superlight.fr

Sun and Moon Almanac

Celestial navigation — 2027–2035

Atlantic to Indian Ocean edition

The hours around noon and the Moon's transit on the Greenwich meridian (0°)

Updated November 13, 2026

Contents

- How to use, with an example followed step by step
- Table 1: dip of the horizon
- Table 2: Sun, total correction
- Table 3: Moon, total correction
- Tables 4 and 5: interpolation of the GHA, v and d
- Each month, January 2027 to December 2035: the Sun's page, then the Moon's

© Superlight — superlight.fr — Licence CC BY-NC-SA 4.0: free to share and adapt, non-commercially, under the same licence.

How to use

An example followed step by step: the Sun, lower limb, 12 June 2027 at 10 h 23 min 41 s UTC, height of eye 2.5 m, index error +1.4'.

The body's altitude

1 Sextant altitude. Read the sextant (H_i) and remove the index error e. With an artificial horizon, divide it by 2: the reading is twice the altitude.

$H_s = H_i - e$ — $62°14.6' - 1.4' = 62°13.2'$

2 Dip. On a sea horizon, add the dip (table 1, always negative). Nothing with an artificial horizon.

$H_a = H_s + \text{dip}$ — $62°13.2' - 2.8' = 62°10.4'$ (eye 2.5 m)

3 True altitude. Add the total correction for the Sun (table 2) or the Moon (table 3), read with H_a and, for the Moon, the horizontal parallax HP of the day's page. It combines refraction, parallax and semi-diameter: do not add them a second time.

$H_o = H_a + \text{corr.}$ — $62°10.4' + 15.4' = 62°25.8'$ (table 2)

The body's position

4 Hour angle. On the month's page, read the GHA at the whole hour before the sight, then interpolate for the minutes and seconds since: table 4, then table 5 for v, the Δ'/h of the GHA row (the excess over 15°/h for the Sun, 14°/h for the Moon).

$\text{GHA} = \text{GHA}_h + \text{table 4} + \text{table 5}\,(v)$ — $330°02.6' + 5°55.2' + 0.0' = 335°57.8'$

5 Declination. Read the declination at the whole hour and add the interpolation of d, the Δ'/h of the declination row, with its sign.

$\text{Dec} = \text{Dec}_h + \text{table 5}\,(d)$ — $23°08.9' + 0.1' = 23°09.0'$ ($d = +0.2$)

The tables assume 10 °C and 1010 hPa; below 10° altitude refraction varies with the weather and sights are less reliable. Formulas: dip $1.76'\sqrt{h}$; Bennett's refraction; parallax $0.15'\cos H_a$ (Sun), $\arcsin(\sin HP \cos H_a)$ (Moon); Moon semi-diameter $0.2725\,HP$.

Table 1 — Dip of the horizon

Eye (m)	Dip
0.5	−1.2
1.0	−1.8
1.5	−2.2
2.0	−2.5
2.5	−2.8
3.0	−3.0
3.5	−3.3
4.0	−3.5
4.5	−3.7
5.0	−3.9
6.0	−4.3
7.0	−4.7
8.0	−5.0
9.0	−5.3
10.0	−5.6
12.0	−6.1
14.0	−6.6
16.0	−7.0
18.0	−7.5
20.0	−7.9
25.0	−8.8
30.0	−9.6

Table 2 — Sun: total correction

	October – March		April – September	
H_a	Lower	Upper	Lower	Upper
5°00’	+6.4	−25.8	+6.2	−25.6
5°30’	+7.1	−25.1	+6.9	−24.9
6°00’	+7.7	−24.5	+7.5	−24.3
6°30’	+8.3	−23.9	+8.1	−23.7
7°00’	+8.8	−23.4	+8.6	−23.2
7°30’	+9.2	−23.0	+9.0	−22.8
8°00’	+9.6	−22.6	+9.4	−22.4
8°30’	+10.0	−22.2	+9.8	−22.0
9°00’	+10.3	−21.9	+10.1	−21.7
9°30’	+10.6	−21.6	+10.4	−21.4
10°00’	+10.9	−21.3	+10.7	−21.1
11°00’	+11.3	−20.9	+11.1	−20.7
12°00’	+11.7	−20.5	+11.5	−20.3
13°00’	+12.1	−20.1	+11.9	−19.9
14°00’	+12.4	−19.8	+12.2	−19.6
15°00’	+12.6	−19.6	+12.4	−19.4
16°00’	+12.8	−19.4	+12.6	−19.2
17°00’	+13.0	−19.2	+12.8	−19.0
18°00’	+13.2	−19.0	+13.0	−18.8
19°00’	+13.4	−18.8	+13.2	−18.6
20°00’	+13.5	−18.7	+13.3	−18.5
25°00’	+14.1	−18.1	+13.9	−17.9
30°00’	+14.5	−17.7	+14.3	−17.5
35°00’	+14.8	−17.4	+14.6	−17.2
40°00’	+15.0	−17.2	+14.8	−17.0
45°00’	+15.2	−17.0	+15.0	−16.8
50°00’	+15.4	−16.8	+15.2	−16.6
55°00’	+15.5	−16.7	+15.3	−16.5
60°00’	+15.6	−16.6	+15.4	−16.4
65°00’	+15.7	−16.5	+15.5	−16.3
70°00’	+15.8	−16.4	+15.6	−16.2
75°00’	+15.9	−16.3	+15.7	−16.1
80°00’	+16.0	−16.2	+15.8	−16.0
85°00’	+16.0	−16.2	+15.8	−16.0
90°00’	+16.1	−16.1	+15.9	−15.9

Refraction, parallax and semi-diameter (16.1’ October to March, 15.9’ April to September). Add to H_a.

Table 3 — Moon: total correction

Lower limb									
H_a \ HP	**54'**	**55'**	**56'**	**57'**	**58'**	**59'**	**60'**	**61'**	**62'**
5°00'	+58.6	+59.9	+61.2	+62.4	+63.7	+65.0	+66.2	+67.5	+68.8
6°00'	+59.9	+61.2	+62.4	+63.7	+65.0	+66.2	+67.5	+68.8	+70.0
7°00'	+60.9	+62.1	+63.4	+64.7	+65.9	+67.2	+68.4	+69.7	+71.0
8°00'	+61.6	+62.8	+64.1	+65.4	+66.6	+67.9	+69.1	+70.4	+71.7
9°00'	+62.1	+63.4	+64.6	+65.9	+67.1	+68.4	+69.7	+70.9	+72.2
10°00'	+62.5	+63.8	+65.0	+66.3	+67.5	+68.8	+70.0	+71.3	+72.6
11°00'	+62.8	+64.1	+65.3	+66.6	+67.8	+69.1	+70.3	+71.6	+72.8
12°00'	+63.0	+64.3	+65.5	+66.8	+68.0	+69.3	+70.5	+71.8	+73.0
13°00'	+63.1	+64.4	+65.6	+66.9	+68.1	+69.4	+70.6	+71.9	+73.1
14°00'	+63.2	+64.5	+65.7	+66.9	+68.2	+69.4	+70.7	+71.9	+73.2
15°00'	+63.2	+64.5	+65.7	+67.0	+68.2	+69.4	+70.7	+71.9	+73.1
20°00'	+62.8	+64.0	+65.2	+66.4	+67.6	+68.8	+70.0	+71.2	+72.5
25°00'	+61.5	+62.7	+63.9	+65.1	+66.2	+67.4	+68.6	+69.8	+71.0
30°00'	+59.8	+60.9	+62.0	+63.2	+64.3	+65.5	+66.6	+67.7	+68.9
35°00'	+57.5	+58.6	+59.7	+60.8	+61.9	+63.0	+64.1	+65.2	+66.3
40°00'	+54.9	+55.9	+57.0	+58.0	+59.0	+60.1	+61.1	+62.2	+63.2
45°00'	+51.9	+52.9	+53.9	+54.8	+55.8	+56.8	+57.8	+58.8	+59.7
50°00'	+48.6	+49.5	+50.4	+51.3	+52.3	+53.2	+54.1	+55.0	+55.9
55°00'	+45.0	+45.8	+46.7	+47.5	+48.4	+49.2	+50.1	+50.9	+51.8
60°00'	+41.1	+41.9	+42.7	+43.5	+44.2	+45.0	+45.8	+46.5	+47.3
65°00'	+37.1	+37.8	+38.5	+39.2	+39.9	+40.5	+41.2	+41.9	+42.6
70°00'	+32.8	+33.4	+34.1	+34.7	+35.3	+35.9	+36.5	+37.1	+37.7
75°00'	+28.4	+29.0	+29.5	+30.0	+30.5	+31.1	+31.6	+32.1	+32.7
80°00'	+23.9	+24.4	+24.8	+25.3	+25.7	+26.1	+26.6	+27.0	+27.5
85°00'	+19.3	+19.7	+20.1	+20.4	+20.8	+21.1	+21.5	+21.9	+22.2
90°00'	+14.7	+15.0	+15.3	+15.5	+15.8	+16.1	+16.4	+16.6	+16.9

Upper limb									
H_a \ HP	**54'**	**55'**	**56'**	**57'**	**58'**	**59'**	**60'**	**61'**	**62'**
5°00'	+29.2	+29.9	+30.6	+31.4	+32.1	+32.8	+33.5	+34.3	+35.0
6°00'	+30.5	+31.2	+31.9	+32.6	+33.4	+34.1	+34.8	+35.5	+36.3
7°00'	+31.4	+32.1	+32.9	+33.6	+34.3	+35.0	+35.7	+36.5	+37.2
8°00'	+32.1	+32.9	+33.6	+34.3	+35.0	+35.7	+36.4	+37.2	+37.9
9°00'	+32.7	+33.4	+34.1	+34.8	+35.5	+36.2	+37.0	+37.7	+38.4
10°00'	+33.1	+33.8	+34.5	+35.2	+35.9	+36.6	+37.3	+38.1	+38.8
11°00'	+33.4	+34.1	+34.8	+35.5	+36.2	+36.9	+37.6	+38.3	+39.0
12°00'	+33.6	+34.3	+35.0	+35.7	+36.4	+37.1	+37.8	+38.5	+39.2
13°00'	+33.7	+34.4	+35.1	+35.8	+36.5	+37.2	+37.9	+38.6	+39.3
14°00'	+33.8	+34.5	+35.2	+35.9	+36.6	+37.3	+38.0	+38.7	+39.4
15°00'	+33.8	+34.5	+35.2	+35.9	+36.6	+37.3	+38.0	+38.7	+39.4
20°00'	+33.3	+34.0	+34.7	+35.3	+36.0	+36.7	+37.3	+38.0	+38.7
25°00'	+32.1	+32.7	+33.4	+34.0	+34.6	+35.3	+35.9	+36.5	+37.2
30°00'	+30.3	+30.9	+31.5	+32.1	+32.7	+33.3	+33.9	+34.5	+35.1
35°00'	+28.1	+28.6	+29.2	+29.7	+30.3	+30.8	+31.4	+31.9	+32.5
40°00'	+25.5	+26.0	+26.5	+26.9	+27.4	+27.9	+28.4	+28.9	+29.4
45°00'	+22.5	+22.9	+23.3	+23.8	+24.2	+24.6	+25.1	+25.5	+25.9
50°00'	+19.2	+19.5	+19.9	+20.3	+20.6	+21.0	+21.4	+21.8	+22.1
55°00'	+15.6	+15.9	+16.2	+16.5	+16.8	+17.1	+17.4	+17.7	+18.0
60°00'	+11.7	+11.9	+12.2	+12.4	+12.6	+12.8	+13.1	+13.3	+13.5
65°00'	+7.6	+7.8	+7.9	+8.1	+8.2	+8.4	+8.5	+8.7	+8.8
70°00'	+3.4	+3.5	+3.5	+3.6	+3.7	+3.7	+3.8	+3.9	+3.9
75°00'	−1.0	−1.0	−1.0	−1.0	−1.1	−1.1	−1.1	−1.1	−1.1
80°00'	−5.5	−5.6	−5.7	−5.8	−5.9	−6.0	−6.1	−6.2	−6.3
85°00'	−10.1	−10.3	−10.5	−10.7	−10.8	−11.0	−11.2	−11.4	−11.6
90°00'	−14.7	−15.0	−15.3	−15.5	−15.8	−16.1	−16.3	−16.6	−16.9

Columns: horizontal parallax HP (the day's page). Refraction, parallax and semi-diameter ($0.2725\,HP$). Add to H_a; interpolate between rows and columns.

Table 4 — GHA interpolation: minutes and seconds

min	Sun	Moon	min	Sun	Moon	s	Sun	Moon
0	0°00.0’	0°00.0’	30	7°30.0’	7°00.0’	0	0.0’	0.0’
1	0°15.0’	0°14.0’	31	7°45.0’	7°14.0’	2	0.5’	0.5’
2	0°30.0’	0°28.0’	32	8°00.0’	7°28.0’	4	1.0’	0.9’
3	0°45.0’	0°42.0’	33	8°15.0’	7°42.0’	6	1.5’	1.4’
4	1°00.0’	0°56.0’	34	8°30.0’	7°56.0’	8	2.0’	1.9’
5	1°15.0’	1°10.0’	35	8°45.0’	8°10.0’	10	2.5’	2.3’
6	1°30.0’	1°24.0’	36	9°00.0’	8°24.0’	12	3.0’	2.8’
7	1°45.0’	1°38.0’	37	9°15.0’	8°38.0’	14	3.5’	3.3’
8	2°00.0’	1°52.0’	38	9°30.0’	8°52.0’	16	4.0’	3.7’
9	2°15.0’	2°06.0’	39	9°45.0’	9°06.0’	18	4.5’	4.2’
10	2°30.0’	2°20.0’	40	10°00.0’	9°20.0’	20	5.0’	4.7’
11	2°45.0’	2°34.0’	41	10°15.0’	9°34.0’	22	5.5’	5.1’
12	3°00.0’	2°48.0’	42	10°30.0’	9°48.0’	24	6.0’	5.6’
13	3°15.0’	3°02.0’	43	10°45.0’	10°02.0’	26	6.5’	6.1’
14	3°30.0’	3°16.0’	44	11°00.0’	10°16.0’	28	7.0’	6.5’
15	3°45.0’	3°30.0’	45	11°15.0’	10°30.0’	30	7.5’	7.0’
16	4°00.0’	3°44.0’	46	11°30.0’	10°44.0’	32	8.0’	7.5’
17	4°15.0’	3°58.0’	47	11°45.0’	10°58.0’	34	8.5’	7.9’
18	4°30.0’	4°12.0’	48	12°00.0’	11°12.0’	36	9.0’	8.4’
19	4°45.0’	4°26.0’	49	12°15.0’	11°26.0’	38	9.5’	8.9’
20	5°00.0’	4°40.0’	50	12°30.0’	11°40.0’	40	10.0’	9.3’
21	5°15.0’	4°54.0’	51	12°45.0’	11°54.0’	42	10.5’	9.8’
22	5°30.0’	5°08.0’	52	13°00.0’	12°08.0’	44	11.0’	10.3’
23	5°45.0’	5°22.0’	53	13°15.0’	12°22.0’	46	11.5’	10.7’
24	6°00.0’	5°36.0’	54	13°30.0’	12°36.0’	48	12.0’	11.2’
25	6°15.0’	5°50.0’	55	13°45.0’	12°50.0’	50	12.5’	11.7’
26	6°30.0’	6°04.0’	56	14°00.0’	13°04.0’	52	13.0’	12.1’
27	6°45.0’	6°18.0’	57	14°15.0’	13°18.0’	54	13.5’	12.6’
28	7°00.0’	6°32.0’	58	14°30.0’	13°32.0’	56	14.0’	13.1’
29	7°15.0’	6°46.0’	59	14°45.0’	13°46.0’	58	14.5’	13.5’

The month’s pages give the GHA at whole hours; in between it grows steadily, by 15° an hour for the Sun and 14° for the Moon. This table gives what it gains in the minutes (left) and the seconds (right) since the whole hour: add both to the GHA of the whole hour, then the interpolation of v (table 5). Example, Sun at 15 h 30 min 52 s: 7°30.0’ + 13.0’ = 7°43.0’.

Table 5 — Interpolation of v and d

Δ'/h \ min	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
0.3	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
0.5	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
0.7	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7
1.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9	1.0
2.0	0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0
3.0	0.2	0.5	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0
4.0	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0
5.0	0.4	0.8	1.2	1.7	2.1	2.5	2.9	3.3	3.8	4.2	4.6	5.0
6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
7.0	0.6	1.2	1.8	2.3	2.9	3.5	4.1	4.7	5.2	5.8	6.4	7.0
8.0	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0
9.0	0.8	1.5	2.2	3.0	3.8	4.5	5.2	6.0	6.8	7.5	8.2	9.0
10.0	0.8	1.7	2.5	3.3	4.2	5.0	5.8	6.7	7.5	8.3	9.2	10.0
11.0	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.3	8.2	9.2	10.1	11.0
12.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
13.0	1.1	2.2	3.2	4.3	5.4	6.5	7.6	8.7	9.8	10.8	11.9	13.0
14.0	1.2	2.3	3.5	4.7	5.8	7.0	8.2	9.3	10.5	11.7	12.8	14.0
15.0	1.2	2.5	3.8	5.0	6.2	7.5	8.8	10.0	11.2	12.5	13.8	15.0
16.0	1.3	2.7	4.0	5.3	6.7	8.0	9.3	10.7	12.0	13.3	14.7	16.0
17.0	1.4	2.8	4.2	5.7	7.1	8.5	9.9	11.3	12.8	14.2	15.6	17.0
18.0	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0
20.0	1.7	3.3	5.0	6.7	8.3	10.0	11.7	13.3	15.0	16.7	18.3	20.0
30.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0
40.0	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3	36.7	40.0

The rest of the interpolation: the GHA actually grows by v more than 15° (14°) an hour, the declination by d an hour (Δ'/h on the month's page). The table gives $\Delta \times min/60$ for the minutes since the whole hour; add it with the sign of Δ. For a Δ not listed, add rows: Moon, v = 38.3'/h at 41 min ≈ 30 + 8 + 0.3: 20.5 + 5.5 + 0.2 = 26.2'.

SUN

January 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	269° 10.2	284° 09.9	299° 09.6	314° 09.3	329° 09.0	344° 08.7	359° 08.4	14° 08.1	29° 07.8	44° 07.5	59° 07.2	74° 06.9	-0.3
	-23° 01.0	-23° 00.8	-23° 00.6	-23° 00.4	-23° 00.2	-23° 00.0	-22° 59.8	-22° 59.6	-22° 59.3	-22° 59.1	-22° 58.9	-22° 58.7	+0.2
Sa 2	269° 03.1	284° 02.8	299° 02.5	314° 02.2	329° 01.9	344° 01.6	359° 01.3	14° 01.0	29° 00.8	44° 00.5	59° 00.2	73° 59.9	-0.3
	-22° 55.9	-22° 55.7	-22° 55.5	-22° 55.2	-22° 55.0	-22° 54.8	-22° 54.6	-22° 54.3	-22° 54.1	-22° 53.9	-22° 53.7	-22° 53.4	+0.2
Su 3	268° 56.1	283° 55.8	298° 55.5	313° 55.2	328° 55.0	343° 54.7	358° 54.4	13° 54.1	28° 53.8	43° 53.5	58° 53.2	73° 52.9	-0.3
	-22° 50.4	-22° 50.1	-22° 49.9	-22° 49.6	-22° 49.4	-22° 49.2	-22° 48.9	-22° 48.7	-22° 48.4	-22° 48.2	-22° 47.9	-22° 47.7	+0.2
Mo 4	268° 49.2	283° 48.9	298° 48.6	313° 48.4	328° 48.1	343° 47.8	358° 47.5	13° 47.2	28° 46.9	43° 46.7	58° 46.4	73° 46.1	-0.3
	-22° 44.4	-22° 44.1	-22° 43.9	-22° 43.6	-22° 43.3	-22° 43.1	-22° 42.8	-22° 42.5	-22° 42.3	-22° 42.0	-22° 41.7	-22° 41.5	+0.3
Tu 5	268° 42.4	283° 42.1	298° 41.9	313° 41.6	328° 41.3	343° 41.0	358° 40.7	13° 40.5	28° 40.2	43° 39.9	58° 39.6	73° 39.3	-0.3
	-22° 37.9	-22° 37.7	-22° 37.4	-22° 37.1	-22° 36.8	-22° 36.5	-22° 36.3	-22° 36.0	-22° 35.7	-22° 35.4	-22° 35.1	-22° 34.8	+0.3
We 6	268° 35.7	283° 35.5	298° 35.2	313° 34.9	328° 34.6	343° 34.4	358° 34.1	13° 33.8	28° 33.5	43° 33.3	58° 33.0	73° 32.7	-0.3
	-22° 31.0	-22° 30.7	-22° 30.4	-22° 30.1	-22° 29.8	-22° 29.5	-22° 29.2	-22° 28.9	-22° 28.6	-22° 28.3	-22° 28.0	-22° 27.7	+0.3
Th 7	268° 29.2	283° 28.9	298° 28.6	313° 28.3	328° 28.1	343° 27.8	358° 27.5	13° 27.3	28° 27.0	43° 26.7	58° 26.5	73° 26.2	-0.3
	-22° 23.7	-22° 23.4	-22° 23.1	-22° 22.8	-22° 22.4	-22° 22.1	-22° 21.8	-22° 21.5	-22° 21.2	-22° 20.8	-22° 20.5	-22° 20.2	+0.3
Fr 8	268° 22.7	283° 22.4	298° 22.2	313° 21.9	328° 21.6	343° 21.4	358° 21.1	13° 20.8	28° 20.6	43° 20.3	58° 20.0	73° 19.8	-0.3
	-22° 15.9	-22° 15.6	-22° 15.3	-22° 14.9	-22° 14.6	-22° 14.2	-22° 13.9	-22° 13.6	-22° 13.2	-22° 12.9	-22° 12.6	-22° 12.2	+0.3
Sa 9	268° 16.4	283° 16.1	298° 15.9	313° 15.6	328° 15.3	343° 15.1	358° 14.8	13° 14.6	28° 14.3	43° 14.0	58° 13.8	73° 13.5	-0.3
	-22° 07.7	-22° 07.4	-22° 07.0	-22° 06.6	-22° 06.3	-22° 05.9	-22° 05.6	-22° 05.2	-22° 04.9	-22° 04.5	-22° 04.2	-22° 03.8	+0.4
Su 10	268° 10.2	283° 09.9	298° 09.7	313° 09.4	328° 09.2	343° 08.9	358° 08.7	13° 08.4	28° 08.1	43° 07.9	58° 07.6	73° 07.4	-0.3
	-21° 59.1	-21° 58.7	-21° 58.3	-21° 57.9	-21° 57.6	-21° 57.2	-21° 56.8	-21° 56.4	-21° 56.1	-21° 55.7	-21° 55.3	-21° 54.9	+0.4
Mo 11	268° 04.1	283° 03.9	298° 03.6	313° 03.4	328° 03.1	343° 02.9	358° 02.6	13° 02.4	28° 02.1	43° 01.9	58° 01.6	73° 01.4	-0.2
	-21° 50.0	-21° 49.6	-21° 49.2	-21° 48.8	-21° 48.4	-21° 48.0	-21° 47.6	-21° 47.2	-21° 46.8	-21° 46.5	-21° 46.1	-21° 45.7	+0.4
Tu 12	267° 58.2	282° 58.0	297° 57.7	312° 57.5	327° 57.3	342° 57.0	357° 56.8	12° 56.5	27° 56.3	42° 56.1	57° 55.8	72° 55.6	-0.2
	-21° 40.5	-21° 40.1	-21° 39.7	-21° 39.2	-21° 38.8	-21° 38.4	-21° 38.0	-21° 37.6	-21° 37.2	-21° 36.8	-21° 36.4	-21° 36.0	+0.4
We 13	267° 52.5	282° 52.2	297° 52.0	312° 51.8	327° 51.5	342° 51.3	357° 51.1	12° 50.8	27° 50.6	42° 50.4	57° 50.1	72° 49.9	-0.2
	-21° 30.5	-21° 30.1	-21° 29.7	-21° 29.3	-21° 28.8	-21° 28.4	-21° 28.0	-21° 27.6	-21° 27.1	-21° 26.7	-21° 26.3	-21° 25.9	+0.4
Th 14	267° 46.9	282° 46.7	297° 46.4	312° 46.2	327° 46.0	342° 45.7	357° 45.5	12° 45.3	27° 45.1	42° 44.8	57° 44.6	72° 44.4	-0.2
	-21° 20.2	-21° 19.8	-21° 19.3	-21° 18.9	-21° 18.4	-21° 18.0	-21° 17.5	-21° 17.1	-21° 16.7	-21° 16.2	-21° 15.8	-21° 15.3	+0.4
Fr 15	267° 41.5	282° 41.3	297° 41.0	312° 40.8	327° 40.6	342° 40.4	357° 40.1	12° 39.9	27° 39.7	42° 39.5	57° 39.3	72° 39.0	-0.2
	-21° 09.4	-21° 09.0	-21° 08.5	-21° 08.1	-21° 07.6	-21° 07.2	-21° 06.7	-21° 06.2	-21° 05.8	-21° 05.3	-21° 04.8	-21° 04.4	+0.5
Sa 16	267° 36.2	282° 36.0	297° 35.8	312° 35.6	327° 35.4	342° 35.2	357° 34.9	12° 34.7	27° 34.5	42° 34.3	57° 34.1	72° 33.9	-0.2
	-20° 58.3	-20° 57.8	-20° 57.3	-20° 56.9	-20° 56.4	-20° 55.9	-20° 55.4	-20° 55.0	-20° 54.5	-20° 54.0	-20° 53.5	-20° 53.0	+0.5
Su 17	267° 31.2	282° 30.9	297° 30.7	312° 30.5	327° 30.3	342° 30.1	357° 29.9	12° 29.7	27° 29.5	42° 29.3	57° 29.1	72° 28.9	-0.2
	-20° 46.7	-20° 46.2	-20° 45.8	-20° 45.3	-20° 44.8	-20° 44.3	-20° 43.8	-20° 43.3	-20° 42.8	-20° 42.3	-20° 41.8	-20° 41.3	+0.5
Mo 18	267° 26.3	282° 26.1	297° 25.9	312° 25.7	327° 25.5	342° 25.3	357° 25.1	12° 24.9	27° 24.7	42° 24.5	57° 24.3	72° 24.1	-0.2
	-20° 34.8	-20° 34.3	-20° 33.8	-20° 33.3	-20° 32.8	-20° 32.3	-20° 31.7	-20° 31.2	-20° 30.7	-20° 30.2	-20° 29.7	-20° 29.2	+0.5
Tu 19	267° 21.6	282° 21.4	297° 21.2	312° 21.0	327° 20.8	342° 20.6	357° 20.4	12° 20.2	27° 20.0	42° 19.8	57° 19.6	72° 19.5	-0.2
	-20° 22.5	-20° 21.9	-20° 21.4	-20° 20.9	-20° 20.4	-20° 19.8	-20° 19.3	-20° 18.8	-20° 18.3	-20° 17.7	-20° 17.2	-20° 16.7	+0.5
We 20	267° 17.0	282° 16.8	297° 16.7	312° 16.5	327° 16.3	342° 16.1	357° 15.9	12° 15.7	27° 15.6	42° 15.4	57° 15.2	72° 15.0	-0.2
	-20° 09.7	-20° 09.2	-20° 08.7	-20° 08.1	-20° 07.6	-20° 07.0	-20° 06.5	-20° 06.0	-20° 05.4	-20° 04.9	-20° 04.3	-20° 03.8	+0.5
Th 21	267° 12.7	282° 12.5	297° 12.3	312° 12.2	327° 12.0	342° 11.8	357° 11.6	12° 11.5	27° 11.3	42° 11.1	57° 10.9	72° 10.8	-0.2
	-19° 56.6	-19° 56.1	-19° 55.5	-19° 55.0	-19° 54.4	-19° 53.9	-19° 53.3	-19° 52.7	-19° 52.2	-19° 51.6	-19° 51.1	-19° 50.5	+0.6
Fr 22	267° 08.6	282° 08.4	297° 08.2	312° 08.0	327° 07.9	342° 07.7	357° 07.5	12° 07.4	27° 07.2	42° 07.0	57° 06.9	72° 06.7	-0.2
	-19° 43.2	-19° 42.6	-19° 42.0	-19° 41.5	-19° 40.9	-19° 40.3	-19° 39.7	-19° 39.2	-19° 38.6	-19° 38.0	-19° 37.4	-19° 36.9	+0.6
Sa 23	267° 04.6	282° 04.4	297° 04.3	312° 04.1	327° 04.0	342° 03.8	357° 03.6	12° 03.5	27° 03.3	42° 03.2	57° 03.0	72° 02.9	-0.2
	-19° 29.3	-19° 28.8	-19° 28.2	-19° 27.6	-19° 27.0	-19° 26.4	-19° 25.8	-19° 25.2	-19° 24.6	-19° 24.1	-19° 23.5	-19° 22.9	+0.6
Su 24	267° 00.8	282° 00.7	297° 00.5	312° 00.4	327° 00.2	342° 00.1	356° 59.9	11° 59.8	26° 59.6	41° 59.5	56° 59.3	71° 59.2	-0.2
	-19° 15.1	-19° 14.5	-19° 13.9	-19° 13.3	-19° 12.7	-19° 12.1	-19° 11.5	-19° 10.9	-19° 10.3	-19° 09.7	-19° 09.1	-19° 08.5	+0.6
Mo 25	266° 57.3	281° 57.1	296° 57.0	311° 56.8	326° 56.7	341° 56.6	356° 56.4	11° 56.3	26° 56.1	41° 56.0	56° 55.9	71° 55.7	-0.1
	-19° 00.6	-19° 00.0	-18° 59.4	-18° 58.8	-18° 58.1	-18° 57.5	-18° 56.9	-18° 56.3	-18° 55.7	-18° 55.1	-18° 54.4	-18° 53.8	+0.6
Tu 26	266° 53.9	281° 53.8	296° 53.6	311° 53.5	326° 53.4	341° 53.2	356° 53.1	11° 53.0	26° 52.8	41° 52.7	56° 52.6	71° 52.4	-0.1
	-18° 45.7	-18° 45.1	-18° 44.4	-18° 43.8	-18° 43.2	-18° 42.6	-18° 41.9	-18° 41.3	-18° 40.7	-18° 40.0	-18° 39.4	-18° 38.8	+0.6
We 27	266° 50.7	281° 50.6	296° 50.5	311° 50.4	326° 50.2	341° 50.1	356° 50.0	11° 49.8	26° 49.7	41° 49.6	56° 49.5	71° 49.3	-0.1
	-18° 30.5	-18° 29.8	-18° 29.2	-18° 28.5	-18° 27.9	-18° 27.2	-18° 26.6	-18° 26.0	-18° 25.3	-18° 24.7	-18° 24.0	-18° 23.4	+0.6
Th 28	266° 47.8	281° 47.6	296° 47.5	311° 47.4	326° 47.3	341° 47.2	356° 47.0	11° 46.9	26° 46.8	41° 46.7	56° 46.6	71° 46.5	-0.1
	-18° 14.9	-18° 14.2	-18° 13.6	-18° 12.9	-18° 12.3	-18° 11.6	-18° 10.9	-18° 10.3	-18° 09.6	-18° 09.0	-18° 08.3	-18° 07.6	+0.7
Fr 29	266° 45.0	281° 44.9	296° 44.8	311° 44.6	326° 44.5	341° 44.4	356° 44.3	11° 44.2	26° 44.1	41° 44.0	56° 43.9	71° 43.8	-0.1
	-17° 59.0	-17° 58.3	-17° 57.6	-17° 57.0	-17° 56.3	-17° 55.6	-17° 54.9	-17° 54.3	-17° 53.6	-17° 52.9	-17° 52.2	-17° 51.6	+0.7
Sa 30	266° 42.4	281° 42.3	296° 42.2	311° 42.1	326° 42.0	341° 41.9	356° 41.8	11° 41.7	26° 41.6	41° 41.5	56° 41.4	71° 41.3	-0.1
	-17° 42.7	-17° 42.1	-17° 41.4	-17° 40.7	-17° 40.0	-17° 39.3	-17° 38.6	-17° 37.9	-17° 37.3	-17° 36.6	-17° 35.9	-17° 35.2	+0.7
Su 31	266° 40.0	281° 39.9	296° 39.8	311° 39.7	326° 39.6	341° 39.5	356° 39.5	11° 39.4	26° 39.3	41° 39.2	56° 39.1	71° 39.0	-0.1
	-17° 26.2	-17° 25.5	-17° 24.8	-17° 24.1	-17° 23.4	-17° 22.7	-17° 22.0	-17° 21.3	-17° 20.6	-17° 19.9	-17° 19.2	-17° 18.5	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2027

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Fr 1	233° 48.8	248° 20.9	262° 52.9	277° 24.8	291° 56.7	306° 28.6	321° 00.4	335° 32.2	350° 04.0	4° 35.6	19° 07.3	+31.8	15.1
	-18° 26.2	-18° 37.2	-18° 48.2	-18° 59.0	-19° 09.8	-19° 20.4	-19° 31.0	-19° 41.4	-19° 51.8	-20° 02.1	-20° 12.3	-10.6	55.2
Sa 2	248° 20.9	262° 52.9	277° 24.8	291° 56.7	306° 28.6	321° 00.4	335° 32.2	350° 04.0	4° 35.6	19° 07.3	33° 38.9	+31.8	15.0
	-18° 37.2	-18° 48.2	-18° 59.0	-19° 09.8	-19° 20.4	-19° 31.0	-19° 41.4	-19° 51.8	-20° 02.1	-20° 12.3	-20° 22.3	-10.5	55.2
Su 3	251° 27.5	265° 58.4	280° 29.2	295° 00.0	309° 30.8	324° 01.4	338° 32.1	353° 02.7	7° 33.2	22° 03.7	36° 34.2	+30.7	14.9
	-22° 41.4	-22° 49.8	-22° 58.1	-23° 06.3	-23° 14.4	-23° 22.4	-23° 30.3	-23° 38.1	-23° 45.7	-23° 53.3	-24° 00.7	-7.9	54.7
Mo 4	254° 05.9	268° 35.7	283° 05.5	297° 35.2	312° 04.9	326° 34.5	341° 04.1	355° 33.7	10° 03.3	24° 32.8	39° 02.2	+29.6	14.8
	-25° 37.9	-25° 43.4	-25° 48.8	-25° 54.1	-25° 59.2	-26° 04.3	-26° 09.1	-26° 13.9	-26° 18.5	-26° 23.1	-26° 27.4	-5.0	54.3
Tu 5	256° 21.4	270° 50.5	285° 19.6	299° 48.6	314° 17.7	328° 46.8	343° 15.8	357° 44.9	12° 13.9	26° 42.9	41° 11.9	+29.1	14.7
	-27° 17.6	-27° 19.9	-27° 22.1	-27° 24.1	-27° 26.0	-27° 27.8	-27° 29.4	-27° 30.9	-27° 32.2	-27° 33.5	-27° 34.6	-1.7	54.0
We 6	258° 27.3	272° 56.4	287° 25.5	301° 54.7	316° 23.8	330° 52.9	345° 22.1	359° 51.3	14° 20.5	28° 49.8	43° 19.0	+29.2	14.7
	-27° 34.9	-27° 33.8	-27° 32.6	-27° 31.3	-27° 29.9	-27° 28.3	-27° 26.6	-27° 24.8	-27° 22.8	-27° 20.7	-27° 18.4	+1.6	53.9
● Th 7	260° 41.6	275° 11.3	289° 41.2	304° 11.0	318° 40.9	333° 10.9	347° 40.9	2° 10.9	16° 41.0	31° 11.2	45° 41.3	+30.0	14.7
	-26° 29.4	-26° 25.1	-26° 20.7	-26° 16.2	-26° 11.5	-26° 06.7	-26° 01.8	-25° 56.8	-25° 51.7	-25° 46.4	-25° 41.0	+4.8	53.9
Fr 8	263° 20.1	277° 51.1	292° 22.2	306° 53.3	321° 24.5	335° 55.7	350° 27.0	4° 58.4	19° 29.8	34° 01.2	48° 32.7	+31.3	14.7
	-24° 06.5	-23° 59.3	-23° 52.0	-23° 44.6	-23° 37.0	-23° 29.4	-23° 21.7	-23° 13.8	-23° 05.9	-22° 57.9	-22° 49.7	+7.7	53.9
Sa 9	266° 32.5	281° 04.9	295° 37.5	310° 10.0	324° 42.6	339° 15.3	353° 48.0	8° 20.8	22° 53.6	37° 26.5	51° 59.5	+32.7	14.7
	-20° 35.9	-20° 26.3	-20° 16.5	-20° 06.7	-19° 56.8	-19° 46.8	-19° 36.7	-19° 26.5	-19° 16.3	-19° 05.9	-18° 55.5	+10.0	54.1
Su 10	270° 20.0	284° 53.7	299° 27.5	314° 01.4	328° 35.3	343° 09.2	357° 43.2	12° 17.2	26° 51.3	41° 25.4	55° 59.6	+34.0	14.8
	-16° 10.0	-15° 58.4	-15° 46.7	-15° 35.0	-15° 23.2	-15° 11.3	-14° 59.4	-14° 47.4	-14° 35.3	-14° 23.2	-14° 11.0	+11.9	54.3
Mo 11	274° 36.3	289° 11.0	303° 45.7	318° 20.5	332° 55.3	347° 30.1	2° 04.9	16° 39.7	31° 14.6	45° 49.5	60° 24.4	+34.8	14.9
	-11° 01.4	-10° 48.4	-10° 35.3	-10° 22.1	-10° 08.9	-9° 55.7	-9° 42.4	-9° 29.1	-9° 15.7	-9° 02.3	-8° 48.9	+13.3	54.6
Tu 12	279° 09.9	293° 45.0	308° 20.1	322° 55.2	337° 30.3	352° 05.5	6° 40.6	21° 15.7	35° 50.8	50° 25.9	65° 00.9	+35.1	15.0
	-5° 22.6	-5° 08.6	-4° 54.6	-4° 40.5	-4° 26.4	-4° 12.3	-3° 58.1	-3° 43.9	-3° 29.8	-3° 15.5	-3° 01.3	+14.1	55.1
We 13	283° 45.7	298° 20.5	312° 55.4	327° 30.1	342° 04.9	356° 39.6	11° 14.3	25° 48.9	40° 23.6	54° 58.1	69° 32.7	+34.7	15.2
	0° 34.5	0° 49.0	1° 03.5	1° 18.0	1° 32.5	1° 47.1	2° 01.6	2° 16.1	2° 30.7	2° 45.2	2° 59.8	+14.5	55.7
Th 14	288° 05.7	302° 39.5	317° 13.3	331° 46.9	346° 20.6	0° 54.1	15° 27.6	30° 01.0	44° 34.4	59° 07.7	73° 40.9	+33.5	15.4
	6° 37.6	6° 52.0	7° 06.5	7° 20.9	7° 35.3	7° 49.7	8° 04.1	8° 18.5	8° 32.8	8° 47.1	9° 01.4	+14.4	56.4
◐ Fr 15	291° 50.1	306° 22.0	320° 53.8	335° 25.6	349° 57.2	4° 28.8	19° 00.3	33° 31.6	48° 02.9	62° 34.0	77° 05.1	+31.5	15.6
	12° 32.5	12° 46.2	13° 00.0	13° 13.7	13° 27.3	13° 41.0	13° 54.5	14° 08.0	14° 21.5	14° 34.9	14° 48.3	+13.6	57.2
Sa 16	294° 37.9	309° 07.2	323° 36.3	338° 05.4	352° 34.3	7° 03.0	21° 31.7	36° 00.2	50° 28.6	64° 56.9	79° 25.0	+28.7	15.8
	18° 01.3	18° 13.6	18° 25.8	18° 38.0	18° 50.0	19° 02.0	19° 13.9	19° 25.7	19° 37.4	19° 49.0	20° 00.5	+11.9	58.1
Su 17	296° 11.3	310° 37.3	325° 03.2	339° 28.9	353° 54.5	8° 20.0	22° 45.3	37° 10.5	51° 35.6	66° 00.5	80° 25.3	+25.4	16.1
	22° 40.9	22° 50.7	23° 00.3	23° 09.8	23° 19.2	23° 28.5	23° 37.6	23° 46.6	23° 55.4	24° 04.1	24° 12.7	+9.2	59.1
Mo 18	296° 21.9	310° 44.7	325° 07.4	339° 29.9	353° 52.4	8° 14.7	22° 37.0	36° 59.1	51° 21.1	65° 43.0	80° 04.8	+22.3	16.3
	26° 02.8	26° 08.8	26° 14.7	26° 20.3	26° 25.8	26° 31.1	26° 36.3	26° 41.2	26° 46.0	26° 50.6	26° 55.0	+5.2	59.9
Tu 19	295° 21.8	309° 42.3	324° 02.8	338° 23.3	352° 43.7	7° 04.1	21° 24.4	35° 44.7	50° 05.0	64° 25.2	78° 45.4	+20.3	16.5
	27° 37.3	27° 38.5	27° 39.5	27° 40.3	27° 40.9	27° 41.2	27° 41.3	27° 41.3	27° 41.0	27° 40.5	27° 39.8	+0.2	60.7
We 20	293° 47.4	308° 07.6	322° 27.9	336° 48.2	351° 08.5	5° 28.9	19° 49.3	34° 09.7	48° 30.2	62° 50.8	77° 11.4	+20.4	16.7
	27° 03.3	26° 59.1	26° 54.8	26° 50.2	26° 45.4	26° 40.4	26° 35.2	26° 29.8	26° 24.2	26° 18.4	26° 12.4	-5.1	61.2
Th 21	292° 28.9	306° 50.7	321° 12.6	335° 34.7	349° 56.8	4° 19.0	18° 41.3	33° 03.8	47° 26.3	61° 48.9	76° 11.7	+22.3	16.7
	24° 18.2	24° 09.0	23° 59.7	23° 50.3	23° 40.6	23° 30.8	23° 20.8	23° 10.6	23° 00.2	22° 49.7	22° 39.1	-9.9	61.3
○ Fr 22	292° 06.4	306° 31.0	320° 55.7	335° 20.6	349° 45.5	4° 10.6	18° 35.7	33° 01.0	47° 26.4	61° 52.0	76° 17.6	+25.1	16.7
	19° 40.8	19° 27.9	19° 14.8	19° 01.5	18° 48.2	18° 34.7	18° 21.1	18° 07.4	17° 53.6	17° 39.7	17° 25.7	-13.5	61.1
Sa 23	292° 56.2	307° 23.7	321° 51.3	336° 19.0	350° 46.8	5° 14.6	19° 42.6	34° 10.7	48° 38.9	63° 07.2	77° 35.6	+27.9	16.5
	13° 44.2	13° 28.8	13° 13.3	12° 57.8	12° 42.2	12° 26.5	12° 10.8	11° 55.0	11° 39.2	11° 23.4	11° 07.4	-15.7	60.5
Su 24	294° 52.7	309° 22.5	323° 52.4	338° 22.4	352° 52.4	7° 22.6	21° 52.7	36° 23.0	50° 53.4	65° 23.8	79° 54.2	+30.2	16.3
	7° 04.1	6° 47.7	6° 31.2	6° 14.8	5° 58.3	5° 41.8	5° 25.3	5° 08.8	4° 52.3	4° 35.8	4° 19.3	-16.5	59.7
Mo 25	297° 38.5	312° 09.9	326° 41.3	341° 12.8	355° 44.3	10° 15.8	24° 47.4	39° 19.0	53° 50.7	68° 22.4	82° 54.1	+31.6	16.0
	0° 12.5	-0° 03.9	-0° 20.2	-0° 36.5	-0° 52.7	-1° 08.9	-1° 25.1	-1° 41.3	-1° 57.4	-2° 13.5	-2° 29.6	-16.2	58.7
Tu 26	312° 09.9	326° 41.3	341° 12.8	355° 44.3	10° 15.8	24° 47.4	39° 19.0	53° 50.7	68° 22.4	82° 54.1	97° 25.9	+31.6	16.0
	-0° 03.9	-0° 20.2	-0° 36.5	-0° 52.7	-1° 08.9	-1° 25.1	-1° 41.3	-1° 57.4	-2° 13.5	-2° 29.6	-2° 45.6	-16.2	58.7
We 27	315° 25.3	329° 57.4	344° 29.6	359° 01.7	13° 33.8	28° 06.0	42° 38.2	57° 10.3	71° 42.5	86° 14.7	100° 46.9	+32.2	15.7
	-6° 41.1	-6° 56.4	-7° 11.6	-7° 26.8	-7° 41.9	-7° 57.0	-8° 12.1	-8° 27.0	-8° 41.9	-8° 56.8	-9° 11.5	-15.1	57.7
Th 28	318° 49.3	333° 21.3	347° 53.4	2° 25.5	16° 57.5	31° 29.6	46° 01.6	60° 33.6	75° 05.6	89° 37.5	104° 09.5	+32.0	15.5
	-12° 45.1	-12° 58.7	-13° 12.3	-13° 25.8	-13° 39.2	-13° 52.6	-14° 05.8	-14° 19.0	-14° 32.1	-14° 45.1	-14° 58.0	-13.3	56.7
◑ Fr 29	322° 05.7	336° 37.2	351° 08.7	5° 40.1	20° 11.6	34° 42.9	49° 14.3	63° 45.6	78° 16.9	92° 48.2	107° 19.4	+31.4	15.2
	-18° 01.4	-18° 12.9	-18° 24.3	-18° 35.6	-18° 46.8	-18° 57.9	-19° 08.9	-19° 19.8	-19° 30.6	-19° 41.3	-19° 51.9	-11.0	55.8
Sa 30	325° 03.4	339° 34.0	354° 04.6	8° 35.2	23° 05.7	37° 36.2	52° 06.7	66° 37.1	81° 07.4	95° 37.8	110° 08.1	+30.5	15.0
	-22° 18.1	-22° 27.0	-22° 35.8	-22° 44.4	-22° 53.0	-23° 01.4	-23° 09.7	-23° 17.9	-23° 26.0	-23° 34.0	-23° 41.8	-8.4	55.1
Su 31	327° 38.1	342° 07.8	356° 37.5	11° 07.2	25° 36.9	40° 06.5	54° 36.0	69° 05.6	83° 35.1	98° 04.6	112° 34.1	+29.6	14.9
	-25° 25.2	-25° 31.1	-25° 36.9	-25° 42.5	-25° 48.1	-25° 53.5	-25° 58.8	-26° 03.9	-26° 08.9	-26° 13.8	-26° 18.6	-5.3	54.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 7 20h24 — FQ: 15 20h34 — FM: 22 12h17 — LQ: 29 10h55

SUN

February 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	266°37.8	281°37.8	296°37.7	311°37.6	326°37.5	341°37.4	356°37.3	11°37.2	26°37.2	41°37.1	56°37.0	71°36.9	-0.1
	-17°09.3	-17°08.6	-17°07.9	-17°07.2	-17°06.5	-17°05.8	-17°05.1	-17°04.4	-17°03.6	-17°02.9	-17°02.2	-17°01.5	+0.7
Tu 2	266°35.9	281°35.8	296°35.7	311°35.6	326°35.5	341°35.5	356°35.4	11°35.3	26°35.2	41°35.2	56°35.1	71°35.0	-0.1
	-16°52.2	-16°51.4	-16°50.7	-16°50.0	-16°49.3	-16°48.6	-16°47.8	-16°47.1	-16°46.4	-16°45.7	-16°44.9	-16°44.2	+0.7
We 3	266°34.1	281°34.0	296°33.9	311°33.9	326°33.8	341°33.7	356°33.7	11°33.6	26°33.5	41°33.5	56°33.4	71°33.3	-0.1
	-16°34.7	-16°34.0	-16°33.2	-16°32.5	-16°31.8	-16°31.0	-16°30.3	-16°29.6	-16°28.8	-16°28.1	-16°27.3	-16°26.6	+0.7
Th 4	266°32.5	281°32.4	296°32.4	311°32.3	326°32.3	341°32.2	356°32.1	11°32.1	26°32.0	41°32.0	56°31.9	71°31.8	-0.1
	-16°17.0	-16°16.2	-16°15.5	-16°14.7	-16°14.0	-16°13.2	-16°12.5	-16°11.7	-16°11.0	-16°10.2	-16°09.5	-16°08.7	+0.7
Fr 5	266°31.1	281°31.1	296°31.0	311°31.0	326°30.9	341°30.9	356°30.8	11°30.8	26°30.7	41°30.7	56°30.6	71°30.6	-0.1
	-15°58.9	-15°58.2	-15°57.4	-15°56.6	-15°55.9	-15°55.1	-15°54.4	-15°53.6	-15°52.8	-15°52.1	-15°51.3	-15°50.6	+0.8
Sa 6	266°29.9	281°29.9	296°29.9	311°29.8	326°29.8	341°29.7	356°29.7	11°29.6	26°29.6	41°29.6	56°29.5	71°29.5	-0.0
	-15°40.6	-15°39.8	-15°39.1	-15°38.3	-15°37.5	-15°36.8	-15°36.0	-15°35.2	-15°34.4	-15°33.7	-15°32.9	-15°32.1	+0.8
Su 7	266°29.0	281°28.9	296°28.9	311°28.9	326°28.8	341°28.8	356°28.8	11°28.7	26°28.7	41°28.6	56°28.6	71°28.6	-0.0
	-15°22.0	-15°21.3	-15°20.5	-15°19.7	-15°18.9	-15°18.1	-15°17.3	-15°16.6	-15°15.8	-15°15.0	-15°14.2	-15°13.4	+0.8
Mo 8	266°28.2	281°28.2	296°28.1	311°28.1	326°28.1	341°28.0	356°28.0	11°28.0	26°28.0	41°27.9	56°27.9	71°27.9	-0.0
	-15°03.2	-15°02.4	-15°01.6	-15°00.8	-15°00.0	-14°59.2	-14°58.4	-14°57.6	-14°56.9	-14°56.1	-14°55.3	-14°54.5	+0.8
Tu 9	266°27.6	281°27.6	296°27.6	311°27.6	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.4	56°27.4	71°27.4	-0.0
	-14°44.1	-14°43.3	-14°42.5	-14°41.7	-14°40.9	-14°40.1	-14°39.3	-14°38.5	-14°37.7	-14°36.9	-14°36.1	-14°35.3	+0.8
We 10	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.2	11°27.2	26°27.1	41°27.1	56°27.1	71°27.1	-0.0
	-14°24.8	-14°23.9	-14°23.1	-14°22.3	-14°21.5	-14°20.7	-14°19.9	-14°19.1	-14°18.3	-14°17.4	-14°16.6	-14°15.8	+0.8
Th 11	266°27.0	281°27.0	296°27.0	311°27.0	326°27.0	341°27.0	356°27.0	11°27.0	26°27.0	41°27.0	56°27.0	71°27.0	-0.0
	-14°05.2	-14°04.4	-14°03.5	-14°02.7	-14°01.9	-14°01.1	-14°00.2	-13°59.4	-13°58.6	-13°57.8	-13°56.9	-13°56.1	+0.8
Fr 12	266°27.1	281°27.1	296°27.1	311°27.1	326°27.1	341°27.1	356°27.1	11°27.1	26°27.1	41°27.1	56°27.1	71°27.1	+0.0
	-13°45.4	-13°44.5	-13°43.7	-13°42.9	-13°42.0	-13°41.2	-13°40.4	-13°39.5	-13°38.7	-13°37.9	-13°37.0	-13°36.2	+0.8
Sa 13	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.4	26°27.4	41°27.4	56°27.4	71°27.4	+0.0
	-13°25.3	-13°24.5	-13°23.6	-13°22.8	-13°22.0	-13°21.1	-13°20.3	-13°19.4	-13°18.6	-13°17.8	-13°16.9	-13°16.1	+0.8
Su 14	266°27.7	281°27.7	296°27.7	311°27.7	326°27.7	341°27.8	356°27.8	11°27.8	26°27.8	41°27.9	56°27.9	71°27.9	+0.0
	-13°05.1	-13°04.2	-13°03.4	-13°02.5	-13°01.7	-13°00.8	-13°00.0	-12°59.1	-12°58.3	-12°57.4	-12°56.6	-12°55.7	+0.9
Mo 15	266°28.3	281°28.3	296°28.3	311°28.3	326°28.4	341°28.4	356°28.4	11°28.5	26°28.5	41°28.5	56°28.6	71°28.6	+0.0
	-12°44.6	-12°43.7	-12°42.9	-12°42.0	-12°41.2	-12°40.3	-12°39.5	-12°38.6	-12°37.7	-12°36.9	-12°36.0	-12°35.2	+0.9
Tu 16	266°29.0	281°29.1	296°29.1	311°29.1	326°29.2	341°29.2	356°29.2	11°29.3	26°29.3	41°29.4	56°29.4	71°29.4	+0.0
	-12°23.9	-12°23.1	-12°22.2	-12°21.3	-12°20.5	-12°19.6	-12°18.7	-12°17.9	-12°17.0	-12°16.1	-12°15.3	-12°14.4	+0.9
We 17	266°30.0	281°30.0	296°30.1	311°30.1	326°30.2	341°30.2	356°30.2	11°30.3	26°30.3	41°30.4	56°30.4	71°30.5	+0.0
	-12°03.1	-12°02.2	-12°01.3	-12°00.4	-11°59.6	-11°58.7	-11°57.8	-11°56.9	-11°56.1	-11°55.2	-11°54.3	-11°53.4	+0.9
Th 18	266°31.1	281°31.2	296°31.2	311°31.3	326°31.3	341°31.4	356°31.4	11°31.5	26°31.5	41°31.6	56°31.6	71°31.7	+0.1
	-11°42.0	-11°41.1	-11°40.3	-11°39.4	-11°38.5	-11°37.6	-11°36.7	-11°35.8	-11°35.0	-11°34.1	-11°33.2	-11°32.3	+0.9
Fr 19	266°32.4	281°32.5	296°32.5	311°32.6	326°32.7	341°32.7	356°32.8	11°32.8	26°32.9	41°33.0	56°33.0	71°33.1	+0.1
	-11°20.8	-11°19.9	-11°19.0	-11°18.1	-11°17.2	-11°16.3	-11°15.4	-11°14.5	-11°13.7	-11°12.8	-11°11.9	-11°11.0	+0.9
Sa 20	266°33.9	281°34.0	296°34.0	311°34.1	326°34.2	341°34.2	356°34.3	11°34.4	26°34.4	41°34.5	56°34.6	71°34.6	+0.1
	-10°59.4	-10°58.5	-10°57.6	-10°56.7	-10°55.8	-10°54.9	-10°54.0	-10°53.1	-10°52.2	-10°51.3	-10°50.4	-10°49.5	+0.9
Su 21	266°35.6	281°35.6	296°35.7	311°35.8	326°35.8	341°35.9	356°36.0	11°36.1	26°36.1	41°36.2	56°36.3	71°36.4	+0.1
	-10°37.8	-10°36.9	-10°36.0	-10°35.1	-10°34.2	-10°33.3	-10°32.4	-10°31.4	-10°30.5	-10°29.6	-10°28.7	-10°27.8	+0.9
Mo 22	266°37.4	281°37.4	296°37.5	311°37.6	326°37.7	341°37.8	356°37.8	11°37.9	26°38.0	41°38.1	56°38.2	71°38.2	+0.1
	-10°16.0	-10°15.1	-10°14.2	-10°13.3	-10°12.4	-10°11.5	-10°10.6	-10°09.7	-10°08.7	-10°07.8	-10°06.9	-10°06.0	+0.9
Tu 23	266°39.3	281°39.4	296°39.5	311°39.6	326°39.7	341°39.7	356°39.8	11°39.9	26°40.0	41°40.1	56°40.2	71°40.3	+0.1
	-9°54.1	-9°53.2	-9°52.3	-9°51.4	-9°50.5	-9°49.5	-9°48.6	-9°47.7	-9°46.8	-9°45.9	-9°44.9	-9°44.0	+0.9
We 24	266°41.4	281°41.5	296°41.6	311°41.7	326°41.8	341°41.9	356°42.0	11°42.1	26°42.2	41°42.3	56°42.4	71°42.5	+0.1
	-9°32.1	-9°31.1	-9°30.2	-9°29.3	-9°28.4	-9°27.4	-9°26.5	-9°25.6	-9°24.7	-9°23.7	-9°22.8	-9°21.9	+0.9
Th 25	266°43.7	281°43.8	296°43.9	311°44.0	326°44.1	341°44.2	356°44.3	11°44.4	26°44.5	41°44.6	56°44.7	71°44.8	+0.1
	-9°09.8	-9°08.9	-9°08.0	-9°07.1	-9°06.1	-9°05.2	-9°04.3	-9°03.3	-9°02.4	-9°01.5	-9°00.6	-8°59.6	+0.9
Fr 26	266°46.1	281°46.2	296°46.3	311°46.4	326°46.5	341°46.6	356°46.7	11°46.8	26°46.9	41°47.0	56°47.1	71°47.2	+0.1
	-8°47.5	-8°46.6	-8°45.6	-8°44.7	-8°43.8	-8°42.8	-8°41.9	-8°41.0	-8°40.0	-8°39.1	-8°38.2	-8°37.2	+0.9
Sa 27	266°48.6	281°48.7	296°48.9	311°49.0	326°49.1	341°49.2	356°49.3	11°49.4	26°49.5	41°49.6	56°49.7	71°49.8	+0.1
	-8°25.0	-8°24.1	-8°23.1	-8°22.2	-8°21.3	-8°20.3	-8°19.4	-8°18.4	-8°17.5	-8°16.6	-8°15.6	-8°14.7	+0.9
Su 28	266°51.3	281°51.4	296°51.5	311°51.6	326°51.8	341°51.9	356°52.0	11°52.1	26°52.2	41°52.3	56°52.5	71°52.6	+0.1
	-8°02.4	-8°01.5	-8°00.5	-7°59.6	-7°58.6	-7°57.7	-7°56.7	-7°55.8	-7°54.9	-7°53.9	-7°53.0	-7°52.0	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2027

D	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	Δ'/h	SH
Mo 1	257°27.4	271°56.6	286°25.8	300°55.0	315°24.1	329°53.3	344°22.4	358°51.5	13°20.7	27°49.8	42°18.8	+29.1	14.8
	-26°59.2	-27°02.5	-27°05.7	-27°08.8	-27°11.7	-27°14.5	-27°17.2	-27°19.8	-27°22.2	-27°24.5	-27°26.6	-2.7	54.3
Tu 2	259°34.6	274°03.7	288°32.7	303°01.8	317°30.9	332°00.0	346°29.1	0°58.2	15°27.3	29°56.5	44°25.6	+29.1	14.7
	-27°42.7	-27°42.8	-27°42.6	-27°42.4	-27°42.0	-27°41.4	-27°40.8	-27°40.0	-27°39.1	-27°38.0	-27°36.8	+0.6	54.0
We 3	261°45.6	276°15.1	290°44.7	305°14.3	319°43.9	334°13.6	348°43.3	3°13.1	17°42.8	32°12.7	46°42.5	+29.7	14.7
	-27°03.2	-26°59.9	-26°56.5	-26°52.9	-26°49.3	-26°45.5	-26°41.6	-26°37.6	-26°33.4	-26°29.1	-26°24.7	+3.8	53.9
Th 4	264°15.5	278°46.1	293°16.7	307°47.4	322°18.1	336°48.9	351°19.7	5°50.6	20°21.5	34°52.5	49°23.5	+30.8	14.7
	-25°04.0	-24°57.7	-24°51.3	-24°44.7	-24°38.1	-24°31.3	-24°24.4	-24°17.4	-24°10.3	-24°03.1	-23°55.8	+6.8	54.0
Fr 5	267°15.3	281°47.2	296°19.2	310°51.2	325°23.2	339°55.3	354°27.5	8°59.7	23°32.0	38°04.3	52°36.7	+32.1	14.8
	-21°53.3	-21°44.4	-21°35.3	-21°26.1	-21°16.9	-21°07.5	-20°58.1	-20°48.6	-20°38.9	-20°29.2	-20°19.4	+9.4	54.1
● Sa 6	270°48.6	285°21.8	299°55.1	314°28.4	329°01.7	343°35.1	358°08.5	12°42.0	27°15.5	41°49.1	56°22.7	+33.4	14.8
	-17°42.1	-17°31.0	-17°19.8	-17°08.5	-16°57.2	-16°45.7	-16°34.2	-16°22.7	-16°11.0	-15°59.3	-15°47.5	+11.5	54.3
Su 7	274°51.9	289°26.2	304°00.5	318°34.8	333°09.1	347°43.5	2°17.9	16°52.3	31°26.8	46°01.3	60°35.8	+34.4	14.9
	-12°43.1	-12°30.3	-12°17.5	-12°04.6	-11°51.6	-11°38.7	-11°25.6	-11°12.5	-10°59.4	-10°46.2	-10°32.9	+13.0	54.6
Mo 8	279°16.3	293°51.1	308°26.0	323°00.9	337°35.7	352°10.6	6°45.5	21°20.4	35°55.3	50°30.3	65°05.2	+34.9	15.0
	-7°09.2	-6°55.3	-6°41.3	-6°27.4	-6°13.4	-5°59.4	-5°45.3	-5°31.2	-5°17.1	-5°03.0	-4°48.8	+14.0	55.0
Tu 9	283°48.9	298°23.8	312°58.6	327°33.5	342°08.3	356°43.1	11°17.9	25°52.7	40°27.4	55°02.2	69°36.9	+34.8	15.1
	-1°13.6	-0°59.1	-0°44.6	-0°30.1	-0°15.6	-0°01.0	0°13.5	0°28.0	0°42.6	0°57.2	1°11.7	+14.5	55.5
We 10	288°14.3	302°48.5	317°22.7	331°56.9	346°31.0	1°05.0	15°39.0	30°13.0	44°46.9	59°20.8	73°54.6	+34.0	15.3
	4°50.2	5°04.7	5°19.2	5°33.7	5°48.2	6°02.7	6°17.2	6°31.6	6°46.0	7°00.5	7°14.8	+14.5	56.0
Th 11	292°15.2	306°48.0	321°20.8	335°53.5	350°26.2	4°58.8	19°31.3	34°03.7	48°36.1	63°08.4	77°40.6	+32.5	15.4
	10°47.8	11°01.7	11°15.6	11°29.5	11°43.3	11°57.1	12°10.9	12°24.6	12°38.2	12°51.8	13°05.4	+13.8	56.5
Fr 12	295°33.3	310°04.1	324°34.8	339°05.4	353°35.9	8°06.3	22°36.5	37°06.7	51°36.8	66°06.8	80°36.7	+30.3	15.6
	16°22.5	16°35.1	16°47.7	17°00.2	17°12.6	17°25.0	17°37.3	17°49.5	18°01.6	18°13.7	18°25.7	+12.3	57.2
Sa 13	297°51.9	312°20.0	326°48.0	341°15.9	355°43.7	10°11.3	24°38.8	39°06.3	53°33.6	68°00.8	82°27.8	+27.6	15.8
	21°14.6	21°25.0	21°35.4	21°45.7	21°55.8	22°05.9	22°15.8	22°25.6	22°35.3	22°44.8	22°54.3	+10.0	57.9
◐ Su 14	299°00.0	313°25.2	327°50.4	342°15.4	356°40.3	11°05.1	25°29.7	39°54.3	54°18.8	68°43.2	83°07.4	+24.7	16.0
	25°00.5	25°07.9	25°15.0	25°22.0	25°28.9	25°35.6	25°42.1	25°48.5	25°54.7	26°00.8	26°06.7	+6.6	58.6
Mo 15	299°00.0	313°22.8	327°45.5	342°08.2	356°30.8	10°53.3	25°15.8	39°38.2	54°00.5	68°22.8	82°45.0	+22.5	16.2
	27°15.2	27°18.3	27°21.3	27°24.0	27°26.6	27°29.0	27°31.3	27°33.3	27°35.1	27°36.8	27°38.2	+2.3	59.3
Tu 16	298°13.1	312°34.8	326°56.4	341°18.1	355°39.7	10°01.3	24°22.9	38°44.6	53°06.2	67°27.8	81°49.5	+21.6	16.3
	27°36.6	27°34.9	27°33.0	27°30.9	27°28.6	27°26.1	27°23.4	27°20.5	27°17.4	27°14.1	27°10.6	-2.6	59.9
We 17	297°17.0	311°39.2	326°01.4	340°23.6	354°45.9	9°08.3	23°30.7	37°53.2	52°15.8	66°38.4	81°01.1	+22.4	16.5
	25°54.4	25°47.8	25°40.9	25°33.9	25°26.7	25°19.4	25°11.8	25°04.0	24°56.1	24°48.0	24°39.7	-7.5	60.4
Th 18	296°50.6	311°14.5	325°38.6	340°02.8	354°27.0	8°51.3	23°15.8	37°40.3	52°04.9	66°29.6	80°54.5	+24.4	16.5
	22°14.8	22°03.8	21°52.7	21°41.4	21°30.0	21°18.5	21°06.8	20°54.9	20°42.9	20°30.8	20°18.5	-11.6	60.7
Fr 19	297°18.2	311°44.5	326°11.0	340°37.5	355°04.2	9°30.9	23°57.7	38°24.7	52°51.7	67°18.8	81°46.0	+26.8	16.5
	16°59.5	16°45.3	16°31.0	16°16.6	16°02.2	15°47.6	15°32.9	15°18.1	15°03.3	14°48.4	14°33.3	-14.6	60.6
○ Sa 20	298°44.5	313°13.1	327°41.8	342°10.5	356°39.3	11°08.2	25°37.1	40°06.1	54°35.2	69°04.4	83°33.6	+28.9	16.4
	10°39.2	10°23.1	10°07.0	9°50.8	9°34.5	9°18.2	9°01.9	8°45.6	8°29.2	8°12.7	7°56.2	-16.3	60.3
Su 21	300°59.8	315°30.0	330°00.2	344°30.5	359°00.9	13°31.3	28°01.7	42°32.2	57°02.7	71°33.3	86°03.9	+30.4	16.3
	3°46.4	3°29.7	3°12.9	2°56.2	2°39.4	2°22.7	2°05.9	1°49.2	1°32.5	1°15.7	0°59.0	-16.7	59.6
Mo 22	303°47.1	318°18.2	332°49.3	347°20.5	1°51.6	16°22.8	30°54.0	45°25.2	59°56.4	74°27.7	88°58.9	+31.2	16.0
	-3°09.2	-3°25.5	-3°41.8	-3°58.0	-4°14.2	-4°30.4	-4°46.5	-5°02.5	-5°18.6	-5°34.6	-5°50.5	-16.1	58.8
Tu 23	306°48.4	321°19.7	335°51.0	350°22.3	4°53.6	19°24.9	33°56.1	48°27.4	62°58.7	77°29.9	92°01.1	+31.3	15.8
	-9°42.8	-9°57.8	-10°12.7	-10°27.5	-10°42.3	-10°57.0	-11°11.7	-11°26.2	-11°40.7	-11°55.1	-12°09.4	-14.7	57.9
We 24	321°19.7	335°51.0	350°22.3	4°53.6	19°24.9	33°56.1	48°27.4	62°58.7	77°29.9	92°01.1	106°32.3	+31.3	15.8
	-9°57.8	-10°12.7	-10°27.5	-10°42.3	-10°57.0	-11°11.7	-11°26.2	-11°40.7	-11°55.1	-12°09.4	-12°23.7	-14.6	57.9
Th 25	324°18.6	338°49.5	353°20.4	7°51.3	22°22.2	36°53.0	51°23.8	65°54.6	80°25.3	94°56.0	109°26.7	+30.8	15.5
	-15°47.4	-16°00.2	-16°13.0	-16°25.7	-16°38.3	-16°50.7	-17°03.1	-17°15.4	-17°27.6	-17°39.7	-17°51.7	-12.4	56.9
Fr 26	327°03.4	341°33.6	356°03.8	10°33.9	25°04.0	39°34.1	54°04.1	68°34.1	83°04.1	97°34.0	112°03.9	+30.1	15.3
	-20°38.7	-20°49.0	-20°59.1	-21°09.2	-21°19.1	-21°28.9	-21°38.6	-21°48.2	-21°57.6	-22°07.0	-22°16.2	-9.7	56.1
Sa 27	329°28.7	343°58.1	358°27.5	12°56.8	27°26.2	41°55.5	56°24.7	70°54.0	85°23.2	99°52.4	114°21.6	+29.3	15.1
	-24°19.8	-24°27.1	-24°34.2	-24°41.2	-24°48.0	-24°54.8	-25°01.4	-25°07.8	-25°14.2	-25°20.4	-25°26.5	-6.7	55.3
◑ Su 28	331°36.6	346°05.5	0°34.3	15°03.2	29°32.0	44°00.8	58°29.6	72°58.5	87°27.2	101°56.0	116°24.8	+28.8	14.9
	-26°41.9	-26°45.8	-26°49.6	-26°53.3	-26°56.9	-27°00.3	-27°03.6	-27°06.7	-27°09.7	-27°12.6	-27°15.3	-3.3	54.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 15h56 — FQ: 14 07h58 — FM: 20 23h23 — LQ: 28 05h16

SUN

March 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	266°54.1 -7°39.7	281°54.2 -7°38.7	296°54.3 -7°37.8	311°54.5 -7°36.8	326°54.6 -7°35.9	341°54.7 -7°34.9	356°54.8 -7°34.0	11°54.9 -7°33.0	26°55.1 -7°32.1	41°55.2 -7°31.1	56°55.3 -7°30.2	71°55.4 -7°29.2	+0.1 +1.0
Tu 2	266°57.0 -7°16.9	281°57.1 -7°15.9	296°57.3 -7°14.9	311°57.4 -7°14.0	326°57.5 -7°13.0	341°57.6 -7°12.1	356°57.8 -7°11.1	11°57.9 -7°10.2	26°58.0 -7°09.2	41°58.2 -7°08.3	56°58.3 -7°07.3	71°58.4 -7°06.4	+0.1 +1.0
We 3	267°00.1 -6°53.9	282°00.2 -6°53.0	297°00.3 -6°52.0	312°00.5 -6°51.0	327°00.6 -6°50.1	342°00.7 -6°49.1	357°00.8 -6°48.2	12°01.0 -6°47.2	27°01.1 -6°46.2	42°01.2 -6°45.3	57°01.4 -6°44.3	72°01.5 -6°43.4	+0.1 +1.0
Th 4	267°03.2 -6°30.9	282°03.4 -6°29.9	297°03.5 -6°28.9	312°03.6 -6°28.0	327°03.8 -6°27.0	342°03.9 -6°26.1	357°04.0 -6°25.1	12°04.2 -6°24.1	27°04.3 -6°23.2	42°04.4 -6°22.2	57°04.6 -6°21.2	72°04.7 -6°20.3	+0.1 +1.0
Fr 5	267°06.5 -6°07.7	282°06.6 -6°06.8	297°06.8 -6°05.8	312°06.9 -6°04.8	327°07.0 -6°03.9	342°07.2 -6°02.9	357°07.3 -6°01.9	12°07.5 -6°01.0	27°07.6 -6°00.0	42°07.7 -5°59.0	57°07.9 -5°58.1	72°08.0 -5°57.1	+0.1 +1.0
Sa 6	267°09.9 -5°44.5	282°10.0 -5°43.5	297°10.2 -5°42.6	312°10.3 -5°41.6	327°10.4 -5°40.6	342°10.6 -5°39.7	357°10.7 -5°38.7	12°10.9 -5°37.7	27°11.0 -5°36.8	42°11.2 -5°35.8	57°11.3 -5°34.8	72°11.4 -5°33.8	+0.1 +1.0
Su 7	267°13.3 -5°21.2	282°13.5 -5°20.2	297°13.6 -5°19.3	312°13.8 -5°18.3	327°13.9 -5°17.3	342°14.1 -5°16.4	357°14.2 -5°15.4	12°14.4 -5°14.4	27°14.5 -5°13.4	42°14.7 -5°12.5	57°14.8 -5°11.5	72°15.0 -5°10.5	+0.1 +1.0
Mo 8	267°16.9 -4°57.8	282°17.1 -4°56.9	297°17.2 -4°55.9	312°17.4 -4°54.9	327°17.5 -4°53.9	342°17.7 -4°53.0	357°17.8 -4°52.0	12°18.0 -4°51.0	27°18.1 -4°50.0	42°18.3 -4°49.1	57°18.4 -4°48.1	72°18.6 -4°47.1	+0.2 +1.0
Tu 9	267°20.6 -4°34.4	282°20.7 -4°33.4	297°20.9 -4°32.5	312°21.1 -4°31.5	327°21.2 -4°30.5	342°21.4 -4°29.5	357°21.5 -4°28.5	12°21.7 -4°27.6	27°21.8 -4°26.6	42°22.0 -4°25.6	57°22.1 -4°24.6	72°22.3 -4°23.6	+0.2 +1.0
We 10	267°24.4 -4°10.9	282°24.5 -4°09.9	297°24.7 -4°09.0	312°24.8 -4°08.0	327°25.0 -4°07.0	342°25.1 -4°06.0	357°25.3 -4°05.0	12°25.5 -4°04.1	27°25.6 -4°03.1	42°25.8 -4°02.1	57°25.9 -4°01.1	72°26.1 -4°00.1	+0.2 +1.0
Th 11	267°28.2 -3°47.4	282°28.4 -3°46.4	297°28.5 -3°45.4	312°28.7 -3°44.4	327°28.8 -3°43.4	342°29.0 -3°42.5	357°29.2 -3°41.5	12°29.3 -3°40.5	27°29.5 -3°39.5	42°29.7 -3°38.5	57°29.8 -3°37.5	72°30.0 -3°36.6	+0.2 +1.0
Fr 12	267°32.1 -3°23.8	282°32.3 -3°22.8	297°32.5 -3°21.8	312°32.6 -3°20.8	327°32.8 -3°19.8	342°33.0 -3°18.9	357°33.1 -3°17.9	12°33.3 -3°16.9	27°33.5 -3°15.9	42°33.6 -3°14.9	57°33.8 -3°13.9	72°34.0 -3°13.0	+0.2 +1.0
Sa 13	267°36.1 -3°00.2	282°36.3 -2°59.2	297°36.5 -2°58.2	312°36.6 -2°57.2	327°36.8 -2°56.2	342°37.0 -2°55.2	357°37.1 -2°54.2	12°37.3 -2°53.3	27°37.5 -2°52.3	42°37.7 -2°51.3	57°37.8 -2°50.3	72°38.0 -2°49.3	+0.2 +1.0
Su 14	267°40.2 -2°36.5	282°40.4 -2°35.5	297°40.6 -2°34.5	312°40.7 -2°33.5	327°40.9 -2°32.5	342°41.1 -2°31.6	357°41.2 -2°30.6	12°41.4 -2°29.6	27°41.6 -2°28.6	42°41.8 -2°27.6	57°41.9 -2°26.6	72°42.1 -2°25.6	+0.2 +1.0
Mo 15	267°44.4 -2°12.8	282°44.5 -2°11.8	297°44.7 -2°10.8	312°44.9 -2°09.8	327°45.1 -2°08.9	342°45.2 -2°07.9	357°45.4 -2°06.9	12°45.6 -2°05.9	27°45.8 -2°04.9	42°45.9 -2°03.9	57°46.1 -2°02.9	72°46.3 -2°01.9	+0.2 +1.0
Tu 16	267°48.6 -1°49.1	282°48.7 -1°48.1	297°48.9 -1°47.1	312°49.1 -1°46.1	327°49.3 -1°45.2	342°49.5 -1°44.2	357°49.6 -1°43.2	12°49.8 -1°42.2	27°50.0 -1°41.2	42°50.2 -1°40.2	57°50.3 -1°39.2	72°50.5 -1°38.2	+0.2 +1.0
We 17	267°52.8 -1°25.4	282°53.0 -1°24.4	297°53.2 -1°23.4	312°53.4 -1°22.4	327°53.6 -1°21.4	342°53.7 -1°20.5	357°53.9 -1°19.5	12°54.1 -1°18.5	27°54.3 -1°17.5	42°54.5 -1°16.5	57°54.6 -1°15.5	72°54.8 -1°14.5	+0.2 +1.0
Th 18	267°57.2 -1°01.7	282°57.3 -1°00.7	297°57.5 -0°59.7	312°57.7 -0°58.7	327°57.9 -0°57.7	342°58.1 -0°56.7	357°58.3 -0°55.7	12°58.4 -0°54.8	27°58.6 -0°53.8	42°58.8 -0°52.8	57°59.0 -0°51.8	72°59.2 -0°50.8	+0.2 +1.0
Fr 19	268°01.5 -0°38.0	283°01.7 -0°37.0	298°01.9 -0°36.0	313°02.1 -0°35.0	328°02.3 -0°34.0	343°02.5 -0°33.0	358°02.6 -0°32.0	13°02.8 -0°31.0	28°03.0 -0°30.0	43°03.2 -0°29.1	58°03.4 -0°28.1	73°03.6 -0°27.1	+0.2 +1.0
Sa 20	268°06.0 -0°14.2	283°06.1 -0°13.2	298°06.3 -0°12.3	313°06.5 -0°11.3	328°06.7 -0°10.3	343°06.9 -0°09.3	358°07.1 -0°08.3	13°07.3 -0°07.3	28°07.4 -0°06.3	43°07.6 -0°05.3	58°07.8 -0°04.4	73°08.0 -0°03.4	+0.2 +1.0
Su 21	268°10.4 0°09.5	283°10.6 0°10.5	298°10.8 0°11.4	313°11.0 0°12.4	328°11.2 0°13.4	343°11.3 0°14.4	358°11.5 0°15.4	13°11.7 0°16.4	28°11.9 0°17.4	43°12.1 0°18.4	58°12.3 0°19.3	73°12.5 0°20.3	+0.2 +1.0
Mo 22	268°14.9 0°33.2	283°15.1 0°34.1	298°15.3 0°35.1	313°15.5 0°36.1	328°15.6 0°37.1	343°15.8 0°38.1	358°16.0 0°39.1	13°16.2 0°40.1	28°16.4 0°41.0	43°16.6 0°42.0	58°16.8 0°43.0	73°17.0 0°44.0	+0.2 +1.0
Tu 23	268°19.4 0°56.8	283°19.6 0°57.8	298°19.8 0°58.8	313°20.0 0°59.8	328°20.1 1°00.8	343°20.3 1°01.8	358°20.5 1°02.7	13°20.7 1°03.7	28°20.9 1°04.7	43°21.1 1°05.7	58°21.3 1°06.7	73°21.5 1°07.7	+0.2 +1.0
We 24	268°23.9 1°20.5	283°24.1 1°21.4	298°24.3 1°22.4	313°24.5 1°23.4	328°24.7 1°24.4	343°24.9 1°25.4	358°25.0 1°26.4	13°25.2 1°27.4	28°25.4 1°28.3	43°25.6 1°29.3	58°25.8 1°30.3	73°26.0 1°31.3	+0.2 +1.0
Th 25	268°28.5 1°44.1	283°28.6 1°45.1	298°28.8 1°46.0	313°29.0 1°47.0	328°29.2 1°48.0	343°29.4 1°49.0	358°29.6 1°50.0	13°29.8 1°51.0	28°30.0 1°51.9	43°30.2 1°52.9	58°30.3 1°53.9	73°30.5 1°54.9	+0.2 +1.0
Fr 26	268°33.0 2°07.6	283°33.2 2°08.6	298°33.4 2°09.6	313°33.6 2°10.6	328°33.7 2°11.6	343°33.9 2°12.5	358°34.1 2°13.5	13°34.3 2°14.5	28°34.5 2°15.5	43°34.7 2°16.5	58°34.9 2°17.5	73°35.1 2°18.4	+0.2 +1.0
Sa 27	268°37.5 2°31.2	283°37.7 2°32.1	298°37.9 2°33.1	313°38.1 2°34.1	328°38.3 2°35.1	343°38.5 2°36.1	358°38.7 2°37.0	13°38.9 2°38.0	28°39.0 2°39.0	43°39.2 2°40.0	58°39.4 2°41.0	73°39.6 2°41.9	+0.2 +1.0
Su 28	268°42.1 2°54.6	283°42.3 2°55.6	298°42.4 2°56.6	313°42.6 2°57.6	328°42.8 2°58.6	343°43.0 2°59.5	358°43.2 3°00.5	13°43.4 3°01.5	28°43.6 3°02.5	43°43.8 3°03.4	58°44.0 3°04.4	73°44.1 3°05.4	+0.2 +1.0
Mo 29	268°46.6 3°18.1	283°46.8 3°19.0	298°47.0 3°20.0	313°47.2 3°21.0	328°47.3 3°22.0	343°47.5 3°22.9	358°47.7 3°23.9	13°47.9 3°24.9	28°48.1 3°25.9	43°48.3 3°26.8	58°48.5 3°27.8	73°48.7 3°28.8	+0.2 +1.0
Tu 30	268°51.1 3°41.4	283°51.3 3°42.4	298°51.5 3°43.4	313°51.7 3°44.3	328°51.9 3°45.3	343°52.0 3°46.3	358°52.2 3°47.3	13°52.4 3°48.2	28°52.6 3°49.2	43°52.8 3°50.2	58°53.0 3°51.1	73°53.2 3°52.1	+0.2 +1.0
We 31	268°55.6 4°04.7	283°55.8 4°05.7	298°56.0 4°06.7	313°56.2 4°07.6	328°56.3 4°08.6	343°56.5 4°09.6	358°56.7 4°10.5	13°56.9 4°11.5	28°57.1 4°12.5	43°57.3 4°13.4	58°57.5 4°14.4	73°57.6 4°15.4	+0.2 +1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2027

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Mo 1	234°17.8	248°47.0	263°16.2	277°45.4	292°14.6	306°43.9	321°13.2	335°42.5	350°11.9	4°41.3	19°10.8	+29.3	14.8
	-27°29.4	-27°27.6	-27°25.6	-27°23.5	-27°21.2	-27°18.9	-27°16.4	-27°13.7	-27°11.0	-27°08.1	-27°05.0	+2.4	54.1
Tu 2	248°47.0	263°16.2	277°45.4	292°14.6	306°43.9	321°13.2	335°42.5	350°11.9	4°41.3	19°10.8	33°40.2	+29.3	14.8
	-27°27.6	-27°25.6	-27°23.5	-27°21.2	-27°18.9	-27°16.4	-27°13.7	-27°11.0	-27°08.1	-27°05.0	-27°01.9	+2.6	54.1
We 3	251°07.0	265°37.2	280°07.3	294°37.6	309°07.8	323°38.2	338°08.5	352°38.9	7°09.4	21°39.9	36°10.5	+30.3	14.7
	-25°59.6	-25°54.5	-25°49.2	-25°43.8	-25°38.4	-25°32.7	-25°27.0	-25°21.2	-25°15.2	-25°09.2	-25°03.0	+5.7	54.1
Th 4	253°54.9	268°26.3	282°57.8	297°29.3	312°00.8	326°32.4	341°04.0	355°35.7	10°07.5	24°39.3	39°11.1	+31.6	14.8
	-23°16.8	-23°08.9	-23°00.8	-22°52.7	-22°44.4	-22°36.1	-22°27.7	-22°19.1	-22°10.5	-22°01.7	-21°52.9	+8.4	54.1
Fr 5	257°15.2	271°47.9	286°20.6	300°53.4	315°26.2	329°59.1	344°32.0	359°04.9	13°37.9	28°11.0	42°44.1	+32.9	14.8
	-19°29.0	-19°18.7	-19°08.3	-18°57.8	-18°47.2	-18°36.6	-18°25.9	-18°15.1	-18°04.2	-17°53.2	-17°42.2	+10.7	54.4
Sa 6	261°05.6	275°39.4	290°13.1	304°47.0	319°20.8	333°54.7	348°28.6	3°02.6	17°36.6	32°10.6	46°44.6	+33.9	14.9
	-14°47.5	-14°35.3	-14°23.0	-14°10.7	-13°58.3	-13°45.8	-13°33.3	-13°20.7	-13°08.1	-12°55.4	-12°42.6	+12.5	54.7
Su 7	265°18.5	279°52.9	294°27.3	309°01.8	323°36.3	338°10.8	352°45.3	7°19.8	21°54.3	36°28.8	51°03.4	+34.5	15.0
	-9°24.6	-9°11.0	-8°57.3	-8°43.6	-8°29.9	-8°16.1	-8°02.3	-7°48.4	-7°34.5	-7°20.6	-7°06.6	+13.8	55.1
● Mo 8	269°42.2	284°16.8	298°51.3	313°25.9	328°00.5	342°35.0	357°09.6	11°44.1	26°18.6	40°53.1	55°27.6	+34.5	15.2
	-3°33.0	-3°18.6	-3°04.1	-2°49.6	-2°35.0	-2°20.5	-2°05.9	-1°51.3	-1°36.7	-1°22.1	-1°07.5	+14.6	55.6
Tu 9	274°02.6	288°36.7	303°10.8	317°44.9	332°18.9	346°52.9	1°26.9	16°00.8	30°34.7	45°08.5	59°42.3	+34.0	15.3
	2°33.3	2°48.1	3°02.8	3°17.6	3°32.3	3°47.0	4°01.8	4°16.5	4°31.2	4°45.9	5°00.6	+14.7	56.1
We 10	278°03.9	292°36.9	307°09.9	321°42.8	336°15.6	350°48.4	5°21.1	19°53.8	34°26.4	48°58.9	63°31.3	+32.7	15.4
	8°39.2	8°53.6	9°08.0	9°22.3	9°36.6	9°50.9	10°05.1	10°19.3	10°33.5	10°47.6	11°01.7	+14.2	56.6
Th 11	281°29.6	296°00.8	310°32.0	325°03.1	339°34.1	354°05.0	8°35.9	23°06.6	37°37.3	52°07.8	66°38.3	+30.9	15.6
	14°27.3	14°40.6	14°53.8	15°07.0	15°20.1	15°33.1	15°46.1	15°59.0	16°11.8	16°24.6	16°37.2	+13.0	57.1
Fr 12	284°04.3	298°33.3	313°02.2	327°30.9	341°59.6	356°28.1	10°56.6	25°24.9	39°53.2	54°21.3	68°49.4	+28.5	15.7
	19°37.7	19°49.0	20°00.3	20°11.4	20°22.4	20°33.3	20°44.1	20°54.8	21°05.4	21°15.9	21°26.3	+10.9	57.6
Sa 13	285°37.9	300°04.3	314°30.6	328°56.8	343°22.9	357°49.0	12°14.9	26°40.7	41°06.5	55°32.1	69°57.7	+26.0	15.8
	23°47.8	23°56.3	24°04.5	24°12.7	24°20.7	24°28.6	24°36.3	24°43.9	24°51.3	24°58.6	25°05.7	+7.8	58.1
Su 14	286°10.3	300°34.4	314°58.6	329°22.6	343°46.6	358°10.5	12°34.3	26°58.1	41°21.8	55°45.5	70°09.1	+23.9	16.0
	26°34.3	26°39.0	26°43.4	26°47.7	26°51.8	26°55.7	26°59.5	27°03.1	27°06.5	27°09.7	27°12.8	+3.8	58.5
◐ Mo 15	285°57.2	300°20.1	314°43.0	329°05.9	343°28.8	357°51.6	12°14.5	26°37.3	41°00.1	55°22.9	69°45.7	+22.8	16.1
	27°36.9	27°37.1	27°37.0	27°36.8	27°36.4	27°35.8	27°35.0	27°34.0	27°32.8	27°31.4	27°29.9	-0.7	59.0
Tu 16	285°28.9	299°51.9	314°15.0	328°38.1	343°01.3	357°24.4	11°47.7	26°11.0	40°34.3	54°57.7	69°21.1	+23.2	16.2
	26°44.1	26°39.6	26°34.8	26°29.9	26°24.8	26°19.6	26°14.1	26°08.5	26°02.7	25°56.7	25°50.5	-5.4	59.3
We 17	285°19.3	299°43.7	314°08.2	328°32.8	342°57.4	357°22.1	11°46.9	26°11.8	40°36.7	55°01.8	69°26.9	+24.7	16.3
	23°57.5	23°48.6	23°39.6	23°30.4	23°21.1	23°11.6	23°01.9	22°52.1	22°42.2	22°32.1	22°21.9	-9.6	59.6
Th 18	285°53.3	300°19.7	314°46.2	329°12.8	343°39.5	358°06.3	12°33.1	27°00.1	41°27.1	55°54.2	70°21.4	+26.8	16.3
	19°31.7	19°19.3	19°06.8	18°54.2	18°41.4	18°28.6	18°15.6	18°02.5	17°49.4	17°36.1	17°22.7	-12.9	59.8
Fr 19	287°18.9	301°47.3	316°15.9	330°44.5	345°13.1	359°41.9	14°10.7	28°39.6	43°08.5	57°37.5	72°06.6	+28.8	16.3
	13°50.3	13°35.4	13°20.5	13°05.5	12°50.4	12°35.3	12°20.1	12°04.8	11°49.5	11°34.1	11°18.6	-15.2	59.7
Sa 20	289°30.2	304°00.3	318°30.3	333°00.4	347°30.6	2°00.8	16°31.1	31°01.4	45°31.7	60°02.1	74°32.5	+30.2	16.2
	7°20.6	7°04.4	6°48.2	6°31.9	6°15.7	5°59.3	5°43.0	5°26.7	5°10.3	4°53.9	4°37.5	-16.3	59.5
Su 21	292°13.1	306°44.0	321°15.0	335°46.0	350°17.0	4°48.0	19°19.0	33°50.1	48°21.1	62°52.2	77°23.3	+31.0	16.1
	0°30.3	0°13.8	-0°02.7	-0°19.1	-0°35.5	-0°52.0	-1°08.4	-1°24.8	-1°41.1	-1°57.5	-2°13.8	-16.4	59.0
○ Mo 22	295°10.6	309°41.7	324°12.9	338°44.1	353°15.2	7°46.3	22°17.5	36°48.6	51°19.7	65°50.8	80°21.9	+31.1	15.9
	-6°15.0	-6°30.7	-6°46.5	-7°02.1	-7°17.8	-7°33.3	-7°48.8	-8°04.3	-8°19.7	-8°35.1	-8°50.4	-15.5	58.4
Tu 23	298°06.5	312°37.3	327°08.1	341°38.8	356°09.6	10°40.3	25°11.0	39°41.6	54°12.2	68°42.8	83°13.4	+30.7	15.7
	-12°32.0	-12°46.2	-13°00.3	-13°14.4	-13°28.3	-13°42.2	-13°56.0	-14°09.7	-14°23.3	-14°36.8	-14°50.3	-13.8	57.7
We 24	300°48.2	315°18.2	329°48.2	344°18.2	358°48.2	13°18.1	27°47.9	42°17.8	56°47.6	71°17.3	85°47.1	+29.9	15.5
	-18°00.7	-18°12.6	-18°24.4	-18°36.1	-18°47.7	-18°59.2	-19°10.5	-19°21.8	-19°32.9	-19°44.0	-19°54.9	-11.4	56.9
Th 25	303°08.7	317°37.9	332°07.0	346°36.1	1°05.2	15°34.2	30°03.2	44°32.2	59°01.1	73°30.0	87°58.9	+29.0	15.3
	-22°24.7	-22°33.7	-22°42.6	-22°51.4	-23°00.0	-23°08.5	-23°16.9	-23°25.2	-23°33.3	-23°41.3	-23°49.1	-8.4	56.1
Fr 26	317°37.9	332°07.0	346°36.1	1°05.2	15°34.2	30°03.2	44°32.2	59°01.1	73°30.0	87°58.9	102°27.7	+29.0	15.3
	-22°33.7	-22°42.6	-22°51.4	-23°00.0	-23°08.5	-23°16.9	-23°25.2	-23°33.3	-23°41.3	-23°49.1	-23°56.9	-8.3	56.1
Sa 27	319°37.3	334°05.8	348°34.2	3°02.6	17°31.0	31°59.4	46°27.8	60°56.2	75°24.5	89°52.9	104°21.2	+28.4	15.1
	-25°37.0	-25°42.6	-25°48.1	-25°53.4	-25°58.6	-26°03.6	-26°08.5	-26°13.3	-26°17.9	-26°22.4	-26°26.7	-5.0	55.4
Su 28	321°25.6	335°53.9	350°22.2	4°50.5	19°18.8	33°47.1	48°15.5	62°43.8	77°12.2	91°40.6	106°09.0	+28.3	15.0
	-27°15.1	-27°17.2	-27°19.2	-27°21.0	-27°22.7	-27°24.2	-27°25.6	-27°26.9	-27°28.0	-27°29.0	-27°29.9	-1.5	54.8
Mo 29	323°17.4	337°46.2	352°15.0	6°43.9	21°12.7	35°41.7	50°10.6	64°39.6	79°08.6	93°37.7	108°06.8	+28.9	14.8
	-27°26.1	-27°24.7	-27°23.3	-27°21.7	-27°19.9	-27°18.0	-27°16.0	-27°13.9	-27°11.6	-27°09.2	-27°06.7	+1.9	54.4
◑ Tu 30	325°28.5	339°58.3	354°28.2	8°58.1	23°28.0	37°58.1	52°28.2	66°58.3	81°28.5	95°58.7	110°29.0	+30.1	14.8
	-26°13.4	-26°08.8	-26°04.1	-25°59.3	-25°54.4	-25°49.4	-25°44.2	-25°39.0	-25°33.6	-25°28.1	-25°22.4	+5.1	54.2
We 31	328°10.0	342°41.1	357°12.4	11°43.7	26°15.0	40°46.4	55°17.9	69°49.4	84°21.0	98°52.6	113°24.3	+31.4	14.8
	-23°44.6	-23°37.2	-23°29.7	-23°22.1	-23°14.4	-23°06.6	-22°58.7	-22°50.7	-22°42.5	-22°34.3	-22°26.0	+7.9	54.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 8 09h29 — FQ: 15 16h25 — FM: 22 10h43 — LQ: 30 00h53

SUN

April 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269°00.1	284°00.2	299°00.4	314°00.6	329°00.8	344°01.0	359°01.2	14°01.4	29°01.5	44°01.7	59°01.9	74°02.1	+0.2
	4°27.9	4°28.9	4°29.9	4°30.8	4°31.8	4°32.8	4°33.7	4°34.7	4°35.7	4°36.6	4°37.6	4°38.6	+1.0
Fr 2	269°04.5	284°04.7	299°04.9	314°05.0	329°05.2	344°05.4	359°05.6	14°05.8	29°06.0	44°06.2	59°06.3	74°06.5	+0.2
	4°51.1	4°52.0	4°53.0	4°54.0	4°54.9	4°55.9	4°56.9	4°57.8	4°58.8	4°59.7	5°00.7	5°01.7	+1.0
Sa 3	269°08.9	284°09.1	299°09.3	314°09.4	329°09.6	344°09.8	359°10.0	14°10.2	29°10.4	44°10.5	59°10.7	74°10.9	+0.2
	5°14.1	5°15.1	5°16.1	5°17.0	5°18.0	5°18.9	5°19.9	5°20.8	5°21.8	5°22.8	5°23.7	5°24.7	+1.0
Su 4	269°13.3	284°13.4	299°13.6	314°13.8	329°14.0	344°14.2	359°14.3	14°14.5	29°14.7	44°14.9	59°15.1	74°15.2	+0.2
	5°37.1	5°38.1	5°39.0	5°40.0	5°40.9	5°41.9	5°42.8	5°43.8	5°44.7	5°45.7	5°46.6	5°47.6	+1.0
Mo 5	269°17.6	284°17.8	299°17.9	314°18.1	329°18.3	344°18.5	359°18.7	14°18.8	29°19.0	44°19.2	59°19.4	74°19.5	+0.2
	6°00.0	6°00.9	6°01.9	6°02.8	6°03.8	6°04.7	6°05.7	6°06.6	6°07.6	6°08.5	6°09.5	6°10.4	+0.9
Tu 6	269°21.9	284°22.0	299°22.2	314°22.4	329°22.6	344°22.7	359°22.9	14°23.1	29°23.3	44°23.4	59°23.6	74°23.8	+0.2
	6°22.7	6°23.7	6°24.6	6°25.6	6°26.5	6°27.5	6°28.4	6°29.3	6°30.3	6°31.2	6°32.2	6°33.1	+0.9
We 7	269°26.1	284°26.2	299°26.4	314°26.6	329°26.8	344°26.9	359°27.1	14°27.3	29°27.5	44°27.6	59°27.8	74°28.0	+0.2
	6°45.4	6°46.3	6°47.3	6°48.2	6°49.1	6°50.1	6°51.0	6°52.0	6°52.9	6°53.8	6°54.8	6°55.7	+0.9
Th 8	269°30.2	284°30.4	299°30.6	314°30.8	329°30.9	344°31.1	359°31.3	14°31.4	29°31.6	44°31.8	59°32.0	74°32.1	+0.2
	7°07.9	7°08.9	7°09.8	7°10.7	7°11.7	7°12.6	7°13.5	7°14.5	7°15.4	7°16.3	7°17.3	7°18.2	+0.9
Fr 9	269°34.4	284°34.5	299°34.7	314°34.9	329°35.0	344°35.2	359°35.4	14°35.5	29°35.7	44°35.9	59°36.0	74°36.2	+0.2
	7°30.3	7°31.3	7°32.2	7°33.1	7°34.1	7°35.0	7°35.9	7°36.8	7°37.8	7°38.7	7°39.6	7°40.6	+0.9
Sa 10	269°38.4	284°38.6	299°38.7	314°38.9	329°39.1	344°39.2	359°39.4	14°39.6	29°39.7	44°39.9	59°40.1	74°40.2	+0.2
	7°52.6	7°53.5	7°54.5	7°55.4	7°56.3	7°57.2	7°58.2	7°59.1	8°00.0	8°00.9	8°01.9	8°02.8	+0.9
Su 11	269°42.4	284°42.6	299°42.7	314°42.9	329°43.0	344°43.2	359°43.4	14°43.5	29°43.7	44°43.9	59°44.0	74°44.2	+0.2
	8°14.8	8°15.7	8°16.6	8°17.5	8°18.4	8°19.4	8°20.3	8°21.2	8°22.1	8°23.0	8°24.0	8°24.9	+0.9
Mo 12	269°46.3	284°46.5	299°46.6	314°46.8	329°47.0	344°47.1	359°47.3	14°47.4	29°47.6	44°47.8	59°47.9	74°48.1	+0.2
	8°36.8	8°37.7	8°38.6	8°39.5	8°40.4	8°41.4	8°42.3	8°43.2	8°44.1	8°45.0	8°45.9	8°46.8	+0.9
Tu 13	269°50.2	284°50.3	299°50.5	314°50.6	329°50.8	344°50.9	359°51.1	14°51.3	29°51.4	44°51.6	59°51.7	74°51.9	+0.2
	8°58.6	8°59.6	9°00.5	9°01.4	9°02.3	9°03.2	9°04.1	9°05.0	9°05.9	9°06.8	9°07.7	9°08.6	+0.9
We 14	269°53.9	284°54.1	299°54.2	314°54.4	329°54.5	344°54.7	359°54.9	14°55.0	29°55.2	44°55.3	59°55.5	74°55.6	+0.2
	9°20.4	9°21.3	9°22.2	9°23.1	9°24.0	9°24.9	9°25.8	9°26.7	9°27.6	9°28.5	9°29.4	9°30.3	+0.9
Th 15	269°57.6	284°57.8	299°57.9	314°58.1	329°58.2	344°58.4	359°58.5	14°58.7	29°58.8	44°59.0	59°59.1	74°59.3	+0.2
	9°41.9	9°42.8	9°43.7	9°44.6	9°45.5	9°46.4	9°47.3	9°48.2	9°49.1	9°50.0	9°50.9	9°51.7	+0.9
Fr 16	270°01.2	285°01.4	300°01.5	315°01.7	330°01.8	345°02.0	0°02.1	15°02.3	30°02.4	45°02.6	60°02.7	75°02.9	+0.1
	10°03.3	10°04.2	10°05.1	10°06.0	10°06.9	10°07.8	10°08.6	10°09.5	10°10.4	10°11.3	10°12.2	10°13.1	+0.9
Sa 17	270°04.8	285°04.9	300°05.0	315°05.2	330°05.3	345°05.5	0°05.6	15°05.8	30°05.9	45°06.1	60°06.2	75°06.3	+0.1
	10°24.5	10°25.4	10°26.3	10°27.2	10°28.1	10°28.9	10°29.8	10°30.7	10°31.6	10°32.5	10°33.3	10°34.2	+0.9
Su 18	270°08.2	285°08.3	300°08.5	315°08.6	330°08.8	345°08.9	0°09.0	15°09.2	30°09.3	45°09.5	60°09.6	75°09.7	+0.1
	10°45.6	10°46.5	10°47.3	10°48.2	10°49.1	10°50.0	10°50.8	10°51.7	10°52.6	10°53.4	10°54.3	10°55.2	+0.9
Mo 19	270°11.5	285°11.7	300°11.8	315°11.9	330°12.1	345°12.2	0°12.3	15°12.5	30°12.6	45°12.8	60°12.9	75°13.0	+0.1
	11°06.5	11°07.3	11°08.2	11°09.1	11°09.9	11°10.8	11°11.7	11°12.5	11°13.4	11°14.2	11°15.1	11°16.0	+0.9
Tu 20	270°14.8	285°14.9	300°15.0	315°15.2	330°15.3	345°15.4	0°15.6	15°15.7	30°15.8	45°16.0	60°16.1	75°16.2	+0.1
	11°27.2	11°28.0	11°28.9	11°29.7	11°30.6	11°31.4	11°32.3	11°33.2	11°34.0	11°34.9	11°35.7	11°36.6	+0.9
We 21	270°17.9	285°18.0	300°18.2	315°18.3	330°18.4	345°18.5	0°18.7	15°18.8	30°18.9	45°19.0	60°19.2	75°19.3	+0.1
	11°47.7	11°48.5	11°49.4	11°50.2	11°51.1	11°51.9	11°52.8	11°53.6	11°54.4	11°55.3	11°56.1	11°57.0	+0.8
Th 22	270°20.9	285°21.0	300°21.2	315°21.3	330°21.4	345°21.5	0°21.7	15°21.8	30°21.9	45°22.0	60°22.2	75°22.3	+0.1
	12°08.0	12°08.8	12°09.7	12°10.5	12°11.3	12°12.2	12°13.0	12°13.9	12°14.7	12°15.5	12°16.4	12°17.2	+0.8
Fr 23	270°23.8	285°24.0	300°24.1	315°24.2	330°24.3	345°24.4	0°24.5	15°24.7	30°24.8	45°24.9	60°25.0	75°25.1	+0.1
	12°28.1	12°28.9	12°29.7	12°30.6	12°31.4	12°32.2	12°33.1	12°33.9	12°34.7	12°35.6	12°36.4	12°37.2	+0.8
Sa 24	270°26.6	285°26.7	300°26.9	315°27.0	330°27.1	345°27.2	0°27.3	15°27.4	30°27.5	45°27.7	60°27.8	75°27.9	+0.1
	12°48.0	12°48.8	12°49.6	12°50.5	12°51.3	12°52.1	12°52.9	12°53.8	12°54.6	12°55.4	12°56.2	12°57.0	+0.8
Su 25	270°29.3	285°29.4	300°29.5	315°29.6	330°29.7	345°29.9	0°30.0	15°30.1	30°30.2	45°30.3	60°30.4	75°30.5	+0.1
	13°07.7	13°08.5	13°09.3	13°10.1	13°10.9	13°11.8	13°12.6	13°13.4	13°14.2	13°15.0	13°15.8	13°16.6	+0.8
Mo 26	270°31.9	285°32.0	300°32.1	315°32.2	330°32.3	345°32.4	0°32.5	15°32.6	30°32.7	45°32.8	60°32.9	75°33.0	+0.1
	13°27.2	13°28.0	13°28.8	13°29.6	13°30.4	13°31.2	13°32.0	13°32.8	13°33.6	13°34.4	13°35.2	13°36.0	+0.8
Tu 27	270°34.3	285°34.4	300°34.5	315°34.6	330°34.7	345°34.8	0°34.9	15°35.0	30°35.1	45°35.2	60°35.3	75°35.4	+0.1
	13°46.4	13°47.2	13°48.0	13°48.8	13°49.6	13°50.4	13°51.2	13°52.0	13°52.8	13°53.6	13°54.4	13°55.2	+0.8
We 28	270°36.6	285°36.7	300°36.8	315°36.9	330°37.0	345°37.0	0°37.1	15°37.2	30°37.3	45°37.4	60°37.5	75°37.6	+0.1
	14°05.5	14°06.3	14°07.0	14°07.8	14°08.6	14°09.4	14°10.2	14°11.0	14°11.8	14°12.5	14°13.3	14°14.1	+0.8
Th 29	270°38.8	285°38.8	300°38.9	315°39.0	330°39.1	345°39.2	0°39.3	15°39.4	30°39.4	45°39.5	60°39.6	75°39.7	+0.1
	14°24.3	14°25.1	14°25.8	14°26.6	14°27.4	14°28.2	14°28.9	14°29.7	14°30.5	14°31.3	14°32.0	14°32.8	+0.8
Fr 30	270°40.8	285°40.9	300°40.9	315°41.0	330°41.1	345°41.2	0°41.3	15°41.4	30°41.4	45°41.5	60°41.6	75°41.7	+0.1
	14°42.8	14°43.6	14°44.4	14°45.2	14°45.9	14°46.7	14°47.5	14°48.2	14°49.0	14°49.7	14°50.5	14°51.3	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2027

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Th 1	244°11.9	258°44.1	273°16.4	287°48.8	302°21.2	316°53.6	331°26.1	345°58.6	0°31.2	15°03.9	29°36.6	+32.5	14.8
	-21°06.9	-20°57.6	-20°48.2	-20°38.8	-20°29.2	-20°19.6	-20°09.9	-20°00.1	-19°50.2	-19°40.2	-19°30.2	+9.7	54.3
Fr 2	247°52.7	262°26.1	276°59.6	291°33.1	306°06.7	320°40.3	335°13.9	349°47.5	4°21.2	18°55.0	33°28.8	+33.6	14.9
	-16°49.4	-16°38.1	-16°26.7	-16°15.2	-16°03.6	-15°52.0	-15°40.3	-15°28.5	-15°16.7	-15°04.8	-14°52.8	+11.7	54.6
Sa 3	251°59.0	266°33.3	281°07.5	295°41.8	310°16.1	324°50.4	339°24.7	353°59.1	8°33.4	23°07.8	37°42.2	+34.3	15.0
	-11°45.6	-11°32.7	-11°19.7	-11°06.6	-10°53.5	-10°40.3	-10°27.1	-10°13.8	-10°00.5	-9°47.1	-9°33.7	+13.2	55.0
Su 4	256°19.2	270°53.7	285°28.2	300°02.7	314°37.2	329°11.7	343°46.2	358°20.7	12°55.1	27°29.6	42°04.1	+34.5	15.1
	-6°07.0	-5°52.9	-5°38.7	-5°24.5	-5°10.3	-4°56.1	-4°41.8	-4°27.5	-4°13.2	-3°58.8	-3°44.4	+14.3	55.5
Mo 5	260°39.0	275°13.1	289°47.3	304°21.4	318°55.4	333°29.5	348°03.5	2°37.5	17°11.4	31°45.3	46°19.2	+34.0	15.3
	-0°05.7	0°09.0	0°23.8	0°38.5	0°53.3	1°08.1	1°22.8	1°37.6	1°52.4	2°07.2	2°22.0	+14.8	56.1
● Tu 6	264°42.2	279°15.3	293°48.4	308°21.5	322°54.4	337°27.4	352°00.2	6°33.0	21°05.8	35°38.4	50°11.1	+32.9	15.5
	6°04.0	6°18.7	6°33.4	6°48.1	7°02.8	7°17.5	7°32.2	7°46.8	8°01.4	8°16.0	8°30.5	+14.7	56.8
We 7	268°12.0	282°43.4	297°14.8	311°46.1	326°17.3	340°48.5	355°19.5	9°50.5	24°21.4	38°52.2	53°22.9	+31.1	15.6
	12°05.1	12°19.1	12°33.1	12°47.0	13°00.8	13°14.6	13°28.4	13°42.0	13°55.7	14°09.2	14°22.8	+13.8	57.4
Th 8	270°52.4	285°21.6	299°50.7	314°19.7	328°48.6	343°17.4	357°46.1	12°14.7	26°43.2	41°11.6	55°39.9	+28.8	15.8
	17°37.3	17°49.6	18°01.9	18°14.1	18°26.1	18°38.1	18°50.0	19°01.9	19°13.6	19°25.2	19°36.7	+12.0	57.9
Fr 9	272°31.9	286°58.6	301°25.1	315°51.6	330°17.9	344°44.2	359°10.3	13°36.3	28°02.3	42°28.1	56°53.9	+26.2	15.9
	22°16.4	22°26.1	22°35.7	22°45.1	22°54.4	23°03.6	23°12.7	23°21.6	23°30.4	23°39.0	23°47.5	+9.1	58.4
Sa 10	273°09.1	287°33.4	301°57.7	316°21.9	330°46.0	345°10.0	359°33.9	13°57.8	28°21.7	42°45.4	57°09.1	+24.0	16.0
	25°37.1	25°43.2	25°49.1	25°54.8	26°00.4	26°05.8	26°11.0	26°16.1	26°21.0	26°25.7	26°30.2	+5.3	58.7
Su 11	272°58.1	287°21.0	301°44.0	316°06.8	330°29.7	344°52.6	359°15.4	13°38.2	28°01.0	42°23.8	56°46.6	+22.8	16.1
	27°17.0	27°18.7	27°20.2	27°21.5	27°22.6	27°23.5	27°24.2	27°24.8	27°25.1	27°25.3	27°25.3	+0.8	59.0
Mo 12	272°28.8	286°51.8	301°14.8	315°37.8	330°00.9	344°24.0	358°47.1	13°10.3	27°33.5	41°56.8	56°20.1	+23.1	16.1
	27°02.6	26°59.6	26°56.4	26°53.1	26°49.5	26°45.8	26°41.9	26°37.8	26°33.5	26°29.0	26°24.4	-3.8	59.1
◐ Tu 13	272°16.9	286°41.2	301°05.6	315°30.1	329°54.6	344°19.2	358°44.0	13°08.7	27°33.6	41°58.5	56°23.6	+24.7	16.1
	24°54.1	24°46.7	24°39.2	24°31.5	24°23.7	24°15.7	24°07.5	23°59.2	23°50.8	23°42.1	23°33.4	-8.1	59.2
We 14	272°49.4	287°15.8	301°42.3	316°08.9	330°35.6	345°02.4	359°29.3	13°56.2	28°23.3	42°50.4	57°17.7	+26.8	16.1
	21°04.8	20°53.9	20°42.8	20°31.5	20°20.2	20°08.7	19°57.1	19°45.4	19°33.6	19°21.7	19°09.7	-11.5	59.2
Th 15	274°16.5	288°45.1	303°13.8	317°42.6	332°11.4	346°40.3	1°09.3	15°38.3	30°07.5	44°36.7	59°06.0	+28.9	16.1
	15°56.6	15°43.0	15°29.3	15°15.5	15°01.7	14°47.7	14°33.7	14°19.6	14°05.4	13°51.1	13°36.8	-14.0	59.1
Fr 16	276°33.4	291°03.8	305°34.1	320°04.6	334°35.1	349°05.6	3°36.2	18°06.9	32°37.6	47°08.3	61°39.1	+30.6	16.1
	9°54.3	9°39.1	9°23.8	9°08.4	8°53.0	8°37.6	8°22.1	8°06.6	7°51.0	7°35.4	7°19.8	-15.5	58.9
Sa 17	279°25.9	293°57.3	308°28.7	323°00.2	337°31.7	352°03.2	6°34.7	21°06.2	35°37.8	50°09.4	64°41.0	+31.5	16.0
	3°22.5	3°06.5	2°50.5	2°34.6	2°18.6	2°02.6	1°46.6	1°30.6	1°14.6	0°58.6	0°42.7	-16.0	58.6
Su 18	282°36.4	297°08.1	311°39.8	326°11.6	340°43.3	355°15.0	9°46.8	24°18.5	38°50.2	53°21.9	67°53.6	+31.7	15.9
	-3°15.9	-3°31.6	-3°47.4	-4°03.1	-4°18.8	-4°34.4	-4°50.0	-5°05.6	-5°21.2	-5°36.7	-5°52.2	-15.6	58.2
Mo 19	285°47.2	300°18.6	314°50.0	329°21.4	343°52.7	358°24.0	12°55.3	27°26.6	41°57.8	56°29.0	71°00.1	+31.3	15.7
	-9°39.1	-9°53.8	-10°08.5	-10°23.1	-10°37.6	-10°52.1	-11°06.5	-11°20.9	-11°35.2	-11°49.4	-12°03.5	-14.4	57.7
○ Tu 20	288°43.5	303°14.1	317°44.6	332°15.1	346°45.6	1°16.0	15°46.4	30°16.8	44°47.1	59°17.3	73°47.5	+30.4	15.6
	-15°26.8	-15°39.7	-15°52.5	-16°05.3	-16°17.9	-16°30.4	-16°42.9	-16°55.2	-17°07.5	-17°19.7	-17°31.7	-12.5	57.1
We 21	291°15.4	305°44.9	320°14.4	334°43.8	349°13.2	3°42.5	18°11.8	32°41.1	47°10.3	61°39.4	76°08.6	+29.3	15.4
	-20°20.4	-20°30.8	-20°41.1	-20°51.2	-21°01.3	-21°11.2	-21°21.0	-21°30.7	-21°40.2	-21°49.7	-21°59.0	-9.9	56.5
Th 22	293°20.6	307°49.2	322°17.6	336°46.1	351°14.5	5°42.9	20°11.3	34°39.6	49°07.9	63°36.2	78°04.4	+28.4	15.2
	-24°03.9	-24°11.2	-24°18.3	-24°25.4	-24°32.2	-24°39.0	-24°45.6	-24°52.1	-24°58.5	-25°04.7	-25°10.8	-6.7	55.8
Fr 23	295°05.8	309°33.8	324°01.8	338°29.8	352°57.7	7°25.7	21°53.6	36°21.6	50°49.5	65°17.5	79°45.4	+28.0	15.1
	-26°25.3	-26°29.2	-26°32.9	-26°36.4	-26°39.9	-26°43.1	-26°46.3	-26°49.3	-26°52.1	-26°54.8	-26°57.4	-3.2	55.3
Sa 24	296°45.9	311°14.0	325°42.2	340°10.4	354°38.6	9°06.9	23°35.2	38°03.5	52°31.8	67°00.2	81°28.6	+28.3	14.9
	-27°18.9	-27°19.2	-27°19.3	-27°19.3	-27°19.2	-27°19.0	-27°18.6	-27°18.0	-27°17.4	-27°16.6	-27°15.6	+0.3	54.8
Su 25	311°14.0	325°42.2	340°10.4	354°38.6	9°06.9	23°35.2	38°03.5	52°31.8	67°00.2	81°28.6	95°57.0	+28.3	14.9
	-27°19.2	-27°19.3	-27°19.3	-27°19.2	-27°19.0	-27°18.6	-27°18.0	-27°17.4	-27°16.6	-27°15.6	-27°14.5	+0.5	54.8
Mo 26	313°08.3	327°37.4	342°06.5	356°35.7	11°05.0	25°34.3	40°03.6	54°33.0	69°02.5	83°32.0	98°01.6	+29.3	14.8
	-26°42.1	-26°38.9	-26°35.6	-26°32.1	-26°28.5	-26°24.8	-26°21.0	-26°17.0	-26°12.9	-26°08.7	-26°04.4	+3.8	54.4
Tu 27	315°32.0	330°02.5	344°33.1	359°03.7	13°34.4	28°05.2	42°36.0	57°06.9	71°37.8	86°08.8	100°39.9	+30.8	14.8
	-24°45.0	-24°38.8	-24°32.4	-24°26.0	-24°19.5	-24°12.8	-24°06.1	-23°59.2	-23°52.2	-23°45.1	-23°38.0	+6.7	54.2
◑ We 28	318°33.3	333°05.3	347°37.4	2°09.6	16°41.8	31°14.1	45°46.5	60°18.9	74°51.3	89°23.9	103°56.4	+32.3	14.8
	-21°38.1	-21°29.3	-21°20.5	-21°11.5	-21°02.5	-20°53.4	-20°44.2	-20°34.9	-20°25.5	-20°16.0	-20°06.5	+9.2	54.2
Th 29	322°11.5	336°44.9	351°18.4	5°51.9	20°25.4	34°59.0	49°32.7	64°06.3	78°40.1	93°13.8	107°47.6	+33.6	14.8
	-17°33.2	-17°22.4	-17°11.4	-17°00.5	-16°49.4	-16°38.3	-16°27.1	-16°15.8	-16°04.5	-15°53.0	-15°41.6	+11.2	54.4
Fr 30	326°19.2	340°53.5	355°27.9	10°02.3	24°36.7	39°11.2	53°45.7	68°20.2	82°54.7	97°29.2	112°03.8	+34.5	14.9
	-12°41.7	-12°29.2	-12°16.7	-12°04.1	-11°51.5	-11°38.8	-11°26.0	-11°13.2	-11°00.3	-10°47.4	-10°34.5	+12.7	54.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 23h51 — FQ: 13 22h56 — FM: 20 22h27 — LQ: 28 20h17

SUN

May 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	270° 42.7	285° 42.8	300° 42.8	315° 42.9	330° 43.0	345° 43.1	0° 43.1	15° 43.2	30° 43.3	45° 43.4	60° 43.4	75° 43.5	+0.1
	15° 01.2	15° 01.9	15° 02.7	15° 03.4	15° 04.2	15° 05.0	15° 05.7	15° 06.5	15° 07.2	15° 08.0	15° 08.7	15° 09.5	+0.8
Su 2	270° 44.4	285° 44.5	300° 44.6	315° 44.6	330° 44.7	345° 44.8	0° 44.9	15° 44.9	30° 45.0	45° 45.1	60° 45.1	75° 45.2	+0.1
	15° 19.3	15° 20.0	15° 20.8	15° 21.5	15° 22.2	15° 23.0	15° 23.7	15° 24.5	15° 25.2	15° 26.0	15° 26.7	15° 27.5	+0.7
Mo 3	270° 46.1	285° 46.1	300° 46.2	315° 46.2	330° 46.3	345° 46.4	0° 46.4	15° 46.5	30° 46.6	45° 46.6	60° 46.7	75° 46.7	+0.1
	15° 37.1	15° 37.8	15° 38.6	15° 39.3	15° 40.0	15° 40.8	15° 41.5	15° 42.2	15° 43.0	15° 43.7	15° 44.4	15° 45.2	+0.7
Tu 4	270° 47.5	285° 47.6	300° 47.6	315° 47.7	330° 47.8	345° 47.8	0° 47.9	15° 47.9	30° 48.0	45° 48.0	60° 48.1	75° 48.2	+0.1
	15° 54.7	15° 55.4	15° 56.1	15° 56.8	15° 57.6	15° 58.3	15° 59.0	15° 59.7	16° 00.5	16° 01.2	16° 01.9	16° 02.6	+0.7
We 5	270° 48.9	285° 48.9	300° 49.0	315° 49.0	330° 49.1	345° 49.1	0° 49.2	15° 49.2	30° 49.3	45° 49.3	60° 49.4	75° 49.4	+0.1
	16° 12.0	16° 12.7	16° 13.4	16° 14.1	16° 14.8	16° 15.5	16° 16.2	16° 17.0	16° 17.7	16° 18.4	16° 19.1	16° 19.8	+0.7
Th 6	270° 50.1	285° 50.1	300° 50.2	315° 50.2	330° 50.2	345° 50.3	0° 50.3	15° 50.4	30° 50.4	45° 50.5	60° 50.5	75° 50.6	+0.0
	16° 29.0	16° 29.7	16° 30.4	16° 31.1	16° 31.8	16° 32.5	16° 33.2	16° 33.9	16° 34.6	16° 35.3	16° 36.0	16° 36.7	+0.7
Fr 7	270° 51.1	285° 51.2	300° 51.2	315° 51.2	330° 51.3	345° 51.3	0° 51.4	15° 51.4	30° 51.4	45° 51.5	60° 51.5	75° 51.6	+0.0
	16° 45.8	16° 46.5	16° 47.1	16° 47.8	16° 48.5	16° 49.2	16° 49.9	16° 50.6	16° 51.3	16° 52.0	16° 52.7	16° 53.4	+0.7
Sa 8	270° 52.0	285° 52.1	300° 52.1	315° 52.1	330° 52.2	345° 52.2	0° 52.2	15° 52.3	30° 52.3	45° 52.3	60° 52.4	75° 52.4	+0.0
	17° 02.2	17° 02.9	17° 03.6	17° 04.3	17° 05.0	17° 05.6	17° 06.3	17° 07.0	17° 07.7	17° 08.4	17° 09.0	17° 09.7	+0.7
Su 9	270° 52.8	285° 52.8	300° 52.9	315° 52.9	330° 52.9	345° 52.9	0° 53.0	15° 53.0	30° 53.0	45° 53.1	60° 53.1	75° 53.1	+0.0
	17° 18.4	17° 19.1	17° 19.8	17° 20.4	17° 21.1	17° 21.8	17° 22.4	17° 23.1	17° 23.8	17° 24.4	17° 25.1	17° 25.8	+0.7
Mo 10	270° 53.4	285° 53.5	300° 53.5	315° 53.5	330° 53.5	345° 53.6	0° 53.6	15° 53.6	30° 53.6	45° 53.6	60° 53.7	75° 53.7	+0.0
	17° 34.3	17° 35.0	17° 35.7	17° 36.3	17° 37.0	17° 37.6	17° 38.3	17° 38.9	17° 39.6	17° 40.2	17° 40.9	17° 41.5	+0.7
Tu 11	270° 53.9	285° 53.9	300° 54.0	315° 54.0	330° 54.0	345° 54.0	0° 54.0	15° 54.0	30° 54.1	45° 54.1	60° 54.1	75° 54.1	+0.0
	17° 50.0	17° 50.6	17° 51.2	17° 51.9	17° 52.5	17° 53.2	17° 53.8	17° 54.5	17° 55.1	17° 55.7	17° 56.4	17° 57.0	+0.6
We 12	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.4	15° 54.4	30° 54.4	45° 54.4	60° 54.4	75° 54.4	+0.0
	18° 05.3	18° 05.9	18° 06.5	18° 07.2	18° 07.8	18° 08.4	18° 09.0	18° 09.7	18° 10.3	18° 10.9	18° 11.6	18° 12.2	+0.6
Th 13	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.6	60° 54.6	75° 54.6	+0.0
	18° 20.3	18° 20.9	18° 21.5	18° 22.1	18° 22.7	18° 23.4	18° 24.0	18° 24.6	18° 25.2	18° 25.8	18° 26.4	18° 27.0	+0.6
Fr 14	270° 54.6	285° 54.6	300° 54.6	315° 54.6	330° 54.6	345° 54.6	0° 54.6	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	-0.0
	18° 35.0	18° 35.6	18° 36.2	18° 36.8	18° 37.4	18° 38.0	18° 38.6	18° 39.2	18° 39.8	18° 40.4	18° 41.0	18° 41.6	+0.6
Sa 15	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	-0.0
	18° 49.3	18° 49.9	18° 50.5	18° 51.1	18° 51.7	18° 52.3	18° 52.9	18° 53.5	18° 54.1	18° 54.7	18° 55.2	18° 55.8	+0.6
Su 16	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.2	45° 54.2	60° 54.2	75° 54.2	-0.0
	19° 03.4	19° 04.0	19° 04.6	19° 05.1	19° 05.7	19° 06.3	19° 06.9	19° 07.4	19° 08.0	19° 08.6	19° 09.2	19° 09.7	+0.6
Mo 17	270° 54.0	285° 54.0	300° 54.0	315° 54.0	330° 53.9	345° 53.9	0° 53.9	15° 53.9	30° 53.9	45° 53.8	60° 53.8	75° 53.8	-0.0
	19° 17.1	19° 17.7	19° 18.3	19° 18.8	19° 19.4	19° 20.0	19° 20.5	19° 21.1	19° 21.6	19° 22.2	19° 22.8	19° 23.3	+0.6
Tu 18	270° 53.5	285° 53.5	300° 53.5	315° 53.5	330° 53.5	345° 53.4	0° 53.4	15° 53.4	30° 53.4	45° 53.3	60° 53.3	75° 53.3	-0.0
	19° 30.5	19° 31.1	19° 31.6	19° 32.2	19° 32.7	19° 33.3	19° 33.8	19° 34.4	19° 34.9	19° 35.5	19° 36.0	19° 36.6	+0.5
We 19	270° 52.9	285° 52.9	300° 52.9	315° 52.9	330° 52.8	345° 52.8	0° 52.8	15° 52.7	30° 52.7	45° 52.7	60° 52.6	75° 52.6	-0.0
	19° 43.6	19° 44.2	19° 44.7	19° 45.2	19° 45.8	19° 46.3	19° 46.8	19° 47.4	19° 47.9	19° 48.4	19° 49.0	19° 49.5	+0.5
Th 20	270° 52.2	285° 52.2	300° 52.1	315° 52.1	330° 52.1	345° 52.0	0° 52.0	15° 52.0	30° 51.9	45° 51.9	60° 51.9	75° 51.8	-0.0
	19° 56.4	19° 56.9	19° 57.4	19° 57.9	19° 58.5	19° 59.0	19° 59.5	20° 00.0	20° 00.5	20° 01.1	20° 01.6	20° 02.1	+0.5
Fr 21	270° 51.3	285° 51.3	300° 51.2	315° 51.2	330° 51.2	345° 51.1	0° 51.1	15° 51.0	30° 51.0	45° 51.0	60° 50.9	75° 50.9	-0.0
	20° 08.8	20° 09.3	20° 09.8	20° 10.3	20° 10.8	20° 11.3	20° 11.8	20° 12.3	20° 12.8	20° 13.3	20° 13.8	20° 14.3	+0.5
Sa 22	270° 50.3	285° 50.3	300° 50.2	315° 50.2	330° 50.1	345° 50.1	0° 50.0	15° 50.0	30° 50.0	45° 49.9	60° 49.9	75° 49.8	-0.0
	20° 20.8	20° 21.3	20° 21.8	20° 22.3	20° 22.8	20° 23.3	20° 23.8	20° 24.3	20° 24.8	20° 25.3	20° 25.7	20° 26.2	+0.5
Su 23	270° 49.2	285° 49.1	300° 49.1	315° 49.0	330° 49.0	345° 48.9	0° 48.9	15° 48.8	30° 48.8	45° 48.7	60° 48.7	75° 48.6	-0.1
	20° 32.5	20° 33.0	20° 33.5	20° 34.0	20° 34.5	20° 34.9	20° 35.4	20° 35.9	20° 36.4	20° 36.8	20° 37.3	20° 37.8	+0.5
Mo 24	270° 47.9	285° 47.9	300° 47.8	315° 47.7	330° 47.7	345° 47.6	0° 47.6	15° 47.5	30° 47.5	45° 47.4	60° 47.3	75° 47.3	-0.1
	20° 43.9	20° 44.4	20° 44.8	20° 45.3	20° 45.8	20° 46.2	20° 46.7	20° 47.1	20° 47.6	20° 48.1	20° 48.5	20° 49.0	+0.5
Tu 25	270° 46.5	285° 46.4	300° 46.4	315° 46.3	330° 46.3	345° 46.2	0° 46.1	15° 46.1	30° 46.0	45° 45.9	60° 45.9	75° 45.8	-0.1
	20° 54.9	20° 55.3	20° 55.8	20° 56.2	20° 56.7	20° 57.1	20° 57.6	20° 58.0	20° 58.5	20° 58.9	20° 59.4	20° 59.8	+0.4
We 26	270° 45.0	285° 44.9	300° 44.8	315° 44.8	330° 44.7	345° 44.6	0° 44.6	15° 44.5	30° 44.4	45° 44.4	60° 44.3	75° 44.2	-0.1
	21° 05.5	21° 06.0	21° 06.4	21° 06.8	21° 07.3	21° 07.7	21° 08.1	21° 08.6	21° 09.0	21° 09.4	21° 09.9	21° 10.3	+0.4
Th 27	270° 43.3	285° 43.3	300° 43.2	315° 43.1	330° 43.0	345° 43.0	0° 42.9	15° 42.8	30° 42.7	45° 42.7	60° 42.6	75° 42.5	-0.1
	21° 15.8	21° 16.2	21° 16.7	21° 17.1	21° 17.5	21° 17.9	21° 18.3	21° 18.8	21° 19.2	21° 19.6	21° 20.0	21° 20.4	+0.4
Fr 28	270° 41.6	285° 41.5	300° 41.4	315° 41.3	330° 41.2	345° 41.2	0° 41.1	15° 41.0	30° 40.9	45° 40.9	60° 40.8	75° 40.7	-0.1
	21° 25.7	21° 26.1	21° 26.5	21° 26.9	21° 27.4	21° 27.8	21° 28.2	21° 28.6	21° 29.0	21° 29.4	21° 29.8	21° 30.2	+0.4
Sa 29	270° 39.7	285° 39.6	300° 39.5	315° 39.4	330° 39.3	345° 39.2	0° 39.2	15° 39.1	30° 39.0	45° 38.9	60° 38.8	75° 38.7	-0.1
	21° 35.3	21° 35.7	21° 36.1	21° 36.4	21° 36.8	21° 37.2	21° 37.6	21° 38.0	21° 38.4	21° 38.8	21° 39.1	21° 39.5	+0.4
Su 30	270° 37.6	285° 37.6	300° 37.5	315° 37.4	330° 37.3	345° 37.2	0° 37.1	15° 37.0	30° 36.9	45° 36.9	60° 36.8	75° 36.7	-0.1
	21° 44.4	21° 44.8	21° 45.2	21° 45.6	21° 45.9	21° 46.3	21° 46.7	21° 47.1	21° 47.4	21° 47.8	21° 48.2	21° 48.5	+0.4
Mo 31	270° 35.5	285° 35.4	300° 35.3	315° 35.2	330° 35.2	345° 35.1	0° 35.0	15° 34.9	30° 34.8	45° 34.7	60° 34.6	75° 34.5	-0.1
	21° 53.2	21° 53.6	21° 54.0	21° 54.3	21° 54.7	21° 55.0	21° 55.4	21° 55.7	21° 56.1	21° 56.4	21° 56.8	21° 57.1	+0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2027

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Sa 1	243°15.6	257°50.3	272°25.0	286°59.7	301°34.5	316°09.2	330°43.9	345°18.7	359°53.4	14°28.1	29°02.9	+34.7	15.0
	-8°35.7	-8°22.2	-8°08.8	-7°55.2	-7°41.7	-7°28.1	-7°14.4	-7°00.7	-6°47.0	-6°33.3	-6°19.5	+13.6	55.1
Su 2	247°43.3	262°17.9	276°52.4	291°27.0	306°01.5	320°36.0	335°10.5	349°45.0	4°19.4	18°53.8	33°28.2	+34.5	15.2
	-2°48.5	-2°34.2	-2°19.8	-2°05.5	-1°51.1	-1°36.7	-1°22.3	-1°07.9	-0°53.4	-0°38.9	-0°24.4	+14.4	55.8
Mo 3	251°59.8	266°33.5	281°07.3	295°40.9	310°14.6	324°48.1	339°21.7	353°55.1	8°28.5	23°01.9	37°35.2	+33.5	15.4
	3°14.5	3°29.2	3°43.9	3°58.5	4°13.2	4°27.9	4°42.5	4°57.2	5°11.8	5°26.5	5°41.1	+14.7	56.5
Tu 4	255°46.9	270°19.1	284°51.2	299°23.2	313°55.2	328°27.1	342°58.9	357°30.6	12°02.3	26°33.8	41°05.3	+31.8	15.6
	9°19.1	9°33.5	9°47.9	10°02.2	10°16.5	10°30.7	10°45.0	10°59.1	11°13.3	11°27.4	11°41.5	+14.2	57.3
We 5	258°46.1	273°16.0	287°45.8	302°15.6	316°45.2	331°14.7	345°44.1	0°13.4	14°42.6	29°11.7	43°40.6	+29.5	15.8
	15°07.0	15°20.3	15°33.5	15°46.6	15°59.7	16°12.6	16°25.6	16°38.4	16°51.2	17°03.8	17°16.5	+12.9	58.0
● Th 6	260°41.7	275°08.8	289°35.9	304°02.8	318°29.6	332°56.3	347°22.9	1°49.3	16°15.7	30°41.9	45°08.0	+26.6	16.0
	20°14.9	20°26.0	20°37.0	20°47.9	20°58.6	21°09.3	21°19.8	21°30.2	21°40.5	21°50.7	22°00.8	+10.6	58.7
Fr 7	261°26.3	275°50.7	290°15.0	304°39.1	319°03.2	333°27.1	347°51.0	2°14.8	16°38.5	31°02.1	45°25.6	+23.9	16.2
	24°15.2	24°23.1	24°30.7	24°38.2	24°45.5	24°52.7	24°59.7	25°06.6	25°13.3	25°19.8	25°26.1	+7.1	59.2
Sa 8	261°08.7	275°31.0	289°53.3	304°15.5	318°37.7	332°59.9	347°22.0	1°44.0	16°06.1	30°28.1	44°50.0	+22.1	16.2
	26°40.4	26°43.9	26°47.2	26°50.4	26°53.3	26°56.0	26°58.6	27°01.0	27°03.1	27°05.1	27°06.9	+2.6	59.6
Su 9	260°17.5	274°39.3	289°01.1	303°23.0	317°44.9	332°06.8	346°28.7	0°50.7	15°12.7	29°34.7	43°56.8	+21.9	16.3
	27°10.2	27°08.9	27°07.3	27°05.6	27°03.7	27°01.5	26°59.2	26°56.7	26°54.0	26°51.1	26°48.0	-2.2	59.7
Mo 10	259°33.9	273°56.9	288°19.9	302°43.1	317°06.3	331°29.6	345°52.9	0°16.4	14°39.9	29°03.6	43°27.3	+23.3	16.3
	25°39.2	25°33.2	25°27.0	25°20.6	25°14.0	25°07.3	25°00.4	24°53.3	24°46.1	24°38.7	24°31.1	-6.8	59.7
Tu 11	259°34.4	273°59.6	288°25.0	302°50.4	317°16.0	331°41.7	346°07.5	0°33.3	14°59.3	29°25.4	43°51.6	+25.7	16.2
	22°18.9	22°09.0	21°58.8	21°48.6	21°38.2	21°27.7	21°17.0	21°06.3	20°55.4	20°44.3	20°33.2	-10.6	59.5
We 12	260°36.8	275°04.7	289°32.6	304°00.6	318°28.7	332°56.9	347°25.2	1°53.6	16°22.1	30°50.7	45°19.4	+28.3	16.1
	17°32.5	17°19.6	17°06.7	16°53.6	16°40.5	16°27.2	16°13.9	16°00.5	15°47.0	15°33.5	15°19.8	-13.3	59.2
◐ Th 13	262°39.9	277°10.0	291°40.1	306°10.2	320°40.5	335°10.8	349°41.1	4°11.6	18°42.1	33°12.7	47°43.3	+30.3	16.0
	11°46.9	11°32.2	11°17.4	11°02.7	10°47.8	10°32.9	10°18.0	10°03.0	9°48.0	9°33.0	9°17.9	-14.9	58.8
Fr 14	265°29.9	280°01.4	294°33.0	309°04.6	323°36.2	338°07.9	352°39.6	7°11.4	21°43.2	36°15.0	50°46.9	+31.7	15.9
	5°27.7	5°12.1	4°56.6	4°41.0	4°25.4	4°09.8	3°54.2	3°38.6	3°23.0	3°07.4	2°51.7	-15.6	58.3
Sa 15	268°47.8	283°20.1	297°52.3	312°24.5	326°56.8	341°29.0	356°01.3	10°33.6	25°05.8	39°38.1	54°10.4	+32.3	15.8
	-1°02.6	-1°18.1	-1°33.7	-1°49.2	-2°04.7	-2°20.2	-2°35.6	-2°51.1	-3°06.5	-3°21.9	-3°37.2	-15.5	57.9
Su 16	272°14.1	286°46.3	301°18.4	315°50.6	330°22.7	344°54.8	359°26.9	13°58.9	28°30.9	43°03.0	57°34.9	+32.1	15.6
	-7°23.9	-7°38.7	-7°53.5	-8°08.2	-8°22.9	-8°37.5	-8°52.1	-9°06.6	-9°21.1	-9°35.5	-9°49.8	-14.6	57.4
Mo 17	275°31.2	290°02.7	304°34.2	319°05.6	333°36.9	348°08.3	2°39.6	17°10.8	31°42.0	46°13.2	60°44.3	+31.3	15.5
	-13°18.1	-13°31.5	-13°44.7	-13°57.9	-14°11.1	-14°24.1	-14°37.1	-14°50.0	-15°02.8	-15°15.6	-15°28.2	-13.0	56.9
Tu 18	278°25.7	292°56.1	307°26.4	321°56.7	336°27.0	350°57.1	5°27.3	19°57.4	34°27.4	48°57.4	63°27.3	+30.2	15.4
	-18°27.7	-18°38.9	-18°50.0	-19°01.0	-19°12.0	-19°22.8	-19°33.5	-19°44.1	-19°54.6	-20°05.0	-20°15.3	-10.8	56.4
We 19	280°50.6	295°19.8	309°48.9	324°18.0	338°47.1	353°16.1	7°45.0	22°13.9	36°42.8	51°11.6	65°40.4	+29.0	15.2
	-22°36.3	-22°44.8	-22°53.1	-23°01.3	-23°09.4	-23°17.4	-23°25.3	-23°33.0	-23°40.6	-23°48.1	-23°55.4	-7.9	55.8
○ Th 20	282°48.0	297°16.3	311°44.5	326°12.7	340°40.9	355°09.0	9°37.2	24°05.3	38°33.4	53°01.5	67°29.6	+28.2	15.1
	-25°29.9	-25°35.1	-25°40.2	-25°45.2	-25°50.0	-25°54.7	-25°59.2	-26°03.6	-26°07.9	-26°12.0	-26°16.0	-4.6	55.4
Fr 21	284°29.5	298°57.5	313°25.5	327°53.5	342°21.5	356°49.5	11°17.5	25°45.6	40°13.6	54°41.7	69°09.8	+28.0	15.0
	-26°58.9	-27°00.6	-27°02.2	-27°03.7	-27°05.0	-27°06.1	-27°07.2	-27°08.0	-27°08.8	-27°09.4	-27°09.8	-1.1	54.9
Sa 22	286°13.9	300°42.4	315°11.0	329°39.6	344°08.2	358°36.9	13°05.6	27°34.4	42°03.2	56°32.0	71°00.9	+28.7	14.9
	-27°00.1	-26°58.3	-26°56.4	-26°54.4	-26°52.3	-26°50.0	-26°47.6	-26°45.0	-26°42.4	-26°39.5	-26°36.6	+2.3	54.5
Su 23	288°20.5	302°50.3	317°20.1	331°50.0	346°19.9	0°49.9	15°19.9	29°50.0	44°20.2	58°50.5	73°20.8	+30.0	14.8
	-25°37.3	-25°32.3	-25°27.3	-25°22.1	-25°16.8	-25°11.4	-25°05.9	-25°00.2	-24°54.5	-24°48.6	-24°42.6	+5.5	54.3
Mo 24	291°03.1	305°34.4	320°05.8	334°37.3	349°08.9	3°40.5	18°12.2	32°43.9	47°15.7	61°47.6	76°19.5	+31.6	14.8
	-22°59.8	-22°52.1	-22°44.3	-22°36.5	-22°28.5	-22°20.4	-22°12.2	-22°04.0	-21°55.6	-21°47.2	-21°38.6	+8.1	54.1
Tu 25	305°34.4	320°05.8	334°37.3	349°08.9	3°40.5	18°12.2	32°43.9	47°15.7	61°47.6	76°19.5	90°51.5	+31.7	14.8
	-22°52.1	-22°44.3	-22°36.5	-22°28.5	-22°20.4	-22°12.2	-22°04.0	-21°55.6	-21°47.2	-21°38.6	-21°30.0	+8.2	54.1
We 26	308°59.1	323°32.1	338°05.2	352°38.3	7°11.4	21°44.7	36°17.9	50°51.3	65°24.7	79°58.1	94°31.6	+33.3	14.8
	-19°10.0	-19°00.0	-18°49.9	-18°39.7	-18°29.5	-18°19.2	-18°08.8	-17°58.4	-17°47.9	-17°37.3	-17°26.6	+10.3	54.1
Th 27	313°00.0	327°34.2	342°08.5	356°42.9	11°17.3	25°51.7	40°26.1	55°00.6	69°35.1	84°09.7	98°44.3	+34.4	14.8
	-14°38.4	-14°26.6	-14°14.9	-14°03.0	-13°51.1	-13°39.2	-13°27.1	-13°15.1	-13°02.9	-12°50.8	-12°38.5	+12.0	54.3
◑ Fr 28	317°26.5	332°01.5	346°36.5	1°11.6	15°46.6	30°21.7	44°56.8	59°31.9	74°07.0	88°42.1	103°17.2	+35.1	14.9
	-9°28.9	-9°15.9	-9°02.9	-8°49.8	-8°36.6	-8°23.5	-8°10.2	-7°57.0	-7°43.7	-7°30.4	-7°17.0	+13.2	54.7
Sa 29	322°04.2	336°39.3	351°14.4	5°49.5	20°24.6	34°59.6	49°34.7	64°09.7	78°44.7	93°19.7	107°54.7	+35.0	15.1
	-3°52.3	-3°38.4	-3°24.5	-3°10.6	-2°56.6	-2°42.6	-2°28.6	-2°14.6	-2°00.5	-1°46.5	-1°32.4	+14.0	55.2
Su 30	326°36.0	341°10.5	355°45.0	10°19.4	24°53.7	39°28.0	54°02.3	68°36.5	83°10.7	97°44.8	112°18.9	+34.3	15.3
	2°01.0	2°15.3	2°29.6	2°44.0	2°58.3	3°12.6	3°27.0	3°41.3	3°55.7	4°10.0	4°24.4	+14.3	55.9
Mo 31	330°43.0	345°16.0	359°49.0	14°22.0	28°54.8	43°27.6	58°00.3	72°32.9	87°05.5	101°37.9	116°10.3	+32.7	15.5
	7°59.0	8°13.2	8°27.4	8°41.6	8°55.7	9°09.9	9°24.0	9°38.1	9°52.1	10°06.2	10°20.2	+14.1	56.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 10h58 — FQ: 13 04h43 — FM: 20 10h59 — LQ: 28 13h57

SUN

June 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	270°33.3	285°33.2	300°33.1	315°33.0	330°32.9	345°32.8	0°32.7	15°32.6	30°32.5	45°32.4	60°32.3	75°32.2	-0.1
	22°01.7	22°02.0	22°02.3	22°02.7	22°03.0	22°03.4	22°03.7	22°04.0	22°04.4	22°04.7	22°05.0	22°05.4	+0.3
We 2	270°30.9	285°30.8	300°30.7	315°30.6	330°30.5	345°30.4	0°30.3	15°30.2	30°30.1	45°30.0	60°29.9	75°29.8	-0.1
	22°09.7	22°10.0	22°10.3	22°10.7	22°11.0	22°11.3	22°11.6	22°11.9	22°12.3	22°12.6	22°12.9	22°13.2	+0.3
Th 3	270°28.5	285°28.4	300°28.3	315°28.2	330°28.1	345°28.0	0°27.9	15°27.8	30°27.7	45°27.6	60°27.5	75°27.4	-0.1
	22°17.3	22°17.6	22°17.9	22°18.2	22°18.6	22°18.9	22°19.2	22°19.5	22°19.8	22°20.1	22°20.4	22°20.7	+0.3
Fr 4	270°26.0	285°25.9	300°25.8	315°25.7	330°25.6	345°25.4	0°25.3	15°25.2	30°25.1	45°25.0	60°24.9	75°24.8	-0.1
	22°24.6	22°24.9	22°25.2	22°25.4	22°25.7	22°26.0	22°26.3	22°26.6	22°26.9	22°27.2	22°27.5	22°27.8	+0.3
Sa 5	270°23.4	285°23.3	300°23.1	315°23.0	330°22.9	345°22.8	0°22.7	15°22.6	30°22.5	45°22.4	60°22.3	75°22.1	-0.1
	22°31.4	22°31.7	22°32.0	22°32.3	22°32.5	22°32.8	22°33.1	22°33.3	22°33.6	22°33.9	22°34.2	22°34.4	+0.3
Su 6	270°20.7	285°20.6	300°20.4	315°20.3	330°20.2	345°20.1	0°20.0	15°19.9	30°19.7	45°19.6	60°19.5	75°19.4	-0.1
	22°37.9	22°38.1	22°38.4	22°38.7	22°38.9	22°39.2	22°39.4	22°39.7	22°40.0	22°40.2	22°40.5	22°40.7	+0.3
Mo 7	270°17.9	285°17.8	300°17.7	315°17.5	330°17.4	345°17.3	0°17.2	15°17.1	30°17.0	45°16.8	60°16.7	75°16.6	-0.1
	22°43.9	22°44.2	22°44.4	22°44.7	22°44.9	22°45.2	22°45.4	22°45.6	22°45.9	22°46.1	22°46.4	22°46.6	+0.2
Tu 8	270°15.0	285°14.9	300°14.8	315°14.7	330°14.6	345°14.4	0°14.3	15°14.2	30°14.1	45°14.0	60°13.8	75°13.7	-0.1
	22°49.6	22°49.8	22°50.1	22°50.3	22°50.5	22°50.7	22°51.0	22°51.2	22°51.4	22°51.6	22°51.9	22°52.1	+0.2
We 9	270°12.1	285°12.0	300°11.9	315°11.8	330°11.7	345°11.5	0°11.4	15°11.3	30°11.2	45°11.0	60°10.9	75°10.8	-0.1
	22°54.9	22°55.1	22°55.3	22°55.5	22°55.7	22°55.9	22°56.1	22°56.3	22°56.5	22°56.7	22°57.0	22°57.2	+0.2
Th 10	270°09.2	285°09.1	300°08.9	315°08.8	330°08.7	345°08.6	0°08.4	15°08.3	30°08.2	45°08.1	60°07.9	75°07.8	-0.1
	22°59.7	22°59.9	23°00.1	23°00.3	23°00.5	23°00.7	23°00.9	23°01.1	23°01.3	23°01.5	23°01.6	23°01.8	+0.2
Fr 11	270°06.2	285°06.0	300°05.9	315°05.8	330°05.7	345°05.5	0°05.4	15°05.3	30°05.1	45°05.0	60°04.9	75°04.8	-0.1
	23°04.2	23°04.4	23°04.5	23°04.7	23°04.9	23°05.1	23°05.2	23°05.4	23°05.6	23°05.8	23°05.9	23°06.1	+0.2
Sa 12	270°03.1	285°03.0	300°02.8	315°02.7	330°02.6	345°02.5	0°02.3	15°02.2	30°02.1	45°01.9	60°01.8	75°01.7	-0.1
	23°08.2	23°08.4	23°08.6	23°08.7	23°08.9	23°09.0	23°09.2	23°09.3	23°09.5	23°09.7	23°09.8	23°10.0	+0.2
Su 13	270°00.0	284°59.9	299°59.7	314°59.6	329°59.5	344°59.3	359°59.2	14°59.1	29°59.0	44°58.8	59°58.7	74°58.6	-0.1
	23°11.9	23°12.0	23°12.2	23°12.3	23°12.4	23°12.6	23°12.7	23°12.9	23°13.0	23°13.1	23°13.3	23°13.4	+0.1
Mo 14	269°56.9	284°56.7	299°56.6	314°56.5	329°56.3	344°56.2	359°56.1	14°55.9	29°55.8	44°55.7	59°55.5	74°55.4	-0.1
	23°15.1	23°15.2	23°15.4	23°15.5	23°15.6	23°15.7	23°15.9	23°16.0	23°16.1	23°16.2	23°16.3	23°16.5	+0.1
Tu 15	269°53.7	284°53.6	299°53.4	314°53.3	329°53.2	344°53.0	359°52.9	14°52.8	29°52.6	44°52.5	59°52.4	74°52.2	-0.1
	23°17.9	23°18.0	23°18.1	23°18.3	23°18.4	23°18.5	23°18.6	23°18.7	23°18.8	23°18.9	23°19.0	23°19.1	+0.1
We 16	269°50.5	284°50.4	299°50.2	314°50.1	329°50.0	344°49.8	359°49.7	14°49.6	29°49.4	44°49.3	59°49.2	74°49.0	-0.1
	23°20.3	23°20.4	23°20.5	23°20.6	23°20.7	23°20.8	23°20.9	23°21.0	23°21.0	23°21.1	23°21.2	23°21.3	+0.1
Th 17	269°47.3	284°47.1	299°47.0	314°46.9	329°46.7	344°46.6	359°46.5	14°46.3	29°46.2	44°46.1	59°45.9	74°45.8	-0.1
	23°22.3	23°22.4	23°22.5	23°22.6	23°22.6	23°22.7	23°22.8	23°22.8	23°22.9	23°23.0	23°23.0	23°23.1	+0.1
Fr 18	269°44.1	284°43.9	299°43.8	314°43.6	329°43.5	344°43.4	359°43.2	14°43.1	29°43.0	44°42.8	59°42.7	74°42.6	-0.1
	23°23.9	23°24.0	23°24.0	23°24.1	23°24.1	23°24.2	23°24.3	23°24.3	23°24.4	23°24.4	23°24.5	23°24.5	+0.1
Sa 19	269°40.8	284°40.7	299°40.5	314°40.4	329°40.3	344°40.1	359°40.0	14°39.9	29°39.7	44°39.6	59°39.5	74°39.3	-0.1
	23°25.1	23°25.1	23°25.2	23°25.2	23°25.3	23°25.3	23°25.3	23°25.4	23°25.4	23°25.4	23°25.5	23°25.5	+0.0
Su 20	269°37.6	284°37.4	299°37.3	314°37.2	329°37.0	344°36.9	359°36.7	14°36.6	29°36.5	44°36.3	59°36.2	74°36.1	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.1	23°26.1	+0.0
Mo 21	269°34.3	284°34.2	299°34.0	314°33.9	329°33.8	344°33.6	359°33.5	14°33.4	29°33.2	44°33.1	59°33.0	74°32.8	-0.1
	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	+0.0
Tu 22	269°31.1	284°30.9	299°30.8	314°30.7	329°30.5	344°30.4	359°30.3	14°30.1	29°30.0	44°29.9	59°29.7	74°29.6	-0.1
	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	-0.0
We 23	269°27.8	284°27.7	299°27.6	314°27.4	329°27.3	344°27.2	359°27.0	14°26.9	29°26.8	44°26.6	59°26.5	74°26.4	-0.1
	23°25.7	23°25.6	23°25.6	23°25.6	23°25.6	23°25.5	23°25.5	23°25.5	23°25.4	23°25.4	23°25.3	23°25.3	-0.0
Th 24	269°24.6	284°24.5	299°24.3	314°24.2	329°24.1	344°23.9	359°23.8	14°23.7	29°23.5	44°23.4	59°23.3	74°23.1	-0.1
	23°24.8	23°24.7	23°24.7	23°24.6	23°24.6	23°24.5	23°24.5	23°24.4	23°24.4	23°24.3	23°24.3	23°24.2	-0.0
Fr 25	269°21.4	284°21.3	299°21.1	314°21.0	329°20.9	344°20.7	359°20.6	14°20.5	29°20.3	44°20.2	59°20.1	74°20.0	-0.1
	23°23.5	23°23.4	23°23.4	23°23.3	23°23.2	23°23.2	23°23.1	23°23.0	23°23.0	23°22.9	23°22.8	23°22.7	-0.1
Sa 26	269°18.2	284°18.1	299°18.0	314°17.8	329°17.7	344°17.6	359°17.4	14°17.3	29°17.2	44°17.1	59°16.9	74°16.8	-0.1
	23°21.8	23°21.7	23°21.6	23°21.5	23°21.4	23°21.4	23°21.3	23°21.2	23°21.1	23°21.0	23°20.9	23°20.8	-0.1
Su 27	269°15.1	284°15.0	299°14.8	314°14.7	329°14.6	344°14.4	359°14.3	14°14.2	29°14.1	44°13.9	59°13.8	74°13.7	-0.1
	23°19.6	23°19.5	23°19.4	23°19.3	23°19.2	23°19.1	23°19.0	23°18.9	23°18.8	23°18.7	23°18.6	23°18.5	-0.1
Mo 28	269°12.0	284°11.9	299°11.7	314°11.6	329°11.5	344°11.3	359°11.2	14°11.1	29°11.0	44°10.8	59°10.7	74°10.6	-0.1
	23°17.1	23°17.0	23°16.9	23°16.8	23°16.6	23°16.5	23°16.4	23°16.3	23°16.2	23°16.0	23°15.9	23°15.8	-0.1
Tu 29	269°08.9	284°08.8	299°08.7	314°08.5	329°08.4	344°08.3	359°08.2	14°08.0	29°07.9	44°07.8	59°07.7	74°07.5	-0.1
	23°14.2	23°14.0	23°13.9	23°13.8	23°13.6	23°13.5	23°13.4	23°13.2	23°13.1	23°12.9	23°12.8	23°12.7	-0.1
We 30	269°05.9	284°05.8	299°05.6	314°05.5	329°05.4	344°05.3	359°05.2	14°05.0	29°04.9	44°04.8	59°04.7	74°04.5	-0.1
	23°10.8	23°10.7	23°10.5	23°10.4	23°10.2	23°10.1	23°09.9	23°09.7	23°09.6	23°09.4	23°09.3	23°09.1	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2027

D	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	Δ'/h	SH
Tu 1	246°57.7	261°29.1	276°00.5	290°31.8	305°03.0	319°34.0	334°05.0	348°35.9	3°06.6	17°37.3	32°07.8	+31.0	15.7
	12°24.9	12°38.6	12°52.2	13°05.8	13°19.3	13°32.8	13°46.3	13°59.7	14°13.0	14°26.3	14°39.6	+13.5	57.5
We 2	249°32.6	264°01.3	278°29.9	292°58.4	307°26.7	321°55.0	336°23.1	350°51.0	5°18.9	19°46.6	34°14.2	+28.2	15.9
	17°50.7	18°02.9	18°15.0	18°27.0	18°38.9	18°50.7	19°02.4	19°14.1	19°25.6	19°37.1	19°48.4	+11.8	58.4
Th 3	250°52.7	265°18.2	279°43.7	294°08.9	308°34.1	322°59.1	337°24.0	351°48.8	6°13.5	20°38.0	35°02.5	+25.0	16.1
	22°25.7	22°35.3	22°44.7	22°53.9	23°03.1	23°12.1	23°20.9	23°29.7	23°38.2	23°46.7	23°55.0	+8.9	59.2
● Fr 4	250°54.9	265°17.5	279°40.1	294°02.5	308°24.9	322°47.1	337°09.3	351°31.4	5°53.4	20°15.3	34°37.2	+22.2	16.3
	25°40.4	25°46.1	25°51.6	25°57.0	26°02.1	26°07.1	26°11.9	26°16.5	26°20.9	26°25.2	26°29.2	+4.9	59.9
Sa 5	249°57.2	264°18.2	278°39.1	293°00.0	307°20.9	321°41.8	336°02.6	350°23.4	4°44.3	19°05.1	33°25.9	+20.9	16.5
	27°06.7	27°07.6	27°08.3	27°08.8	27°09.0	27°09.1	27°09.0	27°08.7	27°08.1	27°07.4	27°06.5	-0.0	60.4
Su 6	248°39.6	263°00.8	277°22.0	291°43.2	306°04.6	320°25.9	334°47.4	349°08.9	3°30.4	17°52.1	32°13.8	+21.4	16.5
	26°27.8	26°23.6	26°19.2	26°14.6	26°09.8	26°04.8	25°59.6	25°54.3	25°48.7	25°43.0	25°37.0	-5.1	60.5
Mo 7	247°48.9	262°12.0	276°35.2	290°58.5	305°21.9	319°45.4	334°09.0	348°32.7	2°56.5	17°20.4	31°44.4	+23.5	16.5
	23°46.2	23°37.4	23°28.5	23°19.4	23°10.1	23°00.7	22°51.1	22°41.4	22°31.6	22°21.5	22°11.4	-9.5	60.5
Tu 8	247°58.3	262°24.2	276°50.1	291°16.2	305°42.4	320°08.7	334°35.1	349°01.6	3°28.2	17°54.9	32°21.8	+26.3	16.4
	19°22.5	19°10.2	18°57.9	18°45.4	18°32.8	18°20.1	18°07.3	17°54.4	17°41.4	17°28.3	17°15.1	-12.8	60.1
We 9	249°17.4	263°45.9	278°14.6	292°43.3	307°12.1	321°41.0	336°10.0	350°39.1	5°08.3	19°37.6	34°06.9	+29.0	16.2
	13°46.7	13°32.2	13°17.7	13°03.1	12°48.4	12°33.7	12°18.9	12°04.0	11°49.1	11°34.2	11°19.2	-14.8	59.6
Th 10	251°37.1	266°07.7	280°38.4	295°09.2	309°40.0	324°10.8	338°41.7	353°12.7	7°43.8	22°14.9	36°46.0	+30.9	16.1
	7°29.4	7°13.8	6°58.2	6°42.6	6°27.0	6°11.3	5°55.7	5°40.0	5°24.3	5°08.6	4°52.9	-15.7	58.9
◐ Fr 11	254°39.1	269°11.0	283°42.9	298°14.8	312°46.8	327°18.7	341°50.7	356°22.8	10°54.8	25°26.9	39°59.0	+32.0	15.9
	0°56.8	0°41.1	0°25.4	0°09.7	-0°06.0	-0°21.6	-0°37.2	-0°52.9	-1°08.4	-1°24.0	-1°39.6	-15.6	58.2
Sa 12	258°02.5	272°34.7	287°07.0	301°39.3	316°11.6	330°43.9	345°16.2	359°48.5	14°20.7	28°53.0	43°25.3	+32.3	15.7
	-5°29.5	-5°44.6	-5°59.6	-6°14.6	-6°29.5	-6°44.4	-6°59.3	-7°14.1	-7°28.8	-7°43.5	-7°58.2	-14.9	57.6
Su 13	261°27.5	275°59.4	290°31.4	305°03.3	319°35.3	334°07.1	348°39.0	3°10.8	17°42.6	32°14.4	46°46.1	+31.9	15.5
	-11°31.5	-11°45.3	-11°59.0	-12°12.6	-12°26.1	-12°39.6	-12°53.0	-13°06.3	-13°19.6	-13°32.8	-13°45.9	-13.4	56.9
Mo 14	264°37.8	279°08.9	293°40.0	308°11.0	322°42.0	337°13.0	351°43.9	6°14.8	20°45.6	35°16.4	49°47.1	+30.9	15.3
	-16°53.2	-17°05.0	-17°16.8	-17°28.4	-17°40.0	-17°51.4	-18°02.8	-18°14.0	-18°25.2	-18°36.3	-18°47.3	-11.4	56.3
Tu 15	267°22.5	281°52.5	296°22.4	310°52.3	325°22.1	339°51.9	354°21.7	8°51.4	23°21.0	37°50.6	52°20.2	+29.8	15.2
	-21°19.8	-21°29.1	-21°38.3	-21°47.4	-21°56.3	-22°05.2	-22°14.0	-22°22.6	-22°31.1	-22°39.5	-22°47.8	-8.8	55.7
We 16	269°38.5	284°07.4	298°36.2	313°05.0	327°33.8	342°02.6	356°31.3	11°00.0	25°28.7	39°57.3	54°25.9	+28.7	15.1
	-24°37.5	-24°43.8	-24°50.0	-24°56.0	-25°02.0	-25°07.8	-25°13.4	-25°19.0	-25°24.4	-25°29.6	-25°34.8	-5.7	55.3
Th 17	271°32.1	286°00.4	300°28.6	314°56.9	329°25.1	343°53.4	358°21.6	12°49.8	27°18.0	41°46.3	56°14.5	+28.2	15.0
	-26°35.6	-26°38.5	-26°41.4	-26°44.0	-26°46.6	-26°49.0	-26°51.3	-26°53.4	-26°55.4	-26°57.2	-26°58.9	-2.3	54.9
Fr 18	273°18.6	287°47.0	302°15.4	316°43.9	331°12.3	345°40.8	0°09.3	14°37.8	29°06.4	43°35.0	58°03.6	+28.5	14.9
	-27°08.0	-27°07.5	-27°06.8	-27°06.0	-27°05.1	-27°04.1	-27°02.9	-27°01.6	-27°00.1	-26°58.5	-26°56.8	+1.1	54.5
○ Sa 19	275°17.6	289°46.9	304°16.2	318°45.6	333°15.0	347°44.5	2°14.1	16°43.7	31°13.3	45°43.0	60°12.8	+29.5	14.8
	-26°15.1	-26°11.3	-26°07.4	-26°03.3	-25°59.1	-25°54.8	-25°50.4	-25°45.8	-25°41.1	-25°36.3	-25°31.4	+4.4	54.2
Su 20	277°46.2	292°16.9	306°47.7	321°18.6	335°49.5	350°20.5	4°51.6	19°22.7	33°53.9	48°25.1	62°56.4	+31.0	14.7
	-24°03.8	-23°57.1	-23°50.2	-23°43.3	-23°36.2	-23°29.1	-23°21.8	-23°14.4	-23°07.0	-22°59.4	-22°51.8	+7.2	54.1
Mo 21	280°54.0	295°26.4	309°58.8	324°31.3	339°03.9	353°36.5	8°09.2	22°41.9	37°14.7	51°47.6	66°20.5	+32.7	14.7
	-20°45.3	-20°36.2	-20°26.9	-20°17.6	-20°08.2	-19°58.7	-19°49.1	-19°39.5	-19°29.7	-19°19.9	-19°10.0	+9.5	54.0
Tu 22	284°41.6	299°15.5	313°49.4	328°23.3	342°57.3	357°31.4	12°05.5	26°39.7	41°13.9	55°48.1	70°22.4	+34.1	14.7
	-16°32.7	-16°21.7	-16°10.5	-15°59.4	-15°48.1	-15°36.8	-15°25.5	-15°14.1	-15°02.6	-14°51.0	-14°39.4	+11.3	54.0
We 23	289°02.0	303°37.0	318°12.0	332°47.0	347°22.0	1°57.1	16°32.2	31°07.3	45°42.4	60°17.6	74°52.8	+35.1	14.8
	-11°38.8	-11°26.4	-11°13.9	-11°01.4	-10°48.8	-10°36.2	-10°23.5	-10°10.8	-9°58.0	-9°45.2	-9°32.4	+12.6	54.2
Th 24	303°37.0	318°12.0	332°47.0	347°22.0	1°57.1	16°32.2	31°07.3	45°42.4	60°17.6	74°52.8	89°28.1	+35.1	14.8
	-11°26.4	-11°13.9	-11°01.4	-10°48.8	-10°36.2	-10°23.5	-10°10.8	-9°58.0	-9°45.2	-9°32.4	-9°19.5	+12.7	54.2
Fr 25	308°18.7	322°54.2	337°29.7	352°05.2	6°40.7	21°16.2	35°51.7	50°27.2	65°02.7	79°38.2	94°13.7	+35.5	14.9
	-6°02.0	-5°48.6	-5°35.1	-5°21.7	-5°08.1	-4°54.6	-4°41.0	-4°27.5	-4°13.8	-4°00.2	-3°46.5	+13.6	54.6
Sa 26	313°05.3	327°40.6	342°15.9	356°51.2	11°26.4	26°01.6	40°36.8	55°12.0	69°47.1	84°22.3	98°57.3	+35.2	15.0
	-0°19.3	-0°05.3	0°08.6	0°22.6	0°36.5	0°50.5	1°04.5	1°18.5	1°32.5	1°46.5	2°00.6	+14.0	55.1
◑ Su 27	317°39.0	332°13.4	346°47.7	1°22.0	15°56.3	30°30.5	45°04.6	59°38.7	74°12.7	88°46.6	103°20.5	+34.2	15.2
	5°31.0	5°45.0	5°59.0	6°13.0	6°27.0	6°41.0	6°54.9	7°08.9	7°22.8	7°36.7	7°50.6	+14.0	55.8
Mo 28	321°40.4	336°13.1	350°45.7	5°18.2	19°50.7	34°23.0	48°55.3	63°27.4	77°59.5	92°31.5	107°03.4	+32.3	15.4
	11°16.6	11°30.1	11°43.6	11°57.0	12°10.4	12°23.8	12°37.1	12°50.4	13°03.7	13°16.9	13°30.1	+13.4	56.6
Tu 29	324°49.3	339°19.5	353°49.6	8°19.5	22°49.4	37°19.1	51°48.7	66°18.2	80°47.6	95°16.8	109°45.9	+29.7	15.7
	16°41.5	16°53.8	17°06.0	17°18.2	17°30.3	17°42.3	17°54.2	18°06.1	18°17.9	18°29.6	18°41.2	+12.0	57.6
We 30	326°47.4	341°14.5	355°41.4	10°08.2	24°34.9	39°01.4	53°27.8	67°54.1	82°20.2	96°46.2	111°12.1	+26.5	16.0
	21°24.7	21°34.8	21°44.8	21°54.7	22°04.5	22°14.1	22°23.6	22°33.0	22°42.3	22°51.5	23°00.5	+9.6	58.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 19h40 — FQ: 11 10h56 — FM: 19 00h44 — LQ: 27 04h54

SUN

July 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269°02.9	284°02.8	299°02.7	314°02.6	329°02.4	344°02.3	359°02.2	14°02.1	29°02.0	44°01.8	59°01.7	74°01.6	-0.1
	23°07.0	23°06.9	23°06.7	23°06.5	23°06.4	23°06.2	23°06.0	23°05.9	23°05.7	23°05.5	23°05.4	23°05.2	-0.2
Fr 2	269°00.0	283°59.9	298°59.8	313°59.7	328°59.5	343°59.4	358°59.3	13°59.2	28°59.1	43°59.0	58°58.8	73°58.7	-0.1
	23°02.9	23°02.7	23°02.5	23°02.3	23°02.1	23°02.0	23°01.8	23°01.6	23°01.4	23°01.2	23°01.0	23°00.8	-0.2
Sa 3	268°57.2	283°57.1	298°57.0	313°56.8	328°56.7	343°56.6	358°56.5	13°56.4	28°56.3	43°56.1	58°56.0	73°55.9	-0.1
	22°58.3	22°58.1	22°57.9	22°57.7	22°57.5	22°57.3	22°57.1	22°56.9	22°56.7	22°56.5	22°56.3	22°56.1	-0.2
Su 4	268°54.4	283°54.3	298°54.2	313°54.1	328°54.0	343°53.9	358°53.7	13°53.6	28°53.5	43°53.4	58°53.3	73°53.2	-0.1
	22°53.3	22°53.1	22°52.9	22°52.7	22°52.5	22°52.3	22°52.0	22°51.8	22°51.6	22°51.4	22°51.1	22°50.9	-0.2
Mo 5	268°51.7	283°51.6	298°51.5	313°51.4	328°51.3	343°51.2	358°51.1	13°51.0	28°50.9	43°50.7	58°50.6	73°50.5	-0.1
	22°48.0	22°47.7	22°47.5	22°47.3	22°47.0	22°46.8	22°46.6	22°46.3	22°46.1	22°45.9	22°45.6	22°45.4	-0.2
Tu 6	268°49.1	283°49.0	298°48.9	313°48.8	328°48.7	343°48.6	358°48.5	13°48.4	28°48.3	43°48.2	58°48.1	73°48.0	-0.1
	22°42.2	22°42.0	22°41.7	22°41.5	22°41.2	22°41.0	22°40.7	22°40.4	22°40.2	22°39.9	22°39.7	22°39.4	-0.3
We 7	268°46.6	283°46.5	298°46.4	313°46.3	328°46.2	343°46.1	358°46.0	13°45.9	28°45.8	43°45.7	58°45.6	73°45.5	-0.1
	22°36.0	22°35.8	22°35.5	22°35.2	22°35.0	22°34.7	22°34.4	22°34.2	22°33.9	22°33.6	22°33.4	22°33.1	-0.3
Th 8	268°44.2	283°44.1	298°44.0	313°43.9	328°43.8	343°43.7	358°43.6	13°43.5	28°43.4	43°43.3	58°43.2	73°43.1	-0.1
	22°29.5	22°29.2	22°28.9	22°28.6	22°28.4	22°28.1	22°27.8	22°27.5	22°27.2	22°26.9	22°26.6	22°26.4	-0.3
Fr 9	268°41.9	283°41.8	298°41.7	313°41.6	328°41.5	343°41.4	358°41.3	13°41.3	28°41.2	43°41.1	58°41.0	73°40.9	-0.1
	22°22.6	22°22.3	22°22.0	22°21.7	22°21.4	22°21.1	22°20.8	22°20.5	22°20.2	22°19.9	22°19.5	22°19.2	-0.3
Sa 10	268°39.7	283°39.6	298°39.5	313°39.4	328°39.4	343°39.3	358°39.2	13°39.1	28°39.0	43°38.9	58°38.8	73°38.7	-0.1
	22°15.2	22°14.9	22°14.6	22°14.3	22°14.0	22°13.7	22°13.3	22°13.0	22°12.7	22°12.4	22°12.1	22°11.7	-0.3
Su 11	268°37.6	283°37.5	298°37.5	313°37.4	328°37.3	343°37.2	358°37.1	13°37.0	28°37.0	43°36.9	58°36.8	73°36.7	-0.1
	22°07.5	22°07.2	22°06.9	22°06.5	22°06.2	22°05.9	22°05.5	22°05.2	22°04.9	22°04.5	22°04.2	22°03.9	-0.3
Mo 12	268°35.7	283°35.6	298°35.5	313°35.4	328°35.3	343°35.3	358°35.2	13°35.1	28°35.0	43°34.9	58°34.9	73°34.8	-0.1
	21°59.4	21°59.1	21°58.7	21°58.4	21°58.0	21°57.7	21°57.4	21°57.0	21°56.7	21°56.3	21°56.0	21°55.6	-0.3
Tu 13	268°33.8	283°33.7	298°33.7	313°33.6	328°33.5	343°33.4	358°33.4	13°33.3	28°33.2	43°33.1	58°33.1	73°33.0	-0.1
	21°51.0	21°50.6	21°50.2	21°49.9	21°49.5	21°49.2	21°48.8	21°48.4	21°48.1	21°47.7	21°47.3	21°47.0	-0.4
We 14	268°32.1	283°32.0	298°31.9	313°31.9	328°31.8	343°31.7	358°31.7	13°31.6	28°31.5	43°31.5	58°31.4	73°31.3	-0.1
	21°42.1	21°41.8	21°41.4	21°41.0	21°40.6	21°40.2	21°39.9	21°39.5	21°39.1	21°38.7	21°38.3	21°38.0	-0.4
Th 15	268°30.5	283°30.4	298°30.3	313°30.3	328°30.2	343°30.2	358°30.1	13°30.0	28°30.0	43°29.9	58°29.8	73°29.8	-0.1
	21°32.9	21°32.5	21°32.1	21°31.8	21°31.4	21°31.0	21°30.6	21°30.2	21°29.8	21°29.4	21°29.0	21°28.6	-0.4
Fr 16	268°29.0	283°28.9	298°28.9	313°28.8	328°28.8	343°28.7	358°28.6	13°28.6	28°28.5	43°28.5	58°28.4	73°28.4	-0.1
	21°23.4	21°23.0	21°22.5	21°22.1	21°21.7	21°21.3	21°20.9	21°20.5	21°20.1	21°19.7	21°19.3	21°18.9	-0.4
Sa 17	268°27.7	283°27.6	298°27.5	313°27.5	328°27.4	343°27.4	358°27.3	13°27.3	28°27.2	43°27.2	58°27.1	73°27.1	-0.1
	21°13.4	21°13.0	21°12.6	21°12.2	21°11.7	21°11.3	21°10.9	21°10.5	21°10.0	21°09.6	21°09.2	21°08.8	-0.4
Su 18	268°26.4	283°26.4	298°26.3	313°26.3	328°26.3	343°26.2	358°26.2	13°26.1	28°26.1	43°26.0	58°26.0	73°25.9	-0.0
	21°03.1	21°02.7	21°02.3	21°01.8	21°01.4	21°01.0	21°00.5	21°00.1	20°59.6	20°59.2	20°58.7	20°58.3	-0.4
Mo 19	268°25.4	283°25.3	298°25.3	313°25.2	328°25.2	343°25.2	358°25.1	13°25.1	28°25.0	43°25.0	58°25.0	73°24.9	-0.0
	20°52.5	20°52.0	20°51.6	20°51.1	20°50.7	20°50.2	20°49.8	20°49.3	20°48.9	20°48.4	20°48.0	20°47.5	-0.5
Tu 20	268°24.4	283°24.4	298°24.3	313°24.3	328°24.3	343°24.2	358°24.2	13°24.2	28°24.1	43°24.1	58°24.1	73°24.0	-0.0
	20°41.5	20°41.0	20°40.6	20°40.1	20°39.6	20°39.2	20°38.7	20°38.2	20°37.8	20°37.3	20°36.8	20°36.3	-0.5
We 21	268°23.6	283°23.6	298°23.6	313°23.5	328°23.5	343°23.5	358°23.4	13°23.4	28°23.4	43°23.4	58°23.3	73°23.3	-0.0
	20°30.2	20°29.7	20°29.2	20°28.7	20°28.2	20°27.7	20°27.3	20°26.8	20°26.3	20°25.8	20°25.3	20°24.8	-0.5
Th 22	268°23.0	283°22.9	298°22.9	313°22.9	328°22.9	343°22.8	358°22.8	13°22.8	28°22.8	43°22.7	58°22.7	73°22.7	-0.0
	20°18.5	20°18.0	20°17.5	20°17.0	20°16.5	20°16.0	20°15.5	20°15.0	20°14.5	20°14.0	20°13.5	20°13.0	-0.5
Fr 23	268°22.4	283°22.4	298°22.4	313°22.4	328°22.4	343°22.3	358°22.3	13°22.3	28°22.3	43°22.3	58°22.3	73°22.2	-0.0
	20°06.4	20°05.9	20°05.4	20°04.9	20°04.4	20°03.9	20°03.4	20°02.9	20°02.3	20°01.8	20°01.3	20°00.8	-0.5
Sa 24	268°22.0	283°22.0	298°22.0	313°22.0	328°22.0	343°22.0	358°22.0	13°22.0	28°22.0	43°21.9	58°21.9	73°21.9	-0.0
	19°54.1	19°53.5	19°53.0	19°52.5	19°52.0	19°51.4	19°50.9	19°50.4	19°49.9	19°49.3	19°48.8	19°48.3	-0.5
Su 25	268°21.8	283°21.8	298°21.8	313°21.8	328°21.8	343°21.8	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.7	-0.0
	19°41.4	19°40.8	19°40.3	19°39.8	19°39.2	19°38.7	19°38.1	19°37.6	19°37.1	19°36.5	19°36.0	19°35.4	-0.5
Mo 26	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	+0.0
	19°28.3	19°27.8	19°27.2	19°26.7	19°26.1	19°25.6	19°25.0	19°24.5	19°23.9	19°23.4	19°22.8	19°22.3	-0.6
Tu 27	268°21.8	283°21.8	298°21.8	313°21.8	328°21.8	343°21.8	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.8	+0.0
	19°15.0	19°14.4	19°13.9	19°13.3	19°12.7	19°12.2	19°11.6	19°11.0	19°10.5	19°09.9	19°09.3	19°08.8	-0.6
We 28	268°22.0	283°22.0	298°22.0	313°22.0	328°22.0	343°22.0	358°22.0	13°22.0	28°22.1	43°22.1	58°22.1	73°22.1	+0.0
	19°01.3	19°00.7	19°00.2	18°59.6	18°59.0	18°58.4	18°57.8	18°57.3	18°56.7	18°56.1	18°55.5	18°54.9	-0.6
Th 29	268°22.3	283°22.3	298°22.3	313°22.3	328°22.4	343°22.4	358°22.4	13°22.4	28°22.4	43°22.5	58°22.5	73°22.5	+0.0
	18°47.3	18°46.7	18°46.1	18°45.6	18°45.0	18°44.4	18°43.8	18°43.2	18°42.6	18°42.0	18°41.4	18°40.8	-0.6
Fr 30	268°22.8	283°22.8	298°22.8	313°22.9	328°22.9	343°22.9	358°22.9	13°23.0	28°23.0	43°23.0	58°23.0	73°23.1	+0.0
	18°33.0	18°32.4	18°31.8	18°31.2	18°30.6	18°30.0	18°29.4	18°28.8	18°28.2	18°27.6	18°27.0	18°26.4	-0.6
Sa 31	268°23.4	283°23.4	298°23.5	313°23.5	328°23.5	343°23.6	358°23.6	13°23.6	28°23.7	43°23.7	58°23.7	73°23.8	+0.0
	18°18.4	18°17.8	18°17.2	18°16.6	18°16.0	18°15.3	18°14.7	18°14.1	18°13.5	18°12.9	18°12.2	18°11.6	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2027

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
Th 1	255°23.5	269°48.0	284°12.3	298°36.5	313°00.5	327°24.5	341°48.3	356°12.0	10°35.5	24°59.0	39°22.3	+23.9	16.2
	24°23.4	24°30.9	24°38.3	24°45.5	24°52.5	24°59.4	25°06.2	25°12.8	25°19.2	25°25.5	25°31.5	+6.8	59.3
Fr 2	254°59.6	269°21.3	283°43.0	298°04.5	312°26.0	326°47.4	341°08.8	355°30.0	9°51.2	24°12.4	38°33.5	+21.4	16.4
	26°42.1	26°45.4	26°48.4	26°51.3	26°53.9	26°56.4	26°58.7	27°00.7	27°02.6	27°04.3	27°05.8	+2.4	60.2
Sa 3	253°44.5	268°05.0	282°25.5	296°46.0	311°06.6	325°27.1	339°47.6	354°08.2	8°28.7	22°49.3	37°09.9	+20.5	16.6
	27°03.4	27°01.5	26°59.5	26°57.3	26°54.8	26°52.2	26°49.3	26°46.3	26°43.0	26°39.5	26°35.8	-2.8	60.8
● Su 4	252°23.1	266°44.4	281°05.8	295°27.2	309°48.8	324°10.3	338°32.0	352°53.8	7°15.6	21°37.5	35°59.5	+21.6	16.7
	25°16.1	25°09.2	25°02.1	24°54.8	24°47.3	24°39.7	24°31.8	24°23.8	24°15.6	24°07.2	23°58.6	-7.7	61.1
Mo 5	251°40.7	266°04.3	280°28.0	294°51.7	309°15.6	323°39.6	338°03.7	352°28.0	6°52.3	21°16.7	35°41.3	+24.1	16.7
	21°29.8	21°18.7	21°07.3	20°55.8	20°44.2	20°32.5	20°20.6	20°08.6	19°56.4	19°44.1	19°31.7	-11.8	61.1
Tu 6	252°03.1	266°29.4	280°55.9	295°22.4	309°49.1	324°15.9	338°42.7	353°09.7	7°36.8	22°04.0	36°31.3	+26.8	16.6
	16°11.4	15°57.2	15°42.9	15°28.6	15°14.1	14°59.6	14°45.0	14°30.3	14°15.5	14°00.6	13°45.7	-14.6	60.7
We 7	253°32.6	268°01.4	282°30.3	296°59.3	311°28.4	325°57.5	340°26.7	354°56.1	9°25.5	23°54.9	38°24.5	+29.2	16.4
	9°54.5	9°38.7	9°22.9	9°07.0	8°51.1	8°35.1	8°19.1	8°03.1	7°47.1	7°31.0	7°14.9	-16.0	60.1
Th 8	255°55.9	270°26.5	284°57.1	299°27.8	313°58.6	328°29.4	343°00.2	357°31.1	12°02.0	26°33.0	41°04.0	+30.8	16.2
	3°11.8	2°55.5	2°39.3	2°23.1	2°06.8	1°50.6	1°34.4	1°18.2	1°02.0	0°45.8	0°29.7	-16.2	59.3
Fr 9	258°53.4	273°24.9	287°56.4	302°28.0	316°59.5	331°31.1	346°02.7	0°34.4	15°06.0	29°37.6	44°09.3	+31.6	15.9
	-3°29.8	-3°45.5	-4°01.2	-4°16.9	-4°32.5	-4°48.0	-5°03.6	-5°19.0	-5°34.5	-5°49.9	-6°05.2	-15.5	58.4
◐ Sa 10	262°04.5	276°36.2	291°07.8	305°39.5	320°11.1	334°42.7	349°14.3	3°45.9	18°17.5	32°49.1	47°20.6	+31.6	15.7
	-9°48.9	-10°03.3	-10°17.7	-10°32.0	-10°46.2	-11°00.4	-11°14.5	-11°28.6	-11°42.5	-11°56.4	-12°10.2	-14.1	57.6
Su 11	265°11.4	279°42.6	294°13.7	308°44.8	323°15.9	337°47.0	352°18.0	6°49.0	21°19.9	35°50.9	50°21.8	+31.0	15.5
	-15°28.2	-15°40.7	-15°53.2	-16°05.5	-16°17.8	-16°30.0	-16°42.1	-16°54.1	-17°06.0	-17°17.8	-17°29.5	-12.1	56.7
Mo 12	268°00.7	282°31.0	297°01.3	311°31.5	326°01.6	340°31.8	355°01.9	9°31.9	24°01.9	38°31.9	53°01.8	+30.1	15.3
	-20°13.3	-20°23.4	-20°33.4	-20°43.2	-20°53.0	-21°02.7	-21°12.2	-21°21.6	-21°31.0	-21°40.2	-21°49.3	-9.6	56.0
Tu 13	270°26.0	284°55.3	299°24.6	313°53.8	328°23.0	342°52.2	357°21.3	11°50.4	26°19.5	40°48.5	55°17.5	+29.2	15.1
	-23°51.6	-23°58.8	-24°05.8	-24°12.8	-24°19.6	-24°26.3	-24°32.8	-24°39.3	-24°45.6	-24°51.7	-24°57.8	-6.6	55.4
We 14	272°29.3	286°57.9	301°26.5	315°55.0	330°23.6	344°52.1	359°20.7	13°49.2	28°17.7	42°46.2	57°14.6	+28.5	15.0
	-26°12.8	-26°16.7	-26°20.5	-26°24.2	-26°27.7	-26°31.1	-26°34.4	-26°37.5	-26°40.5	-26°43.4	-26°46.1	-3.3	54.9
Th 15	274°21.5	288°50.0	303°18.5	317°47.0	332°15.5	346°44.1	1°12.6	15°41.2	30°09.8	44°38.4	59°07.0	+28.5	14.9
	-27°10.3	-27°10.9	-27°11.3	-27°11.5	-27°11.6	-27°11.6	-27°11.4	-27°11.1	-27°10.7	-27°10.1	-27°09.4	+0.1	54.5
Fr 16	276°19.6	290°48.7	305°17.8	319°47.0	334°16.2	348°45.5	3°14.8	17°44.1	32°13.5	46°43.0	61°12.4	+29.3	14.8
	-26°42.9	-26°40.1	-26°37.1	-26°34.0	-26°30.8	-26°27.5	-26°24.0	-26°20.4	-26°16.7	-26°12.9	-26°08.9	+3.4	54.2
Sa 17	278°40.7	293°11.0	307°41.4	322°11.9	336°42.4	351°12.9	5°43.5	20°14.2	34°44.9	49°15.7	63°46.6	+30.6	14.7
	-24°54.9	-24°49.1	-24°43.1	-24°37.0	-24°30.8	-24°24.5	-24°18.0	-24°11.5	-24°04.8	-23°58.1	-23°51.2	+6.4	54.0
○ Su 18	281°36.9	296°08.8	310°40.7	325°12.7	339°44.8	354°16.9	8°49.1	23°21.3	37°53.6	52°26.0	66°58.4	+32.1	14.7
	-21°56.0	-21°47.5	-21°39.0	-21°30.3	-21°21.6	-21°12.8	-21°03.8	-20°54.8	-20°45.7	-20°36.6	-20°27.3	+8.9	53.9
Mo 19	285°12.2	299°45.6	314°19.0	328°52.5	343°26.1	357°59.7	12°33.4	27°07.1	41°40.9	56°14.7	70°48.6	+33.6	14.7
	-17°58.5	-17°48.0	-17°37.3	-17°26.7	-17°15.9	-17°05.1	-16°54.2	-16°43.3	-16°32.3	-16°21.2	-16°10.0	+10.8	53.9
Tu 20	289°22.8	303°57.5	318°32.2	333°06.9	347°41.6	2°16.5	16°51.3	31°26.2	46°01.1	60°36.0	75°11.0	+34.8	14.7
	-13°15.6	-13°03.5	-12°51.4	-12°39.2	-12°27.0	-12°14.7	-12°02.4	-11°50.0	-11°37.6	-11°25.1	-11°12.6	+12.3	54.0
We 21	293°59.5	308°34.9	323°10.4	337°45.8	352°21.3	6°56.8	21°32.4	36°07.9	50°43.5	65°19.0	79°54.6	+35.5	14.8
	-8°00.0	-7°46.9	-7°33.7	-7°20.5	-7°07.3	-6°54.0	-6°40.7	-6°27.4	-6°14.1	-6°00.7	-5°47.3	+13.3	54.3
Th 22	298°49.1	313°24.8	328°00.4	342°36.0	357°11.7	11°47.3	26°22.9	40°58.5	55°34.1	70°09.7	84°45.2	+35.6	14.9
	-2°23.6	-2°09.9	-1°56.1	-1°42.4	-1°28.6	-1°14.8	-1°01.0	-0°47.2	-0°33.4	-0°19.6	-0°05.7	+13.8	54.6
Fr 23	313°24.8	328°00.4	342°36.0	357°11.7	11°47.3	26°22.9	40°58.5	55°34.1	70°09.7	84°45.2	99°20.8	+35.6	14.9
	-2°09.9	-1°56.1	-1°42.4	-1°28.6	-1°14.8	-1°01.0	-0°47.2	-0°33.4	-0°19.6	-0°05.7	0°08.1	+13.8	54.6
Sa 24	318°11.4	332°46.6	347°21.7	1°56.8	16°31.9	31°06.9	45°41.9	60°16.8	74°51.7	89°26.6	104°01.4	+35.0	15.0
	3°36.2	3°50.1	4°04.0	4°17.8	4°31.7	4°45.5	4°59.4	5°13.2	5°27.0	5°40.8	5°54.6	+13.8	55.1
Su 25	322°37.5	337°11.5	351°45.4	6°19.2	20°53.0	35°26.7	50°00.3	64°33.8	79°07.3	93°40.7	108°14.1	+33.7	15.2
	9°19.7	9°33.2	9°46.7	10°00.1	10°13.5	10°26.9	10°40.3	10°53.6	11°06.9	11°20.2	11°33.4	+13.4	55.7
◑ Mo 26	326°24.5	340°56.5	355°28.4	10°00.2	24°31.9	39°03.5	53°35.0	68°06.4	82°37.8	97°09.0	111°40.1	+31.6	15.4
	14°47.0	14°59.5	15°12.0	15°24.4	15°36.8	15°49.1	16°01.3	16°13.5	16°25.7	16°37.7	16°49.7	+12.3	56.5
Tu 27	329°13.9	343°43.2	358°12.4	12°41.5	27°10.5	41°39.4	56°08.2	70°36.8	85°05.3	99°33.7	114°01.9	+28.8	15.6
	19°41.1	19°51.9	20°02.6	20°13.2	20°23.7	20°34.2	20°44.5	20°54.7	21°04.9	21°14.9	21°24.8	+10.4	57.4
We 28	330°51.1	345°17.3	359°43.5	14°09.5	28°35.4	43°01.2	57°26.9	71°52.4	86°17.8	100°43.1	115°08.3	+25.7	15.9
	23°40.5	23°48.6	23°56.6	24°04.4	24°12.1	24°19.6	24°27.0	24°34.3	24°41.4	24°48.4	24°55.3	+7.5	58.3
Th 29	331°12.1	345°35.5	359°58.8	14°22.0	28°45.0	43°08.0	57°30.9	71°53.8	86°16.5	100°39.1	115°01.7	+22.9	16.2
	26°19.6	26°23.9	26°28.0	26°32.0	26°35.8	26°39.4	26°42.9	26°46.1	26°49.2	26°52.1	26°54.8	+3.5	59.3
Fr 30	330°31.3	344°52.9	359°14.3	13°35.8	27°57.2	42°18.5	56°39.9	71°01.2	85°22.5	99°43.7	114°05.0	+21.4	16.4
	27°12.9	27°12.6	27°12.0	27°11.3	27°10.3	27°09.2	27°07.8	27°06.3	27°04.5	27°02.6	27°00.4	-1.3	60.1
Sa 31	329°23.2	343°44.6	358°05.9	12°27.3	26°48.7	41°10.2	55°31.7	69°53.2	84°14.8	98°36.4	112°58.1	+21.5	16.6
	26°03.8	25°58.4	25°52.8	25°47.0	25°41.0	25°34.8	25°28.5	25°21.9	25°15.2	25°08.2	25°01.1	-6.3	60.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 03h02 — FQ: 10 18h39 — FM: 18 15h44 — LQ: 26 16h54

