.0 04	168.9	8
9	56 49.7	1.0 04	168.5	57 49.6	1.0 04	168.4	59 19.5	1.0 04	168.3	60 19.4	1.0 04	168.2	61 19.3	1.0 04	168.0	62 19.1	1.0 04	167.9	63 19.0	1.0 04	167.8	64 48.8	1.0 04	167.5	9
10	56 47.3	1.0 04	167.3	57 47.2	1.0 04	167.2	59 17.0	1.0 04	167.0	60 16.9	1.0 05	166.9	61 16.8	1.0 05	166.7	62 16.6	1.0 05	166.6	63 16.5	1.0 05	166.4	64 46.2	1.0 05	166.1	10
1	56 44.7	1.0 05	166.0	57 44.5	1.0 05	165.9	59 14.3	1.0 05	165.7	60 14.2	1.0 05	165.5	61 14.0	1.0 05	165.4	62 13.8	1.0 05	165.2	63 13.6	1.0 05	165.1	64 43.3	1.0 05	164.8	1
2	56 41.8	1.0 05	164.7	57 41.6	1.0 06	164.6	59 11.4	1.0 05	164.4	60 11.2	1.0 05	164.2	61 11.0	1.0 05	164.1	62 10.8	1.0 06	163.9	63 10.6	1.0 06	163.7	64 40.2	1.0 06	163.4	2
3	56 38.7	1.0 06	163.5	57 38.5	1.0 06	163.3	59 08.2	1.0 06	163.1	60 08.0	1.0 06	162.9	61 07.7	1.0 06	162.8	62 07.5	1.0 06	162.6	63 07.2	1.0 06	162.4	64 36.8	99 06	162.0	3
4	56 35.3	1.0 06	162.2	57 35.1	1.0 06	162.1	59 04.7	1.0 06	161.8	60 04.5	1.0 06	161.6	61 04.2	1.0 06	161.5	62 03.9	1.0 06	161.2	63 03.6	99 06	161.0	64 33.1	99 07	160.7	4
15	56 31.7	1.0 06	161.0	57 31.4	1.0 06	160.8	59 01.0	1.0 07	160.5	60 00.7	1.0 07	160.3	61 00.4	99 07	160.1	62 00.1	99 07	159.9	62 59.8	99 07	159.7	64 29.2	99 07	159.3	15
6	56 27.8	1.0 07	159.7	57 27.5	1.0 07	159.5	58 57.1	99 07	159.3	59 56.8	99 07	159.1	60 56.4	99 07	158.8	61 56.1	99 07	158.6	62 55.7	99 07	158.4	64 25.0	99 07	158.0	6
7	56 23.7	99 07	158.5	57 23.4	99 07	158.3	58 52.9	99 07	158.0	59 52.6	99 07	157.8	60 52.2	99 07	157.5	61 51.8	99 08	157.3	62 51.3	99 08	157.0	64 20.6	99 08	156.6	7
8	56 19.4	99 08	157.2	57 19.1	99 08	157.0	58 48.5	99 08	156.7	59 48.1	99 08	156.5	60 47.7	99 08	156.2	61 47.2	99 08	156.0	62 46.7	99 08	155.7	64 16.0	99 08	155.3	8
9	56 14.9	99 08	156.0	57 14.5	99 08	155.8	58 43.9	99 08	155.4	59 43.4	99 08	155.2	60 43.0	99 08	155.0	61 42.5	99 08	154.7	62 41.9	99 08	154.4	64 11.0	99 09	153.9	9
20	56 10.1	99 08	154.7	57 09.7	99 08	154.5	58 39.0	99 08	154.2	59 38.5	99 09	153.9	60 38.0	99 09	153.7	61 37.4	99 09	153.4	62 36.9	99 09	153.1	64 05.9	99 09	152.6	20
1	56 05.1	99 09	153.5	57 04.6	99 09	153.3	58 33.9	99 09	152.9	59 33.4	99 09	152.7	60 32.8	99 09	152.4	61 32.2	99 09	152.1	62 31.6	99 09	151.8	64 00.5	99 09	151.3	1
2	55 59.9	99 09	152.3	56 59.4	99 09	152.0	58 28.6	99 09	151.7	59 28.0	99 09	151.4	60 27.4	99 09	151.1	61 26.7	99 10	150.8	62 26.0	99 10	150.5	63 54.9	99 10	149.9	2
3	55 54.4	99 09	151.0	56 53.9	99 09	150.8	58 23.0	99 10	150.4	59 22.4	99 10	150.1	60 21.7	99 10	149.8	61 21.0	99 10	149.5	62 20.3	99 10	149.2	63 49.0	99 10	148.6	3
4	55 48.8	99 10	149.8	56 48.2	99 10	149.6	58 17.3	99 10	149.2	59 16.6	99 10	148.9	60 15.9	99 10	148.6	61 15.1	99 10	148.2	62 14.3	99 10	147.9	63 43.0	98 10	147.3	4
25	55 42.9	99 10	148.6	56 42.3	99 10	148.3	58 11.3	99 10	147.9	59 10.6	99 10	147.6	60 09.8	99 10	147.3	61 09.0	99 11	147.0	62 08.1	99 11	146.6	63 36.7	98 11	146.0	25
6	55 36.9	99 10	147.4	56 36.2	99 11	147.1	58 05.1	99 11	146.7	59 04.3	99 11	146.4	60 03.5	99 11	146.0	61 02.6	98 11	145.7	62 01.7	98 11	145.3	63 30.2	98 11	144.7	6
7	55 30.6	99 11	146.2	56 29.9	99 11	145.9	57 58.7	99 11	145.4	58 57.9	99 11	145.1	59 57.0	98 11	144.8	60 56.1	98 11	144.4	61 55.1	98 11	144.0	63 23.5	98 12	143.4	7
8	55 24.1	99 11	144.9	56 23.3	99 11	144.7	57 52.1	99 11	144.2	58 51.2	98 11	143.9	59 50.3	98 12	143.5	60 49.3	98 12	143.2	61 48.3	98 12	142.8	63 16.5	98 12	142.1	8
9	55 17.4	99 11	143.7	56 16.6	99 12	143.4	57 45.3	98 12	143.0	58 44.4	98 12	142.6	59 43.4	98 12	142.3	60 42.3	98 12	141.9	61 41.2	98 12	141.5	63 09.4	98 12	140.9	9
30	55 10.6	99 12	142.5	56 09.7	99 12	142.2	57 38.3	98 12	141.8	58 37.3	98 12	141.4	59 36.3	98 12	141.1	60 35.2	98 12	140.7	61 34.0	98 12	140.3	63 02.1	98 13	139.6	30
1	55 03.5	99 12	141.3	56 02.6	98 12	141.0	57 31.1	98 12	140.5	58 30.1	98 12	140.2	59 29.0	98 12	139.8	60 27.8	98 13	139.4	61 26.6	98 13	139.0	62 54.6	98 13	138.3	1
2	54 56.3	98 12	140.1	55 55.3	98 12	139.8	57 23.8	98 13	139.3	58 22.7	98 13	139.0	59 21.5	98 13	138.6	60 20.3	98 13	138.2	61 19.0	98 13	137.8	62 46.9	98 13	137.1	2
3	54 48.8	98 13	139.0	55 47.8	98 13	138.6	57 16.2	98 13	138.1	58 15.1	98 13	137.8	59 13.9	98 13	137.4	60 12.6	98 13	137.0	61 11.2	98 13	136.5	62 39.0	97 13	135.8	3
4	54 41.2	98 13	137.8	55 40.2	98 13	137.5	57 08.5	98 13	136.9	58 07.3	98 13	136.6	59 06.0	98 13	136.2	60 04.7	98 13	135.7	61 03.2	98 14	135.3	62 30.9	97 14	134.6	4
35	54 33.5	98 13	136.6	55 32.4	98 13	136.3	57 00.6	98 13	135.7	57 59.3	98 14	135.4	58 58.0	98 14	135.0	59 56.6	98 14	134.5	60 55.1	97 14	134.1	62 22.7	97 14	133.4	35
6	54 25.5	98 14	135.4	55 24.4	98 14	135.1	56 52.5	98 14	134.5	57 51.2	98 14	134.2	58 49.8	98 14	133.8	59 48.3	97 14	133.3	60 46.8	97 14	132.9	62 14.3	97 14	132.1	6
7	54 17.4	98 14	134.3	55 16.2	98 14	133.9	56 44.3	98 14	133.4	57 42.9	98 14	133.0	58 41.5	98 14	132.6	59 39.9	97 14	132.1	60 38.3	97 14	131.7	62 05.7	97 15	130.9	7
8	54 09.1	98 14	133.1	55 07.9	98 14	132.7	56 35.9	98 14	132.2	57 34.4	98 14	131.8	58 33.0	97 14	131.4	59 31.4	97 15	130.9	60 29.7	97 15	130.4	61 57.0	97 15	129.7	8
9	54 00.7	98 14	131.9	54 59.4	98 14	131.6	56 27.3	98 15	131.0	57 25.8	97 15	130.6	58 24.3	97 15	130.2	59 22.6	97 15	129.7	60 20.9	97 15	129.3	61 48.1	97 15	128.5	9
40	53 52.1	98 15	130.8	54 50.7	98 15	130.4	56 18.6	98 15	129.8	57 17.1	97 15	129.4	58 15.5	97 15	129.0	59 13.8	97 15	128.5	60 12.0	97 15	128.1	61 39.0	97 15	127.3	40
1	53 43.3	98 15	129.6	54 41.9	98 15	129.3	56 09.7	97 15	128.7	57 08.1	97 15	128.3	58 06.5	97 15	127.8	59 04.7	97 15	127.4	60 02.9	97 15	126.9	61 29.9	96 16	126.1	1
2	53 34.4	98 15	128.5	54 33.0	98 15	128.1	56 00.7	97 15	127.5	56 59.1	97 15	127.1	57 57.4	97 15	126.7	58 55.6	97 16	126.2	59 53.6	97 16	125.7	61 20.5	96 16	124.9	2
3	53 25.4	98 15	127.3	54 23.9	97 15	127.0	55 51.6	97 15	126.4	56 49.9	97 16	125.9	57 48.1	97 16	125.5	58 46.3	97 16	125.0	59 44.3	97 16	124.5	61 11.1	96 16	123.7	3
4	53 16.2	98 16	126.2	54 14.7	97 16	125.8	55 42.3	97 16	125.2	56 40.6	97 16	124.8	57 38.7	97 16	124.3	58 36.8	97 16	123.9	59 34.8	97 16	123.4	61 01.5	96 16	122.6	4
45	53 06.9	97 16	125.1	54 05.4	97 16	124.7	55 32.9	97 16	124.1	56 31.1	97 16	123.7	57 29.2	97 16	123.2	58 27.2	97 16	122.7	59 25.2	96 16	122.2	60 51.8	96 16	121.4	45
6	52 57.5	97 16	124.0	53 55.9	97 16	123.6	55 23.3	97 16	122.9	56 21.5	97 16	122.5	57 19.6	97 16	122.1	58 17.5	97 16	121.6	59 15.4	96 16	121.1	60 42.0	96 17	120.2	6
7	52 47.9	97 16	122.8	53 46.3	97 16	122.4	55 13.6	97 16	121.8	56 11.8	97 16	121.4	57 09.8	97 16	120.9	58 07.7	96 17	120.4	59 05.5	96 17	119.9	60 32.0	96 17	119.1	7
8	52 38.3	97 16	121.7	53 36.6	97 16	121.3	55 03.9	97 16	120.7	56 01.9	97 17	120.3	56 59.9	97 17	119.8	57 57.8	96 17	119.3	58 55.6	96 17	118.8	60 21.9	96 17	117.9	8
9	52 28.5	97 16	120.6	53 26.7	97 17	120.2	54 54.0	97 17	119.6	55 52.0	97 17	119.1	56 49.9	96 17	118.7	57 47.8	96 17	118.2	58 45.5	96 17	117.6	60 11.8	96 17	116.8	9
50	52 18.6	97 17	119.5	53 16.8	97 17	119.1	54 44.0	97 17	118.5	55 41.9	97 17	118.0	56 39.8	96 17	117.5	57 37.6	96 17	117.0	58 35.3	96 17	116.5	60 01.5	96 17	115.7	50
1	52 08.5	97 17	118.4	53 06.7	97 17	118.0	54 33.8	97 17	117.4	55 31.8	97 17	116.9	56 29.6	96 17	116.4	57 27.4	96 17	115.9	58 25.0	96 17	115.4	59 51.1	96 17	114.6	1
2	51 58.4	97 17	117.3	52 56.6	97 17	116.9	54 23.6	97 17	116.3	55 21.5	96 17	115.8	56 19.3	96 17	115.3	57 17.0	96 17	114.8	58 14.6	96 17	114.3	59 40.7	95 18	113.4	2
3	51 48.2	97 17	116.2	52 46.3	97 17	115.8	54 13.3	97 17	115.2	55 11.2	96 17	114.7	56 08.9	96 17	114.2	57 06.6	96 18	113.7	58 04.1	96 18	113.2	59 30.1	95 18	112.3	3
4	51 37.9	97 17	115.1	52 36.0	97 17	114.7	54 02.9	96 18	114.1	55 00.7	96 18	113.6	55 58.5	96 18	113.1	56 56.1	96 18	112.6	57 53.6	96 18	112.1	59 19.5	95 18	111.2	4
55	51 27.5	97 18	114.0	52 25.5	97 18	113.6	53 52.4	96 18	113.0	54 50.2	96 18	112.5	55 47.9	96 18	112.0	56 45.5	96 18	111.5	57 42.9	96 18	111.0	59 08.8	95 18	110.1	55
6	51 17.0	97 18	113.0	52 15.0	97 18	112.6	53 41.8	96 18	111.9	54 39.6	96 18	111.4	55 37.2	96 18	111.0	56 34.8	96 18	110.4	57 32.2	96 18	109.9	58 58.0	95 18	109.1	6
7	51 06.4	97 18	111.9	52 04.4	97 18	111.5	53 31.2	96 18	110.8	54 28.9	96 18	110.4	55 26.5	96 18	109.9	56 24.0	96 18	109.4	57 21.4	95 18	108.8	58 47.2	95 18	108.0	7
8	50 55.7	97 18	110.8	51 53.7	97 18	110.4	53 20.4	96 18	109.8	54 18.1	96 18	109.3	55 15.7	96 18	108.8	56 13.2	96 18	108.3	57 10.5	95 18	107.8	58 36.2	95 18	106.9	8
9	50 45.0	97 18	109.8	51 42.9	96 18	109.3	53 09.6	96 18	108.7	54 07.3	96 18	108.2	55 04.8	96 18	107.7	56 02.3	96 18	107.2	56 59.6	95 18	106.7	58 25.2	95 18	105.8	9
60	50 34.2	97 18	108.7	51 32.1	96 18	108.3	52 58.7	96 18	107.6	53 56.4	96 18	107.2	54 53.9	96 18	106.7	55 51.3	96 18	106.2	56 48.6	95 18	105.6	58 14.2	95 18	104.8	60
1	50 23.3	97 18	107.7	51 21.2	96 18	107.2	52 47.8	96 18	106.6	53 45.4	96 18	106.1	54 42.9	96 18	105.6	55 40.3	96 18	105.1	56 37.5	95 18	104.6	58 03.1	95 19	103.7	1
2	50 12.4	96 18	106.6	51 10.2	96 18	106.2	52 36.8	96 18	105.5	53 34.4	96 18	105.1	54 31.8	96 19	104.6	55 29.2	95 19	104.1	56 26.4	95 19	103.5	57 52.0	95 19	102.7	2
3	50 01.4	96 18	105.6	50 59.2	96 18	105.1	52 25.7	96 18	104.5	53 23.3	96 19	104.0	54 20.7	96 19	103.5	55 18.1	95 19	103.0	56 15.3	95 19	102.5	57 40.8	95 19	101.6	3
4	49 50.3	96 18	104.5	50 48.1	96 19	104.1	52 14.6	96 19	103.4	53 12.2	96 19	103.0	54 09.6	96 19	102.5	55 06.9	95 19	102.0	56 04.1	95 19	101.4	57 29.5	95 19	100.6	4
65	49 39.2	96 19	103.5	50 37.0	96 19	103.1	52 03.5	96 19	102.4	53 01.0	96 19	101.9	53 58.4	96 19	101.4	54 55.7	95 19	100.9	55 52.8	95 19	100.4	57 18.3	95 19	99.5	65
6	49 28.0	96 19	102.4	50 25.8	96 19	102.0	51 52.2	96 19	101.4	52 49.8	96 19	100.9	53 47.1	96 19	100.4	54 44.4	95 19	99.9	55 41.5	95 19	99.4	57 07.0	95 19	98.5	6
7	49 16.8	96 19	101.4	50 14.6	96 19	101.0	51 41.0	96 19	100.3	52 38.5	96 19	99.9	53 35.9	96 19	99.4	54 33.1	95 19	98.9	55 30.2	95 19	98.3	56 55.6	95 19	97.5	7
8	49 05.6	96 19	100.4	50 03.3	96 19	100.0	51 29.7	96 19	99.3	52 27.2	96 19	98.8	53 24.6	95 19	98.4	54 21.8	95 19	97.9	55 18.9	95 19	97.3	56 44.3	95 19	96.5	8
9	48 54.3	96 19	99.4	49 52.0	96 19	99.0	51 18.4	96 19	98.3	52 15.9	96 19	97.8	53 13.2	95 19	97.3	54 10.4	95 19	96.8	55 07.5	95 19	96.3	56 32.9	95 19	95.5	9
70	48 43.0	96 19	98.4	49 40.7	96 19	97.9	51 07.1	96 19	97.3	52 04.5	96 19	96.8	53 01.8	95 19	96.3	53 59.1	95 19	95.8	54 56.1	95 19	95.3	56 21.5	95 19	94.4	70
1	48 31.7	96 19	97.4	49 29.4	96 19	96.9	50 55.7	96 19	96.3	51 53.1	96 19	95.8	52 50.5	95 19	95.3	53 47.7	95 19	94.8	54 44.7	95 19	94.3	56 10.0	95 19	93.4	1
2	48 20.3	96 19	96.3	49 18.0	96 19	95.9	50 44.3	96 19	95.3	51 41.7	96 19	94.8	52 39.0	95 19	94.3	53 36.2	95 19	93.8	54 33.3	95 19	93.3	55 58.6	95 19	92.5	2
3	48 08.9	96 19	95.3	49 06.6	96 19	94.9	50 32.9	96 19	94.3	51 30.3	96 19	93.8	52 27.6	95 19	93.3	53 24.8	95 19	92.8	54 21.9	95 19	92.3	55 47.2	95 19	91.5	3
4	47 57.5	96 19	94.3	48 55.2	96 19	93.9	50 21.5	96 19	93.3	51 18.9	96 19	92.8	52 16.2	95 19	92.3	53 13.4	95 19	91.8	54 10.4	95 19	91.3	55 35.7	95 19	90.5	4
75	47 46.1	96 19	93.3	48 43.7	96 19	92.9	50 10.0	96 19	92.3	51 07.5	96 19	91.8	52 04.7	95 19	91.3	53 01.9	95 19	90.8	53 59.0	95 19	90.3	55 24.3	95 19	89.5	75
6	47 34.6	96 19	92.4	48 32.3	96 19	91.9	49 58.6	96 19	91.3	50 56.0	96 19	90.8	51 53.3	95 19	90.4	52 50.5	95 19	89.9	53 47.5	95 19	89.3	55 12.8	95 19	88.5	6
7	47 23.2	96 19	91.4	48 20.9	96 19	91.0	49 47.2	96 19	90.3	50 44.6	96 19	89.8	51 41.9	95 19	89.4	52 39.0	95 19	88.9	53 36.1	95 19	88.4	55 01.4	95 19	87.5	7
8	47 11.8	96 19	90.4	48 09.4	96 19	90.0	49 35.7	96 19	89.3	50 33.1	96 19	88.9	51 30.4	95 19	88.4	52 27.6	95 19	87.9	53 24.6	95 19	87.4	54 49.9	95 19	86.6	8
9	47 00.3	96 19	89.4	47 58.0	96 19	89.0	49 24.3	96 19	88.3	50 21.7	96 19	87.9	51 19.0	95 19	87.4	52 16.1	95 19	86.9	53 13.2	95 19	86.4	54 38.5	95 19	85.6	9
80	46 48.9	96 19	88.4	47 46.5	96 19	88.0	49 12.8	96 19	87.4	50 10.2	96 19	86.9	51 07.5	95 19	86.5	52 04.7	95 19	86.0	53 01.8	95 19	85.5	54 27.1	95 19	84.7	80
1	46 37.4	96 19	87.4	47 35.1	96 19	87.0	49 01.4	96 19	86.4	49 58.8	96 19	86.0	50 56.1	95 19	85.5	51 53.3	95 19	85.0	52 50.4	95 19	84.5	54 15.7	95 19	83.7	1
2	46 26.0	96 19	86.5	47 23.6	96 19	86.1	48 50.0	96 19	85.4	49 47.4	96 19	85.0	50 44.7	95 19	84.5	51 41.9	95 19	84.0	52 39.0	95 19	83.5	54 04.4	95 19	82.7	2
3	46 14.6	96 19	85.5	47 12.2	96 19	85.1	48 38.6	96 19	84.5	49 36.0	96 19	84.0	50 33.3	95 19	83.6	51 30.5	95 19	83.1	52 27.6	95 19	82.6	53 53.0	95 19	81.8	3
4	46 03.2	96 19	84.5	47 00.8	96 19	84.1	48 27.2	96 19	83.5	49 24.6	96 19	83.1	50 22.0	95 19	82.6	51 19.2	95 19	82.1	52 16.3	95 19	81.6	53 41.7	95 19	80.9	4
85	45 51.8	96 19	83.6	46 49.5	96 19	83.2	48 15.8	96 19	82.6	49 13.3	96 19	82.1	50 10.6	95 19	81.7	51 07.9	95 19	81.2	52 05.0	95 19	80.7	53 30.4	95 19	79.9	85
6	45 40.4	96 19	82.6	46 38.1	96 19	82.2	48 04.5	96 19	81.6	49 01.9	96 19	81.2	49 59.3	96 19	80.7	50 56.6	95 19	80.3	51 53.7	95 19	79.8	53 19.2	95 19	79.0	6
7	45 29.1	96 19	81.7	46 26.8	96 19	81.3	47 53.2	96 19	80.7	48 50.6	96 19	80.2	49 48.0	96 19	79.8	50 45.3	95 19	79.3	51 42.4	95 19	78.8	53 07.9	95 19	78.1	7
8	45 17.8	96 19	80.7	46 15.5	96 19	80.3	47 41.9	96 19	79.7	48 39.4	96 19	79.3	49 36.8	96 19	78.8	50 34.1	95 19	78.4	51 31.2	95 19	77.9	52 56.8	95 19	77.1	8
9	45 06.5	96 19	79.8	46 04.2	96 19	79.4	47 30.6	96 19	78.8	48 28.1	96 19	78.3	49 25.6	96 19	77.9	50 22.9	95 19	77.4	51 20.1	95 19	77.0	52 45.6	95 18	76.2	9
90	44 55.2	96 19	78.8	45 53.0	96 19	78.4	47 19.4	96 19	77.8	48 17.0	96 19	77.4	49 14.4	96 19	77.0	50 11.7	95 19	76.5	51 08.9	95 18	76.0	52 34.5	95 18	75.3	90

