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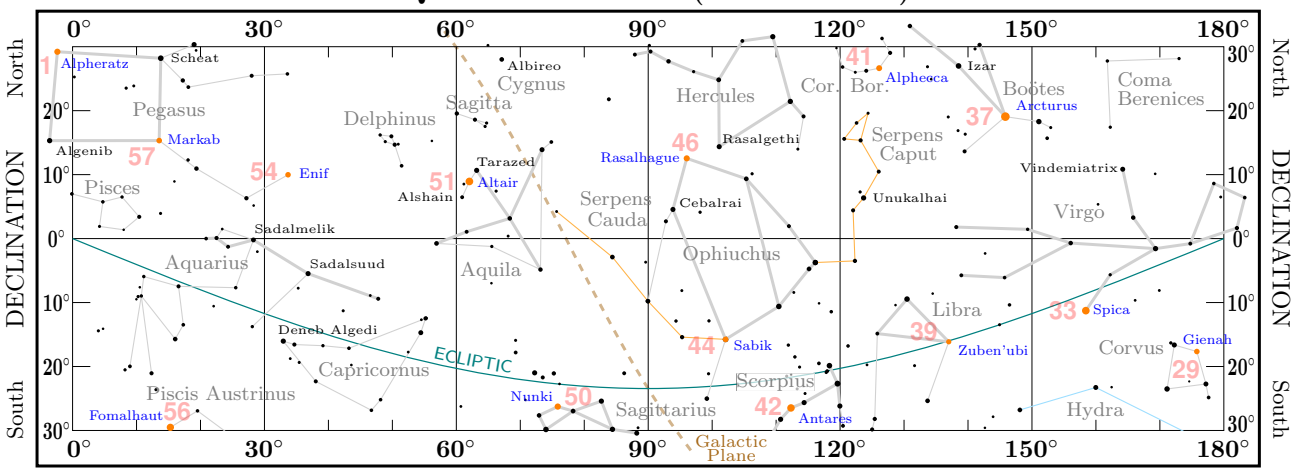
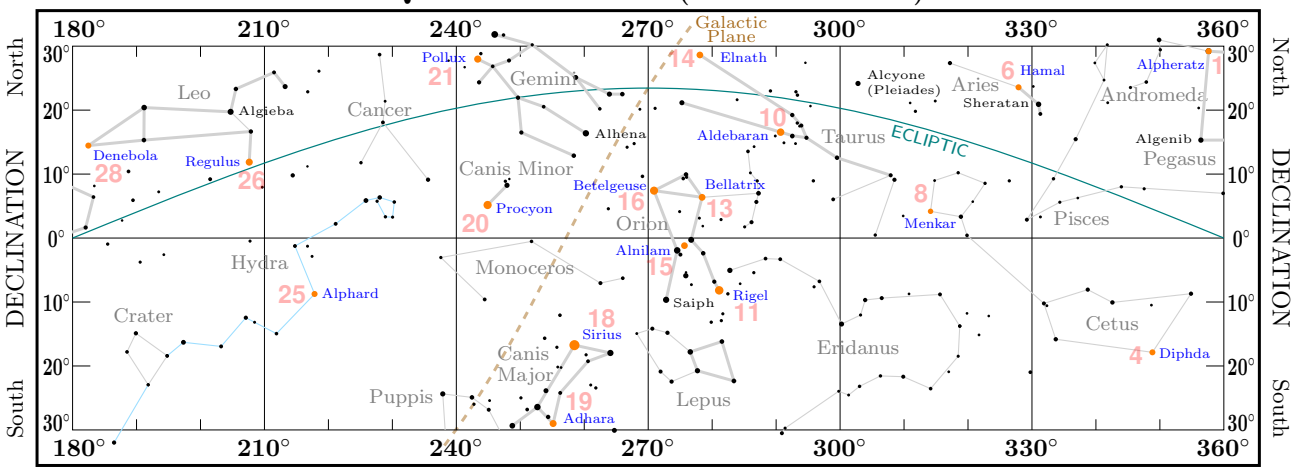
EQUATORIAL STARS (SHA 0° to 180°)



SIDEREAL HOUR ANGLE

EQUATORIAL STARS (SHA 180° to 360°)



SIDEREAL HOUR ANGLE

Lunar Distance

April 2022

Author: Andrew Bauer

May 19, 2022

Lunar Distance

The Lunar Distance method (or the old method of "lunars") is an 18th century technique to find the time, typically to reset ship's clocks or as an emergency procedure. The method uses the Moon's apparent motion relative to the Sun, planets or stars like a clock to find a reference time (e.g. GMT). "Until 1906, the Nautical Almanac included lunar distance tables showing predicted geocentric angular distances between the Moon and selected bodies in 3-hour intervals. After the tables were dropped, lunar distances fell more or less into oblivion."[1]

"The methods are a good deal more laborious than the more commonplace procedures of celestial navigation. It is perhaps the most difficult possible operation within the discipline of celestial navigation. However, one argument for maintaining celestial skills is the utility of celestial navigation as an emergency substitute for electronic navigation."[2] "Nothing else comes close to the lunar for developing skill with a sextant - and the observation is demanding enough to hold one's interest for a lifetime."[3] Thus it is still a valuable process to learn and indeed worthwhile mastering. (A practised user can routinely find the correct time to within ±30 seconds.)

"Because the Moon moves much slower across the sky than the stars, its changing position can be used in sort of a reverse process of sight reduction to find the time."[4] "The basic idea of the lunar distance method is easy to comprehend. Since the Moon moves across the celestial sphere at a rate of about 0.5° per hour, the angular distance between the Moon and a celestial body in her path varies at a similar rate and rapidly enough to be used to measure the time. The time corresponding with an observed lunar distance can be found by comparison with tabulated values."[5] (The continuous motion of the Moon through the sky day-by-day implies that different celestial bodies will be selected for LD measurements on different days.)

The following Lunar Distance tables can contain up to 8 celestial bodies per day (due to the page width limitation). Generally, an attempt is made to include an even number of objects to the east and west of the Moon. The maximum LD angle chosen for inclusion in the tables is 120°, which is about the maximum angle a sextant can measure.

The celestial bodies available for LD measurement include the Sun, four planets (Venus, Mars, Jupiter, Saturn), 21 navigational stars (with magnitude ≤ 1.5) and Polaris.

Three different strategies are available to select suitable celestial bodies for inclusion in a daily LD table:

- pick celestial bodies closest to the Moon
- pick celestial bodies with the highest hourly LD delta (for best accuracy in time determination)
- pick the brightest celestial bodies (possibly easier to locate in the sky)

The celestial body LD angle at a particular hour of day still needs to fulfill several requirements:

- the LD of the Sun is >10° as the Moon is hardly visible during New Moon. (This applies to <u>all</u> celestial bodies)
- the LD of the Sun is >40° (otherwise the Moon is not visible)
- only LD angles <120° are tabulated
- the angle between the celestial body and the Sun ("Solar Distance") is >10° (otherwise the celestial body might not be visible)
- the Sun is not between the celestial body and the Moon (based on the Right Ascenscion of all three)
- the hourly LD delta is $>15'$ of arc (to avoid measurement errors). "The rate of change of LD becomes zero when LD passes through a minimum or maximum, making an observation useless."[6]
- the rate of change of the hourly LD delta does not exceed 0.016° (= 0.96′). This empirical figure removes LD values where linear interpolation (between hours) becomes unreliable.

Suggested further reading: "Stark Tables: For Clearing the Lunar Distance and Finding Universal Time by Sextant Observation" by Bruce Stark, ISBN 978-0-914025-21-4

[1] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances
[2] Eric Romelczyk, The Journal of Navigation, Volume 72, Issue 6
[3] Bruce Stark, page vi, Tables For Clearing the Lunar Distance and Finding Universal Time by Sextant Observation
[4] Bruce Stark, https://www.celestaire.com/product/tables-for-clearing-the-lunar-distance/
[5] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances
[6] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances

DUT1 = UT1-UTC = -0.0995 sec ΔT = TT-UT1 = +69.2835 sec

2022 April 01 to Apr. 03 UT

h — Moon

Fri	GHA	ν	Dec	d	HP	
0	180°32.6	14.1′	S00°11.0	14.9′	56.8′	New Moon
1	195°05.7	14.1′	N00°03.9	14.8′	56.8′	New Moon
2	209°38.9	14.1′	00°18.7	14.8′	56.8′	New Moon
3	224°12.0	14.2′	00°33.5	14.8′	56.8′	New Moon
4	238°45.2	14.2′	00°48.4	14.8′	56.8′	New Moon
5	253°18.3	14.2′	01°03.2	14.8′	56.7′	New Moon
6	267°51.5	14.2′	N01°17.9	14.8′	56.7′	New Moon
7	282°24.8	14.2′	01°32.7	14.7′	56.7′	New Moon
8	296°58.0	14.3′	01°47.5	14.7′	56.7′	New Moon
9	311°31.3	14.3′	02°02.2	14.7′	56.6′	New Moon
10	326°04.5	14.3′	02°16.9	14.7′	56.6′	New Moon
11	340°37.8	14.3′	02°31.6	14.7′	56.6′	New Moon
12	355°11.1	14.3′	N02°46.2	14.6′	56.6′	New Moon
13	9°44.4	14.3′	03°00.9	14.6′	56.5′	New Moon
14	24°17.8	14.3′	03°15.5	14.6′	56.5′	New Moon
15	38°51.1	14.3′	03°30.1	14.6′	56.5′	New Moon
16	53°24.4	14.4′	03°44.6	14.5′	56.5′	New Moon
17	67°57.8	14.4′	03°59.2	14.5′	56.5′	New Moon
18	82°31.1	14.4′	N04°13.7	14.5′	56.4′	New Moon
19	97°04.5	14.4′	04°28.1	14.4′	56.4′	New Moon
20	111°37.9	14.4′	04°42.6	14.4′	56.4′	New Moon
21	126°11.3	14.4′	04°57.0	14.4′	56.4′	New Moon
22	140°44.6	14.4′	05°11.4	14.3′	56.3′	New Moon
23	155°18.0	14.4′	05°25.7	14.3′	56.3′	New Moon
	SD = 15.5′		Mer. pass. 12:20			

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Regulus	-Procyon	-Pollux	-Betelgeuse	-Capella	-Rigel	-Aldebaran	+Achernar
0	169°51.4	14.4′	N05°40.0	14.3′	56.3′	——— New Moon ———							
1	184°24.8	14.4′	05°54.3	14.2′	56.3′	——— New Moon ———							
2	198°58.2	14.4′	06°08.5	14.2′	56.2′		93°05.5	91°42.8	67°07.9	63°48.5	59°03.8	47°56.3	
3	213°31.6	14.4′	06°22.7	14.2′	56.2′		92°35.4	91°10.7	66°37.8	63°18.8	58°39.0	47°24.5	
4	228°05.0	14.4′	06°36.9	14.1′	56.2′		92°05.3	90°38.5	66°07.7	62°49.1	58°14.4	46°52.8	
5	242°38.4	14.4′	06°51.0	14.1′	56.2′		91°35.2	90°06.4	65°37.7	62°19.5	57°49.8	46°21.1	
6	257°11.7	14.4′	N07°05.1	14.0′	56.1′		91°05.1	89°34.3	65°07.7	61°50.0	57°25.3	45°49.5	
7	271°45.1	14.4′	07°19.1	14.0′	56.1′		90°35.1	89°02.2	64°37.8	61°20.5	57°00.9	45°17.8	
8	286°18.5	14.4′	07°33.1	13.9′	56.1′		90°05.1	88°30.2	64°07.9	60°51.1	56°36.6	44°46.3	
9	300°51.9	14.4′	07°47.0	13.9′	56.1′		89°35.1	87°58.2	63°38.0	60°21.7	56°12.4	44°14.7	
10	315°25.2	14.4′	08°00.9	13.9′	56.0′		89°05.2	87°26.2	63°08.2	59°52.3	55°48.3	43°43.2	
11	329°58.6	14.3′	08°14.8	13.8′	56.0′		88°35.2	86°54.3	62°38.5	59°23.1	55°24.4	43°11.7	
12	344°31.9	14.3′	N08°28.6	13.8′	56.0′		88°05.3	86°22.3	62°08.8	58°53.8	55°00.5	42°40.3	
13	359°05.2	14.3′	08°42.3	13.7′	56.0′		87°35.5	85°50.4	61°39.1	58°24.7	54°36.8	42°08.9	
14	13°38.6	14.3′	08°56.0	13.7′	56.0′		87°05.6	85°18.6	61°09.5	57°55.5	54°13.2	41°37.5	
15	28°11.9	14.3′	09°09.7	13.6′	55.9′		86°35.8	84°46.7	60°39.9	57°26.5	53°49.6	41°06.2	
16	42°45.2	14.3′	09°23.3	13.6′	55.9′		86°06.0	84°14.9	60°10.4	56°57.5	53°26.3	40°34.9	
17	57°18.5	14.3′	09°36.9	13.5′	55.9′		85°36.3	83°43.1	59°41.0	56°28.5	53°03.0	40°03.7	
18	71°51.8	14.3′	N09°50.4	13.5′	55.9′	119°31.4	85°06.5	83°11.4	59°11.5	55°59.6	52°39.9	39°32.5	
19	86°25.0	14.2′	10°03.8	13.4′	55.8′	118°59.8	84°36.8	82°39.7	58°42.2	55°30.8	52°16.8	39°01.3	
20	100°58.3	14.2′	10°17.2	13.3′	55.8′	118°28.2	84°07.2	82°08.0	58°12.9	55°02.1	51°54.0	38°30.2	
21	115°31.5	14.2′	10°30.6	13.3′	55.8′	117°56.6	83°37.5	81°36.3	57°43.6	54°33.3	51°31.2	37°59.1	67°49.2
22	130°04.7	14.2′	10°43.9	13.2′	55.8′	117°25.1	83°07.9	81°04.6	57°14.4	54°04.7	51°08.6	37°28.1	68°04.3
23	144°37.9	14.2′	10°57.1	13.2′	55.7′	116°53.6	82°38.3	80°33.0	56°45.2	53°36.1	50°46.1	36°57.1	68°19.5
	SD = 15.4′		Mer. pass. 13:04										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Regulus	-Procyon	-Pollux	-Betelgeuse	-Capella	-Rigel	-Aldebaran	+Achernar
0	159°11.1	14.2′	N11°10.3	13.1′	55.7′	116°22.1	82°08.8	80°01.4	56°16.1	53°07.6	50°23.7	36°26.1	68°34.7
1	173°44.3	14.1′	11°23.4	13.1′	55.7′	115°50.6	81°39.3	79°29.9	55°47.1	52°39.2	50°01.5	35°55.2	68°50.0
2	188°17.4	14.1′	11°36.4	13.0′	55.7′	115°19.2	81°09.8	78°58.3	55°18.1	52°10.8	49°39.5	35°24.3	69°05.4
3	202°50.5	14.1′	11°49.4	12.9′	55.7′	114°47.8	80°40.3	78°26.8	54°49.2	51°42.5	49°17.5	34°53.5	69°20.9
4	217°23.6	14.1′	12°02.4	12.9′	55.6′	114°16.4	80°10.9	77°55.3	54°20.3	51°14.2	48°55.8	34°22.7	69°36.5
5	231°56.7	14.1′	12°15.2	12.8′	55.6′	113°45.1	79°41.5	77°23.9	53°51.5	50°46.0	48°34.2	33°52.0	69°52.1
6	246°29.8	14.0′	N12°28.0	12.7′	55.6′	113°13.7	79°12.1	76°52.5	53°22.8	50°17.9	48°12.7	33°21.3	70°07.7
7	261°02.8	14.0′	12°40.8	12.7′	55.6′	112°42.5	78°42.8	76°21.1	52°54.1	49°49.9	47°51.4	32°50.7	70°23.5
8	275°35.8	14.0′	12°53.5	12.6′	55.5′	112°11.2	78°13.5	75°49.7	52°25.4	49°22.0	47°30.2	32°20.1	70°39.3
9	290°08.8	14.0′	13°06.1	12.5′	55.5′	111°39.9	77°44.3	75°18.4	51°56.9	48°54.1	47°09.2	31°49.6	70°55.1
10	304°41.8	13.9′	13°18.6	12.5′	55.5′	111°08.7	77°15.0	74°47.1	51°28.4	48°26.3	46°48.4	31°19.1	71°11.1
11	319°14.7	13.9′	13°31.1	12.4′	55.5′	110°37.5	76°45.9	74°15.8	50°59.9	47°58.5	46°27.8	30°48.7	71°27.0
12	333°47.7	13.9′	N13°43.5	12.3′	55.5′	110°06.4	76°16.7	73°44.5	50°31.5	47°30.9	46°07.3	30°18.3	71°43.1
13	348°20.6	13.9′	13°55.9	12.3′	55.4′	109°35.2	75°47.6	73°13.3	50°03.2	47°03.3	45°47.0	29°47.9	71°59.2
14	2°53.4	13.8′	14°08.1	12.2′	55.4′	109°04.1	75°18.5	72°42.1	49°35.0	46°35.9	45°26.9	29°17.7	72°15.3
15	17°26.3	13.8′	14°20.3	12.1′	55.4′	108°33.0	74°49.4	72°10.9	49°06.8	46°08.5	45°06.9	28°47.5	72°31.5
16	31°59.1	13.8′	14°32.5	12.1′	55.4′	108°02.0	74°20.4	71°39.7	48°38.7	45°41.1	44°47.1	28°17.3	72°47.8
17	46°31.8	13.7′	14°44.5	12.0′	55.3′	107°30.9	73°51.4	71°08.6	48°10.7	45°13.9	44°27.6	27°47.2	73°04.1
18	61°04.6	13.7′	N14°56.5	11.9′	55.3′	106°59.9	73°22.5	70°37.5	47°42.7	44°46.8	44°08.2	27°17.2	73°20.4
19	75°37.3	13.7′	15°08.4	11.8′	55.3′	106°28.9	72°53.6	70°06.4	47°14.8	44°19.7	43°49.0	26°47.2	73°36.8
20	90°10.0	13.7′	15°20.3	11.8′	55.3′	105°58.0	72°24.7	69°35.4	46°47.0	43°52.8	43°30.0	26°17.3	73°53.3
21	104°42.6	13.6′	15°32.0	11.7′	55.3′	105°27.0	71°55.8	69°04.4	46°19.3	43°25.9	43°11.2	25°47.5	74°09.8
22	119°15.3	13.6′	15°43.7	11.6′	55.2′	104°56.1	71°27.0	68°33.4	45°51.6	42°59.2	42°52.7	25°17.7	74°26.3
23	133°47.9	13.6′	15°55.3	11.5′	55.2′	104°25.2	70°58.3	68°02.4	45°24.0	42°32.5	42°34.3	24°48.0	74°42.9
	SD = 15.2′		Mer. pass. 13:48										