SUN

August 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	268°24.2	283°24.2	298°24.3	313°24.3	328°24.3	343°24.4	358°24.4	13°24.5	28°24.5	43°24.5	58°24.6	73°24.6	+0.0
	18°03.5	18°02.9	18°02.3	18°01.6	18°01.0	18°00.4	17°59.7	17°59.1	17°58.5	17°57.9	17°57.2	17°56.6	-0.6
Mo 2	268°25.1	283°25.2	298°25.2	313°25.3	328°25.3	343°25.4	358°25.4	13°25.4	28°25.5	43°25.5	58°25.6	73°25.6	+0.0
	17°48.3	17°47.7	17°47.0	17°46.4	17°45.8	17°45.1	17°44.5	17°43.8	17°43.2	17°42.5	17°41.9	17°41.3	-0.6
Tu 3	268°26.2	283°26.3	298°26.3	313°26.4	328°26.4	343°26.5	358°26.5	13°26.6	28°26.6	43°26.7	58°26.7	73°26.8	+0.1
	17°32.8	17°32.2	17°31.5	17°30.9	17°30.2	17°29.6	17°28.9	17°28.3	17°27.6	17°27.0	17°26.3	17°25.6	-0.7
We 4	268°27.5	283°27.5	298°27.6	313°27.6	328°27.7	343°27.7	358°27.8	13°27.9	28°27.9	43°28.0	58°28.0	73°28.1	+0.1
	17°17.1	17°16.4	17°15.7	17°15.1	17°14.4	17°13.7	17°13.1	17°12.4	17°11.7	17°11.1	17°10.4	17°09.7	-0.7
Th 5	268°28.9	283°28.9	298°29.0	313°29.0	328°29.1	343°29.2	358°29.2	13°29.3	28°29.4	43°29.4	58°29.5	73°29.6	+0.1
	17°01.0	17°00.3	16°59.7	16°59.0	16°58.3	16°57.6	16°57.0	16°56.3	16°55.6	16°54.9	16°54.2	16°53.6	-0.7
Fr 6	268°30.4	283°30.5	298°30.5	313°30.6	328°30.7	343°30.8	358°30.8	13°30.9	28°31.0	43°31.0	58°31.1	73°31.2	+0.1
	16°44.7	16°44.0	16°43.3	16°42.6	16°41.9	16°41.2	16°40.6	16°39.9	16°39.2	16°38.5	16°37.8	16°37.1	-0.7
Sa 7	268°32.1	283°32.2	298°32.3	313°32.3	328°32.4	343°32.5	358°32.6	13°32.6	28°32.7	43°32.8	58°32.9	73°32.9	+0.1
	16°28.1	16°27.4	16°26.7	16°26.0	16°25.3	16°24.6	16°23.9	16°23.2	16°22.5	16°21.8	16°21.1	16°20.4	-0.7
Su 8	268°34.0	283°34.0	298°34.1	313°34.2	328°34.3	343°34.4	358°34.4	13°34.5	28°34.6	43°34.7	58°34.8	73°34.9	+0.1
	16°11.2	16°10.5	16°09.8	16°09.1	16°08.4	16°07.7	16°07.0	16°06.3	16°05.5	16°04.8	16°04.1	16°03.4	-0.7
Mo 9	268°36.0	283°36.1	298°36.1	313°36.2	328°36.3	343°36.4	358°36.5	13°36.6	28°36.7	43°36.8	58°36.8	73°36.9	+0.1
	15°54.1	15°53.4	15°52.7	15°51.9	15°51.2	15°50.5	15°49.8	15°49.1	15°48.3	15°47.6	15°46.9	15°46.2	-0.7
Tu 10	268°38.1	283°38.2	298°38.3	313°38.4	328°38.5	343°38.6	358°38.7	13°38.8	28°38.9	43°39.0	58°39.1	73°39.2	+0.1
	15°36.7	15°36.0	15°35.3	15°34.5	15°33.8	15°33.1	15°32.4	15°31.6	15°30.9	15°30.2	15°29.4	15°28.7	-0.7
We 11	268°40.4	283°40.5	298°40.6	313°40.7	328°40.8	343°40.9	358°41.0	13°41.1	28°41.2	43°41.3	58°41.4	73°41.5	+0.1
	15°19.1	15°18.4	15°17.6	15°16.9	15°16.2	15°15.4	15°14.7	15°13.9	15°13.2	15°12.4	15°11.7	15°11.0	-0.7
Th 12	268°42.9	283°43.0	298°43.1	313°43.2	328°43.3	343°43.4	358°43.5	13°43.6	28°43.7	43°43.8	58°43.9	73°44.0	+0.1
	15°01.3	15°00.5	14°59.8	14°59.0	14°58.3	14°57.5	14°56.8	14°56.0	14°55.2	14°54.5	14°53.7	14°53.0	-0.8
Fr 13	268°45.5	283°45.6	298°45.7	313°45.8	328°45.9	343°46.0	358°46.1	13°46.2	28°46.4	43°46.5	58°46.6	73°46.7	+0.1
	14°43.2	14°42.4	14°41.6	14°40.9	14°40.1	14°39.4	14°38.6	14°37.8	14°37.1	14°36.3	14°35.5	14°34.8	-0.8
Sa 14	268°48.2	283°48.3	298°48.4	313°48.6	328°48.7	343°48.8	358°48.9	13°49.0	28°49.1	43°49.3	58°49.4	73°49.5	+0.1
	14°24.8	14°24.1	14°23.3	14°22.5	14°21.7	14°21.0	14°20.2	14°19.4	14°18.7	14°17.9	14°17.1	14°16.3	-0.8
Su 15	268°51.1	283°51.2	298°51.3	313°51.4	328°51.6	343°51.7	358°51.8	13°51.9	28°52.1	43°52.2	58°52.3	73°52.4	+0.1
	14°06.3	14°05.5	14°04.7	14°03.9	14°03.2	14°02.4	14°01.6	14°00.8	14°00.0	13°59.2	13°58.5	13°57.7	-0.8
Mo 16	268°54.1	283°54.2	298°54.3	313°54.5	328°54.6	343°54.7	358°54.8	13°55.0	28°55.1	43°55.2	58°55.4	73°55.5	+0.1
	13°47.5	13°46.7	13°45.9	13°45.1	13°44.3	13°43.5	13°42.8	13°42.0	13°41.2	13°40.4	13°39.6	13°38.8	-0.8
Tu 17	268°57.2	283°57.3	298°57.5	313°57.6	328°57.7	343°57.9	358°58.0	13°58.2	28°58.3	43°58.4	58°58.6	73°58.7	+0.1
	13°28.5	13°27.7	13°26.9	13°26.1	13°25.3	13°24.5	13°23.7	13°22.9	13°22.1	13°21.3	13°20.5	13°19.7	-0.8
We 18	269°00.5	284°00.6	299°00.8	314°00.9	329°01.0	344°01.2	359°01.3	14°01.5	29°01.6	44°01.7	59°01.9	74°02.0	+0.1
	13°09.3	13°08.5	13°07.7	13°06.9	13°06.0	13°05.2	13°04.4	13°03.6	13°02.8	13°02.0	13°01.2	13°00.4	-0.8
Th 19	269°03.9	284°04.0	299°04.2	314°04.3	329°04.4	344°04.6	359°04.7	14°04.9	29°05.0	44°05.2	59°05.3	74°05.5	+0.1
	12°49.8	12°49.0	12°48.2	12°47.4	12°46.6	12°45.8	12°45.0	12°44.1	12°43.3	12°42.5	12°41.7	12°40.9	-0.8
Fr 20	269°07.4	284°07.5	299°07.7	314°07.8	329°08.0	344°08.1	359°08.3	14°08.4	29°08.6	44°08.7	59°08.9	74°09.0	+0.2
	12°30.2	12°29.4	12°28.6	12°27.8	12°26.9	12°26.1	12°25.3	12°24.5	12°23.6	12°22.8	12°22.0	12°21.2	-0.8
Sa 21	269°11.0	284°11.2	299°11.3	314°11.5	329°11.6	344°11.8	359°11.9	14°12.1	29°12.2	44°12.4	59°12.6	74°12.7	+0.2
	12°10.4	12°09.6	12°08.7	12°07.9	12°07.1	12°06.2	12°05.4	12°04.6	12°03.7	12°02.9	12°02.1	12°01.2	-0.8
Su 22	269°14.8	284°14.9	299°15.1	314°15.2	329°15.4	344°15.6	359°15.7	14°15.9	29°16.0	44°16.2	59°16.3	74°16.5	+0.2
	11°50.4	11°49.5	11°48.7	11°47.9	11°47.0	11°46.2	11°45.3	11°44.5	11°43.7	11°42.8	11°42.0	11°41.1	-0.8
Mo 23	269°18.6	284°18.8	299°18.9	314°19.1	329°19.3	344°19.4	359°19.6	14°19.8	29°19.9	44°20.1	59°20.2	74°20.4	+0.2
	11°30.2	11°29.3	11°28.5	11°27.6	11°26.8	11°25.9	11°25.1	11°24.2	11°23.4	11°22.5	11°21.7	11°20.8	-0.8
Tu 24	269°22.6	284°22.7	299°22.9	314°23.1	329°23.2	344°23.4	359°23.6	14°23.7	29°23.9	44°24.1	59°24.2	74°24.4	+0.2
	11°09.8	11°08.9	11°08.1	11°07.2	11°06.4	11°05.5	11°04.6	11°03.8	11°02.9	11°02.1	11°01.2	11°00.4	-0.9
We 25	269°26.6	284°26.8	299°27.0	314°27.1	329°27.3	344°27.5	359°27.7	14°27.8	29°28.0	44°28.2	59°28.4	74°28.5	+0.2
	10°49.2	10°48.3	10°47.5	10°46.6	10°45.8	10°44.9	10°44.0	10°43.2	10°42.3	10°41.4	10°40.6	10°39.7	-0.9
Th 26	269°30.8	284°31.0	299°31.1	314°31.3	329°31.5	344°31.7	359°31.8	14°32.0	29°32.2	44°32.4	59°32.6	74°32.7	+0.2
	10°28.5	10°27.6	10°26.7	10°25.9	10°25.0	10°24.1	10°23.2	10°22.4	10°21.5	10°20.6	10°19.8	10°18.9	-0.9
Fr 27	269°35.0	284°35.2	299°35.4	314°35.6	329°35.8	344°35.9	359°36.1	14°36.3	29°36.5	44°36.7	59°36.8	74°37.0	+0.2
	10°07.5	10°06.7	10°05.8	10°04.9	10°04.0	10°03.2	10°02.3	10°01.4	10°00.5	9°59.7	9°58.8	9°57.9	-0.9
Sa 28	269°39.4	284°39.6	299°39.8	314°39.9	329°40.1	344°40.3	359°40.5	14°40.7	29°40.9	44°41.0	59°41.2	74°41.4	+0.2
	9°46.5	9°45.6	9°44.7	9°43.8	9°42.9	9°42.1	9°41.2	9°40.3	9°39.4	9°38.5	9°37.6	9°36.8	-0.9
Su 29	269°43.8	284°44.0	299°44.2	314°44.4	329°44.6	344°44.8	359°44.9	14°45.1	29°45.3	44°45.5	59°45.7	74°45.9	+0.2
	9°25.2	9°24.4	9°23.5	9°22.6	9°21.7	9°20.8	9°19.9	9°19.0	9°18.1	9°17.2	9°16.3	9°15.5	-0.9
Mo 30	269°48.3	284°48.5	299°48.7	314°48.9	329°49.1	344°49.3	359°49.5	14°49.7	29°49.9	44°50.1	59°50.2	74°50.4	+0.2
	9°03.9	9°03.0	9°02.1	9°01.2	9°00.3	8°59.4	8°58.5	8°57.6	8°56.7	8°55.8	8°54.9	8°54.0	-0.9
Tu 31	269°52.9	284°53.1	299°53.3	314°53.5	329°53.7	344°53.9	359°54.1	14°54.3	29°54.5	44°54.7	59°54.9	74°55.1	+0.2
	8°42.3	8°41.4	8°40.5	8°39.6	8°38.7	8°37.8	8°36.9	8°36.0	8°35.1	8°34.2	8°33.3	8°32.4	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2027

D	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	Δ'/h	SH
Su 1	242° 15.8	256° 38.0	271° 00.4	285° 22.8	299° 45.3	314° 07.9	328° 30.6	342° 53.3	357° 16.2	11° 39.1	26° 02.1	+22.6	16.7
	23° 48.4	23° 39.4	23° 30.2	23° 20.9	23° 11.3	23° 01.7	22° 51.8	22° 41.8	22° 31.6	22° 21.2	22° 10.7	-9.8	61.1
● Mo 2	241° 57.7	256° 22.2	270° 46.7	285° 11.4	299° 36.1	314° 01.0	328° 25.9	342° 51.0	357° 16.1	11° 41.4	26° 06.7	+24.9	16.7
	19° 14.5	19° 01.6	18° 48.6	18° 35.5	18° 22.2	18° 08.8	17° 55.3	17° 41.7	17° 27.9	17° 14.1	17° 00.1	-13.4	61.3
Tu 3	242° 38.5	257° 05.4	271° 32.3	285° 59.4	300° 26.5	314° 53.8	329° 21.1	343° 48.5	358° 16.0	12° 43.5	27° 11.2	+27.3	16.7
	13° 18.7	13° 03.3	12° 47.8	12° 32.2	12° 16.5	12° 00.8	11° 45.0	11° 29.1	11° 13.2	10° 57.2	10° 41.2	-15.8	61.1
We 4	244° 15.6	258° 44.4	273° 13.4	287° 42.4	302° 11.4	316° 40.6	331° 09.8	345° 39.0	0° 08.3	14° 37.7	29° 07.1	+29.2	16.5
	6° 35.4	6° 18.7	6° 02.1	5° 45.4	5° 28.7	5° 12.0	4° 55.3	4° 38.5	4° 21.8	4° 05.0	3° 48.2	-16.7	60.5
Th 5	246° 34.4	261° 04.6	275° 34.8	290° 05.0	304° 35.3	319° 05.6	333° 35.9	348° 06.3	2° 36.7	17° 07.1	31° 37.5	+30.3	16.3
	-0° 22.6	-0° 39.2	-0° 55.8	-1° 12.4	-1° 28.9	-1° 45.4	-2° 01.9	-2° 18.3	-2° 34.8	-2° 51.1	-3° 07.5	-16.5	59.7
Fr 6	249° 16.5	263° 47.2	278° 17.9	292° 48.6	307° 19.3	321° 50.0	336° 20.7	350° 51.4	5° 22.2	19° 52.9	34° 23.6	+30.7	16.0
	-7° 07.3	-7° 22.9	-7° 38.4	-7° 53.9	-8° 09.3	-8° 24.6	-8° 39.9	-8° 55.1	-9° 10.3	-9° 25.3	-9° 40.3	-15.3	58.8
Sa 7	252° 03.6	266° 34.2	281° 04.7	295° 35.3	310° 05.8	324° 36.3	339° 06.8	353° 37.2	8° 07.7	22° 38.1	37° 08.5	+30.5	15.8
	-13° 16.5	-13° 30.2	-13° 43.9	-13° 57.5	-14° 11.0	-14° 24.4	-14° 37.7	-14° 50.9	-15° 04.1	-15° 17.1	-15° 30.1	-13.4	57.8
Su 8	254° 41.4	269° 11.4	283° 41.4	298° 11.3	312° 41.2	327° 11.0	341° 40.9	356° 10.6	10° 40.4	25° 10.1	39° 39.8	+29.8	15.5
	-18° 32.4	-18° 43.8	-18° 55.0	-19° 06.1	-19° 17.1	-19° 28.0	-19° 38.8	-19° 49.4	-20° 00.0	-20° 10.4	-20° 20.8	-10.8	56.9
◐ Mo 9	257° 01.5	271° 30.7	285° 59.9	300° 29.0	314° 58.1	329° 27.2	343° 56.3	358° 25.3	12° 54.3	27° 23.2	41° 52.1	+29.1	15.3
	-22° 41.5	-22° 50.0	-22° 58.3	-23° 06.4	-23° 14.5	-23° 22.4	-23° 30.2	-23° 37.8	-23° 45.3	-23° 52.7	-24° 00.0	-7.8	56.0
Tu 10	259° 03.1	273° 31.7	288° 00.3	302° 28.8	316° 57.3	331° 25.8	345° 54.3	0° 22.7	14° 51.2	29° 19.6	43° 48.1	+28.5	15.1
	-25° 33.4	-25° 38.5	-25° 43.6	-25° 48.5	-25° 53.2	-25° 57.8	-26° 02.3	-26° 06.6	-26° 10.9	-26° 14.9	-26° 18.9	-4.5	55.3
We 11	260° 53.9	275° 22.3	289° 50.7	304° 19.1	318° 47.5	333° 16.0	347° 44.4	2° 12.8	16° 41.3	31° 09.8	45° 38.3	+28.4	14.9
	-27° 01.4	-27° 03.1	-27° 04.7	-27° 06.1	-27° 07.5	-27° 08.6	-27° 09.7	-27° 10.6	-27° 11.3	-27° 12.0	-27° 12.5	-1.1	54.8
Th 12	262° 48.0	277° 16.8	291° 45.7	306° 14.7	320° 43.6	335° 12.6	349° 41.6	4° 10.7	18° 39.8	33° 08.9	47° 38.1	+29.0	14.8
	-27° 03.6	-27° 01.9	-27° 00.1	-26° 58.2	-26° 56.2	-26° 54.0	-26° 51.6	-26° 49.2	-26° 46.6	-26° 43.9	-26° 41.1	+2.3	54.4
Fr 13	265° 01.1	279° 31.1	294° 01.0	308° 31.1	323° 01.1	337° 31.3	352° 01.5	6° 31.7	21° 02.0	35° 32.3	50° 02.8	+30.2	14.8
	-25° 43.5	-25° 38.6	-25° 33.7	-25° 28.6	-25° 23.5	-25° 18.2	-25° 12.8	-25° 07.2	-25° 01.6	-24° 55.9	-24° 50.0	+5.3	54.1
Sa 14	267° 45.9	282° 17.2	296° 48.6	311° 20.1	325° 51.6	340° 23.2	354° 54.9	9° 26.6	23° 58.4	38° 30.2	53° 02.1	+31.6	14.7
	-23° 08.9	-23° 01.4	-22° 53.7	-22° 45.9	-22° 38.0	-22° 30.1	-22° 22.0	-22° 13.8	-22° 05.5	-21° 57.2	-21° 48.7	+8.0	54.0
Su 15	271° 07.9	285° 40.7	300° 13.6	314° 46.6	329° 19.6	343° 52.7	358° 25.9	12° 59.1	27° 32.3	42° 05.6	56° 39.0	+33.1	14.7
	-19° 31.2	-19° 21.3	-19° 11.4	-19° 01.4	-18° 51.3	-18° 41.2	-18° 30.9	-18° 20.6	-18° 10.2	-17° 59.7	-17° 49.2	+10.2	53.9
Mo 16	275° 05.6	289° 39.8	304° 14.0	318° 48.3	333° 22.6	347° 56.9	2° 31.3	17° 05.7	31° 40.2	46° 14.7	60° 49.3	+34.4	14.7
	-15° 02.8	-14° 51.2	-14° 39.5	-14° 27.8	-14° 16.0	-14° 04.2	-13° 52.3	-13° 40.3	-13° 28.3	-13° 16.3	-13° 04.2	+11.9	54.0
○ Tu 17	279° 31.9	294° 07.0	308° 42.1	323° 17.3	337° 52.5	352° 27.7	7° 02.9	21° 38.1	36° 13.4	50° 48.7	65° 24.0	+35.2	14.8
	-9° 56.6	-9° 43.7	-9° 30.9	-9° 17.9	-9° 04.9	-8° 51.9	-8° 38.9	-8° 25.8	-8° 12.7	-7° 59.5	-7° 46.3	+13.0	54.2
We 18	284° 15.6	298° 51.1	313° 26.6	328° 02.2	342° 37.7	357° 13.3	11° 48.8	26° 24.3	40° 59.9	55° 35.4	70° 11.0	+35.5	14.9
	-4° 25.0	-4° 11.4	-3° 57.7	-3° 44.1	-3° 30.4	-3° 16.7	-3° 03.0	-2° 49.3	-2° 35.5	-2° 21.7	-2° 08.0	+13.7	54.5
Th 19	289° 03.1	303° 38.4	318° 13.8	332° 49.1	347° 24.4	1° 59.7	16° 35.0	31° 10.2	45° 45.4	60° 20.6	74° 55.7	+35.3	14.9
	1° 19.9	1° 33.8	1° 47.7	2° 01.6	2° 15.5	2° 29.4	2° 43.3	2° 57.1	3° 11.0	3° 24.9	3° 38.8	+13.9	54.8
Fr 20	293° 39.1	308° 13.7	322° 48.2	337° 22.7	351° 57.1	6° 31.5	21° 05.8	35° 40.1	50° 14.3	64° 48.5	79° 22.6	+34.4	15.1
	7° 05.7	7° 19.4	7° 33.0	7° 46.6	8° 00.2	8° 13.8	8° 27.4	8° 40.9	8° 54.4	9° 07.9	9° 21.4	+13.6	55.3
Sa 21	297° 47.3	312° 20.4	326° 53.4	341° 26.4	355° 59.3	10° 32.1	25° 04.8	39° 37.5	54° 10.1	68° 42.6	83° 15.0	+32.8	15.2
	12° 39.1	12° 52.0	13° 04.8	13° 17.6	13° 30.3	13° 43.0	13° 55.7	14° 08.3	14° 20.8	14° 33.3	14° 45.7	+12.7	55.8
Su 22	312° 20.4	326° 53.4	341° 26.4	355° 59.3	10° 32.1	25° 04.8	39° 37.5	54° 10.1	68° 42.6	83° 15.0	97° 47.4	+32.7	15.2
	12° 52.0	13° 04.8	13° 17.6	13° 30.3	13° 43.0	13° 55.7	14° 08.3	14° 20.8	14° 33.3	14° 45.7	14° 58.1	+12.6	55.8
Mo 23	315° 42.2	330° 13.1	344° 43.9	359° 14.6	13° 45.3	28° 15.8	42° 46.2	57° 16.5	71° 46.8	86° 16.9	100° 46.9	+30.5	15.4
	17° 56.3	18° 07.6	18° 18.9	18° 30.0	18° 41.1	18° 52.1	19° 03.1	19° 13.9	19° 24.7	19° 35.4	19° 46.0	+11.0	56.5
Tu 24	318° 04.7	332° 33.0	347° 01.2	1° 29.3	15° 57.3	30° 25.2	44° 53.0	59° 20.7	73° 48.2	88° 15.7	102° 43.0	+27.8	15.6
	22° 13.7	22° 22.7	22° 31.7	22° 40.5	22° 49.2	22° 57.7	23° 06.2	23° 14.6	23° 22.8	23° 30.9	23° 38.9	+8.5	57.2
◑ We 25	319° 20.3	333° 46.0	348° 11.5	2° 37.0	17° 02.3	31° 27.6	45° 52.7	60° 17.8	74° 42.7	89° 07.6	103° 32.4	+25.2	15.8
	25° 22.9	25° 28.8	25° 34.4	25° 40.0	25° 45.3	25° 50.6	25° 55.7	26° 00.6	26° 05.3	26° 10.0	26° 14.4	+5.2	58.0
Th 26	319° 33.9	333° 57.4	348° 20.9	2° 44.2	17° 07.6	31° 30.8	45° 54.0	60° 17.2	74° 40.2	89° 03.3	103° 26.3	+23.2	16.0
	27° 01.4	27° 03.2	27° 04.8	27° 06.2	27° 07.4	27° 08.5	27° 09.4	27° 10.0	27° 10.6	27° 10.9	27° 11.0	+1.0	58.8
Fr 27	319° 06.9	333° 29.4	347° 52.0	2° 14.5	16° 37.0	30° 59.5	45° 22.0	59° 44.5	74° 07.0	88° 29.5	102° 52.1	+22.5	16.3
	26° 50.7	26° 47.9	26° 44.8	26° 41.6	26° 38.1	26° 34.5	26° 30.7	26° 26.7	26° 22.5	26° 18.1	26° 13.6	-3.7	59.6
Sa 28	318° 32.7	332° 55.7	347° 18.7	1° 41.8	16° 04.9	30° 28.0	44° 51.3	59° 14.5	73° 37.8	88° 01.2	102° 24.7	+23.2	16.4
	24° 42.7	24° 35.1	24° 27.4	24° 19.6	24° 11.5	24° 03.3	23° 54.9	23° 46.3	23° 37.6	23° 28.6	23° 19.5	-8.3	60.3
Su 29	318° 23.9	332° 48.4	347° 13.0	1° 37.7	16° 02.4	30° 27.2	44° 52.1	59° 17.1	73° 42.1	88° 07.2	102° 32.4	+24.8	16.6
	20° 43.9	20° 32.3	20° 20.5	20° 08.6	19° 56.6	19° 44.4	19° 32.1	19° 19.7	19° 07.1	18° 54.4	18° 41.6	-12.2	60.8
Mo 30	318° 59.8	333° 26.3	347° 52.8	2° 19.4	16° 46.1	31° 12.8	45° 39.7	60° 06.6	74° 33.5	89° 00.6	103° 27.7	+26.8	16.6
	15° 14.8	15° 00.1	14° 45.4	14° 30.5	14° 15.6	14° 00.6	13° 45.5	13° 30.3	13° 15.0	12° 59.6	12° 44.2	-15.1	61.0
● Tu 31	320° 22.8	334° 51.0	349° 19.3	3° 47.6	18° 15.9	32° 44.4	47° 12.8	61° 41.4	76° 09.9	90° 38.6	105° 07.3	+28.4	16.6
	8° 44.4	8° 28.0	8° 11.5	7° 55.0	7° 38.4	7° 21.8	7° 05.2	6° 48.5	6° 31.8	6° 15.1	5° 58.3	-16.6	60.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 10h05 — FQ: 9 04h54 — FM: 17 07h28 — LQ: 25 02h27 — NM: 31 17h41

SUN

September 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	269°57.6	284°57.8	299°58.0	314°58.2	329°58.4	344°58.6	359°58.8	14°59.0	29°59.2	44°59.4	59°59.6	74°59.8	+0.2
	8°20.7	8°19.8	8°18.8	8°17.9	8°17.0	8°16.1	8°15.2	8°14.3	8°13.4	8°12.5	8°11.6	8°10.7	-0.9
Th 2	270°02.4	285°02.6	300°02.8	315°03.0	330°03.2	345°03.4	0°03.6	15°03.8	30°04.0	45°04.2	60°04.4	75°04.6	+0.2
	7°58.9	7°57.9	7°57.0	7°56.1	7°55.2	7°54.3	7°53.4	7°52.5	7°51.6	7°50.7	7°49.7	7°48.8	-0.9
Fr 3	270°07.2	285°07.4	300°07.6	315°07.8	330°08.0	345°08.2	0°08.4	15°08.6	30°08.8	45°09.0	60°09.2	75°09.4	+0.2
	7°36.9	7°36.0	7°35.1	7°34.2	7°33.3	7°32.3	7°31.4	7°30.5	7°29.6	7°28.7	7°27.8	7°26.8	-0.9
Sa 4	270°12.1	285°12.3	300°12.5	315°12.7	330°12.9	345°13.1	0°13.3	15°13.5	30°13.8	45°14.0	60°14.2	75°14.4	+0.2
	7°14.9	7°14.0	7°13.0	7°12.1	7°11.2	7°10.3	7°09.4	7°08.4	7°07.5	7°06.6	7°05.7	7°04.7	-0.9
Su 5	270°17.1	285°17.3	300°17.5	315°17.7	330°17.9	345°18.1	0°18.3	15°18.5	30°18.7	45°18.9	60°19.2	75°19.4	+0.2
	6°52.7	6°51.8	6°50.9	6°49.9	6°49.0	6°48.1	6°47.2	6°46.2	6°45.3	6°44.4	6°43.4	6°42.5	-0.9
Mo 6	270°22.1	285°22.3	300°22.5	315°22.7	330°22.9	345°23.1	0°23.4	15°23.6	30°23.8	45°24.0	60°24.2	75°24.4	+0.2
	6°30.4	6°29.5	6°28.6	6°27.6	6°26.7	6°25.8	6°24.9	6°23.9	6°23.0	6°22.1	6°21.1	6°20.2	-0.9
Tu 7	270°27.2	285°27.4	300°27.6	315°27.8	330°28.0	345°28.2	0°28.5	15°28.7	30°28.9	45°29.1	60°29.3	75°29.5	+0.2
	6°08.1	6°07.1	6°06.2	6°05.3	6°04.3	6°03.4	6°02.5	6°01.5	6°00.6	5°59.6	5°58.7	5°57.8	-0.9
We 8	270°32.3	285°32.5	300°32.7	315°33.0	330°33.2	345°33.4	0°33.6	15°33.8	30°34.0	45°34.3	60°34.5	75°34.7	+0.2
	5°45.6	5°44.6	5°43.7	5°42.8	5°41.8	5°40.9	5°39.9	5°39.0	5°38.1	5°37.1	5°36.2	5°35.2	-0.9
Th 9	270°37.5	285°37.7	300°37.9	315°38.1	330°38.4	345°38.6	0°38.8	15°39.0	30°39.2	45°39.5	60°39.7	75°39.9	+0.2
	5°23.0	5°22.1	5°21.1	5°20.2	5°19.2	5°18.3	5°17.3	5°16.4	5°15.5	5°14.5	5°13.6	5°12.6	-0.9
Fr 10	270°42.7	285°42.9	300°43.2	315°43.4	330°43.6	345°43.8	0°44.0	15°44.3	30°44.5	45°44.7	60°44.9	75°45.1	+0.2
	5°00.3	4°59.4	4°58.5	4°57.5	4°56.6	4°55.6	4°54.7	4°53.7	4°52.8	4°51.8	4°50.9	4°49.9	-0.9
Sa 11	270°48.0	285°48.2	300°48.4	315°48.6	330°48.9	345°49.1	0°49.3	15°49.5	30°49.8	45°50.0	60°50.2	75°50.4	+0.2
	4°37.6	4°36.7	4°35.7	4°34.8	4°33.8	4°32.9	4°31.9	4°31.0	4°30.0	4°29.0	4°28.1	4°27.1	-1.0
Su 12	270°53.3	285°53.5	300°53.7	315°54.0	330°54.2	345°54.4	0°54.6	15°54.8	30°55.1	45°55.3	60°55.5	75°55.7	+0.2
	4°14.8	4°13.8	4°12.9	4°11.9	4°11.0	4°10.0	4°09.1	4°08.1	4°07.2	4°06.2	4°05.2	4°04.3	-1.0
Mo 13	270°58.6	285°58.8	300°59.1	315°59.3	330°59.5	345°59.7	0°59.9	16°00.2	31°00.4	46°00.6	61°00.8	76°01.1	+0.2
	3°51.9	3°50.9	3°50.0	3°49.0	3°48.1	3°47.1	3°46.1	3°45.2	3°44.2	3°43.3	3°42.3	3°41.4	-1.0
Tu 14	271°04.0	286°04.2	301°04.4	316°04.6	331°04.9	346°05.1	1°05.3	16°05.5	31°05.7	46°06.0	61°06.2	76°06.4	+0.2
	3°28.9	3°28.0	3°27.0	3°26.0	3°25.1	3°24.1	3°23.2	3°22.2	3°21.2	3°20.3	3°19.3	3°18.4	-1.0
We 15	271°09.3	286°09.6	301°09.8	316°10.0	331°10.2	346°10.4	1°10.7	16°10.9	31°11.1	46°11.3	61°11.6	76°11.8	+0.2
	3°05.9	3°04.9	3°04.0	3°03.0	3°02.0	3°01.1	3°00.1	2°59.2	2°58.2	2°57.2	2°56.3	2°55.3	-1.0
Th 16	271°14.7	286°14.9	301°15.2	316°15.4	331°15.6	346°15.8	1°16.0	16°16.3	31°16.5	46°16.7	61°16.9	76°17.2	+0.2
	2°42.8	2°41.8	2°40.9	2°39.9	2°39.0	2°38.0	2°37.0	2°36.1	2°35.1	2°34.1	2°33.2	2°32.2	-1.0
Fr 17	271°20.1	286°20.3	301°20.5	316°20.8	331°21.0	346°21.2	1°21.4	16°21.7	31°21.9	46°22.1	61°22.3	76°22.6	+0.2
	2°19.7	2°18.7	2°17.7	2°16.8	2°15.8	2°14.8	2°13.9	2°12.9	2°11.9	2°11.0	2°10.0	2°09.0	-1.0
Sa 18	271°25.5	286°25.7	301°25.9	316°26.1	331°26.4	346°26.6	1°26.8	16°27.0	31°27.3	46°27.5	61°27.7	76°27.9	+0.2
	1°56.5	1°55.5	1°54.6	1°53.6	1°52.6	1°51.6	1°50.7	1°49.7	1°48.7	1°47.8	1°46.8	1°45.8	-1.0
Su 19	271°30.8	286°31.1	301°31.3	316°31.5	331°31.7	346°32.0	1°32.2	16°32.4	31°32.6	46°32.9	61°33.1	76°33.3	+0.2
	1°33.3	1°32.3	1°31.3	1°30.4	1°29.4	1°28.4	1°27.4	1°26.5	1°25.5	1°24.5	1°23.6	1°22.6	-1.0
Mo 20	271°36.2	286°36.4	301°36.7	316°36.9	331°37.1	346°37.3	1°37.5	16°37.8	31°38.0	46°38.2	61°38.4	76°38.7	+0.2
	1°10.0	1°09.0	1°08.1	1°07.1	1°06.1	1°05.1	1°04.2	1°03.2	1°02.2	1°01.3	1°00.3	0°59.3	-1.0
Tu 21	271°41.5	286°41.8	301°42.0	316°42.2	331°42.4	346°42.7	1°42.9	16°43.1	31°43.3	46°43.5	61°43.8	76°44.0	+0.2
	0°46.7	0°45.7	0°44.8	0°43.8	0°42.8	0°41.8	0°40.9	0°39.9	0°38.9	0°38.0	0°37.0	0°36.0	-1.0
We 22	271°46.9	286°47.1	301°47.3	316°47.5	331°47.8	346°48.0	1°48.2	16°48.4	31°48.6	46°48.9	61°49.1	76°49.3	+0.2
	0°23.4	0°22.4	0°21.4	0°20.5	0°19.5	0°18.5	0°17.5	0°16.6	0°15.6	0°14.6	0°13.7	0°12.7	-1.0
Th 23	271°52.2	286°52.4	301°52.6	316°52.8	331°53.0	346°53.3	1°53.5	16°53.7	31°53.9	46°54.1	61°54.4	76°54.6	+0.2
	0°00.0	-0°00.9	-0°01.9	-0°02.9	-0°03.9	-0°04.8	-0°05.8	-0°06.8	-0°07.8	-0°08.7	-0°09.7	-0°10.7	-1.0
Fr 24	271°57.4	286°57.6	301°57.9	316°58.1	331°58.3	346°58.5	1°58.7	16°58.9	31°59.2	46°59.4	61°59.6	76°59.8	+0.2
	-0°23.3	-0°24.3	-0°25.3	-0°26.2	-0°27.2	-0°28.2	-0°29.2	-0°30.1	-0°31.1	-0°32.1	-0°33.1	-0°34.0	-1.0
Sa 25	272°02.6	287°02.9	302°03.1	317°03.3	332°03.5	347°03.7	2°03.9	17°04.2	32°04.4	47°04.6	62°04.8	77°05.0	+0.2
	-0°46.7	-0°47.7	-0°48.6	-0°49.6	-0°50.6	-0°51.6	-0°52.5	-0°53.5	-0°54.5	-0°55.5	-0°56.4	-0°57.4	-1.0
Su 26	272°07.8	287°08.0	302°08.2	317°08.5	332°08.7	347°08.9	2°09.1	17°09.3	32°09.5	47°09.7	62°10.0	77°10.2	+0.2
	-1°10.1	-1°11.0	-1°12.0	-1°13.0	-1°14.0	-1°14.9	-1°15.9	-1°16.9	-1°17.9	-1°18.8	-1°19.8	-1°20.8	-1.0
Mo 27	272°12.9	287°13.1	302°13.4	317°13.6	332°13.8	347°14.0	2°14.2	17°14.4	32°14.6	47°14.8	62°15.1	77°15.3	+0.2
	-1°33.4	-1°34.4	-1°35.4	-1°36.4	-1°37.3	-1°38.3	-1°39.3	-1°40.3	-1°41.2	-1°42.2	-1°43.2	-1°44.1	-1.0
Tu 28	272°18.0	287°18.2	302°18.4	317°18.6	332°18.8	347°19.1	2°19.3	17°19.5	32°19.7	47°19.9	62°20.1	77°20.3	+0.2
	-1°56.8	-1°57.8	-1°58.7	-1°59.7	-2°00.7	-2°01.7	-2°02.6	-2°03.6	-2°04.6	-2°05.6	-2°06.5	-2°07.5	-1.0
We 29	272°23.0	287°23.2	302°23.4	317°23.6	332°23.8	347°24.1	2°24.3	17°24.5	32°24.7	47°24.9	62°25.1	77°25.3	+0.2
	-2°20.1	-2°21.1	-2°22.1	-2°23.1	-2°24.0	-2°25.0	-2°26.0	-2°27.0	-2°27.9	-2°28.9	-2°29.9	-2°30.8	-1.0
Th 30	272°28.0	287°28.2	302°28.4	317°28.6	332°28.8	347°29.0	2°29.2	17°29.4	32°29.6	47°29.8	62°30.0	77°30.2	+0.2
	-2°43.5	-2°44.4	-2°45.4	-2°46.4	-2°47.4	-2°48.3	-2°49.3	-2°50.3	-2°51.2	-2°52.2	-2°53.2	-2°54.1	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2027

D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
We 1	249°56.7	264°25.9	278°55.1	293°24.4	307°53.7	322°23.0	336°52.4	351°21.8	5°51.2	20°20.7	34°50.2	+29.3	16.5
	3°09.6	2°52.7	2°35.8	2°18.8	2°01.9	1°44.9	1°28.0	1°11.0	0°54.1	0°37.2	0°20.3	-16.9	60.5
Th 2	252°15.3	266°45.2	281°15.0	295°44.8	310°14.7	324°44.5	339°14.4	353°44.3	8°14.2	22°44.0	37°13.9	+29.9	16.3
	-3°51.0	-4°07.5	-4°24.0	-4°40.4	-4°56.8	-5°13.1	-5°29.4	-5°45.6	-6°01.8	-6°18.0	-6°34.1	-16.3	59.8
Fr 3	254°42.0	269°11.8	283°41.6	298°11.4	312°41.2	327°10.9	341°40.7	356°10.4	10°40.1	25°09.8	39°39.5	+29.8	16.1
	-10°28.2	-10°43.3	-10°58.2	-11°13.2	-11°28.0	-11°42.7	-11°57.4	-12°12.0	-12°26.5	-12°40.9	-12°55.2	-14.7	59.0
Sa 4	257°02.3	271°31.7	286°01.0	300°30.2	314°59.5	329°28.7	343°57.9	358°27.1	12°56.2	27°25.3	41°54.4	+29.2	15.8
	-16°18.9	-16°31.7	-16°44.4	-16°56.9	-17°09.4	-17°21.8	-17°34.0	-17°46.2	-17°58.2	-18°10.1	-18°21.9	-12.3	58.0
Su 5	259°07.2	273°35.9	288°04.5	302°33.0	317°01.6	331°30.1	345°58.6	0°27.0	14°55.5	29°23.9	43°52.2	+28.5	15.6
	-21°04.8	-21°14.7	-21°24.5	-21°34.1	-21°43.6	-21°53.0	-22°02.2	-22°11.3	-22°20.3	-22°29.2	-22°37.9	-9.3	57.1
Mo 6	260°55.1	275°23.2	289°51.2	304°19.2	318°47.2	333°15.1	347°43.1	2°11.0	16°39.0	31°06.9	45°34.8	+28.0	15.3
	-24°32.6	-24°39.2	-24°45.6	-24°51.9	-24°58.0	-25°04.0	-25°09.9	-25°15.6	-25°21.2	-25°26.6	-25°31.9	-5.9	56.2
◐ Tu 7	262°32.8	277°00.7	291°28.6	305°56.4	320°24.3	334°52.2	349°20.1	3°48.1	18°16.0	32°43.9	47°11.9	+27.9	15.1
	-26°34.3	-26°37.3	-26°40.2	-26°42.9	-26°45.5	-26°47.9	-26°50.3	-26°52.4	-26°54.4	-26°56.3	-26°58.1	-2.4	55.4
We 8	264°13.7	278°42.1	293°10.4	307°38.8	322°07.3	336°35.7	351°04.2	5°32.8	20°01.3	34°29.9	48°58.6	+28.5	14.9
	-27°07.3	-27°06.8	-27°06.2	-27°05.4	-27°04.5	-27°03.5	-27°02.3	-27°01.0	-26°59.6	-26°58.0	-26°56.3	+1.1	54.8
Th 9	266°13.7	280°43.0	295°12.5	309°42.0	324°11.5	338°41.1	353°10.8	7°40.5	22°10.3	36°40.1	51°10.0	+29.6	14.8
	-26°15.0	-26°11.2	-26°07.3	-26°03.3	-25°59.1	-25°54.9	-25°50.5	-25°46.0	-25°41.3	-25°36.6	-25°31.7	+4.3	54.4
Fr 10	268°45.2	283°16.1	297°47.0	312°17.9	326°49.0	341°20.0	355°51.2	10°22.4	24°53.7	39°25.0	53°56.4	+31.1	14.8
	-24°05.0	-23°58.4	-23°51.6	-23°44.7	-23°37.7	-23°30.7	-23°23.5	-23°16.2	-23°08.8	-23°01.3	-22°53.7	+7.1	54.1
Sa 11	271°54.7	286°27.1	300°59.5	315°32.0	330°04.5	344°37.1	359°09.8	13°42.5	28°15.3	42°48.1	57°21.0	+32.6	14.7
	-20°48.3	-20°39.3	-20°30.1	-20°20.8	-20°11.5	-20°02.1	-19°52.5	-19°42.9	-19°33.3	-19°23.5	-19°13.7	+9.5	54.0
Su 12	275°41.0	290°14.7	304°48.5	319°22.3	333°56.2	348°30.1	3°04.1	17°38.1	32°12.2	46°46.3	61°20.4	+33.9	14.7
	-16°36.9	-16°25.9	-16°14.8	-16°03.7	-15°52.4	-15°41.2	-15°29.8	-15°18.4	-15°06.9	-14°55.4	-14°43.8	+11.3	54.1
Mo 13	279°57.4	294°32.1	309°06.9	323°41.7	338°16.5	352°51.4	7°26.3	22°01.2	36°36.1	51°11.1	65°46.1	+34.9	14.8
	-11°43.0	-11°30.5	-11°18.0	-11°05.4	-10°52.8	-10°40.2	-10°27.5	-10°14.7	-10°01.9	-9°49.1	-9°36.2	+12.7	54.2
Tu 14	284°33.2	299°08.5	313°43.8	328°19.0	342°54.3	357°29.6	12°04.9	26°40.2	41°15.6	55°50.9	70°26.2	+35.3	14.9
	-6°18.6	-6°05.1	-5°51.7	-5°38.2	-5°24.7	-5°11.1	-4°57.5	-4°43.9	-4°30.3	-4°16.6	-4°03.0	+13.6	54.5
○ We 15	289°15.6	303°50.8	318°26.1	333°01.3	347°36.4	2°11.6	16°46.8	31°21.9	45°57.0	60°32.1	75°07.2	+35.2	15.0
	-0°35.7	-0°21.8	-0°07.9	0°06.1	0°20.0	0°33.9	0°47.9	1°01.9	1°15.8	1°29.8	1°43.8	+14.0	54.9
Th 16	293°50.1	308°24.7	322°59.2	337°33.8	352°08.3	6°42.7	21°17.1	35°51.5	50°25.8	65°00.0	79°34.3	+34.4	15.1
	5°12.9	5°26.8	5°40.7	5°54.5	6°08.4	6°22.2	6°36.0	6°49.8	7°03.5	7°17.3	7°31.0	+13.8	55.3
Fr 17	298°01.5	312°34.8	327°08.1	341°41.4	356°14.5	10°47.6	25°20.7	39°53.6	54°26.5	68°59.4	83°32.1	+33.1	15.2
	10°53.6	11°06.8	11°20.0	11°33.2	11°46.3	11°59.4	12°12.4	12°25.4	12°38.4	12°51.3	13°04.1	+13.1	55.7
Sa 18	301°34.7	316°06.2	330°37.7	345°09.0	359°40.3	14°11.5	28°42.6	43°13.7	57°44.6	72°15.5	86°46.2	+31.2	15.3
	16°10.5	16°22.4	16°34.3	16°46.0	16°57.8	17°09.4	17°21.0	17°32.5	17°43.9	17°55.3	18°06.6	+11.6	56.2
Su 19	304°16.7	318°46.0	333°15.1	347°44.2	2°13.2	16°42.1	31°10.9	45°39.6	60°08.2	74°36.7	89°05.1	+28.8	15.5
	20°45.5	20°55.3	21°05.1	21°14.7	21°24.3	21°33.7	21°43.0	21°52.3	22°01.4	22°10.4	22°19.3	+9.4	56.8
Mo 20	318°46.0	333°15.1	347°44.2	2°13.2	16°42.1	31°10.9	45°39.6	60°08.2	74°36.7	89°05.1	103°33.5	+28.7	15.5
	20°55.3	21°05.1	21°14.7	21°24.3	21°33.7	21°43.0	21°52.3	22°01.4	22°10.4	22°19.3	22°28.1	+9.3	56.8
Tu 21	320°26.7	334°53.5	349°20.2	3°46.9	18°13.4	32°39.8	47°06.2	61°32.5	75°58.7	90°24.8	104°50.8	+26.4	15.6
	24°25.4	24°32.2	24°38.9	24°45.4	24°51.8	24°58.0	25°04.1	25°10.1	25°15.9	25°21.6	25°27.1	+6.2	57.4
We 22	321°11.6	335°36.4	350°01.2	4°25.9	18°50.5	33°15.1	47°39.6	62°04.1	76°28.5	90°52.9	105°17.2	+24.6	15.8
	26°32.0	26°35.1	26°38.0	26°40.7	26°43.3	26°45.7	26°47.9	26°50.0	26°51.9	26°53.7	26°55.2	+2.3	58.0
◑ Th 23	321°17.3	335°41.0	350°04.8	4°28.5	18°52.3	33°16.0	47°39.7	62°03.4	76°27.1	90°50.8	105°14.5	+23.7	16.0
	26°58.1	26°56.9	26°55.5	26°53.9	26°52.1	26°50.2	26°48.1	26°45.8	26°43.4	26°40.8	26°38.0	-2.0	58.6
Fr 24	321°11.2	335°35.1	349°59.1	4°23.1	18°47.1	33°11.2	47°35.3	61°59.4	76°23.6	90°47.8	105°12.1	+24.1	16.1
	25°34.6	25°29.0	25°23.2	25°17.2	25°11.1	25°04.8	24°58.3	24°51.7	24°44.9	24°37.9	24°30.7	-6.4	59.2
Sa 25	321°22.0	335°47.1	350°12.3	4°37.5	19°02.8	33°28.2	47°53.6	62°19.1	76°44.6	91°10.2	105°35.9	+25.4	16.3
	22°24.2	22°14.6	22°04.7	21°54.8	21°44.7	21°34.4	21°24.0	21°13.4	21°02.8	20°51.9	20°41.0	-10.3	59.7
Su 26	322°09.0	336°35.7	351°02.5	5°29.4	19°56.4	34°23.4	48°50.4	63°17.6	77°44.8	92°12.1	106°39.4	+27.0	16.4
	17°40.9	17°27.9	17°14.8	17°01.6	16°48.3	16°34.9	16°21.4	16°07.7	15°54.0	15°40.2	15°26.3	-13.5	60.1
Mo 27	323°36.9	338°05.1	352°33.5	7°01.9	21°30.4	35°58.9	50°27.4	64°56.0	79°24.7	93°53.4	108°22.1	+28.5	16.4
	11°46.6	11°31.3	11°15.9	11°00.5	10°45.0	10°29.5	10°13.9	9°58.2	9°42.5	9°26.7	9°10.9	-15.6	60.3
Tu 28	325°38.5	340°07.9	354°37.3	9°06.7	23°36.2	38°05.7	52°35.2	67°04.8	81°34.4	96°04.0	110°33.6	+29.5	16.4
	5°07.8	4°51.3	4°34.8	4°18.3	4°01.8	3°45.2	3°28.6	3°12.0	2°55.4	2°38.8	2°22.1	-16.6	60.2
We 29	327°59.9	342°29.7	356°59.6	11°29.4	25°59.3	40°29.1	54°59.0	69°28.8	83°58.7	98°28.5	112°58.4	+29.9	16.3
	-1°47.4	-2°04.0	-2°20.5	-2°37.0	-2°53.5	-3°10.0	-3°26.5	-3°42.9	-3°59.3	-4°15.6	-4°31.9	-16.5	59.9
● Th 30	330°25.0	344°54.6	359°24.3	13°53.9	28°23.5	42°53.1	57°22.7	71°52.2	86°21.7	100°51.2	115°20.7	+29.6	16.2
	-8°31.6	-8°47.2	-9°02.7	-9°18.1	-9°33.5	-9°48.8	-10°04.1	-10°19.2	-10°34.3	-10°49.4	-11°04.4	-15.3	59.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 7 18h31 — FM: 15 23h03 — LQ: 23 10h20 — NM: 30 02h36

SUN

October 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	272°32.9	287°33.1	302°33.3	317°33.5	332°33.7	347°33.9	2°34.1	17°34.3	32°34.5	47°34.7	62°34.9	77°35.1	+0.2
	-3°06.8	-3°07.7	-3°08.7	-3°09.7	-3°10.6	-3°11.6	-3°12.6	-3°13.6	-3°14.5	-3°15.5	-3°16.5	-3°17.4	-1.0
Sa 2	272°37.7	287°37.9	302°38.1	317°38.3	332°38.5	347°38.7	2°38.9	17°39.1	32°39.3	47°39.5	62°39.7	77°39.9	+0.2
	-3°30.0	-3°31.0	-3°32.0	-3°32.9	-3°33.9	-3°34.9	-3°35.8	-3°36.8	-3°37.8	-3°38.7	-3°39.7	-3°40.7	-1.0
Su 3	272°42.4	287°42.6	302°42.8	317°43.0	332°43.2	347°43.4	2°43.6	17°43.8	32°44.0	47°44.2	62°44.4	77°44.6	+0.2
	-3°53.2	-3°54.2	-3°55.2	-3°56.1	-3°57.1	-3°58.1	-3°59.0	-4°00.0	-4°01.0	-4°01.9	-4°02.9	-4°03.9	-1.0
Mo 4	272°47.1	287°47.3	302°47.5	317°47.6	332°47.8	347°48.0	2°48.2	17°48.4	32°48.6	47°48.8	62°49.0	77°49.2	+0.2
	-4°16.4	-4°17.4	-4°18.4	-4°19.3	-4°20.3	-4°21.2	-4°22.2	-4°23.2	-4°24.1	-4°25.1	-4°26.1	-4°27.0	-1.0
Tu 5	272°51.7	287°51.8	302°52.0	317°52.2	332°52.4	347°52.6	2°52.8	17°53.0	32°53.2	47°53.3	62°53.5	77°53.7	+0.2
	-4°39.5	-4°40.5	-4°41.5	-4°42.4	-4°43.4	-4°44.4	-4°45.3	-4°46.3	-4°47.2	-4°48.2	-4°49.2	-4°50.1	-1.0
We 6	272°56.1	287°56.3	302°56.5	317°56.7	332°56.9	347°57.1	2°57.3	17°57.4	32°57.6	47°57.8	62°58.0	77°58.2	+0.2
	-5°02.6	-5°03.6	-5°04.5	-5°05.5	-5°06.4	-5°07.4	-5°08.4	-5°09.3	-5°10.3	-5°11.2	-5°12.2	-5°13.2	-1.0
Th 7	273°00.5	288°00.7	303°00.9	318°01.1	333°01.3	348°01.4	3°01.6	18°01.8	33°02.0	48°02.2	63°02.3	78°02.5	+0.2
	-5°25.6	-5°26.6	-5°27.5	-5°28.5	-5°29.4	-5°30.4	-5°31.3	-5°32.3	-5°33.3	-5°34.2	-5°35.2	-5°36.1	-1.0
Fr 8	273°04.8	288°05.0	303°05.2	318°05.4	333°05.6	348°05.7	3°05.9	18°06.1	33°06.3	48°06.4	63°06.6	78°06.8	+0.2
	-5°48.5	-5°49.5	-5°50.4	-5°51.4	-5°52.4	-5°53.3	-5°54.3	-5°55.2	-5°56.2	-5°57.1	-5°58.1	-5°59.0	-1.0
Sa 9	273°09.0	288°09.2	303°09.4	318°09.6	333°09.7	348°09.9	3°10.1	18°10.3	33°10.4	48°10.6	63°10.8	78°10.9	+0.2
	-6°11.4	-6°12.3	-6°13.3	-6°14.2	-6°15.2	-6°16.1	-6°17.1	-6°18.0	-6°19.0	-6°19.9	-6°20.9	-6°21.8	-0.9
Su 10	273°13.1	288°13.3	303°13.5	318°13.6	333°13.8	348°14.0	3°14.1	18°14.3	33°14.5	48°14.7	63°14.8	78°15.0	+0.2
	-6°34.2	-6°35.1	-6°36.0	-6°37.0	-6°37.9	-6°38.9	-6°39.8	-6°40.8	-6°41.7	-6°42.7	-6°43.6	-6°44.6	-0.9
Mo 11	273°17.1	288°17.3	303°17.5	318°17.6	333°17.8	348°17.9	3°18.1	18°18.3	33°18.4	48°18.6	63°18.8	78°18.9	+0.2
	-6°56.8	-6°57.8	-6°58.7	-6°59.7	-7°00.6	-7°01.5	-7°02.5	-7°03.4	-7°04.4	-7°05.3	-7°06.3	-7°07.2	-0.9
Tu 12	273°21.0	288°21.2	303°21.3	318°21.5	333°21.6	348°21.8	3°21.9	18°22.1	33°22.3	48°22.4	63°22.6	78°22.7	+0.2
	-7°19.4	-7°20.4	-7°21.3	-7°22.2	-7°23.2	-7°24.1	-7°25.0	-7°26.0	-7°26.9	-7°27.9	-7°28.8	-7°29.7	-0.9
We 13	273°24.7	288°24.9	303°25.0	318°25.2	333°25.3	348°25.5	3°25.7	18°25.8	33°26.0	48°26.1	63°26.3	78°26.4	+0.2
	-7°41.9	-7°42.8	-7°43.8	-7°44.7	-7°45.6	-7°46.6	-7°47.5	-7°48.4	-7°49.4	-7°50.3	-7°51.2	-7°52.2	-0.9
Th 14	273°28.4	288°28.5	303°28.6	318°28.8	333°28.9	348°29.1	3°29.2	18°29.4	33°29.5	48°29.7	63°29.8	78°30.0	+0.1
	-8°04.3	-8°05.2	-8°06.1	-8°07.1	-8°08.0	-8°08.9	-8°09.9	-8°10.8	-8°11.7	-8°12.6	-8°13.6	-8°14.5	-0.9
Fr 15	273°31.8	288°32.0	303°32.1	318°32.3	333°32.4	348°32.5	3°32.7	18°32.8	33°33.0	48°33.1	63°33.2	78°33.4	+0.1
	-8°26.5	-8°27.5	-8°28.4	-8°29.3	-8°30.2	-8°31.2	-8°32.1	-8°33.0	-8°33.9	-8°34.9	-8°35.8	-8°36.7	-0.9
Sa 16	273°35.2	288°35.3	303°35.5	318°35.6	333°35.7	348°35.9	3°36.0	18°36.1	33°36.3	48°36.4	63°36.5	78°36.7	+0.1
	-8°48.7	-8°49.6	-8°50.5	-8°51.4	-8°52.4	-8°53.3	-8°54.2	-8°55.1	-8°56.0	-8°57.0	-8°57.9	-8°58.8	-0.9
Su 17	273°38.4	288°38.5	303°38.6	318°38.8	333°38.9	348°39.0	3°39.2	18°39.3	33°39.4	48°39.5	63°39.7	78°39.8	+0.1
	-9°10.7	-9°11.6	-9°12.5	-9°13.5	-9°14.4	-9°15.3	-9°16.2	-9°17.1	-9°18.0	-9°18.9	-9°19.8	-9°20.8	-0.9
Mo 18	273°41.4	288°41.6	303°41.7	318°41.8	333°41.9	348°42.0	3°42.2	18°42.3	33°42.4	48°42.5	63°42.7	78°42.8	+0.1
	-9°32.6	-9°33.5	-9°34.4	-9°35.3	-9°36.2	-9°37.1	-9°38.1	-9°39.0	-9°39.9	-9°40.8	-9°41.7	-9°42.6	-0.9
Tu 19	273°44.3	288°44.4	303°44.6	318°44.7	333°44.8	348°44.9	3°45.0	18°45.1	33°45.3	48°45.4	63°45.5	78°45.6	+0.1
	-9°54.4	-9°55.3	-9°56.2	-9°57.1	-9°58.0	-9°58.9	-9°59.8	-10°00.7	-10°01.6	-10°02.5	-10°03.4	-10°04.3	-0.9
We 20	273°47.1	288°47.2	303°47.3	318°47.4	333°47.5	348°47.6	3°47.7	18°47.8	33°47.9	48°48.1	63°48.2	78°48.3	+0.1
	-10°16.0	-10°16.9	-10°17.8	-10°18.7	-10°19.6	-10°20.5	-10°21.4	-10°22.2	-10°23.1	-10°24.0	-10°24.9	-10°25.8	-0.9
Th 21	273°49.6	288°49.8	303°49.9	318°50.0	333°50.1	348°50.2	3°50.3	18°50.4	33°50.5	48°50.6	63°50.7	78°50.8	+0.1
	-10°37.4	-10°38.3	-10°39.2	-10°40.1	-10°41.0	-10°41.9	-10°42.8	-10°43.7	-10°44.6	-10°45.4	-10°46.3	-10°47.2	-0.9
Fr 22	273°52.1	288°52.2	303°52.2	318°52.3	333°52.4	348°52.5	3°52.6	18°52.7	33°52.8	48°52.9	63°53.0	78°53.1	+0.1
	-10°58.7	-10°59.6	-11°00.5	-11°01.4	-11°02.3	-11°03.2	-11°04.1	-11°04.9	-11°05.8	-11°06.7	-11°07.6	-11°08.5	-0.9
Sa 23	273°54.3	288°54.4	303°54.5	318°54.6	333°54.6	348°54.7	3°54.8	18°54.9	33°55.0	48°55.1	63°55.2	78°55.3	+0.1
	-11°19.9	-11°20.8	-11°21.7	-11°22.5	-11°23.4	-11°24.3	-11°25.2	-11°26.0	-11°26.9	-11°27.8	-11°28.7	-11°29.5	-0.9
Su 24	273°56.3	288°56.4	303°56.5	318°56.6	333°56.7	348°56.8	3°56.8	18°56.9	33°57.0	48°57.1	63°57.2	78°57.2	+0.1
	-11°40.9	-11°41.7	-11°42.6	-11°43.5	-11°44.4	-11°45.2	-11°46.1	-11°47.0	-11°47.8	-11°48.7	-11°49.6	-11°50.4	-0.9
Mo 25	273°58.2	288°58.3	303°58.4	318°58.4	333°58.5	348°58.6	3°58.7	18°58.7	33°58.8	48°58.9	63°59.0	78°59.0	+0.1
	-12°01.7	-12°02.5	-12°03.4	-12°04.3	-12°05.1	-12°06.0	-12°06.9	-12°07.7	-12°08.6	-12°09.4	-12°10.3	-12°11.2	-0.9
Tu 26	273°59.9	289°00.0	304°00.1	319°00.1	334°00.2	349°00.2	4°00.3	19°00.4	34°00.4	49°00.5	64°00.6	79°00.6	+0.1
	-12°22.3	-12°23.2	-12°24.0	-12°24.9	-12°25.7	-12°26.6	-12°27.4	-12°28.3	-12°29.1	-12°30.0	-12°30.8	-12°31.7	-0.9
We 27	274°01.4	289°01.5	304°01.5	319°01.6	334°01.7	349°01.7	4°01.8	19°01.8	34°01.9	49°01.9	64°02.0	79°02.1	+0.1
	-12°42.7	-12°43.6	-12°44.4	-12°45.3	-12°46.1	-12°47.0	-12°47.8	-12°48.7	-12°49.5	-12°50.3	-12°51.2	-12°52.0	-0.8
Th 28	274°02.8	289°02.8	304°02.9	319°02.9	334°03.0	349°03.0	4°03.1	19°03.1	34°03.1	49°03.2	64°03.2	79°03.3	+0.0
	-13°03.0	-13°03.8	-13°04.6	-13°05.5	-13°06.3	-13°07.2	-13°08.0	-13°08.8	-13°09.7	-13°10.5	-13°11.3	-13°12.2	-0.8
Fr 29	274°03.9	289°03.9	304°04.0	319°04.0	334°04.1	349°04.1	4°04.1	19°04.2	34°04.2	49°04.3	64°04.3	79°04.3	+0.0
	-13°23.0	-13°23.8	-13°24.7	-13°25.5	-13°26.3	-13°27.1	-13°28.0	-13°28.8	-13°29.6	-13°30.5	-13°31.3	-13°32.1	-0.8
Sa 30	274°04.8	289°04.9	304°04.9	319°04.9	334°05.0	349°05.0	4°05.0	19°05.1	34°05.1	49°05.1	64°05.2	79°05.2	+0.0
	-13°42.8	-13°43.6	-13°44.5	-13°45.3	-13°46.1	-13°46.9	-13°47.7	-13°48.6	-13°49.4	-13°50.2	-13°51.0	-13°51.8	-0.8
Su 31	274°05.6	289°05.6	304°05.6	319°05.6	334°05.7	349°05.7	4°05.7	19°05.7	34°05.8	49°05.8	64°05.8	79°05.8	+0.0
	-14°02.4	-14°03.2	-14°04.0	-14°04.9	-14°05.7	-14°06.5	-14°07.3	-14°08.1	-14°08.9	-14°09.7	-14°10.5	-14°11.3	-0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2027

D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
Fr 1	245°44.8	260°14.0	274°43.1	289°12.3	303°41.4	318°10.4	332°39.5	347°08.5	1°37.4	16°06.4	30°35.3	+29.1	16.0
	-13°15.5	-13°29.7	-13°43.7	-13°57.7	-14°11.6	-14°25.4	-14°39.1	-14°52.7	-15°06.2	-15°19.6	-15°33.0	-13.7	58.8
Sa 2	247°44.6	262°13.0	276°41.3	291°09.5	305°37.7	320°05.9	334°34.1	349°02.2	3°30.3	17°58.4	32°26.4	+28.2	15.8
	-18°40.0	-18°51.6	-19°03.0	-19°14.4	-19°25.6	-19°36.7	-19°47.7	-19°58.5	-20°09.2	-20°19.8	-20°30.3	-11.0	58.0
Su 3	249°22.8	263°50.3	278°17.8	292°45.2	307°12.7	321°40.1	336°07.5	350°34.9	5°02.3	19°29.6	33°56.9	+27.4	15.6
	-22°51.7	-23°00.0	-23°08.2	-23°16.3	-23°24.2	-23°32.0	-23°39.6	-23°47.1	-23°54.5	-24°01.7	-24°08.8	-7.7	57.1
Mo 4	250°45.0	265°12.1	279°39.2	294°06.4	308°33.5	323°00.6	337°27.8	351°54.9	6°22.0	20°49.2	35°16.3	+27.1	15.3
	-25°37.5	-25°42.2	-25°46.8	-25°51.3	-25°55.6	-25°59.7	-26°03.7	-26°07.6	-26°11.3	-26°14.8	-26°18.2	-4.1	56.3
Tu 5	252°05.4	266°32.8	281°00.3	295°27.8	309°55.3	324°22.9	338°50.5	353°18.1	7°45.7	22°13.4	36°41.2	+27.6	15.1
	-26°51.6	-26°52.6	-26°53.5	-26°54.3	-26°54.9	-26°55.4	-26°55.7	-26°55.9	-26°56.0	-26°55.9	-26°55.6	-0.4	55.5
We 6	253°42.3	268°10.7	282°39.2	297°07.8	311°36.4	326°05.1	340°33.8	355°02.6	9°31.5	24°00.4	38°29.3	+28.7	15.0
	-26°35.4	-26°32.9	-26°30.4	-26°27.6	-26°24.8	-26°21.9	-26°18.8	-26°15.5	-26°12.2	-26°08.7	-26°05.1	+3.0	54.9
◐ Th 7	255°51.3	270°21.3	284°51.4	299°21.5	313°51.7	328°21.9	342°52.3	357°22.6	11°53.1	26°23.6	40°54.2	+30.3	14.9
	-24°56.4	-24°50.8	-24°45.2	-24°39.5	-24°33.6	-24°27.6	-24°21.5	-24°15.3	-24°09.0	-24°02.6	-23°56.1	+6.0	54.5
Fr 8	258°41.3	273°13.0	287°44.7	302°16.5	316°48.4	331°20.4	345°52.4	0°24.5	14°56.6	29°28.8	44°01.1	+32.0	14.8
	-22°06.0	-21°57.8	-21°49.6	-21°41.3	-21°32.9	-21°24.4	-21°15.8	-21°07.1	-20°58.4	-20°49.5	-20°40.6	+8.5	54.2
Sa 9	262°12.5	276°45.7	291°19.0	305°52.4	320°25.8	334°59.2	349°32.7	4°06.3	18°39.9	33°13.5	47°47.3	+33.5	14.8
	-18°16.7	-18°06.5	-17°56.2	-17°45.8	-17°35.4	-17°24.9	-17°14.3	-17°03.6	-16°52.9	-16°42.1	-16°31.3	+10.5	54.1
Su 10	266°18.5	280°52.9	295°27.3	310°01.8	324°36.4	339°10.9	353°45.5	8°20.1	22°54.8	37°29.5	52°04.2	+34.6	14.8
	-13°40.9	-13°29.0	-13°17.1	-13°05.2	-12°53.2	-12°41.1	-12°29.0	-12°16.9	-12°04.7	-11°52.4	-11°40.1	+12.1	54.2
Mo 11	270°48.2	285°23.3	299°58.4	314°33.6	329°08.7	343°43.9	358°19.0	12°54.2	27°29.4	42°04.6	56°39.8	+35.2	14.9
	-8°30.0	-8°17.0	-8°04.0	-7°50.9	-7°37.8	-7°24.6	-7°11.5	-6°58.2	-6°45.0	-6°31.7	-6°18.4	+13.2	54.5
Tu 12	275°28.3	290°03.5	304°38.7	319°13.9	333°49.0	348°24.2	2°59.4	17°34.5	32°09.6	46°44.7	61°19.8	+35.2	15.0
	-2°55.3	-2°41.6	-2°27.8	-2°14.1	-2°00.3	-1°46.5	-1°32.7	-1°18.8	-1°05.0	-0°51.1	-0°37.3	+13.8	54.9
We 13	280°03.6	294°38.3	309°13.0	323°47.6	338°22.2	352°56.8	7°31.3	22°05.7	36°40.2	51°14.6	65°48.9	+34.5	15.1
	2°51.7	3°05.7	3°19.7	3°33.6	3°47.6	4°01.5	4°15.5	4°29.4	4°43.3	4°57.2	5°11.2	+13.9	55.3
Th 14	284°18.6	298°52.2	313°25.6	327°59.1	342°32.5	357°05.8	11°39.0	26°12.2	40°45.3	55°18.4	69°51.4	+33.3	15.2
	8°38.0	8°51.6	9°05.2	9°18.8	9°32.4	9°45.9	9°59.4	10°12.8	10°26.2	10°39.6	10°52.9	+13.5	55.9
○ Fr 15	287°57.6	302°29.4	317°01.1	331°32.8	346°04.3	0°35.8	15°07.2	29°38.5	44°09.8	58°40.9	73°11.9	+31.4	15.4
	14°08.0	14°20.6	14°33.2	14°45.7	14°58.1	15°10.5	15°22.8	15°35.0	15°47.2	15°59.3	16°11.4	+12.3	56.4
Sa 16	290°46.9	305°16.5	319°46.0	334°15.4	348°44.7	3°13.9	17°43.0	32°12.0	46°41.0	61°09.8	75°38.5	+29.2	15.5
	19°03.1	19°13.9	19°24.6	19°35.2	19°45.7	19°56.2	20°06.5	20°16.7	20°26.8	20°36.8	20°46.8	+10.4	56.9
Su 17	292°37.9	307°05.1	321°32.2	335°59.3	350°26.2	4°53.0	19°19.8	33°46.4	48°13.0	62°39.5	77°05.9	+26.8	15.7
	23°02.2	23°10.3	23°18.3	23°26.1	23°33.8	23°41.4	23°48.8	23°56.1	24°03.3	24°10.3	24°17.2	+7.5	57.4
Mo 18	293°32.1	307°57.2	322°22.3	336°47.3	351°12.3	5°37.2	20°02.0	34°26.8	48°51.5	63°16.1	77°40.7	+24.9	15.8
	25°43.3	25°47.9	25°52.2	25°56.5	26°00.5	26°04.4	26°08.2	26°11.7	26°15.2	26°18.4	26°21.5	+3.8	57.9
Tu 19	293°44.6	308°08.5	322°32.5	336°56.5	351°20.4	5°44.3	20°08.2	34°32.1	48°56.0	63°19.9	77°43.8	+23.9	15.9
	26°47.7	26°48.0	26°48.2	26°48.3	26°48.1	26°47.8	26°47.3	26°46.6	26°45.8	26°44.8	26°43.6	-0.4	58.3
We 20	308°08.5	322°32.5	336°56.5	351°20.4	5°44.3	20°08.2	34°32.1	48°56.0	63°19.9	77°43.8	92°07.6	+23.9	15.9
	26°48.0	26°48.2	26°48.3	26°48.1	26°47.8	26°47.3	26°46.6	26°45.8	26°44.8	26°43.6	26°42.2	-0.6	58.3
Th 21	308°06.7	322°30.8	336°54.9	351°19.1	5°43.3	20°07.5	34°31.8	48°56.1	63°20.4	77°44.8	92°09.2	+24.2	16.0
	26°00.8	25°56.7	25°52.4	25°47.9	25°43.2	25°38.4	25°33.4	25°28.3	25°22.9	25°17.5	25°11.8	-4.9	58.7
◑ Fr 22	308°21.7	322°47.0	337°12.4	351°37.8	6°03.3	20°28.8	34°54.5	49°20.1	63°45.9	78°11.7	92°37.6	+25.6	16.1
	23°27.8	23°19.6	23°11.3	23°02.8	22°54.2	22°45.5	22°36.5	22°27.5	22°18.3	22°09.0	21°59.5	-8.8	59.0
Sa 23	309°14.5	323°41.5	338°08.6	352°35.8	7°03.0	21°30.3	35°57.7	50°25.2	64°52.7	79°20.3	93°48.0	+27.4	16.2
	19°21.6	19°10.1	18°58.4	18°46.7	18°34.8	18°22.8	18°10.7	17°58.5	17°46.2	17°33.8	17°21.3	-12.0	59.2
Su 24	310°51.3	325°20.0	339°48.8	354°17.7	8°46.6	23°15.5	37°44.6	52°13.6	66°42.8	81°12.0	95°41.2	+29.0	16.2
	14°01.9	13°47.9	13°33.9	13°19.7	13°05.5	12°51.2	12°36.8	12°22.4	12°07.9	11°53.3	11°38.6	-14.3	59.4
Mo 25	313°05.8	327°35.7	342°05.8	356°35.8	11°05.9	25°36.0	40°06.2	54°36.4	69°06.6	83°36.8	98°07.1	+30.1	16.2
	7°51.8	7°36.3	7°20.8	7°05.2	6°49.5	6°33.9	6°18.1	6°02.4	5°46.6	5°30.8	5°15.0	-15.7	59.4
Tu 26	315°43.8	330°14.3	344°44.9	359°15.5	13°46.1	28°16.7	42°47.3	57°17.9	71°48.5	86°19.1	100°49.7	+30.6	16.2
	1°15.1	0°59.1	0°43.0	0°26.9	0°10.8	-0°05.3	-0°21.4	-0°37.4	-0°53.5	-1°09.6	-1°25.6	-16.1	59.3
We 27	318°28.2	332°58.6	347°29.1	1°59.5	16°29.9	31°00.3	45°30.7	60°01.0	74°31.3	89°01.6	103°31.9	+30.4	16.1
	-5°24.2	-5°39.9	-5°55.6	-6°11.2	-6°26.8	-6°42.4	-6°57.9	-7°13.3	-7°28.7	-7°44.1	-7°59.4	-15.5	59.1
Th 28	321°02.4	335°32.1	350°01.8	4°31.5	19°01.2	33°30.8	48°00.3	62°29.8	76°59.3	91°28.8	105°58.1	+29.6	16.0
	-11°42.6	-11°57.0	-12°11.3	-12°25.5	-12°39.6	-12°53.7	-13°07.7	-13°21.6	-13°35.4	-13°49.2	-14°02.9	-14.0	58.6
● Fr 29	323°13.6	337°42.3	352°10.9	6°39.5	21°08.0	35°36.5	50°04.9	64°33.3	79°01.6	93°29.9	107°58.1	+28.4	15.8
	-17°16.9	-17°29.1	-17°41.1	-17°53.1	-18°04.9	-18°16.6	-18°28.2	-18°39.7	-18°51.1	-19°02.4	-19°13.5	-11.7	58.1
Sa 30	324°56.2	339°23.7	353°51.2	8°18.7	22°46.1	37°13.5	51°40.8	66°08.1	80°35.4	95°02.6	109°29.8	+27.4	15.7
	-21°46.3	-21°55.5	-22°04.5	-22°13.4	-22°22.2	-22°30.8	-22°39.3	-22°47.6	-22°55.9	-23°03.9	-23°11.9	-8.6	57.4
Su 31	326°14.4	340°41.2	355°08.0	9°34.7	24°01.5	38°28.2	52°54.9	67°21.7	81°48.4	96°15.1	110°41.8	+26.7	15.5
	-24°53.9	-24°59.5	-25°05.0	-25°10.4	-25°15.6	-25°20.6	-25°25.5	-25°30.2	-25°34.8	-25°39.3	-25°43.5	-5.0	56.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 7 11h47 — FM: 15 13h47 — LQ: 22 17h29 — NM: 29 13h36

SUN

November 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	274°06.1	289°06.1	304°06.2	319°06.2	334°06.2	349°06.2	4°06.2	19°06.2	34°06.3	49°06.3	64°06.3	79°06.3	+0.0
	-14°21.8	-14°22.6	-14°23.4	-14°24.2	-14°25.0	-14°25.8	-14°26.6	-14°27.4	-14°28.2	-14°29.0	-14°29.8	-14°30.6	-0.8
Tu 2	274°06.5	289°06.5	304°06.5	319°06.5	334°06.5	349°06.5	4°06.5	19°06.5	34°06.5	49°06.6	64°06.6	79°06.6	+0.0
	-14°40.9	-14°41.7	-14°42.5	-14°43.3	-14°44.1	-14°44.9	-14°45.7	-14°46.5	-14°47.3	-14°48.1	-14°48.9	-14°49.6	-0.8
We 3	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.6	19°06.6	34°06.6	49°06.6	64°06.6	79°06.6	+0.0
	-14°59.9	-15°00.6	-15°01.4	-15°02.2	-15°03.0	-15°03.8	-15°04.5	-15°05.3	-15°06.1	-15°06.9	-15°07.7	-15°08.4	-0.8
Th 4	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.5	4°06.5	19°06.5	34°06.5	49°06.5	64°06.5	79°06.5	-0.0
	-15°18.5	-15°19.3	-15°20.1	-15°20.8	-15°21.6	-15°22.4	-15°23.1	-15°23.9	-15°24.7	-15°25.5	-15°26.2	-15°27.0	-0.8
Fr 5	274°06.3	289°06.3	304°06.3	319°06.3	334°06.3	349°06.3	4°06.2	19°06.2	34°06.2	49°06.2	64°06.2	79°06.2	-0.0
	-15°36.9	-15°37.7	-15°38.5	-15°39.2	-15°40.0	-15°40.7	-15°41.5	-15°42.3	-15°43.0	-15°43.8	-15°44.5	-15°45.3	-0.8
Sa 6	274°05.9	289°05.9	304°05.8	319°05.8	334°05.8	349°05.8	4°05.7	19°05.7	34°05.7	49°05.7	64°05.6	79°05.6	-0.0
	-15°55.1	-15°55.8	-15°56.6	-15°57.3	-15°58.1	-15°58.8	-15°59.6	-16°00.3	-16°01.1	-16°01.8	-16°02.6	-16°03.3	-0.7
Su 7	274°05.2	289°05.2	304°05.2	319°05.1	334°05.1	349°05.1	4°05.0	19°05.0	34°05.0	49°04.9	64°04.9	79°04.9	-0.0
	-16°13.0	-16°13.7	-16°14.4	-16°15.2	-16°15.9	-16°16.7	-16°17.4	-16°18.1	-16°18.9	-16°19.6	-16°20.3	-16°21.1	-0.7
Mo 8	274°04.4	289°04.3	304°04.3	319°04.3	334°04.2	349°04.2	4°04.1	19°04.1	34°04.1	49°04.0	64°04.0	79°03.9	-0.0
	-16°30.6	-16°31.3	-16°32.0	-16°32.8	-16°33.5	-16°34.2	-16°34.9	-16°35.7	-16°36.4	-16°37.1	-16°37.8	-16°38.6	-0.7
Tu 9	274°03.3	289°03.3	304°03.2	319°03.2	334°03.1	349°03.1	4°03.0	19°03.0	34°02.9	49°02.9	64°02.8	79°02.8	-0.1
	-16°47.9	-16°48.6	-16°49.3	-16°50.1	-16°50.8	-16°51.5	-16°52.2	-16°52.9	-16°53.6	-16°54.3	-16°55.1	-16°55.8	-0.7
We 10	274°02.0	289°02.0	304°01.9	319°01.9	334°01.8	349°01.8	4°01.7	19°01.6	34°01.6	49°01.5	64°01.5	79°01.4	-0.1
	-17°05.0	-17°05.7	-17°06.4	-17°07.1	-17°07.8	-17°08.5	-17°09.2	-17°09.9	-17°10.6	-17°11.3	-17°12.0	-17°12.7	-0.7
Th 11	274°00.6	289°00.5	304°00.4	319°00.4	334°00.3	349°00.2	4°00.2	19°00.1	34°00.0	49°00.0	63°59.9	78°59.8	-0.1
	-17°21.7	-17°22.4	-17°23.1	-17°23.8	-17°24.5	-17°25.2	-17°25.9	-17°26.6	-17°27.2	-17°27.9	-17°28.6	-17°29.3	-0.7
Fr 12	273°58.9	288°58.8	303°58.7	318°58.7	333°58.6	348°58.5	3°58.4	18°58.3	33°58.3	48°58.2	63°58.1	78°58.0	-0.1
	-17°38.2	-17°38.9	-17°39.5	-17°40.2	-17°40.9	-17°41.6	-17°42.2	-17°42.9	-17°43.6	-17°44.3	-17°44.9	-17°45.6	-0.7
Sa 13	273°57.0	288°56.9	303°56.8	318°56.7	333°56.6	348°56.6	3°56.5	18°56.4	33°56.3	48°56.2	63°56.1	78°56.0	-0.1
	-17°54.3	-17°55.0	-17°55.7	-17°56.3	-17°57.0	-17°57.7	-17°58.3	-17°59.0	-17°59.6	-18°00.3	-18°01.0	-18°01.6	-0.7
Su 14	273°54.9	288°54.8	303°54.7	318°54.6	333°54.5	348°54.4	3°54.3	18°54.2	33°54.1	48°54.0	63°53.9	78°53.8	-0.1
	-18°10.2	-18°10.8	-18°11.5	-18°12.1	-18°12.8	-18°13.4	-18°14.1	-18°14.7	-18°15.4	-18°16.0	-18°16.7	-18°17.3	-0.7
Mo 15	273°52.6	288°52.5	303°52.3	318°52.2	333°52.1	348°52.0	3°51.9	18°51.8	33°51.7	48°51.6	63°51.5	78°51.4	-0.1
	-18°25.7	-18°26.3	-18°27.0	-18°27.6	-18°28.3	-18°28.9	-18°29.5	-18°30.2	-18°30.8	-18°31.4	-18°32.1	-18°32.7	-0.6
Tu 16	273°50.0	288°49.9	303°49.8	318°49.7	333°49.6	348°49.5	3°49.4	18°49.2	33°49.1	48°49.0	63°48.9	78°48.8	-0.1
	-18°40.9	-18°41.5	-18°42.2	-18°42.8	-18°43.4	-18°44.0	-18°44.7	-18°45.3	-18°45.9	-18°46.5	-18°47.1	-18°47.8	-0.6
We 17	273°47.3	288°47.2	303°47.0	318°46.9	333°46.8	348°46.7	3°46.6	18°46.4	33°46.3	48°46.2	63°46.1	78°45.9	-0.1
	-18°55.8	-18°56.4	-18°57.0	-18°57.6	-18°58.2	-18°58.8	-18°59.5	-19°00.1	-19°00.7	-19°01.3	-19°01.9	-19°02.5	-0.6
Th 18	273°44.3	288°44.2	303°44.1	318°43.9	333°43.8	348°43.7	3°43.5	18°43.4	33°43.3	48°43.2	63°43.0	78°42.9	-0.1
	-19°10.3	-19°10.9	-19°11.5	-19°12.1	-19°12.7	-19°13.3	-19°13.9	-19°14.5	-19°15.1	-19°15.7	-19°16.3	-19°16.9	-0.6
Fr 19	273°41.1	288°41.0	303°40.9	318°40.7	333°40.6	348°40.5	3°40.3	18°40.2	33°40.0	48°39.9	63°39.8	78°39.6	-0.1
	-19°24.5	-19°25.1	-19°25.7	-19°26.3	-19°26.9	-19°27.4	-19°28.0	-19°28.6	-19°29.2	-19°29.8	-19°30.3	-19°30.9	-0.6
Sa 20	273°37.8	288°37.6	303°37.5	318°37.3	333°37.2	348°37.0	3°36.9	18°36.7	33°36.6	48°36.4	63°36.3	78°36.1	-0.1
	-19°38.4	-19°38.9	-19°39.5	-19°40.1	-19°40.7	-19°41.2	-19°41.8	-19°42.4	-19°42.9	-19°43.5	-19°44.0	-19°44.6	-0.6
Su 21	273°34.2	288°34.0	303°33.9	318°33.7	333°33.6	348°33.4	3°33.2	18°33.1	33°32.9	48°32.8	63°32.6	78°32.5	-0.2
	-19°51.9	-19°52.4	-19°53.0	-19°53.5	-19°54.1	-19°54.6	-19°55.2	-19°55.7	-19°56.3	-19°56.8	-19°57.4	-19°57.9	-0.6
Mo 22	273°30.4	288°30.2	303°30.1	318°29.9	333°29.7	348°29.6	3°29.4	18°29.2	33°29.1	48°28.9	63°28.7	78°28.6	-0.2
	-20°05.0	-20°05.6	-20°06.1	-20°06.6	-20°07.2	-20°07.7	-20°08.2	-20°08.8	-20°09.3	-20°09.8	-20°10.4	-20°10.9	-0.5
Tu 23	273°26.4	288°26.2	303°26.0	318°25.9	333°25.7	348°25.5	3°25.3	18°25.2	33°25.0	48°24.8	63°24.6	78°24.5	-0.2
	-20°17.8	-20°18.3	-20°18.8	-20°19.3	-20°19.9	-20°20.4	-20°20.9	-20°21.4	-20°22.0	-20°22.5	-20°23.0	-20°23.5	-0.5
We 24	273°22.2	288°22.0	303°21.8	318°21.6	333°21.5	348°21.3	3°21.1	18°20.9	33°20.7	48°20.5	63°20.4	78°20.2	-0.2
	-20°30.2	-20°30.7	-20°31.2	-20°31.7	-20°32.2	-20°32.7	-20°33.2	-20°33.7	-20°34.2	-20°34.7	-20°35.2	-20°35.7	-0.5
Th 25	273°17.8	288°17.6	303°17.4	318°17.2	333°17.0	348°16.8	3°16.6	18°16.5	33°16.3	48°16.1	63°15.9	78°15.7	-0.2
	-20°42.2	-20°42.7	-20°43.2	-20°43.7	-20°44.2	-20°44.6	-20°45.1	-20°45.6	-20°46.1	-20°46.6	-20°47.1	-20°47.6	-0.5
Fr 26	273°13.2	288°13.0	303°12.8	318°12.6	333°12.4	348°12.2	3°12.0	18°11.8	33°11.6	48°11.4	63°11.2	78°11.0	-0.2
	-20°53.8	-20°54.3	-20°54.8	-20°55.2	-20°55.7	-20°56.2	-20°56.7	-20°57.1	-20°57.6	-20°58.1	-20°58.6	-20°59.0	-0.5
Sa 27	273°08.4	288°08.2	303°08.0	318°07.8	333°07.6	348°07.4	3°07.2	18°07.0	33°06.8	48°06.6	63°06.4	78°06.1	-0.2
	-21°05.1	-21°05.5	-21°06.0	-21°06.4	-21°06.9	-21°07.4	-21°07.8	-21°08.3	-21°08.7	-21°09.2	-21°09.6	-21°10.1	-0.5
Su 28	273°03.4	288°03.2	303°03.0	318°02.8	333°02.6	348°02.4	3°02.2	18°02.0	33°01.7	48°01.5	63°01.3	78°01.1	-0.2
	-21°15.9	-21°16.3	-21°16.8	-21°17.2	-21°17.7	-21°18.1	-21°18.6	-21°19.0	-21°19.4	-21°19.9	-21°20.3	-21°20.7	-0.4
Mo 29	272°58.3	287°58.1	302°57.9	317°57.6	332°57.4	347°57.2	2°57.0	17°56.8	32°56.5	47°56.3	62°56.1	77°55.9	-0.2
	-21°26.3	-21°26.8	-21°27.2	-21°27.6	-21°28.0	-21°28.5	-21°28.9	-21°29.3	-21°29.7	-21°30.2	-21°30.6	-21°31.0	-0.4
Tu 30	272°53.0	287°52.8	302°52.5	317°52.3	332°52.1	347°51.9	2°51.6	17°51.4	32°51.2	47°50.9	62°50.7	77°50.5	-0.2
	-21°36.4	-21°36.8	-21°37.2	-21°37.6	-21°38.0	-21°38.4	-21°38.8	-21°39.2	-21°39.6	-21°40.0	-21°40.4	-21°40.8	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	Δ'/h	SH
Mo 1	255°08.9	269°35.7	284°02.4	298°29.2	312°56.0	327°22.8	341°49.6	356°16.4	10°43.3	25°10.2	39°37.1	+26.8	15.3
	-26°18.2	-26°20.8	-26°23.3	-26°25.6	-26°27.8	-26°29.8	-26°31.7	-26°33.4	-26°35.0	-26°36.5	-26°37.7	-2.0	56.1
Tu 2	256°24.6	270°52.0	285°19.6	299°47.1	314°14.8	328°42.4	343°10.2	357°37.9	12°05.8	26°33.6	41°01.6	+27.7	15.1
	-26°39.3	-26°38.3	-26°37.1	-26°35.7	-26°34.3	-26°32.6	-26°30.9	-26°29.0	-26°27.0	-26°24.8	-26°22.5	+1.7	55.5
We 3	258°07.9	272°36.9	287°05.9	301°34.9	316°04.1	330°33.3	345°02.6	359°32.0	14°01.4	28°30.9	43°00.5	+29.3	15.0
	-25°32.0	-25°27.6	-25°23.1	-25°18.5	-25°13.8	-25°08.9	-25°03.9	-24°58.8	-24°53.5	-24°48.2	-24°42.7	+4.9	54.9
Th 4	260°33.2	275°04.0	289°34.8	304°05.7	318°36.7	333°07.8	347°39.0	2°10.2	16°41.5	31°12.9	45°44.3	+31.1	14.9
	-23°07.5	-23°00.3	-22°53.0	-22°45.6	-22°38.1	-22°30.5	-22°22.8	-22°15.0	-22°07.1	-21°59.1	-21°51.0	+7.6	54.5
Fr 5	263°44.7	278°17.3	292°50.0	307°22.7	321°55.5	336°28.3	351°01.2	5°34.2	20°07.3	34°40.4	49°13.5	+32.9	14.8
	-19°39.3	-19°29.9	-19°20.3	-19°10.7	-19°01.1	-18°51.3	-18°41.5	-18°31.6	-18°21.6	-18°11.5	-18°01.4	+9.8	54.2
◐ Sa 6	267°38.0	282°12.1	296°46.2	311°20.4	325°54.6	340°28.9	355°03.2	9°37.5	24°11.9	38°46.4	53°20.8	+34.3	14.8
	-15°21.3	-15°10.1	-14°58.9	-14°47.6	-14°36.2	-14°24.8	-14°13.3	-14°01.8	-13°50.2	-13°38.6	-13°26.9	+11.4	54.2
Su 7	272°02.6	286°37.6	301°12.7	315°47.8	330°22.9	344°58.0	359°33.2	14°08.3	28°43.6	43°18.8	57°54.0	+35.2	14.8
	-10°25.6	-10°13.1	-10°00.6	-9°48.1	-9°35.5	-9°22.9	-9°10.2	-8°57.5	-8°44.8	-8°32.0	-8°19.2	+12.6	54.3
Mo 8	276°44.2	291°19.6	305°55.0	320°30.4	335°05.8	349°41.2	4°16.6	18°52.0	33°27.4	48°02.8	62°38.1	+35.4	14.9
	-5°03.0	-4°49.7	-4°36.3	-4°22.9	-4°09.5	-3°56.1	-3°42.7	-3°29.2	-3°15.7	-3°02.2	-2°48.7	+13.4	54.6
Tu 9	281°27.1	296°02.2	310°37.2	325°12.3	339°47.3	354°22.3	8°57.2	23°32.2	38°07.1	52°41.9	67°16.8	+35.0	15.0
	0°36.1	0°49.9	1°03.7	1°17.4	1°31.2	1°45.0	1°58.8	2°12.6	2°26.4	2°40.2	2°54.0	+13.8	55.1
We 10	285°54.1	300°28.2	315°02.3	329°36.3	344°10.2	358°44.1	13°18.0	27°51.7	42°25.4	56°59.1	71°32.6	+33.9	15.2
	6°20.6	6°34.3	6°48.0	7°01.7	7°15.4	7°29.0	7°42.7	7°56.3	8°09.9	8°23.4	8°37.0	+13.6	55.7
Th 11	289°48.0	304°20.5	318°52.8	333°25.1	347°57.2	2°29.3	17°01.3	31°33.3	46°05.1	60°36.9	75°08.5	+32.1	15.4
	11°57.0	12°10.1	12°23.1	12°36.1	12°49.0	13°01.9	13°14.7	13°27.5	13°40.3	13°53.0	14°05.6	+12.9	56.4
Fr 12	292°52.2	307°22.4	321°52.4	336°22.3	350°52.2	5°21.9	19°51.5	34°21.0	48°50.5	63°19.8	77°49.0	+29.7	15.6
	17°08.2	17°19.9	17°31.4	17°42.9	17°54.3	18°05.7	18°16.9	18°28.1	18°39.2	18°50.1	19°01.1	+11.3	57.1
Sa 13	294°54.2	309°21.7	323°49.1	338°16.4	352°43.6	7°10.7	21°37.6	36°04.5	50°31.2	64°57.9	79°24.4	+27.0	15.7
	21°33.1	21°42.3	21°51.5	22°00.6	22°09.5	22°18.3	22°27.0	22°35.6	22°44.1	22°52.4	23°00.6	+8.8	57.7
○ Su 14	295°50.8	310°15.8	324°40.7	339°05.5	353°30.3	7°55.0	22°19.6	36°44.1	51°08.5	65°32.9	79°57.1	+24.6	15.9
	24°47.2	24°53.2	24°59.0	25°04.6	25°10.1	25°15.5	25°20.7	25°25.7	25°30.5	25°35.2	25°39.8	+5.3	58.3
Mo 15	295°53.8	310°17.2	324°40.5	339°03.8	353°27.0	7°50.2	22°13.4	36°36.6	50°59.7	65°22.9	79°46.0	+23.2	16.0
	26°27.7	26°29.5	26°31.1	26°32.6	26°33.9	26°35.0	26°35.9	26°36.6	26°37.2	26°37.5	26°37.7	+1.0	58.8
Tu 16	295°31.6	309°54.7	324°17.8	338°40.9	353°04.1	7°27.3	21°50.5	36°13.8	50°37.1	65°00.4	79°23.8	+23.2	16.1
	26°18.9	26°16.2	26°13.3	26°10.2	26°07.0	26°03.6	26°00.0	25°56.2	25°52.2	25°48.1	25°43.8	-3.5	59.1
We 17	295°20.1	309°44.3	324°08.6	338°33.0	352°57.4	7°21.9	21°46.5	36°11.1	50°35.8	65°00.6	79°25.5	+24.5	16.2
	24°18.6	24°11.6	24°04.4	23°57.1	23°49.6	23°42.0	23°34.2	23°26.3	23°18.2	23°09.9	23°01.5	-7.7	59.3
Th 18	309°44.3	324°08.6	338°33.0	352°57.4	7°21.9	21°46.5	36°11.1	50°35.8	65°00.6	79°25.5	93°50.5	+24.6	16.2
	24°11.6	24°04.4	23°57.1	23°49.6	23°42.0	23°34.2	23°26.3	23°18.2	23°09.9	23°01.5	22°53.0	-7.9	59.3
Fr 19	310°14.6	324°40.8	339°07.2	353°33.7	8°00.2	22°26.8	36°53.6	51°20.4	65°47.2	80°14.2	94°41.3	+26.7	16.2
	20°28.0	20°17.3	20°06.5	19°55.5	19°44.4	19°33.2	19°21.9	19°10.5	18°58.9	18°47.3	18°35.5	-11.3	59.3
Sa 20	311°37.3	326°05.7	340°34.2	355°02.7	9°31.3	24°00.0	38°28.8	52°57.7	67°26.6	81°55.6	96°24.6	+28.7	16.2
	15°26.9	15°13.6	15°00.2	14°46.7	14°33.1	14°19.5	14°05.8	13°52.0	13°38.1	13°24.2	13°10.2	-13.7	59.2
◑ Su 21	313°48.5	328°18.6	342°48.7	357°18.9	11°49.2	26°19.4	40°49.8	55°20.2	69°50.6	84°21.1	98°51.6	+30.3	16.1
	9°32.7	9°17.8	9°02.8	8°47.8	8°32.7	8°17.6	8°02.5	7°47.3	7°32.1	7°16.9	7°01.6	-15.1	59.1
Mo 22	316°34.0	331°05.1	345°36.2	0°07.3	14°38.4	29°09.6	43°40.8	58°12.0	72°43.2	87°14.4	101°45.7	+31.2	16.0
	3°09.4	2°53.8	2°38.2	2°22.6	2°06.9	1°51.3	1°35.6	1°20.0	1°04.3	0°48.7	0°33.0	-15.6	58.8
Tu 23	319°35.3	334°06.6	348°37.9	3°09.2	17°40.5	32°11.8	46°43.0	61°14.3	75°45.5	90°16.8	104°48.0	+31.3	16.0
	-3°20.7	-3°36.2	-3°51.6	-4°07.0	-4°22.4	-4°37.7	-4°53.0	-5°08.3	-5°23.6	-5°38.8	-5°54.0	-15.3	58.5
We 24	322°33.7	337°04.5	351°35.3	6°06.1	20°36.8	35°07.5	49°38.2	64°08.8	78°39.4	93°09.9	107°40.5	+30.7	15.9
	-9°37.0	-9°51.4	-10°05.8	-10°20.2	-10°34.5	-10°48.8	-11°02.9	-11°17.1	-11°31.1	-11°45.1	-11°59.0	-14.2	58.2
Th 25	325°13.0	339°42.8	354°12.5	8°42.2	23°11.9	37°41.5	52°11.0	66°40.5	81°10.0	95°39.4	110°08.7	+29.6	15.7
	-15°19.1	-15°31.8	-15°44.4	-15°56.9	-16°09.4	-16°21.7	-16°34.0	-16°46.1	-16°58.2	-17°10.1	-17°22.0	-12.3	57.7
Fr 26	327°22.5	341°51.0	356°19.5	10°47.9	25°16.2	39°44.5	54°12.7	68°40.9	83°09.1	97°37.2	112°05.2	+28.3	15.6
	-20°07.5	-20°17.7	-20°27.7	-20°37.7	-20°47.5	-20°57.2	-21°06.7	-21°16.2	-21°25.5	-21°34.7	-21°43.8	-9.6	57.3
Sa 27	329°00.4	343°27.7	357°55.0	12°22.3	26°49.6	41°16.8	55°43.9	70°11.1	84°38.2	99°05.3	113°32.4	+27.2	15.5
	-23°44.3	-23°51.3	-23°58.1	-24°04.8	-24°11.4	-24°17.8	-24°24.0	-24°30.2	-24°36.1	-24°42.0	-24°47.7	-6.3	56.7
● Su 28	330°15.8	344°42.7	359°09.4	13°36.2	28°03.0	42°29.8	56°56.6	71°23.4	85°50.2	100°17.0	114°43.9	+26.8	15.3
	-25°55.7	-25°59.0	-26°02.2	-26°05.3	-26°08.2	-26°10.9	-26°13.6	-26°16.0	-26°18.3	-26°20.5	-26°22.5	-2.7	56.2
Mo 29	331°28.1	345°55.3	0°22.5	14°49.7	29°17.0	43°44.3	58°11.6	72°39.0	87°06.4	101°33.9	116°01.4	+27.3	15.2
	-26°34.9	-26°34.5	-26°34.0	-26°33.4	-26°32.6	-26°31.7	-26°30.6	-26°29.4	-26°28.0	-26°26.5	-26°24.9	+1.0	55.6
Tu 30	333°00.3	347°28.7	1°57.1	16°25.6	30°54.2	45°22.9	59°51.6	74°20.4	88°49.2	103°18.1	117°47.1	+28.7	15.0
	-25°43.8	-25°40.0	-25°36.1	-25°32.0	-25°27.8	-25°23.5	-25°19.1	-25°14.5	-25°09.8	-25°05.0	-25°00.1	+4.4	55.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 08h00 — FM: 14 03h25 — LQ: 21 00h48 — NM: 28 03h24

SUN

December 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	272°47.5	287°47.3	302°47.0	317°46.8	332°46.6	347°46.3	2°46.1	17°45.9	32°45.6	47°45.4	62°45.2	77°44.9	-0.2
	-21°46.0	-21°46.4	-21°46.8	-21°47.2	-21°47.6	-21°48.0	-21°48.3	-21°48.7	-21°49.1	-21°49.5	-21°49.9	-21°50.3	-0.4
Th 2	272°41.9	287°41.6	302°41.4	317°41.2	332°40.9	347°40.7	2°40.4	17°40.2	32°40.0	47°39.7	62°39.5	77°39.2	-0.2
	-21°55.2	-21°55.6	-21°56.0	-21°56.3	-21°56.7	-21°57.1	-21°57.5	-21°57.8	-21°58.2	-21°58.6	-21°58.9	-21°59.3	-0.4
Fr 3	272°36.1	287°35.8	302°35.6	317°35.3	332°35.1	347°34.8	2°34.6	17°34.4	32°34.1	47°33.9	62°33.6	77°33.4	-0.2
	-22°04.0	-22°04.4	-22°04.7	-22°05.1	-22°05.4	-22°05.8	-22°06.1	-22°06.5	-22°06.8	-22°07.2	-22°07.5	-22°07.9	-0.4
Sa 4	272°30.1	287°29.9	302°29.6	317°29.4	332°29.1	347°28.9	2°28.6	17°28.4	32°28.1	47°27.9	62°27.6	77°27.4	-0.3
	-22°12.4	-22°12.7	-22°13.0	-22°13.4	-22°13.7	-22°14.0	-22°14.4	-22°14.7	-22°15.1	-22°15.4	-22°15.7	-22°16.0	-0.3
Su 5	272°24.1	287°23.8	302°23.5	317°23.3	332°23.0	347°22.8	2°22.5	17°22.3	32°22.0	47°21.7	62°21.5	77°21.2	-0.3
	-22°20.3	-22°20.6	-22°20.9	-22°21.3	-22°21.6	-22°21.9	-22°22.2	-22°22.5	-22°22.8	-22°23.2	-22°23.5	-22°23.8	-0.3
Mo 6	272°17.8	287°17.6	302°17.3	317°17.1	332°16.8	347°16.5	2°16.3	17°16.0	32°15.7	47°15.5	62°15.2	77°14.9	-0.3
	-22°27.8	-22°28.1	-22°28.4	-22°28.7	-22°29.0	-22°29.3	-22°29.6	-22°29.9	-22°30.2	-22°30.5	-22°30.8	-22°31.1	-0.3
Tu 7	272°11.5	287°11.2	302°11.0	317°10.7	332°10.4	347°10.2	2°09.9	17°09.6	32°09.3	47°09.1	62°08.8	77°08.5	-0.3
	-22°34.8	-22°35.1	-22°35.4	-22°35.7	-22°36.0	-22°36.3	-22°36.5	-22°36.8	-22°37.1	-22°37.4	-22°37.7	-22°37.9	-0.3
We 8	272°05.0	287°04.8	302°04.5	317°04.2	332°03.9	347°03.7	2°03.4	17°03.1	32°02.8	47°02.6	62°02.3	77°02.0	-0.3
	-22°41.5	-22°41.7	-22°42.0	-22°42.3	-22°42.5	-22°42.8	-22°43.0	-22°43.3	-22°43.6	-22°43.8	-22°44.1	-22°44.3	-0.3
Th 9	271°58.4	286°58.2	301°57.9	316°57.6	331°57.3	346°57.1	1°56.8	16°56.5	31°56.2	46°55.9	61°55.7	76°55.4	-0.3
	-22°47.6	-22°47.9	-22°48.1	-22°48.4	-22°48.6	-22°48.9	-22°49.1	-22°49.3	-22°49.6	-22°49.8	-22°50.1	-22°50.3	-0.2
Fr 10	271°51.8	286°51.5	301°51.2	316°50.9	331°50.6	346°50.3	1°50.1	16°49.8	31°49.5	46°49.2	61°48.9	76°48.7	-0.3
	-22°53.4	-22°53.6	-22°53.8	-22°54.0	-22°54.3	-22°54.5	-22°54.7	-22°54.9	-22°55.2	-22°55.4	-22°55.6	-22°55.8	-0.2
Sa 11	271°45.0	286°44.7	301°44.4	316°44.1	331°43.8	346°43.5	1°43.2	16°43.0	31°42.7	46°42.4	61°42.1	76°41.8	-0.3
	-22°58.6	-22°58.8	-22°59.0	-22°59.3	-22°59.5	-22°59.7	-22°59.9	-23°00.1	-23°00.3	-23°00.5	-23°00.7	-23°00.9	-0.2
Su 12	271°38.1	286°37.8	301°37.5	316°37.2	331°36.9	346°36.6	1°36.3	16°36.0	31°35.8	46°35.5	61°35.2	76°34.9	-0.3
	-23°03.4	-23°03.6	-23°03.8	-23°04.0	-23°04.2	-23°04.4	-23°04.6	-23°04.8	-23°05.0	-23°05.1	-23°05.3	-23°05.5	-0.2
Mo 13	271°31.1	286°30.8	301°30.5	316°30.2	331°29.9	346°29.6	1°29.3	16°29.0	31°28.8	46°28.5	61°28.2	76°27.9	-0.3
	-23°07.8	-23°08.0	-23°08.2	-23°08.3	-23°08.5	-23°08.7	-23°08.8	-23°09.0	-23°09.2	-23°09.3	-23°09.5	-23°09.7	-0.2
Tu 14	271°24.0	286°23.7	301°23.4	316°23.1	331°22.9	346°22.6	1°22.3	16°22.0	31°21.7	46°21.4	61°21.1	76°20.8	-0.3
	-23°11.7	-23°11.9	-23°12.0	-23°12.2	-23°12.3	-23°12.5	-23°12.6	-23°12.8	-23°12.9	-23°13.1	-23°13.2	-23°13.4	-0.1
We 15	271°16.9	286°16.6	301°16.3	316°16.0	331°15.7	346°15.4	1°15.1	16°14.8	31°14.5	46°14.2	61°13.9	76°13.6	-0.3
	-23°15.2	-23°15.3	-23°15.4	-23°15.6	-23°15.7	-23°15.8	-23°16.0	-23°16.1	-23°16.2	-23°16.3	-23°16.5	-23°16.6	-0.1
Th 16	271°09.7	286°09.4	301°09.1	316°08.8	331°08.5	346°08.2	1°07.9	16°07.6	31°07.3	46°07.0	61°06.7	76°06.4	-0.3
	-23°18.1	-23°18.3	-23°18.4	-23°18.5	-23°18.6	-23°18.7	-23°18.8	-23°18.9	-23°19.0	-23°19.1	-23°19.3	-23°19.4	-0.1
Fr 17	271°02.4	286°02.1	301°01.8	316°01.5	331°01.2	346°00.9	1°00.6	16°00.3	31°00.0	45°59.7	60°59.4	75°59.1	-0.3
	-23°20.7	-23°20.8	-23°20.9	-23°20.9	-23°21.0	-23°21.1	-23°21.2	-23°21.3	-23°21.4	-23°21.5	-23°21.6	-23°21.7	-0.1
Sa 18	270°55.1	285°54.8	300°54.5	315°54.2	330°53.9	345°53.6	0°53.3	15°53.0	30°52.7	45°52.4	60°52.1	75°51.7	-0.3
	-23°22.7	-23°22.8	-23°22.9	-23°22.9	-23°23.0	-23°23.1	-23°23.2	-23°23.2	-23°23.3	-23°23.4	-23°23.4	-23°23.5	-0.1
Su 19	270°47.8	285°47.4	300°47.1	315°46.8	330°46.5	345°46.2	0°45.9	15°45.6	30°45.3	45°45.0	60°44.7	75°44.4	-0.3
	-23°24.3	-23°24.4	-23°24.4	-23°24.5	-23°24.5	-23°24.6	-23°24.6	-23°24.7	-23°24.7	-23°24.8	-23°24.8	-23°24.9	-0.1
Mo 20	270°40.3	285°40.0	300°39.7	315°39.4	330°39.1	345°38.8	0°38.5	15°38.2	30°37.9	45°37.6	60°37.3	75°36.9	-0.3
	-23°25.4	-23°25.4	-23°25.5	-23°25.5	-23°25.5	-23°25.6	-23°25.6	-23°25.6	-23°25.7	-23°25.7	-23°25.7	-23°25.8	-0.0
Tu 21	270°32.9	285°32.6	300°32.3	315°32.0	330°31.7	345°31.4	0°31.0	15°30.7	30°30.4	45°30.1	60°29.8	75°29.5	-0.3
	-23°26.0	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-0.0
We 22	270°25.5	285°25.1	300°24.8	315°24.5	330°24.2	345°23.9	0°23.6	15°23.3	30°23.0	45°22.7	60°22.3	75°22.0	-0.3
	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.1	+0.0
Th 23	270°18.0	285°17.7	300°17.4	315°17.0	330°16.7	345°16.4	0°16.1	15°15.8	30°15.5	45°15.2	60°14.9	75°14.6	-0.3
	-23°25.9	-23°25.9	-23°25.9	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.6	+0.0
Fr 24	270°10.5	285°10.2	300°09.9	315°09.6	330°09.3	345°08.9	0°08.6	15°08.3	30°08.0	45°07.7	60°07.4	75°07.1	-0.3
	-23°25.1	-23°25.1	-23°25.1	-23°25.0	-23°25.0	-23°24.9	-23°24.9	-23°24.8	-23°24.8	-23°24.7	-23°24.7	-23°24.6	+0.0
Sa 25	270°03.0	285°02.7	300°02.4	315°02.1	330°01.8	345°01.5	0°01.2	15°00.9	30°00.6	45°00.2	59°59.9	74°59.6	-0.3
	-23°23.9	-23°23.8	-23°23.8	-23°23.7	-23°23.6	-23°23.6	-23°23.5	-23°23.5	-23°23.4	-23°23.3	-23°23.2	-23°23.2	+0.1
Su 26	269°55.6	284°55.3	299°55.0	314°54.7	329°54.3	344°54.0	359°53.7	14°53.4	29°53.1	44°52.8	59°52.5	74°52.2	-0.3
	-23°22.2	-23°22.1	-23°22.0	-23°21.9	-23°21.9	-23°21.8	-23°21.7	-23°21.6	-23°21.5	-23°21.4	-23°21.3	-23°21.2	+0.1
Mo 27	269°48.2	284°47.8	299°47.5	314°47.2	329°46.9	344°46.6	359°46.3	14°46.0	29°45.7	44°45.4	59°45.1	74°44.8	-0.3
	-23°20.0	-23°19.9	-23°19.8	-23°19.7	-23°19.6	-23°19.5	-23°19.4	-23°19.3	-23°19.2	-23°19.1	-23°19.0	-23°18.8	+0.1
Tu 28	269°40.8	284°40.5	299°40.1	314°39.8	329°39.5	344°39.2	359°38.9	14°38.6	29°38.3	44°38.0	59°37.7	74°37.4	-0.3
	-23°17.4	-23°17.2	-23°17.1	-23°17.0	-23°16.9	-23°16.7	-23°16.6	-23°16.5	-23°16.4	-23°16.2	-23°16.1	-23°16.0	+0.1
We 29	269°33.4	284°33.1	299°32.8	314°32.5	329°32.2	344°31.9	359°31.6	14°31.3	29°31.0	44°30.7	59°30.4	74°30.1	-0.3
	-23°14.2	-23°14.1	-23°13.9	-23°13.8	-23°13.7	-23°13.5	-23°13.4	-23°13.2	-23°13.1	-23°12.9	-23°12.8	-23°12.6	+0.1
Th 30	269°26.1	284°25.8	299°25.5	314°25.2	329°24.9	344°24.6	359°24.3	14°24.0	29°23.7	44°23.4	59°23.1	74°22.8	-0.3
	-23°10.6	-23°10.5	-23°10.3	-23°10.2	-23°10.0	-23°09.8	-23°09.7	-23°09.5	-23°09.3	-23°09.2	-23°09.0	-23°08.8	+0.2
Fr 31	269°18.9	284°18.6	299°18.3	314°18.0	329°17.7	344°17.4	359°17.1	14°16.8	29°16.5	44°16.2	59°15.9	74°15.6	-0.3
	-23°06.6	-23°06.4	-23°06.2	-23°06.1	-23°05.9	-23°05.7	-23°05.5	-23°05.3	-23°05.1	-23°05.0	-23°04.8	-23°04.6	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

December 2027

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	Δ'/h	SH
We 1	248°11.3	262°41.1	277°10.9	291°40.7	306°10.7	320°40.7	335°10.8	349°41.0	4°11.3	18°41.6	33°12.0	+30.1	14.9
	-24°10.3	-24°04.2	-23°58.0	-23°51.7	-23°45.3	-23°38.7	-23°32.1	-23°25.3	-23°18.5	-23°11.5	-23°04.4	+6.6	54.7
Th 2	250°57.6	265°29.3	280°01.0	294°32.8	309°04.7	323°36.7	338°08.7	352°40.8	7°13.0	21°45.3	36°17.6	+32.0	14.8
	-21°06.5	-20°57.9	-20°49.2	-20°40.4	-20°31.5	-20°22.6	-20°13.6	-20°04.4	-19°55.2	-19°46.0	-19°36.6	+9.0	54.4
Fr 3	254°31.0	269°04.4	283°37.9	298°11.5	312°45.1	327°18.8	341°52.5	356°26.3	11°00.2	25°34.1	40°08.1	+33.7	14.8
	-17°07.2	-16°56.7	-16°46.1	-16°35.5	-16°24.8	-16°14.0	-16°03.2	-15°52.3	-15°41.3	-15°30.3	-15°19.2	+10.8	54.2
Sa 4	258°44.0	273°18.8	287°53.6	302°28.5	317°03.4	331°38.3	346°13.3	0°48.3	15°23.4	29°58.5	44°33.6	+35.0	14.8
	-12°26.6	-12°14.7	-12°02.7	-11°50.7	-11°38.7	-11°26.6	-11°14.4	-11°02.3	-10°50.1	-10°37.8	-10°25.5	+12.1	54.1
Su 5	263°24.0	277°59.6	292°35.1	307°10.7	321°46.3	336°21.9	350°57.5	5°33.2	20°08.8	34°44.5	49°20.2	+35.6	14.8
	-7°16.7	-7°03.8	-6°50.9	-6°38.0	-6°25.1	-6°12.1	-5°59.1	-5°46.1	-5°33.1	-5°20.0	-5°06.9	+13.0	54.3
◐ Mo 6	268°15.5	282°51.2	297°26.8	312°02.5	326°38.1	341°13.7	355°49.3	10°24.9	25°00.5	39°36.0	54°11.5	+35.6	14.9
	-1°48.0	-1°34.6	-1°21.2	-1°07.8	-0°54.3	-0°40.9	-0°27.4	-0°14.0	-0°00.5	0°13.0	0°26.5	+13.5	54.6
Tu 7	273°01.4	287°36.4	302°11.4	316°46.4	331°21.4	345°56.3	0°31.1	15°05.9	29°40.7	44°15.4	58°50.1	+34.9	15.0
	3°49.5	4°03.0	4°16.6	4°30.1	4°43.6	4°57.1	5°10.6	5°24.2	5°37.6	5°51.1	6°04.6	+13.5	55.1
We 8	277°23.3	291°57.0	306°30.7	321°04.3	335°37.8	350°11.2	4°44.5	19°17.8	33°51.0	48°24.2	62°57.2	+33.4	15.2
	9°25.0	9°38.2	9°51.3	10°04.5	10°17.6	10°30.7	10°43.8	10°56.8	11°09.8	11°22.8	11°35.7	+13.1	55.8
Th 9	281°02.7	295°34.3	310°05.9	324°37.3	339°08.6	353°39.9	8°11.0	22°42.1	37°13.0	51°43.8	66°14.5	+31.2	15.4
	14°44.9	14°57.1	15°09.3	15°21.4	15°33.5	15°45.5	15°57.5	16°09.4	16°21.2	16°33.0	16°44.7	+12.0	56.6
Fr 10	283°42.2	298°11.2	312°40.0	327°08.7	341°37.3	356°05.8	10°34.1	25°02.4	39°30.5	53°58.5	68°26.3	+28.4	15.7
	19°31.4	19°41.9	19°52.2	20°02.5	20°12.7	20°22.8	20°32.8	20°42.7	20°52.5	21°02.2	21°11.7	+10.0	57.4
Sa 11	285°10.3	299°36.3	314°02.2	328°27.9	342°53.6	357°19.1	11°44.6	26°09.9	40°35.1	55°00.2	69°25.2	+25.5	15.9
	23°21.9	23°29.5	23°37.1	23°44.5	23°51.8	23°59.0	24°06.0	24°12.8	24°19.5	24°26.1	24°32.6	+7.1	58.3
Su 12	285°28.0	299°51.4	314°14.8	328°38.1	343°01.3	357°24.4	11°47.5	26°10.5	40°33.4	54°56.3	69°19.1	+23.1	16.1
	25°50.4	25°54.3	25°58.0	26°01.6	26°05.0	26°08.1	26°11.2	26°14.0	26°16.7	26°19.2	26°21.5	+3.1	59.1
○ Mo 13	284°55.1	299°17.2	313°39.3	328°01.4	342°23.4	356°45.5	11°07.5	25°29.6	39°51.6	54°13.7	68°35.7	+22.1	16.3
	26°34.0	26°33.3	26°32.4	26°31.4	26°30.1	26°28.7	26°27.1	26°25.3	26°23.3	26°21.1	26°18.7	-1.5	59.7
Tu 14	284°08.5	298°30.9	312°53.4	327°15.9	341°38.5	356°01.2	10°23.9	24°46.6	39°09.4	53°32.3	67°55.2	+22.7	16.4
	25°20.2	25°14.8	25°09.3	25°03.5	24°57.6	24°51.5	24°45.2	24°38.7	24°32.1	24°25.3	24°18.3	-6.2	60.0
We 15	283°47.9	298°12.1	312°36.3	327°00.7	341°25.1	355°49.6	10°14.2	24°38.9	39°03.7	53°28.6	67°53.5	+24.6	16.4
	22°13.6	22°04.1	21°54.3	21°44.5	21°34.5	21°24.3	21°14.0	21°03.6	20°53.0	20°42.3	20°31.5	-10.2	60.2
Th 16	284°19.6	298°46.1	313°12.7	327°39.4	342°06.2	356°33.1	11°00.0	25°27.1	39°54.3	54°21.5	68°48.9	+26.9	16.4
	17°33.9	17°21.1	17°08.3	16°55.3	16°42.3	16°29.2	16°15.9	16°02.6	15°49.2	15°35.6	15°22.0	-13.2	60.1
Fr 17	285°49.6	300°18.3	314°47.1	329°16.0	343°45.0	358°14.0	12°43.1	27°12.3	41°41.5	56°10.8	70°40.2	+29.1	16.3
	11°48.7	11°33.9	11°19.1	11°04.3	10°49.3	10°34.4	10°19.3	10°04.3	9°49.2	9°34.0	9°18.8	-15.0	59.8
Sa 18	300°18.3	314°47.1	329°16.0	343°45.0	358°14.0	12°43.1	27°12.3	41°41.5	56°10.8	70°40.2	85°09.7	+29.1	16.3
	11°33.9	11°19.1	11°04.3	10°49.3	10°34.4	10°19.3	10°04.3	9°49.2	9°34.0	9°18.8	9°03.5	-15.0	59.7
Su 19	302°38.9	317°09.3	331°39.7	346°10.2	0°40.7	15°11.3	29°41.9	44°12.6	58°43.3	73°14.0	87°44.8	+30.6	16.2
	5°11.0	4°55.3	4°39.6	4°23.9	4°08.1	3°52.4	3°36.6	3°20.9	3°05.1	2°49.4	2°33.6	-15.7	59.3
◑ Mo 20	305°30.1	320°01.3	334°32.5	349°03.7	3°35.0	18°06.2	32°37.5	47°08.8	61°40.1	76°11.4	90°42.7	+31.3	16.0
	-1°22.3	-1°38.0	-1°53.6	-2°09.1	-2°24.7	-2°40.2	-2°55.8	-3°11.2	-3°26.7	-3°42.1	-3°57.5	-15.5	58.7
Tu 21	308°32.1	323°03.4	337°34.6	352°05.8	6°37.0	21°08.2	35°39.3	50°10.5	64°41.6	79°12.7	93°43.8	+31.2	15.9
	-7°44.1	-7°58.9	-8°13.6	-8°28.2	-8°42.8	-8°57.4	-9°11.9	-9°26.3	-9°40.7	-9°55.0	-10°09.2	-14.5	58.2
We 22	311°26.7	325°57.3	340°27.9	354°58.4	9°28.9	23°59.3	38°29.8	53°00.1	67°30.5	82°00.8	96°31.0	+30.4	15.7
	-13°35.3	-13°48.4	-14°01.5	-14°14.5	-14°27.4	-14°40.2	-14°53.0	-15°05.7	-15°18.3	-15°30.8	-15°43.2	-12.8	57.6
Th 23	313°59.5	328°29.0	342°58.5	357°27.9	11°57.3	26°26.7	40°55.9	55°25.2	69°54.4	84°23.5	98°52.6	+29.3	15.6
	-18°38.3	-18°49.2	-19°00.0	-19°10.6	-19°21.2	-19°31.7	-19°42.0	-19°52.3	-20°02.4	-20°12.4	-20°22.3	-10.4	57.0
Fr 24	316°03.2	330°31.5	344°59.8	359°28.1	13°56.3	28°24.5	42°52.6	57°20.7	71°48.7	86°16.7	100°44.7	+28.1	15.4
	-22°37.0	-22°45.0	-22°52.9	-23°00.7	-23°08.3	-23°15.8	-23°23.2	-23°30.4	-23°37.5	-23°44.5	-23°51.3	-7.4	56.5
Sa 25	317°40.1	332°07.6	346°35.0	1°02.4	15°29.8	29°57.2	44°24.6	58°51.9	73°19.3	87°46.6	102°13.9	+27.4	15.3
	-25°17.7	-25°22.3	-25°26.8	-25°31.2	-25°35.4	-25°39.5	-25°43.4	-25°47.2	-25°50.9	-25°54.4	-25°57.8	-4.0	56.0
Su 26	319°03.1	333°30.4	347°57.7	2°25.0	16°52.4	31°19.7	45°47.1	60°14.5	74°41.9	89°09.4	103°36.8	+27.4	15.1
	-26°30.9	-26°32.0	-26°32.9	-26°33.7	-26°34.3	-26°34.8	-26°35.1	-26°35.3	-26°35.3	-26°35.2	-26°35.0	-0.4	55.5
● Mo 27	320°32.5	335°00.5	349°28.6	3°56.7	18°24.8	32°53.1	47°21.3	61°49.6	76°18.0	90°46.4	105°14.9	+28.2	15.0
	-26°14.5	-26°12.0	-26°09.4	-26°06.7	-26°03.8	-26°00.8	-25°57.6	-25°54.4	-25°51.0	-25°47.4	-25°43.8	+3.1	55.1
Tu 28	322°29.1	336°58.6	351°28.1	5°57.7	20°27.4	34°57.1	49°26.9	63°56.8	78°26.7	92°56.8	107°26.9	+29.8	14.9
	-24°33.7	-24°28.0	-24°22.3	-24°16.4	-24°10.4	-24°04.3	-23°58.1	-23°51.8	-23°45.4	-23°38.8	-23°32.2	+6.2	54.7
We 29	325°07.2	339°38.4	354°09.8	8°41.2	23°12.7	37°44.3	52°16.0	66°47.7	81°19.5	95°51.4	110°23.3	+31.6	14.8
	-21°39.9	-21°31.7	-21°23.3	-21°14.9	-21°06.3	-20°57.7	-20°49.0	-20°40.2	-20°31.3	-20°22.3	-20°13.3	+8.7	54.4
Th 30	328°31.2	343°04.3	357°37.5	12°10.7	26°44.0	41°17.3	55°50.7	70°24.2	84°57.8	99°31.4	114°05.0	+33.4	14.8
	-17°47.8	-17°37.6	-17°27.2	-17°16.8	-17°06.3	-16°55.7	-16°45.1	-16°34.4	-16°23.7	-16°12.9	-16°02.0	+10.6	54.1
Fr 31	332°37.1	347°11.7	1°46.3	16°21.0	30°55.7	45°30.4	60°05.3	74°40.1	89°15.0	103°50.0	118°25.0	+34.8	14.7
	-13°12.2	-13°00.4	-12°48.7	-12°36.8	-12°25.0	-12°13.0	-12°01.1	-11°49.1	-11°37.0	-11°24.9	-11°12.8	+11.9	54.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 05h22 — FM: 13 16h08 — LQ: 20 09h10 — NM: 27 20h12

SUN

January 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°11.7	284°11.4	299°11.1	314°10.8	329°10.5	344°10.2	359°09.9	14°09.6	29°09.3	44°09.0	59°08.7	74°08.5	-0.3
	-23°02.1	-23°01.9	-23°01.7	-23°01.5	-23°01.3	-23°01.1	-23°00.9	-23°00.7	-23°00.5	-23°00.3	-23°00.1	-22°59.9	+0.2
Su 2	269°04.6	284°04.3	299°04.0	314°03.7	329°03.5	344°03.2	359°02.9	14°02.6	29°02.3	44°02.0	59°01.7	74°01.4	-0.3
	-22°57.1	-22°56.9	-22°56.7	-22°56.5	-22°56.2	-22°56.0	-22°55.8	-22°55.6	-22°55.3	-22°55.1	-22°54.9	-22°54.7	+0.2
Mo 3	268°57.6	283°57.3	298°57.0	313°56.8	328°56.5	343°56.2	358°55.9	13°55.6	28°55.3	43°55.0	58°54.7	73°54.4	-0.3
	-22°51.7	-22°51.4	-22°51.2	-22°51.0	-22°50.7	-22°50.5	-22°50.3	-22°50.0	-22°49.8	-22°49.5	-22°49.3	-22°49.0	+0.2
Tu 4	268°50.7	283°50.4	298°50.2	313°49.9	328°49.6	343°49.3	358°49.0	13°48.7	28°48.4	43°48.2	58°47.9	73°47.6	-0.3
	-22°45.8	-22°45.5	-22°45.3	-22°45.0	-22°44.8	-22°44.5	-22°44.3	-22°44.0	-22°43.7	-22°43.5	-22°43.2	-22°42.9	+0.3
We 5	268°43.9	283°43.6	298°43.4	313°43.1	328°42.8	343°42.5	358°42.2	13°42.0	28°41.7	43°41.4	58°41.1	73°40.8	-0.3
	-22°39.5	-22°39.2	-22°38.9	-22°38.6	-22°38.4	-22°38.1	-22°37.8	-22°37.5	-22°37.2	-22°37.0	-22°36.7	-22°36.4	+0.3
Th 6	268°37.2	283°37.0	298°36.7	313°36.4	328°36.1	343°35.9	358°35.6	13°35.3	28°35.0	43°34.8	58°34.5	73°34.2	-0.3
	-22°32.7	-22°32.4	-22°32.1	-22°31.8	-22°31.5	-22°31.2	-22°30.9	-22°30.6	-22°30.3	-22°30.0	-22°29.7	-22°29.4	+0.3
Fr 7	268°30.7	283°30.4	298°30.1	313°29.8	328°29.6	343°29.3	358°29.0	13°28.8	28°28.5	43°28.2	58°28.0	73°27.7	-0.3
	-22°25.4	-22°25.1	-22°24.8	-22°24.5	-22°24.2	-22°23.9	-22°23.6	-22°23.3	-22°22.9	-22°22.6	-22°22.3	-22°22.0	+0.3
Sa 8	268°24.2	283°23.9	298°23.7	313°23.4	328°23.1	343°22.9	358°22.6	13°22.4	28°22.1	43°21.8	58°21.6	73°21.3	-0.3
	-22°17.8	-22°17.5	-22°17.1	-22°16.8	-22°16.5	-22°16.1	-22°15.8	-22°15.5	-22°15.1	-22°14.8	-22°14.5	-22°14.1	+0.3
Su 9	268°17.9	283°17.6	298°17.4	313°17.1	328°16.9	343°16.6	358°16.3	13°16.1	28°15.8	43°15.6	58°15.3	73°15.0	-0.3
	-22°09.7	-22°09.3	-22°09.0	-22°08.6	-22°08.3	-22°07.9	-22°07.6	-22°07.2	-22°06.9	-22°06.5	-22°06.2	-22°05.8	+0.4
Mo 10	268°11.7	283°11.5	298°11.2	313°10.9	328°10.7	343°10.4	358°10.2	13°09.9	28°09.7	43°09.4	58°09.2	73°08.9	-0.3
	-22°01.1	-22°00.8	-22°00.4	-22°00.0	-21°59.7	-21°59.3	-21°58.9	-21°58.6	-21°58.2	-21°57.8	-21°57.5	-21°57.1	+0.4
Tu 11	268°05.7	283°05.4	298°05.2	313°04.9	328°04.7	343°04.4	358°04.2	13°03.9	28°03.7	43°03.4	58°03.2	73°02.9	-0.2
	-21°52.2	-21°51.8	-21°51.4	-21°51.0	-21°50.6	-21°50.2	-21°49.9	-21°49.5	-21°49.1	-21°48.7	-21°48.3	-21°47.9	+0.4
We 12	267°59.8	282°59.5	297°59.3	312°59.0	327°58.8	342°58.6	357°58.3	12°58.1	27°57.8	42°57.6	57°57.4	72°57.1	-0.2
	-21°42.8	-21°42.4	-21°42.0	-21°41.6	-21°41.2	-21°40.8	-21°40.4	-21°40.0	-21°39.6	-21°39.1	-21°38.7	-21°38.3	+0.4
Th 13	267°54.0	282°53.8	297°53.6	312°53.3	327°53.1	342°52.9	357°52.6	12°52.4	27°52.1	42°51.9	57°51.7	72°51.4	-0.2
	-21°33.0	-21°32.5	-21°32.1	-21°31.7	-21°31.3	-21°30.9	-21°30.4	-21°30.0	-21°29.6	-21°29.2	-21°28.8	-21°28.3	+0.4
Fr 14	267°48.4	282°48.2	297°48.0	312°47.7	327°47.5	342°47.3	357°47.1	12°46.8	27°46.6	42°46.4	57°46.2	72°45.9	-0.2
	-21°22.7	-21°22.3	-21°21.9	-21°21.4	-21°21.0	-21°20.6	-21°20.1	-21°19.7	-21°19.2	-21°18.8	-21°18.3	-21°17.9	+0.4
Sa 15	267°43.0	282°42.8	297°42.6	312°42.3	327°42.1	342°41.9	357°41.7	12°41.4	27°41.2	42°41.0	57°40.8	72°40.6	-0.2
	-21°12.1	-21°11.6	-21°11.2	-21°10.7	-21°10.3	-21°09.8	-21°09.4	-21°08.9	-21°08.5	-21°08.0	-21°07.5	-21°07.1	+0.5
Su 16	267°37.7	282°37.5	297°37.3	312°37.1	327°36.9	342°36.6	357°36.4	12°36.2	27°36.0	42°35.8	57°35.6	72°35.4	-0.2
	-21°01.0	-21°00.6	-21°00.1	-20°59.6	-20°59.2	-20°58.7	-20°58.2	-20°57.7	-20°57.3	-20°56.8	-20°56.3	-20°55.8	+0.5
Mo 17	267°32.6	282°32.4	297°32.2	312°32.0	327°31.8	342°31.6	357°31.4	12°31.2	27°31.0	42°30.7	57°30.5	72°30.3	-0.2
	-20°49.6	-20°49.1	-20°48.6	-20°48.1	-20°47.6	-20°47.2	-20°46.7	-20°46.2	-20°45.7	-20°45.2	-20°44.7	-20°44.2	+0.5
Tu 18	267°27.7	282°27.5	297°27.3	312°27.1	327°26.9	342°26.7	357°26.5	12°26.3	27°26.1	42°25.9	57°25.7	72°25.5	-0.2
	-20°37.7	-20°37.2	-20°36.7	-20°36.2	-20°35.7	-20°35.2	-20°34.7	-20°34.2	-20°33.7	-20°33.2	-20°32.7	-20°32.2	+0.5
We 19	267°22.9	282°22.7	297°22.5	312°22.3	327°22.1	342°21.9	357°21.7	12°21.6	27°21.4	42°21.2	57°21.0	72°20.8	-0.2
	-20°25.5	-20°25.0	-20°24.5	-20°23.9	-20°23.4	-20°22.9	-20°22.4	-20°21.8	-20°21.3	-20°20.8	-20°20.3	-20°19.8	+0.5
Th 20	267°18.3	282°18.1	297°17.9	312°17.8	327°17.6	342°17.4	357°17.2	12°17.0	27°16.8	42°16.6	57°16.5	72°16.3	-0.2
	-20°12.9	-20°12.3	-20°11.8	-20°11.3	-20°10.7	-20°10.2	-20°09.6	-20°09.1	-20°08.6	-20°08.0	-20°07.5	-20°06.9	+0.5
Fr 21	267°13.9	282°13.7	297°13.6	312°13.4	327°13.2	342°13.0	357°12.8	12°12.7	27°12.5	42°12.3	57°12.1	72°12.0	-0.2
	-19°59.8	-19°59.3	-19°58.7	-19°58.2	-19°57.6	-19°57.1	-19°56.5	-19°56.0	-19°55.4	-19°54.9	-19°54.3	-19°53.8	+0.6
Sa 22	267°09.7	282°09.5	297°09.3	312°09.2	327°09.0	342°08.8	357°08.7	12°08.5	27°08.3	42°08.2	57°08.0	72°07.8	-0.2
	-19°46.5	-19°45.9	-19°45.3	-19°44.8	-19°44.2	-19°43.6	-19°43.1	-19°42.5	-19°41.9	-19°41.3	-19°40.8	-19°40.2	+0.6
Su 23	267°05.6	282°05.5	297°05.3	312°05.2	327°05.0	342°04.8	357°04.7	12°04.5	27°04.3	42°04.2	57°04.0	72°03.9	-0.2
	-19°32.7	-19°32.1	-19°31.5	-19°31.0	-19°30.4	-19°29.8	-19°29.2	-19°28.6	-19°28.0	-19°27.4	-19°26.9	-19°26.3	+0.6
Mo 24	267°01.8	282°01.6	297°01.5	312°01.3	327°01.2	342°01.0	357°00.9	12°00.7	27°00.6	42°00.4	57°00.3	72°00.1	-0.2
	-19°18.6	-19°18.0	-19°17.4	-19°16.8	-19°16.2	-19°15.6	-19°15.0	-19°14.4	-19°13.8	-19°13.2	-19°12.6	-19°12.0	+0.6
Tu 25	266°58.1	281°58.0	296°57.9	311°57.7	326°57.6	341°57.4	356°57.3	11°57.1	26°57.0	41°56.8	56°56.7	71°56.5	-0.1
	-19°04.1	-19°03.5	-19°02.9	-19°02.3	-19°01.7	-19°01.0	-19°00.4	-18°59.8	-18°59.2	-18°58.6	-18°58.0	-18°57.4	+0.6
We 26	266°54.7	281°54.6	296°54.4	311°54.3	326°54.1	341°54.0	356°53.9	11°53.7	26°53.6	41°53.4	56°53.3	71°53.2	-0.1
	-18°49.3	-18°48.7	-18°48.0	-18°47.4	-18°46.8	-18°46.1	-18°45.5	-18°44.9	-18°44.3	-18°43.6	-18°43.0	-18°42.4	+0.6
Th 27	266°51.4	281°51.3	296°51.2	311°51.0	326°50.9	341°50.8	356°50.7	11°50.5	26°50.4	41°50.3	56°50.1	71°50.0	-0.1
	-18°34.1	-18°33.5	-18°32.8	-18°32.2	-18°31.5	-18°30.9	-18°30.3	-18°29.6	-18°29.0	-18°28.3	-18°27.7	-18°27.0	+0.6
Fr 28	266°48.4	281°48.3	296°48.1	311°48.0	326°47.9	341°47.8	356°47.6	11°47.5	26°47.4	41°47.3	56°47.2	71°47.0	-0.1
	-18°18.6	-18°17.9	-18°17.3	-18°16.6	-18°16.0	-18°15.3	-18°14.7	-18°14.0	-18°13.4	-18°12.7	-18°12.0	-18°11.4	+0.7
Sa 29	266°45.5	281°45.4	296°45.3	311°45.2	326°45.1	341°45.0	356°44.8	11°44.7	26°44.6	41°44.5	56°44.4	71°44.3	-0.1
	-18°02.8	-18°02.1	-18°01.4	-18°00.8	-18°00.1	-17°59.4	-17°58.8	-17°58.1	-17°57.4	-17°56.7	-17°56.1	-17°55.4	+0.7
Su 30	266°42.9	281°42.8	296°42.7	311°42.6	326°42.5	341°42.4	356°42.3	11°42.1	26°42.0	41°41.9	56°41.8	71°41.7	-0.1
	-17°46.6	-17°45.9	-17°45.2	-17°44.6	-17°43.9	-17°43.2	-17°42.5	-17°41.8	-17°41.1	-17°40.5	-17°39.8	-17°39.1	+0.7
Mo 31	266°40.4	281°40.3	296°40.2	311°40.2	326°40.1	341°40.0	356°39.9	11°39.8	26°39.7	41°39.6	56°39.5	71°39.4	-0.1
	-17°30.1	-17°29.4	-17°28.7	-17°28.0	-17°27.3	-17°26.7	-17°26.0	-17°25.3	-17°24.6	-17°23.9	-17°23.2	-17°22.5	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2028

D	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h	SH
Sa 1	249°41.7	264°17.0	278°52.4	293°27.9	308°03.4	322°38.9	337°14.4	351°49.9	6°25.5	21°01.1	35°36.8	+35.5	14.7
	-9°21.9	-9°09.4	-8°56.8	-8°44.2	-8°31.6	-8°19.0	-8°06.4	-7°53.7	-7°40.9	-7°28.2	-7°15.4	+12.6	54.0
Su 2	254°33.7	269°09.6	283°45.5	298°21.4	312°57.4	327°33.3	342°09.2	356°45.2	11°21.1	25°57.0	40°33.0	+35.9	14.8
	-4°00.9	-3°47.8	-3°34.7	-3°21.5	-3°08.3	-2°55.2	-2°42.0	-2°28.7	-2°15.5	-2°02.3	-1°49.0	+13.2	54.1
Mo 3	259°31.3	274°07.1	288°42.8	303°18.6	317°54.3	332°30.0	347°05.7	1°41.3	16°16.9	30°52.5	45°28.1	+35.7	14.8
	1°30.6	1°44.0	1°57.3	2°10.6	2°24.0	2°37.3	2°50.7	3°04.0	3°17.3	3°30.7	3°44.0	+13.3	54.4
Tu 4	264°17.4	278°52.4	293°27.3	308°02.1	322°37.0	337°11.7	351°46.4	6°21.1	20°55.6	35°30.2	50°04.7	+34.7	15.0
	7°02.7	7°15.8	7°29.0	7°42.1	7°55.2	8°08.2	8°21.3	8°34.3	8°47.3	9°00.3	9°13.3	+13.1	54.9
◐ We 5	268°34.0	283°07.4	297°40.7	312°13.9	326°47.1	341°20.2	355°53.1	10°26.1	24°58.9	39°31.6	54°04.2	+33.0	15.2
	12°24.2	12°36.7	12°49.1	13°01.5	13°13.8	13°26.1	13°38.4	13°50.6	14°02.7	14°14.8	14°26.9	+12.3	55.6
Th 6	272°02.7	286°33.8	301°04.8	315°35.7	330°06.5	344°37.2	359°07.7	13°38.2	28°08.5	42°38.8	57°08.9	+30.6	15.4
	17°21.4	17°32.5	17°43.6	17°54.6	18°05.6	18°16.4	18°27.2	18°37.9	18°48.6	18°59.1	19°09.6	+10.8	56.4
Fr 7	274°27.1	288°55.3	303°23.5	317°51.5	332°19.4	346°47.2	1°14.9	15°42.4	30°09.8	44°37.1	59°04.3	+27.7	15.6
	21°36.3	21°45.4	21°54.3	22°03.1	22°11.8	22°20.3	22°28.8	22°37.2	22°45.4	22°53.6	23°01.6	+8.5	57.4
Sa 8	275°37.7	290°03.0	304°28.2	318°53.2	333°18.2	347°43.0	2°07.8	16°32.4	30°56.9	45°21.4	59°45.7	+24.8	15.9
	24°46.5	24°52.4	24°58.2	25°03.8	25°09.3	25°14.6	25°19.8	25°24.8	25°29.6	25°34.3	25°38.9	+5.2	58.4
Su 9	275°39.2	290°02.1	304°24.9	318°47.7	333°10.3	347°33.0	1°55.5	16°18.0	30°40.5	45°02.8	59°25.2	+22.6	16.2
	26°27.1	26°28.9	26°30.5	26°32.0	26°33.3	26°34.4	26°35.3	26°36.1	26°36.6	26°37.0	26°37.1	+1.0	59.3
Mo 10	274°55.5	289°17.4	303°39.2	318°01.0	332°22.8	346°44.7	1°06.5	15°28.3	29°50.1	44°12.0	58°33.9	+21.8	16.4
	26°16.9	26°14.0	26°10.9	26°07.6	26°04.2	26°00.5	25°56.7	25°52.6	25°48.4	25°43.9	25°39.3	-3.8	60.1
Tu 11	274°05.2	288°27.6	302°50.1	317°12.6	331°35.2	345°57.8	0°20.5	14°43.3	29°06.1	43°29.0	57°52.0	+22.7	16.6
	24°07.3	23°59.7	23°51.9	23°43.9	23°35.8	23°27.5	23°19.0	23°10.3	23°01.5	22°52.5	22°43.3	-8.4	60.7
○ We 12	273°45.6	288°09.8	302°34.2	316°58.6	331°23.1	345°47.6	0°12.3	14°37.1	29°01.9	43°26.9	57°51.9	+24.6	16.6
	20°06.8	19°55.2	19°43.5	19°31.6	19°19.5	19°07.4	18°55.1	18°42.7	18°30.1	18°17.5	18°04.7	-12.2	61.0
Th 13	274°18.3	288°44.8	303°11.4	317°38.0	332°04.8	346°31.6	0°58.5	15°25.5	29°52.6	44°19.8	58°47.0	+26.9	16.6
	14°39.5	14°25.1	14°10.5	13°55.9	13°41.2	13°26.4	13°11.5	12°56.5	12°41.5	12°26.4	12°11.2	-14.8	60.9
Fr 14	275°45.3	290°13.7	304°42.3	319°10.9	333°39.6	348°08.3	2°37.1	17°06.0	31°34.9	46°03.9	60°32.9	+28.8	16.5
	8°16.8	8°00.7	7°44.7	7°28.6	7°12.5	6°56.4	6°40.2	6°24.0	6°07.8	5°51.6	5°35.3	-16.1	60.6
Sa 15	277°54.8	292°24.7	306°54.5	321°24.4	335°54.4	350°24.3	4°54.3	19°24.4	33°54.4	48°24.5	62°54.7	+30.0	16.3
	1°30.3	1°14.0	0°57.7	0°41.3	0°25.0	0°08.7	-0°07.5	-0°23.8	-0°40.0	-0°56.2	-1°12.4	-16.3	59.9
Su 16	280°29.2	294°59.6	309°30.0	324°00.5	338°30.9	353°01.4	7°31.8	22°02.3	36°32.7	51°03.2	65°33.6	+30.5	16.1
	-5°11.8	-5°27.4	-5°43.0	-5°58.6	-6°14.1	-6°29.6	-6°45.0	-7°00.3	-7°15.6	-7°30.9	-7°46.1	-15.4	59.2
Mo 17	294°59.6	309°30.0	324°00.5	338°30.9	353°01.4	7°31.8	22°02.3	36°32.7	51°03.2	65°33.6	80°04.1	+30.5	16.1
	-5°27.4	-5°43.0	-5°58.6	-6°14.1	-6°29.6	-6°45.0	-7°00.3	-7°15.6	-7°30.9	-7°46.1	-8°01.2	-15.4	59.2
◑ Tu 18	297°40.1	312°10.4	326°40.6	341°10.9	355°41.1	10°11.4	24°41.6	39°11.7	53°41.9	68°12.0	82°42.1	+30.2	15.9
	-11°40.5	-11°54.5	-12°08.5	-12°22.4	-12°36.2	-12°50.0	-13°03.6	-13°17.2	-13°30.7	-13°44.1	-13°57.4	-13.7	58.3
We 19	300°10.4	314°40.0	329°09.6	343°39.2	358°08.7	12°38.2	27°07.7	41°37.1	56°06.5	70°35.9	85°05.2	+29.5	15.7
	-17°06.3	-17°18.1	-17°29.8	-17°41.4	-17°52.9	-18°04.3	-18°15.6	-18°26.8	-18°37.9	-18°48.9	-18°59.7	-11.3	57.5
Th 20	302°20.6	316°49.3	331°18.0	345°46.7	0°15.3	14°43.9	29°12.4	43°40.9	58°09.4	72°37.8	87°06.2	+28.6	15.5
	-21°29.0	-21°38.1	-21°46.9	-21°55.7	-22°04.3	-22°12.9	-22°21.2	-22°29.5	-22°37.6	-22°45.7	-22°53.5	-8.5	56.8
Fr 21	304°08.7	318°36.6	333°04.5	347°32.4	2°00.3	16°28.1	30°55.9	45°23.8	59°51.5	74°19.3	88°47.1	+27.8	15.3
	-24°36.1	-24°41.8	-24°47.5	-24°53.0	-24°58.3	-25°03.5	-25°08.6	-25°13.6	-25°18.4	-25°23.0	-25°27.5	-5.1	56.1
Sa 22	305°42.2	320°09.8	334°37.4	349°05.1	3°32.7	18°00.4	32°28.0	46°55.7	61°23.4	75°51.1	90°18.8	+27.7	15.1
	-26°18.5	-26°20.8	-26°22.9	-26°24.9	-26°26.7	-26°28.4	-26°30.0	-26°31.4	-26°32.7	-26°33.8	-26°34.8	-1.6	55.5
Su 23	307°16.5	321°44.6	336°12.7	350°40.8	5°09.0	19°37.2	34°05.4	48°33.7	63°02.0	77°30.3	91°58.7	+28.2	15.0
	-26°32.9	-26°31.6	-26°30.2	-26°28.7	-26°27.1	-26°25.3	-26°23.4	-26°21.3	-26°19.1	-26°16.8	-26°14.4	+1.9	55.0
Mo 24	309°10.3	323°39.4	338°08.7	352°38.0	7°07.4	21°36.8	36°06.2	50°35.8	65°05.4	79°35.0	94°04.8	+29.4	14.9
	-25°22.0	-25°17.5	-25°12.9	-25°08.1	-25°03.3	-24°58.3	-24°53.2	-24°48.0	-24°42.6	-24°37.2	-24°31.6	+5.0	54.6
Tu 25	311°38.4	326°09.2	340°40.1	355°11.0	9°42.0	24°13.0	38°44.1	53°15.3	67°46.6	82°17.9	96°49.3	+31.1	14.8
	-22°54.7	-22°47.4	-22°40.0	-22°32.5	-22°24.9	-22°17.1	-22°09.3	-22°01.4	-21°53.4	-21°45.3	-21°37.1	+7.8	54.3
● We 26	314°48.7	329°21.2	343°53.7	358°26.4	12°59.1	27°31.8	42°04.6	56°37.5	71°10.5	85°43.5	100°16.6	+32.8	14.7
	-19°23.6	-19°14.1	-19°04.4	-18°54.7	-18°44.9	-18°35.0	-18°25.1	-18°15.1	-18°05.0	-17°54.8	-17°44.5	+9.9	54.1
Th 27	318°40.3	333°14.4	347°48.5	2°22.6	16°56.8	31°31.1	46°05.4	60°39.8	75°14.2	89°48.7	104°23.2	+34.3	14.7
	-15°03.0	-14°51.8	-14°40.5	-14°29.1	-14°17.7	-14°06.2	-13°54.7	-13°43.1	-13°31.5	-13°19.8	-13°08.1	+11.5	53.9
Fr 28	323°06.4	337°41.6	352°16.9	6°52.1	21°27.5	36°02.8	50°38.2	65°13.6	79°49.1	94°24.5	109°00.1	+35.4	14.7
	-10°06.9	-9°54.5	-9°42.0	-9°29.5	-9°17.0	-9°04.5	-8°51.9	-8°39.3	-8°26.7	-8°14.0	-8°01.3	+12.6	53.9
Sa 29	327°55.7	342°31.6	357°07.4	11°43.3	26°19.2	40°55.2	55°31.1	70°07.0	84°43.0	99°18.9	113°54.9	+35.9	14.7
	-4°47.9	-4°34.8	-4°21.8	-4°08.7	-3°55.5	-3°42.4	-3°29.3	-3°16.1	-3°02.9	-2°49.8	-2°36.6	+13.1	54.0
Su 30	332°54.5	347°30.5	2°06.4	16°42.3	31°18.3	45°54.2	60°30.0	75°05.9	89°41.8	104°17.6	118°53.4	+35.9	14.8
	0°42.2	0°55.5	1°08.8	1°22.1	1°35.4	1°48.7	2°01.9	2°15.2	2°28.5	2°41.7	2°55.0	+13.3	54.1
Mo 31	337°47.9	352°23.3	6°58.6	21°34.0	36°09.2	50°44.5	65°19.7	79°54.8	94°30.0	109°05.0	123°40.1	+35.2	14.8
	6°12.7	6°25.8	6°38.8	6°51.9	7°04.9	7°17.9	7°30.9	7°43.8	7°56.8	8°09.7	8°22.5	+13.0	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 5 01h40 — FM: 12 04h03 — LQ: 18 19h25 — NM: 26 15h12

SUN

February 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	266°38.2	281°38.1	296°38.0	311°37.9	326°37.9	341°37.8	356°37.7	11°37.6	26°37.5	41°37.4	56°37.3	71°37.3	-0.1
	-17°13.3	-17°12.6	-17°11.9	-17°11.2	-17°10.5	-17°09.8	-17°09.1	-17°08.4	-17°07.7	-17°07.0	-17°06.3	-17°05.5	+0.7
We 2	266°36.2	281°36.1	296°36.0	311°35.9	326°35.9	341°35.8	356°35.7	11°35.6	26°35.6	41°35.5	56°35.4	71°35.3	-0.1
	-16°56.2	-16°55.5	-16°54.8	-16°54.1	-16°53.4	-16°52.6	-16°51.9	-16°51.2	-16°50.5	-16°49.8	-16°49.0	-16°48.3	+0.7
Th 3	266°34.4	281°34.3	296°34.2	311°34.2	326°34.1	341°34.0	356°33.9	11°33.9	26°33.8	41°33.7	56°33.7	71°33.6	-0.1
	-16°38.9	-16°38.1	-16°37.4	-16°36.7	-16°35.9	-16°35.2	-16°34.5	-16°33.7	-16°33.0	-16°32.3	-16°31.5	-16°30.8	+0.7
Fr 4	266°32.8	281°32.7	296°32.6	311°32.6	326°32.5	341°32.5	356°32.4	11°32.3	26°32.3	41°32.2	56°32.2	71°32.1	-0.1
	-16°21.2	-16°20.4	-16°19.7	-16°19.0	-16°18.2	-16°17.5	-16°16.7	-16°16.0	-16°15.2	-16°14.5	-16°13.7	-16°13.0	+0.7
Sa 5	266°31.4	281°31.3	296°31.3	311°31.2	326°31.1	341°31.1	356°31.0	11°31.0	26°30.9	41°30.9	56°30.8	71°30.8	-0.1
	-16°03.2	-16°02.5	-16°01.7	-16°01.0	-16°00.2	-15°59.5	-15°58.7	-15°57.9	-15°57.2	-15°56.4	-15°55.7	-15°54.9	+0.8
Su 6	266°30.2	281°30.1	296°30.1	311°30.0	326°30.0	341°29.9	356°29.9	11°29.9	26°29.8	41°29.8	56°29.7	71°29.7	-0.0
	-15°45.0	-15°44.2	-15°43.5	-15°42.7	-15°41.9	-15°41.2	-15°40.4	-15°39.6	-15°38.9	-15°38.1	-15°37.3	-15°36.6	+0.8
Mo 7	266°29.2	281°29.1	296°29.1	311°29.1	326°29.0	341°29.0	356°29.0	11°28.9	26°28.9	41°28.9	56°28.8	71°28.8	-0.0
	-15°26.5	-15°25.7	-15°24.9	-15°24.2	-15°23.4	-15°22.6	-15°21.8	-15°21.1	-15°20.3	-15°19.5	-15°18.7	-15°17.9	+0.8
Tu 8	266°28.4	281°28.4	296°28.3	311°28.3	326°28.3	341°28.3	356°28.2	11°28.2	26°28.2	41°28.1	56°28.1	71°28.1	-0.0
	-15°07.7	-15°07.0	-15°06.2	-15°05.4	-15°04.6	-15°03.8	-15°03.0	-15°02.2	-15°01.4	-15°00.6	-14°59.8	-14°59.1	+0.8
We 9	266°27.8	281°27.8	296°27.8	311°27.7	326°27.7	341°27.7	356°27.7	11°27.7	26°27.7	41°27.6	56°27.6	71°27.6	-0.0
	-14°48.7	-14°47.9	-14°47.1	-14°46.3	-14°45.5	-14°44.7	-14°43.9	-14°43.1	-14°42.3	-14°41.5	-14°40.7	-14°39.9	+0.8
Th 10	266°27.4	281°27.4	296°27.4	311°27.4	326°27.4	341°27.4	356°27.4	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	-0.0
	-14°29.5	-14°28.7	-14°27.8	-14°27.0	-14°26.2	-14°25.4	-14°24.6	-14°23.8	-14°23.0	-14°22.2	-14°21.4	-14°20.6	+0.8
Fr 11	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.2	11°27.2	26°27.2	41°27.2	56°27.2	71°27.2	-0.0
	-14°10.0	-14°09.1	-14°08.3	-14°07.5	-14°06.7	-14°05.9	-14°05.0	-14°04.2	-14°03.4	-14°02.6	-14°01.8	-14°00.9	+0.8
Sa 12	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.3	356°27.3	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	+0.0
	-13°50.2	-13°49.4	-13°48.6	-13°47.7	-13°46.9	-13°46.1	-13°45.2	-13°44.4	-13°43.6	-13°42.8	-13°41.9	-13°41.1	+0.8
Su 13	266°27.4	281°27.4	296°27.4	311°27.5	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.5	56°27.5	71°27.6	+0.0
	-13°30.2	-13°29.4	-13°28.6	-13°27.7	-13°26.9	-13°26.1	-13°25.2	-13°24.4	-13°23.5	-13°22.7	-13°21.9	-13°21.0	+0.8
Mo 14	266°27.8	281°27.8	296°27.8	311°27.8	326°27.9	341°27.9	356°27.9	11°27.9	26°28.0	41°28.0	56°28.0	71°28.0	+0.0
	-13°10.1	-13°09.2	-13°08.4	-13°07.5	-13°06.7	-13°05.8	-13°05.0	-13°04.1	-13°03.3	-13°02.4	-13°01.6	-13°00.7	+0.8
Tu 15	266°28.3	281°28.4	296°28.4	311°28.4	326°28.5	341°28.5	356°28.5	11°28.5	26°28.6	41°28.6	56°28.6	71°28.7	+0.0
	-12°49.6	-12°48.8	-12°47.9	-12°47.1	-12°46.2	-12°45.4	-12°44.5	-12°43.7	-12°42.8	-12°41.9	-12°41.1	-12°40.2	+0.9
We 16	266°29.1	281°29.1	296°29.1	311°29.2	326°29.2	341°29.2	356°29.3	11°29.3	26°29.4	41°29.4	56°29.4	71°29.5	+0.0
	-12°29.0	-12°28.2	-12°27.3	-12°26.4	-12°25.6	-12°24.7	-12°23.8	-12°23.0	-12°22.1	-12°21.2	-12°20.4	-12°19.5	+0.9
Th 17	266°30.0	281°30.0	296°30.1	311°30.1	326°30.1	341°30.2	356°30.2	11°30.3	26°30.3	41°30.4	56°30.4	71°30.5	+0.0
	-12°08.2	-12°07.3	-12°06.5	-12°05.6	-12°04.7	-12°03.8	-12°03.0	-12°02.1	-12°01.2	-12°00.3	-11°59.5	-11°58.6	+0.9
Fr 18	266°31.1	281°31.1	296°31.2	311°31.2	326°31.3	341°31.3	356°31.4	11°31.4	26°31.5	41°31.5	56°31.6	71°31.6	+0.1
	-11°47.2	-11°46.3	-11°45.4	-11°44.5	-11°43.7	-11°42.8	-11°41.9	-11°41.0	-11°40.1	-11°39.3	-11°38.4	-11°37.5	+0.9
Sa 19	266°32.3	281°32.4	296°32.4	311°32.5	326°32.5	341°32.6	356°32.6	11°32.7	26°32.8	41°32.8	56°32.9	71°32.9	+0.1
	-11°26.0	-11°25.1	-11°24.2	-11°23.3	-11°22.4	-11°21.5	-11°20.7	-11°19.8	-11°18.9	-11°18.0	-11°17.1	-11°16.2	+0.9
Su 20	266°33.7	281°33.8	296°33.8	311°33.9	326°34.0	341°34.0	356°34.1	11°34.2	26°34.2	41°34.3	56°34.3	71°34.4	+0.1
	-11°04.6	-11°03.7	-11°02.8	-11°01.9	-11°01.0	-11°00.1	-10°59.2	-10°58.3	-10°57.4	-10°56.5	-10°55.6	-10°54.7	+0.9
Mo 21	266°35.3	281°35.4	296°35.4	311°35.5	326°35.6	341°35.6	356°35.7	11°35.8	26°35.8	41°35.9	56°36.0	71°36.1	+0.1
	-10°43.0	-10°42.1	-10°41.2	-10°40.3	-10°39.4	-10°38.5	-10°37.6	-10°36.7	-10°35.8	-10°34.9	-10°34.0	-10°33.1	+0.9
Tu 22	266°37.0	281°37.1	296°37.2	311°37.2	326°37.3	341°37.4	356°37.5	11°37.5	26°37.6	41°37.7	56°37.8	71°37.9	+0.1
	-10°21.3	-10°20.4	-10°19.5	-10°18.6	-10°17.7	-10°16.8	-10°15.8	-10°14.9	-10°14.0	-10°13.1	-10°12.2	-10°11.3	+0.9
We 23	266°38.9	281°39.0	296°39.1	311°39.1	326°39.2	341°39.3	356°39.4	11°39.5	26°39.6	41°39.6	56°39.7	71°39.8	+0.1
	-9°59.4	-9°58.5	-9°57.6	-9°56.7	-9°55.7	-9°54.8	-9°53.9	-9°53.0	-9°52.1	-9°51.2	-9°50.2	-9°49.3	+0.9
Th 24	266°40.9	281°41.0	296°41.1	311°41.2	326°41.3	341°41.4	356°41.5	11°41.6	26°41.7	41°41.7	56°41.8	71°41.9	+0.1
	-9°37.4	-9°36.4	-9°35.5	-9°34.6	-9°33.7	-9°32.8	-9°31.8	-9°30.9	-9°30.0	-9°29.1	-9°28.1	-9°27.2	+0.9
Fr 25	266°43.1	281°43.2	296°43.3	311°43.4	326°43.5	341°43.6	356°43.7	11°43.8	26°43.9	41°44.0	56°44.1	71°44.2	+0.1
	-9°15.2	-9°14.3	-9°13.3	-9°12.4	-9°11.5	-9°10.5	-9°09.6	-9°08.7	-9°07.8	-9°06.8	-9°05.9	-9°05.0	+0.9
Sa 26	266°45.5	281°45.6	296°45.7	311°45.8	326°45.9	341°46.0	356°46.1	11°46.2	26°46.3	41°46.4	56°46.5	71°46.6	+0.1
	-8°52.9	-8°51.9	-8°51.0	-8°50.1	-8°49.1	-8°48.2	-8°47.3	-8°46.3	-8°45.4	-8°44.4	-8°43.5	-8°42.6	+0.9
Su 27	266°47.9	281°48.1	296°48.2	311°48.3	326°48.4	341°48.5	356°48.6	11°48.7	26°48.8	41°48.9	56°49.0	71°49.1	+0.1
	-8°30.4	-8°29.5	-8°28.5	-8°27.6	-8°26.6	-8°25.7	-8°24.8	-8°23.8	-8°22.9	-8°21.9	-8°21.0	-8°20.1	+0.9
Mo 28	266°50.6	281°50.7	296°50.8	311°50.9	326°51.0	341°51.1	356°51.2	11°51.4	26°51.5	41°51.6	56°51.7	71°51.8	+0.1
	-8°07.8	-8°06.9	-8°05.9	-8°05.0	-8°04.0	-8°03.1	-8°02.1	-8°01.2	-8°00.3	-7°59.3	-7°58.4	-7°57.4	+0.9
Tu 29	266°53.3	281°53.4	296°53.6	311°53.7	326°53.8	341°53.9	356°54.0	11°54.1	26°54.3	41°54.4	56°54.5	71°54.6	+0.1
	-7°45.1	-7°44.2	-7°43.2	-7°42.3	-7°41.3	-7°40.4	-7°39.4	-7°38.5	-7°37.5	-7°36.6	-7°35.6	-7°34.7	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2028

D	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	Δ'/h	SH
Tu 1	254°53.2	269°27.8	284°02.2	298°36.7	313°11.0	327°45.3	342°19.6	356°53.7	11°27.9	26°01.9	40°35.9	+34.3	14.9
	10°17.3	10°29.9	10°42.5	10°55.0	11°07.5	11°20.0	11°32.4	11°44.8	11°57.1	12°09.5	12°21.7	+12.4	54.8
We 2	258°57.4	273°30.2	288°02.9	302°35.6	317°08.2	331°40.6	346°13.0	0°45.4	15°17.6	29°49.7	44°21.8	+32.4	15.1
	15°20.5	15°32.0	15°43.5	15°54.9	16°06.2	16°17.5	16°28.8	16°39.9	16°51.0	17°02.1	17°13.0	+11.3	55.4
◐ Th 3	262°11.3	276°41.8	291°12.2	305°42.5	320°12.7	334°42.8	349°12.8	3°42.7	18°12.5	32°42.2	47°11.7	+30.0	15.3
	19°49.2	19°59.0	20°08.7	20°18.3	20°27.8	20°37.3	20°46.6	20°55.9	21°05.0	21°14.1	21°23.1	+9.4	56.1
Fr 4	264°22.3	278°50.1	293°17.8	307°45.4	322°12.9	336°40.3	351°07.6	5°34.7	20°01.8	34°28.8	48°55.6	+27.3	15.6
	23°25.5	23°32.7	23°39.9	23°46.9	23°53.8	24°00.6	24°07.3	24°13.8	24°20.2	24°26.5	24°32.7	+6.7	57.0
Sa 5	265°25.8	279°51.0	294°16.1	308°41.1	323°06.1	337°30.9	351°55.7	6°20.3	20°44.9	35°09.4	49°33.8	+24.8	15.8
	25°48.5	25°52.3	25°56.1	25°59.6	26°03.1	26°06.3	26°09.4	26°12.4	26°15.2	26°17.8	26°20.3	+3.2	58.0
Su 6	265°31.1	279°54.5	294°17.7	308°40.9	323°04.1	337°27.2	351°50.3	6°13.3	20°36.3	34°59.3	49°22.2	+23.1	16.1
	26°36.9	26°36.6	26°36.1	26°35.5	26°34.6	26°33.6	26°32.4	26°31.0	26°29.5	26°27.7	26°25.8	-1.1	59.0
Mo 7	265°03.4	279°26.0	293°48.7	308°11.4	322°34.1	336°56.8	351°19.5	5°42.2	20°05.0	34°27.7	48°50.5	+22.7	16.4
	25°34.7	25°29.8	25°24.7	25°19.5	25°14.0	25°08.4	25°02.6	24°56.6	24°50.4	24°44.0	24°37.5	-5.7	60.0
Tu 8	264°36.1	278°59.5	293°22.9	307°46.4	322°09.9	336°33.5	350°57.1	5°20.8	19°44.6	34°08.4	48°32.2	+23.6	16.6
	22°38.0	22°28.6	22°19.1	22°09.4	21°59.6	21°49.6	21°39.4	21°29.1	21°18.6	21°08.0	20°57.2	-10.1	60.8
We 9	264°38.1	279°03.1	293°28.1	307°53.2	322°18.3	336°43.6	351°08.9	5°34.2	19°59.7	34°25.2	48°50.8	+25.3	16.7
	17°57.9	17°44.9	17°31.7	17°18.4	17°05.0	16°51.5	16°37.8	16°24.0	16°10.2	15°56.2	15°42.1	-13.6	61.3
○ Th 10	265°23.3	279°50.0	294°16.8	308°43.6	323°10.5	337°37.5	352°04.6	6°31.7	20°58.8	35°26.1	49°53.4	+27.0	16.7
	11°58.8	11°43.2	11°27.6	11°11.9	10°56.1	10°40.2	10°24.3	10°08.3	9°52.3	9°36.2	9°20.0	-15.9	61.4
Fr 11	266°49.6	281°17.8	295°46.0	310°14.2	324°42.5	339°10.9	353°39.3	8°07.7	22°36.1	37°04.6	51°33.2	+28.4	16.7
	5°12.3	4°55.5	4°38.7	4°21.9	4°05.1	3°48.3	3°31.4	3°14.5	2°57.7	2°40.8	2°23.9	-16.9	61.2
Sa 12	268°45.1	283°14.1	297°43.1	312°12.1	326°41.2	341°10.3	355°39.3	10°08.4	24°37.6	39°06.7	53°35.8	+29.1	16.5
	-1°48.6	-2°05.3	-2°22.0	-2°38.6	-2°55.2	-3°11.8	-3°28.3	-3°44.8	-4°01.3	-4°17.7	-4°34.1	-16.6	60.6
Su 13	270°53.5	285°22.7	299°51.9	314°21.0	328°50.2	343°19.4	357°48.5	12°17.6	26°46.8	41°15.9	55°45.0	+29.1	16.3
	-8°33.8	-8°49.3	-9°04.7	-9°20.1	-9°35.4	-9°50.6	-10°05.7	-10°20.8	-10°35.8	-10°50.7	-11°05.5	-15.2	59.8
Mo 14	272°59.6	287°28.4	301°57.2	316°26.0	330°54.8	345°23.5	359°52.2	14°20.9	28°49.5	43°18.2	57°46.8	+28.7	16.0
	-14°37.7	-14°51.1	-15°04.4	-15°17.6	-15°30.7	-15°43.6	-15°56.5	-16°09.3	-16°22.0	-16°34.5	-16°47.0	-12.9	58.9
Tu 15	274°52.6	289°20.7	303°48.9	318°17.0	332°45.1	347°13.1	1°41.2	16°09.1	30°37.1	45°05.1	59°33.0	+28.0	15.8
	-19°40.1	-19°50.6	-20°01.1	-20°11.4	-20°21.6	-20°31.7	-20°41.7	-20°51.5	-21°01.2	-21°10.8	-21°20.2	-10.0	57.9
We 16	289°20.7	303°48.9	318°17.0	332°45.1	347°13.1	1°41.2	16°09.1	30°37.1	45°05.1	59°33.0	74°00.9	+28.0	15.8
	-19°50.6	-20°01.1	-20°11.4	-20°21.6	-20°31.7	-20°41.7	-20°51.5	-21°01.2	-21°10.8	-21°20.2	-21°29.5	-9.9	57.8
◑ Th 17	290°56.3	305°23.9	319°51.4	334°18.9	348°46.3	3°13.8	17°41.2	32°08.7	46°36.1	61°03.5	75°30.9	+27.4	15.5
	-23°33.1	-23°40.2	-23°47.2	-23°54.1	-24°00.8	-24°07.4	-24°13.8	-24°20.1	-24°26.3	-24°32.3	-24°38.2	-6.5	56.9
Fr 18	292°20.8	306°48.1	321°15.5	335°42.8	350°10.1	4°37.4	19°04.8	33°32.1	47°59.5	62°26.9	76°54.3	+27.3	15.3
	-25°49.0	-25°52.5	-25°56.0	-25°59.2	-26°02.4	-26°05.3	-26°08.2	-26°10.9	-26°13.4	-26°15.8	-26°18.1	-2.9	56.1
Sa 19	293°47.4	308°15.2	322°42.9	337°10.7	351°38.6	6°06.5	20°34.4	35°02.3	49°30.3	63°58.3	78°26.4	+27.9	15.1
	-26°34.8	-26°34.8	-26°34.7	-26°34.4	-26°33.9	-26°33.3	-26°32.6	-26°31.8	-26°30.8	-26°29.7	-26°28.4	+0.6	55.4
Su 20	295°32.8	310°01.6	324°30.5	338°59.4	353°28.4	7°57.5	22°26.6	36°55.7	51°25.0	65°54.2	80°23.6	+29.1	14.9
	-25°53.4	-25°50.0	-25°46.5	-25°42.9	-25°39.2	-25°35.3	-25°31.3	-25°27.2	-25°22.9	-25°18.6	-25°14.1	+3.9	54.8
Mo 21	297°51.2	312°21.6	326°52.0	341°22.5	355°53.1	10°23.7	24°54.4	39°25.2	53°56.0	68°26.9	82°57.9	+30.7	14.8
	-23°52.8	-23°46.5	-23°40.1	-23°33.5	-23°26.9	-23°20.2	-23°13.3	-23°06.4	-22°59.3	-22°52.2	-22°44.9	+6.8	54.4
Tu 22	300°50.6	315°22.6	329°54.7	344°26.9	358°59.2	13°31.5	28°03.9	42°36.3	57°08.8	71°41.4	86°14.0	+32.4	14.8
	-20°44.7	-20°36.0	-20°27.2	-20°18.2	-20°09.2	-20°00.2	-19°51.0	-19°41.8	-19°32.4	-19°23.0	-19°13.6	+9.1	54.1
We 23	304°31.1	319°04.7	333°38.4	348°12.1	2°45.9	17°19.7	31°53.6	46°27.6	61°01.6	75°35.6	90°09.7	+33.9	14.7
	-16°42.5	-16°31.8	-16°21.1	-16°10.4	-15°59.6	-15°48.7	-15°37.8	-15°26.8	-15°15.7	-15°04.6	-14°53.4	+10.9	53.9
Th 24	308°47.1	323°21.9	337°56.8	352°31.7	7°06.7	21°41.7	36°16.7	50°51.8	65°26.9	80°02.0	94°37.2	+35.0	14.7
	-11°59.4	-11°47.4	-11°35.4	-11°23.3	-11°11.2	-10°59.0	-10°46.8	-10°34.6	-10°22.3	-10°10.0	-9°57.6	+12.2	53.9
● Fr 25	313°28.5	328°04.1	342°39.7	357°15.4	11°51.1	26°26.7	41°02.5	55°38.2	70°13.9	84°49.7	99°25.5	+35.7	14.7
	-6°48.3	-6°35.4	-6°22.6	-6°09.6	-5°56.7	-5°43.8	-5°30.8	-5°17.8	-5°04.8	-4°51.8	-4°38.7	+13.0	53.9
Sa 26	318°23.1	332°59.0	347°34.8	2°10.7	16°46.6	31°22.4	45°58.3	60°34.1	75°10.0	89°45.8	104°21.7	+35.9	14.7
	-1°21.1	-1°07.9	-0°54.6	-0°41.3	-0°28.1	-0°14.8	-0°01.5	0°11.8	0°25.1	0°38.4	0°51.6	+13.3	54.0
Su 27	323°17.4	337°53.0	352°28.5	7°04.1	21°39.5	36°15.0	50°50.4	65°25.8	80°01.2	94°36.6	109°11.9	+35.4	14.8
	4°10.5	4°23.7	4°36.9	4°50.0	5°03.2	5°16.3	5°29.5	5°42.6	5°55.7	6°08.7	6°21.8	+13.1	54.2
Mo 28	327°57.2	342°31.9	357°06.5	11°41.1	26°15.6	40°50.1	55°24.5	69°58.9	84°33.2	99°07.5	113°41.7	+34.5	14.9
	9°34.9	9°47.5	10°00.1	10°12.7	10°25.3	10°37.8	10°50.2	11°02.7	11°15.1	11°27.5	11°39.8	+12.5	54.6
Tu 29	332°07.9	346°41.1	1°14.2	15°47.3	30°20.3	44°53.3	59°26.1	73°58.9	88°31.7	103°04.3	117°36.9	+32.9	15.0
	14°39.3	14°50.9	15°02.4	15°13.9	15°25.3	15°36.6	15°47.9	15°59.2	16°10.3	16°21.4	16°32.5	+11.3	55.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 3 19h10 — FM: 10 15h03 — LQ: 17 08h08 — NM: 25 10h37

SUN

March 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	266°56.2	281°56.3	296°56.4	311°56.6	326°56.7	341°56.8	356°56.9	11°57.1	26°57.2	41°57.3	56°57.4	71°57.6	+0.1
	-7°22.3	-7°21.3	-7°20.4	-7°19.4	-7°18.5	-7°17.5	-7°16.6	-7°15.6	-7°14.7	-7°13.7	-7°12.8	-7°11.8	+1.0
Th 2	266°59.2	281°59.3	296°59.5	311°59.6	326°59.7	341°59.9	357°00.0	12°00.1	27°00.2	42°00.4	57°00.5	72°00.6	+0.1
	-6°59.4	-6°58.4	-6°57.5	-6°56.5	-6°55.6	-6°54.6	-6°53.6	-6°52.7	-6°51.7	-6°50.8	-6°49.8	-6°48.8	+1.0
Fr 3	267°02.3	282°02.5	297°02.6	312°02.7	327°02.9	342°03.0	357°03.1	12°03.3	27°03.4	42°03.6	57°03.7	72°03.8	+0.1
	-6°36.4	-6°35.4	-6°34.4	-6°33.5	-6°32.5	-6°31.6	-6°30.6	-6°29.6	-6°28.7	-6°27.7	-6°26.8	-6°25.8	+1.0
Sa 4	267°05.6	282°05.7	297°05.9	312°06.0	327°06.2	342°06.3	357°06.4	12°06.6	27°06.7	42°06.8	57°07.0	72°07.1	+0.1
	-6°13.3	-6°12.3	-6°11.3	-6°10.4	-6°09.4	-6°08.4	-6°07.5	-6°06.5	-6°05.5	-6°04.6	-6°03.6	-6°02.6	+1.0
Su 5	267°09.0	282°09.1	297°09.3	312°09.4	327°09.5	342°09.7	357°09.8	12°10.0	27°10.1	42°10.3	57°10.4	72°10.5	+0.1
	-5°50.1	-5°49.1	-5°48.1	-5°47.2	-5°46.2	-5°45.2	-5°44.3	-5°43.3	-5°42.3	-5°41.4	-5°40.4	-5°39.4	+1.0
Mo 6	267°12.4	282°12.6	297°12.7	312°12.9	327°13.0	342°13.2	357°13.3	12°13.5	27°13.6	42°13.8	57°13.9	72°14.1	+0.1
	-5°26.8	-5°25.8	-5°24.9	-5°23.9	-5°22.9	-5°22.0	-5°21.0	-5°20.0	-5°19.0	-5°18.1	-5°17.1	-5°16.1	+1.0
Tu 7	267°16.0	282°16.2	297°16.3	312°16.5	327°16.6	342°16.8	357°16.9	12°17.1	27°17.2	42°17.4	57°17.6	72°17.7	+0.2
	-5°03.5	-5°02.5	-5°01.5	-5°00.6	-4°59.6	-4°58.6	-4°57.6	-4°56.7	-4°55.7	-4°54.7	-4°53.7	-4°52.8	+1.0
We 8	267°19.7	282°19.9	297°20.0	312°20.2	327°20.3	342°20.5	357°20.6	12°20.8	27°21.0	42°21.1	57°21.3	72°21.4	+0.2
	-4°40.1	-4°39.1	-4°38.1	-4°37.1	-4°36.2	-4°35.2	-4°34.2	-4°33.2	-4°32.3	-4°31.3	-4°30.3	-4°29.3	+1.0
Th 9	267°23.5	282°23.6	297°23.8	312°24.0	327°24.1	342°24.3	357°24.4	12°24.6	27°24.8	42°24.9	57°25.1	72°25.3	+0.2
	-4°16.6	-4°15.6	-4°14.7	-4°13.7	-4°12.7	-4°11.7	-4°10.7	-4°09.8	-4°08.8	-4°07.8	-4°06.8	-4°05.8	+1.0
Fr 10	267°27.4	282°27.5	297°27.7	312°27.8	327°28.0	342°28.2	357°28.3	12°28.5	27°28.7	42°28.8	57°29.0	72°29.2	+0.2
	-3°53.1	-3°52.1	-3°51.1	-3°50.2	-3°49.2	-3°48.2	-3°47.2	-3°46.2	-3°45.3	-3°44.3	-3°43.3	-3°42.3	+1.0
Sa 11	267°31.3	282°31.5	297°31.6	312°31.8	327°32.0	342°32.1	357°32.3	12°32.5	27°32.6	42°32.8	57°33.0	72°33.1	+0.2
	-3°29.5	-3°28.6	-3°27.6	-3°26.6	-3°25.6	-3°24.6	-3°23.6	-3°22.7	-3°21.7	-3°20.7	-3°19.7	-3°18.7	+1.0
Su 12	267°35.3	282°35.5	297°35.7	312°35.8	327°36.0	342°36.2	357°36.3	12°36.5	27°36.7	42°36.9	57°37.0	72°37.2	+0.2
	-3°05.9	-3°05.0	-3°04.0	-3°03.0	-3°02.0	-3°01.0	-3°00.0	-2°59.1	-2°58.1	-2°57.1	-2°56.1	-2°55.1	+1.0
Mo 13	267°39.4	282°39.6	297°39.8	312°39.9	327°40.1	342°40.3	357°40.5	12°40.6	27°40.8	42°41.0	57°41.1	72°41.3	+0.2
	-2°42.3	-2°41.3	-2°40.3	-2°39.3	-2°38.4	-2°37.4	-2°36.4	-2°35.4	-2°34.4	-2°33.4	-2°32.4	-2°31.5	+1.0
Tu 14	267°43.6	282°43.7	297°43.9	312°44.1	327°44.3	342°44.4	357°44.6	12°44.8	27°45.0	42°45.1	57°45.3	72°45.5	+0.2
	-2°18.6	-2°17.7	-2°16.7	-2°15.7	-2°14.7	-2°13.7	-2°12.7	-2°11.7	-2°10.7	-2°09.8	-2°08.8	-2°07.8	+1.0
We 15	267°47.8	282°48.0	297°48.1	312°48.3	327°48.5	342°48.7	357°48.8	12°49.0	27°49.2	42°49.4	57°49.6	72°49.7	+0.2
	-1°54.9	-1°54.0	-1°53.0	-1°52.0	-1°51.0	-1°50.0	-1°49.0	-1°48.0	-1°47.0	-1°46.1	-1°45.1	-1°44.1	+1.0
Th 16	267°52.1	282°52.2	297°52.4	312°52.6	327°52.8	342°52.9	357°53.1	12°53.3	27°53.5	42°53.7	57°53.8	72°54.0	+0.2
	-1°31.2	-1°30.2	-1°29.3	-1°28.3	-1°27.3	-1°26.3	-1°25.3	-1°24.3	-1°23.3	-1°22.3	-1°21.4	-1°20.4	+1.0
Fr 17	267°56.4	282°56.5	297°56.7	312°56.9	327°57.1	342°57.3	357°57.4	12°57.6	27°57.8	42°58.0	57°58.2	72°58.4	+0.2
	-1°07.5	-1°06.5	-1°05.5	-1°04.5	-1°03.6	-1°02.6	-1°01.6	-1°00.6	-0°59.6	-0°58.6	-0°57.6	-0°56.6	+1.0
Sa 18	268°00.7	283°00.9	298°01.1	313°01.3	328°01.4	343°01.6	358°01.8	13°02.0	28°02.2	43°02.4	58°02.5	73°02.7	+0.2
	-0°43.8	-0°42.8	-0°41.8	-0°40.8	-0°39.8	-0°38.8	-0°37.8	-0°36.9	-0°35.9	-0°34.9	-0°33.9	-0°32.9	+1.0
Su 19	268°05.1	283°05.3	298°05.5	313°05.7	328°05.8	343°06.0	358°06.2	13°06.4	28°06.6	43°06.8	58°06.9	73°07.1	+0.2
	-0°20.1	-0°19.1	-0°18.1	-0°17.1	-0°16.1	-0°15.1	-0°14.1	-0°13.1	-0°12.1	-0°11.2	-0°10.2	-0°09.2	+1.0
Mo 20	268°09.5	283°09.7	298°09.9	313°10.1	328°10.3	343°10.4	358°10.6	13°10.8	28°11.0	43°11.2	58°11.4	73°11.6	+0.2
	0°03.7	0°04.7	0°05.6	0°06.6	0°07.6	0°08.6	0°09.6	0°10.6	0°11.6	0°12.6	0°13.6	0°14.5	+1.0
Tu 21	268°14.0	283°14.1	298°14.3	313°14.5	328°14.7	343°14.9	358°15.1	13°15.3	28°15.5	43°15.6	58°15.8	73°16.0	+0.2
	0°27.4	0°28.4	0°29.4	0°30.3	0°31.3	0°32.3	0°33.3	0°34.3	0°35.3	0°36.3	0°37.3	0°38.2	+1.0
We 22	268°18.4	283°18.6	298°18.8	313°19.0	328°19.2	343°19.4	358°19.6	13°19.7	28°19.9	43°20.1	58°20.3	73°20.5	+0.2
	0°51.1	0°52.1	0°53.0	0°54.0	0°55.0	0°56.0	0°57.0	0°58.0	0°59.0	1°00.0	1°00.9	1°01.9	+1.0
Th 23	268°22.9	283°23.1	298°23.3	313°23.5	328°23.7	343°23.9	358°24.0	13°24.2	28°24.4	43°24.6	58°24.8	73°25.0	+0.2
	1°14.7	1°15.7	1°16.7	1°17.7	1°18.7	1°19.7	1°20.6	1°21.6	1°22.6	1°23.6	1°24.6	1°25.6	+1.0
Fr 24	268°27.4	283°27.6	298°27.8	313°28.0	328°28.2	343°28.3	358°28.5	13°28.7	28°28.9	43°29.1	58°29.3	73°29.5	+0.2
	1°38.4	1°39.4	1°40.3	1°41.3	1°42.3	1°43.3	1°44.3	1°45.3	1°46.2	1°47.2	1°48.2	1°49.2	+1.0
Sa 25	268°31.9	283°32.1	298°32.3	313°32.5	328°32.7	343°32.9	358°33.0	13°33.2	28°33.4	43°33.6	58°33.8	73°34.0	+0.2
	2°02.0	2°02.9	2°03.9	2°04.9	2°05.9	2°06.9	2°07.9	2°08.8	2°09.8	2°10.8	2°11.8	2°12.8	+1.0
Su 26	268°36.4	283°36.6	298°36.8	313°37.0	328°37.2	343°37.4	358°37.5	13°37.7	28°37.9	43°38.1	58°38.3	73°38.5	+0.2
	2°25.5	2°26.5	2°27.5	2°28.5	2°29.4	2°30.4	2°31.4	2°32.4	2°33.4	2°34.3	2°35.3	2°36.3	+1.0
Mo 27	268°40.9	283°41.1	298°41.3	313°41.5	328°41.7	343°41.9	358°42.1	13°42.2	28°42.4	43°42.6	58°42.8	73°43.0	+0.2
	2°49.0	2°50.0	2°51.0	2°52.0	2°52.9	2°53.9	2°54.9	2°55.9	2°56.8	2°57.8	2°58.8	2°59.8	+1.0
Tu 28	268°45.4	283°45.6	298°45.8	313°46.0	328°46.2	343°46.4	358°46.6	13°46.7	28°46.9	43°47.1	58°47.3	73°47.5	+0.2
	3°12.5	3°13.4	3°14.4	3°15.4	3°16.4	3°17.3	3°18.3	3°19.3	3°20.3	3°21.2	3°22.2	3°23.2	+1.0
We 29	268°49.9	283°50.1	298°50.3	313°50.5	328°50.7	343°50.9	358°51.0	13°51.2	28°51.4	43°51.6	58°51.8	73°52.0	+0.2
	3°35.8	3°36.8	3°37.8	3°38.8	3°39.7	3°40.7	3°41.7	3°42.7	3°43.6	3°44.6	3°45.6	3°46.5	+1.0
Th 30	268°54.4	283°54.6	298°54.8	313°55.0	328°55.2	343°55.3	358°55.5	13°55.7	28°55.9	43°56.1	58°56.3	73°56.5	+0.2
	3°59.2	4°00.1	4°01.1	4°02.1	4°03.0	4°04.0	4°05.0	4°05.9	4°06.9	4°07.9	4°08.8	4°09.8	+1.0
Fr 31	268°58.9	283°59.1	298°59.2	313°59.4	328°59.6	343°59.8	359°00.0	14°00.2	29°00.4	44°00.5	59°00.7	74°00.9	+0.2
	4°22.4	4°23.4	4°24.3	4°25.3	4°26.3	4°27.2	4°28.2	4°29.2	4°30.1	4°31.1	4°32.1	4°33.0	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2028

D	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h	SH
We 1	248°26.5	262°58.2	277°29.9	292°01.5	306°33.1	321°04.5	335°35.8	350°07.1	4°38.3	19°09.4	33°40.4	+31.4	15.1
	18°08.8	18°19.2	18°29.5	18°39.7	18°49.8	18°59.8	19°09.8	19°19.7	19°29.5	19°39.2	19°48.9	+10.0	55.4
Th 2	251°14.6	265°44.1	280°13.6	294°42.9	309°12.2	323°41.4	338°10.4	352°39.4	7°08.3	21°37.1	36°05.8	+29.1	15.3
	22°02.7	22°10.8	22°18.9	22°26.8	22°34.6	22°42.4	22°50.0	22°57.5	23°04.9	23°12.2	23°19.3	+7.7	56.0
Fr 3	253°05.3	267°32.5	281°59.7	296°26.7	310°53.7	325°20.6	339°47.4	354°14.1	8°40.8	23°07.3	37°33.8	+26.9	15.5
	24°52.6	24°57.8	25°02.9	25°07.8	25°12.7	25°17.3	25°21.9	25°26.2	25°30.5	25°34.6	25°38.6	+4.6	56.8
◐ Sa 4	254°02.0	268°27.3	282°52.6	297°17.8	311°42.9	326°08.0	340°33.0	354°58.0	9°22.9	23°47.8	38°12.6	+25.1	15.7
	26°20.4	26°22.0	26°23.4	26°24.7	26°25.8	26°26.7	26°27.5	26°28.1	26°28.5	26°28.8	26°28.9	+0.8	57.6
Su 5	254°20.2	268°44.4	283°08.7	297°32.9	311°57.1	326°21.3	340°45.4	355°09.6	9°33.7	23°57.9	38°22.0	+24.2	16.0
	26°10.6	26°08.0	26°05.3	26°02.4	25°59.3	25°56.0	25°52.6	25°49.0	25°45.2	25°41.2	25°37.1	-3.3	58.6
Mo 6	254°24.5	268°48.7	283°13.0	297°37.3	312°01.6	326°26.0	340°50.4	355°14.8	9°39.2	24°03.7	38°28.2	+24.4	16.2
	24°14.7	24°07.9	24°00.8	23°53.7	23°46.3	23°38.8	23°31.1	23°23.3	23°15.3	23°07.1	22°58.8	-7.6	59.5
Tu 7	254°40.1	269°05.3	283°30.5	297°55.7	312°21.0	326°46.3	341°11.7	355°37.1	10°02.6	24°28.2	38°53.7	+25.4	16.4
	20°35.2	20°24.4	20°13.5	20°02.4	19°51.2	19°39.9	19°28.4	19°16.7	19°05.0	18°53.1	18°41.1	-11.4	60.3
We 8	255°23.8	269°50.2	284°16.7	298°43.2	313°09.8	327°36.4	342°03.1	356°29.8	10°56.6	25°23.4	39°50.3	+26.7	16.6
	15°25.8	15°11.8	14°57.8	14°43.6	14°29.4	14°15.0	14°00.6	13°46.0	13°31.4	13°16.6	13°01.8	-14.4	60.9
Th 9	256°39.1	271°06.7	285°34.3	300°02.0	314°29.7	328°57.5	343°25.3	357°53.1	12°20.9	26°48.8	41°16.8	+27.8	16.7
	9°09.6	8°53.6	8°37.5	8°21.3	8°05.1	7°48.9	7°32.5	7°16.2	6°59.8	6°43.3	6°26.8	-16.3	61.2
Fr 10	258°19.0	272°47.3	287°15.7	301°44.0	316°12.4	330°40.8	345°09.2	359°37.6	14°06.1	28°34.5	43°03.0	+28.4	16.7
	2°15.6	1°58.7	1°41.8	1°24.9	1°07.9	0°51.0	0°34.1	0°17.1	0°00.2	-0°16.7	-0°33.6	-16.9	61.2
○ Sa 11	260°10.2	274°38.7	289°07.2	303°35.6	318°04.1	332°32.5	347°01.0	1°29.4	15°57.8	30°26.2	44°54.6	+28.4	16.6
	-4°45.0	-5°01.6	-5°18.0	-5°34.5	-5°50.9	-6°07.2	-6°23.5	-6°39.8	-6°56.0	-7°12.1	-7°28.2	-16.3	60.8
Su 12	261°58.3	276°26.4	290°54.4	305°22.5	319°50.5	334°18.4	348°46.4	3°14.3	17°42.2	32°10.1	46°37.9	+28.0	16.4
	-11°21.8	-11°36.7	-11°51.6	-12°06.4	-12°21.1	-12°35.7	-12°50.3	-13°04.7	-13°19.1	-13°33.3	-13°47.5	-14.6	60.2
Mo 13	263°31.8	277°59.2	292°26.5	306°53.8	321°21.0	335°48.2	350°15.4	4°42.6	19°09.7	33°36.8	48°03.8	+27.2	16.2
	-17°07.3	-17°19.8	-17°32.1	-17°44.3	-17°56.3	-18°08.3	-18°20.1	-18°31.8	-18°43.4	-18°54.8	-19°06.1	-11.9	59.3
Tu 14	264°46.2	279°12.9	293°39.4	308°06.0	322°32.6	336°59.1	351°25.6	5°52.1	20°18.5	34°45.0	49°11.4	+26.5	15.9
	-21°39.9	-21°49.0	-21°58.0	-22°06.9	-22°15.6	-22°24.2	-22°32.6	-22°40.9	-22°49.0	-22°57.0	-23°04.8	-8.5	58.3
We 15	265°46.4	280°12.7	294°39.0	309°05.3	323°31.6	337°57.9	352°24.1	6°50.4	21°16.8	35°43.1	50°09.4	+26.3	15.6
	-24°44.5	-24°49.9	-24°55.2	-25°00.3	-25°05.3	-25°10.1	-25°14.7	-25°19.2	-25°23.6	-25°27.8	-25°31.8	-4.7	57.3
Th 16	266°46.3	281°12.9	295°39.6	310°06.3	324°33.0	338°59.8	353°26.6	7°53.5	22°20.3	36°47.3	51°14.2	+26.8	15.4
	-26°14.2	-26°15.8	-26°17.3	-26°18.6	-26°19.8	-26°20.8	-26°21.6	-26°22.4	-26°22.9	-26°23.4	-26°23.6	-0.9	56.3
◑ Fr 17	281°12.9	295°39.6	310°06.3	324°33.0	338°59.8	353°26.6	7°53.5	22°20.3	36°47.3	51°14.2	65°41.2	+26.8	15.4
	-26°15.8	-26°17.3	-26°18.6	-26°19.8	-26°20.8	-26°21.6	-26°22.4	-26°22.9	-26°23.4	-26°23.6	-26°23.8	-0.8	56.3
Sa 18	282°32.1	296°59.9	311°27.8	325°55.7	340°23.7	354°51.8	9°19.9	23°48.0	38°16.3	52°44.6	67°13.0	+28.1	15.1
	-26°08.6	-26°06.4	-26°04.2	-26°01.8	-25°59.3	-25°56.6	-25°53.8	-25°50.9	-25°47.8	-25°44.6	-25°41.3	+2.7	55.5
Su 19	284°26.7	298°56.2	313°25.8	327°55.4	342°25.1	356°54.9	11°24.8	25°54.7	40°24.7	54°54.8	69°24.9	+29.8	15.0
	-24°36.6	-24°31.3	-24°25.9	-24°20.4	-24°14.8	-24°09.1	-24°03.2	-23°57.3	-23°51.2	-23°45.1	-23°38.8	+5.8	54.9
Mo 20	287°06.2	301°37.5	316°09.0	330°40.5	345°12.0	359°43.7	14°15.4	28°47.2	43°19.0	57°51.0	72°23.0	+31.7	14.8
	-21°52.4	-21°44.5	-21°36.5	-21°28.5	-21°20.3	-21°12.1	-21°03.8	-20°55.4	-20°46.9	-20°38.3	-20°29.6	+8.3	54.4
Tu 21	290°31.2	305°04.3	319°37.4	334°10.7	348°43.9	3°17.3	17°50.6	32°24.1	46°57.6	61°31.2	76°04.8	+33.4	14.8
	-18°09.9	-18°00.0	-17°50.0	-17°39.9	-17°29.8	-17°19.6	-17°09.3	-16°59.0	-16°48.6	-16°38.1	-16°27.6	+10.2	54.1
We 22	294°35.7	309°10.2	323°44.7	338°19.3	352°53.9	7°28.5	22°03.2	36°37.9	51°12.7	65°47.5	80°22.4	+34.7	14.7
	-13°42.6	-13°31.1	-13°19.7	-13°08.1	-12°56.5	-12°44.9	-12°33.2	-12°21.4	-12°09.7	-11°57.8	-11°46.0	+11.7	54.0
Th 23	299°09.4	313°44.8	328°20.2	342°55.6	357°31.0	12°06.5	26°42.0	41°17.5	55°53.1	70°28.6	85°04.2	+35.5	14.7
	-8°42.9	-8°30.4	-8°17.9	-8°05.4	-7°52.8	-7°40.1	-7°27.5	-7°14.8	-7°02.1	-6°49.4	-6°36.6	+12.6	54.0
Fr 24	303°59.5	318°35.3	333°11.0	347°46.8	2°22.5	16°58.3	31°34.1	46°09.8	60°45.6	75°21.3	89°57.1	+35.8	14.7
	-3°22.4	-3°09.3	-2°56.2	-2°43.1	-2°30.0	-2°16.8	-2°03.7	-1°50.5	-1°37.3	-1°24.1	-1°10.9	+13.2	54.1
Sa 25	308°52.4	323°28.0	338°03.5	352°39.0	7°14.6	21°50.1	36°25.5	51°01.0	65°36.4	80°11.8	94°47.2	+35.5	14.8
	2°07.7	2°20.9	2°34.2	2°47.4	3°00.6	3°13.8	3°27.0	3°40.3	3°53.5	4°06.6	4°19.8	+13.2	54.3
● Su 26	313°34.0	328°08.8	342°43.6	357°18.3	11°53.0	26°27.7	41°02.3	55°36.9	70°11.4	84°45.8	99°20.3	+34.6	14.9
	7°35.7	7°48.6	8°01.5	8°14.4	8°27.2	8°40.0	8°52.8	9°05.5	9°18.2	9°30.9	9°43.5	+12.8	54.6
Mo 27	317°50.3	332°23.8	346°57.3	1°30.7	16°04.1	30°37.3	45°10.6	59°43.7	74°16.8	88°49.8	103°22.8	+33.3	15.0
	12°48.9	13°00.9	13°12.9	13°24.8	13°36.7	13°48.5	14°00.3	14°12.0	14°23.7	14°35.3	14°46.9	+11.8	54.9
Tu 28	321°28.5	336°00.3	350°32.0	5°03.6	19°35.1	34°06.6	48°38.0	63°09.3	77°40.5	92°11.6	106°42.7	+31.4	15.1
	17°32.8	17°43.4	17°53.8	18°04.2	18°14.5	18°24.7	18°34.8	18°44.9	18°54.9	19°04.8	19°14.6	+10.2	55.4
We 29	324°18.6	338°48.4	353°18.0	7°47.5	22°17.0	36°46.4	51°15.7	65°44.9	80°14.1	94°43.1	109°12.1	+29.3	15.2
	21°31.2	21°39.5	21°47.8	21°55.9	22°03.9	22°11.9	22°19.7	22°27.4	22°35.0	22°42.5	22°49.9	+7.9	55.9
Th 30	326°16.7	340°44.4	355°12.0	9°39.5	24°07.0	38°34.4	53°01.7	67°28.9	81°56.1	96°23.2	110°50.2	+27.3	15.4
	24°26.5	24°31.9	24°37.3	24°42.5	24°47.5	24°52.4	24°57.2	25°01.9	25°06.4	25°10.8	25°15.1	+4.9	56.4
Fr 31	327°27.9	341°54.0	356°20.0	10°45.9	25°11.8	39°37.7	54°03.5	68°29.3	82°55.1	97°20.8	111°46.4	+25.8	15.6
	26°01.8	26°03.7	26°05.5	26°07.1	26°08.6	26°09.9	26°11.1	26°12.1	26°13.0	26°13.7	26°14.3	+1.3	57.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 4 09h02 — FM: 11 01h06 — LQ: 17 23h22 — NM: 26 04h31