Lat. 79°

H.A.	46° 00′ Alt.		Az.	47° 00′ Alt.		Az.	48° 30′ Alt.		Az.	49° 30′ Alt.		Az.	50° 30′ Alt.		Az.	51° 30′ Alt.		Az.	52° 30′ Alt.		Az.	54° 00′ Alt.		Az.	H.A.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	44 44.0	96 19	77.9	45 41.8	96 19	77.5	47 08.3	96 19	76.9	48 05.8	96 19	76.5	49 03.3	96 18	76.0	50 00.6	95 18	75.6	50 57.8	96 18	75.1	52 23.5	96 18	74.4	91
2	44 32.8	96 19	76.9	45 30.6	96 19	76.6	46 57.1	96 18	76.0	47 54.7	96 18	75.5	48 52.2	96 18	75.1	49 49.5	96 18	74.7	50 46.8	96 18	74.2	52 12.5	96 18	73.5	2
3	44 21.7	96 18	76.0	45 19.5	96 19	75.6	46 46.0	96 18	75.0	47 43.6	96 18	74.6	48 41.1	96 18	74.2	49 38.5	96 18	73.7	50 35.8	95 18	73.3	52 01.5	96 18	72.5	3
4	44 10.6	96 18	75.1	45 08.4	96 18	74.7	46 35.0	96 18	74.1	47 32.6	96 18	73.7	48 30.1	96 18	73.3	49 27.6	96 18	72.8	50 24.9	95 18	72.4	51 50.6	96 18	71.6	4
95	43 59.6	96 18	74.1	44 57.4	96 18	73.8	46 24.0	96 18	73.2	47 21.7	96 18	72.8	48 19.2	96 18	72.3	49 16.6	96 18	71.9	50 14.0	95 18	71.5	51 39.8	95 18	70.7	95
6	43 48.6	96 18	73.2	44 46.4	96 18	72.8	46 13.1	96 18	72.3	47 10.7	96 18	71.9	48 08.3	96 18	71.4	49 05.8	96 18	71.0	50 03.2	95 18	70.5	51 29.0	95 18	69.8	6
7	43 37.7	97 18	72.3	44 35.5	96 18	71.9	46 02.2	96 18	71.3	46 59.9	96 18	70.9	47 57.5	96 18	70.5	48 55.0	96 18	70.1	49 52.4	96 18	69.6	51 18.3	96 18	68.9	7
8	43 26.8	97 18	71.4	44 24.7	96 18	71.0	45 51.4	96 18	70.4	46 49.1	96 18	70.0	47 46.7	96 18	69.6	48 44.3	96 18	69.2	49 41.7	96 18	68.7	51 07.6	96 18	68.0	8
9	43 16.0	97 18	70.4	44 13.9	96 18	70.1	45 40.6	96 18	69.5	46 38.4	96 18	69.1	47 36.0	96 18	68.7	48 33.6	96 18	68.3	49 31.1	96 18	67.8	50 57.1	95 18	67.2	9
100	43 05.2	97 18	69.5	44 03.2	97 18	69.2	45 30.0	96 18	68.6	46 27.7	96 18	68.2	47 25.4	96 18	67.8	48 23.0	96 18	67.4	49 20.5	96 17	66.9	50 46.5	95 17	66.3	100
1	42 54.5	97 18	68.6	43 52.5	97 18	68.2	45 19.3	96 18	67.7	46 17.1	96 18	67.3	47 14.8	96 18	66.9	48 12.5	96 17	66.5	49 10.0	96 17	66.1	50 36.1	96 17	65.4	1
2	42 43.9	97 18	67.7	43 41.9	97 18	67.3	45 08.8	96 17	66.8	46 06.6	96 17	66.4	47 04.3	96 17	66.0	48 02.0	96 17	65.6	48 59.6	96 17	65.2	50 25.7	96 17	64.5	2
3	42 33.3	97 17	66.8	43 31.4	97 17	66.4	44 58.3	96 17	65.9	45 56.1	96 17	65.5	46 53.9	96 17	65.1	47 51.6	96 17	64.7	48 49.2	96 17	64.3	50 15.4	96 17	63.6	3
4	42 22.9	97 17	65.8	43 20.9	97 17	65.5	44 47.9	97 17	65.0	45 45.8	96 17	64.6	46 43.6	96 17	64.2	47 41.3	96 17	63.8	48 38.9	96 17	63.4	50 05.2	96 17	62.7	4
105	42 12.5	97 17	64.9	43 10.5	97 17	64.6	44 37.5	97 17	64.1	45 35.5	96 17	63.7	46 33.3	96 17	63.3	47 31.1	96 17	62.9	48 28.7	96 17	62.5	49 55.1	96 17	61.9	105
6	42 02.1	97 17	64.0	43 00.2	97 17	63.7	44 27.3	97 17	63.2	45 25.2	97 17	62.8	46 23.1	96 17	62.4	47 20.9	96 17	62.0	48 18.6	96 17	61.6	49 45.0	96 17	61.0	6
7	41 51.9	97 17	63.1	42 50.0	97 17	62.8	44 17.1	97 17	62.3	45 15.1	97 17	61.9	46 13.0	96 17	61.5	47 10.8	96 17	61.1	48 08.6	96 17	60.7	49 35.1	96 16	60.1	7
8	41 41.7	97 17	62.2	42 39.9	97 17	61.9	44 07.0	97 17	61.4	45 05.0	97 17	61.0	46 03.0	97 17	60.6	47 00.9	96 16	60.3	47 58.7	96 16	59.9	49 25.2	96 16	59.2	8
9	41 31.6	97 17	61.3	42 29.8	97 17	61.0	43 57.0	97 17	60.5	44 55.1	97 16	60.1	45 53.0	97 16	59.8	46 51.0	96 16	59.4	47 48.8	96 16	59.0	49 15.4	96 16	58.4	9
110	41 21.6	97 16	60.4	42 19.8	97 16	60.1	43 47.1	97 16	59.6	44 45.2	97 16	59.2	45 43.2	97 16	58.9	46 41.2	97 16	58.5	47 39.0	96 16	58.1	49 05.7	96 16	57.5	110
1	41 11.7	97 16	59.5	42 10.0	97 16	59.2	43 37.3	97 16	58.7	44 35.4	97 16	58.4	45 33.4	97 16	58.0	46 31.4	97 16	57.6	47 29.4	96 16	57.3	48 56.1	96 16	56.6	1
2	41 01.9	97 16	58.6	42 00.2	97 16	58.3	43 27.5	97 16	57.8	44 25.7	97 16	57.5	45 23.8	97 16	57.1	46 21.8	97 16	56.8	47 19.8	97 16	56.4	48 46.6	96 16	55.8	2
3	40 52.1	97 16	57.7	41 50.5	97 16	57.4	43 17.9	97 16	56.9	44 16.1	97 16	56.6	45 14.2	97 16	56.3	46 12.3	97 16	55.9	47 10.3	97 16	55.5	48 37.1	96 16	54.9	3
4	40 42.5	97 16	56.8	41 40.9	97 16	56.5	43 08.3	97 16	56.1	44 06.6	97 16	55.7	45 04.7	97 16	55.4	46 02.9	97 16	55.0	47 00.9	97 16	54.7	48 27.8	96 15	54.1	4
115	40 33.0	97 16	56.0	41 31.4	97 16	55.6	42 58.9	97 16	55.2	43 57.2	97 16	54.8	44 55.4	97 15	54.5	45 53.5	97 15	54.2	46 51.6	97 15	53.8	48 18.6	96 15	53.2	115
6	40 23.5	97 16	55.1	41 22.0	97 16	54.8	42 49.5	97 15	54.3	43 47.9	97 15	54.0	44 46.1	97 15	53.6	45 44.3	97 15	53.3	46 42.4	97 15	52.9	48 09.5	96 15	52.4	6
7	40 14.2	97 15	54.2	41 12.7	97 15	53.9	42 40.3	97 15	53.4	43 38.6	97 15	53.1	44 36.9	97 15	52.8	45 35.2	97 15	52.4	46 33.3	97 15	52.1	48 00.5	97 15	51.5	7
8	40 05.0	98 15	53.3	41 03.5	97 15	53.0	42 31.2	97 15	52.5	43 29.5	97 15	52.2	44 27.9	97 15	51.9	45 26.1	97 15	51.6	46 24.4	97 15	51.2	47 51.6	97 15	50.7	8
9	39 55.9	98 15	52.4	40 54.4	98 15	52.1	42 22.1	97 15	51.7	43 20.5	97 15	51.4	44 18.9	97 15	51.0	45 17.2	97 15	50.7	46 15.5	97 15	50.4	47 42.8	97 14	49.8	9
120	39 46.8	98 15	51.5	40 45.4	98 15	51.2	42 13.2	97 15	50.8	43 11.7	97 15	50.5	44 10.1	97 15	50.2	45 08.4	97 14	49.8	46 06.7	97 14	49.5	47 34.1	97 14	49.0	120
1	39 37.9	98 15	50.6	40 36.5	98 15	50.4	42 04.4	98 14	49.9	43 02.9	97 14	49.6	44 01.3	97 14	49.3	44 59.7	97 14	49.0	45 58.1	97 14	48.7	47 25.5	97 14	48.1	1
2	39 29.1	98 14	49.8	40 27.8	98 14	49.5	41 55.7	98 14	49.1	42 54.2	98 14	48.8	43 52.7	97 14	48.4	44 51.2	97 14	48.1	45 49.5	97 14	47.8	47 17.0	97 14	47.3	2
3	39 20.5	98 14	48.9	40 19.1	98 14	48.6	41 47.1	98 14	48.2	42 45.7	98 14	47.9	43 44.2	98 14	47.6	44 42.7	97 14	47.3	45 41.1	97 14	47.0	47 08.7	97 14	46.4	3
4	39 11.9	98 14	48.0	40 10.6	98 14	47.7	41 38.6	98 14	47.3	42 37.2	98 14	47.0	43 35.8	98 14	46.7	44 34.3	98 14	46.4	45 32.8	97 14	46.1	47 00.4	97 14	45.6	4
125	39 03.4	98 14	47.1	40 02.2	98 14	46.9	41 30.3	98 14	46.4	42 28.9	98 14	46.2	43 27.5	98 14	45.9	44 26.1	98 14	45.6	45 24.6	97 13	45.3	46 52.3	97 13	44.8	125
6	38 55.1	98 14	46.2	39 53.9	98 14	46.0	41 22.0	98 14	45.6	42 20.7	98 13	45.3	43 19.4	98 13	45.0	44 18.0	98 13	44.7	45 16.5	98 13	44.4	46 44.3	97 13	43.9	6
7	38 46.9	98 13	45.4	39 45.7	98 13	45.1	41 13.9	98 13	44.7	42 12.6	98 13	44.4	43 11.3	98 13	44.2	44 10.0	98 13	43.9	45 08.6	98 13	43.6	46 36.4	98 13	43.1	7
8	38 38.8	98 13	44.5	39 37.7	98 13	44.2	41 05.9	98 13	43.9	42 04.7	98 13	43.6	43 03.4	98 13	43.3	44 02.1	98 13	43.0	45 00.8	98 13	42.7	46 28.6	98 13	42.3	8
9	38 30.9	98 13	43.6	39 29.8	98 13	43.4	40 58.0	98 13	43.0	41 56.9	98 13	42.7	42 55.6	98 13	42.5	43 54.4	98 13	42.2	44 53.1	98 13	41.9	46 21.0	98 13	41.4	9
130	38 23.0	98 13	42.8	39 22.0	98 13	42.5	40 50.3	98 13	42.1	41 49.1	98 13	41.9	42 48.0	98 13	41.6	43 46.7	98 12	41.3	44 45.5	98 12	41.1	46 13.5	98 12	40.6	130
1	38 15.3	98 13	41.9	39 14.3	98 13	41.6	40 42.7	98 12	41.3	41 41.6	98 12	41.0	42 40.4	98 12	40.8	43 39.2	98 12	40.5	44 38.0	98 12	40.2	46 06.1	98 12	39.8	1
2	38 07.7	98 12	41.0	39 06.7	98 12	40.8	40 35.2	98 12	40.4	41 34.1	98 12	40.2	42 33.0	98 12	39.9	43 31.9	98 12	39.6	44 30.7	98 12	39.4	45 58.8	98 12	38.9	2
3	38 00.3	98 12	40.1	38 59.3	98 12	39.9	40 27.8	98 12	39.6	41 26.8	98 12	39.3	42 25.7	98 12	39.1	43 24.6	98 12	38.8	44 23.5	98 12	38.5	45 51.7	98 12	38.1	3
4	37 53.0	98 12	39.3	38 52.0	98 12	39.1	40 20.6	98 12	38.7	41 19.6	98 12	38.5	42 18.6	98 12	38.2	43 17.5	98 12	38.0	44 16.4	98 12	37.7	45 44.7	98 11	37.3	4
135	37 45.8	99 12	38.4	38 44.9	98 12	38.2	40 13.5	98 12	37.9	41 12.6	98 12	37.6	42 11.6	98 11	37.4	43 10.5	98 11	37.1	44 09.5	98 11	36.9	45 37.8	98 11	36.5	135
6	37 38.7	99 12	37.5	38 37.9	99 11	37.3	40 06.6	98 11	37.0	41 05.6	98 11	36.8	42 04.7	98 11	36.5	43 03.7	98 11	36.3	44 02.7	98 11	36.0	45 31.1	98 11	35.6	6
7	37 31.8	99 11	36.7	38 31.0	99 11	36.5	39 59.7	99 11	36.1	40 58.8	99 11	35.9	41 57.9	98 11	35.7	42 57.0	98 11	35.5	43 56.0	98 11	35.2	45 24.5	98 11	34.8	7
8	37 25.1	99 11	35.8	38 24.3	99 11	35.6	39 53.0	99 11	35.3	40 52.2	99 11	35.1	41 51.3	99 11	34.9	42 50.4	98 11	34.6	43 49.5	98 11	34.4	45 18.0	98 11	34.0	8
9	37 18.4	99 11	35.0	38 17.7	99 11	34.8	39 46.5	99 11	34.4	40 45.7	99 11	34.2	41 44.8	99 11	34.0	42 44.0	99 10	33.8	43 43.1	98 10	33.5	45 11.7	98 10	33.2	9
140	37 11.9	99 11	34.1	38 11.2	99 11	33.9	39 40.1	99 10	33.6	40 39.3	99 10	33.4	41 38.5	99 10	33.2	42 37.7	99 10	32.9	43 36.8	99 10	32.7	45 05.5	98 10	32.4	140
1	37 05.6	99 10	33.2	38 04.9	99 10	33.0	39 33.8	99 10	32.7	40 33.1	99 10	32.5	41 32.3	99 10	32.3	42 31.5	99 10	32.1	43 30.7	99 10	31.9	44 59.4	99 10	31.5	1
2	36 59.4	99 10	32.4	37 58.7	99 10	32.2	39 27.7	99 10	31.9	40 27.0	99 10	31.7	41 26.3	99 10	31.5	42 25.5	99 10	31.3	43 24.7	99 10	31.1	44 53.5	99 10	30.7	2
3	36 53.3	99 10	31.5	37 52.7	99 10	31.3	39 21.7	99 10	31.0	40 21.1	99 10	30.9	41 20.4	99 10	30.7	42 19.6	99 10	30.4	43 18.9	99 09	30.2	44 47.7	99 09	29.9	3
4	36 47.4	99 10	30.7	37 46.8	99 10	30.5	39 15.9	99 09	30.2	40 15.3	99 09	30.0	41 14.6	99 09	29.8	42 13.9	99 09	29.6	43 13.2	99 09	29.4	44 42.1	99 09	29.1	4
145	36 41.7	99 09	29.8	37 41.1	99 09	29.6	39 10.2	99 09	29.4	40 09.6	99 09	29.2	41 09.0	99 09	29.0	42 08.3	99 09	28.8	43 07.7	99 09	28.6	44 36.6	99 09	28.3	145
6	36 36.1	99 09	28.9	37 35.5	99 09	28.8	39 04.7	99 09	28.5	40 04.1	99 09	28.3	41 03.5	99 09	28.1	42 02.9	99 09	28.0	43 02.3	99 09	27.8	44 31.3	99 09	27.5	6
7	36 30.6	99 09	28.1	37 30.1	99 09	27.9	38 59.3	99 09	27.7	39 58.7	99 09	27.5	40 58.2	99 09	27.3	41 57.6	99 09	27.1	42 57.0	99 09	26.9	44 26.1	99 09	26.6	7
8	36 25.3	99 09	27.2	37 24.8	99 09	27.1	38 54.0	99 08	26.8	39 53.5	99 08	26.7	40 53.0	99 08	26.5	41 52.5	99 08	26.3	42 51.9	99 08	26.1	44 21.0	99 08	25.8	8
9	36 20.1	99 08	26.4	37 19.7	99 08	26.2	38 49.0	99 08	26.0	39 48.5	99 08	25.8	40 48.0	99 08	25.6	41 47.5	99 08	25.5	42 46.9	99 08	25.3	44 16.1	99 08	25.0	9
150	36 15.1	99 08	25.5	37 14.7	99 08	25.4	38 44.0	99 08	25.1	39 43.6	99 08	25.0	40 43.1	99 08	24.8	41 42.6	99 08	24.6	42 42.1	99 08	24.5	44 11.3	99 08	24.2	150
1	36 10.3	99 08	24.7	37 09.9	99 08	24.5	38 39.2	99 08	24.3	39 38.8	99 08	24.1	40 38.4	99 08	24.0	41 37.9	99 08	23.8	42 37.4	99 08	23.6	44 06.7	99 07	23.4	1
2	36 05.6	99 08	23.8	37 05.2	99 08	23.7	38 34.6	99 07	23.4	39 34.2	99 07	23.3	40 33.8	99 07	23.1	41 33.4	99 07	23.0	42 32.9	99 07	22.8	44 02.2	99 07	22.6	2
3	36 01.0	99 07	22.9	37 00.7	99 07	22.8	38 30.1	99 07	22.6	39 29.7	99 07	22.5	40 29.4	99 07	22.3	41 29.0	99 07	22.2	42 28.6	99 07	22.0	43 57.9	99 07	21.8	3
4	35 56.6	99 07	22.1	36 56.3	99 07	22.0	38 25.8	99 07	21.8	39 25.4	99 07	21.6	40 25.1	99 07	21.5	41 24.7	99 07	21.3	42 24.3	99 07	21.2	43 53.7	99 07	21.0	4
155	35 52.4	1.0 07	21.2	36 52.1	99 07	21.1	38 21.6	99 07	20.9	39 21.3	99 07	20.8	40 21.0	99 07	20.7	41 20.6	99 07	20.5	42 20.3	99 07	20.4	43 49.7	99 06	20.1	155
6	35 48.3	1.0 07	20.4	36 48.1	1.0 06	20.3	38 17.6	1.0 06	20.1	39 17.3	99 06	20.0	40 17.0	99 06	19.8	41 16.7	99 06	19.7	42 16.4	99 06	19.5	43 45.9	99 06	19.3	6
7	35 44.4	1.0 06	19.5	36 44.2	1.0 06	19.4	38 13.8	1.0 06	19.2	39 13.5	1.0 06	19.1	40 13.2	1.0 06	19.0	41 12.9	1.0 06	18.9	42 12.6	99 06	18.7	43 42.2	99 06	18.5	7
8	35 40.7	1.0 06	18.7	36 40.4	1.0 06	18.6	38 10.1	1.0 06	18.4	39 09.8	1.0 06	18.3	40 09.6	1.0 06	18.2	41 09.3	1.0 06	18.0	42 09.0	1.0 06	17.9	43 38.6	1.0 06	17.7	8
9	35 37.1	1.0 06	17.8	36 36.9	1.0 06	17.7	38 06.5	1.0 06	17.6	39 06.3	1.0 06	17.5	40 06.1	1.0 06	17.3	41 05.8	1.0 06	17.2	42 05.6	1.0 06	17.1	43 35.2	1.0 05	16.9	9
160	35 33.7	1.0 05	17.0	36 33.5	1.0 05	16.9	38 03.2	1.0 05	16.7	39 03.0	1.0 05	16.6	40 02.7	1.0 05	16.5	41 02.5	1.0 05	16.4	42 02.3	1.0 05	16.3	43 31.9	1.0 05	16.1	160
1	35 30.4	1.0 05	16.1	36 30.2	1.0 05	16.0	37 59.9	1.0 05	15.9	38 59.8	1.0 05	15.8	39 59.6	1.0 05	15.7	40 59.4	1.0 05	15.6	41 59.2	1.0 05	15.5	43 28.8	1.0 05	15.3	1
2	35 27.3	1.0 05	15.3	36 27.1	1.0 05	15.2	37 56.9	1.0 05	15.0	38 56.7	1.0 05	15.0	39 56.5	1.0 05	14.9	40 56.4	1.0 05	14.8	41 56.2	1.0 05	14.6	43 25.9	1.0 05	14.5	2
3	35 24.4	1.0 05	14.4	36 24.2	1.0 05	14.3	37 54.0	1.0 05	14.2	38 53.9	1.0 05	14.1	39 53.7	1.0 05	14.0	40 53.5	1.0 04	18.9	41 53.4	1.0 04	13.8	43 23.1	1.0 04	13.7	3
4	35 21.6	1.0 04	13.6	36 21.5	1.0 04	13.5	37 51.3	1.0 04	13.4	38 51.1	1.0 04	13.3	39 51.0	1.0 04	13.2	40 50.9	1.0 04	13.1	41 50.7	1.0 04	13.0	43 20.5	1.0 04	12.9	4
165	35 19.0	1.0 04	12.7	36 18.9	1.0 04	12.7	37 48.7	1.0 04	12.5	38 48.6	1.0 04	12.5	39 48.5	1.0 04	12.4	40 48.3	1.0 04	12.3	41 48.2	1.0 04	12.2	43 18.0	1.0 04	12.1	165
6	35 16.6	1.0 04	11.9	36 16.5	1.0 04	11.8	37 46.3	1.0 04	11.7	38 46.2	1.0 04	11.6	39 46.1	1.0 04	11.5	40 46.0	1.0 04	11.5	41 45.9	1.0 04	11.4	43 15.7	1.0 04	11.3	6
7	35 14.3	1.0 04	11.0	36 14.2	1.0 04	11.0	37 44.1	1.0 03	10.9	38 44.0	1.0 03	10.8	39 43.9	1.0 03	10.7	40 43.8	1.0 03	10.6	41 43.7	1.0 04	10.6	43 13.5	1.0 03	10.5	7
8	35 12.2	1.0 03	10.2	36 12.1	1.0 03	10.1	37 42.0	1.0 03	10.0	38 41.9	1.0 03	10.0	39 41.8	1.0 03	09.9	40 41.8	1.0 03	09.8	41 41.7	1.0 03	09.8	43 11.5	1.0 03	09.6	8
9	35 10.2	1.0 03	09.3	36 10.2	1.0 03	09.3	37 40.1	1.0 03	09.2	38 40.0	1.0 03	09.1	39 39.9	1.0 03	09.1	40 39.9	1.0 03	09.0	41 39.8	1.0 03	08.9	43 09.7	1.0 03	08.8	9
170	35 08.5	1.0 03	08.5	36 08.4	1.0 03	08.4	37 38.3	1.0 03	08.4	38 38.3	1.0 03	08.3	39 38.2	1.0 02	08.2	40 38.2	1.0 03	08.2	41 38.1	1.0 03	08.1	43 08.0	1.0 03	08.0	170
1	35 06.9	1.0 02	07.6	36 06.8	1.0 03	07.6	37 36.8	1.0 02	07.5	38 36.7	1.0 02	07.5	39 36.7	1.0 02	07.4	40 36.6	1.0 02	07.4	41 36.6	1.0 02	07.3	43 06.5	1.0 02	07.2	1
2	35 05.4	1.0 02	06.8	36 05.4	1.0 02	06.7	37 35.3	1.0 02	06.7	38 35.3	1.0 02	06.6	39 35.3	1.0 02	06.6	40 35.2	1.0 02	06.6	41 35.2	1.0 02	06.5	43 05.1	1.0 02	06.4	2
3	35 04.1	1.0 02	05.9	36 04.1	1.0 02	05.9	37 34.1	1.0 02	05.8	38 34.1	1.0 02	05.8	39 34.0	1.0 02	05.8	40 34.0	1.0 02	05.7	41 34.0	1.0 02	05.7	43 03.9	1.0 02	05.6	3
4	35 03.0	1.0 02	05.1	36 03.0	1.0 02	05.1	37 33.0	1.0 02	05.0	38 33.0	1.0 02	05.0	39 33.0	1.0 02	04.9	40 32.9	1.0 02	04.9	41 32.9	1.0 01	04.9	43 02.9	1.0 01	04.8	4
175	35 02.1	1.0 01	04.2	36 02.1	1.0 01	04.2	37 32.1	1.0 01	04.2	38 32.1	1.0 01	04.1	39 32.1	1.0 01	04.1	40 32.0	1.0 01	04.1	41 32.0	1.0 01	04.1	43 02.0	1.0 01	04.0	175
6	35 01.4	1.0 01	03.4	36 01.3	1.0 01	03.4	37 31.3	1.0 01	03.3	38 31.3	1.0 01	03.3	39 31.3	1.0 01	03.3	40 31.3	1.0 01	03.3	41 31.3	1.0 01	03.3	43 01.3	1.0 01	03.2	6
7	35 00.8	1.0 01	02.5	36 00.8	1.0 01	02.5	37 30.7	1.0 01	02.5	38 30.7	1.0 01	02.5	39 30.7	1.0 01	02.5	40 30.7	1.0 01	02.5	41 30.7	1.0 01	02.4	43 00.7	1.0 01	02.4	7
8	35 00.3	1.0 00	01.7	36 00.3	1.0 00	01.7	37 30.3	1.0 00	01.7	38 30.3	1.0 00	01.7	39 30.3	1.0 00	01.6	40 30.3	1.0 00	01.6	41 30.3	1.0 00	01.6	43 00.3	1.0 00	01.6	8
9	35 00.1	1.0 00	00.8	36 00.1	1.0 00	00.8	37 30.1	1.0 00	00.8	38 30.1	1.0 00	00.8	39 30.1	1.0 00	00.8	40 30.1	1.0 00	00.8	41 30.1	1.0 00	00.8	43 00.1	1.0 00	00.8	9
180	35 00.0	1.0 00	00.0	36 00.0	1.0 00	00.0	37 30.0	1.0 00	00.0	38 30.0	1.0 00	00.0	39 30.0	1.0 00	00.0	40 30.0	1.0 00	00.0	41 30.0	1.0 00	00.0	43 00.0	1.0 00	00.0	180

Lat. 79°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	65 30.0	1.0 00	180.0	66 00.0	1.0 00	180.0	67 00.0	1.0 00	180.0	67 30.0	1.0 00	180.0
1	65 29.9	1.0 01	178.6	65 59.9	1.0 01	178.6	66 59.9	1.0 01	178.6	67 29.9	1.0 01	178.6
2	65 29.4	1.0 01	177.2	65 59.4	1.0 01	177.2	66 59.4	1.0 01	177.1	67 29.4	1.0 01	177.1
3	65 28.7	1.0 02	175.8	65 58.7	1.0 02	175.8	66 58.7	1.0 02	175.7	67 28.7	1.0 02	175.7
4	65 27.8	1.0 02	174.4	65 57.7	1.0 02	174.4	66 57.7	1.0 02	174.3	67 27.7	1.0 02	174.2
05	65 26.5	1.0 03	173.0	65 56.5	1.0 03	173.0	66 56.4	1.0 03	172.9	67 26.4	1.0 03	172.8
6	65 25.0	1.0 03	171.6	65 54.9	1.0 03	171.6	66 54.9	1.0 03	171.4	67 24.8	1.0 03	171.4
7	65 23.2	1.0 03	170.2	65 53.1	1.0 04	170.1	66 53.0	1.0 04	170.0	67 23.0	1.0 04	169.9
8	65 21.1	1.0 04	168.8	65 51.0	1.0 04	168.7	66 50.9	1.0 04	168.6	67 20.8	1.0 04	168.5
9	65 18.7	1.0 04	167.4	65 48.7	1.0 04	167.4	66 48.5	1.0 04	167.2	67 18.4	1.0 04	167.1
10	65 16.1	1.0 05	166.1	65 46.0	1.0 05	166.0	66 45.8	1.0 05	165.8	67 15.7	1.0 05	165.6
1	65 13.2	1.0 05	164.7	65 43.1	1.0 05	164.6	66 42.9	1.0 05	164.3	67 12.7	1.0 05	164.2
2	65 10.1	1.0 06	163.3	65 39.9	1.0 06	163.2	66 39.6	99 06	162.9	67 09.5	99 06	162.8
3	65 06.6	99 06	161.9	65 36.5	99 06	161.8	66 36.1	99 06	161.5	67 06.0	99 06	161.4
4	65 02.9	99 07	160.5	65 32.8	99 07	160.4	66 32.4	99 07	160.1	67 02.2	99 07	160.0
15	64 59.0	99 07	159.2	65 28.8	99 07	159.0	66 28.4	99 07	158.7	66 58.1	99 07	158.6
6	64 54.8	99 07	157.8	65 24.6	99 07	157.7	66 24.1	99 08	157.4	66 53.8	99 08	157.2
7	64 50.4	99 08	156.5	65 20.1	99 08	156.3	66 19.5	99 08	156.0	66 49.2	99 08	155.8
8	64 45.7	99 08	155.1	65 15.4	99 08	154.9	66 14.8	99 08	154.6	66 44.4	99 08	154.4
9	64 40.7	99 09	153.8	65 10.4	99 09	153.6	66 09.7	99 09	153.2	66 39.4	99 09	153.0
20	64 35.6	99 09	152.4	65 05.2	99 09	152.2	66 04.4	99 09	151.9	66 34.0	99 09	151.7
1	64 30.1	99 09	151.1	64 59.7	99 09	150.9	65 58.9	99 10	150.5	66 28.5	99 10	150.3
2	64 24.5	99 10	149.8	64 54.1	99 10	149.6	65 53.2	98 10	149.2	66 22.7	98 10	148.9
3	64 18.6	99 10	148.4	64 48.1	98 10	148.2	65 47.2	98 10	147.8	66 16.7	98 10	147.6
4	64 12.5	98 11	147.1	64 42.0	98 11	146.9	65 41.0	98 11	146.5	66 10.4	98 11	146.2
25	64 06.2	98 11	145.8	64 35.6	98 11	145.6	65 34.5	98 11	145.1	66 04.0	98 11	144.9
6	63 59.6	98 11	144.5	64 29.1	98 11	144.3	65 27.9	98 11	143.8	65 57.3	98 12	143.6
7	63 52.9	98 12	143.2	64 22.3	98 12	143.0	65 21.0	98 12	142.5	65 50.4	98 12	142.3
8	63 45.9	98 12	141.9	64 15.3	98 12	141.7	65 14.0	98 12	141.2	65 43.2	98 12	140.9
9	63 38.8	98 12	140.6	64 08.1	98 12	140.4	65 06.7	98 12	139.9	65 35.9	97 13	139.6
30	63 31.4	98 13	139.4	64 00.7	98 13	139.1	64 59.2	97 13	138.6	65 28.4	97 13	138.3
1	63 23.9	98 13	138.1	63 53.1	97 13	137.8	64 51.5	97 13	137.3	65 20.7	97 13	137.0
2	63 16.1	97 13	136.8	63 45.3	97 13	136.6	64 43.7	97 13	136.0	65 12.8	97 13	135.8
3	63 08.2	97 14	135.6	63 37.4	97 14	135.3	64 35.6	97 14	134.8	65 04.7	97 14	134.5
4	63 00.1	97 14	134.3	63 29.2	97 14	134.1	64 27.4	97 14	133.5	64 56.5	97 14	133.2
35	62 51.8	97 14	133.1	63 20.9	97 14	132.8	64 19.0	97 14	132.3	64 48.1	97 14	132.0
6	62 43.4	97 14	131.9	63 12.4	97 14	131.6	64 10.5	97 15	131.0	64 39.5	97 15	130.7
7	62 34.8	97 15	130.6	63 03.8	97 15	130.4	64 01.8	97 15	129.8	64 30.7	96 15	129.5
8	62 26.0	97 15	129.4	62 55.0	97 15	129.1	63 52.9	96 15	128.6	64 21.8	96 15	128.2
9	62 17.1	97 15	128.2	62 46.0	96 15	127.9	63 43.9	96 15	127.3	64 12.7	96 15	127.0
40	62 08.0	96 15	127.0	62 36.9	96 15	126.7	63 34.7	96 16	126.1	64 03.5	96 16	125.8
1	61 58.8	96 16	125.8	62 27.7	96 16	125.5	63 25.4	96 16	124.9	63 54.2	96 16	124.6
2	61 49.4	96 16	124.6	62 18.3	96 16	124.3	63 15.9	96 16	123.7	63 44.7	96 16	123.4
3	61 40.0	96 16	123.4	62 08.8	96 16	123.1	63 06.3	96 16	122.5	63 35.0	96 16	122.2
4	61 30.3	96 16	122.3	61 59.1	96 16	122.0	62 56.6	96 16	121.4	63 25.3	96 16	121.0
45	61 20.6	96 16	121.1	61 49.4	96 16	120.8	62 46.8	96 17	120.2	63 15.4	95 17	119.9
6	61 10.7	96 17	119.9	61 39.5	96 17	119.6	62 36.8	95 17	119.0	63 05.4	95 17	118.7
7	61 00.8	96 17	118.8	61 29.5	96 17	118.5	62 26.8	95 17	117.9	62 55.3	95 17	117.5
8	60 50.7	96 17	117.7	61 19.3	96 17	117.3	62 16.6	95 17	116.7	62 45.1	95 17	116.4
9	60 40.5	96 17	116.5	61 09.1	95 17	116.2	62 06.3	95 17	115.6	62 34.8	95 17	115.2
50	60 30.2	95 17	115.4	60 58.8	95 17	115.1	61 55.9	95 17	114.4	62 24.4	95 18	114.1
1	60 19.8	95 17	114.3	60 48.4	95 18	114.0	61 45.5	95 18	113.3	62 13.9	95 18	113.0
2	60 09.3	95 18	113.1	60 37.9	95 18	112.8	61 34.9	95 18	112.2	62 03.3	95 18	111.9
3	59 58.7	95 18	112.0	60 27.3	95 18	111.7	61 24.3	95 18	111.1	61 52.7	95 18	110.7
4	59 48.1	95 18	110.9	60 16.6	95 18	110.6	61 13.5	95 18	110.0	61 41.9	95 18	109.6
55	59 37.4	95 18	109.8	60 05.9	95 18	109.5	61 02.7	95 18	108.9	61 31.1	94 18	108.5
6	59 26.5	95 18	108.7	59 55.0	95 18	108.4	60 51.9	95 18	107.8	61 20.2	94 18	107.5
7	59 15.7	95 18	107.7	59 44.1	95 18	107.4	60 40.9	95 18	106.7	61 09.3	94 18	106.4
8	59 04.7	95 18	106.6	59 33.2	95 18	106.3	60 29.9	94 18	105.6	60 58.3	94 18	105.3
9	58 53.7	95 18	105.5	59 22.2	95 18	105.2	60 18.9	94 19	104.6	60 47.2	94 19	104.2
60	58 42.7	95 19	104.5	59 11.1	95 19	104.1	60 07.8	94 19	103.5	60 36.1	94 19	103.2
1	58 31.6	95 19	103.4	59 00.0	95 19	103.1	59 56.6	94 19	102.4	60 24.9	94 19	102.1
2	58 20.4	95 19	102.4	58 48.8	95 19	102.0	59 45.4	94 19	101.4	60 13.7	94 19	101.1
3	58 09.2	95 19	101.3	58 37.6	95 19	101.0	59 34.2	94 19	100.4	60 02.4	94 19	100.0
4	57 57.9	95 19	100.3	58 26.3	94 19	100.0	59 22.9	94 19	99.3	59 51.1	94 19	99.0
65	57 46.7	96 19	99.2	58 15.0	94 19	98.9	59 11.6	94 19	98.3	59 39.8	94 19	97.9
6	57 35.3	95 19	98.2	58 03.7	94 19	97.9	59 00.2	94 19	97.3	59 28.5	94 19	96.9
7	57 24.0	95 19	97.2	57 52.3	94 19	96.9	58 48.9	94 19	96.2	59 17.1	94 19	95.9
8	57 12.6	95 19	96.2	57 41.0	94 19	95.9	58 37.5	94 19	95.2	59 05.7	94 19	94.9
9	57 01.2	94 19	95.2	57 29.6	94 19	94.9	58 26.1	94 19	94.2	58 54.3	94 19	93.9
70	56 49.8	94 19	94.2	57 18.1	94 19	93.8	58 14.7	94 19	93.2	58 42.8	94 19	92.9
1	56 38.4	94 19	93.2	57 06.7	94 19	92.9	58 03.2	94 19	92.2	58 31.4	94 19	91.9
2	56 27.0	94 19	92.2	56 55.3	94 19	91.9	57 51.8	94 19	91.2	58 20.0	94 19	90.9
3	56 15.5	94 19	91.2	56 43.8	94 19	90.9	57 40.3	94 19	90.2	58 08.5	94 19	89.9
4	56 04.1	94 19	90.2	56 32.4	94 19	89.9	57 28.9	94 19	89.3	57 57.1	94 19	88.9
75	55 52.6	94 19	89.2	56 20.9	94 19	88.9	57 17.4	94 19	88.3	57 45.6	94 19	88.0
6	55 41.2	94 19	88.2	56 09.5	94 19	87.9	57 06.0	94 19	87.3	57 34.2	94 19	87.0
7	55 29.7	94 19	87.3	55 58.1	94 19	87.0	56 54.6	94 19	86.4	57 22.7	94 19	86.0
8	55 18.3	94 19	86.3	55 46.6	94 19	86.0	56 43.1	94 19	85.4	57 11.3	94 19	85.1
9	55 06.9	94 19	85.3	55 35.2	94 19	85.0	56 31.7	94 19	84.4	56 59.9	94 19	84.1
80	54 55.5	95 19	84.4	55 23.8	94 19	84.1	56 20.4	94 19	83.5	56 48.6	94 19	83.2
1	54 44.1	95 19	83.4	55 12.4	94 19	83.1	56 09.0	94 19	82.5	56 37.2	94 19	82.2
2	54 32.7	95 19	82.5	55 01.1	94 19	82.2	55 57.7	94 19	81.6	56 25.9	94 19	81.3
3	54 21.4	95 19	81.5	54 49.8	94 19	81.2	55 46.3	94 19	80.7	56 14.6	94 19	80.4
4	54 10.1	95 19	80.6	54 38.5	94 19	80.3	55 35.1	94 19	79.7	56 03.3	94 19	79.4
85	53 58.8	95 19	79.6	54 27.2	95 19	79.4	55 23.8	94 19	78.8	55 52.1	94 19	78.5
6	53 47.6	95 19	78.7	54 16.0	95 19	78.4	55 12.6	94 19	77.9	55 40.9	94 19	77.6
7	53 36.4	95 19	77.8	54 04.8	95 19	77.5	55 01.4	94 19	76.9	55 29.7	94 19	76.7
8	53 25.2	95 19	76.9	53 53.6	95 19	76.6	54 50.3	94 18	76.0	55 18.6	94 18	75.7
9	53 14.1	95 18	75.9	53 42.5	95 18	75.7	54 39.2	94 18	75.1	55 07.5	94 18	74.8
90	53 03.0	95 18	75.0	53 31.4	95 18	74.8	54 28.2	94 18	74.2	54 56.5	94 18	73.9

