Re: 12 Feb 2011 Unorthodox Jupiter Lunar from a moving platform

I followed the same iterative method as earlier:

1. first intersect the circles of position to get an approximate AP, taking into account the distances traveled while doing so. This is done with numerical optimization (see below how to compute the coordinates).

2. using that AP in a lunar distance time calculation to find the watch correction

3. which is then used to intersect the circles to get the fix.

4. A final lunar distance is used to check the watch correction from fix position.
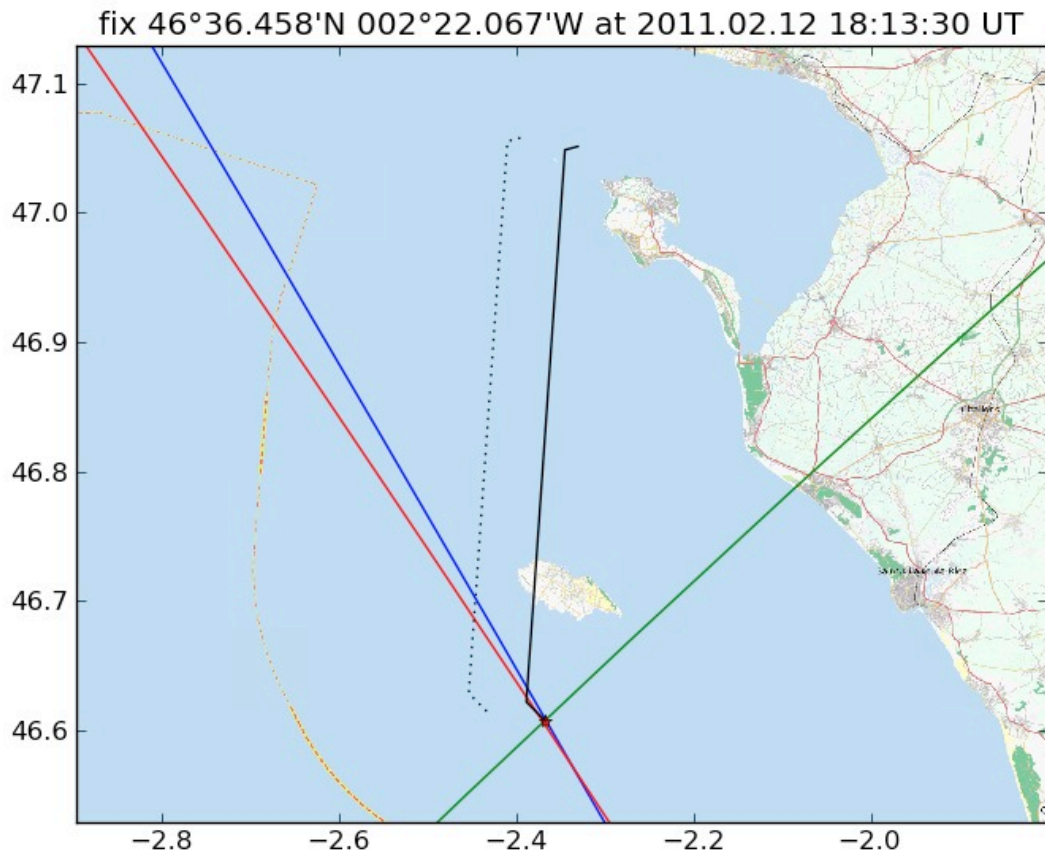
With my code I find the following:

> **time of lunar distance sight: 18:13:30.2**
> **at fix: 46°36.5'N 002°22.1'W**

(With a residual 1s watch error from the last check.)