SUN

April 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°03.3	284°03.5	299°03.7	314°03.9	329°04.0	344°04.2	359°04.4	14°04.6	29°04.8	44°05.0	59°05.2	74°05.3	+0.2
	4°45.5	4°46.5	4°47.5	4°48.4	4°49.4	4°50.4	4°51.3	4°52.3	4°53.2	4°54.2	4°55.2	4°56.1	+1.0
Su 2	269°07.7	284°07.9	299°08.1	314°08.3	329°08.5	344°08.6	359°08.8	14°09.0	29°09.2	44°09.4	59°09.6	74°09.7	+0.2
	5°08.6	5°09.6	5°10.5	5°11.5	5°12.5	5°13.4	5°14.4	5°15.3	5°16.3	5°17.2	5°18.2	5°19.2	+1.0
Mo 3	269°12.1	284°12.3	299°12.5	314°12.7	329°12.8	344°13.0	359°13.2	14°13.4	29°13.6	44°13.8	59°13.9	74°14.1	+0.2
	5°31.6	5°32.5	5°33.5	5°34.5	5°35.4	5°36.4	5°37.3	5°38.3	5°39.2	5°40.2	5°41.1	5°42.1	+1.0
Tu 4	269°16.5	284°16.6	299°16.8	314°17.0	329°17.2	344°17.4	359°17.5	14°17.7	29°17.9	44°18.1	59°18.3	74°18.4	+0.2
	5°54.5	5°55.4	5°56.4	5°57.3	5°58.3	5°59.2	6°00.2	6°01.1	6°02.1	6°03.0	6°04.0	6°04.9	+0.9
We 5	269°20.8	284°21.0	299°21.1	314°21.3	329°21.5	344°21.7	359°21.9	14°22.0	29°22.2	44°22.4	59°22.6	74°22.7	+0.2
	6°17.2	6°18.2	6°19.1	6°20.1	6°21.0	6°22.0	6°22.9	6°23.9	6°24.8	6°25.8	6°26.7	6°27.6	+0.9
Th 6	269°25.1	284°25.2	299°25.4	314°25.6	329°25.8	344°25.9	359°26.1	14°26.3	29°26.5	44°26.6	59°26.8	74°27.0	+0.2
	6°39.9	6°40.8	6°41.8	6°42.7	6°43.7	6°44.6	6°45.6	6°46.5	6°47.4	6°48.4	6°49.3	6°50.3	+0.9
Fr 7	269°29.3	284°29.4	299°29.6	314°29.8	329°30.0	344°30.1	359°30.3	14°30.5	29°30.7	44°30.8	59°31.0	74°31.2	+0.2
	7°02.4	7°03.4	7°04.3	7°05.3	7°06.2	7°07.1	7°08.1	7°09.0	7°09.9	7°10.9	7°11.8	7°12.7	+0.9
Sa 8	269°33.4	284°33.6	299°33.8	314°34.0	329°34.1	344°34.3	359°34.5	14°34.6	29°34.8	44°35.0	59°35.2	74°35.3	+0.2
	7°24.9	7°25.8	7°26.7	7°27.7	7°28.6	7°29.5	7°30.5	7°31.4	7°32.3	7°33.3	7°34.2	7°35.1	+0.9
Su 9	269°37.5	284°37.7	299°37.9	314°38.0	329°38.2	344°38.4	359°38.6	14°38.7	29°38.9	44°39.1	59°39.2	74°39.4	+0.2
	7°47.2	7°48.1	7°49.0	7°50.0	7°50.9	7°51.8	7°52.7	7°53.7	7°54.6	7°55.5	7°56.4	7°57.4	+0.9
Mo 10	269°41.6	284°41.7	299°41.9	314°42.1	329°42.2	344°42.4	359°42.6	14°42.7	29°42.9	44°43.1	59°43.2	74°43.4	+0.2
	8°09.3	8°10.3	8°11.2	8°12.1	8°13.0	8°13.9	8°14.9	8°15.8	8°16.7	8°17.6	8°18.5	8°19.5	+0.9
Tu 11	269°45.5	284°45.7	299°45.9	314°46.0	329°46.2	344°46.4	359°46.5	14°46.7	29°46.9	44°47.0	59°47.2	74°47.3	+0.2
	8°31.4	8°32.3	8°33.2	8°34.1	8°35.0	8°35.9	8°36.9	8°37.8	8°38.7	8°39.6	8°40.5	8°41.4	+0.9
We 12	269°49.4	284°49.6	299°49.8	314°49.9	329°50.1	344°50.2	359°50.4	14°50.6	29°50.7	44°50.9	59°51.0	74°51.2	+0.2
	8°53.3	8°54.2	8°55.1	8°56.0	8°56.9	8°57.8	8°58.7	8°59.6	9°00.5	9°01.4	9°02.3	9°03.3	+0.9
Th 13	269°53.3	284°53.4	299°53.6	314°53.7	329°53.9	344°54.0	359°54.2	14°54.3	29°54.5	44°54.7	59°54.8	74°55.0	+0.2
	9°15.0	9°15.9	9°16.8	9°17.7	9°18.6	9°19.5	9°20.4	9°21.3	9°22.2	9°23.1	9°24.0	9°24.9	+0.9
Fr 14	269°57.0	284°57.1	299°57.3	314°57.4	329°57.6	344°57.7	359°57.9	14°58.0	29°58.2	44°58.4	59°58.5	74°58.7	+0.2
	9°36.6	9°37.5	9°38.4	9°39.3	9°40.2	9°41.1	9°42.0	9°42.9	9°43.8	9°44.7	9°45.6	9°46.5	+0.9
Sa 15	270°00.6	285°00.8	300°00.9	315°01.1	330°01.2	345°01.4	0°01.5	15°01.7	30°01.8	45°02.0	60°02.1	75°02.2	+0.1
	9°58.0	9°58.9	9°59.8	10°00.7	10°01.6	10°02.5	10°03.4	10°04.3	10°05.2	10°06.0	10°06.9	10°07.8	+0.9
Su 16	270°04.2	285°04.3	300°04.4	315°04.6	330°04.7	345°04.9	0°05.0	15°05.2	30°05.3	45°05.5	60°05.6	75°05.7	+0.1
	10°19.3	10°20.2	10°21.1	10°22.0	10°22.8	10°23.7	10°24.6	10°25.5	10°26.4	10°27.3	10°28.1	10°29.0	+0.9
Mo 17	270°07.6	285°07.7	300°07.9	315°08.0	330°08.2	345°08.3	0°08.4	15°08.6	30°08.7	45°08.9	60°09.0	75°09.1	+0.1
	10°40.4	10°41.3	10°42.2	10°43.1	10°43.9	10°44.8	10°45.7	10°46.5	10°47.4	10°48.3	10°49.2	10°50.0	+0.9
Tu 18	270°10.9	285°11.1	300°11.2	315°11.4	330°11.5	345°11.6	0°11.8	15°11.9	30°12.0	45°12.2	60°12.3	75°12.4	+0.1
	11°01.4	11°02.2	11°03.1	11°04.0	11°04.8	11°05.7	11°06.6	11°07.4	11°08.3	11°09.2	11°10.0	11°10.9	+0.9
We 19	270°14.2	285°14.3	300°14.4	315°14.6	330°14.7	345°14.8	0°15.0	15°15.1	30°15.2	45°15.4	60°15.5	75°15.6	+0.1
	11°22.1	11°23.0	11°23.8	11°24.7	11°25.5	11°26.4	11°27.3	11°28.1	11°29.0	11°29.8	11°30.7	11°31.6	+0.9
Th 20	270°17.3	285°17.4	300°17.6	315°17.7	330°17.8	345°17.9	0°18.1	15°18.2	30°18.3	45°18.4	60°18.6	75°18.7	+0.1
	11°42.7	11°43.5	11°44.4	11°45.2	11°46.1	11°46.9	11°47.8	11°48.6	11°49.5	11°50.3	11°51.2	11°52.0	+0.9
Fr 21	270°20.3	285°20.4	300°20.6	315°20.7	330°20.8	345°20.9	0°21.1	15°21.2	30°21.3	45°21.4	60°21.5	75°21.7	+0.1
	12°03.0	12°03.9	12°04.7	12°05.6	12°06.4	12°07.3	12°08.1	12°08.9	12°09.8	12°10.6	12°11.5	12°12.3	+0.8
Sa 22	270°23.2	285°23.3	300°23.5	315°23.6	330°23.7	345°23.8	0°23.9	15°24.0	30°24.2	45°24.3	60°24.4	75°24.5	+0.1
	12°23.2	12°24.0	12°24.9	12°25.7	12°26.6	12°27.4	12°28.2	12°29.1	12°29.9	12°30.7	12°31.6	12°32.4	+0.8
Su 23	270°26.0	285°26.1	300°26.2	315°26.4	330°26.5	345°26.6	0°26.7	15°26.8	30°26.9	45°27.0	60°27.1	75°27.2	+0.1
	12°43.2	12°44.0	12°44.8	12°45.7	12°46.5	12°47.3	12°48.1	12°49.0	12°49.8	12°50.6	12°51.4	12°52.3	+0.8
Mo 24	270°28.7	285°28.8	300°28.9	315°29.0	330°29.1	345°29.2	0°29.3	15°29.4	30°29.5	45°29.6	60°29.8	75°29.9	+0.1
	13°02.9	13°03.8	13°04.6	13°05.4	13°06.2	13°07.0	13°07.8	13°08.7	13°09.5	13°10.3	13°11.1	13°11.9	+0.8
Tu 25	270°31.2	285°31.3	300°31.4	315°31.5	330°31.6	345°31.7	0°31.8	15°31.9	30°32.1	45°32.2	60°32.3	75°32.4	+0.1
	13°22.5	13°23.3	13°24.1	13°24.9	13°25.7	13°26.5	13°27.3	13°28.1	13°28.9	13°29.8	13°30.6	13°31.4	+0.8
We 26	270°33.7	285°33.8	300°33.9	315°33.9	330°34.0	345°34.1	0°34.2	15°34.3	30°34.4	45°34.5	60°34.6	75°34.7	+0.1
	13°41.8	13°42.6	13°43.4	13°44.2	13°45.0	13°45.8	13°46.6	13°47.4	13°48.2	13°49.0	13°49.8	13°50.6	+0.8
Th 27	270°36.0	285°36.0	300°36.1	315°36.2	330°36.3	345°36.4	0°36.5	15°36.6	30°36.7	45°36.8	60°36.9	75°37.0	+0.1
	14°00.9	14°01.7	14°02.5	14°03.3	14°04.1	14°04.9	14°05.6	14°06.4	14°07.2	14°08.0	14°08.8	14°09.6	+0.8
Fr 28	270°38.1	285°38.2	300°38.3	315°38.4	330°38.5	345°38.6	0°38.7	15°38.7	30°38.8	45°38.9	60°39.0	75°39.1	+0.1
	14°19.8	14°20.5	14°21.3	14°22.1	14°22.9	14°23.7	14°24.4	14°25.2	14°26.0	14°26.8	14°27.6	14°28.3	+0.8
Sa 29	270°40.2	285°40.3	300°40.3	315°40.4	330°40.5	345°40.6	0°40.7	15°40.8	30°40.8	45°40.9	60°41.0	75°41.1	+0.1
	14°38.4	14°39.2	14°39.9	14°40.7	14°41.5	14°42.2	14°43.0	14°43.8	14°44.6	14°45.3	14°46.1	14°46.9	+0.8
Su 30	270°42.1	285°42.2	300°42.3	315°42.3	330°42.4	345°42.5	0°42.6	15°42.6	30°42.7	45°42.8	60°42.9	75°42.9	+0.1
	14°56.8	14°57.5	14°58.3	14°59.1	14°59.8	15°00.6	15°01.3	15°02.1	15°02.9	15°03.6	15°04.4	15°05.1	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2028

D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
Sa 1	256°01.2 26°11.2	270°26.6 26°10.0	284°51.9 26°08.7	299°17.2 26°07.2	313°42.5 26°05.5	328°07.7 26°03.7	342°33.0 26°01.7	356°58.2 25°59.6	11°23.4 25°57.3	25°48.7 25°54.8	40°13.9 25°52.2	+25.3 -1.9	15.7 57.6
◐ Su 2	256°32.1 24°53.4	270°57.4 24°48.3	285°22.7 24°42.9	299°48.0 24°37.4	314°13.4 24°31.7	328°38.7 24°25.9	343°04.1 24°19.9	357°29.5 24°13.8	11°54.9 24°07.5	26°20.4 24°01.1	40°45.9 23°54.5	+25.4 -5.9	15.9 58.3
Mo 3	257°12.0 21°57.4	271°38.0 21°48.4	286°04.1 21°39.3	300°30.2 21°30.0	314°56.4 21°20.6	329°22.6 21°11.1	343°48.8 21°01.4	358°15.1 20°51.6	12°41.4 20°41.6	27°07.8 20°31.6	41°34.2 20°21.3	+26.2 -9.6	16.1 59.0
Tu 4	258°16.2 17°32.8	272°43.4 17°20.6	287°10.6 17°08.2	301°37.9 16°55.8	316°05.2 16°43.3	330°32.6 16°30.6	345°00.0 16°17.9	359°27.4 16°05.0	13°54.9 15°52.0	28°22.5 15°39.0	42°50.1 15°25.8	+27.4 -12.7	16.3 59.6
We 5	259°49.1 11°56.7	274°17.3 11°42.1	288°45.6 11°27.4	303°13.9 11°12.6	317°42.3 10°57.8	332°10.7 10°42.8	346°39.1 10°27.8	1°07.5 10°12.8	15°36.0 9°57.6	30°04.6 9°42.4	44°33.1 9°27.1	+28.4 -15.0	16.4 60.2
Th 6	261°44.4 5°31.4	276°13.3 5°15.3	290°42.2 4°59.2	305°11.1 4°43.1	319°40.1 4°26.9	334°09.1 4°10.7	348°38.0 3°54.4	3°07.0 3°38.2	17°36.0 3°21.9	32°05.0 3°05.5	46°34.0 2°49.2	+29.0 -16.2	16.5 60.5
Fr 7	263°49.3 -1°17.4	278°18.3 -1°33.9	292°47.3 -1°50.3	307°16.2 -2°06.7	321°45.2 -2°23.2	336°14.1 -2°39.6	350°43.0 -2°56.0	5°11.9 -3°12.3	19°40.8 -3°28.7	34°09.7 -3°45.0	48°38.5 -4°01.3	+28.9 -16.4	16.5 60.6
Sa 8	265°48.6 -8°01.9	280°17.1 -8°17.6	294°45.5 -8°33.2	309°13.9 -8°48.8	323°42.2 -9°04.3	338°10.5 -9°19.8	352°38.8 -9°35.2	7°07.0 -9°50.5	21°35.2 -10°05.8	36°03.4 -10°21.0	50°31.5 -10°36.1	+28.3 -15.4	16.5 60.4
○ Su 9	267°28.6 -14°13.7	281°56.0 -14°27.5	296°23.4 -14°41.2	310°50.8 -14°54.8	325°18.1 -15°08.3	339°45.4 -15°21.7	354°12.6 -15°35.0	8°39.8 -15°48.2	23°06.9 -16°01.3	37°34.0 -16°14.3	52°01.0 -16°27.1	+27.2 -13.3	16.3 59.9
Mo 10	268°41.2 -19°26.0	283°07.5 -19°36.9	297°33.8 -19°47.7	312°00.1 -19°58.4	326°26.3 -20°08.9	340°52.4 -20°19.3	355°18.5 -20°29.5	9°44.6 -20°39.6	24°10.7 -20°49.6	38°36.7 -20°59.4	53°02.6 -21°09.1	+26.1 -10.3	16.1 59.2
Tu 11	269°28.4 -23°16.8	283°53.9 -23°24.1	298°19.4 -23°31.3	312°44.9 -23°38.3	327°10.3 -23°45.1	341°35.8 -23°51.8	356°01.2 -23°58.4	10°26.6 -24°04.7	24°52.0 -24°10.9	39°17.4 -24°17.0	53°42.8 -24°22.9	+25.4 -6.6	15.9 58.3
We 12	270°03.5 -25°32.3	284°29.0 -25°35.6	298°54.5 -25°38.8	313°19.9 -25°41.8	327°45.4 -25°44.7	342°11.0 -25°47.4	356°36.5 -25°49.9	11°02.1 -25°52.3	25°27.7 -25°54.5	39°53.3 -25°56.6	54°19.0 -25°58.5	+25.5 -2.6	15.7 57.4
Th 13	270°48.5 -26°08.5	285°14.8 -26°07.9	299°41.2 -26°07.2	314°07.6 -26°06.3	328°34.1 -26°05.3	343°00.7 -26°04.2	357°27.3 -26°02.9	11°54.0 -26°01.4	26°20.7 -25°59.9	40°47.5 -25°58.1	55°14.4 -25°56.2	+26.6 +1.2	15.4 56.5
Fr 14	272°05.7 -25°11.5	286°33.7 -25°07.5	301°01.8 -25°03.3	315°30.0 -24°59.0	329°58.2 -24°54.5	344°26.5 -24°50.0	358°54.9 -24°45.3	13°23.4 -24°40.5	27°52.0 -24°35.6	42°20.7 -24°30.5	56°49.4 -24°25.4	+28.4 +4.6	15.2 55.7
Sa 15	286°33.7 -25°07.5	301°01.8 -25°03.3	315°30.0 -24°59.0	329°58.2 -24°54.5	344°26.5 -24°50.0	358°54.9 -24°45.3	13°23.4 -24°40.5	27°52.0 -24°35.6	42°20.7 -24°30.5	56°49.4 -24°25.4	71°18.2 -24°20.1	+28.5 +4.7	15.2 55.7
◑ Su 16	288°40.6 -22°47.3	303°10.8 -22°40.3	317°41.0 -22°33.1	332°11.4 -22°25.9	346°41.8 -22°18.5	1°12.3 -22°11.1	15°42.9 -22°03.6	30°13.6 -21°55.9	44°44.3 -21°48.2	59°15.2 -21°40.4	73°46.1 -21°32.5	+30.6 +7.5	15.0 55.0
Mo 17	291°39.7 -19°23.2	306°12.0 -19°13.9	320°44.2 -19°04.6	335°16.6 -18°55.1	349°49.0 -18°45.6	4°21.5 -18°36.1	18°54.1 -18°26.4	33°26.8 -18°16.7	47°59.5 -18°06.9	62°32.3 -17°57.0	77°05.1 -17°47.1	+32.5 +9.6	14.9 54.5
Tu 18	295°26.1 -15°10.3	310°00.0 -14°59.4	324°34.0 -14°48.4	339°08.0 -14°37.3	353°42.0 -14°26.2	8°16.2 -14°15.1	22°50.3 -14°03.9	37°24.6 -13°52.6	51°58.8 -13°41.3	66°33.2 -13°29.9	81°07.6 -13°18.5	+34.1 +11.2	14.8 54.2
We 19	299°48.8 -10°22.0	314°23.9 -10°09.9	328°59.0 -9°57.7	343°34.2 -9°45.6	358°09.3 -9°33.4	12°44.6 -9°21.1	27°19.8 -9°08.8	41°55.1 -8°56.5	56°30.4 -8°44.2	71°05.7 -8°31.8	85°41.1 -8°19.4	+35.2 +12.3	14.7 54.1
Th 20	304°34.1 -5°09.9	319°09.8 -4°57.0	333°45.5 -4°44.2	348°21.2 -4°31.3	2°56.9 -4°18.4	17°32.6 -4°05.5	32°08.3 -3°52.6	46°44.0 -3°39.6	61°19.8 -3°26.7	75°55.5 -3°13.7	90°31.2 -3°00.7	+35.7 +12.9	14.8 54.1
Fr 21	309°27.0 0°15.5	324°02.7 0°28.7	338°38.3 0°41.8	353°13.9 0°55.0	7°49.6 1°08.1	22°25.2 1°21.3	37°00.7 1°34.4	51°36.3 1°47.6	66°11.8 2°00.7	80°47.4 2°13.9	95°22.9 2°27.0	+35.6 +13.2	14.8 54.3
Sa 22	314°12.2 5°43.5	328°47.2 5°56.5	343°22.2 6°09.5	357°57.1 6°22.5	12°32.1 6°35.5	27°06.9 6°48.4	41°41.8 7°01.3	56°16.5 7°14.2	70°51.3 7°27.1	85°26.0 7°40.0	100°00.7 7°52.8	+34.9 +12.9	14.9 54.6
Su 23	318°34.4 11°02.2	333°08.3 11°14.5	347°42.0 11°26.9	2°15.7 11°39.2	16°49.3 11°51.4	31°22.9 12°03.6	45°56.4 12°15.8	60°29.8 12°27.9	75°03.2 12°40.0	89°36.5 12°52.0	104°09.7 13°04.0	+33.5 +12.2	15.0 55.0
● Mo 24	322°19.7 15°57.6	336°51.8 16°08.7	351°23.8 16°19.7	5°55.7 16°30.7	20°27.5 16°41.6	34°59.3 16°52.4	49°31.0 17°03.2	64°02.6 17°13.9	78°34.1 17°24.5	93°05.5 17°35.1	107°36.8 17°45.6	+31.7 +10.8	15.1 55.5
Tu 25	325°16.8 20°13.2	339°46.8 20°22.3	354°16.6 20°31.3	8°46.4 20°40.3	23°16.2 20°49.1	37°45.8 20°57.9	52°15.3 21°06.5	66°44.8 21°15.1	81°14.1 21°23.6	95°43.4 21°31.9	110°12.6 21°40.1	+29.6 +8.7	15.3 56.0
We 26	327°20.2 23°30.5	341°48.0 23°36.9	356°15.8 23°43.2	10°43.5 23°49.4	25°11.1 23°55.4	39°38.6 24°01.3	54°06.1 24°07.1	68°33.4 24°12.7	83°00.7 24°18.3	97°28.0 24°23.6	111°55.1 24°28.9	+27.5 +5.8	15.4 56.5
Th 27	328°34.3 25°31.1	343°00.4 25°34.1	357°26.4 25°37.0	11°52.5 25°39.7	26°18.4 25°42.2	40°44.3 25°44.6	55°10.2 25°46.9	69°36.0 25°49.0	84°01.8 25°50.9	98°27.6 25°52.7	112°53.2 25°54.3	+25.9 +2.3	15.5 57.0
Fr 28	329°14.8 26°00.2	343°40.0 25°59.3	358°05.3 25°58.3	12°30.5 25°57.1	26°55.7 25°55.7	41°20.9 25°54.2	55°46.1 25°52.6	70°11.3 25°50.7	84°36.5 25°48.7	99°01.7 25°46.6	113°26.9 25°44.3	+25.2 -1.6	15.7 57.5
Sa 29	329°45.9 24°50.5	344°11.3 24°45.6	358°36.8 24°40.6	13°02.2 24°35.5	27°27.7 24°30.2	41°53.3 24°24.7	56°18.8 24°19.1	70°44.4 24°13.3	85°10.1 24°07.4	99°35.7 24°01.3	114°01.4 23°55.1	+25.5 -5.5	15.8 58.0
Su 30	330°32.0 22°04.3	344°58.4 21°55.8	359°24.9 21°47.2	13°51.4 21°38.4	28°18.0 21°29.5	42°44.6 21°20.4	57°11.3 21°11.2	71°38.0 21°01.9	86°04.8 20°52.5	100°31.6 20°42.9	114°58.5 20°33.2	+26.7 -9.1	16.0 58.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 2 19h15 — FM: 9 10h26 — LQ: 16 16h36 — NM: 24 19h46

SUN

May 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	270° 43.9	285° 44.0	300° 44.0	315° 44.1	330° 44.2	345° 44.3	0° 44.3	15° 44.4	30° 44.5	45° 44.5	60° 44.6	75° 44.7	+0.1
	15° 14.9	15° 15.7	15° 16.4	15° 17.2	15° 17.9	15° 18.7	15° 19.4	15° 20.2	15° 20.9	15° 21.7	15° 22.4	15° 23.1	+0.7
Tu 2	270° 45.6	285° 45.6	300° 45.7	315° 45.8	330° 45.8	345° 45.9	0° 46.0	15° 46.0	30° 46.1	45° 46.2	60° 46.2	75° 46.3	+0.1
	15° 32.8	15° 33.5	15° 34.3	15° 35.0	15° 35.8	15° 36.5	15° 37.2	15° 38.0	15° 38.7	15° 39.4	15° 40.2	15° 40.9	+0.7
We 3	270° 47.1	285° 47.2	300° 47.2	315° 47.3	330° 47.3	345° 47.4	0° 47.5	15° 47.5	30° 47.6	45° 47.6	60° 47.7	75° 47.8	+0.1
	15° 50.4	15° 51.1	15° 51.9	15° 52.6	15° 53.3	15° 54.1	15° 54.8	15° 55.5	15° 56.2	15° 57.0	15° 57.7	15° 58.4	+0.7
Th 4	270° 48.5	285° 48.6	300° 48.6	315° 48.7	330° 48.7	345° 48.8	0° 48.8	15° 48.9	30° 48.9	45° 49.0	60° 49.0	75° 49.1	+0.1
	16° 07.8	16° 08.5	16° 09.2	16° 09.9	16° 10.6	16° 11.4	16° 12.1	16° 12.8	16° 13.5	16° 14.2	16° 14.9	16° 15.6	+0.7
Fr 5	270° 49.8	285° 49.8	300° 49.9	315° 49.9	330° 50.0	345° 50.0	0° 50.1	15° 50.1	30° 50.2	45° 50.2	60° 50.3	75° 50.3	+0.0
	16° 24.9	16° 25.6	16° 26.3	16° 27.0	16° 27.7	16° 28.4	16° 29.1	16° 29.8	16° 30.5	16° 31.2	16° 31.9	16° 32.6	+0.7
Sa 6	270° 50.9	285° 50.9	300° 51.0	315° 51.0	330° 51.1	345° 51.1	0° 51.2	15° 51.2	30° 51.2	45° 51.3	60° 51.3	75° 51.4	+0.0
	16° 41.7	16° 42.4	16° 43.1	16° 43.8	16° 44.5	16° 45.2	16° 45.8	16° 46.5	16° 47.2	16° 47.9	16° 48.6	16° 49.3	+0.7
Su 7	270° 51.9	285° 51.9	300° 52.0	315° 52.0	330° 52.0	345° 52.1	0° 52.1	15° 52.2	30° 52.2	45° 52.2	60° 52.3	75° 52.3	+0.0
	16° 58.2	16° 58.9	16° 59.6	17° 00.3	17° 00.9	17° 01.6	17° 02.3	17° 03.0	17° 03.7	17° 04.3	17° 05.0	17° 05.7	+0.7
Mo 8	270° 52.7	285° 52.8	300° 52.8	315° 52.8	330° 52.9	345° 52.9	0° 52.9	15° 53.0	30° 53.0	45° 53.0	60° 53.1	75° 53.1	+0.0
	17° 14.5	17° 15.1	17° 15.8	17° 16.5	17° 17.2	17° 17.8	17° 18.5	17° 19.2	17° 19.8	17° 20.5	17° 21.2	17° 21.8	+0.7
Tu 9	270° 53.5	285° 53.5	300° 53.5	315° 53.5	330° 53.6	345° 53.6	0° 53.6	15° 53.6	30° 53.7	45° 53.7	60° 53.7	75° 53.7	+0.0
	17° 30.4	17° 31.1	17° 31.8	17° 32.4	17° 33.1	17° 33.7	17° 34.4	17° 35.0	17° 35.7	17° 36.4	17° 37.0	17° 37.7	+0.7
We 10	270° 54.0	285° 54.0	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.2	30° 54.2	45° 54.2	60° 54.2	75° 54.2	+0.0
	17° 46.1	17° 46.8	17° 47.4	17° 48.1	17° 48.7	17° 49.3	17° 50.0	17° 50.6	17° 51.3	17° 51.9	17° 52.6	17° 53.2	+0.6
Th 11	270° 54.4	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.6	45° 54.6	60° 54.6	75° 54.6	+0.0
	18° 01.5	18° 02.1	18° 02.8	18° 03.4	18° 04.0	18° 04.7	18° 05.3	18° 05.9	18° 06.5	18° 07.2	18° 07.8	18° 08.4	+0.6
Fr 12	270° 54.7	285° 54.7	300° 54.7	315° 54.7	330° 54.8	345° 54.8	0° 54.8	15° 54.8	30° 54.8	45° 54.8	60° 54.8	75° 54.8	+0.0
	18° 16.6	18° 17.2	18° 17.8	18° 18.4	18° 19.0	18° 19.7	18° 20.3	18° 20.9	18° 21.5	18° 22.1	18° 22.8	18° 23.4	+0.6
Sa 13	270° 54.9	285° 54.9	300° 54.9	315° 54.9	330° 54.9	345° 54.9	0° 54.9	15° 54.9	30° 54.9	45° 54.9	60° 54.9	75° 54.9	+0.0
	18° 31.3	18° 31.9	18° 32.6	18° 33.2	18° 33.8	18° 34.4	18° 35.0	18° 35.6	18° 36.2	18° 36.8	18° 37.4	18° 38.0	+0.6
Su 14	270° 54.8	285° 54.8	300° 54.8	315° 54.8	330° 54.8	345° 54.8	0° 54.8	15° 54.8	30° 54.8	45° 54.8	60° 54.8	75° 54.8	-0.0
	18° 45.8	18° 46.4	18° 47.0	18° 47.6	18° 48.2	18° 48.8	18° 49.4	18° 50.0	18° 50.5	18° 51.1	18° 51.7	18° 52.3	+0.6
Mo 15	270° 54.7	285° 54.7	300° 54.7	315° 54.7	330° 54.6	345° 54.6	0° 54.6	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	-0.0
	18° 59.9	19° 00.5	19° 01.1	19° 01.7	19° 02.3	19° 02.8	19° 03.4	19° 04.0	19° 04.6	19° 05.2	19° 05.7	19° 06.3	+0.6
Tu 16	270° 54.4	285° 54.4	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.2	45° 54.2	60° 54.2	75° 54.2	-0.0
	19° 13.8	19° 14.3	19° 14.9	19° 15.5	19° 16.0	19° 16.6	19° 17.2	19° 17.7	19° 18.3	19° 18.9	19° 19.4	19° 20.0	+0.6
We 17	270° 53.9	285° 53.9	300° 53.9	315° 53.9	330° 53.8	345° 53.8	0° 53.8	15° 53.8	30° 53.7	45° 53.7	60° 53.7	75° 53.7	-0.0
	19° 27.3	19° 27.8	19° 28.4	19° 28.9	19° 29.5	19° 30.0	19° 30.6	19° 31.1	19° 31.7	19° 32.2	19° 32.8	19° 33.3	+0.6
Th 18	270° 53.3	285° 53.3	300° 53.3	315° 53.3	330° 53.2	345° 53.2	0° 53.2	15° 53.1	30° 53.1	45° 53.1	60° 53.0	75° 53.0	-0.0
	19° 40.4	19° 41.0	19° 41.5	19° 42.0	19° 42.6	19° 43.1	19° 43.7	19° 44.2	19° 44.7	19° 45.3	19° 45.8	19° 46.3	+0.5
Fr 19	270° 52.6	285° 52.6	300° 52.5	315° 52.5	330° 52.5	345° 52.4	0° 52.4	15° 52.4	30° 52.3	45° 52.3	60° 52.3	75° 52.2	-0.0
	19° 53.3	19° 53.8	19° 54.3	19° 54.8	19° 55.4	19° 55.9	19° 56.4	19° 56.9	19° 57.5	19° 58.0	19° 58.5	19° 59.0	+0.5
Sa 20	270° 51.7	285° 51.7	300° 51.6	315° 51.6	330° 51.6	345° 51.5	0° 51.5	15° 51.4	30° 51.4	45° 51.4	60° 51.3	75° 51.3	-0.0
	20° 05.7	20° 06.3	20° 06.8	20° 07.3	20° 07.8	20° 08.3	20° 08.8	20° 09.3	20° 09.8	20° 10.3	20° 10.8	20° 11.4	+0.5
Su 21	270° 50.7	285° 50.7	300° 50.6	315° 50.6	330° 50.5	345° 50.5	0° 50.4	15° 50.4	30° 50.3	45° 50.3	60° 50.2	75° 50.2	-0.0
	20° 17.9	20° 18.4	20° 18.9	20° 19.4	20° 19.9	20° 20.4	20° 20.9	20° 21.4	20° 21.9	20° 22.4	20° 22.9	20° 23.3	+0.5
Mo 22	270° 49.6	285° 49.5	300° 49.5	315° 49.4	330° 49.4	345° 49.3	0° 49.3	15° 49.2	30° 49.2	45° 49.1	60° 49.0	75° 49.0	-0.1
	20° 29.7	20° 30.2	20° 30.7	20° 31.1	20° 31.6	20° 32.1	20° 32.6	20° 33.1	20° 33.5	20° 34.0	20° 34.5	20° 35.0	+0.5
Tu 23	270° 48.3	285° 48.2	300° 48.2	315° 48.1	330° 48.1	345° 48.0	0° 47.9	15° 47.9	30° 47.8	45° 47.8	60° 47.7	75° 47.7	-0.1
	20° 41.1	20° 41.6	20° 42.1	20° 42.5	20° 43.0	20° 43.5	20° 43.9	20° 44.4	20° 44.9	20° 45.3	20° 45.8	20° 46.3	+0.5
We 24	270° 46.9	285° 46.8	300° 46.8	315° 46.7	330° 46.6	345° 46.6	0° 46.5	15° 46.4	30° 46.4	45° 46.3	60° 46.3	75° 46.2	-0.1
	20° 52.2	20° 52.7	20° 53.1	20° 53.6	20° 54.0	20° 54.5	20° 55.0	20° 55.4	20° 55.9	20° 56.3	20° 56.8	20° 57.2	+0.5
Th 25	270° 45.3	285° 45.3	300° 45.2	315° 45.1	330° 45.1	345° 45.0	0° 44.9	15° 44.9	30° 44.8	45° 44.7	60° 44.7	75° 44.6	-0.1
	21° 03.0	21° 03.4	21° 03.8	21° 04.3	21° 04.7	21° 05.2	21° 05.6	21° 06.0	21° 06.5	21° 06.9	21° 07.3	21° 07.8	+0.4
Fr 26	270° 43.7	285° 43.6	300° 43.5	315° 43.5	330° 43.4	345° 43.3	0° 43.3	15° 43.2	30° 43.1	45° 43.0	60° 43.0	75° 42.9	-0.1
	21° 13.3	21° 13.8	21° 14.2	21° 14.6	21° 15.0	21° 15.5	21° 15.9	21° 16.3	21° 16.7	21° 17.1	21° 17.6	21° 18.0	+0.4
Sa 27	270° 41.9	285° 41.8	300° 41.8	315° 41.7	330° 41.6	345° 41.5	0° 41.5	15° 41.4	30° 41.3	45° 41.2	60° 41.1	75° 41.1	-0.1
	21° 23.3	21° 23.7	21° 24.2	21° 24.6	21° 25.0	21° 25.4	21° 25.8	21° 26.2	21° 26.6	21° 27.0	21° 27.4	21° 27.8	+0.4
Su 28	270° 40.0	285° 40.0	300° 39.9	315° 39.8	330° 39.7	345° 39.6	0° 39.5	15° 39.5	30° 39.4	45° 39.3	60° 39.2	75° 39.1	-0.1
	21° 33.0	21° 33.4	21° 33.8	21° 34.1	21° 34.5	21° 34.9	21° 35.3	21° 35.7	21° 36.1	21° 36.5	21° 36.9	21° 37.3	+0.4
Mo 29	270° 38.0	285° 38.0	300° 37.9	315° 37.8	330° 37.7	345° 37.6	0° 37.5	15° 37.4	30° 37.4	45° 37.3	60° 37.2	75° 37.1	-0.1
	21° 42.2	21° 42.6	21° 43.0	21° 43.4	21° 43.7	21° 44.1	21° 44.5	21° 44.9	21° 45.2	21° 45.6	21° 46.0	21° 46.3	+0.4
Tu 30	270° 35.9	285° 35.9	300° 35.8	315° 35.7	330° 35.6	345° 35.5	0° 35.4	15° 35.3	30° 35.2	45° 35.1	60° 35.0	75° 35.0	-0.1
	21° 51.1	21° 51.5	21° 51.8	21° 52.2	21° 52.6	21° 52.9	21° 53.3	21° 53.6	21° 54.0	21° 54.3	21° 54.7	21° 55.1	+0.4
We 31	270° 33.8	285° 33.7	300° 33.6	315° 33.5	330° 33.4	345° 33.3	0° 33.2	15° 33.1	30° 33.0	45° 32.9	60° 32.8	75° 32.7	-0.1
	21° 59.6	22° 00.0	22° 00.3	22° 00.6	22° 01.0	22° 01.3	22° 01.7	22° 02.0	22° 02.4	22° 02.7	22° 03.0	22° 03.4	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2028

D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
Mo 1	245°03.1	259°30.6	273°58.1	288°25.7	302°53.3	317°21.0	331°48.7	346°16.5	0°44.3	15°12.2	29°40.2	+27.7	16.0
	19°00.3	18°49.4	18°38.4	18°27.2	18°16.0	18°04.6	17°53.1	17°41.6	17°29.9	17°18.1	17°06.2	-11.4	58.8
◐ Tu 2	246°46.0	261°14.7	275°43.6	290°12.5	304°41.4	319°10.4	333°39.4	348°08.4	2°37.5	17°06.7	31°35.8	+29.0	16.1
	13°55.8	13°42.4	13°28.9	13°15.4	13°01.7	12°48.0	12°34.2	12°20.3	12°06.3	11°52.3	11°38.2	-13.8	59.2
We 3	248°57.9	263°27.7	277°57.4	292°27.2	306°57.0	321°26.8	335°56.6	350°26.5	4°56.4	19°26.3	33°56.2	+29.8	16.2
	7°59.0	7°43.9	7°28.8	7°13.6	6°58.4	6°43.2	6°27.9	6°12.6	5°57.2	5°41.8	5°26.4	-15.3	59.5
Th 4	251°26.2	265°56.2	280°26.2	294°56.3	309°26.3	323°56.3	338°26.3	352°56.3	7°26.3	21°56.3	36°26.3	+30.0	16.3
	1°31.5	1°15.7	0°59.9	0°44.1	0°28.2	0°12.4	-0°03.5	-0°19.3	-0°35.2	-0°51.0	-1°06.9	-15.8	59.7
Fr 5	253°54.0	268°23.7	282°53.3	297°22.9	311°52.5	326°22.1	340°51.6	355°21.0	9°50.5	24°19.9	38°49.3	+29.5	16.3
	-5°03.3	-5°18.9	-5°34.5	-5°50.1	-6°05.6	-6°21.0	-6°36.5	-6°51.9	-7°07.3	-7°22.6	-7°37.9	-15.5	59.7
Sa 6	256°04.9	270°33.6	285°02.2	299°30.8	313°59.3	328°27.8	342°56.2	357°24.6	11°52.9	26°21.1	40°49.3	+28.4	16.2
	-11°21.1	-11°35.5	-11°49.8	-12°04.1	-12°18.3	-12°32.4	-12°46.4	-13°00.4	-13°14.3	-13°28.1	-13°41.8	-14.1	59.6
Su 7	257°45.7	272°13.0	286°40.3	301°07.5	315°34.6	330°01.7	344°28.7	358°55.6	13°22.5	27°49.4	42°16.2	+27.0	16.1
	-16°56.6	-17°08.8	-17°20.9	-17°32.9	-17°44.7	-17°56.5	-18°08.1	-18°19.6	-18°31.0	-18°42.3	-18°53.5	-11.7	59.2
○ Mo 8	258°51.5	273°17.4	287°43.3	302°09.2	316°35.0	331°00.8	345°26.5	359°52.2	14°17.9	28°43.5	43°09.0	+25.8	16.0
	-21°25.6	-21°34.7	-21°43.6	-21°52.4	-22°01.1	-22°09.6	-22°17.9	-22°26.2	-22°34.2	-22°42.1	-22°49.9	-8.4	58.7
Tu 9	259°29.0	273°54.1	288°19.3	302°44.4	317°09.5	331°34.6	345°59.7	0°24.8	14°49.9	29°15.0	43°40.1	+25.1	15.8
	-24°28.2	-24°33.5	-24°38.6	-24°43.6	-24°48.5	-24°53.1	-24°57.6	-25°02.0	-25°06.2	-25°10.2	-25°14.0	-4.6	58.0
We 10	259°57.6	274°23.0	288°48.3	303°13.7	317°39.1	332°04.6	346°30.1	0°55.6	15°21.2	29°46.8	44°12.5	+25.5	15.6
	-25°52.6	-25°53.9	-25°55.1	-25°56.0	-25°56.8	-25°57.5	-25°58.0	-25°58.3	-25°58.5	-25°58.5	-25°58.4	-0.6	57.2
Th 11	260°43.6	275°10.2	289°36.8	304°03.5	318°30.3	332°57.1	347°24.0	1°51.0	16°18.1	30°45.2	45°12.4	+26.9	15.4
	-25°38.2	-25°35.7	-25°33.0	-25°30.2	-25°27.3	-25°24.2	-25°20.9	-25°17.6	-25°14.1	-25°10.4	-25°06.6	+3.2	56.5
Fr 12	262°10.4	276°38.9	291°07.6	305°36.3	320°05.1	334°34.0	349°03.0	3°32.0	18°01.2	32°30.5	46°59.8	+28.9	15.2
	-23°54.4	-23°48.6	-23°42.6	-23°36.6	-23°30.4	-23°24.2	-23°17.8	-23°11.3	-23°04.7	-22°58.0	-22°51.2	+6.3	55.7
Sa 13	264°30.8	279°01.5	293°32.4	308°03.4	322°34.4	337°05.5	351°36.7	6°08.0	20°39.4	35°10.9	49°42.4	+31.2	15.0
	-20°56.7	-20°48.3	-20°39.8	-20°31.2	-20°22.6	-20°13.8	-20°05.0	-19°56.1	-19°47.1	-19°38.0	-19°28.8	+8.8	55.1
Su 14	267°45.5	282°18.4	296°51.3	311°24.2	325°57.3	340°30.4	355°03.6	9°36.9	24°10.2	38°43.6	53°17.0	+33.2	14.9
	-17°02.4	-16°52.1	-16°41.7	-16°31.3	-16°20.8	-16°10.2	-15°59.6	-15°48.9	-15°38.2	-15°27.3	-15°16.5	+10.6	54.6
Mo 15	282°18.4	296°51.3	311°24.2	325°57.3	340°30.4	355°03.6	9°36.9	24°10.2	38°43.6	53°17.0	67°50.6	+33.2	14.9
	-16°52.1	-16°41.7	-16°31.3	-16°20.8	-16°10.2	-15°59.6	-15°48.9	-15°38.2	-15°27.3	-15°16.5	-15°05.6	+10.7	54.6
◑ Tu 16	286°20.9	300°55.4	315°29.9	330°04.5	344°39.1	359°13.8	13°48.5	28°23.3	42°58.1	57°32.9	72°07.8	+34.7	14.8
	-12°15.7	-12°04.0	-11°52.3	-11°40.5	-11°28.7	-11°16.8	-11°04.9	-10°53.0	-10°41.0	-10°29.0	-10°16.9	+11.9	54.3
We 17	290°55.7	305°31.2	320°06.7	334°42.2	349°17.7	3°53.2	18°28.8	33°04.4	47°40.0	62°15.6	76°51.2	+35.6	14.8
	-7°12.2	-6°59.7	-6°47.1	-6°34.5	-6°21.9	-6°09.3	-5°56.6	-5°44.0	-5°31.3	-5°18.5	-5°05.8	+12.6	54.2
Th 18	295°47.2	310°23.0	324°58.7	339°34.5	354°10.3	8°46.0	23°21.8	37°57.5	52°33.3	67°09.0	81°44.8	+35.8	14.8
	-1°52.7	-1°39.7	-1°26.8	-1°13.8	-1°00.8	-0°47.8	-0°34.8	-0°21.7	-0°08.7	0°04.3	0°17.3	+13.0	54.3
Fr 19	300°38.8	315°14.2	329°49.7	344°25.0	359°00.4	13°35.7	28°11.0	42°46.2	57°21.5	71°56.6	86°31.8	+35.3	14.9
	3°32.9	3°45.9	3°58.9	4°11.9	4°24.8	4°37.8	4°50.8	5°03.7	5°16.7	5°29.6	5°42.5	+13.0	54.5
Sa 20	305°14.0	319°48.4	334°22.8	348°57.1	3°31.4	18°05.6	32°39.8	47°13.8	61°47.9	76°21.9	90°55.8	+34.2	15.0
	8°54.1	9°06.7	9°19.2	9°31.8	9°44.3	9°56.8	10°09.2	10°21.6	10°34.0	10°46.4	10°58.7	+12.5	54.9
Su 21	309°16.5	323°49.3	338°22.0	352°54.7	7°27.3	21°59.8	36°32.2	51°04.5	65°36.8	80°08.9	94°41.0	+32.5	15.1
	13°58.8	14°10.4	14°22.0	14°33.6	14°45.1	14°56.5	15°07.9	15°19.2	15°30.5	15°41.7	15°52.8	+11.4	55.4
Mo 22	312°32.0	327°02.6	341°33.2	356°03.7	10°34.1	25°04.4	39°34.6	54°04.7	68°34.8	83°04.7	97°34.5	+30.3	15.3
	18°32.0	18°42.0	18°52.0	19°01.8	19°11.6	19°21.3	19°30.9	19°40.4	19°49.9	19°59.2	20°08.5	+9.7	56.0
Tu 23	314°50.5	329°18.8	343°47.1	358°15.2	12°43.2	27°11.1	41°39.0	56°06.7	70°34.4	85°02.0	99°29.4	+27.9	15.4
	22°15.5	22°23.1	22°30.6	22°38.0	22°45.3	22°52.5	22°59.5	23°06.4	23°13.3	23°19.9	23°26.5	+7.1	56.6
● We 24	316°11.4	330°37.5	345°03.6	359°29.6	13°55.6	28°21.5	42°47.3	57°13.0	71°38.7	86°04.3	100°29.8	+25.8	15.6
	24°49.2	24°53.6	24°57.9	25°02.0	25°06.0	25°09.9	25°13.6	25°17.1	25°20.5	25°23.7	25°26.8	+3.8	57.2
Th 25	316°46.6	331°11.4	345°36.2	0°00.9	14°25.6	28°50.2	43°14.9	57°39.5	72°04.1	86°28.6	100°53.2	+24.6	15.8
	25°54.6	25°55.1	25°55.5	25°55.8	25°55.9	25°55.8	25°55.5	25°55.1	25°54.6	25°53.8	25°52.9	-0.2	57.8
Fr 26	317°00.9	331°25.5	345°50.0	0°14.6	14°39.2	29°03.9	43°28.5	57°53.2	72°17.9	86°42.7	101°07.4	+24.6	15.9
	25°19.5	25°16.0	25°12.3	25°08.4	25°04.4	25°00.2	24°55.8	24°51.3	24°46.6	24°41.8	24°36.8	-4.3	58.3
Sa 27	317°23.7	331°49.1	346°14.7	0°40.2	15°05.8	29°31.5	43°57.3	58°23.1	72°48.9	87°14.8	101°40.8	+25.7	16.0
	23°03.1	22°55.6	22°48.0	22°40.2	22°32.3	22°24.3	22°16.1	22°07.8	21°59.4	21°50.8	21°42.0	-8.1	58.7
Su 28	318°18.1	332°45.1	347°12.2	1°39.3	16°06.6	30°33.9	45°01.2	59°28.6	73°56.1	88°23.7	102°51.3	+27.3	16.1
	19°15.4	19°04.6	18°53.7	18°42.7	18°31.6	18°20.4	18°09.1	17°57.6	17°46.1	17°34.4	17°22.7	-11.3	59.0
Mo 29	319°53.6	334°22.3	348°51.0	3°19.8	17°48.7	32°17.6	46°46.5	61°15.5	75°44.6	90°13.7	104°42.9	+28.9	16.1
	14°14.8	14°01.5	13°48.2	13°34.8	13°21.4	13°07.8	12°54.2	12°40.5	12°26.8	12°12.9	11°59.0	-13.6	59.1
Tu 30	322°06.5	336°36.4	351°06.4	5°36.4	20°06.5	34°36.5	49°06.6	63°36.8	78°07.0	92°37.2	107°07.4	+30.1	16.1
	8°23.3	8°08.5	7°53.6	7°38.7	7°23.8	7°08.9	6°53.9	6°38.8	6°23.7	6°08.6	5°53.5	-15.0	59.2
◐ We 31	324°43.8	339°14.3	353°44.9	8°15.5	22°46.1	37°16.7	51°47.3	66°17.9	80°48.5	95°19.1	109°49.7	+30.6	16.1
	2°03.4	1°47.9	1°32.4	1°17.0	1°01.5	0°46.0	0°30.5	0°15.0	-0°00.5	-0°16.0	-0°31.5	-15.5	59.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 2 02h25 — FM: 8 19h48 — LQ: 16 10h43 — NM: 24 08h16 — FQ: 31 07h36

SUN

June 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	270°31.5	285°31.4	300°31.3	315°31.2	330°31.1	345°31.0	0°30.9	15°30.8	30°30.7	45°30.6	60°30.5	75°30.4	-0.1
	22°07.7	22°08.1	22°08.4	22°08.7	22°09.0	22°09.4	22°09.7	22°10.0	22°10.3	22°10.7	22°11.0	22°11.3	+0.3
Fr 2	270°29.1	285°29.0	300°28.9	315°28.8	330°28.7	345°28.6	0°28.5	15°28.4	30°28.3	45°28.2	60°28.1	75°28.0	-0.1
	22°15.4	22°15.8	22°16.1	22°16.4	22°16.7	22°17.0	22°17.3	22°17.6	22°17.9	22°18.2	22°18.6	22°18.9	+0.3
Sa 3	270°26.6	285°26.5	300°26.4	315°26.3	330°26.2	345°26.1	0°26.0	15°25.9	30°25.8	45°25.7	60°25.6	75°25.5	-0.1
	22°22.8	22°23.1	22°23.4	22°23.7	22°24.0	22°24.3	22°24.6	22°24.9	22°25.1	22°25.4	22°25.7	22°26.0	+0.3
Su 4	270°24.1	285°24.0	300°23.9	315°23.7	330°23.6	345°23.5	0°23.4	15°23.3	30°23.2	45°23.1	60°23.0	75°22.9	-0.1
	22°29.7	22°30.0	22°30.3	22°30.6	22°30.9	22°31.1	22°31.4	22°31.7	22°32.0	22°32.2	22°32.5	22°32.8	+0.3
Mo 5	270°21.4	285°21.3	300°21.2	315°21.1	330°21.0	345°20.9	0°20.8	15°20.7	30°20.5	45°20.4	60°20.3	75°20.2	-0.1
	22°36.3	22°36.6	22°36.8	22°37.1	22°37.3	22°37.6	22°37.9	22°38.1	22°38.4	22°38.6	22°38.9	22°39.2	+0.3
Tu 6	270°18.7	285°18.6	300°18.5	315°18.4	330°18.3	345°18.2	0°18.0	15°17.9	30°17.8	45°17.7	60°17.6	75°17.5	-0.1
	22°42.4	22°42.7	22°42.9	22°43.2	22°43.4	22°43.7	22°43.9	22°44.2	22°44.4	22°44.7	22°44.9	22°45.1	+0.2
We 7	270°15.9	285°15.8	300°15.7	315°15.6	330°15.5	345°15.4	0°15.2	15°15.1	30°15.0	45°14.9	60°14.8	75°14.7	-0.1
	22°48.2	22°48.4	22°48.7	22°48.9	22°49.1	22°49.4	22°49.6	22°49.8	22°50.0	22°50.3	22°50.5	22°50.7	+0.2
Th 8	270°13.1	285°13.0	300°12.9	315°12.7	330°12.6	345°12.5	0°12.4	15°12.3	30°12.1	45°12.0	60°11.9	75°11.8	-0.1
	22°53.6	22°53.8	22°54.0	22°54.2	22°54.4	22°54.6	22°54.8	22°55.1	22°55.3	22°55.5	22°55.7	22°55.9	+0.2
Fr 9	270°10.2	285°10.1	300°09.9	315°09.8	330°09.7	345°09.6	0°09.4	15°09.3	30°09.2	45°09.1	60°09.0	75°08.8	-0.1
	22°58.5	22°58.7	22°58.9	22°59.1	22°59.3	22°59.5	22°59.7	22°59.9	23°00.1	23°00.3	23°00.5	23°00.7	+0.2
Sa 10	270°07.2	285°07.1	300°07.0	315°06.8	330°06.7	345°06.6	0°06.5	15°06.3	30°06.2	45°06.1	60°06.0	75°05.8	-0.1
	23°03.1	23°03.3	23°03.4	23°03.6	23°03.8	23°04.0	23°04.2	23°04.3	23°04.5	23°04.7	23°04.9	23°05.0	+0.2
Su 11	270°04.2	285°04.1	300°03.9	315°03.8	330°03.7	345°03.5	0°03.4	15°03.3	30°03.2	45°03.0	60°02.9	75°02.8	-0.1
	23°07.2	23°07.4	23°07.6	23°07.7	23°07.9	23°08.0	23°08.2	23°08.4	23°08.5	23°08.7	23°08.8	23°09.0	+0.2
Mo 12	270°01.1	285°01.0	300°00.8	315°00.7	330°00.6	345°00.5	0°00.3	15°00.2	30°00.1	44°59.9	59°59.8	74°59.7	-0.1
	23°11.0	23°11.1	23°11.3	23°11.4	23°11.6	23°11.7	23°11.9	23°12.0	23°12.1	23°12.3	23°12.4	23°12.6	+0.1
Tu 13	269°58.0	284°57.8	299°57.7	314°57.6	329°57.4	344°57.3	359°57.2	14°57.1	29°56.9	44°56.8	59°56.7	74°56.5	-0.1
	23°14.3	23°14.4	23°14.6	23°14.7	23°14.8	23°15.0	23°15.1	23°15.2	23°15.3	23°15.5	23°15.6	23°15.7	+0.1
We 14	269°54.8	284°54.7	299°54.5	314°54.4	329°54.3	344°54.1	359°54.0	14°53.9	29°53.7	44°53.6	59°53.5	74°53.3	-0.1
	23°17.2	23°17.4	23°17.5	23°17.6	23°17.7	23°17.8	23°17.9	23°18.0	23°18.1	23°18.2	23°18.3	23°18.4	+0.1
Th 15	269°51.6	284°51.5	299°51.3	314°51.2	329°51.1	344°50.9	359°50.8	14°50.7	29°50.5	44°50.4	59°50.3	74°50.1	-0.1
	23°19.8	23°19.9	23°20.0	23°20.1	23°20.2	23°20.3	23°20.4	23°20.5	23°20.6	23°20.7	23°20.8	23°20.9	+0.1
Fr 16	269°48.4	284°48.2	299°48.1	314°48.0	329°47.8	344°47.7	359°47.6	14°47.4	29°47.3	44°47.2	59°47.0	74°46.9	-0.1
	23°21.9	23°21.9	23°22.0	23°22.1	23°22.2	23°22.2	23°22.3	23°22.4	23°22.5	23°22.5	23°22.6	23°22.7	+0.1
Sa 17	269°45.1	284°45.0	299°44.8	314°44.7	329°44.6	344°44.4	359°44.3	14°44.2	29°44.0	44°43.9	59°43.8	74°43.6	-0.1
	23°23.5	23°23.6	23°23.7	23°23.7	23°23.8	23°23.8	23°23.9	23°24.0	23°24.0	23°24.1	23°24.1	23°24.2	+0.1
Su 18	269°41.8	284°41.7	299°41.6	314°41.4	329°41.3	344°41.2	359°41.0	14°40.9	29°40.8	44°40.6	59°40.5	74°40.3	-0.1
	23°24.8	23°24.9	23°24.9	23°24.9	23°25.0	23°25.0	23°25.1	23°25.1	23°25.1	23°25.2	23°25.2	23°25.3	+0.0
Mo 19	269°38.6	284°38.4	299°38.3	314°38.1	329°38.0	344°37.9	359°37.7	14°37.6	29°37.5	44°37.3	59°37.2	74°37.1	-0.1
	23°25.7	23°25.7	23°25.7	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.9	23°25.9	23°25.9	23°25.9	+0.0
Tu 20	269°35.3	284°35.1	299°35.0	314°34.9	329°34.7	344°34.6	359°34.4	14°34.3	29°34.2	44°34.0	59°33.9	74°33.8	-0.1
	23°26.1	23°26.1	23°26.1	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	23°26.2	+0.0
We 21	269°32.0	284°31.8	299°31.7	314°31.6	329°31.4	344°31.3	359°31.2	14°31.0	29°30.9	44°30.8	59°30.6	74°30.5	-0.1
	23°26.2	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.0	23°26.0	-0.0
Th 22	269°28.7	284°28.6	299°28.4	314°28.3	329°28.2	344°28.0	359°27.9	14°27.7	29°27.6	44°27.5	59°27.3	74°27.2	-0.1
	23°25.8	23°25.8	23°25.7	23°25.7	23°25.7	23°25.6	23°25.6	23°25.6	23°25.6	23°25.5	23°25.5	23°25.5	-0.0
Fr 23	269°25.4	284°25.3	299°25.2	314°25.0	329°24.9	344°24.8	359°24.6	14°24.5	29°24.4	44°24.2	59°24.1	74°24.0	-0.1
	23°25.0	23°24.9	23°24.9	23°24.9	23°24.8	23°24.8	23°24.7	23°24.7	23°24.6	23°24.6	23°24.5	23°24.5	-0.0
Sa 24	269°22.2	284°22.1	299°21.9	314°21.8	329°21.7	344°21.5	359°21.4	14°21.3	29°21.1	44°21.0	59°20.9	74°20.7	-0.1
	23°23.8	23°23.7	23°23.7	23°23.6	23°23.5	23°23.5	23°23.4	23°23.3	23°23.3	23°23.2	23°23.2	23°23.1	-0.1
Su 25	269°19.0	284°18.9	299°18.7	314°18.6	329°18.5	344°18.3	359°18.2	14°18.1	29°17.9	44°17.8	59°17.7	74°17.5	-0.1
	23°22.2	23°22.1	23°22.0	23°21.9	23°21.8	23°21.8	23°21.7	23°21.6	23°21.5	23°21.4	23°21.4	23°21.3	-0.1
Mo 26	269°15.8	284°15.7	299°15.6	314°15.4	329°15.3	344°15.2	359°15.0	14°14.9	29°14.8	44°14.6	59°14.5	74°14.4	-0.1
	23°20.1	23°20.0	23°19.9	23°19.8	23°19.7	23°19.7	23°19.6	23°19.5	23°19.4	23°19.3	23°19.2	23°19.1	-0.1
Tu 27	269°12.7	284°12.6	299°12.4	314°12.3	329°12.2	344°12.0	359°11.9	14°11.8	29°11.7	44°11.5	59°11.4	74°11.3	-0.1
	23°17.7	23°17.6	23°17.5	23°17.4	23°17.2	23°17.1	23°17.0	23°16.9	23°16.8	23°16.7	23°16.5	23°16.4	-0.1
We 28	269°09.6	284°09.5	299°09.4	314°09.2	329°09.1	344°09.0	359°08.8	14°08.7	29°08.6	44°08.5	59°08.3	74°08.2	-0.1
	23°14.8	23°14.7	23°14.6	23°14.5	23°14.3	23°14.2	23°14.1	23°13.9	23°13.8	23°13.7	23°13.5	23°13.4	-0.1
Th 29	269°06.6	284°06.5	299°06.3	314°06.2	329°06.1	344°06.0	359°05.8	14°05.7	29°05.6	44°05.5	59°05.3	74°05.2	-0.1
	23°11.6	23°11.4	23°11.3	23°11.1	23°11.0	23°10.9	23°10.7	23°10.6	23°10.4	23°10.3	23°10.1	23°10.0	-0.1
Fr 30	269°03.6	284°03.5	299°03.4	314°03.3	329°03.1	344°03.0	359°02.9	14°02.8	29°02.7	44°02.5	59°02.4	74°02.3	-0.1
	23°07.9	23°07.8	23°07.6	23°07.4	23°07.3	23°07.1	23°06.9	23°06.8	23°06.6	23°06.4	23°06.3	23°06.1	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2028

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Th 1	254°55.5	269°26.1	283°56.6	298°27.1	312°57.6	327°28.1	341°58.5	356°29.0	10°59.4	25°29.8	40°00.2	+30.5	16.1
	-3°06.1	-3°21.5	-3°36.9	-3°52.2	-4°07.5	-4°22.8	-4°38.1	-4°53.3	-5°08.5	-5°23.7	-5°38.9	-15.3	59.1
Fr 2	257°32.5	272°02.3	286°32.2	301°02.0	315°31.7	330°01.5	344°31.1	359°00.8	13°30.3	27°59.9	42°29.4	+29.7	16.1
	-9°21.7	-9°36.2	-9°50.6	-10°05.0	-10°19.3	-10°33.6	-10°47.8	-11°01.9	-11°16.0	-11°30.0	-11°43.9	-14.2	59.0
Sa 3	259°45.8	274°14.4	288°43.0	303°11.6	317°40.1	332°08.5	346°36.9	1°05.2	15°33.5	30°01.7	44°29.8	+28.4	16.0
	-15°04.3	-15°17.1	-15°29.7	-15°42.2	-15°54.6	-16°07.0	-16°19.2	-16°31.4	-16°43.4	-16°55.4	-17°07.3	-12.3	58.7
Su 4	261°24.9	275°52.1	290°19.2	304°46.3	319°13.3	333°40.3	348°07.2	2°34.1	17°00.9	31°27.6	45°54.3	+26.9	15.9
	-19°52.2	-20°02.3	-20°12.2	-20°22.1	-20°31.8	-20°41.4	-20°50.8	-21°00.1	-21°09.3	-21°18.4	-21°27.4	-9.5	58.3
Mo 5	262°28.9	276°54.8	291°20.7	305°46.6	320°12.5	334°38.3	349°04.1	3°29.8	17°55.5	32°21.2	46°46.9	+25.8	15.8
	-23°25.0	-23°31.7	-23°38.3	-23°44.7	-23°51.0	-23°57.1	-24°03.1	-24°08.9	-24°14.6	-24°20.1	-24°25.5	-6.0	57.9
Tu 6	263°09.6	277°35.1	292°00.5	306°26.0	320°51.4	335°16.9	349°42.3	4°07.8	18°33.3	32°58.8	47°24.3	+25.5	15.6
	-25°27.4	-25°30.3	-25°33.0	-25°35.6	-25°38.0	-25°40.2	-25°42.3	-25°44.3	-25°46.0	-25°47.7	-25°49.1	-2.2	57.3
○ We 7	263°50.0	278°16.0	292°42.0	307°08.1	321°34.2	336°00.4	350°26.6	4°52.9	19°19.2	33°45.6	48°12.0	+26.2	15.5
	-25°52.4	-25°51.4	-25°50.2	-25°48.9	-25°47.4	-25°45.8	-25°44.0	-25°42.1	-25°40.1	-25°37.9	-25°35.5	+1.7	56.7
Th 8	264°56.1	279°23.6	293°51.2	308°18.9	322°46.6	337°14.4	351°42.3	6°10.3	20°38.3	35°06.5	49°34.7	+27.9	15.3
	-24°43.4	-24°38.8	-24°34.1	-24°29.3	-24°24.3	-24°19.2	-24°14.0	-24°08.7	-24°03.3	-23°57.7	-23°52.0	+5.1	56.1
Fr 9	266°48.1	281°17.7	295°47.3	310°17.1	324°47.0	339°16.9	353°46.9	8°17.1	22°47.3	37°17.6	51°48.0	+30.0	15.1
	-22°12.6	-22°05.1	-21°57.5	-21°49.8	-21°42.0	-21°34.1	-21°26.1	-21°18.0	-21°09.8	-21°01.5	-20°53.2	+8.0	55.5
Sa 10	269°34.1	284°05.9	298°37.7	313°09.6	327°41.7	342°13.7	356°45.9	11°18.1	25°50.5	40°22.9	54°55.3	+32.1	15.0
	-18°37.0	-18°27.3	-18°17.5	-18°07.6	-17°57.7	-17°47.7	-17°37.6	-17°27.4	-17°17.2	-17°06.9	-16°56.6	+10.0	54.9
Su 11	273°11.4	287°45.0	302°18.7	316°52.5	331°26.3	346°00.2	0°34.1	15°08.1	29°42.2	44°16.3	58°50.5	+33.9	14.9
	-14°13.9	-14°02.7	-13°51.3	-13°39.9	-13°28.5	-13°17.0	-13°05.5	-12°53.9	-12°42.3	-12°30.7	-12°19.0	+11.5	54.5
Mo 12	277°29.5	292°04.5	306°39.5	321°14.6	335°49.7	350°24.8	5°00.0	19°35.2	34°10.4	48°45.7	63°21.0	+35.2	14.8
	-9°18.8	-9°06.5	-8°54.2	-8°41.8	-8°29.5	-8°17.1	-8°04.6	-7°52.2	-7°39.7	-7°27.2	-7°14.7	+12.4	54.3
Tu 13	292°04.5	306°39.5	321°14.6	335°49.7	350°24.8	5°00.0	19°35.2	34°10.4	48°45.7	63°21.0	77°56.4	+35.2	14.8
	-9°06.5	-8°54.2	-8°41.8	-8°29.5	-8°17.1	-8°04.6	-7°52.2	-7°39.7	-7°27.2	-7°14.7	-7°02.1	+12.4	54.3
We 14	296°49.8	311°25.5	326°01.2	340°37.0	355°12.8	9°48.5	24°24.3	39°00.1	53°35.9	68°11.7	82°47.5	+35.8	14.8
	-3°51.5	-3°38.6	-3°25.8	-3°12.9	-3°00.1	-2°47.2	-2°34.3	-2°21.4	-2°08.5	-1°55.6	-1°42.6	+12.9	54.2
◑ Th 15	301°44.7	316°20.5	330°56.2	345°32.0	0°07.7	14°43.4	29°19.1	43°54.8	58°30.4	73°06.0	87°41.7	+35.7	14.8
	1°31.7	1°44.7	1°57.7	2°10.6	2°23.6	2°36.5	2°49.4	3°02.4	3°15.3	3°28.2	3°41.1	+12.9	54.3
Fr 16	306°32.5	321°07.6	335°42.7	350°17.7	4°52.7	19°27.7	34°02.6	48°37.4	63°12.2	77°47.0	92°21.7	+34.9	14.9
	6°53.3	7°06.0	7°18.7	7°31.3	7°43.9	7°56.6	8°09.1	8°21.7	8°34.2	8°46.7	8°59.2	+12.6	54.6
Sa 17	310°55.9	325°29.7	340°03.5	354°37.1	9°10.7	23°44.2	38°17.7	52°51.1	67°24.4	81°57.6	96°30.8	+33.5	15.0
	12°02.8	12°14.7	12°26.6	12°38.5	12°50.3	13°02.1	13°13.9	13°25.6	13°37.2	13°48.8	14°00.4	+11.8	55.0
Su 18	314°38.6	329°10.5	343°42.2	358°13.9	12°45.5	27°17.0	41°48.4	56°19.7	70°50.9	85°22.0	99°53.0	+31.4	15.2
	16°47.4	16°58.1	17°08.7	17°19.2	17°29.7	17°40.1	17°50.4	18°00.6	18°10.8	18°20.9	18°30.9	+10.4	55.7
Mo 19	317°26.6	331°56.1	346°25.4	0°54.7	15°23.8	29°52.8	44°21.8	58°50.6	73°19.3	87°48.0	102°16.5	+29.0	15.4
	20°51.5	21°00.2	21°08.7	21°17.2	21°25.5	21°33.8	21°42.0	21°50.0	21°58.0	22°05.8	22°13.5	+8.2	56.4
Tu 20	319°12.3	333°39.3	348°06.1	2°32.9	16°59.5	31°26.1	45°52.5	60°18.9	74°45.2	89°11.4	103°37.5	+26.5	15.6
	23°55.8	24°01.6	24°07.3	24°12.9	24°18.3	24°23.6	24°28.8	24°33.8	24°38.7	24°43.5	24°48.1	+5.2	57.1
We 21	319°59.6	334°24.5	348°49.3	3°14.1	17°38.8	32°03.4	46°28.0	60°52.6	75°17.1	89°41.5	104°05.9	+24.6	15.8
	25°39.7	25°41.9	25°43.9	25°45.8	25°47.6	25°49.1	25°50.6	25°51.8	25°52.9	25°53.8	25°54.6	+1.5	57.9
● Th 22	320°07.2	334°31.1	348°55.0	3°18.8	17°42.7	32°06.5	46°30.4	60°54.2	75°18.0	89°41.9	104°05.7	+23.8	16.0
	25°45.8	25°43.9	25°41.7	25°39.5	25°37.0	25°34.4	25°31.6	25°28.6	25°25.4	25°22.1	25°18.6	-2.7	58.6
Fr 23	320°05.2	334°29.4	348°53.6	3°17.8	17°42.1	32°06.5	46°30.8	60°55.2	75°19.7	89°44.2	104°08.8	+24.4	16.1
	24°06.0	23°59.9	23°53.5	23°47.0	23°40.4	23°33.6	23°26.6	23°19.5	23°12.2	23°04.7	22°57.1	-6.9	59.2
Sa 24	320°24.0	334°49.5	349°15.0	3°40.7	18°06.4	32°32.2	46°58.0	61°23.9	75°49.9	90°16.0	104°42.1	+25.8	16.2
	20°45.2	20°35.3	20°25.2	20°15.0	20°04.7	19°54.2	19°43.6	19°32.9	19°22.1	19°11.1	19°00.0	-10.5	59.6
Su 25	321°22.7	335°50.0	350°17.4	4°44.8	19°12.3	33°39.8	48°07.5	62°35.2	77°03.0	91°30.8	105°58.7	+27.6	16.3
	16°00.1	15°47.2	15°34.3	15°21.3	15°08.1	14°54.9	14°41.6	14°28.3	14°14.8	14°01.2	13°47.6	-13.3	59.7
Mo 26	323°05.2	337°34.1	352°03.1	6°32.1	21°01.2	35°30.3	49°59.5	64°28.7	78°58.0	93°27.4	107°56.7	+29.2	16.3
	10°14.4	9°59.7	9°44.9	9°30.1	9°15.3	9°00.3	8°45.4	8°30.4	8°15.3	8°00.2	7°45.1	-14.9	59.7
Tu 27	325°22.7	339°52.7	354°22.7	8°52.8	23°22.9	37°53.0	52°23.2	66°53.4	81°23.6	95°53.8	110°24.0	+30.1	16.2
	3°54.2	3°38.6	3°23.0	3°07.4	2°51.8	2°36.2	2°20.5	2°04.9	1°49.3	1°33.6	1°18.0	-15.6	59.6
We 28	327°59.4	342°29.9	357°00.3	11°30.7	26°01.1	40°31.5	55°01.9	69°32.4	84°02.8	98°33.2	113°03.5	+30.4	16.2
	-2°36.0	-2°51.5	-3°06.9	-3°22.4	-3°37.8	-3°53.2	-4°08.5	-4°23.9	-4°39.2	-4°54.4	-5°09.7	-15.4	59.3
◐ Th 29	330°37.6	345°07.7	359°37.8	14°07.8	28°37.9	43°07.8	57°37.8	72°07.8	86°37.7	101°07.5	115°37.4	+30.0	16.1
	-8°53.3	-9°07.8	-9°22.3	-9°36.7	-9°51.0	-10°05.3	-10°19.6	-10°33.7	-10°47.8	-11°01.9	-11°15.8	-14.3	58.9
Fr 30	333°00.4	347°29.6	1°58.7	16°27.8	30°56.9	45°25.9	59°54.9	74°23.8	88°52.6	103°21.5	117°50.2	+29.0	15.9
	-14°36.7	-14°49.4	-15°02.1	-15°14.7	-15°27.1	-15°39.5	-15°51.8	-16°04.0	-16°16.2	-16°28.2	-16°40.1	-12.3	58.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 7 06h08 — LQ: 15 04h27 — NM: 22 18h27 — FQ: 29 12h10

SUN

July 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°00.7	284°00.6	299°00.5	314°00.4	329°00.3	344°00.1	359°00.0	13°59.9	28°59.8	43°59.7	58°59.6	73°59.4	-0.1
	23°03.9	23°03.7	23°03.5	23°03.3	23°03.1	23°03.0	23°02.8	23°02.6	23°02.4	23°02.2	23°02.0	23°01.9	-0.2
Su 2	268°57.9	283°57.8	298°57.7	313°57.6	328°57.5	343°57.3	358°57.2	13°57.1	28°57.0	43°56.9	58°56.8	73°56.7	-0.1
	22°59.4	22°59.2	22°59.0	22°58.8	22°58.6	22°58.4	22°58.2	22°58.0	22°57.8	22°57.6	22°57.4	22°57.2	-0.2
Mo 3	268°55.2	283°55.1	298°55.0	313°54.8	328°54.7	343°54.6	358°54.5	13°54.4	28°54.3	43°54.2	58°54.1	73°53.9	-0.1
	22°54.5	22°54.3	22°54.1	22°53.9	22°53.7	22°53.5	22°53.2	22°53.0	22°52.8	22°52.6	22°52.4	22°52.2	-0.2
Tu 4	268°52.5	283°52.4	298°52.3	313°52.2	328°52.1	343°52.0	358°51.9	13°51.8	28°51.7	43°51.5	58°51.4	73°51.3	-0.1
	22°49.3	22°49.0	22°48.8	22°48.6	22°48.3	22°48.1	22°47.9	22°47.6	22°47.4	22°47.2	22°46.9	22°46.7	-0.2
We 5	268°49.9	283°49.8	298°49.7	313°49.6	328°49.5	343°49.4	358°49.3	13°49.2	28°49.1	43°49.0	58°48.9	73°48.8	-0.1
	22°43.6	22°43.3	22°43.1	22°42.9	22°42.6	22°42.4	22°42.1	22°41.9	22°41.6	22°41.4	22°41.1	22°40.9	-0.2
Th 6	268°47.5	283°47.4	298°47.3	313°47.2	328°47.1	343°47.0	358°46.8	13°46.7	28°46.6	43°46.5	58°46.4	73°46.3	-0.1
	22°37.5	22°37.3	22°37.0	22°36.8	22°36.5	22°36.2	22°36.0	22°35.7	22°35.4	22°35.2	22°34.9	22°34.6	-0.3
Fr 7	268°45.1	283°45.0	298°44.9	313°44.8	328°44.7	343°44.6	358°44.5	13°44.4	28°44.3	43°44.2	58°44.1	73°44.0	-0.1
	22°31.1	22°30.8	22°30.5	22°30.3	22°30.0	22°29.7	22°29.4	22°29.1	22°28.9	22°28.6	22°28.3	22°28.0	-0.3
Sa 8	268°42.8	283°42.7	298°42.6	313°42.5	328°42.4	343°42.3	358°42.2	13°42.1	28°42.0	43°41.9	58°41.8	73°41.7	-0.1
	22°24.3	22°24.0	22°23.7	22°23.4	22°23.1	22°22.8	22°22.5	22°22.2	22°21.9	22°21.6	22°21.3	22°21.0	-0.3
Su 9	268°40.6	283°40.5	298°40.4	313°40.3	328°40.2	343°40.1	358°40.0	13°39.9	28°39.9	43°39.8	58°39.7	73°39.6	-0.1
	22°17.0	22°16.7	22°16.4	22°16.1	22°15.8	22°15.5	22°15.2	22°14.9	22°14.5	22°14.2	22°13.9	22°13.6	-0.3
Mo 10	268°38.5	283°38.4	298°38.3	313°38.2	328°38.1	343°38.1	358°38.0	13°37.9	28°37.8	43°37.7	58°37.6	73°37.6	-0.1
	22°09.4	22°09.1	22°08.8	22°08.5	22°08.1	22°07.8	22°07.5	22°07.1	22°06.8	22°06.5	22°06.1	22°05.8	-0.3
Tu 11	268°36.5	283°36.4	298°36.3	313°36.3	328°36.2	343°36.1	358°36.0	13°35.9	28°35.9	43°35.8	58°35.7	73°35.6	-0.1
	22°01.4	22°01.1	22°00.8	22°00.4	22°00.1	21°59.7	21°59.4	21°59.0	21°58.7	21°58.3	21°58.0	21°57.7	-0.3
We 12	268°34.6	283°34.5	298°34.5	313°34.4	328°34.3	343°34.2	358°34.2	13°34.1	28°34.0	43°33.9	58°33.9	73°33.8	-0.1
	21°53.1	21°52.7	21°52.4	21°52.0	21°51.6	21°51.3	21°50.9	21°50.6	21°50.2	21°49.8	21°49.5	21°49.1	-0.4
Th 13	268°32.9	283°32.8	298°32.7	313°32.6	328°32.6	343°32.5	358°32.4	13°32.4	28°32.3	43°32.2	58°32.2	73°32.1	-0.1
	21°44.3	21°44.0	21°43.6	21°43.2	21°42.8	21°42.5	21°42.1	21°41.7	21°41.3	21°41.0	21°40.6	21°40.2	-0.4
Fr 14	268°31.2	283°31.1	298°31.1	313°31.0	328°30.9	343°30.9	358°30.8	13°30.8	28°30.7	43°30.6	58°30.6	73°30.5	-0.1
	21°35.2	21°34.8	21°34.4	21°34.1	21°33.7	21°33.3	21°32.9	21°32.5	21°32.1	21°31.7	21°31.3	21°30.9	-0.4
Sa 15	268°29.7	283°29.6	298°29.6	313°29.5	328°29.4	343°29.4	358°29.3	13°29.3	28°29.2	43°29.1	58°29.1	73°29.0	-0.1
	21°25.7	21°25.3	21°24.9	21°24.5	21°24.1	21°23.7	21°23.3	21°22.9	21°22.5	21°22.1	21°21.7	21°21.3	-0.4
Su 16	268°28.3	283°28.2	298°28.2	313°28.1	328°28.1	343°28.0	358°28.0	13°27.9	28°27.8	43°27.8	58°27.7	73°27.7	-0.1
	21°15.9	21°15.5	21°15.0	21°14.6	21°14.2	21°13.8	21°13.4	21°12.9	21°12.5	21°12.1	21°11.7	21°11.3	-0.4
Mo 17	268°27.0	283°27.0	298°26.9	313°26.9	328°26.8	343°26.8	358°26.7	13°26.7	28°26.6	43°26.6	58°26.5	73°26.5	-0.0
	21°05.7	21°05.2	21°04.8	21°04.4	21°03.9	21°03.5	21°03.1	21°02.6	21°02.2	21°01.8	21°01.3	21°00.9	-0.4
Tu 18	268°25.9	283°25.8	298°25.8	313°25.7	328°25.7	343°25.6	358°25.6	13°25.6	28°25.5	43°25.5	58°25.4	73°25.4	-0.0
	20°55.1	20°54.7	20°54.2	20°53.8	20°53.3	20°52.9	20°52.4	20°52.0	20°51.5	20°51.1	20°50.6	20°50.1	-0.5
We 19	268°24.8	283°24.8	298°24.8	313°24.7	328°24.7	343°24.7	358°24.6	13°24.6	28°24.5	43°24.5	58°24.5	73°24.4	-0.0
	20°44.2	20°43.7	20°43.3	20°42.8	20°42.3	20°41.9	20°41.4	20°40.9	20°40.5	20°40.0	20°39.5	20°39.1	-0.5
Th 20	268°24.0	283°23.9	298°23.9	313°23.9	328°23.8	343°23.8	358°23.8	13°23.7	28°23.7	43°23.7	58°23.6	73°23.6	-0.0
	20°32.9	20°32.4	20°32.0	20°31.5	20°31.0	20°30.5	20°30.0	20°29.6	20°29.1	20°28.6	20°28.1	20°27.6	-0.5
Fr 21	268°23.2	283°23.2	298°23.2	313°23.1	328°23.1	343°23.1	358°23.1	13°23.0	28°23.0	43°23.0	58°23.0	73°22.9	-0.0
	20°21.3	20°20.8	20°20.3	20°19.8	20°19.3	20°18.8	20°18.3	20°17.8	20°17.3	20°16.8	20°16.3	20°15.9	-0.5
Sa 22	268°22.6	283°22.6	298°22.6	313°22.6	328°22.5	343°22.5	358°22.5	13°22.5	28°22.5	43°22.4	58°22.4	73°22.4	-0.0
	20°09.3	20°08.8	20°08.3	20°07.8	20°07.3	20°06.8	20°06.3	20°05.8	20°05.3	20°04.8	20°04.2	20°03.7	-0.5
Su 23	268°22.2	283°22.2	298°22.1	313°22.1	328°22.1	343°22.1	358°22.1	13°22.1	28°22.1	43°22.0	58°22.0	73°22.0	-0.0
	19°57.0	19°56.5	19°56.0	19°55.5	19°55.0	19°54.4	19°53.9	19°53.4	19°52.9	19°52.3	19°51.8	19°51.3	-0.5
Mo 24	268°21.9	283°21.9	298°21.9	313°21.8	328°21.8	343°21.8	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.8	-0.0
	19°44.4	19°43.9	19°43.3	19°42.8	19°42.3	19°41.7	19°41.2	19°40.7	19°40.1	19°39.6	19°39.0	19°38.5	-0.5
Tu 25	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	-0.0
	19°31.5	19°30.9	19°30.4	19°29.8	19°29.3	19°28.7	19°28.2	19°27.6	19°27.1	19°26.5	19°26.0	19°25.4	-0.5
We 26	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.8	58°21.8	73°21.8	+0.0
	19°18.2	19°17.6	19°17.1	19°16.5	19°15.9	19°15.4	19°14.8	19°14.2	19°13.7	19°13.1	19°12.5	19°12.0	-0.6
Th 27	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.9	358°21.9	13°21.9	28°22.0	43°22.0	58°22.0	73°22.0	+0.0
	19°04.6	19°04.0	19°03.4	19°02.9	19°02.3	19°01.7	19°01.1	19°00.6	19°00.0	18°59.4	18°58.8	18°58.2	-0.6
Fr 28	268°22.2	283°22.2	298°22.2	313°22.2	328°22.2	343°22.3	358°22.3	13°22.3	28°22.3	43°22.3	58°22.4	73°22.4	+0.0
	18°50.7	18°50.1	18°49.5	18°48.9	18°48.3	18°47.7	18°47.1	18°46.5	18°46.0	18°45.4	18°44.8	18°44.2	-0.6
Sa 29	268°22.6	283°22.7	298°22.7	313°22.7	328°22.7	343°22.8	358°22.8	13°22.8	28°22.8	43°22.9	58°22.9	73°22.9	+0.0
	18°36.4	18°35.8	18°35.2	18°34.6	18°34.0	18°33.4	18°32.8	18°32.2	18°31.6	18°31.0	18°30.4	18°29.8	-0.6
Su 30	268°23.3	283°23.3	298°23.3	313°23.4	328°23.4	343°23.4	358°23.4	13°23.5	28°23.5	43°23.5	58°23.6	73°23.6	+0.0
	18°21.9	18°21.3	18°20.7	18°20.1	18°19.5	18°18.9	18°18.2	18°17.6	18°17.0	18°16.4	18°15.8	18°15.2	-0.6
Mo 31	268°24.0	283°24.1	298°24.1	313°24.1	328°24.2	343°24.2	358°24.3	13°24.3	28°24.3	43°24.4	58°24.4	73°24.5	+0.0
	18°07.1	18°06.5	18°05.9	18°05.2	18°04.6	18°04.0	18°03.4	18°02.7	18°02.1	18°01.5	18°00.8	18°00.2	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2028

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Sa 1	248°06.9	262°35.1	277°03.4	291°31.5	305°59.6	320°27.7	334°55.7	349°23.6	3°51.5	18°19.4	32°47.2	+28.0	15.8
	-18°22.8	-18°33.7	-18°44.5	-18°55.1	-19°05.7	-19°16.1	-19°26.5	-19°36.7	-19°46.8	-19°56.8	-20°06.6	-10.4	58.1
Su 2	249°38.1	264°05.1	278°32.1	292°59.0	307°25.9	321°52.7	336°19.5	350°46.3	5°13.0	19°39.7	34°06.4	+26.8	15.7
	-22°19.7	-22°27.6	-22°35.3	-22°42.9	-22°50.3	-22°57.6	-23°04.8	-23°11.8	-23°18.7	-23°25.4	-23°32.0	-7.2	57.6
Mo 3	250°42.3	265°08.4	279°34.6	294°00.8	308°26.9	322°53.1	337°19.2	351°45.3	6°11.4	20°37.5	35°03.5	+26.1	15.6
	-24°53.9	-24°58.1	-25°02.3	-25°06.3	-25°10.1	-25°13.8	-25°17.3	-25°20.7	-25°23.9	-25°27.0	-25°29.9	-3.6	57.1
Tu 4	251°35.1	266°01.3	280°27.5	294°53.7	309°20.0	323°46.3	338°12.6	352°38.9	7°05.3	21°31.7	35°58.1	+26.3	15.4
	-25°55.6	-25°56.1	-25°56.4	-25°56.6	-25°56.7	-25°56.6	-25°56.3	-25°55.9	-25°55.4	-25°54.7	-25°53.8	+0.2	56.5
We 5	252°39.6	267°06.7	281°33.9	296°01.2	310°28.5	324°55.9	339°23.3	353°50.8	8°18.4	22°46.0	37°13.7	+27.4	15.3
	-25°23.7	-25°20.6	-25°17.3	-25°13.9	-25°10.3	-25°06.6	-25°02.8	-24°58.8	-24°54.7	-24°50.5	-24°46.2	+3.8	56.0
○ Th 6	254°17.6	268°46.4	283°15.4	297°44.4	312°13.5	326°42.6	341°11.9	355°41.2	10°10.6	24°40.1	39°09.6	+29.2	15.1
	-23°25.7	-23°19.4	-23°12.9	-23°06.4	-22°59.7	-22°52.9	-22°46.0	-22°39.0	-22°31.9	-22°24.7	-22°17.4	+6.8	55.5
Fr 7	256°42.9	271°13.8	285°44.7	300°15.8	314°46.9	329°18.1	343°49.4	358°20.7	12°52.2	27°23.7	41°55.3	+31.2	15.0
	-20°15.6	-20°06.7	-19°57.8	-19°48.7	-19°39.6	-19°30.4	-19°21.1	-19°11.7	-19°02.2	-18°52.7	-18°43.1	+9.3	55.1
Sa 8	259°58.6	274°31.4	289°04.3	303°37.2	318°10.3	332°43.4	347°16.5	1°49.8	16°23.1	30°56.4	45°29.9	+33.1	14.9
	-16°10.1	-15°59.4	-15°48.6	-15°37.7	-15°26.8	-15°15.8	-15°04.8	-14°53.7	-14°42.6	-14°31.4	-14°20.1	+11.0	54.7
Su 9	263°58.8	278°33.2	293°07.6	307°42.1	322°16.6	336°51.2	351°25.8	6°00.5	20°35.3	35°10.0	49°44.9	+34.6	14.8
	-11°25.7	-11°13.7	-11°01.7	-10°49.6	-10°37.6	-10°25.4	-10°13.3	-10°01.1	-9°48.9	-9°36.6	-9°24.3	+12.1	54.3
Mo 10	268°32.1	283°07.5	297°43.0	312°18.5	326°54.0	341°29.5	356°05.1	10°40.7	25°16.3	39°51.9	54°27.6	+35.6	14.8
	-6°16.8	-6°04.2	-5°51.5	-5°38.7	-5°26.0	-5°13.3	-5°00.5	-4°47.7	-4°34.9	-4°22.1	-4°09.3	+12.8	54.1
Tu 11	273°24.3	288°00.2	302°36.1	317°11.9	331°47.8	346°23.7	0°59.6	15°35.4	30°11.3	44°47.2	59°23.1	+35.9	14.8
	-0°55.9	-0°42.9	-0°30.0	-0°17.0	-0°04.1	0°08.8	0°21.8	0°34.7	0°47.7	1°00.6	1°13.5	+12.9	54.1
We 12	278°19.9	292°55.6	307°31.2	322°06.8	336°42.4	351°18.0	5°53.5	20°29.1	35°04.6	49°40.0	64°15.4	+35.6	14.8
	4°26.6	4°39.4	4°52.2	5°04.9	5°17.7	5°30.4	5°43.1	5°55.8	6°08.5	6°21.1	6°33.8	+12.7	54.2
Th 13	292°55.6	307°31.2	322°06.8	336°42.4	351°18.0	5°53.5	20°29.1	35°04.6	49°40.0	64°15.4	78°50.8	+35.5	14.8
	4°39.4	4°52.2	5°04.9	5°17.7	5°30.4	5°43.1	5°55.8	6°08.5	6°21.1	6°33.8	6°46.4	+12.7	54.2
◑ Fr 14	297°37.4	312°12.2	326°46.9	341°21.5	355°56.1	10°30.7	25°05.2	39°39.6	54°14.0	68°48.4	83°22.7	+34.5	14.9
	9°52.7	10°04.9	10°17.0	10°29.2	10°41.3	10°53.3	11°05.4	11°17.3	11°29.3	11°41.2	11°53.1	+12.0	54.5
Sa 15	301°49.3	316°22.6	330°55.7	345°28.8	0°01.8	14°34.7	29°07.6	43°40.4	58°13.0	72°45.7	87°18.2	+32.9	15.0
	14°46.0	14°57.2	15°08.3	15°19.3	15°30.3	15°41.2	15°52.1	16°02.9	16°13.6	16°24.3	16°35.0	+10.9	55.0
Su 16	305°15.9	319°47.1	334°18.1	348°49.0	3°19.9	17°50.6	32°21.3	46°51.9	61°22.3	75°52.7	90°23.0	+30.7	15.2
	19°06.4	19°15.9	19°25.3	19°34.7	19°44.0	19°53.2	20°02.3	20°11.3	20°20.2	20°29.1	20°37.8	+9.1	55.7
Mo 17	307°45.1	322°13.7	336°42.3	351°10.8	5°39.1	20°07.4	34°35.6	49°03.6	63°31.6	77°59.5	92°27.2	+28.2	15.4
	22°37.7	22°44.9	22°51.9	22°58.9	23°05.7	23°12.4	23°19.0	23°25.5	23°31.9	23°38.2	23°44.3	+6.7	56.4
Tu 18	309°12.1	323°38.4	338°04.6	352°30.6	6°56.6	21°22.5	35°48.4	50°14.1	64°39.8	79°05.3	93°30.8	+25.9	15.6
	25°01.0	25°05.0	25°08.9	25°12.7	25°16.3	25°19.8	25°23.1	25°26.3	25°29.3	25°32.2	25°34.9	+3.4	57.3
We 19	309°44.9	324°09.3	338°33.7	352°58.1	7°22.4	21°46.6	36°10.8	50°35.0	64°59.1	79°23.2	93°47.2	+24.2	15.9
	25°57.0	25°57.2	25°57.2	25°57.1	25°56.8	25°56.3	25°55.6	25°54.8	25°53.8	25°52.7	25°51.4	-0.6	58.2
Th 20	309°45.0	324°08.7	338°32.5	352°56.2	7°20.0	21°43.7	36°07.5	50°31.2	64°55.0	79°18.8	93°42.6	+23.8	16.1
	25°10.9	25°06.8	25°02.6	24°58.1	24°53.5	24°48.8	24°43.8	24°38.7	24°33.4	24°28.0	24°22.4	-4.9	59.1
Fr 21	309°42.5	324°06.8	338°31.1	352°55.4	7°19.8	21°44.3	36°08.8	50°33.3	64°57.9	79°22.5	93°47.2	+24.5	16.3
	22°38.0	22°29.8	22°21.4	22°12.8	22°04.1	21°55.2	21°46.2	21°37.0	21°27.7	21°18.2	21°08.5	-9.0	59.8
● Sa 22	310°04.4	324°30.0	338°55.7	353°21.5	7°47.3	22°13.2	36°39.1	51°05.2	65°31.2	79°57.4	94°23.6	+25.9	16.5
	18°27.2	18°15.4	18°03.5	17°51.4	17°39.2	17°26.9	17°14.5	17°02.0	16°49.3	16°36.6	16°23.7	-12.4	60.3
Su 23	311°04.7	325°32.0	339°59.3	354°26.7	8°54.1	23°21.6	37°49.2	52°16.8	66°44.5	81°12.2	95°40.0	+27.5	16.5
	12°58.7	12°44.4	12°29.9	12°15.4	12°00.7	11°46.0	11°31.3	11°16.5	11°01.6	10°46.6	10°31.6	-14.7	60.6
Mo 24	312°43.3	327°12.0	341°40.6	356°09.3	10°38.0	25°06.8	39°35.7	54°04.5	68°33.4	83°02.3	97°31.3	+28.8	16.5
	6°39.7	6°23.9	6°08.1	5°52.2	5°36.3	5°20.4	5°04.4	4°48.4	4°32.4	4°16.4	4°00.4	-15.9	60.5
Tu 25	314°49.5	329°18.9	343°48.3	358°17.7	12°47.2	27°16.6	41°46.1	56°15.6	70°45.1	85°14.6	99°44.1	+29.5	16.4
	-0°01.1	-0°17.2	-0°33.2	-0°49.3	-1°05.3	-1°21.4	-1°37.4	-1°53.4	-2°09.4	-2°25.3	-2°41.2	-16.0	60.2
We 26	317°07.3	331°36.9	346°06.4	0°35.9	15°05.4	29°34.9	44°04.3	58°33.8	73°03.2	87°32.7	102°02.1	+29.5	16.3
	-6°36.2	-6°51.6	-7°06.8	-7°22.1	-7°37.3	-7°52.4	-8°07.5	-8°22.5	-8°37.4	-8°52.3	-9°07.2	-15.1	59.7
Th 27	319°20.7	333°49.8	348°18.8	2°47.7	17°16.7	31°45.6	46°14.5	60°43.3	75°12.2	89°40.9	104°09.7	+28.9	16.1
	-12°41.4	-12°55.1	-13°08.6	-13°22.2	-13°35.6	-13°48.9	-14°02.1	-14°15.3	-14°28.4	-14°41.3	-14°54.2	-13.3	59.0
◐ Fr 28	321°16.5	335°44.7	350°12.8	4°40.8	19°08.9	33°36.8	48°04.8	62°32.7	77°00.5	91°28.4	105°56.2	+28.0	15.9
	-17°55.3	-18°06.6	-18°17.7	-18°28.7	-18°39.6	-18°50.4	-19°01.0	-19°11.6	-19°22.0	-19°32.3	-19°42.5	-10.7	58.3
Sa 29	322°48.2	337°15.4	351°42.5	6°09.6	20°36.7	35°03.7	49°30.7	63°57.7	78°24.6	92°51.5	107°18.4	+27.0	15.7
	-22°00.2	-22°08.4	-22°16.4	-22°24.3	-22°32.0	-22°39.6	-22°47.1	-22°54.4	-23°01.6	-23°08.7	-23°15.6	-7.5	57.6
Su 30	323°58.6	338°25.2	352°51.7	7°18.2	21°44.7	36°11.2	50°37.6	65°04.1	79°30.6	93°57.0	108°23.5	+26.5	15.5
	-24°42.3	-24°46.9	-24°51.4	-24°55.7	-24°59.9	-25°03.9	-25°07.8	-25°11.5	-25°15.1	-25°18.5	-25°21.8	-4.0	57.0
Mo 31	325°00.7	339°27.3	353°53.9	8°20.5	22°47.1	37°13.8	51°40.4	66°07.2	80°33.9	95°00.7	109°27.4	+26.7	15.4
	-25°53.3	-25°54.2	-25°55.0	-25°55.6	-25°56.1	-25°56.4	-25°56.6	-25°56.6	-25°56.5	-25°56.2	-25°55.8	-0.2	56.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 6 18h10 — LQ: 14 20h56 — NM: 22 03h01 — FQ: 28 17h40

SUN

August 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	268° 25.0	283° 25.0	298° 25.1	313° 25.1	328° 25.1	343° 25.2	358° 25.2	13° 25.3	28° 25.3	43° 25.4	58° 25.4	73° 25.5	+0.0
	17° 52.0	17° 51.4	17° 50.7	17° 50.1	17° 49.4	17° 48.8	17° 48.2	17° 47.5	17° 46.9	17° 46.2	17° 45.6	17° 45.0	-0.6
We 2	268° 26.1	283° 26.1	298° 26.2	313° 26.2	328° 26.3	343° 26.3	358° 26.4	13° 26.4	28° 26.5	43° 26.5	58° 26.6	73° 26.6	+0.1
	17° 36.6	17° 35.9	17° 35.3	17° 34.6	17° 34.0	17° 33.3	17° 32.7	17° 32.0	17° 31.4	17° 30.7	17° 30.1	17° 29.4	-0.7
Th 3	268° 27.3	283° 27.4	298° 27.4	313° 27.5	328° 27.5	343° 27.6	358° 27.6	13° 27.7	28° 27.8	43° 27.8	58° 27.9	73° 27.9	+0.1
	17° 20.9	17° 20.2	17° 19.6	17° 18.9	17° 18.3	17° 17.6	17° 16.9	17° 16.3	17° 15.6	17° 14.9	17° 14.3	17° 13.6	-0.7
Fr 4	268° 28.7	283° 28.8	298° 28.8	313° 28.9	328° 29.0	343° 29.0	358° 29.1	13° 29.1	28° 29.2	43° 29.3	58° 29.3	73° 29.4	+0.1
	17° 04.9	17° 04.3	17° 03.6	17° 02.9	17° 02.2	17° 01.6	17° 00.9	17° 00.2	16° 59.5	16° 58.9	16° 58.2	16° 57.5	-0.7
Sa 5	268° 30.2	283° 30.3	298° 30.4	313° 30.5	328° 30.5	343° 30.6	358° 30.7	13° 30.7	28° 30.8	43° 30.9	58° 30.9	73° 31.0	+0.1
	16° 48.7	16° 48.0	16° 47.3	16° 46.6	16° 45.9	16° 45.3	16° 44.6	16° 43.9	16° 43.2	16° 42.5	16° 41.8	16° 41.1	-0.7
Su 6	268° 31.9	283° 32.0	298° 32.1	313° 32.2	328° 32.2	343° 32.3	358° 32.4	13° 32.5	28° 32.5	43° 32.6	58° 32.7	73° 32.8	+0.1
	16° 32.2	16° 31.5	16° 30.8	16° 30.1	16° 29.4	16° 28.7	16° 28.0	16° 27.3	16° 26.6	16° 25.9	16° 25.2	16° 24.5	-0.7
Mo 7	268° 33.8	283° 33.9	298° 33.9	313° 34.0	328° 34.1	343° 34.2	358° 34.3	13° 34.4	28° 34.4	43° 34.5	58° 34.6	73° 34.7	+0.1
	16° 15.4	16° 14.7	16° 14.0	16° 13.3	16° 12.6	16° 11.9	16° 11.1	16° 10.4	16° 09.7	16° 09.0	16° 08.3	16° 07.6	-0.7
Tu 8	268° 35.8	283° 35.9	298° 35.9	313° 36.0	328° 36.1	343° 36.2	358° 36.3	13° 36.4	28° 36.5	43° 36.6	58° 36.6	73° 36.7	+0.1
	15° 58.3	15° 57.6	15° 56.9	15° 56.2	15° 55.5	15° 54.8	15° 54.0	15° 53.3	15° 52.6	15° 51.9	15° 51.2	15° 50.4	-0.7
We 9	268° 37.9	283° 38.0	298° 38.1	313° 38.2	328° 38.3	343° 38.4	358° 38.5	13° 38.6	28° 38.7	43° 38.7	58° 38.8	73° 38.9	+0.1
	15° 41.0	15° 40.3	15° 39.6	15° 38.9	15° 38.1	15° 37.4	15° 36.7	15° 35.9	15° 35.2	15° 34.5	15° 33.8	15° 33.0	-0.7
Th 10	268° 40.2	283° 40.3	298° 40.4	313° 40.5	328° 40.6	343° 40.7	358° 40.8	13° 40.9	28° 41.0	43° 41.1	58° 41.2	73° 41.3	+0.1
	15° 23.5	15° 22.7	15° 22.0	15° 21.3	15° 20.5	15° 19.8	15° 19.1	15° 18.3	15° 17.6	15° 16.8	15° 16.1	15° 15.4	-0.7
Fr 11	268° 42.6	283° 42.7	298° 42.8	313° 42.9	328° 43.0	343° 43.1	358° 43.2	13° 43.3	28° 43.4	43° 43.5	58° 43.6	73° 43.8	+0.1
	15° 05.7	15° 04.9	15° 04.2	15° 03.4	15° 02.7	15° 01.9	15° 01.2	15° 00.4	14° 59.7	14° 58.9	14° 58.2	14° 57.4	-0.7
Sa 12	268° 45.1	283° 45.3	298° 45.4	313° 45.5	328° 45.6	343° 45.7	358° 45.8	13° 45.9	28° 46.0	43° 46.1	58° 46.1	73° 46.4	+0.1
	14° 47.6	14° 46.9	14° 46.1	14° 45.4	14° 44.6	14° 43.8	14° 43.1	14° 42.3	14° 41.6	14° 40.8	14° 40.0	14° 39.3	-0.8
Su 13	268° 47.8	283° 47.9	298° 48.1	313° 48.2	328° 48.3	343° 48.4	358° 48.5	13° 48.6	28° 48.8	43° 48.9	58° 49.0	73° 49.1	+0.1
	14° 29.4	14° 28.6	14° 27.8	14° 27.1	14° 26.3	14° 25.5	14° 24.7	14° 24.0	14° 23.2	14° 22.4	14° 21.7	14° 20.9	-0.8
Mo 14	268° 50.6	283° 50.8	298° 50.9	313° 51.0	328° 51.1	343° 51.3	358° 51.4	13° 51.5	28° 51.6	43° 51.7	58° 51.9	73° 52.0	+0.1
	14° 10.8	14° 10.1	14° 09.3	14° 08.5	14° 07.7	14° 07.0	14° 06.2	14° 05.4	14° 04.6	14° 03.8	14° 03.1	14° 02.3	-0.8
Tu 15	268° 53.6	283° 53.7	298° 53.8	313° 54.0	328° 54.1	343° 54.2	358° 54.4	13° 54.5	28° 54.6	43° 54.7	58° 54.9	73° 55.0	+0.1
	13° 52.1	13° 51.3	13° 50.5	13° 49.7	13° 49.0	13° 48.2	13° 47.4	13° 46.6	13° 45.8	13° 45.0	13° 44.2	13° 43.4	-0.8
We 16	268° 56.7	283° 56.8	298° 56.9	313° 57.1	328° 57.2	343° 57.3	358° 57.5	13° 57.6	28° 57.7	43° 57.9	58° 58.0	73° 58.1	+0.1
	13° 33.1	13° 32.3	13° 31.5	13° 30.8	13° 30.0	13° 29.2	13° 28.4	13° 27.6	13° 26.8	13° 26.0	13° 25.2	13° 24.4	-0.8
Th 17	268° 59.9	284° 00.0	299° 00.1	314° 00.3	329° 00.4	344° 00.5	359° 00.7	14° 00.8	29° 01.0	44° 01.1	59° 01.2	74° 01.4	+0.1
	13° 14.0	13° 13.2	13° 12.3	13° 11.5	13° 10.7	13° 09.9	13° 09.1	13° 08.3	13° 07.5	13° 06.7	13° 05.9	13° 05.1	-0.8
Fr 18	269° 03.2	284° 03.3	299° 03.5	314° 03.6	329° 03.8	344° 03.9	359° 04.0	14° 04.2	29° 04.3	44° 04.5	59° 04.6	74° 04.7	+0.1
	12° 54.6	12° 53.8	12° 52.9	12° 52.1	12° 51.3	12° 50.5	12° 49.7	12° 48.9	12° 48.1	12° 47.2	12° 46.4	12° 45.6	-0.8
Sa 19	269° 06.6	284° 06.8	299° 06.9	314° 07.1	329° 07.2	344° 07.4	359° 07.5	14° 07.7	29° 07.8	44° 08.0	59° 08.1	74° 08.2	+0.1
	12° 35.0	12° 34.1	12° 33.3	12° 32.5	12° 31.7	12° 30.9	12° 30.0	12° 29.2	12° 28.4	12° 27.6	12° 26.7	12° 25.9	-0.8
Su 20	269° 10.2	284° 10.3	299° 10.5	314° 10.6	329° 10.8	344° 10.9	359° 11.1	14° 11.3	29° 11.4	44° 11.6	59° 11.7	74° 11.9	+0.2
	12° 15.2	12° 14.3	12° 13.5	12° 12.7	12° 11.9	12° 11.0	12° 10.2	12° 09.4	12° 08.5	12° 07.7	12° 06.9	12° 06.0	-0.8
Mo 21	269° 13.9	284° 14.0	299° 14.2	314° 14.3	329° 14.5	344° 14.6	359° 14.8	14° 15.0	29° 15.1	44° 15.3	59° 15.4	74° 15.6	+0.2
	11° 55.2	11° 54.4	11° 53.5	11° 52.7	11° 51.8	11° 51.0	11° 50.2	11° 49.3	11° 48.5	11° 47.6	11° 46.8	11° 46.0	-0.8
Tu 22	269° 17.7	284° 17.8	299° 18.0	314° 18.1	329° 18.3	344° 18.5	359° 18.6	14° 18.8	29° 19.0	44° 19.1	59° 19.3	74° 19.4	+0.2
	11° 35.0	11° 34.2	11° 33.3	11° 32.5	11° 31.6	11° 30.8	11° 29.9	11° 29.1	11° 28.2	11° 27.4	11° 26.6	11° 25.7	-0.8
We 23	269° 21.6	284° 21.7	299° 21.9	314° 22.1	329° 22.2	344° 22.4	359° 22.6	14° 22.7	29° 22.9	44° 23.1	59° 23.2	74° 23.4	+0.2
	11° 14.7	11° 13.8	11° 12.9	11° 12.1	11° 11.2	11° 10.4	11° 09.5	11° 08.7	11° 07.8	11° 07.0	11° 06.1	11° 05.3	-0.9
Th 24	269° 25.6	284° 25.8	299° 25.9	314° 26.1	329° 26.3	344° 26.4	359° 26.6	14° 26.8	29° 26.9	44° 27.1	59° 27.3	74° 27.5	+0.2
	10° 54.1	10° 53.3	10° 52.4	10° 51.5	10° 50.7	10° 49.8	10° 49.0	10° 48.1	10° 47.2	10° 46.4	10° 45.5	10° 44.7	-0.9
Fr 25	269° 29.7	284° 29.9	299° 30.1	314° 30.2	329° 30.4	344° 30.6	359° 30.8	14° 30.9	29° 31.1	44° 31.3	59° 31.5	74° 31.6	+0.2
	10° 33.4	10° 32.5	10° 31.7	10° 30.8	10° 29.9	10° 29.1	10° 28.2	10° 27.3	10° 26.5	10° 25.6	10° 24.7	10° 23.9	-0.9
Sa 26	269° 33.9	284° 34.1	299° 34.3	314° 34.5	329° 34.7	344° 34.8	359° 35.0	14° 35.2	29° 35.4	44° 35.5	59° 35.7	74° 35.9	+0.2
	10° 12.5	10° 11.7	10° 10.8	10° 09.9	10° 09.0	10° 08.2	10° 07.3	10° 06.4	10° 05.6	10° 04.7	10° 03.8	10° 02.9	-0.9
Su 27	269° 38.3	284° 38.4	299° 38.6	314° 38.8	329° 39.0	344° 39.2	359° 39.4	14° 39.5	29° 39.7	44° 39.9	59° 40.1	74° 40.3	+0.2
	9° 51.5	9° 50.6	9° 49.8	9° 48.9	9° 48.0	9° 47.1	9° 46.2	9° 45.3	9° 44.5	9° 43.6	9° 42.7	9° 41.8	-0.9
Mo 28	269° 42.7	284° 42.9	299° 43.1	314° 43.3	329° 43.4	344° 43.6	359° 43.8	14° 44.0	29° 44.2	44° 44.4	59° 44.6	74° 44.8	+0.2
	9° 30.3	9° 29.4	9° 28.6	9° 27.7	9° 26.8	9° 25.9	9° 25.0	9° 24.1	9° 23.2	9° 22.3	9° 21.5	9° 20.6	-0.9
Tu 29	269° 47.2	284° 47.4	299° 47.6	314° 47.8	329° 48.0	344° 48.2	359° 48.4	14° 48.5	29° 48.7	44° 48.9	59° 49.1	74° 49.3	+0.2
	9° 09.0	9° 08.1	9° 07.2	9° 06.3	9° 05.4	9° 04.5	9° 03.6	9° 02.7	9° 01.9	9° 01.0	9° 00.1	8° 59.2	-0.9
We 30	269° 51.8	284° 52.0	299° 52.2	314° 52.4	329° 52.6	344° 52.8	359° 53.0	14° 53.2	29° 53.4	44° 53.6	59° 53.8	74° 54.0	+0.2
	8° 47.5	8° 46.6	8° 45.7	8° 44.8	8° 43.9	8° 43.0	8° 42.1	8° 41.2	8° 40.3	8° 39.4	8° 38.5	8° 37.6	-0.9
Th 31	269° 56.5	284° 56.7	299° 56.9	314° 57.1	329° 57.3	344° 57.5	359° 57.7	14° 57.9	29° 58.1	44° 58.3	59° 58.5	74° 58.7	+0.2
	8° 25.9	8° 25.0	8° 24.1	8° 23.2	8° 22.3	8° 21.4	8° 20.5	8° 19.6	8° 18.7	8° 17.8	8° 16.9	8° 15.9	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2028

D	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	Δ'/h	SH
Tu 1	253° 57.3	268° 24.5	282° 51.8	297° 19.0	311° 46.4	326° 13.8	340° 41.2	355° 08.7	9° 36.3	24° 03.9	38° 31.5	+27.4	15.2
	-25° 43.8	-25° 41.9	-25° 39.7	-25° 37.5	-25° 35.1	-25° 32.6	-25° 29.9	-25° 27.1	-25° 24.1	-25° 21.1	-25° 17.8	+2.6	55.9
We 2	255° 33.3	270° 02.0	284° 30.7	298° 59.4	313° 28.3	327° 57.2	342° 26.2	356° 55.2	11° 24.3	25° 53.5	40° 22.8	+28.9	15.1
	-24° 14.1	-24° 08.8	-24° 03.4	-23° 57.9	-23° 52.3	-23° 46.6	-23° 40.7	-23° 34.8	-23° 28.7	-23° 22.5	-23° 16.2	+5.8	55.4
Th 3	257° 50.7	272° 21.2	286° 51.7	301° 22.3	315° 53.0	330° 23.8	344° 54.6	359° 25.5	13° 56.5	28° 27.6	42° 58.7	+30.8	15.0
	-21° 28.7	-21° 20.7	-21° 12.6	-21° 04.4	-20° 56.2	-20° 47.8	-20° 39.3	-20° 30.8	-20° 22.2	-20° 13.4	-20° 04.6	+8.4	55.0
Fr 4	260° 54.9	275° 27.2	289° 59.6	304° 32.1	319° 04.6	333° 37.3	348° 09.9	2° 42.7	17° 15.5	31° 48.4	46° 21.3	+32.6	14.9
	-17° 42.6	-17° 32.5	-17° 22.4	-17° 12.2	-17° 01.9	-16° 51.5	-16° 41.1	-16° 30.6	-16° 20.1	-16° 09.4	-15° 58.8	+10.4	54.6
○ Sa 5	264° 43.2	279° 17.1	293° 51.1	308° 25.1	322° 59.2	337° 33.4	352° 07.6	6° 41.9	21° 16.2	35° 50.6	50° 25.0	+34.2	14.8
	-13° 11.7	-13° 00.1	-12° 48.5	-12° 36.9	-12° 25.2	-12° 13.5	-12° 01.7	-11° 49.9	-11° 38.0	-11° 26.1	-11° 14.2	+11.8	54.3
Su 6	269° 06.7	283° 41.8	298° 17.0	312° 52.1	327° 27.4	342° 02.6	356° 37.9	11° 13.2	25° 48.6	40° 23.9	54° 59.3	+35.3	14.8
	-8° 10.8	-7° 58.4	-7° 45.9	-7° 33.4	-7° 20.8	-7° 08.3	-6° 55.7	-6° 43.1	-6° 30.4	-6° 17.8	-6° 05.1	+12.6	54.1
Mo 7	273° 53.4	288° 29.1	303° 04.9	317° 40.7	332° 16.5	346° 52.3	1° 28.1	16° 04.0	30° 39.8	45° 15.6	59° 51.5	+35.8	14.7
	-2° 53.3	-2° 40.4	-2° 27.5	-2° 14.6	-2° 01.7	-1° 48.8	-1° 35.9	-1° 23.0	-1° 10.1	-0° 57.1	-0° 44.2	+12.9	54.0
Tu 8	278° 49.5	293° 25.3	308° 01.1	322° 37.0	337° 12.8	351° 48.6	6° 24.3	21° 00.1	35° 35.9	50° 11.6	64° 47.3	+35.8	14.7
	2° 29.3	2° 42.1	2° 55.0	3° 07.8	3° 20.6	3° 33.4	3° 46.2	3° 59.0	4° 11.8	4° 24.5	4° 37.3	+12.8	54.0
We 9	283° 40.5	298° 15.8	312° 51.1	327° 26.3	342° 01.5	356° 36.7	11° 11.9	25° 47.0	40° 22.1	54° 57.1	69° 32.1	+35.2	14.8
	7° 46.0	7° 58.4	8° 10.8	8° 23.1	8° 35.4	8° 47.7	9° 00.0	9° 12.2	9° 24.4	9° 36.6	9° 48.7	+12.3	54.1
Th 10	288° 11.5	302° 45.7	317° 19.9	331° 54.0	346° 28.0	1° 02.0	15° 35.9	30° 09.8	44° 43.6	59° 17.4	73° 51.0	+34.0	14.8
	12° 46.2	12° 57.7	13° 09.1	13° 20.5	13° 31.9	13° 43.2	13° 54.5	14° 05.7	14° 16.8	14° 27.9	14° 39.0	+11.3	54.4
Fr 11	302° 45.7	317° 19.9	331° 54.0	346° 28.0	1° 02.0	15° 35.9	30° 09.8	44° 43.6	59° 17.4	73° 51.0	88° 24.7	+33.9	14.8
	12° 57.7	13° 09.1	13° 20.5	13° 31.9	13° 43.2	13° 54.5	14° 05.7	14° 16.8	14° 27.9	14° 39.0	14° 50.0	+11.2	54.4
Sa 12	306° 40.7	321° 13.2	335° 45.6	350° 17.9	4° 50.2	19° 22.3	33° 54.4	48° 26.4	62° 58.4	77° 30.2	92° 02.0	+32.1	15.0
	17° 28.1	17° 38.2	17° 48.1	17° 58.0	18° 07.9	18° 17.6	18° 27.3	18° 36.9	18° 46.4	18° 55.9	19° 05.3	+9.7	54.9
◑ Su 13	309° 48.2	324° 18.6	338° 48.9	353° 19.1	7° 49.2	22° 19.2	36° 49.1	51° 18.9	65° 48.7	80° 18.3	94° 47.9	+30.0	15.1
	21° 16.2	21° 24.2	21° 32.1	21° 40.0	21° 47.7	21° 55.3	22° 02.9	22° 10.3	22° 17.6	22° 24.9	22° 32.0	+7.6	55.5
Mo 14	312° 00.3	326° 28.4	340° 56.4	355° 24.3	9° 52.1	24° 19.9	38° 47.5	53° 15.1	67° 42.6	82° 10.0	96° 37.3	+27.7	15.4
	24° 05.9	24° 11.2	24° 16.4	24° 21.5	24° 26.5	24° 31.3	24° 36.0	24° 40.6	24° 45.1	24° 49.4	24° 53.6	+4.8	56.3
Tu 15	313° 17.3	327° 43.3	342° 09.3	356° 35.3	11° 01.1	25° 26.9	39° 52.6	54° 18.3	68° 43.9	83° 09.4	97° 34.9	+25.8	15.6
	25° 40.0	25° 41.9	25° 43.7	25° 45.4	25° 46.9	25° 48.2	25° 49.4	25° 50.5	25° 51.4	25° 52.1	25° 52.7	+1.3	57.3
We 16	313° 51.1	328° 15.8	342° 40.5	357° 05.2	11° 29.9	25° 54.5	40° 19.1	54° 43.7	69° 08.2	83° 32.7	97° 57.2	+24.6	15.9
	25° 42.5	25° 40.5	25° 38.3	25° 36.0	25° 33.6	25° 30.9	25° 28.1	25° 25.1	25° 22.0	25° 18.7	25° 15.2	-2.7	58.2
Th 17	314° 03.7	328° 28.2	342° 52.6	357° 17.1	11° 41.5	26° 06.0	40° 30.5	54° 55.0	69° 19.5	83° 44.1	98° 08.6	+24.5	16.1
	24° 03.2	23° 57.0	23° 50.7	23° 44.3	23° 37.7	23° 30.9	23° 23.9	23° 16.8	23° 09.5	23° 02.1	22° 54.5	-6.9	59.2
Fr 18	314° 20.4	328° 45.5	343° 10.6	357° 35.7	12° 00.9	26° 26.1	40° 51.4	55° 16.7	69° 42.1	84° 07.4	98° 32.9	+25.2	16.4
	20° 41.9	20° 31.9	20° 21.7	20° 11.3	20° 00.9	19° 50.2	19° 39.5	19° 28.6	19° 17.6	19° 06.4	18° 55.1	-10.7	60.1
Sa 19	315° 00.2	329° 26.4	343° 52.6	358° 18.9	12° 45.3	27° 11.7	41° 38.2	56° 04.7	70° 31.2	84° 57.8	99° 24.5	+26.4	16.6
	15° 50.2	15° 37.0	15° 23.6	15° 10.1	14° 56.5	14° 42.8	14° 29.0	14° 15.1	14° 01.1	13° 47.0	13° 32.8	-13.7	60.7
● Su 20	316° 10.0	330° 37.4	345° 04.8	359° 32.3	13° 59.8	28° 27.3	42° 54.9	57° 22.5	71° 50.2	86° 17.9	100° 45.6	+27.6	16.7
	9° 49.7	9° 34.3	9° 18.7	9° 03.1	8° 47.5	8° 31.8	8° 16.0	8° 00.2	7° 44.3	7° 28.4	7° 12.4	-15.7	61.1
Mo 21	317° 45.5	332° 13.7	346° 41.9	1° 10.2	15° 38.4	30° 06.7	44° 35.0	59° 03.3	73° 31.7	88° 00.0	102° 28.4	+28.3	16.7
	3° 08.5	2° 52.0	2° 35.6	2° 19.1	2° 02.6	1° 46.0	1° 29.5	1° 13.0	0° 56.5	0° 40.0	0° 23.4	-16.5	61.1
Tu 22	319° 34.9	334° 03.4	348° 31.8	3° 00.3	17° 28.7	31° 57.2	46° 25.6	60° 54.1	75° 22.5	89° 50.9	104° 19.4	+28.4	16.6
	-3° 42.9	-3° 59.2	-4° 15.4	-4° 31.6	-4° 47.7	-5° 03.8	-5° 19.9	-5° 35.9	-5° 51.8	-6° 07.8	-6° 23.6	-16.1	60.8
We 23	321° 23.9	335° 52.1	350° 20.2	4° 48.3	19° 16.4	33° 44.5	48° 12.6	62° 40.6	77° 08.6	91° 36.5	106° 04.5	+28.1	16.4
	-10° 14.9	-10° 29.8	-10° 44.6	-10° 59.3	-11° 14.0	-11° 28.6	-11° 43.0	-11° 57.5	-12° 11.8	-12° 26.0	-12° 40.2	-14.5	60.2
Th 24	323° 00.0	337° 27.5	351° 54.9	6° 22.3	20° 49.7	35° 17.0	49° 44.3	64° 11.5	78° 38.7	93° 05.9	107° 33.1	+27.3	16.2
	-16° 00.9	-16° 13.4	-16° 25.9	-16° 38.2	-16° 50.4	-17° 02.5	-17° 14.5	-17° 26.4	-17° 38.2	-17° 49.8	-18° 01.3	-12.0	59.4
Fr 25	324° 16.4	338° 43.1	353° 09.7	7° 36.3	22° 02.8	36° 29.4	50° 55.9	65° 22.3	79° 48.8	94° 15.2	108° 41.6	+26.5	16.0
	-20° 39.0	-20° 48.4	-20° 57.8	-21° 07.0	-21° 16.0	-21° 24.9	-21° 33.7	-21° 42.3	-21° 50.8	-21° 59.2	-22° 07.4	-8.8	58.6
Sa 26	325° 15.1	339° 41.2	354° 07.3	8° 33.4	22° 59.5	37° 25.6	51° 51.7	66° 17.7	80° 43.8	95° 09.9	109° 35.9	+26.1	15.7
	-23° 53.2	-23° 59.0	-24° 04.8	-24° 10.3	-24° 15.8	-24° 21.0	-24° 26.1	-24° 31.1	-24° 35.9	-24° 40.6	-24° 45.1	-5.2	57.7
◐ Su 27	326° 07.6	340° 33.8	355° 00.1	9° 26.3	23° 52.6	38° 18.9	52° 45.2	67° 11.6	81° 38.0	96° 04.4	110° 30.8	+26.3	15.5
	-25° 34.5	-25° 36.6	-25° 38.5	-25° 40.3	-25° 41.9	-25° 43.4	-25° 44.7	-25° 45.9	-25° 46.9	-25° 47.8	-25° 48.6	-1.4	56.8
Mo 28	327° 12.0	341° 39.1	356° 06.3	10° 33.5	25° 00.7	39° 28.0	53° 55.4	68° 22.8	82° 50.3	97° 17.8	111° 45.4	+27.3	15.3
	-25° 41.9	-25° 40.4	-25° 38.6	-25° 36.8	-25° 34.8	-25° 32.6	-25° 30.3	-25° 27.9	-25° 25.4	-25° 22.7	-25° 19.8	+2.2	56.1
Tu 29	328° 46.7	343° 15.3	357° 44.0	12° 12.8	26° 41.6	41° 10.5	55° 39.5	70° 08.5	84° 37.7	99° 06.9	113° 36.1	+28.9	15.1
	-24° 21.8	-24° 17.0	-24° 12.0	-24° 06.9	-24° 01.6	-23° 56.3	-23° 50.8	-23° 45.2	-23° 39.5	-23° 33.7	-23° 27.8	+5.4	55.5
We 30	331° 04.2	345° 34.7	0° 05.3	14° 35.9	29° 06.6	43° 37.4	58° 08.2	72° 39.2	87° 10.2	101° 41.3	116° 12.4	+30.8	15.0
	-21° 46.0	-21° 38.4	-21° 30.7	-21° 22.9	-21° 15.0	-21° 07.1	-20° 59.0	-20° 50.8	-20° 42.5	-20° 34.2	-20° 25.8	+8.0	54.9
Th 31	334° 08.7	348° 41.0	3° 13.4	17° 45.8	32° 18.4	46° 51.0	61° 23.6	75° 56.4	90° 29.2	105° 02.0	119° 35.0	+32.6	14.9
	-18° 09.1	-17° 59.4	-17° 49.6	-17° 39.7	-17° 29.8	-17° 19.7	-17° 09.7	-16° 59.5	-16° 49.3	-16° 39.0	-16° 28.6	+10.1	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 5 08h09 — LQ: 13 11h45 — NM: 20 10h43 — FQ: 27 01h35

SUN

September 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	270°01.3	285°01.5	300°01.7	315°01.9	330°02.1	345°02.3	0°02.5	15°02.7	30°02.9	45°03.1	60°03.3	75°03.5	+0.2
	8°04.1	8°03.2	8°02.3	8°01.4	8°00.5	7°59.6	7°58.7	7°57.8	7°56.9	7°56.0	7°55.0	7°54.1	-0.9
Sa 2	270°06.1	285°06.3	300°06.5	315°06.7	330°06.9	345°07.1	0°07.4	15°07.6	30°07.8	45°08.0	60°08.2	75°08.4	+0.2
	7°42.3	7°41.4	7°40.4	7°39.5	7°38.6	7°37.7	7°36.8	7°35.9	7°34.9	7°34.0	7°33.1	7°32.2	-0.9
Su 3	270°11.0	285°11.3	300°11.5	315°11.7	330°11.9	345°12.1	0°12.3	15°12.5	30°12.7	45°12.9	60°13.1	75°13.3	+0.2
	7°20.3	7°19.3	7°18.4	7°17.5	7°16.6	7°15.7	7°14.7	7°13.8	7°12.9	7°12.0	7°11.1	7°10.1	-0.9
Mo 4	270°16.0	285°16.2	300°16.4	315°16.6	330°16.9	345°17.1	0°17.3	15°17.5	30°17.7	45°17.9	60°18.1	75°18.3	+0.2
	6°58.1	6°57.2	6°56.3	6°55.4	6°54.4	6°53.5	6°52.6	6°51.7	6°50.7	6°49.8	6°48.9	6°48.0	-0.9
Tu 5	270°21.1	285°21.3	300°21.5	315°21.7	330°21.9	345°22.1	0°22.3	15°22.5	30°22.8	45°23.0	60°23.2	75°23.4	+0.2
	6°35.9	6°35.0	6°34.1	6°33.1	6°32.2	6°31.3	6°30.3	6°29.4	6°28.5	6°27.5	6°26.6	6°25.7	-0.9
We 6	270°26.2	285°26.4	300°26.6	315°26.8	330°27.0	345°27.2	0°27.4	15°27.6	30°27.9	45°28.1	60°28.3	75°28.5	+0.2
	6°13.6	6°12.6	6°11.7	6°10.8	6°09.8	6°08.9	6°08.0	6°07.0	6°06.1	6°05.2	6°04.2	6°03.3	-0.9
Th 7	270°31.3	285°31.5	300°31.7	315°31.9	330°32.2	345°32.4	0°32.6	15°32.8	30°33.0	45°33.2	60°33.4	75°33.7	+0.2
	5°51.1	5°50.2	5°49.2	5°48.3	5°47.4	5°46.4	5°45.5	5°44.6	5°43.6	5°42.7	5°41.7	5°40.8	-0.9
Fr 8	270°36.5	285°36.7	300°36.9	315°37.1	330°37.3	345°37.6	0°37.8	15°38.0	30°38.2	45°38.4	60°38.6	75°38.9	+0.2
	5°28.6	5°27.6	5°26.7	5°25.7	5°24.8	5°23.9	5°22.9	5°22.0	5°21.0	5°20.1	5°19.1	5°18.2	-0.9
Sa 9	270°41.7	285°41.9	300°42.1	315°42.3	330°42.6	345°42.8	0°43.0	15°43.2	30°43.4	45°43.7	60°43.9	75°44.1	+0.2
	5°05.9	5°05.0	5°04.0	5°03.1	5°02.1	5°01.2	5°00.3	4°59.3	4°58.4	4°57.4	4°56.5	4°55.5	-0.9
Su 10	270°46.9	285°47.2	300°47.4	315°47.6	330°47.8	345°48.0	0°48.3	15°48.5	30°48.7	45°48.9	60°49.1	75°49.4	+0.2
	4°43.2	4°42.3	4°41.3	4°40.4	4°39.4	4°38.5	4°37.5	4°36.6	4°35.6	4°34.7	4°33.7	4°32.8	-0.9
Mo 11	270°52.2	285°52.4	300°52.7	315°52.9	330°53.1	345°53.3	0°53.6	15°53.8	30°54.0	45°54.2	60°54.4	75°54.7	+0.2
	4°20.4	4°19.4	4°18.5	4°17.5	4°16.6	4°15.6	4°14.7	4°13.7	4°12.8	4°11.8	4°10.9	4°09.9	-1.0
Tu 12	270°57.5	285°57.8	300°58.0	315°58.2	330°58.4	345°58.6	0°58.9	15°59.1	30°59.3	45°59.5	60°59.7	76°00.0	+0.2
	3°57.5	3°56.5	3°55.6	3°54.6	3°53.7	3°52.7	3°51.8	3°50.8	3°49.9	3°48.9	3°47.9	3°47.0	-1.0
We 13	271°02.8	286°03.1	301°03.3	316°03.5	331°03.7	346°04.0	1°04.2	16°04.4	31°04.6	46°04.8	61°05.1	76°05.3	+0.2
	3°34.5	3°33.6	3°32.6	3°31.7	3°30.7	3°29.7	3°28.8	3°27.8	3°26.9	3°25.9	3°24.9	3°24.0	-1.0
Th 14	271°08.2	286°08.4	301°08.6	316°08.8	331°09.1	346°09.3	1°09.5	16°09.7	31°10.0	46°10.2	61°10.4	76°10.6	+0.2
	3°11.5	3°10.5	3°09.6	3°08.6	3°07.7	3°06.7	3°05.7	3°04.8	3°03.8	3°02.9	3°01.9	3°00.9	-1.0
Fr 15	271°13.5	286°13.7	301°14.0	316°14.2	331°14.4	346°14.6	1°14.9	16°15.1	31°15.3	46°15.5	61°15.7	76°16.0	+0.2
	2°48.4	2°47.5	2°46.5	2°45.5	2°44.6	2°43.6	2°42.6	2°41.7	2°40.7	2°39.7	2°38.8	2°37.8	-1.0
Sa 16	271°18.9	286°19.1	301°19.3	316°19.5	331°19.8	346°20.0	1°20.2	16°20.4	31°20.6	46°20.9	61°21.1	76°21.3	+0.2
	2°25.3	2°24.3	2°23.3	2°22.4	2°21.4	2°20.4	2°19.5	2°18.5	2°17.5	2°16.6	2°15.6	2°14.6	-1.0
Su 17	271°24.2	286°24.4	301°24.6	316°24.9	331°25.1	346°25.3	1°25.5	16°25.8	31°26.0	46°26.2	61°26.4	76°26.6	+0.2
	2°02.1	2°01.1	2°00.1	1°59.2	1°58.2	1°57.2	1°56.3	1°55.3	1°54.3	1°53.4	1°52.4	1°51.4	-1.0
Mo 18	271°29.5	286°29.8	301°30.0	316°30.2	331°30.4	346°30.6	1°30.9	16°31.1	31°31.3	46°31.5	61°31.8	76°32.0	+0.2
	1°38.8	1°37.9	1°36.9	1°35.9	1°35.0	1°34.0	1°33.0	1°32.1	1°31.1	1°30.1	1°29.1	1°28.2	-1.0
Tu 19	271°34.9	286°35.1	301°35.3	316°35.5	331°35.7	346°36.0	1°36.2	16°36.4	31°36.6	46°36.9	61°37.1	76°37.3	+0.2
	1°15.6	1°14.6	1°13.6	1°12.7	1°11.7	1°10.7	1°09.7	1°08.8	1°07.8	1°06.8	1°05.9	1°04.9	-1.0
We 20	271°40.2	286°40.4	301°40.6	316°40.8	331°41.1	346°41.3	1°41.5	16°41.7	31°41.9	46°42.2	61°42.4	76°42.6	+0.2
	0°52.3	0°51.3	0°50.3	0°49.4	0°48.4	0°47.4	0°46.4	0°45.5	0°44.5	0°43.5	0°42.5	0°41.6	-1.0
Th 21	271°45.5	286°45.7	301°45.9	316°46.1	331°46.4	346°46.6	1°46.8	16°47.0	31°47.2	46°47.5	61°47.7	76°47.9	+0.2
	0°28.9	0°28.0	0°27.0	0°26.0	0°25.0	0°24.1	0°23.1	0°22.1	0°21.2	0°20.2	0°19.2	0°18.2	-1.0
Fr 22	271°50.7	286°51.0	301°51.2	316°51.4	331°51.6	346°51.8	1°52.1	16°52.3	31°52.5	46°52.7	61°52.9	76°53.2	+0.2
	0°05.6	0°04.6	0°03.6	0°02.7	0°01.7	0°00.7	-0°00.2	-0°01.2	-0°02.2	-0°03.2	-0°04.1	-0°05.1	-1.0
Sa 23	271°56.0	286°56.2	301°56.4	316°56.6	331°56.9	346°57.1	1°57.3	16°57.5	31°57.7	46°58.0	61°58.2	76°58.4	+0.2
	-0°17.8	-0°18.7	-0°19.7	-0°20.7	-0°21.7	-0°22.6	-0°23.6	-0°24.6	-0°25.6	-0°26.5	-0°27.5	-0°28.5	-1.0
Su 24	272°01.2	287°01.4	302°01.6	317°01.9	332°02.1	347°02.3	2°02.5	17°02.7	32°02.9	47°03.2	62°03.4	77°03.6	+0.2
	-0°41.1	-0°42.1	-0°43.1	-0°44.1	-0°45.0	-0°46.0	-0°47.0	-0°47.9	-0°48.9	-0°49.9	-0°50.9	-0°51.8	-1.0
Mo 25	272°06.4	287°06.6	302°06.8	317°07.0	332°07.3	347°07.5	2°07.7	17°07.9	32°08.1	47°08.3	62°08.5	77°08.8	+0.2
	-1°04.5	-1°05.5	-1°06.4	-1°07.4	-1°08.4	-1°09.4	-1°10.3	-1°11.3	-1°12.3	-1°13.3	-1°14.2	-1°15.2	-1.0
Tu 26	272°11.5	287°11.8	302°12.0	317°12.2	332°12.4	347°12.6	2°12.8	17°13.0	32°13.2	47°13.5	62°13.7	77°13.9	+0.2
	-1°27.9	-1°28.8	-1°29.8	-1°30.8	-1°31.8	-1°32.7	-1°33.7	-1°34.7	-1°35.6	-1°36.6	-1°37.6	-1°38.6	-1.0
We 27	272°16.6	287°16.9	302°17.1	317°17.3	332°17.5	347°17.7	2°17.9	17°18.1	32°18.3	47°18.5	62°18.8	77°19.0	+0.2
	-1°51.2	-1°52.2	-1°53.2	-1°54.1	-1°55.1	-1°56.1	-1°57.0	-1°58.0	-1°59.0	-2°00.0	-2°00.9	-2°01.9	-1.0
Th 28	272°21.7	287°21.9	302°22.1	317°22.3	332°22.5	347°22.7	2°22.9	17°23.2	32°23.4	47°23.6	62°23.8	77°24.0	+0.2
	-2°14.5	-2°15.5	-2°16.5	-2°17.5	-2°18.4	-2°19.4	-2°20.4	-2°21.4	-2°22.3	-2°23.3	-2°24.3	-2°25.2	-1.0
Fr 29	272°26.7	287°26.9	302°27.1	317°27.3	332°27.5	347°27.7	2°27.9	17°28.1	32°28.3	47°28.5	62°28.7	77°29.0	+0.2
	-2°37.9	-2°38.8	-2°39.8	-2°40.8	-2°41.7	-2°42.7	-2°43.7	-2°44.7	-2°45.6	-2°46.6	-2°47.6	-2°48.5	-1.0
Sa 30	272°31.6	287°31.8	302°32.0	317°32.2	332°32.4	347°32.6	2°32.8	17°33.0	32°33.2	47°33.4	62°33.7	77°33.9	+0.2
	-3°01.1	-3°02.1	-3°03.1	-3°04.1	-3°05.0	-3°06.0	-3°07.0	-3°07.9	-3°08.9	-3°09.9	-3°10.8	-3°11.8	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2028

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
Fr 1	250°34.2	265°07.7	279°41.4	294°15.0	308°48.8	323°22.5	337°56.4	352°30.3	7°04.2	21°38.2	36°12.3	+33.8	14.8
	-14°52.7	-14°41.7	-14°30.7	-14°19.7	-14°08.5	-13°57.4	-13°46.1	-13°34.9	-13°23.6	-13°12.2	-13°00.8	+11.2	54.3
Sa 2	254°49.1	269°23.9	283°58.7	298°33.6	313°08.5	327°43.5	342°18.5	356°53.6	11°28.6	26°03.8	40°38.9	+35.0	14.7
	-10°04.2	-9°52.2	-9°40.0	-9°27.9	-9°15.7	-9°03.5	-8°51.3	-8°39.0	-8°26.7	-8°14.4	-8°02.0	+12.2	54.1
○ Su 3	259°29.6	274°05.2	288°40.8	303°16.4	317°52.1	332°27.7	347°03.4	1°39.1	16°14.8	30°50.5	45°26.2	+35.7	14.7
	-4°53.8	-4°41.1	-4°28.4	-4°15.7	-4°02.9	-3°50.2	-3°37.4	-3°24.6	-3°11.8	-2°59.0	-2°46.2	+12.8	53.9
Mo 4	264°23.2	278°59.0	293°34.8	308°10.6	322°46.4	337°22.2	351°58.0	6°33.8	21°09.6	35°45.4	50°21.2	+35.8	14.7
	0°26.5	0°39.4	0°52.2	1°05.1	1°17.9	1°30.8	1°43.6	1°56.4	2°09.3	2°22.1	2°34.9	+12.8	53.9
Tu 5	269°16.2	283°51.8	298°27.3	313°02.7	327°38.2	342°13.6	356°49.0	11°24.4	25°59.7	40°35.0	55°10.3	+35.4	14.7
	5°45.4	5°57.9	6°10.5	6°23.0	6°35.5	6°48.0	7°00.4	7°12.9	7°25.3	7°37.6	7°50.0	+12.5	54.0
We 6	273°55.4	288°30.1	303°04.8	317°39.4	332°13.9	346°48.4	1°22.9	15°57.3	30°31.7	45°06.0	59°40.3	+34.5	14.8
	10°51.5	11°03.3	11°15.1	11°26.8	11°38.5	11°50.2	12°01.8	12°13.4	12°24.9	12°36.3	12°47.8	+11.6	54.1
Th 7	278°07.8	292°41.2	307°14.5	321°47.7	336°20.9	350°54.0	5°27.0	20°00.0	34°32.9	49°05.8	63°38.6	+33.1	14.8
	15°33.1	15°43.7	15°54.2	16°04.7	16°15.1	16°25.4	16°35.7	16°45.9	16°56.0	17°06.1	17°16.1	+10.3	54.4
Fr 8	281°41.9	296°13.5	310°45.1	325°16.6	339°48.0	354°19.3	8°50.6	23°21.7	37°52.8	52°23.9	66°54.8	+31.3	15.0
	19°37.5	19°46.3	19°55.0	20°03.6	20°12.2	20°20.6	20°29.0	20°37.3	20°45.5	20°53.6	21°01.6	+8.4	54.9
Sa 9	284°29.6	298°59.2	313°28.9	327°58.4	342°27.8	356°57.2	11°26.5	25°55.7	40°24.8	54°53.9	69°22.9	+29.3	15.1
	22°50.4	22°56.8	23°03.1	23°09.4	23°15.5	23°21.5	23°27.4	23°33.1	23°38.8	23°44.4	23°49.8	+5.9	55.4
Su 10	298°59.2	313°28.9	327°58.4	342°27.8	356°57.2	11°26.5	25°55.7	40°24.8	54°53.9	69°22.9	83°51.8	+29.3	15.1
	22°56.8	23°03.1	23°09.4	23°15.5	23°21.5	23°27.4	23°33.1	23°38.8	23°44.4	23°49.8	23°55.1	+5.8	55.4
Mo 11	300°56.5	315°24.2	329°51.9	344°19.5	358°47.0	13°14.5	27°41.9	42°09.3	56°36.6	71°03.8	85°30.9	+27.4	15.3
	25°00.3	25°03.7	25°06.9	25°09.9	25°12.9	25°15.7	25°18.3	25°20.9	25°23.3	25°25.5	25°27.7	+2.7	56.2
◑ Tu 12	302°11.8	316°38.1	331°04.4	345°30.6	359°56.9	14°23.0	28°49.2	43°15.3	57°41.3	72°07.3	86°33.3	+26.2	15.5
	25°42.5	25°42.3	25°42.0	25°41.5	25°40.9	25°40.1	25°39.2	25°38.1	25°36.8	25°35.5	25°33.9	-0.9	57.0
We 13	303°00.3	317°26.0	331°51.6	346°17.3	0°42.9	15°08.5	29°34.1	43°59.8	58°25.4	72°51.0	87°16.6	+25.6	15.8
	24°52.4	24°48.4	24°44.3	24°39.9	24°35.5	24°30.8	24°26.1	24°21.1	24°16.0	24°10.8	24°05.4	-4.7	57.9
Th 14	303°41.7	318°07.5	332°33.3	346°59.1	1°24.9	15°50.8	30°16.7	44°42.6	59°08.5	73°34.4	88°00.4	+25.9	16.1
	22°25.9	22°18.1	22°10.1	22°01.9	21°53.7	21°45.2	21°36.7	21°27.9	21°19.1	21°10.1	21°00.9	-8.5	58.9
Fr 15	304°33.4	318°59.8	333°26.3	347°52.8	2°19.3	16°45.9	31°12.5	45°39.2	60°05.8	74°32.6	88°59.3	+26.6	16.3
	18°27.2	18°15.9	18°04.4	17°52.9	17°41.2	17°29.4	17°17.4	17°05.4	16°53.2	16°40.9	16°28.5	-11.9	59.8
Sa 16	305°44.5	320°11.7	334°39.1	349°06.4	3°33.7	18°01.1	32°28.6	46°56.0	61°23.5	75°51.0	90°18.5	+27.4	16.5
	13°09.4	12°55.3	12°41.1	12°26.8	12°12.5	11°58.0	11°43.5	11°28.9	11°14.2	10°59.4	10°44.6	-14.5	60.6
Su 17	307°14.4	321°42.3	336°10.2	350°38.1	5°06.0	19°33.9	34°01.9	48°29.9	62°57.9	77°25.8	91°53.8	+27.9	16.7
	6°53.3	6°37.4	6°21.5	6°05.5	5°49.5	5°33.4	5°17.3	5°01.1	4°44.9	4°28.7	4°12.4	-16.1	61.1
● Mo 18	308°54.4	323°22.4	337°50.5	352°18.5	6°46.5	21°14.5	35°42.5	50°10.5	64°38.5	79°06.5	93°34.4	+28.0	16.7
	0°05.7	-0°10.8	-0°27.4	-0°43.9	-1°00.4	-1°17.0	-1°33.5	-1°50.0	-2°06.5	-2°23.0	-2°39.5	-16.5	61.3
Tu 19	310°31.7	324°59.4	339°27.0	353°54.6	8°22.2	22°49.7	37°17.2	51°44.7	66°12.2	80°39.6	95°07.0	+27.5	16.7
	-6°43.4	-6°59.3	-7°15.2	-7°31.1	-7°46.9	-8°02.6	-8°18.3	-8°33.9	-8°49.5	-9°05.0	-9°20.4	-15.7	61.2
We 20	311°53.7	326°20.6	340°47.3	355°14.1	9°40.8	24°07.5	38°34.1	53°00.7	67°27.2	81°53.7	96°20.2	+26.6	16.5
	-13°03.0	-13°17.2	-13°31.3	-13°45.2	-13°59.1	-14°12.9	-14°26.5	-14°40.1	-14°53.5	-15°06.9	-15°20.1	-13.7	60.7
Th 21	312°52.4	327°18.2	341°44.0	356°09.8	10°35.5	25°01.2	39°26.9	53°52.5	68°18.1	82°43.6	97°09.2	+25.7	16.3
	-18°24.8	-18°36.1	-18°47.3	-18°58.3	-19°09.2	-19°20.0	-19°30.6	-19°41.1	-19°51.5	-20°01.7	-20°11.8	-10.7	59.9
Fr 22	313°28.6	327°53.7	342°18.8	356°43.9	11°09.0	25°34.0	39°59.0	54°24.1	68°49.1	83°14.1	97°39.1	+25.0	16.1
	-22°25.6	-22°33.3	-22°40.8	-22°48.2	-22°55.5	-23°02.6	-23°09.5	-23°16.3	-23°22.9	-23°29.4	-23°35.7	-7.0	59.0
Sa 23	313°54.1	328°19.2	342°44.2	357°09.4	11°34.5	25°59.6	40°24.8	54°50.0	69°15.2	83°40.4	98°05.7	+25.2	15.8
	-24°51.0	-24°54.7	-24°58.3	-25°01.7	-25°05.0	-25°08.1	-25°11.0	-25°13.8	-25°16.4	-25°18.8	-25°21.1	-3.0	58.0
Su 24	314°29.1	328°55.0	343°20.9	357°47.0	12°13.0	26°39.2	41°05.3	55°31.6	69°57.9	84°24.2	98°50.7	+26.2	15.5
	-25°36.7	-25°36.5	-25°36.2	-25°35.7	-25°35.0	-25°34.2	-25°33.3	-25°32.2	-25°31.0	-25°29.6	-25°28.0	+0.9	57.0
◐ Mo 25	315°35.1	330°02.6	344°30.2	358°57.9	13°25.7	27°53.5	42°21.5	56°49.5	71°17.6	85°45.7	100°14.0	+27.9	15.3
	-24°48.3	-24°44.5	-24°40.7	-24°36.7	-24°32.5	-24°28.3	-24°23.9	-24°19.4	-24°14.8	-24°10.0	-24°05.2	+4.3	56.1
Tu 26	317°27.6	331°57.2	346°26.9	0°56.6	15°26.4	29°56.4	44°26.4	58°56.4	73°26.6	87°56.9	102°27.2	+30.0	15.1
	-22°38.2	-22°31.5	-22°24.7	-22°17.8	-22°10.8	-22°03.7	-21°56.5	-21°49.2	-21°41.8	-21°34.3	-21°26.7	+7.1	55.4
We 27	320°12.2	334°43.8	349°15.6	3°47.4	18°19.2	32°51.2	47°23.2	61°55.3	76°27.5	90°59.8	105°32.1	+32.0	14.9
	-19°22.1	-19°13.1	-19°04.0	-18°54.9	-18°45.6	-18°36.3	-18°27.0	-18°17.5	-18°08.0	-17°58.4	-17°48.7	+9.3	54.8
Th 28	323°45.4	338°18.9	352°52.3	7°25.9	21°59.5	36°33.2	51°06.9	65°40.7	80°14.5	94°48.4	109°22.4	+33.7	14.8
	-15°15.8	-15°05.1	-14°54.4	-14°43.6	-14°32.7	-14°21.8	-14°10.9	-13°59.8	-13°48.8	-13°37.7	-13°26.5	+10.9	54.4
Fr 29	327°57.9	342°32.6	357°07.4	11°42.2	26°17.1	40°52.0	55°27.0	70°01.9	84°37.0	99°12.0	113°47.1	+34.9	14.8
	-10°33.7	-10°21.9	-10°10.0	-9°58.1	-9°46.1	-9°34.1	-9°22.1	-9°10.1	-8°58.0	-8°45.9	-8°33.8	+12.0	54.1
Sa 30	332°37.1	347°12.6	1°48.2	16°23.8	30°59.4	45°35.0	60°10.6	74°46.3	89°21.9	103°57.6	118°33.3	+35.6	14.7
	-5°28.5	-5°16.0	-5°03.5	-4°50.9	-4°38.3	-4°25.7	-4°13.1	-4°00.5	-3°47.9	-3°35.2	-3°22.6	+12.6	54.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 23h47 — LQ: 12 00h45 — NM: 18 18h23 — FQ: 25 13h10

SUN

October 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	272°36.5 -3°24.4	287°36.7 -3°25.4	302°36.9 -3°26.3	317°37.1 -3°27.3	332°37.3 -3°28.3	347°37.5 -3°29.2	2°37.7 -3°30.2	17°37.9 -3°31.2	32°38.1 -3°32.1	47°38.3 -3°33.1	62°38.5 -3°34.1	77°38.7 -3°35.0	+0.2 -1.0
Mo 2	272°41.3 -3°47.6	287°41.5 -3°48.6	302°41.7 -3°49.6	317°41.9 -3°50.5	332°42.1 -3°51.5	347°42.3 -3°52.4	2°42.5 -3°53.4	17°42.7 -3°54.4	32°42.9 -3°55.3	47°43.1 -3°56.3	62°43.2 -3°57.3	77°43.4 -3°58.2	+0.2 -1.0
Tu 3	272°46.0 -4°10.8	287°46.2 -4°11.8	302°46.4 -4°12.7	317°46.6 -4°13.7	332°46.8 -4°14.6	347°47.0 -4°15.6	2°47.2 -4°16.6	17°47.3 -4°17.5	32°47.5 -4°18.5	47°47.7 -4°19.5	62°47.9 -4°20.4	77°48.1 -4°21.4	+0.2 -1.0
We 4	272°50.6 -4°33.9	287°50.8 -4°34.9	302°51.0 -4°35.8	317°51.2 -4°36.8	332°51.4 -4°37.8	347°51.6 -4°38.7	2°51.8 -4°39.7	17°51.9 -4°40.6	32°52.1 -4°41.6	47°52.3 -4°42.6	62°52.5 -4°43.5	77°52.7 -4°44.5	+0.2 -1.0
Th 5	272°55.2 -4°57.0	287°55.3 -4°57.9	302°55.5 -4°58.9	317°55.7 -4°59.9	332°55.9 -5°00.8	347°56.1 -5°01.8	2°56.3 -5°02.7	17°56.5 -5°03.7	32°56.6 -5°04.7	47°56.8 -5°05.6	62°57.0 -5°06.6	77°57.2 -5°07.5	+0.2 -1.0
Fr 6	272°59.6 -5°20.0	287°59.8 -5°20.9	303°00.0 -5°21.9	318°00.1 -5°22.9	333°00.3 -5°23.8	348°00.5 -5°24.8	3°00.7 -5°25.7	18°00.9 -5°26.7	33°01.1 -5°27.6	48°01.2 -5°28.6	63°01.4 -5°29.6	78°01.6 -5°30.5	+0.2 -1.0
Sa 7	273°03.9 -5°42.9	288°04.1 -5°43.9	303°04.3 -5°44.8	318°04.5 -5°45.8	333°04.7 -5°46.7	348°04.8 -5°47.7	3°05.0 -5°48.7	18°05.2 -5°49.6	33°05.4 -5°50.6	48°05.5 -5°51.5	63°05.7 -5°52.5	78°05.9 -5°53.4	+0.2 -1.0
Su 8	273°08.2 -6°05.8	288°08.3 -6°06.7	303°08.5 -6°07.7	318°08.7 -6°08.7	333°08.9 -6°09.6	348°09.0 -6°10.6	3°09.2 -6°11.5	18°09.4 -6°12.5	33°09.6 -6°13.4	48°09.7 -6°14.4	63°09.9 -6°15.3	78°10.1 -6°16.3	+0.2 -1.0
Mo 9	273°12.3 -6°28.6	288°12.5 -6°29.5	303°12.6 -6°30.5	318°12.8 -6°31.4	333°13.0 -6°32.4	348°13.1 -6°33.3	3°13.3 -6°34.3	18°13.5 -6°35.2	33°13.6 -6°36.2	48°13.8 -6°37.1	63°14.0 -6°38.1	78°14.1 -6°39.0	+0.2 -0.9
Tu 10	273°16.3 -6°51.3	288°16.5 -6°52.2	303°16.6 -6°53.2	318°16.8 -6°54.1	333°17.0 -6°55.1	348°17.1 -6°56.0	3°17.3 -6°57.0	18°17.4 -6°57.9	33°17.6 -6°58.8	48°17.8 -6°59.8	63°17.9 -7°00.7	78°18.1 -7°01.7	+0.2 -0.9
We 11	273°20.2 -7°13.9	288°20.3 -7°14.9	303°20.5 -7°15.8	318°20.7 -7°16.7	333°20.8 -7°17.7	348°21.0 -7°18.6	3°21.1 -7°19.6	18°21.3 -7°20.5	33°21.4 -7°21.4	48°21.6 -7°22.4	63°21.8 -7°23.3	78°21.9 -7°24.3	+0.2 -0.9
Th 12	273°23.9 -7°36.4	288°24.1 -7°37.4	303°24.2 -7°38.3	318°24.4 -7°39.2	333°24.5 -7°40.2	348°24.7 -7°41.1	3°24.8 -7°42.1	18°25.0 -7°43.0	33°25.1 -7°43.9	48°25.3 -7°44.9	63°25.5 -7°45.8	78°25.6 -7°46.7	+0.2 -0.9
Fr 13	273°27.5 -7°58.9	288°27.7 -7°59.8	303°27.8 -8°00.7	318°28.0 -8°01.7	333°28.1 -8°02.6	348°28.3 -8°03.5	3°28.4 -8°04.4	18°28.6 -8°05.4	33°28.7 -8°06.3	48°28.9 -8°07.2	63°29.0 -8°08.2	78°29.2 -8°09.1	+0.1 -0.9
Sa 14	273°31.0 -8°21.2	288°31.2 -8°22.1	303°31.3 -8°23.0	318°31.5 -8°23.9	333°31.6 -8°24.9	348°31.7 -8°25.8	3°31.9 -8°26.7	18°32.0 -8°27.7	33°32.2 -8°28.6	48°32.3 -8°29.5	63°32.4 -8°30.4	78°32.6 -8°31.4	+0.1 -0.9
Su 15	273°34.4 -8°43.4	288°34.5 -8°44.3	303°34.6 -8°45.2	318°34.8 -8°46.1	333°34.9 -8°47.0	348°35.0 -8°48.0	3°35.2 -8°48.9	18°35.3 -8°49.8	33°35.4 -8°50.7	48°35.6 -8°51.6	63°35.7 -8°52.6	78°35.8 -8°53.5	+0.1 -0.9
Mo 16	273°37.6 -9°05.4	288°37.7 -9°06.3	303°37.8 -9°07.3	318°37.9 -9°08.2	333°38.1 -9°09.1	348°38.2 -9°10.0	3°38.3 -9°10.9	18°38.5 -9°11.8	33°38.6 -9°12.8	48°38.7 -9°13.7	63°38.8 -9°14.6	78°39.0 -9°15.5	+0.1 -0.9
Tu 17	273°40.6 -9°27.4	288°40.7 -9°28.3	303°40.8 -9°29.2	318°41.0 -9°30.1	333°41.1 -9°31.0	348°41.2 -9°31.9	3°41.3 -9°32.8	18°41.5 -9°33.7	33°41.6 -9°34.7	48°41.7 -9°35.6	63°41.8 -9°36.5	78°41.9 -9°37.4	+0.1 -0.9
We 18	273°43.5 -9°49.2	288°43.6 -9°50.1	303°43.7 -9°51.0	318°43.8 -9°51.9	333°44.0 -9°52.8	348°44.1 -9°53.7	3°44.2 -9°54.6	18°44.3 -9°55.5	33°44.4 -9°56.4	48°44.5 -9°57.3	63°44.7 -9°58.2	78°44.8 -9°59.1	+0.1 -0.9
Th 19	273°46.2 -10°10.8	288°46.3 -10°11.7	303°46.4 -10°12.6	318°46.6 -10°13.5	333°46.7 -10°14.4	348°46.8 -10°15.3	3°46.9 -10°16.2	18°47.0 -10°17.1	33°47.1 -10°18.0	48°47.2 -10°18.9	63°47.3 -10°19.8	78°47.4 -10°20.7	+0.1 -0.9
Fr 20	273°48.8 -10°32.3	288°48.9 -10°33.2	303°49.0 -10°34.1	318°49.1 -10°35.0	333°49.2 -10°35.9	348°49.3 -10°36.8	3°49.4 -10°37.7	18°49.5 -10°38.6	33°49.6 -10°39.5	48°49.7 -10°40.4	63°49.8 -10°41.3	78°49.9 -10°42.2	+0.1 -0.9
Sa 21	273°51.2 -10°53.7	288°51.3 -10°54.6	303°51.4 -10°55.5	318°51.5 -10°56.4	333°51.6 -10°57.2	348°51.7 -10°58.1	3°51.8 -10°59.0	18°51.9 -10°59.9	33°52.0 -11°00.8	48°52.1 -11°01.7	63°52.2 -11°02.5	78°52.3 -11°03.4	+0.1 -0.9
Su 22	273°53.5 -11°14.9	288°53.6 -11°15.8	303°53.7 -11°16.6	318°53.7 -11°17.5	333°53.8 -11°18.4	348°53.9 -11°19.3	3°54.0 -11°20.2	18°54.1 -11°21.0	33°54.2 -11°21.9	48°54.3 -11°22.8	63°54.4 -11°23.7	78°54.5 -11°24.5	+0.1 -0.9
Mo 23	273°55.6 -11°35.9	288°55.6 -11°36.8	303°55.7 -11°37.7	318°55.8 -11°38.5	333°55.9 -11°39.4	348°56.0 -11°40.3	3°56.1 -11°41.1	18°56.1 -11°42.0	33°56.2 -11°42.9	48°56.3 -11°43.7	63°56.4 -11°44.6	78°56.5 -11°45.5	+0.1 -0.9
Tu 24	273°57.5 -11°56.8	288°57.6 -11°57.6	303°57.6 -11°58.5	318°57.7 -11°59.3	333°57.8 -12°00.2	348°57.9 -12°01.1	3°57.9 -12°01.9	18°58.0 -12°02.8	33°58.1 -12°03.7	48°58.2 -12°04.5	63°58.2 -12°05.4	78°58.3 -12°06.2	+0.1 -0.9
We 25	273°59.2 -12°17.4	288°59.3 -12°18.3	303°59.4 -12°19.1	318°59.4 -12°20.0	333°59.5 -12°20.8	348°59.6 -12°21.7	3°59.6 -12°22.5	18°59.7 -12°23.4	33°59.8 -12°24.3	48°59.8 -12°25.1	63°59.9 -12°26.0	79°00.0 -12°26.8	+0.1 -0.9
Th 26	274°00.8 -12°37.9	289°00.9 -12°38.7	304°00.9 -12°39.6	319°01.0 -12°40.4	334°01.0 -12°41.3	349°01.1 -12°42.1	4°01.2 -12°43.0	19°01.2 -12°43.8	34°01.3 -12°44.7	49°01.3 -12°45.5	64°01.4 -12°46.3	79°01.5 -12°47.2	+0.1 -0.8
Fr 27	274°02.2 -12°58.1	289°02.2 -12°59.0	304°02.3 -12°59.8	319°02.3 -13°00.7	334°02.4 -13°01.5	349°02.4 -13°02.3	4°02.5 -13°03.2	19°02.5 -13°04.0	34°02.6 -13°04.9	49°02.7 -13°05.7	64°02.7 -13°06.5	79°02.8 -13°07.4	+0.1 -0.8
Sa 28	274°03.4 -13°18.2	289°03.4 -13°19.0	304°03.5 -13°19.9	319°03.5 -13°20.7	334°03.6 -13°21.5	349°03.6 -13°22.4	4°03.7 -13°23.2	19°03.7 -13°24.0	34°03.7 -13°24.9	49°03.8 -13°25.7	64°03.8 -13°26.5	79°03.9 -13°27.3	+0.0 -0.8
Su 29	274°04.4 -13°38.1	289°04.4 -13°38.9	304°04.5 -13°39.7	319°04.5 -13°40.5	334°04.6 -13°41.4	349°04.6 -13°42.2	4°04.6 -13°43.0	19°04.7 -13°43.8	34°04.7 -13°44.6	49°04.7 -13°45.5	64°04.8 -13°46.3	79°04.8 -13°47.1	+0.0 -0.8
Mo 30	274°05.2 -13°57.7	289°05.3 -13°58.5	304°05.3 -13°59.3	319°05.3 -14°00.2	334°05.3 -14°01.0	349°05.4 -14°01.8	4°05.4 -14°02.6	19°05.4 -14°03.4	34°05.5 -14°04.2	49°05.5 -14°05.0	64°05.5 -14°05.8	79°05.5 -14°06.6	+0.0 -0.8
Tu 31	274°05.9 -14°17.1	289°05.9 -14°17.9	304°05.9 -14°18.7	319°05.9 -14°19.6	334°05.9 -14°20.4	349°06.0 -14°21.2	4°06.0 -14°22.0	19°06.0 -14°22.8	34°06.0 -14°23.6	49°06.0 -14°24.4	64°06.1 -14°25.2	79°06.1 -14°26.0	+0.0 -0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2028

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
Su 1	249°54.9	264°30.7	279°06.4	293°42.2	308°18.0	322°53.8	337°29.6	352°05.3	6°41.1	21°16.9	35°52.7	+35.8	14.7
	-1°28.2	-1°15.5	-1°02.7	-0°50.0	-0°37.2	-0°24.5	-0°11.7	0°01.0	0°13.8	0°26.6	0°39.3	+12.8	53.9
Mo 2	254°48.2	269°23.8	283°59.4	298°34.9	313°10.5	327°46.0	342°21.5	356°57.0	11°32.4	26°07.8	40°43.2	+35.5	14.7
	3°50.1	4°02.7	4°15.3	4°27.9	4°40.5	4°53.1	5°05.7	5°18.2	5°30.8	5°43.3	5°55.8	+12.6	54.0
○ Tu 3	259°30.7	274°05.6	288°40.5	303°15.3	317°50.1	332°24.8	346°59.5	1°34.2	16°08.8	30°43.4	45°17.9	+34.7	14.8
	9°00.4	9°12.5	9°24.5	9°36.5	9°48.5	10°00.5	10°12.4	10°24.3	10°36.1	10°47.9	10°59.7	+11.9	54.1
We 4	263°49.9	278°23.6	292°57.3	307°30.9	322°04.4	336°37.9	351°11.3	5°44.7	20°18.0	34°51.3	49°24.4	+33.5	14.8
	13°50.9	14°01.9	14°12.9	14°23.8	14°34.7	14°45.5	14°56.2	15°06.9	15°17.6	15°28.1	15°38.6	+10.8	54.3
Th 5	267°34.7	282°06.8	296°38.9	311°10.9	325°42.9	340°14.7	354°46.5	9°18.3	23°49.9	38°21.5	52°53.1	+31.8	14.9
	18°08.5	18°17.9	18°27.3	18°36.6	18°45.7	18°54.9	19°03.9	19°12.8	19°21.7	19°30.5	19°39.2	+9.1	54.6
Fr 6	270°37.4	285°07.8	299°38.1	314°08.3	328°38.5	343°08.6	357°38.6	12°08.6	26°38.5	41°08.3	55°38.0	+30.1	15.0
	21°39.1	21°46.3	21°53.5	22°00.5	22°07.4	22°14.3	22°21.0	22°27.6	22°34.2	22°40.6	22°46.9	+6.8	55.0
Sa 7	272°56.1	287°24.7	301°53.4	316°21.9	330°50.4	345°18.8	359°47.2	14°15.5	28°43.8	43°12.0	57°40.1	+28.4	15.1
	24°08.0	24°12.5	24°16.8	24°21.1	24°25.2	24°29.2	24°33.0	24°36.7	24°40.3	24°43.8	24°47.2	+3.9	55.5
Su 8	274°36.1	289°03.5	303°30.8	317°58.1	332°25.4	346°52.6	1°19.7	15°46.9	30°14.0	44°41.1	59°08.1	+27.2	15.3
	25°21.6	25°22.9	25°23.9	25°24.9	25°25.7	25°26.3	25°26.9	25°27.2	25°27.5	25°27.6	25°27.5	+0.6	56.1
Mo 9	275°50.8	290°17.5	304°44.2	319°10.9	333°37.5	348°04.2	2°30.9	16°57.5	31°24.2	45°50.8	60°17.4	+26.7	15.5
	25°09.7	25°07.3	25°04.8	25°02.2	24°59.4	24°56.5	24°53.4	24°50.2	24°46.8	24°43.3	24°39.6	-3.0	56.8
Tu 10	290°17.5	304°44.2	319°10.9	333°37.5	348°04.2	2°30.9	16°57.5	31°24.2	45°50.8	60°17.4	74°44.1	+26.7	15.5
	25°07.3	25°04.8	25°02.2	24°59.4	24°56.5	24°53.4	24°50.2	24°46.8	24°43.3	24°39.6	24°35.8	-3.1	56.9
◑ We 11	291°24.3	305°51.1	320°17.9	334°44.7	349°11.5	3°38.3	18°05.2	32°32.1	46°59.0	61°25.9	75°52.8	+26.8	15.7
	23°21.4	23°15.3	23°09.1	23°02.7	22°56.1	22°49.5	22°42.7	22°35.7	22°28.6	22°21.4	22°14.0	-6.7	57.7
Th 12	292°39.9	307°07.2	321°34.6	336°02.0	350°29.5	4°57.0	19°24.5	33°52.0	48°19.6	62°47.2	77°14.8	+27.5	15.9
	20°07.5	19°58.1	19°48.5	19°38.7	19°28.9	19°18.9	19°08.8	18°58.6	18°48.3	18°37.8	18°27.2	-10.0	58.5
Fr 13	294°13.0	308°41.1	323°09.3	337°37.5	352°05.7	6°33.9	21°02.2	35°30.4	49°58.8	64°27.1	78°55.5	+28.2	16.2
	15°34.9	15°22.5	15°10.1	14°57.5	14°44.9	14°32.1	14°19.3	14°06.3	13°53.3	13°40.1	13°26.9	-12.8	59.3
Sa 14	296°03.6	310°32.3	325°01.0	339°29.7	353°58.4	8°27.2	22°55.9	37°24.7	51°53.5	66°22.3	80°51.1	+28.8	16.4
	9°58.3	9°43.8	9°29.2	9°14.5	8°59.8	8°45.0	8°30.1	8°15.2	8°00.2	7°45.2	7°30.1	-14.8	60.1
Su 15	298°03.4	312°32.2	327°01.0	341°29.8	355°58.6	10°27.4	24°56.2	39°24.9	53°53.7	68°22.4	82°51.1	+28.8	16.5
	3°37.7	3°21.8	3°06.0	2°50.1	2°34.2	2°18.3	2°02.3	1°46.4	1°30.4	1°14.4	0°58.3	-15.9	60.6
Mo 16	299°59.4	314°27.8	328°56.1	343°24.4	357°52.6	12°20.8	26°49.0	41°17.2	55°45.3	70°13.4	84°41.4	+28.2	16.6
	-3°02.9	-3°19.0	-3°35.0	-3°51.1	-4°07.1	-4°23.1	-4°39.0	-4°55.0	-5°10.9	-5°26.8	-5°42.6	-16.0	61.0
Tu 17	301°36.9	316°04.3	330°31.5	344°58.8	359°25.9	13°53.1	28°20.1	42°47.2	57°14.1	71°41.0	86°07.9	+27.1	16.6
	-9°35.6	-9°50.8	-10°05.8	-10°20.8	-10°35.7	-10°50.6	-11°05.4	-11°20.1	-11°34.8	-11°49.3	-12°03.8	-14.8	61.0
● We 18	302°44.1	317°10.1	331°36.0	346°01.8	0°27.6	14°53.4	29°19.0	43°44.7	58°10.2	72°35.7	87°01.2	+25.7	16.5
	-15°30.5	-15°43.5	-15°56.4	-16°09.2	-16°21.8	-16°34.4	-16°46.8	-16°59.1	-17°11.3	-17°23.4	-17°35.3	-12.5	60.7
Th 19	303°16.9	317°41.5	332°06.2	346°30.7	0°55.3	15°19.8	29°44.2	44°08.6	58°33.0	72°57.4	87°21.7	+24.5	16.4
	-20°18.8	-20°28.6	-20°38.2	-20°47.7	-20°57.0	-21°06.2	-21°15.3	-21°24.2	-21°32.9	-21°41.5	-21°49.9	-9.1	60.0
Fr 20	303°23.3	317°47.3	332°11.3	346°35.2	0°59.2	15°23.2	29°47.1	44°11.1	58°35.0	72°59.0	87°22.9	+24.0	16.1
	-23°37.2	-23°43.1	-23°48.8	-23°54.3	-23°59.6	-24°04.8	-24°09.8	-24°14.6	-24°19.3	-24°23.8	-24°28.2	-5.1	59.2
Sa 21	303°24.5	317°48.8	332°13.2	346°37.6	1°02.0	15°26.5	29°51.0	44°15.6	58°40.2	73°04.9	87°29.6	+24.5	15.9
	-25°13.0	-25°14.7	-25°16.1	-25°17.5	-25°18.6	-25°19.6	-25°20.4	-25°21.1	-25°21.6	-25°21.9	-25°22.1	-0.9	58.2
Su 22	303°47.7	318°13.5	332°39.3	347°05.2	1°31.2	15°57.3	30°23.4	44°49.6	59°16.0	73°42.3	88°08.8	+26.1	15.6
	-25°06.0	-25°03.7	-25°01.2	-24°58.6	-24°55.9	-24°53.0	-24°50.0	-24°46.8	-24°43.5	-24°40.1	-24°36.5	+2.9	57.3
Mo 23	304°56.6	319°24.6	333°52.6	348°20.7	2°48.9	17°17.2	31°45.6	46°14.1	60°42.7	75°11.4	89°40.2	+28.4	15.4
	-23°27.0	-23°21.3	-23°15.6	-23°09.7	-23°03.7	-22°57.6	-22°51.4	-22°45.0	-22°38.6	-22°32.0	-22°25.4	+6.2	56.3
Tu 24	307°03.4	321°33.7	336°04.1	350°34.6	5°05.2	19°35.8	34°06.6	48°37.4	63°08.4	77°39.4	92°10.6	+30.7	15.1
	-20°33.1	-20°24.9	-20°16.6	-20°08.1	-19°59.6	-19°51.0	-19°42.3	-19°33.6	-19°24.7	-19°15.8	-19°06.8	+8.6	55.5
◐ We 25	310°07.7	324°40.2	339°12.7	353°45.4	8°18.1	22°50.8	37°23.7	51°56.6	66°29.6	81°02.7	95°35.8	+32.8	15.0
	-16°42.8	-16°32.6	-16°22.4	-16°12.2	-16°01.8	-15°51.4	-15°41.0	-15°30.5	-15°19.9	-15°09.3	-14°58.6	+10.4	54.9
Th 26	314°00.8	328°34.9	343°09.2	357°43.4	12°17.7	26°52.1	41°26.5	56°01.0	70°35.5	85°10.1	99°44.7	+34.4	14.8
	-12°12.4	-12°01.0	-11°49.5	-11°38.0	-11°26.4	-11°14.8	-11°03.1	-10°51.5	-10°39.7	-10°28.0	-10°16.2	+11.6	54.4
Fr 27	318°29.1	333°04.3	347°39.6	2°14.9	16°50.3	31°25.7	46°01.1	60°36.5	75°11.9	89°47.4	104°22.9	+35.4	14.8
	-7°15.7	-7°03.5	-6°51.2	-6°38.9	-6°26.6	-6°14.3	-6°01.9	-5°49.6	-5°37.2	-5°24.8	-5°12.3	+12.3	54.1
Sa 28	323°17.5	337°53.3	352°29.0	7°04.8	21°40.5	36°16.3	50°52.0	65°27.8	80°03.6	94°39.3	109°15.1	+35.8	14.7
	-2°04.3	-1°51.7	-1°39.1	-1°26.5	-1°13.8	-1°01.2	-0°48.6	-0°35.9	-0°23.3	-0°10.6	0°02.0	+12.6	54.0
Su 29	328°10.8	342°46.4	357°22.0	11°57.6	26°33.1	41°08.7	55°44.2	70°19.7	84°55.2	99°30.6	114°06.1	+35.5	14.7
	3°11.4	3°24.0	3°36.6	3°49.1	4°01.6	4°14.2	4°26.7	4°39.2	4°51.7	5°04.2	5°16.6	+12.5	54.0
Mo 30	332°54.0	347°28.9	2°03.8	16°38.7	31°13.5	45°48.2	60°22.9	74°57.6	89°32.3	104°06.8	118°41.4	+34.7	14.8
	8°21.1	8°33.2	8°45.3	8°57.3	9°09.3	9°21.3	9°33.3	9°45.2	9°57.1	10°08.9	10°20.7	+12.0	54.2
Tu 31	337°13.5	351°47.2	6°20.8	20°54.4	35°27.9	50°01.4	64°34.8	79°08.2	93°41.4	108°14.7	122°47.8	+33.4	14.8
	13°13.3	13°24.4	13°35.5	13°46.5	13°57.5	14°08.5	14°19.4	14°30.2	14°41.0	14°51.7	15°02.4	+10.9	54.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 16h24 — LQ: 11 11h56 — NM: 18 02h56 — FQ: 25 04h53

SUN

November 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	274°06.3	289°06.3	304°06.3	319°06.3	334°06.4	349°06.4	4°06.4	19°06.4	34°06.4	49°06.4	64°06.4	79°06.4	+0.0
	-14°36.3	-14°37.1	-14°37.9	-14°38.7	-14°39.5	-14°40.3	-14°41.1	-14°41.9	-14°42.7	-14°43.5	-14°44.3	-14°45.0	-0.8
Th 2	274°06.5	289°06.5	304°06.5	319°06.6	334°06.6	349°06.6	4°06.6	19°06.6	34°06.6	49°06.6	64°06.6	79°06.6	+0.0
	-14°55.3	-14°56.1	-14°56.9	-14°57.6	-14°58.4	-14°59.2	-15°00.0	-15°00.8	-15°01.6	-15°02.3	-15°03.1	-15°03.9	-0.8
Fr 3	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.5	19°06.5	34°06.5	49°06.5	64°06.5	79°06.5	-0.0
	-15°14.0	-15°14.8	-15°15.5	-15°16.3	-15°17.1	-15°17.9	-15°18.6	-15°19.4	-15°20.2	-15°21.0	-15°21.7	-15°22.5	-0.8
Sa 4	274°06.4	289°06.4	304°06.4	319°06.4	334°06.4	349°06.3	4°06.3	19°06.3	34°06.3	49°06.3	64°06.3	79°06.3	-0.0
	-15°32.5	-15°33.2	-15°34.0	-15°34.8	-15°35.5	-15°36.3	-15°37.0	-15°37.8	-15°38.6	-15°39.3	-15°40.1	-15°40.8	-0.8
Su 5	274°06.0	289°06.0	304°06.0	319°06.0	334°05.9	349°05.9	4°05.9	19°05.9	34°05.9	49°05.8	64°05.8	79°05.8	-0.0
	-15°50.7	-15°51.4	-15°52.2	-15°52.9	-15°53.7	-15°54.4	-15°55.2	-15°55.9	-15°56.7	-15°57.4	-15°58.2	-15°58.9	-0.8
Mo 6	274°05.4	289°05.4	304°05.4	319°05.3	334°05.3	349°05.3	4°05.3	19°05.2	34°05.2	49°05.2	64°05.1	79°05.1	-0.0
	-16°08.6	-16°09.4	-16°10.1	-16°10.9	-16°11.6	-16°12.3	-16°13.1	-16°13.8	-16°14.5	-16°15.3	-16°16.0	-16°16.8	-0.7
Tu 7	274°04.6	289°04.6	304°04.6	319°04.5	334°04.5	349°04.4	4°04.4	19°04.4	34°04.3	49°04.3	64°04.2	79°04.2	-0.0
	-16°26.3	-16°27.0	-16°27.8	-16°28.5	-16°29.2	-16°30.0	-16°30.7	-16°31.4	-16°32.1	-16°32.9	-16°33.6	-16°34.3	-0.7
We 8	274°03.6	289°03.6	304°03.5	319°03.5	334°03.4	349°03.4	4°03.3	19°03.3	34°03.2	49°03.2	64°03.1	79°03.1	-0.0
	-16°43.7	-16°44.4	-16°45.2	-16°45.9	-16°46.6	-16°47.3	-16°48.0	-16°48.7	-16°49.5	-16°50.2	-16°50.9	-16°51.6	-0.7
Th 9	274°02.4	289°02.3	304°02.3	319°02.2	334°02.2	349°02.1	4°02.0	19°02.0	34°01.9	49°01.9	64°01.8	79°01.8	-0.1
	-17°00.8	-17°01.5	-17°02.3	-17°03.0	-17°03.7	-17°04.4	-17°05.1	-17°05.8	-17°06.5	-17°07.2	-17°07.9	-17°08.6	-0.7
Fr 10	274°00.9	289°00.9	304°00.8	319°00.7	334°00.7	349°00.6	4°00.5	19°00.5	34°00.4	49°00.3	64°00.3	79°00.2	-0.1
	-17°17.7	-17°18.4	-17°19.1	-17°19.8	-17°20.5	-17°21.1	-17°21.8	-17°22.5	-17°23.2	-17°23.9	-17°24.6	-17°25.3	-0.7
Sa 11	273°59.3	288°59.2	303°59.1	318°59.1	333°59.0	348°58.9	3°58.8	18°58.7	33°58.7	48°58.6	63°58.5	78°58.4	-0.1
	-17°34.2	-17°34.9	-17°35.6	-17°36.3	-17°36.9	-17°37.6	-17°38.3	-17°39.0	-17°39.7	-17°40.3	-17°41.0	-17°41.7	-0.7
Su 12	273°57.4	288°57.3	303°57.2	318°57.1	333°57.1	348°57.0	3°56.9	18°56.8	33°56.7	48°56.6	63°56.5	78°56.5	-0.1
	-17°50.5	-17°51.1	-17°51.8	-17°52.5	-17°53.1	-17°53.8	-17°54.5	-17°55.1	-17°55.8	-17°56.5	-17°57.1	-17°57.8	-0.7
Mo 13	273°55.3	288°55.2	303°55.1	318°55.0	333°54.9	348°54.8	3°54.7	18°54.6	33°54.5	48°54.4	63°54.4	78°54.3	-0.1
	-18°06.4	-18°07.0	-18°07.7	-18°08.4	-18°09.0	-18°09.7	-18°10.3	-18°11.0	-18°11.6	-18°12.3	-18°12.9	-18°13.6	-0.7
Tu 14	273°53.0	288°52.9	303°52.8	318°52.7	333°52.6	348°52.5	3°52.4	18°52.3	33°52.2	48°52.0	63°51.9	78°51.8	-0.1
	-18°22.0	-18°22.6	-18°23.3	-18°23.9	-18°24.6	-18°25.2	-18°25.9	-18°26.5	-18°27.1	-18°27.8	-18°28.4	-18°29.1	-0.6
We 15	273°50.4	288°50.3	303°50.2	318°50.1	333°50.0	348°49.9	3°49.8	18°49.7	33°49.6	48°49.4	63°49.3	78°49.2	-0.1
	-18°37.3	-18°37.9	-18°38.6	-18°39.2	-18°39.8	-18°40.4	-18°41.1	-18°41.7	-18°42.3	-18°42.9	-18°43.6	-18°44.2	-0.6
Th 16	273°47.7	288°47.6	303°47.5	318°47.3	333°47.2	348°47.1	3°47.0	18°46.9	33°46.7	48°46.6	63°46.5	78°46.4	-0.1
	-18°52.3	-18°52.9	-18°53.5	-18°54.1	-18°54.7	-18°55.3	-18°55.9	-18°56.6	-18°57.2	-18°57.8	-18°58.4	-18°59.0	-0.6
Fr 17	273°44.7	288°44.6	303°44.5	318°44.4	333°44.2	348°44.1	3°44.0	18°43.8	33°43.7	48°43.6	63°43.5	78°43.3	-0.1
	-19°06.9	-19°07.5	-19°08.1	-19°08.7	-19°09.3	-19°09.9	-19°10.5	-19°11.1	-19°11.7	-19°12.3	-19°12.9	-19°13.5	-0.6
Sa 18	273°41.6	288°41.4	303°41.3	318°41.2	333°41.0	348°40.9	3°40.8	18°40.6	33°40.5	48°40.3	63°40.2	78°40.1	-0.1
	-19°21.2	-19°21.8	-19°22.3	-19°22.9	-19°23.5	-19°24.1	-19°24.7	-19°25.3	-19°25.9	-19°26.4	-19°27.0	-19°27.6	-0.6
Su 19	273°38.2	288°38.1	303°37.9	318°37.8	333°37.6	348°37.5	3°37.3	18°37.2	33°37.1	48°36.9	63°36.8	78°36.6	-0.1
	-19°35.1	-19°35.7	-19°36.2	-19°36.8	-19°37.4	-19°38.0	-19°38.5	-19°39.1	-19°39.7	-19°40.2	-19°40.8	-19°41.4	-0.6
Mo 20	273°34.7	288°34.5	303°34.3	318°34.2	333°34.0	348°33.9	3°33.7	18°33.6	33°33.4	48°33.3	63°33.1	78°33.0	-0.2
	-19°48.7	-19°49.2	-19°49.8	-19°50.4	-19°50.9	-19°51.5	-19°52.0	-19°52.6	-19°53.1	-19°53.7	-19°54.2	-19°54.8	-0.6
Tu 21	273°30.9	288°30.7	303°30.6	318°30.4	333°30.2	348°30.1	3°29.9	18°29.8	33°29.6	48°29.4	63°29.3	78°29.1	-0.2
	-20°01.9	-20°02.4	-20°03.0	-20°03.5	-20°04.1	-20°04.6	-20°05.2	-20°05.7	-20°06.2	-20°06.8	-20°07.3	-20°07.8	-0.5
We 22	273°26.9	288°26.8	303°26.6	318°26.4	333°26.2	348°26.1	3°25.9	18°25.7	33°25.6	48°25.4	63°25.2	78°25.0	-0.2
	-20°14.8	-20°15.3	-20°15.8	-20°16.3	-20°16.9	-20°17.4	-20°17.9	-20°18.4	-20°19.0	-20°19.5	-20°20.0	-20°20.5	-0.5
Th 23	273°22.8	288°22.6	303°22.4	318°22.2	333°22.1	348°21.9	3°21.7	18°21.5	33°21.3	48°21.2	63°21.0	78°20.8	-0.2
	-20°27.2	-20°27.7	-20°28.3	-20°28.8	-20°29.3	-20°29.8	-20°30.3	-20°30.8	-20°31.3	-20°31.8	-20°32.3	-20°32.8	-0.5
Fr 24	273°18.4	288°18.2	303°18.1	318°17.9	333°17.7	348°17.5	3°17.3	18°17.1	33°16.9	48°16.8	63°16.6	78°16.4	-0.2
	-20°39.3	-20°39.8	-20°40.3	-20°40.8	-20°41.3	-20°41.8	-20°42.3	-20°42.8	-20°43.3	-20°43.8	-20°44.3	-20°44.8	-0.5
Sa 25	273°13.9	288°13.7	303°13.5	318°13.3	333°13.1	348°12.9	3°12.7	18°12.6	33°12.4	48°12.2	63°12.0	78°11.8	-0.2
	-20°51.1	-20°51.5	-20°52.0	-20°52.5	-20°53.0	-20°53.4	-20°53.9	-20°54.4	-20°54.9	-20°55.3	-20°55.8	-20°56.3	-0.5
Su 26	273°09.2	288°09.0	303°08.8	318°08.6	333°08.4	348°08.2	3°08.0	18°07.8	33°07.6	48°07.4	63°07.2	78°07.0	-0.2
	-21°02.4	-21°02.8	-21°03.3	-21°03.8	-21°04.2	-21°04.7	-21°05.2	-21°05.6	-21°06.1	-21°06.5	-21°07.0	-21°07.4	-0.5
Mo 27	273°04.3	288°04.1	303°03.9	318°03.7	333°03.5	348°03.3	3°03.1	18°02.9	33°02.6	48°02.4	63°02.2	78°02.0	-0.2
	-21°13.3	-21°13.8	-21°14.2	-21°14.7	-21°15.1	-21°15.5	-21°16.0	-21°16.4	-21°16.9	-21°17.3	-21°17.8	-21°18.2	-0.4
Tu 28	272°59.3	287°59.0	302°58.8	317°58.6	332°58.4	347°58.2	2°58.0	17°57.7	32°57.5	47°57.3	62°57.1	77°56.9	-0.2
	-21°23.8	-21°24.3	-21°24.7	-21°25.1	-21°25.6	-21°26.0	-21°26.4	-21°26.8	-21°27.3	-21°27.7	-21°28.1	-21°28.5	-0.4
We 29	272°54.0	287°53.8	302°53.6	317°53.4	332°53.1	347°52.9	2°52.7	17°52.5	32°52.2	47°52.0	62°51.8	77°51.6	-0.2
	-21°34.0	-21°34.4	-21°34.8	-21°35.2	-21°35.6	-21°36.0	-21°36.4	-21°36.8	-21°37.3	-21°37.7	-21°38.1	-21°38.5	-0.4
Th 30	272°48.6	287°48.4	302°48.2	317°47.9	332°47.7	347°47.5	2°47.2	17°47.0	32°46.8	47°46.6	62°46.3	77°46.1	-0.2
	-21°43.7	-21°44.1	-21°44.5	-21°44.9	-21°45.3	-21°45.7	-21°46.1	-21°46.4	-21°46.8	-21°47.2	-21°47.6	-21°48.0	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2028