57° 00′			57° 30′			59° 00′			59° 30′			H.A.
Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
68 00.0	1.0 00	180.0	68 30.0	1.0 00	180.0	70 00.0	1.0 00	180.0	70 30.0	1.0 00	180.0	00
67 59.9	1.0 01	178.5	68 29.9	1.0 01	178.5	69 59.8	1.0 01	178.5	70 29.8	1.0 01	178.5	1
67 59.4	1.0 01	177.1	68 29.4	1.0 01	177.1	69 59.4	1.0 01	177.0	70 29.4	1.0 01	177.0	2
67 58.7	1.0 02	175.6	68 28.7	1.0 02	175.6	69 58.6	1.0 02	175.5	70 28.6	1.0 02	175.4	3
67 57.7	1.0 02	174.2	68 27.7	1.0 02	174.1	69 57.6	1.0 02	174.0	70 27.6	1.0 02	173.9	4
67 56.4	1.0 03	172.7	68 26.3	1.0 03	172.7	69 56.2	1.0 03	172.5	70 26.2	1.0 03	172.4	05
67 54.8	1.0 03	171.3	68 24.7	1.0 03	171.2	69 54.6	1.0 03	171.0	70 24.5	1.0 03	170.9	6
67 52.9	1.0 04	169.8	68 22.8	1.0 04	169.8	69 52.7	1.0 04	169.5	70 22.6	1.0 04	169.4	7
67 50.8	1.0 04	168.4	68 20.7	1.0 04	168.3	69 50.4	1.0 04	168.0	70 20.3	1.0 04	167.9	8
67 48.3	1.0 05	167.0	68 18.2	1.0 05	166.9	69 47.9	1.0 05	166.5	70 17.8	1.0 05	166.4	9
67 45.6	1.0 05	165.5	68 15.5	1.0 05	165.4	69 45.1	1.0 05	165.0	70 14.9	1.0 05	164.9	10
67 42.6	1.0 05	164.1	68 12.4	1.0 06	164.0	69 42.0	99 06	163.5	70 11.8	99 06	163.4	1
67 39.3	99 06	162.7	68 09.1	99 06	162.5	69 38.6	99 06	162.1	70 08.4	99 06	161.9	2
67 35.8	99 06	161.2	68 05.6	99 06	161.1	69 34.9	99 07	160.6	70 04.7	99 07	160.4	3
67 32.0	99 07	159.8	68 01.7	99 07	159.7	69 31.0	99 07	159.1	70 00.7	99 07	158.9	4
67 27.9	99 07	158.4	67 57.6	99 07	158.2	69 26.8	99 07	157.7	69 56.5	99 08	157.5	15
67 23.5	99 08	157.0	67 53.2	99 08	156.8	69 22.3	99 08	156.2	69 52.0	99 08	156.0	6
67 18.9	99 08	155.6	67 48.6	99 08	155.4	69 17.6	99 08	154.8	69 47.2	99 08	154.6	7
67 14.1	99 08	154.2	67 43.7	99 09	154.0	69 12.6	99 09	153.4	69 42.1	99 09	153.1	8
67 09.0	99 09	152.8	67 38.6	99 09	152.6	69 07.3	98 09	151.9	69 36.8	98 09	151.7	9
67 03.6	99 09	151.4	67 33.2	99 09	151.2	69 01.8	98 10	150.5	69 31.3	98 10	150.3	20
66 58.0	98 10	150.1	67 27.6	98 10	149.8	68 56.0	98 10	149.1	69 25.5	98 10	148.8	1
66 52.2	98 10	148.7	67 21.7	98 10	148.5	68 50.0	98 10	147.7	69 19.4	98 10	147.4	2
66 46.1	98 10	147.3	67 15.6	98 11	147.1	68 43.8	98 11	146.3	69 13.1	98 11	146.0	3
66 39.9	98 11	146.0	67 09.3	98 11	145.7	68 37.3	98 11	144.9	69 06.6	98 11	144.6	4
66 33.3	98 11	144.7	67 02.7	98 11	144.4	68 30.6	98 12	143.5	68 59.9	97 12	143.2	25
66 26.6	98 12	143.3	66 55.9	98 12	143.0	68 23.7	97 12	142.2	68 52.9	97 12	141.9	6
66 19.7	98 12	142.0	66 48.9	98 12	141.7	68 16.6	97 12	140.8	68 45.7	97 12	140.5	7
66 12.5	98 12	140.7	66 41.7	97 12	140.4	68 09.3	97 13	139.5	68 38.4	97 13	139.1	8
66 05.2	97 13	139.4	66 34.3	97 13	139.1	68 01.7	97 13	138.1	68 30.8	97 13	137.8	9
65 57.6	97 13	138.1	66 26.7	97 13	137.8	67 54.0	97 13	136.8	68 23.0	97 13	136.5	30
65 49.8	97 13	136.8	66 19.0	97 13	136.5	67 46.0	97 14	135.5	68 15.0	96 14	135.1	1
65 41.9	97 14	135.5	66 11.0	97 14	135.2	67 37.9	96 14	134.2	68 06.8	96 14	133.8	2
65 33.8	97 14	134.2	66 02.8	97 14	133.9	67 29.6	96 14	132.9	67 58.5	96 14	132.5	3
65 25.5	97 14	132.9	65 54.5	97 14	132.6	67 21.2	96 14	131.6	67 50.0	96 14	131.2	4
65 17.0	97 14	131.7	65 46.0	96 14	131.3	67 12.5	96 15	130.3	67 41.3	96 15	129.9	35
65 08.4	96 15	130.4	65 37.3	96 15	130.1	67 03.7	96 15	129.0	67 32.4	96 15	128.7	6
64 59.6	96 15	129.2	65 28.4	96 15	128.8	66 54.7	96 15	127.8	67 23.4	95 15	127.4	7
64 50.6	96 15	127.9	65 19.4	96 15	127.6	66 45.6	95 15	126.5	67 14.2	95 16	126.1	8
64 41.5	96 15	126.7	65 10.3	96 15	126.4	66 36.3	95 16	125.3	67 04.9	95 16	124.9	9
64 32.3	96 16	125.5	65 01.0	96 16	125.1	66 26.9	95 16	124.1	66 55.4	95 16	123.7	40
64 22.9	96 16	124.3	64 51.6	96 16	123.9	66 17.4	95 16	122.8	66 45.8	95 16	122.4	1
64 13.4	96 16	123.1	64 42.0	95 16	122.7	66 07.7	95 16	121.6	66 36.1	95 16	121.2	2
64 03.7	95 16	121.9	64 32.3	95 16	121.5	65 57.9	95 17	120.4	66 26.3	95 17	120.0	3
63 53.9	95 16	120.7	64 22.5	95 17	120.3	65 47.9	95 17	119.2	66 16.3	94 17	118.8	4
63 44.0	95 17	119.5	64 12.6	95 17	119.2	65 37.9	95 17	118.0	66 06.2	94 17	117.6	45
63 34.0	95 17	118.3	64 02.5	95 17	118.0	65 27.7	94 17	116.9	65 56.0	94 17	116.5	6
63 23.9	95 17	117.2	63 52.3	95 17	116.8	65 17.4	94 17	115.7	65 45.7	94 17	115.3	7
63 13.6	95 17	116.0	63 42.1	95 17	115.7	65 07.1	94 17	114.5	65 35.3	94 18	114.1	8
63 03.3	95 17	114.9	63 31.7	95 17	114.5	64 56.6	94 18	113.4	65 24.8	94 18	113.0	9
62 52.9	95 18	113.8	63 21.2	95 18	113.4	64 46.1	94 18	112.3	65 14.2	94 18	111.8	50
62 42.3	95 18	112.6	63 10.7	94 18	112.3	64 35.4	94 18	111.1	65 03.6	94 18	110.7	1
62 31.7	95 18	111.5	63 00.1	94 18	111.1	64 24.7	94 18	110.0	64 52.8	94 18	109.6	2
62 21.0	94 18	110.4	62 49.3	94 18	110.0	64 13.9	94 18	108.9	64 42.0	93 18	108.5	3
62 10.3	94 18	109.3	62 38.6	94 18	108.9	64 03.1	94 18	107.8	64 31.1	93 18	107.4	4
61 59.4	94 18	108.2	62 27.7	94 18	107.8	63 52.1	93 18	106.7	64 20.1	93 18	106.3	55
61 48.5	94 18	107.1	62 16.8	94 18	106.7	63 41.1	93 18	105.6	64 09.1	93 18	105.2	6
61 37.5	94 18	106.0	62 05.8	94 18	105.7	63 30.1	93 19	104.5	63 58.0	93 19	104.1	7
61 26.5	94 18	104.9	61 54.7	94 19	104.6	63 19.0	93 19	103.4	63 46.9	93 19	103.0	8
61 15.4	94 19	103.9	61 43.6	94 19	103.5	63 07.8	93 19	102.4	63 35.7	93 19	102.0	9
61 04.3	94 19	102.8	61 32.4	94 19	102.5	62 56.6	93 19	101.3	63 24.5	93 19	100.9	60
60 53.1	94 19	101.8	61 21.2	94 19	101.4	62 45.3	93 19	100.3	63 13.2	93 19	99.9	1
60 41.9	94 19	100.7	61 10.0	94 19	100.4	62 34.1	93 19	99.2	63 01.9	93 19	98.8	2
60 30.6	94 19	99.7	60 58.7	94 19	99.3	62 22.7	93 19	98.2	62 50.6	93 19	97.8	3
60 19.3	94 19	98.6	60 47.4	94 19	98.3	62 11.4	93 19	97.2	62 39.3	93 19	96.8	4
60 08.0	94 19	97.6	60 36.1	94 19	97.3	62 00.0	93 19	96.1	62 27.9	93 19	95.7	65
59 56.6	94 19	96.6	60 24.7	94 19	96.2	61 48.6	93 19	95.1	62 16.5	93 19	94.7	6
59 45.2	94 19	95.6	60 13.3	94 19	95.2	61 37.2	93 19	94.1	62 05.1	93 19	93.7	7
59 33.8	94 19	94.6	60 01.9	94 19	94.2	61 25.8	93 19	93.1	61 53.6	93 19	92.7	8
59 22.4	94 19	93.6	59 50.5	94 19	93.2	61 14.4	93 19	92.1	61 42.2	93 19	91.7	9
59 11.0	94 19	92.6	59 39.0	93 19	92.2	61 02.9	93 19	91.1	61 30.7	93 19	90.7	70
58 59.5	94 19	91.6	59 27.6	93 19	91.2	60 51.5	93 19	90.1	61 19.3	93 19	89.7	1
58 48.1	94 19	90.6	59 16.1	93 19	90.2	60 40.0	93 19	89.1	61 07.9	93 19	88.8	2
58 36.6	94 19	89.6	59 04.7	93 19	89.2	60 28.6	93 19	88.2	60 56.4	93 19	87.8	3
58 25.2	94 19	88.6	58 53.3	93 19	88.3	60 17.1	93 19	87.2	60 45.0	93 19	86.8	4
58 13.7	94 19	87.6	58 41.8	93 19	87.3	60 05.7	93 19	86.2	60 33.5	93 19	85.9	75
58 02.3	94 19	86.7	58 30.4	94 19	86.3	59 54.3	93 19	85.3	60 22.1	93 19	84.9	6
57 50.9	94 19	85.7	58 19.0	94 19	85.4	59 42.9	93 19	84.3	60 10.7	93 19	84.0	7
57 39.5	94 19	84.8	58 07.6	94 19	84.4	59 31.5	93 19	83.4	59 59.4	93 19	83.0	8
57 28.1	94 19	83.8	57 56.2	94 19	83.5	59 20.1	93 19	82.4	59 48.0	93 19	82.1	9
57 16.7	94 19	82.9	57 44.8	94 19	82.5	59 08.8	93 19	81.5	59 36.7	93 19	81.1	80
57 05.4	94 19	81.9	57 33.5	94 19	81.6	58 57.5	93 19	80.6	59 25.4	93 19	80.2	1
56 54.0	94 19	81.0	57 22.2	94 19	80.7	58 46.2	93 19	79.6	59 14.1	93 19	79.3	2
56 42.7	94 19	80.0	57 10.9	94 19	79.7	58 35.0	93 19	78.7	59 02.9	93 19	78.4	3
56 31.5	94 19	79.1	56 59.6	94 19	78.8	58 23.8	93 19	77.8	58 51.7	93 19	77.5	4
56 20.3	94 19	78.2	56 48.4	94 19	77.9	58 12.6	93 19	76.9	58 40.5	93 19	76.5	85
56 09.1	94 19	77.3	56 37.2	94 19	77.0	58 01.5	93 18	76.0	58 29.4	93 18	75.6	6
55 57.9	94 18	76.4	56 26.1	94 18	76.0	57 50.4	93 18	75.1	58 18.4	93 18	74.7	7
55 46.8	94 18	75.4	56 15.0	94 18	75.1	57 39.3	93 18	74.2	58 07.3	93 18	73.8	8
55 35.8	94 18	74.5	56 04.0	94 18	74.2	57 28.4	93 18	73.3	57 56.4	93 18	72.9	9
55 24.8	94 18	73.6	55 53.0	94 18	73.3	57 17.4	94 18	72.4	57 45.5	93 18	72.1	90