fix 46°36.458'N 002°22.067'W at 2011.02.12 18:13:30 UT
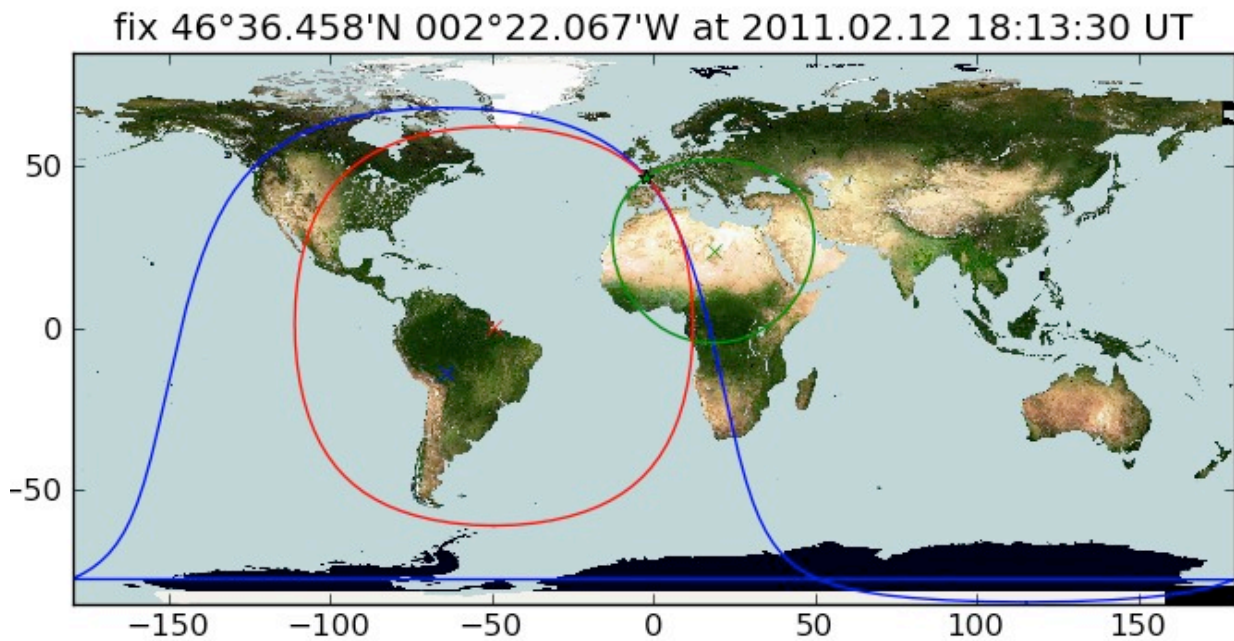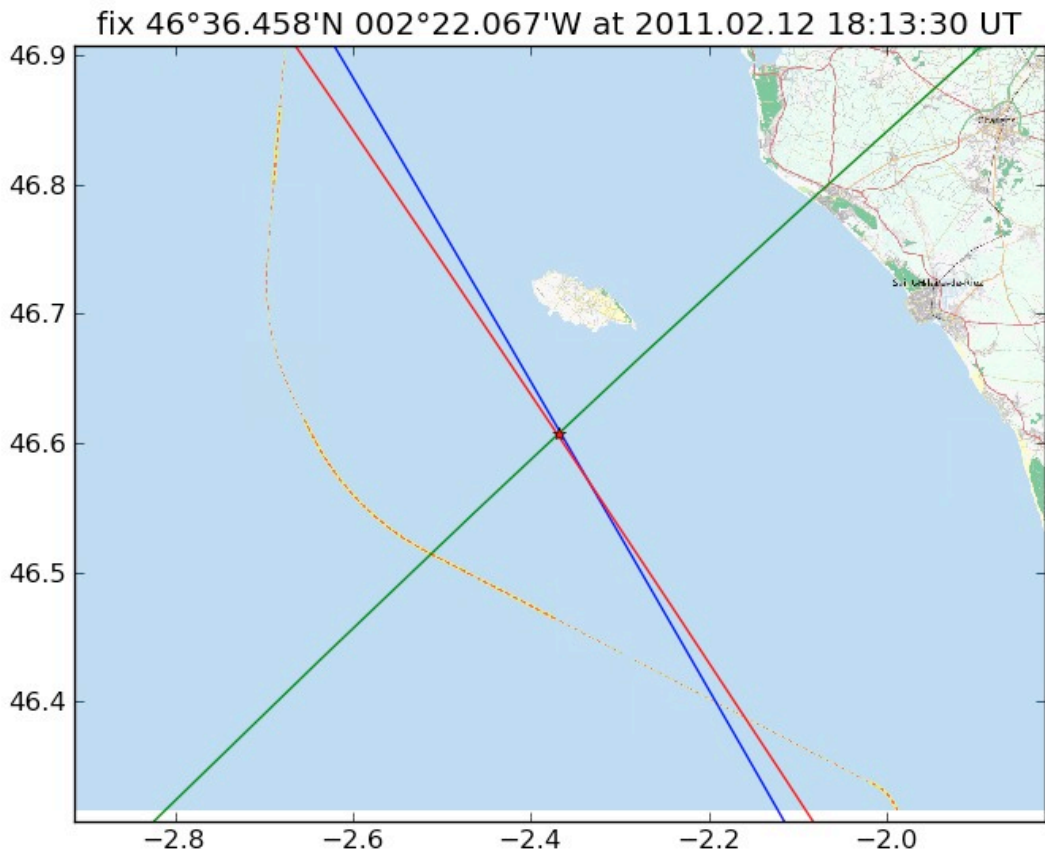
Ship's track traced backwards from our fix (solid black line), from fix given by ship's navigation system (at our fix time; dotted black line).