D	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	Δ'/h	SH
We 1	253°43.3	268°15.8	282°48.3	297°20.6	311°52.9	326°25.1	340°57.3	355°29.4	10°01.4	24°33.3	39°05.2	+32.2	14.9
	16°35.7	16°45.7	16°55.7	17°05.6	17°15.4	17°25.2	17°34.9	17°44.5	17°54.1	18°03.6	18°13.0	+9.7	54.7
○ **Th 2**	256°54.4	271°25.1	285°55.7	300°26.3	314°56.7	329°27.1	343°57.4	358°27.7	12°57.9	27°28.0	41°58.0	+30.4	15.0
	20°24.3	20°32.4	20°40.3	20°48.2	20°56.0	21°03.7	21°11.3	21°18.8	21°26.2	21°33.5	21°40.7	+7.6	55.1
Fr 3	259°19.8	273°48.7	288°17.6	302°46.4	317°15.1	331°43.7	346°12.3	0°40.8	15°09.3	29°37.6	44°06.0	+28.6	15.1
	23°15.8	23°21.3	23°26.6	23°31.9	23°37.0	23°41.9	23°46.8	23°51.5	23°56.2	24°00.7	24°05.0	+4.9	55.5
Sa 4	261°04.4	275°31.9	289°59.3	304°26.7	318°54.1	333°21.4	347°48.7	2°16.0	16°43.2	31°10.4	45°37.5	+27.3	15.3
	24°55.3	24°57.6	24°59.8	25°01.8	25°03.7	25°05.5	25°07.1	25°08.6	25°09.9	25°11.1	25°12.2	+1.7	56.0
Su 5	262°21.6	276°48.4	291°15.1	305°41.9	320°08.7	334°35.4	349°02.2	3°28.9	17°55.6	32°22.4	46°49.1	+26.7	15.4
	25°11.2	25°10.0	25°08.6	25°07.2	25°05.5	25°03.7	25°01.8	24°59.7	24°57.5	24°55.2	24°52.7	-1.9	56.5
Mo 6	263°30.9	277°57.7	292°24.7	306°51.6	321°18.5	335°45.5	350°12.5	4°39.5	19°06.6	33°33.6	48°00.7	+27.0	15.6
	23°58.0	23°53.2	23°48.3	23°43.2	23°38.0	23°32.7	23°27.2	23°21.6	23°15.8	23°09.9	23°03.9	-5.4	57.1
Tu 7	264°50.9	279°18.6	293°46.2	308°13.9	322°41.7	337°09.4	351°37.3	6°05.1	20°33.0	35°01.0	49°28.9	+27.8	15.7
	21°17.6	21°09.5	21°01.3	20°52.9	20°44.4	20°35.8	20°27.0	20°18.2	20°09.2	20°00.1	19°50.9	-8.7	57.7
We 8	266°33.6	281°02.2	295°30.9	309°59.6	324°28.3	338°57.1	353°26.0	7°54.8	22°23.7	36°52.7	51°21.7	+28.8	15.9
	17°19.1	17°08.1	16°57.0	16°45.8	16°34.5	16°23.1	16°11.6	16°00.0	15°48.3	15°36.6	15°24.7	-11.4	58.3
◑ **Th 9**	281°02.2	295°30.9	309°59.6	324°28.3	338°57.1	353°26.0	7°54.8	22°23.7	36°52.7	51°21.7	65°50.7	+28.9	15.9
	17°08.1	16°57.0	16°45.8	16°34.5	16°23.1	16°11.6	16°00.0	15°48.3	15°36.6	15°24.7	15°12.7	-11.5	58.3
Fr 10	283°10.2	297°39.7	312°09.3	326°38.9	341°08.5	355°38.1	10°07.8	24°37.5	39°07.2	53°37.0	68°06.7	+29.7	16.1
	12°02.8	11°49.5	11°36.2	11°22.7	11°09.2	10°55.6	10°41.9	10°28.2	10°14.4	10°00.6	9°46.6	-13.6	58.9
Sa 11	285°35.0	300°05.0	314°35.0	329°04.9	343°34.9	358°04.9	12°34.9	27°04.9	41°34.8	56°04.8	70°34.8	+30.0	16.2
	6°10.9	5°56.1	5°41.3	5°26.5	5°11.6	4°56.6	4°41.6	4°26.6	4°11.6	3°56.5	3°41.4	-15.0	59.4
Su 12	288°03.3	302°33.0	317°02.8	331°32.5	346°02.2	0°31.9	15°01.5	29°31.2	44°00.8	58°30.3	72°59.9	+29.7	16.3
	-0°08.2	-0°23.6	-0°39.1	-0°54.5	-1°09.9	-1°25.4	-1°40.8	-1°56.3	-2°11.7	-2°27.2	-2°42.6	-15.4	59.9
Mo 13	290°18.5	304°47.4	319°16.2	333°45.0	348°13.8	2°42.5	17°11.1	31°39.7	46°08.3	60°36.8	75°05.2	+28.7	16.4
	-6°32.4	-6°47.6	-7°02.7	-7°17.7	-7°32.7	-7°47.7	-8°02.7	-8°17.6	-8°32.5	-8°47.3	-9°02.1	-15.0	60.2
Tu 14	292°04.6	306°32.1	320°59.5	335°26.8	349°54.1	4°21.3	18°48.4	33°15.4	47°42.4	62°09.3	76°36.2	+27.2	16.4
	-12°36.8	-12°50.6	-13°04.3	-13°18.0	-13°31.5	-13°45.0	-13°58.4	-14°11.7	-14°24.9	-14°38.0	-14°51.0	-13.4	60.2
We 15	293°10.5	307°36.2	322°01.9	336°27.5	350°53.0	5°18.5	19°43.9	34°09.2	48°34.5	62°59.7	77°24.9	+25.4	16.4
	-17°54.4	-18°05.7	-18°16.9	-18°28.0	-18°39.0	-18°49.9	-19°00.6	-19°11.2	-19°21.7	-19°32.0	-19°42.2	-10.8	60.1
● **Th 16**	293°35.0	307°59.2	322°23.4	336°47.6	351°11.7	5°35.8	19°59.9	34°23.9	48°47.8	63°11.8	77°35.7	+24.1	16.3
	-21°58.5	-22°06.4	-22°14.1	-22°21.7	-22°29.2	-22°36.5	-22°43.6	-22°50.6	-22°57.4	-23°04.0	-23°10.5	-7.2	59.6
Fr 17	293°31.5	307°55.1	322°18.7	336°42.3	351°06.0	5°29.6	19°53.2	34°16.9	48°40.6	63°04.3	77°27.9	+23.6	16.1
	-24°28.1	-24°31.9	-24°35.5	-24°39.0	-24°42.3	-24°45.5	-24°48.5	-24°51.3	-24°53.9	-24°56.4	-24°58.7	-3.1	59.0
Sa 18	293°26.8	307°51.0	322°15.3	336°39.7	351°04.1	5°28.5	19°53.0	34°17.6	48°42.2	63°06.9	77°31.7	+24.5	15.9
	-25°12.8	-25°12.4	-25°11.9	-25°11.2	-25°10.3	-25°09.3	-25°08.1	-25°06.7	-25°05.2	-25°03.5	-25°01.7	+1.1	58.2
Su 19	293°52.0	308°18.0	322°44.1	337°10.3	351°36.6	6°02.9	20°29.4	34°55.9	49°22.6	63°49.3	78°16.1	+26.4	15.6
	-24°16.1	-24°11.9	-24°07.5	-24°03.0	-23°58.4	-23°53.7	-23°48.8	-23°43.8	-23°38.6	-23°33.3	-23°27.9	+4.8	57.3
Mo 20	295°10.4	309°38.9	324°07.4	338°36.0	353°04.7	7°33.6	22°02.5	36°31.5	51°00.7	65°29.9	79°59.2	+28.9	15.4
	-21°52.2	-21°44.9	-21°37.5	-21°30.0	-21°22.4	-21°14.7	-21°06.8	-20°58.9	-20°50.9	-20°42.8	-20°34.6	+7.8	56.5
Tu 21	297°31.2	312°02.1	326°33.1	341°04.2	355°35.4	10°06.6	24°38.0	39°09.5	53°41.0	68°12.7	82°44.4	+31.3	15.2
	-18°20.9	-18°11.3	-18°01.7	-17°51.9	-17°42.2	-17°32.3	-17°22.4	-17°12.4	-17°02.3	-16°52.2	-16°42.0	+9.9	55.7
We 22	300°50.4	315°23.4	329°56.5	344°29.7	359°03.0	13°36.3	28°09.7	42°43.2	57°16.7	71°50.3	86°24.0	+33.4	15.0
	-14°01.8	-13°50.7	-13°39.5	-13°28.3	-13°17.1	-13°05.8	-12°54.5	-12°43.1	-12°31.7	-12°20.2	-12°08.7	+11.3	55.0
Th 23	304°56.2	319°30.8	334°05.4	348°40.1	3°14.8	17°49.6	32°24.4	46°59.3	61°34.2	76°09.2	90°44.1	+34.8	14.9
	-9°11.7	-8°59.7	-8°47.6	-8°35.5	-8°23.4	-8°11.2	-7°59.0	-7°46.8	-7°34.6	-7°22.4	-7°10.1	+12.2	54.5
◐ **Fr 24**	309°33.1	324°08.6	338°44.1	353°19.6	7°55.2	22°30.7	37°06.3	51°41.9	66°17.5	80°53.2	95°28.8	+35.6	14.8
	-4°04.0	-3°51.5	-3°38.9	-3°26.4	-3°13.9	-3°01.3	-2°48.7	-2°36.2	-2°23.6	-2°11.0	-1°58.4	+12.6	54.2
Sa 25	314°24.5	329°00.2	343°35.9	358°11.6	12°47.3	27°23.0	41°58.7	56°34.4	71°10.1	85°45.7	100°21.4	+35.7	14.8
	1°10.5	1°23.1	1°35.7	1°48.2	2°00.8	2°13.4	2°25.9	2°38.5	2°51.0	3°03.5	3°16.0	+12.6	54.1
Su 26	319°13.9	333°49.2	348°24.5	2°59.8	17°35.0	32°10.2	46°45.3	61°20.4	75°55.5	90°30.6	105°05.6	+35.2	14.8
	6°22.0	6°34.3	6°46.5	6°58.7	7°10.9	7°23.1	7°35.2	7°47.4	7°59.5	8°11.5	8°23.6	+12.2	54.2
Mo 27	323°45.7	338°19.9	352°54.2	7°28.4	22°02.5	36°36.6	51°10.6	65°44.6	80°18.5	94°52.3	109°26.1	+34.0	14.8
	11°20.5	11°32.0	11°43.4	11°54.9	12°06.3	12°17.6	12°28.9	12°40.2	12°51.4	13°02.6	13°13.7	+11.3	54.4
Tu 28	327°45.3	342°18.0	356°50.7	11°23.3	25°55.8	40°28.3	55°00.6	69°32.9	84°05.2	98°37.3	113°09.4	+32.4	14.9
	15°54.4	16°04.6	16°14.8	16°25.0	16°35.0	16°45.0	16°55.0	17°04.8	17°14.7	17°24.4	17°34.1	+10.0	54.8
We 29	331°01.2	345°32.1	0°02.8	14°33.5	29°04.0	43°34.5	58°04.9	72°35.3	87°05.5	101°35.7	116°05.8	+30.5	15.1
	19°50.0	19°58.4	20°06.7	20°15.0	20°23.1	20°31.2	20°39.1	20°47.0	20°54.8	21°02.5	21°10.0	+8.0	55.2
Th 30	333°27.5	347°56.3	2°25.1	16°53.7	31°22.3	45°50.9	60°19.3	74°47.7	89°16.0	103°44.2	118°12.4	+28.5	15.2
	22°51.6	22°57.5	23°03.2	23°08.9	23°14.5	23°19.9	23°25.2	23°30.4	23°35.5	23°40.5	23°45.3	+5.4	55.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 2 09h17 — LQ: 9 21h25 — NM: 16 13h18 — FQ: 24 00h14

SUN

December 2028

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	272°43.1	287°42.8	302°42.6	317°42.4	332°42.1	347°41.9	2°41.6	17°41.4	32°41.2	47°40.9	62°40.7	77°40.5	-0.2
	-21°53.0	-21°53.4	-21°53.8	-21°54.1	-21°54.5	-21°54.9	-21°55.3	-21°55.6	-21°56.0	-21°56.4	-21°56.7	-21°57.1	-0.4
Sa 2	272°37.3	287°37.1	302°36.9	317°36.6	332°36.4	347°36.1	2°35.9	17°35.6	32°35.4	47°35.2	62°34.9	77°34.7	-0.2
	-22°01.9	-22°02.2	-22°02.6	-22°03.0	-22°03.3	-22°03.7	-22°04.0	-22°04.4	-22°04.7	-22°05.1	-22°05.5	-22°05.8	-0.4
Su 3	272°31.5	287°31.2	302°31.0	317°30.7	332°30.5	347°30.2	2°30.0	17°29.7	32°29.5	47°29.2	62°29.0	77°28.7	-0.2
	-22°10.3	-22°10.7	-22°11.0	-22°11.4	-22°11.7	-22°12.0	-22°12.4	-22°12.7	-22°13.1	-22°13.4	-22°13.7	-22°14.1	-0.3
Mo 4	272°25.5	287°25.2	302°24.9	317°24.7	332°24.4	347°24.2	2°23.9	17°23.7	32°23.4	47°23.2	62°22.9	77°22.7	-0.3
	-22°18.4	-22°18.7	-22°19.0	-22°19.3	-22°19.7	-22°20.0	-22°20.3	-22°20.6	-22°21.0	-22°21.3	-22°21.6	-22°21.9	-0.3
Tu 5	272°19.3	287°19.0	302°18.8	317°18.5	332°18.3	347°18.0	2°17.7	17°17.5	32°17.2	47°16.9	62°16.7	77°16.4	-0.3
	-22°26.0	-22°26.3	-22°26.6	-22°26.9	-22°27.2	-22°27.5	-22°27.8	-22°28.1	-22°28.4	-22°28.7	-22°29.0	-22°29.3	-0.3
We 6	272°13.0	287°12.7	302°12.5	317°12.2	332°11.9	347°11.7	2°11.4	17°11.1	32°10.9	47°10.6	62°10.3	77°10.1	-0.3
	-22°33.1	-22°33.4	-22°33.7	-22°34.0	-22°34.3	-22°34.6	-22°34.9	-22°35.2	-22°35.4	-22°35.7	-22°36.0	-22°36.3	-0.3
Th 7	272°06.6	287°06.3	302°06.0	317°05.7	332°05.5	347°05.2	2°04.9	17°04.7	32°04.4	47°04.1	62°03.8	77°03.6	-0.3
	-22°39.9	-22°40.1	-22°40.4	-22°40.7	-22°40.9	-22°41.2	-22°41.5	-22°41.7	-22°42.0	-22°42.3	-22°42.5	-22°42.8	-0.3
Fr 8	272°00.0	286°59.7	301°59.5	316°59.2	331°58.9	346°58.6	1°58.3	16°58.1	31°57.8	46°57.5	61°57.2	76°57.0	-0.3
	-22°46.2	-22°46.4	-22°46.7	-22°46.9	-22°47.2	-22°47.4	-22°47.7	-22°47.9	-22°48.1	-22°48.4	-22°48.6	-22°48.9	-0.2
Sa 9	271°53.3	286°53.0	301°52.8	316°52.5	331°52.2	346°51.9	1°51.6	16°51.4	31°51.1	46°50.8	61°50.5	76°50.2	-0.3
	-22°52.0	-22°52.2	-22°52.5	-22°52.7	-22°52.9	-22°53.1	-22°53.4	-22°53.6	-22°53.8	-22°54.1	-22°54.3	-22°54.5	-0.2
Su 10	271°46.5	286°46.2	301°46.0	316°45.7	331°45.4	346°45.1	1°44.8	16°44.5	31°44.2	46°44.0	61°43.7	76°43.4	-0.3
	-22°57.4	-22°57.6	-22°57.8	-22°58.0	-22°58.2	-22°58.4	-22°58.6	-22°58.9	-22°59.1	-22°59.3	-22°59.5	-22°59.7	-0.2
Mo 11	271°39.6	286°39.3	301°39.1	316°38.8	331°38.5	346°38.2	1°37.9	16°37.6	31°37.3	46°37.0	61°36.7	76°36.4	-0.3
	-23°02.3	-23°02.5	-23°02.7	-23°02.9	-23°03.1	-23°03.3	-23°03.5	-23°03.7	-23°03.8	-23°04.0	-23°04.2	-23°04.4	-0.2
Tu 12	271°32.6	286°32.3	301°32.1	316°31.8	331°31.5	346°31.2	1°30.9	16°30.6	31°30.3	46°30.0	61°29.7	76°29.4	-0.3
	-23°06.8	-23°07.0	-23°07.1	-23°07.3	-23°07.5	-23°07.6	-23°07.8	-23°08.0	-23°08.2	-23°08.3	-23°08.5	-23°08.7	-0.2
We 13	271°25.6	286°25.3	301°25.0	316°24.7	331°24.4	346°24.1	1°23.8	16°23.5	31°23.2	46°22.9	61°22.6	76°22.3	-0.3
	-23°10.8	-23°10.9	-23°11.1	-23°11.3	-23°11.4	-23°11.6	-23°11.7	-23°11.9	-23°12.0	-23°12.2	-23°12.3	-23°12.5	-0.2
Th 14	271°18.4	286°18.1	301°17.8	316°17.5	331°17.2	346°16.9	1°16.6	16°16.3	31°16.0	46°15.7	61°15.4	76°15.1	-0.3
	-23°14.3	-23°14.5	-23°14.6	-23°14.8	-23°14.9	-23°15.0	-23°15.2	-23°15.3	-23°15.4	-23°15.6	-23°15.7	-23°15.8	-0.1
Fr 15	271°11.2	286°10.9	301°10.5	316°10.2	331°09.9	346°09.6	1°09.3	16°09.0	31°08.7	46°08.4	61°08.1	76°07.8	-0.3
	-23°17.4	-23°17.5	-23°17.7	-23°17.8	-23°17.9	-23°18.0	-23°18.1	-23°18.2	-23°18.4	-23°18.5	-23°18.6	-23°18.7	-0.1
Sa 16	271°03.9	286°03.6	301°03.2	316°02.9	331°02.6	346°02.3	1°02.0	16°01.7	31°01.4	46°01.1	61°00.8	76°00.5	-0.3
	-23°20.1	-23°20.2	-23°20.3	-23°20.3	-23°20.4	-23°20.5	-23°20.6	-23°20.7	-23°20.8	-23°20.9	-23°21.0	-23°21.1	-0.1
Su 17	270°56.5	285°56.2	300°55.9	315°55.6	330°55.3	345°55.0	0°54.7	15°54.4	30°54.0	45°53.7	60°53.4	75°53.1	-0.3
	-23°22.2	-23°22.3	-23°22.4	-23°22.4	-23°22.5	-23°22.6	-23°22.7	-23°22.8	-23°22.8	-23°22.9	-23°23.0	-23°23.0	-0.1
Mo 18	270°49.1	285°48.8	300°48.5	315°48.2	330°47.9	345°47.6	0°47.3	15°47.0	30°46.6	45°46.3	60°46.0	75°45.7	-0.3
	-23°23.9	-23°24.0	-23°24.0	-23°24.1	-23°24.1	-23°24.2	-23°24.2	-23°24.3	-23°24.4	-23°24.4	-23°24.5	-23°24.5	-0.1
Tu 19	270°41.7	285°41.4	300°41.1	315°40.8	330°40.5	345°40.1	0°39.8	15°39.5	30°39.2	45°38.9	60°38.6	75°38.3	-0.3
	-23°25.1	-23°25.2	-23°25.2	-23°25.2	-23°25.3	-23°25.3	-23°25.4	-23°25.4	-23°25.4	-23°25.5	-23°25.5	-23°25.5	-0.0
We 20	270°34.2	285°33.9	300°33.6	315°33.3	330°33.0	345°32.7	0°32.4	15°32.1	30°31.8	45°31.4	60°31.1	75°30.8	-0.3
	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.1	-0.0
Th 21	270°26.8	285°26.5	300°26.2	315°25.8	330°25.5	345°25.2	0°24.9	15°24.6	30°24.3	45°24.0	60°23.7	75°23.4	-0.3
	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.2	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	+0.0
Fr 22	270°19.3	285°19.0	300°18.7	315°18.4	330°18.1	345°17.8	0°17.4	15°17.1	30°16.8	45°16.5	60°16.2	75°15.9	-0.3
	-23°26.0	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.7	-23°25.7	+0.0
Sa 23	270°11.9	285°11.5	300°11.2	315°10.9	330°10.6	345°10.3	0°10.0	15°09.7	30°09.4	45°09.1	60°08.7	75°08.4	-0.3
	-23°25.3	-23°25.3	-23°25.2	-23°25.2	-23°25.1	-23°25.1	-23°25.1	-23°25.0	-23°25.0	-23°24.9	-23°24.9	-23°24.8	+0.0
Su 24	270°04.4	285°04.1	300°03.8	315°03.5	330°03.2	345°02.9	0°02.5	15°02.2	30°01.9	45°01.6	60°01.3	75°01.0	-0.3
	-23°24.2	-23°24.1	-23°24.1	-23°24.0	-23°23.9	-23°23.9	-23°23.8	-23°23.7	-23°23.7	-23°23.6	-23°23.6	-23°23.5	+0.1
Mo 25	269°57.0	284°56.7	299°56.4	314°56.0	329°55.7	344°55.4	359°55.1	14°54.8	29°54.5	44°54.2	59°53.9	74°53.6	-0.3
	-23°22.6	-23°22.5	-23°22.4	-23°22.3	-23°22.3	-23°22.2	-23°22.1	-23°22.0	-23°21.9	-23°21.8	-23°21.8	-23°21.7	+0.1
Tu 26	269°49.6	284°49.3	299°49.0	314°48.6	329°48.3	344°48.0	359°47.7	14°47.4	29°47.1	44°46.8	59°46.5	74°46.2	-0.3
	-23°20.5	-23°20.4	-23°20.3	-23°20.2	-23°20.1	-23°20.0	-23°19.9	-23°19.8	-23°19.7	-23°19.6	-23°19.5	-23°19.4	+0.1
We 27	269°42.2	284°41.9	299°41.6	314°41.3	329°41.0	344°40.7	359°40.4	14°40.1	29°39.8	44°39.5	59°39.1	74°38.8	-0.3
	-23°18.0	-23°17.8	-23°17.7	-23°17.6	-23°17.5	-23°17.4	-23°17.2	-23°17.1	-23°17.0	-23°16.9	-23°16.8	-23°16.6	+0.1
Th 28	269°34.9	284°34.6	299°34.3	314°34.0	329°33.7	344°33.4	359°33.1	14°32.8	29°32.5	44°32.2	59°31.9	74°31.5	-0.3
	-23°14.9	-23°14.8	-23°14.7	-23°14.5	-23°14.4	-23°14.3	-23°14.1	-23°14.0	-23°13.8	-23°13.7	-23°13.6	-23°13.4	+0.1
Fr 29	269°27.6	284°27.3	299°27.0	314°26.7	329°26.4	344°26.1	359°25.8	14°25.5	29°25.2	44°24.9	59°24.6	74°24.3	-0.3
	-23°11.5	-23°11.3	-23°11.2	-23°11.0	-23°10.9	-23°10.7	-23°10.5	-23°10.4	-23°10.2	-23°10.1	-23°09.9	-23°09.7	+0.2
Sa 30	269°20.4	284°20.1	299°19.8	314°19.5	329°19.2	344°18.9	359°18.6	14°18.3	29°18.0	44°17.7	59°17.4	74°17.1	-0.3
	-23°07.5	-23°07.4	-23°07.2	-23°07.0	-23°06.8	-23°06.7	-23°06.5	-23°06.3	-23°06.1	-23°05.9	-23°05.8	-23°05.6	+0.2
Su 31	269°13.3	284°13.0	299°12.7	314°12.4	329°12.1	344°11.8	359°11.5	14°11.2	29°10.9	44°10.6	59°10.3	74°10.0	-0.3
	-23°03.1	-23°03.0	-23°02.8	-23°02.6	-23°02.4	-23°02.2	-23°02.0	-23°01.8	-23°01.6	-23°01.4	-23°01.2	-23°01.0	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

December 2028

D	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	Δ'/h	SH
Fr 1	248°22.7	262°50.2	277°17.7	291°45.0	306°12.3	320°39.6	335°06.8	349°34.0	4°01.1	18°28.1	32°55.1	+27.2	15.3
	24°23.3	24°26.8	24°30.3	24°33.6	24°36.7	24°39.8	24°42.7	24°45.5	24°48.1	24°50.6	24°52.9	+3.0	56.2
○ Sa 2	249°34.7	264°01.1	278°27.4	292°53.7	307°20.0	321°46.3	336°12.5	350°38.7	5°04.9	19°31.1	33°57.3	+26.3	15.5
	25°11.4	25°11.5	25°11.4	25°11.2	25°10.8	25°10.3	25°09.6	25°08.8	25°07.9	25°06.8	25°05.5	-0.6	56.7
Su 3	250°29.2	264°55.4	279°21.5	293°47.7	308°13.9	322°40.1	337°06.3	351°32.6	5°58.8	20°25.1	34°51.4	+26.2	15.6
	24°29.0	24°25.3	24°21.6	24°17.6	24°13.6	24°09.4	24°05.0	24°00.5	23°55.9	23°51.1	23°46.1	-4.3	57.3
Mo 4	251°29.5	265°56.3	280°23.2	294°50.1	309°17.0	323°44.0	338°11.1	352°38.1	7°05.3	21°32.4	35°59.6	+27.0	15.7
	22°15.2	22°08.1	22°00.8	21°53.3	21°45.8	21°38.1	21°30.3	21°22.3	21°14.3	21°06.1	20°57.7	-7.8	57.7
Tu 5	252°53.8	267°21.8	281°49.9	296°18.0	310°46.2	325°14.5	339°42.7	354°11.1	8°39.5	23°07.9	37°36.4	+28.3	15.9
	18°38.4	18°28.2	18°17.8	18°07.4	17°56.9	17°46.2	17°35.5	17°24.7	17°13.7	17°02.7	16°51.5	-10.7	58.2
We 6	254°49.8	269°19.1	283°48.4	298°17.8	312°47.2	327°16.7	341°46.2	356°15.7	10°45.3	25°15.0	39°44.6	+29.5	16.0
	13°53.2	13°40.7	13°28.0	13°15.3	13°02.5	12°49.6	12°36.6	12°23.6	12°10.5	11°57.4	11°44.1	-12.9	58.5
Th 7	257°14.1	271°44.3	286°14.6	300°44.8	315°15.1	329°45.4	344°15.8	358°46.1	13°16.5	27°46.9	42°17.3	+30.3	16.0
	8°18.2	8°04.0	7°49.8	7°35.6	7°21.3	7°06.9	6°52.6	6°38.1	6°23.7	6°09.2	5°54.6	-14.4	58.8
Fr 8	259°55.1	274°25.7	288°56.2	303°26.8	317°57.4	332°27.9	346°58.5	1°29.0	15°59.6	30°30.1	45°00.7	+30.6	16.1
	2°13.0	1°58.1	1°43.1	1°28.1	1°13.1	0°58.1	0°43.1	0°28.1	0°13.1	-0°01.9	-0°17.0	-15.0	59.1
◑ Sa 9	274°25.7	288°56.2	303°26.8	317°57.4	332°27.9	346°58.5	1°29.0	15°59.6	30°30.1	45°00.7	59°31.2	+30.6	16.1
	1°58.1	1°43.1	1°28.1	1°13.1	0°58.1	0°43.1	0°28.1	0°13.1	-0°01.9	-0°17.0	-0°32.0	-15.0	59.1
Su 10	277°06.9	291°37.1	306°07.3	320°37.5	335°07.6	349°37.6	4°07.7	18°37.7	33°07.7	47°37.6	62°07.5	+30.1	16.2
	-4°17.0	-4°31.9	-4°46.7	-5°01.6	-5°16.4	-5°31.2	-5°46.0	-6°00.8	-6°15.5	-6°30.2	-6°44.8	-14.8	59.3
Mo 11	279°30.7	293°59.8	308°28.9	322°58.0	337°26.9	351°55.9	6°24.7	20°53.5	35°22.3	49°51.0	64°19.6	+28.9	16.2
	-10°19.9	-10°33.9	-10°47.8	-11°01.6	-11°15.4	-11°29.1	-11°42.8	-11°56.4	-12°09.9	-12°23.3	-12°36.7	-13.7	59.4
Tu 12	281°21.4	295°49.0	310°16.5	324°44.0	339°11.3	353°38.7	8°05.9	22°33.1	37°00.2	51°27.2	65°54.1	+27.3	16.2
	-15°48.3	-16°00.4	-16°12.4	-16°24.3	-16°36.0	-16°47.7	-16°59.3	-17°10.8	-17°22.2	-17°33.5	-17°44.7	-11.6	59.3
We 13	282°30.2	296°56.1	311°21.9	325°47.6	340°13.3	354°38.9	9°04.4	23°29.9	37°55.3	52°20.7	66°46.0	+25.6	16.1
	-20°18.6	-20°27.9	-20°37.0	-20°46.1	-20°55.0	-21°03.7	-21°12.3	-21°20.8	-21°29.1	-21°37.4	-21°45.4	-8.7	59.1
Th 14	282°59.4	297°23.9	311°48.4	326°12.9	340°37.3	355°01.7	9°26.1	23°50.4	38°14.7	52°39.0	67°03.3	+24.4	16.0
	-23°28.9	-23°34.5	-23°40.1	-23°45.4	-23°50.7	-23°55.7	-24°00.6	-24°05.3	-24°09.9	-24°14.3	-24°18.6	-5.0	58.8
Fr 15	283°05.9	297°30.0	311°54.2	326°18.4	340°42.6	355°06.8	9°31.0	23°55.3	38°19.6	52°43.9	67°08.2	+24.2	15.9
	-25°02.8	-25°04.4	-25°05.9	-25°07.2	-25°08.3	-25°09.3	-25°10.1	-25°10.7	-25°11.2	-25°11.5	-25°11.7	-0.9	58.3
● Sa 16	283°17.8	297°42.8	312°07.9	326°33.0	340°58.2	355°23.5	9°48.8	24°14.2	38°39.7	53°05.2	67°30.9	+25.3	15.7
	-24°54.7	-24°52.3	-24°49.7	-24°47.0	-24°44.2	-24°41.2	-24°38.0	-24°34.7	-24°31.3	-24°27.7	-24°23.9	+3.1	57.7
Su 17	284°04.3	298°31.2	312°58.2	327°25.3	341°52.5	356°19.8	10°47.1	25°14.6	39°42.1	54°09.8	68°37.5	+27.3	15.5
	-23°11.0	-23°05.1	-22°59.0	-22°52.9	-22°46.6	-22°40.1	-22°33.6	-22°26.9	-22°20.2	-22°13.3	-22°06.2	+6.5	57.0
Mo 18	285°45.1	300°14.4	314°43.7	329°13.2	343°42.8	358°12.5	12°42.2	27°12.1	41°42.1	56°12.1	70°42.3	+29.7	15.4
	-20°08.0	-19°59.3	-19°50.5	-19°41.7	-19°32.7	-19°23.6	-19°14.5	-19°05.3	-18°56.0	-18°46.6	-18°37.1	+9.1	56.3
Tu 19	288°25.6	302°57.2	317°28.9	332°00.7	346°32.6	1°04.5	15°36.6	30°08.7	44°40.9	59°13.2	73°45.6	+32.0	15.2
	-16°05.8	-15°55.1	-15°44.5	-15°33.7	-15°22.9	-15°12.0	-15°01.1	-14°50.1	-14°39.0	-14°27.9	-14°16.8	+10.9	55.6
We 20	292°00.1	306°33.6	321°07.2	335°40.9	350°14.6	4°48.4	19°22.2	33°56.2	48°30.1	63°04.2	77°38.2	+33.8	15.0
	-11°23.9	-11°12.0	-11°00.1	-10°48.2	-10°36.2	-10°24.2	-10°12.2	-10°00.2	-9°48.1	-9°35.9	-9°23.8	+12.0	55.0
Th 21	296°15.8	310°50.6	325°25.5	340°00.5	354°35.5	9°10.5	23°45.5	38°20.6	52°55.8	67°30.9	82°06.1	+35.0	14.9
	-6°18.7	-6°06.2	-5°53.7	-5°41.2	-5°28.7	-5°16.1	-5°03.6	-4°51.0	-4°38.4	-4°25.8	-4°13.2	+12.6	54.6
Fr 22	300°57.0	315°32.6	330°08.1	344°43.7	359°19.3	13°54.9	28°30.5	43°06.1	57°41.8	72°17.4	86°53.0	+35.6	14.8
	-1°03.5	-0°50.9	-0°38.2	-0°25.6	-0°12.9	-0°00.3	0°12.4	0°25.0	0°37.6	0°50.3	1°02.9	+12.6	54.3
◐ Sa 23	305°47.4	320°23.0	334°58.6	349°34.1	4°09.6	18°45.1	33°20.6	47°56.1	62°31.6	77°07.0	91°42.4	+35.5	14.8
	4°11.0	4°23.4	4°35.8	4°48.2	5°00.6	5°13.0	5°25.3	5°37.6	5°49.9	6°02.2	6°14.5	+12.3	54.2
Su 24	310°30.5	325°05.4	339°40.4	354°15.2	8°50.0	23°24.8	37°59.6	52°34.3	67°08.9	81°43.5	96°18.1	+34.8	14.8
	9°15.2	9°27.0	9°38.8	9°50.6	10°02.3	10°14.0	10°25.6	10°37.2	10°48.8	11°00.4	11°11.9	+11.7	54.2
Mo 25	314°50.5	329°24.2	343°57.8	358°31.4	13°04.9	27°38.4	42°11.8	56°45.1	71°18.4	85°51.6	100°24.7	+33.4	14.9
	13°59.2	14°10.0	14°20.7	14°31.4	14°42.0	14°52.6	15°03.1	15°13.6	15°24.0	15°34.3	15°44.6	+10.5	54.5
Tu 26	318°33.0	333°05.0	347°36.9	2°08.6	16°40.4	31°12.0	45°43.6	60°15.0	74°46.4	89°17.7	103°49.0	+31.6	15.0
	18°11.4	18°20.6	18°29.8	18°38.8	18°47.9	18°56.8	19°05.6	19°14.4	19°23.1	19°31.7	19°40.3	+8.9	54.9
We 27	321°27.4	335°57.2	350°27.0	4°56.7	19°26.4	33°55.9	48°25.4	62°54.7	77°24.0	91°53.2	106°22.3	+29.5	15.1
	21°37.8	21°44.9	21°51.9	21°58.8	22°05.5	22°12.2	22°18.8	22°25.3	22°31.6	22°37.9	22°44.0	+6.6	55.5
Th 28	323°29.2	337°57.1	352°24.8	6°52.5	21°20.1	35°47.6	50°15.1	64°42.5	79°09.8	93°37.0	108°04.2	+27.5	15.3
	24°02.6	24°06.8	24°11.0	24°15.0	24°18.9	24°22.7	24°26.3	24°29.8	24°33.2	24°36.4	24°39.5	+3.7	56.2
Fr 29	324°44.5	339°10.8	353°37.0	8°03.1	22°29.3	36°55.3	51°21.4	65°47.4	80°13.3	94°39.2	109°05.1	+26.1	15.5
	25°09.5	25°10.4	25°11.1	25°11.7	25°12.1	25°12.4	25°12.5	25°12.5	25°12.3	25°12.0	25°11.5	+0.2	56.9
Sa 30	325°30.3	339°55.9	354°21.4	8°47.0	23°12.5	37°38.0	52°03.6	66°29.1	80°54.6	95°20.2	109°45.7	+25.5	15.7
	24°46.1	24°43.2	24°40.2	24°36.9	24°33.6	24°30.0	24°26.4	24°22.5	24°18.5	24°14.4	24°10.1	-3.6	57.6
○ Su 31	326°10.8	340°36.6	355°02.5	9°28.4	23°54.4	38°20.4	52°46.4	67°12.4	81°38.5	96°04.7	110°30.8	+26.0	15.9
	22°47.7	22°41.0	22°34.2	22°27.2	22°20.1	22°12.8	22°05.5	21°57.9	21°50.3	21°42.5	21°34.5	-7.3	58.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 2 01h40 — LQ: 9 05h38 — NM: 16 02h06 — FQ: 23 21h44 — FM: 31 16h48

SUN

January 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	269°06.2	284°05.9	299°05.6	314°05.3	329°05.0	344°04.7	359°04.5	14°04.2	29°03.9	44°03.6	59°03.3	74°03.0	-0.3
	-22°58.3	-22°58.1	-22°57.9	-22°57.7	-22°57.4	-22°57.2	-22°57.0	-22°56.8	-22°56.6	-22°56.4	-22°56.1	-22°55.9	+0.2
Tu 2	268°59.2	283°58.9	298°58.6	313°58.4	328°58.1	343°57.8	358°57.5	13°57.2	28°56.9	43°56.6	58°56.3	73°56.1	-0.3
	-22°53.0	-22°52.7	-22°52.5	-22°52.3	-22°52.1	-22°51.8	-22°51.6	-22°51.3	-22°51.1	-22°50.9	-22°50.6	-22°50.4	+0.2
We 3	268°52.3	283°52.0	298°51.8	313°51.5	328°51.2	343°50.9	358°50.6	13°50.3	28°50.0	43°49.8	58°49.5	73°49.2	-0.3
	-22°47.2	-22°47.0	-22°46.7	-22°46.5	-22°46.2	-22°46.0	-22°45.7	-22°45.4	-22°45.2	-22°44.9	-22°44.7	-22°44.4	+0.3
Th 4	268°45.5	283°45.2	298°45.0	313°44.7	328°44.4	343°44.1	358°43.8	13°43.6	28°43.3	43°43.0	58°42.7	73°42.4	-0.3
	-22°41.0	-22°40.7	-22°40.5	-22°40.2	-22°39.9	-22°39.6	-22°39.4	-22°39.1	-22°38.8	-22°38.5	-22°38.3	-22°38.0	+0.3
Fr 5	268°38.8	283°38.5	298°38.3	313°38.0	328°37.7	343°37.4	358°37.2	13°36.9	28°36.6	43°36.3	58°36.1	73°35.8	-0.3
	-22°34.3	-22°34.0	-22°33.7	-22°33.5	-22°33.2	-22°32.9	-22°32.6	-22°32.3	-22°32.0	-22°31.7	-22°31.4	-22°31.1	+0.3
Sa 6	268°32.2	283°32.0	298°31.7	313°31.4	328°31.1	343°30.9	358°30.6	13°30.3	28°30.1	43°29.8	58°29.5	73°29.2	-0.3
	-22°27.2	-22°26.9	-22°26.6	-22°26.3	-22°26.0	-22°25.7	-22°25.4	-22°25.0	-22°24.7	-22°24.4	-22°24.1	-22°23.8	+0.3
Su 7	268°25.7	283°25.5	298°25.2	313°24.9	328°24.7	343°24.4	358°24.1	13°23.9	28°23.6	43°23.3	58°23.1	73°22.8	-0.3
	-22°19.6	-22°19.3	-22°19.0	-22°18.7	-22°18.3	-22°18.0	-22°17.7	-22°17.3	-22°17.0	-22°16.7	-22°16.4	-22°16.0	+0.3
Mo 8	268°19.4	283°19.1	298°18.9	313°18.6	328°18.3	343°18.1	358°17.8	13°17.5	28°17.3	43°17.0	58°16.8	73°16.5	-0.3
	-22°11.6	-22°11.3	-22°10.9	-22°10.6	-22°10.3	-22°09.9	-22°09.6	-22°09.2	-22°08.9	-22°08.5	-22°08.2	-22°07.8	+0.3
Tu 9	268°13.1	283°12.9	298°12.6	313°12.4	328°12.1	343°11.9	358°11.6	13°11.3	28°11.1	43°10.8	58°10.6	73°10.3	-0.3
	-22°03.2	-22°02.8	-22°02.5	-22°02.1	-22°01.7	-22°01.4	-22°01.0	-22°00.7	-22°00.3	-21°59.9	-21°59.5	-21°59.2	+0.4
We 10	268°07.0	283°06.8	298°06.5	313°06.3	328°06.0	343°05.8	358°05.5	13°05.3	28°05.0	43°04.8	58°04.5	73°04.3	-0.3
	-21°54.3	-21°53.9	-21°53.6	-21°53.2	-21°52.8	-21°52.4	-21°52.0	-21°51.7	-21°51.3	-21°50.9	-21°50.5	-21°50.1	+0.4
Th 11	268°01.1	283°00.8	298°00.6	313°00.3	328°00.1	342°59.8	357°59.6	12°59.3	27°59.1	42°58.9	57°58.6	72°58.4	-0.2
	-21°45.0	-21°44.6	-21°44.2	-21°43.8	-21°43.4	-21°43.0	-21°42.6	-21°42.2	-21°41.8	-21°41.4	-21°41.0	-21°40.6	+0.4
Fr 12	267°55.2	282°55.0	297°54.8	312°54.5	327°54.3	342°54.0	357°53.8	12°53.6	27°53.3	42°53.1	57°52.9	72°52.6	-0.2
	-21°35.3	-21°34.9	-21°34.5	-21°34.1	-21°33.6	-21°33.2	-21°32.8	-21°32.4	-21°32.0	-21°31.5	-21°31.1	-21°30.7	+0.4
Sa 13	267°49.6	282°49.3	297°49.1	312°48.9	327°48.6	342°48.4	357°48.2	12°47.9	27°47.7	42°47.5	57°47.2	72°47.0	-0.2
	-21°25.2	-21°24.7	-21°24.3	-21°23.9	-21°23.4	-21°23.0	-21°22.6	-21°22.1	-21°21.7	-21°21.2	-21°20.8	-21°20.4	+0.4
Su 14	267°44.0	282°43.8	297°43.6	312°43.4	327°43.1	342°42.9	357°42.7	12°42.5	27°42.2	42°42.0	57°41.8	72°41.6	-0.2
	-21°14.6	-21°14.1	-21°13.7	-21°13.2	-21°12.8	-21°12.3	-21°11.9	-21°11.4	-21°11.0	-21°10.5	-21°10.1	-21°09.6	+0.5
Mo 15	267°38.7	282°38.5	297°38.3	312°38.0	327°37.8	342°37.6	357°37.4	12°37.2	27°37.0	42°36.7	57°36.5	72°36.3	-0.2
	-21°03.6	-21°03.2	-21°02.7	-21°02.2	-21°01.8	-21°01.3	-21°00.8	-21°00.4	-20°59.9	-20°59.4	-20°58.9	-20°58.5	+0.5
Tu 16	267°33.5	282°33.3	297°33.1	312°32.9	327°32.7	342°32.5	357°32.2	12°32.0	27°31.8	42°31.6	57°31.4	72°31.2	-0.2
	-20°52.3	-20°51.8	-20°51.3	-20°50.8	-20°50.3	-20°49.8	-20°49.4	-20°48.9	-20°48.4	-20°47.9	-20°47.4	-20°46.9	+0.5
We 17	267°28.5	282°28.3	297°28.1	312°27.9	327°27.7	342°27.5	357°27.3	12°27.1	27°26.9	42°26.7	57°26.5	72°26.3	-0.2
	-20°40.5	-20°40.0	-20°39.5	-20°39.0	-20°38.5	-20°38.0	-20°37.5	-20°37.0	-20°36.5	-20°36.0	-20°35.5	-20°35.0	+0.5
Th 18	267°23.7	282°23.5	297°23.3	312°23.1	327°22.9	342°22.7	357°22.5	12°22.3	27°22.1	42°21.9	57°21.7	72°21.5	-0.2
	-20°28.3	-20°27.8	-20°27.3	-20°26.8	-20°26.3	-20°25.8	-20°25.2	-20°24.7	-20°24.2	-20°23.7	-20°23.2	-20°22.6	+0.5
Fr 19	267°19.0	282°18.9	297°18.7	312°18.5	327°18.3	342°18.1	357°17.9	12°17.7	27°17.5	42°17.3	57°17.2	72°17.0	-0.2
	-20°15.8	-20°15.3	-20°14.7	-20°14.2	-20°13.7	-20°13.1	-20°12.6	-20°12.1	-20°11.5	-20°11.0	-20°10.5	-20°09.9	+0.5
Sa 20	267°14.6	282°14.4	297°14.2	312°14.0	327°13.9	342°13.7	357°13.5	12°13.3	27°13.1	42°13.0	57°12.8	72°12.6	-0.2
	-20°02.9	-20°02.3	-20°01.8	-20°01.2	-20°00.7	-20°00.1	-19°59.6	-19°59.0	-19°58.5	-19°57.9	-19°57.4	-19°56.8	+0.6
Su 21	267°10.3	282°10.2	297°10.0	312°09.8	327°09.6	342°09.5	357°09.3	12°09.1	27°08.9	42°08.8	57°08.6	72°08.4	-0.2
	-19°49.6	-19°49.0	-19°48.5	-19°47.9	-19°47.3	-19°46.8	-19°46.2	-19°45.6	-19°45.1	-19°44.5	-19°43.9	-19°43.4	+0.6
Mo 22	267°06.3	282°06.1	297°05.9	312°05.8	327°05.6	342°05.4	357°05.3	12°05.1	27°04.9	42°04.8	57°04.6	72°04.5	-0.2
	-19°35.9	-19°35.3	-19°34.8	-19°34.2	-19°33.6	-19°33.0	-19°32.4	-19°31.9	-19°31.3	-19°30.7	-19°30.1	-19°29.5	+0.6
Tu 23	267°02.4	282°02.2	297°02.1	312°01.9	327°01.8	342°01.6	357°01.4	12°01.3	27°01.1	42°01.0	57°00.8	72°00.7	-0.2
	-19°21.9	-19°21.3	-19°20.7	-19°20.1	-19°19.5	-19°18.9	-19°18.3	-19°17.7	-19°17.1	-19°16.5	-19°15.9	-19°15.3	+0.6
We 24	266°58.7	281°58.6	296°58.4	311°58.3	326°58.1	341°58.0	356°57.8	11°57.7	26°57.5	41°57.4	56°57.2	71°57.1	-0.1
	-19°07.5	-19°06.9	-19°06.3	-19°05.7	-19°05.1	-19°04.5	-19°03.9	-19°03.2	-19°02.6	-19°02.0	-19°01.4	-19°00.8	+0.6
Th 25	266°55.2	281°55.1	296°55.0	311°54.8	326°54.7	341°54.5	356°54.4	11°54.3	26°54.1	41°54.0	56°53.9	71°53.7	-0.1
	-18°52.8	-18°52.2	-18°51.5	-18°50.9	-18°50.3	-18°49.7	-18°49.0	-18°48.4	-18°47.8	-18°47.2	-18°46.5	-18°45.9	+0.6
Fr 26	266°52.0	281°51.8	296°51.7	311°51.6	326°51.5	341°51.3	356°51.2	11°51.1	26°50.9	41°50.8	56°50.7	71°50.6	-0.1
	-18°37.7	-18°37.1	-18°36.4	-18°35.8	-18°35.2	-18°34.5	-18°33.9	-18°33.2	-18°32.6	-18°32.0	-18°31.3	-18°30.7	+0.6
Sa 27	266°48.9	281°48.8	296°48.7	311°48.6	326°48.4	341°48.3	356°48.2	11°48.1	26°47.9	41°47.8	56°47.7	71°47.6	-0.1
	-18°22.3	-18°21.6	-18°21.0	-18°20.3	-18°19.7	-18°19.0	-18°18.4	-18°17.7	-18°17.1	-18°16.4	-18°15.8	-18°15.1	+0.7
Su 28	266°46.1	281°45.9	296°45.8	311°45.7	326°45.6	341°45.5	356°45.4	11°45.3	26°45.2	41°45.0	56°44.9	71°44.8	-0.1
	-18°06.5	-18°05.9	-18°05.2	-18°04.6	-18°03.9	-18°03.2	-18°02.6	-18°01.9	-18°01.2	-18°00.6	-17°59.9	-17°59.2	+0.7
Mo 29	266°43.4	281°43.3	296°43.2	311°43.1	326°43.0	341°42.9	356°42.8	11°42.7	26°42.6	41°42.5	56°42.4	71°42.3	-0.1
	-17°50.5	-17°49.8	-17°49.1	-17°48.4	-17°47.8	-17°47.1	-17°46.4	-17°45.7	-17°45.0	-17°44.4	-17°43.7	-17°43.0	+0.7
Tu 30	266°41.0	281°40.9	296°40.8	311°40.7	326°40.6	341°40.5	356°40.4	11°40.3	26°40.2	41°40.1	56°40.0	71°39.9	-0.1
	-17°34.1	-17°33.4	-17°32.7	-17°32.0	-17°31.3	-17°30.6	-17°29.9	-17°29.2	-17°28.6	-17°27.9	-17°27.2	-17°26.5	+0.7
We 31	266°38.7	281°38.6	296°38.5	311°38.5	326°38.4	341°38.3	356°38.2	11°38.1	26°38.0	41°37.9	56°37.8	71°37.8	-0.1
	-17°17.4	-17°16.7	-17°16.0	-17°15.3	-17°14.6	-17°13.9	-17°13.2	-17°12.5	-17°11.8	-17°11.0	-17°10.3	-17°09.6	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2029

D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
Mo 1	240°28.3	254°54.9	269°21.5	283°48.2	298°15.0	312°41.8	327°08.7	341°35.6	356°02.5	10°29.6	24°56.6	+26.8	16.0
	20°17.0	20°07.7	19°58.3	19°48.8	19°39.1	19°29.4	19°19.5	19°09.5	18°59.3	18°49.1	18°38.7	-9.8	58.7
Tu 2	241°49.0	256°17.0	270°45.0	285°13.0	299°41.1	314°09.2	328°37.4	343°05.7	357°34.0	12°02.3	26°30.8	+28.2	16.1
	15°50.0	15°37.9	15°25.8	15°13.5	15°01.2	14°48.7	14°36.2	14°23.6	14°10.9	13°58.1	13°45.2	-12.5	59.0
We 3	243°42.9	258°12.0	272°41.3	287°10.5	301°39.8	316°09.2	330°38.6	345°08.0	359°37.4	14°06.9	28°36.5	+29.4	16.2
	10°23.2	10°09.2	9°55.1	9°41.0	9°26.8	9°12.6	8°58.3	8°44.0	8°29.6	8°15.2	8°00.7	-14.3	59.3
Th 4	246°03.4	260°33.4	275°03.4	289°33.4	304°03.5	318°33.6	333°03.7	347°33.8	2°03.9	16°34.1	31°04.2	+30.1	16.2
	4°19.0	4°04.0	3°49.0	3°33.9	3°18.9	3°03.8	2°48.7	2°33.5	2°18.4	2°03.3	1°48.1	-15.1	59.4
Fr 5	248°37.3	263°07.5	277°37.7	292°07.9	306°38.1	321°08.3	335°38.5	350°08.6	4°38.8	19°08.9	33°39.0	+30.2	16.2
	-1°59.4	-2°14.5	-2°29.6	-2°44.7	-2°59.8	-3°14.8	-3°29.9	-3°44.9	-3°59.9	-4°14.8	-4°29.8	-15.0	59.3
Sa 6	251°08.4	265°38.1	280°07.8	294°37.5	309°07.2	323°36.8	338°06.4	352°35.9	7°05.4	21°34.9	36°04.3	+29.6	16.1
	-8°09.8	-8°24.2	-8°38.5	-8°52.7	-9°06.9	-9°21.0	-9°35.1	-9°49.2	-10°03.1	-10°17.0	-10°30.9	-14.1	59.2
◑ Su 7	253°20.5	267°49.2	282°17.9	296°46.5	311°15.0	325°43.5	340°11.9	354°40.3	9°08.7	23°36.9	38°05.2	+28.5	16.1
	-13°50.6	-14°03.4	-14°16.0	-14°28.5	-14°41.0	-14°53.4	-15°05.7	-15°17.9	-15°30.0	-15°42.0	-15°53.9	-12.3	59.0
Mo 8	267°49.2	282°17.9	296°46.5	311°15.0	325°43.5	340°11.9	354°40.3	9°08.7	23°36.9	38°05.2	52°33.3	+28.4	16.1
	-14°03.4	-14°16.0	-14°28.5	-14°41.0	-14°53.4	-15°05.7	-15°17.9	-15°30.0	-15°42.0	-15°53.9	-16°05.8	-12.2	58.9
Tu 9	269°28.9	283°56.1	298°23.3	312°50.5	327°17.5	341°44.5	356°11.5	10°38.4	25°05.2	39°32.0	53°58.7	+27.0	16.0
	-18°51.2	-19°01.3	-19°11.4	-19°21.3	-19°31.1	-19°40.8	-19°50.3	-19°59.8	-20°09.1	-20°18.3	-20°27.4	-9.6	58.7
We 10	270°33.2	284°59.1	299°24.9	313°50.7	328°16.5	342°42.2	357°07.9	11°33.6	25°59.2	40°24.7	54°50.3	+25.7	15.9
	-22°28.0	-22°34.9	-22°41.7	-22°48.4	-22°54.9	-23°01.3	-23°07.6	-23°13.6	-23°19.6	-23°25.4	-23°31.1	-6.3	58.3
Th 11	271°09.7	285°34.9	300°00.0	314°25.1	328°50.2	343°15.2	357°40.3	12°05.4	26°30.5	40°55.5	55°20.6	+25.1	15.8
	-24°37.8	-24°41.0	-24°44.1	-24°47.0	-24°49.8	-24°52.4	-24°54.8	-24°57.1	-24°59.2	-25°01.2	-25°03.0	-2.5	57.9
Fr 12	271°37.9	286°03.2	300°28.6	314°53.9	329°19.4	343°44.8	358°10.3	12°35.8	27°01.3	41°26.9	55°52.6	+25.5	15.7
	-25°11.5	-25°10.8	-25°10.0	-25°09.0	-25°07.8	-25°06.5	-25°05.1	-25°03.5	-25°01.7	-24°59.9	-24°57.8	+1.4	57.4
Sa 13	272°23.2	286°49.8	301°16.3	315°43.0	330°09.7	344°36.5	359°03.3	13°30.3	27°57.3	42°24.3	56°51.5	+26.8	15.5
	-24°09.5	-24°05.2	-24°00.7	-23°56.1	-23°51.3	-23°46.4	-23°41.4	-23°36.2	-23°31.0	-23°25.5	-23°20.0	+5.0	56.9
● Su 14	273°48.0	288°16.5	302°45.0	317°13.6	331°42.2	346°11.0	0°39.9	15°08.8	29°37.8	44°06.9	58°36.1	+28.8	15.4
	-21°42.1	-21°34.7	-21°27.1	-21°19.4	-21°11.7	-21°03.8	-20°55.8	-20°47.7	-20°39.5	-20°31.2	-20°22.8	+7.9	56.4
Mo 15	276°04.5	290°35.1	305°05.7	319°36.5	334°07.3	348°38.2	3°09.2	17°40.3	32°11.5	46°42.7	61°14.1	+31.0	15.2
	-18°05.9	-17°56.1	-17°46.2	-17°36.2	-17°26.2	-17°16.1	-17°05.9	-16°55.6	-16°45.3	-16°34.9	-16°24.4	+10.2	55.8
Tu 16	279°13.4	293°46.0	308°18.6	322°51.3	337°24.1	351°57.0	6°29.9	21°02.9	35°35.9	50°09.0	64°42.2	+32.9	15.1
	-13°39.8	-13°28.4	-13°17.0	-13°05.4	-12°53.9	-12°42.3	-12°30.6	-12°18.9	-12°07.2	-11°55.4	-11°43.6	+11.6	55.3
We 17	283°07.2	297°41.3	312°15.5	326°49.7	341°24.0	355°58.3	10°32.7	25°07.1	39°41.5	54°16.0	68°50.6	+34.3	14.9
	-8°42.0	-8°29.6	-8°17.2	-8°04.9	-7°52.4	-7°40.0	-7°27.5	-7°15.0	-7°02.5	-6°50.0	-6°37.5	+12.5	54.8
Th 18	287°33.4	302°08.5	316°43.7	331°18.8	345°54.0	0°29.3	15°04.5	29°39.8	44°15.1	58°50.4	73°25.7	+35.2	14.8
	-3°27.7	-3°15.0	-3°02.3	-2°49.6	-2°36.8	-2°24.1	-2°11.4	-1°58.6	-1°45.9	-1°33.2	-1°20.4	+12.7	54.4
Fr 19	292°17.5	306°53.0	321°28.5	336°04.0	350°39.5	5°15.1	19°50.6	34°26.1	49°01.7	63°37.2	78°12.7	+35.5	14.8
	1°50.0	2°02.6	2°15.2	2°27.8	2°40.4	2°53.0	3°05.6	3°18.1	3°30.6	3°43.1	3°55.6	+12.6	54.2
Sa 20	297°04.2	311°39.5	326°14.8	340°50.1	355°25.3	10°00.6	24°35.8	39°10.9	53°46.1	68°21.2	82°56.3	+35.2	14.8
	7°00.4	7°12.6	7°24.7	7°36.7	7°48.8	8°00.8	8°12.7	8°24.7	8°36.6	8°48.5	9°00.3	+12.0	54.1
Su 21	301°38.6	316°13.1	330°47.6	345°22.0	359°56.4	14°30.7	29°05.0	43°39.2	58°13.4	72°47.6	87°21.6	+34.3	14.8
	11°53.6	12°04.8	12°16.0	12°27.1	12°38.2	12°49.2	13°00.2	13°11.1	13°22.0	13°32.9	13°43.7	+11.0	54.2
◐ Mo 22	305°46.3	320°19.4	334°52.5	349°25.5	3°58.5	18°31.4	33°04.2	47°37.0	62°09.7	76°42.3	91°14.9	+32.9	14.8
	16°19.1	16°29.0	16°38.8	16°48.5	16°58.2	17°07.9	17°17.4	17°26.9	17°36.4	17°45.7	17°55.0	+9.6	54.4
Tu 23	309°14.6	323°45.9	338°17.2	352°48.4	7°19.6	21°50.6	36°21.6	50°52.5	65°23.3	79°54.1	94°24.7	+31.0	15.0
	20°05.4	20°13.4	20°21.4	20°29.3	20°37.1	20°44.8	20°52.4	20°59.9	21°07.4	21°14.7	21°22.0	+7.7	54.9
We 24	311°54.8	326°24.2	340°53.5	355°22.7	9°51.8	24°20.8	38°49.8	53°18.7	67°47.5	82°16.2	96°44.8	+29.0	15.1
	22°59.0	23°04.6	23°10.1	23°15.5	23°20.8	23°26.0	23°31.1	23°36.1	23°40.9	23°45.7	23°50.3	+5.1	55.5
Th 25	313°45.4	328°12.9	342°40.3	357°07.6	11°34.9	26°02.1	40°29.2	54°56.3	69°23.3	83°50.3	98°17.2	+27.2	15.4
	24°44.9	24°47.5	24°50.0	24°52.3	24°54.5	24°56.6	24°58.6	25°00.4	25°02.0	25°03.6	25°05.0	+2.0	56.3
Fr 26	314°54.2	329°20.3	343°46.4	358°12.4	12°38.4	27°04.3	41°30.3	55°56.2	70°22.0	84°47.9	99°13.7	+25.9	15.6
	25°08.7	25°07.8	25°06.8	25°05.5	25°04.2	25°02.7	25°01.0	24°59.2	24°57.2	24°55.1	24°52.8	-1.6	57.2
Sa 27	315°38.6	330°04.2	344°29.8	358°55.4	13°21.0	27°46.5	42°12.1	56°37.7	71°03.3	85°28.9	99°54.6	+25.6	15.8
	24°00.3	23°55.6	23°50.7	23°45.7	23°40.5	23°35.2	23°29.7	23°24.1	23°18.3	23°12.4	23°06.3	-5.4	58.1
Su 28	316°20.8	330°46.7	345°12.7	359°38.7	14°04.7	28°30.7	42°56.8	57°22.9	71°49.1	86°15.3	100°41.5	+26.1	16.1
	21°17.3	21°08.8	21°00.3	20°51.6	20°42.7	20°33.8	20°24.7	20°15.4	20°06.0	19°56.5	19°46.9	-9.0	58.9
Mo 29	317°19.5	331°46.3	346°13.2	0°40.2	15°07.2	29°34.2	44°01.3	58°28.4	72°55.6	87°22.8	101°50.1	+27.1	16.2
	17°07.0	16°55.4	16°43.7	16°31.9	16°19.9	16°07.9	15°55.7	15°43.5	15°31.1	15°18.6	15°06.0	-12.1	59.6
○ Tu 30	318°44.1	333°12.1	347°40.1	2°08.1	16°36.1	31°04.2	45°32.4	60°00.6	74°28.8	88°57.0	103°25.3	+28.1	16.4
	11°46.4	11°32.4	11°18.4	11°04.2	10°50.0	10°35.8	10°21.4	10°07.0	9°52.6	9°38.0	9°23.4	-14.3	60.1
We 31	320°33.6	335°02.4	349°31.2	4°00.0	18°28.8	32°57.7	47°26.6	61°55.5	76°24.5	90°53.4	105°22.4	+28.9	16.4
	5°38.4	5°23.0	5°07.6	4°52.2	4°36.8	4°21.3	4°05.9	3°50.4	3°34.8	3°19.3	3°03.7	-15.5	60.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 7 13h26 — NM: 14 17h24 — FQ: 22 19h23 — FM: 30 06h03

SUN

February 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	266°36.7	281°36.6	296°36.5	311°36.4	326°36.4	341°36.3	356°36.2	11°36.1	26°36.0	41°36.0	56°35.9	71°35.8	-0.1
	-17°00.4	-16°59.7	-16°59.0	-16°58.2	-16°57.5	-16°56.8	-16°56.1	-16°55.4	-16°54.6	-16°53.9	-16°53.2	-16°52.5	+0.7
Fr 2	266°34.8	281°34.8	296°34.7	311°34.6	326°34.6	341°34.5	356°34.4	11°34.3	26°34.3	41°34.2	56°34.1	71°34.1	-0.1
	-16°43.1	-16°42.4	-16°41.6	-16°40.9	-16°40.2	-16°39.4	-16°38.7	-16°38.0	-16°37.2	-16°36.5	-16°35.8	-16°35.1	+0.7
Sa 3	266°33.2	281°33.1	296°33.1	311°33.0	326°33.0	341°32.9	356°32.8	11°32.8	26°32.7	41°32.6	56°32.6	71°32.5	-0.1
	-16°25.5	-16°24.7	-16°24.0	-16°23.3	-16°22.5	-16°21.8	-16°21.0	-16°20.3	-16°19.6	-16°18.8	-16°18.1	-16°17.3	+0.7
Su 4	266°31.8	281°31.7	296°31.7	311°31.6	326°31.5	341°31.5	356°31.4	11°31.4	26°31.3	41°31.3	56°31.2	71°31.2	-0.1
	-16°07.6	-16°06.8	-16°06.1	-16°05.3	-16°04.6	-16°03.8	-16°03.1	-16°02.3	-16°01.6	-16°00.8	-16°00.1	-15°59.3	+0.8
Mo 5	266°30.5	281°30.5	296°30.4	311°30.4	326°30.3	341°30.3	356°30.2	11°30.2	26°30.2	41°30.1	56°30.1	71°30.0	-0.0
	-15°49.4	-15°48.7	-15°47.9	-15°47.1	-15°46.4	-15°45.6	-15°44.8	-15°44.1	-15°43.3	-15°42.5	-15°41.8	-15°41.0	+0.8
Tu 6	266°29.5	281°29.4	296°29.4	311°29.4	326°29.3	341°29.3	356°29.2	11°29.2	26°29.2	41°29.1	56°29.1	71°29.1	-0.0
	-15°31.0	-15°30.2	-15°29.4	-15°28.7	-15°27.9	-15°27.1	-15°26.3	-15°25.6	-15°24.8	-15°24.0	-15°23.2	-15°22.5	+0.8
We 7	266°28.6	281°28.6	296°28.6	311°28.5	326°28.5	341°28.5	356°28.4	11°28.4	26°28.4	41°28.4	56°28.3	71°28.3	-0.0
	-15°12.3	-15°11.5	-15°10.7	-15°09.9	-15°09.1	-15°08.4	-15°07.6	-15°06.8	-15°06.0	-15°05.2	-15°04.4	-15°03.6	+0.8
Th 8	266°28.0	281°27.9	296°27.9	311°27.9	326°27.9	341°27.9	356°27.8	11°27.8	26°27.8	41°27.8	56°27.8	71°27.7	-0.0
	-14°53.3	-14°52.5	-14°51.7	-14°50.9	-14°50.1	-14°49.3	-14°48.5	-14°47.7	-14°46.9	-14°46.1	-14°45.3	-14°44.5	+0.8
Fr 9	266°27.5	281°27.5	296°27.5	311°27.5	326°27.4	341°27.4	356°27.4	11°27.4	26°27.4	41°27.4	56°27.4	71°27.4	-0.0
	-14°34.1	-14°33.3	-14°32.5	-14°31.7	-14°30.9	-14°30.1	-14°29.3	-14°28.4	-14°27.6	-14°26.8	-14°26.0	-14°25.2	+0.8
Sa 10	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.2	11°27.2	26°27.2	41°27.2	56°27.2	71°27.2	-0.0
	-14°14.6	-14°13.8	-14°13.0	-14°12.2	-14°11.4	-14°10.6	-14°09.7	-14°08.9	-14°08.1	-14°07.3	-14°06.5	-14°05.6	+0.8
Su 11	266°27.1	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.2	11°27.2	26°27.2	41°27.2	56°27.2	71°27.2	+0.0
	-13°54.9	-13°54.1	-13°53.3	-13°52.5	-13°51.6	-13°50.8	-13°50.0	-13°49.1	-13°48.3	-13°47.5	-13°46.7	-13°45.8	+0.8
Mo 12	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.3	26°27.3	41°27.3	56°27.4	71°27.4	+0.0
	-13°35.0	-13°34.2	-13°33.3	-13°32.5	-13°31.7	-13°30.8	-13°30.0	-13°29.2	-13°28.3	-13°27.5	-13°26.6	-13°25.8	+0.8
Tu 13	266°27.5	281°27.6	296°27.6	311°27.6	326°27.6	341°27.6	356°27.7	11°27.7	26°27.7	41°27.7	56°27.7	71°27.7	+0.0
	-13°14.9	-13°14.0	-13°13.2	-13°12.3	-13°11.5	-13°10.6	-13°09.8	-13°08.9	-13°08.1	-13°07.2	-13°06.4	-13°05.5	+0.8
We 14	266°28.0	281°28.1	296°28.1	311°28.1	326°28.1	341°28.2	356°28.2	11°28.2	26°28.2	41°28.3	56°28.3	71°28.3	+0.0
	-12°54.5	-12°53.6	-12°52.8	-12°51.9	-12°51.1	-12°50.2	-12°49.4	-12°48.5	-12°47.6	-12°46.8	-12°45.9	-12°45.1	+0.9
Th 15	266°28.7	281°28.7	296°28.8	311°28.8	326°28.8	341°28.9	356°28.9	11°28.9	26°29.0	41°29.0	56°29.0	71°29.1	+0.0
	-12°33.9	-12°33.0	-12°32.2	-12°31.3	-12°30.5	-12°29.6	-12°28.7	-12°27.9	-12°27.0	-12°26.1	-12°25.3	-12°24.4	+0.9
Fr 16	266°29.5	281°29.6	296°29.6	311°29.7	326°29.7	341°29.7	356°29.8	11°29.8	26°29.9	41°29.9	56°29.9	71°30.0	+0.0
	-12°13.1	-12°12.3	-12°11.4	-12°10.5	-12°09.6	-12°08.8	-12°07.9	-12°07.0	-12°06.2	-12°05.3	-12°04.4	-12°03.5	+0.9
Sa 17	266°30.6	281°30.6	296°30.6	311°30.7	326°30.7	341°30.8	356°30.8	11°30.9	26°30.9	41°31.0	56°31.0	71°31.1	+0.0
	-11°52.2	-11°51.3	-11°50.4	-11°49.5	-11°48.6	-11°47.8	-11°46.9	-11°46.0	-11°45.1	-11°44.2	-11°43.4	-11°42.5	+0.9
Su 18	266°31.8	281°31.8	296°31.9	311°31.9	326°32.0	341°32.0	356°32.1	11°32.1	26°32.2	41°32.2	56°32.3	71°32.4	+0.1
	-11°31.0	-11°30.1	-11°29.2	-11°28.3	-11°27.4	-11°26.6	-11°25.7	-11°24.8	-11°23.9	-11°23.0	-11°22.1	-11°21.2	+0.9
Mo 19	266°33.1	281°33.2	296°33.2	311°33.3	326°33.4	341°33.4	356°33.5	11°33.6	26°33.6	41°33.7	56°33.7	71°33.8	+0.1
	-11°09.6	-11°08.8	-11°07.9	-11°07.0	-11°06.1	-11°05.2	-11°04.3	-11°03.4	-11°02.5	-11°01.6	-11°00.7	-10°59.8	+0.9
Tu 20	266°34.7	281°34.7	296°34.8	311°34.9	326°34.9	341°35.0	356°35.1	11°35.1	26°35.2	41°35.3	56°35.4	71°35.4	+0.1
	-10°48.1	-10°47.2	-10°46.3	-10°45.4	-10°44.5	-10°43.6	-10°42.7	-10°41.8	-10°40.9	-10°40.0	-10°39.1	-10°38.2	+0.9
We 21	266°36.4	281°36.5	296°36.5	311°36.6	326°36.7	341°36.8	356°36.8	11°36.9	26°37.0	41°37.1	56°37.1	71°37.2	+0.1
	-10°26.5	-10°25.5	-10°24.6	-10°23.7	-10°22.8	-10°21.9	-10°21.0	-10°20.1	-10°19.2	-10°18.3	-10°17.4	-10°16.5	+0.9
Th 22	266°38.2	281°38.3	296°38.4	311°38.5	326°38.6	341°38.7	356°38.7	11°38.8	26°38.9	41°39.0	56°39.1	71°39.2	+0.1
	-10°04.6	-10°03.7	-10°02.8	-10°01.9	-10°01.0	-10°00.0	-9°59.1	-9°58.2	-9°57.3	-9°56.4	-9°55.5	-9°54.6	+0.9
Fr 23	266°40.3	281°40.4	296°40.5	311°40.5	326°40.6	341°40.7	356°40.8	11°40.9	26°41.0	41°41.1	56°41.2	71°41.3	+0.1
	-9°42.6	-9°41.7	-9°40.8	-9°39.9	-9°38.9	-9°38.0	-9°37.1	-9°36.2	-9°35.3	-9°34.3	-9°33.4	-9°32.5	+0.9
Sa 24	266°42.5	281°42.6	296°42.7	311°42.8	326°42.8	341°42.9	356°43.0	11°43.1	26°43.2	41°43.3	56°43.4	71°43.5	+0.1
	-9°20.5	-9°19.6	-9°18.6	-9°17.7	-9°16.8	-9°15.9	-9°14.9	-9°14.0	-9°13.1	-9°12.1	-9°11.2	-9°10.3	+0.9
Su 25	266°44.8	281°44.9	296°45.0	311°45.1	326°45.2	341°45.3	356°45.4	11°45.5	26°45.6	41°45.7	56°45.8	71°45.9	+0.1
	-8°58.2	-8°57.3	-8°56.3	-8°55.4	-8°54.5	-8°53.6	-8°52.6	-8°51.7	-8°50.8	-8°49.8	-8°48.9	-8°48.0	+0.9
Mo 26	266°47.3	281°47.4	296°47.5	311°47.6	326°47.7	341°47.8	356°47.9	11°48.0	26°48.1	41°48.3	56°48.4	71°48.5	+0.1
	-8°35.8	-8°34.9	-8°33.9	-8°33.0	-8°32.1	-8°31.1	-8°30.2	-8°29.2	-8°28.3	-8°27.4	-8°26.4	-8°25.5	+0.9
Tu 27	266°49.9	281°50.0	296°50.1	311°50.3	326°50.4	341°50.5	356°50.6	11°50.7	26°50.8	41°50.9	56°51.0	71°51.2	+0.1
	-8°13.3	-8°12.3	-8°11.4	-8°10.4	-8°09.5	-8°08.6	-8°07.6	-8°06.7	-8°05.7	-8°04.8	-8°03.8	-8°02.9	+0.9
We 28	266°52.7	281°52.8	296°52.9	311°53.0	326°53.2	341°53.3	356°53.4	11°53.5	26°53.6	41°53.7	56°53.9	71°54.0	+0.1
	-7°50.6	-7°49.7	-7°48.7	-7°47.8	-7°46.8	-7°45.9	-7°44.9	-7°44.0	-7°43.0	-7°42.1	-7°41.1	-7°40.2	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2029

D	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	Δ'/h	SH
Th 1	250°12.9	264°42.0	279°11.1	293°40.2	308°09.3	322°38.4	337°07.6	351°36.7	6°05.8	20°35.0	35°04.1	+29.1	16.4
	0°27.3	0°11.7	-0°04.0	-0°19.6	-0°35.3	-0°50.9	-1°06.6	-1°22.2	-1°37.8	-1°53.4	-2°09.0	-15.6	60.3
Fr 2	252°20.3	266°49.3	281°18.3	295°47.2	310°16.2	324°45.1	339°14.0	353°42.9	8°11.7	22°40.5	37°09.4	+28.9	16.4
	-5°59.9	-6°15.0	-6°30.1	-6°45.1	-7°00.1	-7°15.1	-7°30.0	-7°44.8	-7°59.6	-8°14.4	-8°29.0	-14.9	60.0
Sa 3	254°18.2	268°46.5	283°14.8	297°43.1	312°11.3	326°39.5	341°07.6	355°35.7	10°03.8	24°31.8	38°59.8	+28.2	16.3
	-12°01.7	-12°15.3	-12°28.8	-12°42.3	-12°55.7	-13°08.9	-13°22.1	-13°35.2	-13°48.3	-14°01.2	-14°14.0	-13.2	59.6
Su 4	255°54.8	270°22.1	284°49.3	299°16.6	313°43.8	328°10.9	342°38.0	357°05.0	11°32.0	25°59.0	40°25.9	+27.1	16.1
	-17°14.9	-17°26.1	-17°37.2	-17°48.2	-17°59.1	-18°09.8	-18°20.5	-18°31.0	-18°41.4	-18°51.7	-19°01.9	-10.7	59.1
◑ Mo 5	257°04.7	271°31.0	285°57.2	300°23.4	314°49.6	329°15.7	343°41.8	358°07.8	12°33.8	26°59.8	41°25.8	+26.1	16.0
	-21°19.3	-21°27.4	-21°35.4	-21°43.2	-21°50.9	-21°58.5	-22°05.9	-22°13.2	-22°20.3	-22°27.3	-22°34.2	-7.5	58.5
Tu 6	271°31.0	285°57.2	300°23.4	314°49.6	329°15.7	343°41.8	358°07.8	12°33.8	26°59.8	41°25.8	55°51.7	+26.1	15.9
	-21°27.4	-21°35.4	-21°43.2	-21°50.9	-21°58.5	-22°05.9	-22°13.2	-22°20.3	-22°27.3	-22°34.2	-22°40.9	-7.3	58.5
We 7	272°17.8	286°43.3	301°08.9	315°34.5	330°00.1	344°25.6	358°51.1	13°16.7	27°42.2	42°07.8	56°33.3	+25.5	15.8
	-24°04.0	-24°08.4	-24°12.6	-24°16.6	-24°20.5	-24°24.2	-24°27.8	-24°31.3	-24°34.6	-24°37.7	-24°40.7	-3.7	57.9
Th 8	272°57.1	287°22.8	301°48.5	316°14.3	330°40.0	345°05.8	359°31.7	13°57.5	28°23.4	42°49.4	57°15.3	+25.8	15.6
	-25°07.1	-25°07.6	-25°08.0	-25°08.3	-25°08.4	-25°08.3	-25°08.1	-25°07.7	-25°07.2	-25°06.6	-25°05.8	+0.1	57.3
Fr 9	273°49.7	288°16.4	302°43.1	317°09.9	331°36.8	346°03.7	0°30.7	14°57.7	29°24.8	43°51.9	58°19.1	+26.9	15.5
	-24°36.2	-24°33.1	-24°29.9	-24°26.5	-24°23.0	-24°19.3	-24°15.5	-24°11.6	-24°07.5	-24°03.3	-23°59.0	+3.7	56.7
Sa 10	275°15.5	289°43.8	304°12.2	318°40.7	333°09.3	347°37.9	2°06.6	16°35.4	31°04.2	45°33.2	60°02.2	+28.7	15.3
	-22°39.0	-22°32.7	-22°26.3	-22°19.8	-22°13.2	-22°06.4	-21°59.5	-21°52.6	-21°45.5	-21°38.3	-21°31.0	+6.8	56.2
Su 11	277°26.8	291°57.1	306°27.4	320°57.9	335°28.4	349°59.0	4°29.6	19°00.4	33°31.2	48°02.1	62°33.1	+30.6	15.2
	-19°29.4	-19°20.5	-19°11.6	-19°02.5	-18°53.4	-18°44.2	-18°34.9	-18°25.5	-18°16.1	-18°06.5	-17°56.9	+9.2	55.7
Mo 12	280°26.6	294°58.8	309°31.0	324°03.3	338°35.6	353°08.0	7°40.5	22°13.1	36°45.7	51°18.4	65°51.2	+32.5	15.1
	-15°23.9	-15°13.2	-15°02.4	-14°51.6	-14°40.6	-14°29.7	-14°18.6	-14°07.6	-13°56.4	-13°45.2	-13°34.0	+11.0	55.2
● Tu 13	284°09.9	298°43.6	313°17.3	327°51.1	342°25.0	356°58.9	11°32.9	26°06.9	40°40.9	55°15.0	69°49.2	+33.9	14.9
	-10°39.7	-10°27.8	-10°15.8	-10°03.8	-9°51.7	-9°39.6	-9°27.5	-9°15.4	-9°03.2	-8°51.0	-8°38.7	+12.1	54.8
We 14	288°26.6	303°01.3	317°36.2	332°11.0	346°45.9	1°20.8	15°55.8	30°30.8	45°05.8	59°40.8	74°15.9	+34.9	14.9
	-5°32.4	-5°19.8	-5°07.2	-4°54.6	-4°42.0	-4°29.4	-4°16.7	-4°04.1	-3°51.4	-3°38.8	-3°26.1	+12.6	54.5
Th 15	293°04.3	307°39.6	322°15.0	336°50.4	351°25.8	6°01.2	20°36.6	35°12.0	49°47.4	64°22.8	78°58.2	+35.4	14.8
	-0°15.7	-0°03.0	0°09.7	0°22.3	0°35.0	0°47.7	1°00.3	1°13.0	1°25.6	1°38.2	1°50.8	+12.7	54.2
Fr 16	297°49.6	312°25.0	327°00.4	341°35.8	356°11.1	10°46.4	25°21.8	39°57.1	54°32.4	69°07.7	83°42.9	+35.3	14.7
	4°58.1	5°10.5	5°22.8	5°35.1	5°47.4	5°59.6	6°11.8	6°24.0	6°36.2	6°48.3	7°00.4	+12.2	54.0
Sa 17	302°29.3	317°04.1	331°39.0	346°13.8	0°48.6	15°23.4	29°58.1	44°32.8	59°07.4	73°42.0	88°16.6	+34.7	14.7
	9°58.1	10°09.7	10°21.2	10°32.7	10°44.1	10°55.5	11°06.9	11°18.2	11°29.5	11°40.7	11°51.9	+11.4	54.0
Su 18	306°50.3	321°24.2	335°58.0	350°31.8	5°05.5	19°39.2	34°12.8	48°46.4	63°19.9	77°53.4	92°26.8	+33.7	14.7
	14°33.7	14°44.0	14°54.3	15°04.6	15°14.7	15°24.9	15°34.9	15°44.9	15°54.9	16°04.8	16°14.6	+10.1	54.1
Mo 19	310°41.1	325°13.5	339°45.9	354°18.3	8°50.5	23°22.7	37°54.9	52°26.9	66°59.0	81°30.9	96°02.8	+32.2	14.8
	18°33.8	18°42.5	18°51.1	18°59.6	19°08.1	19°16.5	19°24.8	19°33.1	19°41.2	19°49.3	19°57.3	+8.4	54.3
Tu 20	313°52.7	328°23.4	342°54.1	357°24.8	11°55.3	26°25.8	40°56.2	55°26.6	69°56.8	84°27.0	98°57.2	+30.4	14.9
	21°46.4	21°53.2	21°59.6	22°06.0	22°12.2	22°18.4	22°24.5	22°30.4	22°36.3	22°42.0	22°47.7	+6.1	54.8
◐ We 21	316°20.8	330°49.8	345°18.8	359°47.7	14°16.5	28°45.3	43°14.0	57°42.6	72°11.2	86°39.7	101°08.1	+28.7	15.1
	23°59.5	24°03.4	24°07.1	24°10.8	24°14.3	24°17.7	24°21.0	24°24.2	24°27.2	24°30.1	24°32.9	+3.3	55.4
Th 22	318°07.9	332°35.4	347°02.9	1°30.4	15°57.8	30°25.2	44°52.5	59°19.8	73°47.0	88°14.2	102°41.3	+27.3	15.3
	24°59.5	25°00.3	25°00.9	25°01.3	25°01.6	25°01.8	25°01.8	25°01.7	25°01.5	25°01.1	25°00.6	+0.1	56.2
Fr 23	319°24.2	333°50.8	348°17.4	2°44.0	17°10.6	31°37.1	46°03.6	60°30.2	74°56.6	89°23.1	103°49.6	+26.5	15.6
	24°35.9	24°33.1	24°30.2	24°27.1	24°23.9	24°20.5	24°17.0	24°13.3	24°09.5	24°05.5	24°01.4	-3.5	57.1
Sa 24	320°25.6	334°52.0	349°18.4	3°44.8	18°11.2	32°37.6	47°04.0	61°30.4	75°56.8	90°23.3	104°49.8	+26.4	15.8
	22°42.3	22°35.9	22°29.3	22°22.6	22°15.7	22°08.7	22°01.5	21°54.3	21°46.8	21°39.3	21°31.5	-7.1	58.1
Su 25	321°28.5	335°55.2	350°21.9	4°48.7	19°15.5	33°42.3	48°09.2	62°36.1	77°03.0	91°29.9	105°56.8	+26.8	16.1
	19°19.5	19°09.6	18°59.6	18°49.5	18°39.2	18°28.8	18°18.3	18°07.7	17°56.9	17°46.1	17°35.1	-10.4	59.1
Mo 26	322°44.2	337°11.6	351°39.0	6°06.4	20°33.8	35°01.3	49°28.8	63°56.3	78°23.9	92°51.4	107°19.0	+27.5	16.4
	14°36.4	14°23.7	14°10.8	13°57.8	13°44.7	13°31.6	13°18.3	13°04.9	12°51.5	12°38.0	12°24.3	-13.2	60.0
Tu 27	324°15.8	338°43.8	353°11.7	7°39.7	22°07.7	36°35.7	51°03.7	65°31.8	79°59.8	94°27.9	108°56.0	+28.0	16.5
	8°50.2	8°35.3	8°20.4	8°05.4	7°50.4	7°35.3	7°20.2	7°05.0	6°49.7	6°34.4	6°19.0	-15.1	60.6
○ We 28	325°58.3	340°26.5	354°54.6	9°22.8	23°51.0	38°19.2	52°47.4	67°15.5	81°43.7	96°11.9	110°40.0	+28.2	16.6
	2°24.1	2°08.2	1°52.3	1°36.4	1°20.4	1°04.5	0°48.5	0°32.6	0°16.6	0°00.6	-0°15.4	-16.0	61.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 21h52 — NM: 13 10h31 — FQ: 21 15h09 — FM: 28 17h10

SUN

March 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	266°55.6	281°55.7	296°55.8	311°55.9	326°56.1	341°56.2	356°56.3	11°56.4	26°56.6	41°56.7	56°56.8	71°56.9	+0.1
	-7°27.8	-7°26.9	-7°25.9	-7°25.0	-7°24.0	-7°23.1	-7°22.1	-7°21.2	-7°20.2	-7°19.3	-7°18.3	-7°17.4	+1.0
Fr 2	266°58.6	281°58.7	296°58.8	311°59.0	326°59.1	341°59.2	356°59.4	11°59.5	26°59.6	41°59.7	56°59.9	72°00.0	+0.1
	-7°05.0	-7°04.0	-7°03.1	-7°02.1	-7°01.1	-7°00.2	-6°59.2	-6°58.3	-6°57.3	-6°56.4	-6°55.4	-6°54.5	+1.0
Sa 3	267°01.7	282°01.9	297°02.0	312°02.1	327°02.3	342°02.4	357°02.5	12°02.7	27°02.8	42°02.9	57°03.1	72°03.2	+0.1
	-6°42.0	-6°41.0	-6°40.1	-6°39.1	-6°38.2	-6°37.2	-6°36.2	-6°35.3	-6°34.3	-6°33.4	-6°32.4	-6°31.4	+1.0
Su 4	267°05.0	282°05.1	297°05.2	312°05.4	327°05.5	342°05.7	357°05.8	12°05.9	27°06.1	42°06.2	57°06.4	72°06.5	+0.1
	-6°18.9	-6°18.0	-6°17.0	-6°16.0	-6°15.1	-6°14.1	-6°13.1	-6°12.2	-6°11.2	-6°10.2	-6°09.3	-6°08.3	+1.0
Mo 5	267°08.3	282°08.5	297°08.6	312°08.8	327°08.9	342°09.0	357°09.2	12°09.3	27°09.5	42°09.6	57°09.8	72°09.9	+0.1
	-5°55.8	-5°54.8	-5°53.8	-5°52.9	-5°51.9	-5°50.9	-5°50.0	-5°49.0	-5°48.0	-5°47.1	-5°46.1	-5°45.1	+1.0
Tu 6	267°11.8	282°11.9	297°12.1	312°12.2	327°12.4	342°12.5	357°12.7	12°12.8	27°13.0	42°13.1	57°13.3	72°13.4	+0.1
	-5°32.5	-5°31.5	-5°30.6	-5°29.6	-5°28.6	-5°27.7	-5°26.7	-5°25.7	-5°24.7	-5°23.8	-5°22.8	-5°21.8	+1.0
We 7	267°15.3	282°15.5	297°15.6	312°15.8	327°15.9	342°16.1	357°16.2	12°16.4	27°16.6	42°16.7	57°16.9	72°17.0	+0.2
	-5°09.2	-5°08.2	-5°07.2	-5°06.3	-5°05.3	-5°04.3	-5°03.3	-5°02.4	-5°01.4	-5°00.4	-4°59.4	-4°58.5	+1.0
Th 8	267°19.0	282°19.1	297°19.3	312°19.5	327°19.6	342°19.8	357°19.9	12°20.1	27°20.2	42°20.4	57°20.5	72°20.7	+0.2
	-4°45.8	-4°44.8	-4°43.8	-4°42.9	-4°41.9	-4°40.9	-4°39.9	-4°39.0	-4°38.0	-4°37.0	-4°36.0	-4°35.1	+1.0
Fr 9	267°22.7	282°22.9	297°23.0	312°23.2	327°23.4	342°23.5	357°23.7	12°23.8	27°24.0	42°24.2	57°24.3	72°24.5	+0.2
	-4°22.3	-4°21.4	-4°20.4	-4°19.4	-4°18.4	-4°17.4	-4°16.5	-4°15.5	-4°14.5	-4°13.5	-4°12.5	-4°11.6	+1.0
Sa 10	267°26.5	282°26.7	297°26.9	312°27.0	327°27.2	342°27.4	357°27.5	12°27.7	27°27.8	42°28.0	57°28.2	72°28.3	+0.2
	-3°58.8	-3°57.8	-3°56.9	-3°55.9	-3°54.9	-3°53.9	-3°52.9	-3°52.0	-3°51.0	-3°50.0	-3°49.0	-3°48.0	+1.0
Su 11	267°30.4	282°30.6	297°30.8	312°30.9	327°31.1	342°31.3	357°31.4	12°31.6	27°31.8	42°31.9	57°32.1	72°32.3	+0.2
	-3°35.3	-3°34.3	-3°33.3	-3°32.3	-3°31.3	-3°30.3	-3°29.4	-3°28.4	-3°27.4	-3°26.4	-3°25.4	-3°24.4	+1.0
Mo 12	267°34.4	282°34.6	297°34.7	312°34.9	327°35.1	342°35.3	357°35.4	12°35.6	27°35.8	42°35.9	57°36.1	72°36.3	+0.2
	-3°11.6	-3°10.7	-3°09.7	-3°08.7	-3°07.7	-3°06.7	-3°05.7	-3°04.8	-3°03.8	-3°02.8	-3°01.8	-3°00.8	+1.0
Tu 13	267°38.5	282°38.6	297°38.8	312°39.0	327°39.1	342°39.3	357°39.5	12°39.6	27°39.8	42°40.0	57°40.2	72°40.3	+0.2
	-2°48.0	-2°47.0	-2°46.0	-2°45.0	-2°44.1	-2°43.1	-2°42.1	-2°41.1	-2°40.1	-2°39.1	-2°38.1	-2°37.2	+1.0
We 14	267°42.6	282°42.7	297°42.9	312°43.1	327°43.3	342°43.4	357°43.6	12°43.8	27°43.9	42°44.1	57°44.3	72°44.5	+0.2
	-2°24.3	-2°23.3	-2°22.4	-2°21.4	-2°20.4	-2°19.4	-2°18.4	-2°17.4	-2°16.4	-2°15.4	-2°14.5	-2°13.5	+1.0
Th 15	267°46.7	282°46.9	297°47.1	312°47.3	327°47.4	342°47.6	357°47.8	12°48.0	27°48.1	42°48.3	57°48.5	72°48.7	+0.2
	-2°00.6	-1°59.6	-1°58.7	-1°57.7	-1°56.7	-1°55.7	-1°54.7	-1°53.7	-1°52.7	-1°51.7	-1°50.7	-1°49.8	+1.0
Fr 16	267°51.0	282°51.1	297°51.3	312°51.5	327°51.7	342°51.8	357°52.0	12°52.2	27°52.4	42°52.6	57°52.7	72°52.9	+0.2
	-1°36.9	-1°35.9	-1°34.9	-1°33.9	-1°33.0	-1°32.0	-1°31.0	-1°30.0	-1°29.0	-1°28.0	-1°27.0	-1°26.0	+1.0
Sa 17	267°55.2	282°55.4	297°55.6	312°55.8	327°55.9	342°56.1	357°56.3	12°56.5	27°56.7	42°56.8	57°57.0	72°57.2	+0.2
	-1°13.2	-1°12.2	-1°11.2	-1°10.2	-1°09.2	-1°08.2	-1°07.3	-1°06.3	-1°05.3	-1°04.3	-1°03.3	-1°02.3	+1.0
Su 18	267°59.6	282°59.7	297°59.9	313°00.1	328°00.3	343°00.5	358°00.6	13°00.8	28°01.0	43°01.2	58°01.4	73°01.5	+0.2
	-0°49.5	-0°48.5	-0°47.5	-0°46.5	-0°45.5	-0°44.5	-0°43.5	-0°42.5	-0°41.5	-0°40.6	-0°39.6	-0°38.6	+1.0
Mo 19	268°03.9	283°04.1	298°04.3	313°04.5	328°04.7	343°04.8	358°05.0	13°05.2	28°05.4	43°05.6	58°05.7	73°05.9	+0.2
	-0°25.7	-0°24.7	-0°23.7	-0°22.8	-0°21.8	-0°20.8	-0°19.8	-0°18.8	-0°17.8	-0°16.8	-0°15.8	-0°14.8	+1.0
Tu 20	268°08.3	283°08.5	298°08.7	313°08.9	328°09.1	343°09.2	358°09.4	13°09.6	28°09.8	43°10.0	58°10.2	73°10.4	+0.2
	-0°02.0	-0°01.0	-0°00.0	0°01.0	0°02.0	0°02.9	0°03.9	0°04.9	0°05.9	0°06.9	0°07.9	0°08.9	+1.0
We 21	268°12.8	283°12.9	298°13.1	313°13.3	328°13.5	343°13.7	358°13.9	13°14.1	28°14.3	43°14.4	58°14.6	73°14.8	+0.2
	0°21.7	0°22.7	0°23.7	0°24.7	0°25.7	0°26.6	0°27.6	0°28.6	0°29.6	0°30.6	0°31.6	0°32.6	+1.0
Th 22	268°17.2	283°17.4	298°17.6	313°17.8	328°18.0	343°18.2	358°18.4	13°18.5	28°18.7	43°18.9	58°19.1	73°19.3	+0.2
	0°45.4	0°46.4	0°47.4	0°48.4	0°49.3	0°50.3	0°51.3	0°52.3	0°53.3	0°54.3	0°55.3	0°56.2	+1.0
Fr 23	268°21.7	283°21.9	298°22.1	313°22.3	328°22.5	343°22.7	358°22.9	13°23.0	28°23.2	43°23.4	58°23.6	73°23.8	+0.2
	1°09.1	1°10.0	1°11.0	1°12.0	1°13.0	1°14.0	1°15.0	1°16.0	1°16.9	1°17.9	1°18.9	1°19.9	+1.0
Sa 24	268°26.2	283°26.4	298°26.6	313°26.8	328°27.0	343°27.2	358°27.4	13°27.6	28°27.8	43°27.9	58°28.1	73°28.3	+0.2
	1°32.7	1°33.7	1°34.7	1°35.6	1°36.6	1°37.6	1°38.6	1°39.6	1°40.6	1°41.5	1°42.5	1°43.5	+1.0
Su 25	268°30.8	283°31.0	298°31.2	313°31.3	328°31.5	343°31.7	358°31.9	13°32.1	28°32.3	43°32.5	58°32.7	73°32.9	+0.2
	1°56.3	1°57.3	1°58.2	1°59.2	2°00.2	2°01.2	2°02.2	2°03.1	2°04.1	2°05.1	2°06.1	2°07.1	+1.0
Mo 26	268°35.3	283°35.5	298°35.7	313°35.9	328°36.1	343°36.3	358°36.5	13°36.6	28°36.8	43°37.0	58°37.2	73°37.4	+0.2
	2°19.8	2°20.8	2°21.8	2°22.8	2°23.7	2°24.7	2°25.7	2°26.7	2°27.7	2°28.6	2°29.6	2°30.6	+1.0
Tu 27	268°39.9	283°40.0	298°40.2	313°40.4	328°40.6	343°40.8	358°41.0	13°41.2	28°41.4	43°41.6	58°41.8	73°41.9	+0.2
	2°43.3	2°44.3	2°45.3	2°46.2	2°47.2	2°48.2	2°49.2	2°50.2	2°51.1	2°52.1	2°53.1	2°54.1	+1.0
We 28	268°44.4	283°44.6	298°44.8	313°45.0	328°45.2	343°45.4	358°45.5	13°45.7	28°45.9	43°46.1	58°46.3	73°46.5	+0.2
	3°06.8	3°07.7	3°08.7	3°09.7	3°10.7	3°11.6	3°12.6	3°13.6	3°14.6	3°15.5	3°16.5	3°17.5	+1.0
Th 29	268°48.9	283°49.1	298°49.3	313°49.5	328°49.7	343°49.9	358°50.1	13°50.3	28°50.5	43°50.6	58°50.8	73°51.0	+0.2
	3°30.1	3°31.1	3°32.1	3°33.0	3°34.0	3°35.0	3°36.0	3°36.9	3°37.9	3°38.9	3°39.9	3°40.8	+1.0
Fr 30	268°53.5	283°53.7	298°53.8	313°54.0	328°54.2	343°54.4	358°54.6	13°54.8	28°55.0	43°55.2	58°55.3	73°55.5	+0.2
	3°53.4	3°54.4	3°55.4	3°56.4	3°57.3	3°58.3	3°59.3	4°00.2	4°01.2	4°02.2	4°03.1	4°04.1	+1.0
Sa 31	268°58.0	283°58.2	298°58.3	313°58.5	328°58.7	343°58.9	358°59.1	13°59.3	28°59.5	43°59.7	58°59.8	74°00.0	+0.2
	4°16.7	4°17.6	4°18.6	4°19.6	4°20.5	4°21.5	4°22.5	4°23.4	4°24.4	4°25.4	4°26.3	4°27.3	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2029

D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
Th 1	240°53.0	255°21.1	269°49.1	284°17.1	298°45.1	313°13.1	327°41.1	342°09.0	356°36.9	11°04.8	25°32.7	+28.0	16.7
	-2°39.0	-2°54.9	-3°10.8	-3°26.7	-3°42.5	-3°58.3	-4°14.1	-4°29.9	-4°45.6	-5°01.3	-5°17.0	-15.8	61.1
Fr 2	242°27.8	256°55.2	271°22.6	285°50.0	300°17.3	314°44.6	329°11.9	343°39.1	358°06.3	12°33.5	27°00.6	+27.3	16.6
	-9°06.8	-9°21.7	-9°36.5	-9°51.2	-10°05.9	-10°20.5	-10°35.1	-10°49.5	-11°03.9	-11°18.2	-11°32.5	-14.6	60.9
Sa 3	243°42.6	258°09.1	272°35.6	287°02.0	301°28.3	315°54.6	330°20.9	344°47.1	359°13.3	13°39.4	28°05.5	+26.3	16.5
	-14°55.4	-15°08.2	-15°20.8	-15°33.4	-15°45.8	-15°58.1	-16°10.3	-16°22.4	-16°34.4	-16°46.2	-16°58.0	-12.3	60.4
Su 4	244°32.3	258°57.8	273°23.2	287°48.7	302°14.0	316°39.4	331°04.7	345°30.0	359°55.3	14°20.5	28°45.7	+25.3	16.3
	-19°39.2	-19°48.9	-19°58.4	-20°07.9	-20°17.1	-20°26.3	-20°35.3	-20°44.1	-20°52.9	-21°01.4	-21°09.8	-9.1	59.7
Mo 5	245°00.8	259°25.7	273°50.6	288°15.4	302°40.3	317°05.1	331°30.0	345°54.8	0°19.6	14°44.4	29°09.3	+24.8	16.0
	-22°58.3	-23°04.3	-23°10.2	-23°15.9	-23°21.4	-23°26.8	-23°32.0	-23°37.1	-23°42.0	-23°46.8	-23°51.4	-5.3	58.8
Tu 6	245°22.6	259°47.6	274°12.6	288°37.7	303°02.8	317°27.9	331°53.1	346°18.3	0°43.5	15°08.7	29°34.0	+25.1	15.8
	-24°41.4	-24°43.4	-24°45.4	-24°47.1	-24°48.7	-24°50.1	-24°51.4	-24°52.6	-24°53.5	-24°54.4	-24°55.0	-1.4	58.0
◑ We 7	245°58.5	260°24.6	274°50.7	289°16.8	303°43.0	318°09.3	332°35.6	347°02.0	1°28.5	15°55.0	30°21.6	+26.3	15.6
	-24°46.8	-24°45.1	-24°43.2	-24°41.1	-24°39.0	-24°36.7	-24°34.2	-24°31.6	-24°28.9	-24°26.0	-24°23.0	+2.4	57.2
Th 8	260°24.6	274°50.7	289°16.8	303°43.0	318°09.3	332°35.6	347°02.0	1°28.5	15°55.0	30°21.6	44°48.3	+26.4	15.6
	-24°45.1	-24°43.2	-24°41.1	-24°39.0	-24°36.7	-24°34.2	-24°31.6	-24°28.9	-24°26.0	-24°23.0	-24°19.9	+2.5	57.1
Fr 9	261°36.7	276°04.5	290°32.4	305°00.4	319°28.5	333°56.6	348°24.9	2°53.2	17°21.6	31°50.0	46°18.6	+28.2	15.4
	-23°16.9	-23°11.7	-23°06.3	-23°00.9	-22°55.3	-22°49.6	-22°43.8	-22°37.9	-22°31.8	-22°25.7	-22°19.4	+5.7	56.4
Sa 10	263°36.6	278°06.5	292°36.5	307°06.5	321°36.6	336°06.8	350°37.1	5°07.4	19°37.8	34°08.4	48°39.0	+30.2	15.2
	-20°32.7	-20°24.8	-20°16.8	-20°08.7	-20°00.5	-19°52.2	-19°43.8	-19°35.4	-19°26.8	-19°18.2	-19°09.4	+8.3	55.7
Su 11	266°27.3	280°59.1	295°31.0	310°03.0	324°35.0	339°07.1	353°39.3	8°11.6	22°43.9	37°16.3	51°48.7	+32.2	15.1
	-16°49.0	-16°39.0	-16°29.0	-16°18.9	-16°08.8	-15°58.5	-15°48.3	-15°37.9	-15°27.5	-15°17.0	-15°06.5	+10.3	55.2
Mo 12	270°03.4	284°36.9	299°10.4	313°44.0	328°17.6	342°51.3	357°25.0	11°58.8	26°32.6	41°06.5	55°40.5	+33.7	14.9
	-12°22.0	-12°10.6	-11°59.2	-11°47.8	-11°36.3	-11°24.8	-11°13.2	-11°01.6	-10°49.9	-10°38.2	-10°26.5	+11.6	54.8
Tu 13	274°15.1	288°49.7	303°24.4	317°59.1	332°33.8	347°08.6	1°43.4	16°18.3	30°53.1	45°28.0	60°03.0	+34.8	14.8
	-7°26.8	-7°14.6	-7°02.3	-6°50.1	-6°37.8	-6°25.5	-6°13.2	-6°00.9	-5°48.6	-5°36.2	-5°23.8	+12.3	54.4
We 14	278°50.0	293°25.3	308°00.6	322°35.9	337°11.2	351°46.6	6°21.9	20°57.3	35°32.7	50°08.1	64°43.5	+35.4	14.8
	-2°16.7	-2°04.2	-1°51.6	-1°39.1	-1°26.6	-1°14.0	-1°01.5	-0°48.9	-0°36.4	-0°23.8	-0°11.3	+12.5	54.1
● Th 15	283°35.1	298°10.5	312°45.9	327°21.4	341°56.8	356°32.2	11°07.6	25°43.0	40°18.4	54°53.7	69°29.1	+35.4	14.7
	2°56.0	3°08.4	3°20.8	3°33.1	3°45.5	3°57.8	4°10.2	4°22.5	4°34.7	4°47.0	4°59.2	+12.3	54.0
Fr 16	288°17.7	302°52.7	317°27.8	332°02.8	346°37.8	1°12.8	15°47.8	30°22.7	44°57.6	59°32.4	74°07.3	+35.0	14.7
	7°59.9	8°11.7	8°23.5	8°35.3	8°47.0	8°58.7	9°10.3	9°21.9	9°33.5	9°45.1	9°56.6	+11.7	53.9
Sa 17	292°45.8	307°20.0	321°54.3	336°28.4	351°02.6	5°36.7	20°10.7	34°44.7	49°18.7	63°52.6	78°26.5	+34.1	14.7
	12°43.9	12°54.7	13°05.5	13°16.1	13°26.8	13°37.4	13°47.9	13°58.4	14°08.8	14°19.1	14°29.4	+10.6	53.9
Su 18	296°48.8	311°21.9	325°54.9	340°27.9	355°00.8	9°33.7	24°06.5	38°39.2	53°11.9	67°44.5	82°17.1	+32.8	14.7
	16°56.7	17°06.0	17°15.2	17°24.4	17°33.4	17°42.5	17°51.4	18°00.3	18°09.1	18°17.8	18°26.4	+9.0	54.0
Mo 19	300°18.8	314°50.4	329°22.0	343°53.5	358°25.0	12°56.3	27°27.7	41°58.9	56°30.2	71°01.3	85°32.4	+31.4	14.8
	20°26.4	20°33.8	20°41.0	20°48.2	20°55.2	21°02.2	21°09.1	21°15.8	21°22.5	21°29.1	21°35.6	+6.9	54.3
Tu 20	303°11.5	317°41.6	332°11.7	346°41.7	1°11.7	15°41.6	30°11.4	44°41.2	59°11.0	73°40.7	88°10.3	+29.9	14.9
	23°01.2	23°06.1	23°10.9	23°15.6	23°20.1	23°24.6	23°28.9	23°33.1	23°37.3	23°41.3	23°45.2	+4.4	54.7
We 21	305°28.4	319°57.2	334°26.0	348°54.7	3°23.4	17°52.0	32°20.6	46°49.2	61°17.7	75°46.1	90°14.6	+28.6	15.1
	24°29.5	24°31.6	24°33.4	24°35.2	24°36.8	24°38.3	24°39.7	24°41.0	24°42.1	24°43.1	24°44.0	+1.4	55.3
Th 22	307°16.9	321°44.8	336°12.7	350°40.5	5°08.3	19°36.2	34°04.0	48°31.7	62°59.5	77°27.2	91°54.9	+27.8	15.3
	24°41.5	24°40.3	24°39.0	24°37.5	24°35.9	24°34.1	24°32.3	24°30.3	24°28.1	24°25.8	24°23.4	-1.8	56.0
◐ Fr 23	308°49.1	323°16.6	337°44.2	352°11.7	6°39.2	21°06.8	35°34.3	50°01.8	64°29.4	78°56.9	93°24.4	+27.5	15.5
	23°30.8	23°26.2	23°21.5	23°16.7	23°11.7	23°06.5	23°01.3	22°55.9	22°50.3	22°44.7	22°38.9	-5.2	56.8
Sa 24	310°18.2	324°45.9	339°13.5	353°41.2	8°08.9	22°36.6	37°04.3	51°32.1	65°59.8	80°27.6	94°55.4	+27.7	15.8
	20°55.9	20°48.0	20°40.0	20°31.8	20°23.5	20°15.1	20°06.6	19°57.9	19°49.1	19°40.2	19°31.2	-8.5	57.8
Su 25	311°54.0	326°22.0	340°50.1	355°18.2	9°46.3	24°14.4	38°42.5	53°10.6	67°38.8	82°07.0	96°35.2	+28.1	16.0
	17°01.2	16°50.3	16°39.2	16°28.1	16°16.8	16°05.5	15°54.0	15°42.4	15°30.7	15°18.9	15°07.1	-11.4	58.8
Mo 26	313°39.7	328°08.1	342°36.5	357°04.9	11°33.4	26°01.8	40°30.2	54°58.7	69°27.2	83°55.6	98°24.1	+28.4	16.3
	11°56.9	11°43.5	11°30.0	11°16.5	11°02.8	10°49.1	10°35.3	10°21.4	10°07.4	9°53.3	9°39.2	-13.8	59.8
Tu 27	315°31.4	329°59.9	344°28.3	358°56.8	13°25.2	27°53.7	42°22.1	56°50.5	71°18.9	85°47.3	100°15.7	+28.4	16.5
	5°59.4	5°44.3	5°29.1	5°13.9	4°58.7	4°43.4	4°28.0	4°12.6	3°57.2	3°41.8	3°26.2	-15.3	60.6
We 28	317°19.4	331°47.5	346°15.5	0°43.5	15°11.5	29°39.5	44°07.4	58°35.3	73°03.1	87°31.0	101°58.8	+27.9	16.7
	-0°29.4	-0°45.2	-1°01.1	-1°16.9	-1°32.8	-1°48.6	-2°04.5	-2°20.3	-2°36.1	-2°52.0	-3°07.8	-15.8	61.2
Th 29	318°51.1	333°18.3	347°45.4	2°12.5	16°39.5	31°06.4	45°33.4	60°00.2	74°27.0	88°53.8	103°20.5	+26.9	16.7
	-7°02.5	-7°17.9	-7°33.2	-7°48.5	-8°03.8	-8°19.0	-8°34.1	-8°49.2	-9°04.3	-9°19.3	-9°34.2	-15.2	61.4
○ Fr 30	319°54.9	334°20.7	348°46.5	3°12.3	17°38.0	32°03.6	46°29.2	60°54.7	75°20.1	89°45.5	104°10.9	+25.6	16.7
	-13°09.5	-13°23.2	-13°36.8	-13°50.3	-14°03.7	-14°17.0	-14°30.2	-14°43.3	-14°56.3	-15°09.2	-15°22.0	-13.3	61.3
Sa 31	320°24.6	334°49.1	349°13.5	3°37.9	18°02.3	32°26.6	46°50.9	61°15.1	75°39.3	90°03.4	104°27.5	+24.3	16.6
	-18°19.7	-18°30.5	-18°41.2	-18°51.7	-19°02.2	-19°12.4	-19°22.6	-19°32.6	-19°42.4	-19°52.1	-20°01.7	-10.2	60.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 7 07h51 — NM: 15 04h19 — FQ: 23 07h33 — FM: 30 02h26

SUN

April 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°02.5	284°02.6	299°02.8	314°03.0	329°03.2	344°03.4	359°03.6	14°03.8	29°03.9	44°04.1	59°04.3	74°04.5	+0.2
	4°39.8	4°40.8	4°41.8	4°42.7	4°43.7	4°44.7	4°45.6	4°46.6	4°47.5	4°48.5	4°49.5	4°50.4	+1.0
Mo 2	269°06.9	284°07.1	299°07.3	314°07.5	329°07.6	344°07.8	359°08.0	14°08.2	29°08.4	44°08.6	59°08.7	74°08.9	+0.2
	5°02.9	5°03.9	5°04.8	5°05.8	5°06.8	5°07.7	5°08.7	5°09.6	5°10.6	5°11.6	5°12.5	5°13.5	+1.0
Tu 3	269°11.3	284°11.5	299°11.7	314°11.9	329°12.0	344°12.2	359°12.4	14°12.6	29°12.8	44°13.0	59°13.1	74°13.3	+0.2
	5°25.9	5°26.9	5°27.8	5°28.8	5°29.7	5°30.7	5°31.7	5°32.6	5°33.6	5°34.5	5°35.5	5°36.4	+1.0
We 4	269°15.7	284°15.9	299°16.0	314°16.2	329°16.4	344°16.6	359°16.8	14°17.0	29°17.1	44°17.3	59°17.5	74°17.7	+0.2
	5°48.8	5°49.8	5°50.7	5°51.7	5°52.6	5°53.6	5°54.5	5°55.5	5°56.4	5°57.4	5°58.3	5°59.3	+1.0
Th 5	269°20.0	284°20.2	299°20.4	314°20.5	329°20.7	344°20.9	359°21.1	14°21.3	29°21.4	44°21.6	59°21.8	74°22.0	+0.2
	6°11.6	6°12.6	6°13.5	6°14.5	6°15.4	6°16.4	6°17.3	6°18.3	6°19.2	6°20.1	6°21.1	6°22.0	+0.9
Fr 6	269°24.3	284°24.5	299°24.6	314°24.8	329°25.0	344°25.2	359°25.3	14°25.5	29°25.7	44°25.9	59°26.0	74°26.2	+0.2
	6°34.3	6°35.3	6°36.2	6°37.2	6°38.1	6°39.0	6°40.0	6°40.9	6°41.9	6°42.8	6°43.7	6°44.7	+0.9
Sa 7	269°28.5	284°28.7	299°28.8	314°29.0	329°29.2	344°29.4	359°29.5	14°29.7	29°29.9	44°30.1	59°30.2	74°30.4	+0.2
	6°56.9	6°57.8	6°58.8	6°59.7	7°00.7	7°01.6	7°02.5	7°03.5	7°04.4	7°05.3	7°06.3	7°07.2	+0.9
Su 8	269°32.7	284°32.8	299°33.0	314°33.2	329°33.3	344°33.5	359°33.7	14°33.9	29°34.0	44°34.2	59°34.4	74°34.5	+0.2
	7°19.4	7°20.3	7°21.2	7°22.2	7°23.1	7°24.0	7°25.0	7°25.9	7°26.8	7°27.8	7°28.7	7°29.6	+0.9
Mo 9	269°36.7	284°36.9	299°37.1	314°37.2	329°37.4	344°37.6	359°37.8	14°37.9	29°38.1	44°38.3	59°38.4	74°38.6	+0.2
	7°41.7	7°42.6	7°43.6	7°44.5	7°45.4	7°46.4	7°47.3	7°48.2	7°49.1	7°50.1	7°51.0	7°51.9	+0.9
Tu 10	269°40.8	284°40.9	299°41.1	314°41.3	329°41.4	344°41.6	359°41.8	14°41.9	29°42.1	44°42.3	59°42.4	74°42.6	+0.2
	8°03.9	8°04.9	8°05.8	8°06.7	8°07.6	8°08.5	8°09.5	8°10.4	8°11.3	8°12.2	8°13.2	8°14.1	+0.9
We 11	269°44.7	284°44.9	299°45.0	314°45.2	329°45.4	344°45.5	359°45.7	14°45.9	29°46.0	44°46.2	59°46.3	74°46.5	+0.2
	8°26.0	8°26.9	8°27.9	8°28.8	8°29.7	8°30.6	8°31.5	8°32.4	8°33.3	8°34.3	8°35.2	8°36.1	+0.9
Th 12	269°48.6	284°48.7	299°48.9	314°49.1	329°49.2	344°49.4	359°49.5	14°49.7	29°49.9	44°50.0	59°50.2	74°50.3	+0.2
	8°48.0	8°48.9	8°49.8	8°50.7	8°51.6	8°52.5	8°53.4	8°54.3	8°55.2	8°56.1	8°57.1	8°58.0	+0.9
Fr 13	269°52.4	284°52.5	299°52.7	314°52.9	329°53.0	344°53.2	359°53.3	14°53.5	29°53.6	44°53.8	59°53.9	74°54.1	+0.2
	9°09.8	9°10.7	9°11.6	9°12.5	9°13.4	9°14.3	9°15.2	9°16.1	9°17.0	9°17.9	9°18.8	9°19.7	+0.9
Sa 14	269°56.1	284°56.2	299°56.4	314°56.6	329°56.7	344°56.9	359°57.0	14°57.2	29°57.3	44°57.5	59°57.6	74°57.8	+0.2
	9°31.4	9°32.3	9°33.2	9°34.1	9°35.0	9°35.9	9°36.8	9°37.7	9°38.6	9°39.5	9°40.4	9°41.3	+0.9
Su 15	269°59.7	284°59.9	300°00.0	315°00.2	330°00.3	345°00.5	0°00.6	15°00.8	30°00.9	45°01.1	60°01.2	75°01.4	+0.1
	9°52.9	9°53.8	9°54.7	9°55.5	9°56.4	9°57.3	9°58.2	9°59.1	10°00.0	10°00.9	10°01.8	10°02.7	+0.9
Mo 16	270°03.3	285°03.4	300°03.6	315°03.7	330°03.8	345°04.0	0°04.1	15°04.3	30°04.4	45°04.6	60°04.7	75°04.9	+0.1
	10°14.2	10°15.1	10°16.0	10°16.8	10°17.7	10°18.6	10°19.5	10°20.4	10°21.3	10°22.1	10°23.0	10°23.9	+0.9
Tu 17	270°06.7	285°06.9	300°07.0	315°07.1	330°07.3	345°07.4	0°07.6	15°07.7	30°07.8	45°08.0	60°08.1	75°08.3	+0.1
	10°35.3	10°36.2	10°37.1	10°38.0	10°38.8	10°39.7	10°40.6	10°41.5	10°42.4	10°43.2	10°44.1	10°45.0	+0.9
We 18	270°10.1	285°10.2	300°10.3	315°10.5	330°10.6	345°10.7	0°10.9	15°11.0	30°11.2	45°11.3	60°11.4	75°11.6	+0.1
	10°56.3	10°57.2	10°58.1	10°58.9	10°59.8	11°00.7	11°01.5	11°02.4	11°03.3	11°04.1	11°05.0	11°05.9	+0.9
Th 19	270°13.3	285°13.5	300°13.6	315°13.7	330°13.9	345°14.0	0°14.1	15°14.2	30°14.4	45°14.5	60°14.6	75°14.8	+0.1
	11°17.1	11°18.0	11°18.8	11°19.7	11°20.6	11°21.4	11°22.3	11°23.1	11°24.0	11°24.9	11°25.7	11°26.6	+0.9
Fr 20	270°16.5	285°16.6	300°16.7	315°16.9	330°17.0	345°17.1	0°17.2	15°17.4	30°17.5	45°17.6	60°17.8	75°17.9	+0.1
	11°37.7	11°38.6	11°39.4	11°40.3	11°41.1	11°42.0	11°42.8	11°43.7	11°44.5	11°45.4	11°46.2	11°47.1	+0.9
Sa 21	270°19.5	285°19.7	300°19.8	315°19.9	330°20.0	345°20.1	0°20.3	15°20.4	30°20.5	45°20.6	60°20.8	75°20.9	+0.1
	11°58.1	11°59.0	11°59.8	12°00.7	12°01.5	12°02.3	12°03.2	12°04.0	12°04.9	12°05.7	12°06.6	12°07.4	+0.8
Su 22	270°22.5	285°22.6	300°22.7	315°22.8	330°23.0	345°23.1	0°23.2	15°23.3	30°23.4	45°23.6	60°23.7	75°23.8	+0.1
	12°18.3	12°19.2	12°20.0	12°20.8	12°21.7	12°22.5	12°23.3	12°24.2	12°25.0	12°25.9	12°26.7	12°27.5	+0.8
Mo 23	270°25.3	285°25.4	300°25.5	315°25.7	330°25.8	345°25.9	0°26.0	15°26.1	30°26.2	45°26.4	60°26.5	75°26.6	+0.1
	12°38.3	12°39.2	12°40.0	12°40.8	12°41.7	12°42.5	12°43.3	12°44.1	12°45.0	12°45.8	12°46.6	12°47.4	+0.8
Tu 24	270°28.0	285°28.2	300°28.3	315°28.4	330°28.5	345°28.6	0°28.7	15°28.8	30°28.9	45°29.0	60°29.1	75°29.3	+0.1
	12°58.1	12°59.0	12°59.8	13°00.6	13°01.4	13°02.2	13°03.0	13°03.9	13°04.7	13°05.5	13°06.3	13°07.1	+0.8
We 25	270°30.7	285°30.8	300°30.9	315°31.0	330°31.1	345°31.2	0°31.3	15°31.4	30°31.5	45°31.6	60°31.7	75°31.8	+0.1
	13°17.7	13°18.5	13°19.3	13°20.1	13°21.0	13°21.8	13°22.6	13°23.4	13°24.2	13°25.0	13°25.8	13°26.6	+0.8
Th 26	270°33.2	285°33.3	300°33.4	315°33.5	330°33.6	345°33.7	0°33.8	15°33.9	30°34.0	45°34.1	60°34.2	75°34.3	+0.1
	13°37.1	13°37.9	13°38.7	13°39.5	13°40.3	13°41.1	13°41.9	13°42.7	13°43.5	13°44.3	13°45.1	13°45.9	+0.8
Fr 27	270°35.5	285°35.6	300°35.7	315°35.8	330°35.9	345°36.0	0°36.1	15°36.2	30°36.3	45°36.4	60°36.5	75°36.6	+0.1
	13°56.2	13°57.0	13°57.8	13°58.6	13°59.4	14°00.2	14°01.0	14°01.8	14°02.5	14°03.3	14°04.1	14°04.9	+0.8
Sa 28	270°37.8	285°37.9	300°38.0	315°38.1	330°38.1	345°38.2	0°38.3	15°38.4	30°38.5	45°38.6	60°38.7	75°38.8	+0.1
	14°15.1	14°15.9	14°16.7	14°17.5	14°18.3	14°19.0	14°19.8	14°20.6	14°21.4	14°22.2	14°22.9	14°23.7	+0.8
Su 29	270°39.9	285°40.0	300°40.1	315°40.2	330°40.2	345°40.3	0°40.4	15°40.5	30°40.6	45°40.7	60°40.7	75°40.8	+0.1
	14°33.8	14°34.6	14°35.3	14°36.1	14°36.9	14°37.7	14°38.4	14°39.2	14°40.0	14°40.7	14°41.5	14°42.3	+0.8
Mo 30	270°41.9	285°42.0	300°42.1	315°42.1	330°42.2	345°42.3	0°42.4	15°42.4	30°42.5	45°42.6	60°42.7	75°42.8	+0.1
	14°52.2	14°53.0	14°53.8	14°54.5	14°55.3	14°56.0	14°56.8	14°57.6	14°58.3	14°59.1	14°59.8	15°00.6	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2029

D	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	Δ'/h	SH
Su 1	234°02.7	248°26.5	262°50.2	277°13.9	291°37.5	306°01.2	320°24.8	334°48.4	349°12.0	3°35.5	17°59.1	+23.6	16.4
	-21°20.9	-21°29.0	-21°36.8	-21°44.6	-21°52.1	-21°59.5	-22°06.8	-22°13.8	-22°20.8	-22°27.5	-22°34.1	-7.3	60.2
Mo 2	233°51.5	248°15.0	262°38.5	277°02.1	291°25.7	305°49.2	320°12.9	334°36.5	349°00.1	3°23.8	17°47.5	+23.6	16.2
	-23°52.9	-23°56.8	-24°00.6	-24°04.1	-24°07.5	-24°10.8	-24°13.8	-24°16.7	-24°19.5	-24°22.0	-24°24.4	-3.1	59.4
Tu 3	233°47.7	248°12.1	262°36.5	277°01.0	291°25.6	305°50.2	320°14.9	334°39.7	349°04.5	3°29.4	17°54.3	+24.7	15.9
	-24°40.4	-24°40.2	-24°39.8	-24°39.2	-24°38.5	-24°37.6	-24°36.6	-24°35.4	-24°34.1	-24°32.6	-24°30.9	+0.9	58.4
We 4	234°17.8	248°44.0	263°10.3	277°36.7	292°03.2	306°29.7	320°56.4	335°23.1	349°50.0	4°16.9	18°43.9	+26.6	15.7
	-23°48.6	-23°44.6	-23°40.5	-23°36.3	-23°32.0	-23°27.5	-23°22.9	-23°18.1	-23°13.2	-23°08.2	-23°03.1	+4.6	57.4
◑ Th 5	235°40.5	250°09.0	264°37.6	279°06.4	293°35.2	308°04.1	322°33.1	337°02.2	351°31.4	6°00.7	20°30.1	+29.0	15.4
	-21°31.9	-21°24.9	-21°17.9	-21°10.7	-21°03.4	-20°56.0	-20°48.5	-20°40.9	-20°33.3	-20°25.5	-20°17.6	+7.4	56.5
Fr 6	238°02.0	252°32.9	267°03.8	281°34.9	296°06.0	310°37.2	325°08.5	339°39.8	354°11.3	8°42.8	23°14.4	+31.2	15.2
	-18°08.8	-17°59.6	-17°50.3	-17°40.9	-17°31.4	-17°21.9	-17°12.3	-17°02.6	-16°52.9	-16°43.1	-16°33.2	+9.6	55.7
Sa 7	252°32.9	267°03.8	281°34.9	296°06.0	310°37.2	325°08.5	339°39.8	354°11.3	8°42.8	23°14.4	37°46.1	+31.3	15.2
	-17°59.6	-17°50.3	-17°40.9	-17°31.4	-17°21.9	-17°12.3	-17°02.6	-16°52.9	-16°43.1	-16°33.2	-16°23.2	+9.6	55.7
Su 8	255°50.9	270°23.8	284°56.8	299°29.8	314°02.9	328°36.1	343°09.3	357°42.6	12°16.0	26°49.4	41°22.9	+33.2	15.0
	-13°46.8	-13°35.9	-13°25.0	-13°14.1	-13°03.1	-12°52.0	-12°40.9	-12°29.7	-12°18.6	-12°07.3	-11°56.0	+11.1	55.0
Mo 9	259°52.0	274°26.3	289°00.7	303°35.1	318°09.6	332°44.1	347°18.7	1°53.3	16°28.0	31°02.7	45°37.4	+34.5	14.9
	-9°02.4	-8°50.6	-8°38.7	-8°26.9	-8°14.9	-8°03.0	-7°51.0	-7°39.0	-7°27.0	-7°15.0	-7°02.9	+12.0	54.6
Tu 10	264°22.2	278°57.4	293°32.7	308°07.9	322°43.2	337°18.5	351°53.8	6°29.1	21°04.5	35°39.9	50°15.2	+35.3	14.8
	-4°00.0	-3°47.6	-3°35.3	-3°23.0	-3°10.7	-2°58.3	-2°46.0	-2°33.6	-2°21.3	-2°08.9	-1°56.5	+12.3	54.2
We 11	269°07.2	283°42.8	298°18.3	312°53.8	327°29.3	342°04.8	356°40.3	11°15.8	25°51.3	40°26.8	55°02.3	+35.5	14.7
	1°09.0	1°21.3	1°33.6	1°45.9	1°58.3	2°10.6	2°22.9	2°35.1	2°47.4	2°59.7	3°11.9	+12.3	54.0
Th 12	273°53.2	288°28.5	303°03.7	317°38.9	332°14.1	346°49.3	1°24.5	15°59.6	30°34.7	45°09.8	59°44.9	+35.2	14.7
	6°13.5	6°25.4	6°37.3	6°49.2	7°01.1	7°12.9	7°24.7	7°36.5	7°48.2	8°00.0	8°11.6	+11.8	53.9
● Fr 13	278°27.2	293°01.8	307°36.3	322°10.8	336°45.2	351°19.6	5°54.0	20°28.3	35°02.5	49°36.8	64°11.0	+34.4	14.7
	11°02.8	11°13.9	11°25.0	11°36.0	11°46.9	11°57.9	12°08.7	12°19.6	12°30.4	12°41.1	12°51.8	+10.9	53.9
Sa 14	282°38.3	297°11.7	311°45.1	326°18.4	340°51.7	355°24.9	9°58.1	24°31.2	39°04.3	53°37.3	68°10.3	+33.2	14.7
	15°25.6	15°35.4	15°45.2	15°54.8	16°04.4	16°14.0	16°23.5	16°32.9	16°42.2	16°51.5	17°00.7	+9.5	54.0
Su 15	286°17.9	300°50.0	315°22.0	329°53.9	344°25.8	358°57.6	13°29.4	28°01.1	42°32.7	57°04.3	71°35.8	+31.8	14.8
	19°10.0	19°18.0	19°25.9	19°33.7	19°41.5	19°49.2	19°56.7	20°04.2	20°11.6	20°18.9	20°26.2	+7.6	54.2
Mo 16	289°21.9	303°52.5	318°23.0	332°53.5	347°24.0	1°54.4	16°24.7	30°55.0	45°25.2	59°55.4	74°25.5	+30.4	14.8
	22°03.5	22°09.2	22°14.8	22°20.3	22°25.7	22°31.0	22°36.2	22°41.3	22°46.3	22°51.1	22°55.9	+5.2	54.4
Tu 17	291°51.5	306°20.8	320°50.1	335°19.4	349°48.6	4°17.8	18°47.0	33°16.1	47°45.2	62°14.2	76°43.2	+29.2	14.9
	23°54.2	23°57.2	24°00.0	24°02.8	24°05.4	24°07.9	24°10.3	24°12.6	24°14.7	24°16.7	24°18.6	+2.4	54.8
We 18	293°54.3	308°22.8	322°51.3	337°19.8	351°48.2	6°16.7	20°45.1	35°13.5	49°41.9	64°10.3	78°38.6	+28.4	15.1
	24°32.3	24°32.2	24°32.0	24°31.7	24°31.2	24°30.6	24°29.9	24°29.0	24°28.1	24°26.9	24°25.7	-0.7	55.3
Th 19	295°42.7	310°10.9	324°39.2	339°07.4	353°35.6	8°03.9	22°32.1	37°00.4	51°28.6	65°56.9	80°25.1	+28.2	15.3
	23°51.6	23°48.3	23°44.9	23°41.3	23°37.6	23°33.8	23°29.8	23°25.8	23°21.6	23°17.2	23°12.8	-3.9	55.9
Fr 20	297°30.2	311°58.6	326°27.1	340°55.6	355°24.1	9°52.6	24°21.1	38°49.6	53°18.2	67°46.8	82°15.4	+28.5	15.5
	21°50.6	21°44.2	21°37.6	21°30.9	21°24.0	21°17.1	21°10.0	21°02.8	20°55.5	20°48.0	20°40.4	-7.0	56.7
◐ Sa 21	299°26.9	313°55.8	328°24.7	342°53.7	357°22.7	11°51.7	26°20.8	40°49.8	55°18.9	69°48.0	84°17.2	+29.0	15.7
	18°33.1	18°23.7	18°14.2	18°04.6	17°54.9	17°45.1	17°35.2	17°25.1	17°15.0	17°04.7	16°54.4	-9.9	57.5
Su 22	301°36.3	316°05.8	330°35.2	345°04.6	359°34.1	14°03.6	28°33.1	43°02.6	57°32.1	72°01.6	86°31.1	+29.5	15.9
	14°07.3	13°55.4	13°43.5	13°31.4	13°19.2	13°07.0	12°54.7	12°42.2	12°29.7	12°17.2	12°04.5	-12.3	58.4
Mo 23	303°55.0	318°24.6	332°54.2	347°23.8	1°53.4	16°23.0	30°52.6	45°22.2	59°51.8	74°21.4	88°51.0	+29.6	16.2
	8°45.5	8°31.7	8°17.8	8°03.9	7°49.9	7°35.8	7°21.7	7°07.5	6°53.2	6°39.0	6°24.6	-14.1	59.3
Tu 24	306°12.9	320°42.3	335°11.5	349°40.8	4°10.0	18°39.3	33°08.4	47°37.6	62°06.7	76°35.8	91°04.9	+29.2	16.4
	2°43.9	2°28.9	2°13.8	1°58.7	1°43.6	1°28.5	1°13.3	0°58.1	0°42.9	0°27.7	0°12.5	-15.1	60.1
We 25	308°16.3	322°44.7	337°13.1	351°41.4	6°09.7	20°37.9	35°06.1	49°34.2	64°02.2	78°30.2	92°58.2	+28.2	16.6
	-3°37.2	-3°52.5	-4°07.8	-4°23.0	-4°38.3	-4°53.6	-5°08.8	-5°24.0	-5°39.2	-5°54.4	-6°09.5	-15.2	60.7
Th 26	309°50.1	324°17.0	338°43.9	353°10.7	7°37.5	22°04.1	36°30.7	50°57.3	65°23.7	79°50.1	94°16.4	+26.6	16.7
	-9°52.4	-10°06.9	-10°21.3	-10°35.7	-10°50.0	-11°04.2	-11°18.4	-11°32.5	-11°46.5	-12°00.5	-12°14.4	-14.2	61.1
Fr 27	310°42.3	325°07.4	339°32.5	353°57.5	8°22.4	22°47.2	37°12.0	51°36.7	66°01.3	80°25.9	94°50.4	+24.8	16.7
	-15°32.5	-15°45.0	-15°57.3	-16°09.5	-16°21.7	-16°33.6	-16°45.5	-16°57.3	-17°09.0	-17°20.5	-17°31.9	-11.9	61.2
○ Sa 28	310°49.6	325°13.1	339°36.5	353°59.9	8°23.2	22°46.4	37°09.6	51°32.8	65°55.9	80°18.9	94°41.9	+23.2	16.6
	-20°07.2	-20°16.4	-20°25.5	-20°34.4	-20°43.2	-20°51.8	-21°00.2	-21°08.6	-21°16.7	-21°24.7	-21°32.5	-8.5	60.9
Su 29	310°23.1	324°45.6	339°08.2	353°30.7	7°53.3	22°15.8	36°38.3	51°00.8	65°23.4	79°45.9	94°08.4	+22.5	16.4
	-23°10.2	-23°15.3	-23°20.3	-23°25.1	-23°29.8	-23°34.2	-23°38.5	-23°42.6	-23°46.5	-23°50.3	-23°53.9	-4.4	60.3
Mo 30	309°48.6	324°11.6	338°34.5	352°57.6	7°20.6	21°43.7	36°06.9	50°30.1	64°53.4	79°16.7	93°40.1	+23.1	16.2
	-24°26.5	-24°27.2	-24°27.9	-24°28.3	-24°28.6	-24°28.6	-24°28.6	-24°28.3	-24°27.9	-24°27.3	-24°26.6	-0.0	59.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 19h51 — NM: 13 21h40 — FQ: 21 19h50 — FM: 28 10h36

SUN

May 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	270° 43.7	285° 43.8	300° 43.9	315° 44.0	330° 44.0	345° 44.1	0° 44.2	15° 44.3	30° 44.3	45° 44.4	60° 44.5	75° 44.6	+0.1
	15° 10.4	15° 11.2	15° 11.9	15° 12.7	15° 13.4	15° 14.2	15° 14.9	15° 15.7	15° 16.4	15° 17.2	15° 17.9	15° 18.7	+0.8
We 2	270° 45.5	285° 45.5	300° 45.6	315° 45.7	330° 45.7	345° 45.8	0° 45.9	15° 45.9	30° 46.0	45° 46.1	60° 46.1	75° 46.2	+0.1
	15° 28.4	15° 29.1	15° 29.9	15° 30.6	15° 31.3	15° 32.1	15° 32.8	15° 33.6	15° 34.3	15° 35.0	15° 35.8	15° 36.5	+0.7
Th 3	270° 47.0	285° 47.1	300° 47.2	315° 47.2	330° 47.3	345° 47.4	0° 47.4	15° 47.5	30° 47.5	45° 47.6	60° 47.7	75° 47.7	+0.1
	15° 46.1	15° 46.8	15° 47.5	15° 48.3	15° 49.0	15° 49.7	15° 50.4	15° 51.2	15° 51.9	15° 52.6	15° 53.4	15° 54.1	+0.7
Fr 4	270° 48.5	285° 48.5	300° 48.6	315° 48.7	330° 48.7	345° 48.8	0° 48.8	15° 48.9	30° 48.9	45° 49.0	60° 49.0	75° 49.1	+0.1
	16° 03.5	16° 04.2	16° 04.9	16° 05.6	16° 06.4	16° 07.1	16° 07.8	16° 08.5	16° 09.2	16° 10.0	16° 10.7	16° 11.4	+0.7
Sa 5	270° 49.8	285° 49.8	300° 49.9	315° 49.9	330° 50.0	345° 50.0	0° 50.1	15° 50.1	30° 50.2	45° 50.2	60° 50.3	75° 50.3	+0.0
	16° 20.6	16° 21.4	16° 22.1	16° 22.8	16° 23.5	16° 24.2	16° 24.9	16° 25.6	16° 26.3	16° 27.0	16° 27.7	16° 28.4	+0.7
Su 6	270° 50.9	285° 51.0	300° 51.0	315° 51.1	330° 51.1	345° 51.1	0° 51.2	15° 51.2	30° 51.3	45° 51.3	60° 51.4	75° 51.4	+0.0
	16° 37.5	16° 38.2	16° 38.9	16° 39.6	16° 40.3	16° 41.0	16° 41.7	16° 42.4	16° 43.1	16° 43.8	16° 44.5	16° 45.2	+0.7
Mo 7	270° 51.9	285° 52.0	300° 52.0	315° 52.0	330° 52.1	345° 52.1	0° 52.2	15° 52.2	30° 52.2	45° 52.3	60° 52.3	75° 52.3	+0.0
	16° 54.2	16° 54.8	16° 55.5	16° 56.2	16° 56.9	16° 57.6	16° 58.3	16° 58.9	16° 59.6	17° 00.3	17° 01.0	17° 01.7	+0.7
Tu 8	270° 52.8	285° 52.8	300° 52.8	315° 52.9	330° 52.9	345° 52.9	0° 53.0	15° 53.0	30° 53.0	45° 53.1	60° 53.1	75° 53.1	+0.0
	17° 10.5	17° 11.2	17° 11.8	17° 12.5	17° 13.2	17° 13.9	17° 14.5	17° 15.2	17° 15.9	17° 16.5	17° 17.2	17° 17.9	+0.7
We 9	270° 53.5	285° 53.5	300° 53.5	315° 53.6	330° 53.6	345° 53.6	0° 53.6	15° 53.7	30° 53.7	45° 53.7	60° 53.7	75° 53.8	+0.0
	17° 26.5	17° 27.2	17° 27.9	17° 28.5	17° 29.2	17° 29.8	17° 30.5	17° 31.2	17° 31.8	17° 32.5	17° 33.1	17° 33.8	+0.7
Th 10	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.2	15° 54.2	30° 54.2	45° 54.2	60° 54.2	75° 54.3	+0.0
	17° 42.3	17° 42.9	17° 43.6	17° 44.2	17° 44.9	17° 45.5	17° 46.2	17° 46.8	17° 47.5	17° 48.1	17° 48.8	17° 49.4	+0.6
Fr 11	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	+0.0
	17° 57.7	17° 58.4	17° 59.0	17° 59.7	18° 00.3	18° 00.9	18° 01.6	18° 02.2	18° 02.8	18° 03.5	18° 04.1	18° 04.7	+0.6
Sa 12	270° 54.7	285° 54.7	300° 54.8	315° 54.8	330° 54.8	345° 54.8	0° 54.8	15° 54.8	30° 54.8	45° 54.8	60° 54.8	75° 54.8	+0.0
	18° 12.9	18° 13.5	18° 14.2	18° 14.8	18° 15.4	18° 16.0	18° 16.6	18° 17.3	18° 17.9	18° 18.5	18° 19.1	18° 19.7	+0.6
Su 13	270° 54.9	285° 54.9	300° 54.9	315° 54.9	330° 54.9	345° 54.9	0° 54.9	15° 54.9	30° 54.9	45° 54.9	60° 54.9	75° 54.9	+0.0
	18° 27.8	18° 28.4	18° 29.0	18° 29.6	18° 30.2	18° 30.8	18° 31.4	18° 32.0	18° 32.6	18° 33.2	18° 33.8	18° 34.5	+0.6
Mo 14	270° 54.9	285° 54.8	300° 54.8	315° 54.8	330° 54.8	345° 54.8	0° 54.8	15° 54.8	30° 54.8	45° 54.8	60° 54.8	75° 54.8	-0.0
	18° 42.3	18° 42.9	18° 43.5	18° 44.1	18° 44.7	18° 45.3	18° 45.9	18° 46.5	18° 47.1	18° 47.7	18° 48.3	18° 48.8	+0.6
Tu 15	270° 54.7	285° 54.7	300° 54.7	315° 54.7	330° 54.7	345° 54.6	0° 54.6	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	-0.0
	18° 56.5	18° 57.1	18° 57.7	18° 58.3	18° 58.8	18° 59.4	19° 00.0	19° 00.6	19° 01.2	19° 01.8	19° 02.3	19° 02.9	+0.6
We 16	270° 54.4	285° 54.4	300° 54.4	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.2	60° 54.2	75° 54.2	-0.0
	19° 10.4	19° 11.0	19° 11.6	19° 12.1	19° 12.7	19° 13.3	19° 13.8	19° 14.4	19° 15.0	19° 15.5	19° 16.1	19° 16.7	+0.6
Th 17	270° 54.0	285° 53.9	300° 53.9	315° 53.9	330° 53.9	345° 53.9	0° 53.8	15° 53.8	30° 53.8	45° 53.8	60° 53.7	75° 53.7	-0.0
	19° 24.0	19° 24.5	19° 25.1	19° 25.7	19° 26.2	19° 26.8	19° 27.3	19° 27.9	19° 28.4	19° 29.0	19° 29.5	19° 30.1	+0.6
Fr 18	270° 53.4	285° 53.4	300° 53.3	315° 53.3	330° 53.3	345° 53.3	0° 53.2	15° 53.2	30° 53.2	45° 53.1	60° 53.1	75° 53.1	-0.0
	19° 37.2	19° 37.8	19° 38.3	19° 38.9	19° 39.4	19° 39.9	19° 40.5	19° 41.0	19° 41.6	19° 42.1	19° 42.7	19° 43.2	+0.5
Sa 19	270° 52.7	285° 52.7	300° 52.6	315° 52.6	330° 52.6	345° 52.5	0° 52.5	15° 52.5	30° 52.4	45° 52.4	60° 52.4	75° 52.3	-0.0
	19° 50.1	19° 50.7	19° 51.2	19° 51.7	19° 52.3	19° 52.8	19° 53.3	19° 53.8	19° 54.4	19° 54.9	19° 55.4	19° 55.9	+0.5
Su 20	270° 51.8	285° 51.8	300° 51.8	315° 51.7	330° 51.7	345° 51.7	0° 51.6	15° 51.6	30° 51.5	45° 51.5	60° 51.5	75° 51.4	-0.0
	20° 02.7	20° 03.2	20° 03.7	20° 04.3	20° 04.8	20° 05.3	20° 05.8	20° 06.3	20° 06.8	20° 07.3	20° 07.8	20° 08.4	+0.5
Mo 21	270° 50.9	285° 50.8	300° 50.8	315° 50.8	330° 50.7	345° 50.7	0° 50.6	15° 50.6	30° 50.5	45° 50.5	60° 50.4	75° 50.4	-0.0
	20° 14.9	20° 15.4	20° 15.9	20° 16.4	20° 16.9	20° 17.4	20° 17.9	20° 18.4	20° 18.9	20° 19.4	20° 19.9	20° 20.4	+0.5
Tu 22	270° 49.8	285° 49.7	300° 49.7	315° 49.6	330° 49.6	345° 49.5	0° 49.5	15° 49.4	30° 49.4	45° 49.3	60° 49.3	75° 49.2	-0.0
	20° 26.8	20° 27.3	20° 27.8	20° 28.3	20° 28.8	20° 29.2	20° 29.7	20° 30.2	20° 30.7	20° 31.2	20° 31.7	20° 32.1	+0.5
We 23	270° 48.6	285° 48.5	300° 48.5	315° 48.4	330° 48.4	345° 48.3	0° 48.2	15° 48.2	30° 48.1	45° 48.1	60° 48.0	75° 48.0	-0.1
	20° 38.3	20° 38.8	20° 39.3	20° 39.8	20° 40.2	20° 40.7	20° 41.2	20° 41.6	20° 42.1	20° 42.6	20° 43.0	20° 43.5	+0.5
Th 24	270° 47.2	285° 47.2	300° 47.1	315° 47.1	330° 47.0	345° 46.9	0° 46.9	15° 46.8	30° 46.8	45° 46.7	60° 46.6	75° 46.6	-0.1
	20° 49.5	20° 50.0	20° 50.4	20° 50.9	20° 51.3	20° 51.8	20° 52.3	20° 52.7	20° 53.2	20° 53.6	20° 54.1	20° 54.5	+0.5
Fr 25	270° 45.8	285° 45.7	300° 45.6	315° 45.6	330° 45.5	345° 45.5	0° 45.4	15° 45.3	30° 45.3	45° 45.2	60° 45.1	75° 45.1	-0.1
	21° 00.3	21° 00.8	21° 01.2	21° 01.7	21° 02.1	21° 02.5	21° 03.0	21° 03.4	21° 03.9	21° 04.3	21° 04.7	21° 05.2	+0.4
Sa 26	270° 44.2	285° 44.1	300° 44.1	315° 44.0	330° 43.9	345° 43.8	0° 43.8	15° 43.7	30° 43.6	45° 43.6	60° 43.5	75° 43.4	-0.1
	21° 10.8	21° 11.2	21° 11.6	21° 12.1	21° 12.5	21° 12.9	21° 13.3	21° 13.8	21° 14.2	21° 14.6	21° 15.0	21° 15.5	+0.4
Su 27	270° 42.5	285° 42.4	300° 42.3	315° 42.3	330° 42.2	345° 42.1	0° 42.1	15° 42.0	30° 41.9	45° 41.8	60° 41.8	75° 41.7	-0.1
	21° 20.9	21° 21.3	21° 21.7	21° 22.1	21° 22.5	21° 22.9	21° 23.3	21° 23.7	21° 24.2	21° 24.6	21° 25.0	21° 25.4	+0.4
Mo 28	270° 40.7	285° 40.6	300° 40.5	315° 40.4	330° 40.4	345° 40.3	0° 40.2	15° 40.1	30° 40.1	45° 40.0	60° 39.9	75° 39.8	-0.1
	21° 30.6	21° 31.0	21° 31.4	21° 31.8	21° 32.2	21° 32.6	21° 33.0	21° 33.4	21° 33.7	21° 34.1	21° 34.5	21° 34.9	+0.4
Tu 29	270° 38.8	285° 38.7	300° 38.6	315° 38.5	330° 38.4	345° 38.3	0° 38.3	15° 38.2	30° 38.1	45° 38.0	60° 37.9	75° 37.8	-0.1
	21° 39.9	21° 40.3	21° 40.7	21° 41.1	21° 41.5	21° 41.8	21° 42.2	21° 42.6	21° 43.0	21° 43.3	21° 43.7	21° 44.1	+0.4
We 30	270° 36.7	285° 36.6	300° 36.5	315° 36.5	330° 36.4	345° 36.3	0° 36.2	15° 36.1	30° 36.0	45° 35.9	60° 35.8	75° 35.7	-0.1
	21° 48.9	21° 49.3	21° 49.6	21° 50.0	21° 50.4	21° 50.7	21° 51.1	21° 51.5	21° 51.8	21° 52.2	21° 52.5	21° 52.9	+0.4
Th 31	270° 34.6	285° 34.5	300° 34.4	315° 34.3	330° 34.2	345° 34.1	0° 34.0	15° 33.9	30° 33.8	45° 33.7	60° 33.6	75° 33.6	-0.1
	21° 57.5	21° 57.9	21° 58.2	21° 58.6	21° 58.9	21° 59.2	21° 59.6	21° 59.9	22° 00.3	22° 00.6	22° 01.0	22° 01.3	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2029

D	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	Δ'/h	SH
Tu 1	237°37.8	252°01.9	266°26.2	280°50.5	295°14.9	309°39.4	324°04.0	338°28.7	352°53.4	7°18.3	21°43.2	+24.5	16.0
	-24°10.1	-24°07.5	-24°04.9	-24°02.0	-23°59.0	-23°55.9	-23°52.6	-23°49.2	-23°45.6	-23°41.8	-23°38.0	+3.2	58.7
We 2	238°08.9	252°35.4	267°02.0	281°28.8	295°55.6	310°22.5	324°49.6	339°16.7	353°44.0	8°11.4	22°38.8	+27.0	15.7
	-22°23.1	-22°17.1	-22°10.9	-22°04.6	-21°58.2	-21°51.7	-21°45.1	-21°38.3	-21°31.4	-21°24.5	-21°17.4	+6.6	57.7
Th 3	239°43.7	254°12.9	268°42.1	283°11.5	297°41.0	312°10.6	326°40.3	341°10.1	355°39.9	10°09.9	24°40.0	+29.6	15.5
	-19°18.6	-19°09.9	-19°01.2	-18°52.3	-18°43.4	-18°34.3	-18°25.2	-18°16.0	-18°06.8	-17°57.4	-17°48.0	+9.1	56.7
Fr 4	242°22.9	256°54.5	271°26.2	285°57.9	300°29.8	315°01.7	329°33.8	344°05.9	358°38.1	13°10.3	27°42.7	+32.0	15.2
	-15°18.1	-15°07.6	-14°57.1	-14°46.5	-14°35.8	-14°25.1	-14°14.3	-14°03.5	-13°52.6	-13°41.7	-13°30.7	+10.7	55.8
◑ Sa 5	245°56.9	260°30.4	275°03.9	289°37.5	304°11.2	318°45.0	333°18.8	347°52.6	2°26.6	17°00.5	31°34.6	+33.8	15.0
	-10°40.9	-10°29.2	-10°17.6	-10°05.9	-9°54.2	-9°42.4	-9°30.6	-9°18.8	-9°07.0	-8°55.1	-8°43.2	+11.8	55.1
Su 6	260°30.4	275°03.9	289°37.5	304°11.2	318°45.0	333°18.8	347°52.6	2°26.6	17°00.5	31°34.6	46°08.6	+33.8	15.0
	-10°29.2	-10°17.6	-10°05.9	-9°54.2	-9°42.4	-9°30.6	-9°18.8	-9°07.0	-8°55.1	-8°43.2	-8°31.3	+11.8	55.1
Mo 7	264°45.7	279°20.5	293°55.3	308°30.2	323°05.1	337°40.0	352°15.0	6°50.0	21°25.1	36°00.1	50°35.2	+35.0	14.9
	-5°30.1	-5°17.9	-5°05.7	-4°53.5	-4°41.2	-4°29.0	-4°16.7	-4°04.4	-3°52.1	-3°39.8	-3°27.6	+12.3	54.6
Tu 8	269°24.3	283°59.7	298°35.1	313°10.5	327°45.9	342°21.4	356°56.8	11°32.3	26°07.7	40°43.2	55°18.7	+35.4	14.8
	-0°22.7	-0°10.4	0°01.9	0°14.2	0°26.5	0°38.8	0°51.1	1°03.4	1°15.7	1°27.9	1°40.2	+12.3	54.2
We 9	274°10.4	288°45.8	303°21.1	317°56.5	332°31.8	347°07.2	1°42.5	16°17.8	30°53.1	45°28.3	60°03.6	+35.3	14.7
	4°42.5	4°54.5	5°06.5	5°18.5	5°30.5	5°42.4	5°54.3	6°06.2	6°18.1	6°29.9	6°41.8	+11.9	54.0
Th 10	278°49.3	293°24.1	307°58.9	322°33.7	337°08.4	351°43.1	6°17.7	20°52.3	35°26.9	50°01.4	64°35.9	+34.7	14.7
	9°35.5	9°46.9	9°58.2	10°09.4	10°20.6	10°31.8	10°42.9	10°54.0	11°05.1	11°16.1	11°27.0	+11.2	53.9
Fr 11	283°08.1	297°41.9	312°15.6	326°49.3	341°22.9	355°56.5	10°30.0	25°03.4	39°36.8	54°10.2	68°43.5	+33.5	14.7
	14°06.0	14°16.2	14°26.3	14°36.4	14°46.4	14°56.3	15°06.2	15°16.1	15°25.9	15°35.6	15°45.3	+9.9	54.0
Sa 12	286°56.3	301°28.7	316°01.0	330°33.3	345°05.5	359°37.6	14°09.7	28°41.8	43°13.7	57°45.6	72°17.5	+32.1	14.8
	18°02.3	18°10.8	18°19.3	18°27.8	18°36.1	18°44.4	18°52.5	19°00.6	19°08.7	19°16.6	19°24.5	+8.2	54.2
● Su 13	290°07.7	304°38.6	319°09.4	333°40.1	348°10.8	2°41.4	17°12.0	31°42.5	46°12.9	60°43.3	75°13.6	+30.6	14.9
	21°12.0	21°18.4	21°24.7	21°31.0	21°37.1	21°43.2	21°49.1	21°55.0	22°00.7	22°06.3	22°11.9	+6.0	54.5
Mo 14	292°42.0	307°11.4	321°40.9	336°10.2	350°39.6	5°08.8	19°38.1	34°07.3	48°36.4	63°05.5	77°34.6	+29.3	14.9
	23°22.3	23°26.1	23°29.8	23°33.4	23°36.8	23°40.2	23°43.4	23°46.5	23°49.5	23°52.4	23°55.2	+3.3	54.8
Tu 15	294°46.0	309°14.5	323°43.0	338°11.5	352°39.9	7°08.3	21°36.7	36°05.1	50°33.4	65°01.7	79°30.0	+28.4	15.1
	24°22.0	24°22.8	24°23.5	24°24.0	24°24.5	24°24.8	24°24.9	24°25.0	24°24.9	24°24.6	24°24.3	+0.2	55.2
We 16	296°33.2	311°01.3	325°29.5	339°57.7	354°25.8	8°54.0	23°22.2	37°50.3	52°18.5	66°46.7	81°14.9	+28.2	15.2
	24°03.7	24°01.2	23°58.7	23°56.0	23°53.2	23°50.3	23°47.3	23°44.1	23°40.8	23°37.3	23°33.8	-3.0	55.7
Th 17	298°19.3	312°47.7	327°16.2	341°44.6	356°13.1	10°41.7	25°10.2	39°38.8	54°07.4	68°36.0	83°04.6	+28.5	15.3
	22°25.0	22°19.5	22°13.8	22°07.9	22°02.0	21°55.9	21°49.7	21°43.4	21°37.0	21°30.5	21°23.8	-6.1	56.2
Fr 18	300°17.7	314°46.8	329°15.9	343°45.1	358°14.3	12°43.5	27°12.8	41°42.1	56°11.4	70°40.8	85°10.2	+29.3	15.5
	19°30.0	19°21.5	19°12.9	19°04.2	18°55.4	18°46.5	18°37.4	18°28.3	18°19.1	18°09.8	18°00.3	-9.0	56.9
Sa 19	302°34.8	317°04.7	331°34.6	346°04.6	0°34.5	15°04.5	29°34.5	44°04.6	58°34.7	73°04.7	87°34.9	+30.0	15.7
	15°27.1	15°16.2	15°05.1	14°54.0	14°42.8	14°31.5	14°20.1	14°08.6	13°57.0	13°45.4	13°33.7	-11.3	57.5
Su 20	305°09.2	319°39.6	334°10.0	348°40.5	3°11.0	17°41.4	32°11.9	46°42.4	61°12.9	75°43.4	90°14.0	+30.5	15.9
	10°28.8	10°15.9	10°03.0	9°50.0	9°36.9	9°23.7	9°10.5	8°57.3	8°44.0	8°30.6	8°17.2	-13.2	58.2
◐ Mo 21	307°51.9	322°22.4	336°52.9	351°23.4	5°53.9	20°24.3	34°54.8	49°25.2	63°55.6	78°26.0	92°56.4	+30.5	16.1
	4°49.7	4°35.5	4°21.3	4°07.0	3°52.7	3°38.4	3°24.1	3°09.7	2°55.3	2°40.8	2°26.3	-14.3	58.9
Tu 22	310°29.3	324°59.2	339°29.1	353°59.0	8°28.9	22°58.7	37°28.4	51°58.1	66°27.8	80°57.5	95°27.0	+29.8	16.2
	-1°13.2	-1°27.9	-1°42.7	-1°57.4	-2°12.2	-2°26.9	-2°41.7	-2°56.4	-3°11.2	-3°25.9	-3°40.6	-14.8	59.5
We 23	312°44.8	327°13.5	341°42.2	356°10.8	10°39.4	25°07.9	39°36.3	54°04.6	68°32.9	83°01.1	97°29.2	+28.4	16.4
	-7°19.8	-7°34.3	-7°48.7	-8°03.0	-8°17.3	-8°31.6	-8°45.8	-9°00.0	-9°14.2	-9°28.3	-9°42.4	-14.3	60.1
Th 24	314°22.6	328°49.5	343°16.4	357°43.2	12°09.9	26°36.5	41°03.0	55°29.5	69°55.9	84°22.2	98°48.4	+26.6	16.5
	-13°06.5	-13°19.6	-13°32.6	-13°45.6	-13°58.4	-14°11.2	-14°23.8	-14°36.4	-14°48.9	-15°01.3	-15°13.7	-12.7	60.5
Fr 25	315°11.6	329°36.5	344°01.3	358°26.0	12°50.7	27°15.3	41°39.8	56°04.2	70°28.6	84°52.8	99°17.0	+24.5	16.5
	-18°06.3	-18°16.9	-18°27.4	-18°37.8	-18°48.0	-18°58.1	-19°08.1	-19°18.0	-19°27.7	-19°37.3	-19°46.7	-10.1	60.6
Sa 26	315°11.9	329°35.0	343°58.1	358°21.2	12°44.2	27°07.2	41°30.1	55°53.0	70°15.8	84°38.6	99°01.4	+22.9	16.5
	-21°51.4	-21°58.5	-22°05.4	-22°12.2	-22°18.8	-22°25.3	-22°31.6	-22°37.7	-22°43.7	-22°49.5	-22°55.1	-6.4	60.4
○ Su 27	314°39.6	329°02.1	343°24.5	357°47.0	12°09.4	26°31.9	40°54.3	55°16.8	69°39.3	84°01.8	98°24.3	+22.5	16.4
	-23°59.1	-24°02.0	-24°04.7	-24°07.3	-24°09.6	-24°11.8	-24°13.8	-24°15.6	-24°17.3	-24°18.8	-24°20.1	-2.1	60.0
Mo 28	314°05.9	328°29.1	342°52.2	357°15.5	11°38.8	26°02.2	40°25.6	54°49.1	69°12.7	83°36.3	98°00.0	+23.4	16.2
	-24°18.7	-24°17.2	-24°15.6	-24°13.8	-24°11.9	-24°09.8	-24°07.5	-24°05.0	-24°02.4	-23°59.6	-23°56.7	+2.2	59.3
Tu 29	314°05.5	328°30.6	342°55.7	357°21.0	11°46.4	26°11.9	40°37.4	55°03.1	69°28.9	83°54.8	98°20.7	+25.5	15.9
	-22°54.4	-22°49.1	-22°43.6	-22°38.1	-22°32.3	-22°26.5	-22°20.5	-22°14.3	-22°08.1	-22°01.7	-21°55.2	+5.9	58.5
We 30	328°30.6	342°55.7	357°21.0	11°46.4	26°11.9	40°37.4	55°03.1	69°28.9	83°54.8	98°20.7	112°46.8	+25.6	15.9
	-22°49.1	-22°43.6	-22°38.1	-22°32.3	-22°26.5	-22°20.5	-22°14.3	-22°08.1	-22°01.7	-21°55.2	-21°48.5	+6.1	58.4
Th 31	329°30.9	343°58.7	358°26.6	12°54.6	27°22.7	41°51.0	56°19.3	70°47.8	85°16.3	99°45.0	114°13.8	+28.3	15.7
	-19°55.0	-19°46.5	-19°38.0	-19°29.4	-19°20.6	-19°11.8	-19°02.9	-18°53.9	-18°44.8	-18°35.6	-18°26.3	+8.9	57.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 09h48 — NM: 13 13h42 — FQ: 21 04h16 — FM: 27 18h37

SUN

June 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	270°32.3	285°32.2	300°32.1	315°32.0	330°31.9	345°31.8	0°31.7	15°31.6	30°31.5	45°31.4	60°31.4	75°31.3	-0.1
	22°05.7	22°06.0	22°06.4	22°06.7	22°07.0	22°07.4	22°07.7	22°08.0	22°08.4	22°08.7	22°09.0	22°09.4	+0.3
Sa 2	270°30.0	285°29.9	300°29.8	315°29.7	330°29.6	345°29.5	0°29.4	15°29.3	30°29.2	45°29.1	60°29.0	75°28.9	-0.1
	22°13.5	22°13.9	22°14.2	22°14.5	22°14.8	22°15.1	22°15.4	22°15.8	22°16.1	22°16.4	22°16.7	22°17.0	+0.3
Su 3	270°27.5	285°27.4	300°27.3	315°27.2	330°27.1	345°27.0	0°26.9	15°26.8	30°26.7	45°26.6	60°26.5	75°26.4	-0.1
	22°21.0	22°21.3	22°21.6	22°21.9	22°22.2	22°22.5	22°22.8	22°23.1	22°23.4	22°23.7	22°24.0	22°24.3	+0.3
Mo 4	270°25.0	285°24.9	300°24.8	315°24.6	330°24.5	345°24.4	0°24.3	15°24.2	30°24.1	45°24.0	60°23.9	75°23.8	-0.1
	22°28.0	22°28.3	22°28.6	22°28.9	22°29.2	22°29.4	22°29.7	22°30.0	22°30.3	22°30.6	22°30.8	22°31.1	+0.3
Tu 5	270°22.3	285°22.2	300°22.1	315°22.0	330°21.9	345°21.8	0°21.7	15°21.5	30°21.4	45°21.3	60°21.2	75°21.1	-0.1
	22°34.7	22°35.0	22°35.2	22°35.5	22°35.8	22°36.0	22°36.3	22°36.5	22°36.8	22°37.1	22°37.3	22°37.6	+0.3
We 6	270°19.6	285°19.5	300°19.4	315°19.3	330°19.2	345°19.0	0°18.9	15°18.8	30°18.7	45°18.6	60°18.5	75°18.3	-0.1
	22°40.9	22°41.2	22°41.4	22°41.7	22°41.9	22°42.2	22°42.4	22°42.7	22°42.9	22°43.2	22°43.4	22°43.7	+0.2
Th 7	270°16.8	285°16.7	300°16.6	315°16.5	330°16.3	345°16.2	0°16.1	15°16.0	30°15.9	45°15.7	60°15.6	75°15.5	-0.1
	22°46.8	22°47.0	22°47.3	22°47.5	22°47.7	22°48.0	22°48.2	22°48.4	22°48.7	22°48.9	22°49.1	22°49.4	+0.2
Fr 8	270°13.9	285°13.8	300°13.7	315°13.6	330°13.5	345°13.3	0°13.2	15°13.1	30°13.0	45°12.8	60°12.7	75°12.6	-0.1
	22°52.3	22°52.5	22°52.7	22°52.9	22°53.1	22°53.3	22°53.6	22°53.8	22°54.0	22°54.2	22°54.4	22°54.6	+0.2
Sa 9	270°11.0	285°10.9	300°10.8	315°10.6	330°10.5	345°10.4	0°10.3	15°10.1	30°10.0	45°09.9	60°09.8	75°09.6	-0.1
	22°57.3	22°57.5	22°57.7	22°57.9	22°58.1	22°58.3	22°58.5	22°58.7	22°58.9	22°59.1	22°59.3	22°59.5	+0.2
Su 10	270°08.0	285°07.9	300°07.7	315°07.6	330°07.5	345°07.4	0°07.2	15°07.1	30°07.0	45°06.9	60°06.7	75°06.6	-0.1
	23°02.0	23°02.2	23°02.3	23°02.5	23°02.7	23°02.9	23°03.1	23°03.2	23°03.4	23°03.6	23°03.8	23°04.0	+0.2
Mo 11	270°04.9	285°04.8	300°04.7	315°04.5	330°04.4	345°04.3	0°04.2	15°04.0	30°03.9	45°03.8	60°03.6	75°03.5	-0.1
	23°06.2	23°06.4	23°06.5	23°06.7	23°06.9	23°07.0	23°07.2	23°07.4	23°07.5	23°07.7	23°07.9	23°08.0	+0.2
Tu 12	270°01.8	285°01.7	300°01.6	315°01.4	330°01.3	345°01.2	0°01.0	15°00.9	30°00.8	45°00.6	60°00.5	75°00.4	-0.1
	23°10.1	23°10.2	23°10.4	23°10.5	23°10.7	23°10.8	23°10.9	23°11.1	23°11.2	23°11.4	23°11.5	23°11.7	+0.1
We 13	269°58.7	284°58.5	299°58.4	314°58.3	329°58.1	344°58.0	359°57.9	14°57.7	29°57.6	44°57.5	59°57.3	74°57.2	-0.1
	23°13.5	23°13.6	23°13.8	23°13.9	23°14.0	23°14.1	23°14.3	23°14.4	23°14.5	23°14.7	23°14.8	23°14.9	+0.1
Th 14	269°55.5	284°55.4	299°55.2	314°55.1	329°55.0	344°54.8	359°54.7	14°54.5	29°54.4	44°54.3	59°54.1	74°54.0	-0.1
	23°16.5	23°16.6	23°16.7	23°16.9	23°17.0	23°17.1	23°17.2	23°17.3	23°17.4	23°17.5	23°17.6	23°17.8	+0.1
Fr 15	269°52.3	284°52.1	299°52.0	314°51.9	329°51.7	344°51.6	359°51.5	14°51.3	29°51.2	44°51.1	59°50.9	74°50.8	-0.1
	23°19.1	23°19.2	23°19.3	23°19.4	23°19.5	23°19.6	23°19.7	23°19.8	23°19.9	23°20.0	23°20.1	23°20.2	+0.1
Sa 16	269°49.0	284°48.9	299°48.8	314°48.6	329°48.5	344°48.3	359°48.2	14°48.1	29°47.9	44°47.8	59°47.7	74°47.5	-0.1
	23°21.3	23°21.4	23°21.5	23°21.6	23°21.6	23°21.7	23°21.8	23°21.9	23°22.0	23°22.0	23°22.1	23°22.2	+0.1
Su 17	269°45.8	284°45.6	299°45.5	314°45.4	329°45.2	344°45.1	359°44.9	14°44.8	29°44.7	44°44.5	59°44.4	74°44.3	-0.1
	23°23.1	23°23.2	23°23.2	23°23.3	23°23.4	23°23.4	23°23.5	23°23.5	23°23.6	23°23.7	23°23.7	23°23.8	+0.1
Mo 18	269°42.5	284°42.4	299°42.2	314°42.1	329°42.0	344°41.8	359°41.7	14°41.5	29°41.4	44°41.3	59°41.1	74°41.0	-0.1
	23°24.5	23°24.5	23°24.6	23°24.6	23°24.7	23°24.7	23°24.8	23°24.8	23°24.8	23°24.9	23°24.9	23°25.0	+0.0
Tu 19	269°39.2	284°39.1	299°39.0	314°38.8	329°38.7	344°38.5	359°38.4	14°38.3	29°38.1	44°38.0	59°37.9	74°37.7	-0.1
	23°25.4	23°25.5	23°25.5	23°25.5	23°25.6	23°25.6	23°25.6	23°25.6	23°25.7	23°25.7	23°25.7	23°25.7	+0.0
We 20	269°36.0	284°35.8	299°35.7	314°35.6	329°35.4	344°35.3	359°35.1	14°35.0	29°34.9	44°34.7	59°34.6	74°34.5	-0.1
	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	+0.0
Th 21	269°32.7	284°32.6	299°32.4	314°32.3	329°32.2	344°32.0	359°31.9	14°31.8	29°31.6	44°31.5	59°31.3	74°31.2	-0.1
	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.0	-0.0
Fr 22	269°29.5	284°29.3	299°29.2	314°29.1	329°28.9	344°28.8	359°28.6	14°28.5	29°28.4	44°28.2	59°28.1	74°28.0	-0.1
	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.7	23°25.7	23°25.7	23°25.7	23°25.6	23°25.6	23°25.6	-0.0
Sa 23	269°26.2	284°26.1	299°26.0	314°25.8	329°25.7	344°25.6	359°25.4	14°25.3	29°25.2	44°25.0	59°24.9	74°24.8	-0.1
	23°25.1	23°25.1	23°25.1	23°25.0	23°25.0	23°25.0	23°24.9	23°24.9	23°24.8	23°24.8	23°24.7	23°24.7	-0.0
Su 24	269°23.0	284°22.9	299°22.8	314°22.6	329°22.5	344°22.4	359°22.2	14°22.1	29°22.0	44°21.8	59°21.7	74°21.6	-0.1
	23°24.0	23°24.0	23°23.9	23°23.9	23°23.8	23°23.8	23°23.7	23°23.6	23°23.6	23°23.5	23°23.5	23°23.4	-0.1
Mo 25	269°19.9	284°19.7	299°19.6	314°19.5	329°19.3	344°19.2	359°19.1	14°18.9	29°18.8	44°18.7	59°18.5	74°18.4	-0.1
	23°22.5	23°22.5	23°22.4	23°22.3	23°22.2	23°22.2	23°22.1	23°22.0	23°21.9	23°21.9	23°21.8	23°21.7	-0.1
Tu 26	269°16.7	284°16.6	299°16.5	314°16.3	329°16.2	344°16.1	359°15.9	14°15.8	29°15.7	44°15.6	59°15.4	74°15.3	-0.1
	23°20.6	23°20.5	23°20.4	23°20.3	23°20.2	23°20.2	23°20.1	23°20.0	23°19.9	23°19.8	23°19.7	23°19.6	-0.1
We 27	269°13.6	284°13.5	299°13.4	314°13.2	329°13.1	344°13.0	359°12.9	14°12.7	29°12.6	44°12.5	59°12.3	74°12.2	-0.1
	23°18.3	23°18.2	23°18.1	23°18.0	23°17.8	23°17.7	23°17.6	23°17.5	23°17.4	23°17.3	23°17.2	23°17.1	-0.1
Th 28	269°10.6	284°10.4	299°10.3	314°10.2	329°10.1	344°09.9	359°09.8	14°09.7	29°09.6	44°09.4	59°09.3	74°09.2	-0.1
	23°15.5	23°15.4	23°15.3	23°15.2	23°15.0	23°14.9	23°14.8	23°14.7	23°14.5	23°14.4	23°14.3	23°14.1	-0.1
Fr 29	269°07.6	284°07.4	299°07.3	314°07.2	329°07.1	344°06.9	359°06.8	14°06.7	29°06.6	44°06.4	59°06.3	74°06.2	-0.1
	23°12.4	23°12.2	23°12.1	23°12.0	23°11.8	23°11.7	23°11.5	23°11.4	23°11.2	23°11.1	23°10.9	23°10.8	-0.1
Sa 30	269°04.6	284°04.5	299°04.4	314°04.2	329°04.1	344°04.0	359°03.9	14°03.7	29°03.6	44°03.5	59°03.4	74°03.3	-0.1
	23°08.8	23°08.7	23°08.5	23°08.3	23°08.2	23°08.0	23°07.9	23°07.7	23°07.5	23°07.4	23°07.2	23°07.1	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2029

D	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	Δ'/h	SH
Fr 1	232°59.7	247°31.7	262°03.8	276°36.0	291°08.3	305°40.7	320°13.1	334°45.7	349°18.3	3°51.0	18°23.7	+32.4	15.3
	-12°39.9	-12°28.5	-12°17.0	-12°05.4	-11°53.9	-11°42.2	-11°30.6	-11°18.9	-11°07.2	-10°55.4	-10°43.6	+11.6	56.0
Sa 2	236°43.1	251°16.9	265°50.8	280°24.7	294°58.6	309°32.6	324°06.7	338°40.8	353°15.0	7°49.2	22°23.4	+34.0	15.1
	-7°43.1	-7°30.9	-7°18.6	-7°06.4	-6°54.1	-6°41.8	-6°29.5	-6°17.2	-6°04.9	-5°52.5	-5°40.2	+12.3	55.3
Su 3	241°02.2	255°37.1	270°12.0	284°46.9	299°21.8	313°56.8	328°31.8	343°06.8	357°41.8	12°16.9	26°52.0	+35.0	14.9
	-2°33.8	-2°21.4	-2°08.9	-1°56.5	-1°44.0	-1°31.6	-1°19.1	-1°06.7	-0°54.3	-0°41.8	-0°29.4	+12.4	54.7
◑ Mo 4	245°40.0	260°15.3	274°50.5	289°25.8	304°01.1	318°36.3	333°11.6	347°46.9	2°22.2	16°57.4	31°32.7	+35.3	14.8
	2°35.9	2°48.2	3°00.4	3°12.6	3°24.8	3°37.0	3°49.2	4°01.3	4°13.4	4°25.6	4°37.6	+12.2	54.3
Tu 5	260°15.3	274°50.5	289°25.8	304°01.1	318°36.3	333°11.6	347°46.9	2°22.2	16°57.4	31°32.7	46°07.9	+35.3	14.8
	2°48.2	3°00.4	3°12.6	3°24.8	3°37.0	3°49.2	4°01.3	4°13.4	4°25.6	4°37.6	4°49.7	+12.2	54.3
We 6	264°55.3	279°30.3	294°05.3	308°40.3	323°15.2	337°50.2	352°25.1	7°00.0	21°34.8	36°09.6	50°44.4	+34.9	14.8
	7°47.7	7°59.3	8°10.9	8°22.5	8°34.0	8°45.6	8°57.0	9°08.5	9°19.9	9°31.2	9°42.6	+11.5	54.1
Th 7	269°22.2	283°56.4	298°30.6	313°04.7	327°38.8	342°12.9	356°46.9	11°20.8	25°54.7	40°28.6	55°02.4	+34.0	14.7
	12°27.6	12°38.3	12°48.9	12°59.4	13°09.9	13°20.4	13°30.8	13°41.1	13°51.4	14°01.6	14°11.8	+10.4	54.1
Fr 8	273°23.2	287°56.1	302°29.0	317°01.8	331°34.6	346°07.3	0°40.0	15°12.6	29°45.1	44°17.6	58°50.0	+32.7	14.8
	16°37.6	16°46.8	16°56.0	17°05.1	17°14.1	17°23.0	17°31.9	17°40.7	17°49.4	17°58.1	18°06.7	+8.9	54.2
Sa 9	276°48.5	291°19.9	305°51.2	320°22.5	334°53.7	349°24.8	3°55.9	18°26.9	32°57.8	47°28.7	61°59.5	+31.1	14.9
	20°06.1	20°13.4	20°20.6	20°27.7	20°34.8	20°41.7	20°48.6	20°55.3	21°02.0	21°08.6	21°15.1	+6.9	54.5
Su 10	279°34.0	294°03.8	308°33.6	323°03.2	337°32.9	352°02.4	6°32.0	21°01.4	35°30.8	50°00.2	64°29.4	+29.5	15.0
	22°40.4	22°45.3	22°50.0	22°54.7	22°59.2	23°03.6	23°08.0	23°12.2	23°16.3	23°20.2	23°24.1	+4.4	54.9
Mo 11	281°42.7	296°11.2	310°39.7	325°08.1	339°36.5	354°04.9	8°33.2	23°01.5	37°29.7	51°57.9	66°26.1	+28.3	15.1
	24°08.0	24°09.9	24°11.8	24°13.5	24°15.1	24°16.5	24°17.8	24°19.1	24°20.1	24°21.1	24°21.9	+1.4	55.3
● Tu 12	283°25.7	297°53.5	312°21.3	326°49.1	341°16.9	355°44.6	10°12.4	24°40.2	39°07.9	53°35.6	68°03.4	+27.8	15.2
	24°18.7	24°17.4	24°16.0	24°14.5	24°12.9	24°11.1	24°09.1	24°07.1	24°04.9	24°02.6	24°00.1	-1.9	55.8
We 13	284°59.8	299°27.6	313°55.5	328°23.3	342°51.2	357°19.1	11°47.0	26°15.0	40°42.9	55°10.9	69°38.9	+27.9	15.4
	23°07.5	23°03.0	22°58.3	22°53.5	22°48.6	22°43.5	22°38.3	22°33.0	22°27.5	22°22.0	22°16.3	-5.1	56.3
Th 14	286°42.1	301°10.6	315°39.1	330°07.6	344°36.2	359°04.8	13°33.4	28°02.0	42°30.8	56°59.5	71°28.3	+28.6	15.5
	20°36.1	20°28.4	20°20.7	20°12.8	20°04.9	19°56.8	19°48.6	19°40.2	19°31.8	19°23.3	19°14.6	-8.1	56.8
Fr 15	288°44.4	303°13.8	317°43.3	332°12.7	346°42.2	1°11.8	15°41.3	30°10.9	44°40.6	59°10.3	73°40.0	+29.6	15.6
	16°52.4	16°42.2	16°31.8	16°21.3	16°10.8	16°00.1	15°49.4	15°38.6	15°27.6	15°16.6	15°05.5	-10.7	57.4
Sa 16	291°10.0	305°40.3	320°10.6	334°40.9	349°11.2	3°41.6	18°12.0	32°42.4	47°12.9	61°43.4	76°13.9	+30.4	15.8
	12°09.5	11°57.2	11°44.8	11°32.3	11°19.8	11°07.2	10°54.5	10°41.8	10°29.0	10°16.1	10°03.2	-12.6	57.9
Su 17	293°53.7	308°24.5	322°55.3	337°26.1	351°56.9	6°27.7	20°58.5	35°29.3	50°00.1	64°31.0	79°01.8	+30.8	15.9
	6°43.1	6°29.4	6°15.6	6°01.8	5°48.0	5°34.1	5°20.2	5°06.2	4°52.3	4°38.2	4°24.2	-13.9	58.3
Mo 18	296°43.9	311°14.7	325°45.4	340°16.1	354°46.8	9°17.4	23°48.1	38°18.7	52°49.3	67°19.9	81°50.5	+30.7	16.0
	0°50.5	0°36.1	0°21.7	0°07.3	-0°07.2	-0°21.6	-0°36.0	-0°50.5	-1°04.9	-1°19.3	-1°33.8	-14.4	58.8
◐ Tu 19	299°25.3	313°55.4	328°25.4	342°55.3	357°25.2	11°55.1	26°24.9	40°54.7	55°24.4	69°54.1	84°23.7	+29.8	16.1
	-5°09.7	-5°24.0	-5°38.3	-5°52.5	-6°06.8	-6°21.0	-6°35.1	-6°49.3	-7°03.4	-7°17.4	-7°31.5	-14.2	59.2
We 20	301°41.3	316°10.0	330°38.6	345°07.2	359°35.7	14°04.1	28°32.5	43°00.7	57°29.0	71°57.1	86°25.2	+28.4	16.2
	-10°57.2	-11°10.6	-11°23.8	-11°37.0	-11°50.2	-12°03.3	-12°16.3	-12°29.2	-12°42.1	-12°54.9	-13°07.7	-13.1	59.5
Th 21	303°17.3	317°44.2	332°11.0	346°37.7	1°04.3	15°30.9	29°57.3	44°23.7	58°50.0	73°16.3	87°42.4	+26.5	16.3
	-16°09.4	-16°20.8	-16°32.2	-16°43.4	-16°54.5	-17°05.5	-17°16.4	-17°27.2	-17°37.9	-17°48.5	-17°59.0	-11.0	59.7
Fr 22	304°05.5	318°30.4	332°55.3	347°20.1	1°44.8	16°09.5	30°34.1	44°58.6	59°23.1	73°47.5	88°11.8	+24.6	16.3
	-20°22.1	-20°30.7	-20°39.1	-20°47.3	-20°55.5	-21°03.4	-21°11.3	-21°19.0	-21°26.6	-21°34.0	-21°41.3	-7.9	59.7
Sa 23	304°10.2	318°33.7	332°57.2	347°20.6	1°44.0	16°07.4	30°30.8	44°54.1	59°17.4	73°40.6	88°03.9	+23.4	16.3
	-23°12.3	-23°17.1	-23°21.8	-23°26.2	-23°30.6	-23°34.7	-23°38.7	-23°42.6	-23°46.3	-23°49.8	-23°53.1	-4.1	59.6
Su 24	303°51.3	318°14.5	332°37.6	347°00.8	1°24.1	15°47.3	30°10.6	44°33.9	58°57.2	73°20.5	87°43.9	+23.3	16.2
	-24°23.0	-24°23.7	-24°24.1	-24°24.4	-24°24.6	-24°24.5	-24°24.3	-24°24.0	-24°23.4	-24°22.7	-24°21.8	+0.1	59.3
Mo 25	303°39.8	318°03.9	332°28.2	346°52.5	1°16.8	15°41.2	30°05.7	44°30.3	58°54.9	73°19.7	87°44.5	+24.5	16.0
	-23°49.2	-23°45.7	-23°42.1	-23°38.3	-23°34.4	-23°30.3	-23°26.1	-23°21.8	-23°17.3	-23°12.6	-23°07.8	+4.1	58.7
○ Tu 26	304°06.4	318°32.6	332°58.9	347°25.3	1°51.7	16°18.3	30°45.0	45°11.7	59°38.6	74°05.5	88°32.6	+26.6	15.8
	-21°39.1	-21°32.1	-21°25.0	-21°17.8	-21°10.5	-21°03.0	-20°55.5	-20°47.8	-20°40.0	-20°32.1	-20°24.0	+7.5	58.1
We 27	305°30.5	319°59.1	334°27.9	348°56.7	3°25.7	17°54.7	32°23.9	46°53.2	61°22.5	75°52.0	90°21.5	+29.1	15.6
	-18°11.3	-18°01.7	-17°52.0	-17°42.2	-17°32.3	-17°22.4	-17°12.4	-17°02.3	-16°52.1	-16°41.8	-16°31.5	+10.0	57.3
Th 28	307°56.1	322°27.1	336°58.2	351°29.4	6°00.7	20°32.1	35°03.5	49°35.1	64°06.7	78°38.4	93°10.2	+31.4	15.4
	-13°48.4	-13°37.0	-13°25.6	-13°14.2	-13°02.7	-12°51.1	-12°39.5	-12°27.9	-12°16.2	-12°04.4	-11°52.7	+11.6	56.5
Fr 29	322°27.1	336°58.2	351°29.4	6°00.7	20°32.1	35°03.5	49°35.1	64°06.7	78°38.4	93°10.2	107°42.1	+31.5	15.4
	-13°37.0	-13°25.6	-13°14.2	-13°02.7	-12°51.1	-12°39.5	-12°27.9	-12°16.2	-12°04.4	-11°52.7	-11°40.8	+11.6	56.5
Sa 30	325°49.0	340°22.0	354°55.0	9°28.2	24°01.4	38°34.6	53°08.0	67°41.3	82°14.8	96°48.3	111°21.8	+33.3	15.2
	-8°39.3	-8°27.0	-8°14.7	-8°02.3	-7°49.9	-7°37.5	-7°25.0	-7°12.6	-7°00.1	-6°47.6	-6°35.1	+12.4	55.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 4 01h18 — NM: 12 03h50 — FQ: 19 09h54 — FM: 26 03h22

SUN

July 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°01.7	284°01.6	299°01.5	314°01.3	329°01.2	344°01.1	359°01.0	14°00.9	29°00.7	44°00.6	59°00.5	74°00.4	-0.1
	23°04.9	23°04.7	23°04.5	23°04.3	23°04.2	23°04.0	23°03.8	23°03.6	23°03.4	23°03.3	23°03.1	23°02.9	-0.2
Mo 2	268°58.9	283°58.7	298°58.6	313°58.5	328°58.4	343°58.3	358°58.2	13°58.0	28°57.9	43°57.8	58°57.7	73°57.6	-0.1
	23°00.5	23°00.3	23°00.1	22°59.9	22°59.7	22°59.5	22°59.3	22°59.1	22°58.9	22°58.7	22°58.6	22°58.4	-0.2
Tu 3	268°56.1	283°56.0	298°55.9	313°55.8	328°55.6	343°55.5	358°55.4	13°55.3	28°55.2	43°55.1	58°55.0	73°54.8	-0.1
	22°55.7	22°55.5	22°55.3	22°55.1	22°54.9	22°54.7	22°54.5	22°54.3	22°54.0	22°53.8	22°53.6	22°53.4	-0.2
We 4	268°53.4	283°53.3	298°53.2	313°53.1	328°53.0	343°52.8	358°52.7	13°52.6	28°52.5	43°52.4	58°52.3	73°52.2	-0.1
	22°50.5	22°50.3	22°50.1	22°49.9	22°49.6	22°49.4	22°49.2	22°49.0	22°48.7	22°48.5	22°48.3	22°48.0	-0.2
Th 5	268°50.8	283°50.7	298°50.6	313°50.5	328°50.3	343°50.2	358°50.1	13°50.0	28°49.9	43°49.8	58°49.7	73°49.6	-0.1
	22°45.0	22°44.7	22°44.5	22°44.3	22°44.0	22°43.8	22°43.5	22°43.3	22°43.0	22°42.8	22°42.5	22°42.3	-0.2
Fr 6	268°48.2	283°48.1	298°48.0	313°47.9	328°47.8	343°47.7	358°47.6	13°47.5	28°47.4	43°47.3	58°47.2	73°47.1	-0.1
	22°39.0	22°38.8	22°38.5	22°38.2	22°38.0	22°37.7	22°37.5	22°37.2	22°36.9	22°36.7	22°36.4	22°36.1	-0.3
Sa 7	268°45.8	283°45.7	298°45.6	313°45.5	328°45.4	343°45.3	358°45.2	13°45.1	28°45.0	43°44.9	58°44.8	73°44.7	-0.1
	22°32.7	22°32.4	22°32.1	22°31.8	22°31.6	22°31.3	22°31.0	22°30.7	22°30.4	22°30.2	22°29.9	22°29.6	-0.3
Su 8	268°43.4	283°43.3	298°43.2	313°43.1	328°43.0	343°42.9	358°42.8	13°42.8	28°42.7	43°42.6	58°42.5	73°42.4	-0.1
	22°25.9	22°25.6	22°25.3	22°25.0	22°24.7	22°24.5	22°24.2	22°23.9	22°23.6	22°23.3	22°23.0	22°22.7	-0.3
Mo 9	268°41.2	283°41.1	298°41.0	313°40.9	328°40.8	343°40.7	358°40.6	13°40.5	28°40.4	43°40.3	58°40.2	73°40.2	-0.1
	22°18.8	22°18.5	22°18.2	22°17.8	22°17.5	22°17.2	22°16.9	22°16.6	22°16.3	22°16.0	22°15.7	22°15.4	-0.3
Tu 10	268°39.0	283°38.9	298°38.8	313°38.7	328°38.7	343°38.6	358°38.5	13°38.4	28°38.3	43°38.2	58°38.1	73°38.0	-0.1
	22°11.2	22°10.9	22°10.6	22°10.3	22°10.0	22°09.6	22°09.3	22°09.0	22°08.7	22°08.3	22°08.0	22°07.7	-0.3
We 11	268°36.9	283°36.9	298°36.8	313°36.7	328°36.6	343°36.5	358°36.5	13°36.4	28°36.3	43°36.2	58°36.1	73°36.0	-0.1
	22°03.3	22°03.0	22°02.7	22°02.3	22°02.0	22°01.6	22°01.3	22°01.0	22°00.6	22°00.3	21°59.9	21°59.6	-0.3
Th 12	268°35.0	283°34.9	298°34.9	313°34.8	328°34.7	343°34.6	358°34.5	13°34.5	28°34.4	43°34.3	58°34.2	73°34.2	-0.1
	21°55.1	21°54.7	21°54.3	21°54.0	21°53.6	21°53.3	21°52.9	21°52.6	21°52.2	21°51.9	21°51.5	21°51.1	-0.4
Fr 13	268°33.2	283°33.1	298°33.0	313°33.0	328°32.9	343°32.8	358°32.8	13°32.7	28°32.6	43°32.5	58°32.5	73°32.4	-0.1
	21°46.4	21°46.0	21°45.7	21°45.3	21°44.9	21°44.5	21°44.2	21°43.8	21°43.4	21°43.1	21°42.7	21°42.3	-0.4
Sa 14	268°31.5	283°31.4	298°31.4	313°31.3	328°31.2	343°31.2	358°31.1	13°31.0	28°30.9	43°30.9	58°30.8	73°30.8	-0.1
	21°37.4	21°37.0	21°36.6	21°36.2	21°35.8	21°35.4	21°35.1	21°34.7	21°34.3	21°33.9	21°33.5	21°33.1	-0.4
Su 15	268°29.9	283°29.9	298°29.8	313°29.7	328°29.7	343°29.6	358°29.5	13°29.5	28°29.4	43°29.4	58°29.3	73°29.2	-0.1
	21°28.0	21°27.6	21°27.2	21°26.8	21°26.4	21°26.0	21°25.6	21°25.2	21°24.8	21°24.4	21°23.9	21°23.5	-0.4
Mo 16	268°28.5	283°28.4	298°28.4	313°28.3	328°28.2	343°28.2	358°28.1	13°28.1	28°28.0	43°28.0	58°27.9	73°27.9	-0.1
	21°18.2	21°17.8	21°17.4	21°17.0	21°16.5	21°16.1	21°15.7	21°15.3	21°14.9	21°14.5	21°14.0	21°13.6	-0.4
Tu 17	268°27.2	283°27.1	298°27.1	313°27.0	328°27.0	343°26.9	358°26.9	13°26.8	28°26.8	43°26.7	58°26.7	73°26.6	-0.1
	21°08.1	21°07.7	21°07.2	21°06.8	21°06.4	21°05.9	21°05.5	21°05.1	21°04.6	21°04.2	21°03.8	21°03.3	-0.4
We 18	268°26.0	283°26.0	298°25.9	313°25.9	328°25.8	343°25.8	358°25.7	13°25.7	28°25.6	43°25.6	58°25.6	73°25.5	-0.0
	20°57.6	20°57.2	20°56.7	20°56.3	20°55.8	20°55.4	20°54.9	20°54.5	20°54.0	20°53.6	20°53.1	20°52.7	-0.4
Th 19	268°25.0	283°24.9	298°24.9	313°24.9	328°24.8	343°24.8	358°24.7	13°24.7	28°24.7	43°24.6	58°24.6	73°24.5	-0.0
	20°46.8	20°46.3	20°45.9	20°45.4	20°44.9	20°44.5	20°44.0	20°43.5	20°43.1	20°42.6	20°42.2	20°41.7	-0.5
Fr 20	268°24.1	283°24.1	298°24.0	313°24.0	328°24.0	343°23.9	358°23.9	13°23.9	28°23.8	43°23.8	58°23.8	73°23.7	-0.0
	20°35.6	20°35.1	20°34.6	20°34.2	20°33.7	20°33.2	20°32.7	20°32.3	20°31.8	20°31.3	20°30.8	20°30.4	-0.5
Sa 21	268°23.3	283°23.3	298°23.3	313°23.3	328°23.2	343°23.2	358°23.2	13°23.2	28°23.1	43°23.1	58°23.1	73°23.1	-0.0
	20°24.1	20°23.6	20°23.1	20°22.6	20°22.1	20°21.6	20°21.1	20°20.6	20°20.1	20°19.7	20°19.2	20°18.7	-0.5
Su 22	268°22.8	283°22.7	298°22.7	313°22.7	328°22.7	343°22.6	358°22.6	13°22.6	28°22.6	43°22.6	58°22.6	73°22.5	-0.0
	20°12.2	20°11.7	20°11.2	20°10.7	20°10.2	20°09.7	20°09.2	20°08.7	20°08.2	20°07.7	20°07.2	20°06.6	-0.5
Mo 23	268°22.3	283°22.3	298°22.3	313°22.3	328°22.2	343°22.2	358°22.2	13°22.2	28°22.2	43°22.2	58°22.2	73°22.2	-0.0
	20°00.0	19°59.5	19°59.0	19°58.4	19°57.9	19°57.4	19°56.9	19°56.4	19°55.9	19°55.3	19°54.8	19°54.3	-0.5
Tu 24	268°22.0	283°22.0	298°22.0	313°22.0	328°22.0	343°22.0	358°22.0	13°22.0	28°21.9	43°21.9	58°21.9	73°21.9	-0.0
	19°47.5	19°46.9	19°46.4	19°45.9	19°45.3	19°44.8	19°44.3	19°43.7	19°43.2	19°42.7	19°42.1	19°41.6	-0.5
We 25	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.9	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.8	-0.0
	19°34.6	19°34.1	19°33.5	19°33.0	19°32.4	19°31.9	19°31.3	19°30.8	19°30.2	19°29.7	19°29.1	19°28.6	-0.5
Th 26	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.9	358°21.9	13°21.9	28°21.9	43°21.9	58°21.9	73°21.9	+0.0
	19°21.4	19°20.9	19°20.3	19°19.7	19°19.2	19°18.6	19°18.1	19°17.5	19°16.9	19°16.4	19°15.8	19°15.3	-0.6
Fr 27	268°22.0	283°22.0	298°22.0	313°22.0	328°22.1	343°22.1	358°22.1	13°22.1	28°22.1	43°22.1	58°22.1	73°22.1	+0.0
	19°07.9	19°07.3	19°06.8	19°06.2	19°05.6	19°05.1	19°04.5	19°03.9	19°03.3	19°02.8	19°02.2	19°01.6	-0.6
Sa 28	268°22.3	283°22.3	298°22.3	313°22.4	328°22.4	343°22.4	358°22.4	13°22.4	28°22.4	43°22.5	58°22.5	73°22.5	+0.0
	18°54.1	18°53.5	18°52.9	18°52.3	18°51.7	18°51.2	18°50.6	18°50.0	18°49.4	18°48.8	18°48.2	18°47.6	-0.6
Su 29	268°22.8	283°22.8	298°22.8	313°22.8	328°22.8	343°22.9	358°22.9	13°22.9	28°22.9	43°23.0	58°23.0	73°23.0	+0.0
	18°39.9	18°39.3	18°38.8	18°38.2	18°37.6	18°37.0	18°36.4	18°35.8	18°35.2	18°34.6	18°34.0	18°33.4	-0.6
Mo 30	268°23.4	283°23.4	298°23.4	313°23.4	328°23.5	343°23.5	358°23.5	13°23.6	28°23.6	43°23.6	58°23.6	73°23.7	+0.0
	18°25.5	18°24.9	18°24.3	18°23.7	18°23.1	18°22.5	18°21.8	18°21.2	18°20.6	18°20.0	18°19.4	18°18.8	-0.6
Tu 31	268°24.1	283°24.1	298°24.2	313°24.2	328°24.2	343°24.3	358°24.3	13°24.3	28°24.4	43°24.4	58°24.5	73°24.5	+0.0
	18°10.8	18°10.1	18°09.5	18°08.9	18°08.3	18°07.6	18°07.0	18°06.4	18°05.8	18°05.1	18°04.5	18°03.9	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2029