Lat. 79°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
91	52 52.0	95 18	74.1	53 20.4	95 18	73.8	54 17.2	95 18	73.3	54 45.5	94 18	73.0	55 13.8	94 18	72.7	55 42.1	94 18	72.4	57 06.5	94 18	71.5	57 34.6	93 18	71.2	91
2	52 41.0	95 18	73.2	53 09.4	95 18	72.9	54 06.2	95 18	72.4	54 34.6	94 18	72.1	55 02.9	94 18	71.8	55 31.2	94 18	71.5	56 55.7	94 18	70.6	57 23.8	94 18	70.3	2
3	52 30.0	95 18	72.3	52 58.5	95 18	72.0	53 55.4	95 18	71.5	54 23.7	94 18	71.2	54 52.0	94 18	70.9	55 20.3	94 18	70.6	56 44.9	94 18	69.7	57 13.0	94 18	69.4	3
4	52 19.2	95 18	71.4	52 47.6	95 18	71.1	53 44.5	95 18	70.6	54 12.9	95 18	70.3	54 41.3	94 18	70.0	55 09.6	94 18	69.8	56 34.2	94 18	68.8	57 02.4	94 18	68.5	4
95	52 08.3	95 18	70.5	52 36.8	95 18	70.2	53 33.8	95 18	69.7	54 02.2	95 18	69.4	54 30.5	94 18	69.2	54 58.9	94 18	68.9	56 23.6	94 18	68.0	56 51.7	94 18	67.7	95
6	51 57.6	95 18	69.6	52 26.1	95 18	69.3	53 23.0	95 18	68.8	53 51.5	95 18	68.5	54 19.9	95 18	68.3	54 48.2	94 18	68.0	56 13.0	94 18	67.1	56 41.2	94 18	66.8	6
7	51 46.9	95 18	68.7	52 15.4	95 18	68.4	53 12.4	95 18	67.9	53 40.9	95 18	67.7	54 09.3	95 18	67.4	54 37.6	94 18	67.1	56 02.5	94 17	66.2	56 30.7	94 17	65.9	7
8	51 36.2	95 18	67.8	52 04.8	95 18	67.6	53 01.8	95 18	67.0	53 30.3	95 17	66.8	53 58.7	95 17	66.5	54 27.1	95 17	66.2	55 52.0	94 17	65.4	56 20.3	94 17	65.1	8
9	51 25.7	95 18	66.9	51 54.3	95 17	66.7	52 51.3	95 17	66.2	53 19.8	95 17	65.9	53 48.3	95 17	65.6	54 16.7	95 17	65.4	55 41.7	94 17	64.5	56 09.9	94 17	64.2	9
100	51 15.2	95 17	66.0	51 43.8	95 17	65.8	52 40.9	95 17	65.3	53 09.4	95 17	65.0	53 37.9	95 17	64.8	54 06.3	95 17	64.5	55 31.4	94 17	63.6	55 59.7	94 17	63.3	100
1	51 04.8	95 17	65.1	51 33.4	95 17	64.9	52 30.5	95 17	64.4	52 59.1	95 17	64.1	53 27.5	95 17	63.9	53 56.0	95 17	63.6	55 21.2	94 17	62.8	55 49.5	94 17	62.5	1
2	50 54.4	96 17	64.3	51 23.0	95 17	64.0	52 20.2	95 17	63.5	52 48.8	95 17	63.3	53 17.3	95 17	63.0	53 45.8	95 17	62.8	55 11.0	95 17	61.9	55 39.4	94 17	61.6	2
3	50 44.1	96 17	63.4	51 12.8	95 17	63.1	52 10.0	95 17	62.7	52 38.6	95 17	62.4	53 07.1	95 17	62.2	53 35.7	95 17	61.9	55 01.0	95 17	61.1	55 29.3	94 17	60.8	3
4	50 33.9	96 17	62.5	51 02.6	96 17	62.3	51 59.9	95 17	61.8	52 28.5	95 17	61.5	52 57.1	95 17	61.3	53 25.6	95 17	61.0	54 51.0	95 16	60.2	55 19.4	95 16	59.9	4
105	50 23.8	96 17	61.6	50 52.5	96 17	61.4	51 49.9	95 17	60.9	52 18.5	95 17	60.7	52 47.1	95 17	60.4	53 15.6	95 16	60.2	54 41.1	95 16	59.4	55 09.5	95 16	59.1	105
6	50 13.8	96 17	60.8	50 42.5	96 17	60.5	51 39.9	96 16	60.1	52 08.5	95 16	59.8	52 37.1	95 16	59.6	53 05.7	95 16	59.3	54 31.3	95 16	58.5	54 59.7	95 16	58.3	6
7	50 03.8	96 16	59.9	50 32.6	96 16	59.7	51 30.0	96 16	59.2	51 58.7	96 16	59.0	52 27.3	95 16	58.7	52 55.9	95 16	58.5	54 21.6	95 16	57.7	54 50.0	95 16	57.4	7
8	49 54.0	96 16	59.0	50 22.8	96 16	58.8	51 20.2	96 16	58.4	51 48.9	96 16	58.1	52 17.6	95 16	57.9	52 46.2	95 16	57.6	54 11.9	95 16	56.9	54 40.4	95 16	56.6	8
9	49 44.2	96 16	58.2	50 13.0	96 16	57.9	51 10.5	96 16	57.5	51 39.2	96 16	57.3	52 07.9	96 16	57.0	52 36.6	95 16	56.8	54 02.4	95 16	56.0	54 30.9	95 16	55.8	9
110	49 34.5	96 16	57.3	50 03.3	96 16	57.1	51 00.9	96 16	56.6	51 29.7	96 16	56.4	51 58.4	96 16	56.2	52 27.1	96 16	55.9	53 52.9	95 16	55.2	54 21.5	95 16	54.9	110
1	49 24.9	96 16	56.4	49 53.8	96 16	56.2	50 51.4	96 16	55.8	51 20.2	96 16	55.6	51 48.9	96 16	55.3	52 17.6	96 16	55.1	53 43.6	95 15	54.4	54 12.2	95 15	54.1	1
2	49 15.4	96 16	55.6	49 44.3	96 16	55.4	50 42.0	96 16	54.9	51 10.8	96 16	54.7	51 39.5	96 15	54.5	52 08.3	96 15	54.3	53 34.3	95 15	53.5	54 02.9	95 15	53.3	2
3	49 06.1	96 16	54.7	49 34.9	96 15	54.5	50 32.7	96 15	54.1	51 01.5	96 15	53.9	51 30.3	96 15	53.7	51 59.0	96 15	53.4	53 25.2	96 15	52.7	53 53.8	95 15	52.5	3
4	48 56.8	96 15	53.9	49 25.7	96 15	53.7	50 23.4	96 15	53.3	50 52.3	96 15	53.0	51 21.1	96 15	52.8	51 49.9	96 15	52.6	53 16.1	96 15	51.9	53 44.8	96 15	51.6	4
115	48 47.6	96 15	53.0	49 16.5	96 15	52.8	50 14.3	96 15	52.4	50 43.2	96 15	52.2	51 12.0	96 15	52.0	51 40.8	96 15	51.8	53 07.2	96 15	51.1	53 35.9	96 15	50.8	115
6	48 38.5	97 15	52.2	49 07.4	97 15	52.0	50 05.3	96 15	51.6	50 34.2	96 15	51.4	51 03.1	96 15	51.1	51 31.9	96 15	50.9	52 58.3	96 15	50.2	53 27.0	96 15	50.0	6
7	48 29.5	97 15	51.3	48 58.5	97 15	51.1	49 56.4	96 15	50.7	50 25.3	96 15	50.5	50 54.2	96 15	50.3	51 23.1	96 15	50.1	52 49.6	96 14	49.4	53 18.3	96 14	49.2	7
8	48 20.6	97 15	50.5	48 49.6	97 15	50.3	49 47.6	97 14	49.9	50 16.5	96 15	49.7	50 45.4	96 14	49.5	51 14.3	96 14	49.3	52 40.9	96 14	48.6	53 09.7	96 14	48.4	8
9	48 11.8	97 14	49.6	48 40.8	97 14	49.4	49 38.9	97 14	49.1	50 07.8	97 14	48.9	50 36.8	96 14	48.7	51 05.7	96 14	48.4	52 32.4	96 14	47.8	53 01.2	96 14	47.6	9
120	48 03.1	97 14	48.8	48 32.2	97 14	48.6	49 30.3	97 14	48.2	49 59.3	97 14	48.0	50 28.3	97 14	47.8	50 57.2	96 14	47.6	52 24.0	96 14	47.0	52 52.8	96 14	46.7	120
1	47 54.6	97 14	48.0	48 23.7	97 14	47.8	49 21.8	97 14	47.4	49 50.8	97 14	47.2	50 19.8	97 14	47.0	50 48.8	97 14	46.8	52 15.6	96 14	46.2	52 44.5	96 14	45.9	1
2	47 46.1	97 14	47.1	48 15.2	97 14	46.9	49 13.4	97 14	46.6	49 42.5	97 14	46.4	50 11.5	97 14	46.2	50 40.5	97 14	46.0	52 07.4	96 13	45.4	52 36.4	96 13	45.1	2
3	47 37.8	97 14	46.3	48 06.9	97 14	46.1	49 05.2	97 14	45.7	49 34.2	97 14	45.5	50 03.3	97 13	45.4	50 32.3	97 13	45.2	51 59.4	97 13	44.5	52 28.3	96 13	44.3	3
4	47 29.6	97 14	45.4	47 58.8	97 13	45.3	48 57.0	97 13	44.9	49 26.1	97 13	44.7	49 55.2	97 13	44.5	50 24.3	97 13	44.3	51 51.4	97 13	43.7	52 20.4	97 13	43.5	4
125	47 21.5	97 13	44.6	47 50.7	97 13	44.4	48 49.0	97 13	44.1	49 18.1	97 13	43.9	49 47.2	97 13	43.7	50 16.3	97 13	43.5	51 43.5	97 13	42.9	52 12.5	97 13	42.7	125
6	47 13.5	97 13	43.8	47 42.7	97 13	43.6	48 41.1	97 13	43.3	49 10.3	97 13	43.1	49 39.4	97 13	42.9	50 08.5	97 13	42.7	51 35.8	97 13	42.1	52 04.8	97 13	41.9	6
7	47 05.7	97 13	42.9	47 34.9	97 13	42.8	48 33.3	97 13	42.4	49 02.5	97 13	42.3	49 31.7	97 13	42.1	50 00.8	97 13	41.9	51 28.2	97 12	41.3	51 57.2	97 12	41.1	7
8	46 57.9	98 13	42.1	47 27.2	97 13	41.9	48 25.6	97 13	41.6	48 54.9	97 13	41.4	49 24.1	97 12	41.3	49 53.2	97 12	41.1	51 20.7	97 12	40.5	51 49.8	97 12	40.3	8
9	46 50.3	98 12	41.3	47 19.6	98 12	41.1	48 18.1	97 12	40.8	48 47.3	97 12	40.6	49 16.6	97 12	40.4	49 45.8	97 12	40.3	51 13.3	97 12	39.7	51 42.4	97 12	39.5	9
130	46 42.8	98 12	40.5	47 12.1	98 12	40.3	48 10.7	98 12	40.0	48 39.9	98 12	39.8	49 09.2	97 12	39.6	49 38.4	97 12	39.5	51 06.0	97 12	38.9	51 35.2	97 12	38.7	130
1	46 35.4	98 12	39.6	47 04.8	98 12	39.5	48 03.4	98 12	39.2	48 32.7	98 12	39.0	49 02.0	98 12	38.8	49 31.2	98 12	38.7	50 58.9	97 12	38.1	51 28.1	97 12	37.9	1
2	46 28.2	98 12	38.8	46 57.6	98 12	38.6	47 56.2	98 12	38.3	48 25.5	98 12	38.2	48 54.8	98 12	38.0	49 24.1	98 12	37.8	50 51.9	97 11	37.3	51 21.1	97 11	37.2	2
3	46 21.1	98 12	38.0	46 50.5	98 12	37.8	47 49.2	98 12	37.5	48 18.5	98 11	37.4	48 47.9	98 11	37.2	49 17.2	98 11	37.0	50 45.0	98 11	36.5	51 14.3	97 11	36.4	3
4	46 14.1	98 11	37.2	46 43.5	98 11	37.0	47 42.3	98 11	36.7	48 11.6	98 11	36.6	48 41.0	98 11	36.4	49 10.3	98 11	36.2	50 38.3	98 11	35.7	51 07.5	98 11	35.6	4
135	46 07.3	98 11	36.3	46 36.7	98 11	36.2	47 35.5	98 11	35.9	48 04.9	98 11	35.7	48 34.3	98 11	35.6	49 03.6	98 11	35.4	50 31.6	98 11	35.0	51 01.0	98 11	34.8	135
6	46 00.6	98 11	35.5	46 30.0	98 11	35.4	47 28.9	98 11	35.1	47 58.3	98 11	34.9	48 27.7	98 11	34.8	48 57.1	98 11	34.6	50 25.1	98 11	34.2	50 54.5	98 11	34.0	6
7	45 54.0	98 11	34.7	46 23.4	98 11	34.6	47 22.3	98 11	34.3	47 51.8	98 11	34.1	48 21.2	98 11	34.0	48 50.6	98 10	33.8	50 18.8	98 10	33.4	50 48.2	98 10	33.2	7
8	45 47.5	98 11	33.9	46 17.0	98 10	33.7	47 16.0	98 10	33.5	47 45.4	98 10	33.3	48 14.9	98 10	33.2	48 44.3	98 10	33.0	50 12.6	98 10	32.6	50 41.9	98 10	32.4	8
9	45 41.2	98 10	33.0	46 10.7	98 10	32.9	47 09.7	98 10	32.7	47 39.2	98 10	32.5	48 08.7	98 10	32.4	48 38.1	98 10	32.2	50 06.5	98 10	31.8	50 35.9	98 10	31.6	9
140	45 35.0	98 10	32.2	46 04.6	98 10	32.1	47 03.6	98 10	31.8	47 33.1	98 10	31.7	48 02.6	98 10	31.6	48 32.1	98 10	31.4	50 00.5	98 10	31.0	50 29.9	98 10	30.9	140
1	45 29.0	99 10	31.4	45 58.6	98 10	31.3	46 57.6	98 10	31.0	47 27.2	98 10	30.9	47 56.7	98 10	30.8	48 26.2	98 10	30.6	49 54.7	98 10	30.2	50 24.1	98 09	30.1	1
2	45 23.1	99 10	30.6	45 52.7	99 10	30.5	46 51.8	99 09	30.2	47 21.4	98 09	30.1	47 50.9	98 09	30.0	48 20.4	98 09	29.8	49 49.0	98 09	29.4	50 18.5	98 09	29.3	2
3	45 17.4	99 09	29.8	45 46.9	99 09	29.7	46 46.1	99 09	29.4	47 15.7	99 09	29.3	47 45.2	99 09	29.2	48 14.8	99 09	29.0	49 43.4	98 09	28.6	50 12.9	98 09	28.5	3
4	45 11.7	99 09	29.0	45 41.3	99 09	28.9	46 40.6	99 09	28.6	47 10.1	99 09	28.5	47 39.7	99 09	28.4	48 09.3	99 09	28.3	49 38.0	98 09	27.9	50 07.5	98 09	27.7	4
145	45 06.3	99 09	28.2	45 35.9	99 09	28.0	46 35.1	99 09	27.8	47 04.8	99 09	27.7	47 34.4	99 09	27.6	48 04.0	99 09	27.5	49 32.7	99 09	27.1	50 02.3	99 09	27.0	145
6	45 00.9	99 09	27.3	45 30.6	99 09	27.2	46 29.9	99 09	27.0	46 59.5	99 08	26.9	47 29.1	99 08	26.8	47 58.8	99 08	26.7	49 27.6	99 08	26.3	49 57.2	99 08	26.2	6
7	44 55.7	99 08	26.5	45 25.4	99 08	26.4	46 24.7	99 08	26.2	46 54.4	99 08	26.1	47 24.0	99 08	26.0	47 53.7	99 08	25.9	49 22.6	99 08	25.5	49 52.2	99 08	25.4	7
8	44 50.7	99 08	25.7	45 20.4	99 08	25.6	46 19.8	99 08	25.4	46 49.4	99 08	25.3	47 19.1	99 08	25.2	47 48.8	99 08	25.1	49 17.7	99 08	24.7	49 47.3	99 08	24.6	8
9	44 45.8	99 08	24.9	45 15.5	99 08	24.8	46 14.9	99 08	24.6	46 44.6	99 08	24.5	47 14.3	99 08	24.4	47 44.0	99 08	24.3	49 13.0	99 08	24.0	49 42.6	99 08	23.8	9
150	44 41.1	99 08	24.1	45 10.8	99 08	24.0	46 10.2	99 08	23.8	46 39.9	99 08	23.7	47 09.6	99 08	23.6	47 39.3	99 07	23.5	49 08.4	99 07	23.2	49 38.1	99 07	23.1	150
1	44 36.5	99 07	23.3	45 06.2	99 07	23.2	46 05.7	99 07	23.0	46 35.4	99 07	22.9	47 05.1	99 07	22.8	47 34.8	99 07	22.7	49 04.0	99 07	22.4	49 33.7	99 07	22.3	1
2	44 32.0	99 07	22.5	45 01.8	99 07	22.4	46 01.3	99 07	22.2	46 31.0	99 07	22.1	47 00.8	99 07	22.0	47 30.5	99 07	21.9	48 59.7	99 07	21.6	49 29.4	99 07	21.5	2
3	44 27.7	99 07	21.7	44 57.5	99 07	21.6	45 57.0	99 07	21.4	46 26.8	99 07	21.3	46 56.5	99 07	21.2	47 26.3	99 07	21.1	48 55.5	99 07	20.8	49 25.3	99 07	20.7	3
4	44 23.5	99 07	20.9	44 53.3	99 07	20.8	45 52.9	99 07	20.6	46 22.7	99 07	20.5	46 52.5	99 07	20.4	47 22.2	99 06	20.4	48 51.5	99 06	20.1	49 21.3	99 06	20.0	4
155	44 19.5	99 06	20.1	44 49.3	99 06	20.0	45 49.0	99 06	19.8	46 18.7	99 06	19.7	46 48.5	99 06	19.7	47 18.3	99 06	19.6	48 47.7	99 06	19.3	49 17.4	99 06	19.2	155
6	44 15.7	99 06	19.3	44 45.5	99 06	19.2	45 45.1	99 06	19.0	46 15.0	99 06	18.9	46 44.8	99 06	18.9	47 14.6	99 06	18.8	48 44.0	99 06	18.5	49 13.8	99 06	18.4	6
7	44 12.0	99 06	18.5	44 41.8	99 06	18.4	45 41.5	99 06	18.2	46 11.3	99 06	18.2	46 41.1	99 06	18.1	47 11.0	99 06	18.0	48 40.4	99 06	17.7	49 10.2	99 06	17.7	7
8	44 08.4	1.0 05	17.6	44 38.3	99 06	17.6	45 38.0	99 06	17.4	46 07.8	99 06	17.4	46 37.7	99 06	17.3	47 07.5	99 06	17.2	48 37.0	99 06	17.0	49 06.8	99 06	16.9	8
9	44 05.0	1.0 05	16.8	44 34.9	1.0 05	16.8	45 34.6	1.0 05	16.6	46 04.5	1.0 05	16.6	46 34.3	1.0 05	16.5	47 04.2	99 05	16.4	48 33.7	99 05	16.2	49 03.6	99 05	16.1	9
160	44 01.8	1.0 05	16.0	44 31.7	1.0 05	16.0	45 31.4	1.0 05	15.8	46 01.3	1.0 05	15.8	46 31.2	1.0 05	15.7	47 01.0	1.0 05	15.6	48 30.6	1.0 05	15.4	49 00.5	1.0 05	15.3	160
1	43 58.7	1.0 05	15.2	44 28.6	1.0 05	15.2	45 28.4	1.0 05	15.0	45 58.3	1.0 05	15.0	46 28.1	1.0 05	14.9	46 58.0	1.0 05	14.9	48 27.6	1.0 05	14.6	48 57.5	1.0 05	14.6	1
2	43 55.8	1.0 05	14.4	44 25.7	1.0 05	14.4	45 25.5	1.0 05	14.3	45 55.4	1.0 05	14.2	46 25.3	1.0 05	14.1	46 55.2	1.0 04	14.1	48 24.8	1.0 04	13.9	48 54.7	1.0 04	13.8	2
3	43 53.0	1.0 04	13.6	44 22.9	1.0 04	13.6	45 22.7	1.0 04	13.5	45 52.6	1.0 04	13.4	46 22.5	1.0 04	13.3	46 52.4	1.0 04	13.3	48 22.1	1.0 04	13.1	48 52.0	1.0 04	13.0	3
4	43 50.4	1.0 04	12.8	44 20.3	1.0 04	12.8	45 20.2	1.0 04	12.7	45 50.1	1.0 04	12.6	46 20.0	1.0 04	12.6	46 49.9	1.0 04	12.5	48 19.6	1.0 04	12.3	48 49.5	1.0 04	12.3	4
165	43 47.9	1.0 04	12.0	44 17.9	1.0 04	12.0	45 17.7	1.0 04	11.9	45 47.6	1.0 04	11.8	46 17.6	1.0 04	11.8	46 47.5	1.0 04	11.7	48 17.3	1.0 04	11.6	48 47.2	1.0 04	11.5	165
6	43 45.6	1.0 04	11.2	44 15.6	1.0 04	11.2	45 15.4	1.0 04	11.1	45 45.4	1.0 04	11.0	46 15.3	1.0 04	11.0	46 45.2	1.0 04	10.9	48 15.0	1.0 03	10.8	48 45.0	1.0 03	10.7	6
7	43 43.5	1.0 03	10.4	44 13.4	1.0 03	10.4	45 13.3	1.0 03	10.3	45 43.3	1.0 03	10.2	46 13.2	1.0 03	10.2	46 43.1	1.0 03	10.2	48 13.0	1.0 03	10.0	48 42.9	1.0 03	10.0	7
8	43 41.5	1.0 03	09.6	44 11.4	1.0 03	09.6	45 11.4	1.0 03	09.5	45 41.3	1.0 03	09.5	46 11.3	1.0 03	09.4	46 41.2	1.0 03	09.4	48 11.1	1.0 03	09.2	48 41.0	1.0 03	09.2	8
9	43 39.7	1.0 03	08.8	44 09.6	1.0 03	08.8	45 09.5	1.0 03	08.7	45 39.5	1.0 03	08.7	46 09.5	1.0 03	08.6	46 39.4	1.0 03	08.6	48 09.3	1.0 03	08.5	48 39.2	1.0 03	08.4	9
170	43 38.0	1.0 03	08.0	44 08.0	1.0 02	08.0	45 07.9	1.0 02	07.9	45 37.9	1.0 02	07.9	46 07.8	1.0 02	07.8	46 37.8	1.0 02	07.8	48 07.7	1.0 02	07.7	48 37.6	1.0 02	07.7	170
1	43 36.5	1.0 02	07.2	44 06.4	1.0 02	07.2	45 06.4	1.0 02	07.1	45 36.4	1.0 02	07.1	46 06.3	1.0 02	07.1	46 36.3	1.0 02	07.0	48 06.2	1.0 02	06.9	48 36.2	1.0 02	06.9	1
2	43 35.1	1.0 02	06.4	44 05.1	1.0 02	06.4	45 05.1	1.0 02	06.3	45 35.0	1.0 02	06.3	46 05.0	1.0 02	06.3	46 35.0	1.0 02	06.2	48 04.9	1.0 02	06.2	48 34.9	1.0 02	06.1	2
3	43 33.9	1.0 02	05.6	44 03.9	1.0 02	05.6	45 03.9	1.0 02	05.5	45 33.9	1.0 02	05.5	46 03.8	1.0 02	05.5	46 33.8	1.0 02	05.5	48 03.8	1.0 02	05.4	48 33.7	1.0 02	05.4	3
4	43 32.9	1.0 01	04.8	44 02.9	1.0 01	04.8	45 02.8	1.0 01	04.7	45 32.8	1.0 01	04.7	46 02.8	1.0 01	04.7	46 32.8	1.0 01	04.7	48 02.8	1.0 01	04.6	48 32.8	1.0 01	04.6	4
175	43 32.0	1.0 01	04.0	44 02.0	1.0 01	04.0	45 02.0	1.0 01	04.0	45 32.0	1.0 01	03.9	46 02.0	1.0 01	03.9	46 31.9	1.0 01	03.9	48 01.9	1.0 01	03.8	48 31.9	1.0 01	03.8	175
6	43 31.3	1.0 01	03.2	44 01.3	1.0 01	03.2	45 01.3	1.0 01	03.2	45 31.3	1.0 01	03.2	46 01.3	1.0 01	03.1	46 31.2	1.0 01	03.1	48 01.2	1.0 01	03.1	48 31.2	1.0 01	03.1	6
7	43 30.7	1.0 01	02.4	44 00.7	1.0 01	02.4	45 00.7	1.0 01	02.4	45 30.7	1.0 01	02.4	46 00.7	1.0 01	02.4	46 30.7	1.0 01	02.3	48 00.7	1.0 01	02.3	48 30.7	1.0 01	02.3	7
8	43 30.3	1.0 00	01.6	44 00.3	1.0 00	01.6	45 00.3	1.0 00	01.6	45 30.3	1.0 00	01.6	46 00.3	1.0 00	01.6	46 30.3	1.0 00	01.6	48 00.3	1.0 00	01.5	48 30.3	1.0 00	01.5	8
9	43 30.1	1.0 00	00.8	44 00.1	1.0 00	00.8	45 00.1	1.0 00	00.8	45 30.1	1.0 00	00.8	46 00.1	1.0 00	00.8	46 30.1	1.0 00	00.8	48 00.1	1.0 00	00.8	48 30.1	1.0 00	00.8	9
180	43 30.0	1.0 00	00.0	44 00.0	1.0 00	00.0	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	46 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	48 00.0	1.0 00	00.0	48 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	65 30.0	1.0 00	180.0	66 00.0	1.0 00	180.0	67 00.0	1.0 00	180.0	67 30.0	1.0 00	180.0
1	65 29.9	1.0 01	178.6	65 59.9	1.0 01	178.6	66 59.9	1.0 01	178.6	67 29.9	1.0 01	178.6
2	65 29.4	1.0 01	177.2	65 59.4	1.0 01	177.2	66 59.4	1.0 01	177.1	67 29.4	1.0 01	177.1
3	65 28.7	1.0 02	175.8	65 58.7	1.0 02	175.8	66 58.7	1.0 02	175.7	67 28.7	1.0 02	175.7
4	65 27.8	1.0 02	174.4	65 57.7	1.0 02	174.4	66 57.7	1.0 02	174.3	67 27.7	1.0 02	174.2
05	65 26.5	1.0 03	173.0	65 56.5	1.0 03	173.0	66 56.4	1.0 03	172.9	67 26.4	1.0 03	172.8
6	65 25.0	1.0 03	171.6	65 54.9	1.0 03	171.6	66 54.9	1.0 03	171.4	67 24.8	1.0 03	171.4
7	65 23.2	1.0 03	170.2	65 53.1	1.0 04	170.1	66 53.0	1.0 04	170.0	67 23.0	1.0 04	169.9
8	65 21.1	1.0 04	168.8	65 51.0	1.0 04	168.7	66 50.9	1.0 04	168.6	67 20.8	1.0 04	168.5
9	65 18.7	1.0 04	167.4	65 48.7	1.0 04	167.4	66 48.5	1.0 04	167.2	67 18.4	1.0 04	167.1
10	65 16.1	1.0 05	166.1	65 46.0	1.0 05	166.0	66 45.8	1.0 05	165.8	67 15.7	1.0 05	165.6
1	65 13.2	1.0 05	164.7	65 43.1	1.0 05	164.6	66 42.9	1.0 05	164.3	67 12.7	1.0 05	164.2
2	65 10.1	1.0 06	163.3	65 39.9	1.0 06	163.2	66 39.6	99 06	162.9	67 09.5	99 06	162.8
3	65 06.6	99 06	161.9	65 36.5	99 06	161.8	66 36.1	99 06	161.5	67 06.0	99 06	161.4
4	65 02.9	99 07	160.5	65 32.8	99 07	160.4	66 32.4	99 07	160.1	67 02.2	99 07	160.0
15	64 59.0	99 07	159.2	65 28.8	99 07	159.0	66 28.4	99 07	158.7	66 58.1	99 07	158.6
6	64 54.8	99 07	157.8	65 24.6	99 07	157.7	66 24.1	99 08	157.4	66 53.8	99 08	157.2
7	64 50.4	99 08	156.5	65 20.1	99 08	156.3	66 19.5	99 08	156.0	66 49.2	99 08	155.8
8	64 45.7	99 08	155.1	65 15.4	99 08	154.9	66 14.8	99 08	154.6	66 44.4	99 08	154.4
9	64 40.7	99 09	153.8	65 10.4	99 09	153.6	66 09.7	99 09	153.2	66 39.4	99 09	153.0
20	64 35.6	99 09	152.4	65 05.2	99 09	152.2	66 04.4	99 09	151.9	66 34.0	99 09	151.7
1	64 30.1	99 09	151.1	64 59.7	99 09	150.9	65 58.9	99 10	150.5	66 28.5	99 10	150.3
2	64 24.5	99 10	149.8	64 54.1	99 10	149.6	65 53.2	98 10	149.2	66 22.7	98 10	148.9
3	64 18.6	99 10	148.4	64 48.1	98 10	148.2	65 47.2	98 10	147.8	66 16.7	98 10	147.6
4	64 12.5	98 11	147.1	64 42.0	98 11	146.9	65 41.0	98 11	146.5	66 10.4	98 11	146.2
25	64 06.2	98 11	145.8	64 35.6	98 11	145.6	65 34.5	98 11	145.1	66 04.0	98 11	144.9
6	63 59.6	98 11	144.5	64 29.1	98 11	144.3	65 27.9	98 11	143.8	65 57.3	98 12	143.6
7	63 52.9	98 12	143.2	64 22.3	98 12	143.0	65 21.0	98 12	142.5	65 50.4	98 12	142.3
8	63 45.9	98 12	141.9	64 15.3	98 12	141.7	65 14.0	98 12	141.2	65 43.2	98 12	140.9
9	63 38.8	98 12	140.6	64 08.1	98 12	140.4	65 06.7	98 12	139.9	65 35.9	97 13	139.6
30	63 31.4	98 13	139.4	64 00.7	98 13	139.1	64 59.2	97 13	138.6	65 28.4	97 13	138.3
1	63 23.9	98 13	138.1	63 53.1	97 13	137.8	64 51.5	97 13	137.3	65 20.7	97 13	137.0
2	63 16.1	97 13	136.8	63 45.3	97 13	136.6	64 43.7	97 13	136.0	65 12.8	97 13	135.8
3	63 08.2	97 14	135.6	63 37.4	97 14	135.3	64 35.6	97 14	134.8	65 04.7	97 14	134.5
4	63 00.1	97 14	134.3	63 29.2	97 14	134.1	64 27.4	97 14	133.5	64 56.5	97 14	133.2
35	62 51.8	97 14	133.1	63 20.9	97 14	132.8	64 19.0	97 14	132.3	64 48.1	97 14	132.0
6	62 43.4	97 14	131.9	63 12.4	97 14	131.6	64 10.5	97 15	131.0	64 39.5	97 15	130.7
7	62 34.8	97 15	130.6	63 03.8	97 15	130.4	64 01.8	97 15	129.8	64 30.7	96 15	129.5
8	62 26.0	97 15	129.4	62 55.0	97 15	129.1	63 52.9	96 15	128.6	64 21.8	96 15	128.2
9	62 17.1	97 15	128.2	62 46.0	96 15	127.9	63 43.9	96 15	127.3	64 12.7	96 15	127.0
40	62 08.0	96 15	127.0	62 36.9	96 15	126.7	63 34.7	96 16	126.1	64 03.5	96 16	125.8
1	61 58.8	96 16	125.8	62 27.7	96 16	125.5	63 25.4	96 16	124.9	63 54.2	96 16	124.6
2	61 49.4	96 16	124.6	62 18.3	96 16	124.3	63 15.9	96 16	123.7	63 44.7	96 16	123.4
3	61 40.0	96 16	123.4	62 08.8	96 16	123.1	63 06.3	96 16	122.5	63 35.0	96 16	122.2
4	61 30.3	96 16	122.3	61 59.1	96 16	122.0	62 56.6	96 16	121.4	63 25.3	96 16	121.0
45	61 20.6	96 16	121.1	61 49.4	96 16	120.8	62 46.8	96 17	120.2	63 15.4	95 17	119.9
6	61 10.7	96 17	119.9	61 39.5	96 17	119.6	62 36.8	95 17	119.0	63 05.4	95 17	118.7
7	61 00.8	96 17	118.8	61 29.5	96 17	118.5	62 26.8	95 17	117.9	62 55.3	95 17	117.5
8	60 50.7	96 17	117.7	61 19.3	96 17	117.3	62 16.6	95 17	116.7	62 45.1	95 17	116.4
9	60 40.5	96 17	116.5	61 09.1	95 17	116.2	62 06.3	95 17	115.6	62 34.8	95 17	115.2
50	60 30.2	95 17	115.4	60 58.8	95 17	115.1	61 55.9	95 17	114.4	62 24.4	95 18	114.1
1	60 19.8	95 17	114.3	60 48.4	95 18	114.0	61 45.5	95 18	113.3	62 13.9	95 18	113.0
2	60 09.3	95 18	113.1	60 37.9	95 18	112.8	61 34.9	95 18	112.2	62 03.3	95 18	111.9
3	59 58.7	95 18	112.0	60 27.3	95 18	111.7	61 24.3	95 18	111.1	61 52.7	95 18	110.7
4	59 48.1	95 18	110.9	60 16.6	95 18	110.6	61 13.5	95 18	110.0	61 41.9	95 18	109.6
55	59 37.4	95 18	109.8	60 05.9	95 18	109.5	61 02.7	95 18	108.9	61 31.1	94 18	108.5
6	59 26.5	95 18	108.7	59 55.0	95 18	108.4	60 51.9	95 18	107.8	61 20.2	94 18	107.5
7	59 15.7	95 18	107.7	59 44.1	95 18	107.4	60 40.9	95 18	106.7	61 09.3	94 18	106.4
8	59 04.7	95 18	106.6	59 33.2	95 18	106.3	60 29.9	94 18	105.6	60 58.3	94 18	105.3
9	58 53.7	95 18	105.5	59 22.2	95 18	105.2	60 18.9	94 19	104.6	60 47.2	94 19	104.2
60	58 42.7	95 19	104.5	59 11.1	95 19	104.1	60 07.8	94 19	103.5	60 36.1	94 19	103.2
1	58 31.6	95 19	103.4	59 00.0	95 19	103.1	59 56.6	94 19	102.4	60 24.9	94 19	102.1
2	58 20.4	95 19	102.4	58 48.8	95 19	102.0	59 45.4	94 19	101.4	60 13.7	94 19	101.1
3	58 09.2	95 19	101.3	58 37.6	95 19	101.0	59 34.2	94 19	100.4	60 02.4	94 19	100.0
4	57 57.9	95 19	100.3	58 26.3	94 19	100.0	59 22.9	94 19	99.3	59 51.1	94 19	99.0
65	57 46.7	95 19	99.2	58 15.0	94 19	98.9	59 11.6	94 19	98.3	59 39.8	94 19	97.9
6	57 35.3	95 19	98.2	58 03.7	94 19	97.9	59 00.2	94 19	97.3	59 28.5	94 19	96.9
7	57 24.0	95 19	97.2	57 52.3	94 19	96.9	58 48.9	94 19	96.2	59 17.1	94 19	95.9
8	57 12.6	95 19	96.2	57 41.0	94 19	95.9	58 37.5	94 19	95.2	59 05.7	94 19	94.9
9	57 01.2	94 19	95.2	57 29.6	94 19	94.9	58 26.1	94 19	94.2	58 54.3	94 19	93.9
70	56 49.8	94 19	94.2	57 18.1	94 19	93.8	58 14.7	94 19	93.2	58 42.8	94 19	92.9
1	56 38.4	94 19	93.2	57 06.7	94 19	92.9	58 03.2	94 19	92.2	58 31.4	94 19	91.9
2	56 27.0	94 19	92.2	56 55.3	94 19	91.9	57 51.8	94 19	91.2	58 20.0	94 19	90.9
3	56 15.5	94 19	91.2	56 43.8	94 19	90.9	57 40.3	94 19	90.2	58 08.5	94 19	89.9
4	56 04.1	94 19	90.2	56 32.4	94 19	89.9	57 28.9	94 19	89.3	57 57.1	94 19	88.9
75	55 52.6	94 19	89.2	56 20.9	94 19	88.9	57 17.4	94 19	88.3	57 45.6	94 19	88.0
6	55 41.2	94 19	88.2	56 09.5	94 19	87.9	57 06.0	94 19	87.3	57 34.2	94 19	87.0
7	55 29.7	94 19	87.3	55 58.1	94 19	87.0	56 54.6	94 19	86.4	57 22.7	94 19	86.0
8	55 18.3	94 19	86.3	55 46.6	94 19	86.0	56 43.1	94 19	85.4	57 11.3	94 19	85.1
9	55 06.9	94 19	85.3	55 35.2	94 19	85.0	56 31.7	94 19	84.4	56 59.9	94 19	84.1
80	54 55.5	95 19	84.4	55 23.8	94 19	84.1	56 20.4	94 19	83.5	56 48.6	94 19	83.2
1	54 44.1	95 19	83.4	55 12.4	94 19	83.1	56 09.0	94 19	82.5	56 37.2	94 19	82.2
2	54 32.7	95 19	82.5	55 01.1	94 19	82.2	55 57.7	94 19	81.6	56 25.9	94 19	81.3
3	54 21.4	95 19	81.5	54 49.8	94 19	81.2	55 46.3	94 19	80.7	56 14.6	94 19	80.4
4	54 10.1	95 19	80.6	54 38.5	94 19	80.3	55 35.1	94 19	79.7	56 03.3	94 19	79.4
85	53 58.8	95 19	79.6	54 27.2	95 19	79.4	55 23.8	94 19	78.8	55 52.1	94 19	78.5
6	53 47.6	95 19	78.7	54 16.0	95 19	78.4	55 12.6	94 19	77.9	55 40.9	94 19	77.6
7	53 36.4	95 19	77.8	54 04.8	95 19	77.5	55 01.4	94 19	76.9	55 29.7	94 19	76.7
8	53 25.2	95 19	76.9	53 53.6	95 19	76.6	54 50.3	94 18	76.0	55 18.6	94 18	75.7
9	53 14.1	95 18	75.9	53 42.5	95 18	75.7	54 39.2	94 18	75.1	55 07.5	94 18	74.8
90	53 03.0	95 18	75.0	53 31.4	95 18	74.8	54 28.2	94 18	74.2	54 56.5	94 18	73.9

H.A.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	68 00.0	1.0 00	180.0	68 30.0	1.0 00	180.0	70 00.0	1.0 00	180.0	70 30.0	1.0 00	180.0
1	67 59.9	1.0 01	178.5	68 29.9	1.0 01	178.5	69 59.8	1.0 01	178.5	70 29.8	1.0 01	178.5
2	67 59.4	1.0 01	177.1	68 29.4	1.0 01	177.1	69 59.4	1.0 01	177.0	70 29.4	1.0 01	177.0
3	67 58.7	1.0 02	175.6	68 28.7	1.0 02	175.6	69 58.6	1.0 02	175.5	70 28.6	1.0 02	175.4
4	67 57.7	1.0 02	174.2	68 27.7	1.0 02	174.1	69 57.6	1.0 02	174.0	70 27.6	1.0 02	173.9
05	67 56.4	1.0 03	172.7	68 26.3	1.0 03	172.7	69 56.2	1.0 03	172.5	70 26.2	1.0 03	172.4
6	67 54.8	1.0 03	171.3	68 24.7	1.0 03	171.2	69 54.6	1.0 03	171.0	70 24.5	1.0 03	170.9
7	67 52.9	1.0 04	169.8	68 22.8	1.0 04	169.8	69 52.7	1.0 04	169.5	70 22.6	1.0 04	169.4
8	67 50.8	1.0 04	168.4	68 20.7	1.0 04	168.3	69 50.4	1.0 04	168.0	70 20.3	1.0 04	167.9
9	67 48.3	1.0 05	167.0	68 18.2	1.0 05	166.9	69 47.9	1.0 05	166.5	70 17.8	1.0 05	166.4
10	67 45.6	1.0 05	165.5	68 15.5	1.0 05	165.4	69 45.1	1.0 05	165.0	70 14.9	1.0 05	164.9
1	67 42.6	1.0 05	164.1	68 12.4	1.0 06	164.0	69 42.0	99 06	163.5	70 11.8	99 06	163.4
2	67 39.3	99 06	162.7	68 09.1	99 06	162.5	69 38.6	99 06	162.1	70 08.4	99 06	161.9
3	67 35.8	99 06	161.2	68 05.6	99 06	161.1	69 34.9	99 07	160.6	70 04.7	99 07	160.4
4	67 32.0	99 07	159.8	68 01.7	99 07	159.7	69 31.0	99 07	159.1	70 00.7	99 07	158.9
15	67 27.9	99 07	158.4	67 57.6	99 07	158.2	69 26.8	99 07	157.7	69 56.5	99 08	157.5
6	67 23.5	99 08	157.0	67 53.2	99 08	156.8	69 22.3	99 08	156.2	69 52.0	99 08	156.0
7	67 18.9	99 08	155.6	67 48.6	99 08	155.4	69 17.6	99 08	154.8	69 47.2	99 08	154.6
8	67 14.1	99 08	154.2	67 43.7	99 09	154.0	69 12.6	99 09	153.4	69 42.1	99 09	153.1
9	67 09.0	99 09	152.8	67 38.6	99 09	152.6	69 07.3	98 09	151.9	69 36.8	98 09	151.7
20	67 03.6	99 09	151.4	67 33.2	99 09	151.2	69 01.8	98 10	150.5	69 31.3	98 10	150.3
1	66 58.0	98 10	150.1	67 27.6	98 10	149.8	68 56.0	98 10	149.1	69 25.5	98 10	148.8
2	66 52.2	98 10	148.7	67 21.7	98 10	148.5	68 50.0	98 10	147.7	69 19.4	98 10	147.4
3	66 46.1	98 10	147.3	67 15.6	98 11	147.1	68 43.8	98 11	146.3	69 13.1	98 11	146.0
4	66 39.9	98 11	146.0	67 09.3	98 11	145.7	68 37.3	98 11	144.9	69 06.6	98 11	144.6
25	66 33.3	98 11	144.7	67 02.7	98 11	144.4	68 30.6	98 12	143.5	68 59.9	97 12	143.2
6	66 26.6	98 12	143.3	66 55.9	98 12	143.0	68 23.7	97 12	142.2	68 52.9	97 12	141.9
7	66 19.7	98 12	142.0	66 48.9	98 12	141.7	68 16.6	97 12	140.8	68 45.7	97 12	140.5
8	66 12.5	98 12	140.7	66 41.7	97 12	140.4	68 09.3	97 13	139.5	68 38.4	97 13	139.1
9	66 05.2	97 13	139.4	66 34.3	97 13	139.1	68 01.7	97 13	138.1	68 30.8	97 13	137.8
30	65 57.6	97 13	138.1	66 26.7	97 13	137.8	67 54.0	97 13	136.8	68 23.0	97 13	136.5
1	65 49.8	97 13	136.8	66 19.0	97 13	136.5	67 46.0	97 14	135.5	68 15.0	96 14	135.1
2	65 41.9	97 14	135.5	66 11.0	97 14	135.2	67 37.9	96 14	134.2	68 06.8	96 14	133.8
3	65 33.8	97 14	134.2	66 02.8	97 14	133.9	67 29.6	96 14	132.9	67 58.5	96 14	132.5
4	65 25.5	97 14	132.9	65 54.5	97 14	132.6	67 21.2	96 14	131.6	67 50.0	96 14	131.2
35	65 17.0	97 14	131.7	65 46.0	96 14	131.3	67 12.5	96 15	130.3	67 41.3	96 15	129.9
6	65 08.4	96 15	130.4	65 37.3	96 15	130.1	67 03.7	96 15	129.0	67 32.4	96 15	128.7
7	64 59.6	96 15	129.2	65 28.4	96 15	128.8	66 54.7	96 15	127.8	67 23.4	95 15	127.4
8	64 50.6	96 15	127.9	65 19.4	96 15	127.6	66 45.6	95 15	126.5	67 14.2	95 16	126.1
9	64 41.5	96 15	126.7	65 10.3	96 15	126.4	66 36.3	95 16	125.3	67 04.9	95 16	124.9
40	64 32.3	96 16	125.5	65 01.0	96 16	125.1	66 26.9	95 16	124.1	66 55.4	95 16	123.7
1	64 22.9	96 16	124.3	64 51.6	96 16	123.9	66 17.4	95 16	122.8	66 45.8	95 16	122.4
2	64 13.4	96 16	123.1	64 42.0	95 16	122.7	66 07.7	95 16	121.6	66 36.1	95 16	121.2
3	64 03.7	95 16	121.9	64 32.3	95 16	121.5	65 57.9	95 17	120.4	66 26.3	95 17	120.0
4	63 53.9	95 16	120.7	64 22.5	95 17	120.3	65 47.9	95 17	119.2	66 16.3	94 17	118.8
45	63 44.0	95 17	119.5	64 12.6	95 17	119.2	65 37.9	95 17	118.0	66 06.2	94 17	117.6
6	63 34.0	95 17	118.3	64 02.5	95 17	118.0	65 27.7	94 17	116.9	65 56.0	94 17	116.5
7	63 23.9	95 17	117.2	63 52.3	95 17	116.8	65 17.4	94 17	115.7	65 45.7	94 17	115.3
8	63 13.6	95 17	116.0	63 42.1	95 17	115.7	65 07.1	94 17	114.5	65 35.3	94 18	114.1
9	63 03.3	95 17	114.9	63 31.7	95 17	114.5	64 56.6	94 18	113.4	65 24.8	94 18	113.0
50	62 52.9	95 18	113.8	63 21.2	95 18	113.4	64 46.1	94 18	112.3	65 14.2	94 18	111.8
1	62 42.3	95 18	112.6	63 10.7	94 18	112.3	64 35.4	94 18	111.1	65 03.6	94 18	110.7
2	62 31.7	95 18	111.5	63 00.1	94 18	111.1	64 24.7	94 18	110.0	64 52.8	94 18	109.6
3	62 21.0	94 18	110.4	62 49.3	94 18	110.0	64 13.9	94 18	108.9	64 42.0	93 18	108.5
4	62 10.3	94 18	109.3	62 38.6	94 18	108.9	64 03.1	94 18	107.8	64 31.1	93 18	107.4
55	61 59.4	94 18	108.2	62 27.7	94 18	107.8	63 52.1	93 18	106.7	64 20.1	93 18	106.3
6	61 48.5	94 18	107.1	62 16.8	94 18	106.7	63 41.1	93 18	105.6	64 09.1	93 18	105.2
7	61 37.5	94 18	106.0	62 05.8	94 18	105.7	63 30.1	93 19	104.5	63 58.0	93 19	104.1
8	61 26.5	94 18	104.9	61 54.7	94 19	104.6	63 19.0	93 19	103.4	63 46.9	93 19	103.0
9	61 15.4	94 19	103.9	61 43.6	94 19	103.5	63 07.8	93 19	102.4	63 35.7	93 19	102.0
60	61 04.3	94 19	102.8	61 32.4	94 19	102.5	62 56.6	93 19	101.3	63 24.5	93 19	100.9
1	60 53.1	94 19	101.8	61 21.2	94 19	101.4	62 45.3	93 19	100.3	63 13.2	93 19	99.9
2	60 41.9	94 19	100.7	61 10.0	94 19	100.4	62 34.1	93 19	99.2	63 01.9	93 19	98.8
3	60 30.6	94 19	99.7	60 58.7	94 19	99.3	62 22.7	93 19	98.2	62 50.6	93 19	97.8
4	60 19.3	94 19	98.6	60 47.4	94 19	98.3	62 11.4	93 19	97.2	62 39.3	93 19	96.8
65	60 08.0	94 19	97.6	60 36.1	94 19	97.3	62 00.0	93 19	96.1	62 27.9	93 19	95.7
6	59 56.6	94 19	96.6	60 24.7	94 19	96.2	61 48.6	93 19	95.1	62 16.5	93 19	94.7
7	59 45.2	94 19	95.6	60 13.3	94 19	95.2	61 37.2	93 19	94.1	62 05.1	93 19	93.7
8	59 33.8	94 19	94.6	60 01.9	94 19	94.2	61 25.8	93 19	93.1	61 53.6	93 19	92.7
9	59 22.4	94 19	93.6	59 50.5	94 19	93.2	61 14.4	93 19	92.1	61 42.2	93 19	91.7
70	59 11.0	94 19	92.6	59 39.0	93 19	92.2	61 02.9	93 19	91.1	61 30.7	93 19	90.7
1	58 59.5	94 19	91.6	59 27.6	93 19	91.2	60 51.5	93 19	90.1	61 19.3	93 19	89.7
2	58 48.1	94 19	90.6	59 16.1	93 19	90.2	60 40.0	93 19	89.1	61 07.9	93 19	88.8
3	58 36.6	94 19	89.6	59 04.7	93 19	89.2	60 28.6	93 19	88.2	60 56.4	93 19	87.8
4	58 25.2	94 19	88.6	58 53.3	93 19	88.3	60 17.1	93 19	87.2	60 45.0	93 19	86.8
75	58 13.7	94 19	87.6	58 41.8	93 19	87.3	60 05.7	93 19	86.2	60 33.5	93 19	85.9
6	58 02.3	94 19	86.7	58 30.4	94 19	86.3	59 54.3	93 19	85.3	60 22.1	93 19	84.9
7	57 50.9	94 19	85.7	58 19.0	94 19	85.4	59 42.9	93 19	84.3	60 10.7	93 19	84.0
8	57 39.5	94 19	84.8	58 07.6	94 19	84.4	59 31.5	93 19	83.4	59 59.4	93 19	83.0
9	57 28.1	94 19	83.8	57 56.2	94 19	83.5	59 20.1	93 19	82.4	59 48.0	93 19	82.1
80	57 16.7	94 19	82.9	57 44.8	94 19	82.5	59 08.8	93 19	81.5	59 36.7	93 19	81.1
1	57 05.4	94 19	81.9	57 33.5	94 19	81.6	58 57.5	93 19	80.6	59 25.4	93 19	80.2
2	56 54.0	94 19	81.0	57 22.2	94 19	80.7	58 46.2	93 19	79.6	59 14.1	93 19	79.3
3	56 42.7	94 19	80.0	57 10.9	94 19	79.7	58 35.0	93 19	78.7	59 02.9	93 19	78.4
4	56 31.5	94 19	79.1	56 59.6	94 19	78.8	58 23.8	93 19	77.8	58 51.7	93 19	77.5
85	56 20.3	94 19	78.2	56 48.4	94 19	77.9	58 12.6	93 19	76.9	58 40.5	93 19	76.5
6	56 09.1	94 19	77.3	56 37.2	94 19	77.0	58 01.5	93 18	76.0	58 29.4	93 18	75.6
7	55 57.9	94 18	76.4	56 26.1	94 18	76.0	57 50.4	93 18	75.1	58 18.4	93 18	74.7
8	55 46.8	94 18	75.4	56 15.0	94 18	75.1	57 39.3	93 18	74.2	58 07.3	93 18	73.8
9	55 35.8	94 18	74.5	56 04.0	94 18	74.2	57 28.4	93 18	73.3	57 56.4	93 18	72.9
90	55 24.8	94 18	73.6	55 53.0	94 18	73.3	57 17.4	94 18	72.4	57 45.5	93 18	72.1