Known *GHA*, declination *Dec*, and altitude *H* of a celestial body.
Compute: points (*Lat,Lon*) on the circle of position.

Let *B* be the parallactic angle (i.e., in the nautical triangle the bearing angle at the celestial body). The circle of position is obtained by letting *B* vary from -180° to 180° and computing latitude and longitude as follows:

Latitude is given by

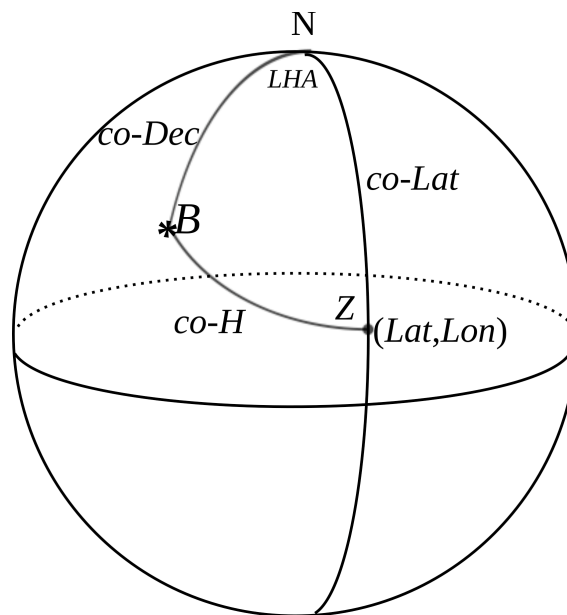$$\sin(Lat) = \sin(Dec)\sin(H) + \cos(Dec)\cos(H)\cos(B)$$

and longitude is from

$$\cos(LHA) = \frac{\sin(H) - \sin(Dec)\sin(Lat)}{\cos(Dec)\cos(Lat)}$$

$$Lon = \pm\, LHA - GHA$$

where the sign of *LHA* is the same as the sign of *B*.

Vessel motion is taken into account by advancing the above computed points (*Lat,Lon*).

[NavList] 12 Feb 2011 Unorthodox Jupiter Lunar from a moving platform

Time	dT	Course	Speed [kn]	Distance[NM]	DLat [']	Dep [']	Dlat cumul [']	Dep cumul [']	Sights	
16:08:54,60		255	12							
16:08:54,60	00:00:00,00	255	12	0,00	0,00	0,00	-26,62	-1,52	Sun LL	7°46,7
16:12:00	00:03:05,40	184	16,2	0,62	-0,16	-0,60	-26,46	-0,92	course change	
17:26:57,90	01:14:57,90	184	16,2	20,24	-20,19	-1,41	-6,27	0,49	Moon LL	61°02,9
17:42:01,80	00:15:03,90	184	16,2	4,07	-4,06	-0,28	-2,21	0,78	Jupiter	28°28,8
17:47:00	00:04:58,20	135	22	1,34	-1,34	-0,09	-0,87	0,87	course change	
17:50:21,40	00:03:21,40	135	22	1,23	-0,87	0,87	0,00	0,00	Jupiter-Moon NL	66°12,9
					-26,62	-1,52				

fix: 46°36.458'N 002°22.067'W
dT: 1388.8
residual clock error: 1.3
time of lunarian: (2011, 2, 12, 18, 13, 30.2)

fix 46°36.458'N 002°22.067'W at 2011.02.12 18:13:30 UT