D	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	Δ'/h	SH
Su 1	232°13.2	246°48.0	261°22.8	275°57.7	290°32.5	305°07.4	319°42.3	334°17.2	348°52.1	3°27.1	18°02.0	+34.9	14.9
	0°20.7	0°33.3	0°45.8	0°58.3	1°10.8	1°23.3	1°35.8	1°48.3	2°00.7	2°13.1	2°25.6	+12.5	54.8
Mo 2	236°46.9	251°21.9	265°56.9	280°31.8	295°06.8	309°41.8	324°16.7	338°51.6	353°26.6	8°01.5	22°36.4	+35.0	14.8
	5°29.3	5°41.4	5°53.4	6°05.4	6°17.4	6°29.3	6°41.2	6°53.1	7°05.0	7°16.8	7°28.6	+11.9	54.4
◑ Tu 3	241°17.7	255°52.2	270°26.8	285°01.3	299°35.8	314°10.2	328°44.6	343°19.0	357°53.3	12°27.6	27°01.9	+34.4	14.8
	10°21.1	10°32.3	10°43.4	10°54.5	11°05.6	11°16.6	11°27.6	11°38.5	11°49.4	12°00.2	12°11.0	+11.0	54.2
We 4	245°31.3	260°04.9	274°38.4	289°11.9	303°45.4	318°18.8	332°52.2	347°25.5	1°58.7	16°31.9	31°05.1	+33.4	14.8
	14°46.5	14°56.4	15°06.3	15°16.1	15°25.8	15°35.5	15°45.1	15°54.7	16°04.2	16°13.6	16°23.0	+9.7	54.2
Th 5	260°04.9	274°38.4	289°11.9	303°45.4	318°18.8	332°52.2	347°25.5	1°58.7	16°31.9	31°05.1	45°38.2	+33.3	14.8
	14°56.4	15°06.3	15°16.1	15°25.8	15°35.5	15°45.1	15°54.7	16°04.2	16°13.6	16°23.0	16°32.3	+9.6	54.2
Fr 6	263°47.8	278°20.0	292°52.1	307°24.2	321°56.1	336°28.1	350°59.9	5°31.7	20°03.4	34°35.1	49°06.7	+31.9	14.8
	18°43.4	18°51.6	18°59.7	19°07.7	19°15.6	19°23.4	19°31.2	19°38.8	19°46.4	19°53.9	20°01.3	+7.8	54.4
Sa 7	266°53.0	281°23.6	295°54.1	310°24.5	324°54.9	339°25.2	353°55.4	8°25.6	22°55.7	37°25.8	51°55.8	+30.3	14.9
	21°41.9	21°47.8	21°53.7	21°59.4	22°05.1	22°10.6	22°16.1	22°21.4	22°26.7	22°31.8	22°36.9	+5.5	54.7
Su 8	269°18.3	283°47.3	298°16.3	312°45.2	327°14.1	341°42.9	356°11.7	10°40.4	25°09.1	39°37.7	54°06.2	+28.8	15.1
	23°39.4	23°42.7	23°45.8	23°48.8	23°51.7	23°54.5	23°57.2	23°59.7	24°02.2	24°04.5	24°06.7	+2.7	55.2
Mo 9	271°09.4	285°37.3	300°05.1	314°33.0	329°00.8	343°28.5	357°56.3	12°24.0	26°51.7	41°19.4	55°47.0	+27.8	15.2
	24°24.4	24°24.5	24°24.6	24°24.4	24°24.2	24°23.8	24°23.3	24°22.7	24°21.9	24°21.0	24°20.0	-0.4	55.8
Tu 10	272°39.6	287°07.0	301°34.4	316°01.8	330°29.2	344°56.6	359°24.0	13°51.5	28°18.9	42°46.3	57°13.7	+27.4	15.4
	23°48.4	23°45.2	23°41.9	23°38.4	23°34.8	23°31.1	23°27.3	23°23.3	23°19.1	23°14.9	23°10.5	-3.8	56.4
● We 11	274°06.4	288°34.0	303°01.7	317°29.4	331°57.1	346°24.8	0°52.6	15°20.4	29°48.2	44°16.0	58°43.9	+27.7	15.6
	21°48.8	21°42.3	21°35.7	21°29.0	21°22.1	21°15.1	21°08.0	21°00.8	20°53.4	20°45.9	20°38.3	-7.0	57.0
Th 12	275°45.7	290°14.0	304°42.5	319°10.9	333°39.4	348°08.0	2°36.5	17°05.1	31°33.8	46°02.5	60°31.2	+28.6	15.7
	18°30.2	18°20.7	18°11.2	18°01.5	17°51.7	17°41.9	17°31.9	17°21.8	17°11.6	17°01.3	16°50.9	-9.9	57.6
Fr 13	277°46.4	292°15.7	306°45.1	321°14.5	335°43.9	350°13.3	4°42.8	19°12.3	33°41.9	48°11.5	62°41.1	+29.5	15.9
	14°03.8	13°52.0	13°40.1	13°28.0	13°16.0	13°03.8	12°51.6	12°39.2	12°26.8	12°14.4	12°01.8	-12.2	58.1
Sa 14	280°09.0	294°39.1	309°09.2	323°39.3	338°09.4	352°39.6	7°09.8	21°40.0	36°10.2	50°40.4	65°10.7	+30.2	16.0
	8°45.9	8°32.4	8°18.8	8°05.2	7°51.5	7°37.8	7°24.1	7°10.2	6°56.4	6°42.5	6°28.5	-13.7	58.6
Su 15	282°46.1	297°16.5	311°46.9	326°17.3	340°47.7	355°18.2	9°48.6	24°19.0	38°49.4	53°19.8	67°50.2	+30.4	16.1
	2°55.5	2°41.1	2°26.6	2°12.2	1°57.7	1°43.3	1°28.8	1°14.3	0°59.8	0°45.2	0°30.7	-14.5	58.9
Mo 16	285°25.1	299°55.3	314°25.4	328°55.6	343°25.7	357°55.8	12°25.9	26°55.9	41°25.9	55°55.9	70°25.9	+30.1	16.1
	-3°07.3	-3°21.7	-3°36.2	-3°50.6	-4°05.0	-4°19.4	-4°33.8	-4°48.2	-5°02.5	-5°16.8	-5°31.1	-14.4	59.1
Tu 17	287°51.0	302°20.4	316°49.7	331°19.0	345°48.2	0°17.4	14°46.5	29°15.5	43°44.6	58°13.5	72°42.4	+29.1	16.1
	-9°01.3	-9°15.0	-9°28.6	-9°42.2	-9°55.7	-10°09.2	-10°22.6	-10°36.0	-10°49.3	-11°02.5	-11°15.7	-13.4	59.2
◐ We 18	289°49.5	304°17.5	318°45.4	333°13.3	347°41.1	2°08.8	16°36.5	31°04.1	45°31.7	59°59.2	74°26.6	+27.7	16.2
	-14°25.2	-14°37.2	-14°49.2	-15°01.0	-15°12.8	-15°24.4	-15°36.0	-15°47.5	-15°58.9	-16°10.2	-16°21.4	-11.6	59.2
Th 19	291°10.0	305°36.4	320°02.7	334°28.9	348°55.1	3°21.2	17°47.3	32°13.2	46°39.2	61°05.0	75°30.8	+26.1	16.1
	-18°57.1	-19°06.6	-19°15.9	-19°25.2	-19°34.3	-19°43.3	-19°52.2	-20°01.0	-20°09.6	-20°18.1	-20°26.5	-8.9	59.2
Fr 20	291°50.9	306°15.8	320°40.6	335°05.5	349°30.2	3°55.0	18°19.7	32°44.3	47°08.9	61°33.5	75°58.0	+24.7	16.1
	-22°16.0	-22°22.2	-22°28.3	-22°34.1	-22°39.9	-22°45.5	-22°50.9	-22°56.2	-23°01.4	-23°06.4	-23°11.2	-5.5	59.0
Sa 21	292°02.6	306°26.7	320°50.8	335°15.0	349°39.1	4°03.2	18°27.3	32°51.5	47°15.6	61°39.7	76°03.8	+24.1	16.0
	-24°05.2	-24°07.5	-24°09.7	-24°11.7	-24°13.5	-24°15.2	-24°16.8	-24°18.1	-24°19.4	-24°20.4	-24°21.3	-1.6	58.8
Su 22	292°07.5	306°31.9	320°56.4	335°20.9	349°45.5	4°10.1	18°34.7	32°59.4	47°24.2	61°48.9	76°13.8	+24.6	15.9
	-24°15.4	-24°13.8	-24°12.0	-24°10.0	-24°07.9	-24°05.6	-24°03.1	-24°00.5	-23°57.8	-23°54.9	-23°51.9	+2.4	58.4
Mo 23	292°33.0	306°58.8	321°24.7	335°50.6	350°16.6	4°42.7	19°08.9	33°35.1	48°01.4	62°27.8	76°54.3	+26.1	15.8
	-22°48.6	-22°43.3	-22°37.8	-22°32.2	-22°26.5	-22°20.6	-22°14.6	-22°08.4	-22°02.2	-21°55.8	-21°49.2	+5.9	57.9
Tu 24	293°41.4	308°09.2	322°37.1	337°05.1	351°33.2	6°01.4	20°29.7	34°58.0	49°26.5	63°55.0	78°23.6	+28.2	15.6
	-19°57.1	-19°48.7	-19°40.2	-19°31.7	-19°23.0	-19°14.2	-19°05.3	-18°56.4	-18°47.3	-18°38.1	-18°28.9	+8.8	57.4
○ We 25	295°43.5	310°13.5	324°43.6	339°13.8	353°44.1	8°14.5	22°44.9	37°15.4	51°46.1	66°16.7	80°47.5	+30.4	15.5
	-15°59.7	-15°49.1	-15°38.5	-15°27.7	-15°17.0	-15°06.1	-14°55.2	-14°44.2	-14°33.2	-14°22.1	-14°10.9	+10.9	56.8
Th 26	298°38.4	313°10.4	327°42.5	342°14.6	356°46.8	11°19.1	25°51.4	40°23.8	54°56.3	69°28.8	84°01.4	+32.3	15.3
	-11°17.2	-11°05.3	-10°53.3	-10°41.2	-10°29.2	-10°17.1	-10°04.9	-9°52.7	-9°40.5	-9°28.3	-9°16.0	+12.1	56.1
Fr 27	302°17.2	316°50.7	331°24.2	345°57.8	0°31.4	15°05.1	29°38.8	44°12.6	58°46.4	73°20.2	87°54.1	+33.7	15.1
	-6°09.1	-5°56.5	-5°43.8	-5°31.2	-5°18.5	-5°05.9	-4°53.2	-4°40.5	-4°27.8	-4°15.1	-4°02.4	+12.7	55.5
Sa 28	306°26.7	321°01.1	335°35.6	350°10.1	4°44.5	19°19.1	33°53.6	48°28.1	63°02.7	77°37.3	92°11.9	+34.5	15.0
	-0°51.7	-0°39.0	-0°26.4	-0°13.7	-0°01.0	0°11.6	0°24.3	0°36.9	0°49.5	1°02.1	1°14.7	+12.6	55.0
Su 29	321°01.1	335°35.6	350°10.1	4°44.5	19°19.1	33°53.6	48°28.1	63°02.7	77°37.3	92°11.9	106°46.5	+34.5	15.0
	-0°39.0	-0°26.4	-0°13.7	-0°01.0	0°11.6	0°24.3	0°36.9	0°49.5	1°02.1	1°14.7	1°27.3	+12.6	55.0
Mo 30	325°27.3	340°02.1	354°36.8	9°11.6	23°46.4	38°21.1	52°55.9	67°30.7	82°05.4	96°40.2	111°14.9	+34.8	14.9
	4°33.6	4°45.9	4°58.1	5°10.3	5°22.5	5°34.6	5°46.7	5°58.8	6°10.8	6°22.8	6°34.8	+12.1	54.6
Tu 31	329°54.8	344°29.3	359°03.8	13°38.3	28°12.8	42°47.2	57°21.6	71°56.0	86°30.4	101°04.7	115°39.1	+34.4	14.8
	9°30.3	9°41.7	9°53.1	10°04.4	10°15.6	10°26.9	10°38.0	10°49.2	11°00.3	11°11.3	11°22.3	+11.2	54.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 3 17h57 — NM: 11 15h51 — FQ: 18 14h14 — FM: 25 13h35

SUN

August 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	268° 25.0	283° 25.0	298° 25.1	313° 25.1	328° 25.2	343° 25.2	358° 25.2	13° 25.3	28° 25.3	43° 25.4	58° 25.4	73° 25.5	+0.0
	17° 55.7	17° 55.1	17° 54.4	17° 53.8	17° 53.2	17° 52.5	17° 51.9	17° 51.3	17° 50.6	17° 50.0	17° 49.4	17° 48.7	-0.6
Th 2	268° 26.0	283° 26.1	298° 26.1	313° 26.2	328° 26.2	343° 26.3	358° 26.3	13° 26.4	28° 26.4	43° 26.5	58° 26.5	73° 26.6	+0.0
	17° 40.4	17° 39.7	17° 39.1	17° 38.4	17° 37.8	17° 37.1	17° 36.5	17° 35.8	17° 35.2	17° 34.5	17° 33.9	17° 33.2	-0.6
Fr 3	268° 27.2	283° 27.3	298° 27.3	313° 27.4	328° 27.4	343° 27.5	358° 27.5	13° 27.6	28° 27.6	43° 27.7	58° 27.8	73° 27.8	+0.1
	17° 24.7	17° 24.1	17° 23.4	17° 22.8	17° 22.1	17° 21.5	17° 20.8	17° 20.1	17° 19.5	17° 18.8	17° 18.1	17° 17.5	-0.7
Sa 4	268° 28.6	283° 28.6	298° 28.7	313° 28.7	328° 28.8	343° 28.9	358° 28.9	13° 29.0	28° 29.0	43° 29.1	58° 29.2	73° 29.2	+0.1
	17° 08.8	17° 08.2	17° 07.5	17° 06.8	17° 06.2	17° 05.5	17° 04.8	17° 04.1	17° 03.5	17° 02.8	17° 02.1	17° 01.4	-0.7
Su 5	268° 30.0	283° 30.1	298° 30.2	313° 30.2	328° 30.3	343° 30.4	358° 30.4	13° 30.5	28° 30.6	43° 30.6	58° 30.7	73° 30.8	+0.1
	16° 52.6	16° 52.0	16° 51.3	16° 50.6	16° 49.9	16° 49.2	16° 48.6	16° 47.9	16° 47.2	16° 46.5	16° 45.8	16° 45.1	-0.7
Mo 6	268° 31.7	283° 31.7	298° 31.8	313° 31.9	328° 31.9	343° 32.0	358° 32.1	13° 32.2	28° 32.2	43° 32.3	58° 32.4	73° 32.5	+0.1
	16° 36.2	16° 35.5	16° 34.8	16° 34.1	16° 33.4	16° 32.7	16° 32.0	16° 31.3	16° 30.6	16° 29.9	16° 29.2	16° 28.5	-0.7
Tu 7	268° 33.4	283° 33.5	298° 33.6	313° 33.7	328° 33.7	343° 33.8	358° 33.9	13° 34.0	28° 34.1	43° 34.1	58° 34.2	73° 34.3	+0.1
	16° 19.4	16° 18.7	16° 18.0	16° 17.3	16° 16.6	16° 15.9	16° 15.2	16° 14.5	16° 13.8	16° 13.1	16° 12.4	16° 11.7	-0.7
We 8	268° 35.3	283° 35.4	298° 35.5	313° 35.6	328° 35.7	343° 35.8	358° 35.9	13° 35.9	28° 36.0	43° 36.1	58° 36.2	73° 36.3	+0.1
	16° 02.4	16° 01.7	16° 01.0	16° 00.3	15° 59.6	15° 58.9	15° 58.2	15° 57.4	15° 56.7	15° 56.0	15° 55.3	15° 54.6	-0.7
Th 9	268° 37.4	283° 37.5	298° 37.6	313° 37.7	328° 37.8	343° 37.9	358° 37.9	13° 38.0	28° 38.1	43° 38.2	58° 38.3	73° 38.4	+0.1
	15° 45.2	15° 44.5	15° 43.7	15° 43.0	15° 42.3	15° 41.6	15° 40.8	15° 40.1	15° 39.4	15° 38.7	15° 37.9	15° 37.2	-0.7
Fr 10	268° 39.6	283° 39.7	298° 39.8	313° 39.9	328° 40.0	343° 40.1	358° 40.2	13° 40.3	28° 40.4	43° 40.5	58° 40.6	73° 40.7	+0.1
	15° 27.7	15° 27.0	15° 26.2	15° 25.5	15° 24.7	15° 24.0	15° 23.3	15° 22.5	15° 21.8	15° 21.1	15° 20.3	15° 19.6	-0.7
Sa 11	268° 42.0	283° 42.1	298° 42.2	313° 42.3	328° 42.4	343° 42.5	358° 42.6	13° 42.7	28° 42.8	43° 42.9	58° 43.0	73° 43.1	+0.1
	15° 09.9	15° 09.2	15° 08.4	15° 07.7	15° 07.0	15° 06.2	15° 05.5	15° 04.7	15° 04.0	15° 03.2	15° 02.5	15° 01.7	-0.7
Su 12	268° 44.5	283° 44.6	298° 44.7	313° 44.8	328° 44.9	343° 45.0	358° 45.1	13° 45.2	28° 45.3	43° 45.4	58° 45.4	73° 45.6	+0.1
	14° 51.9	14° 51.2	14° 50.4	14° 49.7	14° 48.9	14° 48.2	14° 47.4	14° 46.6	14° 45.9	14° 45.1	14° 44.4	14° 43.6	-0.8
Mo 13	268° 47.1	283° 47.2	298° 47.3	313° 47.4	328° 47.5	343° 47.6	358° 47.8	13° 47.9	28° 48.0	43° 48.1	58° 48.2	73° 48.3	+0.1
	14° 33.7	14° 32.9	14° 32.2	14° 31.4	14° 30.7	14° 29.9	14° 29.1	14° 28.4	14° 27.6	14° 26.8	14° 26.0	14° 25.3	-0.8
Tu 14	268° 49.9	283° 50.0	298° 50.1	313° 50.2	328° 50.3	343° 50.4	358° 50.6	13° 50.7	28° 50.8	43° 50.9	58° 51.1	73° 51.2	+0.1
	14° 15.3	14° 14.5	14° 13.7	14° 12.9	14° 12.2	14° 11.4	14° 10.6	14° 09.8	14° 09.0	14° 08.3	14° 07.5	14° 06.7	-0.8
We 15	268° 52.8	283° 52.9	298° 53.0	313° 53.1	328° 53.3	343° 53.4	358° 53.5	13° 53.6	28° 53.8	43° 53.9	58° 54.0	73° 54.1	+0.1
	13° 56.6	13° 55.8	13° 55.0	13° 54.2	13° 53.4	13° 52.6	13° 51.9	13° 51.1	13° 50.3	13° 49.5	13° 48.7	13° 47.9	-0.8
Th 16	268° 55.8	283° 55.9	298° 56.1	313° 56.2	328° 56.3	343° 56.5	358° 56.6	13° 56.7	28° 56.9	43° 57.0	58° 57.1	73° 57.3	+0.1
	13° 37.7	13° 36.9	13° 36.1	13° 35.3	13° 34.5	13° 33.7	13° 32.9	13° 32.1	13° 31.3	13° 30.5	13° 29.7	13° 28.9	-0.8
Fr 17	268° 59.0	283° 59.1	298° 59.3	313° 59.4	328° 59.5	343° 59.7	358° 59.8	13° 59.9	29° 00.1	44° 00.2	59° 00.4	74° 00.5	+0.1
	13° 18.5	13° 17.7	13° 16.9	13° 16.1	13° 15.3	13° 14.5	13° 13.7	13° 12.9	13° 12.1	13° 11.3	13° 10.5	13° 09.7	-0.8
Sa 18	269° 02.3	284° 02.4	299° 02.6	314° 02.7	329° 02.9	344° 03.0	359° 03.2	14° 03.3	29° 03.4	44° 03.6	59° 03.7	74° 03.9	+0.1
	12° 59.2	12° 58.4	12° 57.6	12° 56.8	12° 56.0	12° 55.2	12° 54.3	12° 53.5	12° 52.7	12° 51.9	12° 51.1	12° 50.3	-0.8
Su 19	269° 05.8	284° 05.9	299° 06.0	314° 06.2	329° 06.3	344° 06.5	359° 06.6	14° 06.8	29° 06.9	44° 07.1	59° 07.2	74° 07.4	+0.1
	12° 39.7	12° 38.9	12° 38.0	12° 37.2	12° 36.4	12° 35.6	12° 34.8	12° 33.9	12° 33.1	12° 32.3	12° 31.5	12° 30.7	-0.8
Mo 20	269° 09.3	284° 09.5	299° 09.6	314° 09.8	329° 09.9	344° 10.1	359° 10.2	14° 10.4	29° 10.5	44° 10.7	59° 10.8	74° 11.0	+0.2
	12° 20.0	12° 19.1	12° 18.3	12° 17.5	12° 16.6	12° 15.8	12° 15.0	12° 14.2	12° 13.3	12° 12.5	12° 11.7	12° 10.8	-0.8
Tu 21	269° 13.0	284° 13.2	299° 13.3	314° 13.5	329° 13.6	344° 13.8	359° 13.9	14° 14.1	29° 14.3	44° 14.4	59° 14.6	74° 14.7	+0.2
	12° 00.0	11° 59.2	11° 58.4	11° 57.5	11° 56.7	11° 55.9	11° 55.0	11° 54.2	11° 53.3	11° 52.5	11° 51.7	11° 50.8	-0.8
We 22	269° 16.8	284° 17.0	299° 17.1	314° 17.3	329° 17.5	344° 17.6	359° 17.8	14° 17.9	29° 18.1	44° 18.3	59° 18.4	74° 18.6	+0.2
	11° 39.9	11° 39.1	11° 38.2	11° 37.4	11° 36.5	11° 35.7	11° 34.9	11° 34.0	11° 33.2	11° 32.3	11° 31.5	11° 30.6	-0.8
Th 23	269° 20.7	284° 20.9	299° 21.1	314° 21.2	329° 21.4	344° 21.6	359° 21.7	14° 21.9	29° 22.1	44° 22.2	59° 22.4	74° 22.6	+0.2
	11° 19.6	11° 18.8	11° 17.9	11° 17.1	11° 16.2	11° 15.4	11° 14.5	11° 13.7	11° 12.8	11° 12.0	11° 11.1	11° 10.3	-0.9
Fr 24	269° 24.8	284° 24.9	299° 25.1	314° 25.3	329° 25.4	344° 25.6	359° 25.8	14° 26.0	29° 26.1	44° 26.3	59° 26.5	74° 26.6	+0.2
	10° 59.1	10° 58.3	10° 57.4	10° 56.6	10° 55.7	10° 54.9	10° 54.0	10° 53.1	10° 52.3	10° 51.4	10° 50.6	10° 49.7	-0.9
Sa 25	269° 28.9	284° 29.1	299° 29.2	314° 29.4	329° 29.6	344° 29.8	359° 29.9	14° 30.1	29° 30.3	44° 30.5	59° 30.6	74° 30.8	+0.2
	10° 38.5	10° 37.6	10° 36.8	10° 35.9	10° 35.0	10° 34.2	10° 33.3	10° 32.4	10° 31.6	10° 30.7	10° 29.8	10° 29.0	-0.9
Su 26	269° 33.1	284° 33.3	299° 33.5	314° 33.7	329° 33.8	344° 34.0	359° 34.2	14° 34.4	29° 34.6	44° 34.7	59° 34.9	74° 35.1	+0.2
	10° 17.7	10° 16.8	10° 15.9	10° 15.1	10° 14.2	10° 13.3	10° 12.5	10° 11.6	10° 10.7	10° 09.8	10° 09.0	10° 08.1	-0.9
Mo 27	269° 37.5	284° 37.6	299° 37.8	314° 38.0	329° 38.2	344° 38.4	359° 38.6	14° 38.7	29° 38.9	44° 39.1	59° 39.3	74° 39.5	+0.2
	9° 56.7	9° 55.8	9° 54.9	9° 54.1	9° 53.2	9° 52.3	9° 51.4	9° 50.5	9° 49.7	9° 48.8	9° 47.9	9° 47.0	-0.9
Tu 28	269° 41.9	284° 42.1	299° 42.2	314° 42.4	329° 42.6	344° 42.8	359° 43.0	14° 43.2	29° 43.4	44° 43.6	59° 43.7	74° 43.9	+0.2
	9° 35.6	9° 34.7	9° 33.8	9° 32.9	9° 32.0	9° 31.1	9° 30.2	9° 29.4	9° 28.5	9° 27.6	9° 26.7	9° 25.8	-0.9
We 29	269° 46.4	284° 46.6	299° 46.8	314° 47.0	329° 47.1	344° 47.3	359° 47.5	14° 47.7	29° 47.9	44° 48.1	59° 48.3	74° 48.5	+0.2
	9° 14.3	9° 13.4	9° 12.5	9° 11.6	9° 10.7	9° 09.8	9° 08.9	9° 08.0	9° 07.1	9° 06.2	9° 05.3	9° 04.5	-0.9
Th 30	269° 51.0	284° 51.2	299° 51.4	314° 51.5	329° 51.7	344° 51.9	359° 52.1	14° 52.3	29° 52.5	44° 52.7	59° 52.9	74° 53.1	+0.2
	8° 52.8	8° 51.9	8° 51.0	8° 50.1	8° 49.2	8° 48.3	8° 47.4	8° 46.5	8° 45.6	8° 44.7	8° 43.8	8° 42.9	-0.9
Fr 31	269° 55.6	284° 55.8	299° 56.0	314° 56.2	329° 56.4	344° 56.6	359° 56.8	14° 57.0	29° 57.2	44° 57.4	59° 57.6	74° 57.8	+0.2
	8° 31.2	8° 30.3	8° 29.4	8° 28.5	8° 27.6	8° 26.7	8° 25.8	8° 24.9	8° 24.0	8° 23.1	8° 22.2	8° 21.3	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2029

D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
We 1	236°11.6	250°44.5	265°17.5	279°50.3	294°23.2	308°55.9	323°28.7	338°01.3	352°33.9	7°06.5	21°39.0	+32.7	14.8
	16°54.2	17°03.2	17°12.1	17°21.0	17°29.7	17°38.5	17°47.1	17°55.7	18°04.2	18°12.6	18°20.9	+8.7	54.2
◑ Th 2	239°39.8	254°11.4	268°42.9	283°14.4	297°45.8	312°17.2	326°48.5	341°19.7	355°50.8	10°22.0	24°53.0	+31.3	14.8
	20°16.5	20°23.5	20°30.5	20°37.3	20°44.1	20°50.8	20°57.4	21°03.9	21°10.3	21°16.6	21°22.8	+6.6	54.4
Fr 3	242°31.5	257°01.6	271°31.6	286°01.6	300°31.5	315°01.3	329°31.1	344°00.9	358°30.5	13°00.2	27°29.7	+29.8	14.9
	22°44.3	22°48.9	22°53.5	22°57.9	23°02.2	23°06.4	23°10.4	23°14.4	23°18.3	23°22.0	23°25.7	+4.1	54.8
Sa 4	257°01.6	271°31.6	286°01.6	300°31.5	315°01.3	329°31.1	344°00.9	358°30.5	13°00.2	27°29.7	41°59.2	+29.8	15.0
	22°48.9	22°53.5	22°57.9	23°02.2	23°06.4	23°10.4	23°14.4	23°18.3	23°22.0	23°25.7	23°29.2	+4.0	54.8
Su 5	259°15.5	273°44.2	288°12.9	302°41.5	317°10.0	331°38.5	346°07.0	0°35.4	15°03.8	29°32.1	44°00.4	+28.5	15.1
	24°08.3	24°09.9	24°11.5	24°12.9	24°14.2	24°15.3	24°16.3	24°17.3	24°18.0	24°18.7	24°19.2	+1.1	55.4
Mo 6	261°00.8	275°28.6	289°56.3	304°24.1	318°51.8	333°19.5	347°47.2	2°14.8	16°42.5	31°10.1	45°37.7	+27.7	15.3
	24°11.7	24°10.2	24°08.5	24°06.7	24°04.7	24°02.7	24°00.5	23°58.1	23°55.6	23°53.0	23°50.3	-2.1	56.1
Tu 7	262°30.6	276°58.1	291°25.6	305°53.1	320°20.6	334°48.1	349°15.6	3°43.1	18°10.6	32°38.1	47°05.7	+27.5	15.5
	22°53.1	22°48.2	22°43.2	22°38.0	22°32.8	22°27.4	22°21.8	22°16.1	22°10.3	22°04.4	21°58.3	-5.5	56.8
We 8	264°00.2	278°28.0	292°55.7	307°23.5	321°51.4	336°19.2	350°47.1	5°15.0	19°42.9	34°10.9	48°38.8	+27.9	15.7
	20°12.0	20°03.9	19°55.7	19°47.3	19°38.9	19°30.3	19°21.6	19°12.8	19°03.9	18°54.8	18°45.6	-8.6	57.6
Th 9	265°41.5	280°09.9	294°38.4	309°06.8	323°35.3	338°03.8	352°32.3	7°00.9	21°29.5	35°58.1	50°26.8	+28.5	15.9
	16°14.9	16°04.0	15°53.0	15°41.9	15°30.7	15°19.4	15°08.0	14°56.5	14°44.9	14°33.2	14°21.5	-11.3	58.4
● Fr 10	267°39.8	282°08.9	296°38.0	311°07.1	325°36.2	340°05.4	354°34.6	9°03.8	23°33.0	38°02.3	52°31.5	+29.2	16.1
	11°14.8	11°01.7	10°48.6	10°35.4	10°22.1	10°08.8	9°55.3	9°41.9	9°28.3	9°14.7	9°01.1	-13.4	59.0
Sa 11	269°52.5	284°22.0	298°51.5	313°21.0	327°50.6	342°20.1	356°49.6	11°19.2	25°48.7	40°18.3	54°47.8	+29.5	16.2
	5°30.0	5°15.5	5°01.1	4°46.6	4°32.1	4°17.5	4°02.9	3°48.3	3°33.6	3°19.0	3°04.3	-14.6	59.4
Su 12	272°11.0	286°40.5	301°10.0	315°39.4	330°08.9	344°38.3	359°07.7	13°37.2	28°06.6	42°35.9	57°05.3	+29.4	16.3
	-0°38.0	-0°52.8	-1°07.7	-1°22.6	-1°37.4	-1°52.3	-2°07.1	-2°21.9	-2°36.8	-2°51.6	-3°06.4	-14.8	59.7
Mo 13	274°23.0	288°51.9	303°20.9	317°49.7	332°18.6	346°47.4	1°16.2	15°45.0	30°13.7	44°42.4	59°11.0	+28.8	16.3
	-6°45.5	-6°59.8	-7°14.1	-7°28.4	-7°42.6	-7°56.8	-8°10.9	-8°25.0	-8°39.1	-8°53.0	-9°07.0	-14.2	59.8
Tu 14	276°15.6	290°43.6	305°11.5	319°39.3	334°07.1	348°34.9	3°02.6	17°30.2	31°57.8	46°25.4	60°52.9	+27.7	16.3
	-12°28.5	-12°41.4	-12°54.2	-13°06.9	-13°19.6	-13°32.1	-13°44.6	-13°57.0	-14°09.3	-14°21.5	-14°33.6	-12.5	59.7
We 15	277°39.1	292°05.7	306°32.3	320°58.8	335°25.3	349°51.8	4°18.2	18°44.5	33°10.8	47°37.0	62°03.2	+26.4	16.2
	-17°23.8	-17°34.3	-17°44.7	-17°55.0	-18°05.1	-18°15.2	-18°25.1	-18°34.9	-18°44.6	-18°54.2	-19°03.6	-10.0	59.4
◐ Th 16	278°30.0	292°55.4	307°20.8	321°46.2	336°11.5	350°36.7	5°02.0	19°27.2	33°52.3	48°17.4	62°42.5	+25.2	16.1
	-21°10.0	-21°17.4	-21°24.6	-21°31.7	-21°38.6	-21°45.4	-21°52.1	-21°58.6	-22°04.9	-22°11.2	-22°17.2	-6.7	59.0
Fr 17	278°55.5	293°20.2	307°44.9	322°09.6	336°34.3	350°58.9	5°23.6	19°48.2	34°12.9	48°37.5	63°02.2	+24.7	16.0
	-23°30.5	-23°34.2	-23°37.7	-23°41.0	-23°44.3	-23°47.3	-23°50.2	-23°52.9	-23°55.5	-23°58.0	-24°00.2	-3.0	58.6
Sa 18	279°12.9	293°37.7	308°02.6	322°27.5	336°52.4	351°17.4	5°42.4	20°07.4	34°32.4	48°57.5	63°22.7	+25.0	15.9
	-24°15.7	-24°15.5	-24°15.1	-24°14.6	-24°13.9	-24°13.1	-24°12.1	-24°11.0	-24°09.7	-24°08.3	-24°06.7	+0.9	58.1
Su 19	279°45.1	294°11.0	308°37.0	323°03.0	337°29.1	351°55.2	6°21.5	20°47.8	35°14.1	49°40.5	64°07.0	+26.2	15.7
	-23°25.4	-23°21.5	-23°17.4	-23°13.2	-23°08.9	-23°04.5	-22°59.9	-22°55.2	-22°50.3	-22°45.4	-22°40.2	+4.5	57.6
Mo 20	280°52.8	295°20.5	309°48.2	324°16.0	338°43.9	353°11.9	7°39.9	22°08.1	36°36.3	51°04.6	65°32.9	+28.0	15.6
	-21°08.5	-21°01.4	-20°54.2	-20°47.0	-20°39.5	-20°32.0	-20°24.4	-20°16.7	-20°08.8	-20°00.9	-19°52.9	+7.6	57.1
Tu 21	282°48.1	297°17.7	311°47.5	326°17.3	340°47.2	355°17.2	9°47.2	24°17.3	38°47.5	53°17.8	67°48.2	+30.0	15.4
	-17°40.6	-17°31.1	-17°21.5	-17°11.8	-17°02.0	-16°52.1	-16°42.2	-16°32.2	-16°22.1	-16°11.9	-16°01.7	+9.9	56.6
We 22	285°32.6	300°04.1	314°35.7	329°07.4	343°39.1	358°10.9	12°42.8	27°14.8	41°46.8	56°18.8	70°51.0	+31.8	15.3
	-13°20.1	-13°08.9	-12°57.6	-12°46.2	-12°34.8	-12°23.4	-12°11.9	-12°00.3	-11°48.7	-11°37.1	-11°25.4	+11.5	56.1
Th 23	289°00.1	303°33.2	318°06.3	332°39.4	347°12.6	1°45.9	16°19.2	30°52.5	45°25.9	59°59.4	74°32.9	+33.3	15.2
	-8°25.5	-8°13.3	-8°01.0	-7°48.7	-7°36.3	-7°24.0	-7°11.6	-6°59.2	-6°46.8	-6°34.4	-6°21.9	+12.4	55.6
○ Fr 24	292°59.9	307°34.0	322°08.1	336°42.2	351°16.4	5°50.6	20°24.8	34°59.1	49°33.4	64°07.7	78°42.0	+34.2	15.0
	-3°13.5	-3°00.9	-2°48.3	-2°35.6	-2°23.0	-2°10.4	-1°57.7	-1°45.1	-1°32.5	-1°19.8	-1°07.2	+12.6	55.1
Sa 25	297°19.2	311°53.8	326°28.4	341°03.0	355°37.7	10°12.3	24°46.9	39°21.6	53°56.2	68°30.8	83°05.5	+34.6	14.9
	2°01.2	2°13.6	2°26.1	2°38.5	2°50.9	3°03.3	3°15.7	3°28.0	3°40.3	3°52.6	4°04.9	+12.4	54.7
Su 26	301°45.1	316°19.7	330°54.2	345°28.8	0°03.4	14°37.9	29°12.5	43°47.0	58°21.5	72°56.0	87°30.4	+34.5	14.8
	7°05.9	7°17.7	7°29.5	7°41.2	7°52.9	8°04.6	8°16.2	8°27.8	8°39.4	8°50.9	9°02.4	+11.7	54.4
Mo 27	306°05.1	320°39.2	335°13.3	349°47.3	4°21.4	18°55.4	33°29.3	48°03.3	62°37.2	77°11.0	91°44.9	+34.0	14.8
	11°49.3	12°00.0	12°10.7	12°21.4	12°32.0	12°42.5	12°53.0	13°03.4	13°13.8	13°24.1	13°34.3	+10.5	54.2
Tu 28	320°39.2	335°13.3	349°47.3	4°21.4	18°55.4	33°29.3	48°03.3	62°37.2	77°11.0	91°44.9	106°18.7	+34.0	14.8
	12°00.0	12°10.7	12°21.4	12°32.0	12°42.5	12°53.0	13°03.4	13°13.8	13°24.1	13°34.3	13°44.5	+10.5	54.1
We 29	324°41.4	339°14.5	353°47.7	8°20.8	22°53.9	37°26.9	51°59.9	66°32.8	81°05.7	95°38.5	110°11.3	+33.0	14.7
	16°10.2	16°19.4	16°28.5	16°37.6	16°46.6	16°55.5	17°04.3	17°13.1	17°21.8	17°30.4	17°39.0	+8.9	54.1
Th 30	328°17.4	342°49.4	357°21.4	11°53.3	26°25.2	40°57.0	55°28.7	70°00.4	84°32.1	99°03.7	113°35.2	+31.8	14.8
	19°38.0	19°45.2	19°52.4	19°59.5	20°06.6	20°13.5	20°20.4	20°27.1	20°33.8	20°40.4	20°46.9	+6.9	54.2
Fr 31	331°22.1	345°52.8	0°23.5	14°54.1	29°24.6	43°55.1	58°25.6	72°56.0	87°26.3	101°56.6	116°26.9	+30.5	14.8
	22°13.0	22°18.0	22°22.9	22°27.6	22°32.3	22°36.9	22°41.3	22°45.7	22°49.9	22°54.0	22°58.1	+4.5	54.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 2 11h15 — NM: 10 01h55 — FQ: 16 18h55 — FM: 24 01h51

SUN

September 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	270°00.4	285°00.6	300°00.8	315°01.0	330°01.2	345°01.4	0°01.6	15°01.8	30°02.0	45°02.2	60°02.4	75°02.6	+0.2
	8°09.5	8°08.6	8°07.7	8°06.8	8°05.9	8°05.0	8°04.1	8°03.1	8°02.2	8°01.3	8°00.4	7°59.5	-0.9
Su 2	270°05.2	285°05.4	300°05.6	315°05.8	330°06.0	345°06.2	0°06.4	15°06.6	30°06.8	45°07.0	60°07.2	75°07.4	+0.2
	7°47.6	7°46.7	7°45.8	7°44.9	7°44.0	7°43.1	7°42.2	7°41.2	7°40.3	7°39.4	7°38.5	7°37.6	-0.9
Mo 3	270°10.1	285°10.3	300°10.5	315°10.7	330°10.9	345°11.1	0°11.3	15°11.5	30°11.7	45°11.9	60°12.1	75°12.3	+0.2
	7°25.7	7°24.7	7°23.8	7°22.9	7°22.0	7°21.1	7°20.1	7°19.2	7°18.3	7°17.4	7°16.5	7°15.5	-0.9
Tu 4	270°15.0	285°15.2	300°15.4	315°15.6	330°15.8	345°16.0	0°16.2	15°16.4	30°16.7	45°16.9	60°17.1	75°17.3	+0.2
	7°03.5	7°02.6	7°01.7	7°00.8	6°59.9	6°58.9	6°58.0	6°57.1	6°56.2	6°55.2	6°54.3	6°53.4	-0.9
We 5	270°20.0	285°20.2	300°20.4	315°20.6	330°20.8	345°21.0	0°21.2	15°21.5	30°21.7	45°21.9	60°22.1	75°22.3	+0.2
	6°41.3	6°40.4	6°39.5	6°38.5	6°37.6	6°36.7	6°35.8	6°34.8	6°33.9	6°33.0	6°32.0	6°31.1	-0.9
Th 6	270°25.0	285°25.2	300°25.4	315°25.7	330°25.9	345°26.1	0°26.3	15°26.5	30°26.7	45°26.9	60°27.1	75°27.4	+0.2
	6°19.0	6°18.1	6°17.1	6°16.2	6°15.3	6°14.3	6°13.4	6°12.5	6°11.5	6°10.6	6°09.7	6°08.7	-0.9
Fr 7	270°30.1	285°30.3	300°30.5	315°30.8	330°31.0	345°31.2	0°31.4	15°31.6	30°31.8	45°32.0	60°32.3	75°32.5	+0.2
	5°56.5	5°55.6	5°54.7	5°53.7	5°52.8	5°51.9	5°50.9	5°50.0	5°49.0	5°48.1	5°47.2	5°46.2	-0.9
Sa 8	270°35.3	285°35.5	300°35.7	315°35.9	330°36.1	345°36.3	0°36.5	15°36.8	30°37.0	45°37.2	60°37.4	75°37.6	+0.2
	5°34.0	5°33.1	5°32.1	5°31.2	5°30.2	5°29.3	5°28.4	5°27.4	5°26.5	5°25.5	5°24.6	5°23.7	-0.9
Su 9	270°40.4	285°40.7	300°40.9	315°41.1	330°41.3	345°41.5	0°41.7	15°42.0	30°42.2	45°42.4	60°42.6	75°42.8	+0.2
	5°11.4	5°10.4	5°09.5	5°08.5	5°07.6	5°06.7	5°05.7	5°04.8	5°03.8	5°02.9	5°01.9	5°01.0	-0.9
Mo 10	270°45.6	285°45.9	300°46.1	315°46.3	330°46.5	345°46.7	0°47.0	15°47.2	30°47.4	45°47.6	60°47.8	75°48.1	+0.2
	4°48.7	4°47.7	4°46.8	4°45.8	4°44.9	4°43.9	4°43.0	4°42.0	4°41.1	4°40.1	4°39.2	4°38.2	-0.9
Tu 11	270°50.9	285°51.1	300°51.3	315°51.6	330°51.8	345°52.0	0°52.2	15°52.4	30°52.7	45°52.9	60°53.1	75°53.3	+0.2
	4°25.9	4°24.9	4°24.0	4°23.0	4°22.1	4°21.1	4°20.2	4°19.2	4°18.2	4°17.3	4°16.3	4°15.4	-1.0
We 12	270°56.2	285°56.4	300°56.6	315°56.8	330°57.1	345°57.3	0°57.5	15°57.7	30°57.9	45°58.2	60°58.4	75°58.6	+0.2
	4°03.0	4°02.0	4°01.1	4°00.1	3°59.2	3°58.2	3°57.3	3°56.3	3°55.3	3°54.4	3°53.4	3°52.5	-1.0
Th 13	271°01.5	286°01.7	301°01.9	316°02.2	331°02.4	346°02.6	1°02.8	16°03.0	31°03.3	46°03.5	61°03.7	76°03.9	+0.2
	3°40.0	3°39.1	3°38.1	3°37.2	3°36.2	3°35.3	3°34.3	3°33.3	3°32.4	3°31.4	3°30.5	3°29.5	-1.0
Fr 14	271°06.8	286°07.0	301°07.3	316°07.5	331°07.7	346°07.9	1°08.2	16°08.4	31°08.6	46°08.8	61°09.0	76°09.3	+0.2
	3°17.0	3°16.1	3°15.1	3°14.2	3°13.2	3°12.2	3°11.3	3°10.3	3°09.4	3°08.4	3°07.4	3°06.5	-1.0
Sa 15	271°12.2	286°12.4	301°12.6	316°12.8	331°13.1	346°13.3	1°13.5	16°13.7	31°13.9	46°14.2	61°14.4	76°14.6	+0.2
	2°54.0	2°53.0	2°52.0	2°51.1	2°50.1	2°49.2	2°48.2	2°47.2	2°46.3	2°45.3	2°44.3	2°43.4	-1.0
Su 16	271°17.5	286°17.7	301°18.0	316°18.2	331°18.4	346°18.6	1°18.9	16°19.1	31°19.3	46°19.5	61°19.8	76°20.0	+0.2
	2°30.8	2°29.9	2°28.9	2°28.0	2°27.0	2°26.0	2°25.1	2°24.1	2°23.1	2°22.2	2°21.2	2°20.2	-1.0
Mo 17	271°22.9	286°23.1	301°23.3	316°23.6	331°23.8	346°24.0	1°24.2	16°24.5	31°24.7	46°24.9	61°25.1	76°25.3	+0.2
	2°07.7	2°06.7	2°05.8	2°04.8	2°03.8	2°02.9	2°01.9	2°00.9	2°00.0	1°59.0	1°58.0	1°57.1	-1.0
Tu 18	271°28.3	286°28.5	301°28.7	316°28.9	331°29.1	346°29.4	1°29.6	16°29.8	31°30.0	46°30.3	61°30.5	76°30.7	+0.2
	1°44.5	1°43.5	1°42.5	1°41.6	1°40.6	1°39.6	1°38.7	1°37.7	1°36.7	1°35.8	1°34.8	1°33.8	-1.0
We 19	271°33.6	286°33.8	301°34.1	316°34.3	331°34.5	346°34.7	1°35.0	16°35.2	31°35.4	46°35.6	61°35.9	76°36.1	+0.2
	1°21.2	1°20.3	1°19.3	1°18.3	1°17.4	1°16.4	1°15.4	1°14.4	1°13.5	1°12.5	1°11.5	1°10.6	-1.0
Th 20	271°39.0	286°39.2	301°39.4	316°39.6	331°39.9	346°40.1	1°40.3	16°40.5	31°40.8	46°41.0	61°41.2	76°41.4	+0.2
	0°58.0	0°57.0	0°56.0	0°55.0	0°54.1	0°53.1	0°52.1	0°51.2	0°50.2	0°49.2	0°48.2	0°47.3	-1.0
Fr 21	271°44.3	286°44.5	301°44.8	316°45.0	331°45.2	346°45.4	1°45.6	16°45.9	31°46.1	46°46.3	61°46.5	76°46.8	+0.2
	0°34.6	0°33.7	0°32.7	0°31.7	0°30.8	0°29.8	0°28.8	0°27.8	0°26.9	0°25.9	0°24.9	0°24.0	-1.0
Sa 22	271°49.6	286°49.9	301°50.1	316°50.3	331°50.5	346°50.7	1°51.0	16°51.2	31°51.4	46°51.6	61°51.8	76°52.1	+0.2
	0°11.3	0°10.4	0°09.4	0°08.4	0°07.4	0°06.5	0°05.5	0°04.5	0°03.5	0°02.6	0°01.6	0°00.6	-1.0
Su 23	271°54.9	286°55.1	301°55.4	316°55.6	331°55.8	346°56.0	1°56.2	16°56.5	31°56.7	46°56.9	61°57.1	76°57.3	+0.2
	-0°12.0	-0°13.0	-0°14.0	-0°14.9	-0°15.9	-0°16.9	-0°17.9	-0°18.8	-0°19.8	-0°20.8	-0°21.7	-0°22.7	-1.0
Mo 24	272°00.2	287°00.4	302°00.6	317°00.8	332°01.1	347°01.3	2°01.5	17°01.7	32°01.9	47°02.1	62°02.4	77°02.6	+0.2
	-0°35.4	-0°36.3	-0°37.3	-0°38.3	-0°39.3	-0°40.2	-0°41.2	-0°42.2	-0°43.2	-0°44.1	-0°45.1	-0°46.1	-1.0
Tu 25	272°05.4	287°05.6	302°05.8	317°06.0	332°06.3	347°06.5	2°06.7	17°06.9	32°07.1	47°07.3	62°07.6	77°07.8	+0.2
	-0°58.7	-0°59.7	-1°00.7	-1°01.6	-1°02.6	-1°03.6	-1°04.6	-1°05.5	-1°06.5	-1°07.5	-1°08.5	-1°09.4	-1.0
We 26	272°10.6	287°10.8	302°11.0	317°11.2	332°11.4	347°11.6	2°11.9	17°12.1	32°12.3	47°12.5	62°12.7	77°12.9	+0.2
	-1°22.1	-1°23.1	-1°24.0	-1°25.0	-1°26.0	-1°26.9	-1°27.9	-1°28.9	-1°29.9	-1°30.8	-1°31.8	-1°32.8	-1.0
Th 27	272°15.7	287°15.9	302°16.1	317°16.3	332°16.5	347°16.8	2°17.0	17°17.2	32°17.4	47°17.6	62°17.8	77°18.0	+0.2
	-1°45.4	-1°46.4	-1°47.4	-1°48.3	-1°49.3	-1°50.3	-1°51.3	-1°52.2	-1°53.2	-1°54.2	-1°55.2	-1°56.1	-1.0
Fr 28	272°20.8	287°21.0	302°21.2	317°21.4	332°21.6	347°21.8	2°22.0	17°22.2	32°22.4	47°22.7	62°22.9	77°23.1	+0.2
	-2°08.8	-2°09.7	-2°10.7	-2°11.7	-2°12.7	-2°13.6	-2°14.6	-2°15.6	-2°16.5	-2°17.5	-2°18.5	-2°19.5	-1.0
Sa 29	272°25.8	287°26.0	302°26.2	317°26.4	332°26.6	347°26.8	2°27.0	17°27.2	32°27.4	47°27.6	62°27.8	77°28.0	+0.2
	-2°32.1	-2°33.1	-2°34.0	-2°35.0	-2°36.0	-2°37.0	-2°37.9	-2°38.9	-2°39.9	-2°40.8	-2°41.8	-2°42.8	-1.0
Su 30	272°30.7	287°30.9	302°31.1	317°31.3	332°31.5	347°31.7	2°31.9	17°32.1	32°32.3	47°32.5	62°32.8	77°33.0	+0.2
	-2°55.4	-2°56.4	-2°57.3	-2°58.3	-2°59.3	-3°00.2	-3°01.2	-3°02.2	-3°03.2	-3°04.1	-3°05.1	-3°06.1	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2029

	D	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	Δ'/h	SH
◑	Sa 1	234°39.6	249°08.4	263°37.1	278°05.9	292°34.6	307°03.3	321°31.9	336°00.5	350°29.1	4°57.7	19°26.2	+28.7	15.1
		24°08.2	24°08.3	24°08.3	24°08.2	24°07.9	24°07.6	24°07.1	24°06.4	24°05.7	24°04.8	24°03.8	-0.4	55.3
	Su 2	236°31.6	250°59.8	265°28.0	279°56.2	294°24.4	308°52.5	323°20.7	337°48.8	352°17.0	6°45.1	21°13.2	+28.2	15.3
		23°33.6	23°30.6	23°27.4	23°24.1	23°20.7	23°17.1	23°13.5	23°09.7	23°05.7	23°01.7	22°57.5	-3.6	56.1
	Mo 3	250°59.8	265°28.0	279°56.2	294°24.4	308°52.5	323°20.7	337°48.8	352°17.0	6°45.1	21°13.2	35°41.3	+28.2	15.3
		23°30.6	23°27.4	23°24.1	23°20.7	23°17.1	23°13.5	23°09.7	23°05.7	23°01.7	22°57.5	22°53.1	-3.7	56.1
	Tu 4	252°42.7	267°10.8	281°39.0	296°07.1	310°35.2	325°03.3	339°31.4	353°59.6	8°27.7	22°55.9	37°24.0	+28.1	15.5
		21°33.0	21°26.7	21°20.2	21°13.6	21°06.9	21°00.0	20°53.0	20°45.9	20°38.7	20°31.4	20°23.9	-6.9	57.0
	We 5	254°27.8	268°56.2	283°24.5	297°52.9	312°21.3	326°49.7	341°18.2	355°46.6	10°15.1	24°43.6	39°12.0	+28.4	15.8
		18°17.5	18°08.2	17°58.7	17°49.1	17°39.5	17°29.7	17°19.7	17°09.7	16°59.6	16°49.4	16°39.0	-9.9	57.9
	Th 6	256°21.3	270°50.0	285°18.7	299°47.5	314°16.3	328°45.1	343°13.9	357°42.7	12°11.5	26°40.4	41°09.2	+28.8	16.0
		13°51.7	13°39.8	13°27.8	13°15.7	13°03.5	12°51.2	12°38.8	12°26.4	12°13.8	12°01.2	11°48.5	-12.3	58.8
	Fr 7	258°23.1	272°52.1	287°21.1	301°50.1	316°19.1	330°48.1	345°17.1	359°46.1	14°15.1	28°44.1	43°13.1	+29.0	16.2
		8°28.9	8°15.1	8°01.2	7°47.2	7°33.2	7°19.1	7°05.0	6°50.8	6°36.5	6°22.3	6°07.9	-14.1	59.6
●	Sa 8	260°27.5	274°56.4	289°25.2	303°54.1	318°23.0	332°51.8	347°20.6	1°49.4	16°18.2	30°47.0	45°15.7	+28.8	16.4
		2°27.9	2°13.0	1°58.1	1°43.1	1°28.1	1°13.1	0°58.1	0°43.1	0°28.0	0°12.9	-0°02.1	-15.0	60.2
	Su 9	262°24.2	276°52.6	291°20.9	305°49.2	320°17.4	334°45.6	349°13.8	3°42.0	18°10.1	32°38.1	47°06.2	+28.2	16.5
		-3°48.1	-4°03.1	-4°18.1	-4°33.0	-4°48.0	-5°02.9	-5°17.7	-5°32.6	-5°47.4	-6°02.2	-6°16.9	-14.9	60.5
	Mo 10	264°01.8	278°29.2	292°56.5	307°23.7	321°50.9	336°18.1	350°45.2	5°12.3	19°39.3	34°06.3	48°33.2	+27.1	16.5
		-9°52.9	-10°06.8	-10°20.7	-10°34.6	-10°48.3	-11°02.0	-11°15.7	-11°29.2	-11°42.7	-11°56.1	-12°09.4	-13.7	60.6
	Tu 11	265°10.7	279°36.8	294°02.9	308°28.9	322°54.8	337°20.7	351°46.5	6°12.3	20°38.0	35°03.7	49°29.3	+25.9	16.5
		-15°18.9	-15°30.7	-15°42.5	-15°54.1	-16°05.7	-16°17.1	-16°28.4	-16°39.6	-16°50.7	-17°01.7	-17°12.6	-11.4	60.4
	We 12	265°47.8	280°12.7	294°37.6	309°02.4	323°27.1	337°51.8	352°16.5	6°41.2	21°05.8	35°30.3	49°54.9	+24.7	16.3
		-19°40.5	-19°49.3	-19°58.0	-20°06.5	-20°14.9	-20°23.1	-20°31.3	-20°39.2	-20°47.0	-20°54.7	-21°02.3	-8.2	59.9
	Th 13	265°59.8	280°24.0	294°48.1	309°12.3	323°36.4	338°00.6	352°24.7	6°48.8	21°12.9	35°37.1	50°01.2	+24.1	16.2
		-22°37.2	-22°42.3	-22°47.3	-22°52.1	-22°56.7	-23°01.2	-23°05.5	-23°09.6	-23°13.6	-23°17.5	-23°21.2	-4.4	59.3
	Fr 14	266°04.0	280°28.4	294°52.7	309°17.1	323°41.5	338°06.0	352°30.5	6°55.0	21°19.6	35°44.1	50°08.8	+24.5	16.0
		-23°57.2	-23°58.4	-23°59.3	-24°00.2	-24°00.8	-24°01.3	-24°01.7	-24°01.9	-24°01.9	-24°01.8	-24°01.5	-0.4	58.6
◐	Sa 15	266°23.9	280°49.3	295°14.8	309°40.4	324°06.0	338°31.7	352°57.5	7°23.3	21°49.2	36°15.2	50°41.2	+25.7	15.8
		-23°39.2	-23°36.5	-23°33.7	-23°30.7	-23°27.6	-23°24.4	-23°21.0	-23°17.5	-23°13.8	-23°10.0	-23°06.1	+3.3	57.9
	Su 16	267°20.6	281°47.9	296°15.2	310°42.6	325°10.1	339°37.7	354°05.3	8°33.1	23°00.9	37°28.8	51°56.8	+27.6	15.6
		-21°51.5	-21°45.6	-21°39.5	-21°33.3	-21°27.0	-21°20.5	-21°14.0	-21°07.3	-21°00.5	-20°53.7	-20°46.7	+6.5	57.2
	Mo 17	269°06.6	283°35.9	298°05.4	312°34.8	327°04.4	341°34.1	356°03.8	10°33.6	25°03.5	39°33.5	54°03.6	+29.7	15.4
		-18°49.4	-18°40.9	-18°32.2	-18°23.4	-18°14.6	-18°05.6	-17°56.6	-17°47.5	-17°38.3	-17°29.1	-17°19.7	+9.0	56.6
	Tu 18	271°43.9	286°15.2	300°46.5	315°17.9	329°49.4	344°21.0	358°52.7	13°24.4	27°56.2	42°28.0	56°59.9	+31.6	15.3
		-14°50.7	-14°40.2	-14°29.6	-14°19.0	-14°08.4	-13°57.7	-13°46.9	-13°36.1	-13°25.2	-13°14.2	-13°03.2	+10.7	56.0
	We 19	275°06.2	289°39.1	304°12.0	318°45.0	333°18.0	347°51.1	2°24.3	16°57.5	31°30.7	46°04.0	60°37.4	+33.1	15.1
		-10°12.8	-10°01.1	-9°49.3	-9°37.6	-9°25.8	-9°13.9	-9°02.1	-8°50.2	-8°38.2	-8°26.3	-8°14.3	+11.8	55.5
	Th 20	279°02.7	293°36.7	308°10.7	322°44.8	337°18.9	351°53.0	6°27.2	21°01.4	35°35.6	50°09.8	64°44.1	+34.1	15.0
		-5°11.8	-4°59.5	-4°47.2	-4°34.8	-4°22.5	-4°10.1	-3°57.7	-3°45.4	-3°33.0	-3°20.6	-3°08.2	+12.4	55.0
	Fr 21	283°20.9	297°55.5	312°30.1	327°04.7	341°39.3	356°13.9	10°48.6	25°23.3	39°57.9	54°32.6	69°07.3	+34.6	14.9
		-0°02.0	0°10.4	0°22.8	0°35.1	0°47.5	0°59.9	1°12.2	1°24.5	1°36.9	1°49.2	2°01.5	+12.4	54.7
○	Sa 22	287°47.8	302°22.5	316°57.2	331°31.8	346°06.5	0°41.2	15°15.8	29°50.4	44°25.1	58°59.7	73°34.3	+34.7	14.8
		5°03.8	5°15.8	5°27.7	5°39.7	5°51.6	6°03.4	6°15.3	6°27.1	6°38.9	6°50.6	7°02.3	+11.9	54.3
	Su 23	292°11.5	306°45.8	321°20.1	335°54.4	350°28.7	5°02.9	19°37.1	34°11.3	48°45.4	63°19.5	77°53.6	+34.2	14.8
		9°53.8	10°04.9	10°16.0	10°27.0	10°38.0	10°49.0	10°59.8	11°10.7	11°21.5	11°32.2	11°42.9	+10.9	54.1
	Mo 24	296°21.4	310°55.0	325°28.5	340°02.1	354°35.5	9°09.0	23°42.4	38°15.7	52°49.0	67°22.3	81°55.6	+33.4	14.7
		14°16.9	14°26.7	14°36.4	14°46.1	14°55.8	15°05.3	15°14.8	15°24.2	15°33.6	15°42.9	15°52.1	+9.5	54.0
	Tu 25	300°09.3	314°41.8	329°14.3	343°46.8	358°19.3	12°51.7	27°24.0	41°56.3	56°28.6	71°00.8	85°32.9	+32.4	14.7
		18°02.2	18°10.2	18°18.2	18°26.2	18°34.0	18°41.8	18°49.4	18°57.0	19°04.5	19°12.0	19°19.3	+7.7	54.0
	We 26	303°29.9	318°01.3	332°32.7	347°04.1	1°35.4	16°06.6	30°37.8	45°09.0	59°40.1	74°11.2	88°42.2	+31.2	14.7
		20°59.2	21°05.1	21°10.9	21°16.7	21°22.3	21°27.9	21°33.4	21°38.7	21°44.0	21°49.2	21°54.2	+5.5	54.1
	Th 27	318°01.3	332°32.7	347°04.1	1°35.4	16°06.6	30°37.8	45°09.0	59°40.1	74°11.2	88°42.2	103°13.2	+31.2	14.7
		21°05.1	21°10.9	21°16.7	21°22.3	21°27.9	21°33.4	21°38.7	21°44.0	21°49.2	21°54.2	21°59.2	+5.4	54.1
	Fr 28	320°52.8	335°23.1	349°53.4	4°23.7	18°53.9	33°24.0	47°54.2	62°24.3	76°54.3	91°24.3	105°54.3	+30.1	14.8
		23°01.6	23°04.9	23°08.1	23°11.2	23°14.2	23°17.1	23°19.9	23°22.5	23°25.1	23°27.5	23°29.9	+2.8	54.3
	Sa 29	323°20.3	337°49.8	352°19.3	6°48.7	21°18.1	35°47.5	50°16.9	64°46.3	79°15.6	93°44.9	108°14.2	+29.4	14.9
		23°51.3	23°51.8	23°52.2	23°52.5	23°52.7	23°52.7	23°52.6	23°52.4	23°52.1	23°51.7	23°51.1	-0.0	54.8
◑	Su 30	325°31.6	340°00.7	354°29.7	8°58.8	23°27.8	37°56.8	52°25.8	66°54.9	81°23.9	95°52.9	110°21.9	+29.0	15.1
		23°28.5	23°26.0	23°23.4	23°20.7	23°17.9	23°14.9	23°11.8	23°08.6	23°05.3	23°01.9	22°58.3	-3.0	55.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24

LQ: 1 04h33 — NM: 8 10h44 — FQ: 15 01h29 — FM: 22 16h29 — LQ: 30 20h56

SUN

October 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	272°35.6	287°35.8	302°36.0	317°36.2	332°36.4	347°36.6	2°36.8	17°37.0	32°37.2	47°37.4	62°37.6	77°37.8	+0.2
	-3°18.7	-3°19.6	-3°20.6	-3°21.6	-3°22.5	-3°23.5	-3°24.5	-3°25.4	-3°26.4	-3°27.4	-3°28.4	-3°29.3	-1.0
Tu 2	272°40.4	287°40.6	302°40.8	317°41.0	332°41.2	347°41.4	2°41.6	17°41.8	32°41.9	47°42.1	62°42.3	77°42.5	+0.2
	-3°41.9	-3°42.9	-3°43.8	-3°44.8	-3°45.8	-3°46.7	-3°47.7	-3°48.7	-3°49.6	-3°50.6	-3°51.6	-3°52.5	-1.0
We 3	272°45.1	287°45.3	302°45.5	317°45.7	332°45.9	347°46.0	2°46.2	17°46.4	32°46.6	47°46.8	62°47.0	77°47.2	+0.2
	-4°05.1	-4°06.1	-4°07.0	-4°08.0	-4°09.0	-4°09.9	-4°10.9	-4°11.9	-4°12.8	-4°13.8	-4°14.8	-4°15.7	-1.0
Th 4	272°49.7	287°49.9	302°50.1	317°50.3	332°50.5	347°50.6	2°50.8	17°51.0	32°51.2	47°51.4	62°51.6	77°51.8	+0.2
	-4°28.3	-4°29.2	-4°30.2	-4°31.1	-4°32.1	-4°33.1	-4°34.0	-4°35.0	-4°36.0	-4°36.9	-4°37.9	-4°38.8	-1.0
Fr 5	272°54.2	287°54.4	302°54.6	317°54.8	332°55.0	347°55.2	2°55.3	17°55.5	32°55.7	47°55.9	62°56.1	77°56.3	+0.2
	-4°51.4	-4°52.3	-4°53.3	-4°54.2	-4°55.2	-4°56.2	-4°57.1	-4°58.1	-4°59.0	-5°00.0	-5°01.0	-5°01.9	-1.0
Sa 6	272°58.6	287°58.8	302°59.0	317°59.2	332°59.4	347°59.6	2°59.7	17°59.9	33°00.1	48°00.3	63°00.5	78°00.6	+0.2
	-5°14.4	-5°15.3	-5°16.3	-5°17.3	-5°18.2	-5°19.2	-5°20.1	-5°21.1	-5°22.1	-5°23.0	-5°24.0	-5°24.9	-1.0
Su 7	273°03.0	288°03.2	303°03.3	318°03.5	333°03.7	348°03.9	3°04.0	18°04.2	33°04.4	48°04.6	63°04.7	78°04.9	+0.2
	-5°37.4	-5°38.3	-5°39.3	-5°40.2	-5°41.2	-5°42.1	-5°43.1	-5°44.0	-5°45.0	-5°46.0	-5°46.9	-5°47.9	-1.0
Mo 8	273°07.2	288°07.4	303°07.5	318°07.7	333°07.9	348°08.1	3°08.2	18°08.4	33°08.6	48°08.8	63°08.9	78°09.1	+0.2
	-6°00.3	-6°01.2	-6°02.2	-6°03.1	-6°04.1	-6°05.0	-6°06.0	-6°06.9	-6°07.9	-6°08.8	-6°09.8	-6°10.7	-1.0
Tu 9	273°11.3	288°11.5	303°11.7	318°11.8	333°12.0	348°12.2	3°12.3	18°12.5	33°12.7	48°12.8	63°13.0	78°13.2	+0.2
	-6°23.1	-6°24.0	-6°25.0	-6°25.9	-6°26.9	-6°27.8	-6°28.8	-6°29.7	-6°30.7	-6°31.6	-6°32.6	-6°33.5	-0.9
We 10	273°15.3	288°15.5	303°15.6	318°15.8	333°16.0	348°16.1	3°16.3	18°16.5	33°16.6	48°16.8	63°17.0	78°17.1	+0.2
	-6°45.8	-6°46.8	-6°47.7	-6°48.6	-6°49.6	-6°50.5	-6°51.5	-6°52.4	-6°53.4	-6°54.3	-6°55.3	-6°56.2	-0.9
Th 11	273°19.2	288°19.4	303°19.5	318°19.7	333°19.8	348°20.0	3°20.2	18°20.3	33°20.5	48°20.6	63°20.8	78°20.9	+0.2
	-7°08.5	-7°09.4	-7°10.3	-7°11.3	-7°12.2	-7°13.2	-7°14.1	-7°15.0	-7°16.0	-7°16.9	-7°17.9	-7°18.8	-0.9
Fr 12	273°23.0	288°23.1	303°23.3	318°23.4	333°23.6	348°23.7	3°23.9	18°24.0	33°24.2	48°24.4	63°24.5	78°24.7	+0.2
	-7°31.0	-7°31.9	-7°32.9	-7°33.8	-7°34.8	-7°35.7	-7°36.6	-7°37.6	-7°38.5	-7°39.4	-7°40.4	-7°41.3	-0.9
Sa 13	273°26.6	288°26.8	303°26.9	318°27.1	333°27.2	348°27.4	3°27.5	18°27.7	33°27.8	48°28.0	63°28.1	78°28.2	+0.1
	-7°53.4	-7°54.4	-7°55.3	-7°56.2	-7°57.2	-7°58.1	-7°59.0	-8°00.0	-8°00.9	-8°01.8	-8°02.8	-8°03.7	-0.9
Su 14	273°30.1	288°30.3	303°30.4	318°30.6	333°30.7	348°30.9	3°31.0	18°31.1	33°31.3	48°31.4	63°31.6	78°31.7	+0.1
	-8°15.8	-8°16.7	-8°17.6	-8°18.6	-8°19.5	-8°20.4	-8°21.3	-8°22.3	-8°23.2	-8°24.1	-8°25.0	-8°26.0	-0.9
Mo 15	273°33.5	288°33.7	303°33.8	318°33.9	333°34.1	348°34.2	3°34.4	18°34.5	33°34.6	48°34.8	63°34.9	78°35.0	+0.1
	-8°38.0	-8°38.9	-8°39.8	-8°40.8	-8°41.7	-8°42.6	-8°43.5	-8°44.4	-8°45.4	-8°46.3	-8°47.2	-8°48.1	-0.9
Tu 16	273°36.8	288°36.9	303°37.0	318°37.2	333°37.3	348°37.4	3°37.6	18°37.7	33°37.8	48°38.0	63°38.1	78°38.2	+0.1
	-9°00.1	-9°01.0	-9°01.9	-9°02.8	-9°03.7	-9°04.7	-9°05.6	-9°06.5	-9°07.4	-9°08.3	-9°09.2	-9°10.2	-0.9
We 17	273°39.9	288°40.0	303°40.1	318°40.3	333°40.4	348°40.5	3°40.6	18°40.8	33°40.9	48°41.0	63°41.1	78°41.3	+0.1
	-9°22.0	-9°22.9	-9°23.9	-9°24.8	-9°25.7	-9°26.6	-9°27.5	-9°28.4	-9°29.3	-9°30.2	-9°31.1	-9°32.1	-0.9
Th 18	273°42.8	288°43.0	303°43.1	318°43.2	333°43.3	348°43.4	3°43.6	18°43.7	33°43.8	48°43.9	63°44.0	78°44.2	+0.1
	-9°43.9	-9°44.8	-9°45.7	-9°46.6	-9°47.5	-9°48.4	-9°49.3	-9°50.2	-9°51.1	-9°52.0	-9°52.9	-9°53.8	-0.9
Fr 19	273°45.7	288°45.8	303°45.9	318°46.0	333°46.1	348°46.2	3°46.3	18°46.5	33°46.6	48°46.7	63°46.8	78°46.9	+0.1
	-10°05.5	-10°06.4	-10°07.3	-10°08.2	-10°09.1	-10°10.0	-10°10.9	-10°11.8	-10°12.7	-10°13.6	-10°14.5	-10°15.4	-0.9
Sa 20	273°48.3	288°48.4	303°48.5	318°48.6	333°48.7	348°48.9	3°49.0	18°49.1	33°49.2	48°49.3	63°49.4	78°49.5	+0.1
	-10°27.1	-10°28.0	-10°28.9	-10°29.7	-10°30.6	-10°31.5	-10°32.4	-10°33.3	-10°34.2	-10°35.1	-10°36.0	-10°36.9	-0.9
Su 21	273°50.8	288°50.9	303°51.0	318°51.1	333°51.2	348°51.3	3°51.4	18°51.5	33°51.6	48°51.7	63°51.8	78°51.9	+0.1
	-10°48.4	-10°49.3	-10°50.2	-10°51.1	-10°52.0	-10°52.9	-10°53.8	-10°54.6	-10°55.5	-10°56.4	-10°57.3	-10°58.2	-0.9
Mo 22	273°53.1	288°53.2	303°53.3	318°53.4	333°53.5	348°53.6	3°53.7	18°53.8	33°53.9	48°54.0	63°54.1	78°54.2	+0.1
	-11°09.7	-11°10.5	-11°11.4	-11°12.3	-11°13.2	-11°14.1	-11°14.9	-11°15.8	-11°16.7	-11°17.6	-11°18.5	-11°19.3	-0.9
Tu 23	273°55.3	288°55.4	303°55.5	318°55.6	333°55.7	348°55.7	3°55.8	18°55.9	33°56.0	48°56.1	63°56.2	78°56.2	+0.1
	-11°30.7	-11°31.6	-11°32.5	-11°33.3	-11°34.2	-11°35.1	-11°35.9	-11°36.8	-11°37.7	-11°38.6	-11°39.4	-11°40.3	-0.9
We 24	273°57.3	288°57.4	303°57.5	318°57.5	333°57.6	348°57.7	3°57.8	18°57.8	33°57.9	48°58.0	63°58.1	78°58.2	+0.1
	-11°51.6	-11°52.5	-11°53.3	-11°54.2	-11°55.1	-11°55.9	-11°56.8	-11°57.6	-11°58.5	-11°59.4	-12°00.2	-12°01.1	-0.9
Th 25	273°59.1	288°59.2	303°59.3	318°59.3	333°59.4	348°59.5	3°59.5	18°59.6	33°59.7	48°59.7	63°59.8	78°59.9	+0.1
	-12°12.3	-12°13.1	-12°14.0	-12°14.9	-12°15.7	-12°16.6	-12°17.4	-12°18.3	-12°19.1	-12°20.0	-12°20.9	-12°21.7	-0.9
Fr 26	274°00.7	289°00.8	304°00.9	319°00.9	334°01.0	349°01.1	4°01.1	19°01.2	34°01.2	49°01.3	64°01.4	79°01.4	+0.1
	-12°32.8	-12°33.7	-12°34.5	-12°35.4	-12°36.2	-12°37.1	-12°37.9	-12°38.7	-12°39.6	-12°40.4	-12°41.3	-12°42.1	-0.8
Sa 27	274°02.2	289°02.2	304°02.3	319°02.4	334°02.4	349°02.5	4°02.5	19°02.6	34°02.6	49°02.7	64°02.7	79°02.8	+0.1
	-12°53.1	-12°54.0	-12°54.8	-12°55.6	-12°56.5	-12°57.3	-12°58.2	-12°59.0	-12°59.9	-13°00.7	-13°01.5	-13°02.4	-0.8
Su 28	274°03.4	289°03.5	304°03.5	319°03.6	334°03.6	349°03.7	4°03.7	19°03.8	34°03.8	49°03.9	64°03.9	79°03.9	+0.0
	-13°13.2	-13°14.1	-13°14.9	-13°15.7	-13°16.6	-13°17.4	-13°18.2	-13°19.1	-13°19.9	-13°20.7	-13°21.6	-13°22.4	-0.8
Mo 29	274°04.5	289°04.5	304°04.6	319°04.6	334°04.7	349°04.7	4°04.7	19°04.8	34°04.8	49°04.8	64°04.9	79°04.9	+0.0
	-13°33.2	-13°34.0	-13°34.8	-13°35.6	-13°36.5	-13°37.3	-13°38.1	-13°38.9	-13°39.8	-13°40.6	-13°41.4	-13°42.2	-0.8
Tu 30	274°05.4	289°05.4	304°05.4	319°05.4	334°05.5	349°05.5	4°05.5	19°05.6	34°05.6	49°05.6	64°05.7	79°05.7	+0.0
	-13°52.9	-13°53.7	-13°54.5	-13°55.3	-13°56.1	-13°56.9	-13°57.8	-13°58.6	-13°59.4	-14°00.2	-14°01.0	-14°01.8	-0.8
We 31	274°06.0	289°06.0	304°06.1	319°06.1	334°06.1	349°06.1	4°06.2	19°06.2	34°06.2	49°06.2	64°06.2	79°06.3	+0.0
	-14°12.3	-14°13.2	-14°14.0	-14°14.8	-14°15.6	-14°16.4	-14°17.2	-14°18.0	-14°18.8	-14°19.6	-14°20.4	-14°21.2	-0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2029

D	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	Δ'/h	SH
Mo 1	228°19.3	242°48.5	257°17.6	271°46.7	286°15.9	300°45.0	315°14.2	329°43.4	344°12.5	358°41.7	13°10.9	+29.2	15.5
	19°53.8	19°46.3	19°38.6	19°30.8	19°22.9	19°14.8	19°06.7	18°58.5	18°50.1	18°41.7	18°33.1	-8.1	56.7
Tu 2	230°30.3	244°59.7	259°29.0	273°58.4	288°27.8	302°57.2	317°26.6	331°56.1	346°25.5	0°54.9	15°24.4	+29.4	15.7
	16°11.8	16°01.5	15°51.2	15°40.7	15°30.2	15°19.6	15°08.8	14°58.0	14°47.1	14°36.1	14°25.0	-10.7	57.7
We 3	244°59.7	259°29.0	273°58.4	288°27.8	302°57.2	317°26.6	331°56.1	346°25.5	0°54.9	15°24.4	29°53.8	+29.4	15.7
	16°01.5	15°51.2	15°40.7	15°30.2	15°19.6	15°08.8	14°58.0	14°47.1	14°36.1	14°25.0	14°13.8	-10.8	57.8
Th 4	247°16.2	261°45.7	276°15.2	290°44.7	305°14.2	319°43.7	334°13.3	348°42.8	3°12.2	17°41.7	32°11.2	+29.5	16.0
	11°15.2	11°02.6	10°50.0	10°37.3	10°24.5	10°11.6	9°58.7	9°45.7	9°32.6	9°19.4	9°06.2	-12.9	58.8
Fr 5	249°32.4	264°01.8	278°31.1	293°00.3	307°29.6	321°58.8	336°28.0	350°57.2	5°26.4	19°55.6	34°24.7	+29.2	16.3
	5°40.4	5°26.2	5°12.0	4°57.7	4°43.4	4°29.1	4°14.7	4°00.3	3°45.8	3°31.3	3°16.7	-14.4	59.7
Sa 6	251°38.3	266°06.9	280°35.5	295°04.1	309°32.6	324°01.1	338°29.6	352°58.0	7°26.3	21°54.7	36°22.9	+28.5	16.5
	-0°25.0	-0°39.9	-0°54.9	-1°09.8	-1°24.8	-1°39.8	-1°54.7	-2°09.7	-2°24.7	-2°39.7	-2°54.6	-15.0	60.5
● Su 7	253°21.3	267°48.7	282°16.1	296°43.5	311°10.8	325°38.0	340°05.2	354°32.3	8°59.4	23°26.4	37°53.3	+27.2	16.6
	-6°37.7	-6°52.4	-7°07.0	-7°21.6	-7°36.2	-7°50.7	-8°05.2	-8°19.6	-8°34.0	-8°48.4	-9°02.7	-14.5	61.0
Mo 8	254°29.8	268°55.7	283°21.5	297°47.3	312°13.0	326°38.6	341°04.2	355°29.7	9°55.1	24°20.5	38°45.8	+25.6	16.7
	-12°29.9	-12°43.2	-12°56.3	-13°09.4	-13°22.4	-13°35.3	-13°48.1	-14°00.8	-14°13.4	-14°25.9	-14°38.4	-12.9	61.2
Tu 9	254°57.5	269°21.7	283°46.0	298°10.1	312°34.2	326°58.3	341°22.2	355°46.2	10°10.0	24°33.9	38°57.6	+24.0	16.7
	-17°31.7	-17°42.3	-17°52.8	-18°03.2	-18°13.4	-18°23.5	-18°33.5	-18°43.3	-18°53.0	-19°02.5	-19°11.9	-10.0	61.1
We 10	254°48.7	269°11.8	283°34.8	297°57.9	312°20.9	326°43.9	341°06.8	355°29.8	9°52.7	24°15.6	38°38.5	+23.0	16.5
	-21°15.4	-21°22.4	-21°29.2	-21°35.9	-21°42.4	-21°48.8	-21°55.0	-22°01.0	-22°06.9	-22°12.6	-22°18.2	-6.3	60.6
Th 11	254°21.1	268°44.0	283°06.9	297°29.8	311°52.8	326°15.7	340°38.7	355°01.7	9°24.8	23°47.8	38°10.9	+23.0	16.3
	-23°21.2	-23°24.1	-23°26.8	-23°29.3	-23°31.6	-23°33.8	-23°35.8	-23°37.7	-23°39.3	-23°40.8	-23°42.2	-2.1	59.9
Fr 12	254°02.6	268°26.5	282°50.4	297°14.4	311°38.4	326°02.6	340°26.8	354°51.0	9°15.3	23°39.8	38°04.2	+24.2	16.1
	-23°42.4	-23°41.1	-23°39.7	-23°38.1	-23°36.3	-23°34.4	-23°32.3	-23°30.1	-23°27.8	-23°25.2	-23°22.6	+2.0	59.0
Sa 13	254°21.0	268°46.9	283°12.8	297°38.7	312°04.8	326°31.0	340°57.3	355°23.6	9°50.1	24°16.6	38°43.3	+26.2	15.8
	-22°25.3	-22°20.4	-22°15.3	-22°10.1	-22°04.8	-21°59.4	-21°53.8	-21°48.1	-21°42.3	-21°36.4	-21°30.3	+5.5	58.1
◐ Su 14	255°34.6	270°02.8	284°31.1	298°59.5	313°27.9	327°56.5	342°25.2	356°54.0	11°22.8	25°51.8	40°20.9	+28.6	15.6
	-19°46.0	-19°38.2	-19°30.3	-19°22.3	-19°14.2	-19°06.0	-18°57.7	-18°49.4	-18°40.9	-18°32.3	-18°23.7	+8.2	57.2
Mo 15	257°47.9	272°18.4	286°49.0	301°19.7	315°50.5	330°21.3	344°52.3	359°23.3	13°54.4	28°25.6	42°56.9	+30.9	15.4
	-16°04.3	-15°54.5	-15°44.5	-15°34.5	-15°24.4	-15°14.3	-15°04.1	-14°53.8	-14°43.4	-14°33.1	-14°22.6	+10.2	56.4
Tu 16	260°55.0	275°27.4	289°59.9	304°32.5	319°05.1	333°37.8	348°10.6	2°43.4	17°16.3	31°49.3	46°22.3	+32.7	15.2
	-11°39.6	-11°28.3	-11°17.0	-11°05.7	-10°54.4	-10°43.0	-10°31.5	-10°20.0	-10°08.5	-9°57.0	-9°45.4	+11.4	55.7
We 17	264°43.8	279°17.6	293°51.5	308°25.4	322°59.3	337°33.3	352°07.3	6°41.4	21°15.5	35°49.6	50°23.8	+34.0	15.0
	-6°48.4	-6°36.4	-6°24.4	-6°12.3	-6°00.3	-5°48.2	-5°36.2	-5°24.1	-5°12.0	-4°59.9	-4°47.7	+12.1	55.1
Th 18	269°00.0	283°34.6	298°09.2	312°43.9	327°18.6	341°53.3	356°28.0	11°02.7	25°37.4	40°12.2	54°46.9	+34.7	14.9
	-1°44.8	-1°32.6	-1°20.4	-1°08.2	-0°56.0	-0°43.7	-0°31.5	-0°19.3	-0°07.1	0°05.1	0°17.3	+12.2	54.7
Fr 19	273°29.3	288°04.1	302°39.0	317°13.8	331°48.7	346°23.5	0°58.3	15°33.2	30°08.0	44°42.8	59°17.6	+34.8	14.8
	3°18.8	3°30.8	3°42.8	3°54.7	4°06.7	4°18.6	4°30.5	4°42.3	4°54.2	5°06.0	5°17.8	+11.9	54.3
Sa 20	277°58.3	292°32.9	307°07.5	321°42.0	336°16.5	350°51.0	5°25.5	20°00.0	34°34.4	49°08.8	63°43.2	+34.5	14.8
	8°11.4	8°22.7	8°34.0	8°45.3	8°56.5	9°07.6	9°18.8	9°29.9	9°40.9	9°51.9	10°02.9	+11.2	54.1
Su 21	282°15.5	296°49.4	311°23.3	325°57.1	340°30.9	355°04.6	9°38.4	24°12.0	38°45.7	53°19.3	67°52.9	+33.7	14.7
	12°42.0	12°52.2	13°02.4	13°12.5	13°22.5	13°32.5	13°42.4	13°52.3	14°02.1	14°11.9	14°21.6	+10.0	53.9
○ Mo 22	286°11.7	300°44.6	315°17.5	329°50.3	344°23.1	358°55.8	13°28.5	28°01.2	42°33.8	57°06.3	71°38.8	+32.7	14.7
	16°39.6	16°48.2	16°56.8	17°05.4	17°13.8	17°22.2	17°30.5	17°38.7	17°46.8	17°54.9	18°02.9	+8.3	53.9
Tu 23	289°41.2	304°13.0	318°44.7	333°16.4	347°48.1	2°19.7	16°51.3	31°22.8	45°54.3	60°25.7	74°57.1	+31.6	14.7
	19°53.2	19°59.8	20°06.4	20°12.9	20°19.3	20°25.6	20°31.9	20°38.0	20°44.1	20°50.0	20°55.9	+6.3	53.9
We 24	292°42.9	307°13.6	321°44.3	336°15.0	350°45.6	5°16.1	19°46.7	34°17.2	48°47.7	63°18.1	77°48.5	+30.6	14.7
	22°12.2	22°16.5	22°20.7	22°24.8	22°28.8	22°32.7	22°36.5	22°40.1	22°43.7	22°47.2	22°50.5	+3.8	54.1
Th 25	295°20.8	309°50.7	324°20.6	338°50.5	353°20.3	7°50.2	22°20.0	36°49.8	51°19.6	65°49.3	80°19.1	+29.8	14.8
	23°27.8	23°29.4	23°30.9	23°32.3	23°33.6	23°34.7	23°35.8	23°36.7	23°37.5	23°38.2	23°38.8	+1.1	54.3
Fr 26	297°43.3	312°12.9	326°42.4	341°11.9	355°41.4	10°10.9	24°40.4	39°09.9	53°39.4	68°08.9	82°38.4	+29.5	14.9
	23°33.7	23°32.4	23°31.0	23°29.5	23°27.9	23°26.2	23°24.3	23°22.4	23°20.3	23°18.1	23°15.8	-1.8	54.7
Sa 27	312°12.9	326°42.4	341°11.9	355°41.4	10°10.9	24°40.4	39°09.9	53°39.4	68°08.9	82°38.4	97°07.9	+29.5	14.9
	23°32.4	23°31.0	23°29.5	23°27.9	23°26.2	23°24.3	23°22.4	23°20.3	23°18.1	23°15.8	23°13.3	-1.9	54.7
Su 28	314°30.7	329°00.3	343°29.9	357°59.4	12°29.0	26°58.6	41°28.3	55°57.9	70°27.5	84°57.2	99°26.9	+29.6	15.1
	22°22.9	22°18.6	22°14.2	22°09.7	22°05.1	22°00.4	21°55.5	21°50.6	21°45.5	21°40.3	21°35.0	-4.8	55.3
Mo 29	316°53.6	331°23.5	345°53.4	0°23.3	14°53.3	29°23.3	43°53.3	58°23.3	72°53.3	87°23.4	101°53.4	+30.0	15.3
	20°02.3	19°55.3	19°48.2	19°40.9	19°33.5	19°26.1	19°18.5	19°10.8	19°03.1	18°55.2	18°47.2	-7.5	55.9
◑ Tu 30	319°26.4	333°56.7	348°27.0	2°57.4	17°27.8	31°58.2	46°28.6	60°59.0	75°29.4	89°59.8	104°30.3	+30.4	15.5
	16°35.6	16°26.1	16°16.5	16°06.7	15°56.9	15°47.0	15°37.0	15°26.9	15°16.7	15°06.5	14°56.1	-10.0	56.7
We 31	322°08.2	336°38.8	351°09.3	5°39.9	20°10.5	34°41.1	49°11.7	63°42.3	78°12.9	92°43.5	107°14.1	+30.6	15.7
	12°10.8	11°59.1	11°47.4	11°35.5	11°23.6	11°11.7	10°59.7	10°47.5	10°35.4	10°23.1	10°10.8	-12.0	57.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 7 19h14 — FQ: 14 11h08 — FM: 22 09h27 — LQ: 30 11h32

SUN

November 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	274°06.5	289°06.5	304°06.5	319°06.5	334°06.5	349°06.5	4°06.6	19°06.6	34°06.6	49°06.6	64°06.6	79°06.6	+0.0
	-14°31.6	-14°32.4	-14°33.2	-14°34.0	-14°34.8	-14°35.6	-14°36.4	-14°37.2	-14°38.0	-14°38.8	-14°39.6	-14°40.4	-0.8
Fr 2	274°06.7	289°06.7	304°06.7	319°06.7	334°06.8	349°06.8	4°06.8	19°06.8	34°06.8	49°06.8	64°06.8	79°06.8	+0.0
	-14°50.6	-14°51.4	-14°52.2	-14°53.0	-14°53.8	-14°54.6	-14°55.4	-14°56.1	-14°56.9	-14°57.7	-14°58.5	-14°59.3	-0.8
Sa 3	274°06.8	289°06.8	304°06.8	319°06.8	334°06.8	349°06.8	4°06.8	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	-0.0
	-15°09.4	-15°10.2	-15°11.0	-15°11.7	-15°12.5	-15°13.3	-15°14.1	-15°14.8	-15°15.6	-15°16.4	-15°17.2	-15°17.9	-0.8
Su 4	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.5	19°06.5	34°06.5	49°06.5	64°06.5	79°06.5	-0.0
	-15°28.0	-15°28.7	-15°29.5	-15°30.3	-15°31.0	-15°31.8	-15°32.5	-15°33.3	-15°34.1	-15°34.8	-15°35.6	-15°36.4	-0.8
Mo 5	274°06.2	289°06.2	304°06.2	319°06.2	334°06.2	349°06.1	4°06.1	19°06.1	34°06.1	49°06.0	64°06.0	79°06.0	-0.0
	-15°46.2	-15°47.0	-15°47.7	-15°48.5	-15°49.3	-15°50.0	-15°50.8	-15°51.5	-15°52.3	-15°53.0	-15°53.8	-15°54.5	-0.8
Tu 6	274°05.7	289°05.6	304°05.6	319°05.6	334°05.5	349°05.5	4°05.5	19°05.5	34°05.4	49°05.4	64°05.4	79°05.3	-0.0
	-16°04.3	-16°05.0	-16°05.7	-16°06.5	-16°07.2	-16°08.0	-16°08.7	-16°09.5	-16°10.2	-16°10.9	-16°11.7	-16°12.4	-0.7
We 7	274°04.9	289°04.8	304°04.8	319°04.8	334°04.7	349°04.7	4°04.6	19°04.6	34°04.6	49°04.5	64°04.5	79°04.4	-0.0
	-16°22.0	-16°22.7	-16°23.5	-16°24.2	-16°24.9	-16°25.7	-16°26.4	-16°27.1	-16°27.9	-16°28.6	-16°29.3	-16°30.1	-0.7
Th 8	274°03.9	289°03.8	304°03.8	319°03.7	334°03.7	349°03.6	4°03.6	19°03.5	34°03.5	49°03.4	64°03.4	79°03.3	-0.0
	-16°39.5	-16°40.2	-16°40.9	-16°41.7	-16°42.4	-16°43.1	-16°43.8	-16°44.5	-16°45.3	-16°46.0	-16°46.7	-16°47.4	-0.7
Fr 9	274°02.7	289°02.6	304°02.6	319°02.5	334°02.4	349°02.4	4°02.3	19°02.3	34°02.2	49°02.2	64°02.1	79°02.0	-0.1
	-16°56.7	-16°57.4	-16°58.1	-16°58.8	-16°59.5	-17°00.2	-17°00.9	-17°01.6	-17°02.4	-17°03.1	-17°03.8	-17°04.5	-0.7
Sa 10	274°01.3	289°01.2	304°01.1	319°01.1	334°01.0	349°00.9	4°00.9	19°00.8	34°00.7	49°00.7	64°00.6	79°00.5	-0.1
	-17°13.6	-17°14.3	-17°15.0	-17°15.7	-17°16.4	-17°17.1	-17°17.8	-17°18.5	-17°19.2	-17°19.9	-17°20.6	-17°21.2	-0.7
Su 11	273°59.6	288°59.6	303°59.5	318°59.4	333°59.3	348°59.3	3°59.2	18°59.1	33°59.0	48°59.0	63°58.9	78°58.8	-0.1
	-17°30.2	-17°30.9	-17°31.6	-17°32.3	-17°32.9	-17°33.6	-17°34.3	-17°35.0	-17°35.7	-17°36.4	-17°37.0	-17°37.7	-0.7
Mo 12	273°57.8	288°57.7	303°57.6	318°57.6	333°57.5	348°57.4	3°57.3	18°57.2	33°57.1	48°57.1	63°57.0	78°56.9	-0.1
	-17°46.5	-17°47.2	-17°47.9	-17°48.5	-17°49.2	-17°49.9	-17°50.5	-17°51.2	-17°51.9	-17°52.6	-17°53.2	-17°53.9	-0.7
Tu 13	273°55.8	288°55.7	303°55.6	318°55.5	333°55.4	348°55.3	3°55.2	18°55.1	33°55.0	48°54.9	63°54.9	78°54.8	-0.1
	-18°02.5	-18°03.2	-18°03.8	-18°04.5	-18°05.2	-18°05.8	-18°06.5	-18°07.1	-18°07.8	-18°08.4	-18°09.1	-18°09.7	-0.7
We 14	273°53.5	288°53.4	303°53.3	318°53.2	333°53.1	348°53.0	3°52.9	18°52.8	33°52.7	48°52.6	63°52.5	78°52.4	-0.1
	-18°18.2	-18°18.8	-18°19.5	-18°20.1	-18°20.8	-18°21.4	-18°22.1	-18°22.7	-18°23.4	-18°24.0	-18°24.6	-18°25.3	-0.6
Th 15	273°51.1	288°51.0	303°50.9	318°50.7	333°50.6	348°50.5	3°50.4	18°50.3	33°50.2	48°50.1	63°50.0	78°49.9	-0.1
	-18°33.6	-18°34.2	-18°34.8	-18°35.5	-18°36.1	-18°36.7	-18°37.4	-18°38.0	-18°38.6	-18°39.2	-18°39.9	-18°40.5	-0.6
Fr 16	273°48.4	288°48.3	303°48.2	318°48.1	333°47.9	348°47.8	3°47.7	18°47.6	33°47.5	48°47.4	63°47.2	78°47.1	-0.1
	-18°48.6	-18°49.2	-18°49.8	-18°50.5	-18°51.1	-18°51.7	-18°52.3	-18°52.9	-18°53.5	-18°54.1	-18°54.8	-18°55.4	-0.6
Sa 17	273°45.5	288°45.4	303°45.3	318°45.2	333°45.1	348°44.9	3°44.8	18°44.7	33°44.5	48°44.4	63°44.3	78°44.2	-0.1
	-19°03.3	-19°03.9	-19°04.5	-19°05.1	-19°05.7	-19°06.3	-19°06.9	-19°07.5	-19°08.1	-19°08.7	-19°09.3	-19°09.9	-0.6
Su 18	273°42.5	288°42.3	303°42.2	318°42.1	333°41.9	348°41.8	3°41.7	18°41.5	33°41.4	48°41.3	63°41.1	78°41.0	-0.1
	-19°17.7	-19°18.2	-19°18.8	-19°19.4	-19°20.0	-19°20.6	-19°21.2	-19°21.8	-19°22.4	-19°23.0	-19°23.5	-19°24.1	-0.6
Mo 19	273°39.2	288°39.1	303°38.9	318°38.8	333°38.6	348°38.5	3°38.4	18°38.2	33°38.1	48°37.9	63°37.8	78°37.6	-0.1
	-19°31.7	-19°32.2	-19°32.8	-19°33.4	-19°34.0	-19°34.5	-19°35.1	-19°35.7	-19°36.3	-19°36.8	-19°37.4	-19°38.0	-0.6
Tu 20	273°35.7	288°35.6	303°35.4	318°35.3	333°35.1	348°35.0	3°34.8	18°34.7	33°34.5	48°34.4	63°34.2	78°34.1	-0.2
	-19°45.3	-19°45.9	-19°46.5	-19°47.0	-19°47.6	-19°48.1	-19°48.7	-19°49.2	-19°49.8	-19°50.4	-19°50.9	-19°51.5	-0.6
We 21	273°32.1	288°31.9	303°31.7	318°31.6	333°31.4	348°31.3	3°31.1	18°30.9	33°30.8	48°30.6	63°30.5	78°30.3	-0.2
	-19°58.6	-19°59.2	-19°59.7	-20°00.3	-20°00.8	-20°01.4	-20°01.9	-20°02.4	-20°03.0	-20°03.5	-20°04.1	-20°04.6	-0.5
Th 22	273°28.2	288°28.0	303°27.8	318°27.7	333°27.5	348°27.3	3°27.2	18°27.0	33°26.8	48°26.7	63°26.5	78°26.3	-0.2
	-20°11.6	-20°12.1	-20°12.6	-20°13.2	-20°13.7	-20°14.2	-20°14.8	-20°15.3	-20°15.8	-20°16.3	-20°16.9	-20°17.4	-0.5
Fr 23	273°24.1	288°23.9	303°23.8	318°23.6	333°23.4	348°23.2	3°23.1	18°22.9	33°22.7	48°22.5	63°22.3	78°22.2	-0.2
	-20°24.1	-20°24.7	-20°25.2	-20°25.7	-20°26.2	-20°26.7	-20°27.2	-20°27.7	-20°28.3	-20°28.8	-20°29.3	-20°29.8	-0.5
Sa 24	273°19.8	288°19.6	303°19.5	318°19.3	333°19.1	348°18.9	3°18.7	18°18.5	33°18.4	48°18.2	63°18.0	78°17.8	-0.2
	-20°36.3	-20°36.8	-20°37.3	-20°37.8	-20°38.3	-20°38.8	-20°39.3	-20°39.8	-20°40.3	-20°40.8	-20°41.3	-20°41.8	-0.5
Su 25	273°15.4	288°15.2	303°15.0	318°14.8	333°14.6	348°14.4	3°14.2	18°14.0	33°13.8	48°13.6	63°13.4	78°13.3	-0.2
	-20°48.2	-20°48.6	-20°49.1	-20°49.6	-20°50.1	-20°50.6	-20°51.0	-20°51.5	-20°52.0	-20°52.5	-20°53.0	-20°53.4	-0.5
Mo 26	273°10.7	288°10.5	303°10.3	318°10.1	333°09.9	348°09.7	3°09.5	18°09.3	33°09.1	48°08.9	63°08.7	78°08.5	-0.2
	-20°59.6	-21°00.0	-21°00.5	-21°01.0	-21°01.4	-21°01.9	-21°02.4	-21°02.8	-21°03.3	-21°03.8	-21°04.2	-21°04.7	-0.5
Tu 27	273°05.9	288°05.7	303°05.5	318°05.2	333°05.0	348°04.8	3°04.6	18°04.4	33°04.2	48°04.0	63°03.8	78°03.6	-0.2
	-21°10.6	-21°11.1	-21°11.5	-21°12.0	-21°12.4	-21°12.9	-21°13.3	-21°13.8	-21°14.2	-21°14.6	-21°15.1	-21°15.5	-0.4
We 28	273°00.8	288°00.6	303°00.4	318°00.2	333°00.0	347°59.8	2°59.6	17°59.3	32°59.1	47°58.9	62°58.7	77°58.5	-0.2
	-21°21.2	-21°21.7	-21°22.1	-21°22.5	-21°23.0	-21°23.4	-21°23.8	-21°24.3	-21°24.7	-21°25.1	-21°25.6	-21°26.0	-0.4
Th 29	272°55.6	287°55.4	302°55.2	317°55.0	332°54.7	347°54.5	2°54.3	17°54.1	32°53.9	47°53.6	62°53.4	77°53.2	-0.2
	-21°31.5	-21°31.9	-21°32.3	-21°32.7	-21°33.1	-21°33.6	-21°34.0	-21°34.4	-21°34.8	-21°35.2	-21°35.6	-21°36.0	-0.4
Fr 30	272°50.2	287°50.0	302°49.8	317°49.6	332°49.3	347°49.1	2°48.9	17°48.6	32°48.4	47°48.2	62°48.0	77°47.7	-0.2
	-21°41.3	-21°41.7	-21°42.1	-21°42.5	-21°42.9	-21°43.3	-21°43.7	-21°44.1	-21°44.5	-21°44.9	-21°45.3	-21°45.7	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2029

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Th 1	252°19.7	266°50.2	281°20.8	295°51.3	310°21.7	324°52.2	339°22.7	353°53.1	8°23.5	22°54.0	37°24.3	+30.5	15.9
	8°04.1	7°51.0	7°38.0	7°24.8	7°11.6	6°58.4	6°45.1	6°31.8	6°18.4	6°04.9	5°51.4	-13.3	58.4
Fr 2	254°57.5	269°27.4	283°57.4	298°27.3	312°57.2	327°27.0	341°56.8	356°26.6	10°56.3	25°26.0	39°55.6	+29.8	16.2
	2°23.6	2°09.4	1°55.2	1°41.0	1°26.8	1°12.5	0°58.2	0°43.9	0°29.5	0°15.2	0°00.8	-14.3	59.4
Sa 3	257°14.5	271°43.3	286°12.1	300°40.8	315°09.4	329°38.0	344°06.6	358°35.0	13°03.4	27°31.8	42°00.0	+28.6	16.4
	-3°36.4	-3°50.9	-4°05.4	-4°19.9	-4°34.4	-4°48.8	-5°03.3	-5°17.8	-5°32.2	-5°46.6	-6°01.0	-14.5	60.3
Su 4	258°55.6	273°22.7	287°49.8	302°16.7	316°43.6	331°10.4	345°37.1	0°03.7	14°30.2	28°56.7	43°23.1	+26.7	16.6
	-9°33.5	-9°47.4	-10°01.2	-10°15.0	-10°28.7	-10°42.3	-10°55.9	-11°09.4	-11°22.9	-11°36.3	-11°49.6	-13.6	60.9
Mo 5	259°48.5	274°13.6	288°38.5	303°03.3	317°28.1	331°52.8	346°17.3	0°41.8	15°06.3	29°30.6	43°54.9	+24.6	16.7
	-15°00.5	-15°12.5	-15°24.5	-15°36.3	-15°48.0	-15°59.6	-16°11.1	-16°22.5	-16°33.8	-16°45.0	-16°56.0	-11.6	61.3
● Tu 6	259°49.2	274°12.3	288°35.2	302°58.1	317°21.0	331°43.7	346°06.4	0°29.1	14°51.7	29°14.2	43°36.7	+22.7	16.7
	-19°26.9	-19°35.9	-19°44.7	-19°53.4	-20°01.9	-20°10.3	-20°18.5	-20°26.6	-20°34.5	-20°42.3	-20°49.9	-8.3	61.3
We 7	259°08.4	273°30.3	287°52.1	302°13.9	316°35.7	330°57.5	345°19.2	359°41.0	14°02.7	28°24.4	42°46.2	+21.8	16.6
	-22°24.7	-22°29.6	-22°34.4	-22°39.0	-22°43.5	-22°47.8	-22°51.9	-22°55.8	-22°59.5	-23°03.1	-23°06.5	-4.2	61.0
Th 8	258°13.4	272°35.4	286°57.5	301°19.6	315°41.7	330°03.9	344°26.1	358°48.4	13°10.7	27°33.1	41°55.5	+22.2	16.5
	-23°36.0	-23°36.6	-23°37.0	-23°37.2	-23°37.2	-23°37.0	-23°36.7	-23°36.2	-23°35.6	-23°34.7	-23°33.7	+0.2	60.3
Fr 9	257°40.1	272°03.7	286°27.3	300°51.1	315°14.9	329°38.9	344°02.9	358°27.1	12°51.3	27°15.6	41°40.0	+24.0	16.2
	-22°58.9	-22°55.3	-22°51.5	-22°47.6	-22°43.6	-22°39.4	-22°35.0	-22°30.5	-22°25.9	-22°21.1	-22°16.2	+4.3	59.5
Sa 10	257°58.5	272°24.6	286°50.8	301°17.1	315°43.5	330°10.1	344°36.7	359°03.4	13°30.3	27°57.2	42°24.3	+26.6	15.9
	-20°46.2	-20°39.3	-20°32.1	-20°24.9	-20°17.6	-20°10.1	-20°02.5	-19°54.9	-19°47.1	-19°39.2	-19°31.2	+7.5	58.5
Su 11	259°23.5	273°52.3	288°21.2	302°50.2	317°19.3	331°48.5	346°17.9	0°47.3	15°16.8	29°46.4	44°16.2	+29.3	15.7
	-17°19.8	-17°10.4	-17°00.8	-16°51.2	-16°41.5	-16°31.8	-16°21.9	-16°12.0	-16°02.0	-15°52.0	-15°41.9	+9.8	57.5
Mo 12	261°53.6	276°24.9	290°56.2	305°27.6	319°59.0	334°30.6	349°02.3	3°34.0	18°05.8	32°37.7	47°09.6	+31.6	15.4
	-13°02.7	-12°51.7	-12°40.6	-12°29.5	-12°18.3	-12°07.1	-11°55.8	-11°44.5	-11°33.1	-11°21.8	-11°10.3	+11.2	56.5
◐ Tu 13	265°17.8	279°50.9	294°24.0	308°57.2	323°30.5	338°03.8	352°37.1	7°10.6	21°44.0	36°17.6	50°51.1	+33.3	15.2
	-8°15.0	-8°03.1	-7°51.2	-7°39.2	-7°27.3	-7°15.3	-7°03.3	-6°51.3	-6°39.2	-6°27.2	-6°15.1	+12.0	55.7
We 14	269°20.4	283°54.6	298°28.9	313°03.3	327°37.6	342°12.0	356°46.4	11°20.9	25°55.4	40°29.9	55°04.4	+34.4	15.0
	-3°12.8	-3°00.6	-2°48.4	-2°36.2	-2°24.0	-2°11.8	-1°59.6	-1°47.4	-1°35.2	-1°23.0	-1°10.8	+12.2	55.0
Th 15	273°44.8	288°19.7	302°54.5	317°29.3	332°04.1	346°39.0	1°13.8	15°48.7	30°23.5	44°58.4	59°33.2	+34.8	14.9
	1°51.2	2°03.3	2°15.3	2°27.3	2°39.3	2°51.3	3°03.3	3°15.2	3°27.1	3°39.0	3°50.9	+12.0	54.5
Fr 16	278°15.7	292°50.5	307°25.3	322°00.0	336°34.7	351°09.4	5°44.1	20°18.8	34°53.5	49°28.1	64°02.7	+34.7	14.8
	6°46.3	6°57.8	7°09.2	7°20.6	7°32.0	7°43.4	7°54.7	8°06.0	8°17.2	8°28.4	8°39.6	+11.3	54.2
Sa 17	282°39.2	297°13.4	311°47.6	326°21.8	340°55.9	355°30.0	10°04.0	24°38.1	39°12.0	53°46.0	68°19.9	+34.1	14.7
	11°22.4	11°32.9	11°43.3	11°53.7	12°04.1	12°14.4	12°24.7	12°34.9	12°45.0	12°55.2	13°05.2	+10.3	54.0
Su 18	286°44.0	301°17.2	315°50.5	330°23.6	344°56.8	359°29.9	14°02.9	28°35.9	43°08.9	57°41.8	72°14.7	+33.1	14.7
	15°29.2	15°38.3	15°47.4	15°56.4	16°05.3	16°14.2	16°23.0	16°31.7	16°40.3	16°48.9	16°57.4	+8.8	53.9
Mo 19	290°22.0	304°54.1	319°26.1	333°58.1	348°30.1	3°02.0	17°33.8	32°05.6	46°37.4	61°09.1	75°40.8	+31.9	14.7
	18°56.2	19°03.5	19°10.7	19°17.8	19°24.9	19°31.8	19°38.7	19°45.5	19°52.2	19°58.8	20°05.3	+6.9	53.9
Tu 20	293°30.0	308°01.0	322°31.8	337°02.7	351°33.4	6°04.2	20°34.9	35°05.5	49°36.2	64°06.7	78°37.3	+30.7	14.7
	21°32.3	21°37.4	21°42.3	21°47.2	21°51.9	21°56.6	22°01.1	22°05.5	22°09.9	22°14.1	22°18.3	+4.6	54.1
○ We 21	296°10.8	310°40.8	325°10.7	339°40.6	354°10.5	8°40.3	23°10.2	37°39.9	52°09.7	66°39.5	81°09.2	+29.8	14.8
	23°07.6	23°10.0	23°12.4	23°14.6	23°16.6	23°18.6	23°20.5	23°22.2	23°23.9	23°25.4	23°26.8	+1.9	54.3
Th 22	298°32.7	313°02.2	327°31.6	342°01.0	356°30.5	10°59.9	25°29.3	39°58.7	54°28.1	68°57.5	83°26.9	+29.4	14.9
	23°34.3	23°33.9	23°33.3	23°32.7	23°31.9	23°31.0	23°30.0	23°28.9	23°27.6	23°26.2	23°24.8	-1.0	54.6
Fr 23	300°48.0	315°17.5	329°46.9	344°16.4	358°45.9	13°15.4	27°44.9	42°14.5	56°44.0	71°13.6	85°43.1	+29.5	15.0
	22°48.6	22°45.2	22°41.8	22°38.2	22°34.5	22°30.7	22°26.8	22°22.8	22°18.7	22°14.4	22°10.0	-3.9	55.0
Sa 24	303°09.0	317°38.9	332°08.9	346°38.8	1°08.8	15°38.8	30°08.8	44°38.8	59°08.9	73°39.0	88°09.1	+30.0	15.1
	20°51.3	20°45.1	20°38.9	20°32.6	20°26.2	20°19.6	20°13.0	20°06.2	19°59.4	19°52.4	19°45.3	-6.6	55.4
Su 25	317°38.9	332°08.9	346°38.8	1°08.8	15°38.8	30°08.8	44°38.8	59°08.9	73°39.0	88°09.1	102°39.3	+30.0	15.1
	20°45.1	20°38.9	20°32.6	20°26.2	20°19.6	20°13.0	20°06.2	19°59.4	19°52.4	19°45.3	19°38.2	-6.7	55.5
Mo 26	320°14.8	334°45.4	349°16.0	3°46.6	18°17.3	32°47.9	47°18.7	61°49.4	76°20.2	90°51.0	105°21.8	+30.7	15.3
	17°39.0	17°30.3	17°21.5	17°12.6	17°03.6	16°54.5	16°45.4	16°36.1	16°26.8	16°17.4	16°07.9	-9.1	56.0
Tu 27	323°06.8	337°38.0	352°09.2	6°40.4	21°11.6	35°42.9	50°14.1	64°45.4	79°16.7	93°48.0	108°19.3	+31.3	15.5
	13°35.4	13°24.6	13°13.7	13°02.8	12°51.7	12°40.7	12°29.5	12°18.3	12°07.0	11°55.6	11°44.2	-11.1	56.7
◑ We 28	326°10.3	340°41.8	355°13.2	9°44.7	24°16.1	38°47.6	53°19.0	67°50.5	82°21.9	96°53.4	111°24.8	+31.4	15.7
	8°45.1	8°32.7	8°20.2	8°07.7	7°55.1	7°42.5	7°29.8	7°17.1	7°04.3	6°51.5	6°38.6	-12.6	57.4
Th 29	329°14.9	343°46.2	358°17.3	12°48.5	27°19.7	41°50.8	56°21.9	70°52.9	85°24.0	99°55.0	114°26.0	+31.1	15.9
	3°20.6	3°07.1	2°53.6	2°40.0	2°26.5	2°12.9	1°59.2	1°45.6	1°31.9	1°18.2	1°04.4	-13.6	58.2
Fr 30	332°06.3	346°36.6	1°06.9	15°37.2	30°07.3	44°37.5	59°07.6	73°37.6	88°07.6	102°37.5	117°07.4	+30.1	16.1
	-2°23.4	-2°37.3	-2°51.3	-3°05.2	-3°19.1	-3°33.1	-3°47.0	-4°00.9	-4°14.8	-4°28.8	-4°42.7	-13.9	59.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 04h24 — FQ: 13 00h35 — FM: 21 04h02 — LQ: 28 23h47

SUN

December 2029

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	272°44.7	287°44.5	302°44.2	317°44.0	332°43.8	347°43.5	2°43.3	17°43.0	32°42.8	47°42.6	62°42.3	77°42.1	-0.2
	-21°50.7	-21°51.1	-21°51.5	-21°51.9	-21°52.2	-21°52.6	-21°53.0	-21°53.4	-21°53.8	-21°54.1	-21°54.5	-21°54.9	-0.4
Su 2	272°39.0	287°38.7	302°38.5	317°38.2	332°38.0	347°37.8	2°37.5	17°37.3	32°37.0	47°36.8	62°36.5	77°36.3	-0.2
	-21°59.7	-22°00.1	-22°00.4	-22°00.8	-22°01.2	-22°01.5	-22°01.9	-22°02.2	-22°02.6	-22°03.0	-22°03.3	-22°03.7	-0.4
Mo 3	272°33.1	287°32.8	302°32.6	317°32.3	332°32.1	347°31.9	2°31.6	17°31.4	32°31.1	47°30.9	62°30.6	77°30.3	-0.2
	-22°08.3	-22°08.6	-22°09.0	-22°09.3	-22°09.7	-22°10.0	-22°10.3	-22°10.7	-22°11.0	-22°11.4	-22°11.7	-22°12.0	-0.3
Tu 4	272°27.1	287°26.8	302°26.6	317°26.3	332°26.0	347°25.8	2°25.5	17°25.3	32°25.0	47°24.8	62°24.5	77°24.3	-0.3
	-22°16.4	-22°16.7	-22°17.1	-22°17.4	-22°17.7	-22°18.0	-22°18.4	-22°18.7	-22°19.0	-22°19.3	-22°19.7	-22°20.0	-0.3
We 5	272°20.9	287°20.6	302°20.4	317°20.1	332°19.8	347°19.6	2°19.3	17°19.1	32°18.8	47°18.5	62°18.3	77°18.0	-0.3
	-22°24.1	-22°24.4	-22°24.7	-22°25.0	-22°25.4	-22°25.7	-22°26.0	-22°26.3	-22°26.6	-22°26.9	-22°27.2	-22°27.5	-0.3
Th 6	272°14.6	287°14.3	302°14.0	317°13.8	332°13.5	347°13.2	2°13.0	17°12.7	32°12.4	47°12.2	62°11.9	77°11.6	-0.3
	-22°31.4	-22°31.7	-22°32.0	-22°32.3	-22°32.6	-22°32.8	-22°33.1	-22°33.4	-22°33.7	-22°34.0	-22°34.3	-22°34.6	-0.3
Fr 7	272°08.1	287°07.9	302°07.6	317°07.3	332°07.0	347°06.8	2°06.5	17°06.2	32°06.0	47°05.7	62°05.4	77°05.1	-0.3
	-22°38.2	-22°38.5	-22°38.8	-22°39.0	-22°39.3	-22°39.6	-22°39.9	-22°40.1	-22°40.4	-22°40.7	-22°40.9	-22°41.2	-0.3
Sa 8	272°01.6	287°01.3	302°01.0	317°00.7	332°00.5	347°00.2	1°59.9	16°59.6	31°59.4	46°59.1	61°58.8	76°58.5	-0.3
	-22°44.6	-22°44.9	-22°45.1	-22°45.4	-22°45.6	-22°45.9	-22°46.1	-22°46.4	-22°46.6	-22°46.9	-22°47.1	-22°47.4	-0.3
Su 9	271°54.9	286°54.6	301°54.3	316°54.1	331°53.8	346°53.5	1°53.2	16°52.9	31°52.6	46°52.4	61°52.1	76°51.8	-0.3
	-22°50.5	-22°50.8	-22°51.0	-22°51.3	-22°51.5	-22°51.7	-22°52.0	-22°52.2	-22°52.4	-22°52.7	-22°52.9	-22°53.1	-0.2
Mo 10	271°48.1	286°47.8	301°47.5	316°47.3	331°47.0	346°46.7	1°46.4	16°46.1	31°45.8	46°45.5	61°45.3	76°45.0	-0.3
	-22°56.0	-22°56.3	-22°56.5	-22°56.7	-22°56.9	-22°57.1	-22°57.3	-22°57.6	-22°57.8	-22°58.0	-22°58.2	-22°58.4	-0.2
Tu 11	271°41.2	286°41.0	301°40.7	316°40.4	331°40.1	346°39.8	1°39.5	16°39.2	31°38.9	46°38.6	61°38.3	76°38.1	-0.3
	-23°01.1	-23°01.3	-23°01.5	-23°01.7	-23°01.9	-23°02.1	-23°02.3	-23°02.5	-23°02.7	-23°02.9	-23°03.0	-23°03.2	-0.2
We 12	271°34.3	286°34.0	301°33.7	316°33.4	331°33.1	346°32.8	1°32.5	16°32.2	31°31.9	46°31.6	61°31.3	76°31.1	-0.3
	-23°05.7	-23°05.8	-23°06.0	-23°06.2	-23°06.4	-23°06.6	-23°06.7	-23°06.9	-23°07.1	-23°07.3	-23°07.4	-23°07.6	-0.2
Th 13	271°27.2	286°26.9	301°26.6	316°26.3	331°26.0	346°25.7	1°25.5	16°25.2	31°24.9	46°24.6	61°24.3	76°24.0	-0.3
	-23°09.8	-23°10.0	-23°10.1	-23°10.3	-23°10.4	-23°10.6	-23°10.7	-23°10.9	-23°11.1	-23°11.2	-23°11.4	-23°11.5	-0.2
Fr 14	271°20.1	286°19.8	301°19.5	316°19.2	331°18.9	346°18.6	1°18.3	16°18.0	31°17.7	46°17.4	61°17.1	76°16.8	-0.3
	-23°13.5	-23°13.6	-23°13.7	-23°13.9	-23°14.0	-23°14.2	-23°14.3	-23°14.4	-23°14.6	-23°14.7	-23°14.8	-23°15.0	-0.1
Sa 15	271°12.9	286°12.6	301°12.3	316°12.0	331°11.7	346°11.4	1°11.1	16°10.8	31°10.5	46°10.2	61°09.9	76°09.6	-0.3
	-23°16.7	-23°16.8	-23°16.9	-23°17.0	-23°17.1	-23°17.3	-23°17.4	-23°17.5	-23°17.6	-23°17.7	-23°17.9	-23°18.0	-0.1
Su 16	271°05.7	286°05.4	301°05.1	316°04.8	331°04.5	346°04.2	1°03.9	16°03.6	31°03.2	46°02.9	61°02.6	76°02.3	-0.3
	-23°19.4	-23°19.5	-23°19.6	-23°19.7	-23°19.8	-23°19.9	-23°20.0	-23°20.1	-23°20.2	-23°20.3	-23°20.4	-23°20.5	-0.1
Mo 17	270°58.4	285°58.1	300°57.8	315°57.5	330°57.2	345°56.9	0°56.5	15°56.2	30°55.9	45°55.6	60°55.3	75°55.0	-0.3
	-23°21.7	-23°21.8	-23°21.8	-23°21.9	-23°22.0	-23°22.1	-23°22.2	-23°22.2	-23°22.3	-23°22.4	-23°22.5	-23°22.6	-0.1
Tu 18	270°51.0	285°50.7	300°50.4	315°50.1	330°49.8	345°49.5	0°49.2	15°48.9	30°48.6	45°48.3	60°48.0	75°47.7	-0.3
	-23°23.5	-23°23.5	-23°23.6	-23°23.7	-23°23.7	-23°23.8	-23°23.8	-23°23.9	-23°24.0	-23°24.0	-23°24.1	-23°24.1	-0.1
We 19	270°43.7	285°43.4	300°43.1	315°42.7	330°42.4	345°42.1	0°41.8	15°41.5	30°41.2	45°40.9	60°40.6	75°40.3	-0.3
	-23°24.8	-23°24.9	-23°24.9	-23°24.9	-23°25.0	-23°25.0	-23°25.1	-23°25.1	-23°25.1	-23°25.2	-23°25.2	-23°25.3	-0.0
Th 20	270°36.3	285°36.0	300°35.7	315°35.3	330°35.0	345°34.7	0°34.4	15°34.1	30°33.8	45°33.5	60°33.2	75°32.9	-0.3
	-23°25.7	-23°25.7	-23°25.7	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-0.0
Fr 21	270°28.8	285°28.5	300°28.2	315°27.9	330°27.6	345°27.3	0°27.0	15°26.7	30°26.4	45°26.1	60°25.8	75°25.4	-0.3
	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-23°26.1	-0.0
Sa 22	270°21.4	285°21.1	300°20.8	315°20.5	330°20.2	345°19.9	0°19.6	15°19.2	30°18.9	45°18.6	60°18.3	75°18.0	-0.3
	-23°26.0	-23°26.0	-23°26.0	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.8	-23°25.8	+0.0
Su 23	270°14.0	285°13.7	300°13.4	315°13.1	330°12.7	345°12.4	0°12.1	15°11.8	30°11.5	45°11.2	60°10.9	75°10.6	-0.3
	-23°25.5	-23°25.4	-23°25.4	-23°25.4	-23°25.3	-23°25.3	-23°25.3	-23°25.2	-23°25.2	-23°25.1	-23°25.1	-23°25.1	+0.0
Mo 24	270°06.5	285°06.2	300°05.9	315°05.6	330°05.3	345°05.0	0°04.7	15°04.4	30°04.1	45°03.8	60°03.5	75°03.1	-0.3
	-23°24.4	-23°24.4	-23°24.3	-23°24.3	-23°24.2	-23°24.2	-23°24.1	-23°24.1	-23°24.0	-23°23.9	-23°23.9	-23°23.8	+0.1
Tu 25	269°59.1	284°58.8	299°58.5	314°58.2	329°57.9	344°57.6	359°57.3	14°57.0	29°56.7	44°56.3	59°56.0	74°55.7	-0.3
	-23°23.0	-23°22.9	-23°22.8	-23°22.7	-23°22.7	-23°22.6	-23°22.5	-23°22.4	-23°22.4	-23°22.3	-23°22.2	-23°22.1	+0.1
We 26	269°51.7	284°51.4	299°51.1	314°50.8	329°50.5	344°50.2	359°49.9	14°49.6	29°49.3	44°48.9	59°48.6	74°48.3	-0.3
	-23°21.0	-23°20.9	-23°20.8	-23°20.7	-23°20.6	-23°20.5	-23°20.5	-23°20.4	-23°20.3	-23°20.2	-23°20.1	-23°20.0	+0.1
Th 27	269°44.3	284°44.0	299°43.7	314°43.4	329°43.1	344°42.8	359°42.5	14°42.2	29°41.9	44°41.6	59°41.3	74°41.0	-0.3
	-23°18.6	-23°18.5	-23°18.4	-23°18.3	-23°18.1	-23°18.0	-23°17.9	-23°17.8	-23°17.7	-23°17.6	-23°17.4	-23°17.3	+0.1
Fr 28	269°37.0	284°36.7	299°36.4	314°36.1	329°35.8	344°35.5	359°35.2	14°34.9	29°34.6	44°34.3	59°33.9	74°33.6	-0.3
	-23°15.7	-23°15.6	-23°15.4	-23°15.3	-23°15.2	-23°15.0	-23°14.9	-23°14.8	-23°14.6	-23°14.5	-23°14.4	-23°14.2	+0.1
Sa 29	269°29.7	284°29.4	299°29.1	314°28.8	329°28.5	344°28.2	359°27.9	14°27.6	29°27.3	44°27.0	59°26.7	74°26.4	-0.3
	-23°12.3	-23°12.2	-23°12.0	-23°11.9	-23°11.7	-23°11.6	-23°11.4	-23°11.3	-23°11.1	-23°11.0	-23°10.8	-23°10.6	+0.2
Su 30	269°22.4	284°22.1	299°21.8	314°21.5	329°21.2	344°20.9	359°20.6	14°20.3	29°20.0	44°19.7	59°19.4	74°19.1	-0.3
	-23°08.5	-23°08.3	-23°08.2	-23°08.0	-23°07.8	-23°07.7	-23°07.5	-23°07.3	-23°07.1	-23°07.0	-23°06.8	-23°06.6	+0.2
Mo 31	269°15.2	284°14.9	299°14.6	314°14.3	329°14.1	344°13.8	359°13.5	14°13.2	29°12.9	44°12.6	59°12.3	74°12.0	-0.3
	-23°04.2	-23°04.0	-23°03.8	-23°03.7	-23°03.5	-23°03.3	-23°03.1	-23°02.9	-23°02.7	-23°02.5	-23°02.3	-23°02.1	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

December 2029

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Sa 1	247°33.4	262°02.7	276°31.8	291°00.9	305°30.0	319°58.9	334°27.8	348°56.6	3°25.3	17°54.0	32°22.6	+28.9	16.3
	-6°47.2	-7°00.9	-7°14.6	-7°28.3	-7°42.0	-7°55.6	-8°09.2	-8°22.8	-8°36.4	-8°49.9	-9°03.3	-13.6	59.6
Su 2	249°21.5	263°48.7	278°15.9	292°43.0	307°09.9	321°36.8	336°03.6	350°30.3	4°56.9	19°23.4	33°49.9	+26.8	16.4
	-12°19.9	-12°32.5	-12°45.1	-12°57.6	-13°10.1	-13°22.5	-13°34.8	-13°47.0	-13°59.2	-14°11.3	-14°23.3	-12.3	60.3
Mo 3	250°14.9	264°39.8	279°04.6	293°29.4	307°54.0	322°18.5	336°43.0	351°07.3	5°31.6	19°55.8	34°19.9	+24.5	16.6
	-17°12.5	-17°23.0	-17°33.3	-17°43.6	-17°53.7	-18°03.8	-18°13.7	-18°23.4	-18°33.1	-18°42.6	-18°52.0	-10.0	60.8
Tu 4	250°11.2	264°34.0	278°56.7	293°19.4	307°42.0	322°04.5	336°27.0	350°49.4	5°11.7	19°34.0	33°56.3	+22.5	16.6
	-20°57.0	-21°04.1	-21°11.2	-21°18.0	-21°24.7	-21°31.3	-21°37.7	-21°43.9	-21°50.0	-21°55.9	-22°01.7	-6.5	61.0
● We 5	249°24.6	263°46.2	278°07.8	292°29.4	306°51.0	321°12.6	335°34.2	349°55.8	4°17.3	18°38.9	33°00.5	+21.6	16.6
	-23°07.7	-23°10.8	-23°13.6	-23°16.3	-23°18.8	-23°21.1	-23°23.2	-23°25.2	-23°26.9	-23°28.5	-23°30.0	-2.2	60.8
Th 6	248°26.2	262°48.2	277°10.2	291°32.3	305°54.4	320°16.6	334°38.8	349°01.1	3°23.4	17°45.8	32°08.3	+22.2	16.5
	-23°29.9	-23°28.5	-23°26.9	-23°25.2	-23°23.3	-23°21.2	-23°18.9	-23°16.5	-23°13.8	-23°11.1	-23°08.1	+2.2	60.4
Fr 7	247°54.4	262°18.1	276°41.9	291°05.9	305°29.9	319°54.0	334°18.3	348°42.6	3°07.0	17°31.6	31°56.2	+24.2	16.3
	-22°04.9	-21°59.4	-21°53.9	-21°48.1	-21°42.3	-21°36.3	-21°30.1	-21°23.8	-21°17.4	-21°10.9	-21°04.2	+6.1	59.7
Sa 8	248°18.5	262°44.9	277°11.4	291°37.9	306°04.6	320°31.4	334°58.4	349°25.4	3°52.6	18°19.8	32°47.2	+26.9	16.0
	-19°09.0	-19°00.4	-18°51.7	-18°43.0	-18°34.1	-18°25.1	-18°16.0	-18°06.8	-17°57.5	-17°48.1	-17°38.6	+9.0	58.7
Su 9	249°50.8	264°19.9	278°49.1	293°18.5	307°47.9	322°17.4	336°47.0	351°16.7	5°46.5	20°16.4	34°46.4	+29.6	15.8
	-15°06.7	-14°56.0	-14°45.2	-14°34.3	-14°23.4	-14°12.5	-14°01.4	-13°50.3	-13°39.2	-13°28.0	-13°16.8	+11.0	57.8
Mo 10	252°27.7	266°59.1	281°30.6	296°02.3	310°33.9	325°05.7	339°37.6	354°09.5	8°41.5	23°13.6	37°45.7	+31.8	15.5
	-10°22.5	-10°10.6	-9°58.6	-9°46.6	-9°34.6	-9°22.6	-9°10.5	-8°58.4	-8°46.3	-8°34.1	-8°21.9	+12.1	56.8
Tu 11	255°56.0	270°29.2	285°02.4	299°35.7	314°09.0	328°42.4	343°15.8	357°49.3	12°22.9	26°56.4	41°30.1	+33.4	15.3
	-5°17.2	-5°04.8	-4°52.4	-4°40.0	-4°27.6	-4°15.1	-4°02.7	-3°50.3	-3°37.8	-3°25.4	-3°13.0	+12.4	55.9
◐ We 12	259°59.2	274°33.4	289°07.7	303°42.0	318°16.3	332°50.6	347°24.9	1°59.3	16°33.7	31°08.1	45°42.5	+34.3	15.1
	-0°06.9	0°05.4	0°17.8	0°30.1	0°42.4	0°54.6	1°06.9	1°19.2	1°31.4	1°43.6	1°55.8	+12.3	55.2
Th 13	264°20.5	278°55.1	293°29.7	308°04.3	322°38.9	337°13.5	351°48.1	6°22.7	20°57.2	35°31.8	50°06.4	+34.6	14.9
	4°56.2	5°08.0	5°19.8	5°31.6	5°43.3	5°55.0	6°06.7	6°18.4	6°30.0	6°41.6	6°53.1	+11.7	54.6
Fr 14	268°44.0	283°18.3	297°52.7	312°27.0	327°01.4	341°35.7	356°09.9	10°44.2	25°18.4	39°52.6	54°26.8	+34.3	14.8
	9°42.0	9°52.9	10°03.8	10°14.6	10°25.5	10°36.2	10°46.9	10°57.6	11°08.2	11°18.8	11°29.3	+10.7	54.3
Sa 15	272°55.9	287°29.6	302°03.2	316°36.8	331°10.4	345°43.9	0°17.4	14°50.8	29°24.2	43°57.6	58°30.9	+33.5	14.7
	14°01.0	14°10.7	14°20.3	14°29.9	14°39.4	14°48.8	14°58.2	15°07.5	15°16.7	15°25.9	15°35.1	+9.4	54.1
Su 16	276°45.4	291°18.0	305°50.6	320°23.1	334°55.5	349°27.9	4°00.3	18°32.6	33°04.8	47°37.0	62°09.2	+32.4	14.7
	17°43.8	17°51.8	17°59.8	18°07.6	18°15.4	18°23.1	18°30.7	18°38.3	18°45.8	18°53.2	19°00.5	+7.7	54.0
Mo 17	280°05.5	294°36.9	309°08.2	323°39.4	338°10.6	352°41.8	7°12.9	21°44.0	36°15.0	50°45.9	65°16.8	+31.1	14.8
	20°40.1	20°46.0	20°51.9	20°57.6	21°03.3	21°08.9	21°14.3	21°19.7	21°25.0	21°30.2	21°35.3	+5.5	54.1
Tu 18	282°54.9	297°25.1	311°55.2	326°25.3	340°55.4	355°25.4	9°55.4	24°25.4	38°55.3	53°25.1	67°55.0	+30.0	14.8
	22°39.6	22°43.0	22°46.4	22°49.6	22°52.8	22°55.8	22°58.7	23°01.5	23°04.2	23°06.8	23°09.3	+3.0	54.3
We 19	285°18.7	299°48.0	314°17.4	328°46.7	343°16.0	357°45.2	12°14.5	26°43.7	41°12.9	55°42.1	70°11.3	+29.3	14.9
	23°33.0	23°33.7	23°34.2	23°34.7	23°35.0	23°35.2	23°35.3	23°35.2	23°35.1	23°34.8	23°34.4	+0.1	54.7
○ Th 20	287°27.8	301°56.9	316°25.9	330°55.0	345°24.1	359°53.1	14°22.2	28°51.3	43°20.3	57°49.4	72°18.5	+29.1	15.0
	23°14.2	23°11.9	23°09.5	23°07.0	23°04.3	23°01.5	22°58.6	22°55.6	22°52.5	22°49.3	22°45.9	-2.8	55.0
Fr 21	289°36.2	304°05.5	318°34.9	333°04.2	347°33.6	2°03.0	16°32.4	31°01.8	45°31.3	60°00.8	74°30.3	+29.4	15.1
	21°41.5	21°36.3	21°30.9	21°25.5	21°20.0	21°14.3	21°08.5	21°02.7	20°56.7	20°50.6	20°44.4	-5.7	55.5
Sa 22	291°56.2	306°26.2	320°56.1	335°26.2	349°56.2	4°26.3	18°56.4	33°26.6	47°56.7	62°27.0	76°57.2	+30.1	15.3
	18°58.5	18°50.7	18°42.7	18°34.6	18°26.5	18°18.2	18°09.8	18°01.4	17°52.8	17°44.2	17°35.4	-8.3	55.9
Su 23	294°34.6	309°05.4	323°36.2	338°07.0	352°37.8	7°08.7	21°39.6	36°10.5	50°41.4	65°12.4	79°43.4	+30.9	15.4
	15°13.7	15°03.6	14°53.4	14°43.1	14°32.7	14°22.3	14°11.8	14°01.2	13°50.5	13°39.8	13°29.0	-10.5	56.4
Mo 24	297°31.5	312°02.9	326°34.3	341°05.8	355°37.2	10°08.7	24°40.1	39°11.6	53°43.1	68°14.6	82°46.2	+31.5	15.5
	10°38.6	10°26.8	10°14.9	10°02.9	9°50.9	9°38.8	9°26.6	9°14.4	9°02.2	8°49.9	8°37.5	-12.1	57.0
Tu 25	312°02.9	326°34.3	341°05.8	355°37.2	10°08.7	24°40.1	39°11.6	53°43.1	68°14.6	82°46.2	97°17.7	+31.5	15.5
	10°26.8	10°14.9	10°02.9	9°50.9	9°38.8	9°26.6	9°14.4	9°02.2	8°49.9	8°37.5	8°25.2	-12.2	57.0
We 26	315°11.9	329°43.5	344°15.2	358°46.8	13°18.5	27°50.1	42°21.7	56°53.3	71°25.0	85°56.6	100°28.2	+31.6	15.7
	5°13.9	5°00.8	4°47.7	4°34.6	4°21.4	4°08.2	3°55.0	3°41.8	3°28.5	3°15.2	3°01.9	-13.2	57.5
Th 27	318°20.5	332°51.8	347°23.1	1°54.4	16°25.7	30°56.9	45°28.1	59°59.2	74°30.4	89°01.5	103°32.5	+31.2	15.8
	-0°20.3	-0°33.9	-0°47.5	-1°01.1	-1°14.7	-1°28.3	-1°41.9	-1°55.5	-2°09.1	-2°22.7	-2°36.3	-13.6	58.1
◑ Fr 28	321°13.7	335°44.1	350°14.4	4°44.7	19°14.9	33°45.1	48°15.2	62°45.3	77°15.2	91°45.2	106°15.1	+30.1	16.0
	-5°59.5	-6°12.9	-6°26.3	-6°39.7	-6°53.1	-7°06.4	-7°19.7	-7°32.9	-7°46.2	-7°59.4	-8°12.6	-13.3	58.7
Sa 29	323°35.5	338°04.3	352°33.0	7°01.6	21°30.2	35°58.7	50°27.1	64°55.5	79°23.7	93°51.9	108°20.0	+28.5	16.1
	-11°25.4	-11°37.9	-11°50.3	-12°02.7	-12°15.0	-12°27.2	-12°39.4	-12°51.5	-13°03.5	-13°15.5	-13°27.4	-12.2	59.2
Su 30	325°11.5	339°38.3	354°04.9	8°31.5	22°58.0	37°24.4	51°50.7	66°16.9	80°43.0	95°09.1	109°35.0	+26.4	16.3
	-16°16.9	-16°27.5	-16°38.0	-16°48.5	-16°58.8	-17°09.0	-17°19.1	-17°29.2	-17°39.1	-17°48.9	-17°58.6	-10.2	59.7
Mo 31	325°54.1	340°18.7	354°43.2	9°07.6	23°32.0	37°56.3	52°20.5	66°44.6	81°08.7	95°32.7	109°56.6	+24.2	16.4
	-20°10.4	-20°18.1	-20°25.8	-20°33.3	-20°40.7	-20°48.0	-20°55.1	-21°02.1	-21°08.9	-21°15.6	-21°22.1	-7.2	60.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 5 14h52 — FQ: 12 17h49 — FM: 20 22h46 — LQ: 28 09h49

SUN

January 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	269°08.1	284°07.8	299°07.5	314°07.2	329°06.9	344°06.6	359°06.3	14°06.1	29°05.8	44°05.5	59°05.2	74°04.9	-0.3
	-22°59.5	-22°59.3	-22°59.1	-22°58.8	-22°58.6	-22°58.4	-22°58.2	-22°58.0	-22°57.8	-22°57.6	-22°57.4	-22°57.1	+0.2
We 2	269°01.1	284°00.8	299°00.5	314°00.2	328°59.9	343°59.6	358°59.3	13°59.0	28°58.7	43°58.4	58°58.2	73°57.9	-0.3
	-22°54.3	-22°54.0	-22°53.8	-22°53.6	-22°53.3	-22°53.1	-22°52.9	-22°52.7	-22°52.4	-22°52.2	-22°52.0	-22°51.7	+0.2
Th 3	268°54.1	283°53.8	298°53.5	313°53.2	328°52.9	343°52.7	358°52.4	13°52.1	28°51.8	43°51.5	58°51.2	73°50.9	-0.3
	-22°48.6	-22°48.3	-22°48.1	-22°47.9	-22°47.6	-22°47.4	-22°47.1	-22°46.9	-22°46.6	-22°46.4	-22°46.1	-22°45.8	+0.3
Fr 4	268°47.2	283°46.9	298°46.7	313°46.4	328°46.1	343°45.8	358°45.5	13°45.2	28°45.0	43°44.7	58°44.4	73°44.1	-0.3
	-22°42.5	-22°42.2	-22°41.9	-22°41.7	-22°41.4	-22°41.1	-22°40.9	-22°40.6	-22°40.3	-22°40.1	-22°39.8	-22°39.5	+0.3
Sa 5	268°40.5	283°40.2	298°39.9	313°39.6	328°39.3	343°39.1	358°38.8	13°38.5	28°38.2	43°37.9	58°37.7	73°37.4	-0.3
	-22°35.9	-22°35.6	-22°35.3	-22°35.1	-22°34.8	-22°34.5	-22°34.2	-22°33.9	-22°33.6	-22°33.3	-22°33.0	-22°32.7	+0.3
Su 6	268°33.8	283°33.5	298°33.2	313°33.0	328°32.7	343°32.4	358°32.1	13°31.9	28°31.6	43°31.3	58°31.1	73°30.8	-0.3
	-22°28.9	-22°28.6	-22°28.3	-22°28.0	-22°27.7	-22°27.4	-22°27.1	-22°26.8	-22°26.5	-22°26.1	-22°25.8	-22°25.5	+0.3
Mo 7	268°27.3	283°27.0	298°26.7	313°26.4	328°26.2	343°25.9	358°25.6	13°25.4	28°25.1	43°24.8	58°24.6	73°24.3	-0.3
	-22°21.4	-22°21.1	-22°20.8	-22°20.5	-22°20.1	-22°19.8	-22°19.5	-22°19.2	-22°18.8	-22°18.5	-22°18.2	-22°17.9	+0.3
Tu 8	268°20.8	283°20.6	298°20.3	313°20.0	328°19.8	343°19.5	358°19.3	13°19.0	28°18.7	43°18.5	58°18.2	73°17.9	-0.3
	-22°13.5	-22°13.2	-22°12.9	-22°12.5	-22°12.2	-22°11.8	-22°11.5	-22°11.1	-22°10.8	-22°10.5	-22°10.1	-22°09.8	+0.3
We 9	268°14.6	283°14.3	298°14.0	313°13.8	328°13.5	343°13.3	358°13.0	13°12.8	28°12.5	43°12.2	58°12.0	73°11.7	-0.3
	-22°05.2	-22°04.8	-22°04.5	-22°04.1	-22°03.8	-22°03.4	-22°03.0	-22°02.7	-22°02.3	-22°02.0	-22°01.6	-22°01.2	+0.4
Th 10	268°08.4	283°08.2	298°07.9	313°07.7	328°07.4	343°07.2	358°06.9	13°06.7	28°06.4	43°06.2	58°05.9	73°05.7	-0.3
	-21°56.4	-21°56.1	-21°55.7	-21°55.3	-21°54.9	-21°54.5	-21°54.2	-21°53.8	-21°53.4	-21°53.0	-21°52.6	-21°52.3	+0.4
Fr 11	268°02.4	283°02.2	298°01.9	313°01.7	328°01.4	343°01.2	358°01.0	13°00.7	28°00.5	43°00.2	58°00.0	72°59.7	-0.2
	-21°47.2	-21°46.8	-21°46.4	-21°46.1	-21°45.7	-21°45.3	-21°44.9	-21°44.5	-21°44.1	-21°43.7	-21°43.3	-21°42.9	+0.4
Sa 12	267°56.6	282°56.3	297°56.1	312°55.9	327°55.6	342°55.4	357°55.1	12°54.9	27°54.7	42°54.4	57°54.2	72°54.0	-0.2
	-21°37.6	-21°37.2	-21°36.8	-21°36.4	-21°36.0	-21°35.6	-21°35.1	-21°34.7	-21°34.3	-21°33.9	-21°33.5	-21°33.1	+0.4
Su 13	267°50.9	282°50.7	297°50.4	312°50.2	327°50.0	342°49.7	357°49.5	12°49.3	27°49.0	42°48.8	57°48.6	72°48.3	-0.2
	-21°27.6	-21°27.2	-21°26.7	-21°26.3	-21°25.9	-21°25.4	-21°25.0	-21°24.6	-21°24.1	-21°23.7	-21°23.3	-21°22.8	+0.4
Mo 14	267°45.4	282°45.2	297°44.9	312°44.7	327°44.5	342°44.2	357°44.0	12°43.8	27°43.6	42°43.3	57°43.1	72°42.9	-0.2
	-21°17.1	-21°16.7	-21°16.2	-21°15.8	-21°15.4	-21°14.9	-21°14.5	-21°14.0	-21°13.6	-21°13.1	-21°12.7	-21°12.2	+0.4
Tu 15	267°40.0	282°39.8	297°39.6	312°39.4	327°39.1	342°38.9	357°38.7	12°38.5	27°38.3	42°38.1	57°37.8	72°37.6	-0.2
	-21°06.3	-21°05.8	-21°05.4	-21°04.9	-21°04.4	-21°04.0	-21°03.5	-21°03.0	-21°02.6	-21°02.1	-21°01.6	-21°01.2	+0.5
We 16	267°34.8	282°34.6	297°34.4	312°34.2	327°34.0	342°33.8	357°33.6	12°33.4	27°33.1	42°32.9	57°32.7	72°32.5	-0.2
	-20°55.0	-20°54.5	-20°54.1	-20°53.6	-20°53.1	-20°52.6	-20°52.1	-20°51.7	-20°51.2	-20°50.7	-20°50.2	-20°49.7	+0.5
Th 17	267°29.8	282°29.6	297°29.4	312°29.2	327°29.0	342°28.8	357°28.6	12°28.4	27°28.2	42°28.0	57°27.8	72°27.6	-0.2
	-20°43.4	-20°42.9	-20°42.4	-20°41.9	-20°41.4	-20°40.9	-20°40.4	-20°39.9	-20°39.4	-20°38.9	-20°38.4	-20°37.9	+0.5
Fr 18	267°25.0	282°24.8	297°24.6	312°24.4	327°24.2	342°24.0	357°23.8	12°23.6	27°23.4	42°23.2	57°23.0	72°22.8	-0.2
	-20°31.3	-20°30.8	-20°30.3	-20°29.8	-20°29.3	-20°28.8	-20°28.2	-20°27.7	-20°27.2	-20°26.7	-20°26.2	-20°25.7	+0.5
Sa 19	267°20.3	282°20.2	297°20.0	312°19.8	327°19.6	342°19.4	357°19.2	12°19.0	27°18.8	42°18.7	57°18.5	72°18.3	-0.2
	-20°18.9	-20°18.3	-20°17.8	-20°17.3	-20°16.8	-20°16.2	-20°15.7	-20°15.2	-20°14.6	-20°14.1	-20°13.6	-20°13.0	+0.5
Su 20	267°15.9	282°15.7	297°15.5	312°15.3	327°15.2	342°15.0	357°14.8	12°14.6	27°14.4	42°14.3	57°14.1	72°13.9	-0.2
	-20°06.1	-20°05.5	-20°05.0	-20°04.4	-20°03.9	-20°03.3	-20°02.8	-20°02.2	-20°01.7	-20°01.2	-20°00.6	-20°00.1	+0.5
Mo 21	267°11.6	282°11.4	297°11.3	312°11.1	327°10.9	342°10.7	357°10.6	12°10.4	27°10.2	42°10.0	57°09.9	72°09.7	-0.2
	-19°52.9	-19°52.3	-19°51.7	-19°51.2	-19°50.6	-19°50.1	-19°49.5	-19°48.9	-19°48.4	-19°47.8	-19°47.3	-19°46.7	+0.6
Tu 22	267°07.5	282°07.3	297°07.2	312°07.0	327°06.8	342°06.7	357°06.5	12°06.4	27°06.2	42°06.0	57°05.9	72°05.7	-0.2
	-19°39.3	-19°38.7	-19°38.1	-19°37.6	-19°37.0	-19°36.4	-19°35.8	-19°35.3	-19°34.7	-19°34.1	-19°33.5	-19°33.0	+0.6
We 23	267°03.6	282°03.5	297°03.3	312°03.1	327°03.0	342°02.8	357°02.7	12°02.5	27°02.4	42°02.2	57°02.0	72°01.9	-0.2
	-19°25.4	-19°24.8	-19°24.2	-19°23.6	-19°23.0	-19°22.4	-19°21.8	-19°21.2	-19°20.6	-19°20.0	-19°19.4	-19°18.9	+0.6
Th 24	266°59.9	281°59.7	296°59.6	311°59.4	326°59.3	341°59.2	356°59.0	11°58.9	26°58.7	41°58.6	56°58.4	71°58.3	-0.1
	-19°11.1	-19°10.5	-19°09.9	-19°09.3	-19°08.6	-19°08.0	-19°07.4	-19°06.8	-19°06.2	-19°05.6	-19°05.0	-19°04.4	+0.6
Fr 25	266°56.4	281°56.2	296°56.1	311°56.0	326°55.8	341°55.7	356°55.5	11°55.4	26°55.3	41°55.1	56°55.0	71°54.8	-0.1
	-18°56.4	-18°55.8	-18°55.2	-18°54.6	-18°53.9	-18°53.3	-18°52.7	-18°52.1	-18°51.5	-18°50.8	-18°50.2	-18°49.6	+0.6
Sa 26	266°53.1	281°52.9	296°52.8	311°52.7	326°52.5	341°52.4	356°52.3	11°52.1	26°52.0	41°51.9	56°51.7	71°51.6	-0.1
	-18°41.4	-18°40.8	-18°40.2	-18°39.5	-18°38.9	-18°38.3	-18°37.6	-18°37.0	-18°36.3	-18°35.7	-18°35.1	-18°34.4	+0.6
Su 27	266°49.9	281°49.8	296°49.7	311°49.6	326°49.4	341°49.3	356°49.2	11°49.1	26°48.9	41°48.8	56°48.7	71°48.6	-0.1
	-18°26.1	-18°25.4	-18°24.8	-18°24.1	-18°23.5	-18°22.8	-18°22.2	-18°21.5	-18°20.9	-18°20.2	-18°19.6	-18°18.9	+0.6
Mo 28	266°47.0	281°46.9	296°46.8	311°46.6	326°46.5	341°46.4	356°46.3	11°46.2	26°46.1	41°45.9	56°45.8	71°45.7	-0.1
	-18°10.4	-18°09.7	-18°09.1	-18°08.4	-18°07.8	-18°07.1	-18°06.4	-18°05.8	-18°05.1	-18°04.4	-18°03.8	-18°03.1	+0.7
Tu 29	266°44.3	281°44.1	296°44.0	311°43.9	326°43.8	341°43.7	356°43.6	11°43.5	26°43.4	41°43.3	56°43.2	71°43.1	-0.1
	-17°54.4	-17°53.7	-17°53.1	-17°52.4	-17°51.7	-17°51.0	-17°50.4	-17°49.7	-17°49.0	-17°48.3	-17°47.6	-17°47.0	+0.7
We 30	266°41.7	281°41.6	296°41.5	311°41.4	326°41.3	341°41.2	356°41.1	11°41.0	26°40.9	41°40.8	56°40.7	71°40.6	-0.1
	-17°38.1	-17°37.4	-17°36.7	-17°36.0	-17°35.3	-17°34.6	-17°34.0	-17°33.3	-17°32.6	-17°31.9	-17°31.2	-17°30.5	+0.7
Th 31	266°39.4	281°39.3	296°39.2	311°39.1	326°39.0	341°38.9	356°38.8	11°38.7	26°38.7	41°38.6	56°38.5	71°38.4	-0.1
	-17°21.4	-17°20.7	-17°20.0	-17°19.3	-17°18.6	-17°17.9	-17°17.2	-17°16.5	-17°15.8	-17°15.1	-17°14.4	-17°13.7	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2030

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
Tu 1	253° 52.1	268° 15.4	282° 38.5	297° 01.6	311° 24.7	325° 47.7	340° 10.7	354° 33.6	8° 56.5	23° 19.3	37° 42.1	+23.0	16.4
	-22° 19.5	-22° 24.3	-22° 29.1	-22° 33.7	-22° 38.1	-22° 42.3	-22° 46.4	-22° 50.4	-22° 54.2	-22° 57.8	-23° 01.2	-4.2	60.1
We 2	253° 20.7	267° 43.1	282° 05.6	296° 28.0	310° 50.5	325° 12.9	339° 35.4	353° 57.8	8° 20.3	22° 42.8	37° 05.3	+22.5	16.4
	-23° 32.9	-23° 33.7	-23° 34.3	-23° 34.7	-23° 34.9	-23° 35.0	-23° 34.9	-23° 34.6	-23° 34.2	-23° 33.6	-23° 32.8	+0.0	60.1
Th 3	252° 46.3	267° 09.4	281° 32.5	295° 55.6	310° 18.8	324° 42.1	339° 05.5	353° 28.9	7° 52.3	22° 15.8	36° 39.4	+23.3	16.3
	-23° 01.1	-22° 57.7	-22° 54.1	-22° 50.3	-22° 46.4	-22° 42.3	-22° 38.1	-22° 33.7	-22° 29.2	-22° 24.5	-22° 19.7	+4.1	59.8
● Fr 4	252° 42.4	267° 07.3	281° 32.2	295° 57.3	310° 22.4	324° 47.6	339° 12.9	353° 38.3	8° 03.8	22° 29.4	36° 55.1	+25.3	16.2
	-20° 49.6	-20° 42.5	-20° 35.3	-20° 27.9	-20° 20.4	-20° 12.8	-20° 05.1	-19° 57.2	-19° 49.2	-19° 41.1	-19° 32.9	+7.7	59.3
Sa 5	253° 32.4	267° 59.6	282° 27.0	296° 54.5	311° 22.1	325° 49.8	340° 17.5	354° 45.4	9° 13.4	23° 41.5	38° 09.7	+27.7	16.0
	-17° 16.6	-17° 06.7	-16° 56.8	-16° 46.7	-16° 36.6	-16° 26.3	-16° 16.0	-16° 05.6	-15° 55.1	-15° 44.6	-15° 33.9	+10.3	58.6
Su 6	255° 23.9	269° 53.6	284° 23.4	298° 53.3	313° 23.2	327° 53.3	342° 23.4	356° 53.7	11° 24.0	25° 54.4	40° 24.9	+30.1	15.7
	-12° 46.2	-12° 34.6	-12° 22.9	-12° 11.1	-11° 59.3	-11° 47.4	-11° 35.5	-11° 23.6	-11° 11.6	-10° 59.5	-10° 47.5	+11.9	57.7
Mo 7	258° 11.7	272° 43.5	287° 15.2	301° 47.1	316° 19.0	330° 51.0	345° 23.1	359° 55.2	14° 27.4	28° 59.6	43° 31.9	+32.0	15.5
	-7° 42.4	-7° 29.9	-7° 17.3	-7° 04.7	-6° 52.1	-6° 39.5	-6° 26.9	-6° 14.3	-6° 01.6	-5° 48.9	-5° 36.3	+12.6	56.9
Tu 8	261° 43.2	276° 16.3	290° 49.5	305° 22.7	319° 56.0	334° 29.3	349° 02.7	3° 36.1	18° 09.5	32° 43.0	47° 16.5	+33.3	15.3
	-2° 25.5	-2° 12.8	-2° 00.1	-1° 47.4	-1° 34.8	-1° 22.1	-1° 09.4	-0° 56.8	-0° 44.1	-0° 31.5	-0° 18.8	+12.7	56.0
We 9	265° 42.7	280° 16.7	294° 50.6	309° 24.6	323° 58.6	338° 32.6	353° 06.7	7° 40.7	22° 14.8	36° 48.8	51° 22.9	+34.0	15.1
	2° 48.5	3° 00.8	3° 13.1	3° 25.3	3° 37.6	3° 49.8	4° 02.0	4° 14.1	4° 26.3	4° 38.4	4° 50.4	+12.2	55.3
Th 10	269° 54.8	284° 29.0	299° 03.1	313° 37.2	328° 11.3	342° 45.4	357° 19.6	11° 53.6	26° 27.7	41° 01.8	55° 35.9	+34.1	14.9
	7° 47.3	7° 58.8	8° 10.2	8° 21.6	8° 33.0	8° 44.3	8° 55.6	9° 06.8	9° 18.0	9° 29.2	9° 40.3	+11.3	54.8
◐ Fr 11	274° 05.0	288° 38.8	303° 12.5	317° 46.3	332° 20.0	346° 53.7	1° 27.3	16° 01.0	30° 34.6	45° 08.1	59° 41.7	+33.7	14.8
	12° 20.8	12° 31.1	12° 41.3	12° 51.5	13° 01.6	13° 11.7	13° 21.7	13° 31.6	13° 41.5	13° 51.3	14° 01.1	+10.0	54.4
Sa 12	278° 00.9	292° 33.9	307° 06.8	321° 39.7	336° 12.6	350° 45.4	5° 18.2	19° 51.0	34° 23.7	48° 56.4	63° 29.0	+32.8	14.8
	16° 19.9	16° 28.6	16° 37.3	16° 45.9	16° 54.4	17° 02.8	17° 11.2	17° 19.5	17° 27.7	17° 35.8	17° 43.9	+8.4	54.2
Su 13	281° 33.1	296° 05.0	310° 36.8	325° 08.6	339° 40.4	354° 12.1	8° 43.8	23° 15.4	37° 47.0	52° 18.5	66° 50.0	+31.7	14.8
	19° 35.4	19° 42.2	19° 48.9	19° 55.5	20° 02.0	20° 08.5	20° 14.8	20° 21.1	20° 27.2	20° 33.3	20° 39.3	+6.4	54.1
Mo 14	284° 36.5	299° 07.2	313° 37.9	328° 08.5	342° 39.1	357° 09.6	11° 40.1	26° 10.6	40° 41.0	55° 11.4	69° 41.7	+30.5	14.8
	21° 58.0	22° 02.4	22° 06.8	22° 11.1	22° 15.2	22° 19.3	22° 23.2	22° 27.1	22° 30.9	22° 34.5	22° 38.0	+4.0	54.3
Tu 15	287° 11.7	301° 41.4	316° 11.1	330° 40.7	345° 10.3	359° 39.9	14° 09.4	28° 38.9	43° 08.4	57° 37.8	72° 07.2	+29.5	14.9
	23° 18.4	23° 20.2	23° 21.9	23° 23.4	23° 24.9	23° 26.3	23° 27.5	23° 28.6	23° 29.6	23° 30.5	23° 31.3	+1.3	54.6
We 16	289° 25.4	303° 54.4	318° 23.5	332° 52.5	347° 21.5	1° 50.5	16° 19.5	30° 48.4	45° 17.4	59° 46.4	74° 15.3	+29.0	15.0
	23° 29.0	23° 27.9	23° 26.7	23° 25.3	23° 23.9	23° 22.3	23° 20.6	23° 18.8	23° 16.8	23° 14.8	23° 12.6	-1.6	55.0
Th 17	291° 28.9	305° 57.8	320° 26.7	334° 55.7	349° 24.6	3° 53.5	18° 22.5	32° 51.4	47° 20.4	61° 49.4	76° 18.4	+28.9	15.1
	22° 25.5	22° 21.4	22° 17.2	22° 12.9	22° 08.5	22° 03.9	21° 59.2	21° 54.4	21° 49.5	21° 44.5	21° 39.3	-4.6	55.6
Fr 18	293° 35.0	308° 04.2	322° 33.5	337° 02.8	351° 32.1	6° 01.5	20° 30.9	35° 00.2	49° 29.7	63° 59.1	78° 28.6	+29.4	15.3
	20° 08.4	20° 01.5	19° 54.4	19° 47.2	19° 40.0	19° 32.6	19° 25.1	19° 17.5	19° 09.8	19° 02.0	18° 54.1	-7.4	56.1
○ Sa 19	295° 53.6	310° 23.5	324° 53.5	339° 23.4	353° 53.4	8° 23.4	22° 53.4	37° 23.5	51° 53.6	66° 23.7	80° 53.8	+30.0	15.5
	16° 43.4	16° 33.9	16° 24.3	16° 14.7	16° 04.9	15° 55.1	15° 45.2	15° 35.1	15° 25.0	15° 14.9	15° 04.6	-9.9	56.7
Su 20	298° 29.2	312° 59.7	327° 30.3	342° 00.9	356° 31.6	11° 02.2	25° 32.9	40° 03.6	54° 34.3	69° 05.1	83° 35.8	+30.7	15.6
	12° 21.0	12° 09.5	11° 57.9	11° 46.2	11° 34.5	11° 22.8	11° 10.9	10° 59.0	10° 47.1	10° 35.1	10° 23.0	-11.8	57.2
Mo 21	301° 19.4	315° 50.4	330° 21.4	344° 52.4	359° 23.5	13° 54.5	28° 25.6	42° 56.7	57° 27.7	71° 58.8	86° 29.9	+31.1	15.7
	7° 15.2	7° 02.3	6° 49.3	6° 36.3	6° 23.3	6° 10.2	5° 57.1	5° 44.0	5° 30.8	5° 17.6	5° 04.3	-13.1	57.7
Tu 22	304° 16.3	318° 47.4	333° 18.4	347° 49.5	2° 20.5	16° 51.5	31° 22.5	45° 53.5	60° 24.5	74° 55.5	89° 26.4	+31.0	15.9
	1° 42.4	1° 28.8	1° 15.1	1° 01.5	0° 47.8	0° 34.2	0° 20.5	0° 06.8	-0° 06.9	-0° 20.6	-0° 34.3	-13.7	58.1
We 23	318° 47.4	333° 18.4	347° 49.5	2° 20.5	16° 51.5	31° 22.5	45° 53.5	60° 24.5	74° 55.5	89° 26.4	103° 57.4	+31.0	15.9
	1° 28.8	1° 15.1	1° 01.5	0° 47.8	0° 34.2	0° 20.5	0° 06.8	-0° 06.9	-0° 20.6	-0° 34.3	-0° 48.0	-13.7	58.2
Th 24	321° 38.8	336° 09.3	350° 39.9	5° 10.3	19° 40.8	34° 11.2	48° 41.6	63° 11.9	77° 42.2	92° 12.5	106° 42.7	+30.4	16.0
	-4° 13.2	-4° 26.8	-4° 40.4	-4° 53.9	-5° 07.4	-5° 21.0	-5° 34.5	-5° 47.9	-6° 01.4	-6° 14.8	-6° 28.2	-13.5	58.5
Fr 25	324° 10.8	338° 40.3	353° 09.8	7° 39.1	22° 08.4	36° 37.7	51° 06.9	65° 36.1	80° 05.2	94° 34.2	109° 03.2	+29.2	16.0
	-9° 44.7	-9° 57.5	-10° 10.2	-10° 22.8	-10° 35.4	-10° 48.0	-11° 00.5	-11° 12.9	-11° 25.3	-11° 37.6	-11° 49.9	-12.5	58.8
◑ Sa 26	326° 10.3	340° 38.3	355° 06.2	9° 34.0	24° 01.7	38° 29.4	52° 57.0	67° 24.5	81° 52.0	96° 19.4	110° 46.7	+27.6	16.1
	-14° 45.6	-14° 56.7	-15° 07.8	-15° 18.7	-15° 29.6	-15° 40.3	-15° 51.0	-16° 01.6	-16° 12.1	-16° 22.5	-16° 32.8	-10.7	59.0
Su 27	327° 28.1	341° 54.3	356° 20.4	10° 46.5	25° 12.5	39° 38.4	54° 04.2	68° 30.0	82° 55.7	97° 21.4	111° 47.0	+25.9	16.1
	-18° 55.1	-19° 03.7	-19° 12.2	-19° 20.6	-19° 28.9	-19° 37.0	-19° 45.0	-19° 52.9	-20° 00.7	-20° 08.4	-20° 15.9	-8.1	59.2
Mo 28	328° 03.3	342° 28.0	356° 52.5	11° 17.1	25° 41.6	40° 06.0	54° 30.4	68° 54.8	83° 19.1	97° 43.3	112° 07.6	+24.4	16.2
	-21° 52.8	-21° 58.1	-22° 03.3	-22° 08.4	-22° 13.3	-22° 18.1	-22° 22.7	-22° 27.2	-22° 31.5	-22° 35.7	-22° 39.7	-4.7	59.3
Tu 29	328° 07.1	342° 30.8	356° 54.6	11° 18.4	25° 42.1	40° 05.9	54° 29.6	68° 53.3	83° 17.1	97° 40.8	112° 04.5	+23.7	16.2
	-23° 21.7	-23° 23.2	-23° 24.6	-23° 25.8	-23° 26.9	-23° 27.8	-23° 28.5	-23° 29.1	-23° 29.6	-23° 29.8	-23° 30.0	-0.8	59.2
We 30	328° 01.8	342° 25.8	356° 49.8	11° 13.8	25° 37.9	40° 02.0	54° 26.2	68° 50.4	83° 14.6	97° 38.9	112° 03.2	+24.1	16.1
	-23° 12.6	-23° 10.2	-23° 07.6	-23° 04.9	-23° 02.0	-22° 59.0	-22° 55.8	-22° 52.5	-22° 49.0	-22° 45.4	-22° 41.6	+3.1	59.1
Th 31	328° 14.5	342° 39.7	357° 05.0	11° 30.4	25° 55.8	40° 21.3	54° 46.9	69° 12.5	83° 38.3	98° 04.0	112° 29.9	+25.5	16.0
	-21° 27.4	-21° 21.3	-21° 15.1	-21° 08.8	-21° 02.3	-20° 55.7	-20° 49.0	-20° 42.2	-20° 35.2	-20° 28.1	-20° 20.9	+6.7	58.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 02h49 — FQ: 11 14h06 — FM: 19 15h54 — LQ: 26 18h14

SUN

February 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	266°37.3	281°37.2	296°37.1	311°37.0	326°36.9	341°36.8	356°36.7	11°36.7	26°36.6	41°36.5	56°36.4	71°36.3	-0.1
	-17°04.5	-17°03.8	-17°03.1	-17°02.4	-17°01.6	-17°00.9	-17°00.2	-16°59.5	-16°58.8	-16°58.1	-16°57.3	-16°56.6	+0.7
Sa 2	266°35.3	281°35.2	296°35.2	311°35.1	326°35.0	341°34.9	356°34.9	11°34.8	26°34.7	41°34.6	56°34.6	71°34.5	-0.1
	-16°47.2	-16°46.5	-16°45.8	-16°45.1	-16°44.3	-16°43.6	-16°42.9	-16°42.2	-16°41.4	-16°40.7	-16°40.0	-16°39.2	+0.7
Su 3	266°33.6	281°33.5	296°33.5	311°33.4	326°33.3	341°33.3	356°33.2	11°33.1	26°33.1	41°33.0	56°32.9	71°32.9	-0.1
	-16°29.7	-16°29.0	-16°28.2	-16°27.5	-16°26.8	-16°26.0	-16°25.3	-16°24.5	-16°23.8	-16°23.1	-16°22.3	-16°21.6	+0.7
Mo 4	266°32.1	281°32.0	296°31.9	311°31.9	326°31.8	341°31.8	356°31.7	11°31.7	26°31.6	41°31.5	56°31.5	71°31.4	-0.1
	-16°11.9	-16°11.1	-16°10.4	-16°09.6	-16°08.9	-16°08.1	-16°07.4	-16°06.6	-16°05.9	-16°05.1	-16°04.4	-16°03.6	+0.8
Tu 5	266°30.7	281°30.7	296°30.6	311°30.6	326°30.5	341°30.5	356°30.4	11°30.4	26°30.3	41°30.3	56°30.3	71°30.2	-0.0
	-15°53.8	-15°53.0	-15°52.3	-15°51.5	-15°50.7	-15°50.0	-15°49.2	-15°48.4	-15°47.7	-15°46.9	-15°46.1	-15°45.4	+0.8
We 6	266°29.6	281°29.6	296°29.5	311°29.5	326°29.5	341°29.4	356°29.4	11°29.3	26°29.3	41°29.3	56°29.2	71°29.2	-0.0
	-15°35.4	-15°34.6	-15°33.9	-15°33.1	-15°32.3	-15°31.5	-15°30.8	-15°30.0	-15°29.2	-15°28.4	-15°27.7	-15°26.9	+0.8
Th 7	266°28.7	281°28.7	296°28.6	311°28.6	326°28.6	341°28.5	356°28.5	11°28.5	26°28.5	41°28.4	56°28.4	71°28.4	-0.0
	-15°16.8	-15°16.0	-15°15.2	-15°14.4	-15°13.6	-15°12.8	-15°12.0	-15°11.3	-15°10.5	-15°09.7	-15°08.9	-15°08.1	+0.8
Fr 8	266°28.0	281°28.0	296°28.0	311°27.9	326°27.9	341°27.9	356°27.9	11°27.8	26°27.8	41°27.8	56°27.8	71°27.7	-0.0
	-14°57.8	-14°57.1	-14°56.3	-14°55.5	-14°54.7	-14°53.9	-14°53.1	-14°52.3	-14°51.5	-14°50.7	-14°49.9	-14°49.1	+0.8
Sa 9	266°27.5	281°27.5	296°27.5	311°27.4	326°27.4	341°27.4	356°27.4	11°27.4	26°27.4	41°27.4	56°27.3	71°27.3	-0.0
	-14°38.7	-14°37.9	-14°37.1	-14°36.3	-14°35.5	-14°34.7	-14°33.9	-14°33.1	-14°32.3	-14°31.4	-14°30.6	-14°29.8	+0.8
Su 10	266°27.2	281°27.2	296°27.2	311°27.2	326°27.1	341°27.1	356°27.1	11°27.1	26°27.1	41°27.1	56°27.1	71°27.1	-0.0
	-14°19.3	-14°18.5	-14°17.7	-14°16.9	-14°16.0	-14°15.2	-14°14.4	-14°13.6	-14°12.8	-14°12.0	-14°11.1	-14°10.3	+0.8
Mo 11	266°27.1	281°27.1	296°27.1	311°27.1	326°27.1	341°27.1	356°27.1	11°27.1	26°27.1	41°27.1	56°27.1	71°27.1	+0.0
	-13°59.7	-13°58.8	-13°58.0	-13°57.2	-13°56.4	-13°55.5	-13°54.7	-13°53.9	-13°53.1	-13°52.2	-13°51.4	-13°50.6	+0.8
Tu 12	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.2	11°27.2	26°27.2	41°27.2	56°27.2	71°27.3	+0.0
	-13°39.8	-13°39.0	-13°38.1	-13°37.3	-13°36.5	-13°35.6	-13°34.8	-13°34.0	-13°33.1	-13°32.3	-13°31.5	-13°30.6	+0.8
We 13	266°27.4	281°27.4	296°27.5	311°27.5	326°27.5	341°27.5	356°27.5	11°27.5	26°27.6	41°27.6	56°27.6	71°27.6	+0.0
	-13°19.7	-13°18.9	-13°18.0	-13°17.2	-13°16.3	-13°15.5	-13°14.7	-13°13.8	-13°13.0	-13°12.1	-13°11.3	-13°10.4	+0.8
Th 14	266°27.9	281°27.9	296°27.9	311°28.0	326°28.0	341°28.0	356°28.0	11°28.1	26°28.1	41°28.1	56°28.1	71°28.2	+0.0
	-12°59.4	-12°58.6	-12°57.7	-12°56.9	-12°56.0	-12°55.2	-12°54.3	-12°53.4	-12°52.6	-12°51.7	-12°50.9	-12°50.0	+0.9
Fr 15	266°28.5	281°28.6	296°28.6	311°28.6	326°28.7	341°28.7	356°28.7	11°28.8	26°28.8	41°28.8	56°28.9	71°28.9	+0.0
	-12°38.9	-12°38.0	-12°37.2	-12°36.3	-12°35.5	-12°34.6	-12°33.7	-12°32.9	-12°32.0	-12°31.1	-12°30.3	-12°29.4	+0.9
Sa 16	266°29.4	281°29.4	296°29.5	311°29.5	326°29.5	341°29.6	356°29.6	11°29.7	26°29.7	41°29.7	56°29.8	71°29.8	+0.0
	-12°18.2	-12°17.3	-12°16.4	-12°15.6	-12°14.7	-12°13.8	-12°13.0	-12°12.1	-12°11.2	-12°10.4	-12°09.5	-12°08.6	+0.9
Su 17	266°30.4	281°30.4	296°30.5	311°30.5	326°30.6	341°30.6	356°30.7	11°30.7	26°30.8	41°30.8	56°30.9	71°30.9	+0.0
	-11°57.3	-11°56.4	-11°55.5	-11°54.6	-11°53.8	-11°52.9	-11°52.0	-11°51.1	-11°50.3	-11°49.4	-11°48.5	-11°47.6	+0.9
Mo 18	266°31.6	281°31.6	296°31.7	311°31.7	326°31.8	341°31.8	356°31.9	11°32.0	26°32.0	41°32.1	56°32.1	71°32.2	+0.1
	-11°36.2	-11°35.3	-11°34.4	-11°33.5	-11°32.6	-11°31.7	-11°30.9	-11°30.0	-11°29.1	-11°28.2	-11°27.3	-11°26.4	+0.9
Tu 19	266°32.9	281°33.0	296°33.1	311°33.1	326°33.2	341°33.2	356°33.3	11°33.4	26°33.4	41°33.5	56°33.6	71°33.6	+0.1
	-11°14.9	-11°14.0	-11°13.1	-11°12.2	-11°11.3	-11°10.4	-11°09.5	-11°08.6	-11°07.7	-11°06.9	-11°06.0	-11°05.1	+0.9
We 20	266°34.5	281°34.5	296°34.6	311°34.7	326°34.7	341°34.8	356°34.9	11°34.9	26°35.0	41°35.1	56°35.2	71°35.2	+0.1
	-10°53.4	-10°52.5	-10°51.6	-10°50.7	-10°49.8	-10°48.9	-10°48.0	-10°47.1	-10°46.2	-10°45.3	-10°44.4	-10°43.5	+0.9
Th 21	266°36.2	281°36.2	296°36.3	311°36.4	326°36.5	341°36.5	356°36.6	11°36.7	26°36.8	41°36.8	56°36.9	71°37.0	+0.1
	-10°31.8	-10°30.9	-10°30.0	-10°29.1	-10°28.2	-10°27.3	-10°26.4	-10°25.4	-10°24.5	-10°23.6	-10°22.7	-10°21.8	+0.9
Fr 22	266°38.0	281°38.1	296°38.2	311°38.2	326°38.3	341°38.4	356°38.5	11°38.6	26°38.7	41°38.7	56°38.8	71°38.9	+0.1
	-10°10.0	-10°09.1	-10°08.2	-10°07.3	-10°06.3	-10°05.4	-10°04.5	-10°03.6	-10°02.7	-10°01.8	-10°00.9	-9°59.9	+0.9
Sa 23	266°40.0	281°40.1	296°40.2	311°40.3	326°40.3	341°40.4	356°40.5	11°40.6	26°40.7	41°40.8	56°40.9	71°41.0	+0.1
	-9°48.0	-9°47.1	-9°46.2	-9°45.3	-9°44.4	-9°43.4	-9°42.5	-9°41.6	-9°40.7	-9°39.8	-9°38.8	-9°37.9	+0.9
Su 24	266°42.1	281°42.2	296°42.3	311°42.4	326°42.5	341°42.6	356°42.7	11°42.8	26°42.9	41°43.0	56°43.1	71°43.2	+0.1
	-9°25.9	-9°25.0	-9°24.1	-9°23.2	-9°22.2	-9°21.3	-9°20.4	-9°19.5	-9°18.5	-9°17.6	-9°16.7	-9°15.7	+0.9
Mo 25	266°44.4	281°44.5	296°44.6	311°44.7	326°44.8	341°44.9	356°45.0	11°45.1	26°45.2	41°45.3	56°45.4	71°45.5	+0.1
	-9°03.7	-9°02.7	-9°01.8	-9°00.9	-9°00.0	-8°59.0	-8°58.1	-8°57.2	-8°56.2	-8°55.3	-8°54.4	-8°53.4	+0.9
Tu 26	266°46.9	281°47.0	296°47.1	311°47.2	326°47.3	341°47.4	356°47.5	11°47.6	26°47.7	41°47.8	56°47.9	71°48.0	+0.1
	-8°41.3	-8°40.4	-8°39.4	-8°38.5	-8°37.5	-8°36.6	-8°35.7	-8°34.7	-8°33.8	-8°32.9	-8°31.9	-8°31.0	+0.9
We 27	266°49.4	281°49.5	296°49.6	311°49.8	326°49.9	341°50.0	356°50.1	11°50.2	26°50.3	41°50.4	56°50.5	71°50.6	+0.1
	-8°18.8	-8°17.8	-8°16.9	-8°15.9	-8°15.0	-8°14.1	-8°13.1	-8°12.2	-8°11.2	-8°10.3	-8°09.3	-8°08.4	+0.9
Th 28	266°52.1	281°52.2	296°52.3	311°52.5	326°52.6	341°52.7	356°52.8	11°52.9	26°53.0	41°53.2	56°53.3	71°53.4	+0.1
	-7°56.1	-7°55.2	-7°54.2	-7°53.3	-7°52.3	-7°51.4	-7°50.4	-7°49.5	-7°48.6	-7°47.6	-7°46.7	-7°45.7	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2030

D	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	Δ'/h	SH
Fr 1	256°52.8	271°19.5	285°46.3	300°13.2	314°40.2	329°07.2	343°34.4	358°01.6	12°28.9	26°56.3	41°23.8	+27.1	15.9
	-19°02.1	-18°53.6	-18°44.9	-18°36.2	-18°27.4	-18°18.5	-18°09.4	-18°00.3	-17°51.1	-17°41.7	-17°32.3	+9.0	58.4
● Sa 2	258°25.8	272°54.7	287°23.5	301°52.5	316°21.6	330°50.7	345°19.9	359°49.2	14°18.6	28°48.0	43°17.6	+29.2	15.8
	-15°00.2	-14°49.4	-14°38.6	-14°27.6	-14°16.6	-14°05.6	-13°54.4	-13°43.2	-13°32.0	-13°20.6	-13°09.3	+11.1	57.9
Su 3	260°49.8	275°20.5	289°51.3	304°22.2	318°53.1	333°24.1	347°55.2	2°26.3	16°57.5	31°28.8	46°00.1	+31.0	15.6
	-10°12.1	-9°59.9	-9°47.7	-9°35.4	-9°23.1	-9°10.8	-8°58.5	-8°46.1	-8°33.7	-8°21.2	-8°08.8	+12.3	57.3
Mo 4	263°57.2	278°29.4	293°01.7	307°34.0	322°06.4	336°38.9	351°11.3	5°43.9	20°16.4	34°49.1	49°21.7	+32.5	15.4
	-4°59.1	-4°46.3	-4°33.6	-4°20.8	-4°08.0	-3°55.2	-3°42.4	-3°29.6	-3°16.8	-3°04.0	-2°51.2	+12.8	56.6
Tu 5	267°36.2	282°09.4	296°42.6	311°15.9	325°49.2	340°22.6	354°55.9	9°29.3	24°02.7	38°36.1	53°09.6	+33.3	15.2
	0°20.1	0°32.8	0°45.5	0°58.1	1°10.7	1°23.3	1°35.9	1°48.5	2°01.0	2°13.5	2°26.0	+12.6	55.9
We 6	271°33.3	286°07.0	300°40.7	315°14.3	329°48.0	344°21.7	358°55.4	13°29.1	28°02.9	42°36.6	57°10.3	+33.7	15.1
	5°30.3	5°42.3	5°54.3	6°06.3	6°18.2	6°30.1	6°41.9	6°53.7	7°05.5	7°17.2	7°28.9	+11.9	55.3
Th 7	275°35.5	290°09.1	304°42.7	319°16.3	333°49.8	348°23.4	2°57.0	17°30.5	32°04.0	46°37.5	61°11.0	+33.6	14.9
	10°18.8	10°29.8	10°40.7	10°51.5	11°02.3	11°13.0	11°23.7	11°34.3	11°44.9	11°55.4	12°05.9	+10.7	54.8
Fr 8	279°30.8	294°03.9	308°37.0	323°10.1	337°43.1	352°16.1	6°49.1	21°22.1	35°55.0	50°27.9	65°00.8	+33.0	14.8
	14°35.4	14°44.9	14°54.3	15°03.6	15°12.9	15°22.1	15°31.2	15°40.3	15°49.2	15°58.2	16°07.0	+9.2	54.4
Sa 9	283°09.7	297°42.0	312°14.3	326°46.6	341°18.8	355°50.9	10°23.0	24°55.1	39°27.2	53°59.2	68°31.2	+32.1	14.8
	18°10.7	18°18.3	18°25.9	18°33.3	18°40.7	18°48.0	18°55.2	19°02.4	19°09.4	19°16.4	19°23.3	+7.3	54.2
◐ Su 10	286°25.9	300°57.2	315°28.5	329°59.8	344°31.0	359°02.1	13°33.3	28°04.3	42°35.4	57°06.4	71°37.4	+31.1	14.8
	20°55.9	21°01.3	21°06.7	21°12.0	21°17.1	21°22.2	21°27.2	21°32.0	21°36.8	21°41.5	21°46.1	+5.0	54.2
Mo 11	289°17.2	303°47.5	318°17.8	332°48.1	347°18.4	1°48.6	16°18.8	30°48.9	45°19.0	59°49.1	74°19.1	+30.2	14.8
	22°42.7	22°45.7	22°48.5	22°51.2	22°53.9	22°56.4	22°58.8	23°01.1	23°03.3	23°05.4	23°07.4	+2.5	54.4
Tu 12	291°46.2	306°15.8	320°45.4	335°15.0	349°44.5	4°14.0	18°43.5	33°12.9	47°42.4	62°11.8	76°41.2	+29.5	14.9
	23°23.8	23°24.0	23°24.1	23°24.0	23°23.9	23°23.6	23°23.2	23°22.7	23°22.1	23°21.4	23°20.5	-0.3	54.7
We 13	294°00.4	308°29.6	322°58.7	337°27.9	351°57.1	6°26.2	20°55.4	35°24.5	49°53.7	64°22.8	78°52.0	+29.2	15.1
	22°53.8	22°51.1	22°48.3	22°45.3	22°42.2	22°39.0	22°35.7	22°32.3	22°28.8	22°25.1	22°21.3	-3.2	55.3
Th 14	296°09.2	310°38.4	325°07.6	339°36.8	354°06.0	8°35.2	23°04.4	37°33.7	52°02.9	66°32.2	81°01.4	+29.2	15.2
	21°10.7	21°05.1	20°59.3	20°53.5	20°47.5	20°41.4	20°35.2	20°28.9	20°22.5	20°16.0	20°09.3	-6.1	55.9
Fr 15	298°22.0	312°51.4	327°20.9	341°50.5	356°20.0	10°49.5	25°19.1	39°48.7	54°18.3	68°47.9	83°17.6	+29.6	15.4
	18°16.7	18°08.3	17°59.9	17°51.3	17°42.6	17°33.9	17°25.0	17°16.0	17°07.0	16°57.8	16°48.6	-8.8	56.6
Sa 16	300°44.2	315°14.1	329°44.1	344°14.0	358°44.0	13°14.0	27°44.0	42°14.0	56°44.0	71°14.0	85°44.1	+30.0	15.6
	14°18.6	14°07.9	13°57.1	13°46.2	13°35.2	13°24.2	13°13.1	13°01.9	12°50.6	12°39.2	12°27.8	-11.1	57.4
Su 17	303°16.5	317°46.8	332°17.0	346°47.3	1°17.6	15°47.8	30°18.1	44°48.4	59°18.7	73°49.0	88°19.3	+30.3	15.8
	9°27.8	9°15.3	9°02.7	8°50.1	8°37.4	8°24.6	8°11.8	7°59.0	7°46.0	7°33.1	7°20.1	-12.8	58.1
○ Mo 18	305°54.1	320°24.4	334°54.6	349°24.9	3°55.2	18°25.5	32°55.7	47°26.0	61°56.2	76°26.4	90°56.6	+30.3	16.0
	3°59.7	3°46.1	3°32.4	3°18.7	3°04.9	2°51.2	2°37.4	2°23.6	2°09.8	1°55.9	1°42.1	-13.8	58.6
Tu 19	308°27.9	322°57.8	337°27.7	351°57.6	6°27.4	20°57.3	35°27.1	49°56.8	64°26.6	78°56.3	93°25.9	+29.8	16.1
	-1°47.2	-2°01.1	-2°15.1	-2°29.1	-2°43.0	-2°57.0	-3°10.9	-3°24.8	-3°38.8	-3°52.7	-4°06.5	-13.9	59.1
We 20	310°46.8	325°15.9	339°45.0	354°13.9	8°42.9	23°11.8	37°40.7	52°09.5	66°38.3	81°07.0	95°35.6	+28.9	16.2
	-7°31.8	-7°45.3	-7°58.7	-8°12.0	-8°25.3	-8°38.5	-8°51.8	-9°04.9	-9°18.0	-9°31.1	-9°44.1	-13.2	59.3
Th 21	325°15.9	339°45.0	354°13.9	8°42.9	23°11.8	37°40.7	52°09.5	66°38.3	81°07.0	95°35.6	110°04.3	+28.8	16.2
	-7°45.3	-7°58.7	-8°12.0	-8°25.3	-8°38.5	-8°51.8	-9°04.9	-9°18.0	-9°31.1	-9°44.1	-9°57.0	-13.2	59.4
Fr 22	327°07.5	341°35.3	356°03.0	10°30.7	24°58.3	39°25.8	53°53.3	68°20.8	82°48.1	97°15.5	111°42.7	+27.5	16.2
	-13°03.9	-13°15.7	-13°27.6	-13°39.3	-13°50.9	-14°02.5	-14°14.0	-14°25.4	-14°36.7	-14°47.9	-14°59.1	-11.5	59.5
Sa 23	328°24.7	342°51.1	357°17.4	11°43.6	26°09.7	40°35.9	55°01.9	69°27.9	83°53.8	98°19.7	112°45.6	+26.1	16.2
	-17°34.3	-17°43.8	-17°53.2	-18°02.5	-18°11.7	-18°20.7	-18°29.7	-18°38.5	-18°47.2	-18°55.8	-19°04.2	-9.0	59.4
Su 24	329°07.0	343°32.0	357°57.0	12°22.0	26°46.9	41°11.8	55°36.7	70°01.5	84°26.3	98°51.0	113°15.8	+24.9	16.2
	-20°55.8	-21°02.2	-21°08.4	-21°14.5	-21°20.4	-21°26.3	-21°31.9	-21°37.5	-21°42.8	-21°48.1	-21°53.2	-5.7	59.3
◑ Mo 25	329°23.3	343°47.7	358°12.0	12°36.4	27°00.7	41°25.0	55°49.3	70°13.7	84°38.0	99°02.3	113°26.6	+24.3	16.1
	-22°51.9	-22°54.6	-22°57.2	-22°59.6	-23°01.8	-23°03.9	-23°05.9	-23°07.6	-23°09.3	-23°10.8	-23°12.1	-2.0	59.0
Tu 26	329°32.5	343°57.0	358°21.6	12°46.2	27°10.8	41°35.5	56°00.2	70°24.9	84°49.6	99°14.4	113°39.3	+24.7	16.0
	-23°13.7	-23°12.6	-23°11.3	-23°09.9	-23°08.3	-23°06.6	-23°04.7	-23°02.7	-23°00.6	-22°58.2	-22°55.8	+1.8	58.7
We 27	329°57.2	344°22.9	358°48.5	13°14.3	27°40.1	42°05.9	56°31.8	70°57.8	85°23.8	99°50.0	114°16.1	+25.9	15.9
	-22°01.8	-21°57.0	-21°52.2	-21°47.2	-21°42.1	-21°36.9	-21°31.5	-21°26.0	-21°20.3	-21°14.6	-21°08.7	+5.3	58.3
Th 28	330°56.9	345°24.2	359°51.6	14°19.0	28°46.6	43°14.1	57°41.8	72°09.6	86°37.4	101°05.3	115°33.2	+27.6	15.8
	-19°25.9	-19°18.1	-19°10.2	-19°02.3	-18°54.2	-18°46.0	-18°37.7	-18°29.3	-18°20.8	-18°12.2	-18°03.5	+8.2	57.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 16h07 — FQ: 10 11h49 — FM: 18 06h19 — LQ: 25 01h57

SUN

March 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	266°54.9	281°55.1	296°55.2	311°55.3	326°55.4	341°55.5	356°55.7	11°55.8	26°55.9	41°56.0	56°56.1	71°56.3	+0.1
	-7°33.4	-7°32.4	-7°31.5	-7°30.5	-7°29.6	-7°28.6	-7°27.7	-7°26.7	-7°25.8	-7°24.8	-7°23.8	-7°22.9	+1.0
Sa 2	266°57.9	281°58.0	296°58.1	311°58.3	326°58.4	341°58.5	356°58.6	11°58.8	26°58.9	41°59.0	56°59.1	71°59.3	+0.1
	-7°10.5	-7°09.5	-7°08.6	-7°07.6	-7°06.7	-7°05.7	-7°04.8	-7°03.8	-7°02.9	-7°01.9	-7°00.9	-7°00.0	+1.0
Su 3	267°00.9	282°01.1	297°01.2	312°01.3	327°01.5	342°01.6	357°01.7	12°01.9	27°02.0	42°02.1	57°02.3	72°02.4	+0.1
	-6°47.5	-6°46.6	-6°45.6	-6°44.6	-6°43.7	-6°42.7	-6°41.8	-6°40.8	-6°39.8	-6°38.9	-6°37.9	-6°37.0	+1.0
Mo 4	267°04.1	282°04.3	297°04.4	312°04.5	327°04.7	342°04.8	357°04.9	12°05.1	27°05.2	42°05.3	57°05.5	72°05.6	+0.1
	-6°24.5	-6°23.5	-6°22.5	-6°21.6	-6°20.6	-6°19.6	-6°18.7	-6°17.7	-6°16.7	-6°15.8	-6°14.8	-6°13.9	+1.0
Tu 5	267°07.4	282°07.6	297°07.7	312°07.8	327°08.0	342°08.1	357°08.3	12°08.4	27°08.5	42°08.7	57°08.8	72°09.0	+0.1
	-6°01.3	-6°00.3	-5°59.4	-5°58.4	-5°57.4	-5°56.5	-5°55.5	-5°54.5	-5°53.6	-5°52.6	-5°51.6	-5°50.7	+1.0
We 6	267°10.8	282°11.0	297°11.1	312°11.3	327°11.4	342°11.5	357°11.7	12°11.8	27°12.0	42°12.1	57°12.3	72°12.4	+0.1
	-5°38.1	-5°37.1	-5°36.1	-5°35.2	-5°34.2	-5°33.2	-5°32.2	-5°31.3	-5°30.3	-5°29.3	-5°28.4	-5°27.4	+1.0
Th 7	267°14.3	282°14.5	297°14.6	312°14.8	327°14.9	342°15.1	357°15.2	12°15.4	27°15.5	42°15.7	57°15.8	72°16.0	+0.1
	-5°14.8	-5°13.8	-5°12.8	-5°11.8	-5°10.9	-5°09.9	-5°08.9	-5°07.9	-5°07.0	-5°06.0	-5°05.0	-5°04.0	+1.0
Fr 8	267°17.9	282°18.1	297°18.2	312°18.4	327°18.5	342°18.7	357°18.8	12°19.0	27°19.2	42°19.3	57°19.5	72°19.6	+0.2
	-4°51.4	-4°50.4	-4°49.4	-4°48.4	-4°47.5	-4°46.5	-4°45.5	-4°44.5	-4°43.6	-4°42.6	-4°41.6	-4°40.6	+1.0
Sa 9	267°21.6	282°21.8	297°21.9	312°22.1	327°22.3	342°22.4	357°22.6	12°22.7	27°22.9	42°23.0	57°23.2	72°23.4	+0.2
	-4°27.9	-4°27.0	-4°26.0	-4°25.0	-4°24.0	-4°23.0	-4°22.1	-4°21.1	-4°20.1	-4°19.1	-4°18.1	-4°17.2	+1.0
Su 10	267°25.4	282°25.6	297°25.7	312°25.9	327°26.1	342°26.2	357°26.4	12°26.5	27°26.7	42°26.9	57°27.0	72°27.2	+0.2
	-4°04.4	-4°03.4	-4°02.5	-4°01.5	-4°00.5	-3°59.5	-3°58.5	-3°57.6	-3°56.6	-3°55.6	-3°54.6	-3°53.6	+1.0
Mo 11	267°29.3	282°29.5	297°29.6	312°29.8	327°30.0	342°30.1	357°30.3	12°30.4	27°30.6	42°30.8	57°30.9	72°31.1	+0.2
	-3°40.9	-3°39.9	-3°38.9	-3°37.9	-3°37.0	-3°36.0	-3°35.0	-3°34.0	-3°33.0	-3°32.0	-3°31.1	-3°30.1	+1.0
Tu 12	267°33.3	282°33.4	297°33.6	312°33.8	327°33.9	342°34.1	357°34.3	12°34.4	27°34.6	42°34.8	57°34.9	72°35.1	+0.2
	-3°17.3	-3°16.3	-3°15.3	-3°14.3	-3°13.4	-3°12.4	-3°11.4	-3°10.4	-3°09.4	-3°08.4	-3°07.5	-3°06.5	+1.0
We 13	267°37.3	282°37.5	297°37.6	312°37.8	327°38.0	342°38.2	357°38.3	12°38.5	27°38.7	42°38.8	57°39.0	72°39.2	+0.2
	-2°53.7	-2°52.7	-2°51.7	-2°50.7	-2°49.7	-2°48.7	-2°47.8	-2°46.8	-2°45.8	-2°44.8	-2°43.8	-2°42.8	+1.0
Th 14	267°41.4	282°41.6	297°41.8	312°41.9	327°42.1	342°42.3	357°42.5	12°42.6	27°42.8	42°43.0	57°43.1	72°43.3	+0.2
	-2°30.0	-2°29.0	-2°28.0	-2°27.0	-2°26.1	-2°25.1	-2°24.1	-2°23.1	-2°22.1	-2°21.1	-2°20.1	-2°19.2	+1.0
Fr 15	267°45.6	282°45.8	297°45.9	312°46.1	327°46.3	342°46.5	357°46.6	12°46.8	27°47.0	42°47.2	57°47.4	72°47.5	+0.2
	-2°06.3	-2°05.3	-2°04.4	-2°03.4	-2°02.4	-2°01.4	-2°00.4	-1°59.4	-1°58.4	-1°57.4	-1°56.5	-1°55.5	+1.0
Sa 16	267°49.8	282°50.0	297°50.2	312°50.4	327°50.5	342°50.7	357°50.9	12°51.1	27°51.3	42°51.4	57°51.6	72°51.8	+0.2
	-1°42.6	-1°41.6	-1°40.7	-1°39.7	-1°38.7	-1°37.7	-1°36.7	-1°35.7	-1°34.7	-1°33.7	-1°32.8	-1°31.8	+1.0
Su 17	267°54.1	282°54.3	297°54.5	312°54.7	327°54.8	342°55.0	357°55.2	12°55.4	27°55.6	42°55.8	57°55.9	72°56.1	+0.2
	-1°18.9	-1°17.9	-1°16.9	-1°16.0	-1°15.0	-1°14.0	-1°13.0	-1°12.0	-1°11.0	-1°10.0	-1°09.0	-1°08.1	+1.0
Mo 18	267°58.5	282°58.7	297°58.8	312°59.0	327°59.2	342°59.4	357°59.6	12°59.7	27°59.9	43°00.1	58°00.3	73°00.5	+0.2
	-0°55.2	-0°54.2	-0°53.2	-0°52.2	-0°51.3	-0°50.3	-0°49.3	-0°48.3	-0°47.3	-0°46.3	-0°45.3	-0°44.3	+1.0
Tu 19	268°02.9	283°03.0	298°03.2	313°03.4	328°03.6	343°03.8	358°04.0	13°04.2	28°04.3	43°04.5	58°04.7	73°04.9	+0.2
	-0°31.5	-0°30.5	-0°29.5	-0°28.5	-0°27.5	-0°26.5	-0°25.6	-0°24.6	-0°23.6	-0°22.6	-0°21.6	-0°20.6	+1.0
We 20	268°07.3	283°07.5	298°07.7	313°07.8	328°08.0	343°08.2	358°08.4	13°08.6	28°08.8	43°09.0	58°09.1	73°09.3	+0.2
	-0°07.8	-0°06.8	-0°05.8	-0°04.8	-0°03.8	-0°02.8	-0°01.8	-0°00.9	0°00.1	0°01.1	0°02.1	0°03.1	+1.0
Th 21	268°11.8	283°11.9	298°12.1	313°12.3	328°12.5	343°12.7	358°12.9	13°13.1	28°13.2	43°13.4	58°13.6	73°13.8	+0.2
	0°15.9	0°16.9	0°17.9	0°18.9	0°19.9	0°20.9	0°21.8	0°22.8	0°23.8	0°24.8	0°25.8	0°26.8	+1.0
Fr 22	268°16.2	283°16.4	298°16.6	313°16.8	328°17.0	343°17.2	358°17.4	13°17.6	28°17.7	43°17.9	58°18.1	73°18.3	+0.2
	0°39.6	0°40.6	0°41.6	0°42.6	0°43.6	0°44.5	0°45.5	0°46.5	0°47.5	0°48.5	0°49.5	0°50.5	+1.0
Sa 23	268°20.7	283°20.9	298°21.1	313°21.3	328°21.5	343°21.7	358°21.9	13°22.1	28°22.2	43°22.4	58°22.6	73°22.8	+0.2
	1°03.3	1°04.3	1°05.2	1°06.2	1°07.2	1°08.2	1°09.2	1°10.2	1°11.2	1°12.1	1°13.1	1°14.1	+1.0
Su 24	268°25.3	283°25.5	298°25.6	313°25.8	328°26.0	343°26.2	358°26.4	13°26.6	28°26.8	43°27.0	58°27.1	73°27.3	+0.2
	1°26.9	1°27.9	1°28.9	1°29.9	1°30.8	1°31.8	1°32.8	1°33.8	1°34.8	1°35.8	1°36.7	1°37.7	+1.0
Mo 25	268°29.8	283°30.0	298°30.2	313°30.4	328°30.5	343°30.7	358°30.9	13°31.1	28°31.3	43°31.5	58°31.7	73°31.9	+0.2
	1°50.5	1°51.5	1°52.5	1°53.5	1°54.4	1°55.4	1°56.4	1°57.4	1°58.4	1°59.4	2°00.3	2°01.3	+1.0
Tu 26	268°34.3	283°34.5	298°34.7	313°34.9	328°35.1	343°35.3	358°35.5	13°35.6	28°35.8	43°36.0	58°36.2	73°36.4	+0.2
	2°14.1	2°15.1	2°16.0	2°17.0	2°18.0	2°19.0	2°20.0	2°20.9	2°21.9	2°22.9	2°23.9	2°24.9	+1.0
We 27	268°38.8	283°39.0	298°39.2	313°39.4	328°39.6	343°39.8	358°40.0	13°40.2	28°40.4	43°40.5	58°40.7	73°40.9	+0.2
	2°37.6	2°38.6	2°39.6	2°40.5	2°41.5	2°42.5	2°43.5	2°44.4	2°45.4	2°46.4	2°47.4	2°48.4	+1.0
Th 28	268°43.4	283°43.6	298°43.7	313°43.9	328°44.1	343°44.3	358°44.5	13°44.7	28°44.9	43°45.1	58°45.2	73°45.4	+0.2
	3°01.1	3°02.0	3°03.0	3°04.0	3°05.0	3°05.9	3°06.9	3°07.9	3°08.9	3°09.8	3°10.8	3°11.8	+1.0
Fr 29	268°47.9	283°48.1	298°48.2	313°48.4	328°48.6	343°48.8	358°49.0	13°49.2	28°49.4	43°49.6	58°49.7	73°49.9	+0.2
	3°24.5	3°25.4	3°26.4	3°27.4	3°28.4	3°29.3	3°30.3	3°31.3	3°32.3	3°33.2	3°34.2	3°35.2	+1.0
Sa 30	268°52.4	283°52.5	298°52.7	313°52.9	328°53.1	343°53.3	358°53.5	13°53.7	28°53.9	43°54.0	58°54.2	73°54.4	+0.2
	3°47.8	3°48.8	3°49.8	3°50.7	3°51.7	3°52.7	3°53.6	3°54.6	3°55.6	3°56.6	3°57.5	3°58.5	+1.0
Su 31	268°56.8	283°57.0	298°57.2	313°57.4	328°57.6	343°57.8	358°57.9	13°58.1	28°58.3	43°58.5	58°58.7	73°58.9	+0.2
	4°11.1	4°12.1	4°13.0	4°14.0	4°15.0	4°15.9	4°16.9	4°17.9	4°18.8	4°19.8	4°20.8	4°21.7	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2030