Lat. 79°

H.A.	54° 30′ Alt.	Δd Δt	Az.	55° 00′ Alt.	Δd Δt	Az.	56° 00′ Alt.	Δd Δt	Az.	56° 30′ Alt.	Δd Δt	Az.	57° 00′ Alt.	Δd Δt	Az.	57° 30′ Alt.	Δd Δt	Az.	59° 00′ Alt.	Δd Δt	Az.	59° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	52 52.0	95 18	74.1	53 20.4	95 18	73.8	54 17.2	95 18	73.3	54 45.5	94 18	73.0	55 13.8	94 18	72.7	55 42.1	94 18	72.4	57 06.5	94 18	71.5	57 34.6	93 18	71.2	91
2	52 41.0	95 18	73.2	53 09.4	95 18	72.9	54 06.2	95 18	72.4	54 34.6	94 18	72.1	55 02.9	94 18	71.8	55 31.2	94 18	71.5	56 55.7	94 18	70.6	57 23.8	94 18	70.3	2
3	52 30.0	95 18	72.3	52 58.5	95 18	72.0	53 55.4	95 18	71.5	54 23.7	94 18	71.2	54 52.0	94 18	70.9	55 20.3	94 18	70.6	56 44.9	94 18	69.7	57 13.0	94 18	69.4	3
4	52 19.2	95 18	71.4	52 47.6	95 18	71.1	53 44.5	95 18	70.6	54 12.9	95 18	70.3	54 41.3	94 18	70.0	55 09.6	94 18	69.8	56 34.2	94 18	68.8	57 02.4	94 18	68.5	4
95	52 08.3	95 18	70.5	52 36.8	95 18	70.2	53 33.8	95 18	69.7	54 02.2	95 18	69.4	54 30.5	94 18	69.2	54 58.9	94 18	68.9	56 23.6	94 18	68.0	56 51.7	94 18	67.7	95
6	51 57.6	95 18	69.6	52 26.1	95 18	69.3	53 23.0	95 18	68.8	53 51.5	95 18	68.5	54 19.9	95 18	68.3	54 48.2	94 18	68.0	56 13.0	94 18	67.1	56 41.2	94 18	66.8	6
7	51 46.9	95 18	68.7	52 15.4	95 18	68.4	53 12.4	95 18	67.9	53 40.9	95 18	67.7	54 09.3	95 18	67.4	54 37.6	94 18	67.1	56 02.5	94 17	66.2	56 30.7	94 17	65.9	7
8	51 36.2	95 18	67.8	52 04.8	95 18	67.6	53 01.8	95 18	67.0	53 30.3	95 18	66.8	53 58.7	95 17	66.5	54 27.1	95 17	66.2	55 52.0	94 17	65.4	56 20.3	94 17	65.1	8
9	51 25.7	95 18	66.9	51 54.3	95 17	66.7	52 51.3	95 17	66.2	53 19.8	95 17	65.9	53 48.3	95 17	65.6	54 16.7	95 17	65.4	55 41.7	94 17	64.5	56 09.9	94 17	64.2	9
100	51 15.2	95 17	66.0	51 43.8	95 17	65.8	52 40.9	95 17	65.3	53 09.4	95 17	65.0	53 37.9	95 17	64.8	54 06.3	95 17	64.5	55 31.4	94 17	63.6	55 59.7	94 17	63.3	100
1	51 04.8	95 17	65.1	51 33.4	95 17	64.9	52 30.5	95 17	64.4	52 59.1	95 17	64.1	53 27.5	95 17	63.9	53 56.0	95 17	63.6	55 21.2	94 17	62.8	55 49.5	94 17	62.5	1
2	50 54.4	96 17	64.3	51 23.0	95 17	64.0	52 20.2	95 17	63.5	52 48.8	95 17	63.3	53 17.3	95 17	63.0	53 45.8	95 17	62.8	55 11.0	95 17	61.9	55 39.4	94 17	61.6	2
3	50 44.1	96 17	63.4	51 12.8	95 17	63.1	52 10.0	95 17	62.7	52 38.6	95 17	62.4	53 07.1	95 17	62.2	53 35.7	95 17	61.9	55 01.0	95 17	61.1	55 29.3	94 17	60.8	3
4	50 33.9	96 17	62.5	51 02.6	96 17	62.3	51 59.9	95 17	61.8	52 28.5	95 17	61.5	52 57.1	95 17	61.3	53 25.6	95 17	61.0	54 51.0	95 16	60.2	55 19.4	95 16	59.9	4
105	50 23.8	96 17	61.6	50 52.5	96 17	61.4	51 49.9	95 17	60.9	52 18.5	95 17	60.7	52 47.1	95 17	60.4	53 15.6	95 16	60.2	54 41.1	95 16	59.4	55 09.5	95 16	59.1	105
6	50 13.8	96 17	60.8	50 42.5	96 17	60.5	51 39.9	96 16	60.1	52 08.5	95 16	59.8	52 37.1	95 16	59.6	53 05.7	95 16	59.3	54 31.3	95 16	58.5	54 59.7	95 16	58.3	6
7	50 03.8	96 16	59.9	50 32.6	96 16	59.7	51 30.0	96 16	59.2	51 58.7	96 16	59.0	52 27.3	95 16	58.7	52 55.9	95 16	58.5	54 21.6	95 16	57.7	54 50.0	95 16	57.4	7
8	49 54.0	96 16	59.0	50 22.8	96 16	58.8	51 20.2	96 16	58.4	51 48.9	96 16	58.1	52 17.6	95 16	57.9	52 46.2	95 16	57.6	54 11.9	95 16	56.9	54 40.4	95 16	56.6	8
9	49 44.2	96 16	58.2	50 13.0	96 16	57.9	51 10.5	96 16	57.5	51 39.2	96 16	57.3	52 07.9	96 16	57.0	52 36.6	95 16	56.8	54 02.4	95 16	56.0	54 30.9	95 16	55.8	9
110	49 34.5	96 16	57.3	50 03.3	96 16	57.1	51 00.9	96 16	56.6	51 29.7	96 16	56.4	51 58.4	96 16	56.2	52 27.1	96 16	55.9	53 52.9	95 16	55.2	54 21.5	95 16	54.9	110
1	49 24.9	96 16	56.4	49 53.8	96 16	56.2	50 51.4	96 16	55.8	51 20.2	96 16	55.6	51 48.9	96 16	55.3	52 17.6	96 16	55.1	53 43.6	95 15	54.4	54 12.2	95 15	54.1	1
2	49 15.4	96 16	55.6	49 44.3	96 16	55.4	50 42.0	96 16	54.9	51 10.8	96 16	54.7	51 39.5	96 15	54.5	52 08.3	96 15	54.3	53 34.3	95 15	53.5	54 02.9	95 15	53.3	2
3	49 06.1	96 16	54.7	49 34.9	96 15	54.5	50 32.7	96 15	54.1	51 01.5	96 15	53.9	51 30.3	96 15	53.7	51 59.0	96 15	53.4	53 25.2	96 15	52.7	53 53.8	95 15	52.5	3
4	48 56.8	96 15	53.9	49 25.7	96 15	53.7	50 23.4	96 15	53.3	50 52.3	96 15	53.0	51 21.1	96 15	52.8	51 49.9	96 15	52.6	53 16.1	96 15	51.9	53 44.8	96 15	51.6	4
115	48 47.6	96 15	53.0	49 16.5	96 15	52.8	50 14.3	96 15	52.4	50 43.2	96 15	52.2	51 12.0	96 15	52.0	51 40.8	96 15	51.8	53 07.2	96 15	51.1	53 35.9	96 15	50.8	115
6	48 38.5	97 15	52.2	49 07.4	97 15	52.0	50 05.3	96 15	51.6	50 34.2	96 15	51.4	51 03.1	96 15	51.1	51 31.9	96 15	50.9	52 58.3	96 15	50.2	53 27.0	96 15	50.0	6
7	48 29.5	97 15	51.3	48 58.5	97 15	51.1	49 56.4	96 15	50.7	50 25.3	96 15	50.5	50 54.2	96 15	50.3	51 23.1	96 15	50.1	52 49.6	96 14	49.4	53 18.3	96 14	49.2	7
8	48 20.6	97 15	50.5	48 49.6	97 15	50.3	49 47.6	97 14	49.9	50 16.5	96 14	49.7	50 45.4	96 14	49.5	51 14.3	96 14	49.3	52 40.9	96 14	48.6	53 09.7	96 14	48.4	8
9	48 11.8	97 14	49.6	48 40.8	97 14	49.4	49 38.9	97 14	49.1	50 07.8	97 14	48.9	50 36.8	96 14	48.7	51 05.7	96 14	48.4	52 32.4	96 14	47.8	53 01.2	96 14	47.6	9
120	48 03.1	97 14	48.8	48 32.2	97 14	48.6	49 30.3	97 14	48.2	49 59.3	97 14	48.0	50 28.3	97 14	47.8	50 57.2	96 14	47.6	52 24.0	96 14	47.0	52 52.8	96 14	46.7	120
1	47 54.6	97 14	48.0	48 23.7	97 14	47.8	49 21.8	97 14	47.4	49 50.8	97 14	47.2	50 19.8	97 14	47.0	50 48.8	97 14	46.8	52 15.6	96 14	46.2	52 44.5	96 14	45.9	1
2	47 46.1	97 14	47.1	48 15.2	97 14	46.9	49 13.4	97 14	46.6	49 42.5	97 14	46.4	50 11.5	97 14	46.2	50 40.5	97 14	46.0	52 07.4	96 13	45.4	52 36.4	96 13	45.1	2
3	47 37.8	97 14	46.3	48 06.9	97 14	46.1	49 05.2	97 14	45.7	49 34.2	97 14	45.5	50 03.3	97 13	45.4	50 32.3	97 13	45.2	51 59.4	97 13	44.5	52 28.3	96 13	44.3	3
4	47 29.6	97 14	45.4	47 58.8	97 13	45.3	48 57.0	97 13	44.9	49 26.1	97 13	44.7	49 55.2	97 13	44.5	50 24.3	97 13	44.3	51 51.4	97 13	43.7	52 20.4	97 13	43.5	4
125	47 21.5	97 13	44.6	47 50.7	97 13	44.4	48 49.0	97 13	44.1	49 18.1	97 13	43.9	49 47.2	97 13	43.7	50 16.3	97 13	43.5	51 43.5	97 13	42.9	52 12.5	97 13	42.7	125
6	47 13.5	97 13	43.8	47 42.7	97 13	43.6	48 41.1	97 13	43.3	49 10.3	97 13	43.1	49 39.4	97 13	42.9	50 08.5	97 13	42.7	51 35.8	97 13	42.1	52 04.8	97 13	41.9	6
7	47 05.7	97 13	42.9	47 34.9	97 13	42.8	48 33.3	97 13	42.4	49 02.5	97 13	42.3	49 31.7	97 13	42.1	50 00.8	97 13	41.9	51 28.2	97 12	41.3	51 57.2	97 12	41.1	7
8	46 57.9	98 13	42.1	47 27.2	97 13	41.9	48 25.6	97 13	41.6	48 54.9	97 13	41.4	49 24.1	97 12	41.3	49 53.2	97 12	41.1	51 20.7	97 12	40.5	51 49.8	97 12	40.3	8
9	46 50.3	98 12	41.3	47 19.6	98 12	41.1	48 18.1	97 12	40.8	48 47.3	97 12	40.6	49 16.6	97 12	40.4	49 45.8	97 12	40.3	51 13.3	97 12	39.7	51 42.4	97 12	39.5	9
130	46 42.8	98 12	40.5	47 12.1	98 12	40.3	48 10.7	98 12	40.0	48 39.9	98 12	39.8	49 09.2	97 12	39.6	49 38.4	97 12	39.5	51 06.0	97 12	38.9	51 35.2	97 12	38.7	130
1	46 35.4	98 12	39.6	47 04.8	98 12	39.5	48 03.4	98 12	39.2	48 32.7	98 12	39.0	49 02.0	98 12	38.8	49 31.2	98 12	38.7	50 58.9	97 12	38.1	51 28.1	97 12	37.9	1
2	46 28.2	98 12	38.8	46 57.6	98 12	38.6	47 56.2	98 12	38.3	48 25.5	98 12	38.2	48 54.8	98 12	38.0	49 24.1	98 12	37.8	50 51.9	97 11	37.3	51 21.1	97 11	37.2	2
3	46 21.1	98 12	38.0	46 50.5	98 12	37.8	47 49.2	98 12	37.5	48 18.5	98 11	37.4	48 47.9	98 11	37.2	49 17.2	98 11	37.0	50 45.0	98 11	36.5	51 14.3	97 11	36.4	3
4	46 14.1	98 11	37.2	46 43.5	98 11	37.0	47 42.3	98 11	36.7	48 11.6	98 11	36.6	48 41.0	98 11	36.4	49 10.3	98 11	36.2	50 38.3	98 11	35.7	51 07.5	98 11	35.6	4
135	46 07.3	98 11	36.3	46 36.7	98 11	36.2	47 35.5	98 11	35.9	48 04.9	98 11	35.7	48 34.3	98 11	35.6	49 03.6	98 11	35.4	50 31.6	98 11	35.0	51 01.0	98 11	34.8	135
6	46 00.6	98 11	35.5	46 30.0	98 11	35.4	47 28.9	98 11	35.1	47 58.3	98 11	34.9	48 27.7	98 11	34.8	48 57.1	98 11	34.6	50 25.1	98 11	34.2	50 54.5	98 11	34.0	6
7	45 54.0	98 11	34.7	46 23.4	98 11	34.6	47 22.3	98 11	34.3	47 51.8	98 11	34.1	48 21.2	98 11	34.0	48 50.6	98 10	33.8	50 18.8	98 10	33.4	50 48.2	98 10	33.2	7
8	45 47.5	98 11	33.9	46 17.0	98 10	33.7	47 16.0	98 10	33.5	47 45.4	98 10	33.3	48 14.9	98 10	33.2	48 44.3	98 10	33.0	50 12.6	98 10	32.6	50 41.9	98 10	32.4	8
9	45 41.2	98 10	33.0	46 10.7	98 10	32.9	47 09.7	98 10	32.7	47 39.2	98 10	32.5	48 08.7	98 10	32.4	48 38.1	98 10	32.2	50 06.5	98 10	31.8	50 35.9	98 10	31.6	9
140	45 35.0	98 10	32.2	46 04.6	98 10	32.1	47 03.6	98 10	31.8	47 33.1	98 10	31.7	48 02.6	98 10	31.6	48 32.1	98 10	31.4	50 00.5	98 10	31.0	50 29.9	98 10	30.9	140
1	45 29.0	99 10	31.4	45 58.6	98 10	31.3	46 57.6	98 10	31.0	47 27.2	98 10	30.9	47 56.7	98 10	30.8	48 26.2	98 10	30.6	49 54.7	98 10	30.2	50 24.1	98 09	30.1	1
2	45 23.1	99 10	30.6	45 52.7	99 10	30.5	46 51.8	99 09	30.2	47 21.4	98 09	30.1	47 50.9	98 09	30.0	48 20.4	98 09	29.8	49 49.0	98 09	29.4	50 18.5	98 09	29.3	2
3	45 17.4	99 09	29.8	45 46.9	99 09	29.7	46 46.1	99 09	29.4	47 15.7	99 09	29.3	47 45.2	99 09	29.2	48 14.8	99 09	29.0	49 43.4	98 09	28.6	50 12.9	98 09	28.5	3
4	45 11.7	99 09	29.0	45 41.3	99 09	28.9	46 40.6	99 09	28.6	47 10.1	99 09	28.5	47 39.7	99 09	28.4	48 09.3	99 09	28.3	49 38.0	98 09	27.9	50 07.5	98 09	27.7	4
145	45 06.3	99 09	28.2	45 35.9	99 09	28.0	46 35.1	99 09	27.8	47 04.8	99 09	27.7	47 34.4	99 09	27.6	48 04.0	99 09	27.5	49 32.7	99 09	27.1	50 02.3	99 09	27.0	145
6	45 00.9	99 09	27.3	45 30.6	99 09	27.2	46 29.9	99 09	27.0	46 59.5	99 08	26.9	47 29.1	99 08	26.8	47 58.8	99 08	26.7	49 27.6	99 08	26.3	49 57.2	99 08	26.2	6
7	44 55.7	99 08	26.5	45 25.4	99 08	26.4	46 24.7	99 08	26.2	46 54.4	99 08	26.1	47 24.0	99 08	26.0	47 53.7	99 08	25.9	49 22.6	99 08	25.5	49 52.2	99 08	25.4	7
8	44 50.7	99 08	25.7	45 20.4	99 08	25.6	46 19.8	99 08	25.4	46 49.4	99 08	25.3	47 19.1	99 08	25.2	47 48.8	99 08	25.1	49 17.7	99 08	24.7	49 47.3	99 08	24.6	8
9	44 45.8	99 08	24.9	45 15.5	99 08	24.8	46 14.9	99 08	24.6	46 44.6	99 08	24.5	47 14.3	99 08	24.4	47 44.0	99 08	24.3	49 13.0	99 08	24.0	49 42.6	99 08	23.8	9
150	44 41.1	99 08	24.1	45 10.8	99 08	24.0	46 10.2	99 08	23.8	46 39.9	99 08	23.7	47 09.6	99 08	23.6	47 39.3	99 07	23.5	49 08.4	99 07	23.2	49 38.1	99 07	23.1	150
1	44 36.5	99 07	23.3	45 06.2	99 07	23.2	46 05.7	99 07	23.0	46 35.4	99 07	22.9	47 05.1	99 07	22.8	47 34.8	99 07	22.7	49 04.0	99 07	22.4	49 33.7	99 07	22.3	1
2	44 32.0	99 07	22.5	45 01.8	99 07	22.4	46 01.3	99 07	22.2	46 31.0	99 07	22.1	47 00.8	99 07	22.0	47 30.5	99 07	21.9	48 59.7	99 07	21.6	49 29.4	99 07	21.5	2
3	44 27.7	99 07	21.7	44 57.5	99 07	21.6	45 57.0	99 07	21.4	46 26.8	99 07	21.3	46 56.5	99 07	21.2	47 26.3	99 07	21.1	48 55.5	99 07	20.8	49 25.3	99 07	20.7	3
4	44 23.5	99 07	20.9	44 53.3	99 07	20.8	45 52.9	99 07	20.6	46 22.7	99 07	20.5	46 52.5	99 07	20.4	47 22.2	99 06	20.4	48 51.5	99 06	20.1	49 21.3	99 06	20.0	4
155	44 19.5	99 06	20.1	44 49.3	99 06	20.0	45 49.0	99 06	19.8	46 18.7	99 06	19.7	46 48.5	99 06	19.7	47 18.3	99 06	19.6	48 47.7	99 06	19.3	49 17.4	99 06	19.2	155
6	44 15.7	99 06	19.3	44 45.5	99 06	19.2	45 45.1	99 06	19.0	46 15.0	99 06	18.9	46 44.8	99 06	18.9	47 14.6	99 06	18.8	48 44.0	99 06	18.5	49 13.8	99 06	18.4	6
7	44 12.0	99 06	18.5	44 41.8	99 06	18.4	45 41.5	99 06	18.2	46 11.3	99 06	18.2	46 41.1	99 06	18.1	47 11.0	99 06	18.0	48 40.4	99 06	17.7	49 10.2	99 06	17.7	7
8	44 08.4	1.0 05	17.6	44 38.3	99 06	17.6	45 38.0	99 06	17.4	46 07.8	99 06	17.4	46 37.7	99 06	17.3	47 07.5	99 06	17.2	48 37.0	99 05	17.0	49 06.8	99 05	16.9	8
9	44 05.0	1.0 05	16.8	44 34.9	1.0 06	16.8	45 34.6	1.0 05	16.6	46 04.5	1.0 05	16.6	46 34.3	1.0 05	16.5	47 04.2	99 05	16.4	48 33.7	99 05	16.2	49 03.6	99 05	16.1	9
160	44 01.8	1.0 05	16.0	44 31.7	1.0 05	16.0	45 31.4	1.0 05	15.8	46 01.3	1.0 05	15.8	46 31.2	1.0 05	15.7	47 01.0	1.0 05	15.6	48 30.6	1.0 05	15.4	49 00.5	1.0 05	15.3	160
1	43 58.7	1.0 05	15.2	44 28.6	1.0 05	15.2	45 28.4	1.0 05	15.0	45 58.3	1.0 05	15.0	46 28.1	1.0 05	14.9	46 58.0	1.0 05	14.9	48 27.6	1.0 05	14.6	48 57.5	1.0 05	14.6	1
2	43 55.8	1.0 05	14.4	44 25.7	1.0 05	14.4	45 25.5	1.0 05	14.3	45 55.4	1.0 05	14.2	46 25.3	1.0 05	14.1	46 55.2	1.0 04	14.1	48 24.8	1.0 04	13.9	48 54.7	1.0 04	13.8	2
3	43 53.0	1.0 04	13.6	44 22.9	1.0 04	13.6	45 22.7	1.0 04	13.5	45 52.6	1.0 04	13.4	46 22.5	1.0 04	13.3	46 52.4	1.0 04	13.3	48 22.1	1.0 04	13.1	48 52.0	1.0 04	13.0	3
4	43 50.4	1.0 04	12.8	44 20.3	1.0 04	12.8	45 20.2	1.0 04	12.7	45 50.1	1.0 04	12.6	46 20.0	1.0 04	12.6	46 49.9	1.0 04	12.5	48 19.6	1.0 04	12.3	48 49.5	1.0 04	12.3	4
165	43 47.9	1.0 04	12.0	44 17.9	1.0 04	12.0	45 17.7	1.0 04	11.9	45 47.6	1.0 04	11.8	46 17.6	1.0 04	11.8	46 47.5	1.0 04	11.7	48 17.3	1.0 04	11.6	48 47.2	1.0 04	11.5	165
6	43 45.6	1.0 04	11.2	44 15.6	1.0 04	11.2	45 15.4	1.0 04	11.1	45 45.4	1.0 04	11.0	46 15.3	1.0 04	11.0	46 45.2	1.0 04	10.9	48 15.0	1.0 03	10.8	48 45.0	1.0 03	10.7	6
7	43 43.5	1.0 03	10.4	44 13.4	1.0 03	10.4	45 13.3	1.0 03	10.3	45 43.3	1.0 03	10.2	46 13.2	1.0 03	10.2	46 43.1	1.0 03	10.2	48 13.0	1.0 03	10.0	48 42.9	1.0 03	10.0	7
8	43 41.5	1.0 03	09.6	44 11.4	1.0 03	09.6	45 11.4	1.0 03	09.5	45 41.3	1.0 03	09.5	46 11.3	1.0 03	09.4	46 41.2	1.0 03	09.4	48 11.1	1.0 03	09.2	48 41.0	1.0 03	09.2	8
9	43 39.7	1.0 03	08.8	44 09.6	1.0 03	08.8	45 09.5	1.0 03	08.7	45 39.5	1.0 03	08.7	46 09.5	1.0 03	08.6	46 39.4	1.0 03	08.6	48 09.3	1.0 03	08.5	48 39.2	1.0 03	08.4	9
170	43 38.0	1.0 03	08.0	44 08.0	1.0 02	08.0	45 07.9	1.0 02	07.9	45 37.9	1.0 02	07.9	46 07.8	1.0 02	07.8	46 37.8	1.0 02	07.8	48 07.7	1.0 02	07.7	48 37.6	1.0 02	07.7	170
1	43 36.5	1.0 02	07.2	44 06.4	1.0 02	07.2	45 06.4	1.0 02	07.1	45 36.4	1.0 02	07.1	46 06.3	1.0 02	07.1	46 36.3	1.0 02	07.0	48 06.2	1.0 02	06.9	48 36.2	1.0 02	06.9	1
2	43 35.1	1.0 02	06.4	44 05.1	1.0 02	06.4	45 05.1	1.0 02	06.3	45 35.0	1.0 02	06.3	46 05.0	1.0 02	06.3	46 35.0	1.0 02	06.2	48 04.9	1.0 02	06.2	48 34.9	1.0 02	06.1	2
3	43 33.9	1.0 02	05.6	44 03.9	1.0 02	05.6	45 03.9	1.0 02	05.5	45 33.9	1.0 02	05.5	46 03.8	1.0 02	05.5	46 33.8	1.0 02	05.5	48 03.8	1.0 02	05.4	48 33.7	1.0 02	05.4	3
4	43 32.9	1.0 01	04.8	44 02.9	1.0 01	04.8	45 02.8	1.0 01	04.7	45 32.8	1.0 01	04.7	46 02.8	1.0 01	04.7	46 32.8	1.0 01	04.7	48 02.8	1.0 01	04.6	48 32.8	1.0 01	04.6	4
175	43 32.0	1.0 01	04.0	44 02.0	1.0 01	04.0	45 02.0	1.0 01	04.0	45 32.0	1.0 01	03.9	46 02.0	1.0 01	03.9	46 31.9	1.0 01	03.9	48 01.9	1.0 01	03.8	48 31.9	1.0 01	03.8	175
6	43 31.3	1.0 01	03.2	44 01.3	1.0 01	03.2	45 01.3	1.0 01	03.2	45 31.3	1.0 01	03.2	46 01.3	1.0 01	03.1	46 31.2	1.0 01	03.1	48 01.2	1.0 01	03.1	48 31.2	1.0 01	03.1	6
7	43 39.7	1.0 01	02.4	44 00.7	1.0 01	02.4	45 00.7	1.0 01	02.4	45 30.7	1.0 01	02.4	46 00.7	1.0 01	02.4	46 30.7	1.0 01	02.3	48 00.7	1.0 01	02.3	48 30.7	1.0 01	02.3	7
8	43 30.3	1.0 00	01.6	44 00.3	1.0 00	01.6	45 00.3	1.0 00	01.6	45 30.3	1.0 00	01.6	46 00.3	1.0 00	01.6	46 30.3	1.0 00	01.6	48 00.3	1.0 00	01.5	48 30.3	1.0 00	01.5	8
9	43 30.1	1.0 00	00.8	44 00.1	1.0 00	00.8	45 00.1	1.0 00	00.8	45 30.1	1.0 00	00.8	46 00.1	1.0 00	00.8	46 30.1	1.0 00	00.8	48 00.1	1.0 00	00.8	48 30.1	1.0 00	00.8	9
180	43 30.0	1.0 00	00.0	44 00.0	1.0 00	00.0	45 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	46 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	48 00.0	1.0 00	00.0	48 30.0	1.0 00	00.0	180