DUT1 = UT1-UTC = -0.1001 sec ΔT = TT-UT1 = +69.2841 sec

2022 April 04 to Apr. 06 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Regulus	-Procyon	-Pollux	-Betelgeuse	-Capella	-Aldebaran	+Sun	+Achernar
0	148°20.4	13.5′	N16°06.8	11.5′	55.2′	103°54.4	70°29.5	67°31.4	44°56.5	42°05.9	24°18.4		74°59.5
1	162°52.9	13.5′	16°18.3	11.4′	55.2′	103°23.5	70°00.8	67°00.5	44°29.1	41°39.5	23°48.9		75°16.1
2	177°25.4	13.5′	16°29.7	11.3′	55.2′	102°52.7	69°32.2	66°29.6	44°01.8	41°13.1	23°19.4		75°32.8
3	191°57.9	13.4′	16°41.0	11.2′	55.1′	102°21.9	69°03.6	65°58.8	43°34.5	40°46.9	22°50.0		75°49.6
4	206°30.3	13.4′	16°52.2	11.1′	55.1′	101°51.2	68°35.0	65°27.9	43°07.3	40°20.8	22°20.7		76°06.3
5	221°02.7	13.4′	17°03.3	11.0′	55.1′	101°20.4	68°06.4	64°57.1	42°40.3	39°54.8	21°51.5		76°23.1
6	235°35.1	13.3′	N17°14.3	11.0′	55.1′	100°49.7	67°37.9	64°26.3	42°13.3	39°28.9	21°22.4		76°40.0
7	250°07.4	13.3′	17°25.3	10.9′	55.1′	100°19.0	67°09.5	63°55.5	41°46.4	39°03.1	20°53.4		76°56.9
8	264°39.7	13.2′	17°36.2	10.8′	55.0′	99°48.4	66°41.1	63°24.8	41°19.6	38°37.4	20°24.6		77°13.8
9	279°11.9	13.2′	17°47.0	10.7′	55.0′	99°17.7	66°12.7	62°54.1	40°52.9	38°11.9	19°55.8		77°30.7
10	293°44.1	13.2′	17°57.7	10.6′	55.0′	98°47.1	65°44.3	62°23.4	40°26.3	37°46.5	19°27.1		77°47.6
11	308°16.3	13.1′	18°08.3	10.5′	55.0′	98°16.5	65°16.0	61°52.7	39°59.8	37°21.3	18°58.6		78°04.6
12	322°48.4	13.1′	N18°18.8	10.4′	55.0′	97°45.9	64°47.8	61°22.1	39°33.4	36°56.1	18°30.2		78°21.6
13	337°20.5	13.1′	18°29.3	10.4′	54.9′	97°15.4	64°19.5	60°51.5	39°07.2	36°31.1	18°01.9		78°38.7
14	351°52.6	13.0′	18°39.7	10.3′	54.9′	96°44.9	63°51.4	60°20.9	38°41.0	36°06.3	17°33.8		78°55.8
15	6°24.6	13.0′	18°49.9	10.2′	54.9′	96°14.4	63°23.2	59°50.3	38°14.9	35°41.6	17°05.9		79°12.8
16	20°56.6	12.9′	19°00.1	10.1′	54.9′	95°43.9	62°55.1	59°19.7	37°49.0	35°17.0	16°38.1		79°30.0
17	35°28.5	12.9′	19°10.2	10.0′	54.9′	95°13.4	62°27.1	58°49.2	37°23.2	34°52.7	16°10.5		79°47.1
18	50°00.4	12.9′	N19°20.2	9.9′	54.9′	94°43.0	61°59.1	58°18.7	36°57.5	34°28.4	15°43.1		80°04.3
19	64°32.3	12.8′	19°30.1	9.8′	54.8′	94°12.6	61°31.1	57°48.2	36°31.9	34°04.4	15°16.0	40°56.5	80°21.4
20	79°04.1	12.8′	19°39.9	9.7′	54.8′	93°42.2	61°03.2	57°17.7	36°06.4	33°40.5	14°49.0	41°24.4	80°38.6
21	93°35.9	12.7′	19°49.6	9.6′	54.8′	93°11.8	60°35.3	56°47.3	35°41.1	33°16.8	14°22.3	41°52.3	80°55.8
22	108°07.6	12.7′	19°59.3	9.5′	54.8′	92°41.5	60°07.5	56°16.9	35°15.9	32°53.2	13°55.9	42°20.2	81°13.1
23	122°39.3	12.7′	20°08.8	9.4′	54.8′	92°11.2	59°39.7	55°46.5	34°50.9	32°29.9	13°29.8	42°48.0	81°30.3
	SD = 15.1′		Mer. pass. 14:34			Sun SD = 16.0′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Regulus	-Procyon	-Pollux	-Betelgeuse	-Capella	-Aldebaran	+Sun	+Achernar
0	137°11.0	12.6′	N20°18.2	9.3′	54.7′	91°40.9	59°12.0	55°16.1	34°26.0	32°06.7	13°04.0	43°15.9	81°47.6
1	151°42.6	12.6′	20°27.6	9.2′	54.7′	91°10.6	58°44.3	54°45.8	34°01.2	31°43.7	12°38.5	43°43.7	82°04.9
2	166°14.2	12.5′	20°36.8	9.1′	54.7′	90°40.3	58°16.6	54°15.4	33°36.6	31°21.0	12°13.4	44°11.5	82°22.1
3	180°45.7	12.5′	20°45.9	9.0′	54.7′	90°10.1	57°49.0	53°45.1	33°12.2	30°58.4	11°48.8	44°39.3	82°39.4
4	195°17.2	12.5′	20°55.0	8.9′	54.7′	89°39.9	57°21.5	53°14.8	32°47.9	30°36.1	11°24.6	45°07.0	82°56.8
5	209°48.7	12.4′	21°03.9	8.8′	54.7′	89°09.7	56°54.0	52°44.6	32°23.8	30°14.0	11°01.0	45°34.8	83°14.1
6	224°20.1	12.4′	N21°12.8	8.7′	54.7′	88°39.5	56°26.5	52°14.3	31°59.9	29°52.1	10°37.9	46°02.5	83°31.4
7	238°51.5	12.3′	21°21.5	8.6′	54.6′	88°09.3	55°59.1	51°44.1	31°36.1	29°30.5	10°15.4	46°30.2	83°48.8
8	253°22.8	12.3′	21°30.2	8.5′	54.6′	87°39.2	55°31.8	51°13.9	31°12.5	29°09.1	9°53.7	46°57.9	84°06.1
9	267°54.1	12.3′	21°38.7	8.4′	54.6′	87°09.1	55°04.5	50°43.7	30°49.1	28°48.0	9°32.7	47°25.6	84°23.5
10	282°25.4	12.2′	21°47.2	8.3′	54.6′	86°39.0	54°37.2	50°13.5	30°25.9	28°27.1	9°12.6	47°53.2	84°40.8
11	296°56.6	12.2′	21°55.5	8.2′	54.6′	86°08.9	54°10.0	49°43.4	30°03.0	28°06.5	8°53.4	48°20.9	84°58.2
12	311°27.7	12.1′	N22°03.7	8.1′	54.6′	85°38.8	53°42.9	49°13.3	29°40.2	27°46.2		48°48.5	85°15.6
13	325°58.9	12.1′	22°11.9	8.0′	54.5′	85°08.8	53°15.8	48°43.2	29°17.6	27°26.1		49°16.1	85°33.0
14	340°29.9	12.0′	22°19.9	7.9′	54.5′	84°38.8	52°48.8	48°13.1	28°55.3	27°06.4		49°43.7	85°50.4
15	355°01.0	12.0′	22°27.8	7.8′	54.5′	84°08.7	52°21.8	47°43.0	28°33.1	26°47.0		50°11.3	86°07.8
16	9°32.0	12.0′	22°35.6	7.7′	54.5′	83°38.8	51°54.9	47°12.9	28°11.3	26°27.9		50°38.8	86°25.1
17	24°03.0	11.9′	22°43.3	7.6′	54.5′	83°08.8	51°28.0	46°42.9	27°49.6	26°09.1		51°06.4	86°42.5
18	38°33.9	11.9′	N22°50.9	7.5′	54.5′	82°38.8	51°01.2	46°12.9	27°28.3	25°50.6		51°33.9	86°59.9
19	53°04.8	11.8′	22°58.4	7.4′	54.5′	82°08.9	50°34.4	45°42.9	27°07.2	25°32.6		52°01.4	87°17.3
20	67°35.6	11.8′	23°05.8	7.3′	54.5′	81°39.0	50°07.7	45°12.9	26°46.3	25°14.8		52°28.9	87°34.7
21	82°06.4	11.8′	23°13.1	7.2′	54.4′	81°09.1	49°41.1	44°42.9	26°25.8	24°57.5		52°56.4	87°52.1
22	96°37.2	11.7′	23°20.3	7.1′	54.4′	80°39.2	49°14.6	44°13.0	26°05.5	24°40.6		53°23.8	88°09.5
23	111°07.9	11.7′	23°27.3	6.9′	54.4′	80°09.3	48°48.1	43°43.1	25°45.6	24°24.0		53°51.3	88°26.9
	SD = 14.9′		Mer. pass. 15:21			Sun SD = 16.0′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Arcturus	-Regulus	-Procyon	-Pollux	-Betelgeuse	+Aldebaran	+Sun	+Achernar
0	125°38.6	11.6′	N23°34.3	6.8′	54.4′		79°39.4	48°21.6	43°13.1	25°25.9		54°18.7	88°44.2
1	140°09.2	11.6′	23°41.1	6.7′	54.4′		79°09.6	47°55.2	42°43.2	25°06.6		54°46.1	89°01.6
2	154°39.8	11.6′	23°47.8	6.6′	54.4′		78°39.8	47°28.9	42°13.4	24°47.7		55°13.5	89°19.0
3	169°10.4	11.5′	23°54.4	6.5′	54.4′		78°10.0	47°02.7	41°43.5	24°29.0		55°40.9	89°36.3
4	183°40.9	11.5′	24°00.9	6.4′	54.4′		77°40.2	46°36.5	41°13.6	24°10.8		56°08.3	89°53.7
5	198°11.4	11.4′	24°07.3	6.3′	54.3′		77°10.4	46°10.4	40°43.8	23°52.9		56°35.6	90°11.0
6	212°41.8	11.4′	N24°13.6	6.2′	54.3′		76°40.6	45°44.4	40°14.0	23°35.4		57°03.0	90°28.4
7	227°12.2	11.4′	24°19.8	6.0′	54.3′		76°10.9	45°18.4	39°44.2	23°18.3		57°30.3	90°45.7
8	241°42.6	11.3′	24°25.8	5.9′	54.3′		75°41.1	44°52.5	39°14.4	23°01.7		57°57.7	91°03.0
9	256°13.0	11.3′	24°31.7	5.8′	54.3′		75°11.4	44°26.7	38°44.6	22°45.4		58°25.0	91°20.3
10	270°43.3	11.3′	24°37.5	5.7′	54.3′		74°41.7	44°01.0	38°14.8	22°29.6		58°52.3	91°37.6
11	285°13.5	11.2′	24°43.2	5.6′	54.3′		74°12.0	43°35.4	37°45.1	22°14.3	9°30.2	59°19.6	91°54.9
12	299°43.8	11.2′	N24°48.8	5.5′	54.3′		73°42.3	43°09.8	37°15.3		9°50.8	59°46.8	92°12.2
13	314°13.9	11.2′	24°54.3	5.3′	54.3′		73°12.6	42°44.3	36°45.6		10°12.1	60°14.1	92°29.4
14	328°44.1	11.1′	24°59.6	5.2′	54.3′	119°57.2	72°43.0	42°18.9	36°15.9		10°34.1	60°41.4	92°46.7
15	343°14.2	11.1′	25°04.8	5.1′	54.3′	119°32.2	72°13.3	41°53.6	35°46.2		10°56.7	61°08.6	93°03.9
16	357°44.3	11.1′	25°09.9	5.0′	54.2′	119°07.2	71°43.7	41°28.4	35°16.5		11°19.8	61°35.9	93°21.1
17	12°14.4	11.0′	25°14.9	4.9′	54.2′	118°42.1	71°14.0	41°03.3	34°46.8		11°43.4	62°03.1	93°38.3
18	26°44.4	11.0′	N25°19.8	4.7′	54.2′	118°17.0	70°44.4	40°38.2	34°17.2		12°07.5	62°30.3	93°55.5
19	41°14.4	11.0′	25°24.5	4.6′	54.2′	117°51.9	70°14.8	40°13.3	33°47.5		12°31.9	62°57.5	94°12.7
20	55°44.4	10.9′	25°29.2	4.5′	54.2′	117°26.7	69°45.2	39°48.4	33°17.9		12°56.7	63°24.7	94°29.8
21	70°14.3	10.9′	25°33.7	4.4′	54.2′	117°01.6	69°15.6	39°23.7	32°48.2		13°21.8	63°51.9	94°46.9
22	84°44.2	10.9′	25°38.1	4.3′	54.2′	116°36.4	68°46.1	38°59.1	32°18.6		13°47.2	64°19.1	95°04.0
23	99°14.1	10.8′	25°42.3	4.1′	54.2′	116°11.1	68°16.5	38°34.5	31°49.0		14°12.9	64°46.3	95°21.1
	SD = 14.8′		Mer. pass. 16:09			Sun SD = 16.0′							

DUT1 = UT1-UTC = -0.0991 sec ΔT = TT-UT1 = +69.2831 sec

2022 April 07 to Apr. 09 UT

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Thu	**GHA**	ν	**Dec**	d	**HP**	**-Spica**	**-Arcturus**	**-Regulus**	**-Procyon**	**-Pollux**	**+Aldebaran**	**+Sun**	**+Achernar**
0	113°43.9	10.8′	N25°46.5	4.0′	54.2′		115°45.9	67°46.9	38°10.1	31°19.4	14°38.8	65°13.4	95°38.2
1	128°13.7	10.8′	25°50.5	3.9′	54.2′		115°20.6	67°17.4	37°45.8	30°49.8	15°04.9	65°40.6	95°55.2
2	142°43.5	10.8′	25°54.4	3.8′	54.2′		114°55.2	66°47.8	37°21.6	30°20.2	15°31.3	66°07.7	96°12.3
3	157°13.3	10.7′	25°58.2	3.7′	54.2′		114°29.9	66°18.3	36°57.6	29°50.7	15°57.8	66°34.9	96°29.3
4	171°43.0	10.7′	26°01.8	3.5′	54.2′	119°52.6	114°04.5	65°48.8	36°33.6	29°21.1	16°24.5	67°02.0	96°46.2
5	186°12.7	10.7′	26°05.3	3.4′	54.2′	119°23.1	113°39.1	65°19.3	36°09.8	28°51.6	16°51.3	67°29.2	97°03.2
6	200°42.4	10.7′	N26°08.7	3.3′	54.2′	118°53.6	113°13.7	64°49.7	35°46.1	28°22.0	17°18.3	67°56.3	97°20.1
7	215°12.0	10.6′	26°12.0	3.2′	54.2′	118°24.1	112°48.3	64°20.2	35°22.5	27°52.5	17°45.4	68°23.4	97°37.0
8	229°41.7	10.6′	26°15.2	3.0′	54.2′	117°54.6	112°22.8	63°50.7	34°59.1	27°23.0	18°12.6	68°50.5	97°53.9
9	244°11.3	10.6′	26°18.2	2.9′	54.2′	117°25.1	111°57.3	63°21.3	34°35.8	26°53.4	18°40.0	69°17.6	98°10.7
10	258°40.9	10.6′	26°21.1	2.8′	54.2′	116°55.6	111°31.8	62°51.8	34°12.7	26°23.9	19°07.4	69°44.7	98°27.6
11	273°10.4	10.5′	26°23.9	2.7′	54.2′	116°26.1	111°06.3	62°22.3	33°49.7	25°54.4	19°35.0	70°11.8	98°44.4
12	287°40.0	10.5′	N26°26.5	2.5′	54.2′	115°56.6	110°40.7	61°52.8	33°26.9	25°25.0	20°02.6	70°38.9	99°01.1
13	302°09.5	10.5′	26°29.1	2.4′	54.1′	115°27.1	110°15.2	61°23.3	33°04.3	24°55.5	20°30.3	71°06.0	99°17.9
14	316°39.0	10.5′	26°31.4	2.3′	54.1′	114°57.7	109°49.6	60°53.9	32°41.8	24°26.0	20°58.1	71°33.1	99°34.6
15	331°08.5	10.5′	26°33.7	2.1′	54.1′	114°28.2	109°23.9	60°24.4	32°19.4	23°56.5	21°26.0	72°00.2	99°51.2
16	345°38.0	10.4′	26°35.9	2.0′	54.1′	113°58.7	108°58.3	59°55.0	31°57.3	23°27.1	21°53.9	72°27.3	100°07.9
17	0°07.4	10.4′	26°37.9	1.9′	54.1′	113°29.2	108°32.7	59°25.5	31°35.3	22°57.6	22°21.9	72°54.4	100°24.5
18	14°36.8	10.4′	N26°39.8	1.8′	54.1′	112°59.8	108°07.0	58°56.1	31°13.6	22°28.2	22°50.0	73°21.5	100°41.1
19	29°06.3	10.4′	26°41.5	1.6′	54.1′	112°30.3	107°41.3	58°26.6	30°52.0	21°58.7	23°18.1	73°48.6	100°57.6
20	43°35.7	10.4′	26°43.2	1.5′	54.1′	112°00.8	107°15.6	57°57.2	30°30.6	21°29.3	23°46.3	74°15.6	101°14.1
21	58°05.0	10.4′	26°44.7	1.4′	54.1′	111°31.3	106°49.8	57°27.7	30°09.4	20°59.9	24°14.5	74°42.7	101°30.6
22	72°34.4	10.4′	26°46.1	1.3′	54.1′	111°01.9	106°24.1	56°58.3	29°48.5	20°30.5	24°42.8	75°09.8	101°47.0
23	87°03.8	10.4′	26°47.3	1.1′	54.1′	110°32.4	105°58.3	56°28.9	29°27.8	20°01.1	25°11.1	75°36.9	102°03.4
	SD = 14.8′		Mer. pass. 16:59			Sun SD = 16.0′							