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
Fr 1	245°48.3	260°17.1	274°45.9	289°14.7	303°43.7	318°12.7	332°41.8	347°11.0	1°40.2	16°09.5	30°38.9	+29.1	15.7
	-16°41.1	-16°31.5	-16°21.8	-16°12.0	-16°02.1	-15°52.2	-15°42.2	-15°32.1	-15°21.9	-15°11.7	-15°01.4	+10.0	57.6
Sa 2	248°08.3	262°38.8	277°09.4	291°40.0	306°10.7	320°41.5	335°12.3	349°43.2	4°14.1	18°45.1	33°16.2	+30.8	15.6
	-12°18.5	-12°07.2	-11°55.8	-11°44.4	-11°32.9	-11°21.3	-11°09.7	-10°58.1	-10°46.4	-10°34.7	-10°22.9	+11.6	57.1
Su 3	251°09.2	265°41.1	280°13.1	294°45.2	309°17.3	323°49.4	338°21.6	352°53.9	7°26.1	21°58.5	36°30.8	+32.2	15.4
	-7°21.9	-7°09.6	-6°57.2	-6°44.9	-6°32.5	-6°20.1	-6°07.6	-5°55.2	-5°42.7	-5°30.3	-5°17.8	+12.4	56.5
● Mo 4	254°41.0	269°14.0	283°47.0	298°20.0	312°53.0	327°26.1	341°59.2	356°32.3	11°05.4	25°38.6	40°11.8	+33.1	15.3
	-2°09.2	-1°56.6	-1°44.0	-1°31.4	-1°18.8	-1°06.2	-0°53.6	-0°41.1	-0°28.5	-0°15.9	-0°03.4	+12.6	56.0
Tu 5	258°32.0	273°05.5	287°38.9	302°12.4	316°45.9	331°19.4	345°52.9	0°26.4	15°00.0	29°33.5	44°07.0	+33.5	15.1
	3°03.3	3°15.6	3°27.8	3°40.1	3°52.3	4°04.5	4°16.6	4°28.8	4°40.9	4°52.9	5°05.0	+12.2	55.5
We 6	262°30.2	277°03.7	291°37.2	306°10.7	320°44.2	335°17.7	349°51.2	4°24.7	18°58.1	33°31.6	48°05.0	+33.5	15.0
	8°01.5	8°12.9	8°24.3	8°35.7	8°47.0	8°58.3	9°09.5	9°20.7	9°31.9	9°42.9	9°54.0	+11.3	55.0
Th 7	266°24.9	280°58.0	295°31.2	310°04.4	324°37.5	339°10.6	353°43.6	8°16.7	22°49.7	37°22.7	51°55.7	+33.1	14.9
	12°33.2	12°43.3	12°53.4	13°03.5	13°13.5	13°23.4	13°33.2	13°43.0	13°52.7	14°02.4	14°12.0	+9.9	54.6
Fr 8	270°07.3	284°39.8	299°12.3	313°44.8	328°17.3	342°49.7	357°22.1	11°54.5	26°26.8	40°59.1	55°31.4	+32.4	14.8
	16°27.6	16°36.1	16°44.5	16°52.8	17°01.0	17°09.2	17°17.3	17°25.3	17°33.2	17°41.0	17°48.8	+8.1	54.3
Sa 9	273°31.5	288°03.2	302°34.9	317°06.6	331°38.2	346°09.8	0°41.4	15°13.0	29°44.5	44°15.9	58°47.4	+31.6	14.8
	19°35.3	19°41.7	19°48.0	19°54.3	20°00.4	20°06.4	20°12.4	20°18.3	20°24.1	20°29.7	20°35.3	+6.0	54.1
Su 10	276°35.0	291°05.9	305°36.8	320°07.7	334°38.5	349°09.3	3°40.1	18°10.8	32°41.6	47°12.2	61°42.9	+30.8	14.8
	21°47.8	21°51.8	21°55.8	21°59.6	22°03.4	22°07.0	22°10.5	22°14.0	22°17.3	22°20.6	22°23.7	+3.6	54.1
Mo 11	279°19.5	293°49.7	308°20.0	322°50.2	337°20.3	351°50.5	6°20.6	20°50.8	35°20.9	49°50.9	64°21.0	+30.1	14.8
	22°58.1	22°59.5	23°00.8	23°02.1	23°03.2	23°04.2	23°05.1	23°05.9	23°06.5	23°07.1	23°07.6	+1.0	54.3
◐ Tu 12	281°50.0	296°19.9	310°49.7	325°19.5	339°49.3	354°19.1	8°48.9	23°18.7	37°48.4	52°18.2	66°47.9	+29.8	14.9
	23°01.1	22°59.8	22°58.3	22°56.8	22°55.1	22°53.3	22°51.5	22°49.5	22°47.3	22°45.1	22°42.8	-1.8	54.7
We 13	284°13.9	298°43.6	313°13.3	327°43.1	342°12.8	356°42.5	11°12.3	25°42.0	40°11.7	54°41.5	69°11.2	+29.7	15.1
	21°54.2	21°50.1	21°45.8	21°41.5	21°37.0	21°32.4	21°27.8	21°23.0	21°18.0	21°13.0	21°07.9	-4.6	55.3
Th 14	286°38.2	301°08.1	315°37.9	330°07.8	344°37.7	359°07.6	13°37.5	28°07.4	42°37.3	57°07.3	71°37.2	+29.9	15.3
	19°37.9	19°31.0	19°24.1	19°17.0	19°09.8	19°02.6	18°55.2	18°47.7	18°40.1	18°32.4	18°24.7	-7.3	56.0
Fr 15	289°07.5	303°37.6	318°07.7	332°37.8	347°07.9	1°38.1	16°08.2	30°38.4	45°08.5	59°38.7	74°08.9	+30.1	15.5
	16°15.9	16°06.6	15°57.1	15°47.6	15°38.0	15°28.2	15°18.4	15°08.5	14°58.5	14°48.5	14°38.3	-9.8	56.8
Sa 16	291°42.2	306°12.5	320°42.7	335°13.0	349°43.3	4°13.5	18°43.8	33°14.1	47°44.3	62°14.6	76°44.8	+30.3	15.7
	11°55.7	11°44.3	11°32.7	11°21.1	11°09.4	10°57.6	10°45.8	10°33.9	10°21.9	10°09.8	9°57.7	-11.8	57.7
Su 17	294°18.2	308°48.4	323°18.5	337°48.7	352°18.8	6°48.9	21°19.0	35°49.1	50°19.2	64°49.3	79°19.3	+30.1	16.0
	6°48.5	6°35.4	6°22.3	6°09.2	5°55.9	5°42.7	5°29.4	5°16.0	5°02.6	4°49.2	4°35.7	-13.3	58.6
Mo 18	296°47.4	311°17.1	325°46.8	340°16.4	354°46.0	9°15.6	23°45.1	38°14.6	52°44.1	67°13.5	81°42.9	+29.5	16.2
	1°09.6	0°55.6	0°41.6	0°27.6	0°13.6	-0°00.4	-0°14.4	-0°28.5	-0°42.5	-0°56.6	-1°10.7	-14.0	59.3
○ Tu 19	298°59.2	313°27.9	327°56.6	342°25.3	356°53.9	11°22.5	25°51.0	40°19.4	54°47.8	69°16.2	83°44.5	+28.5	16.3
	-4°41.5	-4°55.5	-5°09.5	-5°23.4	-5°37.3	-5°51.2	-6°05.1	-6°18.9	-6°32.7	-6°46.5	-7°00.2	-13.9	59.9
We 20	300°42.4	315°09.8	329°37.2	344°04.5	358°31.7	12°58.8	27°25.9	41°53.0	56°19.9	70°46.8	85°13.7	+27.1	16.4
	-10°21.4	-10°34.4	-10°47.3	-11°00.2	-11°13.0	-11°25.7	-11°38.4	-11°51.0	-12°03.5	-12°16.0	-12°28.4	-12.7	60.3
Th 21	301°48.9	316°14.7	330°40.5	345°06.2	359°31.9	13°57.5	28°23.0	42°48.5	57°13.9	71°39.2	86°04.5	+25.6	16.5
	-15°24.1	-15°35.1	-15°45.9	-15°56.7	-16°07.3	-16°17.9	-16°28.3	-16°38.7	-16°48.9	-16°59.0	-17°09.0	-10.5	60.3
Fr 22	302°17.2	316°41.6	331°06.0	345°30.3	359°54.6	14°18.9	28°43.1	43°07.2	57°31.3	71°55.4	86°19.5	+24.2	16.4
	-19°24.2	-19°32.2	-19°40.0	-19°47.7	-19°55.3	-20°02.7	-20°10.0	-20°17.1	-20°24.1	-20°31.0	-20°37.7	-7.4	60.2
Sa 23	316°41.6	331°06.0	345°30.3	359°54.6	14°18.9	28°43.1	43°07.2	57°31.3	71°55.4	86°19.5	100°43.5	+24.2	16.4
	-19°32.2	-19°40.0	-19°47.7	-19°55.3	-20°02.7	-20°10.0	-20°17.1	-20°24.1	-20°31.0	-20°37.7	-20°44.3	-7.2	60.2
Su 24	316°40.2	331°03.8	345°27.4	359°51.0	14°14.5	28°38.1	43°01.7	57°25.3	71°48.8	86°12.4	100°35.9	+23.6	16.3
	-22°04.8	-22°09.0	-22°13.0	-22°16.8	-22°20.5	-22°24.0	-22°27.3	-22°30.5	-22°33.6	-22°36.5	-22°39.2	-3.4	59.8
Mo 25	316°30.7	330°54.5	345°18.3	359°42.2	14°06.1	28°30.0	42°54.0	57°18.0	71°42.1	86°06.2	100°30.3	+24.0	16.2
	-23°01.1	-23°01.3	-23°01.3	-23°01.2	-23°00.9	-23°00.5	-22°59.9	-22°59.2	-22°58.3	-22°57.2	-22°56.0	+0.5	59.3
◑ Tu 26	316°38.4	331°03.4	345°28.4	359°53.5	14°18.7	28°44.0	43°09.3	57°34.7	72°00.2	86°25.7	100°51.3	+25.3	16.0
	-22°20.2	-22°16.6	-22°12.9	-22°09.1	-22°05.1	-22°01.0	-21°56.8	-21°52.4	-21°47.9	-21°43.3	-21°38.5	+4.2	58.6
We 27	317°24.6	331°51.4	346°18.4	0°45.4	15°12.5	29°39.6	44°06.9	58°34.2	73°01.6	87°29.2	101°56.7	+27.2	15.8
	-20°11.8	-20°05.0	-19°58.2	-19°51.2	-19°44.1	-19°37.0	-19°29.7	-19°22.3	-19°14.8	-19°07.2	-18°59.5	+7.2	58.0
Th 28	319°00.5	333°29.4	347°58.4	2°27.5	16°56.6	31°25.8	45°55.1	60°24.5	74°54.0	89°23.5	103°53.2	+29.3	15.7
	-16°52.2	-16°43.0	-16°33.8	-16°24.4	-16°15.0	-16°05.4	-15°55.9	-15°46.2	-15°36.4	-15°26.6	-15°16.7	+9.6	57.4
Fr 29	321°26.4	335°57.2	350°28.1	4°59.0	19°30.0	34°01.0	48°32.1	63°03.3	77°34.6	92°05.9	106°37.3	+31.1	15.5
	-12°40.3	-12°29.4	-12°18.5	-12°07.5	-11°56.4	-11°45.3	-11°34.1	-11°22.9	-11°11.7	-11°00.4	-10°49.0	+11.1	56.8
Sa 30	324°34.8	339°07.1	353°39.4	8°11.7	22°44.1	37°16.6	51°49.1	66°21.6	80°54.2	95°26.8	109°59.5	+32.5	15.3
	-7°54.3	-7°42.4	-7°30.5	-7°18.5	-7°06.5	-6°54.5	-6°42.5	-6°30.4	-6°18.4	-6°06.3	-5°54.1	+12.0	56.3
Su 31	328°14.1	342°47.3	357°20.6	11°53.8	26°27.2	41°00.5	55°33.9	70°07.3	84°40.7	99°14.1	113°47.6	+33.4	15.2
	-2°50.8	-2°38.5	-2°26.2	-2°13.9	-2°01.6	-1°49.3	-1°37.0	-1°24.7	-1°12.4	-1°00.1	-0°47.8	+12.3	55.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 06h34 — FQ: 12 08h47 — FM: 19 17h56 — LQ: 26 09h51

SUN

April 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	269°01.3	284°01.5	299°01.6	314°01.8	329°02.0	344°02.2	359°02.4	14°02.6	29°02.7	44°02.9	59°03.1	74°03.3	+0.2
	4°34.3	4°35.3	4°36.2	4°37.2	4°38.2	4°39.1	4°40.1	4°41.0	4°42.0	4°43.0	4°43.9	4°44.9	+1.0
Tu 2	269°05.7	284°05.9	299°06.1	314°06.2	329°06.4	344°06.6	359°06.8	14°07.0	29°07.1	44°07.3	59°07.5	74°07.7	+0.2
	4°57.4	4°58.4	4°59.3	5°00.3	5°01.3	5°02.2	5°03.2	5°04.1	5°05.1	5°06.1	5°07.0	5°08.0	+1.0
We 3	269°10.1	284°10.2	299°10.4	314°10.6	329°10.8	344°11.0	359°11.2	14°11.3	29°11.5	44°11.7	59°11.9	74°12.1	+0.2
	5°20.4	5°21.4	5°22.4	5°23.3	5°24.3	5°25.2	5°26.2	5°27.1	5°28.1	5°29.0	5°30.0	5°31.0	+1.0
Th 4	269°14.4	284°14.6	299°14.8	314°14.9	329°15.1	344°15.3	359°15.5	14°15.7	29°15.8	44°16.0	59°16.2	74°16.4	+0.2
	5°43.4	5°44.3	5°45.3	5°46.2	5°47.2	5°48.1	5°49.1	5°50.0	5°51.0	5°51.9	5°52.9	5°53.8	+1.0
Fr 5	269°18.7	284°18.9	299°19.1	314°19.2	329°19.4	344°19.6	359°19.8	14°20.0	29°20.1	44°20.3	59°20.5	74°20.7	+0.2
	6°06.2	6°07.2	6°08.1	6°09.1	6°10.0	6°10.9	6°11.9	6°12.8	6°13.8	6°14.7	6°15.7	6°16.6	+0.9
Sa 6	269°23.0	284°23.1	299°23.3	314°23.5	329°23.7	344°23.9	359°24.0	14°24.2	29°24.4	44°24.6	59°24.7	74°24.9	+0.2
	6°28.9	6°29.9	6°30.8	6°31.8	6°32.7	6°33.7	6°34.6	6°35.5	6°36.5	6°37.4	6°38.4	6°39.3	+0.9
Su 7	269°27.2	284°27.4	299°27.5	314°27.7	329°27.9	344°28.1	359°28.2	14°28.4	29°28.6	44°28.7	59°28.9	74°29.1	+0.2
	6°51.5	6°52.5	6°53.4	6°54.4	6°55.3	6°56.2	6°57.2	6°58.1	6°59.1	7°00.0	7°00.9	7°01.9	+0.9
Mo 8	269°31.3	284°31.5	299°31.7	314°31.9	329°32.0	344°32.2	359°32.4	14°32.5	29°32.7	44°32.9	59°33.1	74°33.2	+0.2
	7°14.0	7°15.0	7°15.9	7°16.8	7°17.8	7°18.7	7°19.6	7°20.6	7°21.5	7°22.4	7°23.4	7°24.3	+0.9
Tu 9	269°35.4	284°35.6	299°35.8	314°35.9	329°36.1	344°36.3	359°36.5	14°36.6	29°36.8	44°37.0	59°37.1	74°37.3	+0.2
	7°36.4	7°37.3	7°38.3	7°39.2	7°40.1	7°41.1	7°42.0	7°42.9	7°43.8	7°44.8	7°45.7	7°46.6	+0.9
We 10	269°39.5	284°39.6	299°39.8	314°40.0	329°40.1	344°40.3	359°40.5	14°40.6	29°40.8	44°41.0	59°41.1	74°41.3	+0.2
	7°58.7	7°59.6	8°00.5	8°01.4	8°02.4	8°03.3	8°04.2	8°05.1	8°06.0	8°07.0	8°07.9	8°08.8	+0.9
Th 11	269°43.5	284°43.6	299°43.8	314°43.9	329°44.1	344°44.3	359°44.4	14°44.6	29°44.8	44°44.9	59°45.1	74°45.3	+0.2
	8°20.8	8°21.7	8°22.6	8°23.5	8°24.4	8°25.4	8°26.3	8°27.2	8°28.1	8°29.0	8°29.9	8°30.8	+0.9
Fr 12	269°47.4	284°47.5	299°47.7	314°47.8	329°48.0	344°48.2	359°48.3	14°48.5	29°48.7	44°48.8	59°49.0	74°49.1	+0.2
	8°42.7	8°43.6	8°44.6	8°45.5	8°46.4	8°47.3	8°48.2	8°49.1	8°50.0	8°50.9	8°51.8	8°52.7	+0.9
Sa 13	269°51.2	284°51.4	299°51.5	314°51.7	329°51.8	344°52.0	359°52.2	14°52.3	29°52.5	44°52.6	59°52.8	74°52.9	+0.2
	9°04.5	9°05.5	9°06.4	9°07.3	9°08.2	9°09.1	9°10.0	9°10.9	9°11.8	9°12.7	9°13.6	9°14.5	+0.9
Su 14	269°55.0	284°55.1	299°55.3	314°55.4	329°55.6	344°55.7	359°55.9	14°56.0	29°56.2	44°56.4	59°56.5	74°56.7	+0.2
	9°26.2	9°27.1	9°28.0	9°28.9	9°29.8	9°30.7	9°31.6	9°32.5	9°33.4	9°34.3	9°35.2	9°36.1	+0.9
Mo 15	269°58.6	284°58.8	299°58.9	314°59.1	329°59.2	344°59.4	359°59.6	14°59.7	29°59.9	45°00.0	60°00.2	75°00.3	+0.2
	9°47.7	9°48.6	9°49.5	9°50.4	9°51.3	9°52.2	9°53.1	9°54.0	9°54.9	9°55.7	9°56.6	9°57.5	+0.9
Tu 16	270°02.2	285°02.4	300°02.5	315°02.7	330°02.8	345°03.0	0°03.1	15°03.3	30°03.4	45°03.6	60°03.7	75°03.9	+0.1
	10°09.1	10°10.0	10°10.8	10°11.7	10°12.6	10°13.5	10°14.4	10°15.3	10°16.1	10°17.0	10°17.9	10°18.8	+0.9
We 17	270°05.7	285°05.9	300°06.0	315°06.2	330°06.3	345°06.5	0°06.6	15°06.7	30°06.9	45°07.0	60°07.2	75°07.3	+0.1
	10°30.2	10°31.1	10°32.0	10°32.9	10°33.8	10°34.6	10°35.5	10°36.4	10°37.3	10°38.1	10°39.0	10°39.9	+0.9
Th 18	270°09.2	285°09.3	300°09.4	315°09.6	330°09.7	345°09.9	0°10.0	15°10.1	30°10.3	45°10.4	60°10.5	75°10.7	+0.1
	10°51.2	10°52.1	10°53.0	10°53.9	10°54.7	10°55.6	10°56.5	10°57.3	10°58.2	10°59.1	10°59.9	11°00.8	+0.9
Fr 19	270°12.5	285°12.6	300°12.7	315°12.9	330°13.0	345°13.1	0°13.3	15°13.4	30°13.5	45°13.7	60°13.8	75°13.9	+0.1
	11°12.1	11°12.9	11°13.8	11°14.7	11°15.5	11°16.4	11°17.2	11°18.1	11°19.0	11°19.8	11°20.7	11°21.6	+0.9
Sa 20	270°15.7	285°15.8	300°15.9	315°16.1	330°16.2	345°16.3	0°16.5	15°16.6	30°16.7	45°16.8	60°17.0	75°17.1	+0.1
	11°32.7	11°33.6	11°34.4	11°35.3	11°36.1	11°37.0	11°37.8	11°38.7	11°39.6	11°40.4	11°41.3	11°42.1	+0.9
Su 21	270°18.8	285°18.9	300°19.0	315°19.2	330°19.3	345°19.4	0°19.5	15°19.7	30°19.8	45°19.9	60°20.0	75°20.2	+0.1
	11°53.2	11°54.0	11°54.9	11°55.7	11°56.6	11°57.4	11°58.3	11°59.1	11°59.9	12°00.8	12°01.6	12°02.5	+0.8
Mo 22	270°21.8	285°21.9	300°22.0	315°22.1	330°22.2	345°22.4	0°22.5	15°22.6	30°22.7	45°22.8	60°23.0	75°23.1	+0.1
	12°13.4	12°14.3	12°15.1	12°15.9	12°16.8	12°17.6	12°18.5	12°19.3	12°20.1	12°21.0	12°21.8	12°22.6	+0.8
Tu 23	270°24.6	285°24.7	300°24.9	315°25.0	330°25.1	345°25.2	0°25.3	15°25.4	30°25.6	45°25.7	60°25.8	75°25.9	+0.1
	12°33.5	12°34.3	12°35.1	12°36.0	12°36.8	12°37.6	12°38.5	12°39.3	12°40.1	12°41.0	12°41.8	12°42.6	+0.8
We 24	270°27.4	285°27.5	300°27.6	315°27.7	330°27.8	345°27.9	0°28.0	15°28.2	30°28.3	45°28.4	60°28.5	75°28.6	+0.1
	12°53.3	12°54.2	12°55.0	12°55.8	12°56.6	12°57.5	12°58.3	12°59.1	12°59.9	13°00.7	13°01.6	13°02.4	+0.8
Th 25	270°30.0	285°30.1	300°30.2	315°30.3	330°30.4	345°30.5	0°30.6	15°30.7	30°30.8	45°31.0	60°31.1	75°31.2	+0.1
	13°13.0	13°13.8	13°14.6	13°15.4	13°16.2	13°17.1	13°17.9	13°18.7	13°19.5	13°20.3	13°21.1	13°21.9	+0.8
Fr 26	270°32.5	285°32.6	300°32.7	315°32.8	330°32.9	345°33.0	0°33.1	15°33.2	30°33.3	45°33.4	60°33.5	75°33.6	+0.1
	13°32.4	13°33.2	13°34.0	13°34.8	13°35.6	13°36.4	13°37.2	13°38.0	13°38.8	13°39.6	13°40.4	13°41.2	+0.8
Sa 27	270°34.9	285°35.0	300°35.1	315°35.2	330°35.3	345°35.4	0°35.4	15°35.5	30°35.6	45°35.7	60°35.8	75°35.9	+0.1
	13°51.6	13°52.4	13°53.2	13°54.0	13°54.8	13°55.6	13°56.4	13°57.2	13°58.0	13°58.8	13°59.6	14°00.3	+0.8
Su 28	270°37.1	285°37.2	300°37.3	315°37.4	330°37.5	345°37.6	0°37.7	15°37.7	30°37.8	45°37.9	60°38.0	75°38.1	+0.1
	14°10.6	14°11.4	14°12.2	14°12.9	14°13.7	14°14.5	14°15.3	14°16.1	14°16.9	14°17.7	14°18.4	14°19.2	+0.8
Mo 29	270°39.2	285°39.3	300°39.4	315°39.5	330°39.6	345°39.6	0°39.7	15°39.8	30°39.9	45°40.0	60°40.1	75°40.1	+0.1
	14°29.3	14°30.1	14°30.9	14°31.7	14°32.4	14°33.2	14°34.0	14°34.8	14°35.5	14°36.3	14°37.1	14°37.8	+0.8
Tu 30	270°41.2	285°41.3	300°41.4	315°41.4	330°41.5	345°41.6	0°41.7	15°41.8	30°41.8	45°41.9	60°42.0	75°42.1	+0.1
	14°47.8	14°48.6	14°49.4	14°50.1	14°50.9	14°51.7	14°52.4	14°53.2	14°54.0	14°54.7	14°55.5	14°56.2	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2030

D	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	Δ'/h	SH
Mo 1	244°49.5	259°23.1	273°56.8	288°30.4	303°04.1	317°37.7	332°11.4	346°45.1	1°18.8	15°52.5	30°26.2	+33.7	15.1
	1°02.5	1°14.7	1°26.9	1°39.0	1°51.2	2°03.3	2°15.5	2°27.6	2°39.7	2°51.8	3°03.8	+12.1	55.4
● Tu 2	248°52.3	263°26.0	277°59.8	292°33.5	307°07.2	321°40.9	336°14.6	350°48.3	5°22.0	19°55.6	34°29.3	+33.7	15.0
	6°01.8	6°13.4	6°25.0	6°36.6	6°48.2	6°59.7	7°11.1	7°22.6	7°33.9	7°45.3	7°56.6	+11.5	55.0
We 3	252°52.6	267°26.0	281°59.4	296°32.8	311°06.1	325°39.5	340°12.8	354°46.1	9°19.4	23°52.6	38°25.8	+33.3	14.9
	10°41.2	10°51.8	11°02.3	11°12.8	11°23.2	11°33.6	11°43.9	11°54.2	12°04.4	12°14.6	12°24.7	+10.4	54.6
Th 4	256°41.2	271°14.0	285°46.8	300°19.6	314°52.3	329°25.0	343°57.7	358°30.3	13°02.9	27°35.5	42°08.0	+32.7	14.8
	14°49.0	14°58.1	15°07.1	15°16.1	15°25.0	15°33.8	15°42.6	15°51.2	15°59.8	16°08.4	16°16.9	+8.8	54.3
Fr 5	260°12.3	274°44.3	289°16.3	303°48.3	318°20.2	332°52.1	347°24.0	1°55.8	16°27.7	30°59.4	45°31.2	+31.9	14.7
	18°14.6	18°21.8	18°29.0	18°36.0	18°43.0	18°49.8	18°56.6	19°03.3	19°09.9	19°16.5	19°22.9	+6.8	54.1
Sa 6	263°23.5	277°54.8	292°26.0	306°57.2	321°28.3	335°59.5	350°30.6	5°01.6	19°32.7	34°03.7	48°34.7	+31.1	14.7
	20°48.7	20°53.6	20°58.5	21°03.3	21°08.0	21°12.6	21°17.1	21°21.5	21°25.8	21°30.0	21°34.0	+4.5	54.0
Su 7	266°16.7	280°47.3	295°17.9	309°48.5	324°19.1	338°49.6	353°20.1	7°50.6	22°21.1	36°51.6	51°22.1	+30.5	14.7
	22°23.4	22°25.9	22°28.2	22°30.5	22°32.7	22°34.7	22°36.6	22°38.5	22°40.2	22°41.8	22°43.4	+2.0	54.0
Mo 8	268°57.4	283°27.6	297°57.9	312°28.2	326°58.4	341°28.6	355°58.9	10°29.1	24°59.3	39°29.6	53°59.8	+30.2	14.8
	22°53.4	22°53.2	22°52.9	22°52.4	22°51.9	22°51.3	22°50.6	22°49.7	22°48.8	22°47.7	22°46.5	-0.7	54.2
Tu 9	271°33.1	286°03.3	300°33.5	315°03.8	329°34.0	344°04.3	358°34.5	13°04.8	27°35.1	42°05.4	56°35.7	+30.3	14.9
	22°15.9	22°13.0	22°10.0	22°06.9	22°03.7	22°00.3	21°56.9	21°53.3	21°49.7	21°45.9	21°42.0	-3.4	54.6
We 10	274°11.1	288°41.5	303°12.0	317°42.4	332°12.9	346°43.4	1°13.9	15°44.4	30°15.0	44°45.5	59°16.1	+30.5	15.0
	20°31.4	20°25.9	20°20.2	20°14.5	20°08.6	20°02.7	19°56.7	19°50.5	19°44.3	19°37.9	19°31.5	-6.0	55.1
◐ Th 11	276°55.9	291°26.7	305°57.5	320°28.2	334°59.0	349°29.8	4°00.7	18°31.5	33°02.3	47°33.2	62°04.0	+30.8	15.2
	17°43.0	17°35.0	17°26.9	17°18.8	17°10.5	17°02.1	16°53.7	16°45.1	16°36.5	16°27.8	16°18.9	-8.4	55.8
Fr 12	279°47.9	294°18.9	308°49.9	323°20.9	337°51.9	352°22.9	6°53.9	21°24.9	35°55.9	50°26.9	64°57.9	+31.0	15.5
	13°56.4	13°46.2	13°36.0	13°25.6	13°15.2	13°04.7	12°54.2	12°43.5	12°32.8	12°22.0	12°11.2	-10.5	56.7
Sa 13	282°42.7	297°13.6	311°44.5	326°15.5	340°46.4	355°17.3	9°48.1	24°19.0	38°49.9	53°20.7	67°51.5	+30.9	15.7
	9°19.7	9°07.7	8°55.7	8°43.6	8°31.4	8°19.2	8°06.9	7°54.6	7°42.2	7°29.8	7°17.3	-12.2	57.6
Su 14	285°31.5	300°02.0	314°32.4	329°02.8	343°33.2	358°03.6	12°33.9	27°04.2	41°34.4	56°04.6	70°34.8	+30.3	16.0
	4°03.8	3°50.6	3°37.3	3°24.0	3°10.6	2°57.2	2°43.8	2°30.3	2°16.8	2°03.3	1°49.7	-13.4	58.6
Mo 15	288°02.6	302°32.1	317°01.6	331°31.0	346°00.3	0°29.6	14°58.8	29°28.0	43°57.1	58°26.2	72°55.2	+29.3	16.2
	-1°36.4	-1°50.2	-2°04.1	-2°18.0	-2°31.8	-2°45.7	-2°59.6	-3°13.5	-3°27.3	-3°41.2	-3°55.1	-13.9	59.5
Tu 16	290°02.8	304°30.8	318°58.7	333°26.5	347°54.3	2°22.0	16°49.6	31°17.1	45°44.6	60°12.0	74°39.3	+27.7	16.5
	-7°21.5	-7°35.1	-7°48.6	-8°02.1	-8°15.6	-8°29.0	-8°42.4	-8°55.8	-9°09.1	-9°22.4	-9°35.6	-13.4	60.3
We 17	291°19.9	305°46.0	320°12.0	334°37.9	349°03.7	3°29.5	17°55.2	32°20.8	46°46.3	61°11.7	75°37.0	+25.7	16.6
	-12°47.1	-12°59.4	-13°11.5	-13°23.6	-13°35.6	-13°47.5	-13°59.3	-14°11.0	-14°22.7	-14°34.2	-14°45.7	-11.9	60.9
○ Th 18	291°47.8	306°12.0	320°36.0	335°00.0	349°23.9	3°47.7	18°11.5	32°35.2	46°58.8	61°22.3	75°45.8	+23.8	16.7
	-17°25.2	-17°34.9	-17°44.5	-17°54.0	-18°03.4	-18°12.6	-18°21.7	-18°30.7	-18°39.5	-18°48.2	-18°56.8	-9.2	61.1
Fr 19	291°31.4	305°54.1	320°16.7	334°39.2	349°01.8	3°24.3	17°46.7	32°09.2	46°31.6	60°54.0	75°16.3	+22.5	16.6
	-20°48.1	-20°54.3	-21°00.4	-21°06.3	-21°12.0	-21°17.6	-21°23.1	-21°28.3	-21°33.4	-21°38.4	-21°43.2	-5.5	60.9
Sa 20	290°50.1	305°12.3	319°34.5	333°56.8	348°19.1	2°41.4	17°03.7	31°26.0	45°48.4	60°10.8	74°33.2	+22.3	16.5
	-22°35.0	-22°37.1	-22°39.0	-22°40.8	-22°42.4	-22°43.8	-22°45.1	-22°46.2	-22°47.1	-22°47.9	-22°48.5	-1.4	60.5
Su 21	290°14.1	304°37.2	319°00.4	333°23.6	347°47.0	2°10.3	16°33.8	30°57.3	45°20.9	59°44.5	74°08.3	+23.4	16.3
	-22°37.6	-22°35.6	-22°33.4	-22°31.0	-22°28.5	-22°25.9	-22°23.1	-22°20.2	-22°17.1	-22°13.8	-22°10.4	+2.7	59.8
Mo 22	304°37.2	319°00.4	333°23.6	347°47.0	2°10.3	16°33.8	30°57.3	45°20.9	59°44.5	74°08.3	88°32.1	+23.5	16.3
	-22°35.6	-22°33.4	-22°31.0	-22°28.5	-22°25.9	-22°23.1	-22°20.2	-22°17.1	-22°13.8	-22°10.4	-22°06.8	+2.9	59.8
Tu 23	304°38.9	319°04.1	333°29.3	347°54.7	2°20.1	16°45.6	31°11.3	45°37.0	60°02.8	74°28.7	88°54.7	+25.6	16.1
	-20°56.5	-20°50.8	-20°44.9	-20°38.9	-20°32.7	-20°26.4	-20°20.0	-20°13.5	-20°06.9	-20°00.2	-19°53.3	+6.3	59.0
◑ We 24	305°36.5	320°04.0	334°31.7	348°59.5	3°27.3	17°55.3	32°23.3	46°51.5	61°19.7	75°48.1	90°16.5	+28.0	15.9
	-17°57.3	-17°48.7	-17°40.1	-17°31.4	-17°22.6	-17°13.7	-17°04.7	-16°55.6	-16°46.4	-16°37.2	-16°27.9	+8.9	58.2
Th 25	307°34.1	322°04.0	336°34.0	351°04.1	5°34.2	20°04.4	34°34.7	49°05.1	63°35.6	78°06.2	92°36.8	+30.3	15.6
	-13°59.1	-13°48.7	-13°38.2	-13°27.6	-13°17.0	-13°06.3	-12°55.5	-12°44.8	-12°33.9	-12°23.0	-12°12.1	+10.7	57.3
Fr 26	310°25.1	324°56.9	339°28.7	354°00.6	8°32.6	23°04.6	37°36.7	52°08.9	66°41.1	81°13.3	95°45.7	+32.1	15.4
	-9°22.7	-9°11.1	-8°59.5	-8°47.8	-8°36.2	-8°24.4	-8°12.7	-8°00.9	-7°49.2	-7°37.3	-7°25.5	+11.7	56.6
Sa 27	313°56.5	328°29.6	343°02.7	357°35.9	12°09.1	26°42.4	41°15.6	55°48.9	70°22.3	84°55.7	99°29.1	+33.3	15.2
	-4°25.8	-4°13.7	-4°01.6	-3°49.5	-3°37.4	-3°25.2	-3°13.1	-3°01.0	-2°48.9	-2°36.7	-2°24.6	+12.1	55.9
Su 28	317°53.5	332°27.3	347°01.2	1°35.0	16°08.9	30°42.7	45°16.6	59°50.5	74°24.4	88°58.3	103°32.2	+33.9	15.1
	0°37.0	0°49.0	1°01.1	1°13.1	1°25.1	1°37.1	1°49.1	2°01.0	2°13.0	2°24.9	2°36.8	+12.0	55.3
Mo 29	322°01.8	336°35.7	351°09.7	5°43.7	20°17.6	34°51.6	49°25.5	63°59.5	78°33.4	93°07.3	107°41.2	+34.0	15.0
	5°32.9	5°44.4	5°55.9	6°07.3	6°18.8	6°30.2	6°41.6	6°52.9	7°04.2	7°15.5	7°26.7	+11.4	54.8
Tu 30	326°08.4	340°42.1	355°15.7	9°49.4	24°23.0	38°56.6	53°30.2	68°03.7	82°37.2	97°10.7	111°44.2	+33.6	14.9
	10°10.4	10°21.0	10°31.5	10°42.0	10°52.4	11°02.8	11°13.1	11°23.4	11°33.6	11°43.8	11°53.9	+10.3	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 22h02 — FQ: 11 02h56 — FM: 18 03h20 — LQ: 24 18h39

SUN

May 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	270° 43.0	285° 43.1	300° 43.2	315° 43.3	330° 43.3	345° 43.4	0° 43.5	15° 43.6	30° 43.6	45° 43.7	60° 43.8	75° 43.8	+0.1
	15° 06.1	15° 06.9	15° 07.6	15° 08.4	15° 09.1	15° 09.9	15° 10.6	15° 11.4	15° 12.1	15° 12.9	15° 13.6	15° 14.4	+0.8
Th 2	270° 44.7	285° 44.8	300° 44.9	315° 45.0	330° 45.0	345° 45.1	0° 45.2	15° 45.2	30° 45.3	45° 45.4	60° 45.4	75° 45.5	+0.1
	15° 24.1	15° 24.9	15° 25.6	15° 26.3	15° 27.1	15° 27.8	15° 28.6	15° 29.3	15° 30.1	15° 30.8	15° 31.5	15° 32.3	+0.7
Fr 3	270° 46.3	285° 46.4	300° 46.4	315° 46.5	330° 46.6	345° 46.6	0° 46.7	15° 46.8	30° 46.8	45° 46.9	60° 46.9	75° 47.0	+0.1
	15° 41.9	15° 42.6	15° 43.3	15° 44.1	15° 44.8	15° 45.5	15° 46.3	15° 47.0	15° 47.7	15° 48.5	15° 49.2	15° 49.9	+0.7
Sa 4	270° 47.8	285° 47.8	300° 47.9	315° 47.9	330° 48.0	345° 48.0	0° 48.1	15° 48.1	30° 48.2	45° 48.3	60° 48.3	75° 48.4	+0.1
	15° 59.4	16° 00.1	16° 00.8	16° 01.5	16° 02.3	16° 03.0	16° 03.7	16° 04.4	16° 05.1	16° 05.9	16° 06.6	16° 07.3	+0.7
Su 5	270° 49.0	285° 49.1	300° 49.1	315° 49.2	330° 49.2	345° 49.3	0° 49.3	15° 49.4	30° 49.4	45° 49.5	60° 49.5	75° 49.6	+0.0
	16° 16.6	16° 17.3	16° 18.0	16° 18.7	16° 19.4	16° 20.1	16° 20.9	16° 21.6	16° 22.3	16° 23.0	16° 23.7	16° 24.4	+0.7
Mo 6	270° 50.2	285° 50.2	300° 50.3	315° 50.3	330° 50.4	345° 50.4	0° 50.5	15° 50.5	30° 50.6	45° 50.6	60° 50.6	75° 50.7	+0.0
	16° 33.5	16° 34.2	16° 34.9	16° 35.6	16° 36.3	16° 37.0	16° 37.7	16° 38.4	16° 39.1	16° 39.8	16° 40.5	16° 41.2	+0.7
Tu 7	270° 51.2	285° 51.3	300° 51.3	315° 51.3	330° 51.4	345° 51.4	0° 51.5	15° 51.5	30° 51.5	45° 51.6	60° 51.6	75° 51.6	+0.0
	16° 50.2	16° 50.9	16° 51.6	16° 52.3	16° 53.0	16° 53.7	16° 54.4	16° 55.0	16° 55.7	16° 56.4	16° 57.1	16° 57.8	+0.7
We 8	270° 52.1	285° 52.1	300° 52.2	315° 52.2	330° 52.2	345° 52.3	0° 52.3	15° 52.3	30° 52.4	45° 52.4	60° 52.4	75° 52.5	+0.0
	17° 06.6	17° 07.3	17° 08.0	17° 08.7	17° 09.3	17° 10.0	17° 10.7	17° 11.4	17° 12.0	17° 12.7	17° 13.4	17° 14.0	+0.7
Th 9	270° 52.8	285° 52.9	300° 52.9	315° 52.9	330° 53.0	345° 53.0	0° 53.0	15° 53.0	30° 53.1	45° 53.1	60° 53.1	75° 53.1	+0.0
	17° 22.7	17° 23.4	17° 24.1	17° 24.7	17° 25.4	17° 26.1	17° 26.7	17° 27.4	17° 28.0	17° 28.7	17° 29.4	17° 30.0	+0.7
Fr 10	270° 53.4	285° 53.5	300° 53.5	315° 53.5	330° 53.5	345° 53.6	0° 53.6	15° 53.6	30° 53.6	45° 53.6	60° 53.7	75° 53.7	+0.0
	17° 38.6	17° 39.2	17° 39.9	17° 40.5	17° 41.2	17° 41.8	17° 42.5	17° 43.1	17° 43.8	17° 44.4	17° 45.1	17° 45.7	+0.6
Sa 11	270° 53.9	285° 53.9	300° 53.9	315° 54.0	330° 54.0	345° 54.0	0° 54.0	15° 54.0	30° 54.0	45° 54.1	60° 54.1	75° 54.1	+0.0
	17° 54.1	17° 54.7	17° 55.4	17° 56.0	17° 56.6	17° 57.3	17° 57.9	17° 58.6	17° 59.2	17° 59.8	18° 00.5	18° 01.1	+0.6
Su 12	270° 54.2	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.3	60° 54.3	75° 54.3	+0.0
	18° 09.3	18° 09.9	18° 10.6	18° 11.2	18° 11.8	18° 12.4	18° 13.1	18° 13.7	18° 14.3	18° 14.9	18° 15.6	18° 16.2	+0.6
Mo 13	270° 54.4	285° 54.4	300° 54.4	315° 54.4	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	+0.0
	18° 24.2	18° 24.8	18° 25.5	18° 26.1	18° 26.7	18° 27.3	18° 27.9	18° 28.5	18° 29.1	18° 29.7	18° 30.3	18° 31.0	+0.6
Tu 14	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	-0.0
	18° 38.8	18° 39.4	18° 40.0	18° 40.6	18° 41.2	18° 41.8	18° 42.4	18° 43.0	18° 43.6	18° 44.2	18° 44.8	18° 45.4	+0.6
We 15	270° 54.4	285° 54.4	300° 54.4	315° 54.4	330° 54.4	345° 54.4	0° 54.4	15° 54.3	30° 54.3	45° 54.3	60° 54.3	75° 54.3	-0.0
	18° 53.1	18° 53.7	18° 54.3	18° 54.9	18° 55.5	18° 56.1	18° 56.6	18° 57.2	18° 57.8	18° 58.4	18° 59.0	18° 59.6	+0.6
Th 16	270° 54.2	285° 54.2	300° 54.2	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.0	75° 54.0	-0.0
	19° 07.1	19° 07.7	19° 08.2	19° 08.8	19° 09.4	19° 10.0	19° 10.5	19° 11.1	19° 11.7	19° 12.2	19° 12.8	19° 13.4	+0.6
Fr 17	270° 53.8	285° 53.8	300° 53.8	315° 53.8	330° 53.7	345° 53.7	0° 53.7	15° 53.7	30° 53.7	45° 53.6	60° 53.6	75° 53.6	-0.0
	19° 20.7	19° 21.3	19° 21.9	19° 22.4	19° 23.0	19° 23.5	19° 24.1	19° 24.7	19° 25.2	19° 25.8	19° 26.3	19° 26.9	+0.6
Sa 18	270° 53.3	285° 53.3	300° 53.3	315° 53.2	330° 53.2	345° 53.2	0° 53.2	15° 53.1	30° 53.1	45° 53.1	60° 53.1	75° 53.0	-0.0
	19° 34.1	19° 34.6	19° 35.1	19° 35.7	19° 36.2	19° 36.8	19° 37.3	19° 37.9	19° 38.4	19° 39.0	19° 39.5	19° 40.0	+0.5
Su 19	270° 52.7	285° 52.6	300° 52.6	315° 52.6	330° 52.5	345° 52.5	0° 52.5	15° 52.5	30° 52.4	45° 52.4	60° 52.4	75° 52.3	-0.0
	19° 47.0	19° 47.6	19° 48.1	19° 48.6	19° 49.2	19° 49.7	19° 50.2	19° 50.8	19° 51.3	19° 51.8	19° 52.4	19° 52.9	+0.5
Mo 20	270° 51.9	285° 51.9	300° 51.8	315° 51.8	330° 51.7	345° 51.7	0° 51.7	15° 51.6	30° 51.6	45° 51.6	60° 51.5	75° 51.5	-0.0
	19° 59.7	20° 00.2	20° 00.7	20° 01.2	20° 01.8	20° 02.3	20° 02.8	20° 03.3	20° 03.8	20° 04.3	20° 04.9	20° 05.4	+0.5
Tu 21	270° 51.0	285° 50.9	300° 50.9	315° 50.8	330° 50.8	345° 50.8	0° 50.7	15° 50.7	30° 50.6	45° 50.6	60° 50.5	75° 50.5	-0.0
	20° 12.0	20° 12.5	20° 13.0	20° 13.5	20° 14.0	20° 14.5	20° 15.0	20° 15.5	20° 16.0	20° 16.5	20° 17.0	20° 17.5	+0.5
We 22	270° 49.9	285° 49.9	300° 49.8	315° 49.8	330° 49.7	345° 49.7	0° 49.6	15° 49.6	30° 49.5	45° 49.5	60° 49.4	75° 49.4	-0.0
	20° 24.0	20° 24.5	20° 24.9	20° 25.4	20° 25.9	20° 26.4	20° 26.9	20° 27.4	20° 27.9	20° 28.4	20° 28.8	20° 29.3	+0.5
Th 23	270° 48.7	285° 48.7	300° 48.6	315° 48.6	330° 48.5	345° 48.5	0° 48.4	15° 48.4	30° 48.3	45° 48.2	60° 48.2	75° 48.1	-0.1
	20° 35.6	20° 36.1	20° 36.5	20° 37.0	20° 37.5	20° 38.0	20° 38.4	20° 38.9	20° 39.4	20° 39.8	20° 40.3	20° 40.8	+0.5
Fr 24	270° 47.3	285° 47.3	300° 47.3	315° 47.2	330° 47.2	345° 47.1	0° 47.1	15° 47.0	30° 46.9	45° 46.9	60° 46.8	75° 46.8	-0.1
	20° 46.8	20° 47.3	20° 47.8	20° 48.2	20° 48.7	20° 49.1	20° 49.6	20° 50.1	20° 50.5	20° 51.0	20° 51.4	20° 51.9	+0.5
Sa 25	270° 45.9	285° 45.9	300° 45.8	315° 45.8	330° 45.7	345° 45.6	0° 45.6	15° 45.5	30° 45.4	45° 45.4	60° 45.3	75° 45.2	-0.1
	20° 57.7	20° 58.2	20° 58.6	20° 59.1	20° 59.5	21° 00.0	21° 00.4	21° 00.9	21° 01.3	21° 01.7	21° 02.2	21° 02.6	+0.4
Su 26	270° 44.4	285° 44.3	300° 44.2	315° 44.2	330° 44.1	345° 44.0	0° 43.9	15° 43.9	30° 43.8	45° 43.7	60° 43.7	75° 43.6	-0.1
	21° 08.3	21° 08.7	21° 09.2	21° 09.6	21° 10.0	21° 10.4	21° 10.9	21° 11.3	21° 11.7	21° 12.2	21° 12.6	21° 13.0	+0.4
Mo 27	270° 42.7	285° 42.6	300° 42.5	315° 42.4	330° 42.4	345° 42.3	0° 42.2	15° 42.1	30° 42.1	45° 42.0	60° 41.9	75° 41.8	-0.1
	21° 18.5	21° 18.9	21° 19.3	21° 19.7	21° 20.1	21° 20.5	21° 21.0	21° 21.4	21° 21.8	21° 22.2	21° 22.6	21° 23.0	+0.4
Tu 28	270° 40.8	285° 40.7	300° 40.7	315° 40.6	330° 40.5	345° 40.4	0° 40.4	15° 40.3	30° 40.2	45° 40.1	60° 40.0	75° 39.9	-0.1
	21° 28.3	21° 28.7	21° 29.1	21° 29.5	21° 29.9	21° 30.3	21° 30.7	21° 31.1	21° 31.5	21° 31.9	21° 32.3	21° 32.7	+0.4
We 29	270° 38.9	285° 38.8	300° 38.7	315° 38.6	330° 38.5	345° 38.5	0° 38.4	15° 38.3	30° 38.2	45° 38.1	60° 38.0	75° 37.9	-0.1
	21° 37.7	21° 38.1	21° 38.5	21° 38.9	21° 39.3	21° 39.6	21° 40.0	21° 40.4	21° 40.8	21° 41.2	21° 41.5	21° 41.9	+0.4
Th 30	270° 36.8	285° 36.7	300° 36.6	315° 36.6	330° 36.5	345° 36.4	0° 36.3	15° 36.2	30° 36.1	45° 36.0	60° 35.9	75° 35.8	-0.1
	21° 46.8	21° 47.1	21° 47.5	21° 47.9	21° 48.3	21° 48.6	21° 49.0	21° 49.4	21° 49.7	21° 50.1	21° 50.4	21° 50.8	+0.4
Fr 31	270° 34.7	285° 34.6	300° 34.5	315° 34.4	330° 34.3	345° 34.2	0° 34.1	15° 34.0	30° 33.9	45° 33.8	60° 33.7	75° 33.6	-0.1
	21° 55.5	21° 55.8	21° 56.2	21° 56.5	21° 56.9	21° 57.2	21° 57.6	21° 57.9	21° 58.3	21° 58.6	21° 59.0	21° 59.3	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2030

D	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	Δ'/h	SH
We 1	242°44.4	257°17.6	271°50.7	286°23.9	300°57.0	315°30.1	330°03.2	344°36.2	359°09.2	13°42.2	28°15.1	+33.1	14.8
	13°22.4	13°32.0	13°41.5	13°50.9	14°00.3	14°09.6	14°18.8	14°28.0	14°37.1	14°46.2	14°55.2	+9.3	54.3
● Th 2	246°25.3	260°57.7	275°30.0	290°02.4	304°34.7	319°06.9	333°39.2	348°11.4	2°43.5	17°15.7	31°47.7	+32.2	14.7
	17°01.6	17°09.5	17°17.2	17°24.9	17°32.5	17°40.1	17°47.5	17°54.9	18°02.2	18°09.4	18°16.6	+7.5	54.0
Fr 3	249°44.9	264°16.5	278°48.0	293°19.5	307°50.9	322°22.3	336°53.7	351°25.0	5°56.4	20°27.6	34°58.9	+31.4	14.7
	19°53.5	19°59.3	20°05.0	20°10.5	20°16.0	20°21.4	20°26.7	20°32.0	20°37.1	20°42.1	20°47.0	+5.4	53.9
Sa 4	252°44.3	267°15.1	281°45.9	296°16.7	310°47.4	325°18.1	339°48.8	354°19.5	8°50.2	23°20.8	37°51.5	+30.7	14.7
	21°49.4	21°52.7	21°56.0	21°59.1	22°02.2	22°05.2	22°08.0	22°10.8	22°13.4	22°16.0	22°18.4	+2.9	53.9
Su 5	255°28.9	269°59.3	284°29.7	299°00.1	313°30.4	328°00.8	342°31.2	357°01.5	11°31.9	26°02.2	40°32.5	+30.4	14.7
	22°42.4	22°43.2	22°43.8	22°44.4	22°44.8	22°45.1	22°45.3	22°45.5	22°45.5	22°45.4	22°45.2	+0.3	54.0
Mo 6	258°07.5	272°37.9	287°08.2	301°38.6	316°09.0	330°39.4	345°09.7	359°40.1	14°10.6	28°41.0	43°11.4	+30.4	14.8
	22°29.2	22°27.2	22°25.2	22°23.1	22°20.8	22°18.5	22°16.0	22°13.5	22°10.8	22°08.0	22°05.1	-2.4	54.2
Tu 7	260°49.4	275°20.0	289°50.7	304°21.4	318°52.1	333°22.8	347°53.5	2°24.3	16°55.1	31°25.9	45°56.7	+30.7	14.9
	21°09.5	21°04.9	21°00.3	20°55.6	20°50.7	20°45.8	20°40.8	20°35.6	20°30.4	20°25.1	20°19.6	-5.0	54.5
We 8	263°41.3	278°12.4	292°43.6	307°14.8	321°46.0	336°17.2	350°48.4	5°19.7	19°51.0	34°22.3	48°53.6	+31.2	15.0
	18°46.6	18°39.6	18°32.6	18°25.5	18°18.2	18°10.9	18°03.5	17°56.0	17°48.4	17°40.7	17°33.0	-7.4	55.0
Th 9	266°45.6	281°17.2	295°48.8	310°20.5	324°52.1	339°23.8	353°55.5	8°27.2	22°58.9	37°30.6	52°02.3	+31.7	15.2
	15°26.3	15°17.2	15°08.0	14°58.8	14°49.4	14°40.0	14°30.5	14°21.0	14°11.3	14°01.6	13°51.8	-9.5	55.7
◐ Fr 10	269°59.3	284°31.1	299°03.0	313°34.8	328°06.7	342°38.5	357°10.4	11°42.2	26°14.1	40°45.9	55°17.7	+31.8	15.4
	11°16.3	11°05.4	10°54.4	10°43.4	10°32.3	10°21.1	10°09.9	9°58.6	9°47.3	9°35.9	9°24.4	-11.2	56.5
Sa 11	273°14.4	287°46.1	302°17.7	316°49.4	331°21.0	345°52.6	0°24.2	14°55.7	29°27.3	43°58.8	58°30.3	+31.6	15.6
	6°25.9	6°13.5	6°01.2	5°48.8	5°36.3	5°23.9	5°11.3	4°58.7	4°46.1	4°33.5	4°20.8	-12.5	57.4
Su 12	276°19.1	290°50.0	305°21.0	319°51.8	334°22.7	348°53.5	3°24.2	17°54.9	32°25.6	46°56.2	61°26.8	+30.8	15.9
	1°06.2	0°53.0	0°39.8	0°26.6	0°13.3	0°00.0	-0°13.3	-0°26.6	-0°40.0	-0°53.3	-1°06.7	-13.3	58.3
Mo 13	278°58.6	293°28.3	307°57.8	322°27.3	336°56.8	351°26.1	5°55.4	20°24.7	34°53.8	49°22.9	63°51.9	+29.3	16.2
	-4°28.1	-4°41.6	-4°55.0	-5°08.4	-5°21.8	-5°35.2	-5°48.6	-6°02.0	-6°15.3	-6°28.6	-6°42.0	-13.4	59.3
Tu 14	280°57.6	295°25.3	309°52.9	324°20.5	338°47.9	353°15.3	7°42.5	22°09.7	36°36.8	51°03.8	65°30.7	+27.3	16.4
	-9°58.3	-10°11.1	-10°23.9	-10°36.6	-10°49.3	-11°01.9	-11°14.4	-11°26.9	-11°39.3	-11°51.7	-12°04.0	-12.6	60.2
We 15	282°02.9	296°28.3	310°53.6	325°18.8	339°43.9	354°08.9	8°33.8	22°58.6	37°23.3	51°48.0	66°12.5	+25.0	16.6
	-15°00.3	-15°11.4	-15°22.4	-15°33.3	-15°44.1	-15°54.8	-16°05.4	-16°15.9	-16°26.4	-16°36.7	-16°46.9	-10.7	60.9
Th 16	282°09.5	296°32.6	310°55.7	325°18.6	339°41.5	354°04.3	8°27.0	22°49.7	37°12.3	51°34.8	65°57.2	+22.8	16.7
	-19°05.7	-19°13.9	-19°22.0	-19°30.0	-19°37.8	-19°45.5	-19°53.0	-20°00.4	-20°07.6	-20°14.7	-20°21.7	-7.6	61.3
○ Fr 17	281°26.7	295°48.3	310°09.9	324°31.4	338°52.9	353°14.3	7°35.8	21°57.2	36°18.6	50°39.9	65°01.3	+21.4	16.7
	-21°47.0	-21°51.3	-21°55.5	-21°59.6	-22°03.4	-22°07.1	-22°10.7	-22°14.0	-22°17.2	-22°20.2	-22°23.1	-3.6	61.3
Sa 18	280°21.3	294°42.7	309°04.1	323°25.6	337°47.1	352°08.7	6°30.2	20°51.9	35°13.5	49°35.2	63°57.0	+21.6	16.6
	-22°44.6	-22°44.6	-22°44.4	-22°44.1	-22°43.6	-22°43.0	-22°42.1	-22°41.1	-22°39.9	-22°38.6	-22°37.0	+0.8	61.0
Su 19	279°30.1	293°52.8	308°15.7	322°38.6	337°01.6	351°24.7	5°47.9	20°11.1	34°34.5	48°57.9	63°21.4	+23.1	16.5
	-21°54.2	-21°50.1	-21°45.8	-21°41.4	-21°36.8	-21°32.0	-21°27.1	-21°22.1	-21°16.9	-21°11.6	-21°06.1	+4.8	60.4
Mo 20	279°26.0	293°51.1	308°16.4	322°41.7	337°07.2	351°32.7	5°58.4	20°24.1	34°50.0	49°16.0	63°42.0	+25.6	16.2
	-19°27.9	-19°20.3	-19°12.6	-19°04.8	-18°56.9	-18°48.9	-18°40.8	-18°32.6	-18°24.2	-18°15.8	-18°07.2	+8.1	59.5
Tu 21	280°26.3	294°54.1	309°22.0	323°50.0	338°18.1	352°46.3	7°14.6	21°43.0	36°11.6	50°40.2	65°08.9	+28.3	16.0
	-15°47.7	-15°37.7	-15°27.7	-15°17.5	-15°07.3	-14°57.0	-14°46.7	-14°36.2	-14°25.8	-14°15.2	-14°04.6	+10.3	58.6
We 22	294°54.1	309°22.0	323°50.0	338°18.1	352°46.3	7°14.6	21°43.0	36°11.6	50°40.2	65°08.9	79°37.7	+28.4	16.0
	-15°37.7	-15°27.7	-15°17.5	-15°07.3	-14°57.0	-14°46.7	-14°36.2	-14°25.8	-14°15.2	-14°04.6	-13°53.9	+10.4	58.5
Th 23	297°01.5	311°31.8	326°02.2	340°32.7	355°03.2	9°33.9	24°04.6	38°35.4	53°06.3	67°37.3	82°08.3	+30.7	15.7
	-11°07.0	-10°55.5	-10°44.0	-10°32.4	-10°20.8	-10°09.1	-9°57.4	-9°45.7	-9°33.9	-9°22.1	-9°10.3	+11.7	57.5
◑ Fr 24	300°02.6	314°34.7	329°06.9	343°39.2	358°11.5	12°43.9	27°16.3	41°48.8	56°21.3	70°53.9	85°26.6	+32.4	15.4
	-6°10.1	-5°57.9	-5°45.8	-5°33.6	-5°21.4	-5°09.2	-4°57.0	-4°44.7	-4°32.5	-4°20.3	-4°08.0	+12.2	56.6
Sa 25	303°41.7	318°15.0	332°48.4	347°21.8	1°55.2	16°28.7	31°02.2	45°35.7	60°09.2	74°42.8	89°16.4	+33.5	15.2
	-1°04.4	-0°52.2	-0°40.0	-0°27.8	-0°15.7	-0°03.5	0°08.6	0°20.8	0°32.9	0°45.0	0°57.1	+12.2	55.8
Su 26	307°42.7	322°16.5	336°50.4	351°24.3	5°58.2	20°32.1	35°06.0	49°39.9	64°13.8	78°47.8	93°21.7	+33.9	15.0
	3°56.3	4°08.0	4°19.8	4°31.5	4°43.1	4°54.8	5°06.4	5°18.0	5°29.6	5°41.1	5°52.6	+11.6	55.2
Mo 27	311°50.3	326°24.1	340°58.0	355°31.8	10°05.6	24°39.4	39°13.2	53°47.0	68°20.8	82°54.5	97°28.3	+33.8	14.9
	8°40.7	8°51.6	9°02.4	9°13.2	9°24.0	9°34.7	9°45.4	9°56.0	10°06.6	10°17.1	10°27.6	+10.7	54.7
Tu 28	315°51.8	330°25.2	344°58.6	359°31.9	14°05.2	28°38.5	43°11.7	57°44.9	72°18.1	86°51.3	101°24.4	+33.3	14.8
	12°58.8	13°08.4	13°18.0	13°27.5	13°36.9	13°46.3	13°55.7	14°05.0	14°14.2	14°23.3	14°32.4	+9.4	54.3
We 29	319°37.5	334°10.1	348°42.7	3°15.2	17°47.7	32°20.2	46°52.6	61°25.0	75°57.4	90°29.7	105°02.0	+32.4	14.7
	16°40.7	16°48.7	16°56.6	17°04.5	17°12.2	17°19.9	17°27.5	17°35.1	17°42.5	17°49.9	17°57.2	+7.7	54.0
Th 30	323°01.8	337°33.5	352°05.2	6°36.8	21°08.4	35°39.9	50°11.5	64°43.0	79°14.4	93°45.8	108°17.2	+31.5	14.7
	19°37.0	19°43.0	19°48.9	19°54.7	20°00.4	20°06.0	20°11.5	20°16.9	20°22.3	20°27.5	20°32.7	+5.6	53.9
Fr 31	326°04.1	340°35.0	355°05.8	9°36.7	24°07.5	38°38.2	53°09.0	67°39.7	82°10.4	96°41.1	111°11.8	+30.8	14.7
	21°38.8	21°42.4	21°45.9	21°49.3	21°52.7	21°55.9	21°59.0	22°02.0	22°04.9	22°07.8	22°10.5	+3.2	53.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 14h12 — FQ: 10 17h11 — FM: 17 11h19 — LQ: 24 04h57

SUN

June 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	270°32.4	285°32.3	300°32.2	315°32.1	330°32.0	345°31.9	0°31.8	15°31.7	30°31.6	45°31.5	60°31.4	75°31.3	-0.1
	22°03.8	22°04.1	22°04.4	22°04.8	22°05.1	22°05.4	22°05.8	22°06.1	22°06.4	22°06.8	22°07.1	22°07.4	+0.3
Su 2	270°30.0	285°29.9	300°29.8	315°29.7	330°29.6	345°29.5	0°29.4	15°29.3	30°29.2	45°29.1	60°29.0	75°28.9	-0.1
	22°11.7	22°12.0	22°12.3	22°12.6	22°13.0	22°13.3	22°13.6	22°13.9	22°14.2	22°14.5	22°14.9	22°15.2	+0.3
Mo 3	270°27.5	285°27.4	300°27.3	315°27.2	330°27.1	345°27.0	0°26.9	15°26.8	30°26.7	45°26.6	60°26.5	75°26.4	-0.1
	22°19.2	22°19.5	22°19.8	22°20.1	22°20.4	22°20.7	22°21.0	22°21.3	22°21.6	22°21.9	22°22.2	22°22.5	+0.3
Tu 4	270°25.0	285°24.9	300°24.8	315°24.7	330°24.6	345°24.5	0°24.3	15°24.2	30°24.1	45°24.0	60°23.9	75°23.8	-0.1
	22°26.3	22°26.6	22°26.9	22°27.2	22°27.5	22°27.8	22°28.1	22°28.4	22°28.6	22°28.9	22°29.2	22°29.5	+0.3
We 5	270°22.4	285°22.3	300°22.1	315°22.0	330°21.9	345°21.8	0°21.7	15°21.6	30°21.5	45°21.4	60°21.2	75°21.1	-0.1
	22°33.1	22°33.4	22°33.6	22°33.9	22°34.2	22°34.5	22°34.7	22°35.0	22°35.3	22°35.5	22°35.8	22°36.1	+0.3
Th 6	270°19.6	285°19.5	300°19.4	315°19.3	330°19.2	345°19.1	0°19.0	15°18.8	30°18.7	45°18.6	60°18.5	75°18.4	-0.1
	22°39.4	22°39.7	22°40.0	22°40.2	22°40.5	22°40.7	22°41.0	22°41.2	22°41.5	22°41.7	22°42.0	22°42.2	+0.3
Fr 7	270°16.9	285°16.7	300°16.6	315°16.5	330°16.4	345°16.3	0°16.2	15°16.0	30°15.9	45°15.8	60°15.7	75°15.6	-0.1
	22°45.4	22°45.6	22°45.9	22°46.1	22°46.4	22°46.6	22°46.8	22°47.1	22°47.3	22°47.5	22°47.8	22°48.0	+0.2
Sa 8	270°14.0	285°13.9	300°13.8	315°13.7	330°13.5	345°13.4	0°13.3	15°13.2	30°13.1	45°12.9	60°12.8	75°12.7	-0.1
	22°51.0	22°51.2	22°51.4	22°51.6	22°51.8	22°52.1	22°52.3	22°52.5	22°52.7	22°52.9	22°53.1	22°53.4	+0.2
Su 9	270°11.1	285°11.0	300°10.9	315°10.7	330°10.6	345°10.5	0°10.4	15°10.2	30°10.1	45°10.0	60°09.9	75°09.8	-0.1
	22°56.1	22°56.3	22°56.5	22°56.7	22°56.9	22°57.1	22°57.3	22°57.5	22°57.7	22°57.9	22°58.1	22°58.3	+0.2
Mo 10	270°08.1	285°08.0	300°07.9	315°07.8	330°07.6	345°07.5	0°07.4	15°07.3	30°07.1	45°07.0	60°06.9	75°06.8	-0.1
	23°00.8	23°01.0	23°01.2	23°01.4	23°01.6	23°01.8	23°02.0	23°02.2	23°02.3	23°02.5	23°02.7	23°02.9	+0.2
Tu 11	270°05.1	285°05.0	300°04.9	315°04.7	330°04.6	345°04.5	0°04.4	15°04.2	30°04.1	45°04.0	60°03.9	75°03.7	-0.1
	23°05.2	23°05.4	23°05.5	23°05.7	23°05.9	23°06.0	23°06.2	23°06.4	23°06.5	23°06.7	23°06.9	23°07.0	+0.2
We 12	270°02.1	285°01.9	300°01.8	315°01.7	330°01.5	345°01.4	0°01.3	15°01.2	30°01.0	45°00.9	60°00.8	75°00.6	-0.1
	23°09.1	23°09.3	23°09.4	23°09.6	23°09.7	23°09.9	23°10.0	23°10.2	23°10.3	23°10.5	23°10.6	23°10.8	+0.2
Th 13	269°59.0	284°58.8	299°58.7	314°58.6	329°58.4	344°58.3	359°58.2	14°58.0	29°57.9	44°57.8	59°57.7	74°57.5	-0.1
	23°12.7	23°12.8	23°12.9	23°13.1	23°13.2	23°13.3	23°13.5	23°13.6	23°13.7	23°13.9	23°14.0	23°14.1	+0.1
Fr 14	269°55.8	284°55.7	299°55.6	314°55.4	329°55.3	344°55.2	359°55.0	14°54.9	29°54.8	44°54.6	59°54.5	74°54.4	-0.1
	23°15.8	23°15.9	23°16.0	23°16.1	23°16.3	23°16.4	23°16.5	23°16.6	23°16.7	23°16.8	23°17.0	23°17.1	+0.1
Sa 15	269°52.7	284°52.5	299°52.4	314°52.3	329°52.1	344°52.0	359°51.9	14°51.7	29°51.6	44°51.5	59°51.3	74°51.2	-0.1
	23°18.5	23°18.6	23°18.7	23°18.8	23°18.9	23°19.0	23°19.1	23°19.2	23°19.3	23°19.4	23°19.5	23°19.6	+0.1
Su 16	269°49.5	284°49.3	299°49.2	314°49.1	329°48.9	344°48.8	359°48.7	14°48.5	29°48.4	44°48.3	59°48.1	74°48.0	-0.1
	23°20.8	23°20.9	23°21.0	23°21.0	23°21.1	23°21.2	23°21.3	23°21.4	23°21.5	23°21.5	23°21.6	23°21.7	+0.1
Mo 17	269°46.2	284°46.1	299°46.0	314°45.8	329°45.7	344°45.6	359°45.4	14°45.3	29°45.2	44°45.0	59°44.9	74°44.8	-0.1
	23°22.7	23°22.7	23°22.8	23°22.9	23°22.9	23°23.0	23°23.1	23°23.1	23°23.2	23°23.3	23°23.3	23°23.4	+0.1
Tu 18	269°43.0	284°42.9	299°42.7	314°42.6	329°42.5	344°42.3	359°42.2	14°42.1	29°41.9	44°41.8	59°41.7	74°41.5	-0.1
	23°24.1	23°24.2	23°24.2	23°24.3	23°24.3	23°24.4	23°24.4	23°24.5	23°24.5	23°24.6	23°24.6	23°24.7	+0.0
We 19	269°39.8	284°39.6	299°39.5	314°39.3	329°39.2	344°39.1	359°38.9	14°38.8	29°38.7	44°38.5	59°38.4	74°38.3	-0.1
	23°25.2	23°25.2	23°25.3	23°25.3	23°25.3	23°25.4	23°25.4	23°25.4	23°25.5	23°25.5	23°25.5	23°25.5	+0.0
Th 20	269°36.5	284°36.4	299°36.2	314°36.1	329°36.0	344°35.8	359°35.7	14°35.6	29°35.4	44°35.3	59°35.1	74°35.0	-0.1
	23°25.8	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	+0.0
Fr 21	269°33.2	284°33.1	299°33.0	314°32.8	329°32.7	344°32.6	359°32.4	14°32.3	29°32.2	44°32.0	59°31.9	74°31.7	-0.1
	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	23°26.1	-0.0
Sa 22	269°30.0	284°29.9	299°29.7	314°29.6	329°29.4	344°29.3	359°29.2	14°29.0	29°28.9	44°28.8	59°28.6	74°28.5	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.7	23°25.7	23°25.7	-0.0
Su 23	269°26.7	284°26.6	299°26.5	314°26.3	329°26.2	344°26.1	359°25.9	14°25.8	29°25.7	44°25.5	59°25.4	74°25.3	-0.1
	23°25.3	23°25.3	23°25.2	23°25.2	23°25.2	23°25.1	23°25.1	23°25.1	23°25.0	23°25.0	23°24.9	23°24.9	-0.0
Mo 24	269°23.5	284°23.4	299°23.2	314°23.1	329°23.0	344°22.8	359°22.7	14°22.6	29°22.4	44°22.3	59°22.2	74°22.0	-0.1
	23°24.3	23°24.2	23°24.2	23°24.1	23°24.1	23°24.0	23°24.0	23°23.9	23°23.9	23°23.8	23°23.8	23°23.7	-0.1
Tu 25	269°20.3	284°20.2	299°20.0	314°19.9	329°19.8	344°19.6	359°19.5	14°19.4	29°19.2	44°19.1	59°19.0	74°18.8	-0.1
	23°22.9	23°22.8	23°22.7	23°22.7	23°22.6	23°22.5	23°22.5	23°22.4	23°22.3	23°22.2	23°22.2	23°22.1	-0.1
We 26	269°17.1	284°17.0	299°16.8	314°16.7	329°16.6	344°16.5	359°16.3	14°16.2	29°16.1	44°15.9	59°15.8	74°15.7	-0.1
	23°21.0	23°21.0	23°20.9	23°20.8	23°20.7	23°20.6	23°20.5	23°20.4	23°20.3	23°20.3	23°20.2	23°20.1	-0.1
Th 27	269°14.0	284°13.8	299°13.7	314°13.6	329°13.4	344°13.3	359°13.2	14°13.1	29°12.9	44°12.8	59°12.7	74°12.5	-0.1
	23°18.8	23°18.7	23°18.6	23°18.5	23°18.4	23°18.3	23°18.2	23°18.1	23°18.0	23°17.9	23°17.7	23°17.6	-0.1
Fr 28	269°10.9	284°10.7	299°10.6	314°10.5	329°10.3	344°10.2	359°10.1	14°10.0	29°09.8	44°09.7	59°09.6	74°09.4	-0.1
	23°16.1	23°16.0	23°15.9	23°15.8	23°15.7	23°15.5	23°15.4	23°15.3	23°15.2	23°15.0	23°14.9	23°14.8	-0.1
Sa 29	269°07.8	284°07.7	299°07.5	314°07.4	329°07.3	344°07.2	359°07.0	14°06.9	29°06.8	44°06.7	59°06.5	74°06.4	-0.1
	23°13.1	23°13.0	23°12.8	23°12.7	23°12.5	23°12.4	23°12.3	23°12.1	23°12.0	23°11.8	23°11.7	23°11.5	-0.1
Su 30	269°04.8	284°04.7	299°04.5	314°04.4	329°04.3	344°04.2	359°04.0	14°03.9	29°03.8	44°03.7	59°03.5	74°03.4	-0.1
	23°09.6	23°09.5	23°09.3	23°09.2	23°09.0	23°08.8	23°08.7	23°08.5	23°08.4	23°08.2	23°08.1	23°07.9	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2030

	D	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	Δ'/h	SH
●	Sa 1	241°46.7	256°17.1	270°47.5	285°18.0	299°48.4	314°18.8	328°49.1	343°19.5	357°49.8	12°20.2	26°50.5	+30.4	14.7
		22°30.3	22°31.9	22°33.5	22°35.0	22°36.3	22°37.6	22°38.7	22°39.8	22°40.7	22°41.5	22°42.2	+1.2	53.9
	Su 2	244°24.4	258°54.7	273°24.9	287°55.2	302°25.4	316°55.6	331°25.9	345°56.1	0°26.4	14°56.7	29°26.9	+30.2	14.8
		22°40.1	22°39.1	22°38.0	22°36.8	22°35.5	22°34.1	22°32.5	22°30.9	22°29.1	22°27.3	22°25.3	-1.5	54.1
	Mo 3	247°02.1	261°32.5	276°03.0	290°33.4	305°03.9	319°34.5	334°05.0	348°35.5	3°06.1	17°36.7	32°07.3	+30.5	14.8
		21°43.0	21°39.4	21°35.6	21°31.8	21°27.8	21°23.7	21°19.6	21°15.3	21°10.9	21°06.4	21°01.9	-4.1	54.3
	Tu 4	249°49.1	264°20.1	278°51.1	293°22.1	307°53.2	322°24.2	336°55.3	351°26.5	5°57.6	20°28.8	35°00.0	+31.1	14.9
		19°41.3	19°35.2	19°29.0	19°22.6	19°16.2	19°09.7	19°03.1	18°56.4	18°49.6	18°42.7	18°35.8	-6.6	54.7
	We 5	252°51.3	267°22.9	281°54.6	296°26.3	310°58.0	325°29.7	340°01.4	354°33.2	9°05.0	23°36.8	38°08.7	+31.7	15.0
		16°40.8	16°32.4	16°24.0	16°15.5	16°07.0	15°58.3	15°49.6	15°40.7	15°31.9	15°22.9	15°13.9	-8.7	55.1
	Th 6	256°08.9	270°41.1	285°13.3	299°45.5	314°17.7	328°49.9	343°22.2	357°54.4	12°26.7	26°59.0	41°31.3	+32.2	15.2
		12°49.5	12°39.4	12°29.1	12°18.8	12°08.5	11°58.0	11°47.5	11°37.0	11°26.4	11°15.7	11°05.0	-10.5	55.7
	Fr 7	259°36.7	274°09.0	288°41.4	303°13.8	317°46.2	332°18.6	346°51.0	1°23.4	15°55.7	30°28.1	45°00.5	+32.4	15.4
		8°17.3	8°05.7	7°54.0	7°42.3	7°30.6	7°18.8	7°07.0	6°55.1	6°43.2	6°31.2	6°19.2	-11.8	56.4
	Sa 8	263°04.5	277°36.7	292°08.8	306°40.9	321°12.9	335°45.0	350°17.0	4°49.0	19°20.9	33°52.9	48°24.8	+32.0	15.6
		3°14.7	3°02.1	2°49.6	2°36.9	2°24.3	2°11.6	1°58.9	1°46.2	1°33.5	1°20.7	1°07.9	-12.7	57.2
◐	Su 9	266°19.0	280°50.2	295°21.5	309°52.6	324°23.8	338°54.9	353°25.9	7°56.9	22°27.8	36°58.7	51°29.5	+31.1	15.8
		-2°05.8	-2°18.8	-2°31.8	-2°44.8	-2°57.8	-3°10.8	-3°23.8	-3°36.8	-3°49.8	-4°02.8	-4°15.8	-13.0	58.0
	Mo 10	269°04.2	283°33.9	298°03.6	312°33.3	327°02.8	341°32.3	356°01.7	10°31.0	25°00.2	39°29.4	53°58.4	+29.4	16.1
		-7°29.5	-7°42.2	-7°55.0	-8°07.7	-8°20.4	-8°33.0	-8°45.6	-8°58.2	-9°10.8	-9°23.3	-9°35.8	-12.6	58.9
	Tu 11	271°04.2	285°31.9	299°59.4	314°26.9	328°54.3	343°21.6	357°48.7	12°15.8	26°42.8	41°09.7	55°36.5	+27.2	16.3
		-12°37.6	-12°49.3	-13°01.0	-13°12.5	-13°24.0	-13°35.5	-13°46.8	-13°58.1	-14°09.3	-14°20.5	-14°31.5	-11.4	59.7
	We 12	272°06.5	286°31.7	300°56.8	315°21.8	329°46.7	344°11.5	358°36.2	13°00.8	27°25.3	41°49.7	56°14.1	+24.8	16.5
		-17°07.2	-17°16.8	-17°26.3	-17°35.7	-17°45.0	-17°54.2	-18°03.2	-18°12.2	-18°21.0	-18°29.7	-18°38.3	-9.1	60.5
	Th 13	272°07.9	286°30.8	300°53.6	315°16.3	329°39.0	344°01.6	358°24.1	12°46.6	27°09.0	41°31.3	55°53.6	+22.6	16.6
		-20°31.7	-20°38.2	-20°44.5	-20°50.7	-20°56.7	-21°02.5	-21°08.2	-21°13.8	-21°19.2	-21°24.4	-21°29.5	-5.8	61.0
	Fr 14	271°20.9	285°42.4	300°03.8	314°25.3	328°46.7	343°08.1	357°29.5	11°50.8	26°12.1	40°33.5	54°54.8	+21.4	16.7
		-22°26.2	-22°28.7	-22°30.9	-22°33.0	-22°35.0	-22°36.7	-22°38.3	-22°39.7	-22°40.9	-22°41.9	-22°42.8	-1.7	61.1
○	Sa 15	270°15.3	284°36.8	298°58.4	313°20.0	327°41.6	342°03.3	356°25.0	10°46.8	25°08.6	39°30.5	53°52.4	+21.7	16.6
		-22°34.8	-22°32.9	-22°30.8	-22°28.5	-22°26.1	-22°23.5	-22°20.7	-22°17.8	-22°14.6	-22°11.4	-22°07.9	+2.7	61.0
	Su 16	269°29.0	283°52.0	298°15.1	312°38.3	327°01.6	341°25.0	355°48.5	10°12.0	24°35.7	38°59.4	53°23.3	+23.4	16.5
		-20°57.1	-20°51.2	-20°45.1	-20°38.8	-20°32.5	-20°25.9	-20°19.3	-20°12.5	-20°05.6	-19°58.5	-19°51.3	+6.6	60.5
	Mo 17	269°32.8	283°58.2	298°23.8	312°49.5	327°15.2	341°41.1	356°07.1	10°33.2	24°59.4	39°25.7	53°52.1	+25.9	16.3
		-17°48.5	-17°39.4	-17°30.2	-17°20.9	-17°11.5	-17°02.0	-16°52.4	-16°42.7	-16°32.9	-16°23.1	-16°13.1	+9.6	59.8
	Tu 18	270°40.8	285°08.9	299°37.1	314°05.4	328°33.7	343°02.2	357°30.8	11°59.4	26°28.2	40°57.1	55°26.0	+28.5	16.0
		-13°33.9	-13°22.7	-13°11.4	-13°00.1	-12°48.7	-12°37.3	-12°25.8	-12°14.3	-12°02.7	-11°51.1	-11°39.4	+11.4	58.9
	We 19	272°51.2	287°21.5	301°52.0	316°22.5	330°53.1	345°23.7	359°54.5	14°25.3	28°56.2	43°27.2	57°58.2	+30.7	15.8
		-8°39.2	-8°26.9	-8°14.6	-8°02.3	-7°49.9	-7°37.6	-7°25.2	-7°12.8	-7°00.3	-6°47.9	-6°35.4	+12.4	57.9
	Th 20	275°51.9	290°23.9	304°56.0	319°28.2	334°00.4	348°32.7	3°05.0	17°37.4	32°09.8	46°42.3	61°14.8	+32.3	15.5
		-3°27.3	-3°14.7	-3°02.1	-2°49.5	-2°37.0	-2°24.4	-2°11.9	-1°59.3	-1°46.8	-1°34.3	-1°21.7	+12.6	56.9
	Fr 21	290°23.9	304°56.0	319°28.2	334°00.4	348°32.7	3°05.0	17°37.4	32°09.8	46°42.3	61°14.8	75°47.3	+32.3	15.5
		-3°14.7	-3°02.1	-2°49.5	-2°37.0	-2°24.4	-2°11.9	-1°59.3	-1°46.8	-1°34.3	-1°21.7	-1°09.2	+12.5	56.9
◑	Sa 22	294°00.3	308°33.5	323°06.6	337°39.8	352°13.0	6°46.2	21°19.5	35°52.8	50°26.1	64°59.4	79°32.8	+33.2	15.3
		1°56.6	2°08.8	2°21.0	2°33.2	2°45.3	2°57.5	3°09.6	3°21.6	3°33.7	3°45.7	3°57.7	+12.1	56.0
	Su 23	297°54.6	312°28.1	327°01.7	341°35.2	356°08.8	10°42.3	25°15.8	39°49.4	54°22.9	68°56.5	83°30.0	+33.5	15.1
		6°53.5	7°04.9	7°16.3	7°27.6	7°38.9	7°50.2	8°01.4	8°12.6	8°23.7	8°34.8	8°45.8	+11.2	55.3
	Mo 24	301°52.2	316°25.6	330°59.0	345°32.4	0°05.7	14°39.1	29°12.4	43°45.7	58°18.9	72°52.2	87°25.4	+33.3	14.9
		11°25.4	11°35.6	11°45.8	11°55.9	12°05.9	12°15.9	12°25.9	12°35.7	12°45.6	12°55.3	13°05.0	+10.0	54.7
	Tu 25	305°41.2	320°14.1	334°46.9	349°19.7	3°52.4	18°25.2	32°57.9	47°30.5	62°03.2	76°35.8	91°08.4	+32.7	14.8
		15°23.0	15°31.6	15°40.2	15°48.7	15°57.2	16°05.6	16°13.9	16°22.1	16°30.3	16°38.4	16°46.4	+8.3	54.3
	We 26	309°13.1	323°45.1	338°17.1	352°49.1	7°21.0	21°52.9	36°24.8	50°56.7	65°28.5	80°00.2	94°31.9	+31.9	14.7
		18°37.4	18°44.2	18°50.9	18°57.5	19°04.0	19°10.4	19°16.7	19°23.0	19°29.1	19°35.2	19°41.2	+6.4	54.1
	Th 27	312°23.8	326°55.0	341°26.1	355°57.2	10°28.3	24°59.4	39°30.4	54°01.4	68°32.4	83°03.3	97°34.2	+31.0	14.7
		21°00.3	21°04.8	21°09.3	21°13.6	21°17.9	21°22.0	21°26.1	21°30.0	21°33.9	21°37.6	21°41.3	+4.1	54.0
	Fr 28	315°14.6	329°45.1	344°15.5	358°46.0	13°16.4	27°46.8	42°17.2	56°47.6	71°18.0	85°48.3	100°18.6	+30.4	14.7
		22°24.0	22°26.1	22°28.0	22°29.8	22°31.5	22°33.1	22°34.6	22°36.0	22°37.3	22°38.5	22°39.6	+1.6	54.0
	Sa 29	317°51.9	332°22.0	346°52.1	1°22.3	15°52.4	30°22.5	44°52.6	59°22.8	73°52.9	88°23.0	102°53.1	+30.1	14.8
		22°43.0	22°42.3	22°41.6	22°40.7	22°39.7	22°38.7	22°37.5	22°36.2	22°34.8	22°33.3	22°31.7	-1.1	54.2
●	Su 30	320°25.4	334°55.6	349°25.9	3°56.1	18°26.4	32°56.6	47°26.9	61°57.2	76°27.5	90°57.8	105°28.2	+30.3	14.8
		21°54.5	21°51.2	21°47.8	21°44.2	21°40.6	21°36.8	21°33.0	21°29.0	21°24.9	21°20.8	21°16.5	-3.8	54.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 1 06h21 — FQ: 9 03h35 — FM: 15 18h41 — LQ: 22 17h19 — NM: 30 21h34

SUN

July 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	269°01.8	284°01.7	299°01.6	314°01.5	329°01.3	344°01.2	359°01.1	14°01.0	29°00.9	44°00.7	59°00.6	74°00.5	-0.1
	23°05.7	23°05.6	23°05.4	23°05.2	23°05.1	23°04.9	23°04.7	23°04.5	23°04.4	23°04.2	23°04.0	23°03.8	-0.2
Tu 2	268°58.9	283°58.8	298°58.7	313°58.6	328°58.5	343°58.3	358°58.2	13°58.1	28°58.0	43°57.9	58°57.8	73°57.6	-0.1
	23°01.5	23°01.3	23°01.1	23°00.9	23°00.7	23°00.5	23°00.3	23°00.1	22°59.9	22°59.8	22°59.6	22°59.4	-0.2
We 3	268°56.1	283°56.0	298°55.9	313°55.8	328°55.7	343°55.5	358°55.4	13°55.3	28°55.2	43°55.1	58°55.0	73°54.9	-0.1
	22°56.8	22°56.6	22°56.4	22°56.2	22°56.0	22°55.8	22°55.6	22°55.3	22°55.1	22°54.9	22°54.7	22°54.5	-0.2
Th 4	268°53.4	283°53.3	298°53.2	313°53.1	328°52.9	343°52.8	358°52.7	13°52.6	28°52.5	43°52.4	58°52.3	73°52.2	-0.1
	22°51.7	22°51.5	22°51.3	22°51.0	22°50.8	22°50.6	22°50.4	22°50.1	22°49.9	22°49.7	22°49.5	22°49.2	-0.2
Fr 5	268°50.7	283°50.6	298°50.5	313°50.4	328°50.3	343°50.2	358°50.1	13°50.0	28°49.9	43°49.8	58°49.7	73°49.5	-0.1
	22°46.2	22°46.0	22°45.8	22°45.5	22°45.3	22°45.0	22°44.8	22°44.6	22°44.3	22°44.1	22°43.8	22°43.6	-0.2
Sa 6	268°48.2	283°48.1	298°48.0	313°47.9	328°47.8	343°47.7	358°47.5	13°47.4	28°47.3	43°47.2	58°47.1	73°47.0	-0.1
	22°40.4	22°40.1	22°39.8	22°39.6	22°39.3	22°39.1	22°38.8	22°38.6	22°38.3	22°38.1	22°37.8	22°37.5	-0.3
Su 7	268°45.7	283°45.6	298°45.5	313°45.4	328°45.3	343°45.2	358°45.1	13°45.0	28°44.9	43°44.8	58°44.7	73°44.6	-0.1
	22°34.1	22°33.8	22°33.6	22°33.3	22°33.0	22°32.7	22°32.5	22°32.2	22°31.9	22°31.6	22°31.4	22°31.1	-0.3
Mo 8	268°43.3	283°43.2	298°43.1	313°43.0	328°43.0	343°42.9	358°42.8	13°42.7	28°42.6	43°42.5	58°42.4	73°42.3	-0.1
	22°27.4	22°27.2	22°26.9	22°26.6	22°26.3	22°26.0	22°25.7	22°25.4	22°25.1	22°24.8	22°24.5	22°24.3	-0.3
Tu 9	268°41.1	283°41.0	298°40.9	313°40.8	328°40.7	343°40.6	358°40.5	13°40.4	28°40.3	43°40.3	58°40.2	73°40.1	-0.1
	22°20.4	22°20.1	22°19.8	22°19.5	22°19.2	22°18.9	22°18.6	22°18.3	22°18.0	22°17.7	22°17.3	22°17.0	-0.3
We 10	268°38.9	283°38.8	298°38.7	313°38.7	328°38.6	343°38.5	358°38.4	13°38.3	28°38.2	43°38.1	58°38.1	73°38.0	-0.1
	22°13.0	22°12.7	22°12.3	22°12.0	22°11.7	22°11.4	22°11.1	22°10.7	22°10.4	22°10.1	22°09.8	22°09.4	-0.3
Th 11	268°36.9	283°36.8	298°36.7	313°36.6	328°36.6	343°36.5	358°36.4	13°36.3	28°36.2	43°36.1	58°36.1	73°36.0	-0.1
	22°05.2	22°04.8	22°04.5	22°04.2	22°03.8	22°03.5	22°03.1	22°02.8	22°02.5	22°02.1	22°01.8	22°01.5	-0.3
Fr 12	268°35.0	283°34.9	298°34.8	313°34.7	328°34.6	343°34.6	358°34.5	13°34.4	28°34.3	43°34.3	58°34.2	73°34.1	-0.1
	21°57.0	21°56.6	21°56.3	21°55.9	21°55.6	21°55.2	21°54.9	21°54.5	21°54.2	21°53.8	21°53.5	21°53.1	-0.4
Sa 13	268°33.2	283°33.1	298°33.0	313°32.9	328°32.9	343°32.8	358°32.7	13°32.6	28°32.6	43°32.5	58°32.4	73°32.4	-0.1
	21°48.4	21°48.0	21°47.7	21°47.3	21°47.0	21°46.6	21°46.2	21°45.8	21°45.5	21°45.1	21°44.7	21°44.4	-0.4
Su 14	268°31.5	283°31.4	298°31.3	313°31.3	328°31.2	343°31.1	358°31.1	13°31.0	28°30.9	43°30.9	58°30.8	73°30.7	-0.1
	21°39.5	21°39.1	21°38.7	21°38.3	21°38.0	21°37.6	21°37.2	21°36.8	21°36.4	21°36.0	21°35.7	21°35.3	-0.4
Mo 15	268°29.9	283°29.9	298°29.8	313°29.7	328°29.7	343°29.6	358°29.5	13°29.5	28°29.4	43°29.4	58°29.3	73°29.2	-0.1
	21°30.2	21°29.8	21°29.4	21°29.0	21°28.6	21°28.2	21°27.8	21°27.4	21°27.0	21°26.6	21°26.2	21°25.8	-0.4
Tu 16	268°28.5	283°28.4	298°28.4	313°28.3	328°28.3	343°28.2	358°28.1	13°28.1	28°28.0	43°28.0	58°27.9	73°27.9	-0.1
	21°20.5	21°20.1	21°19.7	21°19.3	21°18.9	21°18.5	21°18.0	21°17.6	21°17.2	21°16.8	21°16.4	21°16.0	-0.4
We 17	268°27.2	283°27.1	298°27.1	313°27.0	328°27.0	343°26.9	358°26.9	13°26.8	28°26.8	43°26.7	58°26.7	73°26.6	-0.1
	21°10.5	21°10.1	21°09.6	21°09.2	21°08.8	21°08.3	21°07.9	21°07.5	21°07.1	21°06.6	21°06.2	21°05.8	-0.4
Th 18	268°26.0	283°26.0	298°25.9	313°25.9	328°25.8	343°25.8	358°25.7	13°25.7	28°25.6	43°25.6	58°25.6	73°25.5	-0.0
	21°00.1	20°59.7	20°59.2	20°58.8	20°58.3	20°57.9	20°57.4	20°57.0	20°56.6	20°56.1	20°55.7	20°55.2	-0.4
Fr 19	268°25.0	283°24.9	298°24.9	313°24.8	328°24.8	343°24.8	358°24.7	13°24.7	28°24.6	43°24.6	58°24.6	73°24.5	-0.0
	20°49.4	20°48.9	20°48.4	20°48.0	20°47.5	20°47.1	20°46.6	20°46.1	20°45.7	20°45.2	20°44.8	20°44.3	-0.5
Sa 20	268°24.1	283°24.0	298°24.0	313°23.9	328°23.9	343°23.9	358°23.8	13°23.8	28°23.8	43°23.7	58°23.7	73°23.7	-0.0
	20°38.3	20°37.8	20°37.3	20°36.8	20°36.4	20°35.9	20°35.4	20°35.0	20°34.5	20°34.0	20°33.5	20°33.1	-0.5
Su 21	268°23.3	283°23.3	298°23.2	313°23.2	328°23.2	343°23.1	358°23.1	13°23.1	28°23.1	43°23.0	58°23.0	73°23.0	-0.0
	20°26.8	20°26.3	20°25.8	20°25.4	20°24.9	20°24.4	20°23.9	20°23.4	20°22.9	20°22.4	20°21.9	20°21.4	-0.5
Mo 22	268°22.6	283°22.6	298°22.6	313°22.6	328°22.6	343°22.5	358°22.5	13°22.5	28°22.5	43°22.4	58°22.4	73°22.4	-0.0
	20°15.0	20°14.5	20°14.0	20°13.5	20°13.0	20°12.5	20°12.0	20°11.5	20°11.0	20°10.5	20°10.0	20°09.5	-0.5
Tu 23	268°22.1	283°22.1	298°22.1	313°22.1	328°22.1	343°22.1	358°22.0	13°22.0	28°22.0	43°22.0	58°22.0	73°22.0	-0.0
	20°02.9	20°02.4	20°01.9	20°01.4	20°00.8	20°00.3	19°59.8	19°59.3	19°58.8	19°58.3	19°57.7	19°57.2	-0.5
We 24	268°21.8	283°21.8	298°21.8	313°21.8	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	-0.0
	19°50.4	19°49.9	19°49.4	19°48.8	19°48.3	19°47.8	19°47.3	19°46.7	19°46.2	19°45.7	19°45.1	19°44.6	-0.5
Th 25	268°21.6	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.5	13°21.5	28°21.5	43°21.5	58°21.5	73°21.5	-0.0
	19°37.6	19°37.1	19°36.5	19°36.0	19°35.5	19°34.9	19°34.4	19°33.8	19°33.3	19°32.7	19°32.2	19°31.7	-0.5
Fr 26	268°21.5	283°21.5	298°21.5	313°21.5	328°21.5	343°21.5	358°21.5	13°21.5	28°21.5	43°21.5	58°21.5	73°21.5	+0.0
	19°24.5	19°24.0	19°23.4	19°22.8	19°22.3	19°21.7	19°21.2	19°20.6	19°20.1	19°19.5	19°18.9	19°18.4	-0.6
Sa 27	268°21.6	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.6	13°21.6	28°21.7	43°21.7	58°21.7	73°21.7	+0.0
	19°11.1	19°10.5	19°09.9	19°09.4	19°08.8	19°08.2	19°07.7	19°07.1	19°06.5	19°05.9	19°05.4	19°04.8	-0.6
Su 28	268°21.8	283°21.8	298°21.8	313°21.9	328°21.9	343°21.9	358°21.9	13°21.9	28°21.9	43°21.9	58°22.0	73°22.0	+0.0
	18°57.3	18°56.7	18°56.1	18°55.6	18°55.0	18°54.4	18°53.8	18°53.2	18°52.6	18°52.1	18°51.5	18°50.9	-0.6
Mo 29	268°22.2	283°22.2	298°22.2	313°22.3	328°22.3	343°22.3	358°22.3	13°22.3	28°22.4	43°22.4	58°22.4	73°22.4	+0.0
	18°43.2	18°42.6	18°42.0	18°41.4	18°40.8	18°40.3	18°39.7	18°39.1	18°38.5	18°37.9	18°37.3	18°36.7	-0.6
Tu 30	268°22.7	283°22.7	298°22.8	313°22.8	328°22.8	343°22.8	358°22.9	13°22.9	28°22.9	43°23.0	58°23.0	73°23.0	+0.0
	18°28.8	18°28.2	18°27.6	18°27.0	18°26.4	18°25.8	18°25.2	18°24.6	18°24.0	18°23.4	18°22.8	18°22.2	-0.6
We 31	268°23.4	283°23.4	298°23.5	313°23.5	328°23.5	343°23.6	358°23.6	13°23.6	28°23.7	43°23.7	58°23.7	73°23.8	+0.0
	18°14.2	18°13.5	18°12.9	18°12.3	18°11.7	18°11.1	18°10.4	18°09.8	18°09.2	18°08.6	18°08.0	18°07.3	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2030

D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
Mo 1	250°32.6	265°03.2	279°33.7	294°04.3	308°34.9	323°05.6	337°36.2	352°06.9	6°37.7	21°08.4	35°39.1	+30.7	14.9
	20°28.2	20°22.8	20°17.3	20°11.7	20°06.0	20°00.2	19°54.3	19°48.4	19°42.3	19°36.1	19°29.9	-5.8	54.7
Tu 2	253°23.7	267°54.9	282°26.1	296°57.3	311°28.6	325°59.9	340°31.2	355°02.5	9°33.9	24°05.3	38°36.7	+31.3	15.0
	17°44.8	17°37.0	17°29.2	17°21.3	17°13.4	17°05.3	16°57.2	16°48.9	16°40.6	16°32.2	16°23.8	-8.1	55.1
We 3	256°31.4	271°03.2	285°35.1	300°07.0	314°38.9	329°10.9	343°42.8	358°14.8	12°46.8	27°18.8	41°50.9	+32.0	15.1
	14°07.3	13°57.7	13°47.9	13°38.1	13°28.2	13°18.2	13°08.2	12°58.1	12°48.0	12°37.8	12°27.5	-10.0	55.5
Th 4	259°53.9	274°26.2	288°58.5	303°30.9	318°03.2	332°35.6	347°08.0	1°40.4	16°12.8	30°45.2	45°17.6	+32.4	15.3
	9°46.1	9°34.9	9°23.6	9°12.3	9°00.9	8°49.5	8°38.1	8°26.6	8°15.1	8°03.5	7°51.8	-11.4	56.0
Fr 5	263°24.2	277°56.6	292°29.0	307°01.4	321°33.9	336°06.3	350°38.6	5°11.0	19°43.4	34°15.8	48°48.1	+32.4	15.4
	4°52.5	4°40.3	4°28.0	4°15.7	4°03.4	3°51.1	3°38.7	3°26.3	3°13.8	3°01.4	2°48.9	-12.4	56.6
Sa 6	266°51.2	281°23.3	295°55.3	310°27.2	324°59.2	339°31.1	354°03.0	8°34.8	23°06.6	37°38.4	52°10.1	+31.9	15.6
	-0°20.5	-0°33.3	-0°46.0	-0°58.8	-1°11.5	-1°24.3	-1°37.0	-1°49.8	-2°02.6	-2°15.4	-2°28.1	-12.8	57.2
Su 7	270°01.2	284°32.3	299°03.2	313°34.2	328°05.0	342°35.8	357°06.6	11°37.3	26°07.9	40°38.5	55°09.1	+30.8	15.8
	-5°39.1	-5°51.7	-6°04.3	-6°16.9	-6°29.5	-6°42.1	-6°54.6	-7°07.1	-7°19.6	-7°32.1	-7°44.5	-12.5	57.9
◐ Mo 8	272°39.0	287°08.5	301°37.8	316°07.1	330°36.3	345°05.4	359°34.5	14°03.4	28°32.3	43°01.1	57°29.9	+29.1	16.0
	-10°47.0	-10°58.9	-11°10.7	-11°22.4	-11°34.1	-11°45.7	-11°57.3	-12°08.8	-12°20.3	-12°31.7	-12°43.1	-11.6	58.6
Tu 9	274°30.5	288°57.9	303°25.1	317°52.3	332°19.4	346°46.3	1°13.2	15°40.0	30°06.7	44°33.4	58°59.9	+26.9	16.2
	-15°25.4	-15°35.6	-15°45.7	-15°55.8	-16°05.7	-16°15.6	-16°25.4	-16°35.1	-16°44.7	-16°54.2	-17°03.6	-9.8	59.3
We 10	275°26.8	289°51.8	304°16.8	318°41.7	333°06.5	347°31.2	1°55.9	16°20.4	30°44.9	45°09.3	59°33.6	+24.7	16.3
	-19°12.2	-19°19.8	-19°27.4	-19°34.8	-19°42.1	-19°49.3	-19°56.3	-20°03.2	-20°10.0	-20°16.7	-20°23.2	-7.1	59.9
Th 11	275°29.1	289°52.3	304°15.4	318°38.4	333°01.4	347°24.3	1°47.2	16°10.0	30°32.8	44°55.5	59°18.2	+22.9	16.4
	-21°44.4	-21°48.6	-21°52.7	-21°56.6	-22°00.4	-22°04.0	-22°07.5	-22°10.8	-22°13.9	-22°16.9	-22°19.8	-3.5	60.3
Fr 12	274°54.1	289°16.4	303°38.6	318°00.8	332°22.9	346°45.1	1°07.3	15°29.5	29°51.7	44°13.9	58°36.1	+22.2	16.5
	-22°42.6	-22°42.8	-22°42.8	-22°42.7	-22°42.4	-22°41.9	-22°41.2	-22°40.4	-22°39.4	-22°38.3	-22°37.0	+0.6	60.5
Sa 13	274°11.4	288°34.0	302°56.7	317°19.4	331°42.1	346°04.9	0°27.8	14°50.7	29°13.6	43°36.6	57°59.7	+22.8	16.5
	-21°57.4	-21°53.4	-21°49.3	-21°45.1	-21°40.6	-21°36.1	-21°31.3	-21°26.5	-21°21.4	-21°16.2	-21°10.9	+4.6	60.5
Su 14	273°53.7	288°17.9	302°42.2	317°06.6	331°31.0	345°55.5	0°20.1	14°44.8	29°09.6	43°34.5	57°59.5	+24.6	16.4
	-19°33.5	-19°25.9	-19°18.2	-19°10.4	-19°02.4	-18°54.3	-18°46.1	-18°37.8	-18°29.3	-18°20.7	-18°12.0	+8.2	60.1
○ Mo 15	274°24.7	288°51.2	303°17.7	317°44.3	332°11.0	346°37.8	1°04.7	15°31.7	29°58.8	44°25.9	58°53.2	+26.8	16.2
	-15°48.8	-15°38.5	-15°28.0	-15°17.5	-15°07.0	-14°56.3	-14°45.5	-14°34.7	-14°23.8	-14°12.8	-14°01.7	+10.7	59.6
Tu 16	275°53.1	290°21.8	304°50.6	319°19.5	333°48.4	348°17.4	2°46.6	17°15.8	31°45.1	46°14.4	60°43.9	+29.1	16.0
	-11°08.0	-10°55.9	-10°43.9	-10°31.7	-10°19.6	-10°07.3	-9°55.1	-9°42.8	-9°30.5	-9°18.1	-9°05.7	+12.2	58.8
We 17	278°14.6	292°45.2	307°15.9	321°46.6	336°17.4	350°48.3	5°19.2	19°50.2	34°21.3	48°52.4	63°23.6	+30.9	15.8
	-5°56.4	-5°43.6	-5°30.8	-5°18.0	-5°05.2	-4°52.4	-4°39.6	-4°26.7	-4°13.9	-4°01.1	-3°48.2	+12.8	57.9
Th 18	281°17.5	295°49.5	310°21.5	324°53.6	339°25.7	353°57.8	8°30.0	23°02.2	37°34.4	52°06.7	66°39.0	+32.2	15.5
	-0°36.1	-0°23.3	-0°10.6	0°02.1	0°14.8	0°27.5	0°40.1	0°52.7	1°05.3	1°17.9	1°30.5	+12.7	57.0
Fr 19	284°47.4	299°20.2	313°52.9	328°25.7	342°58.5	357°31.4	12°04.2	26°37.0	41°09.9	55°42.8	70°15.7	+32.8	15.3
	4°35.6	4°47.7	4°59.8	5°11.8	5°23.7	5°35.7	5°47.6	5°59.4	6°11.2	6°23.0	6°34.8	+11.9	56.1
Sa 20	299°20.2	313°52.9	328°25.7	342°58.5	357°31.4	12°04.2	26°37.0	41°09.9	55°42.8	70°15.7	84°48.6	+32.8	15.3
	4°47.7	4°59.8	5°11.8	5°23.7	5°35.7	5°47.6	5°59.4	6°11.2	6°23.0	6°34.8	6°46.4	+11.9	56.1
Su 21	303°03.0	317°36.0	332°08.9	346°41.9	1°14.9	15°47.9	30°20.8	44°53.8	59°26.7	73°59.7	88°32.6	+33.0	15.1
	9°36.2	9°47.1	9°58.0	10°08.8	10°19.5	10°30.2	10°40.9	10°51.5	11°02.0	11°12.5	11°22.9	+10.7	55.4
◑ Mo 22	306°45.3	321°18.1	335°50.8	350°23.5	4°56.2	19°28.8	34°01.5	48°34.1	63°06.7	77°39.3	92°11.8	+32.7	14.9
	13°51.7	14°01.1	14°10.4	14°19.7	14°28.9	14°38.0	14°47.0	14°56.0	15°05.0	15°13.8	15°22.6	+9.1	54.8
Tu 23	310°17.4	324°49.5	339°21.7	353°53.8	8°25.9	22°57.9	37°29.9	52°01.9	66°33.9	81°05.8	95°37.7	+32.0	14.8
	17°25.2	17°32.8	17°40.2	17°47.6	17°55.0	18°02.2	18°09.3	18°16.4	18°23.4	18°30.3	18°37.1	+7.2	54.4
We 24	313°32.8	328°04.3	342°35.7	357°07.0	11°38.4	26°09.7	40°41.0	55°12.2	69°43.5	84°14.7	98°45.8	+31.3	14.8
	20°08.9	20°14.3	20°19.6	20°24.8	20°29.9	20°35.0	20°39.9	20°44.8	20°49.5	20°54.2	20°58.7	+5.0	54.2
Th 25	316°30.0	331°00.8	345°31.5	0°02.1	14°32.8	29°03.4	43°34.1	58°04.7	72°35.2	87°05.8	101°36.3	+30.6	14.8
	21°55.5	21°58.5	22°01.4	22°04.2	22°06.8	22°09.4	22°11.9	22°14.3	22°16.6	22°18.7	22°20.8	+2.5	54.1
Fr 26	319°11.9	333°42.2	348°12.4	2°42.6	17°12.9	31°43.1	46°13.2	60°43.4	75°13.6	89°43.8	104°13.9	+30.2	14.8
	22°39.2	22°39.6	22°39.9	22°40.0	22°40.1	22°40.0	22°39.9	22°39.6	22°39.2	22°38.7	22°38.2	-0.1	54.2
Sa 27	321°45.6	336°15.7	350°45.8	5°15.9	19°46.0	34°16.2	48°46.3	63°16.4	77°46.5	92°16.7	106°46.8	+30.1	14.9
	22°16.4	22°14.0	22°11.6	22°09.1	22°06.5	22°03.7	22°00.9	21°57.9	21°54.8	21°51.7	21°48.4	-2.8	54.5
Su 28	324°20.1	338°50.4	353°20.7	7°51.1	22°21.5	36°51.8	51°22.2	65°52.6	80°23.1	94°53.5	109°24.0	+30.4	14.9
	20°46.5	20°41.6	20°36.5	20°31.4	20°26.1	20°20.7	20°15.3	20°09.7	20°04.1	19°58.3	19°52.4	-5.4	54.8
Mo 29	327°03.4	341°34.2	356°05.1	10°35.9	25°06.8	39°37.7	54°08.6	68°39.5	83°10.5	97°41.5	112°12.5	+30.9	15.1
	18°13.0	18°05.6	17°58.1	17°50.5	17°42.9	17°35.1	17°27.3	17°19.4	17°11.4	17°03.3	16°55.1	-7.8	55.2
● Tu 30	330°00.4	344°31.7	359°03.1	13°34.5	28°06.0	42°37.5	57°08.9	71°40.4	86°12.0	100°43.5	115°15.1	+31.5	15.2
	14°42.5	14°33.0	14°23.5	14°13.8	14°04.2	13°54.4	13°44.5	13°34.6	13°24.7	13°14.6	13°04.5	-9.8	55.7
We 31	333°10.8	347°42.7	2°14.5	16°46.4	31°18.3	45°50.2	60°22.1	74°54.0	89°26.0	103°57.9	118°29.9	+31.9	15.3
	10°25.0	10°13.9	10°02.7	9°51.5	9°40.2	9°28.9	9°17.5	9°06.1	8°54.6	8°43.1	8°31.5	-11.4	56.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 8 11h01 — FM: 15 02h12 — LQ: 22 08h07 — NM: 30 11h11

SUN

August 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	268° 24.2	283° 24.3	298° 24.3	313° 24.3	328° 24.4	343° 24.4	358° 24.5	13° 24.5	28° 24.5	43° 24.6	58° 24.6	73° 24.7	+0.0
	17° 59.2	17° 58.5	17° 57.9	17° 57.3	17° 56.7	17° 56.0	17° 55.4	17° 54.8	17° 54.1	17° 53.5	17° 52.8	17° 52.2	-0.6
Fr 2	268° 25.2	283° 25.3	298° 25.3	313° 25.4	328° 25.4	343° 25.4	358° 25.5	13° 25.5	28° 25.6	43° 25.6	58° 25.7	73° 25.7	+0.0
	17° 43.9	17° 43.3	17° 42.6	17° 42.0	17° 41.3	17° 40.7	17° 40.0	17° 39.4	17° 38.7	17° 38.1	17° 37.5	17° 36.8	-0.6
Sa 3	268° 26.4	283° 26.4	298° 26.5	313° 26.5	328° 26.6	343° 26.6	358° 26.7	13° 26.7	28° 26.8	43° 26.8	58° 26.9	73° 26.9	+0.1
	17° 28.3	17° 27.7	17° 27.0	17° 26.4	17° 25.7	17° 25.1	17° 24.4	17° 23.8	17° 23.1	17° 22.4	17° 21.8	17° 21.1	-0.7
Su 4	268° 27.7	283° 27.7	298° 27.8	313° 27.8	328° 27.9	343° 27.9	358° 28.0	13° 28.1	28° 28.1	43° 28.2	58° 28.2	73° 28.3	+0.1
	17° 12.5	17° 11.8	17° 11.2	17° 10.5	17° 09.8	17° 09.2	17° 08.5	17° 07.8	17° 07.2	17° 06.5	17° 05.8	17° 05.1	-0.7
Mo 5	268° 29.1	283° 29.2	298° 29.2	313° 29.3	328° 29.4	343° 29.4	358° 29.5	13° 29.6	28° 29.6	43° 29.7	58° 29.8	73° 29.8	+0.1
	16° 56.4	16° 55.7	16° 55.0	16° 54.3	16° 53.7	16° 53.0	16° 52.3	16° 51.6	16° 50.9	16° 50.3	16° 49.6	16° 48.9	-0.7
Tu 6	268° 30.7	283° 30.8	298° 30.8	313° 30.9	328° 31.0	343° 31.1	358° 31.1	13° 31.2	28° 31.3	43° 31.3	58° 31.4	73° 31.5	+0.1
	16° 40.0	16° 39.3	16° 38.6	16° 37.9	16° 37.2	16° 36.5	16° 35.8	16° 35.2	16° 34.5	16° 33.8	16° 33.1	16° 32.4	-0.7
We 7	268° 32.5	283° 32.5	298° 32.6	313° 32.7	328° 32.8	343° 32.8	358° 32.9	13° 33.0	28° 33.1	43° 33.2	58° 33.2	73° 33.3	+0.1
	16° 23.3	16° 22.6	16° 21.9	16° 21.2	16° 20.5	16° 19.8	16° 19.1	16° 18.4	16° 17.7	16° 17.0	16° 16.3	16° 15.6	-0.7
Th 8	268° 34.4	283° 34.5	298° 34.5	313° 34.6	328° 34.7	343° 34.8	358° 34.9	13° 35.0	28° 35.0	43° 35.1	58° 35.2	73° 35.3	+0.1
	16° 06.4	16° 05.7	16° 05.0	16° 04.3	16° 03.6	16° 02.8	16° 02.1	16° 01.4	16° 00.7	16° 00.0	15° 59.3	15° 58.6	-0.7
Fr 9	268° 36.4	283° 36.5	298° 36.6	313° 36.7	328° 36.8	343° 36.9	358° 37.0	13° 37.1	28° 37.2	43° 37.2	58° 37.3	73° 37.4	+0.1
	15° 49.2	15° 48.5	15° 47.8	15° 47.1	15° 46.3	15° 45.6	15° 44.9	15° 44.2	15° 43.4	15° 42.7	15° 42.0	15° 41.3	-0.7
Sa 10	268° 38.6	283° 38.7	298° 38.8	313° 38.9	328° 39.0	343° 39.1	358° 39.2	13° 39.3	28° 39.4	43° 39.5	58° 39.6	73° 39.7	+0.1
	15° 31.8	15° 31.1	15° 30.3	15° 29.6	15° 28.9	15° 28.1	15° 27.4	15° 26.7	15° 25.9	15° 25.2	15° 24.5	15° 23.7	-0.7
Su 11	268° 41.0	283° 41.1	298° 41.2	313° 41.3	328° 41.4	343° 41.5	358° 41.6	13° 41.7	28° 41.8	43° 41.9	58° 42.0	73° 42.1	+0.1
	15° 14.1	15° 13.4	15° 12.6	15° 11.9	15° 11.1	15° 10.4	15° 09.7	15° 08.9	15° 08.2	15° 07.4	15° 06.7	15° 05.9	-0.7
Mo 12	268° 43.5	283° 43.6	298° 43.7	313° 43.8	328° 43.9	343° 44.0	358° 44.2	13° 44.3	28° 44.4	43° 44.5	58° 44.6	73° 44.7	+0.1
	14° 56.2	14° 55.4	14° 54.7	14° 53.9	14° 53.2	14° 52.4	14° 51.7	14° 50.9	14° 50.2	14° 49.4	14° 48.7	14° 47.9	-0.8
Tu 13	268° 46.2	283° 46.3	298° 46.4	313° 46.5	328° 46.6	343° 46.7	358° 46.8	13° 46.9	28° 47.1	43° 47.2	58° 47.3	73° 47.4	+0.1
	14° 38.0	14° 37.3	14° 36.5	14° 35.8	14° 35.0	14° 34.2	14° 33.5	14° 32.7	14° 31.9	14° 31.2	14° 30.4	14° 29.6	-0.8
We 14	268° 48.9	283° 49.1	298° 49.2	313° 49.3	328° 49.4	343° 49.5	358° 49.6	13° 49.8	28° 49.9	43° 50.0	58° 50.1	73° 50.3	+0.1
	14° 19.6	14° 18.9	14° 18.1	14° 17.3	14° 16.6	14° 15.8	14° 15.0	14° 14.2	14° 13.5	14° 12.7	14° 11.9	14° 11.1	-0.8
Th 15	268° 51.8	283° 52.0	298° 52.1	313° 52.2	328° 52.3	343° 52.5	358° 52.6	13° 52.7	28° 52.8	43° 53.0	58° 53.1	73° 53.2	+0.1
	14° 01.0	14° 00.2	13° 59.5	13° 58.7	13° 57.9	13° 57.1	13° 56.3	13° 55.6	13° 54.8	13° 54.0	13° 53.2	13° 52.4	-0.8
Fr 16	268° 54.9	283° 55.0	298° 55.2	313° 55.3	328° 55.4	343° 55.5	358° 55.7	13° 55.8	28° 55.9	43° 56.1	58° 56.2	73° 56.3	+0.1
	13° 42.2	13° 41.4	13° 40.6	13° 39.8	13° 39.0	13° 38.2	13° 37.4	13° 36.6	13° 35.9	13° 35.1	13° 34.3	13° 33.5	-0.8
Sa 17	268° 58.1	283° 58.2	298° 58.3	313° 58.5	328° 58.6	343° 58.7	358° 58.9	13° 59.0	28° 59.2	43° 59.3	58° 59.4	73° 59.6	+0.1
	13° 23.1	13° 22.3	13° 21.5	13° 20.7	13° 19.9	13° 19.1	13° 18.3	13° 17.5	13° 16.7	13° 15.9	13° 15.1	13° 14.3	-0.8
Su 18	269° 01.4	284° 01.5	299° 01.6	314° 01.8	329° 01.9	344° 02.1	359° 02.2	14° 02.4	29° 02.5	44° 02.6	59° 02.8	74° 02.9	+0.1
	13° 03.9	13° 03.0	13° 02.2	13° 01.4	13° 00.6	12° 59.8	12° 59.0	12° 58.2	12° 57.4	12° 56.6	12° 55.8	12° 54.9	-0.8
Mo 19	269° 04.8	284° 04.9	299° 05.1	314° 05.2	329° 05.4	344° 05.5	359° 05.7	14° 05.8	29° 06.0	44° 06.1	59° 06.2	74° 06.4	+0.1
	12° 44.4	12° 43.6	12° 42.7	12° 41.9	12° 41.1	12° 40.3	12° 39.5	12° 38.6	12° 37.8	12° 37.0	12° 36.2	12° 35.4	-0.8
Tu 20	269° 08.3	284° 08.5	299° 08.6	314° 08.8	329° 08.9	344° 09.1	359° 09.2	14° 09.4	29° 09.5	44° 09.7	59° 09.8	74° 10.0	+0.2
	12° 24.7	12° 23.9	12° 23.0	12° 22.2	12° 21.4	12° 20.6	12° 19.7	12° 18.9	12° 18.1	12° 17.3	12° 16.4	12° 15.6	-0.8
We 21	269° 12.0	284° 12.1	299° 12.3	314° 12.4	329° 12.6	344° 12.8	359° 12.9	14° 13.1	29° 13.2	44° 13.4	59° 13.5	74° 13.7	+0.2
	12° 04.8	12° 04.0	12° 03.1	12° 02.3	12° 01.5	12° 00.6	11° 59.8	11° 59.0	11° 58.1	11° 57.3	11° 56.5	11° 55.6	-0.8
Th 22	269° 15.7	284° 15.9	299° 16.1	314° 16.2	329° 16.4	344° 16.5	359° 16.7	14° 16.9	29° 17.0	44° 17.2	59° 17.3	74° 17.5	+0.2
	11° 44.7	11° 43.9	11° 43.0	11° 42.2	11° 41.4	11° 40.5	11° 39.7	11° 38.8	11° 38.0	11° 37.1	11° 36.3	11° 35.5	-0.8
Fr 23	269° 19.6	284° 19.8	299° 19.9	314° 20.1	329° 20.3	344° 20.4	359° 20.6	14° 20.8	29° 20.9	44° 21.1	59° 21.3	74° 21.4	+0.2
	11° 24.5	11° 23.6	11° 22.8	11° 21.9	11° 21.1	11° 20.2	11° 19.4	11° 18.5	11° 17.7	11° 16.8	11° 16.0	11° 15.1	-0.9
Sa 24	269° 23.6	284° 23.8	299° 23.9	314° 24.1	329° 24.3	344° 24.4	359° 24.6	14° 24.8	29° 24.9	44° 25.1	59° 25.3	74° 25.4	+0.2
	11° 04.0	11° 03.2	11° 02.3	11° 01.4	11° 00.6	10° 59.7	10° 58.9	10° 58.0	10° 57.2	10° 56.3	10° 55.4	10° 54.6	-0.9
Su 25	269° 27.7	284° 27.8	299° 28.0	314° 28.2	329° 28.4	344° 28.5	359° 28.7	14° 28.9	29° 29.1	44° 29.2	59° 29.4	74° 29.6	+0.2
	10° 43.4	10° 42.5	10° 41.7	10° 40.8	10° 39.9	10° 39.1	10° 38.2	10° 37.3	10° 36.5	10° 35.6	10° 34.8	10° 33.9	-0.9
Mo 26	269° 31.8	284° 32.0	299° 32.2	314° 32.4	329° 32.6	344° 32.7	359° 32.9	14° 33.1	29° 33.3	44° 33.4	59° 33.6	74° 33.8	+0.2
	10° 22.6	10° 21.7	10° 20.9	10° 20.0	10° 19.1	10° 18.2	10° 17.4	10° 16.5	10° 15.6	10° 14.8	10° 13.9	10° 13.0	-0.9
Tu 27	269° 36.1	284° 36.3	299° 36.5	314° 36.7	329° 36.8	344° 37.0	359° 37.2	14° 37.4	29° 37.6	44° 37.8	59° 37.9	74° 38.1	+0.2
	10° 01.6	10° 00.8	9° 59.9	9° 59.0	9° 58.1	9° 57.3	9° 56.4	9° 55.5	9° 54.6	9° 53.7	9° 52.9	9° 52.0	-0.9
We 28	269° 40.5	284° 40.7	299° 40.9	314° 41.0	329° 41.2	344° 41.4	359° 41.6	14° 41.8	29° 42.0	44° 42.2	59° 42.3	74° 42.5	+0.2
	9° 40.5	9° 39.6	9° 38.8	9° 37.9	9° 37.0	9° 36.1	9° 35.2	9° 34.3	9° 33.5	9° 32.6	9° 31.7	9° 30.8	-0.9
Th 29	269° 44.9	284° 45.1	299° 45.3	314° 45.5	329° 45.7	344° 45.9	359° 46.1	14° 46.3	29° 46.5	44° 46.6	59° 46.8	74° 47.0	+0.2
	9° 19.3	9° 18.4	9° 17.5	9° 16.6	9° 15.7	9° 14.8	9° 13.9	9° 13.0	9° 12.1	9° 11.2	9° 10.4	9° 09.5	-0.9
Fr 30	269° 49.5	284° 49.7	299° 49.9	314° 50.1	329° 50.3	344° 50.4	359° 50.6	14° 50.8	29° 51.0	44° 51.2	59° 51.4	74° 51.6	+0.2
	8° 57.8	8° 56.9	8° 56.1	8° 55.2	8° 54.3	8° 53.4	8° 52.5	8° 51.6	8° 50.7	8° 49.8	8° 48.9	8° 48.0	-0.9
Sa 31	269° 54.1	284° 54.3	299° 54.5	314° 54.7	329° 54.9	344° 55.1	359° 55.3	14° 55.5	29° 55.7	44° 55.9	59° 56.1	74° 56.3	+0.2
	8° 36.3	8° 35.4	8° 34.5	8° 33.6	8° 32.7	8° 31.8	8° 30.9	8° 30.0	8° 29.1	8° 28.2	8° 27.3	8° 26.4	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2030

D	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	Δ'/h	SH
Th 1	249°17.8	263°49.9	278°21.9	292°53.9	307°26.0	321°58.0	336°30.0	351°02.1	5°34.1	20°06.1	34°38.2	+32.0	15.4
	6°45.3	6°33.2	6°21.2	6°09.1	5°57.0	5°44.8	5°32.6	5°20.4	5°08.1	4°55.8	4°43.5	-12.2	56.6
Fr 2	252°37.9	267°09.8	281°41.7	296°13.6	310°45.5	325°17.3	339°49.1	354°20.9	8°52.7	23°24.5	37°56.2	+31.8	15.6
	1°35.5	1°22.9	1°10.2	0°57.4	0°44.7	0°32.0	0°19.2	0°06.4	-0°06.3	-0°19.1	-0°31.9	-12.7	57.2
Sa 3	255°49.3	270°20.6	284°51.8	299°23.1	313°54.3	328°25.4	342°56.5	357°27.6	11°58.6	26°29.6	41°00.5	+31.1	15.7
	-3°43.7	-3°56.5	-4°09.2	-4°21.9	-4°34.6	-4°47.3	-5°00.0	-5°12.7	-5°25.3	-5°37.9	-5°50.5	-12.7	57.7
Su 4	258°39.1	273°09.3	287°39.4	302°09.4	316°39.4	331°09.3	345°39.2	0°09.0	14°38.8	29°08.5	43°38.1	+29.9	15.9
	-8°56.2	-9°08.3	-9°20.4	-9°32.4	-9°44.4	-9°56.4	-10°08.3	-10°20.1	-10°31.9	-10°43.7	-10°55.4	-11.9	58.1
Mo 5	260°54.7	275°23.3	289°51.8	304°20.2	318°48.5	333°16.8	347°45.0	2°13.1	16°41.2	31°09.2	45°37.1	+28.2	16.0
	-13°43.9	-13°54.6	-14°05.3	-14°15.9	-14°26.4	-14°36.8	-14°47.1	-14°57.4	-15°07.6	-15°17.7	-15°27.7	-10.4	58.6
◐ Tu 6	262°26.5	276°53.2	291°19.8	305°46.3	320°12.8	334°39.2	349°05.5	3°31.7	17°57.9	32°24.0	46°50.0	+26.3	16.1
	-17°47.2	-17°55.7	-18°04.1	-18°12.4	-18°20.6	-18°28.7	-18°36.7	-18°44.6	-18°52.4	-19°00.0	-19°07.5	-8.0	59.0
We 7	263°11.6	277°36.5	292°01.4	306°26.1	320°50.9	335°15.5	349°40.1	4°04.7	18°29.2	32°53.6	47°18.0	+24.6	16.2
	-20°45.9	-20°51.4	-20°56.8	-21°02.1	-21°07.2	-21°12.2	-21°17.1	-21°21.8	-21°26.4	-21°30.8	-21°35.1	-4.9	59.4
Th 8	263°18.0	277°41.7	292°05.4	306°29.1	320°52.7	335°16.3	349°39.8	4°03.4	18°26.9	32°50.4	47°13.9	+23.6	16.3
	-22°21.9	-22°23.8	-22°25.6	-22°27.2	-22°28.7	-22°30.0	-22°31.1	-22°32.1	-22°33.0	-22°33.6	-22°34.2	-1.2	59.6
Fr 9	263°05.4	277°28.9	291°52.4	306°15.9	320°39.4	335°02.9	349°26.5	3°50.0	18°13.6	32°37.3	47°00.9	+23.5	16.3
	-22°23.2	-22°21.3	-22°19.1	-22°16.8	-22°14.4	-22°11.8	-22°09.0	-22°06.1	-22°03.1	-21°59.8	-21°56.5	+2.7	59.7
Sa 10	263°00.1	277°24.4	291°48.7	306°13.1	320°37.6	335°02.1	349°26.7	3°51.3	18°16.0	32°40.7	47°05.5	+24.5	16.3
	-20°48.2	-20°42.4	-20°36.6	-20°30.6	-20°24.5	-20°18.2	-20°11.8	-20°05.3	-19°58.7	-19°51.9	-19°44.9	+6.3	59.7
Su 11	263°25.7	277°51.6	292°17.6	306°43.7	321°09.8	335°36.0	350°02.3	4°28.7	18°55.1	33°21.6	47°48.2	+26.2	16.2
	-17°46.3	-17°37.5	-17°28.5	-17°19.5	-17°10.3	-17°01.1	-16°51.7	-16°42.3	-16°32.7	-16°23.0	-16°13.3	+9.3	59.4
Mo 12	264°36.3	279°04.2	293°32.1	308°00.0	322°28.1	336°56.2	351°24.4	5°52.7	20°21.1	34°49.5	49°18.0	+28.2	16.1
	-13°36.4	-13°25.3	-13°14.1	-13°02.9	-12°51.6	-12°40.2	-12°28.8	-12°17.3	-12°05.7	-11°54.1	-11°42.4	+11.4	59.0
○ Tu 13	266°34.1	281°03.7	295°33.4	310°03.2	324°33.0	339°02.9	353°32.8	8°02.8	22°32.9	37°03.0	51°33.2	+29.9	15.9
	-8°41.2	-8°28.8	-8°16.3	-8°03.8	-7°51.3	-7°38.8	-7°26.2	-7°13.6	-7°01.0	-6°48.3	-6°35.7	+12.6	58.3
We 14	269°12.6	283°43.7	298°14.8	312°45.9	327°17.1	341°48.3	356°19.6	10°50.9	25°22.2	39°53.6	54°25.1	+31.2	15.7
	-3°23.7	-3°10.8	-2°58.0	-2°45.1	-2°32.2	-2°19.4	-2°06.5	-1°53.6	-1°40.8	-1°27.9	-1°15.1	+12.9	57.6
Th 15	272°20.9	286°52.9	301°24.9	315°56.9	330°28.9	345°01.0	359°33.1	14°05.2	28°37.4	43°09.6	57°41.7	+32.1	15.5
	1°55.9	2°08.4	2°21.0	2°33.5	2°46.0	2°58.5	3°10.9	3°23.3	3°35.7	3°48.1	4°00.4	+12.5	56.8
Fr 16	275°46.5	290°18.9	304°51.3	319°23.8	333°56.2	348°28.7	3°01.1	17°33.6	32°06.0	46°38.5	61°10.9	+32.4	15.3
	7°00.7	7°12.4	7°24.0	7°35.6	7°47.1	7°58.6	8°10.1	8°21.5	8°32.8	8°44.1	8°55.4	+11.5	56.1
Sa 17	279°17.8	293°50.2	308°22.6	322°55.0	337°27.4	351°59.8	6°32.2	21°04.6	35°36.9	50°09.3	64°41.6	+32.4	15.1
	11°37.3	11°47.6	11°57.9	12°08.1	12°18.2	12°28.3	12°38.3	12°48.2	12°58.1	13°07.9	13°17.6	+10.0	55.4
Su 18	282°45.0	297°17.1	311°49.2	326°21.2	340°53.3	355°25.3	9°57.3	24°29.3	39°01.3	53°33.2	68°05.1	+32.0	15.0
	15°35.1	15°43.7	15°52.1	16°00.6	16°08.9	16°17.2	16°25.3	16°33.4	16°41.5	16°49.4	16°57.3	+8.2	54.9
Mo 19	297°17.1	311°49.2	326°21.2	340°53.3	355°25.3	9°57.3	24°29.3	39°01.3	53°33.2	68°05.1	82°37.0	+32.0	15.0
	15°43.7	15°52.1	16°00.6	16°08.9	16°17.2	16°25.3	16°33.4	16°41.5	16°49.4	16°57.3	17°05.1	+8.1	54.8
Tu 20	300°32.9	315°04.4	329°35.9	344°07.4	358°38.9	13°10.3	27°41.8	42°13.2	56°44.6	71°15.9	85°47.2	+31.4	14.8
	18°51.7	18°58.1	19°04.4	19°10.6	19°16.8	19°22.8	19°28.8	19°34.7	19°40.5	19°46.2	19°51.8	+6.0	54.4
◑ We 21	303°34.4	318°05.4	332°36.3	347°07.2	1°38.1	16°09.0	30°39.9	45°10.7	59°41.5	74°12.3	88°43.1	+30.9	14.8
	21°04.5	21°08.5	21°12.5	21°16.4	21°20.2	21°23.9	21°27.4	21°30.9	21°34.3	21°37.6	21°40.8	+3.6	54.2
Th 22	306°22.5	320°53.0	335°23.5	349°54.0	4°24.4	18°54.9	33°25.3	47°55.7	62°26.1	76°56.5	91°26.9	+30.4	14.8
	22°16.3	22°17.9	22°19.3	22°20.6	22°21.9	22°23.0	22°24.0	22°24.9	22°25.8	22°26.5	22°27.1	+1.1	54.2
Fr 23	309°01.7	323°31.9	338°02.2	352°32.5	7°02.7	21°33.0	36°03.2	50°33.5	65°03.7	79°34.0	94°04.2	+30.3	14.8
	22°23.4	22°22.3	22°21.1	22°19.8	22°18.4	22°16.9	22°15.2	22°13.5	22°11.7	22°09.7	22°07.7	-1.6	54.4
Sa 24	311°38.4	326°08.7	340°39.0	355°09.4	9°39.7	24°10.1	38°40.4	53°10.8	67°41.2	82°11.6	96°42.0	+30.4	14.9
	21°24.2	21°20.5	21°16.7	21°12.7	21°08.7	21°04.5	21°00.3	20°55.9	20°51.4	20°46.9	20°42.2	-4.2	54.7
Su 25	314°19.4	328°50.0	343°20.7	357°51.3	12°21.9	26°52.6	41°23.3	55°54.0	70°24.7	84°55.4	99°26.2	+30.7	15.0
	19°20.2	19°14.0	19°07.6	19°01.1	18°54.6	18°48.0	18°41.2	18°34.4	18°27.5	18°20.5	18°13.3	-6.7	55.1
Mo 26	317°09.4	331°40.4	346°11.4	0°42.4	15°13.5	29°44.6	44°15.7	58°46.8	73°17.9	87°49.0	102°20.2	+31.1	15.2
	16°15.8	16°07.3	15°58.7	15°50.0	15°41.2	15°32.3	15°23.4	15°14.4	15°05.3	14°56.1	14°46.8	-8.9	55.7
Tu 27	320°09.2	334°40.6	349°12.0	3°43.4	18°14.8	32°46.2	47°17.6	61°49.0	76°20.5	90°51.9	105°23.4	+31.4	15.4
	12°18.7	12°08.3	11°57.8	11°47.2	11°36.5	11°25.8	11°15.0	11°04.2	10°53.3	10°42.4	10°31.3	-10.7	56.3
● We 28	323°15.9	337°47.5	352°19.0	6°50.5	21°22.0	35°53.6	50°25.1	64°56.6	79°28.1	93°59.6	108°31.2	+31.5	15.5
	7°39.3	7°27.4	7°15.4	7°03.5	6°51.5	6°39.4	6°27.3	6°15.1	6°03.0	5°50.7	5°38.5	-12.1	57.0
Th 29	326°22.8	340°54.1	355°25.5	9°56.8	24°28.1	38°59.4	53°30.6	68°01.9	82°33.1	97°04.3	111°35.5	+31.3	15.7
	2°30.6	2°17.8	2°05.1	1°52.3	1°39.5	1°26.7	1°13.9	1°01.0	0°48.1	0°35.3	0°22.4	-12.8	57.6
Fr 30	329°20.2	343°51.0	358°21.7	12°52.4	27°23.0	41°53.6	56°24.2	70°54.7	85°25.2	99°55.7	114°26.1	+30.6	15.8
	-2°51.7	-3°04.6	-3°17.5	-3°30.4	-3°43.3	-3°56.2	-4°09.1	-4°21.9	-4°34.8	-4°47.6	-5°00.4	-12.9	58.1
Sa 31	331°57.3	346°27.0	0°56.6	15°26.2	29°55.8	44°25.3	58°54.7	73°24.1	87°53.5	102°22.7	116°52.0	+29.5	16.0
	-8°09.7	-8°22.0	-8°34.3	-8°46.6	-8°58.8	-9°11.0	-9°23.2	-9°35.3	-9°47.3	-9°59.3	-10°11.3	-12.2	58.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 16h42 — FM: 13 10h44 — LQ: 21 01h15 — NM: 28 23h07

SUN

September 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°58.8	284°59.0	299°59.2	314°59.4	329°59.6	344°59.8	0°00.0	15°00.2	30°00.4	45°00.6	60°00.8	75°01.0	+0.2
	8°14.6	8°13.7	8°12.8	8°11.9	8°11.0	8°10.1	8°09.1	8°08.2	8°07.3	8°06.4	8°05.5	8°04.6	-0.9
Mo 2	270°03.6	285°03.8	300°04.0	315°04.2	330°04.4	345°04.6	0°04.8	15°05.0	30°05.2	45°05.4	60°05.6	75°05.8	+0.2
	7°52.8	7°51.9	7°50.9	7°50.0	7°49.1	7°48.2	7°47.3	7°46.4	7°45.5	7°44.5	7°43.6	7°42.7	-0.9
Tu 3	270°08.5	285°08.7	300°08.9	315°09.1	330°09.3	345°09.5	0°09.7	15°09.9	30°10.1	45°10.3	60°10.5	75°10.7	+0.2
	7°30.8	7°29.9	7°29.0	7°28.1	7°27.1	7°26.2	7°25.3	7°24.4	7°23.5	7°22.5	7°21.6	7°20.7	-0.9
We 4	270°13.4	285°13.6	300°13.8	315°14.0	330°14.2	345°14.4	0°14.6	15°14.9	30°15.1	45°15.3	60°15.5	75°15.7	+0.2
	7°08.7	7°07.8	7°06.9	7°06.0	7°05.1	7°04.1	7°03.2	7°02.3	7°01.4	7°00.4	6°59.5	6°58.6	-0.9
Th 5	270°18.4	285°18.6	300°18.8	315°19.0	330°19.2	345°19.4	0°19.7	15°19.9	30°20.1	45°20.3	60°20.5	75°20.7	+0.2
	6°46.6	6°45.6	6°44.7	6°43.8	6°42.8	6°41.9	6°41.0	6°40.1	6°39.1	6°38.2	6°37.3	6°36.4	-0.9
Fr 6	270°23.5	285°23.7	300°23.9	315°24.1	330°24.3	345°24.5	0°24.7	15°24.9	30°25.2	45°25.4	60°25.6	75°25.8	+0.2
	6°24.3	6°23.3	6°22.4	6°21.5	6°20.5	6°19.6	6°18.7	6°17.7	6°16.8	6°15.9	6°14.9	6°14.0	-0.9
Sa 7	270°28.6	285°28.8	300°29.0	315°29.2	330°29.4	345°29.6	0°29.9	15°30.1	30°30.3	45°30.5	60°30.7	75°30.9	+0.2
	6°01.9	6°00.9	6°00.0	5°59.1	5°58.1	5°57.2	5°56.2	5°55.3	5°54.4	5°53.4	5°52.5	5°51.6	-0.9
Su 8	270°33.7	285°33.9	300°34.2	315°34.4	330°34.6	345°34.8	0°35.0	15°35.2	30°35.5	45°35.7	60°35.9	75°36.1	+0.2
	5°39.4	5°38.4	5°37.5	5°36.5	5°35.6	5°34.7	5°33.7	5°32.8	5°31.8	5°30.9	5°30.0	5°29.0	-0.9
Mo 9	270°38.9	285°39.2	300°39.4	315°39.6	330°39.8	345°40.0	0°40.3	15°40.5	30°40.7	45°40.9	60°41.1	75°41.3	+0.2
	5°16.8	5°15.8	5°14.9	5°13.9	5°13.0	5°12.1	5°11.1	5°10.2	5°09.2	5°08.3	5°07.3	5°06.4	-0.9
Tu 10	270°44.2	285°44.4	300°44.6	315°44.9	330°45.1	345°45.3	0°45.5	15°45.7	30°46.0	45°46.2	60°46.4	75°46.6	+0.2
	4°54.1	4°53.2	4°52.2	4°51.3	4°50.3	4°49.4	4°48.4	4°47.5	4°46.5	4°45.6	4°44.6	4°43.7	-0.9
We 11	270°49.5	285°49.7	300°49.9	315°50.1	330°50.4	345°50.6	0°50.8	15°51.0	30°51.3	45°51.5	60°51.7	75°51.9	+0.2
	4°31.3	4°30.4	4°29.4	4°28.5	4°27.5	4°26.6	4°25.6	4°24.7	4°23.7	4°22.8	4°21.8	4°20.9	-1.0
Th 12	270°54.8	285°55.0	300°55.2	315°55.5	330°55.7	345°55.9	0°56.1	15°56.4	30°56.6	45°56.8	60°57.0	75°57.2	+0.2
	4°08.5	4°07.6	4°06.6	4°05.6	4°04.7	4°03.7	4°02.8	4°01.8	4°00.9	3°59.9	3°59.0	3°58.0	-1.0
Fr 13	271°00.1	286°00.4	301°00.6	316°00.8	331°01.0	346°01.3	1°01.5	16°01.7	31°01.9	46°02.2	61°02.4	76°02.6	+0.2
	3°45.6	3°44.6	3°43.7	3°42.7	3°41.8	3°40.8	3°39.9	3°38.9	3°37.9	3°37.0	3°36.0	3°35.1	-1.0
Sa 14	271°05.5	286°05.7	301°05.9	316°06.2	331°06.4	346°06.6	1°06.8	16°07.1	31°07.3	46°07.5	61°07.7	76°08.0	+0.2
	3°22.6	3°21.7	3°20.7	3°19.7	3°18.8	3°17.8	3°16.9	3°15.9	3°14.9	3°14.0	3°13.0	3°12.1	-1.0
Su 15	271°10.9	286°11.1	301°11.3	316°11.5	331°11.8	346°12.0	1°12.2	16°12.4	31°12.7	46°12.9	61°13.1	76°13.3	+0.2
	2°59.6	2°58.6	2°57.6	2°56.7	2°55.7	2°54.8	2°53.8	2°52.8	2°51.9	2°50.9	2°50.0	2°49.0	-1.0
Mo 16	271°16.2	286°16.5	301°16.7	316°16.9	331°17.1	346°17.4	1°17.6	16°17.8	31°18.0	46°18.3	61°18.5	76°18.7	+0.2
	2°36.5	2°35.5	2°34.5	2°33.6	2°32.6	2°31.7	2°30.7	2°29.7	2°28.8	2°27.8	2°26.8	2°25.9	-1.0
Tu 17	271°21.6	286°21.9	301°22.1	316°22.3	331°22.5	346°22.7	1°23.0	16°23.2	31°23.4	46°23.6	61°23.9	76°24.1	+0.2
	2°13.3	2°12.4	2°11.4	2°10.4	2°09.5	2°08.5	2°07.5	2°06.6	2°05.6	2°04.6	2°03.7	2°02.7	-1.0
We 18	271°27.0	286°27.2	301°27.4	316°27.7	331°27.9	346°28.1	1°28.3	16°28.6	31°28.8	46°29.0	61°29.2	76°29.5	+0.2
	1°50.1	1°49.1	1°48.2	1°47.2	1°46.2	1°45.3	1°44.3	1°43.3	1°42.4	1°41.4	1°40.4	1°39.5	-1.0
Th 19	271°32.4	286°32.6	301°32.8	316°33.0	331°33.3	346°33.5	1°33.7	16°33.9	31°34.2	46°34.4	61°34.6	76°34.8	+0.2
	1°26.9	1°25.9	1°24.9	1°24.0	1°23.0	1°22.0	1°21.1	1°20.1	1°19.1	1°18.2	1°17.2	1°16.2	-1.0
Fr 20	271°37.7	286°37.9	301°38.2	316°38.4	331°38.6	346°38.8	1°39.0	16°39.3	31°39.5	46°39.7	61°39.9	76°40.2	+0.2
	1°03.6	1°02.6	1°01.7	1°00.7	0°59.7	0°58.7	0°57.8	0°56.8	0°55.8	0°54.9	0°53.9	0°52.9	-1.0
Sa 21	271°43.0	286°43.3	301°43.5	316°43.7	331°43.9	346°44.1	1°44.4	16°44.6	31°44.8	46°45.0	61°45.3	76°45.5	+0.2
	0°40.3	0°39.3	0°38.3	0°37.4	0°36.4	0°35.4	0°34.5	0°33.5	0°32.5	0°31.5	0°30.6	0°29.6	-1.0
Su 22	271°48.3	286°48.6	301°48.8	316°49.0	331°49.2	346°49.4	1°49.7	16°49.9	31°50.1	46°50.3	61°50.5	76°50.8	+0.2
	0°17.0	0°16.0	0°15.0	0°14.0	0°13.1	0°12.1	0°11.1	0°10.2	0°09.2	0°08.2	0°07.2	0°06.3	-1.0
Mo 23	271°53.6	286°53.8	301°54.1	316°54.3	331°54.5	346°54.7	1°54.9	16°55.2	31°55.4	46°55.6	61°55.8	76°56.0	+0.2
	-0°06.4	-0°07.4	-0°08.3	-0°09.3	-0°10.3	-0°11.3	-0°12.2	-0°13.2	-0°14.2	-0°15.1	-0°16.1	-0°17.1	-1.0
Tu 24	271°58.9	286°59.1	301°59.3	316°59.5	331°59.7	346°59.9	2°00.2	17°00.4	32°00.6	47°00.8	62°01.0	77°01.2	+0.2
	-0°29.7	-0°30.7	-0°31.7	-0°32.7	-0°33.6	-0°34.6	-0°35.6	-0°36.6	-0°37.5	-0°38.5	-0°39.5	-0°40.5	-1.0
We 25	272°04.1	287°04.3	302°04.5	317°04.7	332°04.9	347°05.1	2°05.3	17°05.6	32°05.8	47°06.0	62°06.2	77°06.4	+0.2
	-0°53.1	-0°54.1	-0°55.1	-0°56.0	-0°57.0	-0°58.0	-0°59.0	-0°59.9	-1°00.9	-1°01.9	-1°02.9	-1°03.8	-1.0
Th 26	272°09.2	287°09.4	302°09.6	317°09.9	332°10.1	347°10.3	2°10.5	17°10.7	32°10.9	47°11.1	62°11.3	77°11.6	+0.2
	-1°16.5	-1°17.5	-1°18.4	-1°19.4	-1°20.4	-1°21.4	-1°22.3	-1°23.3	-1°24.3	-1°25.2	-1°26.2	-1°27.2	-1.0
Fr 27	272°14.3	287°14.5	302°14.7	317°15.0	332°15.2	347°15.4	2°15.6	17°15.8	32°16.0	47°16.2	62°16.4	77°16.6	+0.2
	-1°39.8	-1°40.8	-1°41.8	-1°42.8	-1°43.7	-1°44.7	-1°45.7	-1°46.7	-1°47.6	-1°48.6	-1°49.6	-1°50.6	-1.0
Sa 28	272°19.4	287°19.6	302°19.8	317°20.0	332°20.2	347°20.4	2°20.6	17°20.8	32°21.0	47°21.3	62°21.5	77°21.7	+0.2
	-2°03.2	-2°04.2	-2°05.1	-2°06.1	-2°07.1	-2°08.1	-2°09.0	-2°10.0	-2°11.0	-2°11.9	-2°12.9	-2°13.9	-1.0
Su 29	272°24.4	287°24.6	302°24.8	317°25.0	332°25.2	347°25.4	2°25.6	17°25.8	32°26.0	47°26.2	62°26.4	77°26.6	+0.2
	-2°26.5	-2°27.5	-2°28.5	-2°29.4	-2°30.4	-2°31.4	-2°32.4	-2°33.3	-2°34.3	-2°35.3	-2°36.2	-2°37.2	-1.0
Mo 30	272°29.3	287°29.5	302°29.7	317°29.9	332°30.1	347°30.3	2°30.5	17°30.7	32°30.9	47°31.1	62°31.3	77°31.5	+0.2
	-2°49.8	-2°50.8	-2°51.8	-2°52.8	-2°53.7	-2°54.7	-2°55.7	-2°56.6	-2°57.6	-2°58.6	-2°59.5	-3°00.5	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	Δ'/h	SH
Su 1	247°12.5	261°41.1	276°09.7	290°38.2	305°06.7	319°35.1	334°03.4	348°31.7	2°59.9	17°28.1	31°56.2	+28.4	16.0
	-11°56.4	-12°07.8	-12°19.1	-12°30.4	-12°41.6	-12°52.7	-13°03.7	-13°14.7	-13°25.6	-13°36.4	-13°47.2	-11.1	58.8
Mo 2	248°49.9	263°17.0	277°44.0	292°10.9	306°37.8	321°04.6	335°31.4	349°58.0	4°24.7	18°51.2	33°17.7	+26.8	16.1
	-16°18.5	-16°27.9	-16°37.1	-16°46.3	-16°55.4	-17°04.3	-17°13.2	-17°22.0	-17°30.6	-17°39.2	-17°47.6	-8.9	59.0
Tu 3	249°47.8	264°13.3	278°38.8	293°04.2	307°29.6	321°54.9	336°20.2	350°45.4	5°10.6	19°35.7	34°00.8	+25.3	16.1
	-19°40.7	-19°47.2	-19°53.7	-20°00.0	-20°06.2	-20°12.3	-20°18.2	-20°24.0	-20°29.7	-20°35.2	-20°40.6	-6.0	59.2
◐ We 4	250°12.1	264°36.6	279°01.0	293°25.4	307°49.8	322°14.2	336°38.5	351°02.8	5°27.1	19°51.4	34°15.7	+24.4	16.1
	-21°45.2	-21°48.4	-21°51.4	-21°54.3	-21°57.0	-21°59.6	-22°02.0	-22°04.3	-22°06.5	-22°08.5	-22°10.3	-2.5	59.2
Th 5	250°18.7	264°42.9	279°07.1	293°31.3	307°55.5	322°19.8	336°44.0	351°08.3	5°32.6	19°56.9	34°21.2	+24.2	16.1
	-22°20.2	-22°19.7	-22°19.0	-22°18.1	-22°17.1	-22°16.0	-22°14.7	-22°13.3	-22°11.7	-22°10.0	-22°08.1	+1.2	59.2
Fr 6	250°29.4	264°54.3	279°19.1	293°44.0	308°09.0	322°34.0	336°59.1	351°24.2	5°49.3	20°14.5	34°39.8	+25.0	16.1
	-21°22.5	-21°18.3	-21°14.0	-21°09.6	-21°05.0	-21°00.2	-20°55.4	-20°50.4	-20°45.2	-20°40.0	-20°34.6	+4.8	59.0
Sa 7	251°05.2	265°31.3	279°57.6	294°23.9	308°50.2	323°16.6	337°43.1	352°09.7	6°36.3	21°03.0	35°29.8	+26.5	16.0
	-18°58.5	-18°51.1	-18°43.6	-18°36.0	-18°28.3	-18°20.5	-18°12.5	-18°04.5	-17°56.3	-17°48.1	-17°39.7	+7.9	58.8
Su 8	252°19.2	266°47.1	281°15.0	295°43.0	310°11.0	324°39.1	339°07.3	353°35.6	8°03.9	22°32.3	37°00.7	+28.1	16.0
	-15°22.5	-15°12.6	-15°02.6	-14°52.6	-14°42.4	-14°32.2	-14°22.0	-14°11.6	-14°01.2	-13°50.6	-13°40.1	+10.2	58.5
Mo 9	254°15.3	268°44.8	283°14.3	297°43.9	312°13.5	326°43.3	341°13.0	355°42.8	10°12.7	24°42.7	39°12.7	+29.7	15.8
	-10°53.4	-10°41.8	-10°30.2	-10°18.5	-10°06.8	-9°55.0	-9°43.2	-9°31.3	-9°19.4	-9°07.5	-8°55.5	+11.8	58.1
Tu 10	256°48.9	271°19.7	285°50.5	300°21.4	314°52.4	329°23.3	343°54.4	358°25.4	12°56.5	27°27.7	41°58.9	+31.0	15.7
	-5°51.7	-5°39.2	-5°26.7	-5°14.2	-5°01.7	-4°49.1	-4°36.6	-4°24.0	-4°11.5	-3°58.9	-3°46.3	+12.5	57.6
○ We 11	259°50.8	274°22.5	288°54.3	303°26.0	317°57.8	332°29.6	347°01.5	1°33.3	16°05.2	30°37.1	45°09.1	+31.8	15.5
	-0°36.9	-0°24.3	-0°11.7	0°00.9	0°13.4	0°26.0	0°38.5	0°51.1	1°03.6	1°16.1	1°28.6	+12.6	57.0
Th 12	263°10.1	277°42.3	292°14.5	306°46.7	321°18.9	335°51.1	350°23.3	4°55.5	19°27.8	34°00.0	48°32.2	+32.2	15.4
	4°33.1	4°45.2	4°57.2	5°09.2	5°21.2	5°33.1	5°45.0	5°56.9	6°08.7	6°20.5	6°32.3	+11.9	56.4
Fr 13	266°36.0	281°08.3	295°40.5	310°12.7	324°45.0	339°17.2	353°49.4	8°21.6	22°53.8	37°26.0	51°58.2	+32.2	15.2
	9°23.0	9°34.0	9°44.9	9°55.8	10°06.6	10°17.4	10°28.1	10°38.7	10°49.3	10°59.8	11°10.3	+10.7	55.8
Sa 14	269°59.6	284°31.6	299°03.6	313°35.5	328°07.5	342°39.4	357°11.3	11°43.2	26°15.1	40°47.0	55°18.8	+31.9	15.1
	13°39.7	13°49.2	13°58.5	14°07.8	14°17.0	14°26.1	14°35.2	14°44.2	14°53.1	15°01.9	15°10.7	+9.1	55.2
Su 15	273°14.4	287°46.0	302°17.5	316°49.0	331°20.5	345°52.0	0°23.5	14°54.9	29°26.3	43°57.7	58°29.1	+31.5	14.9
	17°12.6	17°20.1	17°27.5	17°34.8	17°42.0	17°49.1	17°56.2	18°03.1	18°10.0	18°16.8	18°23.5	+7.1	54.8
Mo 16	276°17.5	290°48.5	305°19.6	319°50.6	334°21.6	348°52.6	3°23.6	17°54.6	32°25.5	46°56.5	61°27.4	+31.0	14.8
	19°53.0	19°58.2	20°03.3	20°08.4	20°13.3	20°18.1	20°22.9	20°27.5	20°32.1	20°36.5	20°40.9	+4.8	54.4
Tu 17	279°09.3	293°39.9	308°10.6	322°41.3	337°11.9	351°42.6	6°13.2	20°43.8	35°14.4	49°45.0	64°15.6	+30.6	14.8
	21°34.4	21°37.2	21°39.8	21°42.4	21°44.8	21°47.2	21°49.5	21°51.6	21°53.7	21°55.6	21°57.4	+2.3	54.2
We 18	293°39.9	308°10.6	322°41.3	337°11.9	351°42.6	6°13.2	20°43.8	35°14.4	49°45.0	64°15.6	78°46.2	+30.6	14.8
	21°37.2	21°39.8	21°42.4	21°44.8	21°47.2	21°49.5	21°51.6	21°53.7	21°55.6	21°57.4	21°59.2	+2.2	54.2
◑ Th 19	296°24.0	310°54.5	325°25.0	339°55.5	354°26.0	8°56.5	23°27.0	37°57.4	52°27.9	66°58.4	81°28.9	+30.5	14.8
	22°12.9	22°13.0	22°12.9	22°12.8	22°12.6	22°12.3	22°11.8	22°11.3	22°10.6	22°09.9	22°09.0	-0.4	54.2
Fr 20	299°06.5	313°37.1	328°07.6	342°38.2	357°08.8	11°39.4	26°09.9	40°40.5	55°11.2	69°41.8	84°12.4	+30.6	14.8
	21°43.7	21°41.2	21°38.6	21°35.9	21°33.1	21°30.1	21°27.1	21°24.0	21°20.8	21°17.4	21°14.0	-3.0	54.4
Sa 21	301°53.1	316°23.9	330°54.7	345°25.5	359°56.4	14°27.2	28°58.1	43°29.0	57°59.9	72°30.8	87°01.7	+30.9	14.9
	20°10.5	20°05.5	20°00.4	19°55.2	19°49.9	19°44.5	19°39.0	19°33.4	19°27.7	19°21.9	19°16.0	-5.5	54.8
Su 22	304°47.4	319°18.5	333°49.7	348°20.9	2°52.1	17°23.3	31°54.5	46°25.7	60°57.0	75°28.2	89°59.5	+31.2	15.1
	17°36.6	17°29.2	17°21.8	17°14.2	17°06.6	16°58.9	16°51.1	16°43.3	16°35.3	16°27.2	16°19.1	-7.7	55.3
Mo 23	307°50.0	322°21.4	336°52.9	351°24.3	5°55.8	20°27.3	34°58.8	49°30.3	64°01.8	78°33.3	93°04.8	+31.5	15.3
	14°07.3	13°57.9	13°48.4	13°38.9	13°29.2	13°19.5	13°09.7	12°59.8	12°49.9	12°39.9	12°29.8	-9.8	56.0
Tu 24	310°57.7	325°29.3	340°00.8	354°32.3	9°03.8	23°35.4	38°06.9	52°38.4	67°09.9	81°41.4	96°12.9	+31.5	15.5
	9°50.7	9°39.6	9°28.4	9°17.1	9°05.9	8°54.5	8°43.1	8°31.6	8°20.1	8°08.6	7°57.0	-11.4	56.7
We 25	314°03.9	328°35.2	343°06.5	357°37.7	12°09.0	26°40.2	41°11.4	55°42.6	70°13.7	84°44.8	99°15.9	+31.2	15.7
	4°57.0	4°44.6	4°32.2	4°19.8	4°07.4	3°54.9	3°42.4	3°29.8	3°17.2	3°04.6	2°52.0	-12.5	57.5
Th 26	316°59.2	331°29.8	346°00.4	0°31.0	15°01.5	29°32.0	44°02.5	58°32.9	73°03.2	87°33.6	102°03.9	+30.5	15.9
	-0°20.4	-0°33.4	-0°46.4	-0°59.3	-1°12.3	-1°25.3	-1°38.3	-1°51.3	-2°04.3	-2°17.4	-2°30.4	-13.0	58.3
● Fr 27	319°32.7	334°02.2	348°31.7	3°01.1	17°30.5	31°59.8	46°29.1	60°58.3	75°27.4	89°56.5	104°25.6	+29.3	16.1
	-5°44.7	-5°57.5	-6°10.3	-6°23.1	-6°35.9	-6°48.6	-7°01.3	-7°14.0	-7°26.7	-7°39.3	-7°51.9	-12.7	58.9
Sa 28	321°33.8	336°01.8	350°29.8	4°57.7	19°25.5	33°53.3	48°21.0	62°48.7	77°16.2	91°43.8	106°11.2	+27.7	16.2
	-10°55.5	-11°07.3	-11°19.1	-11°30.8	-11°42.5	-11°54.1	-12°05.6	-12°17.1	-12°28.5	-12°39.8	-12°51.0	-11.6	59.4
Su 29	322°54.7	337°21.1	351°47.4	6°13.6	20°39.8	35°05.9	49°31.9	63°57.9	78°23.8	92°49.6	107°15.4	+26.1	16.3
	-15°30.2	-15°40.1	-15°49.9	-15°59.6	-16°09.2	-16°18.7	-16°28.1	-16°37.4	-16°46.6	-16°55.7	-17°04.6	-9.5	59.7
Mo 30	323°34.7	337°59.5	352°24.3	6°49.0	21°13.7	35°38.4	50°02.9	64°27.5	78°52.0	93°16.4	107°40.8	+24.6	16.3
	-19°05.5	-19°12.6	-19°19.5	-19°26.3	-19°33.0	-19°39.6	-19°46.0	-19°52.3	-19°58.4	-20°04.5	-20°10.4	-6.5	59.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 4 21h55 — FM: 11 21h17 — LQ: 19 19h56 — NM: 27 09h54

SUN

October 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	272°34.2	287°34.4	302°34.6	317°34.8	332°35.0	347°35.2	2°35.4	17°35.6	32°35.8	47°36.0	62°36.2	77°36.4	+0.2
	-3°13.1	-3°14.1	-3°15.1	-3°16.0	-3°17.0	-3°18.0	-3°18.9	-3°19.9	-3°20.9	-3°21.8	-3°22.8	-3°23.8	-1.0
We 2	272°39.0	287°39.2	302°39.4	317°39.6	332°39.8	347°40.0	2°40.2	17°40.4	32°40.6	47°40.8	62°41.0	77°41.2	+0.2
	-3°36.4	-3°37.3	-3°38.3	-3°39.3	-3°40.2	-3°41.2	-3°42.2	-3°43.1	-3°44.1	-3°45.1	-3°46.0	-3°47.0	-1.0
Th 3	272°43.7	287°43.9	302°44.1	317°44.3	332°44.5	347°44.7	2°44.9	17°45.1	32°45.3	47°45.5	62°45.7	77°45.9	+0.2
	-3°59.6	-4°00.5	-4°01.5	-4°02.5	-4°03.4	-4°04.4	-4°05.4	-4°06.3	-4°07.3	-4°08.2	-4°09.2	-4°10.2	-1.0
Fr 4	272°48.4	287°48.6	302°48.8	317°48.9	332°49.1	347°49.3	2°49.5	17°49.7	32°49.9	47°50.1	62°50.3	77°50.5	+0.2
	-4°22.7	-4°23.7	-4°24.6	-4°25.6	-4°26.6	-4°27.5	-4°28.5	-4°29.5	-4°30.4	-4°31.4	-4°32.3	-4°33.3	-1.0
Sa 5	272°52.9	287°53.1	302°53.3	317°53.5	332°53.7	347°53.9	2°54.1	17°54.3	32°54.4	47°54.6	62°54.8	77°55.0	+0.2
	-4°45.8	-4°46.8	-4°47.7	-4°48.7	-4°49.7	-4°50.6	-4°51.6	-4°52.5	-4°53.5	-4°54.5	-4°55.4	-4°56.4	-1.0
Su 6	272°57.4	287°57.6	302°57.8	317°58.0	332°58.2	347°58.3	2°58.5	17°58.7	32°58.9	47°59.1	62°59.3	77°59.4	+0.2
	-5°08.8	-5°09.8	-5°10.8	-5°11.7	-5°12.7	-5°13.6	-5°14.6	-5°15.6	-5°16.5	-5°17.5	-5°18.4	-5°19.4	-1.0
Mo 7	273°01.8	288°02.0	303°02.2	318°02.4	333°02.5	348°02.7	3°02.9	18°03.1	33°03.3	48°03.4	63°03.6	78°03.8	+0.2
	-5°31.8	-5°32.8	-5°33.7	-5°34.7	-5°35.6	-5°36.6	-5°37.5	-5°38.5	-5°39.5	-5°40.4	-5°41.4	-5°42.3	-1.0
Tu 8	273°06.1	288°06.3	303°06.5	318°06.6	333°06.8	348°07.0	3°07.2	18°07.3	33°07.5	48°07.7	63°07.9	78°08.0	+0.2
	-5°54.7	-5°55.7	-5°56.6	-5°57.6	-5°58.5	-5°59.5	-6°00.4	-6°01.4	-6°02.3	-6°03.3	-6°04.2	-6°05.2	-1.0
We 9	273°10.3	288°10.5	303°10.6	318°10.8	333°11.0	348°11.1	3°11.3	18°11.5	33°11.7	48°11.8	63°12.0	78°12.2	+0.2
	-6°17.5	-6°18.5	-6°19.4	-6°20.4	-6°21.3	-6°22.3	-6°23.2	-6°24.2	-6°25.1	-6°26.1	-6°27.0	-6°28.0	-0.9
Th 10	273°14.4	288°14.5	303°14.7	318°14.9	333°15.0	348°15.2	3°15.4	18°15.5	33°15.7	48°15.9	63°16.0	78°16.2	+0.2
	-6°40.3	-6°41.2	-6°42.2	-6°43.1	-6°44.1	-6°45.0	-6°45.9	-6°46.9	-6°47.8	-6°48.8	-6°49.7	-6°50.7	-0.9
Fr 11	273°18.3	288°18.5	303°18.7	318°18.8	333°19.0	348°19.1	3°19.3	18°19.5	33°19.6	48°19.8	63°19.9	78°20.1	+0.2
	-7°02.9	-7°03.9	-7°04.8	-7°05.7	-7°06.7	-7°07.6	-7°08.6	-7°09.5	-7°10.5	-7°11.4	-7°12.3	-7°13.3	-0.9
Sa 12	273°22.2	288°22.3	303°22.5	318°22.6	333°22.8	348°23.0	3°23.1	18°23.3	33°23.4	48°23.6	63°23.7	78°23.9	+0.2
	-7°25.5	-7°26.4	-7°27.4	-7°28.3	-7°29.2	-7°30.2	-7°31.1	-7°32.0	-7°33.0	-7°33.9	-7°34.8	-7°35.8	-0.9
Su 13	273°25.9	288°26.0	303°26.2	318°26.3	333°26.5	348°26.6	3°26.8	18°26.9	33°27.1	48°27.2	63°27.4	78°27.5	+0.2
	-7°47.9	-7°48.9	-7°49.8	-7°50.7	-7°51.7	-7°52.6	-7°53.5	-7°54.5	-7°55.4	-7°56.3	-7°57.3	-7°58.2	-0.9
Mo 14	273°29.5	288°29.6	303°29.8	318°29.9	333°30.1	348°30.2	3°30.3	18°30.5	33°30.6	48°30.8	63°30.9	78°31.1	+0.1
	-8°10.3	-8°11.2	-8°12.1	-8°13.1	-8°14.0	-8°14.9	-8°15.8	-8°16.8	-8°17.7	-8°18.6	-8°19.6	-8°20.5	-0.9
Tu 15	273°32.9	288°33.1	303°33.2	318°33.3	333°33.5	348°33.6	3°33.7	18°33.9	33°34.0	48°34.2	63°34.3	78°34.4	+0.1
	-8°32.5	-8°33.4	-8°34.4	-8°35.3	-8°36.2	-8°37.1	-8°38.1	-8°39.0	-8°39.9	-8°40.8	-8°41.7	-8°42.7	-0.9
We 16	273°36.2	288°36.3	303°36.5	318°36.6	333°36.7	348°36.9	3°37.0	18°37.1	33°37.3	48°37.4	63°37.5	78°37.7	+0.1
	-8°54.6	-8°55.5	-8°56.5	-8°57.4	-8°58.3	-8°59.2	-9°00.1	-9°01.1	-9°02.0	-9°02.9	-9°03.8	-9°04.7	-0.9
Th 17	273°39.4	288°39.5	303°39.6	318°39.8	333°39.9	348°40.0	3°40.1	18°40.3	33°40.4	48°40.5	63°40.6	78°40.8	+0.1
	-9°16.6	-9°17.5	-9°18.4	-9°19.4	-9°20.3	-9°21.2	-9°22.1	-9°23.0	-9°23.9	-9°24.8	-9°25.7	-9°26.7	-0.9
Fr 18	273°42.4	288°42.5	303°42.6	318°42.7	333°42.9	348°43.0	3°43.1	18°43.2	33°43.3	48°43.5	63°43.6	78°43.7	+0.1
	-9°38.5	-9°39.4	-9°40.3	-9°41.2	-9°42.1	-9°43.0	-9°43.9	-9°44.8	-9°45.7	-9°46.6	-9°47.5	-9°48.4	-0.9
Sa 19	273°45.2	288°45.3	303°45.4	318°45.6	333°45.7	348°45.8	3°45.9	18°46.0	33°46.1	48°46.2	63°46.4	78°46.5	+0.1
	-10°00.2	-10°01.1	-10°02.0	-10°02.9	-10°03.8	-10°04.7	-10°05.6	-10°06.5	-10°07.4	-10°08.3	-10°09.2	-10°10.1	-0.9
Su 20	273°47.9	288°48.0	303°48.1	318°48.2	333°48.3	348°48.4	3°48.5	18°48.6	33°48.8	48°48.9	63°49.0	78°49.1	+0.1
	-10°21.8	-10°22.7	-10°23.6	-10°24.5	-10°25.4	-10°26.2	-10°27.1	-10°28.0	-10°28.9	-10°29.8	-10°30.7	-10°31.6	-0.9
Mo 21	273°50.4	288°50.5	303°50.6	318°50.7	333°50.8	348°50.9	3°51.0	18°51.1	33°51.2	48°51.3	63°51.4	78°51.5	+0.1
	-10°43.2	-10°44.1	-10°45.0	-10°45.9	-10°46.8	-10°47.6	-10°48.5	-10°49.4	-10°50.3	-10°51.2	-10°52.1	-10°53.0	-0.9
Tu 22	273°52.8	288°52.9	303°52.9	318°53.0	333°53.1	348°53.2	3°53.3	18°53.4	33°53.5	48°53.6	63°53.7	78°53.8	+0.1
	-11°04.5	-11°05.3	-11°06.2	-11°07.1	-11°08.0	-11°08.9	-11°09.8	-11°10.6	-11°11.5	-11°12.4	-11°13.3	-11°14.2	-0.9
We 23	273°54.9	288°55.0	303°55.1	318°55.2	333°55.3	348°55.4	3°55.5	18°55.5	33°55.6	48°55.7	63°55.8	78°55.9	+0.1
	-11°25.6	-11°26.4	-11°27.3	-11°28.2	-11°29.1	-11°29.9	-11°30.8	-11°31.7	-11°32.6	-11°33.4	-11°34.3	-11°35.2	-0.9
Th 24	273°56.9	288°57.0	303°57.1	318°57.2	333°57.3	348°57.3	3°57.4	18°57.5	33°57.6	48°57.6	63°57.7	78°57.8	+0.1
	-11°46.5	-11°47.4	-11°48.2	-11°49.1	-11°50.0	-11°50.8	-11°51.7	-11°52.6	-11°53.4	-11°54.3	-11°55.2	-11°56.0	-0.9
Fr 25	273°58.8	288°58.8	303°58.9	318°59.0	333°59.0	348°59.1	3°59.2	18°59.3	33°59.3	48°59.4	63°59.5	78°59.5	+0.1
	-12°07.2	-12°08.1	-12°09.0	-12°09.8	-12°10.7	-12°11.5	-12°12.4	-12°13.3	-12°14.1	-12°15.0	-12°15.8	-12°16.7	-0.9
Sa 26	274°00.4	289°00.5	304°00.5	319°00.6	334°00.6	349°00.7	4°00.8	19°00.8	34°00.9	49°01.0	64°01.0	79°01.1	+0.1
	-12°27.8	-12°28.7	-12°29.5	-12°30.4	-12°31.2	-12°32.1	-12°32.9	-12°33.8	-12°34.6	-12°35.5	-12°36.3	-12°37.2	-0.9
Su 27	274°01.8	289°01.9	304°02.0	319°02.0	334°02.1	349°02.1	4°02.2	19°02.2	34°02.3	49°02.3	64°02.4	79°02.5	+0.1
	-12°48.2	-12°49.0	-12°49.9	-12°50.7	-12°51.6	-12°52.4	-12°53.2	-12°54.1	-12°54.9	-12°55.8	-12°56.6	-12°57.5	-0.8
Mo 28	274°03.1	289°03.2	304°03.2	319°03.3	334°03.3	349°03.4	4°03.4	19°03.4	34°03.5	49°03.5	64°03.6	79°03.6	+0.0
	-13°08.4	-13°09.2	-13°10.0	-13°10.9	-13°11.7	-13°12.5	-13°13.4	-13°14.2	-13°15.0	-13°15.9	-13°16.7	-13°17.5	-0.8
Tu 29	274°04.2	289°04.2	304°04.3	319°04.3	334°04.4	349°04.4	4°04.4	19°04.5	34°04.5	49°04.6	64°04.6	79°04.6	+0.0
	-13°28.3	-13°29.2	-13°30.0	-13°30.8	-13°31.6	-13°32.5	-13°33.3	-13°34.1	-13°34.9	-13°35.8	-13°36.6	-13°37.4	-0.8
We 30	274°05.1	289°05.1	304°05.2	319°05.2	334°05.2	349°05.2	4°05.3	19°05.3	34°05.3	49°05.4	64°05.4	79°05.4	+0.0
	-13°48.1	-13°48.9	-13°49.7	-13°50.5	-13°51.4	-13°52.2	-13°53.0	-13°53.8	-13°54.6	-13°55.4	-13°56.3	-13°57.1	-0.8
Th 31	274°05.8	289°05.8	304°05.8	319°05.9	334°05.9	349°05.9	4°05.9	19°06.0	34°06.0	49°06.0	64°06.0	79°06.0	+0.0
	-14°07.6	-14°08.4	-14°09.2	-14°10.1	-14°10.9	-14°11.7	-14°12.5	-14°13.3	-14°14.1	-14°14.9	-14°15.7	-14°16.5	-0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2030

D	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h	SH
Tu 1	251°42.8	266°06.8	280°30.7	294°54.7	309°18.6	323°42.5	338°06.4	352°30.3	6°54.1	21°18.0	35°41.8	+23.9	16.3
	-21°01.5	-21°05.8	-21°10.0	-21°14.0	-21°17.9	-21°21.6	-21°25.2	-21°28.7	-21°32.0	-21°35.1	-21°38.1	-3.7	59.7
We 2	251°38.2	266°02.0	280°25.7	294°49.6	309°13.4	323°37.2	338°01.1	352°24.9	6°48.8	21°12.7	35°36.7	+23.8	16.2
	-22°04.9	-22°05.4	-22°05.9	-22°06.1	-22°06.2	-22°06.2	-22°06.0	-22°05.7	-22°05.2	-22°04.5	-22°03.7	+0.1	59.5
Th 3	251°39.7	266°04.2	280°28.7	294°53.4	309°18.0	323°42.8	338°07.5	352°32.4	6°57.2	21°22.2	35°47.2	+24.7	16.1
	-21°34.1	-21°31.0	-21°27.7	-21°24.3	-21°20.7	-21°17.0	-21°13.2	-21°09.2	-21°05.1	-21°00.9	-20°56.5	+3.8	59.2
◐ Fr 4	252°09.4	266°35.4	281°01.5	295°27.7	309°53.9	324°20.2	338°46.6	353°13.0	7°39.5	22°06.1	36°32.7	+26.3	16.0
	-19°35.4	-19°29.0	-19°22.5	-19°15.8	-19°09.1	-19°02.2	-18°55.3	-18°48.2	-18°41.0	-18°33.7	-18°26.3	+6.9	58.7
Sa 5	253°21.4	267°49.2	282°17.1	296°45.1	311°13.2	325°41.3	340°09.5	354°37.8	9°06.1	23°34.5	38°03.0	+28.2	15.9
	-16°22.8	-16°13.9	-16°04.8	-15°55.6	-15°46.4	-15°37.0	-15°27.6	-15°18.1	-15°08.6	-14°58.9	-14°49.2	+9.4	58.3
Su 6	255°18.7	269°48.3	284°18.0	298°47.7	313°17.5	327°47.3	342°17.2	356°47.2	11°17.2	25°47.3	40°17.4	+29.9	15.8
	-12°14.7	-12°03.8	-11°53.0	-11°42.0	-11°31.1	-11°20.0	-11°08.9	-10°57.8	-10°46.6	-10°35.4	-10°24.1	+11.1	57.8
Mo 7	257°56.2	272°27.2	286°58.3	301°29.4	316°00.5	330°31.7	345°02.9	359°34.2	14°05.5	28°36.9	43°08.3	+31.2	15.6
	-7°29.8	-7°17.9	-7°06.0	-6°54.0	-6°42.1	-6°30.1	-6°18.0	-6°06.0	-5°53.9	-5°41.8	-5°29.7	+12.0	57.3
Tu 8	261°03.7	275°35.7	290°07.6	304°39.7	319°11.7	333°43.8	348°15.8	2°48.0	17°20.1	31°52.3	46°24.4	+32.1	15.5
	-2°26.3	-2°14.0	-2°01.7	-1°49.4	-1°37.1	-1°24.8	-1°12.5	-1°00.2	-0°48.0	-0°35.7	-0°23.4	+12.3	56.8
We 9	264°29.3	279°01.7	293°34.1	308°06.6	322°39.0	337°11.5	351°44.0	6°16.4	20°48.9	35°21.4	49°53.9	+32.5	15.3
	2°39.4	2°51.5	3°03.5	3°15.5	3°27.5	3°39.5	3°51.4	4°03.3	4°15.2	4°27.1	4°38.9	+12.0	56.3
Th 10	268°01.3	282°33.8	297°06.3	311°38.7	326°11.2	340°43.6	355°16.1	9°48.5	24°20.9	38°53.3	53°25.7	+32.4	15.2
	7°32.4	7°43.7	7°54.9	8°06.0	8°17.2	8°28.3	8°39.3	8°50.3	9°01.2	9°12.1	9°23.0	+11.1	55.8
○ Fr 11	271°30.2	286°02.4	300°34.6	315°06.7	329°38.9	344°11.0	358°43.1	13°15.2	27°47.2	42°19.3	56°51.3	+32.1	15.1
	11°59.2	12°09.1	12°19.0	12°28.8	12°38.6	12°48.3	12°57.9	13°07.5	13°17.0	13°26.4	13°35.8	+9.7	55.3
Sa 12	274°49.1	289°20.8	303°52.5	318°24.1	332°55.8	347°27.4	1°59.0	16°30.5	31°02.0	45°33.6	60°05.1	+31.6	15.0
	15°47.7	15°55.9	16°04.0	16°12.0	16°20.0	16°27.9	16°35.7	16°43.4	16°51.0	16°58.6	17°06.0	+7.8	54.9
Su 13	277°54.9	292°26.0	306°57.2	321°28.3	335°59.4	350°30.4	5°01.5	19°32.5	34°03.6	48°34.6	63°05.5	+31.1	14.9
	18°47.7	18°53.8	18°59.8	19°05.7	19°11.5	19°17.2	19°22.8	19°28.3	19°33.8	19°39.1	19°44.3	+5.7	54.5
Mo 14	280°48.3	295°19.0	309°49.8	324°20.5	338°51.2	353°21.9	7°52.5	22°23.2	36°53.9	51°24.5	65°55.2	+30.7	14.8
	20°51.3	20°55.0	20°58.6	21°02.1	21°05.5	21°08.8	21°12.0	21°15.0	21°18.0	21°20.9	21°23.7	+3.2	54.2
Tu 15	283°34.0	298°04.5	312°35.1	327°05.6	341°36.2	356°06.8	10°37.3	25°07.9	39°38.4	54°09.0	68°39.6	+30.6	14.7
	21°53.2	21°54.3	21°55.4	21°56.3	21°57.1	21°57.9	21°58.5	21°59.0	21°59.4	21°59.8	22°00.0	+0.7	54.1
We 16	286°18.7	300°49.3	315°20.0	329°50.7	344°21.4	358°52.1	13°22.8	27°53.6	42°24.3	56°55.1	71°25.8	+30.7	14.8
	21°50.9	21°49.5	21°48.0	21°46.3	21°44.6	21°42.8	21°40.9	21°38.8	21°36.7	21°34.5	21°32.1	-1.9	54.1
Th 17	300°49.3	315°20.0	329°50.7	344°21.4	358°52.1	13°22.8	27°53.6	42°24.3	56°55.1	71°25.8	85°56.6	+30.7	14.8
	21°49.5	21°48.0	21°46.3	21°44.6	21°42.8	21°40.9	21°38.8	21°36.7	21°34.5	21°32.1	21°29.7	-2.0	54.1
Fr 18	303°40.2	318°11.2	332°42.3	347°13.3	1°44.4	16°15.5	30°46.7	45°17.8	59°49.0	74°20.2	88°51.4	+31.1	14.8
	20°41.3	20°37.3	20°33.2	20°29.0	20°24.7	20°20.4	20°15.9	20°11.3	20°06.6	20°01.9	19°57.0	-4.4	54.3
◑ Sa 19	306°41.6	321°13.2	335°44.7	350°16.2	4°47.8	19°19.4	33°51.0	48°22.6	62°54.2	77°25.9	91°57.5	+31.6	14.9
	18°33.1	18°26.8	18°20.4	18°13.9	18°07.4	18°00.7	17°54.0	17°47.1	17°40.2	17°33.2	17°26.1	-6.7	54.7
Su 20	309°54.6	324°26.5	338°58.4	353°30.4	8°02.3	22°34.3	37°06.3	51°38.3	66°10.3	80°42.3	95°14.3	+32.0	15.1
	15°30.0	15°21.6	15°13.2	15°04.6	14°56.0	14°47.4	14°38.6	14°29.8	14°20.9	14°11.9	14°02.8	-8.7	55.2
Mo 21	313°15.6	327°47.7	342°19.9	356°52.0	11°24.1	25°56.2	40°28.4	55°00.5	69°32.6	84°04.7	98°36.8	+32.1	15.3
	11°38.6	11°28.5	11°18.3	11°08.0	10°57.7	10°47.3	10°36.8	10°26.3	10°15.7	10°05.0	9°54.3	-10.4	56.0
Tu 22	316°37.6	331°09.6	345°41.5	0°13.5	14°45.4	29°17.3	43°49.1	58°21.0	72°52.8	87°24.6	101°56.4	+31.9	15.5
	7°07.1	6°55.6	6°44.0	6°32.3	6°20.6	6°08.9	5°57.1	5°45.2	5°33.4	5°21.4	5°09.5	-11.8	56.8
We 23	319°50.2	334°21.5	348°52.8	3°24.1	17°55.3	32°26.5	46°57.7	61°28.8	75°59.8	90°30.9	105°01.9	+31.2	15.7
	2°05.7	1°53.1	1°40.6	1°28.1	1°15.5	1°02.9	0°50.2	0°37.6	0°24.9	0°12.2	-0°00.5	-12.6	57.7
Th 24	322°40.9	337°11.1	351°41.2	6°11.3	20°41.3	35°11.2	49°41.1	64°11.0	78°40.7	93°10.4	107°40.1	+29.9	16.0
	-3°12.6	-3°25.5	-3°38.3	-3°51.1	-4°04.0	-4°16.8	-4°29.7	-4°42.5	-4°55.3	-5°08.1	-5°20.9	-12.8	58.7
Fr 25	324°56.6	339°25.1	353°53.6	8°21.9	22°50.2	37°18.5	51°46.6	66°14.7	80°42.6	95°10.6	109°38.4	+28.2	16.2
	-8°30.4	-8°42.8	-8°55.1	-9°07.5	-9°19.8	-9°32.0	-9°44.2	-9°56.4	-10°08.5	-10°20.6	-10°32.6	-12.2	59.5
● Sa 26	326°26.0	340°52.5	355°19.0	9°45.3	24°11.6	38°37.7	53°03.8	67°29.8	81°55.8	96°21.6	110°47.4	+26.1	16.4
	-13°25.8	-13°36.8	-13°47.7	-13°58.6	-14°09.3	-14°20.0	-14°30.6	-14°41.1	-14°51.5	-15°01.9	-15°12.1	-10.6	60.1
Su 27	327°04.0	341°28.5	355°52.9	10°17.2	24°41.5	39°05.7	53°29.8	67°53.8	82°17.8	96°41.7	111°05.6	+24.2	16.5
	-17°33.6	-17°42.1	-17°50.6	-17°58.9	-18°07.1	-18°15.2	-18°23.1	-18°30.9	-18°38.6	-18°46.2	-18°53.6	-8.0	60.5
Mo 28	326°56.2	341°19.2	355°42.1	10°05.0	24°27.8	38°50.6	53°13.4	67°36.1	81°58.8	96°21.5	110°44.2	+22.8	16.5
	-20°28.5	-20°33.7	-20°38.7	-20°43.6	-20°48.4	-20°52.9	-20°57.3	-21°01.6	-21°05.7	-21°09.7	-21°13.5	-4.5	60.6
Tu 29	326°22.0	340°44.5	355°07.0	9°29.5	23°52.0	38°14.5	52°37.0	66°59.6	81°22.1	95°44.7	110°07.3	+22.5	16.5
	-21°51.4	-21°52.6	-21°53.7	-21°54.6	-21°55.4	-21°56.0	-21°56.4	-21°56.7	-21°56.8	-21°56.8	-21°56.6	-0.5	60.5
We 30	325°50.6	340°13.8	354°37.1	9°00.5	23°23.9	37°47.3	52°10.9	66°34.4	80°58.1	95°21.8	109°45.6	+23.5	16.4
	-21°34.5	-21°31.8	-21°29.0	-21°26.0	-21°22.8	-21°19.5	-21°16.0	-21°12.4	-21°08.7	-21°04.8	-21°00.8	+3.4	60.0
Th 31	325°50.9	340°15.9	354°41.0	9°06.1	23°31.3	37°56.7	52°22.1	66°47.6	81°13.1	95°38.8	110°04.5	+25.4	16.2
	-19°43.9	-19°37.7	-19°31.4	-19°25.0	-19°18.4	-19°11.8	-19°05.0	-18°58.1	-18°51.1	-18°44.0	-18°36.7	+6.7	59.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 4 03h56 — FM: 11 10h46 — LQ: 19 14h50 — NM: 26 20h17

SUN

November 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	274°06.3	289°06.3	304°06.3	319°06.3	334°06.4	349°06.4	4°06.4	19°06.4	34°06.4	49°06.4	64°06.4	79°06.5	+0.0
	-14°26.9	-14°27.7	-14°28.5	-14°29.3	-14°30.1	-14°30.9	-14°31.7	-14°32.5	-14°33.3	-14°34.1	-14°34.9	-14°35.7	-0.8
Sa 2	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.7	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	+0.0
	-14°46.0	-14°46.8	-14°47.6	-14°48.4	-14°49.2	-14°50.0	-14°50.7	-14°51.5	-14°52.3	-14°53.1	-14°53.9	-14°54.7	-0.8
Su 3	274°06.7	289°06.7	304°06.7	319°06.7	334°06.7	349°06.7	4°06.7	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	-0.0
	-15°04.8	-15°05.6	-15°06.4	-15°07.2	-15°08.0	-15°08.7	-15°09.5	-15°10.3	-15°11.1	-15°11.8	-15°12.6	-15°13.4	-0.8
Mo 4	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.6	19°06.6	34°06.6	49°06.6	64°06.5	79°06.5	-0.0
	-15°23.4	-15°24.2	-15°25.0	-15°25.7	-15°26.5	-15°27.3	-15°28.0	-15°28.8	-15°29.6	-15°30.3	-15°31.1	-15°31.9	-0.8
Tu 5	274°06.4	289°06.3	304°06.3	319°06.3	334°06.3	349°06.3	4°06.3	19°06.2	34°06.2	49°06.2	64°06.2	79°06.2	-0.0
	-15°41.8	-15°42.5	-15°43.3	-15°44.0	-15°44.8	-15°45.6	-15°46.3	-15°47.1	-15°47.8	-15°48.6	-15°49.3	-15°50.1	-0.8
We 6	274°05.9	289°05.8	304°05.8	319°05.8	334°05.8	349°05.7	4°05.7	19°05.7	34°05.7	49°05.6	64°05.6	79°05.6	-0.0
	-15°59.8	-16°00.6	-16°01.3	-16°02.1	-16°02.8	-16°03.6	-16°04.3	-16°05.1	-16°05.8	-16°06.6	-16°07.3	-16°08.0	-0.7
Th 7	274°05.2	289°05.1	304°05.1	319°05.1	334°05.0	349°05.0	4°05.0	19°04.9	34°04.9	49°04.9	64°04.8	79°04.8	-0.0
	-16°17.6	-16°18.4	-16°19.1	-16°19.9	-16°20.6	-16°21.3	-16°22.1	-16°22.8	-16°23.5	-16°24.3	-16°25.0	-16°25.7	-0.7
Fr 8	274°04.3	289°04.2	304°04.2	319°04.2	334°04.1	349°04.1	4°04.0	19°04.0	34°03.9	49°03.9	64°03.8	79°03.8	-0.0
	-16°35.2	-16°35.9	-16°36.6	-16°37.4	-16°38.1	-16°38.8	-16°39.5	-16°40.2	-16°41.0	-16°41.7	-16°42.4	-16°43.1	-0.7
Sa 9	274°03.2	289°03.1	304°03.1	319°03.0	334°03.0	349°02.9	4°02.9	19°02.8	34°02.8	49°02.7	64°02.6	79°02.6	-0.1
	-16°52.4	-16°53.2	-16°53.9	-16°54.6	-16°55.3	-16°56.0	-16°56.7	-16°57.4	-16°58.1	-16°58.8	-16°59.5	-17°00.3	-0.7
Su 10	274°01.9	289°01.8	304°01.7	319°01.7	334°01.6	349°01.6	4°01.5	19°01.4	34°01.4	49°01.3	64°01.2	79°01.2	-0.1
	-17°09.4	-17°10.1	-17°10.8	-17°11.5	-17°12.2	-17°12.9	-17°13.6	-17°14.3	-17°15.0	-17°15.7	-17°16.4	-17°17.1	-0.7
Mo 11	274°00.3	289°00.3	304°00.2	319°00.1	334°00.0	349°00.0	3°59.9	18°59.8	33°59.8	48°59.7	63°59.6	78°59.6	-0.1
	-17°26.1	-17°26.8	-17°27.5	-17°28.1	-17°28.8	-17°29.5	-17°30.2	-17°30.9	-17°31.6	-17°32.3	-17°32.9	-17°33.6	-0.7
Tu 12	273°58.6	288°58.5	303°58.4	318°58.3	333°58.3	348°58.2	3°58.1	18°58.0	33°57.9	48°57.9	63°57.8	78°57.7	-0.1
	-17°42.5	-17°43.1	-17°43.8	-17°44.5	-17°45.2	-17°45.8	-17°46.5	-17°47.2	-17°47.9	-17°48.5	-17°49.2	-17°49.9	-0.7
We 13	273°56.6	288°56.5	303°56.4	318°56.4	333°56.3	348°56.2	3°56.1	18°56.0	33°55.9	48°55.8	63°55.7	78°55.7	-0.1
	-17°58.5	-17°59.2	-17°59.9	-18°00.5	-18°01.2	-18°01.8	-18°02.5	-18°03.2	-18°03.8	-18°04.5	-18°05.1	-18°05.8	-0.7
Th 14	273°54.4	288°54.4	303°54.3	318°54.2	333°54.1	348°54.0	3°53.9	18°53.8	33°53.7	48°53.6	63°53.5	78°53.4	-0.1
	-18°14.3	-18°14.9	-18°15.6	-18°16.2	-18°16.9	-18°17.5	-18°18.2	-18°18.8	-18°19.5	-18°20.1	-18°20.8	-18°21.4	-0.6
Fr 15	273°52.1	288°52.0	303°51.9	318°51.7	333°51.6	348°51.5	3°51.4	18°51.3	33°51.2	48°51.1	63°51.0	78°50.9	-0.1
	-18°29.7	-18°30.4	-18°31.0	-18°31.6	-18°32.3	-18°32.9	-18°33.6	-18°34.2	-18°34.8	-18°35.4	-18°36.1	-18°36.7	-0.6
Sa 16	273°49.5	288°49.3	303°49.2	318°49.1	333°49.0	348°48.9	3°48.8	18°48.7	33°48.5	48°48.4	63°48.3	78°48.2	-0.1
	-18°44.9	-18°45.5	-18°46.1	-18°46.7	-18°47.3	-18°48.0	-18°48.6	-18°49.2	-18°49.8	-18°50.4	-18°51.1	-18°51.7	-0.6
Su 17	273°46.6	288°46.5	303°46.4	318°46.3	333°46.2	348°46.0	3°45.9	18°45.8	33°45.7	48°45.5	63°45.4	78°45.3	-0.1
	-18°59.6	-19°00.3	-19°00.9	-19°01.5	-19°02.1	-19°02.7	-19°03.3	-19°03.9	-19°04.5	-19°05.1	-19°05.7	-19°06.3	-0.6
Mo 18	273°43.6	288°43.5	303°43.4	318°43.2	333°43.1	348°43.0	3°42.8	18°42.7	33°42.6	48°42.4	63°42.3	78°42.2	-0.1
	-19°14.1	-19°14.7	-19°15.3	-19°15.9	-19°16.5	-19°17.1	-19°17.7	-19°18.2	-19°18.8	-19°19.4	-19°20.0	-19°20.6	-0.6
Tu 19	273°40.4	288°40.2	303°40.1	318°40.0	333°39.8	348°39.7	3°39.5	18°39.4	33°39.2	48°39.1	63°39.0	78°38.8	-0.1
	-19°28.2	-19°28.8	-19°29.4	-19°29.9	-19°30.5	-19°31.1	-19°31.7	-19°32.2	-19°32.8	-19°33.4	-19°34.0	-19°34.5	-0.6
We 20	273°36.9	288°36.8	303°36.6	318°36.5	333°36.3	348°36.2	3°36.0	18°35.9	33°35.7	48°35.6	63°35.4	78°35.3	-0.2
	-19°42.0	-19°42.5	-19°43.1	-19°43.6	-19°44.2	-19°44.8	-19°45.3	-19°45.9	-19°46.5	-19°47.0	-19°47.6	-19°48.1	-0.6
Th 21	273°33.3	288°33.1	303°32.9	318°32.8	333°32.6	348°32.5	3°32.3	18°32.2	33°32.0	48°31.8	63°31.7	78°31.5	-0.2
	-19°55.3	-19°55.9	-19°56.4	-19°57.0	-19°57.5	-19°58.1	-19°58.6	-19°59.2	-19°59.7	-20°00.3	-20°00.8	-20°01.4	-0.5
Fr 22	273°29.4	288°29.2	303°29.1	318°28.9	333°28.7	348°28.6	3°28.4	18°28.2	33°28.1	48°27.9	63°27.7	78°27.6	-0.2
	-20°08.4	-20°08.9	-20°09.4	-20°10.0	-20°10.5	-20°11.0	-20°11.6	-20°12.1	-20°12.6	-20°13.2	-20°13.7	-20°14.2	-0.5
Sa 23	273°25.3	288°25.1	303°25.0	318°24.8	333°24.6	348°24.4	3°24.3	18°24.1	33°23.9	48°23.7	63°23.6	78°23.4	-0.2
	-20°21.0	-20°21.6	-20°22.1	-20°22.6	-20°23.1	-20°23.6	-20°24.2	-20°24.7	-20°25.2	-20°25.7	-20°26.2	-20°26.7	-0.5
Su 24	273°21.1	288°20.9	303°20.7	318°20.5	333°20.3	348°20.1	3°20.0	18°19.8	33°19.6	48°19.4	63°19.2	78°19.0	-0.2
	-20°33.3	-20°33.8	-20°34.3	-20°34.8	-20°35.3	-20°35.8	-20°36.3	-20°36.8	-20°37.3	-20°37.8	-20°38.3	-20°38.8	-0.5
Mo 25	273°16.6	288°16.4	303°16.2	318°16.0	333°15.8	348°15.6	3°15.5	18°15.3	33°15.1	48°14.9	63°14.7	78°14.5	-0.2
	-20°45.2	-20°45.7	-20°46.2	-20°46.7	-20°47.2	-20°47.7	-20°48.2	-20°48.6	-20°49.1	-20°49.6	-20°50.1	-20°50.6	-0.5
Tu 26	273°11.9	288°11.7	303°11.6	318°11.4	333°11.2	348°11.0	3°10.8	18°10.6	33°10.4	48°10.2	63°10.0	78°09.8	-0.2
	-20°56.8	-20°57.2	-20°57.7	-20°58.2	-20°58.6	-20°59.1	-20°59.6	-21°00.1	-21°00.5	-21°01.0	-21°01.5	-21°01.9	-0.5
We 27	273°07.1	288°06.9	303°06.7	318°06.5	333°06.3	348°06.1	3°05.9	18°05.7	33°05.5	48°05.3	63°05.0	78°04.8	-0.2
	-21°07.9	-21°08.4	-21°08.8	-21°09.3	-21°09.7	-21°10.2	-21°10.6	-21°11.1	-21°11.5	-21°12.0	-21°12.4	-21°12.9	-0.5
Th 28	273°02.1	288°01.9	303°01.7	318°01.5	333°01.3	348°01.0	3°00.8	18°00.6	33°00.4	48°00.2	63°00.0	77°59.7	-0.2
	-21°18.6	-21°19.1	-21°19.5	-21°19.9	-21°20.4	-21°20.8	-21°21.2	-21°21.7	-21°22.1	-21°22.6	-21°23.0	-21°23.4	-0.4
Fr 29	272°56.9	287°56.7	302°56.5	317°56.3	332°56.0	347°55.8	2°55.6	17°55.4	32°55.2	47°54.9	62°54.7	77°54.5	-0.2
	-21°29.0	-21°29.4	-21°29.8	-21°30.2	-21°30.6	-21°31.1	-21°31.5	-21°31.9	-21°32.3	-21°32.7	-21°33.1	-21°33.6	-0.4
Sa 30	272°51.6	287°51.3	302°51.1	317°50.9	332°50.7	347°50.4	2°50.2	17°50.0	32°49.8	47°49.5	62°49.3	77°49.1	-0.2
	-21°38.9	-21°39.3	-21°39.7	-21°40.1	-21°40.5	-21°40.9	-21°41.3	-21°41.7	-21°42.1	-21°42.5	-21°42.9	-21°43.3	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2030