Lat. 79°

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	71 00.0 1.0 00	180.0	71 30.0 1.0 00	180.0	73 00.0 1.0 00	180.0	73 30.0 1.0 00	180.0	74 00.0 1.0 00	180.0	80 00.0 1.0 00	180.0	80 30.0 1.0 00	180.0	85 30.0 1.0 01	180.0	00
1	70 59.8 1.0 01	178.5	71 29.8 1.0 01	178.4	72 59.8 1.0 01	178.4	73 29.8 1.0 01	178.4	73 59.8 1.0 01	178.4	79 59.8 1.0 01	177.9	80 29.8 1.0 01	177.9	85 29.7 1.0 02	176.6	1
2	70 59.4 1.0 01	176.9	71 29.4 1.0 01	176.9	72 59.4 1.0 01	176.8	73 29.4 1.0 01	176.7	73 59.3 1.0 01	176.7	79 59.2 1.0 02	175.9	80 29.2 1.0 02	175.8	85 28.6 1.0 03	173.2	2
3	70 58.6 1.0 02	175.4	71 28.6 1.0 02	175.3	72 58.6 1.0 02	175.2	73 28.5 1.0 02	175.1	73 58.5 1.0 02	175.1	79 58.1 1.0 02	173.8	80 28.1 1.0 02	173.6	85 27.0 99 04	169.8	3
4	70 57.5 1.0 02	173.9	71 27.5 1.0 02	173.8	72 57.4 1.0 02	173.6	73 27.4 1.0 02	173.5	73 57.4 1.0 02	173.4	79 56.7 1.0 03	171.8	80 26.6 1.0 03	171.5	85 24.6 99 05	166.5	4
05	70 56.2 1.0 03	172.3	71 26.1 1.0 03	172.3	72 56.0 1.0 03	172.0	73 26.0 1.0 03	171.9	73 55.9 1.0 03	171.8	79 54.9 1.0 04	169.7	80 24.7 1.0 04	169.4	85 21.6 98 06	163.3	05
6	70 54.5 1.0 03	170.8	71 24.4 1.0 03	170.7	72 54.2 1.0 03	170.4	73 24.2 1.0 03	170.3	73 54.1 1.0 04	170.1	79 52.6 99 04	167.7	80 22.4 99 05	167.4	85 18.0 97 07	160.1	6
7	70 52.5 1.0 04	169.3	71 22.4 1.0 04	169.2	72 52.2 1.0 04	168.8	73 22.1 1.0 04	168.7	73 52.0 1.0 04	168.5	79 50.0 99 05	165.7	80 19.7 99 05	165.3	85 13.8 96 08	156.9	7
8	70 50.2 1.0 04	167.8	71 20.1 1.0 04	167.6	72 49.8 1.0 04	167.2	73 19.7 1.0 05	167.1	73 49.5 1.0 05	166.9	79 47.0 99 06	163.7	80 16.6 99 06	163.2	85 09.1 95 09	153.9	8
9	70 47.7 1.0 05	166.2	71 17.5 1.0 05	166.1	72 47.1 99 05	165.6	73 17.0 99 05	165.5	73 46.8 99 05	165.3	79 43.6 99 06	161.7	80 13.1 98 06	161.2	85 03.8 94 10	150.9	9
10	70 44.8 99 05	164.7	71 14.6 99 05	164.6	72 44.1 99 05	164.1	73 13.9 99 06	163.9	73 43.7 99 06	163.7	79 39.8 98 07	159.7	80 09.2 98 07	159.2	84 58.0 93 10	148.1	10
1	70 41.6 99 06	163.2	71 11.4 99 06	163.1	72 40.8 99 06	162.5	73 10.6 99 06	162.3	73 40.3 99 06	162.1	79 35.6 98 08	157.8	80 05.0 98 08	157.2	84 51.7 91 11	145.3	1
2	70 38.2 99 06	161.7	71 08.0 99 06	161.5	72 37.2 99 06	160.9	73 07.0 99 07	160.7	73 36.7 99 07	160.5	79 31.1 98 08	155.8	80 00.3 97 08	155.2	84 44.9 90 12	142.6	2
3	70 34.5 99 07	160.2	71 04.2 99 07	160.0	72 33.3 99 07	159.4	73 03.0 99 07	159.1	73 32.7 99 07	158.9	79 26.2 97 09	153.9	79 55.4 97 09	153.2	84 37.8 89 13	140.0	3
4	70 30.4 99 07	158.7	71 00.1 99 07	158.5	72 29.2 99 07	157.8	72 58.8 99 08	157.6	73 28.4 99 08	157.3	79 21.0 97 09	152.0	79 50.0 97 09	151.3	84 30.2 88 13	137.5	4
15	70 26.2 99 08	157.3	70 55.8 99 08	157.0	72 24.7 99 08	156.3	72 54.3 99 08	156.0	73 23.8 98 08	155.7	79 15.5 96 10	150.2	79 44.4 96 10	149.4	84 22.3 86 14	135.1	15
6	70 21.6 99 08	155.8	70 51.2 99 08	155.6	72 20.0 98 08	154.8	72 49.5 98 08	154.5	73 19.0 98 09	154.2	79 09.6 96 10	148.3	79 38.4 96 10	147.5	84 14.1 85 14	132.8	6
7	70 16.8 99 08	154.3	70 46.3 99 09	154.1	72 14.9 98 09	153.2	72 44.4 98 09	152.9	73 13.9 98 09	152.6	79 03.5 96 11	146.5	79 32.1 96 11	145.7	84 05.5 84 15	130.6	7
8	70 11.7 98 09	152.9	70 41.2 98 09	152.6	72 09.7 98 09	151.7	72 39.1 98 09	151.4	73 08.5 98 09	151.1	78 57.0 96 11	144.7	79 25.5 96 11	143.9	83 56.7 83 15	128.5	8
9	70 06.3 98 09	151.4	70 35.8 98 09	151.1	72 04.1 98 10	150.2	72 33.5 98 10	149.9	73 02.8 98 10	149.5	78 50.3 95 12	142.9	79 18.6 94 12	142.1	83 47.6 82 16	126.4	9
20	70 00.7 98 10	150.0	70 30.2 98 10	149.7	71 58.3 98 10	148.7	72 27.6 98 10	148.4	72 56.9 97 10	148.0	78 43.2 94 12	141.2	79 11.4 94 12	140.3	83 38.3 81 16	124.4	20
1	69 54.9 98 10	148.5	70 24.3 98 10	148.3	71 52.2 98 10	147.3	72 21.5 97 11	146.9	72 50.7 97 11	146.5	78 35.9 94 13	139.5	79 04.0 93 13	138.6	83 28.8 80 16	122.5	1
2	69 48.8 98 11	147.1	70 18.1 98 11	146.8	71 45.9 97 11	145.8	72 15.1 97 11	145.4	72 44.2 97 11	145.0	78 28.3 93 13	137.8	78 56.3 93 13	136.9	83 19.0 79 17	120.7	2
3	69 42.5 98 11	145.7	70 11.7 98 11	145.4	71 39.4 97 11	144.3	72 08.5 97 11	144.0	72 37.6 97 12	143.6	78 20.5 93 13	136.1	78 48.3 92 14	135.2	83 09.0 78 17	118.9	3
4	69 35.9 97 11	144.3	70 05.1 97 11	144.0	71 32.6 97 12	142.9	72 01.6 97 12	142.5	72 30.6 97 12	142.1	78 12.5 93 14	134.5	78 40.1 92 14	133.5	82 58.9 77 17	117.2	4
25	69 29.1 97 12	142.9	69 58.3 97 12	142.6	71 25.5 97 12	141.5	71 54.5 97 12	141.1	72 23.5 96 12	140.6	78 04.2 92 14	132.9	78 31.7 91 14	131.9	82 48.7 76 17	115.5	25
6	69 22.1 97 12	141.5	69 51.2 97 12	141.2	71 18.3 97 12	140.1	71 47.2 96 13	139.6	72 16.1 96 13	139.2	77 55.7 92 14	131.3	78 23.1 91 15	130.3	82 38.3 76 18	113.9	6
7	69 14.9 97 12	140.2	69 43.9 97 12	139.8	71 10.8 96 13	138.6	71 39.7 96 13	138.2	72 08.5 96 13	137.8	77 47.0 91 15	129.7	78 14.3 91 15	128.7	82 27.8 75 18	112.3	7
8	69 07.4 97 13	138.8	69 36.4 97 13	138.4	71 03.2 96 13	137.2	71 32.0 96 13	136.8	72 00.7 96 13	136.4	77 38.1 91 15	128.2	78 05.2 90 15	127.2	82 17.1 74 18	110.8	8
9	68 59.8 97 13	137.4	69 28.7 96 13	137.1	70 55.3 96 13	135.9	71 24.0 96 14	135.4	71 52.7 95 14	135.0	77 29.0 90 15	126.7	77 56.0 90 16	125.7	82 06.4 74 18	109.4	9
30	68 51.9 96 13	136.1	69 20.8 96 13	135.7	70 47.2 96 14	134.5	71 15.9 96 14	134.0	71 44.5 95 14	133.6	77 19.8 90 16	125.2	77 46.7 89 16	124.2	81 55.5 73 18	108.0	30
1	68 43.9 96 14	134.8	69 12.8 96 14	134.4	70 39.0 96 14	133.1	71 07.6 96 14	132.7	71 36.1 96 14	132.2	77 10.3 90 16	123.8	77 37.1 89 16	122.7	81 44.6 73 18	106.6	1
2	68 35.7 96 14	133.4	69 04.5 96 14	133.1	70 30.5 96 14	131.8	70 59.1 96 14	131.3	71 27.6 96 15	130.8	77 00.7 89 16	122.3	77 27.4 89 16	121.3	81 33.6 72 18	105.2	2
3	68 27.3 96 14	132.1	68 56.0 96 14	131.7	70 21.9 96 15	130.5	70 50.4 96 15	130.0	71 18.8 96 15	129.5	76 51.0 89 16	120.9	77 17.5 88 17	119.9	81 22.5 72 19	103.9	3
4	68 18.7 96 15	130.8	68 47.4 96 15	130.4	70 13.1 96 15	129.1	70 41.5 96 15	128.7	71 09.9 94 15	128.2	76 41.1 89 17	119.5	77 07.5 88 17	118.5	81 11.4 72 19	102.7	4
35	68 10.0 96 15	129.5	68 38.6 96 15	129.1	70 04.1 96 15	127.8	70 32.5 94 15	127.3	71 00.8 94 15	126.8	76 31.1 88 17	118.2	76 57.4 87 17	117.1	81 00.2 71 19	101.4	35
6	68 01.0 96 15	128.3	68 29.6 96 15	127.9	69 55.0 96 15	126.5	70 23.3 94 16	126.0	70 51.6 94 16	125.5	76 20.9 88 17	116.8	76 47.2 87 17	115.8	80 48.9 71 19	100.2	6
7	67 52.0 96 15	127.0	68 20.5 96 15	126.6	69 45.7 94 16	125.2	70 14.0 94 16	124.7	70 42.2 94 16	124.2	76 10.6 88 17	115.5	76 36.8 87 17	114.4	80 37.6 71 19	99.1	7
8	67 42.8 96 16	125.7	68 11.3 96 16	125.3	69 36.3 94 16	124.0	70 04.5 94 16	123.5	70 32.6 94 16	123.0	76 00.2 87 18	114.2	76 26.3 87 18	113.1	80 26.3 71 19	97.9	8
9	67 33.4 96 16	124.5	68 01.8 96 16	124.1	69 26.8 94 16	122.7	69 54.9 94 16	122.2	70 23.0 93 16	121.7	75 49.7 87 18	112.9	76 15.7 86 18	111.9	80 15.0 71 19	96.8	9
40	67 23.9 96 16	123.3	67 52.3 96 16	122.8	69 17.1 94 16	121.4	69 45.2 94 16	120.9	70 13.2 93 17	120.4	75 39.1 87 18	111.6	76 05.1 86 18	110.6	80 03.6 70 19	95.7	40
1	67 14.3 96 16	122.0	67 42.6 94 16	121.6	69 07.2 94 17	120.2	69 35.3 93 17	119.7	70 03.2 93 17	119.2	75 28.4 87 18	110.4	75 54.3 86 18	109.4	79 52.2 70 19	94.6	1
2	67 04.5 94 16	120.8	67 32.8 94 17	120.4	68 57.3 93 17	119.0	69 25.3 93 17	118.5	69 53.2 93 17	117.9	75 17.7 86 18	109.2	75 43.5 86 18	108.1	79 40.8 70 19	93.5	2
3	66 54.6 94 17	119.6	67 22.9 94 17	119.2	68 47.2 93 17	117.8	69 15.1 93 17	117.3	69 43.0 93 17	116.7	75 06.8 86 18	107.9	75 32.6 85 18	106.9	79 29.3 70 19	92.5	3
4	66 44.6 94 17	118.4	67 12.8 94 17	118.0	68 37.0 93 17	116.6	69 04.9 93 17	116.1	69 32.7 93 17	115.5	74 55.9 86 18	106.7	75 21.6 85 18	105.7	79 17.9 70 19	91.5	4
45	66 34.4 94 17	117.2	67 02.6 94 17	116.8	68 26.7 93 17	115.4	68 54.6 93 17	114.9	69 22.3 92 17	114.3	74 44.9 86 18	105.6	75 10.5 85 18	104.6	79 06.4 70 19	90.5	45
6	66 24.2 94 17	116.0	66 52.4 94 17	115.6	68 16.3 93 18	114.2	68 44.1 93 18	113.7	69 11.9 92 18	113.1	74 33.8 86 19	104.4	74 59.4 85 19	103.4	78 55.0 70 19	89.5	6
7	66 13.9 94 17	114.9	66 42.0 94 17	114.4	68 05.8 93 18	113.0	68 33.6 92 18	112.5	69 01.3 92 18	112.0	74 22.7 86 19	103.3	74 48.3 85 19	102.3	78 43.5 70 19	88.5	7
8	66 03.4 94 18	113.7	66 31.5 93 18	113.3	67 55.3 93 18	111.8	68 23.0 92 18	111.3	68 50.6 92 18	110.8	74 11.6 85 19	102.1	74 37.0 85 19	101.2	78 32.1 70 19	87.6	8
9	65 52.9 94 18	112.6	66 21.0 93 18	112.1	67 44.6 92 18	110.7	68 12.3 92 18	110.2	68 39.9 92 18	109.7	74 00.3 85 19	101.0	74 25.8 84 19	100.0	78 20.7 70 19	86.7	9
50	65 42.3 93 18	111.4	66 10.3 93 18	111.0	67 33.8 92 18	109.6	68 01.5 92 18	109.0	68 29.1 92 18	108.5	73 49.1 85 19	99.9	74 14.5 84 19	99.0	78 09.2 70 19	85.7	50
1	65 31.6 93 18	110.3	65 59.6 93 18	109.8	67 23.0 92 18	108.4	67 50.6 92 18	107.9	68 18.2 92 18	107.4	73 37.8 85 19	98.8	74 03.2 84 19	97.9	77 57.8 70 19	84.8	1
2	65 20.8 93 18	109.2	65 48.8 93 18	108.7	67 12.1 92 18	107.3	67 39.7 92 18	106.8	68 07.2 91 18	106.3	73 26.5 85 19	97.8	73 51.8 84 19	96.8	77 46.4 70 19	83.9	2
3	65 10.0 93 18	108.0	65 37.9 93 18	107.6	67 01.2 92 18	106.2	67 28.7 92 18	105.7	67 56.2 91 18	105.2	73 15.1 85 19	96.7	73 40.4 84 19	95.8	77 35.1 71 19	83.1	3
4	64 59.1 93 18	106.9	65 26.9 93 18	106.5	66 50.1 92 18	105.1	67 17.7 92 18	104.6	67 45.1 91 19	104.1	73 03.7 85 19	95.6	73 29.0 84 19	94.7	77 23.7 71 19	82.2	4
55	64 48.1 93 18	105.8	65 15.9 93 18	105.4	66 39.0 92 19	104.0	67 06.6 92 19	103.5	67 34.0 91 19	103.0	72 52.3 85 19	94.6	73 17.6 84 19	93.7	77 12.4 71 19	81.3	55
6	64 37.0 93 18	104.8	65 04.9 93 19	104.3	66 27.9 92 19	102.9	66 55.4 91 19	102.4	67 22.8 91 19	101.9	72 40.9 85 19	93.6	73 06.2 84 19	92.7	77 01.1 71 19	80.5	6
7	64 25.9 93 19	103.7	64 53.8 93 19	103.2	66 16.7 92 19	101.8	66 44.2 91 19	101.3	67 11.6 91 19	100.8	72 29.5 85 19	92.6	72 54.8 84 19	91.7	76 49.8 71 19	79.6	7
8	64 14.8 93 19	102.6	64 42.6 93 19	102.2	66 05.5 92 19	100.8	66 33.0 91 19	100.3	67 00.3 91 19	99.7	72 18.0 85 19	91.6	72 43.3 84 19	90.7	76 38.5 71 19	78.8	8
9	64 03.6 93 19	101.5	64 31.4 92 19	101.1	65 54.2 92 19	99.7	66 21.7 91 19	99.2	66 49.0 91 19	98.7	72 06.6 85 19	90.6	72 31.9 84 19	89.7	76 27.3 72 19	78.0	9
60	63 52.4 93 19	100.5	64 20.1 92 19	100.1	65 42.9 92 19	98.7	66 10.4 91 19	98.2	66 37.7 91 19	97.7	71 55.1 85 19	89.6	72 20.4 84 19	88.7	76 16.2 72 19	77.2	60
1	63 41.1 93 19	99.4	64 08.8 92 19	99.0	65 31.6 92 19	97.6	65 59.0 91 19	97.1	66 26.3 91 19	96.6	71 43.7 85 19	88.6	72 09.0 84 19	87.7	76 05.0 72 18	76.4	1
2	63 29.8 93 19	98.4	63 57.5 92 19	98.0	65 20.2 91 19	96.6	65 47.6 91 19	96.1	66 14.9 91 19	95.6	71 32.2 85 19	87.7	71 57.5 84 19	86.8	75 53.9 72 18	75.6	2
3	63 18.4 93 19	97.4	63 46.2 92 19	96.9	65 08.9 91 19	95.6	65 36.2 91 19	95.1	66 03.5 91 19	94.6	71 20.8 85 19	86.7	71 46.1 84 19	85.8	75 42.8 72 18	74.8	3
4	63 07.1 93 19	96.3	63 34.8 92 19	95.9	64 57.5 91 19	94.5	65 24.8 91 19	94.1	65 52.1 91 19	93.6	71 09.4 85 19	85.8	71 34.7 84 19	84.9	75 31.8 73 18	74.0	4
65	62 55.7 92 19	95.3	63 23.4 92 19	94.9	64 46.0 91 19	93.5	65 13.4 91 19	93.1	65 40.7 91 19	92.6	70 58.0 85 19	84.8	71 23.3 84 19	84.0	75 20.8 73 18	73.2	65
6	62 44.3 92 19	94.3	63 12.0 92 19	93.9	64 34.6 91 19	92.5	65 02.0 91 19	92.1	65 29.2 91 19	91.6	70 46.6 85 19	83.9	71 11.9 84 19	83.1	75 09.9 73 18	72.5	6
7	62 32.8 92 19	93.3	63 00.5 92 19	92.9	64 23.2 91 19	91.5	64 50.5 91 19	91.1	65 17.8 91 19	90.6	70 35.2 85 19	83.0	71 00.6 84 19	82.2	74 59.0 74 18	71.7	7
8	62 21.4 92 19	92.3	62 49.1 92 19	91.9	64 11.7 91 19	90.5	64 39.1 91 19	90.1	65 06.3 91 19	89.6	70 23.9 85 19	82.1	70 49.2 84 19	81.3	74 48.1 74 18	70.9	8
9	62 10.0 92 19	91.3	62 37.7 92 19	90.9	64 00.3 91 19	89.6	64 27.6 91 19	89.1	64 54.9 91 19	88.6	70 12.5 85 19	81.2	70 37.9 84 19	80.4	74 37.3 74 18	70.2	9
70	61 58.5 92 19	90.3	62 26.2 92 19	89.9	63 48.8 91 19	88.6	64 16.2 91 19	88.1	64 43.5 91 19	87.6	70 01.2 85 19	80.3	70 26.7 84 19	79.5	74 26.6 74 18	69.4	70
1	61 47.1 92 19	89.3	62 14.8 92 19	88.9	63 37.4 91 19	87.6	64 04.7 91 19	87.2	64 32.0 91 19	86.7	69 50.0 85 19	79.4	70 15.4 85 19	78.6	74 15.9 75 18	68.7	1
2	61 35.6 92 19	88.4	62 03.3 92 19	88.0	63 25.9 91 19	86.7	63 53.3 91 19	86.2	64 20.6 91 19	85.7	69 38.7 85 19	78.5	70 04.2 85 19	77.7	74 05.3 75 18	68.0	2
3	61 24.2 92 19	87.4	61 51.9 92 19	87.0	63 14.5 91 19	85.7	63 41.9 91 19	85.2	64 09.2 91 19	84.8	69 27.5 85 19	77.6	69 53.1 85 19	76.9	73 54.7 75 18	67.2	3
4	61 12.7 92 19	86.4	61 40.4 92 19	86.0	63 03.1 91 19	84.8	63 30.5 91 19	84.3	63 57.8 91 19	83.8	69 16.4 86 19	76.7	69 41.9 85 18	76.0	73 44.2 76 17	66.5	4
75	61 01.3 92 19	85.5	61 29.0 92 19	85.1	62 51.7 91 19	83.8	63 19.1 91 19	83.4	63 46.4 91 19	82.9	69 05.2 86 18	75.9	69 30.8 85 18	75.1	73 33.7 76 17	65.8	75
6	60 49.9 93 19	84.5	61 17.6 92 19	84.1	62 40.3 92 19	82.9	63 07.8 91 19	82.4	63 35.1 91 19	82.0	68 54.2 86 18	75.0	69 19.8 85 18	74.3	73 23.3 76 17	65.1	6
7	60 38.5 93 19	83.6	61 06.3 92 19	83.2	62 29.0 92 19	81.9	62 56.4 91 19	81.5	63 23.8 91 19	81.0	68 43.1 86 18	74.2	69 08.8 85 18	73.5	73 12.9 77 17	64.4	7
8	60 27.2 93 19	82.6	60 54.9 92 19	82.2	62 17.7 92 19	81.0	62 45.1 91 19	80.6	63 12.5 91 19	80.1	68 32.1 86 18	73.3	68 57.8 85 18	72.6	73 02.6 77 17	63.7	8
9	60 15.8 93 19	81.7	60 43.6 92 19	81.3	62 06.4 92 19	80.1	62 33.8 91 19	79.7	63 01.2 91 19	79.2	68 21.2 86 18	72.5	68 47.0 86 18	71.8	72 52.4 77 17	63.0	9
80	60 04.5 93 19	80.8	60 32.3 92 19	80.4	61 55.1 92 19	79.2	62 22.6 91 19	78.7	62 50.0 91 19	78.3	68 10.3 86 18	71.7	68 36.1 86 18	71.0	72 42.2 77 17	62.3	80
1	59 53.2 93 19	79.8	60 21.0 92 19	79.5	61 43.9 92 19	78.3	62 11.4 91 19	77.8	62 38.8 91 19	77.4	67 59.5 86 18	70.8	68 25.3 86 18	70.1	72 32.1 78 17	61.6	1
2	59 42.0 93 19	78.9	60 09.8 93 19	78.5	61 32.7 92 19	77.4	62 00.2 92 19	76.9	62 27.6 91 19	76.5	67 48.7 87 18	70.0	68 14.6 86 18	69.3	72 22.1 78 17	60.9	2
3	59 30.8 93 19	78.0	59 58.6 93 19	77.6	61 21.6 92 18	76.4	61 49.1 92 18	76.0	62 16.5 91 18	75.6	67 37.9 87 18	69.2	68 03.9 86 18	68.5	72 12.1 78 16	60.2	3
4	59 19.6 93 19	77.1	59 47.4 93 19	76.7	61 10.4 92 18	75.6	61 38.0 92 18	75.1	62 05.5 91 18	74.7	67 27.3 87 18	68.4	67 53.3 86 18	67.7	72 02.2 79 16	59.5	4
85	59 08.4 93 18	76.2	59 36.3 93 18	75.8	60 59.4 92 18	74.7	61 26.9 92 18	74.2	61 54.4 91 18	73.8	67 16.7 87 18	67.6	67 42.7 87 18	66.9	71 52.4 79 16	58.8	85
6	58 57.3 93 18	75.3	59 25.2 93 18	74.9	60 48.4 92 18	73.8	61 16.0 92 18	73.4	61 43.5 92 18	72.9	67 06.1 87 18	66.7	67 32.2 87 17	66.1	71 42.6 80 16	58.2	6
7	58 46.3 93 18	74.4	59 14.2 93 18	74.0	60 37.4 92 18	72.9	61 05.0 92 18	72.5	61 32.5 92 18	72.1	66 55.6 87 17	65.9	67 21.8 87 17	65.3	71 32.9 80 16	57.5	7
8	58 35.3 93 18	73.5	59 03.2 93 18	73.1	60 26.5 92 18	72.0	60 54.1 92 18	71.6	61 21.7 92 18	71.2	66 45.2 88 17	65.2	67 11.4 87 17	64.5	71 23.3 80 16	56.8	8
9	58 24.3 93 18	72.6	58 52.3 93 18	72.2	60 15.6 92 18	71.1	60 43.3 92 18	70.7	61 10.9 92 18	70.3	66 34.8 88 17	64.4	67 01.1 87 17	63.7	71 13.8 81 16	56.1	9
90	58 13.4 93 18	71.7	58 41.4 93 18	71.4	60 04.8 92 18	70.3	60 32.5 92 18	69.9	61 00.1 92 18	69.5	66 24.6 88 17	63.6	66 50.9 87 17	63.0	71 04.3 81 16	55.5	90