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Fri	**GHA**	ν	**Dec**	d	**HP**	**-Spica**	**-Arcturus**	**-Regulus**	**-Pollux**	**+Betelgeuse**	**+Capella**	**+Aldebaran**	**+Sun**
0	101°33.1	10.3′	N26°48.5	1.0′	54.1′	110°02.9	105°32.5	55°59.4	19°31.7			25°39.5	76°04.0
1	116°02.5	10.3′	26°49.5	0.9′	54.1′	109°33.5	105°06.7	55°30.0	19°02.3			26°07.9	76°31.1
2	130°31.8	10.3′	26°50.3	0.7′	54.2′	109°04.0	104°40.9	55°00.6	18°32.9			26°36.4	76°58.1
3	145°01.1	10.3′	26°51.1	0.6′	54.2′	108°34.5	104°15.1	54°31.1	18°03.5			27°04.9	77°25.2
4	159°30.4	10.3′	26°51.7	0.5′	54.2′	108°05.0	103°49.2	54°01.7	17°34.2			27°33.4	77°52.3
5	173°59.8	10.3′	26°52.2	0.4′	54.2′	107°35.6	103°23.4	53°32.3	17°04.8		23°49.6	28°01.9	78°19.4
6	188°29.1	10.3′	N26°52.5	0.2′	54.2′	107°06.1	102°57.5	53°02.9	16°35.5		24°05.1	28°30.5	78°46.5
7	202°58.3	10.3′	26°52.7	0.1′	54.2′	106°36.6	102°31.6	52°33.4	16°06.2		24°20.9	28°59.2	79°13.6
8	217°27.6	10.3′	26°52.8	-0.0′	54.2′	106°07.1	102°05.7	52°04.0	15°36.9		24°37.2	29°27.8	79°40.7
9	231°56.9	10.3′	26°52.8	-0.2′	54.2′	105°37.6	101°39.7	51°34.6	15°07.6		24°53.8	29°56.5	80°07.8
10	246°26.2	10.3′	26°52.6	-0.3′	54.2′	105°08.1	101°13.8	51°05.1	14°38.3		25°10.9	30°25.2	80°34.9
11	260°55.5	10.3′	26°52.3	-0.4′	54.2′	104°38.6	100°47.8	50°35.7	14°09.0	22°23.8	25°28.2	30°54.0	81°02.0
12	275°24.8	10.3′	N26°51.9	-0.5′	54.2′	104°09.1	100°21.8	50°06.3	13°39.8	22°39.3	25°46.0	31°22.8	81°29.1
13	289°54.0	10.3′	26°51.4	-0.7′	54.2′	103°39.6	99°55.9	49°36.8	13°10.5	22°55.3	26°04.1	31°51.6	81°56.2
14	304°23.3	10.3′	26°50.7	-0.8′	54.2′	103°10.1	99°29.8	49°07.4	12°41.3	23°11.7	26°22.5	32°20.4	82°23.3
15	318°52.6	10.3′	26°49.9	-0.9′	54.2′	102°40.6	99°03.8	48°37.9	12°12.2	23°28.4	26°41.2	32°49.3	82°50.5
16	333°21.9	10.3′	26°48.9	-1.1′	54.2′	102°11.0	98°37.8	48°08.5	11°43.0	23°45.6	27°00.2	33°18.1	83°17.6
17	347°51.2	10.3′	26°47.9	-1.2′	54.2′	101°41.5	98°11.7	47°39.0	11°13.9	24°03.2	27°19.5	33°47.1	83°44.8
18	2°20.5	10.3′	N26°46.7	-1.3′	54.2′	101°12.0	97°45.7	47°09.6	10°44.9	24°21.1	27°39.1	34°16.0	84°11.9
19	16°49.8	10.3′	26°45.4	-1.5′	54.2′	100°42.4	97°19.6	46°40.1	10°15.8	24°39.4	27°59.0	34°44.9	84°39.1
20	31°19.0	10.3′	26°43.9	-1.6′	54.2′	100°12.8	96°53.5	46°10.7	9°46.9	24°58.1	28°19.1	35°13.9	85°06.2
21	45°48.4	10.3′	26°42.3	-1.7′	54.2′	99°43.3	96°27.4	45°41.2	9°18.0	25°17.1	28°39.5	35°42.9	85°33.4
22	60°17.7	10.3′	26°40.6	-1.8′	54.3′	99°13.7	96°01.3	45°11.7	8°49.2	25°36.4	29°00.2	36°12.0	86°00.6
23	74°47.0	10.3′	26°38.8	-2.0′	54.3′	98°44.1	95°35.1	44°42.2	8°20.4	25°56.0	29°21.1	36°41.0	86°27.8
	SD = 14.8′		Mer. pass. 17:50			Sun SD = 16.0′							

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Sat	**GHA**	ν	**Dec**	d	**HP**	**-Spica**	**-Arcturus**	**-Regulus**	**-Pollux**	**+Betelgeuse**	**+Capella**	**+Aldebaran**	**+Sun**
0	89°16.3	10.3′	N26°36.8	-2.1′	54.3′	98°14.5	95°09.0	44°12.8	7°51.8	26°15.9	29°42.2	37°10.1	86°55.0
1	103°45.6	10.3′	26°34.7	-2.2′	54.3′	97°44.9	94°42.8	43°43.3	7°23.3	26°36.1	30°03.6	37°39.2	87°22.2
2	118°15.0	10.4′	26°32.5	-2.4′	54.3′	97°15.3	94°16.7	43°13.8	6°55.0	26°56.6	30°25.1	38°08.3	87°49.4
3	132°44.4	10.4′	26°30.1	-2.5′	54.3′	96°45.7	93°50.5	42°44.3	6°26.9	27°17.3	30°46.9	38°37.4	88°16.6
4	147°13.7	10.4′	26°27.6	-2.6′	54.3′	96°16.1	93°24.3	42°14.8	5°59.0	27°38.3	31°08.9	39°06.6	88°43.8
5	161°43.1	10.4′	26°25.0	-2.7′	54.3′	95°46.4	92°58.1	41°45.3	5°31.4	27°59.6	31°31.1	39°35.8	89°11.1
6	176°12.5	10.4′	N26°22.3	-2.9′	54.3′	95°16.8	92°31.8	41°15.7	5°04.2	28°21.1	31°53.5	40°05.0	89°38.4
7	190°41.9	10.4′	26°19.4	-3.0′	54.3′	94°47.1	92°05.6	40°46.2	4°37.5	28°42.8	32°16.1	40°34.2	90°05.6
8	205°11.3	10.4′	26°16.4	-3.1′	54.3′	94°17.5	91°39.4	40°16.7	4°11.5	29°04.7	32°38.8	41°03.5	90°32.9
9	219°40.8	10.5′	26°13.3	-3.2′	54.4′	93°47.8	91°13.1	39°47.1	3°46.4	29°26.9	33°01.7	41°32.8	91°00.2
10	234°10.2	10.5′	26°10.1	-3.4′	54.4′	93°18.1	90°46.8	39°17.6		29°49.3	33°24.8	42°02.0	91°27.5
11	248°39.7	10.5′	26°06.7	-3.5′	54.4′	92°48.4	90°20.5	38°48.0		30°11.9	33°48.1	42°31.4	91°54.8
12	263°09.2	10.5′	N26°03.2	-3.6′	54.4′	92°18.6	89°54.2	38°18.5		30°34.7	34°11.5	43°00.7	92°22.2
13	277°38.7	10.5′	25°59.6	-3.8′	54.4′	91°48.9	89°27.9	37°48.9		30°57.7	34°35.1	43°30.1	92°49.5
14	292°08.2	10.5′	25°55.8	-3.9′	54.4′	91°19.1	89°01.6	37°19.3		31°20.8	34°58.8	43°59.5	93°16.9
15	306°37.8	10.6′	25°51.9	-4.0′	54.4′	90°49.4	88°35.3	36°49.8		31°44.2	35°22.7	44°28.9	93°44.3
16	321°07.4	10.6′	25°47.9	-4.1′	54.4′	90°19.6	88°08.9	36°20.2		32°07.7	35°46.7	44°58.3	94°11.6
17	335°36.9	10.6′	25°43.8	-4.3′	54.5′	89°49.8	87°42.6	35°50.6		32°31.4	36°10.8	45°27.7	94°39.1
18	350°06.6	10.6′	N25°39.5	-4.4′	54.5′	89°20.0	87°16.2	35°21.0		32°55.2	36°35.1	45°57.2	95°06.5
19	4°36.2	10.7′	25°35.2	-4.5′	54.5′	88°50.1	86°49.8	34°51.3		33°19.2	36°59.5	46°26.7	95°33.9
20	19°05.9	10.7′	25°30.7	-4.6′	54.5′	88°20.3	86°23.4	34°21.7		33°43.4	37°24.1	46°56.2	96°01.4
21	33°35.5	10.7′	25°26.0	-4.8′	54.5′	87°50.4	85°57.0	33°52.1		34°07.7	37°48.7	47°25.8	96°28.8
22	48°05.2	10.7′	25°21.3	-4.9′	54.5′	87°20.6	85°30.6	33°22.4		34°32.1	38°13.5	47°55.3	96°56.3
23	62°35.0	10.8′	25°16.4	-5.0′	54.5′	86°50.7	85°04.2	32°52.8		34°56.7	38°38.4	48°24.9	97°23.8
	SD = 14.8′		Mer. pass. 18:41			Sun SD = 16.0′							

DUT1 = UT1-UTC = -0.0974 sec ΔT = TT-UT1 = +69.2814 sec

2022 April 10 to Apr. 12 UT

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Rigil Kent.	-Spica	-Arcturus	-Regulus	+Pollux	+Capella	+Aldebaran	+Sun
0	77°04.7	10.8′	N25°11.4	-5.1′	54.6′	116°13.9	86°20.7	84°37.8	32°23.1	4°51.8	39°03.5	48°54.6	97°51.4
1	91°34.5	10.8′	25°06.3	-5.2′	54.6′	115°53.7	85°50.8	84°11.3	31°53.4	5°19.1	39°28.6	49°24.2	98°18.9
2	106°04.3	10.8′	25°01.0	-5.4′	54.6′	115°33.5	85°20.9	83°44.9	31°23.8	5°46.8	39°53.8	49°53.9	98°46.5
3	120°34.1	10.9′	24°55.7	-5.5′	54.6′	115°13.2	84°50.9	83°18.4	30°54.1	6°14.8	40°19.2	50°23.5	99°14.0
4	135°04.0	10.9′	24°50.2	-5.6′	54.6′	114°52.8	84°20.9	82°51.9	30°24.4	6°43.2	40°44.7	50°53.2	99°41.6
5	149°33.9	10.9′	24°44.6	-5.7′	54.6′	114°32.3	83°50.9	82°25.5	29°54.7	7°11.8	41°10.2	51°23.0	100°09.3
6	164°03.8	10.9′	N24°38.9	-5.9′	54.7′	114°11.8	83°20.9	81°59.0	29°25.0	7°40.7	41°35.9	51°52.7	100°36.9
7	178°33.7	11.0′	24°33.0	-6.0′	54.7′	113°51.2	82°50.8	81°32.5	28°55.3	8°09.7	42°01.6	52°22.5	101°04.6
8	193°03.7	11.0′	24°27.0	-6.1′	54.7′	113°30.5	82°20.8	81°06.0	28°25.6	8°38.9	42°27.5	52°52.3	101°32.2
9	207°33.7	11.0′	24°20.9	-6.2′	54.7′	113°09.7	81°50.7	80°39.4	27°55.8	9°08.1	42°53.5	53°22.2	101°59.9
10	222°03.7	11.1′	24°14.7	-6.3′	54.7′	112°48.9	81°20.6	80°12.9	27°26.1	9°37.5	43°19.5	53°52.0	102°27.7
11	236°33.8	11.1′	24°08.4	-6.4′	54.8′	112°27.9	80°50.4	79°46.4	26°56.4	10°07.0	43°45.6	54°21.9	102°55.4
12	251°03.9	11.1′	N24°02.0	-6.6′	54.8′	112°07.0	80°20.3	79°19.8	26°26.6	10°36.6	44°11.8	54°51.8	103°23.2
13	265°34.0	11.2′	23°55.4	-6.7′	54.8′	111°45.9	79°50.1	78°53.3	25°56.9	11°06.3	44°38.2	55°21.8	103°51.0
14	280°04.2	11.2′	23°48.7	-6.8′	54.8′	111°24.8	79°19.9	78°26.7	25°27.1	11°36.0	45°04.6	55°51.7	104°18.8
15	294°34.4	11.2′	23°41.9	-6.9′	54.8′	111°03.6	78°49.7	78°00.1	24°57.4	12°05.8	45°31.0	56°21.7	104°46.6
16	309°04.6	11.2′	23°35.0	-7.0′	54.8′	110°42.3	78°19.5	77°33.6	24°27.6	12°35.7	45°57.6	56°51.7	105°14.5
17	323°34.8	11.3′	23°27.9	-7.2′	54.9′	110°20.9	77°49.2	77°07.0	23°57.9	13°05.6	46°24.2	57°21.8	105°42.4
18	338°05.1	11.3′	N23°20.8	-7.3′	54.9′	109°59.5	77°18.9	76°40.4	23°28.1	13°35.6	46°51.0	57°51.9	106°10.3
19	352°35.4	11.3′	23°13.5	-7.4′	54.9′	109°38.1	76°48.6	76°13.8	22°58.4	14°05.7	47°17.8	58°22.0	106°38.2
20	7°05.8	11.4′	23°06.2	-7.5′	54.9′	109°16.5	76°18.3	75°47.2	22°28.7	14°35.8	47°44.6	58°52.1	107°06.1
21	21°36.1	11.4′	22°58.7	-7.6′	55.0′	108°54.9	75°47.9	75°20.6	21°58.9	15°05.9	48°11.6	59°22.2	107°34.1
22	36°06.5	11.4′	22°51.0	-7.7′	55.0′	108°33.3	75°17.5	74°54.0	21°29.2	15°36.1	48°38.6	59°52.4	108°02.1
23	50°37.0	11.5′	22°43.3	-7.8′	55.0′	108°11.5	74°47.1	74°27.4	20°59.5	16°06.3	49°05.7	60°22.6	108°30.2
	SD = 14.9′		Mer. pass. 19:31			Sun SD = 16.0′							