D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
Fr 1	254°26.9	268°53.6	283°20.4	297°47.3	312°14.3	326°41.4	341°08.6	355°35.8	10°03.2	24°30.6	38°58.2	+27.1	16.1
	-17°18.5	-17°10.1	-17°01.6	-16°53.1	-16°44.4	-16°35.6	-16°26.8	-16°17.8	-16°08.8	-15°59.7	-15°50.5	+8.8	58.9
◐ Sa 2	256°01.5	270°30.4	284°59.3	299°28.4	313°57.5	328°26.7	342°56.0	357°25.4	11°54.8	26°24.4	40°54.0	+29.3	15.9
	-13°23.2	-13°12.8	-13°02.4	-12°51.9	-12°41.3	-12°30.7	-12°20.0	-12°09.3	-11°58.5	-11°47.7	-11°36.8	+10.6	58.2
Su 3	258°26.5	272°57.2	287°28.0	301°58.8	316°29.7	331°00.6	345°31.6	0°02.7	14°33.8	29°05.0	43°36.2	+31.0	15.7
	-8°47.9	-8°36.3	-8°24.7	-8°13.1	-8°01.4	-7°49.7	-7°38.0	-7°26.2	-7°14.5	-7°02.7	-6°50.8	+11.7	57.4
Mo 4	261°30.6	276°02.6	290°34.6	305°06.7	319°38.8	334°10.9	348°43.1	3°15.3	17°47.6	32°19.8	46°52.1	+32.2	15.5
	-3°51.3	-3°39.3	-3°27.2	-3°15.1	-3°03.0	-2°50.9	-2°38.9	-2°26.8	-2°14.7	-2°02.6	-1°50.5	+12.1	56.8
Tu 5	264°59.9	279°32.6	294°05.3	308°38.1	323°10.8	337°43.6	352°16.3	6°49.1	21°21.9	35°54.7	50°27.6	+32.8	15.3
	1°10.3	1°22.3	1°34.2	1°46.2	1°58.1	2°10.0	2°21.9	2°33.7	2°45.6	2°57.4	3°09.2	+11.9	56.2
We 6	268°40.6	283°13.4	297°46.3	312°19.2	326°52.1	341°24.9	355°57.8	10°30.7	25°03.5	39°36.4	54°09.2	+32.9	15.2
	6°03.1	6°14.4	6°25.8	6°37.0	6°48.3	6°59.5	7°10.7	7°21.8	7°32.9	7°43.9	7°54.9	+11.2	55.6
Th 7	272°20.5	286°53.1	301°25.7	315°58.4	330°30.9	345°03.5	359°36.1	14°08.6	28°41.1	43°13.6	57°46.1	+32.6	15.0
	10°34.6	10°44.8	10°55.0	11°05.2	11°15.3	11°25.3	11°35.3	11°45.2	11°55.0	12°04.9	12°14.6	+10.0	55.2
Fr 8	275°50.6	290°22.7	304°54.8	319°26.8	333°58.9	348°30.9	3°02.9	17°34.8	32°06.7	46°38.6	61°10.5	+32.0	14.9
	14°33.2	14°41.9	14°50.6	14°59.1	15°07.6	15°16.0	15°24.4	15°32.7	15°40.9	15°49.0	15°57.0	+8.4	54.8
Sa 9	279°05.6	293°37.0	308°08.5	322°39.9	337°11.3	351°42.6	6°14.0	20°45.3	35°16.6	49°47.8	64°19.1	+31.3	14.8
	17°48.4	17°55.1	18°01.8	18°08.4	18°14.9	18°21.3	18°27.7	18°33.9	18°40.1	18°46.2	18°52.1	+6.4	54.5
○ Su 10	282°04.9	296°35.8	311°06.7	325°37.5	340°08.3	354°39.2	9°10.0	23°40.7	38°11.5	52°42.3	67°13.0	+30.8	14.8
	20°10.9	20°15.4	20°19.8	20°24.1	20°28.3	20°32.4	20°36.4	20°40.4	20°44.2	20°47.9	20°51.5	+4.1	54.2
Mo 11	284°52.6	299°23.1	313°53.7	328°24.3	342°54.8	357°25.3	11°55.9	26°26.4	40°57.0	55°27.5	69°58.0	+30.5	14.7
	21°33.9	21°35.9	21°37.8	21°39.6	21°41.3	21°42.9	21°44.4	21°45.8	21°47.1	21°48.3	21°49.4	+1.6	54.0
Tu 12	287°36.3	302°06.9	316°37.5	331°08.1	345°38.7	0°09.3	14°39.9	29°10.6	43°41.3	58°11.9	72°42.6	+30.6	14.7
	21°53.5	21°53.0	21°52.3	21°51.6	21°50.7	21°49.7	21°48.7	21°47.5	21°46.3	21°44.9	21°43.4	-1.0	54.0
We 13	290°24.8	304°55.8	319°26.8	333°57.8	348°28.8	2°59.8	17°30.9	32°02.0	46°33.1	61°04.2	75°35.4	+31.1	14.7
	21°09.5	21°06.4	21°03.3	21°00.0	20°56.7	20°53.2	20°49.7	20°46.1	20°42.3	20°38.5	20°34.6	-3.5	54.0
Th 14	293°25.6	307°57.2	322°28.8	337°00.4	351°32.0	6°03.7	20°35.3	35°07.1	49°38.8	64°10.5	78°42.3	+31.7	14.8
	19°24.7	19°19.3	19°13.9	19°08.3	19°02.7	18°56.9	18°51.1	18°45.2	18°39.2	18°33.1	18°27.0	-5.8	54.2
Fr 15	307°57.2	322°28.8	337°00.4	351°32.0	6°03.7	20°35.3	35°07.1	49°38.8	64°10.5	78°42.3	93°14.1	+31.7	14.8
	19°19.3	19°13.9	19°08.3	19°02.7	18°56.9	18°51.1	18°45.2	18°39.2	18°33.1	18°27.0	18°20.7	-5.9	54.2
Sa 16	311°14.4	325°46.6	340°18.9	354°51.1	9°23.4	23°55.7	38°28.0	53°00.4	67°32.8	82°05.2	96°37.6	+32.3	14.9
	16°37.2	16°29.7	16°22.1	16°14.4	16°06.6	15°58.8	15°50.9	15°42.9	15°34.8	15°26.7	15°18.5	-7.9	54.6
Su 17	314°46.1	329°18.8	343°51.5	358°24.2	12°56.9	27°29.7	42°02.4	56°35.2	71°08.0	85°40.7	100°13.5	+32.8	15.0
	13°07.1	12°57.8	12°48.4	12°39.0	12°29.5	12°20.0	12°10.4	12°00.7	11°51.0	11°41.2	11°31.3	-9.6	55.1
◑ Mo 18	318°26.1	332°58.9	347°31.7	2°04.6	16°37.4	31°10.2	45°43.1	60°15.9	74°48.7	89°21.5	103°54.3	+32.8	15.2
	8°56.8	8°46.1	8°35.3	8°24.5	8°13.6	8°02.7	7°51.7	7°40.7	7°29.6	7°18.5	7°07.3	-10.9	55.8
Tu 19	322°04.5	336°37.0	351°09.5	5°42.0	20°14.4	34°46.9	49°19.3	63°51.6	78°24.0	92°56.3	107°28.5	+32.4	15.4
	4°15.1	4°03.3	3°51.5	3°39.6	3°27.7	3°15.8	3°03.9	2°51.9	2°39.9	2°27.9	2°15.8	-11.9	56.6
We 20	325°28.3	339°59.9	354°31.5	9°03.1	23°34.6	38°06.0	52°37.4	67°08.8	81°40.0	96°11.3	110°42.4	+31.4	15.7
	-0°47.9	-1°00.2	-1°12.6	-1°25.1	-1°37.5	-1°49.9	-2°02.4	-2°14.8	-2°27.3	-2°39.7	-2°52.2	-12.4	57.6
Th 21	328°22.7	342°52.8	357°22.9	11°52.9	26°22.8	40°52.6	55°22.4	69°52.1	84°21.7	98°51.2	113°20.7	+29.8	16.0
	-5°59.1	-6°11.5	-6°23.9	-6°36.2	-6°48.6	-7°00.9	-7°13.2	-7°25.5	-7°37.8	-7°50.0	-8°02.2	-12.3	58.6
Fr 22	330°32.4	345°00.4	359°28.4	13°56.3	28°24.1	42°51.8	57°19.4	71°46.9	86°14.3	100°41.6	115°08.8	+27.6	16.2
	-11°01.6	-11°13.2	-11°24.8	-11°36.3	-11°47.7	-11°59.1	-12°10.5	-12°21.8	-12°33.0	-12°44.2	-12°55.3	-11.4	59.6
Sa 23	331°45.2	346°10.8	0°36.3	15°01.8	29°27.1	43°52.3	58°17.5	72°42.5	87°07.4	101°32.3	115°57.0	+25.2	16.5
	-15°33.3	-15°43.1	-15°52.9	-16°02.6	-16°12.2	-16°21.7	-16°31.0	-16°40.3	-16°49.5	-16°58.6	-17°07.6	-9.4	60.4
Su 24	331°57.0	346°20.3	0°43.5	15°06.7	29°29.7	43°52.7	58°15.6	72°38.4	87°01.2	101°23.8	115°46.4	+22.9	16.6
	-19°08.2	-19°15.2	-19°22.1	-19°28.9	-19°35.5	-19°42.0	-19°48.4	-19°54.6	-20°00.6	-20°06.6	-20°12.3	-6.4	61.0
● Mo 25	331°18.2	345°40.0	0°01.6	14°23.3	28°44.9	43°06.5	57°28.1	71°49.6	86°11.1	100°32.6	114°54.1	+21.6	16.7
	-21°20.6	-21°23.9	-21°27.0	-21°30.0	-21°32.8	-21°35.4	-21°37.9	-21°40.1	-21°42.3	-21°44.2	-21°46.0	-2.5	61.3
Tu 26	330°15.5	344°37.0	358°58.6	13°20.1	27°41.7	42°03.3	56°24.9	70°46.6	85°08.3	99°30.1	113°51.9	+21.6	16.7
	-21°52.6	-21°51.6	-21°50.5	-21°49.3	-21°47.9	-21°46.3	-21°44.5	-21°42.6	-21°40.5	-21°38.3	-21°35.8	+1.7	61.2
We 27	329°25.1	343°47.8	358°10.6	12°33.5	26°56.4	41°19.5	55°42.6	70°05.8	84°29.0	98°52.4	113°15.8	+23.1	16.6
	-20°40.5	-20°35.6	-20°30.5	-20°25.3	-20°19.9	-20°14.4	-20°08.8	-20°03.0	-19°57.1	-19°51.0	-19°44.8	+5.6	60.7
Th 28	329°18.3	343°43.3	358°08.3	12°33.4	26°58.6	41°24.0	55°49.4	70°14.9	84°40.5	99°06.3	113°32.1	+25.4	16.4
	-17°56.5	-17°48.4	-17°40.1	-17°31.7	-17°23.2	-17°14.6	-17°05.9	-16°57.1	-16°48.2	-16°39.2	-16°30.1	+8.7	60.0
Fr 29	330°11.5	344°38.9	359°06.4	13°34.0	28°01.8	42°29.6	56°57.5	71°25.5	85°53.5	100°21.7	114°50.0	+27.9	16.1
	-14°03.0	-13°52.6	-13°42.1	-13°31.5	-13°20.8	-13°10.1	-12°59.4	-12°48.5	-12°37.7	-12°26.7	-12°15.7	+10.7	59.2
Sa 30	332°04.8	346°34.5	1°04.2	15°34.0	30°03.9	44°33.9	59°03.9	73°34.1	88°04.2	102°34.5	117°04.9	+30.0	15.9
	-9°24.7	-9°13.0	-9°01.2	-8°49.4	-8°37.6	-8°25.7	-8°13.8	-8°01.9	-7°50.0	-7°38.0	-7°26.0	+11.9	58.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 2 11h56 — FM: 10 03h30 — LQ: 18 08h32 — NM: 25 06h46

SUN

December 2030

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	272°46.1	287°45.8	302°45.6	317°45.4	332°45.1	347°44.9	2°44.7	17°44.4	32°44.2	47°44.0	62°43.7	77°43.5	-0.2
	-21°48.4	-21°48.8	-21°49.2	-21°49.6	-21°49.9	-21°50.3	-21°50.7	-21°51.1	-21°51.5	-21°51.8	-21°52.2	-21°52.6	-0.4
Mo 2	272°40.4	287°40.2	302°39.9	317°39.7	332°39.4	347°39.2	2°39.0	17°38.7	32°38.5	47°38.2	62°38.0	77°37.7	-0.2
	-21°57.5	-21°57.9	-21°58.2	-21°58.6	-21°59.0	-21°59.3	-21°59.7	-22°00.1	-22°00.4	-22°00.8	-22°01.1	-22°01.5	-0.4
Tu 3	272°34.6	287°34.3	302°34.1	317°33.8	332°33.6	347°33.3	2°33.1	17°32.9	32°32.6	47°32.4	62°32.1	77°31.9	-0.2
	-22°06.2	-22°06.5	-22°06.9	-22°07.2	-22°07.6	-22°07.9	-22°08.3	-22°08.6	-22°08.9	-22°09.3	-22°09.6	-22°10.0	-0.3
We 4	272°28.6	287°28.4	302°28.1	317°27.9	332°27.6	347°27.4	2°27.1	17°26.9	32°26.6	47°26.3	62°26.1	77°25.8	-0.3
	-22°14.4	-22°14.7	-22°15.1	-22°15.4	-22°15.7	-22°16.1	-22°16.4	-22°16.7	-22°17.0	-22°17.4	-22°17.7	-22°18.0	-0.3
Th 5	272°22.5	287°22.3	302°22.0	317°21.7	332°21.5	347°21.2	2°21.0	17°20.7	32°20.5	47°20.2	62°19.9	77°19.7	-0.3
	-22°22.2	-22°22.5	-22°22.8	-22°23.2	-22°23.5	-22°23.8	-22°24.1	-22°24.4	-22°24.7	-22°25.0	-22°25.3	-22°25.6	-0.3
Fr 6	272°16.3	287°16.0	302°15.8	317°15.5	332°15.2	347°15.0	2°14.7	17°14.4	32°14.2	47°13.9	62°13.6	77°13.4	-0.3
	-22°29.6	-22°29.9	-22°30.2	-22°30.5	-22°30.8	-22°31.1	-22°31.4	-22°31.7	-22°31.9	-22°32.2	-22°32.5	-22°32.8	-0.3
Sa 7	272°09.9	287°09.6	302°09.4	317°09.1	332°08.8	347°08.6	2°08.3	17°08.0	32°07.8	47°07.5	62°07.2	77°07.0	-0.3
	-22°36.5	-22°36.8	-22°37.1	-22°37.4	-22°37.6	-22°37.9	-22°38.2	-22°38.5	-22°38.7	-22°39.0	-22°39.3	-22°39.6	-0.3
Su 8	272°03.4	287°03.2	302°02.9	317°02.6	332°02.3	347°02.1	2°01.8	17°01.5	32°01.2	47°01.0	62°00.7	77°00.4	-0.3
	-22°43.0	-22°43.3	-22°43.5	-22°43.8	-22°44.1	-22°44.3	-22°44.6	-22°44.8	-22°45.1	-22°45.3	-22°45.6	-22°45.8	-0.3
Mo 9	271°56.8	286°56.5	301°56.3	316°56.0	331°55.7	346°55.4	1°55.2	16°54.9	31°54.6	46°54.3	61°54.0	76°53.8	-0.3
	-22°49.1	-22°49.3	-22°49.6	-22°49.8	-22°50.0	-22°50.3	-22°50.5	-22°50.8	-22°51.0	-22°51.2	-22°51.5	-22°51.7	-0.2
Tu 10	271°50.1	286°49.8	301°49.5	316°49.3	331°49.0	346°48.7	1°48.4	16°48.1	31°47.8	46°47.6	61°47.3	76°47.0	-0.3
	-22°54.7	-22°54.9	-22°55.1	-22°55.3	-22°55.6	-22°55.8	-22°56.0	-22°56.2	-22°56.4	-22°56.7	-22°56.9	-22°57.1	-0.2
We 11	271°43.3	286°43.0	301°42.7	316°42.4	331°42.1	346°41.9	1°41.6	16°41.3	31°41.0	46°40.7	61°40.4	76°40.1	-0.3
	-22°59.8	-23°00.0	-23°00.2	-23°00.4	-23°00.6	-23°00.8	-23°01.0	-23°01.2	-23°01.4	-23°01.6	-23°01.8	-23°02.0	-0.2
Th 12	271°36.4	286°36.1	301°35.8	316°35.5	331°35.2	346°34.9	1°34.6	16°34.3	31°34.0	46°33.8	61°33.5	76°33.2	-0.3
	-23°04.5	-23°04.7	-23°04.9	-23°05.1	-23°05.3	-23°05.4	-23°05.6	-23°05.8	-23°06.0	-23°06.2	-23°06.3	-23°06.5	-0.2
Fr 13	271°29.4	286°29.1	301°28.8	316°28.5	331°28.2	346°27.9	1°27.6	16°27.3	31°27.0	46°26.7	61°26.4	76°26.1	-0.3
	-23°08.8	-23°08.9	-23°09.1	-23°09.3	-23°09.4	-23°09.6	-23°09.8	-23°09.9	-23°10.1	-23°10.2	-23°10.4	-23°10.6	-0.2
Sa 14	271°22.3	286°22.0	301°21.7	316°21.4	331°21.1	346°20.8	1°20.5	16°20.2	31°19.9	46°19.6	61°19.3	76°19.0	-0.3
	-23°12.5	-23°12.7	-23°12.8	-23°13.0	-23°13.1	-23°13.3	-23°13.4	-23°13.6	-23°13.7	-23°13.8	-23°14.0	-23°14.1	-0.1
Su 15	271°15.1	286°14.8	301°14.5	316°14.2	331°13.9	346°13.6	1°13.3	16°13.0	31°12.7	46°12.4	61°12.1	76°11.8	-0.3
	-23°15.9	-23°16.0	-23°16.1	-23°16.2	-23°16.4	-23°16.5	-23°16.6	-23°16.7	-23°16.9	-23°17.0	-23°17.1	-23°17.2	-0.1
Mo 16	271°07.9	286°07.6	301°07.3	316°07.0	331°06.7	346°06.4	1°06.1	16°05.8	31°05.5	46°05.2	61°04.9	76°04.5	-0.3
	-23°18.7	-23°18.8	-23°18.9	-23°19.0	-23°19.1	-23°19.3	-23°19.4	-23°19.5	-23°19.6	-23°19.7	-23°19.8	-23°19.9	-0.1
Tu 17	271°00.6	286°00.3	301°00.0	315°59.7	330°59.4	345°59.1	0°58.8	15°58.5	30°58.1	45°57.8	60°57.5	75°57.2	-0.3
	-23°21.1	-23°21.2	-23°21.3	-23°21.4	-23°21.5	-23°21.5	-23°21.6	-23°21.7	-23°21.8	-23°21.9	-23°22.0	-23°22.0	-0.1
We 18	270°53.2	285°52.9	300°52.6	315°52.3	330°52.0	345°51.7	0°51.4	15°51.1	30°50.8	45°50.5	60°50.2	75°49.9	-0.3
	-23°23.0	-23°23.1	-23°23.2	-23°23.2	-23°23.3	-23°23.4	-23°23.4	-23°23.5	-23°23.6	-23°23.6	-23°23.7	-23°23.7	-0.1
Th 19	270°45.8	285°45.5	300°45.2	315°44.9	330°44.6	345°44.3	0°44.0	15°43.7	30°43.4	45°43.1	60°42.8	75°42.4	-0.3
	-23°24.5	-23°24.5	-23°24.6	-23°24.6	-23°24.7	-23°24.7	-23°24.8	-23°24.8	-23°24.9	-23°24.9	-23°24.9	-23°25.0	-0.0
Fr 20	270°38.4	285°38.1	300°37.8	315°37.5	330°37.2	345°36.9	0°36.6	15°36.2	30°35.9	45°35.6	60°35.3	75°35.0	-0.3
	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-23°25.6	-23°25.6	-23°25.6	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.8	-0.0
Sa 21	270°31.0	285°30.6	300°30.3	315°30.0	330°29.7	345°29.4	0°29.1	15°28.8	30°28.5	45°28.2	60°27.8	75°27.5	-0.3
	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-0.0
Su 22	270°23.5	285°23.2	300°22.9	315°22.5	330°22.2	345°21.9	0°21.6	15°21.3	30°21.0	45°20.7	60°20.4	75°20.1	-0.3
	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	+0.0
Mo 23	270°16.0	285°15.7	300°15.4	315°15.1	330°14.8	345°14.4	0°14.1	15°13.8	30°13.5	45°13.2	60°12.9	75°12.6	-0.3
	-23°25.6	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-23°25.4	-23°25.4	-23°25.4	-23°25.3	-23°25.3	-23°25.3	-23°25.2	+0.0
Tu 24	270°08.5	285°08.2	300°07.9	315°07.6	330°07.3	345°07.0	0°06.6	15°06.3	30°06.0	45°05.7	60°05.4	75°05.1	-0.3
	-23°24.7	-23°24.6	-23°24.6	-23°24.5	-23°24.5	-23°24.4	-23°24.4	-23°24.3	-23°24.3	-23°24.2	-23°24.2	-23°24.1	+0.1
We 25	270°01.0	285°00.7	300°00.4	315°00.1	329°59.8	344°59.5	359°59.2	14°58.9	29°58.6	44°58.2	59°57.9	74°57.6	-0.3
	-23°23.3	-23°23.2	-23°23.2	-23°23.1	-23°23.0	-23°23.0	-23°22.9	-23°22.8	-23°22.7	-23°22.7	-23°22.6	-23°22.5	+0.1
Th 26	269°53.6	284°53.3	299°53.0	314°52.7	329°52.3	344°52.0	359°51.7	14°51.4	29°51.1	44°50.8	59°50.5	74°50.2	-0.3
	-23°21.5	-23°21.4	-23°21.3	-23°21.2	-23°21.1	-23°21.0	-23°20.9	-23°20.8	-23°20.7	-23°20.6	-23°20.6	-23°20.5	+0.1
Fr 27	269°46.2	284°45.9	299°45.6	314°45.2	329°44.9	344°44.6	359°44.3	14°44.0	29°43.7	44°43.4	59°43.1	74°42.8	-0.3
	-23°19.1	-23°19.0	-23°18.9	-23°18.8	-23°18.7	-23°18.6	-23°18.5	-23°18.4	-23°18.3	-23°18.2	-23°18.0	-23°17.9	+0.1
Sa 28	269°38.8	284°38.5	299°38.2	314°37.9	329°37.6	344°37.3	359°36.9	14°36.6	29°36.3	44°36.0	59°35.7	74°35.4	-0.3
	-23°16.4	-23°16.2	-23°16.1	-23°16.0	-23°15.9	-23°15.7	-23°15.6	-23°15.5	-23°15.3	-23°15.2	-23°15.1	-23°14.9	+0.1
Su 29	269°31.5	284°31.2	299°30.8	314°30.5	329°30.2	344°29.9	359°29.6	14°29.3	29°29.0	44°28.7	59°28.4	74°28.1	-0.3
	-23°13.1	-23°13.0	-23°12.8	-23°12.7	-23°12.5	-23°12.4	-23°12.2	-23°12.1	-23°11.9	-23°11.8	-23°11.6	-23°11.5	+0.1
Mo 30	269°24.2	284°23.9	299°23.6	314°23.3	329°23.0	344°22.7	359°22.4	14°22.1	29°21.8	44°21.5	59°21.2	74°20.9	-0.3
	-23°09.4	-23°09.2	-23°09.1	-23°08.9	-23°08.7	-23°08.6	-23°08.4	-23°08.2	-23°08.1	-23°07.9	-23°07.7	-23°07.6	+0.2
Tu 31	269°17.0	284°16.7	299°16.4	314°16.1	329°15.8	344°15.5	359°15.2	14°14.9	29°14.6	44°14.3	59°14.0	74°13.7	-0.3
	-23°05.2	-23°05.1	-23°04.9	-23°04.7	-23°04.5	-23°04.3	-23°04.1	-23°03.9	-23°03.7	-23°03.6	-23°03.4	-23°03.2	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

December 2030

	D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
◐	Su 1	247°41.0	262°12.0	276°43.1	291°14.2	305°45.4	320°16.6	334°47.9	349°19.3	3°50.7	18°22.2	32°53.7	+31.3	15.7
		-5°37.2	-5°25.0	-5°12.8	-5°00.7	-4°48.5	-4°36.2	-4°24.0	-4°11.8	-3°59.6	-3°47.3	-3°35.1	+12.2	57.6
	Mo 2	250°52.1	265°24.3	279°56.6	294°28.9	309°01.2	323°33.6	338°06.0	352°38.4	7°10.9	21°43.3	36°15.9	+32.4	15.5
		-0°31.8	-0°19.7	-0°07.5	0°04.6	0°16.7	0°28.8	0°40.9	0°53.0	1°05.0	1°17.1	1°29.1	+12.1	56.7
	Tu 3	254°26.2	268°59.0	283°31.9	298°04.7	312°37.6	327°10.5	341°43.3	356°16.2	10°49.1	25°22.0	39°54.9	+32.9	15.3
		4°26.6	4°38.2	4°49.8	5°01.3	5°12.8	5°24.3	5°35.8	5°47.2	5°58.6	6°09.9	6°21.2	+11.5	56.0
	We 4	258°08.7	272°41.6	287°14.5	301°47.4	316°20.2	330°53.1	345°25.9	359°58.8	14°31.6	29°04.4	43°37.2	+32.9	15.1
		9°05.8	9°16.4	9°27.0	9°37.5	9°47.9	9°58.4	10°08.7	10°19.0	10°29.3	10°39.5	10°49.7	+10.4	55.3
	Th 5	261°47.5	276°20.0	290°52.5	305°25.0	319°57.5	334°30.0	349°02.4	3°34.8	18°07.2	32°39.6	47°11.9	+32.4	15.0
		13°15.1	13°24.3	13°33.5	13°42.5	13°51.6	14°00.5	14°09.4	14°18.2	14°27.0	14°35.6	14°44.3	+8.9	54.8
	Fr 6	265°14.0	279°45.9	294°17.8	308°49.7	323°21.6	337°53.4	352°25.2	6°56.9	21°28.7	36°00.4	50°32.1	+31.8	14.8
		16°44.8	16°52.2	16°59.6	17°06.9	17°14.1	17°21.2	17°28.2	17°35.2	17°42.0	17°48.8	17°55.5	+7.1	54.4
	Sa 7	268°24.2	282°55.4	297°26.7	311°57.9	326°29.1	341°00.2	355°31.4	10°02.5	24°33.6	39°04.6	53°35.7	+31.2	14.8
		19°25.9	19°31.2	19°36.5	19°41.6	19°46.6	19°51.6	19°56.5	20°01.2	20°05.9	20°10.5	20°15.0	+4.9	54.2
	Su 8	271°19.0	285°49.7	300°20.4	314°51.1	329°21.8	343°52.5	358°23.2	12°53.9	27°24.5	41°55.1	56°25.8	+30.7	14.7
		21°10.8	21°13.7	21°16.6	21°19.3	21°21.9	21°24.5	21°26.9	21°29.3	21°31.5	21°33.6	21°35.7	+2.5	54.0
○	Mo 9	274°04.3	288°34.8	303°05.3	317°35.9	332°06.4	346°36.9	1°07.5	15°38.0	30°08.6	44°39.1	59°09.7	+30.5	14.7
		21°54.0	21°54.4	21°54.7	21°54.9	21°55.0	21°55.0	21°54.9	21°54.7	21°54.4	21°54.0	21°53.5	-0.1	53.9
	Tu 10	276°49.0	291°19.8	305°50.5	320°21.3	334°52.0	349°22.8	3°53.6	18°24.4	32°55.3	47°26.1	61°57.0	+30.8	14.7
		21°33.5	21°31.4	21°29.1	21°26.8	21°24.3	21°21.8	21°19.2	21°16.4	21°13.6	21°10.7	21°07.6	-2.6	53.9
	We 11	279°42.8	294°14.0	308°45.3	323°16.6	337°47.9	352°19.3	6°50.6	21°22.0	35°53.5	50°24.9	64°56.4	+31.4	14.7
		20°10.6	20°06.1	20°01.4	19°56.7	19°51.9	19°47.0	19°42.0	19°36.9	19°31.7	19°26.4	19°21.0	-5.0	54.0
	Th 12	282°52.3	297°24.3	311°56.3	326°28.3	341°00.3	355°32.4	10°04.5	24°36.7	39°08.9	53°41.1	68°13.3	+32.1	14.8
		17°50.3	17°43.6	17°36.8	17°29.9	17°22.9	17°15.9	17°08.8	17°01.6	16°54.3	16°47.0	16°39.6	-7.1	54.2
	Fr 13	286°20.1	300°52.8	315°25.5	329°58.2	344°31.0	359°03.8	13°36.6	28°09.4	42°42.2	57°15.1	71°48.0	+32.8	14.9
		14°39.6	14°31.0	14°22.4	14°13.7	14°05.0	13°56.1	13°47.3	13°38.3	13°29.3	13°20.2	13°11.1	-8.8	54.5
	Sa 14	290°03.6	304°36.8	319°10.0	333°43.2	348°16.4	2°49.7	17°22.9	31°56.1	46°29.4	61°02.7	75°35.9	+33.2	15.0
		10°47.1	10°37.1	10°27.0	10°16.9	10°06.7	9°56.5	9°46.2	9°35.8	9°25.4	9°15.0	9°04.5	-10.3	55.0
	Su 15	304°36.8	319°10.0	333°43.2	348°16.4	2°49.7	17°22.9	31°56.1	46°29.4	61°02.7	75°35.9	90°09.2	+33.2	15.0
		10°37.1	10°27.0	10°16.9	10°06.7	9°56.5	9°46.2	9°35.8	9°25.4	9°15.0	9°04.5	8°54.0	-10.3	55.0
	Mo 16	308°28.9	323°02.2	337°35.5	352°08.8	6°42.1	21°15.4	35°48.6	50°21.9	64°55.2	79°28.4	94°01.6	+33.3	15.2
		6°11.0	5°59.9	5°48.6	5°37.4	5°26.1	5°14.8	5°03.5	4°52.1	4°40.7	4°29.2	4°17.8	-11.3	55.6
	Tu 17	312°18.0	326°50.9	341°23.8	355°56.7	10°29.5	25°02.3	39°35.0	54°07.8	68°40.5	83°13.1	97°45.8	+32.8	15.4
		1°22.6	1°10.7	0°58.8	0°46.9	0°35.0	0°23.1	0°11.2	-0°00.8	-0°12.7	-0°24.7	-0°36.7	-11.9	56.3
◑	We 18	315°50.3	330°22.2	344°54.1	359°25.9	13°57.7	28°29.4	43°01.0	57°32.6	72°04.1	86°35.6	101°07.0	+31.7	15.6
		-3°37.4	-3°49.5	-4°01.5	-4°13.6	-4°25.7	-4°37.7	-4°49.7	-5°01.8	-5°13.8	-5°25.8	-5°37.8	-12.0	57.2
	Th 19	318°50.2	333°20.5	347°50.7	2°20.9	16°50.9	31°20.9	45°50.8	60°20.6	74°50.4	89°20.0	103°49.6	+29.9	15.9
		-8°35.9	-8°47.5	-8°59.2	-9°10.8	-9°22.4	-9°34.0	-9°45.5	-9°57.0	-10°08.5	-10°19.9	-10°31.2	-11.5	58.1
	Fr 20	321°02.3	335°30.4	349°58.4	4°26.3	18°54.1	33°21.8	47°49.4	62°16.9	76°44.3	91°11.6	105°38.8	+27.7	16.1
		-13°16.2	-13°26.8	-13°37.3	-13°47.7	-13°58.1	-14°08.3	-14°18.6	-14°28.7	-14°38.8	-14°48.8	-14°58.7	-10.3	59.1
	Sa 21	322°14.5	336°40.0	351°05.5	5°30.8	19°56.1	34°21.2	48°46.3	63°11.2	77°36.0	92°00.8	106°25.4	+25.1	16.4
		-17°17.5	-17°26.1	-17°34.5	-17°42.7	-17°50.9	-17°59.0	-18°07.0	-18°14.9	-18°22.6	-18°30.2	-18°37.8	-8.0	60.0
	Su 22	322°23.6	336°46.7	351°09.8	5°32.8	19°55.7	34°18.5	48°41.3	63°04.0	77°26.6	91°49.1	106°11.6	+22.8	16.6
		-20°15.5	-20°21.0	-20°26.3	-20°31.5	-20°36.5	-20°41.4	-20°46.1	-20°50.7	-20°55.1	-20°59.4	-21°03.5	-4.8	60.8
	Mo 23	321°41.4	336°03.0	350°24.6	4°46.1	19°07.7	33°29.1	47°50.6	62°12.0	76°33.4	90°54.8	105°16.2	+21.5	16.7
		-21°46.6	-21°48.2	-21°49.6	-21°50.8	-21°51.9	-21°52.8	-21°53.5	-21°54.1	-21°54.5	-21°54.7	-21°54.7	-0.8	61.2
●	Tu 24	320°36.4	334°57.9	349°19.3	3°40.8	18°02.4	32°23.9	46°45.5	61°07.1	75°28.8	89°50.5	104°12.3	+21.6	16.7
		-21°35.2	-21°32.5	-21°29.7	-21°26.7	-21°23.5	-21°20.2	-21°16.7	-21°13.1	-21°09.3	-21°05.3	-21°01.1	+3.4	61.4
	We 25	319°45.1	334°07.8	348°30.6	2°53.5	17°16.4	31°39.4	46°02.5	60°25.7	74°49.0	89°12.3	103°35.8	+23.1	16.7
		-19°40.5	-19°33.9	-19°27.2	-19°20.3	-19°13.4	-19°06.2	-18°59.0	-18°51.6	-18°44.1	-18°36.4	-18°28.6	+7.2	61.1
	Th 26	319°38.0	334°02.9	348°27.9	2°53.0	17°18.2	31°43.5	46°08.9	60°34.4	75°00.0	89°25.7	103°51.5	+25.3	16.5
		-16°17.5	-16°07.9	-15°58.2	-15°48.4	-15°38.4	-15°28.4	-15°18.3	-15°08.1	-14°57.9	-14°47.5	-14°37.0	+10.1	60.5
	Fr 27	320°29.9	334°57.2	349°24.6	3°52.2	18°19.8	32°47.5	47°15.3	61°43.1	76°11.1	90°39.2	105°07.3	+27.7	16.3
		-11°51.2	-11°39.6	-11°28.0	-11°16.3	-11°04.5	-10°52.8	-10°40.9	-10°29.0	-10°17.1	-10°05.1	-9°53.1	+11.8	59.7
	Sa 28	322°19.7	336°49.2	351°18.7	5°48.4	20°18.1	34°47.8	49°17.6	63°47.6	78°17.5	92°47.6	107°17.7	+29.8	16.0
		-6°48.6	-6°36.1	-6°23.6	-6°11.0	-5°58.5	-5°45.9	-5°33.3	-5°20.7	-5°08.1	-4°55.5	-4°42.9	+12.6	58.7
	Su 29	324°56.8	339°27.9	353°59.0	8°30.2	23°01.4	37°32.6	52°03.9	66°35.3	81°06.7	95°38.1	110°09.6	+31.3	15.7
		-1°33.5	-1°20.9	-1°08.3	-0°55.8	-0°43.2	-0°30.7	-0°18.2	-0°05.7	0°06.8	0°19.3	0°31.7	+12.5	57.7
	Mo 30	328°06.4	342°38.4	357°10.5	11°42.6	26°14.7	40°46.8	55°19.0	69°51.2	84°23.4	98°55.6	113°27.9	+32.2	15.5
		3°35.4	3°47.4	3°59.4	4°11.3	4°23.2	4°35.1	4°46.9	4°58.7	5°10.5	5°22.2	5°33.9	+11.9	56.7
◐	Tu 31	331°33.4	346°05.8	0°38.3	15°10.7	29°43.2	44°15.7	58°48.1	73°20.6	87°53.1	102°25.5	116°58.0	+32.5	15.2
		8°23.8	8°34.8	8°45.7	8°56.5	9°07.3	9°18.1	9°28.7	9°39.4	9°50.0	10°00.5	10°10.9	+10.7	55.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 1 22h56 — FM: 9 22h40 — LQ: 18 00h01 — NM: 24 17h32 — FQ: 31 13h36

SUN

January 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	269°09.8	284°09.6	299°09.3	314°09.0	329°08.7	344°08.4	359°08.1	14°07.8	29°07.5	44°07.2	59°06.9	74°06.6	-0.3
	-23°00.6	-23°00.4	-23°00.2	-23°00.0	-22°59.8	-22°59.6	-22°59.4	-22°59.2	-22°59.0	-22°58.7	-22°58.5	-22°58.3	+0.2
Th 2	269°02.8	284°02.5	299°02.2	314°01.9	329°01.6	344°01.3	359°01.1	14°00.8	29°00.5	44°00.2	58°59.9	73°59.6	-0.3
	-22°55.5	-22°55.3	-22°55.1	-22°54.8	-22°54.6	-22°54.4	-22°54.2	-22°53.9	-22°53.7	-22°53.5	-22°53.3	-22°53.0	+0.2
Fr 3	268°55.8	283°55.6	298°55.3	313°55.0	328°54.7	343°54.4	358°54.1	13°53.8	28°53.5	43°53.3	58°53.0	73°52.7	-0.3
	-22°50.0	-22°49.7	-22°49.5	-22°49.2	-22°49.0	-22°48.7	-22°48.5	-22°48.3	-22°48.0	-22°47.8	-22°47.5	-22°47.3	+0.2
Sa 4	268°49.0	283°48.7	298°48.4	313°48.1	328°47.8	343°47.6	358°47.3	13°47.0	28°46.7	43°46.4	58°46.2	73°45.9	-0.3
	-22°44.0	-22°43.7	-22°43.4	-22°43.2	-22°42.9	-22°42.7	-22°42.4	-22°42.1	-22°41.9	-22°41.6	-22°41.3	-22°41.1	+0.3
Su 5	268°42.2	283°41.9	298°41.7	313°41.4	328°41.1	343°40.8	358°40.6	13°40.3	28°40.0	43°39.7	58°39.4	73°39.2	-0.3
	-22°37.5	-22°37.2	-22°36.9	-22°36.7	-22°36.4	-22°36.1	-22°35.8	-22°35.5	-22°35.3	-22°35.0	-22°34.7	-22°34.4	+0.3
Mo 6	268°35.6	283°35.3	298°35.0	313°34.8	328°34.5	343°34.2	358°33.9	13°33.7	28°33.4	43°33.1	58°32.8	73°32.6	-0.3
	-22°30.6	-22°30.3	-22°30.0	-22°29.7	-22°29.4	-22°29.1	-22°28.8	-22°28.5	-22°28.2	-22°27.9	-22°27.6	-22°27.3	+0.3
Tu 7	268°29.0	283°28.8	298°28.5	313°28.2	328°28.0	343°27.7	358°27.4	13°27.2	28°26.9	43°26.6	58°26.4	73°26.1	-0.3
	-22°23.3	-22°22.9	-22°22.6	-22°22.3	-22°22.0	-22°21.7	-22°21.4	-22°21.0	-22°20.7	-22°20.4	-22°20.1	-22°19.7	+0.3
We 8	268°22.6	283°22.4	298°22.1	313°21.8	328°21.3	343°21.0	358°21.1	13°20.8	28°20.5	43°20.3	58°20.0	73°19.7	-0.3
	-22°15.5	-22°15.1	-22°14.8	-22°14.5	-22°14.1	-22°13.8	-22°13.5	-22°13.1	-22°12.8	-22°12.4	-22°12.1	-22°11.8	+0.3
Th 9	268°16.4	283°16.1	298°15.8	313°15.6	328°15.3	343°15.1	358°14.8	13°14.6	28°14.3	43°14.0	58°13.8	73°13.5	-0.3
	-22°07.3	-22°06.9	-22°06.5	-22°06.2	-22°05.8	-22°05.5	-22°05.1	-22°04.8	-22°04.4	-22°04.1	-22°03.7	-22°03.3	+0.4
Fr 10	268°10.2	283°10.0	298°09.7	313°09.5	328°09.2	343°09.0	358°08.7	13°08.4	28°08.2	43°07.9	58°07.7	73°07.4	-0.3
	-21°58.6	-21°58.2	-21°57.9	-21°57.5	-21°57.1	-21°56.7	-21°56.4	-21°56.0	-21°55.6	-21°55.2	-21°54.9	-21°54.5	+0.4
Sa 11	268°04.2	283°04.0	298°03.7	313°03.5	328°03.2	343°03.0	358°02.7	13°02.5	28°02.2	43°02.0	58°01.7	73°01.5	-0.2
	-21°49.5	-21°49.1	-21°48.7	-21°48.4	-21°48.0	-21°47.6	-21°47.2	-21°46.8	-21°46.4	-21°46.0	-21°45.6	-21°45.2	+0.4
Su 12	267°58.3	282°58.1	297°57.9	312°57.6	327°57.4	342°57.1	357°56.9	12°56.7	27°56.4	42°56.2	57°55.9	72°55.7	-0.2
	-21°40.0	-21°39.6	-21°39.2	-21°38.8	-21°38.4	-21°38.0	-21°37.6	-21°37.2	-21°36.7	-21°36.3	-21°35.9	-21°35.5	+0.4
Mo 13	267°52.6	282°52.4	297°52.2	312°51.9	327°51.7	342°51.5	357°51.2	12°51.0	27°50.8	42°50.5	57°50.3	72°50.1	-0.2
	-21°30.1	-21°29.7	-21°29.2	-21°28.8	-21°28.4	-21°28.0	-21°27.5	-21°27.1	-21°26.7	-21°26.2	-21°25.8	-21°25.4	+0.4
Tu 14	267°47.1	282°46.8	297°46.6	312°46.4	327°46.2	342°45.9	357°45.7	12°45.5	27°45.3	42°45.0	57°44.8	72°44.6	-0.2
	-21°19.7	-21°19.3	-21°18.9	-21°18.4	-21°18.0	-21°17.5	-21°17.1	-21°16.6	-21°16.2	-21°15.7	-21°15.3	-21°14.9	+0.4
We 15	267°41.7	282°41.4	297°41.2	312°41.0	327°40.8	342°40.6	357°40.3	12°40.1	27°39.9	42°39.7	57°39.5	72°39.2	-0.2
	-21°09.0	-21°08.5	-21°08.1	-21°07.6	-21°07.1	-21°06.7	-21°06.2	-21°05.8	-21°05.3	-21°04.8	-21°04.4	-21°03.9	+0.5
Th 16	267°36.4	282°36.2	297°36.0	312°35.8	327°35.6	342°35.4	357°35.1	12°34.9	27°34.7	42°34.5	57°34.3	72°34.1	-0.2
	-20°57.8	-20°57.3	-20°56.9	-20°56.4	-20°55.9	-20°55.4	-20°55.0	-20°54.5	-20°54.0	-20°53.5	-20°53.0	-20°52.6	+0.5
Fr 17	267°31.3	282°31.1	297°30.9	312°30.7	327°30.5	342°30.3	357°30.1	12°29.9	27°29.7	42°29.5	57°29.3	72°29.1	-0.2
	-20°46.2	-20°45.7	-20°45.3	-20°44.8	-20°44.3	-20°43.8	-20°43.3	-20°42.8	-20°42.3	-20°41.8	-20°41.3	-20°40.8	+0.5
Sa 18	267°26.4	282°26.2	297°26.0	312°25.8	327°25.6	342°25.4	357°25.2	12°25.0	27°24.8	42°24.6	57°24.4	72°24.2	-0.2
	-20°34.3	-20°33.8	-20°33.3	-20°32.8	-20°32.2	-20°31.7	-20°31.2	-20°30.7	-20°30.2	-20°29.7	-20°29.2	-20°28.7	+0.5
Su 19	267°21.7	282°21.5	297°21.3	312°21.1	327°20.9	342°20.7	357°20.5	12°20.4	27°20.2	42°20.0	57°19.8	72°19.6	-0.2
	-20°21.9	-20°21.4	-20°20.9	-20°20.4	-20°19.8	-20°19.3	-20°18.8	-20°18.2	-20°17.7	-20°17.2	-20°16.7	-20°16.1	+0.5
Mo 20	267°17.1	282°17.0	297°16.8	312°16.6	327°16.4	342°16.2	357°16.0	12°15.9	27°15.7	42°15.5	57°15.3	72°15.1	-0.2
	-20°09.2	-20°08.6	-20°08.1	-20°07.6	-20°07.0	-20°06.5	-20°05.9	-20°05.4	-20°04.9	-20°04.3	-20°03.8	-20°03.2	+0.5
Tu 21	267°12.8	282°12.6	297°12.4	312°12.2	327°12.1	342°11.9	357°11.7	12°11.5	27°11.4	42°11.2	57°11.0	72°10.8	-0.2
	-19°56.1	-19°55.5	-19°55.0	-19°54.4	-19°53.8	-19°53.3	-19°52.7	-19°52.2	-19°51.6	-19°51.0	-19°50.5	-19°49.9	+0.6
We 22	267°08.6	282°08.4	297°08.2	312°08.1	327°07.9	342°07.7	357°07.6	12°07.4	27°07.2	42°07.1	57°06.9	72°06.7	-0.2
	-19°42.6	-19°42.0	-19°41.4	-19°40.9	-19°40.3	-19°39.7	-19°39.1	-19°38.6	-19°38.0	-19°37.4	-19°36.8	-19°36.3	+0.6
Th 23	267°04.6	282°04.4	297°04.3	312°04.1	327°03.9	342°03.8	357°03.6	12°03.5	27°03.3	42°03.1	57°03.0	72°02.8	-0.2
	-19°28.7	-19°28.1	-19°27.5	-19°27.0	-19°26.4	-19°25.8	-19°25.2	-19°24.6	-19°24.0	-19°23.4	-19°22.8	-19°22.2	+0.6
Fr 24	267°00.8	282°00.6	297°00.5	312°00.3	327°00.2	342°00.0	356°59.9	11°59.7	26°59.6	41°59.4	56°59.3	71°59.1	-0.2
	-19°14.5	-19°13.9	-19°13.3	-19°12.7	-19°12.1	-19°11.5	-19°10.9	-19°10.3	-19°09.7	-19°09.1	-19°08.5	-19°07.9	+0.6
Sa 25	266°57.2	281°57.0	296°56.9	311°56.8	326°56.6	341°56.5	356°56.3	11°56.2	26°56.0	41°55.9	56°55.7	71°55.6	-0.1
	-18°59.9	-18°59.3	-18°58.7	-18°58.1	-18°57.5	-18°56.8	-18°56.2	-18°55.6	-18°55.0	-18°54.4	-18°53.8	-18°53.1	+0.6
Su 26	266°53.8	281°53.6	296°53.5	311°53.4	326°53.2	341°53.1	356°53.0	11°52.8	26°52.7	41°52.6	56°52.4	71°52.3	-0.1
	-18°45.0	-18°44.4	-18°43.8	-18°43.1	-18°42.5	-18°41.9	-18°41.2	-18°40.6	-18°40.0	-18°39.3	-18°38.7	-18°38.1	+0.6
Mo 27	266°50.6	281°50.5	296°50.3	311°50.2	326°50.1	341°49.9	356°49.8	11°49.7	26°49.6	41°49.4	56°49.3	71°49.2	-0.1
	-18°29.8	-18°29.1	-18°28.5	-18°27.8	-18°27.2	-18°26.5	-18°25.9	-18°25.2	-18°24.6	-18°23.9	-18°23.3	-18°22.6	+0.6
Tu 28	266°47.6	281°47.5	296°47.4	311°47.2	326°47.1	341°47.0	356°46.9	11°46.8	26°46.6	41°46.5	56°46.4	71°46.3	-0.1
	-18°14.2	-18°13.5	-18°12.8	-18°12.2	-18°11.5	-18°10.9	-18°10.2	-18°09.5	-18°08.9	-18°08.2	-18°07.6	-18°06.9	+0.7
We 29	266°44.8	281°44.7	296°44.6	311°44.5	326°44.4	341°44.2	356°44.1	11°44.0	26°43.9	41°43.8	56°43.7	71°43.6	-0.1
	-17°58.2	-17°57.6	-17°56.9	-17°56.2	-17°55.6	-17°54.9	-17°54.2	-17°53.5	-17°52.9	-17°52.2	-17°51.5	-17°50.8	+0.7
Th 30	266°42.2	281°42.1	296°42.0	311°41.9	326°41.8	341°41.7	356°41.6	11°41.5	26°41.4	41°41.3	56°41.2	71°41.1	-0.1
	-17°42.0	-17°41.3	-17°40.6	-17°39.9	-17°39.3	-17°38.6	-17°37.9	-17°37.2	-17°36.5	-17°35.8	-17°35.1	-17°34.4	+0.7
Fr 31	266°39.9	281°39.8	296°39.7	311°39.6	326°39.5	341°39.4	356°39.3	11°39.2	26°39.1	41°39.0	56°38.9	71°38.8	-0.1
	-17°25.4	-17°24.7	-17°24.0	-17°23.4	-17°22.7	-17°22.0	-17°21.3	-17°20.6	-17°19.9	-17°19.2	-17°18.5	-17°17.8	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2031

D	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	Δ'/h	SH
We 1	247°50.1	262°22.6	276°55.0	291°27.4	305°59.8	320°32.2	335°04.6	349°37.0	4°09.4	18°41.7	33°14.1	+32.4	15.1
	11°42.5	11°52.4	12°02.2	12°12.0	12°21.7	12°31.3	12°40.8	12°50.3	12°59.8	13°09.1	13°18.4	+9.6	55.3
Th 2	251°17.6	265°49.7	280°21.8	294°53.8	309°25.9	323°57.9	338°29.9	353°01.9	7°33.9	22°05.8	36°37.7	+32.0	14.9
	15°29.5	15°37.7	15°45.7	15°53.8	16°01.7	16°09.5	16°17.3	16°25.0	16°32.6	16°40.2	16°47.7	+7.8	54.8
Fr 3	254°33.9	269°05.5	283°37.0	298°08.6	312°40.1	327°11.5	341°43.0	356°14.4	10°45.8	25°17.2	39°48.6	+31.5	14.8
	18°29.8	18°36.0	18°42.0	18°48.0	18°53.9	18°59.7	19°05.4	19°11.0	19°16.5	19°21.9	19°27.3	+5.7	54.3
Sa 4	257°36.5	272°07.5	286°38.5	301°09.5	315°40.5	330°11.4	344°42.4	359°13.3	13°44.2	28°15.1	42°45.9	+30.9	14.7
	20°36.4	20°40.3	20°44.0	20°47.7	20°51.3	20°54.7	20°58.1	21°01.4	21°04.6	21°07.7	21°10.7	+3.4	54.1
Su 5	260°27.3	274°58.0	289°28.7	303°59.3	318°29.9	333°00.6	347°31.2	2°01.8	16°32.5	31°03.1	45°33.7	+30.6	14.7
	21°43.6	21°45.0	21°46.3	21°47.4	21°48.5	21°49.5	21°50.4	21°51.2	21°51.9	21°52.5	21°52.9	+0.9	53.9
Mo 6	263°12.7	277°43.4	292°14.0	306°44.6	321°15.3	335°45.9	350°16.6	4°47.2	19°17.9	33°48.6	48°19.3	+30.7	14.7
	21°47.9	21°46.8	21°45.5	21°44.2	21°42.7	21°41.2	21°39.5	21°37.8	21°35.9	21°33.9	21°31.9	-1.6	53.9
Tu 7	266°01.2	280°32.2	295°03.1	309°34.1	324°05.1	338°36.1	353°07.1	7°38.1	22°09.2	36°40.3	51°11.4	+31.0	14.7
	20°49.1	20°45.5	20°41.7	20°37.9	20°34.0	20°30.0	20°25.9	20°21.7	20°17.4	20°13.0	20°08.5	-4.1	54.0
○ We 8	269°00.9	283°32.4	298°03.9	312°35.5	327°07.1	341°38.7	356°10.3	10°42.0	25°13.7	39°45.4	54°17.2	+31.6	14.8
	18°50.2	18°44.2	18°38.2	18°32.1	18°25.9	18°19.7	18°13.3	18°06.9	18°00.3	17°53.7	17°47.0	-6.3	54.2
Th 9	272°16.9	286°49.1	301°21.3	315°53.6	330°25.9	344°58.2	359°30.5	14°02.9	28°35.3	43°07.7	57°40.2	+32.3	14.9
	15°57.2	15°49.3	15°41.3	15°33.2	15°25.1	15°16.8	15°08.5	15°00.2	14°51.8	14°43.3	14°34.7	-8.3	54.5
Fr 10	275°50.0	290°22.8	304°55.7	319°28.6	334°01.5	348°34.4	3°07.3	17°40.3	32°13.3	46°46.3	61°19.3	+32.9	14.9
	12°18.6	12°09.1	11°59.5	11°49.8	11°40.1	11°30.3	11°20.5	11°10.6	11°00.6	10°50.6	10°40.6	-9.8	54.8
Sa 11	279°36.4	294°09.7	308°42.9	323°16.2	337°49.4	352°22.7	6°56.0	21°29.3	36°02.6	50°35.8	65°09.1	+33.3	15.1
	8°04.3	7°53.5	7°42.7	7°31.8	7°21.0	7°10.0	6°59.1	6°48.1	6°37.0	6°26.0	6°14.9	-10.9	55.2
Su 12	283°28.5	298°01.8	312°35.0	327°08.3	341°41.5	356°14.7	10°47.9	25°21.1	39°54.3	54°27.4	69°00.6	+33.2	15.2
	3°24.8	3°13.2	3°01.7	2°50.1	2°38.5	2°26.8	2°15.2	2°03.5	1°51.8	1°40.1	1°28.4	-11.6	55.7
Mo 13	287°15.3	301°48.1	316°20.9	330°53.6	345°26.3	359°58.9	14°31.6	29°04.1	43°36.7	58°09.2	72°41.7	+32.6	15.4
	-1°28.6	-1°40.5	-1°52.3	-2°04.2	-2°16.0	-2°27.9	-2°39.7	-2°51.6	-3°03.4	-3°15.3	-3°27.1	-11.9	56.3
Tu 14	301°48.1	316°20.9	330°53.6	345°26.3	359°58.9	14°31.6	29°04.1	43°36.7	58°09.2	72°41.7	87°14.1	+32.6	15.4
	-1°40.5	-1°52.3	-2°04.2	-2°16.0	-2°27.9	-2°39.7	-2°51.6	-3°03.4	-3°15.3	-3°27.1	-3°39.0	-11.9	56.4
We 15	305°15.5	319°47.2	334°18.8	348°50.4	3°22.0	17°53.4	32°24.9	46°56.2	61°27.5	75°58.8	90°30.0	+31.4	15.6
	-6°35.2	-6°46.8	-6°58.4	-7°10.0	-7°21.6	-7°33.1	-7°44.6	-7°56.1	-8°07.5	-8°19.0	-8°30.4	-11.5	57.0
◑ Th 16	308°09.7	322°39.8	337°09.8	351°39.7	6°09.6	20°39.4	35°09.1	49°38.7	64°08.2	78°37.7	93°07.1	+29.7	15.8
	-11°17.0	-11°27.8	-11°38.5	-11°49.2	-11°59.8	-12°10.4	-12°20.9	-12°31.4	-12°41.8	-12°52.1	-13°02.4	-10.5	57.8
Fr 17	310°17.5	324°45.5	339°13.4	353°41.3	8°09.0	22°36.6	37°04.2	51°31.6	65°59.0	80°26.2	94°53.4	+27.6	16.0
	-15°29.2	-15°38.4	-15°47.5	-15°56.5	-16°05.5	-16°14.4	-16°23.2	-16°31.9	-16°40.5	-16°49.0	-16°57.4	-8.8	58.6
Sa 18	311°30.0	325°55.7	340°21.3	354°46.8	9°12.3	23°37.6	38°02.9	52°28.0	66°53.1	81°18.1	95°43.1	+25.3	16.2
	-18°52.2	-18°59.0	-19°05.7	-19°12.3	-19°18.8	-19°25.1	-19°31.3	-19°37.4	-19°43.4	-19°49.3	-19°55.0	-6.3	59.4
Su 19	311°47.2	326°10.9	340°34.5	354°58.0	9°21.5	23°44.9	38°08.3	52°31.6	66°54.8	81°18.0	95°41.1	+23.4	16.4
	-21°05.3	-21°08.8	-21°12.3	-21°15.6	-21°18.7	-21°21.7	-21°24.6	-21°27.3	-21°29.8	-21°32.2	-21°34.5	-2.9	60.1
Mo 20	311°22.6	325°45.1	340°07.6	354°30.0	8°52.4	23°14.8	37°37.2	51°59.6	66°21.9	80°44.3	95°06.6	+22.4	16.5
	-21°49.7	-21°49.4	-21°49.0	-21°48.4	-21°47.7	-21°46.8	-21°45.7	-21°44.5	-21°43.1	-21°41.6	-21°39.9	+1.0	60.6
Tu 21	310°42.3	325°04.8	339°27.4	353°49.9	8°12.5	22°35.1	36°57.8	51°20.5	65°43.2	80°06.0	94°28.8	+22.6	16.6
	-20°55.1	-20°50.8	-20°46.4	-20°41.9	-20°37.2	-20°32.3	-20°27.3	-20°22.1	-20°16.8	-20°11.3	-20°05.7	+4.9	60.9
We 22	310°17.0	324°40.7	339°04.4	353°28.2	7°52.1	22°16.0	36°40.0	51°04.1	65°28.3	79°52.5	94°16.8	+24.0	16.6
	-18°24.2	-18°16.4	-18°08.4	-18°00.3	-17°52.1	-17°43.7	-17°35.2	-17°26.6	-17°17.9	-17°09.1	-17°00.1	+8.4	60.8
● Th 23	310°30.5	324°56.1	339°21.7	353°47.4	8°13.2	22°39.1	37°05.0	51°31.1	65°57.2	80°23.4	94°49.7	+25.9	16.5
	-14°33.0	-14°22.4	-14°11.7	-14°01.0	-13°50.1	-13°39.2	-13°28.2	-13°17.1	-13°05.9	-12°54.7	-12°43.3	+11.0	60.5
Fr 24	311°33.7	326°01.3	340°28.9	354°56.6	9°24.4	23°52.3	38°20.3	52°48.3	67°16.4	81°44.5	96°12.8	+27.9	16.3
	-9°45.8	-9°33.5	-9°21.2	-9°08.8	-8°56.4	-8°44.0	-8°31.5	-8°19.0	-8°06.5	-7°53.9	-7°41.2	+12.5	59.8
Sa 25	313°24.8	327°54.1	342°23.5	356°53.0	11°22.5	25°52.0	40°21.7	54°51.3	69°21.1	83°50.9	98°20.7	+29.6	16.1
	-4°29.2	-4°16.3	-4°03.3	-3°50.4	-3°37.5	-3°24.5	-3°11.6	-2°58.6	-2°45.7	-2°32.7	-2°19.8	+12.9	59.0
Su 26	315°54.4	330°25.1	344°55.7	359°26.4	13°57.1	28°27.9	42°58.7	57°29.6	72°00.4	86°31.3	101°02.3	+30.8	15.8
	0°52.9	1°05.6	1°18.3	1°30.9	1°43.5	1°56.1	2°08.7	2°21.3	2°33.8	2°46.3	2°58.7	+12.6	58.0
Mo 27	318°50.1	333°21.5	347°52.9	2°24.3	16°55.7	31°27.2	45°58.7	60°30.2	75°01.7	89°33.2	104°04.8	+31.5	15.6
	6°01.0	6°12.8	6°24.6	6°36.3	6°48.0	6°59.6	7°11.2	7°22.7	7°34.2	7°45.6	7°56.9	+11.6	57.1
Tu 28	321°59.2	336°30.9	351°02.6	5°34.3	20°06.0	34°37.7	49°09.4	63°41.1	78°12.8	92°44.5	107°16.2	+31.7	15.3
	10°40.5	10°50.9	11°01.3	11°11.6	11°21.8	11°32.0	11°42.1	11°52.1	12°02.0	12°11.9	12°21.7	+10.1	56.2
We 29	325°11.3	339°43.0	354°14.6	8°46.2	23°17.8	37°49.4	52°21.0	66°52.5	81°24.1	95°55.7	110°27.2	+31.6	15.1
	14°40.4	14°49.0	14°57.6	15°06.1	15°14.5	15°22.8	15°31.1	15°39.3	15°47.4	15°55.4	16°03.3	+8.3	55.4
◐ Th 30	328°18.9	342°50.2	357°21.5	11°52.9	26°24.2	40°55.4	55°26.7	69°58.0	84°29.2	99°00.4	113°31.7	+31.3	14.9
	17°52.2	17°58.8	18°05.3	18°11.7	18°18.0	18°24.2	18°30.4	18°36.4	18°42.4	18°48.2	18°54.0	+6.2	54.8
Fr 31	331°18.1	345°49.1	0°20.1	14°51.1	29°22.0	43°52.9	58°23.9	72°54.8	87°25.7	101°56.6	116°27.4	+30.9	14.8
	20°09.5	20°13.8	20°18.0	20°22.1	20°26.1	20°30.0	20°33.8	20°37.5	20°41.1	20°44.6	20°48.0	+3.9	54.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 8 18h25 — LQ: 16 12h47 — NM: 23 04h31 — FQ: 30 07h43

SUN

February 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	266°37.7	281°37.6	296°37.5	311°37.4	326°37.4	341°37.3	356°37.2	11°37.1	26°37.0	41°36.9	56°36.9	71°36.8	-0.1
	-17°08.6	-17°07.9	-17°07.2	-17°06.5	-17°05.7	-17°05.0	-17°04.3	-17°03.6	-17°02.9	-17°02.2	-17°01.5	-17°00.8	+0.7
Su 2	266°35.7	281°35.7	296°35.6	311°35.5	326°35.4	341°35.4	356°35.3	11°35.2	26°35.1	41°35.1	56°35.0	71°34.9	-0.1
	-16°51.4	-16°50.7	-16°50.0	-16°49.3	-16°48.5	-16°47.8	-16°47.1	-16°46.4	-16°45.6	-16°44.9	-16°44.2	-16°43.5	+0.7
Mo 3	266°34.0	281°33.9	296°33.9	311°33.8	326°33.7	341°33.7	356°33.6	11°33.5	26°33.5	41°33.4	56°33.3	71°33.3	-0.1
	-16°34.0	-16°33.2	-16°32.5	-16°31.8	-16°31.0	-16°30.3	-16°29.5	-16°28.8	-16°28.1	-16°27.3	-16°26.6	-16°25.9	+0.7
Tu 4	266°32.5	281°32.4	296°32.3	311°32.3	326°32.2	341°32.2	356°32.1	11°32.0	26°32.0	41°31.9	56°31.9	71°31.8	-0.1
	-16°16.2	-16°15.5	-16°14.7	-16°14.0	-16°13.2	-16°12.5	-16°11.7	-16°11.0	-16°10.2	-16°09.5	-16°08.7	-16°08.0	+0.7
We 5	266°31.1	281°31.1	296°31.0	311°31.0	326°30.9	341°30.9	356°30.8	11°30.8	26°30.7	41°30.7	56°30.6	71°30.6	-0.0
	-15°58.2	-15°57.4	-15°56.7	-15°55.9	-15°55.2	-15°54.4	-15°53.6	-15°52.9	-15°52.1	-15°51.4	-15°50.6	-15°49.8	+0.8
Th 6	266°30.0	281°29.9	296°29.9	311°29.9	326°29.8	341°29.8	356°29.7	11°29.7	26°29.7	41°29.6	56°29.6	71°29.5	-0.0
	-15°39.9	-15°39.1	-15°38.3	-15°37.6	-15°36.8	-15°36.0	-15°35.3	-15°34.5	-15°33.7	-15°33.0	-15°32.2	-15°31.4	+0.8
Fr 7	266°29.1	281°29.0	296°29.0	311°29.0	326°28.9	341°28.9	356°28.9	11°28.8	26°28.8	41°28.8	56°28.7	71°28.7	-0.0
	-15°21.3	-15°20.5	-15°19.8	-15°19.0	-15°18.2	-15°17.4	-15°16.6	-15°15.9	-15°15.1	-15°14.3	-15°13.5	-15°12.7	+0.8
Sa 8	266°28.3	281°28.3	296°28.3	311°28.2	326°28.2	341°28.2	356°28.2	11°28.1	26°28.1	41°28.1	56°28.1	71°28.1	-0.0
	-15°02.5	-15°01.7	-15°00.9	-15°00.1	-14°59.3	-14°58.5	-14°57.7	-14°57.0	-14°56.2	-14°55.4	-14°54.6	-14°53.8	+0.8
Su 9	266°27.8	281°27.8	296°27.8	311°27.7	326°27.7	341°27.7	356°27.7	11°27.7	26°27.7	41°27.6	56°27.6	71°27.6	-0.0
	-14°43.4	-14°42.6	-14°41.8	-14°41.0	-14°40.2	-14°39.4	-14°38.6	-14°37.8	-14°37.0	-14°36.2	-14°35.4	-14°34.6	+0.8
Mo 10	266°27.5	281°27.4	296°27.4	311°27.4	326°27.4	341°27.4	356°27.4	11°27.4	26°27.4	41°27.4	56°27.4	71°27.4	-0.0
	-14°24.1	-14°23.3	-14°22.5	-14°21.6	-14°20.8	-14°20.0	-14°19.2	-14°18.4	-14°17.6	-14°16.8	-14°15.9	-14°15.1	+0.8
Tu 11	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	-0.0
	-14°04.5	-14°03.7	-14°02.9	-14°02.0	-14°01.2	-14°00.4	-13°59.6	-13°58.7	-13°57.9	-13°57.1	-13°56.3	-13°55.5	+0.8
We 12	266°27.3	281°27.4	296°27.4	311°27.4	326°27.4	341°27.4	356°27.4	11°27.4	26°27.4	41°27.4	56°27.4	71°27.4	+0.0
	-13°44.7	-13°43.9	-13°43.0	-13°42.2	-13°41.4	-13°40.5	-13°39.7	-13°38.9	-13°38.0	-13°37.2	-13°36.4	-13°35.5	+0.8
Th 13	266°27.6	281°27.6	296°27.6	311°27.6	326°27.6	341°27.6	356°27.7	11°27.7	26°27.7	41°27.7	56°27.7	71°27.7	+0.0
	-13°24.7	-13°23.8	-13°23.0	-13°22.1	-13°21.3	-13°20.5	-13°19.6	-13°18.8	-13°17.9	-13°17.1	-13°16.2	-13°15.4	+0.8
Fr 14	266°28.0	281°28.0	296°28.0	311°28.0	326°28.1	341°28.1	356°28.1	11°28.1	26°28.2	41°28.2	56°28.2	71°28.2	+0.0
	-13°04.4	-13°03.6	-13°02.7	-13°01.9	-13°01.0	-13°00.2	-12°59.3	-12°58.5	-12°57.6	-12°56.7	-12°55.9	-12°55.0	+0.9
Sa 15	266°28.6	281°28.6	296°28.6	311°28.7	326°28.7	341°28.7	356°28.7	11°28.8	26°28.8	41°28.8	56°28.9	71°28.9	+0.0
	-12°43.9	-12°43.1	-12°42.2	-12°41.4	-12°40.5	-12°39.6	-12°38.8	-12°37.9	-12°37.1	-12°36.2	-12°35.3	-12°34.5	+0.9
Su 16	266°29.3	281°29.4	296°29.4	311°29.4	326°29.5	341°29.5	356°29.6	11°29.6	26°29.6	41°29.7	56°29.7	71°29.7	+0.0
	-12°23.2	-12°22.4	-12°21.5	-12°20.6	-12°19.8	-12°18.9	-12°18.0	-12°17.2	-12°16.3	-12°15.4	-12°14.6	-12°13.7	+0.9
Mo 17	266°30.3	281°30.3	296°30.4	311°30.4	326°30.4	341°30.5	356°30.5	11°30.6	26°30.6	41°30.7	56°30.7	71°30.8	+0.0
	-12°02.4	-12°01.5	-12°00.6	-11°59.7	-11°58.9	-11°58.0	-11°57.1	-11°56.2	-11°55.4	-11°54.5	-11°53.6	-11°52.7	+0.9
Tu 18	266°31.4	281°31.4	296°31.5	311°31.5	326°31.6	341°31.6	356°31.7	11°31.7	26°31.8	41°31.8	56°31.9	71°31.9	+0.1
	-11°41.3	-11°40.4	-11°39.5	-11°38.6	-11°37.8	-11°36.9	-11°36.0	-11°35.1	-11°34.2	-11°33.3	-11°32.5	-11°31.6	+0.9
We 19	266°32.7	281°32.7	296°32.8	311°32.8	326°32.9	341°32.9	356°33.0	11°33.1	26°33.1	41°33.2	56°33.2	71°33.3	+0.1
	-11°20.0	-11°19.1	-11°18.3	-11°17.4	-11°16.5	-11°15.6	-11°14.7	-11°13.8	-11°12.9	-11°12.0	-11°11.1	-11°10.2	+0.9
Th 20	266°34.1	281°34.2	296°34.2	311°34.3	326°34.4	341°34.4	356°34.5	11°34.6	26°34.6	41°34.7	56°34.8	71°34.8	+0.1
	-10°58.6	-10°57.7	-10°56.8	-10°55.9	-10°55.0	-10°54.1	-10°53.2	-10°52.3	-10°51.4	-10°50.5	-10°49.6	-10°48.7	+0.9
Fr 21	266°35.7	281°35.8	296°35.8	311°35.9	326°36.0	341°36.1	356°36.1	11°36.2	26°36.3	41°36.4	56°36.4	71°36.5	+0.1
	-10°37.0	-10°36.1	-10°35.2	-10°34.3	-10°33.4	-10°32.5	-10°31.6	-10°30.7	-10°29.7	-10°28.8	-10°27.9	-10°27.0	+0.9
Sa 22	266°37.5	281°37.5	296°37.6	311°37.7	326°37.8	341°37.9	356°37.9	11°38.0	26°38.1	41°38.2	56°38.3	71°38.3	+0.1
	-10°15.2	-10°14.3	-10°13.4	-10°12.5	-10°11.6	-10°10.7	-10°09.7	-10°08.8	-10°07.9	-10°07.0	-10°06.1	-10°05.2	+0.9
Su 23	266°39.4	281°39.5	296°39.6	311°39.6	326°39.7	341°39.8	356°39.9	11°40.0	26°40.1	41°40.2	56°40.2	71°40.3	+0.1
	-9°53.3	-9°52.4	-9°51.5	-9°50.5	-9°49.6	-9°48.7	-9°47.8	-9°46.9	-9°45.9	-9°45.0	-9°44.1	-9°43.2	+0.9
Mo 24	266°41.5	281°41.6	296°41.7	311°41.7	326°41.8	341°41.9	356°42.0	11°42.1	26°42.2	41°42.3	56°42.4	71°42.5	+0.1
	-9°31.2	-9°30.3	-9°29.4	-9°28.4	-9°27.5	-9°26.6	-9°25.7	-9°24.7	-9°23.8	-9°22.9	-9°22.0	-9°21.0	+0.9
Tu 25	266°43.7	281°43.8	296°43.9	311°44.0	326°44.1	341°44.2	356°44.3	11°44.4	26°44.5	41°44.6	56°44.7	71°44.8	+0.1
	-9°09.0	-9°08.1	-9°07.1	-9°06.2	-9°05.3	-9°04.3	-9°03.4	-9°02.5	-9°01.6	-9°00.6	-8°59.7	-8°58.8	+0.9
We 26	266°46.1	281°46.2	296°46.3	311°46.4	326°46.5	341°46.6	356°46.7	11°46.8	26°46.9	41°47.0	56°47.1	71°47.2	+0.1
	-8°46.6	-8°45.7	-8°44.8	-8°43.8	-8°42.9	-8°42.0	-8°41.0	-8°40.1	-8°39.1	-8°38.2	-8°37.3	-8°36.3	+0.9
Th 27	266°48.6	281°48.7	296°48.8	311°48.9	326°49.0	341°49.1	356°49.3	11°49.4	26°49.5	41°49.6	56°49.7	71°49.8	+0.1
	-8°24.1	-8°23.2	-8°22.3	-8°21.3	-8°20.4	-8°19.4	-8°18.5	-8°17.6	-8°16.6	-8°15.7	-8°14.7	-8°13.8	+0.9
Fr 28	266°51.3	281°51.4	296°51.5	311°51.6	326°51.7	341°51.8	356°52.0	11°52.1	26°52.2	41°52.3	56°52.4	71°52.5	+0.1
	-8°01.5	-8°00.6	-7°59.6	-7°58.7	-7°57.8	-7°56.8	-7°55.9	-7°54.9	-7°54.0	-7°53.0	-7°52.1	-7°51.1	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2031

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Sa 1	247°04.8	261°35.6	276°06.4	290°37.1	305°07.9	319°38.6	334°09.4	348°40.1	3°10.8	17°41.5	32°12.2	+30.7	14.8
	21°14.3	21°16.7	21°19.1	21°21.3	21°23.4	21°25.5	21°27.4	21°29.2	21°31.0	21°32.6	21°34.1	+2.0	54.1
Su 2	249°52.5	264°23.1	278°53.8	293°24.5	307°55.1	322°25.8	336°56.5	351°27.2	5°57.9	20°28.6	34°59.2	+30.7	14.7
	21°45.1	21°45.0	21°44.8	21°44.5	21°44.1	21°43.6	21°43.1	21°42.4	21°41.6	21°40.7	21°39.7	-0.5	54.0
Mo 3	252°40.5	267°11.3	281°42.2	296°13.0	310°43.9	325°14.7	339°45.6	354°16.5	8°47.4	23°18.4	37°49.3	+30.9	14.7
	21°12.9	21°10.3	21°07.7	21°04.9	21°02.0	20°59.0	20°56.0	20°52.8	20°49.5	20°46.2	20°42.7	-3.0	54.1
Tu 4	255°35.4	270°06.7	284°37.9	299°09.2	313°40.5	328°11.8	342°43.1	357°14.4	11°45.8	26°17.2	40°48.6	+31.3	14.8
	19°39.5	19°34.5	19°29.5	19°24.3	19°19.1	19°13.8	19°08.3	19°02.8	18°57.2	18°51.6	18°45.8	-5.4	54.2
We 5	258°42.4	273°14.2	287°46.0	302°17.8	316°49.6	331°21.5	345°53.4	0°25.3	14°57.2	29°29.2	44°01.2	+31.9	14.9
	17°09.0	17°01.9	16°54.7	16°47.4	16°40.1	16°32.7	16°25.1	16°17.6	16°09.9	16°02.2	15°54.3	-7.5	54.5
Th 6	262°03.5	276°35.8	291°08.2	305°40.5	320°12.9	334°45.3	349°17.8	3°50.2	18°22.7	32°55.2	47°27.7	+32.4	15.0
	13°48.4	13°39.5	13°30.5	13°21.4	13°12.3	13°03.1	12°53.8	12°44.5	12°35.1	12°25.6	12°16.1	-9.2	54.9
○ Fr 7	265°37.1	280°09.9	294°42.6	309°15.4	323°48.2	338°20.9	352°53.7	7°26.5	21°59.4	36°32.2	51°05.0	+32.8	15.1
	9°46.7	9°36.3	9°25.9	9°15.4	9°04.9	8°54.3	8°43.7	8°33.0	8°22.3	8°11.6	8°00.8	-10.6	55.3
Sa 8	269°18.1	283°51.0	298°23.8	312°56.7	327°29.6	342°02.5	356°35.3	11°08.2	25°41.1	40°13.9	54°46.8	+32.9	15.2
	5°14.4	5°03.0	4°51.6	4°40.2	4°28.8	4°17.3	4°05.8	3°54.3	3°42.7	3°31.1	3°19.5	-11.5	55.8
Su 9	272°58.2	287°30.8	302°03.5	316°36.1	331°08.7	345°41.2	0°13.8	14°46.3	29°18.8	43°51.3	58°23.7	+32.6	15.3
	0°23.5	0°11.6	-0°00.2	-0°12.1	-0°24.0	-0°35.8	-0°47.7	-0°59.6	-1°11.5	-1°23.3	-1°35.2	-11.9	56.3
Mo 10	276°27.1	290°59.0	305°30.9	320°02.8	334°34.7	349°06.5	3°38.2	18°10.0	32°41.6	47°13.3	61°44.9	+31.8	15.5
	-4°33.0	-4°44.7	-4°56.5	-5°08.2	-5°19.9	-5°31.6	-5°43.3	-5°55.0	-6°06.6	-6°18.3	-6°29.9	-11.7	56.8
Tu 11	279°33.1	294°03.9	308°34.7	323°05.3	337°36.0	352°06.6	6°37.1	21°07.5	35°37.9	50°08.3	64°38.6	+30.5	15.6
	-9°20.4	-9°31.5	-9°42.6	-9°53.6	-10°04.6	-10°15.5	-10°26.4	-10°37.2	-10°48.0	-10°58.7	-11°09.4	-10.9	57.3
We 12	282°05.1	296°34.3	311°03.5	325°32.6	340°01.6	354°30.5	8°59.4	23°28.2	37°57.0	52°25.6	66°54.2	+28.9	15.8
	-13°43.1	-13°52.9	-14°02.6	-14°12.2	-14°21.7	-14°31.2	-14°40.6	-14°49.9	-14°59.2	-15°08.3	-15°17.4	-9.4	57.8
Th 13	296°34.3	311°03.5	325°32.6	340°01.6	354°30.5	8°59.4	23°28.2	37°57.0	52°25.6	66°54.2	81°22.7	+28.8	15.8
	-13°52.9	-14°02.6	-14°12.2	-14°21.7	-14°31.2	-14°40.6	-14°49.9	-14°59.2	-15°08.3	-15°17.4	-15°26.4	-9.4	57.9
◑ Fr 14	298°21.7	312°49.0	327°16.3	341°43.5	356°10.6	10°37.6	25°04.6	39°31.5	53°58.3	68°25.0	82°51.7	+27.0	15.9
	-17°31.4	-17°39.0	-17°46.5	-17°53.9	-18°01.2	-18°08.4	-18°15.5	-18°22.4	-18°29.3	-18°36.1	-18°42.8	-7.1	58.4
Sa 15	299°23.3	313°48.9	328°14.4	342°39.8	357°05.2	11°30.5	25°55.8	40°21.0	54°46.1	69°11.2	83°36.2	+25.3	16.1
	-20°09.1	-20°13.9	-20°18.6	-20°23.1	-20°27.5	-20°31.8	-20°36.0	-20°40.0	-20°43.9	-20°47.7	-20°51.3	-4.2	58.9
Su 16	299°45.6	314°09.9	328°34.1	342°58.3	357°22.5	11°46.6	26°10.7	40°34.8	54°58.9	69°22.9	83°46.9	+24.1	16.2
	-21°29.5	-21°30.9	-21°32.1	-21°33.3	-21°34.3	-21°35.1	-21°35.8	-21°36.3	-21°36.7	-21°37.0	-21°37.1	-0.8	59.4
Mo 17	299°44.8	314°08.6	328°32.4	342°56.2	357°20.0	11°43.9	26°07.7	40°31.5	54°55.3	69°19.2	83°43.1	+23.8	16.3
	-21°20.9	-21°18.7	-21°16.3	-21°13.7	-21°11.0	-21°08.1	-21°05.1	-21°02.0	-20°58.7	-20°55.2	-20°51.7	+2.9	59.8
Tu 18	299°43.5	314°07.8	328°32.1	342°56.4	357°20.8	11°45.2	26°09.6	40°34.1	54°58.7	69°23.2	83°47.9	+24.4	16.4
	-19°40.6	-19°34.8	-19°28.8	-19°22.7	-19°16.4	-19°10.0	-19°03.5	-18°56.9	-18°50.1	-18°43.2	-18°36.2	+6.5	60.0
We 19	300°03.1	314°28.6	328°54.1	343°19.6	357°45.3	12°10.9	26°36.7	41°02.5	55°28.3	69°54.2	84°20.2	+25.7	16.4
	-16°36.0	-16°27.1	-16°18.1	-16°08.9	-15°59.7	-15°50.3	-15°40.9	-15°31.3	-15°21.7	-15°11.9	-15°02.1	+9.4	60.0
Th 20	300°57.3	315°24.3	329°51.3	344°18.4	358°45.6	13°12.8	27°40.1	42°07.4	56°34.9	71°02.3	85°29.9	+27.3	16.3
	-12°23.8	-12°12.6	-12°01.4	-11°50.0	-11°38.6	-11°27.2	-11°15.6	-11°04.0	-10°52.4	-10°40.7	-10°28.9	+11.5	59.8
● Fr 21	302°29.9	316°58.4	331°26.9	345°55.5	0°24.1	14°52.8	29°21.5	43°50.3	58°19.1	72°48.0	87°16.9	+28.7	16.2
	-7°26.2	-7°13.7	-7°01.2	-6°48.6	-6°36.0	-6°23.4	-6°10.7	-5°58.0	-5°45.3	-5°32.6	-5°19.9	+12.6	59.4
Sa 22	304°36.6	319°06.3	333°36.0	348°05.8	2°35.5	17°05.4	31°35.2	46°05.1	60°35.0	75°05.0	89°35.0	+29.8	16.0
	-2°07.1	-1°54.2	-1°41.3	-1°28.4	-1°15.5	-1°02.6	-0°49.8	-0°36.9	-0°24.1	-0°11.2	0°01.6	+12.9	58.7
Su 23	307°08.8	321°39.2	336°09.7	350°40.3	5°10.8	19°41.4	34°11.9	48°42.6	63°13.2	77°43.8	92°14.5	+30.6	15.8
	3°11.5	3°24.0	3°36.4	3°48.8	4°01.2	4°13.5	4°25.7	4°38.0	4°50.2	5°02.3	5°14.5	+12.3	57.9
Mo 24	309°56.3	324°27.2	338°58.1	353°29.0	7°59.9	22°30.8	37°01.7	51°32.7	66°03.6	80°34.5	95°05.5	+30.9	15.6
	8°10.7	8°22.1	8°33.3	8°44.6	8°55.7	9°06.8	9°17.9	9°28.9	9°39.8	9°50.7	10°01.5	+11.1	57.1
Tu 25	312°50.1	327°21.1	341°52.0	356°23.0	10°54.0	25°25.0	39°55.9	54°26.9	68°57.8	83°28.8	97°59.8	+31.0	15.3
	12°35.5	12°45.2	12°54.8	13°04.3	13°13.8	13°23.2	13°32.5	13°41.8	13°51.0	14°00.1	14°09.1	+9.4	56.3
We 26	315°43.5	330°14.3	344°45.2	359°16.0	13°46.9	28°17.7	42°48.5	57°19.4	71°50.2	86°21.0	100°51.8	+30.8	15.1
	16°14.4	16°22.1	16°29.7	16°37.2	16°44.6	16°52.0	16°59.2	17°06.4	17°13.4	17°20.4	17°27.3	+7.3	55.5
Th 27	318°32.9	333°03.5	347°34.2	2°04.9	16°35.5	31°06.2	45°36.8	60°07.5	74°38.1	89°08.7	103°39.4	+30.7	15.0
	18°59.5	19°04.9	19°10.2	19°15.4	19°20.5	19°25.5	19°30.4	19°35.2	19°39.9	19°44.6	19°49.1	+5.0	54.9
Fr 28	321°18.2	335°48.7	350°19.3	4°49.9	19°20.4	33°51.0	48°21.5	62°52.1	77°22.6	91°53.2	106°23.7	+30.6	14.9
	20°45.2	20°48.1	20°50.9	20°53.7	20°56.3	20°58.9	21°01.3	21°03.7	21°05.9	21°08.0	21°10.1	+2.5	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 7 12h46 — LQ: 14 22h49 — NM: 21 15h48

SUN

March 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	266°54.1	281°54.2	296°54.3	311°54.4	326°54.5	341°54.7	356°54.8	11°54.9	26°55.0	41°55.1	56°55.3	71°55.4	+0.1
	-7°38.8	-7°37.9	-7°36.9	-7°36.0	-7°35.0	-7°34.1	-7°33.1	-7°32.2	-7°31.2	-7°30.3	-7°29.3	-7°28.4	+1.0
Su 2	266°57.0	281°57.1	296°57.2	311°57.4	326°57.5	341°57.6	356°57.7	11°57.9	26°58.0	41°58.1	56°58.3	71°58.4	+0.1
	-7°16.0	-7°15.0	-7°14.1	-7°13.1	-7°12.2	-7°11.2	-7°10.3	-7°09.3	-7°08.3	-7°07.4	-7°06.4	-7°05.5	+1.0
Mo 3	267°00.1	282°00.2	297°00.3	312°00.4	327°00.6	342°00.7	357°00.8	12°01.0	27°01.1	42°01.2	57°01.4	72°01.5	+0.1
	-6°53.0	-6°52.1	-6°51.1	-6°50.2	-6°49.2	-6°48.3	-6°47.3	-6°46.3	-6°45.4	-6°44.4	-6°43.5	-6°42.5	+1.0
Tu 4	267°03.2	282°03.4	297°03.5	312°03.6	327°03.8	342°03.9	357°04.0	12°04.2	27°04.3	42°04.5	57°04.6	72°04.7	+0.1
	-6°30.0	-6°29.1	-6°28.1	-6°27.1	-6°26.2	-6°25.2	-6°24.2	-6°23.3	-6°22.3	-6°21.4	-6°20.4	-6°19.4	+1.0
We 5	267°06.5	282°06.7	297°06.8	312°06.9	327°07.1	342°07.2	357°07.4	12°07.5	27°07.7	42°07.8	57°07.9	72°08.1	+0.1
	-6°06.9	-6°05.9	-6°05.0	-6°04.0	-6°03.0	-6°02.1	-6°01.1	-6°00.1	-5°59.2	-5°58.2	-5°57.2	-5°56.3	+1.0
Th 6	267°09.9	282°10.1	297°10.2	312°10.4	327°10.5	342°10.7	357°10.8	12°11.0	27°11.1	42°11.2	57°11.4	72°11.5	+0.1
	-5°43.7	-5°42.7	-5°41.8	-5°40.8	-5°39.8	-5°38.8	-5°37.9	-5°36.9	-5°35.9	-5°35.0	-5°34.0	-5°33.0	+1.0
Fr 7	267°13.5	282°13.6	297°13.8	312°13.9	327°14.0	342°14.2	357°14.3	12°14.5	27°14.6	42°14.8	57°14.9	72°15.1	+0.1
	-5°20.4	-5°19.4	-5°18.5	-5°17.5	-5°16.5	-5°15.6	-5°14.6	-5°13.6	-5°12.6	-5°11.7	-5°10.7	-5°09.7	+1.0
Sa 8	267°17.1	282°17.2	297°17.4	312°17.5	327°17.7	342°17.8	357°18.0	12°18.1	27°18.3	42°18.5	57°18.6	72°18.8	+0.2
	-4°57.1	-4°56.1	-4°55.1	-4°54.1	-4°53.2	-4°52.2	-4°51.2	-4°50.2	-4°49.3	-4°48.3	-4°47.3	-4°46.3	+1.0
Su 9	267°20.8	282°20.9	297°21.1	312°21.3	327°21.4	342°21.6	357°21.7	12°21.9	27°22.0	42°22.2	57°22.4	72°22.5	+0.2
	-4°33.6	-4°32.7	-4°31.7	-4°30.7	-4°29.7	-4°28.8	-4°27.8	-4°26.8	-4°25.8	-4°24.9	-4°23.9	-4°22.9	+1.0
Mo 10	267°24.6	282°24.7	297°24.9	312°25.1	327°25.2	342°25.4	357°25.5	12°25.7	27°25.9	42°26.0	57°26.2	72°26.4	+0.2
	-4°10.2	-4°09.2	-4°08.2	-4°07.2	-4°06.3	-4°05.3	-4°04.3	-4°03.3	-4°02.3	-4°01.4	-4°00.4	-3°59.4	+1.0
Tu 11	267°28.5	282°28.6	297°28.8	312°29.0	327°29.1	342°29.3	357°29.5	12°29.6	27°29.8	42°29.9	57°30.1	72°30.3	+0.2
	-3°46.6	-3°45.7	-3°44.7	-3°43.7	-3°42.7	-3°41.7	-3°40.8	-3°39.8	-3°38.8	-3°37.8	-3°36.8	-3°35.8	+1.0
We 12	267°32.4	282°32.6	297°32.8	312°32.9	327°33.1	342°33.3	357°33.4	12°33.6	27°33.8	42°33.9	57°34.1	72°34.3	+0.2
	-3°23.1	-3°22.1	-3°21.1	-3°20.1	-3°19.1	-3°18.2	-3°17.2	-3°16.2	-3°15.2	-3°14.2	-3°13.2	-3°12.3	+1.0
Th 13	267°36.5	282°36.6	297°36.8	312°37.0	327°37.1	342°37.3	357°37.5	12°37.7	27°37.8	42°38.0	57°38.2	72°38.3	+0.2
	-2°59.5	-2°58.5	-2°57.5	-2°56.5	-2°55.5	-2°54.5	-2°53.5	-2°52.6	-2°51.6	-2°50.6	-2°49.6	-2°48.6	+1.0
Fr 14	267°40.6	282°40.7	297°40.9	312°41.1	327°41.3	342°41.4	357°41.6	12°41.8	27°41.9	42°42.1	57°42.3	72°42.5	+0.2
	-2°35.8	-2°34.8	-2°33.8	-2°32.8	-2°31.9	-2°30.9	-2°29.9	-2°28.9	-2°27.9	-2°26.9	-2°25.9	-2°25.0	+1.0
Sa 15	267°44.7	282°44.9	297°45.1	312°45.2	327°45.4	342°45.6	357°45.8	12°45.9	27°46.1	42°46.3	57°46.5	72°46.6	+0.2
	-2°12.1	-2°11.1	-2°10.2	-2°09.2	-2°08.2	-2°07.2	-2°06.2	-2°05.2	-2°04.2	-2°03.2	-2°02.3	-2°01.3	+1.0
Su 16	267°48.9	282°49.1	297°49.3	312°49.5	327°49.6	342°49.8	357°50.0	12°50.2	27°50.4	42°50.5	57°50.7	72°50.9	+0.2
	-1°48.4	-1°47.4	-1°46.4	-1°45.5	-1°44.5	-1°43.5	-1°42.5	-1°41.5	-1°40.5	-1°39.5	-1°38.5	-1°37.6	+1.0
Mo 17	267°53.2	282°53.4	297°53.6	312°53.7	327°53.9	342°54.1	357°54.3	12°54.4	27°54.6	42°54.8	57°55.0	72°55.2	+0.2
	-1°24.7	-1°23.7	-1°22.7	-1°21.7	-1°20.7	-1°19.8	-1°18.8	-1°17.8	-1°16.8	-1°15.8	-1°14.8	-1°13.8	+1.0
Tu 18	267°57.5	282°57.7	297°57.9	312°58.0	327°58.2	342°58.4	357°58.6	12°58.8	27°58.9	42°59.1	57°59.3	72°59.5	+0.2
	-1°01.0	-1°00.0	-0°59.0	-0°58.0	-0°57.0	-0°56.0	-0°55.0	-0°54.1	-0°53.1	-0°52.1	-0°51.1	-0°50.1	+1.0
We 19	268°01.9	283°02.0	298°02.2	313°02.4	328°02.6	343°02.8	358°02.9	13°03.1	28°03.3	43°03.5	58°03.7	73°03.9	+0.2
	-0°37.2	-0°36.3	-0°35.3	-0°34.3	-0°33.3	-0°32.3	-0°31.3	-0°30.3	-0°29.3	-0°28.3	-0°27.4	-0°26.4	+1.0
Th 20	268°06.2	283°06.4	298°06.6	313°06.8	328°07.0	343°07.1	358°07.3	13°07.5	28°07.7	43°07.9	58°08.1	73°08.3	+0.2
	-0°13.5	-0°12.5	-0°11.5	-0°10.5	-0°09.6	-0°08.6	-0°07.6	-0°06.6	-0°05.6	-0°04.6	-0°03.6	-0°02.6	+1.0
Fr 21	268°10.6	283°10.8	298°11.0	313°11.2	328°11.4	343°11.6	358°11.8	13°11.9	28°12.1	43°12.3	58°12.5	73°12.7	+0.2
	0°10.2	0°11.2	0°12.2	0°13.2	0°14.2	0°15.2	0°16.1	0°17.1	0°18.1	0°19.1	0°20.1	0°21.1	+1.0
Sa 22	268°15.1	283°15.3	298°15.5	313°15.6	328°15.8	343°16.0	358°16.2	13°16.4	28°16.6	43°16.8	58°16.9	73°17.1	+0.2
	0°33.9	0°34.9	0°35.9	0°36.9	0°37.9	0°38.9	0°39.8	0°40.8	0°41.8	0°42.8	0°43.8	0°44.8	+1.0
Su 23	268°19.5	283°19.7	298°19.9	313°20.1	328°20.3	343°20.5	358°20.7	13°20.8	28°21.0	43°21.2	58°21.4	73°21.6	+0.2
	0°57.6	0°58.6	0°59.6	1°00.6	1°01.5	1°02.5	1°03.5	1°04.5	1°05.5	1°06.5	1°07.5	1°08.4	+1.0
Mo 24	268°24.0	283°24.2	298°24.4	313°24.6	328°24.8	343°25.0	358°25.1	13°25.3	28°25.5	43°25.7	58°25.9	73°26.1	+0.2
	1°21.3	1°22.2	1°23.2	1°24.2	1°25.2	1°26.2	1°27.2	1°28.1	1°29.1	1°30.1	1°31.1	1°32.1	+1.0
Tu 25	268°28.5	283°28.7	298°28.9	313°29.1	328°29.3	343°29.4	358°29.6	13°29.8	28°30.0	43°30.2	58°30.4	73°30.6	+0.2
	1°44.9	1°45.9	1°46.8	1°47.8	1°48.8	1°49.8	1°50.8	1°51.8	1°52.7	1°53.7	1°54.7	1°55.7	+1.0
We 26	268°33.0	283°33.2	298°33.4	313°33.6	328°33.8	343°34.0	358°34.1	13°34.3	28°34.5	43°34.7	58°34.9	73°35.1	+0.2
	2°08.5	2°09.4	2°10.4	2°11.4	2°12.4	2°13.4	2°14.3	2°15.3	2°16.3	2°17.3	2°18.3	2°19.2	+1.0
Th 27	268°37.5	283°37.7	298°37.9	313°38.1	328°38.3	343°38.5	358°38.7	13°38.8	28°39.0	43°39.2	58°39.4	73°39.6	+0.2
	2°32.0	2°33.0	2°33.9	2°34.9	2°35.9	2°36.9	2°37.9	2°38.8	2°39.8	2°40.8	2°41.8	2°42.8	+1.0
Fr 28	268°42.0	283°42.2	298°42.4	313°42.6	328°42.8	343°43.0	358°43.2	13°43.3	28°43.5	43°43.7	58°43.9	73°44.1	+0.2
	2°55.5	2°56.4	2°57.4	2°58.4	2°59.4	3°00.3	3°01.3	3°02.3	3°03.3	3°04.3	3°05.2	3°06.2	+1.0
Sa 29	268°46.5	283°46.7	298°46.9	313°47.1	328°47.3	343°47.5	358°47.7	13°47.9	28°48.0	43°48.2	58°48.4	73°48.6	+0.2
	3°18.9	3°19.9	3°20.8	3°21.8	3°22.8	3°23.8	3°24.7	3°25.7	3°26.7	3°27.6	3°28.6	3°29.6	+1.0
Su 30	268°51.0	283°51.2	298°51.4	313°51.6	328°51.8	343°52.0	358°52.2	13°52.3	28°52.5	43°52.7	58°52.9	73°53.1	+0.2
	3°42.2	3°43.2	3°44.2	3°45.2	3°46.1	3°47.1	3°48.1	3°49.0	3°50.0	3°51.0	3°51.9	3°52.9	+1.0
Mo 31	268°55.5	283°55.7	298°55.9	313°56.1	328°56.3	343°56.5	358°56.6	13°56.8	28°57.0	43°57.2	58°57.4	73°57.6	+0.2
	4°05.5	4°06.5	4°07.5	4°08.4	4°09.4	4°10.4	4°11.3	4°12.3	4°13.3	4°14.2	4°15.2	4°16.2	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2031

	D	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	Δ'/h	SH
◐	Sa 1	251°29.3	265°59.9	280°30.5	295°01.1	309°31.7	324°02.3	338°32.9	353°03.5	7°34.1	22°04.7	36°35.3	+30.6	14.8
		21°24.9	21°25.9	21°26.7	21°27.4	21°28.1	21°28.6	21°29.0	21°29.3	21°29.6	21°29.7	21°29.7	+0.5	54.2
	Su 2	254°15.8	268°46.5	283°17.3	297°48.1	312°19.0	326°49.8	341°20.6	355°51.5	10°22.4	24°53.2	39°24.1	+30.8	14.8
		21°18.1	21°16.5	21°14.9	21°13.1	21°11.2	21°09.3	21°07.2	21°05.0	21°02.8	21°00.4	20°58.0	-2.0	54.1
	Mo 3	257°09.5	271°40.7	286°11.9	300°43.1	315°14.3	329°45.5	344°16.8	358°48.1	13°19.4	27°50.7	42°22.0	+31.2	14.8
		20°09.7	20°05.8	20°01.7	19°57.6	19°53.3	19°49.0	19°44.5	19°40.0	19°35.4	19°30.7	19°25.9	-4.4	54.2
	Tu 4	260°14.4	274°46.0	289°17.7	303°49.4	318°21.1	332°52.9	347°24.6	1°56.4	16°28.2	31°00.0	45°31.8	+31.7	14.8
		18°03.4	17°57.2	17°50.9	17°44.6	17°38.1	17°31.6	17°25.0	17°18.3	17°11.5	17°04.7	16°57.8	-6.6	54.5
	We 5	263°31.6	278°03.7	292°35.9	307°08.0	321°40.2	336°12.4	350°44.6	5°16.9	19°49.1	34°21.4	48°53.6	+32.2	15.0
		15°04.5	14°56.3	14°48.1	14°39.8	14°31.4	14°23.0	14°14.5	14°05.9	13°57.3	13°48.6	13°39.8	-8.5	54.8
	Th 6	266°59.3	281°31.8	296°04.3	310°36.8	325°09.3	339°41.8	354°14.3	8°46.8	23°19.3	37°51.9	52°24.4	+32.5	15.1
		11°20.4	11°10.6	11°00.7	10°50.8	10°40.9	10°30.9	10°20.8	10°10.7	10°00.5	9°50.3	9°40.0	-10.0	55.3
	Fr 7	270°32.8	285°05.3	299°37.9	314°10.4	328°43.0	343°15.5	357°48.1	12°20.6	26°53.1	41°25.6	55°58.2	+32.5	15.2
		7°00.1	6°49.1	6°38.0	6°26.9	6°15.8	6°04.6	5°53.4	5°42.2	5°30.9	5°19.6	5°08.3	-11.2	55.9
	Sa 8	274°04.5	288°36.8	303°09.1	317°41.3	332°13.6	346°45.8	1°18.0	15°50.2	30°22.4	44°54.5	59°26.6	+32.2	15.4
		2°14.6	2°02.9	1°51.1	1°39.3	1°27.5	1°15.6	1°03.8	0°51.9	0°40.0	0°28.1	0°16.2	-11.8	56.5
○	Su 9	277°25.2	291°56.8	306°28.4	321°00.0	335°31.6	350°03.1	4°34.6	19°06.0	33°37.4	48°08.7	62°40.1	+31.5	15.6
		-2°43.0	-2°55.0	-3°06.9	-3°18.9	-3°30.8	-3°42.8	-3°54.7	-4°06.6	-4°18.5	-4°30.4	-4°42.2	-11.9	57.0
	Mo 10	280°24.6	294°55.2	309°25.7	323°56.2	338°26.7	352°57.1	7°27.4	21°57.7	36°27.9	50°58.1	65°28.2	+30.4	15.7
		-7°37.9	-7°49.4	-8°00.8	-8°12.3	-8°23.7	-8°35.0	-8°46.4	-8°57.7	-9°08.9	-9°20.1	-9°31.3	-11.3	57.6
	Tu 11	282°53.1	297°22.3	311°51.5	326°20.5	340°49.5	355°18.4	9°47.3	24°16.1	38°44.9	53°13.6	67°42.2	+28.9	15.8
		-12°12.8	-12°23.2	-12°33.4	-12°43.6	-12°53.8	-13°03.8	-13°13.9	-13°23.8	-13°33.7	-13°43.4	-13°53.2	-10.0	58.0
	We 12	284°43.7	299°11.3	313°38.8	328°06.2	342°33.6	357°00.9	11°28.2	25°55.4	40°22.5	54°49.6	69°16.6	+27.3	15.9
		-16°09.5	-16°17.9	-16°26.2	-16°34.5	-16°42.6	-16°50.6	-16°58.6	-17°06.4	-17°14.1	-17°21.8	-17°29.3	-8.0	58.4
	Th 13	285°54.4	300°20.5	314°46.5	329°12.5	343°38.4	358°04.2	12°30.0	26°55.7	41°21.4	55°47.1	70°12.7	+25.8	16.0
		-19°09.4	-19°15.2	-19°20.9	-19°26.4	-19°31.8	-19°37.1	-19°42.3	-19°47.3	-19°52.3	-19°57.1	-20°01.7	-5.2	58.7
	Fr 14	300°20.5	314°46.5	329°12.5	343°38.4	358°04.2	12°30.0	26°55.7	41°21.4	55°47.1	70°12.7	84°38.2	+25.8	16.0
		-19°15.2	-19°20.9	-19°26.4	-19°31.8	-19°37.1	-19°42.3	-19°47.3	-19°52.3	-19°57.1	-20°01.7	-20°06.3	-5.1	58.8
	Sa 15	300°56.5	315°21.4	329°46.3	344°11.2	358°36.0	13°00.8	27°25.6	41°50.4	56°15.1	70°39.9	85°04.6	+24.8	16.1
		-20°58.9	-21°01.3	-21°03.6	-21°05.8	-21°07.8	-21°09.7	-21°11.4	-21°13.0	-21°14.5	-21°15.8	-21°17.0	-1.8	59.0
◑	Su 16	301°13.7	315°38.3	330°02.9	344°27.5	358°52.1	13°16.6	27°41.2	42°05.9	56°30.5	70°55.1	85°19.7	+24.6	16.1
		-21°17.9	-21°16.9	-21°15.7	-21°14.3	-21°12.8	-21°11.2	-21°09.4	-21°07.5	-21°05.4	-21°03.2	-21°00.9	+1.7	59.2
	Mo 17	301°31.8	315°56.8	330°21.9	344°47.0	359°12.1	13°37.2	28°02.4	42°27.6	56°52.9	71°18.2	85°43.5	+25.2	16.2
		-20°09.3	-20°04.8	-20°00.1	-19°55.4	-19°50.4	-19°45.4	-19°40.2	-19°34.9	-19°29.5	-19°23.9	-19°18.3	+5.1	59.3
	Tu 18	302°09.0	316°35.0	331°01.2	345°27.3	359°53.6	14°19.9	28°46.2	43°12.6	57°39.0	72°05.5	86°32.1	+26.3	16.2
		-17°38.5	-17°30.9	-17°23.2	-17°15.4	-17°07.5	-16°59.5	-16°51.4	-16°43.2	-16°34.9	-16°26.4	-16°17.9	+8.1	59.2
	We 19	303°16.9	317°44.3	332°11.8	346°39.3	1°06.9	15°34.5	30°02.2	44°30.0	58°57.8	73°25.7	87°53.6	+27.7	16.1
		-13°58.6	-13°48.6	-13°38.5	-13°28.4	-13°18.1	-13°07.8	-12°57.4	-12°47.0	-12°36.4	-12°25.8	-12°15.2	+10.3	59.1
	Th 20	304°58.7	319°27.4	333°56.2	348°25.0	2°53.9	17°22.8	31°51.8	46°20.8	60°49.9	75°19.0	89°48.2	+29.0	16.1
		-9°27.4	-9°15.8	-9°04.1	-8°52.4	-8°40.6	-8°28.8	-8°17.0	-8°05.1	-7°53.1	-7°41.1	-7°29.1	+11.8	58.9
	Fr 21	307°10.4	321°40.2	336°10.0	350°39.9	5°09.8	19°39.7	34°09.6	48°39.6	63°09.6	77°39.7	92°09.8	+29.9	16.0
		-4°25.2	-4°12.8	-4°00.3	-3°47.8	-3°35.3	-3°22.8	-3°10.3	-2°57.8	-2°45.3	-2°32.7	-2°20.2	+12.5	58.5
	Sa 22	309°44.0	324°14.4	338°44.9	353°15.4	7°45.9	22°16.5	36°47.0	51°17.6	65°48.2	80°18.8	94°49.4	+30.5	15.8
		0°47.8	1°00.3	1°12.7	1°25.2	1°37.6	1°50.0	2°02.4	2°14.7	2°27.1	2°39.4	2°51.7	+12.4	58.0
●	Su 23	312°29.9	327°00.7	341°31.4	356°02.2	10°33.0	25°03.8	39°34.5	54°05.3	68°36.1	83°06.9	97°37.7	+30.8	15.6
		5°52.6	6°04.4	6°16.1	6°27.8	6°39.4	6°51.0	7°02.6	7°14.1	7°25.5	7°37.0	7°48.3	+11.6	57.4
	Mo 24	315°19.5	329°50.2	344°21.0	358°51.7	13°22.5	27°53.2	42°23.9	56°54.7	71°25.4	85°56.1	100°26.8	+30.7	15.5
		10°32.2	10°42.7	10°53.1	11°03.4	11°13.6	11°23.8	11°34.0	11°44.0	11°54.0	12°03.9	12°13.8	+10.2	56.7
	Tu 25	318°06.4	332°37.0	347°07.6	1°38.1	16°08.7	30°39.2	45°09.7	59°40.2	74°10.7	88°41.2	103°11.7	+30.5	15.3
		14°32.5	14°41.2	14°49.7	14°58.2	15°06.6	15°14.9	15°23.1	15°31.2	15°39.2	15°47.2	15°55.1	+8.3	56.0
	We 26	320°47.9	335°18.3	349°48.6	4°18.9	18°49.3	33°19.6	47°49.9	62°20.2	76°50.5	91°20.8	105°51.1	+30.3	15.1
		17°42.5	17°48.9	17°55.3	18°01.5	18°07.6	18°13.7	18°19.6	18°25.5	18°31.3	18°36.9	18°42.5	+6.0	55.4
	Th 27	323°24.8	337°55.0	352°25.2	6°55.4	21°25.7	35°55.9	50°26.1	64°56.3	79°26.6	93°56.8	108°27.0	+30.2	15.0
		19°54.3	19°58.3	20°02.2	20°06.0	20°09.7	20°13.3	20°16.8	20°20.2	20°23.4	20°26.6	20°29.7	+3.5	54.9
	Fr 28	326°00.9	340°31.2	355°01.5	9°31.9	24°02.2	38°32.6	53°02.9	67°33.3	82°03.7	96°34.1	111°04.5	+30.4	14.9
		21°03.7	21°05.2	21°06.5	21°07.8	21°08.9	21°10.0	21°10.9	21°11.8	21°12.5	21°13.2	21°13.7	+1.0	54.5
	Sa 29	328°42.1	343°12.8	357°43.4	12°14.1	26°44.8	41°15.5	55°46.2	70°17.0	84°47.7	99°18.5	113°49.3	+30.7	14.8
		21°09.7	21°08.6	21°07.5	21°06.2	21°04.8	21°03.4	21°01.8	21°00.2	20°58.4	20°56.6	20°54.6	-1.5	54.2
	Su 30	331°33.9	346°05.1	0°36.3	15°07.5	29°38.7	44°10.0	58°41.2	73°12.5	87°43.8	102°15.2	116°46.5	+31.3	14.8
		20°13.9	20°10.5	20°06.9	20°03.3	19°59.5	19°55.7	19°51.8	19°47.7	19°43.6	19°39.4	19°35.2	-3.9	54.2
◐	Mo 31	334°40.0	349°11.7	3°43.5	18°15.3	32°47.1	47°19.0	61°50.8	76°22.7	90°54.6	105°26.6	119°58.5	+31.9	14.8
		18°20.4	18°14.7	18°09.0	18°03.2	17°57.2	17°51.2	17°45.2	17°39.0	17°32.8	17°26.4	17°20.0	-6.0	54.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 1 04h02 — FM: 9 04h29 — LQ: 16 06h35 — NM: 23 03h49 — FQ: 31 00h32

SUN

April 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	269°00.0	284°00.2	299°00.4	314°00.5	329°00.7	344°00.9	359°01.1	14°01.3	29°01.5	44°01.7	59°01.8	74°02.0	+0.2
	4°28.7	4°29.7	4°30.7	4°31.6	4°32.6	4°33.6	4°34.5	4°35.5	4°36.4	4°37.4	4°38.4	4°39.3	+1.0
We 2	269°04.4	284°04.6	299°04.8	314°05.0	329°05.2	344°05.4	359°05.5	14°05.7	29°05.9	44°06.1	59°06.3	74°06.5	+0.2
	4°51.9	4°52.8	4°53.8	4°54.7	4°55.7	4°56.7	4°57.6	4°58.6	4°59.5	5°00.5	5°01.5	5°02.4	+1.0
Th 3	269°08.9	284°09.0	299°09.2	314°09.4	329°09.6	344°09.8	359°10.0	14°10.1	29°10.3	44°10.5	59°10.7	74°10.9	+0.2
	5°14.9	5°15.8	5°16.8	5°17.8	5°18.7	5°19.7	5°20.6	5°21.6	5°22.6	5°23.5	5°24.5	5°25.4	+1.0
Fr 4	269°13.2	284°13.4	299°13.6	314°13.8	329°14.0	344°14.2	359°14.3	14°14.5	29°14.7	44°14.9	59°15.1	74°15.2	+0.2
	5°37.8	5°38.8	5°39.7	5°40.7	5°41.6	5°42.6	5°43.6	5°44.5	5°45.5	5°46.4	5°47.4	5°48.3	+1.0
Sa 5	269°17.6	284°17.8	299°18.0	314°18.1	329°18.3	344°18.5	359°18.7	14°18.9	29°19.0	44°19.2	59°19.4	74°19.6	+0.2
	6°00.7	6°01.6	6°02.6	6°03.5	6°04.5	6°05.4	6°06.4	6°07.3	6°08.3	6°09.2	6°10.2	6°11.1	+0.9
Su 6	269°21.9	284°22.1	299°22.3	314°22.4	329°22.6	344°22.8	359°23.0	14°23.2	29°23.3	44°23.5	59°23.7	74°23.9	+0.2
	6°23.4	6°24.4	6°25.3	6°26.3	6°27.2	6°28.1	6°29.1	6°30.0	6°31.0	6°31.9	6°32.9	6°33.8	+0.9
Mo 7	269°26.2	284°26.3	299°26.5	314°26.7	329°26.9	344°27.0	359°27.2	14°27.4	29°27.6	44°27.7	59°27.9	74°28.1	+0.2
	6°46.0	6°47.0	6°47.9	6°48.9	6°49.8	6°50.7	6°51.7	6°52.6	6°53.6	6°54.5	6°55.4	6°56.4	+0.9
Tu 8	269°30.5	284°30.5	299°30.7	314°30.9	329°31.1	344°31.2	359°31.4	14°31.6	29°31.8	44°31.9	59°32.1	74°32.3	+0.2
	7°08.6	7°09.5	7°10.4	7°11.4	7°12.3	7°13.2	7°14.2	7°15.1	7°16.0	7°17.0	7°17.9	7°18.8	+0.9
We 9	269°34.5	284°34.7	299°34.9	314°35.0	329°35.2	344°35.4	359°35.5	14°35.7	29°35.9	44°36.1	59°36.2	74°36.4	+0.2
	7°31.0	7°31.9	7°32.8	7°33.7	7°34.7	7°35.6	7°36.5	7°37.5	7°38.4	7°39.3	7°40.2	7°41.2	+0.9
Th 10	269°38.6	284°38.8	299°38.9	314°39.1	329°39.3	344°39.4	359°39.6	14°39.8	29°39.9	44°40.1	59°40.3	74°40.4	+0.2
	7°53.2	7°54.1	7°55.1	7°56.0	7°56.9	7°57.8	7°58.8	7°59.7	8°00.6	8°01.5	8°02.5	8°03.4	+0.9
Fr 11	269°42.6	284°42.8	299°42.9	314°43.1	329°43.3	344°43.4	359°43.6	14°43.8	29°43.9	44°44.1	59°44.3	74°44.4	+0.2
	8°15.4	8°16.3	8°17.2	8°18.1	8°19.0	8°20.0	8°20.9	8°21.8	8°22.7	8°23.6	8°24.5	8°25.5	+0.9
Sa 12	269°46.5	284°46.7	299°46.9	314°47.0	329°47.2	344°47.4	359°47.5	14°47.7	29°47.8	44°48.0	59°48.2	74°48.3	+0.2
	8°37.4	8°38.3	8°39.2	8°40.1	8°41.0	8°41.9	8°42.8	8°43.7	8°44.7	8°45.6	8°46.5	8°47.4	+0.9
Su 13	269°50.4	284°50.6	299°50.7	314°50.9	329°51.0	344°51.2	359°51.4	14°51.5	29°51.7	44°51.8	59°52.0	74°52.1	+0.2
	8°59.2	9°00.1	9°01.0	9°01.9	9°02.8	9°03.7	9°04.7	9°05.6	9°06.5	9°07.4	9°08.3	9°09.2	+0.9
Mo 14	269°54.2	284°54.3	299°54.5	314°54.6	329°54.8	344°55.0	359°55.1	14°55.3	29°55.4	44°55.6	59°55.7	74°55.9	+0.2
	9°20.9	9°21.8	9°22.7	9°23.6	9°24.5	9°25.4	9°26.3	9°27.2	9°28.1	9°29.0	9°29.9	9°30.8	+0.9
Tu 15	269°57.9	284°58.0	299°58.2	314°58.3	329°58.5	344°58.6	359°58.8	14°58.9	29°59.1	44°59.2	59°59.4	74°59.5	+0.2
	9°42.5	9°43.4	9°44.3	9°45.2	9°46.1	9°46.9	9°47.8	9°48.7	9°49.6	9°50.5	9°51.4	9°52.3	+0.9
We 16	270°01.5	285°01.6	300°01.7	315°01.9	330°02.0	345°02.2	0°02.3	15°02.5	30°02.6	45°02.8	60°02.9	75°03.1	+0.1
	10°03.9	10°04.8	10°05.6	10°06.5	10°07.4	10°08.3	10°09.2	10°10.1	10°11.0	10°11.9	10°12.7	10°13.6	+0.9
Th 17	270°05.0	285°05.1	300°05.2	315°05.4	330°05.5	345°05.7	0°05.8	15°06.0	30°06.1	45°06.2	60°06.4	75°06.5	+0.1
	10°25.1	10°26.0	10°26.9	10°27.7	10°28.6	10°29.5	10°30.4	10°31.3	10°32.1	10°33.0	10°33.9	10°34.8	+0.9
Fr 18	270°08.3	285°08.5	300°08.6	315°08.8	330°08.9	345°09.0	0°09.2	15°09.3	30°09.5	45°09.6	60°09.7	75°09.9	+0.1
	10°46.2	10°47.0	10°47.9	10°48.8	10°49.7	10°50.5	10°51.4	10°52.3	10°53.1	10°54.0	10°54.9	10°55.8	+0.9
Sa 19	270°11.6	285°11.8	300°11.9	315°12.0	330°12.2	345°12.3	0°12.4	15°12.6	30°12.7	45°12.9	60°13.0	75°13.1	+0.1
	11°07.0	11°07.9	11°08.8	11°09.6	11°10.5	11°11.4	11°12.2	11°13.1	11°14.0	11°14.8	11°15.7	11°16.5	+0.9
Su 20	270°14.8	285°15.0	300°15.1	315°15.2	330°15.4	345°15.5	0°15.6	15°15.7	30°15.9	45°16.0	60°16.1	75°16.3	+0.1
	11°27.7	11°28.6	11°29.5	11°30.3	11°31.2	11°32.0	11°32.9	11°33.7	11°34.6	11°35.5	11°36.3	11°37.2	+0.9
Mo 21	270°17.9	285°18.0	300°18.2	315°18.3	330°18.4	345°18.5	0°18.7	15°18.8	30°18.9	45°19.0	60°19.2	75°19.3	+0.1
	11°48.2	11°49.1	11°49.9	11°50.8	11°51.6	11°52.5	11°53.3	11°54.2	11°55.0	11°55.9	11°56.7	11°57.6	+0.8
Tu 22	270°20.9	285°21.0	300°21.1	315°21.3	330°21.4	345°21.5	0°21.6	15°21.7	30°21.9	45°22.0	60°22.1	75°22.2	+0.1
	12°08.6	12°09.4	12°10.2	12°11.1	12°11.9	12°12.8	12°13.6	12°14.4	12°15.3	12°16.1	12°17.0	12°17.8	+0.8
We 23	270°23.8	285°23.9	300°24.0	315°24.1	330°24.2	345°24.3	0°24.5	15°24.6	30°24.7	45°24.8	60°24.9	75°25.0	+0.1
	12°28.7	12°29.5	12°30.3	12°31.2	12°32.0	12°32.8	12°33.7	12°34.5	12°35.3	12°36.2	12°37.0	12°37.8	+0.8
Th 24	270°26.5	285°26.6	300°26.7	315°26.8	330°26.9	345°27.1	0°27.2	15°27.3	30°27.4	45°27.5	60°27.6	75°27.7	+0.1
	12°48.6	12°49.4	12°50.2	12°51.1	12°51.9	12°52.7	12°53.5	12°54.3	12°55.2	12°56.0	12°56.8	12°57.6	+0.8
Fr 25	270°29.1	285°29.2	300°29.4	315°29.5	330°29.6	345°29.7	0°29.8	15°29.9	30°30.0	45°30.1	60°30.2	75°30.3	+0.1
	13°08.3	13°09.1	13°09.9	13°10.7	13°11.5	13°12.4	13°13.2	13°14.0	13°14.8	13°15.6	13°16.4	13°17.2	+0.8
Sa 26	270°31.7	285°31.8	300°31.9	315°32.0	330°32.1	345°32.2	0°32.3	15°32.4	30°32.5	45°32.6	60°32.7	75°32.8	+0.1
	13°27.8	13°28.6	13°29.4	13°30.2	13°31.0	13°31.8	13°32.6	13°33.4	13°34.2	13°35.0	13°35.8	13°36.6	+0.8
Su 27	270°34.0	285°34.1	300°34.2	315°34.3	330°34.4	345°34.5	0°34.6	15°34.7	30°34.8	45°34.9	60°35.0	75°35.1	+0.1
	13°47.0	13°47.8	13°48.6	13°49.4	13°50.2	13°51.0	13°51.8	13°52.6	13°53.4	13°54.2	13°55.0	13°55.8	+0.8
Mo 28	270°36.3	285°36.4	300°36.5	315°36.6	330°36.7	345°36.8	0°36.9	15°37.0	30°37.1	45°37.1	60°37.2	75°37.3	+0.1
	14°06.0	14°06.8	14°07.6	14°08.4	14°09.2	14°10.0	14°10.8	14°11.6	14°12.3	14°13.1	14°13.9	14°14.7	+0.8
Tu 29	270°38.5	285°38.6	300°38.7	315°38.7	330°38.8	345°38.9	0°39.0	15°39.1	30°39.2	45°39.3	60°39.3	75°39.4	+0.1
	14°24.8	14°25.6	14°26.4	14°27.2	14°27.9	14°28.7	14°29.5	14°30.3	14°31.1	14°31.8	14°32.6	14°33.4	+0.8
We 30	270°40.5	285°40.6	300°40.7	315°40.7	330°40.8	345°40.9	0°41.0	15°41.1	30°41.2	45°41.2	60°41.3	75°41.4	+0.1
	14°43.4	14°44.2	14°44.9	14°45.7	14°46.5	14°47.2	14°48.0	14°48.8	14°49.5	14°50.3	14°51.1	14°51.8	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2031

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Tu 1	250°47.2 16°18.9	265°19.4 16°11.7	279°51.6 16°04.4	294°23.8 15°57.1	308°56.0 15°49.7	323°28.3 15°42.2	338°00.6 15°34.7	352°32.9 15°27.0	7°05.2 15°19.4	21°37.5 15°11.6	36°09.9 15°03.7	+32.3 -7.5	14.9 54.5
We 2	254°17.0 12°57.9	268°49.6 12°49.0	283°22.2 12°40.0	297°54.9 12°30.9	312°27.5 12°21.8	327°00.1 12°12.6	341°32.7 12°03.4	356°05.4 11°54.1	10°38.1 11°44.8	25°10.7 11°35.4	39°43.4 11°25.9	+32.6 -9.2	15.0 55.0
Th 3	257°54.1 8°57.2	272°26.8 8°46.8	286°59.5 8°36.5	301°32.2 8°26.0	316°04.9 8°15.6	330°37.6 8°05.0	345°10.4 7°54.5	359°43.1 7°43.8	14°15.7 7°33.2	28°48.4 7°22.5	43°21.1 7°11.7	+32.7 -10.5	15.2 55.6
Fr 4	261°30.1 4°25.7	276°02.6 4°14.3	290°35.0 4°02.9	305°07.5 3°51.5	319°39.9 3°40.1	334°12.3 3°28.6	348°44.7 3°17.1	3°17.0 3°05.6	17°49.4 2°54.0	32°21.7 2°42.4	46°54.0 2°30.8	+32.4 -11.5	15.3 56.3
Sa 5	264°55.0 -0°25.8	279°26.8 -0°37.7	293°58.5 -0°49.6	308°30.3 -1°01.5	323°02.0 -1°13.4	337°33.6 -1°25.3	352°05.3 -1°37.3	6°36.8 -1°49.2	21°08.4 -2°01.1	35°39.9 -2°13.1	50°11.3 -2°25.0	+31.6 -11.9	15.5 57.0
Su 6	267°57.6 -5°23.8	282°28.3 -5°35.6	296°58.9 -5°47.4	311°29.5 -5°59.2	326°00.0 -6°11.0	340°30.5 -6°22.7	355°00.9 -6°34.5	9°31.2 -6°46.2	24°01.5 -6°57.9	38°31.8 -7°09.5	53°01.9 -7°21.2	+30.4 -11.7	15.7 57.7
○ Mo 7	270°27.2 -10°11.7	284°56.3 -10°22.7	299°25.4 -10°33.7	313°54.4 -10°44.7	328°23.4 -10°55.6	342°52.3 -11°06.4	357°21.1 -11°17.2	11°49.9 -11°27.9	26°18.5 -11°38.6	40°47.2 -11°49.2	55°15.7 -11°59.8	+28.9 -10.8	15.9 58.4
Tu 8	272°15.3 -14°30.2	286°42.7 -14°39.6	301°10.1 -14°48.9	315°37.3 -14°58.2	330°04.5 -15°07.4	344°31.6 -15°16.5	358°58.7 -15°25.5	13°25.6 -15°34.4	27°52.5 -15°43.2	42°19.4 -15°51.9	56°46.1 -16°00.6	+27.1 -9.0	16.1 58.9
We 9	273°19.4 -17°58.1	287°45.1 -18°05.1	302°10.8 -18°12.0	316°36.3 -18°18.7	331°01.9 -18°25.4	345°27.3 -18°31.9	359°52.7 -18°38.3	14°18.1 -18°44.6	28°43.3 -18°50.7	43°08.6 -18°56.8	57°33.7 -19°02.7	+25.4 -6.5	16.2 59.3
Th 10	273°45.5 -20°16.0	288°10.0 -20°19.8	302°34.4 -20°23.5	316°58.8 -20°27.1	331°23.1 -20°30.5	345°47.4 -20°33.8	0°11.7 -20°36.9	14°36.0 -20°39.9	29°00.2 -20°42.8	43°24.4 -20°45.5	57°48.6 -20°48.1	+24.3 -3.2	16.2 59.5
Fr 11	273°49.5 -21°09.5	288°13.5 -21°09.8	302°37.6 -21°09.9	317°01.6 -21°09.9	331°25.6 -21°09.7	345°49.6 -21°09.4	0°13.6 -21°09.0	14°37.7 -21°08.4	29°01.7 -21°07.6	43°25.8 -21°06.8	57°49.9 -21°05.7	+24.0 +0.4	16.2 59.5
Sa 12	273°53.8 -20°33.3	288°18.3 -20°30.0	302°42.8 -20°26.6	317°07.4 -20°23.0	331°32.0 -20°19.3	345°56.7 -20°15.5	0°21.4 -20°11.5	14°46.1 -20°07.4	29°10.9 -20°03.2	43°35.7 -19°58.8	58°00.6 -19°54.4	+24.7 +3.9	16.2 59.4
Su 13	288°18.3 -20°30.0	302°42.8 -20°26.6	317°07.4 -20°23.0	331°32.0 -20°19.3	345°56.7 -20°15.5	0°21.4 -20°11.5	14°46.1 -20°07.4	29°10.9 -20°03.2	43°35.7 -19°58.8	58°00.6 -19°54.4	72°25.5 -19°49.7	+24.7 +4.0	16.2 59.4
◑ Mo 14	288°45.6 -18°25.4	303°11.4 -18°18.9	317°37.2 -18°12.2	332°03.1 -18°05.4	346°29.1 -17°58.4	0°55.1 -17°51.4	15°21.2 -17°44.3	29°47.4 -17°37.0	44°13.6 -17°29.7	58°39.9 -17°22.2	73°06.2 -17°14.6	+26.1 +7.1	16.1 59.2
Tu 15	289°49.2 -15°09.3	304°16.5 -15°00.2	318°44.0 -14°51.0	333°11.5 -14°41.7	347°39.1 -14°32.4	2°06.7 -14°22.9	16°34.4 -14°13.4	31°02.2 -14°03.8	45°30.0 -13°54.2	59°57.9 -13°44.4	74°25.8 -13°34.6	+27.7 +9.5	16.1 58.9
We 16	291°32.5 -10°59.0	306°01.5 -10°48.1	320°30.4 -10°37.2	334°59.5 -10°26.3	349°28.6 -10°15.2	3°57.7 -10°04.1	18°26.9 -9°53.0	32°56.1 -9°41.8	47°25.4 -9°30.6	61°54.8 -9°19.3	76°24.2 -9°08.0	+29.2 +11.1	16.0 58.5
Th 17	293°51.0 -6°13.6	308°21.1 -6°01.7	322°51.3 -5°49.8	337°21.5 -5°37.9	351°51.8 -5°25.9	6°22.1 -5°13.9	20°52.4 -5°01.9	35°22.8 -4°49.9	49°53.2 -4°37.9	64°23.7 -4°25.8	78°54.1 -4°13.8	+30.3 +12.0	15.8 58.1
Fr 18	296°34.9 -1°11.5	311°05.8 -0°59.3	325°36.8 -0°47.1	340°07.7 -0°34.9	354°38.7 -0°22.7	9°09.7 -0°10.6	23°40.8 0°01.6	38°11.8 0°13.8	52°42.9 0°25.9	67°13.9 0°38.0	81°45.0 0°50.2	+31.0 +12.2	15.7 57.6
Sa 19	299°32.9 3°50.1	314°04.2 4°02.0	328°35.4 4°13.7	343°06.7 4°25.5	357°38.0 4°37.2	12°09.2 4°49.0	26°40.5 5°00.6	41°11.8 5°12.3	55°43.1 5°23.9	70°14.3 5°35.5	84°45.6 5°47.0	+31.3 +11.7	15.6 57.2
Su 20	302°34.4 8°35.2	317°05.6 8°46.1	331°36.8 8°56.9	346°08.0 9°07.6	0°39.2 9°18.3	15°10.3 9°29.0	29°41.5 9°39.5	44°12.6 9°50.1	58°43.8 10°00.6	73°14.9 10°11.0	87°46.0 10°21.3	+31.2 +10.6	15.4 56.6
● Mo 21	305°31.2 12°49.4	320°02.0 12°58.7	334°32.9 13°08.0	349°03.8 13°17.2	3°34.6 13°26.3	18°05.5 13°35.3	32°36.3 13°44.3	47°07.1 13°53.2	61°37.8 14°02.0	76°08.6 14°10.8	90°39.4 14°19.5	+30.8 +9.0	15.3 56.1
Tu 22	308°18.6 16°20.0	322°49.1 16°27.4	337°19.5 16°34.7	351°50.0 16°41.8	6°20.4 16°49.0	20°50.8 16°56.0	35°21.2 17°02.9	49°51.6 17°09.7	64°22.0 17°16.5	78°52.4 17°23.1	93°22.7 17°29.7	+30.4 +7.0	15.2 55.6
We 23	310°56.5 18°57.1	325°26.7 19°02.1	339°56.8 19°07.1	354°27.0 19°11.9	8°57.1 19°16.7	23°27.2 19°21.4	37°57.4 19°25.9	52°27.5 19°30.4	66°57.6 19°34.8	81°27.7 19°39.1	95°57.8 19°43.2	+30.1 +4.6	15.0 55.1
Th 24	313°29.0 20°33.7	327°59.1 20°36.2	342°29.2 20°38.7	356°59.3 20°41.0	11°29.4 20°43.3	25°59.5 20°45.4	40°29.6 20°47.5	54°59.7 20°49.4	69°29.9 20°51.2	84°00.0 20°53.0	98°30.1 20°54.6	+30.1 +2.1	14.9 54.7
Fr 25	316°03.4 21°06.8	330°33.7 21°06.8	345°04.1 21°06.7	359°34.4 21°06.5	14°04.8 21°06.2	28°35.2 21°05.8	43°05.6 21°05.3	57°36.0 21°04.7	72°06.5 21°04.0	86°37.0 21°03.2	101°07.5 21°02.3	+30.4 -0.5	14.8 54.3
Sa 26	318°47.5 20°36.9	333°18.3 20°34.5	347°49.2 20°31.9	2°20.2 20°29.3	16°51.1 20°26.5	31°22.1 20°23.7	45°53.1 20°20.7	60°24.1 20°17.7	74°55.1 20°14.6	89°26.2 20°11.4	103°57.3 20°08.1	+31.0 -2.9	14.8 54.1
Su 27	321°47.5 19°07.7	336°19.0 19°03.0	350°50.6 18°58.2	5°22.3 18°53.3	19°54.0 18°48.3	34°25.7 18°43.3	48°57.4 18°38.1	63°29.1 18°32.9	78°00.9 18°27.6	92°32.8 18°22.2	107°04.6 18°16.7	+31.7 -5.1	14.8 54.1
Mo 28	325°05.9 16°44.9	339°38.2 16°38.2	354°10.5 16°31.4	8°42.9 16°24.5	23°15.3 16°17.6	37°47.7 16°10.5	52°20.2 16°03.4	66°52.6 15°56.3	81°25.1 15°49.0	95°57.6 15°41.7	110°30.2 15°34.3	+32.4 -7.1	14.8 54.3
◐ Tu 29	328°41.1 13°35.4	343°14.0 13°26.9	357°46.9 13°18.4	12°19.8 13°09.9	26°52.8 13°01.2	41°25.7 12°52.5	55°58.7 12°43.8	70°31.7 12°34.9	85°04.7 12°26.1	99°37.7 12°17.1	114°10.8 12°08.1	+33.0 -8.7	14.9 54.6
We 30	332°27.5 9°46.6	347°00.6 9°36.7	1°33.8 9°26.8	16°07.0 9°16.8	30°40.2 9°06.8	45°13.3 8°56.8	59°46.5 8°46.7	74°19.7 8°36.5	88°52.9 8°26.3	103°26.0 8°16.1	117°59.2 8°05.8	+33.2 -10.1	15.0 55.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 7 17h21 — LQ: 14 12h57 — NM: 21 16h57 — FQ: 29 19h19

SUN

May 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	270° 42.4	285° 42.5	300° 42.6	315° 42.6	330° 42.7	345° 42.8	0° 42.9	15° 42.9	30° 43.0	45° 43.1	60° 43.2	75° 43.2	+0.1
	15° 01.7	15° 02.5	15° 03.2	15° 04.0	15° 04.7	15° 05.5	15° 06.2	15° 07.0	15° 07.8	15° 08.5	15° 09.3	15° 10.0	+0.8
Fr 2	270° 44.2	285° 44.2	300° 44.3	315° 44.4	330° 44.5	345° 44.5	0° 44.6	15° 44.7	30° 44.7	45° 44.8	60° 44.9	75° 44.9	+0.1
	15° 19.8	15° 20.5	15° 21.3	15° 22.0	15° 22.8	15° 23.5	15° 24.2	15° 25.0	15° 25.7	15° 26.5	15° 27.2	15° 28.0	+0.7
Sa 3	270° 45.8	285° 45.9	300° 45.9	315° 46.0	330° 46.1	345° 46.1	0° 46.2	15° 46.3	30° 46.3	45° 46.4	60° 46.5	75° 46.5	+0.1
	15° 37.6	15° 38.3	15° 39.1	15° 39.8	15° 40.5	15° 41.3	15° 42.0	15° 42.7	15° 43.5	15° 44.2	15° 44.9	15° 45.7	+0.7
Su 4	270° 47.3	285° 47.4	300° 47.4	315° 47.5	330° 47.6	345° 47.6	0° 47.7	15° 47.7	30° 47.8	45° 47.8	60° 47.9	75° 48.0	+0.1
	15° 55.1	15° 55.9	15° 56.6	15° 57.3	15° 58.0	15° 58.7	15° 59.5	16° 00.2	16° 00.9	16° 01.6	16° 02.4	16° 03.1	+0.7
Mo 5	270° 48.7	285° 48.7	300° 48.8	315° 48.8	330° 48.9	345° 49.0	0° 49.0	15° 49.1	30° 49.1	45° 49.2	60° 49.2	75° 49.3	+0.1
	16° 12.4	16° 13.1	16° 13.8	16° 14.6	16° 15.3	16° 16.0	16° 16.7	16° 17.4	16° 18.1	16° 18.8	16° 19.5	16° 20.2	+0.7
Tu 6	270° 49.9	285° 50.0	300° 50.0	315° 50.1	330° 50.1	345° 50.2	0° 50.2	15° 50.3	30° 50.3	45° 50.3	60° 50.4	75° 50.4	+0.0
	16° 29.4	16° 30.1	16° 30.8	16° 31.5	16° 32.2	16° 32.9	16° 33.6	16° 34.3	16° 35.0	16° 35.7	16° 36.4	16° 37.1	+0.7
We 7	270° 51.0	285° 51.1	300° 51.1	315° 51.1	330° 51.2	345° 51.2	0° 51.3	15° 51.3	30° 51.3	45° 51.4	60° 51.4	75° 51.5	+0.0
	16° 46.2	16° 46.9	16° 47.5	16° 48.2	16° 48.9	16° 49.6	16° 50.3	16° 51.0	16° 51.7	16° 52.4	16° 53.1	16° 53.7	+0.7
Th 8	270° 52.0	285° 52.0	300° 52.0	315° 52.1	330° 52.1	345° 52.1	0° 52.2	15° 52.2	30° 52.3	45° 52.3	60° 52.3	75° 52.4	+0.0
	17° 02.6	17° 03.3	17° 04.0	17° 04.7	17° 05.3	17° 06.0	17° 06.7	17° 07.4	17° 08.0	17° 08.7	17° 09.4	17° 10.1	+0.7
Fr 9	270° 52.8	285° 52.8	300° 52.8	315° 52.9	330° 52.9	345° 52.9	0° 53.0	15° 53.0	30° 53.0	45° 53.0	60° 53.1	75° 53.1	+0.0
	17° 18.8	17° 19.5	17° 20.1	17° 20.8	17° 21.5	17° 22.1	17° 22.8	17° 23.5	17° 24.1	17° 24.8	17° 25.5	17° 26.1	+0.7
Sa 10	270° 53.4	285° 53.5	300° 53.5	315° 53.5	330° 53.5	345° 53.6	0° 53.6	15° 53.6	30° 53.6	45° 53.6	60° 53.7	75° 53.7	+0.0
	17° 34.7	17° 35.3	17° 36.0	17° 36.7	17° 37.3	17° 38.0	17° 38.6	17° 39.3	17° 39.9	17° 40.6	17° 41.2	17° 41.9	+0.7
Su 11	270° 54.0	285° 54.0	300° 54.0	315° 54.0	330° 54.0	345° 54.0	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.1	75° 54.1	+0.0
	17° 50.3	17° 50.9	17° 51.6	17° 52.2	17° 52.9	17° 53.5	17° 54.1	17° 54.8	17° 55.4	17° 56.1	17° 56.7	17° 57.3	+0.6
Mo 12	270° 54.3	285° 54.3	300° 54.3	315° 54.4	330° 54.4	345° 54.4	0° 54.4	15° 54.4	30° 54.4	45° 54.4	60° 54.4	75° 54.4	+0.0
	18° 05.6	18° 06.2	18° 06.8	18° 07.5	18° 08.1	18° 08.7	18° 09.4	18° 10.0	18° 10.6	18° 11.2	18° 11.9	18° 12.5	+0.6
Tu 13	270° 54.5	285° 54.5	300° 54.6	315° 54.6	330° 54.6	345° 54.6	0° 54.6	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	+0.0
	18° 20.6	18° 21.2	18° 21.8	18° 22.4	18° 23.0	18° 23.7	18° 24.3	18° 24.9	18° 25.5	18° 26.1	18° 26.7	18° 27.3	+0.6
We 14	270° 54.6	285° 54.6	300° 54.6	315° 54.6	330° 54.6	345° 54.6	0° 54.6	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	-0.0
	18° 35.3	18° 35.9	18° 36.5	18° 37.1	18° 37.7	18° 38.3	18° 38.9	18° 39.5	18° 40.1	18° 40.7	18° 41.3	18° 41.9	+0.6
Th 15	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	-0.0
	18° 49.6	18° 50.2	18° 50.8	18° 51.4	18° 52.0	18° 52.6	18° 53.2	18° 53.8	18° 54.4	18° 54.9	18° 55.5	18° 56.1	+0.6
Fr 16	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.2	15° 54.2	30° 54.2	45° 54.2	60° 54.2	75° 54.2	-0.0
	19° 03.7	19° 04.3	19° 04.8	19° 05.4	19° 06.0	19° 06.6	19° 07.1	19° 07.7	19° 08.3	19° 08.9	19° 09.4	19° 10.0	+0.6
Sa 17	270° 54.0	285° 53.9	300° 53.9	315° 53.9	330° 53.9	345° 53.9	0° 53.8	15° 53.8	30° 53.8	45° 53.8	60° 53.8	75° 53.7	-0.0
	19° 17.4	19° 18.0	19° 18.5	19° 19.1	19° 19.7	19° 20.2	19° 20.8	19° 21.4	19° 21.9	19° 22.5	19° 23.0	19° 23.6	+0.6
Su 18	270° 53.4	285° 53.4	300° 53.4	315° 53.4	330° 53.3	345° 53.3	0° 53.3	15° 53.3	30° 53.2	45° 53.2	60° 53.2	75° 53.2	-0.0
	19° 30.8	19° 31.4	19° 31.9	19° 32.5	19° 33.0	19° 33.6	19° 34.1	19° 34.7	19° 35.2	19° 35.8	19° 36.3	19° 36.9	+0.5
Mo 19	270° 52.8	285° 52.8	300° 52.7	315° 52.7	330° 52.7	345° 52.6	0° 52.6	15° 52.6	30° 52.5	45° 52.5	60° 52.5	75° 52.4	-0.0
	19° 43.9	19° 44.4	19° 45.0	19° 45.5	19° 46.0	19° 46.6	19° 47.1	19° 47.6	19° 48.2	19° 48.7	19° 49.2	19° 49.8	+0.5
Tu 20	270° 52.0	285° 52.0	300° 51.9	315° 51.9	330° 51.9	345° 51.8	0° 51.8	15° 51.7	30° 51.7	45° 51.7	60° 51.6	75° 51.6	-0.0
	19° 56.6	19° 57.1	19° 57.7	19° 58.2	19° 58.7	19° 59.2	19° 59.8	20° 00.3	20° 00.8	20° 01.3	20° 01.8	20° 02.3	+0.5
We 21	270° 51.1	285° 51.0	300° 51.0	315° 51.0	330° 50.9	345° 50.9	0° 50.8	15° 50.8	30° 50.7	45° 50.7	60° 50.7	75° 50.6	-0.0
	20° 09.0	20° 09.5	20° 10.0	20° 10.5	20° 11.1	20° 11.6	20° 12.1	20° 12.6	20° 13.1	20° 13.6	20° 14.1	20° 14.6	+0.5
Th 22	270° 50.0	285° 50.0	300° 49.9	315° 49.9	330° 49.8	345° 49.8	0° 49.7	15° 49.7	30° 49.6	45° 49.6	60° 49.5	75° 49.5	-0.0
	20° 21.1	20° 21.6	20° 22.1	20° 22.6	20° 23.0	20° 23.5	20° 24.0	20° 24.5	20° 25.0	20° 25.5	20° 26.0	20° 26.5	+0.5
Fr 23	270° 48.8	285° 48.8	300° 48.7	315° 48.7	330° 48.6	345° 48.6	0° 48.5	15° 48.5	30° 48.4	45° 48.3	60° 48.3	75° 48.2	-0.1
	20° 32.8	20° 33.3	20° 33.7	20° 34.2	20° 34.7	20° 35.2	20° 35.6	20° 36.1	20° 36.6	20° 37.1	20° 37.5	20° 38.0	+0.5
Sa 24	270° 47.5	285° 47.5	300° 47.4	315° 47.3	330° 47.3	345° 47.2	0° 47.2	15° 47.1	30° 47.0	45° 47.0	60° 46.9	75° 46.9	-0.1
	20° 44.1	20° 44.6	20° 45.0	20° 45.5	20° 46.0	20° 46.4	20° 46.9	20° 47.4	20° 47.8	20° 48.3	20° 48.7	20° 49.2	+0.5
Su 25	270° 46.1	285° 46.0	300° 45.9	315° 45.9	330° 45.8	345° 45.8	0° 45.7	15° 45.6	30° 45.6	45° 45.5	60° 45.4	75° 45.4	-0.1
	20° 55.1	20° 55.6	20° 56.0	20° 56.5	20° 56.9	20° 57.4	20° 57.8	20° 58.2	20° 58.7	20° 59.1	20° 59.6	21° 00.0	+0.4
Mo 26	270° 44.5	285° 44.4	300° 44.4	315° 44.3	330° 44.2	345° 44.2	0° 44.1	15° 44.0	30° 44.0	45° 43.9	60° 43.8	75° 43.8	-0.1
	21° 05.7	21° 06.2	21° 06.6	21° 07.0	21° 07.5	21° 07.9	21° 08.3	21° 08.8	21° 09.2	21° 09.6	21° 10.1	21° 10.5	+0.4
Tu 27	270° 42.8	285° 42.8	300° 42.7	315° 42.6	330° 42.5	345° 42.5	0° 42.4	15° 42.3	30° 42.2	45° 42.2	60° 42.1	75° 42.0	-0.1
	21° 16.0	21° 16.4	21° 16.8	21° 17.3	21° 17.7	21° 18.1	21° 18.5	21° 18.9	21° 19.3	21° 19.8	21° 20.2	21° 20.6	+0.4
We 28	270° 41.0	285° 41.0	300° 40.9	315° 40.8	330° 40.7	345° 40.6	0° 40.6	15° 40.5	30° 40.4	45° 40.3	60° 40.3	75° 40.2	-0.1
	21° 25.9	21° 26.3	21° 26.7	21° 27.1	21° 27.5	21° 27.9	21° 28.3	21° 28.7	21° 29.1	21° 29.5	21° 29.9	21° 30.3	+0.4
Th 29	270° 39.1	285° 39.1	300° 39.0	315° 38.9	330° 38.8	345° 38.7	0° 38.6	15° 38.6	30° 38.5	45° 38.4	60° 38.3	75° 38.2	-0.1
	21° 35.4	21° 35.8	21° 36.2	21° 36.6	21° 37.0	21° 37.4	21° 37.8	21° 38.1	21° 38.5	21° 38.9	21° 39.3	21° 39.7	+0.4
Fr 30	270° 37.1	285° 37.0	300° 37.0	315° 36.9	330° 36.8	345° 36.7	0° 36.6	15° 36.5	30° 36.4	45° 36.3	60° 36.3	75° 36.2	-0.1
	21° 44.6	21° 45.0	21° 45.3	21° 45.7	21° 46.1	21° 46.4	21° 46.8	21° 47.2	21° 47.6	21° 47.9	21° 48.3	21° 48.7	+0.4
Sa 31	270° 35.0	285° 34.9	300° 34.8	315° 34.7	330° 34.7	345° 34.6	0° 34.5	15° 34.4	30° 34.3	45° 34.2	60° 34.1	75° 34.0	-0.1
	21° 53.4	21° 53.7	21° 54.1	21° 54.4	21° 54.8	21° 55.1	21° 55.5	21° 55.8	21° 56.2	21° 56.6	21° 56.9	21° 57.3	+0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2031

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Th 1	248°57.5	263°30.6	278°03.7	292°36.8	307°09.9	321°43.0	336°16.0	350°49.1	5°22.1	19°55.1	34°28.1	+33.1	15.2
	6°31.3	6°20.6	6°09.8	5°59.1	5°48.2	5°37.4	5°26.5	5°15.5	5°04.6	4°53.6	4°42.5	-10.9	55.6
Fr 2	252°40.3	267°12.9	281°45.4	296°18.0	310°50.5	325°23.0	339°55.4	354°27.8	9°00.2	23°32.5	38°04.8	+32.5	15.4
	1°53.5	1°42.0	1°30.5	1°19.0	1°07.4	0°55.8	0°44.3	0°32.7	0°21.1	0°09.4	-0°02.2	-11.6	56.4
Sa 3	256°04.1	270°35.7	285°07.2	299°38.7	314°10.1	328°41.4	343°12.8	357°44.0	12°15.2	26°46.3	41°17.4	+31.3	15.6
	-2°58.2	-3°10.0	-3°21.8	-3°33.6	-3°45.3	-3°57.1	-4°08.9	-4°20.6	-4°32.4	-4°44.1	-4°55.9	-11.8	57.3
Su 4	258°55.8	273°25.8	287°55.7	302°25.6	316°55.4	331°25.1	345°54.8	0°24.4	14°53.9	29°23.3	43°52.6	+29.7	15.9
	-7°50.3	-8°01.7	-8°13.1	-8°24.5	-8°35.9	-8°47.2	-8°58.6	-9°09.8	-9°21.1	-9°32.3	-9°43.4	-11.3	58.2
Mo 5	261°03.1	275°31.2	289°59.1	304°27.0	318°54.8	333°22.5	347°50.1	2°17.6	16°45.0	31°12.4	45°39.6	+27.7	16.1
	-12°25.3	-12°35.7	-12°46.0	-12°56.2	-13°06.4	-13°16.5	-13°26.5	-13°36.5	-13°46.4	-13°56.2	-14°05.9	-10.1	59.0
Tu 6	262°18.3	276°44.2	291°10.0	305°35.7	320°01.3	334°26.9	348°52.4	3°17.8	17°43.1	32°08.3	46°33.5	+25.5	16.3
	-16°22.3	-16°30.7	-16°38.9	-16°47.1	-16°55.2	-17°03.1	-17°11.0	-17°18.7	-17°26.3	-17°33.9	-17°41.3	-7.9	59.7
○ We 7	262°42.0	277°06.0	291°30.0	305°53.9	320°17.7	334°41.5	349°05.2	3°28.9	17°52.5	32°16.1	46°39.6	+23.8	16.4
	-19°18.3	-19°23.8	-19°29.1	-19°34.3	-19°39.4	-19°44.3	-19°49.1	-19°53.8	-19°58.3	-20°02.7	-20°06.9	-4.9	60.1
Th 8	262°27.5	276°50.4	291°13.3	305°36.2	319°59.1	334°22.0	348°44.9	3°07.7	17°30.6	31°53.4	46°16.2	+22.9	16.5
	-20°53.1	-20°55.0	-20°56.7	-20°58.3	-20°59.8	-21°01.0	-21°02.2	-21°03.1	-21°04.0	-21°04.6	-21°05.2	-1.2	60.4
Fr 9	261°59.4	276°22.4	290°45.4	305°08.5	319°31.6	333°54.7	348°17.9	2°41.1	17°04.3	31°27.6	45°50.9	+23.1	16.4
	-20°54.5	-20°52.6	-20°50.5	-20°48.3	-20°45.9	-20°43.4	-20°40.7	-20°37.9	-20°34.9	-20°31.8	-20°28.6	+2.6	60.3
Sa 10	261°46.6	276°10.8	290°35.0	304°59.3	319°23.7	333°48.1	348°12.6	2°37.2	17°01.8	31°26.5	45°51.3	+24.5	16.4
	-19°22.8	-19°17.3	-19°11.7	-19°06.0	-19°00.2	-18°54.2	-18°48.1	-18°41.8	-18°35.5	-18°29.0	-18°22.4	+6.0	60.0
Su 11	262°11.8	276°37.8	291°03.9	305°30.0	319°56.3	334°22.6	348°49.0	3°15.4	17°42.0	32°08.6	46°35.3	+26.3	16.2
	-16°29.8	-16°21.5	-16°13.0	-16°04.5	-15°55.9	-15°47.1	-15°38.3	-15°29.4	-15°20.4	-15°11.3	-15°02.1	+8.8	59.6
Mo 12	263°25.3	277°53.2	292°21.3	306°49.4	321°17.5	335°45.8	350°14.1	4°42.5	19°11.0	33°39.5	48°08.1	+28.3	16.1
	-12°34.8	-12°24.4	-12°13.9	-12°03.4	-11°52.9	-11°42.2	-11°31.5	-11°20.8	-11°09.9	-10°59.1	-10°48.2	+10.7	59.0
◑ Tu 13	277°53.2	292°21.3	306°49.4	321°17.5	335°45.8	350°14.1	4°42.5	19°11.0	33°39.5	48°08.1	62°36.8	+28.4	16.1
	-12°24.4	-12°13.9	-12°03.4	-11°52.9	-11°42.2	-11°31.5	-11°20.8	-11°09.9	-10°59.1	-10°48.2	-10°37.2	+10.7	59.0
We 14	279°54.8	294°24.5	308°54.3	323°24.1	337°54.0	352°23.9	6°53.9	21°23.9	35°54.0	50°24.2	64°54.4	+30.0	15.9
	-7°47.3	-7°35.6	-7°24.0	-7°12.3	-7°00.6	-6°48.8	-6°37.1	-6°25.3	-6°13.4	-6°01.6	-5°49.7	+11.8	58.3
Th 15	282°32.8	297°03.7	311°34.6	326°05.6	340°36.6	355°07.7	9°38.7	24°09.8	38°41.0	53°12.1	67°43.3	+31.1	15.7
	-2°50.0	-2°37.9	-2°25.8	-2°13.8	-2°01.7	-1°49.6	-1°37.6	-1°25.5	-1°13.5	-1°01.4	-0°49.3	+12.1	57.7
Fr 16	285°34.2	300°05.7	314°37.3	329°08.9	343°40.5	358°12.1	12°43.7	27°15.3	41°47.0	56°18.6	70°50.3	+31.6	15.6
	2°10.2	2°22.0	2°33.9	2°45.7	2°57.4	3°09.2	3°20.9	3°32.6	3°44.3	3°56.0	4°07.6	+11.7	57.1
Sa 17	288°45.8	303°17.5	317°49.3	332°21.0	346°52.7	1°24.4	15°56.0	30°27.7	44°59.4	59°31.1	74°02.8	+31.7	15.4
	6°58.1	7°09.2	7°20.2	7°31.2	7°42.1	7°53.0	8°03.8	8°14.6	8°25.4	8°36.1	8°46.8	+10.9	56.5
Su 18	291°56.5	306°28.0	320°59.5	335°30.9	350°02.4	4°33.8	19°05.2	33°36.6	48°08.0	62°39.3	77°10.7	+31.4	15.3
	11°20.4	11°30.1	11°39.9	11°49.5	11°59.1	12°08.7	12°18.1	12°27.5	12°36.9	12°46.1	12°55.4	+9.5	56.0
Mo 19	294°58.5	309°29.5	324°00.5	338°31.5	353°02.4	7°33.4	22°04.3	36°35.2	51°06.1	65°37.0	80°07.8	+30.9	15.1
	15°05.0	15°13.1	15°21.0	15°28.9	15°36.7	15°44.5	15°52.1	15°59.7	16°07.2	16°14.6	16°21.9	+7.7	55.5
Tu 20	297°48.2	312°18.7	326°49.3	341°19.8	355°50.3	10°20.7	24°51.2	39°21.6	53°52.1	68°22.5	82°52.9	+30.5	15.0
	18°01.5	18°07.5	18°13.3	18°19.1	18°24.7	18°30.3	18°35.8	18°41.2	18°46.4	18°51.6	18°56.7	+5.5	55.0
● We 21	300°27.4	314°57.6	329°27.8	343°58.0	358°28.2	12°58.4	27°28.6	41°58.8	56°29.0	70°59.2	85°29.4	+30.2	14.9
	20°01.7	20°05.2	20°08.7	20°12.0	20°15.3	20°18.4	20°21.5	20°24.4	20°27.3	20°30.0	20°32.7	+3.1	54.6
Th 22	303°02.2	317°32.4	332°02.6	346°32.9	1°03.1	15°33.4	30°03.6	44°33.9	59°04.2	73°34.5	88°04.8	+30.3	14.8
	21°00.2	21°01.2	21°02.1	21°02.9	21°03.6	21°04.3	21°04.8	21°05.2	21°05.5	21°05.7	21°05.8	+0.6	54.3
Fr 23	305°41.4	320°12.0	334°42.6	349°13.2	3°43.9	18°14.5	32°45.3	47°16.0	61°46.7	76°17.5	90°48.3	+30.7	14.8
	20°55.4	20°53.9	20°52.3	20°50.7	20°48.9	20°47.0	20°45.0	20°43.0	20°40.8	20°38.5	20°36.2	-1.9	54.1
Sa 24	308°33.7	323°04.9	337°36.2	352°07.6	6°38.9	21°10.3	35°41.7	50°13.2	64°44.7	79°16.2	93°47.7	+31.4	14.7
	19°49.6	19°45.7	19°41.8	19°37.8	19°33.7	19°29.5	19°25.2	19°20.9	19°16.4	19°11.9	19°07.2	-4.2	54.0
Su 25	311°45.0	326°17.1	340°49.2	355°21.4	9°53.6	24°25.8	38°58.0	53°30.3	68°02.7	82°35.0	97°07.4	+32.2	14.7
	17°47.9	17°42.0	17°35.9	17°29.9	17°23.7	17°17.4	17°11.1	17°04.7	16°58.3	16°51.7	16°45.1	-6.3	54.0
Mo 26	315°16.9	329°49.8	344°22.7	358°55.6	13°28.6	28°01.6	42°34.6	57°07.6	71°40.7	86°13.8	100°46.9	+33.0	14.8
	14°57.4	14°49.7	14°41.9	14°34.0	14°26.1	14°18.2	14°10.1	14°02.0	13°53.8	13°45.6	13°37.3	-8.0	54.2
Tu 27	319°06.3	333°39.7	348°13.2	2°46.7	17°20.2	31°53.7	46°27.2	61°00.7	75°34.3	90°07.8	104°41.4	+33.5	14.9
	11°26.1	11°16.9	11°07.7	10°58.4	10°49.1	10°39.7	10°30.2	10°20.7	10°11.2	10°01.6	9°52.0	-9.4	54.5
We 28	323°05.8	337°39.4	352°13.1	6°46.7	21°20.4	35°54.0	50°27.7	65°01.3	79°34.9	94°08.6	108°42.2	+33.6	15.0
	7°22.2	7°11.9	7°01.5	6°51.1	6°40.7	6°30.2	6°19.7	6°09.2	5°58.6	5°48.0	5°37.4	-10.5	55.0
◐ Th 29	327°05.0	341°38.4	356°11.8	10°45.1	25°18.4	39°51.7	54°25.0	68°58.2	83°31.4	98°04.6	112°37.8	+33.3	15.2
	2°54.1	2°43.0	2°31.9	2°20.8	2°09.6	1°58.4	1°47.2	1°36.0	1°24.7	1°13.5	1°02.2	-11.2	55.7
Fr 30	330°51.0	345°23.6	359°56.1	14°28.6	29°01.0	43°33.4	58°05.8	72°38.0	87°10.3	101°42.4	116°14.6	+32.4	15.4
	-1°48.8	-2°00.3	-2°11.7	-2°23.2	-2°34.7	-2°46.2	-2°57.7	-3°09.2	-3°20.7	-3°32.2	-3°43.7	-11.5	56.5
Sa 31	334°09.5	348°40.7	3°11.8	17°42.8	32°13.7	46°44.6	61°15.4	75°46.1	90°16.8	104°47.4	119°17.9	+30.8	15.7
	-6°35.4	-6°46.7	-6°58.1	-7°09.4	-7°20.7	-7°31.9	-7°43.2	-7°54.4	-8°05.6	-8°16.8	-8°28.0	-11.3	57.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 7 03h39 — LQ: 13 19h06 — NM: 21 07h17 — FQ: 29 11h19

SUN

June 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	270°32.8	285°32.7	300°32.6	315°32.5	330°32.4	345°32.3	0°32.2	15°32.1	30°32.0	45°31.9	60°31.9	75°31.8	-0.1
	22°01.8	22°02.1	22°02.4	22°02.8	22°03.1	22°03.5	22°03.8	22°04.1	22°04.5	22°04.8	22°05.1	22°05.5	+0.3
Mo 2	270°30.5	285°30.4	300°30.3	315°30.2	330°30.1	345°30.0	0°29.9	15°29.8	30°29.7	45°29.6	60°29.5	75°29.4	-0.1
	22°09.8	22°10.1	22°10.4	22°10.7	22°11.1	22°11.4	22°11.7	22°12.0	22°12.3	22°12.7	22°13.0	22°13.3	+0.3
Tu 3	270°28.1	285°28.0	300°27.9	315°27.8	330°27.7	345°27.6	0°27.5	15°27.4	30°27.3	45°27.2	60°27.1	75°27.0	-0.1
	22°17.4	22°17.7	22°18.0	22°18.3	22°18.6	22°18.9	22°19.2	22°19.5	22°19.8	22°20.1	22°20.4	22°20.7	+0.3
We 4	270°25.6	285°25.5	300°25.4	315°25.3	330°25.2	345°25.1	0°25.0	15°24.9	30°24.8	45°24.7	60°24.6	75°24.4	-0.1
	22°24.6	22°24.9	22°25.2	22°25.5	22°25.8	22°26.1	22°26.4	22°26.6	22°26.9	22°27.2	22°27.5	22°27.8	+0.3
Th 5	270°23.0	285°22.9	300°22.8	315°22.7	330°22.6	345°22.5	0°22.4	15°22.3	30°22.2	45°22.1	60°21.9	75°21.8	-0.1
	22°31.4	22°31.7	22°32.0	22°32.3	22°32.6	22°32.8	22°33.1	22°33.4	22°33.6	22°33.9	22°34.2	22°34.5	+0.3
Fr 6	270°20.4	285°20.3	300°20.2	315°20.1	330°19.9	345°19.8	0°19.7	15°19.6	30°19.5	45°19.4	60°19.3	75°19.2	-0.1
	22°37.9	22°38.2	22°38.4	22°38.7	22°38.9	22°39.2	22°39.4	22°39.7	22°40.0	22°40.2	22°40.5	22°40.7	+0.3
Sa 7	270°17.7	285°17.5	300°17.4	315°17.3	330°17.2	345°17.1	0°17.0	15°16.9	30°16.7	45°16.6	60°16.5	75°16.4	-0.1
	22°43.9	22°44.2	22°44.4	22°44.7	22°44.9	22°45.2	22°45.4	22°45.6	22°45.9	22°46.1	22°46.3	22°46.6	+0.2
Su 8	270°14.9	285°14.7	300°14.6	315°14.5	330°14.4	345°14.3	0°14.1	15°14.0	30°13.9	45°13.8	60°13.7	75°13.5	-0.1
	22°49.6	22°49.8	22°50.0	22°50.3	22°50.5	22°50.7	22°50.9	22°51.2	22°51.4	22°51.6	22°51.8	22°52.1	+0.2
Mo 9	270°12.0	285°11.9	300°11.7	315°11.6	330°11.5	345°11.4	0°11.3	15°11.1	30°11.0	45°10.9	60°10.8	75°10.6	-0.1
	22°54.8	22°55.1	22°55.3	22°55.5	22°55.7	22°55.9	22°56.1	22°56.3	22°56.5	22°56.7	22°56.9	22°57.1	+0.2
Tu 10	270°09.0	285°08.9	300°08.8	315°08.7	330°08.5	345°08.4	0°08.3	15°08.2	30°08.0	45°07.9	60°07.8	75°07.7	-0.1
	22°59.7	22°59.9	23°00.1	23°00.3	23°00.5	23°00.6	23°00.8	23°01.0	23°01.2	23°01.4	23°01.6	23°01.8	+0.2
We 11	270°06.0	285°05.9	300°05.8	315°05.7	330°05.5	345°05.4	0°05.3	15°05.2	30°05.0	45°04.9	60°04.8	75°04.6	-0.1
	23°04.1	23°04.3	23°04.5	23°04.7	23°04.8	23°05.0	23°05.2	23°05.4	23°05.5	23°05.7	23°05.9	23°06.0	+0.2
Th 12	270°03.0	285°02.8	300°02.7	315°02.6	330°02.5	345°02.3	0°02.2	15°02.1	30°01.9	45°01.8	60°01.7	75°01.6	-0.1
	23°08.2	23°08.3	23°08.5	23°08.6	23°08.8	23°09.0	23°09.1	23°09.3	23°09.4	23°09.6	23°09.7	23°09.9	+0.2
Fr 13	269°59.9	284°59.7	299°59.6	314°59.5	329°59.3	344°59.2	359°59.1	14°58.9	29°58.8	44°58.7	59°58.6	74°58.4	-0.1
	23°11.8	23°11.9	23°12.1	23°12.2	23°12.4	23°12.5	23°12.6	23°12.8	23°12.9	23°13.0	23°13.2	23°13.3	+0.1
Sa 14	269°56.7	284°56.6	299°56.4	314°56.3	329°56.2	344°56.0	359°55.9	14°55.8	29°55.6	44°55.5	59°55.4	74°55.2	-0.1
	23°15.0	23°15.1	23°15.3	23°15.4	23°15.5	23°15.6	23°15.7	23°15.9	23°16.0	23°16.1	23°16.2	23°16.3	+0.1
Su 15	269°53.5	284°53.4	299°53.2	314°53.1	329°53.0	344°52.8	359°52.7	14°52.6	29°52.4	44°52.3	59°52.2	74°52.0	-0.1
	23°17.8	23°17.9	23°18.0	23°18.1	23°18.2	23°18.3	23°18.5	23°18.6	23°18.7	23°18.8	23°18.9	23°19.0	+0.1
Mo 16	269°50.3	284°50.1	299°50.0	314°49.9	329°49.7	344°49.6	359°49.5	14°49.3	29°49.2	44°49.1	59°48.9	74°48.8	-0.1
	23°20.2	23°20.3	23°20.4	23°20.5	23°20.6	23°20.7	23°20.7	23°20.8	23°20.9	23°21.0	23°21.1	23°21.2	+0.1
Tu 17	269°47.0	284°46.9	299°46.8	314°46.6	329°46.5	344°46.3	359°46.2	14°46.1	29°45.9	44°45.8	59°45.7	74°45.5	-0.1
	23°22.2	23°22.3	23°22.3	23°22.4	23°22.5	23°22.6	23°22.6	23°22.7	23°22.8	23°22.8	23°22.9	23°23.0	+0.1
We 18	269°43.8	284°43.6	299°43.5	314°43.3	329°43.2	344°43.1	359°42.9	14°42.8	29°42.7	44°42.5	59°42.4	74°42.2	-0.1
	23°23.8	23°23.8	23°23.9	23°23.9	23°24.0	23°24.0	23°24.1	23°24.1	23°24.2	23°24.2	23°24.3	23°24.3	+0.1
Th 19	269°40.5	284°40.3	299°40.2	314°40.1	329°39.9	344°39.8	359°39.6	14°39.5	29°39.4	44°39.2	59°39.1	74°39.0	-0.1
	23°24.9	23°25.0	23°25.0	23°25.0	23°25.1	23°25.1	23°25.1	23°25.2	23°25.2	23°25.2	23°25.3	23°25.3	+0.0
Fr 20	269°37.2	284°37.0	299°36.9	314°36.8	329°36.6	344°36.5	359°36.3	14°36.2	29°36.1	44°35.9	59°35.8	74°35.7	-0.1
	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.9	23°25.9	+0.0
Sa 21	269°33.9	284°33.7	299°33.6	314°33.5	329°33.3	344°33.2	359°33.1	14°32.9	29°32.8	44°32.6	59°32.5	74°32.4	-0.1
	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	+0.0
Su 22	269°30.6	284°30.5	299°30.3	314°30.2	329°30.0	344°29.9	359°29.8	14°29.6	29°29.5	44°29.4	59°29.2	74°29.1	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.7	-0.0
Mo 23	269°27.3	284°27.2	299°27.1	314°26.9	329°26.8	344°26.6	359°26.5	14°26.4	29°26.2	44°26.1	59°26.0	74°25.8	-0.1
	23°25.4	23°25.4	23°25.4	23°25.3	23°25.3	23°25.3	23°25.2	23°25.2	23°25.2	23°25.1	23°25.1	23°25.1	-0.0
Tu 24	269°24.1	284°23.9	299°23.8	314°23.7	329°23.5	344°23.4	359°23.3	14°23.1	29°23.0	44°22.9	59°22.7	74°22.6	-0.1
	23°24.5	23°24.5	23°24.4	23°24.4	23°24.3	23°24.3	23°24.2	23°24.2	23°24.1	23°24.1	23°24.0	23°24.0	-0.1
We 25	269°20.9	284°20.7	299°20.6	314°20.4	329°20.3	344°20.2	359°20.0	14°19.9	29°19.8	44°19.7	59°19.5	74°19.4	-0.1
	23°23.2	23°23.1	23°23.1	23°23.0	23°22.9	23°22.9	23°22.8	23°22.7	23°22.7	23°22.6	23°22.5	23°22.4	-0.1
Th 26	269°17.7	284°17.5	299°17.4	314°17.3	329°17.1	344°17.0	359°16.9	14°16.7	29°16.6	44°16.5	59°16.3	74°16.2	-0.1
	23°21.5	23°21.4	23°21.3	23°21.2	23°21.1	23°21.0	23°21.0	23°20.9	23°20.8	23°20.7	23°20.6	23°20.5	-0.1
Fr 27	269°14.5	284°14.4	299°14.3	314°14.1	329°14.0	344°13.9	359°13.7	14°13.6	29°13.5	44°13.3	59°13.2	74°13.1	-0.1
	23°19.3	23°19.2	23°19.1	23°19.0	23°18.9	23°18.8	23°18.7	23°18.6	23°18.5	23°18.4	23°18.3	23°18.2	-0.1
Sa 28	269°11.4	284°11.3	299°11.2	314°11.0	329°10.9	344°10.8	359°10.6	14°10.5	29°10.4	44°10.3	59°10.1	74°10.0	-0.1
	23°16.8	23°16.7	23°16.5	23°16.4	23°16.3	23°16.2	23°16.1	23°15.9	23°15.8	23°15.7	23°15.6	23°15.5	-0.1
Su 29	269°08.4	284°08.2	299°08.1	314°08.0	329°07.9	344°07.7	359°07.6	14°07.5	29°07.4	44°07.2	59°07.1	74°07.0	-0.1
	23°13.8	23°13.7	23°13.5	23°13.4	23°13.3	23°13.1	23°13.0	23°12.9	23°12.7	23°12.6	23°12.5	23°12.3	-0.1
Mo 30	269°05.4	284°05.3	299°05.1	314°05.0	329°04.9	344°04.8	359°04.6	14°04.5	29°04.4	44°04.3	59°04.1	74°04.0	-0.1
	23°10.4	23°10.3	23°10.1	23°10.0	23°09.8	23°09.7	23°09.5	23°09.4	23°09.2	23°09.1	23°08.9	23°08.8	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2031

D	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	Δ'/h	SH
Su 1	249°48.9	264°18.6	278°48.2	293°17.7	307°47.2	322°16.5	336°45.8	351°15.0	5°44.1	20°13.1	34°42.0	+29.3	15.9
	-10°07.0	-10°17.8	-10°28.6	-10°39.3	-10°50.1	-11°00.7	-11°11.3	-11°21.9	-11°32.4	-11°42.9	-11°53.3	-10.6	58.2
Mo 2	251°44.7	266°12.1	280°39.4	295°06.6	309°33.7	324°00.8	338°27.7	352°54.5	7°21.3	21°47.9	36°14.4	+27.0	16.1
	-14°22.8	-14°32.2	-14°41.5	-14°50.8	-15°00.0	-15°09.2	-15°18.2	-15°27.2	-15°36.1	-15°44.9	-15°53.6	-9.1	59.1
Tu 3	252°40.8	267°05.8	281°30.7	295°55.6	310°20.3	324°44.9	339°09.5	353°33.9	7°58.3	22°22.6	36°46.8	+24.6	16.4
	-17°52.8	-17°59.9	-18°06.9	-18°13.8	-18°20.6	-18°27.3	-18°33.8	-18°40.3	-18°46.6	-18°52.7	-18°58.8	-6.6	60.0
We 4	252°40.3	267°03.3	281°26.3	295°49.1	310°11.9	324°34.7	338°57.4	353°20.1	7°42.7	22°05.2	36°27.7	+22.7	16.5
	-20°13.9	-20°17.8	-20°21.6	-20°25.2	-20°28.7	-20°32.0	-20°35.1	-20°38.2	-20°41.0	-20°43.7	-20°46.3	-3.2	60.6
○ Th 5	252°00.8	266°22.8	280°44.8	295°06.8	309°28.8	323°50.7	338°12.7	352°34.7	6°56.6	21°18.6	35°40.6	+22.0	16.6
	-21°06.2	-21°06.2	-21°06.1	-21°05.9	-21°05.4	-21°04.9	-21°04.1	-21°03.2	-21°02.2	-21°00.9	-20°59.6	+0.7	61.0
Fr 6	251°12.3	265°34.6	279°57.0	294°19.5	308°41.9	323°04.4	337°27.0	351°49.6	6°12.3	20°35.0	34°57.8	+22.5	16.6
	-20°19.9	-20°16.0	-20°12.0	-20°07.8	-20°03.4	-19°59.0	-19°54.3	-19°49.5	-19°44.6	-19°39.6	-19°34.3	+4.6	61.0
Sa 7	250°47.0	265°10.8	279°34.8	293°58.7	308°22.8	322°47.0	337°11.2	351°35.5	5°59.9	20°24.4	34°48.9	+24.2	16.6
	-17°59.7	-17°52.4	-17°44.9	-17°37.3	-17°29.6	-17°21.8	-17°13.8	-17°05.8	-16°57.6	-16°49.3	-16°40.9	+7.9	60.7
Su 8	251°07.4	265°33.4	279°59.4	294°25.5	308°51.7	323°18.0	337°44.3	352°10.8	6°37.3	21°03.9	35°30.6	+26.3	16.4
	-14°22.9	-14°13.0	-14°02.9	-13°52.8	-13°42.7	-13°32.4	-13°22.1	-13°11.7	-13°01.2	-12°50.6	-12°40.0	+10.3	60.2
Mo 9	252°21.3	266°49.3	281°17.4	295°45.6	310°13.8	324°42.2	339°10.6	353°39.1	8°07.6	22°36.3	37°05.0	+28.4	16.2
	-9°53.2	-9°41.7	-9°30.1	-9°18.5	-9°06.8	-8°55.1	-8°43.4	-8°31.6	-8°19.8	-8°07.9	-7°56.0	+11.7	59.4
Tu 10	254°23.7	268°53.4	283°23.2	297°53.1	312°23.0	326°53.0	341°23.0	355°53.1	10°23.3	24°53.5	39°23.7	+30.0	16.0
	-4°54.8	-4°42.5	-4°30.3	-4°18.0	-4°05.8	-3°53.5	-3°41.3	-3°29.0	-3°16.7	-3°04.4	-2°52.1	+12.3	58.6
We 11	257°02.8	271°33.7	286°04.7	300°35.7	315°06.8	329°37.8	344°08.9	358°40.0	13°11.2	27°42.4	42°13.6	+31.1	15.7
	0°11.5	0°23.7	0°35.8	0°48.0	1°00.1	1°12.2	1°24.2	1°36.3	1°48.3	2°00.3	2°12.3	+12.1	57.7
◑ Th 12	271°33.7	286°04.7	300°35.7	315°06.8	329°37.8	344°08.9	358°40.0	13°11.2	27°42.4	42°13.6	56°44.9	+31.1	15.7
	0°23.7	0°35.8	0°48.0	1°00.1	1°12.2	1°24.2	1°36.3	1°48.3	2°00.3	2°12.3	2°24.3	+12.1	57.7
Fr 13	274°36.2	289°07.7	303°39.3	318°10.9	332°42.5	347°14.1	1°45.7	16°17.3	30°49.0	45°20.6	59°52.3	+31.6	15.5
	5°20.1	5°31.5	5°42.9	5°54.3	6°05.6	6°16.9	6°28.2	6°39.4	6°50.6	7°01.7	7°12.7	+11.3	56.9
Sa 14	277°47.4	292°19.0	306°50.7	321°22.3	335°54.0	350°25.6	4°57.3	19°28.9	34°00.5	48°32.2	63°03.8	+31.6	15.3
	9°53.0	10°03.2	10°13.4	10°23.6	10°33.7	10°43.7	10°53.7	11°03.6	11°13.4	11°23.2	11°32.9	+10.0	56.2
Su 15	280°56.6	295°28.0	309°59.4	324°30.8	339°02.2	353°33.6	8°04.9	22°36.2	37°07.5	51°38.8	66°10.1	+31.3	15.2
	13°50.9	13°59.6	14°08.2	14°16.7	14°25.1	14°33.5	14°41.7	14°49.9	14°58.1	15°06.1	15°14.1	+8.3	55.6
Mo 16	283°57.1	298°28.1	312°59.1	327°30.0	342°01.0	356°31.9	11°02.8	25°33.7	40°04.5	54°35.4	69°06.2	+30.9	15.0
	17°04.2	17°10.9	17°17.5	17°24.0	17°30.4	17°36.7	17°43.0	17°49.2	17°55.2	18°01.2	18°07.1	+6.3	55.0
Tu 17	286°46.7	301°17.3	315°47.9	330°18.4	344°49.0	359°19.5	13°50.1	28°20.6	42°51.1	57°21.6	71°52.0	+30.5	14.9
	19°24.6	19°29.0	19°33.4	19°37.6	19°41.7	19°45.8	19°49.7	19°53.6	19°57.3	20°01.0	20°04.5	+4.0	54.6
We 18	289°28.4	303°58.8	318°29.1	332°59.5	347°29.9	2°00.3	16°30.7	31°01.1	45°31.4	60°01.8	74°32.2	+30.4	14.8
	20°46.1	20°48.1	20°49.9	20°51.7	20°53.4	20°55.0	20°56.5	20°57.8	20°59.1	21°00.3	21°01.4	+1.5	54.3
● Th 19	292°08.9	306°39.4	321°09.9	335°40.5	350°11.0	4°41.6	19°12.2	33°42.8	48°13.4	62°44.1	77°14.7	+30.6	14.7
	21°05.5	21°05.0	21°04.3	21°03.6	21°02.8	21°01.9	21°00.9	20°59.7	20°58.5	20°57.2	20°55.8	-1.0	54.1
Fr 20	294°57.0	309°28.0	323°59.0	338°30.1	353°01.2	7°32.3	22°03.4	36°34.6	51°05.8	65°37.0	80°08.2	+31.1	14.7
	20°23.1	20°20.2	20°17.1	20°14.0	20°10.8	20°07.5	20°04.1	20°00.6	19°57.0	19°53.3	19°49.6	-3.4	53.9
Sa 21	298°00.6	312°32.4	327°04.1	341°36.0	356°07.8	10°39.7	25°11.6	39°43.5	54°15.5	68°47.5	83°19.6	+31.9	14.7
	18°42.6	18°37.5	18°32.2	18°26.9	18°21.5	18°16.1	18°10.5	18°04.9	17°59.2	17°53.4	17°47.5	-5.5	53.9
Su 22	301°24.3	315°56.9	330°29.5	345°02.1	359°34.8	14°07.5	28°40.3	43°13.0	57°45.9	72°18.7	86°51.6	+32.7	14.7
	16°10.4	16°03.3	15°56.2	15°49.0	15°41.8	15°34.4	15°27.0	15°19.6	15°12.1	15°04.5	14°56.8	-7.4	54.0
Mo 23	305°08.2	319°41.5	334°14.9	348°48.3	3°21.7	17°55.1	32°28.5	47°02.0	61°35.5	76°09.0	90°42.6	+33.4	14.8
	12°54.6	12°45.9	12°37.3	12°28.5	12°19.8	12°10.9	12°02.0	11°53.1	11°44.1	11°35.1	11°26.0	-8.9	54.1
Tu 24	309°08.1	323°41.9	338°15.7	352°49.6	7°23.4	21°57.3	36°31.2	51°05.1	65°39.0	80°12.9	94°46.8	+33.9	14.9
	9°03.9	8°54.0	8°44.2	8°34.3	8°24.3	8°14.3	8°04.3	7°54.3	7°44.2	7°34.0	7°23.8	-10.0	54.5
We 25	313°15.9	327°49.8	342°23.7	356°57.6	11°31.6	26°05.5	40°39.4	55°13.2	69°47.1	84°21.0	98°54.8	+33.9	15.0
	4°47.3	4°36.6	4°26.0	4°15.2	4°04.5	3°53.7	3°42.9	3°32.1	3°21.2	3°10.4	2°59.5	-10.8	54.9
Th 26	317°20.7	331°54.2	346°27.7	1°01.2	15°34.7	30°08.1	44°41.5	59°14.9	73°48.2	88°21.6	102°54.8	+33.4	15.1
	0°14.1	0°02.9	-0°08.2	-0°19.4	-0°30.5	-0°41.7	-0°52.9	-1°04.1	-1°15.3	-1°26.5	-1°37.7	-11.2	55.5
Fr 27	321°09.3	335°41.9	350°14.4	4°47.0	19°19.4	33°51.8	48°24.2	62°56.4	77°28.7	92°00.9	106°33.0	+32.4	15.4
	-4°26.0	-4°37.1	-4°48.3	-4°59.5	-5°10.7	-5°21.8	-5°32.9	-5°44.1	-5°55.2	-6°06.3	-6°17.4	-11.1	56.3
◐ Sa 28	324°27.3	338°58.4	353°29.4	8°00.3	22°31.2	37°01.9	51°32.6	66°03.3	80°33.8	95°04.3	109°34.7	+30.7	15.6
	-9°01.2	-9°11.9	-9°22.6	-9°33.3	-9°43.9	-9°54.5	-10°05.1	-10°15.6	-10°26.1	-10°36.5	-10°46.9	-10.6	57.2
Su 29	327°00.3	341°29.3	355°58.3	10°27.1	24°55.8	39°24.4	53°53.0	68°21.4	82°49.8	97°18.0	111°46.2	+28.6	15.9
	-13°17.4	-13°27.0	-13°36.5	-13°46.0	-13°55.4	-14°04.8	-14°14.1	-14°23.3	-14°32.4	-14°41.5	-14°50.5	-9.3	58.2
Mo 30	328°36.9	343°03.5	357°29.9	11°56.3	26°22.6	40°48.8	55°14.9	69°40.9	84°06.8	98°32.6	112°58.3	+26.1	16.1
	-16°56.4	-17°04.0	-17°11.6	-17°19.2	-17°26.6	-17°33.9	-17°41.1	-17°48.2	-17°55.2	-18°02.1	-18°08.9	-7.3	59.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 5 11h58 — LQ: 12 02h20 — NM: 19 22h24 — FQ: 28 00h19