Lat. 79°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
91	58 02.6	93 18	70.8	58 30.6	93 18	70.5	59 54.1	92 18	69.4	60 21.8	92 18	69.0	60 49.4	92 18	68.6	66 14.3	88 17	62.8	66 40.7	88 17	62.2	70 54.9	81 16	54.8	91
2	57 51.8	93 18	69.9	58 19.8	93 18	69.6	59 43.4	93 18	68.5	60 11.1	92 18	68.1	60 38.8	92 18	67.8	66 04.2	88 17	62.0	66 30.6	88 17	61.4	70 45.6	82 15	54.1	2
3	57 41.1	93 18	69.1	58 09.1	93 18	68.7	59 32.8	93 18	67.7	60 00.5	92 18	67.3	60 28.2	92 18	66.9	65 54.1	88 17	61.2	66 20.6	88 17	60.6	70 36.4	82 15	53.5	3
4	57 30.4	94 18	68.2	57 58.5	93 18	67.9	59 22.2	93 18	66.8	59 50.0	93 17	66.4	60 17.7	92 17	66.1	65 44.1	89 17	60.5	66 10.7	88 16	59.9	70 27.2	82 15	52.8	4
95	57 19.8	94 18	67.3	57 47.9	93 18	67.0	59 11.7	93 17	66.0	59 39.5	93 17	65.6	60 07.3	92 17	65.2	65 34.2	89 16	59.7	66 00.8	88 16	59.1	70 18.1	83 15	52.2	95
6	57 09.3	94 17	66.5	57 37.4	94 17	66.1	59 01.3	93 17	65.1	59 29.2	93 17	64.7	59 57.0	93 17	64.4	65 24.4	89 16	58.9	65 51.0	89 16	58.4	70 09.1	83 15	51.5	6
7	56 58.8	94 17	65.6	57 26.9	94 17	65.3	58 50.9	93 17	64.3	59 18.8	93 17	63.9	59 46.7	93 17	63.5	65 14.6	89 16	58.1	65 41.3	89 16	57.6	70 00.2	83 15	50.9	7
8	56 48.5	94 17	64.7	57 16.6	94 17	64.4	58 40.7	93 17	63.4	59 08.6	93 17	63.1	59 36.5	93 17	62.7	65 04.9	89 16	57.4	65 31.7	89 16	56.8	69 51.4	84 15	50.2	8
9	56 38.1	94 17	63.9	57 06.3	94 17	63.6	58 30.5	93 17	62.6	58 58.4	93 17	62.2	59 26.3	93 17	61.9	64 55.3	90 16	56.6	65 22.1	89 16	56.1	69 42.6	84 14	49.6	9
100	56 27.9	94 17	63.0	56 56.1	94 17	62.7	58 20.3	93 17	61.7	58 48.3	93 17	61.4	59 16.3	93 17	61.0	64 45.8	90 16	55.9	65 12.7	89 16	55.3	69 33.9	84 14	48.9	100
1	56 17.7	94 17	62.2	56 45.9	94 17	61.9	58 10.3	93 17	60.9	58 38.3	93 17	60.6	59 06.3	93 16	60.2	64 36.4	90 16	55.1	65 03.3	90 16	54.6	69 25.3	85 14	48.3	1
2	56 07.6	94 17	61.3	56 35.9	94 17	61.0	58 00.3	94 16	60.1	58 28.4	93 16	59.7	58 56.4	93 16	59.4	64 27.0	90 15	54.4	64 54.0	90 15	53.9	69 16.8	85 14	47.6	2
3	55 57.6	94 17	60.5	56 25.9	94 16	60.2	57 50.5	94 16	59.3	58 18.5	94 16	58.9	58 46.6	93 16	58.6	64 17.8	90 15	53.6	64 44.8	90 15	53.1	69 08.4	85 14	47.0	3
4	55 47.7	94 16	59.7	56 16.0	94 16	59.4	57 40.7	94 16	58.4	58 08.8	94 16	58.1	58 36.8	93 16	57.8	64 08.6	91 15	52.9	64 35.7	90 15	52.4	69 00.1	86 14	46.4	4
105	55 37.9	95 16	58.8	56 06.2	94 16	58.5	57 31.0	94 16	57.6	57 59.1	94 16	57.3	58 27.2	94 16	56.9	63 59.5	91 15	52.1	64 26.7	90 15	51.6	68 51.9	86 14	45.7	105
6	55 28.1	95 16	58.0	55 56.5	94 16	57.7	57 21.3	94 16	56.8	57 49.5	94 16	56.5	58 17.7	94 16	56.1	63 50.5	91 15	51.4	64 17.7	91 15	50.9	68 43.7	86 13	45.1	6
7	55 18.5	95 16	57.1	55 46.9	95 16	56.9	57 11.8	94 16	56.0	57 40.0	94 16	55.7	58 08.2	94 16	55.3	63 41.6	91 15	50.7	64 08.9	91 15	50.2	68 35.6	87 13	44.4	7
8	55 08.9	95 16	56.3	55 37.3	95 16	56.0	57 02.4	94 16	55.2	57 30.6	94 16	54.8	57 58.8	94 15	54.5	63 32.8	91 15	49.9	64 00.2	91 14	49.5	68 27.7	87 13	43.8	8
9	54 59.4	95 16	55.5	55 27.9	95 16	55.2	56 53.0	94 16	54.3	57 21.3	94 15	54.0	57 49.6	94 15	53.7	63 24.1	92 14	49.2	63 51.5	91 14	48.7	68 19.8	87 13	43.2	9
110	54 50.0	95 15	54.7	55 18.5	95 15	54.4	56 43.8	95 15	53.5	57 12.1	94 15	53.2	57 40.4	94 15	52.9	63 15.5	92 14	48.5	63 42.9	91 14	48.0	68 12.0	88 13	42.5	110
1	54 40.7	95 15	53.8	55 09.3	95 15	53.6	56 34.6	95 15	52.7	57 03.0	94 15	52.4	57 31.3	94 15	52.1	63 07.0	92 14	47.7	63 34.5	92 14	47.3	68 04.3	88 13	41.9	1
2	54 31.5	95 15	53.0	55 00.1	95 15	52.8	56 25.5	95 15	51.9	56 53.9	95 15	51.6	57 22.3	94 15	51.3	62 58.5	92 14	47.0	63 26.1	92 14	46.6	67 56.7	88 13	41.3	2
3	54 22.4	95 15	52.2	54 51.0	95 15	51.9	56 16.6	95 15	51.1	56 45.0	95 15	50.8	57 13.4	95 15	50.5	62 50.2	92 14	46.3	63 17.9	92 14	45.8	67 49.2	89 12	40.7	3
4	54 13.4	95 15	51.4	54 42.1	95 15	51.1	56 07.7	95 15	50.3	56 36.2	95 15	50.0	57 04.6	95 14	49.7	62 42.0	92 14	45.5	63 09.7	92 13	45.1	67 41.8	89 12	40.0	4
115	54 04.6	96 15	50.6	54 33.2	95 15	50.3	55 59.0	95 14	49.5	56 27.5	95 14	49.2	56 55.9	95 14	48.9	62 33.9	93 13	44.8	63 01.6	92 13	44.4	67 34.5	89 12	39.4	115
6	53 55.8	96 14	49.8	54 24.4	96 14	49.5	55 50.3	95 14	48.7	56 18.8	95 14	48.4	56 47.4	95 14	48.2	62 25.8	93 13	44.1	62 53.7	93 13	43.7	67 27.2	89 12	38.8	6
7	53 47.1	96 14	48.9	54 15.8	96 14	48.7	55 41.7	95 14	47.9	56 10.3	95 14	47.6	56 38.9	95 14	47.4	62 17.9	93 13	43.4	62 45.8	93 13	43.0	67 20.1	90 12	38.2	7
8	53 38.5	96 14	48.1	54 07.2	96 14	47.9	55 33.3	95 14	47.1	56 01.9	95 14	46.9	56 30.5	95 14	46.6	62 10.1	93 13	42.7	62 38.1	93 13	42.3	67 13.1	90 12	37.5	8
9	53 30.0	96 14	47.3	53 58.8	96 14	47.1	55 25.0	96 14	46.3	55 53.6	95 14	46.1	56 22.2	95 14	45.8	62 02.4	93 13	42.0	62 30.4	93 13	41.6	67 06.2	90 11	36.9	9
120	53 21.7	96 14	46.5	53 50.5	96 14	46.3	55 16.7	96 14	45.5	55 45.4	96 13	45.3	56 14.1	95 13	45.0	61 54.8	94 12	41.2	62 22.9	93 12	40.9	66 59.3	91 11	36.3	120
1	53 13.4	96 14	45.7	53 42.3	96 14	45.5	55 08.6	96 13	44.8	55 37.4	96 13	44.5	56 06.1	96 13	44.2	61 47.3	94 12	40.5	62 15.4	94 12	40.2	66 52.6	91 11	35.7	1
2	53 05.3	96 13	44.9	53 34.1	96 13	44.7	55 00.6	96 13	44.0	55 29.4	96 13	43.7	55 58.1	96 13	43.5	61 39.9	94 12	39.8	62 08.1	94 12	39.5	66 46.0	91 11	35.1	2
3	52 57.2	96 13	44.1	53 26.2	96 13	43.9	54 52.7	96 13	43.2	55 21.5	96 13	42.9	55 50.3	96 13	42.7	61 32.7	94 12	39.1	62 00.9	94 12	38.7	66 39.5	91 11	34.4	3
4	52 49.3	97 13	43.3	53 18.3	96 13	43.1	54 45.0	96 13	42.4	55 13.8	96 13	42.2	55 42.6	96 13	41.9	61 25.5	94 12	38.4	61 53.8	94 12	38.0	66 33.0	92 11	33.8	4
125	52 41.5	97 13	42.5	53 10.5	97 13	42.3	54 37.3	96 13	41.6	55 06.2	96 13	41.4	55 35.0	96 12	41.1	61 18.4	95 12	37.7	61 46.8	94 12	37.3	66 26.7	92 10	33.2	125
6	52 33.9	97 13	41.7	53 02.9	97 13	41.5	54 29.7	96 12	40.8	54 58.6	96 12	40.6	55 27.5	96 12	40.4	61 11.5	95 11	37.0	61 39.9	95 11	36.7	66 20.5	92 10	32.6	6
7	52 26.3	97 12	40.9	52 55.3	97 12	40.7	54 22.3	97 12	40.1	54 51.3	96 12	39.8	55 20.2	96 12	39.6	61 04.7	95 11	36.3	61 33.1	95 11	36.0	66 14.4	93 10	32.0	7
8	52 18.9	97 12	40.1	52 47.9	97 12	39.9	54 15.0	97 12	39.3	54 44.0	97 12	39.1	55 12.9	96 12	38.8	60 57.9	95 11	35.6	61 26.4	95 11	35.3	66 08.4	93 10	31.4	8
9	52 11.5	97 12	39.3	52 40.6	97 12	39.1	54 07.8	97 12	38.5	54 36.8	97 12	38.3	55 05.8	97 12	38.1	60 51.3	95 11	34.9	61 19.9	95 11	34.6	66 02.5	93 10	30.8	9
130	52 04.4	97 12	38.5	52 33.5	97 12	38.4	54 00.7	97 12	37.7	54 29.8	97 12	37.5	54 58.8	97 11	37.3	60 44.8	95 11	34.2	61 13.5	95 11	33.9	65 56.7	93 10	30.1	130
1	51 57.3	97 12	37.8	52 26.4	97 12	37.6	53 53.8	97 11	37.0	54 22.9	97 11	36.8	54 51.9	97 11	36.5	60 38.5	96 10	33.5	61 07.1	95 10	33.2	65 51.0	94 09	29.5	1
2	51 50.3	97 11	37.0	52 19.5	97 11	36.8	53 47.0	97 11	36.2	54 16.1	97 11	36.0	54 45.2	97 11	35.8	60 32.2	96 10	32.8	61 00.9	96 10	32.5	65 45.4	94 09	28.9	2
3	51 43.5	97 11	36.2	52 12.7	97 11	36.0	53 40.3	97 11	35.4	54 09.4	97 11	35.2	54 38.6	97 11	35.0	60 26.1	96 10	32.1	60 54.8	96 10	31.8	65 39.9	94 09	28.3	3
4	51 36.8	98 11	35.4	52 06.1	97 11	35.2	53 33.7	97 11	34.7	54 02.9	97 11	34.5	54 32.0	97 11	34.3	60 20.1	96 10	31.4	60 48.9	96 10	31.1	65 34.5	94 09	27.7	4
135	51 30.2	98 11	34.6	51 59.5	98 11	34.4	53 27.3	97 11	33.9	53 56.5	97 10	33.7	54 25.7	97 10	33.5	60 14.2	96 10	30.7	60 43.0	96 10	30.4	65 29.2	95 09	27.1	135
6	51 23.8	98 11	33.8	51 53.1	98 10	33.7	53 20.9	98 10	33.1	53 50.2	97 10	32.9	54 19.4	97 10	32.7	60 08.4	96 09	30.0	60 37.3	96 09	29.7	65 24.1	95 08	26.5	6
7	51 17.5	98 10	33.0	51 46.8	98 10	32.9	53 14.8	98 10	32.3	53 44.0	98 10	32.2	54 13.3	97 10	32.0	60 02.7	97 09	29.3	60 31.6	96 09	29.0	65 19.0	95 08	25.9	7
8	51 11.3	98 10	32.3	51 40.7	98 10	32.1	53 08.7	98 10	31.6	53 38.0	98 10	31.4	54 07.3	98 10	31.2	59 57.2	97 09	28.6	60 26.2	97 09	28.4	65 14.1	95 08	25.3	8
9	51 05.3	98 10	31.5	51 34.7	98 10	31.3	53 02.8	98 10	30.8	53 32.1	98 10	30.6	54 01.4	98 10	30.5	59 51.7	97 09	27.9	60 20.8	97 09	27.7	65 09.3	95 08	24.7	9
140	50 59.4	98 10	30.7	51 28.8	98 10	30.5	52 57.0	98 09	30.1	53 26.3	98 09	29.9	53 55.7	98 09	29.7	59 46.4	97 09	27.2	60 15.5	97 09	27.0	65 04.5	96 08	24.1	140
1	50 53.6	98 09	29.9	51 23.0	98 09	29.8	52 51.3	98 09	29.3	53 20.7	98 09	29.1	53 50.1	98 09	29.0	59 41.3	97 08	26.5	60 10.4	97 08	26.3	64 59.9	96 08	23.4	1
2	50 47.9	98 09	29.1	51 17.4	98 09	29.0	52 45.8	98 09	28.5	53 15.2	98 09	28.4	53 44.6	98 09	28.2	59 36.2	97 08	25.9	60 05.4	97 08	25.6	64 55.4	96 07	22.8	2
3	50 42.4	98 09	28.4	51 11.9	98 09	28.2	52 40.4	98 09	27.8	53 09.8	98 09	27.6	53 39.2	98 09	27.5	59 31.3	97 08	25.2	60 00.5	97 08	24.9	64 51.0	96 07	22.2	3
4	50 37.1	98 09	27.6	51 06.6	98 09	27.5	52 35.1	98 09	27.0	53 04.6	98 08	26.9	53 34.0	98 08	26.7	59 26.5	98 08	24.5	59 55.7	97 08	24.3	64 46.8	96 07	21.6	4
145	50 31.8	99 08	26.8	51 01.4	98 08	26.7	52 30.0	98 08	26.3	52 59.5	98 08	26.1	53 29.0	98 08	26.0	59 21.8	98 08	23.8	59 51.1	98 08	23.6	64 42.6	97 07	21.0	145
6	50 26.7	99 08	26.0	50 56.3	99 08	25.9	52 25.0	98 08	25.5	52 54.5	98 08	25.3	53 24.0	98 08	25.2	59 17.2	98 07	23.1	59 46.6	98 07	22.9	64 38.5	97 07	20.4	6
7	50 21.8	99 08	25.3	50 51.4	99 08	25.1	52 20.1	99 08	24.7	52 49.7	99 08	24.6	53 19.2	98 08	24.5	59 12.8	98 07	22.4	59 42.2	98 07	22.2	64 34.6	97 06	19.8	7
8	50 17.0	99 08	24.5	50 46.6	99 08	24.4	52 15.4	99 08	24.0	52 45.0	99 08	23.8	53 14.5	99 08	23.7	59 08.5	98 07	21.7	59 37.9	98 07	21.5	64 30.8	97 06	19.2	8
9	50 12.3	99 08	23.7	50 41.9	99 08	23.6	52 10.8	99 08	23.2	52 40.4	99 07	23.1	53 10.0	99 07	23.0	59 04.3	98 07	21.0	59 33.8	98 07	20.9	64 27.1	97 06	18.6	9
150	50 07.8	99 07	23.0	50 37.4	99 07	22.8	52 06.4	99 07	22.5	52 36.0	99 07	22.3	53 05.6	99 07	22.2	59 00.3	98 07	20.4	59 29.8	98 06	20.2	64 23.5	98 06	18.0	150
1	50 03.4	99 07	22.2	50 33.0	99 07	22.1	52 02.0	99 07	21.7	52 31.7	99 07	21.6	53 01.4	99 07	21.5	58 56.4	98 06	19.7	59 25.9	98 06	19.5	64 20.0	98 06	17.4	1
2	49 59.1	99 07	21.4	50 28.8	99 07	21.3	51 57.9	99 07	21.0	52 27.6	99 07	20.8	52 57.2	99 07	20.7	58 52.6	98 06	19.0	59 22.1	98 06	18.8	64 16.6	98 05	16.8	2
3	49 55.0	99 07	20.6	50 24.7	99 07	20.5	51 53.9	99 06	20.2	52 23.6	99 06	20.1	52 53.2	99 06	20.0	58 48.9	99 06	18.3	59 18.5	99 06	18.1	64 13.4	98 05	16.2	3
4	49 51.0	99 06	19.9	50 20.8	99 06	19.8	51 50.0	99 06	19.5	52 19.7	99 06	19.3	52 49.4	99 06	19.2	58 45.4	99 06	17.6	59 15.0	99 06	17.5	64 10.2	98 05	15.6	4
155	49 47.2	99 06	19.1	50 17.0	99 06	19.0	51 46.2	99 06	18.7	52 16.0	99 06	18.6	52 45.7	99 06	18.5	58 42.0	99 05	16.9	59 11.6	99 05	16.8	64 07.2	98 05	15.0	155
6	49 43.5	99 06	18.3	50 13.3	99 06	18.2	51 42.6	99 06	17.9	52 12.4	99 06	17.8	52 42.2	99 06	17.7	58 38.7	99 05	16.3	59 08.4	99 05	16.1	64 04.3	98 05	14.4	6
7	49 40.0	99 06	17.6	50 09.8	99 06	17.5	51 39.2	99 06	17.2	52 09.0	99 05	17.1	52 38.7	99 06	17.0	58 35.6	99 05	15.6	59 05.2	99 05	15.4	64 01.5	99 04	13.8	7
8	49 36.6	99 05	16.8	50 06.4	99 05	16.7	51 35.9	99 05	16.4	52 05.7	99 05	16.4	52 35.5	99 05	16.3	58 32.5	99 05	14.9	59 02.3	99 05	14.8	63 58.8	99 04	13.2	8
9	49 33.4	99 05	16.0	50 03.2	99 05	16.0	51 32.7	99 05	15.7	52 02.5	99 05	15.6	52 32.3	99 05	15.5	58 29.7	99 05	14.2	58 59.4	99 05	14.1	63 56.3	99 04	12.6	9
160	49 30.3	99 05	15.3	50 00.1	99 05	15.2	51 29.7	99 05	14.9	51 59.5	99 05	14.9	52 29.3	99 05	14.8	58 26.9	99 04	13.5	58 56.7	99 04	13.4	63 53.9	99 04	12.0	160
1	49 27.4	1.0 05	14.5	49 57.2	1.0 05	14.4	51 26.8	1.0 05	14.2	51 56.6	99 05	14.1	52 26.5	99 04	14.0	58 24.3	99 04	12.9	58 54.1	99 04	12.8	63 51.5	99 04	11.4	1
2	49 24.6	1.0 04	13.7	49 54.4	1.0 04	13.7	51 24.1	1.0 04	13.4	51 53.9	1.0 04	13.4	52 23.8	1.0 04	13.3	58 21.8	99 04	12.2	58 51.6	99 04	12.1	63 49.3	99 03	10.8	2
3	49 21.9	1.0 04	13.0	49 51.8	1.0 04	12.9	51 21.5	1.0 04	12.7	51 51.3	1.0 04	12.6	52 21.2	1.0 04	12.6	58 19.5	99 04	11.5	58 49.3	99 04	11.4	63 47.3	99 03	10.2	3
4	49 19.4	1.0 04	12.2	49 49.3	1.0 04	12.1	51 19.0	1.0 04	11.9	51 48.9	1.0 04	11.9	52 18.8	1.0 04	11.8	58 17.3	99 03	10.8	58 47.1	99 03	10.7	63 45.3	99 03	09.6	4
165	49 17.1	1.0 04	11.4	49 47.0	1.0 04	11.4	51 16.7	1.0 04	11.2	51 46.6	1.0 04	11.1	52 16.5	1.0 04	11.1	58 15.2	1.0 03	10.2	58 45.0	1.0 03	10.1	63 43.4	99 03	09.0	165
6	49 14.9	1.0 03	10.7	49 44.8	1.0 03	10.6	51 14.6	1.0 03	10.5	51 44.5	1.0 03	10.4	52 14.4	1.0 03	10.3	58 13.2	1.0 03	09.5	58 43.1	1.0 03	09.4	63 41.7	99 03	08.4	6
7	49 12.8	1.0 03	09.9	49 42.8	1.0 03	09.9	51 12.6	1.0 03	09.7	51 42.5	1.0 03	09.6	52 12.4	1.0 03	09.6	58 11.4	1.0 03	08.8	58 41.3	1.0 03	08.7	63 40.1	1.0 02	07.8	7
8	49 10.9	1.0 03	09.2	49 40.9	1.0 03	09.1	51 10.7	1.0 03	09.0	51 40.7	1.0 03	08.9	52 10.6	1.0 03	08.9	58 09.7	1.0 03	08.1	58 39.6	1.0 03	08.0	63 38.6	1.0 02	07.2	8
9	49 09.2	1.0 03	08.4	49 39.2	1.0 03	08.3	51 09.0	1.0 03	08.2	51 39.0	1.0 03	08.2	52 08.9	1.0 03	08.1	58 08.2	1.0 02	07.4	58 38.1	1.0 02	07.4	63 37.2	1.0 02	06.6	9
170	49 07.6	1.0 02	07.6	49 37.6	1.0 02	07.6	51 07.4	1.0 02	07.5	51 37.4	1.0 02	07.4	52 07.4	1.0 02	07.4	58 06.8	1.0 02	06.8	58 36.7	1.0 02	06.7	63 36.0	1.0 02	06.0	170
1	49 06.2	1.0 02	06.9	49 36.1	1.0 02	06.8	51 06.0	1.0 02	06.7	51 36.0	1.0 02	06.7	52 06.0	1.0 02	06.6	58 05.5	1.0 02	06.1	58 35.4	1.0 02	06.0	63 34.8	1.0 02	05.4	1
2	49 04.9	1.0 02	06.1	49 34.8	1.0 02	06.1	51 04.8	1.0 02	06.0	51 34.7	1.0 02	05.9	52 04.7	1.0 02	05.9	58 04.3	1.0 02	05.4	58 34.3	1.0 02	05.4	63 33.8	1.0 02	04.8	2
3	49 03.7	1.0 02	05.3	49 33.7	1.0 02	05.3	51 03.6	1.0 02	05.2	51 33.6	1.0 02	05.2	52 03.6	1.0 02	05.2	58 03.3	1.0 01	04.7	58 33.3	1.0 01	04.7	63 32.9	1.0 01	04.2	3
4	49 02.7	1.0 01	04.6	49 32.7	1.0 01	04.6	51 02.7	1.0 01	04.5	51 32.7	1.0 01	04.5	52 02.7	1.0 01	04.4	58 02.4	1.0 01	04.1	58 32.4	1.0 01	04.0	63 32.2	1.0 01	03.6	4
175	49 01.9	1.0 01	03.8	49 31.9	1.0 01	03.8	51 01.9	1.0 01	03.7	51 31.9	1.0 01	03.7	52 01.8	1.0 01	03.7	58 01.7	1.0 01	03.4	58 31.7	1.0 01	03.4	63 31.5	1.0 01	03.0	175
6	49 01.2	1.0 01	03.0	49 31.2	1.0 01	03.0	51 01.2	1.0 01	03.0	51 31.2	1.0 01	03.0	52 01.2	1.0 01	02.9	58 01.1	1.0 01	02.7	58 31.1	1.0 01	02.7	63 31.0	1.0 01	02.4	6
7	49 00.7	1.0 01	02.3	49 30.7	1.0 01	02.3	51 00.7	1.0 01	02.2	51 30.7	1.0 01	02.2	52 00.7	1.0 01	02.2	58 00.6	1.0 01	02.0	58 30.6	1.0 01	02.0	63 30.5	1.0 00	01.8	7
8	49 00.3	1.0 00	01.5	49 30.3	1.0 00	01.5	51 00.3	1.0 00	01.5	51 30.3	1.0 00	01.5	52 00.3	1.0 00	01.5	58 00.3	1.0 00	01.4	58 30.3	1.0 00	01.3	63 30.2	1.0 00	01.2	8
9	49 00.1	1.0 00	00.8	49 30.1	1.0 00	00.8	51 00.1	1.0 00	00.7	51 30.1	1.0 00	00.7	52 00.1	1.0 00	00.7	58 00.1	1.0 00	00.7	58 30.1	1.0 00	00.7	63 30.1	1.0 00	00.6	9
180	49 00.0	1.0 00	00.0	49 30.0	1.0 00	00.0	51 00.0	1.0 00	00.0	51 30.0	1.0 00	00.0	52 00.0	1.0 00	00.0	58 00.0	1.0 00	00.0	58 30.0	1.0 00	00.0	63 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 79°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	15	180	19	180	23	180	27	180	31	180	35	180	39	180	43	180	47	180	51	180	55	180	00
4	15	176	19	176	23	176	27	176	31	176	35	176	39	175	43	175	47	175	51	175	55	175	4
8	15	172	19	172	23	172	27	171	31	171	35	171	39	171	43	171	47	171	51	170	55	170	8
12	15	168	19	167	23	167	27	167	31	167	35	167	39	166	43	166	47	166	51	165	55	165	12
16	15	163	19	163	23	163	27	163	31	162	35	162	39	162	43	162	47	161	50	161	54	160	16
20	14	159	18	159	22	159	26	158	30	158	34	158	38	157	42	157	46	156	50	156	54	155	20
24	14	155	18	155	22	155	26	154	30	154	34	153	38	153	42	152	46	152	50	151	54	150	24
28	14	151	18	151	22	150	26	150	30	150	34	149	38	148	42	148	46	147	49	146	53	145	28
32	13	147	17	147	21	146	25	146	29	145	33	145	37	144	41	143	45	143	49	142	53	141	32
36	13	143	17	143	21	142	25	142	29	141	33	140	37	140	41	139	45	138	49	137	52	136	36
40	12	139	16	138	20	138	24	137	28	137	32	136	36	135	40	135	44	134	48	133	52	131	40
44	12	135	16	134	20	134	24	133	28	133	32	132	36	131	40	130	43	129	47	128	51	127	44
48	11	131	15	130	19	130	23	129	27	128	31	128	35	127	39	126	43	125	47	124	51	122	48
52	11	127	15	126	19	126	23	125	26	124	30	123	34	123	38	122	42	121	46	119	50	118	52
56	10	123	14	122	18	122	22	121	26	120	30	119	34	118	38	117	42	116	45	115	49	114	56
60	09	119	13	118	17	117	21	117	25	116	29	115	33	114	37	113	41	112	45	111	49	109	60
64	09	115	13	114	17	113	21	113	24	112	28	111	32	110	36	109	40	108	44	107	48	105	64
68	08	111	12	110	16	109	20	109	24	108	28	107	32	106	36	105	39	104	43	103	47	101	68
72	07	107	11	106	15	105	19	105	23	104	27	103	31	102	35	101	39	100	43	99	46	97	72
76	07	103	11	102	14	101	18	101	22	100	26	99	30	98	34	97	38	96	42	95	46	93	76
80	06	99	10	98	14	98	18	97	22	96	25	95	29	94	33	93	37	92	41	91	45	89	80
84	05	95	09	94	13	94	17	93	21	92	25	91	29	90	32	89	36	88	40	87	44	85	84
88	04	91	08	90	12	90	16	89	20	88	24	87	28	86	32	85	36	84	39	83	43	81	88
92	04	87	07	87	11	86	15	85	19	84	23	83	27	82	31	81	35	80	39	79	43	78	92
96	03	83	07	83	11	82	15	81	18	80	22	79	26	78	30	77	34	76	38	75	42	74	96
100	02	79	06	79	10	78	14	77	18	76	22	75	26	75	29	74	33	73	37	71	41	70	100
104	01	76	05	75	09	74	13	73	17	72	21	72	25	71	29	70	33	69	37	68	40	67	104
108	01	72	04	71	08	70	12	69	16	69	20	68	24	67	28	66	32	65	36	64	40	63	108
112	*00*	68	04	67	08	66	12	66	16	65	20	64	23	63	27	62	31	61	35	60	39	59	112
116	*01*	64	03	63	07	62	11	62	15	61	19	60	23	59	27	59	31	58	35	57	38	56	116
120	*02*	60	02	59	06	58	10	58	14	57	18	56	22	56	26	55	30	54	34	53	38	52	120
124	*02*	56	02	55	06	55	10	54	14	53	18	53	22	52	25	51	29	50	33	49	37	49	124
128	*03*	52	01	51	05	51	09	50	13	49	17	49	21	48	25	47	29	47	33	46	37	45	128
132	*03*	48	01	47	05	47	09	46	12	46	16	45	20	44	24	44	28	43	32	42	36	41	132
136	*04*	44	00	43	04	43	08	42	12	42	16	41	20	41	24	40	28	39	32	39	36	38	136
140	*04*	40	*00*	40	04	39	07	39	11	38	15	38	19	37	23	36	27	36	31	35	35	34	140
144	*05*	36	*01*	36	03	35	07	35	11	34	15	34	19	33	23	33	27	32	31	32	35	31	144
148	*05*	32	*01*	32	03	31	07	31	11	30	15	30	19	30	23	29	26	29	30	28	34	28	148
152	*06*	28	*02*	28	02	27	06	27	10	27	14	26	18	26	22	25	26	25	30	25	34	24	152
156	*06*	24	*02*	24	02	23	06	23	10	23	14	23	18	22	22	22	26	21	30	21	34	21	156
160	*06*	20	*02*	20	02	20	06	19	10	19	14	19	18	18	22	18	26	18	30	18	34	17	160
164	*07*	16	*03*	16	01	16	05	15	09	15	13	15	17	15	21	15	25	14	29	14	33	14	164
168	*07*	12	*03*	12	01	12	05	12	09	11	13	11	17	11	21	11	25	11	29	11	33	10	168
172	*07*	08	*03*	08	01	08	05	08	09	08	13	08	17	07	21	07	25	07	29	07	33	07	172
176	*07*	04	*03*	04	01	04	05	04	09	04	13	04	17	04	21	04	25	04	29	04	33	03	176
180	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	29	00	33	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 79°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	59	180	63	180	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	00
4	59	175	63	175	67	174	71	174	75	173	79	172	83	170	87	162	89	34	85	05	81	01	4
8	59	170	63	169	67	169	71	168	75	167	79	164	83	160	87	146	88	52	85	09	81	02	8
12	59	164	63	164	67	163	71	162	75	160	79	157	82	151	86	133	88	60	85	14	81	03	12
16	58	159	62	158	66	157	70	156	74	153	78	150	82	142	85	123	87	63	85	18	81	03	16
20	58	154	62	153	66	152	70	150	74	147	78	143	81	134	85	115	86	65	84	21	81	04	20
24	58	149	62	148	66	146	70	144	73	141	77	136	81	127	84	108	86	66	84	24	81	05	24
28	57	144	61	143	65	141	69	139	73	135	77	130	80	121	83	102	85	65	84	26	81	06	28
32	57	140	61	138	65	136	69	133	72	130	76	124	80	115	83	97	84	65	83	28	81	07	32
36	56	135	60	133	64	131	68	128	72	124	75	119	79	109	82	93	83	64	83	30	81	07	36
40	56	130	60	128	64	126	67	123	71	119	75	114	78	104	81	89	83	63	83	31	80	08	40
44	55	125	59	124	63	121	67	118	70	114	74	109	77	100	80	85	82	62	82	32	80	08	44
48	55	121	58	119	62	117	66	114	70	110	73	104	77	95	80	82	81	60	82	33	80	09	48
52	54	116	58	115	62	112	65	109	69	105	73	100	76	91	79	78	81	59	81	33	80	09	52
56	53	112	57	110	61	108	65	105	68	101	72	95	75	87	78	75	80	57	81	33	80	10	56
60	52	108	56	106	60	104	64	100	68	97	71	91	74	84	77	72	80	56	80	33	80	10	60
64	52	104	56	102	59	99	63	96	67	92	70	87	74	80	77	70	79	54	80	33	80	10	64
68	51	100	55	98	59	95	62	92	66	89	70	84	73	77	76	67	78	52	80	33	80	10	68
72	50	95	54	94	58	91	62	88	65	85	69	80	72	73	75	64	78	51	79	32	79	10	72
76	49	92	53	90	57	87	61	85	64	81	68	76	71	70	74	61	77	49	79	32	79	11	76
80	49	88	53	86	56	83	60	81	64	77	67	73	71	67	74	59	77	47	78	31	79	11	80
84	48	84	52	82	56	80	59	77	63	74	67	70	70	64	73	56	76	45	78	30	79	11	84
88	47	80	51	78	55	76	59	73	62	70	66	66	69	61	73	54	75	44	78	29	79	10	88
92	46	76	50	74	54	72	58	70	62	67	65	63	69	58	72	51	75	42	77	28	79	10	92
96	46	72	50	71	53	69	57	66	61	64	65	60	68	55	71	49	74	40	77	27	79	10	96
100	45	69	49	67	53	65	56	63	60	60	64	57	67	52	71	46	74	38	77	26	78	10	100
104	44	65	48	64	52	62	56	60	60	57	63	54	67	50	70	44	73	36	76	25	78	10	104
108	44	62	47	60	51	58	55	56	59	54	63	51	66	47	70	42	73	34	76	24	78	09	108
112	43	58	47	57	51	55	55	53	58	51	62	48	66	44	69	39	73	33	76	23	78	09	112
116	42	54	46	53	50	52	54	50	58	48	61	45	65	41	69	37	72	31	75	22	78	09	116
120	42	51	46	50	50	48	53	47	57	44	61	42	65	39	68	35	72	29	75	21	78	08	120
124	41	47	45	46	49	45	53	43	57	41	60	39	64	36	68	32	71	27	75	19	78	08	124
128	41	44	45	43	48	42	52	40	56	38	60	36	64	33	68	30	71	25	75	18	78	07	128
132	40	41	44	40	48	38	52	37	56	35	60	33	63	31	67	28	71	23	74	17	78	07	132
136	40	37	44	36	47	35	51	34	55	32	59	31	63	28	67	25	71	21	74	15	77	06	136
140	39	34	43	33	47	32	51	31	55	29	59	28	63	26	67	23	70	19	74	14	77	06	140
144	39	30	43	30	47	29	51	28	55	26	58	25	62	23	66	21	70	17	74	13	77	05	144
148	38	27	42	26	46	25	50	24	54	23	58	22	62	20	66	18	70	15	74	11	77	05	148
152	38	24	42	23	46	22	50	21	54	20	58	19	62	18	66	16	70	14	73	10	77	04	152
156	38	20	42	20	46	19	50	18	54	18	58	17	62	15	66	14	69	12	73	09	77	04	156
160	38	17	42	16	46	16	50	15	53	15	57	14	61	13	65	11	69	10	73	07	77	03	160
164	37	13	41	13	45	13	49	12	53	12	57	11	61	10	65	09	69	08	73	06	77	02	164
168	37	10	41	10	45	09	49	09	53	09	57	08	61	08	65	07	69	06	73	04	77	02	168
172	37	07	41	07	45	06	49	06	53	06	57	06	61	05	65	05	69	04	73	03	77	01	172
176	37	03	41	03	45	03	49	03	53	03	57	03	61	03	65	02	69	02	73	01	77	01	176
180	37	00	41	00	45	00	49	00	53	00	57	00	61	00	65	00	69	00	73	00	77	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

16—18598

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Az.		LATITUDE DIFFERENCE (minutes of arc)															Az.		LAT. DIFF. (tenths of minutes of arc)									Az.	
°	°	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	°	°	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	°	°
0	180	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180
1	179	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	1	179										1	179
2	178	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	2	178										2	178
3	177	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	3	177										3	177
4	176	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	4	176										4	176
5	175	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	13.9	14.9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175
6	174	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.9	10.9	11.9	12.9	13.9	14.9	6	174										6	174
7	173	1.0	2.0	3.0	4.0	5.0	6.0	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	7	173										7	173
8	172	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	8	172										8	172
9	171	1.0	2.0	3.0	4.0	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.8	13.8	14.8	9	171										9	171
10	170	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.8	13.8	14.8	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170
11	169	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.7	14.7	11	169										11	169
12	168	1.0	2.0	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8	10.8	11.7	12.7	13.7	14.7	12	168										12	168
13	167	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.7	11.7	12.6	13.6	14.6	13	167										13	167
14	166	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	14	166										14	166
15	165	1.0	1.9	2.9	3.9	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165
16	164	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.7	9.6	10.6	11.5	12.5	13.5	14.4	16	164										16	164
17	163	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.7	8.6	9.6	10.5	11.5	12.4	13.4	14.3	17	163										17	163
18	162	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	18	162										18	162
19	161	0.9	1.9	2.8	3.8	4.7	5.7	6.6	7.6	8.5	9.5	10.4	11.3	12.3	13.2	14.2	19	161									0.9	19	161
20	160	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20	160
21	159	0.9	1.9	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0	21	159							0.7	0.7		21	159
22	158	0.9	1.9	2.8	3.7	4.6	5.6	6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.9	22	158							0.6			22	158
23	157	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	23	157						0.6				23	157
24	156	0.9	1.8	2.7	3.7	4.6	5.5	6.4	7.3	8.2	9.1	10.0	11.0	11.9	12.8	13.7	24	156						0.5				24	156
25	155	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.6	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155
26	154	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	26	154					0.4					26	154
27	153	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	27	153										27	153
28	152	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7.1	7.9	8.8	9.7	10.6	11.5	12.4	13.2	28	152				0.4						28	152
29	151	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	8.7	9.6	10.5	11.4	12.2	13.1	29	151				0.3						29	151
30	150	0.9	1.7	2.6	3.5	4.3	5.2	6.1	7.0	7.8	8.7	9.5	10.4	11.3	12.1	13.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150
31	149	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.6	9.4	10.3	11.1	12.0	12.9	31	149										31	149
32	148	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	32	148										32	148
33	147	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.5	8.4	9.2	10.1	10.9	11.7	12.6	33	147			0.3						0.8	33	147
34	146	0.8	1.7	2.5	3.3	4.1	5.0	5.8	6.6	7.5	8.3	9.1	9.9	10.8	11.6	12.4	34	146			0.2						0.7	34	146
35	145	0.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.6	11.5	12.3	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35	145
36	144	0.8	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.1	36	144								0.6		36	144
37	143	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	37	143										37	143
38	142	0.8	1.6	2.4	3.2	3.9	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.2	11.0	11.8	38	142							0.6			38	142
39	141	0.8	1.6	2.3	3.1	3.9	4.7	5.4	6.2	7.0	7.8	8.5	9.3	10.1	10.9	11.7	39	141							0.5			39	141
40	140	0.8	1.5	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140
41	139	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.1	9.8	10.6	11.3	41	139		0.2				0.5				41	139
42	138	0.7	1.5	2.2	3.0	3.7	4.5	5.2	5.9	6.7	7.4	8.2	8.9	9.7	10.4	11.1	42	138		0.1				0.4				42	138
43	137	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.0	8.8	9.5	10.2	11.0	43	137									0.7	43	137
44	136	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	44	136									0.6	44	136
45	135	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.6	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135
46	134	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.7	10.4	46	134					0.3			0.6		46	134
47	133	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	7.5	8.2	8.9	9.5	10.2	47	133								0.5		47	133
48	132	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.0	48	132										48	132
49	131	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.6	7.2	7.9	8.5	9.2	9.8	49	131							0.5			49	131
50	130	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.1	5.8	6.4	7.1	7.7	8.4	9.0	9.6	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50	130
51	129	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.4	51	129				0.3						51	129
52	128	0.6	1.2	1.8	2.5	3.1	3.7	4.3	4.9	5.5	6.2	6.8	7.4	8.0	8.6	9.2	52	128				0.2					0.6	52	128
53	127	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	53	127									0.5	53	127
54	126	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.6	8.2	8.8	54	126						0.4				54	126
55	125	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2	5.7	6.3	6.9	7.5	8.0	8.6	55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	55	125
56	124	0.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	56	124								0.4		56	124
57	123	0.5	1.1	1.6	2.2	2.7	3.3	3.8	4.4	4.9	5.4	6.0	6.5	7.1	7.6	8.2	57	123										57	123
58	122	0.5	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.8	5.3	5.8	6.4	7.0	7.4	7.9	58	122										58	122
59	121	0.5	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.2	5.7	6.2	6.7	7.2	7.7	59	121	0.1				0.3				0.5	59	121
60	120	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	60	120
61	119	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8	6.3	6.8	7.3	61	119			0.1				0.3			61	119
62	118	0.5	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.0	62	118										62	118
63	117	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.4	6.8	63	117										63	117
64	116	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	3.9	4.4	4.8	5.3	5.7	6.1	6.6	64	116								0.4		64	116
65	115	0.4	0.8	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	4.6	5.1	5.5	5.9	6.3	65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	65	115
66	114	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	66	114						0.2			0.4	66	114
67	113	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	67	113				0.2					0.4	67	113
68	112	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1	4.5	4.9	5.2	5.6	68	112				0.1					0.3	68	112
69	111	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	3.9	4.3	4.7	5.0	5.4	69	111							0.3		0.3	69	111
70	110	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.7	3.1	3.4	3.8	4.1	4.4	4.8	5.1	70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	70	110
71	109	0.3	0.7	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.3	3.6	3.9	4.2	4.6	4.9	71	109								0.3		71	109
72	108	0.3	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.6	72	108					0.2			0.2		72	108
73	107	0.3	0.6	0.9	1.2	1.5	1.8	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	73	107					0.1				0.3	73	107
74	106	0.3	0.6	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8	3.0	3.3	3.6	3.9	4.1	74	106									0.2	74	106
75	105	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.6	3.9	75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	75	105
76	104	0.2	0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.4	2.7	2.9	3.1	3.4	3.6	76	104		0.0				0.1				76	104
77	103	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.4	77	103							0.2			77	103
78	102	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	78	102							0.1			78	102
79	101	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	79	101								0.2		79	101
80	100	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.9	2.1	2.3	2.4	2.6	80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	80	100
81	99	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6	1.7	1.9	2.0	2.2	2.3	81	99			0.0						0.1	81	99
82	98	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.1	82	98				0.1						82	98
83	97	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8	83	97				0.0						83	97
84	96	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	84	96					0.1					84	96
85	95	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	85	95
86	94	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	86	94						0.0	0.0	0.1	0.1	86	94
87	93	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	87	93								0.0	0.0	87	93
88	92	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	88	92										88	92
89	91	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	89	91										89	91
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90
Az.		1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Az.		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.	