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Antares	-Spica	-Arcturus	-Regulus	+Pollux	+Betelgeuse	+Aldebaran	+Sun
0	65°07.5	11.5′	N22°35.5	-7.9′	55.0′		74°16.7	74°00.7	20°29.8	16°36.6	45°47.9	60°52.9	108°58.2
1	79°38.0	11.5′	22°27.5	-8.1′	55.0′	119°39.4	73°46.2	73°34.1	20°00.1	17°06.9	46°15.1	61°23.1	109°26.3
2	94°08.5	11.6′	22°19.5	-8.2′	55.1′	119°08.9	73°15.7	73°07.5	19°30.4	17°37.2	46°42.5	61°53.4	109°54.4
3	108°39.1	11.6′	22°11.3	-8.3′	55.1′	118°38.3	72°45.2	72°40.8	19°00.7	18°07.6	47°09.8	62°23.8	110°22.5
4	123°09.7	11.6′	22°03.0	-8.4′	55.1′	118°07.7	72°14.7	72°14.2	18°31.1	18°38.1	47°37.3	62°54.1	110°50.7
5	137°40.4	11.7′	21°54.6	-8.5′	55.1′	117°37.1	71°44.1	71°47.6	18°01.5	19°08.5	48°04.9	63°24.5	111°18.9
6	152°11.0	11.7′	N21°46.1	-8.6′	55.2′	117°06.5	71°13.5	71°20.9	17°31.9	19°39.0	48°32.5	63°54.9	111°47.1
7	166°41.8	11.7′	21°37.5	-8.7′	55.2′	116°35.8	70°42.9	70°54.3	17°02.4	20°09.6	49°00.2	64°25.4	112°15.4
8	181°12.5	11.8′	21°28.8	-8.8′	55.2′	116°05.1	70°12.2	70°27.6	16°32.9	20°40.2	49°27.9	64°55.9	112°43.7
9	195°43.3	11.8′	21°20.0	-8.9′	55.2′	115°34.3	69°41.6	70°01.0	16°03.4	21°10.8	49°55.7	65°26.4	113°12.0
10	210°14.1	11.8′	21°11.1	-9.0′	55.3′	115°03.6	69°10.9	69°34.4	15°34.0	21°41.4	50°23.6	65°56.9	113°40.3
11	224°45.0	11.9′	21°02.0	-9.1′	55.3′	114°32.8	68°40.1	69°07.7	15°04.7	22°12.1	50°51.6	66°27.5	114°08.7
12	239°15.8	11.9′	N20°52.9	-9.3′	55.3′	114°02.0	68°09.4	68°41.1	14°35.5	22°42.9	51°19.6	66°58.1	114°37.1
13	253°46.8	12.0′	20°43.6	-9.4′	55.3′	113°31.1	67°38.6	68°14.4	14°06.3	23°13.6	51°47.7	67°28.7	115°05.5
14	268°17.7	12.0′	20°34.3	-9.5′	55.4′	113°00.2	67°07.7	67°47.8	13°37.2	23°44.4	52°15.9	67°59.4	115°33.9
15	282°48.7	12.0′	20°24.8	-9.6′	55.4′	112°29.3	66°36.9	67°21.1	13°08.3	24°15.3	52°44.1	68°30.1	116°02.4
16	297°19.7	12.1′	20°15.2	-9.7′	55.4′	111°58.4	66°06.0	66°54.5	12°39.5	24°46.1	53°12.4	69°00.9	116°30.9
17	311°50.8	12.1′	20°05.6	-9.8′	55.4′	111°27.4	65°35.1	66°27.9	12°10.8	25°17.1	53°40.8	69°31.6	116°59.5
18	326°21.8	12.1′	N19°55.8	-9.9′	55.5′	110°56.4	65°04.1	66°01.3	11°42.3	25°48.0	54°09.2	70°02.4	117°28.1
19	340°53.0	12.1′	19°45.9	-10.0′	55.5′	110°25.3	64°33.2	65°34.7	11°13.9	26°19.0	54°37.7	70°33.3	117°56.7
20	355°24.1	12.2′	19°35.9	-10.1′	55.5′	109°54.2	64°02.2	65°08.0	10°45.8	26°50.0	55°06.2	71°04.1	118°25.3
21	9°55.3	12.2′	19°25.9	-10.2′	55.5′	109°23.1	63°31.1	64°41.4	10°18.0	27°21.1	55°34.8	71°35.0	118°54.0
22	24°26.5	12.2′	19°15.7	-10.3′	55.6′	108°52.0	63°00.1	64°14.8	9°50.4	27°52.1	56°03.5	72°06.0	119°22.7
23	38°57.7	12.3′	19°05.4	-10.4′	55.6′	108°20.8	62°29.0	63°48.3	9°23.2	28°23.3	56°32.2	72°36.9	119°51.4
	SD = 15.0′		Mer. pass. 20:19			Sun SD = 16.0′							

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Antares	-Arcturus	-Spica	-Regulus	+Pollux	+Betelgeuse	+Capella	+Aldebaran
0	53°29.0	12.3′	N18°55.0	-10.5′	55.6′	107°49.6	63°21.7	61°57.8	8°56.5	28°54.4	57°01.0	60°44.6	73°07.9
1	68°00.3	12.3′	18°44.6	-10.6′	55.7′	107°18.4	62°55.1	61°26.7	8°30.1	29°25.6	57°29.8	61°13.4	73°39.0
2	82°31.7	12.4′	18°34.0	-10.7′	55.7′	106°47.1	62°28.6	60°55.5	8°04.4	29°56.9	57°58.7	61°42.2	74°10.1
3	97°03.0	12.4′	18°23.3	-10.8′	55.7′	106°15.8	62°02.0	60°24.2	7°39.3	30°28.2	58°27.7	62°11.0	74°41.2
4	111°34.4	12.4′	18°12.6	-10.9′	55.7′	105°44.4	61°35.5	59°53.0	7°15.0	30°59.5	58°56.7	62°39.9	75°12.3
5	126°05.9	12.5′	18°01.7	-11.0′	55.8′	105°13.0	61°09.0	59°21.7	6°51.6	31°30.8	59°25.8	63°08.9	75°43.5
6	140°37.3	12.5′	N17°50.8	-11.0′	55.8′	104°41.6	60°42.5	58°50.3		32°02.2	59°54.9	63°37.9	76°14.7
7	155°08.8	12.5′	17°39.7	-11.1′	55.8′	104°10.2	60°16.1	58°19.0		32°33.6	60°24.1	64°06.9	76°46.0
8	169°40.3	12.5′	17°28.6	-11.2′	55.9′	103°38.7	59°49.6	57°47.6		33°05.1	60°53.3	64°36.1	77°17.3
9	184°11.9	12.6′	17°17.4	-11.3′	55.9′	103°07.2	59°23.2	57°16.2		33°36.6	61°22.6	65°05.2	77°48.6
10	198°43.5	12.6′	17°06.0	-11.4′	55.9′	102°35.6	58°56.8	56°44.7		34°08.1	61°51.9	65°34.5	78°19.9
11	213°15.1	12.6′	16°54.6	-11.5′	55.9′	102°04.0	58°30.4	56°13.2		34°39.7	62°21.4	66°03.7	78°51.3
12	227°46.7	12.7′	N16°43.1	-11.6′	56.0′	101°32.4	58°04.0	55°41.7		35°11.3	62°50.8	66°33.1	79°22.8
13	242°18.4	12.7′	16°31.5	-11.7′	56.0′	101°00.7	57°37.7	55°10.1		35°42.9	63°20.3	67°02.4	79°54.2
14	256°50.0	12.7′	16°19.9	-11.8′	56.0′	100°29.0	57°11.4	54°38.5		36°14.6	63°49.9	67°31.9	80°25.7
15	271°21.7	12.7′	16°08.1	-11.9′	56.1′	99°57.3	56°45.1	54°06.9		36°46.3	64°19.5	68°01.4	80°57.3
16	285°53.5	12.8′	15°56.2	-11.9′	56.1′	99°25.5	56°18.8	53°35.2		37°18.1	64°49.2	68°30.9	81°28.9
17	300°25.2	12.8′	15°44.3	-12.0′	56.1′	98°53.7	55°52.6	53°03.5		37°49.9	65°18.9	69°00.5	82°00.5
18	314°57.0	12.8′	N15°32.3	-12.1′	56.2′	98°21.8	55°26.4	52°31.8		38°21.8	65°48.7	69°30.1	82°32.1
19	329°28.8	12.8′	15°20.1	-12.2′	56.2′	97°49.9	55°00.3	52°00.0		38°53.6	66°18.5	69°59.8	83°03.8
20	344°00.7	12.9′	15°07.9	-12.3′	56.2′	97°18.0	54°34.2	51°28.2		39°25.6	66°48.4	70°29.5	83°35.6
21	358°32.5	12.9′	14°55.7	-12.4′	56.2′	96°46.0	54°08.1	50°56.3		39°57.5	67°18.3	70°59.3	84°07.4
22	13°04.4	12.9′	14°43.3	-12.4′	56.3′	96°14.0	53°42.1	50°24.4		40°29.5	67°48.3	71°29.1	84°39.2
23	27°36.3	12.9′	14°30.9	-12.5′	56.3′	95°42.0	53°16.1	49°52.5		41°01.5	68°18.3	71°59.0	85°11.0
	SD = 15.2′		Mer. pass. 21:06										

DUT1 = UT1-UTC = -0.0964 sec ΔT = TT-UT1 = +69.2804 sec

2022 April 13 to Apr. 15 UT

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Antares	-Rigil Kent.	-Arcturus	-Spica	+Regulus	+Pollux	+Betelgeuse	+Aldebaran
0	42°08.2	12.9′	N14°18.3	-12.6′	56.3′	95°09.9	89°24.1	52°50.2	49°20.6		41°33.6	68°48.4	85°42.9
1	56°40.1	13.0′	14°05.7	-12.7′	56.4′	94°37.8	89°00.1	52°24.3	48°48.6		42°05.7	69°18.6	86°14.8
2	71°12.1	13.0′	13°53.0	-12.8′	56.4′	94°05.6	88°36.1	51°58.5	48°16.6		42°37.9	69°48.8	86°46.8
3	85°44.1	13.0′	13°40.3	-12.8′	56.4′	93°33.4	88°12.0	51°32.7	47°44.5	8°09.8	43°10.1	70°19.0	87°18.8
4	100°16.1	13.0′	13°27.4	-12.9′	56.5′	93°01.2	87°48.0	51°07.0	47°12.4	8°36.5	43°42.3	70°49.3	87°50.8
5	114°48.1	13.0′	13°14.5	-13.0′	56.5′	92°28.9	87°23.9	50°41.3	46°40.3	9°03.8	44°14.6	71°19.6	88°22.9
6	129°20.1	13.0′	N13°01.5	-13.1′	56.5′	91°56.6	86°59.7	50°15.7	46°08.1	9°31.7	44°46.9	71°50.0	88°55.0
7	143°52.2	13.1′	12°48.4	-13.1′	56.6′	91°24.2	86°35.6	49°50.1	45°35.9	10°00.0	45°19.3	72°20.4	89°27.2
8	158°24.2	13.1′	12°35.3	-13.2′	56.6′	90°51.8	86°11.4	49°24.7	45°03.7	10°28.8	45°51.7	72°50.9	89°59.4
9	172°56.3	13.1′	12°22.1	-13.3′	56.6′	90°19.4	85°47.3	48°59.3	44°31.4	10°58.0	46°24.1	73°21.5	90°31.6
10	187°28.4	13.1′	12°08.8	-13.4′	56.7′	89°46.9	85°23.1	48°33.9	43°59.1	11°27.5	46°56.6	73°52.0	91°03.9
11	202°00.5	13.1′	11°55.4	-13.4′	56.7′	89°14.4	84°58.8	48°08.7	43°26.7	11°57.2	47°29.1	74°22.7	91°36.2
12	216°32.6	13.1′	N11°42.0	-13.5′	56.7′	88°41.8	84°34.6	47°43.5	42°54.3	12°27.3	48°01.7	74°53.3	92°08.6
13	231°04.7	13.1′	11°28.5	-13.6′	56.8′	88°09.2	84°10.4	47°18.4	42°21.9	12°57.6	48°34.3	75°24.1	92°41.0
14	245°36.9	13.2′	11°14.9	-13.6′	56.8′	87°36.6	83°46.1	46°53.4	41°49.5	13°28.1	49°06.9	75°54.8	93°13.4
15	260°09.0	13.2′	11°01.3	-13.7′	56.8′	87°03.9	83°21.8	46°28.5	41°17.0	13°58.8	49°39.6	76°25.6	93°45.9
16	274°41.2	13.2′	10°47.6	-13.8′	56.9′	86°31.2	82°57.5	46°03.7	40°44.5	14°29.7	50°12.3	76°56.5	94°18.4
17	289°13.4	13.2′	10°33.8	-13.8′	56.9′	85°58.4	82°33.2	45°39.0	40°11.9	15°00.7	50°45.1	77°27.4	94°51.0
18	303°45.5	13.2′	N10°19.9	-13.9′	56.9′	85°25.7	82°08.9	45°14.4	39°39.3	15°31.9	51°17.9	77°58.4	95°23.6
19	318°17.7	13.2′	10°06.0	-14.0′	57.0′	84°52.8	81°44.5	44°49.8	39°06.7	16°03.3	51°50.7	78°29.4	95°56.2
20	332°49.9	13.2′	09°52.1	-14.0′	57.0′	84°19.9	81°20.2	44°25.4	38°34.0	16°34.8	52°23.6	79°00.4	96°28.9
21	347°22.1	13.2′	09°38.0	-14.1′	57.0′	83°47.0	80°55.8	44°01.2	38°01.3	17°06.4	52°56.6	79°31.5	97°01.6
22	1°54.3	13.2′	09°23.9	-14.2′	57.1′	83°14.1	80°31.5	43°37.0	37°28.6	17°38.1	53°29.5	80°02.6	97°34.4
23	16°26.5	13.2′	09°09.8	-14.2′	57.1′	82°41.0	80°07.1	43°13.0	36°55.8	18°10.0	54°02.5	80°33.8	98°07.2
	SD = 15.4′		Mer. pass. 21:52										

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	-Altair	-Antares	-Rigil Kent.	-Spica	+Regulus	+Pollux	+Betelgeuse	+Aldebaran
0	30°58.7	13.2′	N08°55.6	-14.3′	57.1′		82°08.0	79°42.7	36°23.0	18°41.9	54°35.6	81°05.1	98°40.0
1	45°30.9	13.2′	08°41.3	-14.3′	57.2′		81°34.9	79°18.4	35°50.2	19°14.0	55°08.7	81°36.3	99°12.9
2	60°03.1	13.2′	08°27.0	-14.4′	57.2′		81°01.8	78°54.0	35°17.4	19°46.1	55°41.8	82°07.6	99°45.8
3	74°35.3	13.2′	08°12.6	-14.4′	57.2′		80°28.6	78°29.6	34°44.5	20°18.4	56°15.0	82°39.0	100°18.8
4	89°07.6	13.2′	07°58.2	-14.5′	57.3′		79°55.4	78°05.2	34°11.5	20°50.7	56°48.2	83°10.4	100°51.8
5	103°39.8	13.2′	07°43.7	-14.5′	57.3′		79°22.2	77°40.9	33°38.6	21°23.1	57°21.5	83°41.8	101°24.8
6	118°12.0	13.2′	N07°29.1	-14.6′	57.3′		78°48.9	77°16.5	33°05.6	21°55.6	57°54.8	84°13.3	101°57.9
7	132°44.2	13.2′	07°14.5	-14.7′	57.4′		78°15.6	76°52.1	32°32.6	22°28.2	58°28.1	84°44.9	102°31.0
8	147°16.4	13.2′	06°59.9	-14.7′	57.4′		77°42.2	76°27.8	31°59.5	23°00.9	59°01.5	85°16.4	103°04.1
9	161°48.6	13.2′	06°45.2	-14.8′	57.4′		77°08.8	76°03.4	31°26.5	23°33.6	59°35.0	85°48.0	103°37.3
10	176°20.7	13.2′	06°30.4	-14.8′	57.5′	119°55.8	76°35.3	75°39.0	30°53.3	24°06.4	60°08.4	86°19.7	104°10.6
11	190°52.9	13.2′	06°15.6	-14.8′	57.5′	119°30.2	76°01.8	75°14.7	30°20.2	24°39.3	60°41.9	86°51.4	104°43.9
12	205°25.1	13.2′	N06°00.8	-14.9′	57.5′	119°04.5	75°28.3	74°50.4	29°47.1	25°12.2	61°15.5	87°23.1	105°17.2
13	219°57.3	13.2′	05°45.9	-14.9′	57.6′	118°38.7	74°54.7	74°26.1	29°13.9	25°45.2	61°49.1	87°54.9	105°50.5
14	234°29.4	13.1′	05°30.9	-15.0′	57.6′	118°12.8	74°21.1	74°01.8	28°40.7	26°18.3	62°22.7	88°26.7	106°23.9
15	249°01.5	13.1′	05°15.9	-15.0′	57.6′	117°46.8	73°47.5	73°37.5	28°07.4	26°51.4	62°56.4	88°58.6	106°57.3
16	263°33.7	13.1′	05°00.9	-15.1′	57.7′	117°20.6	73°13.8	73°13.2	27°34.2	27°24.6	63°30.1	89°30.5	107°30.8
17	278°05.8	13.1′	04°45.8	-15.1′	57.7′	116°54.4	72°40.0	72°48.9	27°00.9	27°57.9	64°03.9	90°02.4	108°04.3
18	292°37.9	13.1′	N04°30.7	-15.1′	57.7′	116°28.1	72°06.3	72°24.7	26°27.6	28°31.2	64°37.6	90°34.4	108°37.9
19	307°10.0	13.1′	04°15.6	-15.2′	57.8′	116°01.7	71°32.5	72°00.5	25°54.3	29°04.5	65°11.5	91°06.4	109°11.4
20	321°42.0	13.1′	04°00.4	-15.2′	57.8′	115°35.2	70°58.6	71°36.3	25°21.0	29°38.0	65°45.4	91°38.4	109°45.1
21	336°14.1	13.0′	03°45.2	-15.3′	57.8′	115°08.6	70°24.7	71°12.2	24°47.6	30°11.5	66°19.3	92°10.5	110°18.7
22	350°46.1	13.0′	03°29.9	-15.3′	57.9′	114°41.9	69°50.8	70°48.0	24°14.2	30°45.0	66°53.2	92°42.6	110°52.4
23	5°18.1	13.0′	03°14.6	-15.3′	57.9′	114°15.2	69°16.8	70°23.9	23°40.9	31°18.6	67°27.2	93°14.8	111°26.2
	SD = 15.6′		Mer. pass. 22:38										

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	-Altair	-Rigil Kent.	-Antares	-Spica	+Regulus	+Pollux	+Betelgeuse	+Aldebaran
0	19°50.1	13.0′	N02°59.3	-15.4′	57.9′	113°48.3	69°59.9	68°42.8	23°07.5	31°52.2	68°01.3	93°47.0	111°59.9
1	34°22.1	13.0′	02°44.0	-15.4′	57.9′	113°21.3	69°35.8	68°08.7	22°34.1	32°25.9	68°35.4	94°19.2	112°33.7
2	48°54.1	12.9′	02°28.6	-15.4′	58.0′	112°54.3	69°11.8	67°34.7	22°00.7	32°59.7	69°09.5	94°51.4	113°07.6
3	63°26.0	12.9′	02°13.1	-15.4′	58.0′	112°27.2	68°47.9	67°00.5	21°27.3	33°33.5	69°43.6	95°23.7	113°41.5
4	77°57.9	12.9′	01°57.7	-15.5′	58.0′	112°00.0	68°24.0	66°26.4	20°53.9	34°07.3	70°17.8	95°56.1	114°15.4
5	92°29.8	12.9′	01°42.2	-15.5′	58.1′	111°32.7	68°00.1	65°52.1	20°20.5	34°41.2	70°52.1	96°28.4	114°49.3
6	107°01.6	12.8′	N01°26.7	-15.5′	58.1′	111°05.3	67°36.2	65°17.9	19°47.2	35°15.2	71°26.4	97°00.8	115°23.3
7	121°33.4	12.8′	01°11.2	-15.5′	58.1′	110°37.9	67°12.5	64°43.6	19°13.8	35°49.2	72°00.7	97°33.2	115°57.4
8	136°05.2	12.8′	00°55.6	-15.6′	58.2′	110°10.3	66°48.7	64°09.3	18°40.4	36°23.2	72°35.0	98°05.7	116°31.4
9	150°37.0	12.7′	00°40.1	-15.6′	58.2′	109°42.7	66°25.0	63°34.9	18°07.1	36°57.3	73°09.4	98°38.2	117°05.5
10	165°08.7	12.7′	00°24.5	-15.6′	58.2′	109°15.1	66°01.4	63°00.5	17°33.8	37°31.5	73°43.9	99°10.7	117°39.7
11	179°40.4	12.7′	N00°08.9	-15.6′	58.3′	108°47.3	65°37.8	62°26.1	17°00.6	38°05.6	74°18.3	99°43.2	118°13.8
12	194°12.1	12.6′	S00°06.8	-15.6′	58.3′	108°19.5	65°14.3	61°51.6	16°27.4	38°39.9	74°52.8	100°15.8	118°48.0
13	208°43.7	12.6′	00°22.4	-15.7′	58.3′	107°51.6	64°50.8	61°17.1	15°54.2	39°14.2	75°27.4	100°48.4	119°22.3
14	223°15.3	12.6′	00°38.1	-15.7′	58.4′	107°23.6	64°27.4	60°42.6	15°21.2	39°48.5	76°02.0	101°21.1	119°56.5
15	237°46.9	12.5′	00°53.7	-15.7′	58.4′	106°55.6	64°04.1	60°08.0	14°48.2	40°22.8	76°36.6	101°53.7	
16	252°18.4	12.5′	01°09.4	-15.7′	58.4′	106°27.5	63°40.8	59°33.4	14°15.2	40°57.2	77°11.2	102°26.4	
17	266°49.9	12.4′	01°25.1	-15.7′	58.4′	105°59.4	63°17.6	58°58.7	13°42.4	41°31.7	77°45.9	102°59.1	
18	281°21.4	12.4′	S01°40.8	-15.7′	58.5′	105°31.1	62°54.5	58°24.0	13°09.8	42°06.2	78°20.7	103°31.9	
19	295°52.8	12.4′	01°56.5	-15.7′	58.5′	105°02.9	62°31.4	57°49.3	12°37.2	42°40.7	78°55.4	104°04.6	
20	310°24.1	12.3′	02°12.3	-15.7′	58.5′	104°34.5	62°08.5	57°14.5	12°04.9	43°15.3	79°30.3	104°37.4	
21	324°55.5	12.3′	02°28.0	-15.7′	58.6′	104°06.1	61°45.6	56°39.7	11°32.7	43°49.9	80°05.1	105°10.2	
22	339°26.7	12.2′	02°43.7	-15.7′	58.6′	103°37.6	61°22.8	56°04.9	11°00.8	44°24.6	80°40.0	105°43.1	
23	353°58.0	12.2′	02°59.5	-15.7′	58.6′	103°09.1	61°00.1	55°30.0	10°29.2	44°59.3	81°14.9	106°15.9	
	SD = 15.8′		Mer. pass. 23:25										

DUT1 = UT1-UTC = -0.0974 sec ΔT = TT-UT1 = +69.2814 sec **2022 April 16 to Apr. 18 UT**

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Saturn	-Altair	-Antares	-Spica	+Regulus	+Procyon	+Pollux	+Betelgeuse
0	8°29.1	12.1′	S03°15.2	-15.7′	58.7′		102°40.5	54°55.1	9°57.9	45°34.0	80°52.3	81°49.8	106°48.8
1	23°00.3	12.1′	03°30.9	-15.7′	58.7′		102°11.9	54°20.2	9°27.0	46°08.8	81°25.0	82°24.8	107°21.7
2	37°31.4	12.0′	03°46.7	-15.7′	58.7′		101°43.2	53°45.2	8°56.5	46°43.6	81°57.7	82°59.8	107°54.6
3	52°02.4	12.0′	04°02.4	-15.7′	58.7′		101°14.5	53°10.2	8°26.7	47°18.5	82°30.5	83°34.9	108°27.6
4	66°33.4	11.9′	04°18.1	-15.7′	58.8′		100°45.7	52°35.2	7°57.5	47°53.4	83°03.3	84°10.0	109°00.5
5	81°04.3	11.9′	04°33.9	-15.7′	58.8′		100°16.8	52°00.1	7°29.1	48°28.3	83°36.2	84°45.1	109°33.5
6	95°35.2	11.8′	S04°49.6	-15.7′	58.8′		99°47.9	51°25.0		49°03.3	84°09.0	85°20.2	110°06.5
7	110°06.1	11.8′	05°05.3	-15.7′	58.8′		99°19.0	50°49.9		49°38.3	84°42.0	85°55.4	110°39.5
8	124°36.8	11.7′	05°21.0	-15.7′	58.9′		98°50.0	50°14.7		50°13.3	85°14.9	86°30.7	111°12.5
9	139°07.6	11.7′	05°36.6	-15.7′	58.9′		98°21.0	49°39.5		50°48.4	85°47.9	87°05.9	111°45.5
10	153°38.2	11.6′	05°52.3	-15.7′	58.9′		97°51.9	49°04.3		51°23.5	86°20.9	87°41.2	112°18.5
11	168°08.8	11.5′	06°08.0	-15.6′	58.9′		97°22.8	48°29.0		51°58.6	86°54.0	88°16.5	112°51.6
12	182°39.4	11.5′	S06°23.6	-15.6′	59.0′		96°53.6	47°53.8		52°33.8	87°27.0	88°51.9	113°24.6
13	197°09.9	11.4′	06°39.2	-15.6′	59.0′		96°24.4	47°18.4		53°09.0	88°00.2	89°27.2	113°57.7
14	211°40.3	11.4′	06°54.8	-15.6′	59.0′	119°29.5	95°55.2	46°43.1		53°44.3	88°33.3	90°02.6	114°30.8
15	226°10.6	11.3′	07°10.4	-15.5′	59.1′	118°54.3	95°25.9	46°07.7		54°19.5	89°06.5	90°38.1	115°03.9
16	240°40.9	11.2′	07°25.9	-15.5′	59.1′	118°19.1	94°56.6	45°32.3		54°54.8	89°39.7	91°13.5	115°37.0
17	255°11.2	11.2′	07°41.4	-15.5′	59.1′	117°43.9	94°27.3	44°56.9		55°30.2	90°12.9	91°49.0	116°10.1
18	269°41.3	11.1′	S07°56.9	-15.5′	59.1′	117°08.7	93°57.9	44°21.5		56°05.6	90°46.2	92°24.6	116°43.2
19	284°11.4	11.0′	08°12.4	-15.4′	59.1′	116°33.4	93°28.5	43°46.0		56°41.0	91°19.5	93°00.1	117°16.3
20	298°41.5	11.0′	08°27.8	-15.4′	59.2′	115°58.1	92°59.1	43°10.5		57°16.4	91°52.8	93°35.7	117°49.4
21	313°11.4	10.9′	08°43.2	-15.4′	59.2′	115°22.8	92°29.6	42°34.9		57°51.9	92°26.1	94°11.3	118°22.5
22	327°41.3	10.8′	08°58.6	-15.3′	59.2′	114°47.4	92°00.1	41°59.4		58°27.4	92°59.5	94°47.0	118°55.5
23	342°11.1	10.8′	09°13.9	-15.3′	59.2′	114°12.0	91°30.6	41°23.8		59°02.9	93°32.8	95°22.6	119°28.6
	SD = 16.0′		Mer. pass. −:−										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Mars	-Fomalhaut	-Saturn	-Antares	+Spica	+Regulus	+Procyon	+Pollux
0	356°40.9	10.7′	S09°29.2	-15.3′	59.3′			113°36.6	40°48.2		59°38.5	94°06.3	95°58.3
1	11°10.6	10.6′	09°44.5	-15.2′	59.3′			113°01.2	40°12.6		60°14.0	94°39.7	96°34.0
2	25°40.2	10.5′	09°59.7	-15.2′	59.3′			112°25.7	39°36.9		60°49.7	95°13.1	97°09.8
3	40°09.7	10.5′	10°14.9	-15.1′	59.3′	119°58.5		111°50.2	39°01.2	8°23.2	61°25.3	95°46.6	97°45.6
4	54°39.2	10.4′	10°30.0	-15.1′	59.3′	119°24.7		111°14.7	38°25.5	8°53.6	62°01.0	96°20.1	98°21.4
5	69°08.5	10.3′	10°45.1	-15.0′	59.4′	118°50.8	119°48.7	110°39.1	37°49.8	9°24.7	62°36.6	96°53.6	98°57.2
6	83°37.8	10.2′	S11°00.1	-15.0′	59.4′	118°16.9	119°14.7	110°03.6	37°14.1	9°56.4	63°12.4	97°27.1	99°33.0
7	98°07.1	10.1′	11°15.1	-14.9′	59.4′	117°43.0	118°40.7	109°28.0	36°38.3	10°28.5	63°48.1	98°00.6	100°08.9
8	112°36.2	10.1′	11°30.0	-14.9′	59.4′	117°09.1	118°06.5	108°52.3	36°02.5	11°01.0	64°23.9	98°34.2	100°44.8
9	127°05.3	10.0′	11°44.9	-14.8′	59.5′	116°35.2	117°32.4	108°16.7	35°26.7	11°33.9	64°59.7	99°07.7	101°20.7
10	141°34.2	9.9′	11°59.7	-14.8′	59.5′	116°01.2	116°58.2	107°41.0	34°50.9	12°07.1	65°35.5	99°41.3	101°56.7
11	156°03.1	9.8′	12°14.5	-14.7′	59.5′	115°27.2	116°24.0	107°05.3	34°15.1	12°40.5	66°11.3	100°14.9	102°32.6
12	170°32.0	9.7′	S12°29.2	-14.6′	59.5′	114°53.1	115°49.7	106°29.6	33°39.2	13°14.2	66°47.2	100°48.5	103°08.6
13	185°00.7	9.6′	12°43.9	-14.6′	59.5′	114°19.1	115°15.4	105°53.9	33°03.4	13°48.1	67°23.1	101°22.1	103°44.6
14	199°29.3	9.6′	12°58.4	-14.5′	59.5′	113°45.0	114°41.1	105°18.1	32°27.5	14°22.2	67°59.0	101°55.8	104°20.6
15	213°57.9	9.5′	13°13.0	-14.5′	59.6′	113°10.9	114°06.7	104°42.3	31°51.6	14°56.4	68°34.9	102°29.4	104°56.7
16	228°26.4	9.4′	13°27.4	-14.4′	59.6′	112°36.8	113°32.3	104°06.5	31°15.7	15°30.9	69°10.9	103°03.0	105°32.7
17	242°54.8	9.3′	13°41.8	-14.3′	59.6′	112°02.7	112°57.8	103°30.7	30°39.7	16°05.4	69°46.8	103°36.7	106°08.8
18	257°23.1	9.2′	S13°56.1	-14.2′	59.6′	111°28.6	112°23.3	102°54.8	30°03.8	16°40.1	70°22.8	104°10.3	106°44.9
19	271°51.3	9.1′	14°10.4	-14.2′	59.6′	110°54.4	111°48.8	102°19.0	29°27.9	17°14.9	70°58.8	104°44.0	107°21.0
20	286°19.4	9.0′	14°24.5	-14.1′	59.6′	110°20.2	111°14.3	101°43.1	28°51.9	17°49.8	71°34.9	105°17.6	107°57.2
21	300°47.4	8.9′	14°38.6	-14.0′	59.7′	109°46.0	110°39.7	101°07.2	28°15.9	18°24.8	72°10.9	105°51.3	108°33.3
22	315°15.4	8.9′	14°52.6	-13.9′	59.7′	109°11.8	110°05.1	100°31.3	27°40.0	18°59.8	72°47.0	106°24.9	109°09.5
23	329°43.2	8.8′	15°06.6	-13.9′	59.7′	108°37.5	109°30.5	99°55.3	27°04.0	19°35.0	73°23.1	106°58.6	109°45.7
	SD = 16.2′		Mer. pass. 00:14										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Jupiter	-Fomalhaut	-Saturn	-Antares	+Spica	+Regulus	+Procyon	+Pollux
0	344°11.0	8.7′	S15°20.4	-13.8′	59.7′		108°55.8	99°19.4	26°28.0	20°10.2	73°59.2	107°32.3	110°21.9
1	358°38.7	8.6′	15°34.2	-13.7′	59.7′		108°21.1	98°43.4	25°52.0	20°45.5	74°35.3	108°05.9	110°58.1
2	13°06.3	8.5′	15°47.9	-13.6′	59.7′		107°46.4	98°07.5	25°16.0	21°20.9	75°11.4	108°39.6	111°34.4
3	27°33.7	8.4′	16°01.5	-13.5′	59.7′		107°11.7	97°31.5	24°40.0	21°56.4	75°47.6	109°13.2	112°10.6
4	42°01.1	8.3′	16°15.0	-13.4′	59.8′		106°37.0	96°55.4	24°04.0	22°31.8	76°23.7	109°46.9	112°46.9
5	56°28.4	8.2′	16°28.4	-13.3′	59.8′		106°02.2	96°19.4	23°28.0	23°07.4	76°59.9	110°20.5	113°23.2
6	70°55.7	8.1′	S16°41.7	-13.2′	59.8′		105°27.4	95°43.4	22°52.0	23°43.0	77°36.1	110°54.2	113°59.5
7	85°22.8	8.0′	16°55.0	-13.1′	59.8′		104°52.6	95°07.3	22°16.0	24°18.6	78°12.3	111°27.8	114°35.8
8	99°49.8	7.9′	17°08.1	-13.0′	59.8′		104°17.7	94°31.3	21°40.0	24°54.3	78°48.5	112°01.4	115°12.1
9	114°16.7	7.8′	17°21.1	-12.9′	59.8′		103°42.8	93°55.2	21°04.0	25°30.0	79°24.7	112°35.0	115°48.4
10	128°43.5	7.7′	17°34.1	-12.8′	59.8′		103°08.0	93°19.1	20°28.0	26°05.8	80°01.0	113°08.6	116°24.8
11	143°10.3	7.6′	17°46.9	-12.7′	59.8′		102°33.1	92°43.0	19°52.0	26°41.6	80°37.2	113°42.2	117°01.1
12	157°36.9	7.5′	S17°59.6	-12.6′	59.8′		101°58.2	92°06.9	19°16.1	27°17.4	81°13.5	114°15.7	117°37.5
13	172°03.5	7.4′	18°12.2	-12.5′	59.9′		101°23.2	91°30.8	18°40.2	27°53.3	81°49.8	114°49.3	118°13.8
14	186°29.9	7.4′	18°24.7	-12.4′	59.9′		100°48.3	90°54.6	18°04.3	28°29.2	82°26.1	115°22.8	118°50.2
15	200°56.3	7.3′	18°37.1	-12.3′	59.9′		100°13.3	90°18.5	17°28.4	29°05.1	83°02.4	115°56.3	119°26.6
16	215°22.5	7.2′	18°49.4	-12.2′	59.9′		99°38.3	89°42.3	16°52.5	29°41.1	83°38.7	116°29.8	
17	229°48.7	7.1′	19°01.6	-12.1′	59.9′		99°03.4	89°06.2	16°16.7	30°17.0	84°15.0	117°03.2	
18	244°14.7	7.0′	S19°13.7	-11.9′	59.9′		98°28.4	88°30.0	15°40.9	30°53.0	84°51.3	117°36.7	
19	258°40.7	6.9′	19°25.6	-11.8′	59.9′	119°45.3	97°53.3	87°53.8	15°05.1	31°29.1	85°27.6	118°10.1	
20	273°06.6	6.8′	19°37.4	-11.7′	59.9′	119°09.5	97°18.3	87°17.7	14°29.5	32°05.1	86°04.0	118°43.4	
21	287°32.3	6.7′	19°49.1	-11.6′	59.9′	118°33.7	96°43.3	86°41.5	13°53.8	32°41.2	86°40.3	119°16.8	
22	301°58.0	6.6′	20°00.7	-11.5′	59.9′	117°57.8	96°08.3	86°05.3	13°18.2	33°17.3	87°16.6	119°50.1	
23	316°23.6	6.5′	20°12.2	-11.3′	59.9′	117°22.0	95°33.2	85°29.1	12°42.8	33°53.4	87°53.0		
	SD = 16.3′		Mer. pass. 01:06										