When the D. R. latitude is greater than the chosen tabulated latitude, the correction for ΔL is *minus*, but when the D. R. latitude is less than the tabulated latitude, the correction for ΔL is *plus*, providing the azimuth is greater than 90°. The reverse correction is applied when the azimuth is less than 90°.

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Az.		LATITUDE DIFFERENCE (minutes of arc)															Az.		LAT. DIFF. (tenths of minutes of arc)									Az.	
°	°	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	°	°	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	°	°
0	180	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180
1	179	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	1	179										1	179
2	178	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	2	178										2	178
3	177	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	3	177										3	177
4	176	16.0	17.0	18.0	19.0	20.0	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	4	176										4	176
5	175	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175
6	174	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.8	28.8	29.8	6	174										6	174
7	173	15.9	16.9	17.9	18.9	19.9	20.8	21.8	22.8	23.8	24.8	25.8	26.8	27.8	28.8	29.8	7	173										7	173
8	172	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	8	172										8	172
9	171	15.8	16.8	17.8	18.8	19.8	20.7	21.7	22.7	23.7	24.7	25.7	26.7	27.7	28.6	29.6	9	171										9	171
10	170	15.8	16.7	17.7	18.7	19.7	20.7	21.7	22.7	23.6	24.6	25.6	26.6	27.6	28.6	29.5	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170
11	169	15.7	16.7	17.7	18.7	19.6	20.6	21.6	22.6	23.6	24.5	25.5	26.5	27.5	28.5	29.4	11	169										11	169
12	168	15.7	16.6	17.6	18.6	19.6	20.5	21.5	22.5	23.5	24.5	25.4	26.4	27.4	28.4	29.3	12	168										12	168
13	167	15.6	16.6	17.5	18.5	19.5	20.5	21.4	22.4	23.4	24.4	25.3	26.3	27.3	28.3	29.2	13	167										13	167
14	166	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	14	166										14	166
15	165	15.5	16.4	17.4	18.4	19.3	20.3	21.3	22.2	23.2	24.1	25.1	26.1	27.0	28.0	29.0	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165
16	164	15.4	16.3	17.3	18.3	19.2	20.2	21.1	22.1	23.1	24.0	25.0	26.0	26.9	27.9	28.8	16	164										16	164
17	163	15.3	16.3	17.2	18.2	19.1	20.1	21.0	22.0	23.0	23.9	24.9	25.8	26.8	27.7	28.7	17	163										17	163
18	162	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	18	162										18	162
19	161	15.1	16.1	17.0	18.0	18.9	19.9	20.8	21.7	22.7	23.6	24.6	25.5	26.5	27.4	28.4	19	161									0.9	19	161
20	160	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20	160
21	159	14.9	15.9	16.8	17.7	18.7	19.6	20.5	21.5	22.4	23.3	24.3	25.2	26.1	27.1	28.0	21	159							0.7	0.7		21	159
22	158	14.8	15.8	16.7	17.6	18.5	19.5	20.4	21.3	22.3	23.2	24.1	25.0	26.0	26.9	27.8	22	158							0.6			22	158
23	157	14.7	15.6	16.6	17.5	18.4	19.3	20.3	21.2	22.1	23.0	23.9	24.9	25.8	26.7	27.6	23	157						0.6				23	157
24	156	14.6	15.5	16.4	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.8	24.7	25.6	26.5	27.4	24	156						0.5				24	156
25	155	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.8	22.7	23.6	24.5	25.4	26.3	27.2	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155
26	154	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	26	154					0.4					26	154
27	153	14.3	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.2	24.1	24.9	25.8	26.7	27	153										27	153
28	152	14.1	15.0	15.9	16.8	17.7	18.5	19.4	20.3	21.2	22.1	23.0	23.8	24.7	25.6	26.5	28	152				0.4						28	152
29	151	14.0	14.9	15.7	16.6	17.5	18.4	19.2	20.1	21.0	21.9	22.7	23.6	24.5	25.4	26.2	29	151				0.3						29	151
30	150	13.9	14.7	15.6	16.5	17.3	18.2	19.1	19.9	20.8	21.7	22.5	23.4	24.2	25.1	26.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150
31	149	13.7	14.6	15.4	16.3	17.1	18.0	18.9	19.7	20.6	21.4	22.3	23.1	24.0	24.9	25.7	31	149										31	149
32	148	13.6	14.4	15.3	16.1	17.0	17.8	18.7	19.5	20.4	21.2	22.0	22.9	23.7	24.6	25.4	32	148										32	148
33	147	13.4	14.3	15.1	15.9	16.8	17.6	18.5	19.3	20.1	21.0	21.8	22.6	23.5	24.3	25.2	33	147				0.3					0.8	33	147
34	146	13.3	14.1	14.9	15.8	16.6	17.4	18.2	19.1	19.9	20.7	21.6	22.4	23.2	24.0	24.9	34	146				0.2					0.7	34	146
35	145	13.1	13.9	14.7	15.6	16.4	17.2	18.0	18.8	19.7	20.5	21.3	22.1	22.9	23.8	24.6	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35	145
36	144	12.9	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.2	21.0	21.8	22.7	23.5	24.3	36	144								0.6		36	144
37	143	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	37	143										37	143
38	142	12.6	13.4	14.2	15.0	15.8	16.5	17.3	18.1	18.9	19.7	20.5	21.3	22.1	22.9	23.6	38	142							0.6			38	142
39	141	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.5	23.3	39	141							0.5			39	141
40	140	12.3	13.0	13.8	14.6	15.3	16.1	16.9	17.6	18.4	19.2	19.9	20.7	21.4	22.2	23.0	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140
41	139	12.1	12.8	13.6	14.3	15.1	15.8	16.6	17.4	18.1	18.9	19.6	20.4	21.1	21.9	22.6	41	139		0.2				0.5				41	139
42	138	11.9	12.6	13.4	14.1	14.9	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6	22.3	42	138		0.1				0.4				42	138
43	137	11.7	12.4	13.2	13.9	14.6	15.4	16.1	16.8	17.6	18.3	19.0	19.7	20.5	21.2	21.9	43	137									0.7	43	137
44	136	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.5	17.3	18.0	18.7	19.4	20.1	20.9	21.6	44	136									0.6	44	136
45	135	11.3	12.0	12.7	13.4	14.1	14.8	15.6	16.3	17.0	17.7	18.4	19.1	19.8	20.5	21.2	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135
46	134	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.5	20.1	20.8	46	134					0.3			0.6		46	134
47	133	10.9	11.6	12.3	13.0	13.6	14.3	15.0	15.7	16.4	17.1	17.7	18.4	19.1	19.8	20.5	47	133								0.5		47	133
48	132	10.7	11.4	12.0	12.7	13.4	14.1	14.7	15.4	16.1	16.7	17.4	18.1	18.7	19.4	20.1	48	132										48	132
49	131	10.5	11.2	11.8	12.5	13.1	13.8	14.4	15.1	15.7	16.4	17.1	17.7	18.4	19.0	19.7	49	131							0.5			49	131
50	130	10.3	10.9	11.6	12.2	12.9	13.5	14.1	14.8	15.4	16.1	16.7	17.4	18.0	18.6	19.3	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50	130
51	129	10.1	10.7	11.3	12.0	12.6	13.2	13.8	14.5	15.1	15.7	16.4	17.0	17.6	18.3	18.9	51	129				0.3						51	129
52	128	9.9	10.5	11.1	11.7	12.3	12.9	13.5	14.2	14.8	15.4	16.0	16.6	17.2	17.9	18.5	52	128				0.2					0.6	52	128
53	127	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.9	17.5	18.1	53	127									0.5	53	127
54	126	9.4	10.0	10.6	11.2	11.8	12.3	12.9	13.5	14.1	14.7	15.3	15.9	16.5	17.0	17.6	54	126						0.4				54	126
55	125	9.2	9.8	10.3	10.9	11.5	12.0	12.6	13.2	13.8	14.3	14.9	15.5	16.1	16.6	17.2	55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	55	125
56	124	8.9	9.5	10.1	10.6	11.2	11.7	12.3	12.9	13.4	14.0	14.5	15.1	15.7	16.2	16.8	56	124								0.4		56	124
57	123	8.7	9.3	9.8	10.3	10.9	11.4	12.0	12.5	13.1	13.6	14.2	14.7	15.2	15.8	16.3	57	123										57	123
58	122	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.2	13.8	14.3	14.8	15.4	15.9	58	122										58	122
59	121	8.2	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.4	12.9	13.4	13.9	14.4	14.9	15.5	59	121	0.1				0.3				0.5	59	121
60	120	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	60	120
61	119	7.8	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.6	12.1	12.6	13.1	13.6	14.1	14.5	61	119			0.1				0.3			61	119
62	118	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.7	12.2	12.7	13.1	13.6	14.1	62	118										62	118
63	117	7.3	7.7	8.2	8.6	9.1	9.5	10.0	10.4	10.9	11.3	11.8	12.3	12.7	13.2	13.6	63	117										63	117
64	116	7.0	7.5	7.9	8.3	8.8	9.2	9.6	10.1	10.5	11.0	11.4	11.8	12.3	12.7	13.2	64	116								0.4		64	116
65	115	6.8	7.2	7.6	8.0	8.5	8.9	9.3	9.7	10.1	10.6	11.0	11.4	11.8	12.3	12.7	65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	65	115
66	114	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.4	9.8	10.2	10.6	11.0	11.4	11.8	12.2	66	114						0.2				66	114
67	113	6.3	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.2	10.5	10.9	11.3	11.7	67	113				0.2					0.4	67	113
68	112	6.0	6.4	6.7	7.1	7.5	7.9	8.2	8.6	9.0	9.4	9.7	10.1	10.5	10.9	11.2	68	112				0.1					0.3	68	112
69	111	5.7	6.1	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.3	9.7	10.0	10.4	10.8	69	111							0.3			69	111
70	110	5.5	5.8	6.2	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.2	9.6	9.9	10.3	70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	70	110
71	109	5.2	5.5	5.9	6.2	6.5	6.8	7.2	7.5	7.8	8.1	8.5	8.8	9.1	9.4	9.8	71	109								0.3		71	109
72	108	4.9	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	8.0	8.3	8.7	9.0	9.3	72	108					0.2			0.2		72	108
73	107	4.7	5.0	5.3	5.6	5.8	6.1	6.4	6.7	7.0	7.3	7.6	7.9	8.2	8.5	8.8	73	107					0.1				0.3	73	107
74	106	4.4	4.7	5.0	5.2	5.5	5.8	6.1	6.3	6.6	6.9	7.2	7.4	7.7	8.0	8.3	74	106									0.2	74	106
75	105	4.1	4.4	4.7	4.9	5.2	5.4	5.7	6.0	6.2	6.5	6.7	7.0	7.2	7.5	7.8	75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	75	105
76	104	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.6	5.8	6.0	6.3	6.5	6.8	7.0	7.3	76	104		0.0				0.1				76	104
77	103	3.6	3.8	4.0	4.3	4.5	4.7	5.0	5.2	5.4	5.6	5.8	6.1	6.3	6.5	6.7	77	103							0.2			77	103
78	102	3.3	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	78	102							0.1			78	102
79	101	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.3	5.5	5.7	79	101								0.2		79	101
80	100	2.8	3.0	3.1	3.3	3.5	3.6	3.8	4.0	4.2	4.3	4.5	4.7	4.9	5.0	5.2	80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	80	100
81	99	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.6	3.8	3.9	4.1	4.2	4.4	4.5	4.7	81	99			0.0						0.1	81	99
82	98	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.3	3.5	3.6	3.8	3.9	4.0	4.2	82	98				0.1						82	98
83	97	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	83	97				0.0						83	97
84	96	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	84	96					0.1					84	96
85	95	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.6	85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	85	95
86	94	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.1	86	94						0.0	0.0	0.1	0.1	86	94
87	93	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	87	93								0.0	0.0	87	93
88	92	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	88	92										88	92
89	91	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	89	91										89	91
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0	0.0	90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90
Az.		16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	Az.		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.	

When the D. R. latitude is greater than the chosen tabulated latitude, the correction for ΔL is *minus*, but when the D. R. latitude is less than the tabulated latitude, the correction for ΔL is *plus*, providing the azimuth is greater than 90°. The reverse correction is applied when the azimuth is less than 90°.

16—18598

MULTIPLICATION TABLE

Δ	DEC. DIFF. OR H. A. DIFF. (minutes of arc)															Δ	DEC. DIFF. OR H. A. DIFF. (tenths of minutes)									Δ
	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	
01	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
2	.0	.0	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	2										2
3	.0	.1	.1	.1	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.5	3										3
4	.0	.1	.1	.2	.2	.2	.3	.3	.4	.4	.4	.5	.5	.6	.6	4										4
05	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
6	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6	.7	.8	.8	.8	.9	6								0.0	0.1	6
7	.1	.1	.2	.3	.4	.4	.5	.6	.6	.7	.8	.8	.9	1.0	1.1	7							0.0	0.1		7
8	.1	.2	.2	.3	.4	.5	.6	.6	.7	.8	.9	1.0	1.0	1.1	1.2	8						0.0	0.1			8
9	.1	.2	.3	.4	.5	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	9					0.0	0.1				9
10	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	10
1	.1	.2	.3	.4	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1										1
2	.1	.2	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2				0.0						2
3	.1	.3	.4	.5	.7	.8	.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	2.0	3				0.1						3
4	.1	.3	.4	.6	.7	.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.1	4										4
15	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	15
6	.2	.3	.5	.6	.8	1.0	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.2	2.4	6				0.0					0.1	6
7	.2	.3	.5	.7	.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	2.2	2.4	2.6	7				0.1					0.2	7
8	.2	.4	.5	.7	.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	8								0.1		8
9	.2	.4	.6	.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	9								0.2		9
20	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
1	.2	.4	.6	.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	1							0.1			1
2	.2	.4	.7	.9	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3	2							0.2			2
3	.2	.5	.7	.9	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.8	3.0	3.2	3.5	3										3
4	.2	.5	.7	1.0	1.2	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.4	3.6	4				0.0		0.1				4
25	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
6	.3	.5	.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.9	6										6
7	.3	.5	.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.1	7								0.2		7
8	.3	.6	.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	8								0.3		8
9	.3	.6	.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	9					0.1					9
30	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
1	.3	.6	.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.7	1								0.2		1
2	.3	.6	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8	2								0.3		2
3	.3	.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	4.3	4.6	5.0	3										3
4	.3	.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	3.4	3.7	4.1	4.4	4.8	5.1	4										4
35	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
6	.4	.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4	6							0.2	0.3		6
7	.4	.7	1.1	1.5	1.9	2.2	2.6	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.6	7				0.1						7
8	.4	.8	1.1	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.2	4.6	4.9	5.3	5.7	8				0.2					0.3	8
9	.4	.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	9									0.4	9
40	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
1	.4	.8	1.2	1.6	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.2	1						0.2				1
2	.4	.8	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3	2						0.3				2
3	.4	.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9	4.3	4.7	5.2	5.6	6.0	6.5	3								0.3		3
4	.4	.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4	4.8	5.3	5.7	6.2	6.6	4								0.4		4
45	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.8	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
6	.5	.9	1.4	1.8	2.3	2.8	3.2	3.7	4.1	4.6	5.1	5.5	6.0	6.4	6.9	6										6
7	.5	.9	1.4	1.9	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.1	7										7
8	.5	1.0	1.4	1.9	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2	8										8
9	.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	9	0.0			0.1		0.2		0.3		9
50	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
1	.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.7	1										1
2	.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	6.2	6.8	7.3	7.8	2										2
3	.5	1.1	1.6	2.1	2.7	3.2	3.7	4.2	4.8	5.3	5.8	6.4	6.9	7.4	8.0	3										3
4	.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6	8.1	4										4
55	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	7.7	8.3	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
6	.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	6								0.4		6
7	.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	5.7	6.3	6.8	7.4	8.0	8.6	7								0.5		7
8	.6	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	7.0	7.5	8.1	8.7	8						0.3				8
9	.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9	9						0.4				9
60	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
1	.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5	6.1	6.7	7.3	7.9	8.5	9.2	1									0.5	1
2	.6	1.2	1.9	2.5	3.1	3.7	4.3	5.0	5.6	6.2	6.8	7.4	8.1	8.7	9.3	2				0.2					0.6	2
3	.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.5	3				0.3						3
4	.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0	9.6	4							0.4			4
65	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.5	9.1	9.8	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
6	.7	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	6										6
7	.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.1	7										7
8	.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	6.8	7.5	8.2	8.8	9.5	10.2	8								0.5		8
9	.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7	10.4	9					0.3			0.6		9
70	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
1	.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.7	1										1
2	.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	2									0.6	2
3	.7	1.5	2.2	2.9	3.7	4.4	5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	11.0	3									0.7	3
4	.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.1	4				0.1		0.4				4
75	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.0	9.8	10.5	11.3	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
6	.8	1.5	2.3	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.4	9.1	9.9	10.6	11.4	6										6
7	.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	6.9	7.7	8.5	9.2	10.0	10.8	11.6	7										7
8	.8	1.6	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8	8.6	9.4	10.1	10.9	11.7	8							0.5			8
9	.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.1	11.9	9							0.6			9
80	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
1	.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.2	1								0.6		1
2	.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.7	11.5	12.3	2								0.7		2
3	.8	1.7	2.5	3.3	4.2	5.0	5.8	6.6	7.5	8.3	9.1	10.0	10.8	11.6	12.5	3				0.2					0.7	3
4	.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	4				0.3					0.8	4
85	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9	12.8	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
6	.9	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.7	8.6	9.5	10.3	11.2	12.0	12.9	6										6
7	.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.8	8.7	9.6	10.4	11.3	12.2	13.1	7				0.3						7
8	.9	1.8	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8	9.7	10.6	11.4	12.3	13.2	8				0.4						8
9	.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	9					0.4					9
90	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
1	.9	1.8	2.7	3.6	4.6	5.5	6.4	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.7	1						0.5				1
2	.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	2						0.6	0.6			2
3	.9	1.9	2.8	3.7	4.7	5.6	6.5	7.4	8.4	9.3	10.2	11.2	12.1	13.0	14.0	3							0.7	0.7		3
4	.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	4								0.8	0.8	4
95	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
6	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	6										6
7	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	7										7
8	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.7	8										8
99	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	99										99
Δ	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Δ

Δd or Δt

MULTIPLICATION TABLE

Δ	DEC. DIFF. OR H. A. DIFF. (minutes of arc)															Δ	DEC. DIFF. OR H. A. DIFF. (tenths of minutes)									Δ
	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	
01	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
2	.3	.3	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.6	.6	.6	2										2
3	.5	.5	.5	.6	.6	.6	.7	.7	.7	.8	.8	.8	.8	.9	.9	3										3
4	.6	.7	.7	.8	.8	.8	.9	.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2	4										4
05	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
6	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.8	6							0.0	0.0	0.1	6
7	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	7							0.0	0.1		7
8	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	8						0.0	0.1			8
9	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.7	9						0.1				9
10	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	10
1	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.3	1										1
2	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.6	2				0.0						2
3	2.1	2.2	2.3	2.5	2.6	2.7	2.9	3.0	3.1	3.3	3.4	3.5	3.6	3.8	3.9	3				0.1						3
4	2.2	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2	4										4
15	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	4.5	15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	15
6	2.6	2.7	2.9	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.6	4.8	6			0.0						0.1	6
7	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6	4.8	4.9	5.1	7			0.1						0.2	7
8	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.4	8								0.1		8
9	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1	5.3	5.5	5.7	9								0.2		9
20	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
1	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.3	5.5	5.7	5.9	6.1	6.3	1							0.1			1
2	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6	2							0.2			2
3	3.7	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7	6.9	3										3
4	3.8	4.1	4.3	4.6	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	7.0	7.2	4						0.1				4
25	4.0	4.3	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
6	4.2	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.0	7.3	7.5	7.8	6										6
7	4.3	4.6	4.9	5.1	5.4	5.7	5.9	6.2	6.5	6.8	7.0	7.3	7.6	7.8	8.1	7									0.2	7
8	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3	7.6	7.8	8.1	8.4	8									0.3	8
9	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7.0	7.3	7.5	7.8	8.1	8.4	8.7	9							0.1			9
30	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
1	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.8	8.1	8.4	8.7	9.0	9.3	1								0.2		1
2	5.1	5.4	5.8	6.1	6.4	6.7	7.0	7.4	7.7	8.0	8.3	8.6	9.0	9.3	9.6	2								0.3		2
3	5.3	5.6	5.9	6.3	6.6	6.9	7.3	7.6	7.9	8.3	8.6	8.9	9.2	9.6	9.9	3										3
4	5.4	5.8	6.1	6.5	6.8	7.1	7.5	7.8	8.2	8.5	8.8	9.2	9.5	9.9	10.2	4										4
35	5.6	6.0	6.3	6.7	7.0	7.4	7.7	8.1	8.4	8.8	9.1	9.5	9.8	10.2	10.5	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
6	5.8	6.1	6.5	6.8	7.2	7.6	7.9	8.3	8.6	9.0	9.4	9.7	10.1	10.4	10.8	6							0.3			6
7	5.9	6.3	6.7	7.0	7.4	7.8	8.1	8.5	8.9	9.3	9.6	10.0	10.4	10.7	11.1	7				0.1						7
8	6.1	6.5	6.8	7.2	7.6	8.0	8.4	8.7	9.1	9.5	9.9	10.3	10.6	11.0	11.4	8				0.2					0.3	8
9	6.2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.1	10.5	10.9	11.3	11.7	9									0.4	9
40	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6	12.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
1	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.3	10.7	11.1	11.5	11.9	12.3	1						0.2				1
2	6.7	7.1	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	10.9	11.3	11.8	12.2	12.6	2						0.3				2
3	6.9	7.3	7.7	8.2	8.6	9.0	9.5	9.9	10.3	10.8	11.2	11.6	12.0	12.5	12.9	3								0.3		3
4	7.0	7.5	7.9	8.4	8.8	9.2	9.7	10.1	10.6	11.0	11.4	11.9	12.3	12.8	13.2	4								0.4		4
45	7.2	7.7	8.1	8.6	9.0	9.5	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.5	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
6	7.4	7.8	8.3	8.7	9.2	9.7	10.1	10.6	11.0	11.5	12.0	12.4	12.9	13.3	13.8	6										6
7	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.8	12.2	12.7	13.2	13.6	14.1	7										7
8	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.5	13.0	13.4	13.9	14.4	8										8
9	7.8	8.3	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.3	12.7	13.2	13.7	14.2	14.7	9				0.1		0.2			0.4	9
50	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
1	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.7	12.2	12.8	13.3	13.8	14.3	14.8	15.3	1										1
2	8.3	8.8	9.4	9.9	10.4	10.9	11.4	12.0	12.5	13.0	13.5	14.0	14.6	15.1	15.6	2										2
3	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.4	15.9	3										3
4	8.6	9.2	9.7	10.3	10.8	11.3	11.9	12.4	13.0	13.5	14.0	14.6	15.1	15.7	16.2	4										4
55	8.8	9.4	9.9	10.5	11.0	11.6	12.1	12.7	13.2	13.8	14.3	14.9	15.4	16.0	16.5	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
6	9.0	9.5	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6	15.1	15.7	16.2	16.8	6								0.4		6
7	9.1	9.7	10.3	10.8	11.4	12.0	12.5	13.1	13.7	14.3	14.8	15.4	16.0	16.5	17.1	7								0.5		7
8	9.3	9.9	10.4	11.0	11.6	12.2	12.8	13.3	13.9	14.5	15.1	15.7	16.2	16.8	17.4	8						0.3				8
9	9.4	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.3	15.9	16.5	17.1	17.7	9						0.4				9
60	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
1	9.8	10.4	11.0	11.6	12.2	12.8	13.4	14.0	14.6	15.3	15.9	16.5	17.1	17.7	18.3	1									0.5	1
2	9.9	10.5	11.2	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.7	17.4	18.0	18.6	2				0.2					0.6	2
3	10.1	10.7	11.3	12.0	12.6	13.2	13.9	14.5	15.1	15.8	16.4	17.0	17.6	18.3	18.9	3				0.3						3
4	10.2	10.9	11.5	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2	4							0.4			4
65	10.4	11.1	11.7	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
6	10.6	11.2	11.9	12.5	13.2	13.9	14.5	15.2	15.8	16.5	17.2	17.8	18.5	19.1	19.8	6										6
7	10.7	11.4	12.1	12.7	13.4	14.1	14.7	15.4	16.1	16.8	17.4	18.1	18.8	19.4	20.1	7										7
8	10.9	11.6	12.2	12.9	13.6	14.3	15.0	15.6	16.3	17.0	17.7	18.4	19.0	19.7	20.4	8								0.5		8
9	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	17.9	18.6	19.3	20.0	20.7	9						0.3		0.6		9
70	11.2	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
1	11.4	12.1	12.8	13.5	14.2	14.9	15.6	16.3	17.0	17.8	18.5	19.2	19.9	20.6	21.3	1										1
2	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.6	17.3	18.0	18.7	19.4	20.2	20.9	21.6	2									0.6	2
3	11.7	12.4	13.1	13.9	14.6	15.3	16.1	16.8	17.5	18.3	19.0	19.7	20.4	21.2	21.9	3									0.7	3
4	11.8	12.6	13.3	14.1	14.8	15.5	16.3	17.0	17.8	18.5	19.2	20.0	20.7	21.5	22.2	4		0.1				0.4				4
75	12.0	12.8	13.5	14.3	15.0	15.8	16.5	17.3	18.0	18.8	19.5	20.3	21.0	21.8	22.5	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
6	12.2	12.9	13.7	14.4	15.2	16.0	16.7	17.5	18.2	19.0	19.8	20.5	21.3	22.0	22.8	6										6
7	12.3	13.1	13.9	14.6	15.4	16.2	16.9	17.7	18.5	19.3	20.0	20.8	21.6	22.3	23.1	7										7
8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	17.9	18.7	19.5	20.3	21.1	21.8	22.6	23.4	8							0.5			8
9	12.6	13.4	14.2	15.0	15.8	16.6	17.4	18.2	19.0	19.8	20.5	21.3	22.1	22.9	23.7	9							0.6			9
80	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
1	13.0	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.3	21.1	21.9	22.7	23.5	24.3	1								0.6		1
2	13.1	13.9	14.8	15.6	16.4	17.2	18.0	18.9	19.7	20.5	21.3	22.1	23.0	23.8	24.6	2								0.7		2
3	13.3	14.1	14.9	15.8	16.6	17.4	18.3	19.1	19.9	20.8	21.6	22.4	23.2	24.1	24.9	3				0.2					0.7	3
4	13.4	14.3	15.1	16.0	16.8	17.6	18.5	19.3	20.2	21.0	21.8	22.7	23.5	24.4	25.2	4				0.3					0.8	4
85	13.6	14.5	15.3	16.2	17.0	17.9	18.7	19.6	20.4	21.3	22.1	23.0	23.8	24.7	25.5	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
6	13.8	14.6	15.5	16.3	17.2	18.1	18.9	19.8	20.6	21.5	22.4	23.2	24.1	24.9	25.8	6										6
7	13.9	14.8	15.7	16.5	17.4	18.3	19.1	20.0	20.9	21.8	22.6	23.5	24.4	25.2	26.1	7				0.3						7
8	14.1	15.0	15.8	16.7	17.6	18.5	19.4	20.2	21.1	22.0	22.9	23.8	24.6	25.5	26.4	8				0.4						8
9	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.1	24.0	24.9	25.8	26.7	9					0.4					9
90	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
1	14.6	15.5	16.4	17.3	18.2	19.1	20.0	20.9	21.8	22.8	23.7	24.6	25.5	26.4	27.3	1						0.5				1
2	14.7	15.6	16.6	17.5	18.4	19.3	20.2	21.2	22.1	23.0	23.9	24.8	25.8	26.7	27.6	2						0.6	0.6			2
3	14.9	15.8	16.7	17.7	18.6	19.5	20.5	21.4	22.3	23.3	24.2	25.1	26.0	27.0	27.9	3							0.7	0.7		3
4	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	4								0.8	0.8	4
95	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
6	15.4	16.3	17.3	18.2	19.2	20.2	21.1	22.1	23.0	24.0	25.0	25.9	26.9	27.8	28.8	6										6
7	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	7										7
8	15.7	16.7	17.6	18.6	19.6	20.6	21.6	22.5	23.5	24.5	25.5	26.5	27.4	28.4	29.4	8										8
99	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	99										

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