DUT1 = UT1-UTC = -0.0988 sec ΔT = TT-UT1 = +69.2828 sec

2022 April 19 to Apr. 21 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Jupiter	-Fomalhaut	-Saturn	-Antares	+Spica	+Arcturus	+Regulus	+Adhara
0	330°49.1	6.4′	S20°23.5	-11.2′	59.9′	116°46.1	94°58.2	84°52.9	12°07.4	34°29.5	45°00.1	88°29.4	111°54.1
1	345°14.5	6.3′	20°34.7	-11.1′	59.9′	116°10.3	94°23.1	84°16.7	11°32.1	35°05.6	45°27.3	89°05.7	112°10.6
2	359°39.8	6.2′	20°45.8	-10.9′	59.9′	115°34.4	93°48.0	83°40.5	10°56.9	35°41.7	45°54.8	89°42.1	112°27.0
3	14°05.0	6.1′	20°56.7	-10.8′	60.0′	114°58.6	93°12.9	83°04.3	10°21.9	36°17.9	46°22.4	90°18.4	112°43.3
4	28°30.1	6.0′	21°07.5	-10.7′	60.0′	114°22.7	92°37.9	82°28.0	9°47.0	36°54.1	46°50.1	90°54.8	112°59.4
5	42°55.1	5.9′	21°18.2	-10.5′	60.0′	113°46.8	92°02.8	81°51.8	9°12.4	37°30.3	47°18.0	91°31.2	113°15.4
6	57°20.1	5.8′	S21°28.7	-10.4′	60.0′	113°11.0	91°27.7	81°15.6	8°38.0	38°06.5	47°46.1	92°07.6	113°31.3
7	71°44.9	5.7′	21°39.1	-10.2′	60.0′	112°35.1	90°52.6	80°39.4	8°03.9	38°42.7	48°14.3	92°43.9	113°47.0
8	86°09.7	5.7′	21°49.3	-10.1′	60.0′	111°59.2	90°17.5	80°03.2	7°30.2	39°18.9	48°42.6	93°20.3	114°02.6
9	100°34.3	5.6′	21°59.4	-10.0′	60.0′	111°23.3	89°42.4	79°26.9	6°57.0	39°55.1	49°11.1	93°56.7	114°18.1
10	114°58.9	5.5′	22°09.4	-9.8′	60.0′	110°47.4	89°07.3	78°50.7	6°24.4	40°31.3	49°39.7	94°33.1	114°33.4
11	129°23.4	5.4′	22°19.2	-9.7′	60.0′	110°11.6	88°32.3	78°14.5	5°52.5	41°07.5	50°08.5	95°09.5	114°48.6
12	143°47.8	5.3′	S22°28.9	-9.5′	60.0′	109°35.7	87°57.2	77°38.3		41°43.8	50°37.3	95°45.8	115°03.6
13	158°12.1	5.2′	22°38.4	-9.4′	60.0′	108°59.8	87°22.1	77°02.0		42°20.0	51°06.3	96°22.2	
14	172°36.3	5.1′	22°47.8	-9.2′	60.0′	108°23.9	86°47.0	76°25.8		42°56.3	51°35.4	96°58.6	
15	187°00.4	5.1′	22°57.0	-9.1′	60.0′	107°48.0	86°11.9	75°49.6		43°32.5	52°04.6	97°35.0	
16	201°24.5	5.0′	23°06.0	-8.9′	60.0′	107°12.2	85°36.8	75°13.4		44°08.8	52°33.9	98°11.3	
17	215°48.4	4.9′	23°14.9	-8.7′	60.0′	106°36.3	85°01.8	74°37.2		44°45.0	53°03.3	98°47.7	
18	230°12.3	4.8′	S23°23.7	-8.6′	60.0′	106°00.4	84°26.7	74°01.0		45°21.3	53°32.8	99°24.0	
19	244°36.1	4.7′	23°32.3	-8.4′	60.0′	105°24.6	83°51.6	73°24.8		45°57.6	54°02.4	100°00.4	
20	258°59.8	4.6′	23°40.7	-8.3′	60.0′	104°48.7	83°16.6	72°48.6		46°33.8	54°32.1	100°36.8	
21	273°23.5	4.6′	23°48.9	-8.1′	60.0′	104°12.8	82°41.5	72°12.4		47°10.1	55°01.9	101°13.1	
22	287°47.1	4.5′	23°57.1	-7.9′	60.0′	103°37.0	82°06.5	71°36.2		47°46.3	55°31.7	101°49.4	
23	302°10.6	4.4′	24°05.0	-7.8′	60.0′	103°01.1	81°31.5	71°00.0		48°22.6	56°01.7	102°25.8	
	SD = 16.3′	Mer. pass. 02:01											

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Jupiter	-Fomalhaut	-Mars	-Saturn	+Antares	+Spica	+Arcturus	+Regulus
0	316°34.0	4.4′	S24°12.8	-7.6′	60.0′	102°25.3	80°56.5	80°28.8	70°23.9		48°58.9	56°31.7	103°02.1
1	330°57.3	4.3′	24°20.4	-7.4′	60.0′	101°49.4	80°21.5	79°54.3	69°47.7		49°35.1	57°01.8	103°38.4
2	345°20.6	4.2′	24°27.8	-7.3′	60.0′	101°13.6	79°46.5	79°19.8	69°11.5		50°11.4	57°32.0	104°14.8
3	359°43.8	4.1′	24°35.1	-7.1′	60.0′	100°37.8	79°11.5	78°45.3	68°35.4		50°47.6	58°02.2	104°51.1
4	14°07.0	4.1′	24°42.2	-6.9′	60.0′	100°02.0	78°36.5	78°10.9	67°59.2		51°23.9	58°32.6	105°27.4
5	28°30.1	4.0′	24°49.1	-6.7′	59.9′	99°26.1	78°01.6	77°36.4	67°23.1	6°35.2	52°00.1	59°03.0	106°03.7
6	42°53.1	4.0′	S24°55.8	-6.6′	59.9′	98°50.3	77°26.6	77°01.9	66°47.0	7°08.0	52°36.3	59°33.4	106°39.9
7	57°16.0	3.9′	25°02.4	-6.4′	59.9′	98°14.5	76°51.7	76°27.5	66°10.9	7°41.3	53°12.6	60°03.9	107°16.2
8	71°38.9	3.8′	25°08.8	-6.2′	59.9′	97°38.8	76°16.8	75°53.1	65°34.8	8°15.0	53°48.8	60°34.5	107°52.5
9	86°01.8	3.8′	25°15.0	-6.0′	59.9′	97°03.0	75°41.9	75°18.7	64°58.7	8°49.1	54°25.0	61°05.1	108°28.7
10	100°24.6	3.7′	25°21.1	-5.9′	59.9′	96°27.2	75°07.0	74°44.2	64°22.6	9°23.5	55°01.2	61°35.8	109°05.0
11	114°47.3	3.7′	25°26.9	-5.7′	59.9′	95°51.4	74°32.2	74°09.8	63°46.5	9°58.1	55°37.4	62°06.5	109°41.2
12	129°10.0	3.6′	S25°32.6	-5.5′	59.9′	95°15.7	73°57.3	73°35.5	63°10.4	10°32.8	56°13.6	62°37.3	110°17.4
13	143°32.6	3.6′	25°38.1	-5.3′	59.9′	94°40.0	73°22.5	73°01.1	62°34.4	11°07.8	56°49.8	63°08.1	110°53.6
14	157°55.2	3.5′	25°43.4	-5.1′	59.9′	94°04.2	72°47.7	72°26.7	61°58.4	11°42.8	57°26.0	63°39.0	111°29.8
15	172°17.7	3.5′	25°48.6	-5.0′	59.9′	93°28.5	72°12.9	71°52.3	61°22.3	12°18.0	58°02.1	64°09.9	112°06.0
16	186°40.2	3.4′	25°53.5	-4.8′	59.9′	92°52.8	71°38.2	71°18.0	60°46.3	12°53.3	58°38.3	64°40.9	112°42.2
17	201°02.6	3.4′	25°58.3	-4.6′	59.9′	92°17.1	71°03.4	70°43.7	60°10.3	13°28.6	59°14.4	65°11.9	113°18.3
18	215°25.0	3.4′	S26°02.9	-4.4′	59.9′	91°41.4	70°28.7	70°09.4	59°34.3	14°04.1	59°50.6	65°42.9	113°54.5
19	229°47.4	3.3′	26°07.3	-4.2′	59.9′	91°05.8	69°54.0	69°35.0	58°58.4	14°39.5	60°26.7	66°14.0	114°30.6
20	244°09.7	3.3′	26°11.5	-4.0′	59.8′	90°30.1	69°19.4	69°00.8	58°22.4	15°15.0	61°02.8	66°45.1	115°06.7
21	258°32.0	3.3′	26°15.5	-3.8′	59.8′	89°54.5	68°44.7	68°26.5	57°46.5	15°50.6	61°38.9	67°16.2	115°42.8
22	272°54.3	3.2′	26°19.3	-3.6′	59.8′	89°18.8	68°10.1	67°52.2	57°10.5	16°26.2	62°15.0	67°47.4	116°18.9
23	287°16.5	3.2′	26°23.0	-3.5′	59.8′	88°43.2	67°35.5	67°18.0	56°34.6	17°01.8	62°51.1	68°18.5	116°55.0
	SD = 16.4′	Mer. pass. 03:01											

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	-Jupiter	-Fomalhaut	-Mars	-Saturn	+Antares	+Spica	+Arcturus	+Regulus
0	301°38.8	3.2′	S26°26.5	-3.3′	59.8′	88°07.6	67°00.9	66°43.7	55°58.7	17°37.5	63°27.2	68°49.8	117°31.0
1	316°01.0	3.2′	26°29.7	-3.1′	59.8′	87°32.0	66°26.4	66°09.5	55°22.8	18°13.2	64°03.2	69°21.0	118°07.1
2	330°23.1	3.2′	26°32.8	-2.9′	59.8′	86°56.4	65°51.9	65°35.3	54°47.0	18°48.9	64°39.3	69°52.3	118°43.1
3	344°45.3	3.1′	26°35.7	-2.7′	59.8′	86°20.9	65°17.4	65°01.1	54°11.1	19°24.6	65°15.3	70°23.6	119°19.1
4	359°07.4	3.1′	26°38.4	-2.5′	59.8′	85°45.3	64°43.0	64°26.9	53°35.3	20°00.3	65°51.3	70°54.9	119°55.1
5	13°29.5	3.1′	26°40.9	-2.3′	59.8′	85°09.8	64°08.6	63°52.8	52°59.5	20°36.0	66°27.3	71°26.2	
6	27°51.7	3.1′	S26°43.2	-2.1′	59.7′	84°34.3	63°34.2	63°18.6	52°23.7	21°11.8	67°03.3	71°57.6	
7	42°13.8	3.1′	26°45.4	-1.9′	59.7′	83°58.8	62°59.9	62°44.5	51°47.9	21°47.5	67°39.3	72°28.9	
8	56°35.9	3.1′	26°47.3	-1.7′	59.7′	83°23.3	62°25.5	62°10.4	51°12.2	22°23.2	68°15.2	73°00.3	
9	70°58.0	3.1′	26°49.0	-1.6′	59.7′	82°47.8	61°51.3	61°36.3	50°36.4	22°59.0	68°51.2	73°31.7	
10	85°20.1	3.1′	26°50.6	-1.4′	59.7′	82°12.4	61°17.0	61°02.2	50°00.7	23°34.7	69°27.1	74°03.1	
11	99°42.2	3.1′	26°52.0	-1.2′	59.7′	81°37.0	60°42.8	60°28.2	49°25.0	24°10.5	70°03.0	74°34.5	
12	114°04.3	3.1′	S26°53.1	-1.0′	59.7′	81°01.6	60°08.6	59°54.2	48°49.3	24°46.2	70°38.9	75°06.0	
13	128°26.4	3.1′	26°54.1	-0.8′	59.7′	80°26.2	59°34.5	59°20.1	48°13.7	25°21.9	71°14.8	75°37.4	
14	142°48.5	3.1′	26°54.9	-0.6′	59.6′	79°50.8	59°00.4	58°46.1	47°38.0	25°57.7	71°50.6	76°08.8	
15	157°10.6	3.1′	26°55.5	-0.4′	59.6′	79°15.4	58°26.4	58°12.2	47°02.4	26°33.4	72°26.5	76°40.3	
16	171°32.8	3.2′	26°55.9	-0.2′	59.6′	78°40.1	57°52.4	57°38.2	46°26.8	27°09.1	73°02.3	77°11.7	
17	185°54.9	3.2′	26°56.1	-0.0′	59.6′	78°04.8	57°18.4	57°04.3	45°51.3	27°44.8	73°38.1	77°43.2	
18	200°17.1	3.2′	S26°56.1	0.2′	59.6′	77°29.5	56°44.5	56°30.3	45°15.7	28°20.5	74°13.9	78°14.7	
19	214°39.3	3.2′	26°56.0	0.4′	59.6′	76°54.2	56°10.6	55°56.4	44°40.2	28°56.2	74°49.7	78°46.1	
20	229°01.5	3.3′	26°55.6	0.5′	59.6′	76°18.9	55°36.8	55°22.6	44°04.7	29°31.8	75°25.4	79°17.6	
21	243°23.8	3.3′	26°55.1	0.7′	59.5′	75°43.7	55°03.0	54°48.7	43°29.2	30°07.5	76°01.2	79°49.0	
22	257°46.1	3.3′	26°54.3	0.9′	59.5′	75°08.4	54°29.2	54°14.9	42°53.8	30°43.1	76°36.9	80°20.5	
23	272°08.4	3.4′	26°53.4	1.1′	59.5′	74°33.2	53°55.6	53°41.0	42°18.3	31°18.8	77°12.6	80°52.0	
	SD = 16.3′	Mer. pass. 04:04											

DUT1 = UT1-UTC = -0.0983 sec ΔT = TT-UT1 = +69.2823 sec

2022 April 22 to Apr. 24 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	-Jupiter	-Fomalhaut	-Mars	-Saturn	+Antares	+Rigil Kent.	+Spica	+Arcturus
0	286°30.7	3.4′	S26°52.3	1.3′	59.5′	73°58.0	53°21.9	53°07.2	41°42.9	31°54.4	53°49.5	77°48.3	81°23.4
1	300°53.1	3.4′	26°51.0	1.5′	59.5′	73°22.9	52°48.3	52°33.5	41°07.5	32°30.0	54°09.8	78°23.9	81°54.9
2	315°15.6	3.5′	26°49.5	1.7′	59.5′	72°47.7	52°14.8	51°59.7	40°32.2	33°05.6	54°30.3	78°59.5	82°26.3
3	329°38.0	3.5′	26°47.8	1.9′	59.5′	72°12.6	51°41.3	51°26.0	39°56.8	33°41.2	54°51.0	79°35.2	82°57.8
4	344°00.5	3.6′	26°46.0	2.0′	59.4′	71°37.5	51°07.9	50°52.3	39°21.5	34°16.7	55°11.8	80°10.8	83°29.2
5	358°23.1	3.6′	26°43.9	2.2′	59.4′	71°02.4	50°34.5	50°18.6	38°46.3	34°52.3	55°32.8	80°46.3	84°00.6
6	12°45.7	3.7′	S26°41.7	2.4′	59.4′	70°27.4	50°01.2	49°44.9	38°11.0	35°27.8	55°53.9	81°21.9	84°32.0
7	27°08.4	3.7′	26°39.3	2.6′	59.4′	69°52.3	49°28.0	49°11.3	37°35.8	36°03.3	56°15.2	81°57.4	85°03.4
8	41°31.1	3.8′	26°36.7	2.8′	59.4′	69°17.3	48°54.8	48°37.7	37°00.6	36°38.8	56°36.6	82°33.0	85°34.8
9	55°53.8	3.8′	26°33.9	3.0′	59.4′	68°42.3	48°21.6	48°04.1	36°25.4	37°14.3	56°58.2	83°08.5	86°06.2
10	70°16.7	3.9′	26°30.9	3.1′	59.3′	68°07.3	47°48.6	47°30.5	35°50.3	37°49.7	57°19.9	83°43.9	86°37.6
11	84°39.5	3.9′	26°27.8	3.3′	59.3′	67°32.4	47°15.6	46°56.9	35°15.2	38°25.2	57°41.7	84°19.4	87°08.9
12	99°02.5	4.0′	S26°24.5	3.5′	59.3′	66°57.4	46°42.7	46°23.4	34°40.1	39°00.6	58°03.7	84°54.8	87°40.2
13	113°25.5	4.1′	26°21.0	3.7′	59.3′	66°22.5	46°09.8	45°49.9	34°05.0	39°36.0	58°25.8	85°30.2	88°11.6
14	127°48.5	4.1′	26°17.3	3.9′	59.3′	65°47.6	45°37.0	45°16.4	33°30.0	40°11.4	58°48.1	86°05.6	88°42.9
15	142°11.7	4.2′	26°13.5	4.0′	59.3′	65°12.8	45°04.3	44°43.0	32°55.0	40°46.7	59°10.4	86°41.0	89°14.1
16	156°34.9	4.3′	26°09.4	4.2′	59.2′	64°37.9	44°31.6	44°09.5	32°20.1	41°22.1	59°32.9	87°16.3	89°45.4
17	170°58.2	4.3′	26°05.2	4.4′	59.2′	64°03.1	43°59.1	43°36.1	31°45.1	41°57.4	59°55.4	87°51.7	90°16.7
18	185°21.5	4.4′	S26°00.8	4.5′	59.2′	63°28.3	43°26.6	43°02.8	31°10.2	42°32.7	60°18.1	88°27.0	90°47.9
19	199°44.9	4.5′	25°56.3	4.7′	59.2′	62°53.5	42°54.2	42°29.4	30°35.4	43°08.0	60°40.9	89°02.2	91°19.1
20	214°08.4	4.6′	25°51.6	4.9′	59.2′	62°18.8	42°21.9	41°56.1	30°00.6	43°43.3	61°03.8	89°37.5	91°50.3
21	228°32.0	4.7′	25°46.7	5.1′	59.1′	61°44.0	41°49.7	41°22.8	29°25.8	44°18.5	61°26.8	90°12.7	92°21.4
22	242°55.7	4.7′	25°41.6	5.2′	59.1′	61°09.3	41°17.5	40°49.5	28°51.0	44°53.8	61°49.9	90°47.9	92°52.6
23	257°19.4	4.8′	25°36.4	5.4′	59.1′	60°34.6	40°45.5	40°16.2	28°16.3	45°29.0	62°13.1	91°23.1	93°23.7
	SD = 16.2′		Mer. pass. 05:07										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Sun	-Jupiter	-Mars	-Saturn	+Antares	+Rigil Kent.	+Spica	+Arcturus
0	271°43.2	4.9′	S25°31.0	5.6′	59.1′	96°30.2	60°00.0	39°43.0	27°41.7	46°04.2	62°36.4	91°58.3	93°54.8
1	286°07.1	5.0′	25°25.5	5.7′	59.1′	95°57.4	59°25.4	39°09.8	27°07.0	46°39.3	62°59.8	92°33.4	94°25.9
2	300°31.1	5.1′	25°19.7	5.9′	59.1′	95°24.6	58°50.7	38°36.6	26°32.4	47°14.5	63°23.3	93°08.6	94°56.9
3	314°55.2	5.2′	25°13.8	6.0′	59.0′	94°51.9	58°16.2	38°03.5	25°57.9	47°49.6	63°46.8	93°43.7	95°27.9
4	329°19.3	5.2′	25°07.8	6.2′	59.0′	94°19.1	57°41.6	37°30.4	25°23.4	48°24.7	64°10.5	94°18.7	95°58.9
5	343°43.6	5.3′	25°01.6	6.4′	59.0′	93°46.4	57°07.0	36°57.3	24°48.9	48°59.8	64°34.2	94°53.8	96°29.9
6	358°07.9	5.4′	S24°55.2	6.5′	59.0′	93°13.7	56°32.5	36°24.2	24°14.5	49°34.8	64°58.0	95°28.8	97°00.8
7	12°32.3	5.5′	24°48.7	6.7′	59.0′	92°41.0	55°58.0	35°51.2	23°40.1	50°09.9	65°21.8	96°03.8	97°31.7
8	26°56.9	5.6′	24°42.0	6.8′	58.9′	92°08.4	55°23.6	35°18.2	23°05.8	50°44.9	65°45.8	96°38.8	98°02.5
9	41°21.5	5.7′	24°35.2	7.0′	58.9′	91°35.8	54°49.1	34°45.2	22°31.6	51°19.9	66°09.8	97°13.8	98°33.4
10	55°46.2	5.8′	24°28.2	7.1′	58.9′	91°03.2	54°14.7	34°12.3	21°57.4	51°54.8	66°33.9	97°48.7	99°04.2
11	70°11.0	5.9′	24°21.1	7.3′	58.9′	90°30.6	53°40.3	33°39.3	21°23.2	52°29.8	66°58.0	98°23.6	99°34.9
12	84°35.9	6.0′	S24°13.8	7.4′	58.9′	89°58.0	53°05.9	33°06.4	20°49.1	53°04.7	67°22.2	98°58.5	100°05.7
13	99°00.9	6.1′	24°06.4	7.6′	58.8′	89°25.5	52°31.6	32°33.6	20°15.1	53°39.6	67°46.5	99°33.4	100°36.4
14	113°26.0	6.2′	23°58.8	7.7′	58.8′	88°53.0	51°57.3	32°00.7	19°41.1	54°14.5	68°10.8	100°08.2	101°07.0
15	127°51.2	6.3′	23°51.1	7.9′	58.8′	88°20.5	51°23.0	31°27.9	19°07.2	54°49.3	68°35.2	100°43.0	101°37.6
16	142°16.5	6.4′	23°43.2	8.0′	58.8′	87°48.0	50°48.7	30°55.2	18°33.4	55°24.2	68°59.6	101°17.8	102°08.2
17	156°41.9	6.5′	23°35.2	8.1′	58.8′	87°15.6	50°14.5	30°22.4	17°59.7	55°59.0	69°24.1	101°52.6	102°38.8
18	171°07.4	6.6′	S23°27.1	8.3′	58.7′	86°43.2	49°40.2	29°49.7	17°26.1	56°33.8	69°48.6	102°27.3	103°09.3
19	185°33.0	6.7′	23°18.8	8.4′	58.7′	86°10.8	49°06.0	29°17.1	16°52.5	57°08.6	70°13.2	103°02.0	103°39.7
20	199°58.7	6.8′	23°10.3	8.6′	58.7′	85°38.4	48°31.9	28°44.4	16°19.0	57°43.3	70°37.9	103°36.7	104°10.2
21	214°24.5	6.9′	23°01.8	8.7′	58.7′	85°06.1	47°57.7	28°11.8	15°45.7	58°18.0	71°02.5	104°11.4	104°40.6
22	228°50.4	7.0′	22°53.1	8.8′	58.7′	84°33.8	47°23.6	27°39.2	15°12.4	58°52.7	71°27.3	104°46.0	105°10.9
23	243°16.5	7.1′	22°44.3	9.0′	58.6′	84°01.5	46°49.5	27°06.7	14°39.3	59°27.4	71°52.0	105°20.7	105°41.2
	SD = 16.1′		Mer. pass. 06:08			Sun SD = 15.9′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Sun	-Jupiter	-Mars	-Saturn	+Antares	+Rigil Kent.	+Spica	+Arcturus
0	257°42.6	7.2′	S22°35.3	9.1′	58.6′	83°29.2	46°15.4	26°34.2	14°06.3	60°02.0	72°16.8	105°55.3	106°11.4
1	272°08.8	7.3′	22°26.2	9.2′	58.6′	82°56.9	45°41.4	26°01.7	13°33.5	60°36.7	72°41.7	106°29.8	106°41.7
2	286°35.1	7.4′	22°17.0	9.3′	58.6′	82°24.7	45°07.4	25°29.3	13°00.9	61°11.3	73°06.6	107°04.4	107°11.8
3	301°01.6	7.5′	22°07.6	9.5′	58.6′	81°52.5	44°33.4	24°56.9	12°28.4	61°45.9	73°31.5	107°38.9	107°41.9
4	315°28.1	7.6′	21°58.2	9.6′	58.5′	81°20.3	43°59.4	24°24.5	11°56.1	62°20.4	73°56.4	108°13.4	108°12.0
5	329°54.7	7.7′	21°48.6	9.7′	58.5′	80°48.2	43°25.5	23°52.2	11°24.1	62°55.0	74°21.4	108°47.9	108°42.0
6	344°21.5	7.9′	S21°38.9	9.8′	58.5′	80°16.0	42°51.6	23°19.9	10°52.3	63°29.5	74°46.4	109°22.3	109°12.0
7	358°48.3	8.0′	21°29.0	10.0′	58.5′	79°43.9	42°17.7	22°47.7	10°20.8	64°04.0	75°11.4	109°56.8	109°41.9
8	13°15.3	8.1′	21°19.1	10.1′	58.5′	79°11.8	41°43.8	22°15.5	9°49.7	64°38.4	75°36.5	110°31.2	110°11.8
9	27°42.3	8.2′	21°09.0	10.2′	58.4′	78°39.8	41°10.0	21°43.3	9°19.0	65°12.9	76°01.6	111°05.5	110°41.6
10	42°09.5	8.3′	20°58.8	10.3′	58.4′	78°07.7	40°36.2	21°11.2	8°48.7	65°47.3	76°26.7	111°39.9	111°11.3
11	56°36.8	8.4′	20°48.5	10.4′	58.4′	77°35.7	40°02.4	20°39.2	8°19.0	66°21.7	76°51.8	112°14.2	111°41.1
12	71°04.2	8.5′	S20°38.1	10.5′	58.4′	77°03.7	39°28.6	20°07.2	7°49.9	66°56.1	77°16.9	112°48.5	112°10.7
13	85°31.6	8.6′	20°27.6	10.6′	58.3′	76°31.8	38°54.9	19°35.2	7°21.5	67°30.4	77°42.1	113°22.8	112°40.3
14	99°59.2	8.7′	20°16.9	10.7′	58.3′	75°59.8	38°21.2	19°03.3	6°54.1	68°04.8	78°07.3	113°57.1	113°09.8
15	114°26.9	8.8′	20°06.2	10.8′	58.3′	75°27.9	37°47.5	18°31.4		68°39.1	78°32.5	114°31.3	113°39.3
16	128°54.7	8.9′	19°55.4	10.9′	58.3′	74°56.0	37°13.9	17°59.7		69°13.3	78°57.7	115°05.5	114°08.7
17	143°22.6	9.0′	19°44.4	11.1′	58.3′	74°24.1	36°40.3	17°27.9		69°47.6	79°22.9	115°39.7	114°38.1
18	157°50.6	9.1′	S19°33.4	11.2′	58.2′	73°52.3	36°06.7	16°56.3		70°21.8	79°48.2	116°13.8	115°07.4
19	172°18.7	9.2′	19°22.2	11.3′	58.2′	73°20.5	35°33.1	16°24.7		70°56.1	80°13.4	116°48.0	115°36.6
20	186°46.9	9.3′	19°11.0	11.4′	58.2′	72°48.7	34°59.6	15°53.1		71°30.2	80°38.7	117°22.1	116°05.8
21	201°15.2	9.4′	18°59.6	11.4′	58.2′	72°16.9	34°26.0	15°21.7		72°04.4	81°04.0	117°56.1	116°34.9
22	215°43.6	9.5′	18°48.2	11.5′	58.2′	71°45.1	33°52.6	14°50.3		72°38.6	81°29.2	118°30.2	117°03.9
23	230°12.1	9.6′	18°36.6	11.6′	58.1′	71°13.4	33°19.1	14°19.1		73°12.7	81°54.5	119°04.2	117°32.8
	SD = 16.0′		Mer. pass. 07:05			Sun SD = 15.9′							

DUT1 = UT1-UTC = -0.0972 sec ΔT = TT-UT1 = +69.2812 sec

2022 April 25 to Apr. 27 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Sun	-Jupiter	-Venus	-Mars	+Saturn	+Antares	+Rigil Kent.	+Arcturus
0	244°40.7	9.7′	S18°25.0	11.7′	58.1′	70°41.7	32°45.7	27°25.6	13°47.9		73°46.8	82°19.8	118°01.7
1	259°09.4	9.8′	18°13.3	11.8′	58.1′	70°10.0	32°12.3	26°54.6	13°16.8		74°20.8	82°45.1	118°30.5
2	273°38.2	9.9′	18°01.4	11.9′	58.1′	69°38.3	31°38.9	26°23.5	12°45.9		74°54.9	83°10.4	118°59.3
3	288°07.1	10.0′	17°49.5	12.0′	58.1′	69°06.7	31°05.6	25°52.6	12°15.1		75°28.9	83°35.7	119°28.0
4	302°36.2	10.1′	17°37.5	12.1′	58.0′	68°35.1	30°32.3	25°21.6	11°44.4		76°02.9	84°01.0	119°56.6
5	317°05.3	10.2′	17°25.5	12.2′	58.0′	68°03.5	29°59.0	24°50.7	11°13.9		76°36.9	84°26.3	
6	331°34.4	10.3′	S17°13.3	12.2′	58.0′	67°31.9	29°25.8	24°19.8	10°43.6		77°10.9	84°51.6	
7	346°03.7	10.4′	17°01.1	12.3′	58.0′	67°00.4	28°52.5	23°49.0	10°13.4		77°44.8	85°16.8	
8	0°33.1	10.5′	16°48.7	12.4′	57.9′	66°28.9	28°19.4	23°18.2	9°43.5		78°18.7	85°42.1	
9	15°02.6	10.6′	16°36.3	12.5′	57.9′	65°57.4	27°46.2	22°47.4	9°13.9		78°52.6	86°07.4	
10	29°32.2	10.7′	16°23.9	12.6′	57.9′	65°25.9	27°13.1	22°16.7	8°44.5		79°26.5	86°32.7	
11	44°01.9	10.8′	16°11.3	12.6′	57.9′	64°54.4	26°40.0	21°46.0	8°15.5	7°43.1	80°00.3	86°57.9	
12	58°31.6	10.9′	S15°58.7	12.7′	57.9′	64°23.0	26°06.9	21°15.4	7°46.9	8°11.5	80°34.1	87°23.2	
13	73°01.5	10.9′	15°46.0	12.8′	57.8′	63°51.6	25°33.9	20°44.8	7°18.8	8°40.6	81°07.9	87°48.4	
14	87°31.4	11.0′	15°33.2	12.8′	57.8′	63°20.2	25°00.9	20°14.2	6°51.3	9°10.2	81°41.7	88°13.6	
15	102°01.5	11.1′	15°20.3	12.9′	57.8′	62°48.9	24°28.0	19°43.7	6°24.5	9°40.2	82°15.4	88°38.8	
16	116°31.6	11.2′	15°07.4	13.0′	57.8′	62°17.5	23°55.1	19°13.2	5°58.5	10°10.5	82°49.2	89°04.0	
17	131°01.8	11.3′	14°54.4	13.1′	57.8′	61°46.2	23°22.2	18°42.8		10°41.1	83°22.9	89°29.2	
18	145°32.1	11.4′	S14°41.4	13.1′	57.7′	61°14.9	22°49.3	18°12.4		11°12.1	83°56.6	89°54.4	
19	160°02.5	11.5′	14°28.2	13.2′	57.7′	60°43.7	22°16.5	17°42.1		11°43.2	84°30.2	90°19.5	
20	174°32.9	11.6′	14°15.1	13.2′	57.7′	60°12.4	21°43.8	17°11.8		12°14.5	85°03.9	90°44.7	
21	189°03.5	11.6′	14°01.8	13.3′	57.7′	59°41.2	21°11.1	16°41.6		12°46.0	85°37.5	91°09.8	
22	203°34.1	11.7′	13°48.5	13.4′	57.6′	59°10.0	20°38.4	16°11.5		13°17.6	86°11.1	91°34.9	
23	218°04.8	11.8′	13°35.2	13.4′	57.6′	58°38.8	20°05.7	15°41.4		13°49.3	86°44.6	92°00.0	
	SD = 15.8′		Mer. pass. 07:58			Sun SD = 15.9′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Sun	-Jupiter	-Venus	+Mars	+Saturn	+Altair	+Antares	+Rigil Kent.
0	232°35.6	11.9′	S13°21.7	13.5′	57.6′	58°07.7	19°33.2	15°11.4		14°21.2	48°31.4	87°18.2	92°25.0
1	247°06.5	12.0′	13°08.3	13.5′	57.6′	57°36.5	19°00.6	14°41.5		14°53.1	48°53.7	87°51.7	92°50.1
2	261°37.5	12.0′	12°54.7	13.6′	57.6′	57°05.4	18°28.1	14°11.6		15°25.1	49°16.1	88°25.2	93°15.1
3	276°08.5	12.1′	12°41.1	13.6′	57.5′	56°34.3	17°55.7	13°41.9		15°57.2	49°38.7	88°58.7	93°40.0
4	290°39.6	12.2′	12°27.5	13.7′	57.5′	56°03.3	17°23.3	13°12.2		16°29.4	50°01.4	89°32.1	94°05.0
5	305°10.8	12.3′	12°13.8	13.7′	57.5′	55°32.2	16°51.0	12°42.6		17°01.6	50°24.2	90°05.6	94°29.9
6	319°42.1	12.3′	S12°00.1	13.8′	57.5′	55°01.2	16°18.7	12°13.1		17°33.8	50°47.2	90°39.0	94°54.8
7	334°13.4	12.4′	11°46.3	13.8′	57.4′	54°30.2	15°46.5	11°43.8		18°06.1	51°10.2	91°12.4	95°19.7
8	348°44.8	12.5′	11°32.5	13.9′	57.4′	53°59.2	15°14.4	11°14.6		18°38.4	51°33.4	91°45.7	95°44.5
9	3°16.3	12.6′	11°18.6	13.9′	57.4′	53°28.3	14°42.4	10°45.5		19°10.8	51°56.7	92°19.1	96°09.3
10	17°47.9	12.6′	11°04.7	14.0′	57.4′	52°57.4	14°10.4	10°16.6		19°43.2	52°20.2	92°52.4	96°34.1
11	32°19.5	12.7′	10°50.7	14.0′	57.4′	52°26.5	13°38.5	9°47.9		20°15.6	52°43.7	93°25.7	96°58.9
12	46°51.2	12.8′	S10°36.7	14.0′	57.3′	51°55.6	13°06.8	9°19.4	6°46.8	20°48.0	53°07.3	93°59.0	97°23.6
13	61°22.9	12.8′	10°22.6	14.1′	57.3′	51°24.7	12°35.1	8°51.1	7°13.8	21°20.4	53°31.1	94°32.2	97°48.2
14	75°54.8	12.9′	10°08.5	14.1′	57.3′	50°53.9	12°03.5	8°23.1	7°41.3	21°52.8	53°54.9	95°05.5	98°12.9
15	90°26.6	13.0′	09°54.4	14.2′	57.3′	50°23.1	11°32.1	7°55.4	8°09.2	22°25.3	54°18.9	95°38.7	98°37.5
16	104°58.6	13.0′	09°40.3	14.2′	57.3′	49°52.3	11°00.8	7°28.2	8°37.5	22°57.8	54°42.9	96°11.8	99°02.0
17	119°30.6	13.1′	09°26.1	14.2′	57.2′	49°21.5	10°29.7	7°01.3	9°06.2	23°30.2	55°07.1	96°45.0	99°26.6
18	134°02.7	13.1′	S09°11.8	14.3′	57.2′	48°50.7	9°58.8	6°35.0	9°35.1	24°02.7	55°31.3	97°18.2	99°51.0
19	148°34.9	13.2′	08°57.6	14.3′	57.2′	48°20.0	9°28.1	6°09.3	10°04.2	24°35.2	55°55.6	97°51.3	100°15.5
20	163°07.1	13.3′	08°43.3	14.3′	57.2′	47°49.3	8°57.6	5°44.4	10°33.5	25°07.6	56°20.0	98°24.4	100°39.9
21	177°39.3	13.3′	08°28.9	14.4′	57.1′	47°18.6	8°27.4	5°20.5	11°02.9	25°40.1	56°44.4	98°57.4	101°04.2
22	192°11.6	13.4′	08°14.6	14.4′	57.1′	46°48.0	7°57.5		11°32.5	26°12.6	57°09.0	99°30.5	101°28.5
23	206°44.0	13.4′	08°00.2	14.4′	57.1′	46°17.3	7°28.1		12°02.2	26°45.1	57°33.6	100°03.5	101°52.8
	SD = 15.7′		Mer. pass. 08:46			Sun SD = 15.9′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Sun	±Jupiter	+Venus	+Mars	+Fomalhaut	+Saturn	+Altair	+Antares
0	221°16.4	13.5′	S07°45.8	14.4′	57.1′	45°46.7	6°59.1		12°32.0	23°19.2	27°17.5	57°58.3	100°36.5
1	235°48.9	13.5′	07°31.4	14.5′	57.1′	45°16.1	6°30.6		13°01.8	23°43.1	27°50.0	58°23.1	101°09.5
2	250°21.5	13.6′	07°16.9	14.5′	57.0′	44°45.5	6°02.9		13°31.8	24°07.4	28°22.4	58°47.9	101°42.5
3	264°54.1	13.6′	07°02.4	14.5′	57.0′	44°15.0	5°36.1		14°01.8	24°31.9	28°54.9	59°12.8	102°15.4
4	279°26.7	13.7′	06°47.9	14.5′	57.0′	43°44.5			14°31.9	24°56.7	29°27.3	59°37.8	102°48.3
5	293°59.4	13.7′	06°33.4	14.5′	57.0′	43°14.0			15°02.0	25°21.8	29°59.7	60°02.8	103°21.2
6	308°32.1	13.8′	S06°18.8	14.6′	57.0′	42°43.5			15°32.1	25°47.2	30°32.1	60°27.9	103°54.1
7	323°04.9	13.8′	06°04.3	14.6′	56.9′	42°13.0			16°02.3	26°12.8	31°04.5	60°53.0	104°27.0
8	337°37.8	13.9′	05°49.7	14.6′	56.9′	41°42.6			16°32.5	26°38.6	31°36.9	61°18.2	104°59.8
9	352°10.6	13.9′	05°35.1	14.6′	56.9′	41°12.2			17°02.7	27°04.7	32°09.3	61°43.5	105°32.6
10	6°43.6	14.0′	05°20.5	14.6′	56.9′	40°41.8			17°33.0	27°30.9	32°41.7	62°08.8	106°05.4
11	21°16.5	14.0′	05°05.9	14.6′	56.9′	40°11.4			18°03.3	27°57.4	33°14.0	62°34.2	106°38.2
12	35°49.5	14.1′	S04°51.2	14.7′	56.8′				18°33.5	28°24.0	33°46.4	62°59.6	107°10.9
13	50°22.6	14.1′	04°36.6	14.7′	56.8′				19°03.8	28°50.8	34°18.7	63°25.0	107°43.6
14	64°55.7	14.1′	04°21.9	14.7′	56.8′				19°34.1	29°17.8	34°51.0	63°50.5	108°16.3
15	79°28.8	14.2′	04°07.2	14.7′	56.8′				20°04.5	29°45.0	35°23.3	64°16.1	108°49.0
16	94°02.0	14.2′	03°52.6	14.7′	56.7′			6°22.0	20°34.8	30°12.3	35°55.6	64°41.6	109°21.7
17	108°35.2	14.2′	03°37.9	14.7′	56.7′			6°47.5	21°05.1	30°39.7	36°27.9	65°07.3	109°54.3
18	123°08.4	14.3′	S03°23.2	14.7′	56.7′			7°13.6	21°35.4	31°07.3	37°00.2	65°32.9	110°26.9
19	137°41.7	14.3′	03°08.5	14.7′	56.7′			7°40.2	22°05.7	31°35.0	37°32.4	65°58.6	110°59.5
20	152°15.0	14.3′	02°53.8	14.7′	56.7′			8°07.1	22°36.0	32°02.8	38°04.7	66°24.4	111°32.1
21	166°48.3	14.4′	02°39.1	14.7′	56.6′			8°34.3	23°06.3	32°30.7	38°36.9	66°50.1	112°04.6
22	181°21.7	14.4′	02°24.4	14.7′	56.6′		6°31.6	9°01.7	23°36.6	32°58.8	39°09.1	67°15.9	112°37.1
23	195°55.1	14.4′	02°09.7	14.7′	56.6′		6°59.6	9°29.4	24°06.9	33°26.9	39°41.3	67°41.7	113°09.6
	SD = 15.6′		Mer. pass. 09:32			Sun SD = 15.9′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	+Jupiter	+Venus	+Mars	+Fomalhaut	+Saturn	+Altair	+Rigil Kent.	+Antares
0	210°28.5	14.5′	S01°55.0	14.7′	56.6′	7°28.2	9°57.2	24°37.2	33°55.1	40°13.4	68°07.6	111°41.1	113°42.1
1	225°02.0	14.5′	01°40.3	14.7′	56.6′	7°57.1	10°25.2	25°07.5	34°23.5	40°45.6	68°33.5	112°03.7	114°14.6
2	239°35.5	14.5′	01°25.6	14.7′	56.5′	8°26.4	10°53.3	25°37.8	34°51.9	41°17.7	68°59.4	112°26.3	114°47.0
3	254°09.0	14.5′	01°10.9	14.7′	56.5′	8°56.0	11°21.5	26°08.0	35°20.4	41°49.8	69°25.3	112°48.8	115°19.4
4	268°42.5	14.6′	00°56.2	14.7′	56.5′	9°25.8	11°49.9	26°38.3	35°49.0	42°21.9	69°51.3	113°11.2	115°51.8
5	283°16.1	14.6′	00°41.5	14.7′	56.5′	9°55.8	12°18.3	27°08.5	36°17.6	42°54.0	70°17.3	113°33.5	116°24.2
6	297°49.6	14.6′	S00°26.8	14.7′	56.5′	10°26.0	12°46.7	27°38.8	36°46.4	43°26.1	70°43.3	113°55.8	116°56.5
7	312°23.2	14.6′	S00°12.1	14.7′	56.4′	10°56.3	13°15.2	28°09.0	37°15.2	43°58.1	71°09.3	114°17.9	117°28.9
8	326°56.8	14.6′	N00°02.5	14.7′	56.4′	11°26.7	13°43.8	28°39.2	37°44.0	44°30.1	71°35.4	114°40.0	118°01.2
9	341°30.5	14.7′	00°17.2	14.6′	56.4′	11°57.3	14°12.4	29°09.4	38°12.9	45°02.2	72°01.4	115°02.0	118°33.5
10	356°04.1	14.7′	00°31.8	14.6′	56.4′	12°27.9	14°41.1	29°39.6	38°41.9	45°34.2	72°27.5	115°23.9	119°05.7
11	10°37.8	14.7′	00°46.5	14.6′	56.4′	12°58.6	15°09.8	30°09.7	39°11.0	46°06.1	72°53.6	115°45.7	119°38.0
12	25°11.5	14.7′	N01°01.1	14.6′	56.3′	13°29.3	15°38.5	30°39.9	39°40.0	46°38.1	73°19.7	116°07.4	
13	39°45.2	14.7′	01°15.7	14.6′	56.3′	14°00.1	16°07.2	31°10.0	40°09.2	47°10.0	73°45.9	116°29.0	
14	54°18.9	14.7′	01°30.3	14.6′	56.3′	14°31.0	16°36.0	31°40.1	40°38.4	47°42.0	74°12.0	116°50.5	
15	68°52.6	14.7′	01°44.9	14.6′	56.3′	15°01.9	17°04.8	32°10.3	41°07.6	48°13.9	74°38.2	117°11.9	
16	83°26.4	14.8′	01°59.4	14.5′	56.2′	15°32.8	17°33.6	32°40.3	41°36.8	48°45.7	75°04.3	117°33.2	
17	98°00.1	14.8′	02°14.0	14.5′	56.2′	16°03.7	18°02.3	33°10.4	42°06.2	49°17.6	75°30.5	117°54.4	
18	112°33.9	14.8′	N02°28.5	14.5′	56.2′	16°34.7	18°31.1	33°40.5	42°35.5	49°49.5	75°56.7	118°15.5	
19	127°07.7	14.8′	02°43.0	14.5′	56.2′	17°05.7	19°00.0	34°10.5	43°04.9	50°21.3	76°22.9	118°36.5	
20	141°41.4	14.8′	02°57.5	14.5′	56.2′	17°36.7	19°28.8	34°40.6	43°34.3	50°53.1	76°49.1	118°57.4	
21	156°15.2	14.8′	03°11.9	14.4′	56.1′	18°07.7	19°57.6	35°10.6	44°03.7	51°24.9	77°15.3	119°18.2	
22	170°49.0	14.8′	03°26.3	14.4′	56.1′	18°38.7	20°26.4	35°40.6	44°33.2	51°56.7	77°41.5	119°38.9	
23	185°22.8	14.8′	03°40.8	14.4′	56.1′	19°09.7	20°55.2	36°10.6	45°02.7	52°28.4	78°07.7	119°59.4	
	SD = 15.4′		Mer. pass. 10:16										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	+Jupiter	+Venus	+Mars	+Fomalhaut	+Saturn	+Altair
0	199°56.6	14.8′	N03°55.1	14.4′	56.1′	19°40.7	21°24.0	36°40.5	45°32.2	53°00.2	78°33.9
1	214°30.4	14.8′	04°09.5	14.3′	56.1′	20°11.8	21°52.8	37°10.5	46°01.7	53°31.9	79°00.1
2	229°04.2	14.8′	04°23.8	14.3′	56.0′	20°42.8	22°21.6	37°40.4	46°31.3	54°03.6	79°26.3
3	243°38.0	14.8′	04°38.1	14.3′	56.0′	21°13.8	22°50.4	38°10.3	47°00.9	54°35.2	79°52.6
4	258°11.8	14.8′	04°52.4	14.2′	56.0′	21°44.8	23°19.1	38°40.2	47°30.5	55°06.9	80°18.8
5	272°45.6	14.8′	05°06.7	14.2′	56.0′	22°15.9	23°47.9	39°10.1	48°00.1	55°38.5	80°45.0
6	287°19.4	14.8′	N05°20.9	14.2′	56.0′	22°46.9	24°16.7	39°39.9	48°29.8	56°10.2	81°11.2
7	301°53.2	14.8′	05°35.1	14.2′	55.9′	23°17.9	24°45.4	40°09.8	48°59.4	56°41.8	81°37.4
8	316°27.0	14.8′	05°49.2	14.1′	55.9′	23°48.9	25°14.2	40°39.6	49°29.1	57°13.3	82°03.6
9	331°00.8	14.8′	06°03.4	14.1′	55.9′	24°19.9	25°42.9	41°09.4	49°58.8	57°44.9	82°29.8
10	345°34.5	14.8′	06°17.4	14.1′	55.9′	24°50.9	26°11.6	41°39.2	50°28.5	58°16.5	82°56.0
11	0°08.3	14.8′	06°31.5	14.0′	55.9′	25°21.9	26°40.3	42°08.9	50°58.2	58°48.0	83°22.2
12	14°42.1	14.8′	N06°45.5	14.0′	55.8′	25°52.8	27°09.0	42°38.7	51°27.9	59°19.5	83°48.4
13	29°15.8	14.7′	06°59.5	13.9′	55.8′	26°23.8	27°37.7	43°08.4	51°57.6	59°51.0	84°14.6
14	43°49.6	14.7′	07°13.4	13.9′	55.8′	26°54.7	28°06.4	43°38.1	52°27.4	60°22.4	84°40.8
15	58°23.3	14.7′	07°27.3	13.9′	55.8′	27°25.7	28°35.0	44°07.8	52°57.1	60°53.9	85°07.0
16	72°57.0	14.7′	07°41.2	13.8′	55.8′	27°56.6	29°03.7	44°37.5	53°26.9	61°25.3	85°33.1
17	87°30.8	14.7′	07°55.0	13.8′	55.7′	28°27.5	29°32.3	45°07.2	53°56.6	61°56.7	85°59.3
18	102°04.5	14.7′	N08°08.8	13.7′	55.7′	28°58.4	30°00.9	45°36.8	54°26.4	62°28.1	86°25.4
19	116°38.1	14.7′	08°22.5	13.7′	55.7′	29°29.3	30°29.5	46°06.4	54°56.2	62°59.5	86°51.5
20	131°11.8	14.7′	08°36.2	13.6′	55.7′	30°00.2	30°58.1	46°36.0	55°25.9	63°30.8	87°17.6
21	145°45.5	14.6′	08°49.9	13.6′	55.7′	30°31.0	31°26.6	47°05.6	55°55.7	64°02.1	87°43.7
22	160°19.1	14.6′	09°03.5	13.6′	55.7′	31°01.8	31°55.2	47°35.2	56°25.5	64°33.4	88°09.8
23	174°52.7	14.6′	09°17.0	13.5′	55.6′	31°32.7	32°23.7	48°04.7	56°55.2	65°04.7	88°35.9
	SD = 15.3′		Mer. pass. 10:59								

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	+Jupiter	+Venus	+Mars	+Fomalhaut	+Saturn	+Altair
0	189°26.3	14.6′	N09°30.5	13.5′	55.6′	32°03.5	32°52.2	48°34.2	57°25.0	65°36.0	89°01.9
1	203°59.9	14.6′	09°44.0	13.4′	55.6′	New Moon					
2	218°33.5	14.5′	09°57.4	13.4′	55.6′	New Moon					
3	233°07.0	14.5′	10°10.7	13.3′	55.6′	New Moon					
4	247°40.6	14.5′	10°24.1	13.3′	55.5′	New Moon					
5	262°14.1	14.5′	10°37.3	13.2′	55.5′	New Moon					
6	276°47.5	14.5′	N10°50.5	13.1′	55.5′	New Moon					
7	291°21.0	14.4′	11°03.7	13.1′	55.5′	New Moon					
8	305°54.4	14.4′	11°16.8	13.0′	55.5′	New Moon					
9	320°27.8	14.4′	11°29.8	13.0′	55.4′	New Moon					
10	335°01.2	14.4′	11°42.8	12.9′	55.4′	New Moon					
11	349°34.6	14.3′	11°55.7	12.9′	55.4′	New Moon					
12	4°07.9	14.3′	N12°08.6	12.8′	55.4′	New Moon					
13	18°41.2	14.3′	12°21.4	12.7′	55.4′	New Moon					
14	33°14.5	14.2′	12°34.1	12.7′	55.3′	New Moon					
15	47°47.7	14.2′	12°46.8	12.6′	55.3′	New Moon					
16	62°20.9	14.2′	12°59.4	12.6′	55.3′	New Moon					
17	76°54.1	14.2′	13°12.0	12.5′	55.3′	New Moon					
18	91°27.3	14.1′	N13°24.5	12.4′	55.3′	New Moon					
19	106°00.4	14.1′	13°36.9	12.4′	55.3′	New Moon					
20	120°33.5	14.1′	13°49.3	12.3′	55.2′	New Moon					
21	135°06.5	14.0′	14°01.6	12.2′	55.2′	New Moon					
22	149°39.6	14.0′	14°13.8	12.2′	55.2′	New Moon					
23	164°12.6	14.0′	14°26.0	12.1′	55.2′	New Moon					
	SD = 15.2′		Mer. pass. 11:43								