SUN

July 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	269°02.5	284°02.3	299°02.2	314°02.1	329°02.0	344°01.8	359°01.7	14°01.6	29°01.5	44°01.4	59°01.3	74°01.1	-0.1
	23°06.7	23°06.5	23°06.3	23°06.2	23°06.0	23°05.8	23°05.7	23°05.5	23°05.3	23°05.2	23°05.0	23°04.8	-0.2
We 2	268°59.6	283°59.5	298°59.4	313°59.2	328°59.1	343°59.0	358°58.9	13°58.8	28°58.7	43°58.5	58°58.4	73°58.3	-0.1
	23°02.5	23°02.3	23°02.1	23°01.9	23°01.8	23°01.6	23°01.4	23°01.2	23°01.0	23°00.8	23°00.6	23°00.4	-0.2
Th 3	268°56.8	283°56.7	298°56.6	313°56.5	328°56.3	343°56.2	358°56.1	13°56.0	28°55.9	43°55.8	58°55.7	73°55.6	-0.1
	22°57.9	22°57.7	22°57.5	22°57.3	22°57.1	22°56.9	22°56.7	22°56.5	22°56.3	22°56.1	22°55.9	22°55.7	-0.2
Fr 4	268°54.1	283°54.0	298°53.9	313°53.8	328°53.7	343°53.5	358°53.4	13°53.3	28°53.2	43°53.1	58°53.0	73°52.9	-0.1
	22°52.9	22°52.7	22°52.5	22°52.3	22°52.1	22°51.9	22°51.6	22°51.4	22°51.2	22°51.0	22°50.8	22°50.5	-0.2
Sa 5	268°51.5	283°51.4	298°51.3	313°51.1	328°51.0	343°50.9	358°50.8	13°50.7	28°50.6	43°50.5	58°50.4	73°50.3	-0.1
	22°47.6	22°47.3	22°47.1	22°46.9	22°46.6	22°46.4	22°46.2	22°45.9	22°45.7	22°45.5	22°45.2	22°45.0	-0.2
Su 6	268°48.9	283°48.8	298°48.7	313°48.6	328°48.5	343°48.4	358°48.3	13°48.2	28°48.1	43°48.0	58°47.9	73°47.8	-0.1
	22°41.8	22°41.5	22°41.3	22°41.0	22°40.8	22°40.5	22°40.3	22°40.0	22°39.8	22°39.5	22°39.3	22°39.0	-0.3
Mo 7	268°46.5	283°46.4	298°46.3	313°46.2	328°46.1	343°46.0	358°45.9	13°45.8	28°45.7	43°45.6	58°45.5	73°45.4	-0.1
	22°35.6	22°35.4	22°35.1	22°34.8	22°34.6	22°34.3	22°34.0	22°33.8	22°33.5	22°33.2	22°32.9	22°32.7	-0.3
Tu 8	268°44.1	283°44.0	298°43.9	313°43.8	328°43.7	343°43.6	358°43.5	13°43.4	28°43.3	43°43.2	58°43.1	73°43.0	-0.1
	22°29.1	22°28.8	22°28.5	22°28.2	22°27.9	22°27.7	22°27.4	22°27.1	22°26.8	22°26.5	22°26.2	22°25.9	-0.3
We 9	268°41.8	283°41.7	298°41.6	313°41.5	328°41.5	343°41.4	358°41.3	13°41.2	28°41.1	43°41.0	58°40.9	73°40.8	-0.1
	22°22.1	22°21.8	22°21.5	22°21.2	22°20.9	22°20.6	22°20.3	22°20.0	22°19.7	22°19.4	22°19.1	22°18.8	-0.3
Th 10	268°39.6	283°39.6	298°39.5	313°39.4	328°39.3	343°39.2	358°39.1	13°39.0	28°38.9	43°38.9	58°38.8	73°38.7	-0.1
	22°14.8	22°14.5	22°14.2	22°13.9	22°13.5	22°13.2	22°12.9	22°12.6	22°12.3	22°11.9	22°11.6	22°11.3	-0.3
Fr 11	268°37.6	283°37.5	298°37.4	313°37.3	328°37.2	343°37.2	358°37.1	13°37.0	28°36.9	43°36.8	58°36.7	73°36.7	-0.1
	22°07.1	22°06.8	22°06.4	22°06.1	22°05.8	22°05.4	22°05.1	22°04.8	22°04.4	22°04.1	22°03.8	22°03.4	-0.3
Sa 12	268°35.6	283°35.5	298°35.4	313°35.4	328°35.3	343°35.2	358°35.1	13°35.1	28°35.0	43°34.9	58°34.8	73°34.7	-0.1
	21°59.0	21°58.6	21°58.3	21°57.9	21°57.6	21°57.2	21°56.9	21°56.6	21°56.2	21°55.8	21°55.5	21°55.1	-0.3
Su 13	268°33.8	283°33.7	298°33.6	313°33.5	328°33.5	343°33.4	358°33.3	13°33.2	28°33.2	43°33.1	58°33.0	73°32.9	-0.1
	21°50.5	21°50.1	21°49.8	21°49.4	21°49.1	21°48.7	21°48.3	21°48.0	21°47.6	21°47.2	21°46.9	21°46.5	-0.4
Mo 14	268°32.0	283°31.9	298°31.9	313°31.8	328°31.7	343°31.7	358°31.6	13°31.5	28°31.5	43°31.4	58°31.3	73°31.2	-0.1
	21°41.7	21°41.3	21°40.9	21°40.5	21°40.1	21°39.8	21°39.4	21°39.0	21°38.6	21°38.2	21°37.9	21°37.5	-0.4
Tu 15	268°30.4	283°30.3	298°30.3	313°30.2	328°30.1	343°30.1	358°30.0	13°29.9	28°29.9	43°29.8	58°29.7	73°29.7	-0.1
	21°32.4	21°32.0	21°31.7	21°31.3	21°30.9	21°30.5	21°30.1	21°29.7	21°29.3	21°28.9	21°28.5	21°28.1	-0.4
We 16	268°28.9	283°28.8	298°28.8	313°28.7	328°28.6	343°28.6	358°28.5	13°28.5	28°28.4	43°28.4	58°28.3	73°28.2	-0.1
	21°22.8	21°22.4	21°22.0	21°21.6	21°21.2	21°20.8	21°20.4	21°20.0	21°19.6	21°19.2	21°18.7	21°18.3	-0.4
Th 17	268°27.5	283°27.5	298°27.4	313°27.3	328°27.3	343°27.2	358°27.2	13°27.1	28°27.1	43°27.0	58°27.0	73°26.9	-0.1
	21°12.9	21°12.5	21°12.0	21°11.6	21°11.2	21°10.8	21°10.4	21°09.9	21°09.5	21°09.1	21°08.6	21°08.2	-0.4
Fr 18	268°26.3	283°26.2	298°26.2	313°26.1	328°26.1	343°26.0	358°26.0	13°25.9	28°25.9	43°25.8	58°25.8	73°25.7	-0.0
	21°02.6	21°02.1	21°01.7	21°01.3	21°00.8	21°00.4	20°59.9	20°59.5	20°59.1	20°58.6	20°58.2	20°57.7	-0.4
Sa 19	268°25.1	283°25.1	298°25.1	313°25.0	328°25.0	343°24.9	358°24.9	13°24.8	28°24.8	43°24.8	58°24.7	73°24.7	-0.0
	20°51.9	20°51.5	20°51.0	20°50.6	20°50.1	20°49.6	20°49.2	20°48.7	20°48.3	20°47.8	20°47.4	20°46.9	-0.5
Su 20	268°24.2	283°24.1	298°24.1	313°24.1	328°24.0	343°24.0	358°24.0	13°23.9	28°23.9	43°23.8	58°23.8	73°23.8	-0.0
	20°40.9	20°40.4	20°40.0	20°39.5	20°39.0	20°38.6	20°38.1	20°37.6	20°37.1	20°36.7	20°36.2	20°35.7	-0.5
Mo 21	268°23.3	283°23.3	298°23.3	313°23.2	328°23.2	343°23.2	358°23.2	13°23.1	28°23.1	43°23.1	58°23.0	73°23.0	-0.0
	20°29.5	20°29.1	20°28.6	20°28.1	20°27.6	20°27.1	20°26.6	20°26.2	20°25.7	20°25.2	20°24.7	20°24.2	-0.5
Tu 22	268°22.6	283°22.6	298°22.6	313°22.6	328°22.5	343°22.5	358°22.5	13°22.5	28°22.4	43°22.4	58°22.4	73°22.4	-0.0
	20°17.8	20°17.3	20°16.8	20°16.3	20°15.8	20°15.3	20°14.8	20°14.3	20°13.8	20°13.3	20°12.8	20°12.3	-0.5
We 23	268°22.1	283°22.1	298°22.1	313°22.0	328°22.0	343°22.0	358°22.0	13°22.0	28°21.9	43°21.9	58°21.9	73°21.9	-0.0
	20°05.8	20°05.3	20°04.8	20°04.2	20°03.7	20°03.2	20°02.7	20°02.2	20°01.7	20°01.2	20°00.7	20°00.1	-0.5
Th 24	268°21.7	283°21.7	298°21.7	313°21.7	328°21.6	343°21.6	358°21.6	13°21.6	28°21.6	43°21.6	58°21.6	73°21.6	-0.0
	19°53.4	19°52.9	19°52.3	19°51.8	19°51.3	19°50.8	19°50.2	19°49.7	19°49.2	19°48.7	19°48.1	19°47.6	-0.5
Fr 25	268°21.5	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.4	13°21.4	28°21.4	43°21.4	58°21.4	73°21.4	-0.0
	19°40.7	19°40.1	19°39.6	19°39.1	19°38.5	19°38.0	19°37.4	19°36.9	19°36.4	19°35.8	19°35.3	19°34.7	-0.5
Sa 26	268°21.4	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.4	13°21.4	28°21.4	43°21.4	58°21.4	73°21.4	+0.0
	19°27.6	19°27.1	19°26.5	19°26.0	19°25.4	19°24.9	19°24.3	19°23.8	19°23.2	19°22.7	19°22.1	19°21.6	-0.6
Su 27	268°21.4	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.5	13°21.5	28°21.5	43°21.5	58°21.5	73°21.5	+0.0
	19°14.3	19°13.7	19°13.2	19°12.6	19°12.0	19°11.5	19°10.9	19°10.3	19°09.8	19°09.2	19°08.6	19°08.1	-0.6
Mo 28	268°21.6	283°21.6	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.8	73°21.8	+0.0
	19°00.6	19°00.0	18°59.4	18°58.9	18°58.3	18°57.7	18°57.1	18°56.6	18°56.0	18°55.4	18°54.8	18°54.2	-0.6
Tu 29	268°22.0	283°22.0	298°22.0	313°22.1	328°22.1	343°22.1	358°22.1	13°22.1	28°22.2	43°22.2	58°22.2	73°22.2	+0.0
	18°46.6	18°46.0	18°45.4	18°44.8	18°44.3	18°43.7	18°43.1	18°42.5	18°41.9	18°41.3	18°40.7	18°40.1	-0.6
We 30	268°22.5	283°22.6	298°22.6	313°22.6	328°22.6	343°22.7	358°22.7	13°22.7	28°22.7	43°22.8	58°22.8	73°22.8	+0.0
	18°32.3	18°31.7	18°31.1	18°30.5	18°29.9	18°29.3	18°28.7	18°28.1	18°27.5	18°26.9	18°26.3	18°25.7	-0.6
Th 31	268°23.2	283°23.2	298°23.3	313°23.3	328°23.3	343°23.4	358°23.4	13°23.4	28°23.5	43°23.5	58°23.5	73°23.6	+0.0
	18°17.7	18°17.1	18°16.5	18°15.9	18°15.3	18°14.6	18°14.0	18°13.4	18°12.8	18°12.2	18°11.6	18°10.9	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2031

D	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	Δ'/h	SH
Tu 1	257° 10.1	271° 34.8	285° 59.4	300° 23.9	314° 48.3	329° 12.6	343° 36.8	358° 00.9	12° 25.0	26° 49.0	41° 12.9	+24.3	16.3
	-19° 10.7	-19° 16.2	-19° 21.6	-19° 26.9	-19° 32.1	-19° 37.1	-19° 42.0	-19° 46.8	-19° 51.4	-19° 56.0	-20° 00.3	-5.0	59.9
We 2	257° 02.3	271° 25.1	285° 47.8	300° 10.4	314° 33.1	328° 55.6	343° 18.1	357° 40.6	12° 03.0	26° 25.3	40° 47.7	+22.5	16.5
	-20° 49.4	-20° 51.5	-20° 53.5	-20° 55.3	-20° 56.9	-20° 58.4	-20° 59.8	-21° 01.0	-21° 02.0	-21° 02.9	-21° 03.6	-1.4	60.7
Th 3	256° 18.9	270° 40.9	285° 02.8	299° 24.7	313° 46.7	328° 08.6	342° 30.5	356° 52.5	11° 14.4	25° 36.4	39° 58.3	+21.9	16.7
	-20° 55.5	-20° 53.7	-20° 51.8	-20° 49.6	-20° 47.3	-20° 44.9	-20° 42.3	-20° 39.5	-20° 36.5	-20° 33.5	-20° 30.2	+2.5	61.2
○ Fr 4	255° 30.6	269° 53.0	284° 15.5	298° 38.0	313° 00.5	327° 23.2	341° 45.8	356° 08.5	10° 31.3	24° 54.1	39° 17.0	+22.6	16.7
	-19° 22.9	-19° 17.3	-19° 11.4	-19° 05.5	-18° 59.3	-18° 53.1	-18° 46.7	-18° 40.1	-18° 33.4	-18° 26.6	-18° 19.7	+6.3	61.4
Sa 5	255° 07.9	269° 31.8	283° 55.9	298° 20.0	312° 44.1	327° 08.4	341° 32.7	355° 57.2	10° 21.6	24° 46.2	39° 10.9	+24.3	16.7
	-16° 20.0	-16° 11.0	-16° 02.0	-15° 52.8	-15° 43.6	-15° 34.2	-15° 24.7	-15° 15.1	-15° 05.4	-14° 55.7	-14° 45.8	+9.4	61.2
Su 6	255° 30.5	269° 56.4	284° 22.5	298° 48.6	313° 14.8	327° 41.1	342° 07.5	356° 34.0	11° 00.5	25° 27.1	39° 53.8	+26.3	16.5
	-12° 07.1	-11° 55.9	-11° 44.6	-11° 33.3	-11° 21.9	-11° 10.4	-10° 58.9	-10° 47.3	-10° 35.6	-10° 23.9	-10° 12.2	+11.5	60.6
Mo 7	256° 43.6	271° 11.6	285° 39.5	300° 07.6	314° 35.7	329° 03.9	343° 32.2	358° 00.6	12° 29.0	26° 57.4	41° 26.0	+28.2	16.3
	-7° 10.5	-6° 58.1	-6° 45.7	-6° 33.2	-6° 20.7	-6° 08.2	-5° 55.7	-5° 43.2	-5° 30.6	-5° 18.1	-5° 05.5	+12.5	59.9
Tu 8	258° 41.4	273° 10.9	287° 40.5	302° 10.1	316° 39.7	331° 09.4	345° 39.1	0° 08.9	14° 38.7	29° 08.6	43° 38.5	+29.7	16.1
	-1° 55.9	-1° 43.3	-1° 30.6	-1° 18.0	-1° 05.4	-0° 52.8	-0° 40.2	-0° 27.7	-0° 15.1	-0° 02.6	0° 09.9	+12.6	58.9
We 9	261° 12.2	275° 42.8	290° 13.3	304° 43.9	319° 14.5	333° 45.2	348° 15.9	2° 46.6	17° 17.3	31° 48.0	46° 18.8	+30.7	15.8
	3° 14.9	3° 27.0	3° 39.1	3° 51.1	4° 03.1	4° 15.1	4° 27.0	4° 38.9	4° 50.7	5° 02.5	5° 14.3	+11.9	58.0
Th 10	264° 02.9	278° 33.9	293° 05.0	307° 36.1	322° 07.2	336° 38.3	351° 09.4	5° 40.6	20° 11.7	34° 42.8	49° 14.0	+31.1	15.5
	8° 05.0	8° 16.0	8° 26.9	8° 37.8	8° 48.6	8° 59.4	9° 10.1	9° 20.7	9° 31.3	9° 41.8	9° 52.2	+10.7	57.0
◑ Fr 11	278° 33.9	293° 05.0	307° 36.1	322° 07.2	336° 38.3	351° 09.4	5° 40.6	20° 11.7	34° 42.8	49° 14.0	63° 45.1	+31.1	15.5
	8° 16.0	8° 26.9	8° 37.8	8° 48.6	8° 59.4	9° 10.1	9° 20.7	9° 31.3	9° 41.8	9° 52.2	10° 02.6	+10.7	57.0
Sa 12	281° 32.7	296° 03.9	310° 35.1	325° 06.2	339° 37.4	354° 08.6	8° 39.7	23° 10.9	37° 42.0	52° 13.2	66° 44.3	+31.2	15.3
	12° 30.8	12° 40.1	12° 49.4	12° 58.6	13° 07.7	13° 16.7	13° 25.7	13° 34.6	13° 43.4	13° 52.2	14° 00.8	+9.0	56.1
Su 13	284° 30.4	299° 01.4	313° 32.4	328° 03.4	342° 34.3	357° 05.3	11° 36.3	26° 07.2	40° 38.1	55° 09.0	69° 39.9	+31.0	15.1
	16° 01.5	16° 08.9	16° 16.2	16° 23.4	16° 30.6	16° 37.6	16° 44.6	16° 51.5	16° 58.3	17° 05.0	17° 11.6	+7.0	55.4
Mo 14	287° 22.2	301° 52.9	316° 23.7	330° 54.4	345° 25.1	359° 55.8	14° 26.4	28° 57.1	43° 27.8	57° 58.4	72° 29.1	+30.7	15.0
	18° 40.4	18° 45.6	18° 50.7	18° 55.7	19° 00.6	19° 05.4	19° 10.1	19° 14.8	19° 19.3	19° 23.7	19° 28.1	+4.8	54.8
Tu 15	290° 07.9	304° 38.4	319° 09.0	333° 39.5	348° 10.0	2° 40.6	17° 11.1	31° 41.6	46° 12.1	60° 42.7	75° 13.2	+30.5	14.8
	20° 21.8	20° 24.6	20° 27.3	20° 29.9	20° 32.4	20° 34.8	20° 37.1	20° 39.3	20° 41.4	20° 43.5	20° 45.4	+2.4	54.4
We 16	292° 51.3	307° 21.9	321° 52.5	336° 23.0	350° 53.6	5° 24.3	19° 54.9	34° 25.5	48° 56.1	63° 26.8	77° 57.5	+30.6	14.8
	21° 02.2	21° 02.6	21° 02.8	21° 03.0	21° 03.0	21° 02.9	21° 02.8	21° 02.5	21° 02.1	21° 01.7	21° 01.1	-0.1	54.1
Th 17	295° 39.0	310° 09.9	324° 40.9	339° 11.8	353° 42.8	8° 13.8	22° 44.8	37° 15.8	51° 46.8	66° 17.9	80° 49.0	+31.0	14.7
	20° 41.2	20° 39.0	20° 36.9	20° 34.6	20° 32.2	20° 29.7	20° 27.1	20° 24.5	20° 21.7	20° 18.8	20° 15.9	-2.5	53.9
Fr 18	298° 38.3	313° 09.8	327° 41.3	342° 12.9	356° 44.4	11° 16.0	25° 47.7	40° 19.3	54° 51.0	69° 22.8	83° 54.5	+31.6	14.7
	19° 20.8	19° 16.4	19° 12.0	19° 07.4	19° 02.8	18° 58.0	18° 53.2	18° 48.3	18° 43.4	18° 38.3	18° 33.1	-4.8	53.9
● Sa 19	301° 54.5	316° 26.7	330° 59.0	345° 31.3	0° 03.6	14° 36.0	29° 08.4	43° 40.8	58° 13.3	72° 45.8	87° 18.3	+32.4	14.7
	17° 06.3	16° 59.9	16° 53.5	16° 46.9	16° 40.3	16° 33.6	16° 26.8	16° 20.0	16° 13.0	16° 06.0	15° 59.0	-6.7	53.9
Su 20	305° 29.8	320° 02.8	334° 35.8	349° 08.8	3° 41.9	18° 15.0	32° 48.2	47° 21.3	61° 54.5	76° 27.7	91° 01.0	+33.1	14.7
	14° 05.1	13° 57.0	13° 48.8	13° 40.6	13° 32.3	13° 23.9	13° 15.5	13° 07.1	12° 58.6	12° 50.0	12° 41.4	-8.4	54.1
Mo 21	309° 22.4	323° 56.0	338° 29.6	353° 03.2	7° 36.9	22° 10.5	36° 44.2	51° 17.9	65° 51.7	80° 25.4	94° 59.1	+33.7	14.8
	10° 25.7	10° 16.2	10° 06.8	9° 57.2	9° 47.7	9° 38.1	9° 28.4	9° 18.7	9° 09.0	8° 59.2	8° 49.4	-9.6	54.3
Tu 22	313° 26.8	328° 00.8	342° 34.7	357° 08.6	11° 42.5	26° 16.5	40° 50.4	55° 24.3	69° 58.3	84° 32.2	99° 06.1	+33.9	14.9
	6° 17.6	6° 07.2	5° 56.8	5° 46.4	5° 35.9	5° 25.4	5° 14.9	5° 04.3	4° 53.8	4° 43.2	4° 32.5	-10.5	54.6
We 23	317° 34.7	332° 08.6	346° 42.4	1° 16.2	15° 50.0	30° 23.8	44° 57.6	59° 31.3	74° 05.0	88° 38.8	103° 12.5	+33.8	15.0
	1° 50.6	1° 39.7	1° 28.8	1° 17.8	1° 06.8	0° 55.9	0° 44.9	0° 33.9	0° 22.9	0° 11.8	0° 00.8	-11.0	55.1
Th 24	321° 35.2	336° 08.5	350° 41.8	5° 15.0	19° 48.2	34° 21.3	48° 54.5	63° 27.5	78° 00.6	92° 33.6	107° 06.6	+33.1	15.2
	-2° 45.0	-2° 56.1	-3° 07.1	-3° 18.2	-3° 29.2	-3° 40.3	-3° 51.3	-4° 02.3	-4° 13.3	-4° 24.3	-4° 35.3	-11.0	55.6
Fr 25	325° 15.9	339° 48.1	354° 20.3	8° 52.4	23° 24.5	37° 56.5	52° 28.4	67° 00.3	81° 32.1	96° 03.9	110° 35.6	+32.0	15.3
	-7° 18.4	-7° 29.1	-7° 39.8	-7° 50.4	-8° 01.1	-8° 11.7	-8° 22.3	-8° 32.8	-8° 43.4	-8° 53.8	-9° 04.3	-10.6	56.3
Sa 26	328° 23.6	342° 54.3	357° 24.9	11° 55.4	26° 25.8	40° 56.1	55° 26.4	69° 56.6	84° 26.7	98° 56.8	113° 26.7	+30.3	15.6
	-11° 36.8	-11° 46.7	-11° 56.4	-12° 06.2	-12° 15.8	-12° 25.5	-12° 35.1	-12° 44.6	-12° 54.0	-13° 03.5	-13° 12.8	-9.6	57.0
◐ Su 27	330° 46.4	345° 15.0	359° 43.6	14° 12.0	28° 40.4	43° 08.7	57° 36.9	72° 05.0	86° 33.0	101° 01.0	115° 28.8	+28.2	15.8
	-15° 25.6	-15° 33.9	-15° 42.1	-15° 50.3	-15° 58.3	-16° 06.3	-16° 14.2	-16° 22.0	-16° 29.8	-16° 37.4	-16° 45.0	-7.9	57.9
Mo 28	332° 15.8	346° 42.2	1° 08.6	15° 34.8	30° 01.0	44° 27.1	58° 53.1	73° 19.0	87° 44.8	102° 10.5	116° 36.2	+26.0	16.0
	-18° 27.4	-18° 33.4	-18° 39.3	-18° 45.1	-18° 50.8	-18° 56.4	-19° 01.9	-19° 07.3	-19° 12.5	-19° 17.7	-19° 22.7	-5.5	58.8
Tu 29	332° 51.4	347° 15.8	1° 40.2	16° 04.4	30° 28.6	44° 52.8	59° 16.9	73° 40.9	88° 04.8	102° 28.7	116° 52.6	+24.1	16.3
	-20° 23.4	-20° 26.4	-20° 29.3	-20° 32.0	-20° 34.6	-20° 37.1	-20° 39.4	-20° 41.6	-20° 43.7	-20° 45.6	-20° 47.4	-2.4	59.7
We 30	332° 43.9	347° 07.0	1° 30.1	15° 53.1	30° 16.1	44° 39.1	59° 02.0	73° 24.9	87° 47.8	102° 10.7	116° 33.5	+23.0	16.5
	-20° 56.6	-20° 56.0	-20° 55.2	-20° 54.4	-20° 53.3	-20° 52.2	-20° 50.8	-20° 49.3	-20° 47.7	-20° 45.9	-20° 44.0	+1.3	60.4
Th 31	332° 15.4	346° 38.2	1° 01.0	15° 23.8	29° 46.7	44° 09.5	58° 32.4	72° 55.3	87° 18.2	101° 41.2	116° 04.2	+22.9	16.6
	-19° 56.6	-19° 52.2	-19° 47.7	-19° 43.0	-19° 38.2	-19° 33.3	-19° 28.2	-19° 22.9	-19° 17.5	-19° 12.0	-19° 06.3	+5.0	60.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 4 19h01 — LQ: 11 11h49 — NM: 19 13h40 — FQ: 27 10h34

SUN

August 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	268°24.0	283°24.1	298°24.1	313°24.2	328°24.2	343°24.2	358°24.3	13°24.3	28°24.4	43°24.4	58°24.4	73°24.5	+0.0
	18°02.8	18°02.2	18°01.6	18°00.9	18°00.3	17°59.7	17°59.1	17°58.4	17°57.8	17°57.2	17°56.5	17°55.9	-0.6
Sa 2	268°25.0	283°25.1	298°25.1	313°25.2	328°25.2	343°25.3	358°25.3	13°25.4	28°25.4	43°25.5	58°25.5	73°25.5	+0.0
	17°47.6	17°47.0	17°46.4	17°45.7	17°45.1	17°44.4	17°43.8	17°43.2	17°42.5	17°41.9	17°41.2	17°40.6	-0.6
Su 3	268°26.2	283°26.2	298°26.3	313°26.3	328°26.4	343°26.4	358°26.5	13°26.5	28°26.6	43°26.7	58°26.7	73°26.8	+0.1
	17°32.2	17°31.5	17°30.9	17°30.2	17°29.5	17°28.9	17°28.2	17°27.6	17°26.9	17°26.3	17°25.6	17°25.0	-0.7
Mo 4	268°27.5	283°27.5	298°27.6	313°27.7	328°27.7	343°27.8	358°27.8	13°27.9	28°27.9	43°28.0	58°28.1	73°28.1	+0.1
	17°16.4	17°15.7	17°15.1	17°14.4	17°13.7	17°13.1	17°12.4	17°11.7	17°11.1	17°10.4	17°09.7	17°09.1	-0.7
Tu 5	268°28.9	283°29.0	298°29.1	313°29.1	328°29.2	343°29.2	358°29.3	13°29.4	28°29.4	43°29.5	58°29.6	73°29.6	+0.1
	17°00.3	16°59.7	16°59.0	16°58.3	16°57.6	16°57.0	16°56.3	16°55.6	16°54.9	16°54.3	16°53.6	16°52.9	-0.7
We 6	268°30.5	283°30.6	298°30.7	313°30.7	328°30.8	343°30.9	358°30.9	13°31.0	28°31.1	43°31.2	58°31.2	73°31.3	+0.1
	16°44.0	16°43.3	16°42.7	16°42.0	16°41.3	16°40.6	16°39.9	16°39.2	16°38.5	16°37.8	16°37.1	16°36.5	-0.7
Th 7	268°32.3	283°32.3	298°32.4	313°32.5	328°32.6	343°32.6	358°32.7	13°32.8	28°32.9	43°33.0	58°33.0	73°33.1	+0.1
	16°27.4	16°26.7	16°26.0	16°25.3	16°24.6	16°23.9	16°23.2	16°22.5	16°21.8	16°21.1	16°20.4	16°19.7	-0.7
Fr 8	268°34.1	283°34.2	298°34.3	313°34.4	328°34.5	343°34.6	358°34.6	13°34.7	28°34.8	43°34.9	58°35.0	73°35.1	+0.1
	16°10.6	16°09.9	16°09.2	16°08.5	16°07.7	16°07.0	16°06.3	16°05.6	16°04.9	16°04.2	16°03.5	16°02.8	-0.7
Sa 9	268°36.2	283°36.3	298°36.3	313°36.4	328°36.5	343°36.6	358°36.7	13°36.8	28°36.9	43°37.0	58°37.1	73°37.1	+0.1
	15°53.5	15°52.7	15°52.0	15°51.3	15°50.6	15°49.9	15°49.1	15°48.4	15°47.7	15°47.0	15°46.3	15°45.5	-0.7
Su 10	268°38.3	283°38.4	298°38.5	313°38.6	328°38.7	343°38.8	358°38.9	13°39.0	28°39.1	43°39.2	58°39.3	73°39.4	+0.1
	15°36.1	15°35.4	15°34.6	15°33.9	15°33.2	15°32.4	15°31.7	15°31.0	15°30.2	15°29.5	15°28.8	15°28.0	-0.7
Mo 11	268°40.6	283°40.7	298°40.8	313°40.9	328°41.0	343°41.1	358°41.2	13°41.3	28°41.4	43°41.5	58°41.6	73°41.7	+0.1
	15°18.5	15°17.7	15°17.0	15°16.2	15°15.5	15°14.8	15°14.0	15°13.3	15°12.5	15°11.8	15°11.0	15°10.3	-0.7
Tu 12	268°43.1	283°43.2	298°43.3	313°43.4	328°43.5	343°43.6	358°43.7	13°43.8	28°43.9	43°44.0	58°44.1	73°44.3	+0.1
	15°00.6	14°59.8	14°59.1	14°58.3	14°57.6	14°56.8	14°56.1	14°55.3	14°54.6	14°53.8	14°53.1	14°52.3	-0.8
We 13	268°45.7	283°45.8	298°45.9	313°46.0	328°46.1	343°46.2	358°46.3	13°46.4	28°46.6	43°46.7	58°46.8	73°46.9	+0.1
	14°42.5	14°41.7	14°41.0	14°40.2	14°39.4	14°38.7	14°37.9	14°37.1	14°36.4	14°35.6	14°34.9	14°34.1	-0.8
Th 14	268°48.4	283°48.5	298°48.6	313°48.7	328°48.8	343°49.0	358°49.1	13°49.2	28°49.3	43°49.4	58°49.6	73°49.7	+0.1
	14°24.1	14°23.4	14°22.6	14°21.8	14°21.0	14°20.3	14°19.5	14°18.7	14°18.0	14°17.2	14°16.4	14°15.6	-0.8
Fr 15	268°51.2	283°51.3	298°51.5	313°51.6	328°51.7	343°51.8	358°52.0	13°52.1	28°52.2	43°52.3	58°52.5	73°52.6	+0.1
	14°05.6	14°04.8	14°04.0	14°03.2	14°02.4	14°01.7	14°00.9	14°00.1	13°59.3	13°58.5	13°57.7	13°57.0	-0.8
Sa 16	268°54.2	283°54.3	298°54.5	313°54.6	328°54.7	343°54.8	358°55.0	13°55.1	28°55.2	43°55.4	58°55.5	73°55.6	+0.1
	13°46.8	13°46.0	13°45.2	13°44.4	13°43.6	13°42.8	13°42.0	13°41.2	13°40.4	13°39.6	13°38.9	13°38.1	-0.8
Su 17	268°57.3	283°57.4	298°57.6	313°57.7	328°57.8	343°58.0	358°58.1	13°58.2	28°58.4	43°58.5	58°58.6	73°58.8	+0.1
	13°27.7	13°26.9	13°26.1	13°25.3	13°24.5	13°23.7	13°22.9	13°22.1	13°21.3	13°20.5	13°19.7	13°18.9	-0.8
Mo 18	269°00.5	284°00.7	299°00.8	314°01.0	329°01.1	344°01.2	359°01.4	14°01.5	29°01.7	44°01.8	59°01.9	74°02.1	+0.1
	13°08.5	13°07.7	13°06.9	13°06.1	13°05.3	13°04.5	13°03.7	13°02.9	13°02.0	13°01.2	13°00.4	12°59.6	-0.8
Tu 19	269°03.9	284°04.1	299°04.2	314°04.3	329°04.5	344°04.6	359°04.8	14°04.9	29°05.1	44°05.2	59°05.3	74°05.5	+0.1
	12°49.1	12°48.2	12°47.4	12°46.6	12°45.8	12°45.0	12°44.2	12°43.4	12°42.5	12°41.7	12°40.9	12°40.1	-0.8
We 20	269°07.4	284°07.5	299°07.7	314°07.8	329°08.0	344°08.1	359°08.3	14°08.4	29°08.6	44°08.7	59°08.9	74°09.0	+0.1
	12°29.4	12°28.6	12°27.8	12°26.9	12°26.1	12°25.3	12°24.5	12°23.7	12°22.8	12°22.0	12°21.2	12°20.3	-0.8
Th 21	269°11.0	284°11.2	299°11.3	314°11.5	329°11.6	344°11.8	359°11.9	14°12.1	29°12.2	44°12.4	59°12.5	74°12.7	+0.2
	12°09.6	12°08.7	12°07.9	12°07.1	12°06.3	12°05.4	12°04.6	12°03.8	12°02.9	12°02.1	12°01.3	12°00.4	-0.8
Fr 22	269°14.7	284°14.9	299°15.0	314°15.2	329°15.4	344°15.5	359°15.7	14°15.8	29°16.0	44°16.1	59°16.3	74°16.5	+0.2
	11°49.5	11°48.7	11°47.9	11°47.0	11°46.2	11°45.4	11°44.5	11°43.7	11°42.8	11°42.0	11°41.1	11°40.3	-0.8
Sa 23	269°18.6	284°18.7	299°18.9	314°19.1	329°19.2	344°19.4	359°19.5	14°19.7	29°19.9	44°20.0	59°20.2	74°20.4	+0.2
	11°29.3	11°28.5	11°27.6	11°26.8	11°25.9	11°25.1	11°24.3	11°23.4	11°22.6	11°21.7	11°20.9	11°20.0	-0.8
Su 24	269°22.5	284°22.7	299°22.9	314°23.0	329°23.2	344°23.4	359°23.5	14°23.7	29°23.9	44°24.0	59°24.2	74°24.4	+0.2
	11°08.9	11°08.1	11°07.2	11°06.4	11°05.5	11°04.7	11°03.8	11°03.0	11°02.1	11°01.2	11°00.4	10°59.5	-0.9
Mo 25	269°26.6	284°26.8	299°26.9	314°27.1	329°27.3	344°27.4	359°27.6	14°27.8	29°28.0	44°28.1	59°28.3	74°28.5	+0.2
	10°48.4	10°47.5	10°46.6	10°45.8	10°44.9	10°44.1	10°43.2	10°42.3	10°41.5	10°40.6	10°39.7	10°38.9	-0.9
Tu 26	269°30.8	284°30.9	299°31.1	314°31.3	329°31.5	344°31.6	359°31.8	14°32.0	29°32.2	44°32.3	59°32.5	74°32.7	+0.2
	10°27.6	10°26.8	10°25.9	10°25.0	10°24.2	10°23.3	10°22.4	10°21.5	10°20.7	10°19.8	10°18.9	10°18.1	-0.9
We 27	269°35.0	284°35.2	299°35.4	314°35.6	329°35.8	344°35.9	359°36.1	14°36.3	29°36.5	44°36.7	59°36.8	74°37.0	+0.2
	10°06.7	10°05.8	10°05.0	10°04.1	10°03.2	10°02.3	10°01.5	10°00.6	9°59.7	9°58.8	9°58.0	9°57.1	-0.9
Th 28	269°39.4	284°39.6	299°39.8	314°40.0	329°40.1	344°40.3	359°40.5	14°40.7	29°40.9	44°41.1	59°41.3	74°41.4	+0.2
	9°45.7	9°44.8	9°43.9	9°43.0	9°42.1	9°41.3	9°40.4	9°39.5	9°38.6	9°37.7	9°36.8	9°36.0	-0.9
Fr 29	269°43.9	284°44.1	299°44.3	314°44.4	329°44.6	344°44.8	359°45.0	14°45.2	29°45.4	44°45.6	59°45.8	74°46.0	+0.2
	9°24.4	9°23.6	9°22.7	9°21.8	9°20.9	9°20.0	9°19.1	9°18.2	9°17.3	9°16.5	9°15.6	9°14.7	-0.9
Sa 30	269°48.4	284°48.6	299°48.8	314°49.0	329°49.2	344°49.4	359°49.6	14°49.8	29°50.0	44°50.2	59°50.4	74°50.6	+0.2
	9°03.1	9°02.2	9°01.3	9°00.4	8°59.5	8°58.6	8°57.7	8°56.8	8°55.9	8°55.0	8°54.1	8°53.2	-0.9
Su 31	269°53.1	284°53.3	299°53.5	314°53.7	329°53.9	344°54.1	359°54.3	14°54.5	29°54.7	44°54.9	59°55.1	74°55.3	+0.2
	8°41.6	8°40.7	8°39.8	8°38.9	8°38.0	8°37.1	8°36.2	8°35.3	8°34.4	8°33.5	8°32.6	8°31.7	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2031

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
Fr 1	245°32.3	259°55.6	274°18.9	288°42.3	303°05.7	317°29.2	331°52.7	346°16.3	0°39.9	15°03.6	29°27.3	+23.5	16.7
	-18°08.8	-18°01.8	-17°54.6	-17°47.2	-17°39.8	-17°32.2	-17°24.5	-17°16.6	-17°08.6	-17°00.5	-16°52.3	+7.7	61.1
Sa 2	245°29.6	259°54.3	274°19.0	288°43.7	303°08.5	317°33.4	331°58.4	346°23.4	0°48.5	15°13.7	29°38.9	+24.9	16.7
	-14°35.2	-14°25.2	-14°15.1	-14°04.9	-13°54.6	-13°44.2	-13°33.7	-13°23.2	-13°12.5	-13°01.8	-12°51.0	+10.4	61.1
○ Su 3	246°05.2	260°31.5	274°57.9	289°24.3	303°50.8	318°17.4	332°44.0	347°10.7	1°37.5	16°04.3	30°31.2	+26.6	16.6
	-9°59.6	-9°47.7	-9°35.7	-9°23.6	-9°11.5	-8°59.4	-8°47.2	-8°34.9	-8°22.6	-8°10.3	-7°57.9	+12.2	60.7
Mo 4	247°22.0	261°49.8	276°17.8	290°45.7	305°13.8	319°41.9	334°10.0	348°38.2	3°06.4	17°34.7	32°03.1	+28.1	16.4
	-4°48.3	-4°35.4	-4°22.6	-4°09.8	-3°56.9	-3°44.0	-3°31.1	-3°18.3	-3°05.4	-2°52.5	-2°39.6	+12.9	60.1
Tu 5	249°14.2	263°43.3	278°12.4	292°41.6	307°10.8	321°40.0	336°09.3	350°38.6	5°08.0	19°37.4	34°06.8	+29.3	16.1
	0°33.1	0°45.8	0°58.6	1°11.3	1°23.9	1°36.6	1°49.2	2°01.8	2°14.3	2°26.9	2°39.4	+12.6	59.2
We 6	251°32.0	266°01.9	280°31.8	295°01.8	309°31.7	324°01.7	338°31.7	353°01.7	7°31.8	22°01.9	36°31.9	+30.0	15.9
	5°42.4	5°54.2	6°06.0	6°17.8	6°29.5	6°41.1	6°52.8	7°04.3	7°15.8	7°27.2	7°38.6	+11.6	58.2
Th 7	254°05.0	268°35.3	283°05.7	297°36.0	312°06.3	326°36.7	341°07.0	355°37.4	10°07.7	24°38.1	39°08.5	+30.3	15.6
	10°22.1	10°32.5	10°42.8	10°53.0	11°03.2	11°13.3	11°23.4	11°33.3	11°43.2	11°53.0	12°02.7	+10.1	57.3
Fr 8	256°44.6	271°15.0	285°45.4	300°15.8	314°46.3	329°16.7	343°47.1	358°17.5	12°47.9	27°18.4	41°48.8	+30.4	15.4
	14°19.5	14°28.0	14°36.4	14°44.7	14°52.9	15°01.1	15°09.1	15°17.1	15°25.0	15°32.8	15°40.5	+8.1	56.3
Sa 9	259°24.9	273°55.3	288°25.7	302°56.1	317°26.4	331°56.8	346°27.2	0°57.6	15°28.0	29°58.3	44°28.7	+30.4	15.1
	17°25.5	17°31.8	17°38.0	17°44.0	17°50.0	17°55.9	18°01.7	18°07.5	18°13.1	18°18.6	18°24.0	+5.9	55.5
◑ Su 10	273°55.3	288°25.7	302°56.1	317°26.4	331°56.8	346°27.2	0°57.6	15°28.0	29°58.3	44°28.7	58°59.1	+30.4	15.1
	17°31.8	17°38.0	17°44.0	17°50.0	17°55.9	18°01.7	18°07.5	18°13.1	18°18.6	18°24.0	18°29.4	+5.8	55.5
Mo 11	276°34.5	291°04.8	305°35.2	320°05.5	334°35.9	349°06.2	3°36.6	18°07.0	32°37.3	47°07.7	61°38.1	+30.4	15.0
	19°37.9	19°41.7	19°45.3	19°48.9	19°52.4	19°55.8	19°59.1	20°02.3	20°05.4	20°08.4	20°11.3	+3.3	54.9
Tu 12	279°14.2	293°44.7	308°15.2	322°45.6	337°16.1	351°46.6	6°17.1	20°47.6	35°18.2	49°48.7	64°19.2	+30.5	14.8
	20°46.3	20°44.3	20°45.5	20°46.6	20°47.6	20°48.5	20°49.4	20°50.1	20°50.7	20°51.2	20°51.7	+0.9	54.4
We 13	281°59.0	296°29.8	311°00.6	325°31.4	340°02.2	354°33.0	9°03.9	23°34.8	38°05.7	52°36.6	67°07.5	+30.9	14.8
	20°46.3	20°45.1	20°43.9	20°42.6	20°41.2	20°39.6	20°38.0	20°36.3	20°34.5	20°32.6	20°30.6	-1.6	54.1
Th 14	284°54.1	299°25.4	313°56.7	328°28.1	342°59.4	357°30.8	12°02.2	26°33.7	41°05.1	55°36.6	70°08.1	+31.4	14.7
	19°49.6	19°46.1	19°42.6	19°38.9	19°35.2	19°31.4	19°27.4	19°23.4	19°19.4	19°15.2	19°10.9	-3.9	54.0
Fr 15	288°04.1	302°36.1	317°08.0	331°40.0	346°12.1	0°44.1	15°16.2	29°48.4	44°20.5	58°52.7	73°24.9	+32.1	14.7
	17°56.9	17°51.4	17°45.7	17°39.9	17°34.1	17°28.2	17°22.2	17°16.2	17°10.0	17°03.8	16°57.6	-5.9	54.0
Sa 16	291°31.2	306°03.8	320°36.5	335°09.2	349°41.9	4°14.6	18°47.4	33°20.2	47°53.0	62°25.9	76°58.7	+32.8	14.8
	15°14.5	15°07.1	14°59.6	14°52.1	14°44.4	14°36.7	14°29.0	14°21.2	14°13.3	14°05.3	13°57.3	-7.7	54.1
Su 17	295°14.5	309°47.8	324°21.0	338°54.3	353°27.6	8°00.9	22°34.2	37°07.5	51°40.9	66°14.2	80°47.6	+33.3	14.8
	11°50.1	11°41.2	11°32.2	11°23.2	11°14.1	11°05.0	10°55.8	10°46.5	10°37.3	10°27.9	10°18.5	-9.2	54.3
● Mo 18	299°10.2	313°43.8	328°17.4	342°51.0	357°24.6	11°58.3	26°31.9	41°05.6	55°39.2	70°12.9	84°46.5	+33.6	14.9
	7°52.6	7°42.6	7°32.5	7°22.3	7°12.2	7°02.0	6°51.8	6°41.5	6°31.2	6°20.9	6°10.5	-10.2	54.6
Tu 19	303°11.6	317°45.2	332°18.9	346°52.5	1°26.2	15°59.8	30°33.4	45°07.0	59°40.6	74°14.2	88°47.8	+33.6	15.0
	3°31.9	3°21.1	3°10.3	2°59.5	2°48.7	2°37.9	2°27.0	2°16.1	2°05.2	1°54.3	1°43.4	-10.8	55.0
We 20	307°09.9	321°43.2	336°16.5	350°49.8	5°23.1	19°56.3	34°29.5	49°02.7	63°35.9	78°09.0	92°42.1	+33.2	15.1
	-1°01.5	-1°12.5	-1°23.5	-1°34.6	-1°45.6	-1°56.6	-2°07.7	-2°18.7	-2°29.7	-2°40.8	-2°51.8	-11.0	55.4
Th 21	310°55.0	325°27.5	340°00.1	354°32.6	9°05.0	23°37.4	38°09.8	52°42.1	67°14.4	81°46.7	96°18.9	+32.4	15.3
	-5°35.9	-5°46.7	-5°57.5	-6°08.3	-6°19.1	-6°29.8	-6°40.5	-6°51.2	-7°01.9	-7°12.6	-7°23.2	-10.7	55.9
Fr 22	314°15.9	328°47.3	343°18.6	357°49.9	12°21.1	26°52.3	41°23.4	55°54.4	70°25.4	84°56.3	99°27.2	+31.1	15.4
	-9°58.8	-10°08.9	-10°18.9	-10°28.9	-10°38.9	-10°48.8	-10°58.7	-11°08.5	-11°18.3	-11°28.0	-11°37.7	-9.9	56.5
Sa 23	317°02.3	331°32.2	346°01.9	0°31.6	15°01.2	29°30.7	44°00.2	58°29.6	72°58.9	87°28.2	101°57.3	+29.5	15.6
	-13°56.2	-14°05.0	-14°13.7	-14°22.3	-14°30.8	-14°39.3	-14°47.7	-14°56.1	-15°04.3	-15°12.5	-15°20.7	-8.4	57.1
Su 24	319°06.3	333°34.3	348°02.3	2°30.1	16°57.9	31°25.6	45°53.3	60°20.8	74°48.3	89°15.8	103°43.1	+27.7	15.8
	-17°12.8	-17°19.6	-17°26.3	-17°32.9	-17°39.4	-17°45.8	-17°52.1	-17°58.3	-18°04.5	-18°10.5	-18°16.4	-6.4	57.8
◐ Mo 25	320°24.9	334°51.1	349°17.3	3°43.4	18°09.5	32°35.5	47°01.4	61°27.2	75°53.0	90°18.8	104°44.4	+26.0	15.9
	-19°32.4	-19°36.6	-19°40.6	-19°44.6	-19°48.4	-19°52.1	-19°55.7	-19°59.1	-20°02.5	-20°05.7	-20°08.8	-3.6	58.5
Tu 26	321°03.0	335°27.9	349°52.7	4°17.4	18°42.1	33°06.8	47°31.5	61°56.1	76°20.7	90°45.2	105°09.7	+24.7	16.1
	-20°39.8	-20°40.8	-20°41.6	-20°42.4	-20°43.0	-20°43.5	-20°43.8	-20°44.0	-20°44.0	-20°43.9	-20°43.7	-0.4	59.2
We 27	321°14.2	335°38.3	350°02.4	4°26.6	18°50.7	33°14.8	47°38.9	62°03.0	76°27.1	90°51.2	105°15.4	+24.1	16.3
	-20°23.6	-20°21.1	-20°18.5	-20°15.7	-20°12.8	-20°09.8	-20°06.6	-20°03.3	-19°59.9	-19°56.3	-19°52.5	+3.1	59.8
Th 28	321°17.8	335°42.1	350°06.4	4°30.7	18°55.1	33°19.4	47°43.8	62°08.2	76°32.7	90°57.2	105°21.7	+24.4	16.4
	-18°40.0	-18°34.0	-18°28.0	-18°21.8	-18°15.5	-18°09.1	-18°02.5	-17°55.8	-17°49.0	-17°42.0	-17°35.0	+6.5	60.3
Fr 29	321°33.4	335°58.5	350°23.6	4°48.8	19°14.0	33°39.3	48°04.6	62°29.9	76°55.3	91°20.8	105°46.2	+25.3	16.5
	-15°34.6	-15°25.7	-15°16.6	-15°07.5	-14°58.3	-14°48.9	-14°39.5	-14°29.9	-14°20.3	-14°10.5	-14°00.7	+9.4	60.5
Sa 30	322°14.3	336°40.6	351°06.9	5°33.2	19°59.6	34°26.1	48°52.6	63°19.2	77°45.8	92°12.4	106°39.1	+26.5	16.5
	-11°22.5	-11°11.3	-11°00.0	-10°48.7	-10°37.3	-10°25.9	-10°14.3	-10°02.8	-9°51.1	-9°39.4	-9°27.6	+11.5	60.5
Su 31	323°25.4	337°52.9	352°20.4	6°47.9	21°15.5	35°43.1	50°10.8	64°38.5	79°06.3	93°34.1	108°01.9	+27.7	16.4
	-6°25.1	-6°12.6	-6°00.1	-5°47.5	-5°34.9	-5°22.3	-5°09.7	-4°57.0	-4°44.4	-4°31.6	-4°18.9	+12.6	60.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 01h45 — LQ: 10 00h23 — NM: 18 04h32 — FQ: 25 18h39

SUN

September 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	269°57.8 8°19.9	284°58.0 8°19.0	299°58.2 8°18.1	314°58.4 8°17.2	329°58.6 8°16.3	344°58.8 8°15.4	359°59.0 8°14.5	14°59.2 8°13.6	29°59.4 8°12.7	44°59.6 8°11.8	59°59.8 8°10.9	75°00.0 8°10.0	+0.2 -0.9
Tu 2	270°02.6 7°58.1	285°02.8 7°57.2	300°03.0 7°56.3	315°03.2 7°55.4	330°03.4 7°54.5	345°03.6 7°53.6	0°03.8 7°52.7	15°04.0 7°51.8	30°04.3 7°50.9	45°04.5 7°49.9	60°04.7 7°49.0	75°04.9 7°48.1	+0.2 -0.9
We 3	270°07.5 7°36.2	285°07.7 7°35.3	300°07.9 7°34.4	315°08.1 7°33.5	330°08.3 7°32.6	345°08.5 7°31.7	0°08.7 7°30.7	15°08.9 7°29.8	30°09.1 7°28.9	45°09.4 7°28.0	60°09.6 7°27.1	75°09.8 7°26.2	+0.2 -0.9
Th 4	270°12.5 7°14.2	285°12.7 7°13.3	300°12.9 7°12.4	315°13.1 7°11.4	330°13.3 7°10.5	345°13.5 7°09.6	0°13.7 7°08.7	15°13.9 7°07.8	30°14.1 7°06.8	45°14.3 7°05.9	60°14.5 7°05.0	75°14.7 7°04.1	+0.2 -0.9
Fr 5	270°17.5 6°52.1	285°17.7 6°51.1	300°17.9 6°50.2	315°18.1 6°49.3	330°18.3 6°48.4	345°18.5 6°47.4	0°18.7 6°46.5	15°18.9 6°45.6	30°19.1 6°44.6	45°19.3 6°43.7	60°19.6 6°42.8	75°19.8 6°41.9	+0.2 -0.9
Sa 6	270°22.5 6°29.8	285°22.7 6°28.9	300°22.9 6°27.9	315°23.1 6°27.0	330°23.4 6°26.1	345°23.6 6°25.1	0°23.8 6°24.2	15°24.0 6°23.3	30°24.2 6°22.3	45°24.4 6°21.4	60°24.6 6°20.5	75°24.8 6°19.5	+0.2 -0.9
Su 7	270°27.6 6°07.4	285°27.8 6°06.5	300°28.0 6°05.5	315°28.3 6°04.6	330°28.5 6°03.7	345°28.7 6°02.7	0°28.9 6°01.8	15°29.1 6°00.9	30°29.3 5°59.9	45°29.5 5°59.0	60°29.8 5°58.1	75°30.0 5°57.1	+0.2 -0.9
Mo 8	270°32.8 5°44.9	285°33.0 5°44.0	300°33.2 5°43.1	315°33.4 5°42.1	330°33.6 5°41.2	345°33.8 5°40.2	0°34.1 5°39.3	15°34.3 5°38.4	30°34.5 5°37.4	45°34.7 5°36.5	60°34.9 5°35.5	75°35.1 5°34.6	+0.2 -0.9
Tu 9	270°37.9 5°22.4	285°38.2 5°21.4	300°38.4 5°20.5	315°38.6 5°19.5	330°38.8 5°18.6	345°39.0 5°17.6	0°39.3 5°16.7	15°39.5 5°15.8	30°39.7 5°14.8	45°39.9 5°13.9	60°40.1 5°12.9	75°40.3 5°12.0	+0.2 -0.9
We 10	270°43.2 4°59.7	285°43.4 4°58.8	300°43.6 4°57.8	315°43.8 4°56.9	330°44.0 4°55.9	345°44.3 4°55.0	0°44.5 4°54.0	15°44.7 4°53.1	30°44.9 4°52.1	45°45.1 4°51.2	60°45.4 4°50.2	75°45.6 4°49.3	+0.2 -0.9
Th 11	270°48.4 4°36.9	285°48.6 4°36.0	300°48.9 4°35.0	315°49.1 4°34.1	330°49.3 4°33.1	345°49.5 4°32.2	0°49.7 4°31.2	15°50.0 4°30.3	30°50.2 4°29.3	45°50.4 4°28.4	60°50.6 4°27.4	75°50.8 4°26.5	+0.2 -1.0
Fr 12	270°53.7 4°14.1	285°53.9 4°13.2	300°54.1 4°12.2	315°54.4 4°11.3	330°54.6 4°10.3	345°54.8 4°09.3	0°55.0 4°08.4	15°55.2 4°07.4	30°55.5 4°06.5	45°55.7 4°05.5	60°55.9 4°04.6	75°56.1 4°03.6	+0.2 -1.0
Sa 13	270°59.0 3°51.2	285°59.2 3°50.2	300°59.4 3°49.3	315°59.7 3°48.3	330°59.9 3°47.4	346°00.1 3°46.4	1°00.3 3°45.5	16°00.6 3°44.5	31°00.8 3°43.6	46°01.0 3°42.6	61°01.2 3°41.6	76°01.4 3°40.7	+0.2 -1.0
Su 14	271°04.3 3°28.2	286°04.5 3°27.3	301°04.8 3°26.3	316°05.0 3°25.4	331°05.2 3°24.4	346°05.4 3°23.4	1°05.7 3°22.5	16°05.9 3°21.5	31°06.1 3°20.6	46°06.3 3°19.6	61°06.5 3°18.6	76°06.8 3°17.7	+0.2 -1.0
Mo 15	271°09.7 3°05.2	286°09.9 3°04.2	301°10.1 3°03.3	316°10.3 3°02.3	331°10.5 3°01.3	346°10.8 3°00.4	1°11.0 2°59.4	16°11.2 2°58.5	31°11.4 2°57.5	46°11.7 2°56.5	61°11.9 2°55.6	76°12.1 2°54.6	+0.2 -1.0
Tu 16	271°15.0 2°42.1	286°15.2 2°41.1	301°15.4 2°40.2	316°15.7 2°39.2	331°15.9 2°38.2	346°16.1 2°37.3	1°16.3 2°36.3	16°16.6 2°35.3	31°16.8 2°34.4	46°17.0 2°33.4	61°17.2 2°32.4	76°17.4 2°31.5	+0.2 -1.0
We 17	271°20.3 2°18.9	286°20.6 2°18.0	301°20.8 2°17.0	316°21.0 2°16.0	331°21.2 2°15.1	346°21.5 2°14.1	1°21.7 2°13.1	16°21.9 2°12.2	31°22.1 2°11.2	46°22.3 2°10.2	61°22.6 2°09.3	76°22.8 2°08.3	+0.2 -1.0
Th 18	271°25.7 1°55.7	286°25.9 1°54.8	301°26.1 1°53.8	316°26.4 1°52.8	331°26.6 1°51.9	346°26.8 1°50.9	1°27.0 1°49.9	16°27.2 1°49.0	31°27.5 1°48.0	46°27.7 1°47.0	61°27.9 1°46.1	76°28.1 1°45.1	+0.2 -1.0
Fr 19	271°31.0 1°32.5	286°31.3 1°31.5	301°31.5 1°30.6	316°31.7 1°29.6	331°31.9 1°28.6	346°32.1 1°27.7	1°32.4 1°26.7	16°32.6 1°25.7	31°32.8 1°24.8	46°33.0 1°23.8	61°33.3 1°22.8	76°33.5 1°21.8	+0.2 -1.0
Sa 20	271°36.4 1°09.2	286°36.6 1°08.3	301°36.8 1°07.3	316°37.0 1°06.3	331°37.3 1°05.4	346°37.5 1°04.4	1°37.7 1°03.4	16°37.9 1°02.4	31°38.1 1°01.5	46°38.4 1°00.5	61°38.6 0°59.5	76°38.8 0°58.6	+0.2 -1.0
Su 21	271°41.7 0°45.9	286°41.9 0°45.0	301°42.1 0°44.0	316°42.4 0°43.0	331°42.6 0°42.1	346°42.8 0°41.1	1°43.0 0°40.1	16°43.2 0°39.1	31°43.5 0°38.2	46°43.7 0°37.2	61°43.9 0°36.2	76°44.1 0°35.3	+0.2 -1.0
Mo 22	271°47.0 0°22.6	286°47.2 0°21.6	301°47.4 0°20.7	316°47.7 0°19.7	331°47.9 0°18.7	346°48.1 0°17.8	1°48.3 0°16.8	16°48.5 0°15.8	31°48.8 0°14.8	46°49.0 0°13.9	61°49.2 0°12.9	76°49.4 0°11.9	+0.2 -1.0
Tu 23	271°52.3 -0°00.7	286°52.5 -0°01.7	301°52.7 -0°02.7	316°52.9 -0°03.6	331°53.2 -0°04.6	346°53.4 -0°05.6	1°53.6 -0°06.6	16°53.8 -0°07.5	31°54.0 -0°08.5	46°54.3 -0°09.5	61°54.5 -0°10.4	76°54.7 -0°11.4	+0.2 -1.0
We 24	271°57.5 -0°24.1	286°57.8 -0°25.0	301°58.0 -0°26.0	316°58.2 -0°27.0	331°58.4 -0°28.0	346°58.6 -0°28.9	1°58.9 -0°29.9	16°59.1 -0°30.9	31°59.3 -0°31.9	46°59.5 -0°32.8	61°59.7 -0°33.8	76°59.9 -0°34.8	+0.2 -1.0
Th 25	272°02.8 -0°47.4	287°03.0 -0°48.4	302°03.2 -0°49.4	317°03.4 -0°50.3	332°03.6 -0°51.3	347°03.9 -0°52.3	2°04.1 -0°53.3	17°04.3 -0°54.2	32°04.5 -0°55.2	47°04.7 -0°56.2	62°04.9 -0°57.2	77°05.2 -0°58.1	+0.2 -1.0
Fr 26	272°08.0 -1°10.8	287°08.2 -1°11.8	302°08.4 -1°12.7	317°08.6 -1°13.7	332°08.8 -1°14.7	347°09.0 -1°15.6	2°09.3 -1°16.6	17°09.5 -1°17.6	32°09.7 -1°18.6	47°09.9 -1°19.5	62°10.1 -1°20.5	77°10.3 -1°21.5	+0.2 -1.0
Sa 27	272°13.1 -1°34.1	287°13.3 -1°35.1	302°13.5 -1°36.1	317°13.8 -1°37.0	332°14.0 -1°38.0	347°14.2 -1°39.0	2°14.4 -1°40.0	17°14.6 -1°40.9	32°14.8 -1°41.9	47°15.0 -1°42.9	62°15.3 -1°43.9	77°15.5 -1°44.8	+0.2 -1.0
Su 28	272°18.2 -1°57.5	287°18.4 -1°58.4	302°18.6 -1°59.4	317°18.9 -2°00.4	332°19.1 -2°01.4	347°19.3 -2°02.3	2°19.5 -2°03.3	17°19.7 -2°04.3	32°19.9 -2°05.2	47°20.1 -2°06.2	62°20.3 -2°07.2	77°20.5 -2°08.2	+0.2 -1.0
Mo 29	272°23.3 -2°20.8	287°23.5 -2°21.8	302°23.7 -2°22.7	317°23.9 -2°23.7	332°24.1 -2°24.7	347°24.3 -2°25.6	2°24.5 -2°26.6	17°24.7 -2°27.6	32°25.0 -2°28.6	47°25.2 -2°29.5	62°25.4 -2°30.5	77°25.6 -2°31.5	+0.2 -1.0
Tu 30	272°28.3 -2°44.1	287°28.5 -2°45.1	302°28.7 -2°46.0	317°28.9 -2°47.0	332°29.1 -2°48.0	347°29.3 -2°48.9	2°29.5 -2°49.9	17°29.7 -2°50.9	32°29.9 -2°51.8	47°30.1 -2°52.8	62°30.3 -2°53.8	77°30.5 -2°54.8	+0.2 -1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2031

	D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
○	Mo 1	252°42.5 -2°11.0	267°10.8 -1°58.1	281°39.1 -1°45.3	296°07.4 -1°32.4	310°35.8 -1°19.6	325°04.2 -1°06.8	339°32.7 -0°54.0	354°01.1 -0°41.1	8°29.6 -0°28.3	22°58.2 -0°15.5	37°26.7 -0°02.7	+28.4 +12.8	16.3 59.8
	Tu 2	254°38.7 3°07.0	269°07.7 3°19.5	283°36.7 3°31.9	298°05.7 3°44.2	312°34.8 3°56.6	327°03.9 4°08.9	341°33.0 4°21.2	356°02.1 4°33.4	10°31.3 4°45.6	25°00.4 4°57.7	39°29.6 5°09.8	+29.1 +12.3	16.1 59.1
	We 3	256°49.3 8°05.6	271°18.7 8°16.8	285°48.1 8°28.1	300°17.6 8°39.2	314°47.0 8°50.3	329°16.5 9°01.3	343°46.0 9°12.3	358°15.5 9°23.2	12°44.9 9°34.1	27°14.4 9°44.8	41°43.9 9°55.5	+29.5 +11.0	15.9 58.2
	Th 4	259°07.3 12°27.5	273°36.9 12°37.0	288°06.5 12°46.5	302°36.2 12°55.8	317°05.8 13°05.1	331°35.4 13°14.3	346°05.0 13°23.4	0°34.6 13°32.4	15°04.3 13°41.4	29°33.9 13°50.3	44°03.5 13°59.0	+29.6 +9.2	15.6 57.3
	Fr 5	261°28.3 16°00.1	275°57.9 16°07.5	290°27.6 16°14.7	304°57.3 16°21.9	319°26.9 16°29.0	333°56.6 16°36.0	348°26.3 16°42.8	2°56.0 16°49.6	17°25.7 16°56.3	31°55.4 17°02.9	46°25.0 17°09.4	+29.7 +6.9	15.4 56.4
	Sa 6	263°50.8 18°35.1	278°20.6 18°40.1	292°50.3 18°44.9	307°20.1 18°49.6	321°49.9 18°54.2	336°19.7 18°58.8	350°49.4 19°03.2	5°19.2 19°07.5	19°49.0 19°11.7	34°18.8 19°15.9	48°48.7 19°19.9	+29.8 +4.5	15.2 55.6
	Su 7	266°17.0 20°08.0	280°47.0 20°10.4	295°17.0 20°12.7	309°47.0 20°14.9	324°17.0 20°17.0	338°47.0 20°19.0	353°17.0 20°20.9	7°47.1 20°22.7	22°17.2 20°24.3	36°47.3 20°25.9	51°17.4 20°27.4	+30.0 +1.9	15.0 55.0
◑	Mo 8	280°47.0 20°10.4	295°17.0 20°12.7	309°47.0 20°14.9	324°17.0 20°17.0	338°47.0 20°19.0	353°17.0 20°20.9	7°47.1 20°22.7	22°17.2 20°24.3	36°47.3 20°25.9	51°17.4 20°27.4	65°47.5 20°28.8	+30.0 +1.8	15.0 55.0
	Tu 9	283°21.3 20°37.5	297°51.7 20°37.3	312°22.2 20°37.0	326°52.6 20°36.6	341°23.1 20°36.1	355°53.6 20°35.5	10°24.1 20°34.8	24°54.6 20°34.0	39°25.2 20°33.1	53°55.8 20°32.1	68°26.4 20°31.0	+30.5 -0.7	14.9 54.5
	We 10	286°08.4 20°03.3	300°39.5 20°00.7	315°10.5 19°58.0	329°41.6 19°55.3	344°12.6 19°52.4	358°43.8 19°49.4	13°14.9 19°46.4	27°46.1 19°43.2	42°17.3 19°40.0	56°48.5 19°36.7	71°19.8 19°33.3	+31.1 -3.0	14.8 54.2
	Th 11	289°12.0 18°31.8	303°43.8 18°27.0	318°15.5 18°22.2	332°47.3 18°17.2	347°19.1 18°12.2	1°50.9 18°07.1	16°22.8 18°01.9	30°54.7 17°56.6	45°26.6 17°51.3	59°58.5 17°45.9	74°30.5 17°40.4	+31.8 -5.1	14.7 54.1
	Fr 12	292°33.5 16°08.7	307°05.9 16°02.0	321°38.3 15°55.2	336°10.8 15°48.4	350°43.3 15°41.5	5°15.8 15°34.5	19°48.4 15°27.4	34°21.0 15°20.3	48°53.6 15°13.1	63°26.2 15°05.9	77°58.8 14°58.5	+32.5 -7.0	14.8 54.1
	Sa 13	296°11.3 13°01.0	310°44.3 12°52.6	325°17.3 12°44.3	339°50.4 12°35.8	354°23.4 12°27.3	8°56.5 12°18.8	23°29.6 12°10.1	38°02.7 12°01.5	52°35.8 11°52.7	67°09.0 11°44.0	81°42.2 11°35.1	+33.1 -8.6	14.8 54.3
	Su 14	300°01.3 9°16.6	314°34.6 9°06.9	329°08.0 8°57.3	343°41.4 8°47.6	358°14.8 8°37.8	12°48.2 8°28.0	27°21.6 8°18.2	41°55.0 8°08.3	56°28.4 7°58.4	71°01.8 7°48.5	85°35.3 7°38.5	+33.4 -9.8	14.9 54.7
	Mo 15	303°56.8 5°04.4	318°30.2 4°53.9	333°03.7 4°43.3	347°37.1 4°32.7	2°10.5 4°22.1	16°43.9 4°11.5	31°17.3 4°00.8	45°50.7 3°50.1	60°24.1 3°39.4	74°57.4 3°28.7	89°30.8 3°18.0	+33.4 -10.6	15.0 55.1
●	Tu 16	307°49.6 0°34.6	322°22.8 0°23.6	336°55.9 0°12.5	351°28.9 0°01.5	6°02.0 -0°09.5	20°35.0 -0°20.5	35°08.1 -0°31.6	49°41.1 -0°42.6	64°14.0 -0°53.7	78°47.0 -1°04.7	93°19.9 -1°15.8	+33.0 -11.0	15.1 55.6
	We 17	311°30.3 -4°01.4	326°02.7 -4°12.4	340°35.1 -4°23.4	355°07.5 -4°34.4	9°39.8 -4°45.3	24°12.1 -4°56.3	38°44.3 -5°07.2	53°16.5 -5°18.1	67°48.7 -5°29.0	82°20.8 -5°39.8	96°52.9 -5°50.7	+32.3 -10.9	15.3 56.1
	Th 18	314°49.0 -8°30.6	329°20.3 -8°41.0	343°51.6 -8°51.4	358°22.9 -9°01.7	12°54.1 -9°12.0	27°25.3 -9°22.3	41°56.4 -9°32.5	56°27.4 -9°42.7	70°58.4 -9°52.9	85°29.4 -10°03.0	100°00.2 -10°13.0	+31.1 -10.3	15.4 56.6
	Fr 19	317°36.8 -12°38.1	332°06.7 -12°47.4	346°36.6 -12°56.6	1°06.5 -13°05.7	15°36.3 -13°14.7	30°06.0 -13°23.7	44°35.7 -13°32.6	59°05.3 -13°41.5	73°34.8 -13°50.3	88°04.3 -13°59.0	102°33.7 -14°07.6	+29.7 -9.0	15.6 57.1
	Sa 20	319°47.2 -16°08.4	334°15.6 -16°15.8	348°43.9 -16°23.1	3°12.2 -16°30.3	17°40.4 -16°37.4	32°08.6 -16°44.5	46°36.6 -16°51.5	61°04.6 -16°58.3	75°32.6 -17°05.1	90°00.5 -17°11.8	104°28.3 -17°18.4	+28.1 -7.0	15.7 57.6
	Su 21	321°18.5 -18°45.1	335°45.4 -18°50.1	350°12.2 -18°54.9	4°39.0 -18°59.6	19°05.7 -19°04.3	33°32.3 -19°08.8	47°58.9 -19°13.1	62°25.5 -19°17.4	76°52.0 -19°21.6	91°18.5 -19°25.6	105°44.9 -19°29.5	+26.6 -4.4	15.8 58.1
	Mo 22	322°15.4 -20°14.0	336°41.1 -20°16.0	351°06.8 -20°17.8	5°32.4 -20°19.5	19°58.0 -20°21.1	34°23.6 -20°22.6	48°49.2 -20°23.9	63°14.7 -20°25.1	77°40.1 -20°26.2	92°05.6 -20°27.2	106°31.0 -20°28.0	+25.6 -1.4	16.0 58.5
	Tu 23	322°49.8 -20°24.4	337°15.0 -20°23.1	351°40.1 -20°21.7	6°05.2 -20°20.1	20°30.3 -20°18.4	34°55.4 -20°16.6	49°20.5 -20°14.6	63°45.6 -20°12.5	78°10.7 -20°10.3	92°35.8 -20°07.9	107°00.9 -20°05.4	+25.1 +1.9	16.1 58.9
◐	We 24	323°18.1 -19°12.3	337°43.4 -19°07.7	352°08.6 -19°03.0	6°33.9 -18°58.2	20°59.2 -18°53.2	35°24.5 -18°48.1	49°49.9 -18°42.9	64°15.2 -18°37.6	78°40.6 -18°32.2	93°06.0 -18°26.6	107°31.5 -18°20.9	+25.3 +5.1	16.2 59.3
	Th 25	323°56.4 -16°41.2	338°22.3 -16°33.7	352°48.3 -16°26.0	7°14.2 -16°18.3	21°40.3 -16°10.4	36°06.3 -16°02.4	50°32.4 -15°54.3	64°58.6 -15°46.1	79°24.7 -15°37.8	93°50.9 -15°29.5	108°17.2 -15°21.0	+26.1 +8.0	16.2 59.6
	Fr 26	324°55.7 -13°02.2	339°22.6 -12°52.3	353°49.5 -12°42.2	8°16.5 -12°32.1	22°43.5 -12°21.9	37°10.5 -12°11.6	51°37.6 -12°01.3	66°04.8 -11°50.9	80°31.9 -11°40.4	94°59.2 -11°29.8	109°26.4 -11°19.2	+27.1 +10.3	16.3 59.7
	Sa 27	326°20.0 -8°31.8	340°47.8 -8°20.2	355°15.7 -8°08.5	9°43.7 -7°56.8	24°11.7 -7°45.1	38°39.7 -7°33.3	53°07.7 -7°21.5	67°35.8 -7°09.6	82°03.9 -6°57.6	96°32.1 -6°45.7	111°00.3 -6°33.7	+28.0 +11.8	16.3 59.7
	Su 28	328°06.7 -3°30.0	342°35.3 -3°17.6	357°04.0 -3°05.2	11°32.7 -2°52.7	26°01.5 -2°40.3	40°30.2 -2°27.8	54°59.0 -2°15.3	69°27.8 -2°02.8	83°56.6 -1°50.3	98°25.4 -1°37.8	112°54.3 -1°25.3	+28.8 +12.5	16.2 59.4
	Mo 29	330°09.4 1°41.8	344°38.5 1°54.2	359°07.7 2°06.5	13°36.8 2°18.9	28°06.0 2°31.2	42°35.2 2°43.5	57°04.3 2°55.8	71°33.5 3°08.0	86°02.7 3°20.3	100°32.0 3°32.5	115°01.2 3°44.6	+29.2 +12.3	16.1 59.0
○	Tu 30	332°20.3 6°42.9	346°49.6 6°54.5	1°18.9 7°06.0	15°48.2 7°17.4	30°17.6 7°28.8	44°46.9 7°40.2	59°16.2 7°51.5	73°45.5 8°02.7	88°14.8 8°13.9	102°44.1 8°25.0	117°13.4 8°36.1	+29.3 +11.3	15.9 58.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24

FM: 1 09h20 — LQ: 8 16h14 — NM: 16 18h46 — FQ: 24 01h19 — FM: 30 18h57

SUN

October 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	272°33.2 -3°07.4	287°33.4 -3°08.3	302°33.6 -3°09.3	317°33.8 -3°10.3	332°34.0 -3°11.2	347°34.2 -3°12.2	2°34.4 -3°13.2	17°34.6 -3°14.1	32°34.8 -3°15.1	47°35.0 -3°16.1	62°35.2 -3°17.0	77°35.4 -3°18.0	+0.2 -1.0
Th 2	272°38.1 -3°30.6	287°38.3 -3°31.6	302°38.5 -3°32.5	317°38.7 -3°33.5	332°38.9 -3°34.5	347°39.1 -3°35.4	2°39.3 -3°36.4	17°39.5 -3°37.4	32°39.7 -3°38.3	47°39.9 -3°39.3	62°40.1 -3°40.3	77°40.3 -3°41.2	+0.2 -1.0
Fr 3	272°42.8 -3°53.8	287°43.0 -3°54.8	302°43.2 -3°55.7	317°43.4 -3°56.7	332°43.6 -3°57.7	347°43.8 -3°58.6	2°44.0 -3°59.6	17°44.2 -4°00.6	32°44.4 -4°01.5	47°44.6 -4°02.5	62°44.8 -4°03.5	77°45.0 -4°04.4	+0.2 -1.0
Sa 4	272°47.5 -4°17.0	287°47.7 -4°17.9	302°47.9 -4°18.9	317°48.1 -4°19.8	332°48.3 -4°20.8	347°48.5 -4°21.8	2°48.7 -4°22.7	17°48.9 -4°23.7	32°49.1 -4°24.7	47°49.3 -4°25.6	62°49.5 -4°26.6	77°49.7 -4°27.6	+0.2 -1.0
Su 5	272°52.1 -4°40.1	287°52.3 -4°41.0	302°52.5 -4°42.0	317°52.7 -4°43.0	332°52.9 -4°43.9	347°53.1 -4°44.9	2°53.3 -4°45.8	17°53.5 -4°46.8	32°53.7 -4°47.8	47°53.8 -4°48.7	62°54.0 -4°49.7	77°54.2 -4°50.6	+0.2 -1.0
Mo 6	272°56.7 -5°03.1	287°56.8 -5°04.1	302°57.0 -5°05.0	317°57.2 -5°06.0	332°57.4 -5°07.0	347°57.6 -5°07.9	2°57.8 -5°08.9	17°58.0 -5°09.8	32°58.1 -5°10.8	47°58.3 -5°11.7	62°58.5 -5°12.7	77°58.7 -5°13.7	+0.2 -1.0
Tu 7	273°01.1 -5°26.1	288°01.2 -5°27.1	303°01.4 -5°28.0	318°01.6 -5°29.0	333°01.8 -5°29.9	348°02.0 -5°30.9	3°02.2 -5°31.8	18°02.3 -5°32.8	33°02.5 -5°33.8	48°02.7 -5°34.7	63°02.9 -5°35.7	78°03.1 -5°36.6	+0.2 -1.0
We 8	273°05.4 -5°49.0	288°05.6 -5°50.0	303°05.7 -5°50.9	318°05.9 -5°51.9	333°06.1 -5°52.8	348°06.3 -5°53.8	3°06.4 -5°54.8	18°06.6 -5°55.7	33°06.8 -5°56.7	48°07.0 -5°57.6	63°07.1 -5°58.6	78°07.3 -5°59.5	+0.2 -1.0
Th 9	273°09.6 -6°11.9	288°09.7 -6°12.8	303°09.9 -6°13.8	318°10.1 -6°14.7	333°10.3 -6°15.7	348°10.4 -6°16.6	3°10.6 -6°17.6	18°10.8 -6°18.5	33°10.9 -6°19.5	48°11.1 -6°20.4	63°11.3 -6°21.4	78°11.5 -6°22.3	+0.2 -0.9
Fr 10	273°13.7 -6°34.7	288°13.8 -6°35.6	303°14.0 -6°36.5	318°14.2 -6°37.5	333°14.3 -6°38.4	348°14.5 -6°39.4	3°14.7 -6°40.3	18°14.8 -6°41.3	33°15.0 -6°42.2	48°15.2 -6°43.2	63°15.3 -6°44.1	78°15.5 -6°45.1	+0.2 -0.9
Sa 11	273°17.6 -6°57.3	288°17.8 -6°58.3	303°17.9 -6°59.2	318°18.1 -7°00.2	333°18.3 -7°01.1	348°18.4 -7°02.0	3°18.6 -7°03.0	18°18.7 -7°03.9	33°18.9 -7°04.9	48°19.1 -7°05.8	63°19.2 -7°06.8	78°19.4 -7°07.7	+0.2 -0.9
Su 12	273°21.5 -7°19.9	288°21.6 -7°20.9	303°21.8 -7°21.8	318°21.9 -7°22.7	333°22.1 -7°23.7	348°22.2 -7°24.6	3°22.4 -7°25.6	18°22.5 -7°26.5	33°22.7 -7°27.4	48°22.9 -7°28.4	63°23.0 -7°29.3	78°23.2 -7°30.2	+0.2 -0.9
Mo 13	273°25.2 -7°42.4	288°25.3 -7°43.3	303°25.5 -7°44.3	318°25.6 -7°45.2	333°25.8 -7°46.2	348°25.9 -7°47.1	3°26.1 -7°48.0	18°26.2 -7°49.0	33°26.4 -7°49.9	48°26.5 -7°50.8	63°26.7 -7°51.8	78°26.8 -7°52.7	+0.2 -0.9
Tu 14	273°28.7 -8°04.8	288°28.9 -8°05.7	303°29.0 -8°06.7	318°29.2 -8°07.6	333°29.3 -8°08.5	348°29.5 -8°09.4	3°29.6 -8°10.4	18°29.8 -8°11.3	33°29.9 -8°12.2	48°30.0 -8°13.2	63°30.2 -8°14.1	78°30.3 -8°15.0	+0.1 -0.9
We 15	273°32.2 -8°27.1	288°32.3 -8°28.0	303°32.5 -8°28.9	318°32.6 -8°29.8	333°32.7 -8°30.8	348°32.9 -8°31.7	3°33.0 -8°32.6	18°33.2 -8°33.5	33°33.3 -8°34.5	48°33.4 -8°35.4	63°33.6 -8°36.3	78°33.7 -8°37.2	+0.1 -0.9
Th 16	273°35.5 -8°49.2	288°35.6 -8°50.1	303°35.7 -8°51.1	318°35.9 -8°52.0	333°36.0 -8°52.9	348°36.1 -8°53.8	3°36.3 -8°54.7	18°36.4 -8°55.7	33°36.5 -8°56.6	48°36.7 -8°57.5	63°36.8 -8°58.4	78°36.9 -8°59.3	+0.1 -0.9
Fr 17	273°38.6 -9°11.3	288°38.8 -9°12.2	303°38.9 -9°13.1	318°39.0 -9°14.0	333°39.1 -9°14.9	348°39.3 -9°15.8	3°39.4 -9°16.7	18°39.5 -9°17.7	33°39.6 -9°18.6	48°39.8 -9°19.5	63°39.9 -9°20.4	78°40.0 -9°21.3	+0.1 -0.9
Sa 18	273°41.6 -9°33.2	288°41.8 -9°34.1	303°41.9 -9°35.0	318°42.0 -9°35.9	333°42.1 -9°36.8	348°42.2 -9°37.7	3°42.4 -9°38.6	18°42.5 -9°39.5	33°42.6 -9°40.4	48°42.7 -9°41.3	63°42.8 -9°42.2	78°43.0 -9°43.1	+0.1 -0.9
Su 19	273°44.5 -9°54.9	288°44.6 -9°55.8	303°44.7 -9°56.7	318°44.8 -9°57.6	333°45.0 -9°58.5	348°45.1 -9°59.4	3°45.2 -10°00.3	18°45.3 -10°01.2	33°45.4 -10°02.1	48°45.5 -10°03.0	63°45.6 -10°03.9	78°45.8 -10°04.8	+0.1 -0.9
Mo 20	273°47.2 -10°16.5	288°47.3 -10°17.4	303°47.4 -10°18.3	318°47.5 -10°19.2	333°47.6 -10°20.1	348°47.7 -10°21.0	3°47.9 -10°21.9	18°48.0 -10°22.8	33°48.1 -10°23.7	48°48.2 -10°24.6	63°48.3 -10°25.5	78°48.4 -10°26.4	+0.1 -0.9
Tu 21	273°49.8 -10°38.0	288°49.9 -10°38.9	303°50.0 -10°39.8	318°50.1 -10°40.7	333°50.2 -10°41.5	348°50.3 -10°42.4	3°50.4 -10°43.3	18°50.5 -10°44.2	33°50.6 -10°45.1	48°50.7 -10°46.0	63°50.8 -10°46.9	78°50.9 -10°47.8	+0.1 -0.9
We 22	273°52.1 -10°59.3	288°52.2 -11°00.2	303°52.3 -11°01.1	318°52.4 -11°01.9	333°52.5 -11°02.8	348°52.6 -11°03.7	3°52.7 -11°04.6	18°52.8 -11°05.5	33°52.9 -11°06.4	48°53.0 -11°07.2	63°53.1 -11°08.1	78°53.2 -11°09.0	+0.1 -0.9
Th 23	273°54.4 -11°20.4	288°54.5 -11°21.3	303°54.5 -11°22.2	318°54.6 -11°23.1	333°54.7 -11°23.9	348°54.8 -11°24.8	3°54.9 -11°25.7	18°55.0 -11°26.6	33°55.1 -11°27.4	48°55.2 -11°28.3	63°55.2 -11°29.2	78°55.3 -11°30.1	+0.1 -0.9
Fr 24	273°56.4 -11°41.4	288°56.5 -11°42.3	303°56.6 -11°43.1	318°56.7 -11°44.0	333°56.8 -11°44.9	348°56.8 -11°45.7	3°56.9 -11°46.6	18°57.0 -11°47.5	33°57.1 -11°48.3	48°57.2 -11°49.2	63°57.2 -11°50.1	78°57.3 -11°50.9	+0.1 -0.9
Sa 25	273°58.3 -12°02.2	288°58.4 -12°03.0	303°58.5 -12°03.9	318°58.5 -12°04.8	333°58.6 -12°05.6	348°58.7 -12°06.5	3°58.8 -12°07.3	18°58.8 -12°08.2	33°58.9 -12°09.1	48°59.0 -12°09.9	63°59.1 -12°10.8	78°59.1 -12°11.6	+0.1 -0.9
Su 26	274°00.0 -12°22.8	289°00.1 -12°23.6	304°00.2 -12°24.5	319°00.2 -12°25.3	334°00.3 -12°26.2	349°00.4 -12°27.0	4°00.4 -12°27.9	19°00.5 -12°28.8	34°00.6 -12°29.6	49°00.6 -12°30.5	64°00.7 -12°31.3	79°00.8 -12°32.2	+0.1 -0.9
Mo 27	274°01.6 -12°43.2	289°01.6 -12°44.0	304°01.7 -12°44.9	319°01.8 -12°45.7	334°01.8 -12°46.6	349°01.9 -12°47.4	4°01.9 -12°48.3	19°02.0 -12°49.1	34°02.0 -12°49.9	49°02.1 -12°50.8	64°02.2 -12°51.6	79°02.2 -12°52.5	+0.1 -0.8
Tu 28	274°02.9 -13°03.4	289°03.0 -13°04.2	304°03.0 -13°05.1	319°03.1 -13°05.9	334°03.1 -13°06.7	349°03.2 -13°07.6	4°03.2 -13°08.4	19°03.3 -13°09.3	34°03.3 -13°10.1	49°03.4 -13°10.9	64°03.4 -13°11.8	79°03.5 -13°12.6	+0.1 -0.8
We 29	274°04.1 -13°23.4	289°04.1 -13°24.2	304°04.2 -13°25.1	319°04.2 -13°25.9	334°04.3 -13°26.7	349°04.3 -13°27.6	4°04.4 -13°28.4	19°04.4 -13°29.2	34°04.4 -13°30.0	49°04.5 -13°30.9	64°04.5 -13°31.7	79°04.6 -13°32.5	+0.0 -0.8
Th 30	274°05.1 -13°43.2	289°05.1 -13°44.0	304°05.2 -13°44.8	319°05.2 -13°45.7	334°05.2 -13°46.5	349°05.3 -13°47.3	4°05.3 -13°48.1	19°05.3 -13°48.9	34°05.4 -13°49.8	49°05.4 -13°50.6	64°05.4 -13°51.4	79°05.5 -13°52.2	+0.0 -0.8
Fr 31	274°05.9 -14°02.8	289°05.9 -14°03.6	304°05.9 -14°04.4	319°05.9 -14°05.2	334°06.0 -14°06.0	349°06.0 -14°06.8	4°06.0 -14°07.6	19°06.1 -14°08.5	34°06.1 -14°09.3	49°06.1 -14°10.1	64°06.1 -14°10.9	79°06.2 -14°11.7	+0.0 -0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2031

D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
We 1	247°37.2	262°06.5	276°35.8	291°05.1	305°34.4	320°03.7	334°33.0	349°02.2	3°31.5	18°00.8	32°30.0	+29.3	15.8
	10°13.0	10°23.5	10°33.9	10°44.2	10°54.4	11°04.6	11°14.7	11°24.7	11°34.7	11°44.6	11°54.4	+10.1	57.9
Th 2	249°48.5	264°17.7	278°46.9	293°16.1	307°45.3	322°14.5	336°43.7	351°12.9	5°42.0	20°11.2	34°40.4	+29.2	15.6
	14°12.0	14°20.5	14°28.9	14°37.2	14°45.4	14°53.6	15°01.7	15°09.6	15°17.5	15°25.3	15°33.0	+8.1	57.1
Fr 3	251°57.8	266°26.9	280°56.1	295°25.3	309°54.4	324°23.6	338°52.8	353°21.9	7°51.1	22°20.3	36°49.5	+29.2	15.4
	17°17.1	17°23.3	17°29.4	17°35.3	17°41.2	17°47.0	17°52.6	17°58.2	18°03.6	18°09.0	18°14.3	+5.7	56.4
Sa 4	254°08.1	268°37.4	283°06.7	297°36.0	312°05.4	326°34.8	341°04.1	355°33.5	10°02.9	24°32.3	39°01.8	+29.4	15.2
	19°20.8	19°24.4	19°27.9	19°31.3	19°34.6	19°37.8	19°40.9	19°43.9	19°46.8	19°49.5	19°52.2	+3.1	55.7
Su 5	256°25.4	270°55.1	285°24.9	299°54.7	314°24.5	328°54.3	343°24.1	357°54.0	12°23.9	26°53.9	41°23.8	+29.8	15.0
	20°19.8	20°20.8	20°21.7	20°22.5	20°23.2	20°23.8	20°24.3	20°24.7	20°25.0	20°25.2	20°25.3	+0.6	55.0
Mo 6	258°56.5	273°26.9	287°57.3	302°27.8	316°58.3	331°28.8	345°59.4	0°30.0	15°00.7	29°31.3	44°02.0	+30.6	14.9
	20°14.8	20°13.3	20°11.7	20°10.1	20°08.3	20°06.4	20°04.5	20°02.4	20°00.3	19°58.0	19°55.7	-1.9	54.6
Tu 7	261°46.7	276°17.9	290°49.2	305°20.6	319°51.9	334°23.3	348°54.7	3°26.2	17°57.7	32°29.2	47°00.8	+31.4	14.8
	19°09.8	19°06.1	19°02.2	18°58.3	18°54.3	18°50.2	18°46.0	18°41.7	18°37.3	18°32.9	18°28.4	-4.2	54.3
◑ We 8	276°17.9	290°49.2	305°20.6	319°51.9	334°23.3	348°54.7	3°26.2	17°57.7	32°29.2	47°00.8	61°32.4	+31.4	14.8
	19°06.1	19°02.2	18°58.3	18°54.3	18°50.2	18°46.0	18°41.7	18°37.3	18°32.9	18°28.4	18°23.7	-4.2	54.3
Th 9	279°30.6	294°02.7	308°34.9	323°07.1	337°39.4	352°11.7	6°44.0	21°16.3	35°48.7	50°21.1	64°53.5	+32.3	14.8
	17°05.1	16°59.2	16°53.3	16°47.2	16°41.2	16°35.0	16°28.8	16°22.5	16°16.1	16°09.6	16°03.1	-6.2	54.2
Fr 10	283°03.5	297°36.3	312°09.2	326°42.2	341°15.1	355°48.1	10°21.1	24°54.1	39°27.2	54°00.2	68°33.3	+33.0	14.8
	14°17.3	14°09.7	14°02.0	13°54.3	13°46.6	13°38.7	13°30.8	13°22.9	13°14.9	13°06.8	12°58.7	-7.9	54.3
Sa 11	286°51.9	301°25.2	315°58.6	330°32.0	345°05.4	359°38.8	14°12.2	28°45.6	43°19.1	57°52.5	72°26.0	+33.4	14.9
	10°50.2	10°41.2	10°32.2	10°23.1	10°13.9	10°04.8	9°55.5	9°46.2	9°36.9	9°27.5	9°18.1	-9.2	54.5
Su 12	290°48.4	305°21.9	319°55.4	334°28.9	349°02.4	3°35.9	18°09.4	32°42.9	47°16.4	61°49.9	76°23.3	+33.5	15.0
	6°51.8	6°41.7	6°31.6	6°21.5	6°11.3	6°01.1	5°50.9	5°40.6	5°30.3	5°19.9	5°09.6	-10.2	54.9
Mo 13	294°43.9	309°17.2	323°50.4	338°23.6	352°56.8	7°30.0	22°03.1	36°36.3	51°09.4	65°42.4	80°15.5	+33.2	15.1
	2°30.8	2°20.0	2°09.2	1°58.4	1°47.6	1°36.7	1°25.8	1°15.0	1°04.1	0°53.1	0°42.2	-10.9	55.5
Tu 14	298°27.9	313°00.4	327°33.0	342°05.5	356°37.9	11°10.3	25°42.7	40°15.0	54°47.3	69°19.6	83°51.8	+32.4	15.3
	-2°02.8	-2°13.9	-2°24.9	-2°36.0	-2°47.0	-2°58.1	-3°09.1	-3°20.1	-3°31.1	-3°42.2	-3°53.2	-11.0	56.1
We 15	301°49.5	316°21.0	330°52.4	345°23.7	359°55.0	14°26.2	28°57.4	43°28.6	57°59.6	72°30.6	87°01.6	+31.2	15.5
	-6°37.0	-6°47.8	-6°58.5	-7°09.3	-7°20.0	-7°30.7	-7°41.3	-7°51.9	-8°02.5	-8°13.1	-8°23.7	-10.7	56.7
● Th 16	304°38.8	319°08.8	333°38.7	348°08.6	2°38.4	17°08.1	31°37.8	46°07.4	60°36.9	75°06.4	89°35.7	+29.7	15.6
	-10°57.2	-11°07.1	-11°17.0	-11°26.8	-11°36.5	-11°46.2	-11°55.8	-12°05.4	-12°14.9	-12°24.3	-12°33.7	-9.7	57.4
Fr 17	306°48.5	321°16.9	335°45.1	350°13.3	4°41.4	19°09.4	33°37.4	48°05.3	62°33.1	77°00.9	91°28.6	+28.0	15.8
	-14°46.8	-14°55.1	-15°03.3	-15°11.5	-15°19.5	-15°27.5	-15°35.4	-15°43.2	-15°50.9	-15°58.5	-16°06.1	-7.9	57.9
Sa 18	308°16.4	322°43.1	337°09.7	351°36.3	6°02.8	20°29.2	34°55.6	49°22.0	63°48.3	78°14.5	92°40.7	+26.4	15.9
	-17°47.9	-17°53.9	-17°59.8	-18°05.5	-18°11.2	-18°16.7	-18°22.2	-18°27.5	-18°32.7	-18°37.9	-18°42.9	-5.5	58.4
Su 19	309°07.6	323°33.1	337°58.5	352°23.9	6°49.2	21°14.6	35°39.8	50°05.1	64°30.3	78°55.5	93°20.7	+25.3	16.0
	-19°43.6	-19°46.7	-19°49.7	-19°52.5	-19°55.2	-19°57.7	-20°00.2	-20°02.5	-20°04.7	-20°06.7	-20°08.6	-2.5	58.8
Mo 20	309°35.7	324°00.6	338°25.5	352°50.4	7°15.3	21°40.1	36°05.0	50°29.9	64°54.8	79°19.7	93°44.6	+24.9	16.1
	-20°21.6	-20°21.4	-20°21.0	-20°20.6	-20°20.0	-20°19.2	-20°18.4	-20°17.3	-20°16.2	-20°14.9	-20°13.5	+0.8	59.0
Tu 21	309°59.3	324°24.4	338°49.6	353°14.8	7°40.0	22°05.2	36°30.4	50°55.7	65°21.0	79°46.4	94°11.8	+25.2	16.1
	-19°36.5	-19°33.0	-19°29.4	-19°25.6	-19°21.7	-19°17.7	-19°13.5	-19°09.3	-19°04.9	-19°00.3	-18°55.7	+4.1	59.1
We 22	310°36.8	325°02.8	339°28.8	353°54.9	8°21.0	22°47.2	37°13.4	51°39.7	66°06.0	80°32.4	94°58.8	+26.2	16.1
	-17°31.6	-17°25.1	-17°18.5	-17°11.7	-17°04.9	-16°57.9	-16°50.9	-16°43.7	-16°36.4	-16°29.0	-16°21.5	+7.0	59.2
◐ Th 23	311°40.6	326°07.8	340°35.0	355°02.3	9°29.6	23°57.0	38°24.4	52°51.9	67°19.4	81°47.0	96°14.6	+27.4	16.1
	-14°17.6	-14°08.6	-13°59.5	-13°50.4	-13°41.1	-13°31.8	-13°22.4	-13°12.9	-13°03.4	-12°53.7	-12°44.0	+9.4	59.2
Fr 24	313°14.6	327°42.9	342°11.3	356°39.8	11°08.3	25°36.8	40°05.4	54°34.0	69°02.6	83°31.3	98°00.1	+28.5	16.1
	-10°10.0	-9°59.2	-9°48.4	-9°37.5	-9°26.5	-9°15.6	-9°04.5	-8°53.4	-8°42.3	-8°31.1	-8°19.9	+11.0	59.0
Sa 25	315°15.3	329°44.6	344°13.9	358°43.2	13°12.6	27°42.0	42°11.4	56°40.9	71°10.3	85°39.8	100°09.3	+29.4	16.0
	-5°26.6	-5°14.8	-5°03.0	-4°51.1	-4°39.2	-4°27.3	-4°15.4	-4°03.4	-3°51.4	-3°39.5	-3°27.4	+11.9	58.8
Su 26	317°34.6	332°04.4	346°34.2	1°04.1	15°33.9	30°03.8	44°33.7	59°03.6	73°33.4	88°03.4	102°33.3	+29.9	16.0
	-0°26.2	-0°14.1	-0°02.0	0°10.1	0°22.2	0°34.3	0°46.4	0°58.5	1°10.5	1°22.6	1°34.6	+12.1	58.5
Mo 27	320°02.5	334°32.5	349°02.4	3°32.4	18°02.3	32°32.3	47°02.2	61°32.2	76°02.1	90°32.1	105°02.0	+30.0	15.9
	4°33.0	4°44.6	4°56.3	5°07.9	5°19.5	5°31.1	5°42.6	5°54.1	6°05.5	6°16.9	6°28.3	+11.5	58.1
Tu 28	322°30.0	336°59.8	351°29.6	5°59.3	20°29.1	34°58.8	49°28.6	63°58.3	78°28.0	92°57.7	107°27.4	+29.7	15.7
	9°13.2	9°23.8	9°34.3	9°44.8	9°55.2	10°05.6	10°15.9	10°26.1	10°36.2	10°46.3	10°56.4	+10.3	57.7
We 29	324°50.9	339°20.3	353°49.8	8°19.2	22°48.6	37°18.0	51°47.4	66°16.8	80°46.1	95°15.5	109°44.8	+29.4	15.6
	13°18.6	13°27.4	13°36.3	13°45.0	13°53.6	14°02.2	14°10.7	14°19.1	14°27.4	14°35.6	14°43.8	+8.5	57.1
○ Th 30	327°03.3	341°32.4	356°01.5	10°30.7	24°59.8	39°28.9	53°58.0	68°27.1	82°56.2	97°25.3	111°54.4	+29.1	15.4
	16°35.3	16°42.0	16°48.6	16°55.2	17°01.6	17°07.9	17°14.1	17°20.3	17°26.3	17°32.2	17°38.0	+6.3	56.5
Fr 31	329°10.2	343°39.2	358°08.3	12°37.4	27°06.4	41°35.5	56°04.6	70°33.7	85°02.8	99°31.9	114°01.0	+29.1	15.2
	18°53.5	18°57.7	19°01.8	19°05.8	19°09.7	19°13.5	19°17.1	19°20.7	19°24.2	19°27.6	19°30.9	+3.7	55.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 8 10h50 — NM: 16 08h20 — FQ: 23 07h36 — FM: 30 07h32

SUN

November 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	274°06.5	289°06.5	304°06.5	319°06.5	334°06.5	349°06.5	4°06.6	19°06.6	34°06.6	49°06.6	64°06.6	79°06.7	+0.0
	-14°22.1	-14°22.9	-14°23.7	-14°24.6	-14°25.4	-14°26.2	-14°27.0	-14°27.7	-14°28.5	-14°29.3	-14°30.1	-14°30.9	-0.8
Su 2	274°06.8	289°06.9	304°06.9	319°06.9	334°06.9	349°06.9	4°06.9	19°06.9	34°06.9	49°06.9	64°06.9	79°06.9	+0.0
	-14°41.3	-14°42.1	-14°42.9	-14°43.6	-14°44.4	-14°45.2	-14°46.0	-14°46.8	-14°47.6	-14°48.4	-14°49.2	-14°50.0	-0.8
Mo 3	274°07.0	289°07.0	304°07.0	319°07.0	334°07.0	349°07.0	4°07.0	19°07.0	34°07.0	49°07.0	64°07.0	79°07.0	+0.0
	-15°00.2	-15°00.9	-15°01.7	-15°02.5	-15°03.3	-15°04.1	-15°04.9	-15°05.6	-15°06.4	-15°07.2	-15°08.0	-15°08.7	-0.8
Tu 4	274°07.0	289°07.0	304°07.0	319°07.0	334°07.0	349°07.0	4°07.0	19°07.0	34°06.9	49°06.9	64°06.9	79°06.9	-0.0
	-15°18.8	-15°19.6	-15°20.4	-15°21.1	-15°21.9	-15°22.7	-15°23.4	-15°24.2	-15°25.0	-15°25.7	-15°26.5	-15°27.3	-0.8
We 5	274°06.8	289°06.8	304°06.7	319°06.7	334°06.7	349°06.7	4°06.7	19°06.7	34°06.6	49°06.6	64°06.6	79°06.6	-0.0
	-15°37.2	-15°38.0	-15°38.7	-15°39.5	-15°40.3	-15°41.0	-15°41.8	-15°42.5	-15°43.3	-15°44.0	-15°44.8	-15°45.6	-0.8
Th 6	274°06.3	289°06.3	304°06.3	319°06.3	334°06.2	349°06.2	4°06.2	19°06.2	34°06.1	49°06.1	64°06.1	79°06.0	-0.0
	-15°55.4	-15°56.1	-15°56.9	-15°57.6	-15°58.4	-15°59.1	-15°59.9	-16°00.6	-16°01.3	-16°02.1	-16°02.8	-16°03.6	-0.7
Fr 7	274°05.7	289°05.6	304°05.6	319°05.6	334°05.5	349°05.5	4°05.5	19°05.4	34°05.4	49°05.4	64°05.3	79°05.3	-0.0
	-16°13.2	-16°14.0	-16°14.7	-16°15.5	-16°16.2	-16°16.9	-16°17.7	-16°18.4	-16°19.1	-16°19.9	-16°20.6	-16°21.3	-0.7
Sa 8	274°04.8	289°04.8	304°04.7	319°04.7	334°04.6	349°04.6	4°04.5	19°04.5	34°04.5	49°04.4	64°04.4	79°04.3	-0.0
	-16°30.8	-16°31.6	-16°32.3	-16°33.0	-16°33.8	-16°34.5	-16°35.2	-16°35.9	-16°36.7	-16°37.4	-16°38.1	-16°38.8	-0.7
Su 9	274°03.7	289°03.7	304°03.6	319°03.6	334°03.5	349°03.5	4°03.4	19°03.4	34°03.3	49°03.2	64°03.2	79°03.1	-0.1
	-16°48.2	-16°48.9	-16°49.6	-16°50.3	-16°51.0	-16°51.8	-16°52.5	-16°53.2	-16°53.9	-16°54.6	-16°55.3	-16°56.0	-0.7
Mo 10	274°02.4	289°02.3	304°02.3	319°02.2	334°02.2	349°02.1	4°02.0	19°02.0	34°01.9	49°01.9	64°01.8	79°01.7	-0.1
	-17°05.2	-17°05.9	-17°06.6	-17°07.3	-17°08.0	-17°08.7	-17°09.4	-17°10.1	-17°10.8	-17°11.5	-17°12.2	-17°12.9	-0.7
Tu 11	274°00.9	289°00.8	304°00.8	319°00.7	334°00.6	349°00.5	4°00.5	19°00.4	34°00.3	49°00.3	64°00.2	79°00.1	-0.1
	-17°22.0	-17°22.7	-17°23.4	-17°24.1	-17°24.7	-17°25.4	-17°26.1	-17°26.8	-17°27.5	-17°28.2	-17°28.9	-17°29.6	-0.7
We 12	273°59.2	288°59.1	303°59.0	318°58.9	333°58.8	348°58.8	3°58.7	18°58.6	33°58.5	48°58.4	63°58.4	78°58.3	-0.1
	-17°38.4	-17°39.1	-17°39.8	-17°40.5	-17°41.2	-17°41.8	-17°42.5	-17°43.2	-17°43.9	-17°44.5	-17°45.2	-17°45.9	-0.7
Th 13	273°57.2	288°57.1	303°57.0	318°56.9	333°56.9	348°56.8	3°56.7	18°56.6	33°56.5	48°56.4	63°56.3	78°56.2	-0.1
	-17°54.6	-17°55.3	-17°55.9	-17°56.6	-17°57.3	-17°57.9	-17°58.6	-17°59.2	-17°59.9	-18°00.6	-18°01.2	-18°01.9	-0.7
Fr 14	273°55.0	288°54.9	303°54.9	318°54.8	333°54.7	348°54.6	3°54.5	18°54.4	33°54.3	48°54.2	63°54.1	78°54.0	-0.1
	-18°10.4	-18°11.1	-18°11.7	-18°12.4	-18°13.0	-18°13.7	-18°14.3	-18°15.0	-18°15.6	-18°16.3	-18°16.9	-18°17.6	-0.7
Sa 15	273°52.7	288°52.6	303°52.5	318°52.4	333°52.2	348°52.1	3°52.0	18°51.9	33°51.8	48°51.7	63°51.6	78°51.5	-0.1
	-18°26.0	-18°26.6	-18°27.2	-18°27.9	-18°28.5	-18°29.2	-18°29.8	-18°30.4	-18°31.1	-18°31.7	-18°32.3	-18°33.0	-0.6
Su 16	273°50.1	288°50.0	303°49.9	318°49.7	333°49.6	348°49.5	3°49.4	18°49.3	33°49.2	48°49.1	63°48.9	78°48.8	-0.1
	-18°41.2	-18°41.8	-18°42.4	-18°43.0	-18°43.7	-18°44.3	-18°44.9	-18°45.5	-18°46.2	-18°46.8	-18°47.4	-18°48.0	-0.6
Mo 17	273°47.3	288°47.2	303°47.0	318°46.9	333°46.8	348°46.7	3°46.5	18°46.4	33°46.3	48°46.2	63°46.1	78°45.9	-0.1
	-18°56.0	-18°56.6	-18°57.3	-18°57.9	-18°58.5	-18°59.1	-18°59.7	-19°00.3	-19°00.9	-19°01.5	-19°02.1	-19°02.7	-0.6
Tu 18	273°44.3	288°44.1	303°44.0	318°43.9	333°43.8	348°43.6	3°43.5	18°43.4	33°43.2	48°43.1	63°43.0	78°42.8	-0.1
	-19°10.6	-19°11.2	-19°11.8	-19°12.4	-19°13.0	-19°13.6	-19°14.1	-19°14.7	-19°15.3	-19°15.9	-19°16.5	-19°17.1	-0.6
We 19	273°41.1	288°40.9	303°40.8	318°40.7	333°40.5	348°40.4	3°40.2	18°40.1	33°40.0	48°39.8	63°39.7	78°39.5	-0.1
	-19°24.8	-19°25.3	-19°25.9	-19°26.5	-19°27.1	-19°27.7	-19°28.3	-19°28.8	-19°29.4	-19°30.0	-19°30.6	-19°31.1	-0.6
Th 20	273°37.7	288°37.5	303°37.4	318°37.2	333°37.1	348°36.9	3°36.8	18°36.6	33°36.5	48°36.3	63°36.2	78°36.0	-0.1
	-19°38.6	-19°39.2	-19°39.7	-19°40.3	-19°40.9	-19°41.4	-19°42.0	-19°42.6	-19°43.1	-19°43.7	-19°44.3	-19°44.8	-0.6
Fr 21	273°34.1	288°33.9	303°33.7	318°33.6	333°33.4	348°33.3	3°33.1	18°33.0	33°32.8	48°32.7	63°32.5	78°32.3	-0.2
	-19°52.1	-19°52.6	-19°53.2	-19°53.7	-19°54.3	-19°54.8	-19°55.4	-19°55.9	-19°56.5	-19°57.0	-19°57.6	-19°58.1	-0.6
Sa 22	273°30.3	288°30.1	303°29.9	318°29.8	333°29.6	348°29.4	3°29.3	18°29.1	33°28.9	48°28.8	63°28.6	78°28.4	-0.2
	-20°05.2	-20°05.7	-20°06.3	-20°06.8	-20°07.4	-20°07.9	-20°08.4	-20°09.0	-20°09.5	-20°10.0	-20°10.6	-20°11.1	-0.5
Su 23	273°26.3	288°26.1	303°25.9	318°25.7	333°25.6	348°25.4	3°25.2	18°25.1	33°24.9	48°24.7	63°24.5	78°24.4	-0.2
	-20°18.0	-20°18.5	-20°19.0	-20°19.5	-20°20.0	-20°20.6	-20°21.1	-20°21.6	-20°22.1	-20°22.6	-20°23.2	-20°23.7	-0.5
Mo 24	273°22.1	288°21.9	303°21.7	318°21.5	333°21.4	348°21.2	3°21.0	18°20.8	33°20.6	48°20.5	63°20.3	78°20.1	-0.2
	-20°30.3	-20°30.8	-20°31.3	-20°31.9	-20°32.4	-20°32.9	-20°33.4	-20°33.9	-20°34.4	-20°34.9	-20°35.4	-20°35.9	-0.5
Tu 25	273°17.7	288°17.5	303°17.3	318°17.1	333°16.9	348°16.8	3°16.6	18°16.4	33°16.2	48°16.0	63°15.8	78°15.6	-0.2
	-20°42.3	-20°42.8	-20°43.3	-20°43.8	-20°44.3	-20°44.8	-20°45.3	-20°45.8	-20°46.2	-20°46.7	-20°47.2	-20°47.7	-0.5
We 26	273°13.1	288°12.9	303°12.7	318°12.6	333°12.4	348°12.2	3°12.0	18°11.8	33°11.6	48°11.4	63°11.2	78°11.0	-0.2
	-20°53.9	-20°54.4	-20°54.9	-20°55.4	-20°55.8	-20°56.3	-20°56.8	-20°57.3	-20°57.7	-20°58.2	-20°58.7	-20°59.1	-0.5
Th 27	273°08.4	288°08.2	303°08.0	318°07.8	333°07.6	348°07.4	3°07.2	18°07.0	33°06.8	48°06.6	63°06.4	78°06.2	-0.2
	-21°05.2	-21°05.6	-21°06.1	-21°06.5	-21°07.0	-21°07.5	-21°07.9	-21°08.4	-21°08.8	-21°09.3	-21°09.7	-21°10.2	-0.5
Fr 28	273°03.5	288°03.3	303°03.1	318°02.8	333°02.6	348°02.4	3°02.2	18°02.0	33°01.8	48°01.6	63°01.4	78°01.2	-0.2
	-21°16.0	-21°16.4	-21°16.9	-21°17.3	-21°17.8	-21°18.2	-21°18.6	-21°19.1	-21°19.5	-21°19.9	-21°20.4	-21°20.8	-0.4
Sa 29	272°58.4	287°58.2	302°57.9	317°57.7	332°57.5	347°57.3	2°57.1	17°56.8	32°56.6	47°56.4	62°56.2	77°56.0	-0.2
	-21°26.4	-21°26.8	-21°27.3	-21°27.7	-21°28.1	-21°28.5	-21°29.0	-21°29.4	-21°29.8	-21°30.2	-21°30.6	-21°31.1	-0.4
Su 30	272°53.1	287°52.9	302°52.6	317°52.4	332°52.2	347°52.0	2°51.8	17°51.5	32°51.3	47°51.1	62°50.8	77°50.6	-0.2
	-21°36.4	-21°36.8	-21°37.3	-21°37.7	-21°38.1	-21°38.5	-21°38.9	-21°39.3	-21°39.7	-21°40.1	-21°40.5	-21°40.9	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2031

D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
Sa 1	229°54.2	244°23.4	258°52.6	273°21.8	287°51.1	302°20.3	316°49.6	331°18.9	345°48.2	0°17.6	14°46.9	+29.3	15.1
	19°53.2	19°55.6	19°57.8	19°59.9	20°01.9	20°03.8	20°05.6	20°07.3	20°08.9	20°10.4	20°11.7	+1.9	55.5
Su 2	232°09.9	246°39.6	261°09.4	275°39.2	290°09.0	304°38.9	319°08.8	333°38.7	348°08.6	2°38.6	17°08.6	+29.9	15.0
	20°20.0	20°19.7	20°19.3	20°18.9	20°18.3	20°17.6	20°16.8	20°16.0	20°15.0	20°13.9	20°12.8	-0.7	54.9
Mo 3	234°42.9	249°13.5	263°44.1	278°14.8	292°45.5	307°16.2	321°47.0	336°17.8	350°48.6	5°19.5	19°50.5	+30.8	14.9
	19°43.6	19°40.9	19°38.1	19°35.2	19°32.2	19°29.2	19°26.0	19°22.8	19°19.4	19°16.0	19°12.5	-3.1	54.5
Tu 4	237°39.3	252°10.9	266°42.5	281°14.1	295°45.8	310°17.6	324°49.4	339°21.2	353°53.1	8°25.0	22°56.9	+31.8	14.8
	18°09.6	18°04.7	17°59.8	17°54.8	17°49.7	17°44.5	17°39.3	17°33.9	17°28.5	17°23.0	17°17.5	-5.2	54.2
We 5	241°00.7	255°33.2	270°05.8	284°38.4	299°11.1	313°43.8	328°16.5	342°49.3	357°22.1	11°54.9	26°27.8	+32.7	14.8
	15°45.4	15°38.7	15°31.9	15°25.1	15°18.2	15°11.2	15°04.2	14°57.1	14°50.0	14°42.7	14°35.5	-7.0	54.2
Th 6	244°44.3	259°17.6	273°51.0	288°24.4	302°57.7	317°31.2	332°04.6	346°38.1	1°11.6	15°45.1	30°18.6	+33.4	14.8
	12°39.1	12°30.8	12°22.6	12°14.3	12°05.9	11°57.5	11°49.0	11°40.4	11°31.9	11°23.2	11°14.5	-8.5	54.2
◑ Fr 7	248°43.5	263°17.2	277°51.0	292°24.8	306°58.6	321°32.4	336°06.2	350°40.0	5°13.8	19°47.6	34°21.5	+33.8	14.9
	8°58.7	8°49.3	8°39.8	8°30.3	8°20.8	8°11.2	8°01.6	7°51.9	7°42.2	7°32.5	7°22.8	-9.6	54.5
Sa 8	263°17.2	277°51.0	292°24.8	306°58.6	321°32.4	336°06.2	350°40.0	5°13.8	19°47.6	34°21.5	48°55.3	+33.8	14.9
	8°49.3	8°39.8	8°30.3	8°20.8	8°11.2	8°01.6	7°51.9	7°42.2	7°32.5	7°22.8	7°13.0	-9.6	54.5
Su 9	267°22.5	281°56.3	296°30.0	311°03.8	325°37.5	340°11.2	354°44.9	9°18.6	23°52.3	38°26.0	52°59.6	+33.7	15.0
	4°41.9	4°31.6	4°21.2	4°10.9	4°00.5	3°50.1	3°39.6	3°29.1	3°18.7	3°08.1	2°57.6	-10.4	55.0
Mo 10	271°21.9	285°55.2	300°28.4	315°01.7	329°34.8	344°08.0	358°41.1	13°14.2	27°47.3	42°20.3	56°53.2	+33.1	15.2
	0°17.2	0°06.4	-0°04.4	-0°15.3	-0°26.1	-0°37.0	-0°47.9	-0°58.7	-1°09.6	-1°20.5	-1°31.4	-10.9	55.6
Tu 11	275°02.9	289°35.2	304°07.4	318°39.6	333°11.7	347°43.8	2°15.8	16°47.8	31°19.7	45°51.5	60°23.3	+32.0	15.4
	-4°15.1	-4°26.0	-4°36.9	-4°47.7	-4°58.6	-5°09.4	-5°20.3	-5°31.1	-5°41.9	-5°52.7	-6°03.5	-10.8	56.4
We 12	278°12.9	292°43.7	307°14.4	321°45.0	336°15.6	350°46.1	5°16.5	19°46.9	34°17.2	48°47.4	63°17.6	+30.5	15.6
	-8°42.9	-8°53.4	-9°03.7	-9°14.1	-9°24.4	-9°34.7	-9°44.9	-9°55.2	-10°05.3	-10°15.5	-10°25.6	-10.3	57.2
Th 13	280°40.6	295°09.5	309°38.3	324°07.1	338°35.7	353°04.3	7°32.8	22°01.2	36°29.6	50°57.8	65°26.0	+28.5	15.8
	-12°51.2	-13°00.5	-13°09.7	-13°18.9	-13°27.9	-13°37.0	-13°45.9	-13°54.8	-14°03.6	-14°12.4	-14°21.1	-9.0	58.0
● Fr 14	282°19.0	296°45.9	311°12.7	325°39.4	340°06.0	354°32.6	8°59.1	23°25.5	37°51.9	52°18.1	66°44.3	+26.5	16.0
	-16°21.7	-16°29.1	-16°36.4	-16°43.5	-16°50.6	-16°57.6	-17°04.5	-17°11.2	-17°17.9	-17°24.5	-17°31.0	-6.9	58.7
Sa 15	283°08.7	297°33.8	311°58.8	326°23.8	340°48.7	355°13.6	9°38.4	24°03.2	38°27.9	52°52.5	67°17.1	+24.8	16.2
	-18°54.9	-18°59.5	-19°04.1	-19°08.5	-19°12.8	-19°16.9	-19°21.0	-19°24.9	-19°28.7	-19°32.4	-19°35.9	-4.1	59.3
Su 16	283°21.0	297°45.0	312°08.9	326°32.9	340°56.8	355°20.7	9°44.6	24°08.4	38°32.3	52°56.1	67°19.9	+23.9	16.3
	-20°12.9	-20°14.3	-20°15.5	-20°16.6	-20°17.6	-20°18.4	-20°19.1	-20°19.6	-20°20.0	-20°20.3	-20°20.4	-0.7	59.7
Mo 17	283°16.8	297°40.7	312°04.6	326°28.4	340°52.3	355°16.3	9°40.2	24°04.2	38°28.2	52°52.2	67°16.2	+23.9	16.3
	-20°05.0	-20°02.9	-20°00.6	-19°58.2	-19°55.6	-19°52.9	-19°50.0	-19°47.0	-19°43.9	-19°40.7	-19°37.3	+2.8	59.8
Tu 18	283°21.1	297°45.8	312°10.5	326°35.3	341°00.1	355°25.0	9°49.9	24°14.8	38°39.9	53°04.9	67°30.1	+24.9	16.3
	-18°30.5	-18°25.0	-18°19.4	-18°13.7	-18°07.9	-18°01.9	-17°55.8	-17°49.6	-17°43.3	-17°36.8	-17°30.3	+6.0	59.8
We 19	283°54.1	298°20.2	312°46.4	327°12.6	341°38.9	356°05.2	10°31.7	24°58.1	39°24.7	53°51.3	68°18.0	+26.4	16.3
	-15°39.0	-15°30.7	-15°22.4	-15°14.0	-15°05.4	-14°56.8	-14°48.1	-14°39.3	-14°30.4	-14°21.5	-14°12.4	+8.7	59.6
Th 20	285°05.8	299°33.5	314°01.2	328°29.0	342°56.9	357°24.8	11°52.8	26°20.9	40°49.0	55°17.2	69°45.4	+28.0	16.2
	-11°47.2	-11°37.0	-11°26.6	-11°16.3	-11°05.8	-10°55.3	-10°44.8	-10°34.2	-10°23.5	-10°12.8	-10°02.0	+10.5	59.3
◐ Fr 21	286°55.5	301°24.5	315°53.7	330°22.8	344°52.1	359°21.3	13°50.6	28°20.0	42°49.4	57°18.8	71°48.3	+29.3	16.0
	-7°14.8	-7°03.3	-6°51.8	-6°40.3	-6°28.8	-6°17.2	-6°05.6	-5°53.9	-5°42.3	-5°30.6	-5°18.8	+11.6	58.8
Sa 22	289°15.1	303°45.2	318°15.3	332°45.4	347°15.5	1°45.7	16°15.8	30°46.1	45°16.3	59°46.5	74°16.8	+30.2	15.9
	-2°21.2	-2°09.2	-1°57.3	-1°45.4	-1°33.4	-1°21.5	-1°09.6	-0°57.6	-0°45.7	-0°33.8	-0°21.8	+11.9	58.4
Su 23	291°53.2	306°23.7	320°54.3	335°24.8	349°55.4	4°26.0	18°56.5	33°27.1	47°57.7	62°28.3	76°58.9	+30.6	15.8
	2°35.8	2°47.5	2°59.2	3°10.9	3°22.5	3°34.1	3°45.7	3°57.3	4°08.9	4°20.4	4°31.8	+11.6	57.9
Mo 24	294°37.8	309°08.3	323°38.9	338°09.4	352°40.0	7°10.5	21°41.1	36°11.6	50°42.1	65°12.6	79°43.1	+30.5	15.6
	7°19.9	7°30.8	7°41.7	7°52.5	8°03.2	8°13.9	8°24.6	8°35.2	8°45.7	8°56.2	9°06.7	+10.7	57.4
Tu 25	297°18.8	311°49.1	326°19.4	340°49.6	355°19.8	9°50.0	24°20.2	38°50.3	53°20.5	67°50.6	82°20.7	+30.2	15.5
	11°36.6	11°46.1	11°55.5	12°04.9	12°14.2	12°23.4	12°32.6	12°41.7	12°50.7	12°59.6	13°08.5	+9.2	56.9
We 26	299°50.2	314°20.0	328°49.8	343°19.6	357°49.3	12°19.1	26°48.8	41°18.5	55°48.2	70°17.8	84°47.5	+29.7	15.4
	15°12.5	15°20.1	15°27.7	15°35.1	15°42.5	15°49.8	15°57.0	16°04.1	16°11.1	16°18.1	16°24.9	+7.2	56.4
Th 27	302°10.5	316°40.0	331°09.4	345°38.8	0°08.2	14°37.6	29°06.9	43°36.3	58°05.7	72°35.0	87°04.4	+29.4	15.2
	17°56.6	18°02.0	18°07.3	18°12.4	18°17.5	18°22.5	18°27.3	18°32.1	18°36.8	18°41.3	18°45.8	+4.9	55.9
○ Fr 28	304°24.1	318°53.4	333°22.8	347°52.1	2°21.4	16°50.7	31°20.1	45°49.4	60°18.8	74°48.1	89°17.5	+29.3	15.1
	19°40.8	19°43.6	19°46.4	19°49.0	19°51.5	19°54.0	19°56.3	19°58.5	20°00.6	20°02.6	20°04.6	+2.4	55.4
Sa 29	306°39.5	321°09.1	335°38.7	350°08.3	4°38.0	19°07.7	33°37.4	48°07.1	62°36.9	77°06.6	91°36.4	+29.7	15.0
	20°20.8	20°21.1	20°21.2	20°21.3	20°21.2	20°21.1	20°20.8	20°20.5	20°20.0	20°19.4	20°18.8	-0.2	54.9
Su 30	309°06.9	323°37.1	338°07.5	352°37.8	7°08.2	21°38.6	36°09.1	50°39.6	65°10.1	79°40.7	94°11.3	+30.4	14.9
	19°57.1	19°54.9	19°52.5	19°50.1	19°47.6	19°45.0	19°42.3	19°39.5	19°36.7	19°33.7	19°30.6	-2.6	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 7 07h02 — NM: 14 21h09 — FQ: 21 14h44 — FM: 28 23h18

SUN

December 2031

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	272°47.7	287°47.4	302°47.2	317°47.0	332°46.7	347°46.5	2°46.3	17°46.0	32°45.8	47°45.6	62°45.3	77°45.1	-0.2
	-21°46.0	-21°46.4	-21°46.8	-21°47.2	-21°47.6	-21°48.0	-21°48.4	-21°48.8	-21°49.2	-21°49.5	-21°49.9	-21°50.3	-0.4
Tu 2	272°42.0	287°41.8	302°41.6	317°41.3	332°41.1	347°40.9	2°40.6	17°40.4	32°40.1	47°39.9	62°39.7	77°39.4	-0.2
	-21°55.2	-21°55.6	-21°56.0	-21°56.4	-21°56.7	-21°57.1	-21°57.5	-21°57.8	-21°58.2	-21°58.6	-21°58.9	-21°59.3	-0.4
We 3	272°36.3	287°36.0	302°35.8	317°35.5	332°35.3	347°35.1	2°34.8	17°34.6	32°34.3	47°34.1	62°33.8	77°33.6	-0.2
	-22°04.0	-22°04.4	-22°04.7	-22°05.1	-22°05.4	-22°05.8	-22°06.1	-22°06.5	-22°06.8	-22°07.2	-22°07.5	-22°07.9	-0.4
Th 4	272°30.4	287°30.1	302°29.9	317°29.6	332°29.4	347°29.1	2°28.9	17°28.6	32°28.3	47°28.1	62°27.8	77°27.6	-0.3
	-22°12.4	-22°12.7	-22°13.0	-22°13.4	-22°13.7	-22°14.0	-22°14.4	-22°14.7	-22°15.1	-22°15.4	-22°15.7	-22°16.0	-0.3
Fr 5	272°24.3	287°24.0	302°23.8	317°23.5	332°23.3	347°23.0	2°22.7	17°22.5	32°22.2	47°22.0	62°21.7	77°21.5	-0.3
	-22°20.3	-22°20.6	-22°20.9	-22°21.2	-22°21.6	-22°21.9	-22°22.2	-22°22.5	-22°22.8	-22°23.1	-22°23.5	-22°23.8	-0.3
Sa 6	272°18.1	287°17.8	302°17.5	317°17.3	332°17.0	347°16.8	2°16.5	17°16.2	32°16.0	47°15.7	62°15.4	77°15.2	-0.3
	-22°27.8	-22°28.1	-22°28.4	-22°28.7	-22°29.0	-22°29.3	-22°29.6	-22°29.9	-22°30.2	-22°30.5	-22°30.8	-22°31.1	-0.3
Su 7	272°11.7	287°11.4	302°11.2	317°10.9	332°10.6	347°10.4	2°10.1	17°09.8	32°09.6	47°09.3	62°09.0	77°08.8	-0.3
	-22°34.8	-22°35.1	-22°35.4	-22°35.7	-22°35.9	-22°36.2	-22°36.5	-22°36.8	-22°37.1	-22°37.3	-22°37.6	-22°37.9	-0.3
Mo 8	272°05.2	287°05.0	302°04.7	317°04.4	332°04.1	347°03.9	2°03.6	17°03.3	32°03.0	47°02.8	62°02.5	77°02.2	-0.3
	-22°41.4	-22°41.7	-22°42.0	-22°42.2	-22°42.5	-22°42.7	-22°43.0	-22°43.3	-22°43.5	-22°43.8	-22°44.0	-22°44.3	-0.3
Tu 9	271°58.6	286°58.3	301°58.1	316°57.8	331°57.5	346°57.2	1°56.9	16°56.7	31°56.4	46°56.1	61°55.8	76°55.5	-0.3
	-22°47.6	-22°47.8	-22°48.1	-22°48.3	-22°48.6	-22°48.8	-22°49.1	-22°49.3	-22°49.5	-22°49.8	-22°50.0	-22°50.3	-0.2
We 10	271°51.9	286°51.6	301°51.3	316°51.0	331°50.8	346°50.5	1°50.2	16°49.9	31°49.6	46°49.3	61°49.1	76°48.8	-0.3
	-22°53.3	-22°53.5	-22°53.8	-22°54.0	-22°54.2	-22°54.4	-22°54.7	-22°54.9	-22°55.1	-22°55.3	-22°55.5	-22°55.8	-0.2
Th 11	271°45.1	286°44.8	301°44.5	316°44.2	331°43.9	346°43.6	1°43.3	16°43.0	31°42.8	46°42.5	61°42.2	76°41.9	-0.3
	-22°58.6	-22°58.8	-22°59.0	-22°59.2	-22°59.4	-22°59.6	-22°59.8	-23°00.0	-23°00.2	-23°00.4	-23°00.6	-23°00.8	-0.2
Fr 12	271°38.1	286°37.8	301°37.5	316°37.2	331°36.9	346°36.7	1°36.4	16°36.1	31°35.8	46°35.5	61°35.2	76°34.9	-0.3
	-23°03.4	-23°03.6	-23°03.7	-23°03.9	-23°04.1	-23°04.3	-23°04.5	-23°04.7	-23°04.9	-23°05.0	-23°05.2	-23°05.4	-0.2
Sa 13	271°31.1	286°30.8	301°30.5	316°30.2	331°29.9	346°29.6	1°29.3	16°29.0	31°28.7	46°28.4	61°28.1	76°27.8	-0.3
	-23°07.7	-23°07.9	-23°08.1	-23°08.2	-23°08.4	-23°08.6	-23°08.7	-23°08.9	-23°09.1	-23°09.2	-23°09.4	-23°09.6	-0.2
Su 14	271°24.0	286°23.7	301°23.4	316°23.1	331°22.8	346°22.5	1°22.2	16°21.9	31°21.6	46°21.3	61°21.0	76°20.7	-0.3
	-23°11.6	-23°11.8	-23°11.9	-23°12.1	-23°12.2	-23°12.4	-23°12.5	-23°12.7	-23°12.8	-23°12.9	-23°13.1	-23°13.2	-0.1
Mo 15	271°16.8	286°16.5	301°16.2	316°15.9	331°15.6	346°15.3	1°15.0	16°14.7	31°14.4	46°14.1	61°13.8	76°13.5	-0.3
	-23°15.0	-23°15.2	-23°15.3	-23°15.4	-23°15.6	-23°15.7	-23°15.8	-23°15.9	-23°16.1	-23°16.2	-23°16.3	-23°16.5	-0.1
Tu 16	271°09.5	286°09.2	301°08.9	316°08.6	331°08.3	346°08.0	1°07.7	16°07.4	31°07.1	46°06.8	61°06.5	76°06.2	-0.3
	-23°18.0	-23°18.1	-23°18.2	-23°18.3	-23°18.4	-23°18.6	-23°18.7	-23°18.8	-23°18.9	-23°19.0	-23°19.1	-23°19.2	-0.1
We 17	271°02.2	286°01.9	301°01.6	316°01.3	331°01.0	346°00.7	1°00.4	16°00.1	30°59.8	45°59.4	60°59.1	75°58.8	-0.3
	-23°20.5	-23°20.6	-23°20.7	-23°20.8	-23°20.9	-23°21.0	-23°21.1	-23°21.1	-23°21.2	-23°21.3	-23°21.4	-23°21.5	-0.1
Th 18	270°54.8	285°54.5	300°54.2	315°53.9	330°53.6	345°53.3	0°53.0	15°52.7	30°52.4	45°52.1	60°51.8	75°51.5	-0.3
	-23°22.5	-23°22.6	-23°22.7	-23°22.8	-23°22.8	-23°22.9	-23°23.0	-23°23.0	-23°23.1	-23°23.2	-23°23.2	-23°23.3	-0.1
Fr 19	270°47.4	285°47.1	300°46.8	315°46.5	330°46.2	345°45.9	0°45.6	15°45.3	30°45.0	45°44.7	60°44.4	75°44.0	-0.3
	-23°24.1	-23°24.2	-23°24.2	-23°24.3	-23°24.3	-23°24.4	-23°24.4	-23°24.5	-23°24.5	-23°24.6	-23°24.6	-23°24.7	-0.1
Sa 20	270°40.0	285°39.7	300°39.4	315°39.1	330°38.8	345°38.5	0°38.2	15°37.9	30°37.5	45°37.2	60°36.9	75°36.6	-0.3
	-23°25.2	-23°25.2	-23°25.3	-23°25.3	-23°25.3	-23°25.4	-23°25.4	-23°25.4	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-0.0
Su 21	270°32.6	285°32.3	300°32.0	315°31.6	330°31.3	345°31.0	0°30.7	15°30.4	30°30.1	45°29.8	60°29.5	75°29.2	-0.3
	-23°25.8	-23°25.8	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°26.0	-0.0
Mo 22	270°25.1	285°24.8	300°24.5	315°24.2	330°23.9	345°23.6	0°23.3	15°22.9	30°22.6	45°22.3	60°22.0	75°21.7	-0.3
	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	+0.0
Tu 23	270°17.7	285°17.4	300°17.0	315°16.7	330°16.4	345°16.1	0°15.8	15°15.5	30°15.2	45°14.9	60°14.6	75°14.3	-0.3
	-23°25.7	-23°25.6	-23°25.6	-23°25.6	-23°25.6	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-23°25.4	-23°25.4	-23°25.4	+0.0
We 24	270°10.2	285°09.9	300°09.6	315°09.3	330°09.0	345°08.7	0°08.4	15°08.0	30°07.7	45°07.4	60°07.1	75°06.8	-0.3
	-23°24.9	-23°24.8	-23°24.8	-23°24.8	-23°24.7	-23°24.7	-23°24.6	-23°24.6	-23°24.5	-23°24.5	-23°24.4	-23°24.4	+0.0
Th 25	270°02.8	285°02.5	300°02.2	315°01.9	330°01.5	345°01.2	0°00.9	15°00.6	30°00.3	45°00.0	59°59.7	74°59.4	-0.3
	-23°23.6	-23°23.6	-23°23.5	-23°23.4	-23°23.4	-23°23.3	-23°23.2	-23°23.2	-23°23.1	-23°23.0	-23°23.0	-23°22.9	+0.1
Fr 26	269°55.4	284°55.1	299°54.7	314°54.4	329°54.1	344°53.8	359°53.5	14°53.2	29°52.9	44°52.6	59°52.3	74°52.0	-0.3
	-23°21.9	-23°21.8	-23°21.7	-23°21.7	-23°21.6	-23°21.5	-23°21.4	-23°21.3	-23°21.2	-23°21.1	-23°21.0	-23°21.0	+0.1
Sa 27	269°48.0	284°47.7	299°47.4	314°47.1	329°46.8	344°46.4	359°46.1	14°45.8	29°45.5	44°45.2	59°44.9	74°44.6	-0.3
	-23°19.7	-23°19.6	-23°19.5	-23°19.4	-23°19.3	-23°19.2	-23°19.1	-23°19.0	-23°18.9	-23°18.8	-23°18.7	-23°18.5	+0.1
Su 28	269°40.6	284°40.3	299°40.0	314°39.7	329°39.4	344°39.1	359°38.8	14°38.5	29°38.2	44°37.9	59°37.6	74°37.3	-0.3
	-23°17.0	-23°16.9	-23°16.8	-23°16.7	-23°16.6	-23°16.4	-23°16.3	-23°16.2	-23°16.1	-23°15.9	-23°15.8	-23°15.7	+0.1
Mo 29	269°33.3	284°33.0	299°32.7	314°32.4	329°32.1	344°31.8	359°31.5	14°31.2	29°30.9	44°30.6	59°30.3	74°30.0	-0.3
	-23°13.9	-23°13.8	-23°13.6	-23°13.5	-23°13.4	-23°13.2	-23°13.1	-23°12.9	-23°12.8	-23°12.6	-23°12.5	-23°12.3	+0.1
Tu 30	269°26.1	284°25.8	299°25.5	314°25.2	329°24.9	344°24.6	359°24.3	14°24.0	29°23.7	44°23.4	59°23.1	74°22.8	-0.3
	-23°10.3	-23°10.2	-23°10.0	-23°09.8	-23°09.7	-23°09.5	-23°09.4	-23°09.2	-23°09.0	-23°08.9	-23°08.7	-23°08.5	+0.2
We 31	269°18.9	284°18.6	299°18.3	314°18.0	329°17.7	344°17.4	359°17.1	14°16.8	29°16.5	44°16.2	59°15.9	74°15.6	-0.3
	-23°06.3	-23°06.1	-23°05.9	-23°05.7	-23°05.5	-23°05.4	-23°05.2	-23°05.0	-23°04.8	-23°04.6	-23°04.4	-23°04.3	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

December 2031

D	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	Δ'/h	SH
Mo 1	239°19.4	253°50.5	268°21.6	282°52.7	297°23.8	311°55.0	326°26.3	340°57.6	355°28.9	10°00.3	24°31.7	+31.2	14.8
	18°55.1	18°51.0	18°46.9	18°42.7	18°38.4	18°34.0	18°29.6	18°25.0	18°20.4	18°15.7	18°10.9	-4.4	54.3
Tu 2	242°28.0	257°00.1	271°32.2	286°04.4	300°36.6	315°08.9	329°41.2	344°13.5	358°45.9	13°18.3	27°50.8	+32.3	14.8
	16°49.7	16°43.7	16°37.6	16°31.5	16°25.2	16°18.9	16°12.6	16°06.1	15°59.6	15°53.1	15°46.4	-6.3	54.1
We 3	246°02.4	260°35.5	275°08.6	289°41.8	304°14.9	318°48.2	333°21.4	347°54.7	2°28.0	17°01.4	31°34.7	+33.2	14.7
	13°59.2	13°51.6	13°43.9	13°36.1	13°28.3	13°20.4	13°12.5	13°04.6	12°56.5	12°48.5	12°40.3	-7.9	54.0
Th 4	249°58.9	264°32.7	279°06.5	293°40.4	308°14.3	322°48.2	337°22.1	351°56.0	6°30.0	21°04.0	35°38.0	+33.9	14.8
	10°32.4	10°23.5	10°14.5	10°05.5	9°56.5	9°47.4	9°38.3	9°29.1	9°19.9	9°10.7	9°01.4	-9.1	54.1
Fr 5	254°09.5	268°43.7	283°17.9	297°52.1	312°26.3	327°00.5	341°34.7	356°08.9	10°43.1	25°17.3	39°51.5	+34.2	14.8
	6°37.9	6°28.0	6°18.1	6°08.2	5°58.3	5°48.4	5°38.4	5°28.4	5°18.3	5°08.2	4°58.2	-10.0	54.4
Sa 6	258°23.8	272°57.9	287°31.9	302°06.0	316°40.0	331°14.0	345°48.0	0°22.0	14°55.9	29°29.9	44°03.8	+34.0	15.0
	2°23.9	2°13.5	2°03.0	1°52.5	1°42.1	1°31.5	1°21.0	1°10.5	0°59.9	0°49.4	0°38.8	-10.5	54.9
◑ Su 7	272°57.9	287°31.9	302°06.0	316°40.0	331°14.0	345°48.0	0°22.0	14°55.9	29°29.9	44°03.8	58°37.6	+34.0	15.0
	2°13.5	2°03.0	1°52.5	1°42.1	1°31.5	1°21.0	1°10.5	0°59.9	0°49.4	0°38.8	0°28.2	-10.5	54.9
Mo 8	277°02.6	291°36.0	306°09.3	320°42.6	335°15.9	349°49.2	4°22.4	18°55.5	33°28.6	48°01.7	62°34.7	+33.2	15.2
	-2°11.6	-2°22.3	-2°33.0	-2°43.7	-2°54.4	-3°05.1	-3°15.8	-3°26.5	-3°37.2	-3°47.9	-3°58.5	-10.7	55.6
Tu 9	280°44.0	295°16.1	309°48.3	324°20.3	338°52.3	353°24.2	7°56.1	22°27.9	36°59.6	51°31.3	66°02.9	+31.9	15.4
	-6°37.7	-6°48.2	-6°58.7	-7°09.1	-7°19.6	-7°30.0	-7°40.4	-7°50.8	-8°01.1	-8°11.5	-8°21.8	-10.4	56.4
We 10	283°48.2	298°18.6	312°48.9	327°19.2	341°49.3	356°19.4	10°49.4	25°19.3	39°49.2	54°18.9	68°48.6	+30.0	15.6
	-10°52.7	-11°02.5	-11°12.2	-11°21.9	-11°31.5	-11°41.1	-11°50.7	-12°00.2	-12°09.6	-12°19.0	-12°28.4	-9.6	57.3
Th 11	286°03.0	300°31.2	314°59.3	329°27.4	343°55.4	358°23.2	12°51.0	27°18.7	41°46.3	56°13.8	70°41.2	+27.8	15.9
	-14°41.5	-14°49.9	-14°58.2	-15°06.4	-15°14.5	-15°22.6	-15°30.6	-15°38.5	-15°46.3	-15°54.0	-16°01.7	-8.0	58.2
Fr 12	287°21.2	301°47.2	316°13.0	330°38.8	345°04.5	359°30.1	13°55.6	28°21.0	42°46.4	57°11.6	71°36.8	+25.6	16.1
	-17°45.6	-17°51.7	-17°57.8	-18°03.7	-18°09.5	-18°15.2	-18°20.8	-18°26.3	-18°31.7	-18°36.9	-18°42.1	-5.7	59.2
Sa 13	287°45.3	302°09.3	316°33.2	330°57.1	345°20.9	359°44.6	14°08.3	28°32.0	42°55.6	57°19.1	71°42.6	+23.7	16.3
	-19°44.6	-19°47.8	-19°50.8	-19°53.7	-19°56.4	-19°59.0	-20°01.5	-20°03.8	-20°06.0	-20°08.0	-20°09.9	-2.5	59.9
● Su 14	287°30.0	301°52.9	316°15.8	330°38.7	345°01.6	359°24.4	13°47.3	28°10.1	42°32.9	56°55.7	71°18.5	+22.8	16.5
	-20°21.2	-20°20.8	-20°20.2	-20°19.5	-20°18.6	-20°17.6	-20°16.5	-20°15.1	-20°13.7	-20°12.1	-20°10.3	+1.1	60.5
Mo 15	287°01.4	301°24.4	315°47.4	330°10.5	344°33.5	358°56.6	13°19.8	27°43.0	42°06.2	56°29.4	70°52.7	+23.1	16.6
	-19°26.2	-19°22.1	-19°17.9	-19°13.5	-19°09.0	-19°04.3	-18°59.5	-18°54.6	-18°49.5	-18°44.3	-18°38.9	+4.7	60.7
Tu 16	286°47.8	301°11.9	315°36.1	330°00.3	344°24.6	358°49.0	13°13.4	27°37.9	42°02.4	56°27.1	70°51.7	+24.4	16.5
	-17°03.1	-16°55.7	-16°48.2	-16°40.6	-16°32.8	-16°25.0	-16°17.0	-16°09.0	-16°00.8	-15°52.5	-15°44.1	+7.9	60.7
We 17	287°10.3	301°36.2	316°02.0	330°28.0	344°54.0	359°20.1	13°46.3	28°12.6	42°38.9	57°05.3	71°31.7	+26.1	16.5
	-13°26.6	-13°16.8	-13°06.8	-12°56.7	-12°46.6	-12°36.4	-12°26.2	-12°15.8	-12°05.4	-11°54.9	-11°44.4	+10.2	60.4
Th 18	288°17.3	302°44.8	317°12.5	331°40.2	346°08.0	0°35.9	15°03.8	29°31.8	43°59.8	58°27.9	72°56.1	+27.9	16.3
	-8°58.9	-8°47.4	-8°35.9	-8°24.4	-8°12.8	-8°01.2	-7°49.6	-7°37.9	-7°26.2	-7°14.4	-7°02.7	+11.6	59.8
Fr 19	290°05.5	304°34.6	319°03.7	333°32.9	348°02.1	2°31.3	17°00.7	31°30.0	45°59.4	60°28.8	74°58.3	+29.3	16.1
	-4°03.1	-3°51.0	-3°38.9	-3°26.7	-3°14.6	-3°02.5	-2°50.3	-2°38.2	-2°26.0	-2°13.9	-2°01.8	+12.1	59.1
Sa 20	292°25.2	306°55.2	321°25.3	335°55.5	350°25.6	4°55.8	19°26.0	33°56.2	48°26.4	62°56.7	77°27.0	+30.2	15.9
	0°59.6	1°11.6	1°23.6	1°35.5	1°47.4	1°59.3	2°11.2	2°23.1	2°34.9	2°46.7	2°58.5	+11.9	58.4
◐ Su 21	295°03.6	309°34.2	324°04.7	338°35.3	353°05.9	7°36.5	22°07.1	36°37.7	51°08.3	65°38.9	80°09.5	+30.6	15.7
	5°51.4	6°02.6	6°13.8	6°24.9	6°36.0	6°47.1	6°58.1	7°09.1	7°20.0	7°30.8	7°41.7	+11.0	57.6
Mo 22	297°48.8	312°19.5	326°50.1	341°20.6	355°51.2	10°21.8	24°52.4	39°23.0	53°53.5	68°24.1	82°54.6	+30.6	15.5
	10°17.6	10°27.5	10°37.4	10°47.2	10°56.9	11°06.6	11°16.2	11°25.8	11°35.3	11°44.7	11°54.0	+9.7	56.9
Tu 23	300°31.5	315°01.9	329°32.2	344°02.6	358°32.9	13°03.2	27°33.5	42°03.8	56°34.0	71°04.3	85°34.5	+30.3	15.4
	14°05.9	14°14.1	14°22.2	14°30.2	14°38.2	14°46.1	14°53.9	15°01.6	15°09.2	15°16.8	15°24.3	+7.8	56.3
We 24	303°06.4	317°36.4	332°06.4	346°36.4	1°06.4	15°36.4	30°06.3	44°36.3	59°06.2	73°36.1	88°06.0	+30.0	15.2
	17°06.2	17°12.3	17°18.3	17°24.2	17°30.0	17°35.7	17°41.4	17°46.9	17°52.4	17°57.7	18°03.0	+5.7	55.7
Th 25	305°33.4	320°03.2	334°33.0	349°02.7	3°32.5	18°02.2	32°32.0	47°01.7	61°31.4	76°01.2	90°30.9	+29.7	15.1
	19°10.4	19°14.2	19°17.8	19°21.3	19°24.7	19°28.1	19°31.3	19°34.4	19°37.4	19°40.4	19°43.2	+3.3	55.2
Fr 26	307°57.2	322°27.0	336°56.8	351°26.7	5°56.5	20°26.3	34°56.2	49°26.0	63°55.9	78°25.8	92°55.7	+29.8	15.0
	20°13.5	20°14.7	20°15.8	20°16.9	20°17.8	20°18.6	20°19.3	20°19.9	20°20.4	20°20.8	20°21.1	+0.8	54.8
Sa 27	310°26.1	324°56.3	339°26.5	353°56.7	8°27.0	22°57.3	37°27.6	51°57.9	66°28.3	80°58.7	95°29.1	+30.3	14.9
	20°13.8	20°12.5	20°11.1	20°09.6	20°08.1	20°06.4	20°04.6	20°02.8	20°00.8	19°58.8	19°56.6	-1.7	54.5
○ Su 28	313°09.1	327°40.0	342°10.9	356°41.9	11°13.0	25°44.0	40°15.1	54°46.3	69°17.5	83°48.7	98°19.9	+31.1	14.8
	19°13.4	19°09.8	19°06.1	19°02.3	18°58.4	18°54.5	18°50.4	18°46.3	18°42.1	18°37.8	18°33.4	-4.0	54.2
Mo 29	316°13.3	330°45.2	345°17.1	359°49.0	14°21.0	28°53.0	43°25.1	57°57.2	72°29.4	87°01.6	101°33.8	+32.1	14.7
	17°18.0	17°12.3	17°06.6	17°00.8	16°54.9	16°49.0	16°43.0	16°36.9	16°30.7	16°24.5	16°18.2	-6.0	54.0
Tu 30	319°42.0	334°14.8	348°47.7	3°20.7	17°53.6	32°26.6	46°59.7	61°32.7	76°05.8	90°39.0	105°12.2	+33.0	14.7
	14°35.5	14°28.2	14°20.8	14°13.3	14°05.8	13°58.2	13°50.5	13°42.8	13°35.1	13°27.3	13°19.4	-7.6	53.9
We 31	334°14.8	348°47.7	3°20.7	17°53.6	32°26.6	46°59.7	61°32.7	76°05.8	90°39.0	105°12.2	119°45.4	+33.1	14.7
	14°28.2	14°20.8	14°13.3	14°05.8	13°58.2	13°50.5	13°42.8	13°35.1	13°27.3	13°19.4	13°11.5	-7.7	53.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 7 03h19 — NM: 14 09h05 — FQ: 21 00h00 — FM: 28 17h33

SUN

January 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269° 11.7	284° 11.4	299° 11.1	314° 10.8	329° 10.6	344° 10.3	359° 10.0	14° 09.7	29° 09.4	44° 09.1	59° 08.8	74° 08.5	-0.3
	-23° 01.7	-23° 01.6	-23° 01.4	-23° 01.2	-23° 01.0	-23° 00.7	-23° 00.5	-23° 00.3	-23° 00.1	-22° 59.9	-22° 59.7	-22° 59.5	+0.2
Fr 2	269° 04.7	284° 04.4	299° 04.1	314° 03.8	329° 03.5	344° 03.2	359° 02.9	14° 02.6	29° 02.3	44° 02.0	59° 01.8	74° 01.5	-0.3
	-22° 56.8	-22° 56.6	-22° 56.3	-22° 56.1	-22° 55.9	-22° 55.7	-22° 55.5	-22° 55.2	-22° 55.0	-22° 54.8	-22° 54.6	-22° 54.3	+0.2
Sa 3	268° 57.7	283° 57.4	298° 57.1	313° 56.8	328° 56.5	343° 56.3	358° 56.0	13° 55.7	28° 55.4	43° 55.1	58° 54.8	73° 54.5	-0.3
	-22° 51.3	-22° 51.1	-22° 50.9	-22° 50.6	-22° 50.4	-22° 50.1	-22° 49.9	-22° 49.7	-22° 49.4	-22° 49.2	-22° 48.9	-22° 48.7	+0.2
Su 4	268° 50.8	283° 50.5	298° 50.2	313° 50.0	328° 49.7	343° 49.4	358° 49.1	13° 48.8	28° 48.5	43° 48.2	58° 48.0	73° 47.7	-0.3
	-22° 45.4	-22° 45.2	-22° 44.9	-22° 44.7	-22° 44.4	-22° 44.2	-22° 43.9	-22° 43.6	-22° 43.4	-22° 43.1	-22° 42.8	-22° 42.6	+0.3
Mo 5	268° 44.0	283° 43.7	298° 43.4	313° 43.2	328° 42.9	343° 42.6	358° 42.3	13° 42.0	28° 41.8	43° 41.5	58° 41.2	73° 40.9	-0.3
	-22° 39.1	-22° 38.8	-22° 38.5	-22° 38.3	-22° 38.0	-22° 37.7	-22° 37.4	-22° 37.2	-22° 36.9	-22° 36.6	-22° 36.3	-22° 36.0	+0.3
Tu 6	268° 37.3	283° 37.0	298° 36.8	313° 36.5	328° 36.2	343° 35.9	358° 35.7	13° 35.4	28° 35.1	43° 34.8	58° 34.6	73° 34.3	-0.3
	-22° 32.3	-22° 32.0	-22° 31.7	-22° 31.4	-22° 31.1	-22° 30.8	-22° 30.5	-22° 30.2	-22° 29.9	-22° 29.6	-22° 29.3	-22° 29.0	+0.3
We 7	268° 30.7	283° 30.5	298° 30.2	313° 29.9	328° 29.6	343° 29.4	358° 29.1	13° 28.8	28° 28.6	43° 28.3	58° 28.0	73° 27.7	-0.3
	-22° 25.0	-22° 24.7	-22° 24.4	-22° 24.1	-22° 23.8	-22° 23.5	-22° 23.2	-22° 22.9	-22° 22.5	-22° 22.2	-22° 21.9	-22° 21.6	+0.3
Th 8	268° 24.2	283° 24.0	298° 23.7	313° 23.4	328° 23.2	343° 22.9	358° 22.6	13° 22.4	28° 22.1	43° 21.9	58° 21.6	73° 21.3	-0.3
	-22° 17.4	-22° 17.0	-22° 16.7	-22° 16.4	-22° 16.0	-22° 15.7	-22° 15.4	-22° 15.0	-22° 14.7	-22° 14.4	-22° 14.0	-22° 13.7	+0.3
Fr 9	268° 17.9	283° 17.6	298° 17.4	313° 17.1	328° 16.8	343° 16.6	358° 16.3	13° 16.1	28° 15.8	43° 15.5	58° 15.3	73° 15.0	-0.3
	-22° 09.2	-22° 08.9	-22° 08.5	-22° 08.2	-22° 07.8	-22° 07.5	-22° 07.1	-22° 06.8	-22° 06.4	-22° 06.1	-22° 05.7	-22° 05.4	+0.4
Sa 10	268° 11.7	283° 11.4	298° 11.2	313° 10.9	328° 10.6	343° 10.4	358° 10.1	13° 09.9	28° 09.6	43° 09.4	58° 09.1	73° 08.9	-0.3
	-22° 00.7	-22° 00.3	-21° 59.9	-21° 59.6	-21° 59.2	-21° 58.8	-21° 58.5	-21° 58.1	-21° 57.7	-21° 57.4	-21° 57.0	-21° 56.6	+0.4
Su 11	268° 05.6	283° 05.3	298° 05.1	313° 04.8	328° 04.6	343° 04.3	358° 04.1	13° 03.8	28° 03.6	43° 03.3	58° 03.1	73° 02.8	-0.2
	-21° 51.7	-21° 51.3	-21° 50.9	-21° 50.5	-21° 50.1	-21° 49.8	-21° 49.4	-21° 49.0	-21° 48.6	-21° 48.2	-21° 47.8	-21° 47.4	+0.4
Mo 12	267° 59.6	282° 59.4	297° 59.1	312° 58.9	327° 58.7	342° 58.4	357° 58.2	12° 57.9	27° 57.7	42° 57.4	57° 57.2	72° 57.0	-0.2
	-21° 42.3	-21° 41.9	-21° 41.5	-21° 41.1	-21° 40.7	-21° 40.3	-21° 39.9	-21° 39.4	-21° 39.0	-21° 38.6	-21° 38.2	-21° 37.8	+0.4
Tu 13	267° 53.8	282° 53.6	297° 53.4	312° 53.1	327° 52.9	342° 52.6	357° 52.4	12° 52.2	27° 51.9	42° 51.7	57° 51.5	72° 51.2	-0.2
	-21° 32.4	-21° 32.0	-21° 31.6	-21° 31.2	-21° 30.8	-21° 30.3	-21° 29.9	-21° 29.5	-21° 29.1	-21° 28.6	-21° 28.2	-21° 27.8	+0.4
We 14	267° 48.2	282° 48.0	297° 47.7	312° 47.5	327° 47.3	342° 47.0	357° 46.8	12° 46.6	27° 46.3	42° 46.1	57° 45.9	72° 45.7	-0.2
	-21° 22.2	-21° 21.7	-21° 21.3	-21° 20.9	-21° 20.4	-21° 20.0	-21° 19.6	-21° 19.1	-21° 18.7	-21° 18.2	-21° 17.8	-21° 17.3	+0.4
Th 15	267° 42.7	282° 42.5	297° 42.3	312° 42.0	327° 41.8	342° 41.6	357° 41.4	12° 41.1	27° 40.9	42° 40.7	57° 40.5	72° 40.3	-0.2
	-21° 11.5	-21° 11.1	-21° 10.6	-21° 10.2	-21° 09.7	-21° 09.2	-21° 08.8	-21° 08.3	-21° 07.9	-21° 07.4	-21° 07.0	-21° 06.5	+0.5
Fr 16	267° 37.4	282° 37.2	297° 37.0	312° 36.7	327° 36.5	342° 36.3	357° 36.1	12° 35.9	27° 35.7	42° 35.5	57° 35.2	72° 35.0	-0.2
	-21° 00.4	-21° 00.0	-20° 59.5	-20° 59.0	-20° 58.6	-20° 58.1	-20° 57.6	-20° 57.1	-20° 56.7	-20° 56.2	-20° 55.7	-20° 55.2	+0.5
Sa 17	267° 32.3	282° 32.1	297° 31.8	312° 31.6	327° 31.4	342° 31.2	357° 31.0	12° 30.8	27° 30.6	42° 30.4	57° 30.2	72° 30.0	-0.2
	-20° 49.0	-20° 48.5	-20° 48.0	-20° 47.5	-20° 47.0	-20° 46.5	-20° 46.0	-20° 45.6	-20° 45.1	-20° 44.6	-20° 44.1	-20° 43.6	+0.5
Su 18	267° 27.3	282° 27.1	297° 26.9	312° 26.7	327° 26.5	342° 26.3	357° 26.1	12° 25.9	27° 25.7	42° 25.5	57° 25.3	72° 25.1	-0.2
	-20° 37.1	-20° 36.6	-20° 36.1	-20° 35.6	-20° 35.1	-20° 34.6	-20° 34.1	-20° 33.6	-20° 33.1	-20° 32.6	-20° 32.0	-20° 31.5	+0.5
Mo 19	267° 22.5	282° 22.3	297° 22.1	312° 21.9	327° 21.8	342° 21.6	357° 21.4	12° 21.2	27° 21.0	42° 20.8	57° 20.6	72° 20.4	-0.2
	-20° 24.9	-20° 24.3	-20° 23.8	-20° 23.3	-20° 22.8	-20° 22.3	-20° 21.7	-20° 21.2	-20° 20.7	-20° 20.2	-20° 19.6	-20° 19.1	+0.5
Tu 20	267° 17.9	282° 17.8	297° 17.6	312° 17.4	327° 17.2	342° 17.0	357° 16.8	12° 16.6	27° 16.5	42° 16.3	57° 16.1	72° 15.9	-0.2
	-20° 12.2	-20° 11.7	-20° 11.1	-20° 10.6	-20° 10.1	-20° 09.5	-20° 09.0	-20° 08.5	-20° 07.9	-20° 07.4	-20° 06.8	-20° 06.3	+0.5
We 21	267° 13.6	282° 13.4	297° 13.2	312° 13.0	327° 12.8	342° 12.7	357° 12.5	12° 12.3	27° 12.1	42° 12.0	57° 11.8	72° 11.6	-0.2
	-19° 59.2	-19° 58.6	-19° 58.1	-19° 57.5	-19° 57.0	-19° 56.4	-19° 55.9	-19° 55.3	-19° 54.8	-19° 54.2	-19° 53.7	-19° 53.1	+0.6
Th 22	267° 09.3	282° 09.2	297° 09.0	312° 08.8	327° 08.7	342° 08.5	357° 08.3	12° 08.2	27° 08.0	42° 07.8	57° 07.7	72° 07.5	-0.2
	-19° 45.8	-19° 45.2	-19° 44.7	-19° 44.1	-19° 43.5	-19° 43.0	-19° 42.4	-19° 41.8	-19° 41.3	-19° 40.7	-19° 40.1	-19° 39.5	+0.6
Fr 23	267° 05.3	282° 05.2	297° 05.0	312° 04.9	327° 04.7	342° 04.5	357° 04.4	12° 04.2	27° 04.0	42° 03.9	57° 03.7	72° 03.6	-0.2
	-19° 32.0	-19° 31.5	-19° 30.9	-19° 30.3	-19° 29.7	-19° 29.1	-19° 28.5	-19° 28.0	-19° 27.4	-19° 26.8	-19° 26.2	-19° 25.6	+0.6
Sa 24	267° 01.5	282° 01.4	297° 01.2	312° 01.1	327° 00.9	342° 00.8	357° 00.6	12° 00.5	27° 00.3	42° 00.1	57° 00.0	71° 59.8	-0.2
	-19° 17.9	-19° 17.3	-19° 16.7	-19° 16.1	-19° 15.5	-19° 14.9	-19° 14.3	-19° 13.7	-19° 13.1	-19° 12.5	-19° 11.9	-19° 11.3	+0.6
Su 25	266° 57.9	281° 57.8	296° 57.6	311° 57.5	326° 57.3	341° 57.2	356° 57.0	11° 56.9	26° 56.8	41° 56.6	56° 56.5	71° 56.3	-0.1
	-19° 03.4	-19° 02.8	-19° 02.2	-19° 01.6	-19° 01.0	-19° 00.4	-18° 59.8	-18° 59.2	-18° 58.5	-18° 57.9	-18° 57.3	-18° 56.7	+0.6
Mo 26	266° 54.5	281° 54.4	296° 54.2	311° 54.1	326° 54.0	341° 53.8	356° 53.7	11° 53.5	26° 53.4	41° 53.3	56° 53.1	71° 53.0	-0.1
	-18° 48.6	-18° 48.0	-18° 47.4	-18° 46.7	-18° 46.1	-18° 45.5	-18° 44.9	-18° 44.2	-18° 43.6	-18° 43.0	-18° 42.3	-18° 41.7	+0.6
Tu 27	266° 51.3	281° 51.2	296° 51.0	311° 50.9	326° 50.8	341° 50.6	356° 50.5	11° 50.4	26° 50.3	41° 50.1	56° 50.0	71° 49.9	-0.1
	-18° 33.5	-18° 32.8	-18° 32.2	-18° 31.5	-18° 30.9	-18° 30.3	-18° 29.6	-18° 29.0	-18° 28.3	-18° 27.7	-18° 27.0	-18° 26.4	+0.6
We 28	266° 48.3	281° 48.2	296° 48.0	311° 47.9	326° 47.8	341° 47.7	356° 47.6	11° 47.4	26° 47.3	41° 47.2	56° 47.1	71° 47.0	-0.1
	-18° 18.0	-18° 17.3	-18° 16.6	-18° 16.0	-18° 15.3	-18° 14.7	-18° 14.0	-18° 13.4	-18° 12.7	-18° 12.1	-18° 11.4	-18° 10.7	+0.7
Th 29	266° 45.5	281° 45.4	296° 45.2	311° 45.1	326° 45.0	341° 44.9	356° 44.8	11° 44.7	26° 44.6	41° 44.5	56° 44.4	71° 44.2	-0.1
	-18° 02.1	-18° 01.4	-18° 00.8	-18° 00.1	-17° 59.4	-17° 58.8	-17° 58.1	-17° 57.4	-17° 56.8	-17° 56.1	-17° 55.4	-17° 54.7	+0.7
Fr 30	266° 42.9	281° 42.8	296° 42.7	311° 42.6	326° 42.4	341° 42.3	356° 42.2	11° 42.1	26° 42.0	41° 41.9	56° 41.8	71° 41.7	-0.1
	-17° 46.0	-17° 45.3	-17° 44.6	-17° 43.9	-17° 43.2	-17° 42.6	-17° 41.9	-17° 41.2	-17° 40.5	-17° 39.8	-17° 39.1	-17° 38.4	+0.7
Sa 31	266° 40.5	281° 40.4	296° 40.3	311° 40.2	326° 40.1	341° 40.0	356° 39.9	11° 39.8	26° 39.7	41° 39.6	56° 39.5	71° 39.4	-0.1
	-17° 29.5	-17° 28.8	-17° 28.1	-17° 27.4	-17° 26.7	-17° 26.0	-17° 25.3	-17° 24.6	-17° 23.9	-17° 23.2	-17° 22.5	-17° 21.8	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2032

D	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	Δ'/h	SH
Th 1	240°18.5	254°52.7	269°26.8	284°01.0	298°35.2	313°09.4	327°43.7	342°17.9	356°52.2	11°26.5	26°00.8	+34.2	14.7
	8°23.2	8°13.8	8°04.3	7°54.8	7°45.3	7°35.7	7°26.1	7°16.5	7°06.9	6°57.2	6°47.5	-9.6	54.0
Fr 2	244°36.3	259°10.7	273°45.1	288°19.5	302°53.9	317°28.3	332°02.7	346°37.1	1°11.6	15°46.0	30°20.3	+34.4	14.8
	4°18.5	4°08.4	3°58.3	3°48.1	3°38.0	3°27.8	3°17.6	3°07.3	2°57.1	2°46.8	2°36.6	-10.2	54.3
Sa 3	248°55.2	263°29.4	278°03.6	292°37.8	307°11.9	321°46.0	336°20.2	350°54.2	5°28.3	20°02.3	34°36.4	+34.1	14.9
	0°01.0	-0°09.5	-0°19.9	-0°30.4	-0°40.9	-0°51.3	-1°01.8	-1°12.3	-1°22.7	-1°33.2	-1°43.7	-10.5	54.7
Su 4	253°03.0	267°36.5	282°09.9	296°43.3	311°16.7	325°50.0	340°23.3	354°56.5	9°29.7	24°02.9	38°36.0	+33.3	15.1
	-4°20.6	-4°31.0	-4°41.4	-4°51.8	-5°02.1	-5°12.5	-5°22.8	-5°33.2	-5°43.5	-5°53.8	-6°04.1	-10.4	55.3
◑ Mo 5	256°46.2	271°18.4	285°50.6	300°22.7	314°54.7	329°26.7	343°58.6	358°30.5	13°02.2	27°33.9	42°05.6	+31.9	15.3
	-8°36.2	-8°46.1	-8°56.0	-9°05.9	-9°15.8	-9°25.6	-9°35.4	-9°45.2	-9°54.9	-10°04.6	-10°14.2	-9.8	56.1
Tu 6	271°18.4	285°50.6	300°22.7	314°54.7	329°26.7	343°58.6	358°30.5	13°02.2	27°33.9	42°05.6	56°37.2	+31.9	15.3
	-8°46.1	-8°56.0	-9°05.9	-9°15.8	-9°25.6	-9°35.4	-9°45.2	-9°54.9	-10°04.6	-10°14.2	-10°23.9	-9.8	56.1
We 7	274°21.8	288°52.2	303°22.5	317°52.6	332°22.7	346°52.8	1°22.7	15°52.6	30°22.3	44°52.0	59°21.6	+30.0	15.5
	-12°43.1	-12°52.0	-13°00.9	-13°09.7	-13°18.4	-13°27.1	-13°35.8	-13°44.3	-13°52.8	-14°01.3	-14°09.7	-8.7	57.0
Th 8	276°34.9	291°03.1	305°31.1	319°59.1	334°27.0	348°54.8	3°22.4	17°50.0	32°17.6	46°45.0	61°12.3	+27.7	15.8
	-16°07.4	-16°14.6	-16°21.8	-16°28.9	-16°35.9	-16°42.8	-16°49.6	-16°56.4	-17°03.0	-17°09.6	-17°16.1	-6.9	58.0
Fr 9	277°51.1	292°16.9	306°42.7	321°08.4	335°34.0	349°59.5	4°24.9	18°50.3	33°15.5	47°40.7	62°05.8	+25.5	16.1
	-18°41.4	-18°46.2	-18°50.9	-18°55.6	-19°00.1	-19°04.5	-19°08.8	-19°12.9	-19°17.0	-19°20.9	-19°24.7	-4.3	59.0
Sa 10	278°13.0	292°37.0	307°00.8	321°24.6	335°48.3	350°12.0	4°35.6	18°59.2	33°22.7	47°46.2	62°09.6	+23.6	16.4
	-20°06.4	-20°08.2	-20°09.8	-20°11.2	-20°12.5	-20°13.7	-20°14.7	-20°15.6	-20°16.4	-20°17.0	-20°17.4	-1.1	60.0
Su 11	277°55.7	292°18.6	306°41.4	321°04.2	335°26.9	349°49.7	4°12.4	18°35.1	32°57.9	47°20.6	61°43.3	+22.7	16.6
	-20°06.9	-20°05.0	-20°02.9	-20°00.8	-19°58.4	-19°55.9	-19°53.3	-19°50.5	-19°47.6	-19°44.5	-19°41.3	+2.6	60.7
● Mo 12	277°24.3	291°47.1	306°10.0	320°32.9	334°55.8	349°18.8	3°41.7	18°04.8	32°27.8	46°50.9	61°14.0	+23.0	16.7
	-18°35.4	-18°29.8	-18°24.1	-18°18.3	-18°12.3	-18°06.2	-18°00.0	-17°53.6	-17°47.1	-17°40.5	-17°33.7	+6.2	61.2
Tu 13	277°05.9	291°29.7	305°53.6	320°17.6	334°41.6	349°05.7	3°29.8	17°54.0	32°18.3	46°42.6	61°07.0	+24.1	16.7
	-15°37.1	-15°28.4	-15°19.6	-15°10.6	-15°01.6	-14°52.4	-14°43.2	-14°33.8	-14°24.3	-14°14.8	-14°05.1	+9.2	61.3
We 14	277°20.3	291°45.7	306°11.2	320°36.7	335°02.3	349°28.0	3°53.8	18°19.6	32°45.5	47°11.4	61°37.4	+25.7	16.7
	-11°29.4	-11°18.4	-11°07.3	-10°56.1	-10°44.9	-10°33.6	-10°22.3	-10°10.8	-9°59.4	-9°47.8	-9°36.2	+11.3	61.1
Th 15	278°15.5	292°42.5	307°09.6	321°36.8	336°04.0	350°31.3	4°58.7	19°26.1	33°53.5	48°21.1	62°48.6	+27.3	16.5
	-6°36.7	-6°24.4	-6°12.1	-5°59.8	-5°47.4	-5°35.0	-5°22.6	-5°10.2	-4°57.8	-4°45.3	-4°32.8	+12.4	60.5
Fr 16	279°48.8	294°17.2	308°45.7	323°14.2	337°42.7	352°11.3	6°40.0	21°08.6	35°37.4	50°06.1	64°34.9	+28.6	16.3
	-1°24.8	-1°12.3	-0°59.8	-0°47.3	-0°34.8	-0°22.3	-0°09.8	0°02.7	0°15.1	0°27.5	0°40.0	+12.5	59.7
Sa 17	281°51.4	296°20.7	310°50.1	325°19.5	339°48.9	354°18.4	8°47.9	23°17.4	37°47.0	52°16.5	66°46.1	+29.5	16.0
	3°43.0	3°55.0	4°06.9	4°18.8	4°30.6	4°42.4	4°54.2	5°05.9	5°17.5	5°29.2	5°40.7	+11.8	58.8
Su 18	284°12.2	298°42.1	313°12.0	327°41.9	342°11.8	356°41.7	11°11.6	25°41.6	40°11.5	54°41.5	69°11.4	+29.9	15.8
	8°28.3	8°39.0	8°49.6	9°00.2	9°10.8	9°21.3	9°31.7	9°42.0	9°52.3	10°02.5	10°12.7	+10.4	57.9
◐ Mo 19	286°41.6	301°11.6	315°41.7	330°11.7	344°41.7	359°11.8	13°41.8	28°11.8	42°41.9	57°11.9	71°42.0	+30.0	15.5
	12°36.6	12°45.6	12°54.5	13°03.4	13°12.2	13°20.9	13°29.5	13°38.0	13°46.5	13°54.8	14°03.1	+8.7	57.0
Tu 20	289°12.3	303°42.3	318°12.3	332°42.3	347°12.3	1°42.3	16°12.2	30°42.2	45°12.2	59°42.2	74°12.1	+30.0	15.3
	15°57.5	16°04.4	16°11.3	16°18.0	16°24.7	16°31.3	16°37.8	16°44.2	16°50.5	16°56.7	17°02.8	+6.5	56.2
We 21	291°41.3	306°11.3	320°41.2	335°11.1	349°41.0	4°11.0	18°40.9	33°10.8	47°40.7	62°10.7	76°40.6	+29.9	15.1
	18°23.4	18°28.1	18°32.6	18°37.0	18°41.3	18°45.6	18°49.7	18°53.7	18°57.7	19°01.5	19°05.2	+4.2	55.5
Th 22	294°09.8	308°39.8	323°09.8	337°39.8	352°09.8	6°39.8	21°09.8	35°39.9	50°09.9	64°40.0	79°10.0	+30.0	15.0
	19°49.6	19°51.8	19°53.8	19°55.8	19°57.7	19°59.4	20°01.1	20°02.7	20°04.2	20°05.5	20°06.8	+1.7	54.9
Fr 23	296°42.5	311°12.8	325°43.1	340°13.4	354°43.7	9°14.1	23°44.4	38°14.8	52°45.2	67°15.7	81°46.1	+30.4	14.9
	20°14.1	20°13.8	20°13.4	20°12.9	20°12.3	20°11.6	20°10.8	20°10.0	20°09.0	20°07.9	20°06.8	-0.7	54.5
Sa 24	299°25.8	313°56.6	328°27.5	342°58.4	357°29.4	12°00.3	26°31.3	41°02.3	55°33.4	70°04.5	84°35.6	+31.0	14.8
	19°38.0	19°35.3	19°32.6	19°29.7	19°26.8	19°23.8	19°20.7	19°17.5	19°14.2	19°10.9	19°07.4	-3.1	54.2
Su 25	302°26.0	316°57.6	331°29.3	346°01.0	0°32.7	15°04.5	29°36.3	44°08.1	58°40.0	73°11.9	87°43.8	+31.8	14.7
	18°05.3	18°00.5	17°55.6	17°50.7	17°45.6	17°40.5	17°35.3	17°30.1	17°24.7	17°19.3	17°13.8	-5.2	54.0
Mo 26	305°47.1	320°19.6	334°52.1	349°24.7	3°57.3	18°29.9	33°02.6	47°35.3	62°08.1	76°40.8	91°13.6	+32.7	14.7
	15°42.6	15°35.9	15°29.2	15°22.4	15°15.6	15°08.7	15°01.7	14°54.7	14°47.6	14°40.5	14°33.2	-6.9	53.9
○ Tu 27	309°29.7	324°03.0	338°36.4	353°09.8	7°43.2	22°16.6	36°50.1	51°23.6	65°57.1	80°30.7	95°04.2	+33.5	14.7
	12°37.9	12°29.8	12°21.6	12°13.4	12°05.1	11°56.8	11°48.4	11°40.0	11°31.5	11°22.9	11°14.4	-8.4	53.9
We 28	313°31.0	328°04.9	342°38.9	357°12.9	11°46.9	26°21.0	40°55.0	55°29.1	70°03.2	84°37.3	99°11.4	+34.1	14.7
	9°00.5	8°51.3	8°42.0	8°32.7	8°23.4	8°14.0	8°04.6	7°55.1	7°45.6	7°36.1	7°26.5	-9.4	54.0
Th 29	317°44.9	332°19.3	346°53.6	1°27.9	16°02.2	30°36.6	45°10.9	59°45.2	74°19.6	88°53.9	103°28.3	+34.3	14.8
	4°59.9	4°49.9	4°39.9	4°29.9	4°19.9	4°09.8	3°59.7	3°49.6	3°39.5	3°29.4	3°19.2	-10.1	54.2
Fr 30	332°19.3	346°53.6	1°27.9	16°02.2	30°36.6	45°10.9	59°45.2	74°19.6	88°53.9	103°28.3	118°02.7	+34.3	14.8
	4°49.9	4°39.9	4°29.9	4°19.9	4°09.8	3°59.7	3°49.6	3°39.5	3°29.4	3°19.2	3°09.1	-10.1	54.2
Sa 31	336°37.6	351°11.9	5°46.2	20°20.4	34°54.7	49°28.9	64°03.1	78°37.3	93°11.5	107°45.7	122°19.9	+34.2	14.9
	0°35.1	0°24.8	0°14.5	0°04.1	-0°06.2	-0°16.6	-0°26.9	-0°37.3	-0°47.7	-0°58.0	-1°08.4	-10.4	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 22h04 — NM: 12 20h06 — FQ: 19 12h14 — FM: 27 12h52

SUN

February 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	266°38.3	281°38.2	296°38.1	311°38.0	326°37.9	341°37.8	356°37.7	11°37.6	26°37.6	41°37.5	56°37.4	71°37.3	-0.1
	-17°12.7	-17°12.0	-17°11.3	-17°10.6	-17°09.9	-17°09.2	-17°08.4	-17°07.7	-17°07.0	-17°06.3	-17°05.6	-17°04.9	+0.7
Mo 2	266°36.2	281°36.2	296°36.1	311°36.0	326°35.9	341°35.9	356°35.8	11°35.7	26°35.6	41°35.5	56°35.5	71°35.4	-0.1
	-16°55.6	-16°54.9	-16°54.2	-16°53.4	-16°52.7	-16°52.0	-16°51.3	-16°50.6	-16°49.8	-16°49.1	-16°48.4	-16°47.7	+0.7
Tu 3	266°34.4	281°34.4	296°34.3	311°34.2	326°34.2	341°34.1	356°34.0	11°34.0	26°33.9	41°33.8	56°33.8	71°33.7	-0.1
	-16°38.2	-16°37.5	-16°36.7	-16°36.0	-16°35.3	-16°34.5	-16°33.8	-16°33.1	-16°32.3	-16°31.6	-16°30.9	-16°30.1	+0.7
We 4	266°32.8	281°32.8	296°32.7	311°32.7	326°32.6	341°32.5	356°32.5	11°32.4	26°32.3	41°32.3	56°32.2	71°32.2	-0.1
	-16°20.5	-16°19.8	-16°19.0	-16°18.3	-16°17.5	-16°16.8	-16°16.1	-16°15.3	-16°14.6	-16°13.8	-16°13.1	-16°12.3	+0.7
Th 5	266°31.4	281°31.4	296°31.3	311°31.3	326°31.2	341°31.2	356°31.1	11°31.1	26°31.0	41°31.0	56°30.9	71°30.9	-0.1
	-16°02.6	-16°01.8	-16°01.0	-16°00.3	-15°59.5	-15°58.8	-15°58.0	-15°57.3	-15°56.5	-15°55.7	-15°55.0	-15°54.2	+0.8
Fr 6	266°30.2	281°30.2	296°30.1	311°30.1	326°30.0	341°30.0	356°29.9	11°29.9	26°29.9	41°29.8	56°29.8	71°29.7	-0.0
	-15°44.3	-15°43.5	-15°42.8	-15°42.0	-15°41.2	-15°40.5	-15°39.7	-15°38.9	-15°38.2	-15°37.4	-15°36.6	-15°35.9	+0.8
Sa 7	266°29.2	281°29.2	296°29.1	311°29.1	326°29.1	341°29.0	356°29.0	11°28.9	26°28.9	41°28.9	56°28.8	71°28.8	-0.0
	-15°25.8	-15°25.0	-15°24.2	-15°23.5	-15°22.7	-15°21.9	-15°21.1	-15°20.3	-15°19.6	-15°18.8	-15°18.0	-15°17.2	+0.8
Su 8	266°28.4	281°28.4	296°28.3	311°28.3	326°28.3	341°28.2	356°28.2	11°28.2	26°28.2	41°28.1	56°28.1	71°28.1	-0.0
	-15°07.0	-15°06.2	-15°05.4	-15°04.6	-15°03.9	-15°03.1	-15°02.3	-15°01.5	-15°00.7	-14°59.9	-14°59.1	-14°58.3	+0.8
Mo 9	266°27.8	281°27.7	296°27.7	311°27.7	326°27.7	341°27.7	356°27.6	11°27.6	26°27.6	41°27.6	56°27.6	71°27.5	-0.0
	-14°48.0	-14°47.2	-14°46.4	-14°45.6	-14°44.8	-14°44.0	-14°43.2	-14°42.4	-14°41.6	-14°40.8	-14°40.0	-14°39.2	+0.8
Tu 10	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.2	26°27.2	41°27.2	56°27.2	71°27.2	-0.0
	-14°28.7	-14°27.9	-14°27.1	-14°26.3	-14°25.4	-14°24.6	-14°23.8	-14°23.0	-14°22.2	-14°21.4	-14°20.6	-14°19.8	+0.8
We 11	266°27.1	281°27.1	296°27.1	311°27.1	326°27.1	341°27.1	356°27.1	11°27.1	26°27.1	41°27.1	56°27.1	71°27.1	-0.0
	-14°09.2	-14°08.3	-14°07.5	-14°06.7	-14°05.9	-14°05.1	-14°04.2	-14°03.4	-14°02.6	-14°01.8	-14°00.9	-14°00.1	+0.8
Th 12	266°27.0	281°27.1	296°27.1	311°27.1	326°27.1	341°27.1	356°27.1	11°27.1	26°27.1	41°27.1	56°27.1	71°27.1	+0.0
	-13°49.4	-13°48.6	-13°47.7	-13°46.9	-13°46.1	-13°45.2	-13°44.4	-13°43.6	-13°42.8	-13°41.9	-13°41.1	-13°40.3	+0.8
Fr 13	266°27.2	281°27.2	296°27.2	311°27.2	326°27.2	341°27.2	356°27.3	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	+0.0
	-13°29.4	-13°28.6	-13°27.7	-13°26.9	-13°26.0	-13°25.2	-13°24.4	-13°23.5	-13°22.7	-13°21.8	-13°21.0	-13°20.2	+0.8
Sa 14	266°27.5	281°27.5	296°27.6	311°27.6	326°27.6	341°27.6	356°27.6	11°27.7	26°27.7	41°27.7	56°27.7	71°27.7	+0.0
	-13°09.2	-13°08.3	-13°07.5	-13°06.6	-13°05.8	-13°05.0	-13°04.1	-13°03.3	-13°02.4	-13°01.6	-13°00.7	-12°59.9	+0.8
Su 15	266°28.1	281°28.1	296°28.1	311°28.1	326°28.2	341°28.2	356°28.2	11°28.2	26°28.3	41°28.3	56°28.3	71°28.4	+0.0
	-12°48.8	-12°47.9	-12°47.1	-12°46.2	-12°45.3	-12°44.5	-12°43.6	-12°42.8	-12°41.9	-12°41.1	-12°40.2	-12°39.3	+0.9
Mo 16	266°28.8	281°28.8	296°28.8	311°28.9	326°28.9	341°28.9	356°29.0	11°29.0	26°29.0	41°29.1	56°29.1	71°29.2	+0.0
	-12°28.1	-12°27.3	-12°26.4	-12°25.5	-12°24.7	-12°23.8	-12°22.9	-12°22.1	-12°21.2	-12°20.3	-12°19.5	-12°18.6	+0.9
Tu 17	266°29.7	281°29.7	296°29.7	311°29.8	326°29.8	341°29.9	356°29.9	11°30.0	26°30.0	41°30.0	56°30.1	71°30.1	+0.0
	-12°07.3	-12°06.4	-12°05.6	-12°04.7	-12°03.8	-12°02.9	-12°02.1	-12°01.2	-12°00.3	-11°59.4	-11°58.6	-11°57.7	+0.9
We 18	266°30.7	281°30.8	296°30.8	311°30.9	326°30.9	341°31.0	356°31.0	11°31.1	26°31.1	41°31.2	56°31.2	71°31.3	+0.1
	-11°46.3	-11°45.4	-11°44.5	-11°43.6	-11°42.8	-11°41.9	-11°41.0	-11°40.1	-11°39.2	-11°38.4	-11°37.5	-11°36.6	+0.9
Th 19	266°32.0	281°32.0	296°32.1	311°32.2	326°32.2	341°32.3	356°32.3	11°32.4	26°32.4	41°32.5	56°32.6	71°32.6	+0.1
	-11°25.1	-11°24.2	-11°23.3	-11°22.4	-11°21.5	-11°20.6	-11°19.8	-11°18.9	-11°18.0	-11°17.1	-11°16.2	-11°15.3	+0.9
Fr 20	266°33.4	281°33.5	296°33.5	311°33.6	326°33.7	341°33.7	356°33.8	11°33.9	26°33.9	41°34.0	56°34.1	71°34.1	+0.1
	-11°03.7	-11°02.8	-11°01.9	-11°01.0	-11°00.1	-10°59.2	-10°58.3	-10°57.4	-10°56.5	-10°55.6	-10°54.7	-10°53.8	+0.9
Sa 21	266°35.0	281°35.1	296°35.1	311°35.2	326°35.3	341°35.4	356°35.4	11°35.5	26°35.6	41°35.6	56°35.7	71°35.8	+0.1
	-10°42.1	-10°41.2	-10°40.3	-10°39.4	-10°38.5	-10°37.6	-10°36.7	-10°35.8	-10°34.9	-10°34.0	-10°33.1	-10°32.2	+0.9
Su 22	266°36.8	281°36.8	296°36.9	311°37.0	326°37.1	341°37.2	356°37.2	11°37.3	26°37.4	41°37.5	56°37.5	71°37.6	+0.1
	-10°20.4	-10°19.5	-10°18.6	-10°17.7	-10°16.8	-10°15.9	-10°15.0	-10°14.1	-10°13.1	-10°12.2	-10°11.3	-10°10.4	+0.9
Mo 23	266°38.7	281°38.8	296°38.9	311°38.9	326°38.9	341°39.0	356°39.2	11°39.3	26°39.4	41°39.5	56°39.5	71°39.6	+0.1
	-9°58.5	-9°57.6	-9°56.7	-9°55.8	-9°54.9	-9°54.0	-9°53.1	-9°52.1	-9°51.2	-9°50.3	-9°49.4	-9°48.5	+0.9
Tu 24	266°40.8	281°40.9	296°40.9	311°41.0	326°41.1	341°41.2	356°41.3	11°41.4	26°41.5	41°41.6	56°41.7	71°41.8	+0.1
	-9°36.5	-9°35.6	-9°34.7	-9°33.8	-9°32.8	-9°31.9	-9°31.0	-9°30.1	-9°29.1	-9°28.2	-9°27.3	-9°26.4	+0.9
We 25	266°43.0	281°43.1	296°43.2	311°43.3	326°43.4	341°43.5	356°43.6	11°43.7	26°43.8	41°43.9	56°44.0	71°44.1	+0.1
	-9°14.3	-9°13.4	-9°12.5	-9°11.6	-9°10.6	-9°09.7	-9°08.8	-9°07.8	-9°06.9	-9°06.0	-9°05.1	-9°04.1	+0.9
Th 26	266°45.4	281°45.5	296°45.6	311°45.7	326°45.8	341°45.9	356°46.0	11°46.1	26°46.2	41°46.3	56°46.4	71°46.5	+0.1
	-8°52.0	-8°51.1	-8°50.2	-8°49.2	-8°48.3	-8°47.4	-8°46.4	-8°45.5	-8°44.6	-8°43.6	-8°42.7	-8°41.8	+0.9
Fr 27	266°47.9	281°48.0	296°48.1	311°48.2	326°48.3	341°48.4	356°48.5	11°48.7	26°48.8	41°48.9	56°49.0	71°49.1	+0.1
	-8°29.6	-8°28.6	-8°27.7	-8°26.8	-8°25.8	-8°24.9	-8°24.0	-8°23.0	-8°22.1	-8°21.1	-8°20.2	-8°19.3	+0.9
Sa 28	266°50.5	281°50.7	296°50.8	311°50.9	326°51.0	341°51.1	356°51.2	11°51.3	26°51.5	41°51.6	56°51.7	71°51.8	+0.1
	-8°07.0	-8°06.1	-8°05.1	-8°04.2	-8°03.2	-8°02.3	-8°01.4	-8°00.4	-7°59.5	-7°58.5	-7°57.6	-7°56.6	+0.9
Su 29	266°53.3	281°53.5	296°53.6	311°53.7	326°53.8	341°53.9	356°54.1	11°54.2	26°54.3	41°54.4	56°54.5	71°54.7	+0.1
	-7°44.3	-7°43.4	-7°42.4	-7°41.5	-7°40.5	-7°39.6	-7°38.6	-7°37.7	-7°36.7	-7°35.8	-7°34.8	-7°33.9	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2032

D	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	Δ'/h	SH
Su 1	242°53.4	257°26.5	271°59.7	286°32.8	301°05.8	315°38.8	330°11.8	344°44.7	359°17.5	13°50.3	28°23.1	+33.0	15.1
	-6°46.4	-6°56.4	-7°06.3	-7°16.3	-7°26.2	-7°36.1	-7°46.0	-7°55.8	-8°05.6	-8°15.4	-8°25.2	-9.9	55.3
Mo 2	246°28.4	261°00.3	275°32.1	290°03.9	304°35.6	319°07.2	333°38.8	348°10.3	2°41.8	17°13.2	31°44.5	+31.6	15.2
	-10°47.5	-10°56.7	-11°05.9	-11°15.0	-11°24.0	-11°33.1	-11°42.0	-11°51.0	-11°59.8	-12°08.7	-12°17.4	-9.0	55.9
Tu 3	249°26.2	263°56.4	278°26.6	292°56.6	307°26.6	321°56.5	336°26.3	350°56.1	5°25.7	19°55.3	34°24.8	+29.9	15.5
	-14°22.6	-14°30.5	-14°38.3	-14°46.0	-14°53.7	-15°01.3	-15°08.8	-15°16.3	-15°23.7	-15°31.0	-15°38.3	-7.6	56.7
◑ We 4	251°38.0	266°06.2	280°34.4	295°02.5	309°30.5	323°58.4	338°26.2	352°53.9	7°21.6	21°49.2	36°16.7	+27.9	15.7
	-17°17.7	-17°23.6	-17°29.5	-17°35.3	-17°41.0	-17°46.5	-17°52.0	-17°57.4	-18°02.7	-18°08.0	-18°13.1	-5.5	57.6
Th 5	266°06.2	280°34.4	295°02.5	309°30.5	323°58.4	338°26.2	352°53.9	7°21.6	21°49.2	36°16.7	50°44.1	+27.8	15.7
	-17°23.6	-17°29.5	-17°35.3	-17°41.0	-17°46.5	-17°52.0	-17°57.4	-18°02.7	-18°08.0	-18°13.1	-18°18.1	-5.4	57.6
Fr 6	267°26.0	281°52.2	296°18.3	310°44.3	325°10.3	339°36.2	354°02.0	8°27.7	22°53.4	37°19.0	51°44.5	+25.9	16.0
	-19°20.7	-19°24.0	-19°27.1	-19°30.2	-19°33.1	-19°36.0	-19°38.7	-19°41.2	-19°43.7	-19°46.1	-19°48.3	-2.8	58.6
Sa 7	268°00.1	282°24.7	296°49.2	311°13.7	325°38.1	340°02.5	354°26.9	8°51.1	23°15.4	37°39.6	52°03.8	+24.4	16.2
	-20°06.3	-20°06.4	-20°06.5	-20°06.3	-20°06.1	-20°05.7	-20°05.2	-20°04.5	-20°03.7	-20°02.8	-20°01.7	+0.5	59.5
Su 8	268°02.4	282°26.1	296°49.8	311°13.5	325°37.1	340°00.8	354°24.4	8°48.0	23°11.7	37°35.3	51°58.9	+23.6	16.5
	-19°28.8	-19°25.5	-19°22.0	-19°18.4	-19°14.7	-19°10.8	-19°06.8	-19°02.6	-18°58.3	-18°53.9	-18°49.3	+3.9	60.4
Mo 9	267°53.4	282°17.1	296°40.8	311°04.5	325°28.3	339°52.1	354°15.9	8°39.7	23°03.6	37°27.5	51°51.4	+23.8	16.6
	-17°24.4	-17°17.6	-17°10.8	-17°03.8	-16°56.7	-16°49.4	-16°42.1	-16°34.6	-16°27.0	-16°19.2	-16°11.4	+7.3	61.0
Tu 10	267°53.8	282°18.3	296°42.7	311°07.3	325°31.9	339°56.5	354°21.1	8°45.8	23°10.6	37°35.4	52°00.2	+24.6	16.7
	-13°59.8	-13°50.1	-13°40.4	-13°30.6	-13°20.6	-13°10.6	-13°00.5	-12°50.3	-12°40.0	-12°29.6	-12°19.1	+10.1	61.3
● We 11	268°18.3	282°43.9	297°09.6	311°35.2	326°01.0	340°26.8	354°52.6	9°18.5	23°44.4	38°10.4	52°36.4	+25.8	16.7
	-9°32.3	-9°20.6	-9°08.9	-8°57.1	-8°45.2	-8°33.3	-8°21.4	-8°09.4	-7°57.3	-7°45.2	-7°33.0	+11.9	61.3
Th 12	269°12.5	283°39.2	298°06.1	312°32.9	326°59.8	341°26.8	355°53.8	10°20.8	24°47.9	39°15.0	53°42.1	+27.0	16.6
	-4°26.1	-4°13.5	-4°00.8	-3°48.1	-3°35.3	-3°22.6	-3°09.8	-2°57.1	-2°44.3	-2°31.5	-2°18.8	+12.7	60.9
Fr 13	270°34.1	285°01.9	299°29.7	313°57.5	328°25.3	342°53.2	357°21.1	11°49.1	26°17.1	40°45.1	55°13.1	+27.9	16.4
	0°52.4	1°05.1	1°17.7	1°30.3	1°42.9	1°55.4	2°08.0	2°20.5	2°32.9	2°45.4	2°57.8	+12.5	60.2
Sa 14	272°16.8	286°45.3	301°13.7	315°42.2	330°10.7	344°39.2	359°07.8	13°36.3	28°04.9	42°33.5	57°02.1	+28.5	16.2
	5°59.2	6°10.9	6°22.6	6°34.2	6°45.8	6°57.3	7°08.8	7°20.2	7°31.5	7°42.8	7°54.0	+11.5	59.3
Su 15	274°13.2	288°42.1	303°10.9	317°39.8	332°08.7	346°37.6	1°06.5	15°35.4	30°04.3	44°33.3	59°02.2	+28.9	15.9
	10°34.4	10°44.5	10°54.6	11°04.5	11°14.4	11°24.3	11°34.0	11°43.7	11°53.3	12°02.8	12°12.2	+9.8	58.3
Mo 16	276°17.5	290°46.6	305°15.7	319°44.8	334°13.9	348°43.0	3°12.1	17°41.3	32°10.4	46°39.5	61°08.7	+29.1	15.6
	14°23.4	14°31.5	14°39.4	14°47.3	14°55.1	15°02.8	15°10.4	15°17.9	15°25.3	15°32.6	15°39.8	+7.6	57.3
Tu 17	278°26.8	292°56.1	307°25.4	321°54.7	336°24.0	350°53.3	5°22.6	19°51.9	34°21.3	48°50.6	63°20.0	+29.3	15.4
	17°16.7	17°22.4	17°28.0	17°33.4	17°38.8	17°44.1	17°49.3	17°54.4	17°59.4	18°04.3	18°09.0	+5.2	56.4
◐ We 18	280°41.7	295°11.2	309°40.8	324°10.4	338°39.9	353°09.6	7°39.2	22°08.8	36°38.5	51°08.1	65°37.8	+29.6	15.2
	19°08.8	19°12.0	19°15.0	19°18.0	19°20.9	19°23.6	19°26.3	19°28.9	19°31.3	19°33.7	19°36.0	+2.7	55.6
Th 19	283°05.3	297°35.3	312°05.3	326°35.4	341°05.4	355°35.5	10°05.6	24°35.7	39°05.9	53°36.1	68°06.3	+30.1	15.0
	19°57.9	19°58.6	19°59.1	19°59.6	20°00.0	20°00.3	20°00.4	20°00.5	20°00.5	20°00.4	20°00.1	+0.2	54.9
Fr 20	285°42.4	300°13.1	314°43.7	329°14.4	343°45.1	358°15.9	12°46.7	27°17.5	41°48.3	56°19.2	70°50.1	+30.8	14.8
	19°45.4	19°43.7	19°41.9	19°39.9	19°37.9	19°35.8	19°33.6	19°31.4	19°29.0	19°26.5	19°24.0	-2.1	54.4
Sa 21	288°37.5	303°08.9	317°40.3	332°11.8	346°43.3	1°14.9	15°46.5	30°18.1	44°49.8	59°21.5	73°53.2	+31.6	14.8
	18°35.2	18°31.2	18°27.2	18°23.1	18°18.9	18°14.7	18°10.3	18°05.9	18°01.4	17°56.8	17°52.1	-4.3	54.1
Su 22	291°53.1	306°25.4	320°57.6	335°30.0	350°02.3	4°34.7	19°07.2	33°39.6	48°12.1	62°44.7	77°17.2	+32.4	14.7
	16°33.0	16°27.1	16°21.1	16°15.1	16°09.0	16°02.9	15°56.7	15°50.4	15°44.0	15°37.6	15°31.1	-6.2	53.9
Mo 23	295°29.4	310°02.4	324°35.5	339°08.6	353°41.8	8°14.9	22°48.1	37°21.3	51°54.6	66°27.9	81°01.2	+33.2	14.7
	13°46.1	13°38.6	13°31.0	13°23.4	13°15.8	13°08.1	13°00.3	12°52.5	12°44.6	12°36.6	12°28.6	-7.7	53.9
Tu 24	299°23.6	313°57.3	328°31.0	343°04.7	357°38.5	12°12.2	26°46.0	41°19.8	55°53.6	70°27.5	85°01.3	+33.8	14.7
	10°22.8	10°14.0	10°05.2	9°56.3	9°47.4	9°38.5	9°29.5	9°20.5	9°11.5	9°02.4	8°53.2	-9.0	54.0
We 25	303°30.7	318°04.8	332°38.9	347°12.9	1°47.0	16°21.1	30°55.2	45°29.3	60°03.4	74°37.5	89°11.6	+34.1	14.8
	6°31.9	6°22.2	6°12.5	6°02.8	5°53.0	5°43.3	5°33.4	5°23.6	5°13.7	5°03.9	4°54.0	-9.8	54.2
○ Th 26	307°43.6	322°17.7	336°51.8	351°25.9	6°00.0	20°34.1	35°08.2	49°42.3	64°16.4	78°50.4	93°24.5	+34.1	14.8
	2°22.9	2°12.7	2°02.5	1°52.3	1°42.0	1°31.8	1°21.5	1°11.3	1°01.0	0°50.7	0°40.4	-10.3	54.4
Fr 27	311°53.7	326°27.5	341°01.3	355°35.1	10°08.9	24°42.6	39°16.3	53°50.0	68°23.7	82°57.3	97°30.9	+33.7	14.9
	-1°54.4	-2°04.7	-2°15.0	-2°25.3	-2°35.6	-2°45.9	-2°56.2	-3°06.5	-3°16.7	-3°27.0	-3°37.3	-10.3	54.7
Sa 28	315°51.8	330°24.9	344°58.0	359°31.1	14°04.1	28°37.1	43°10.0	57°43.0	72°15.8	86°48.7	101°21.5	+33.0	15.0
	-6°09.4	-6°19.4	-6°29.4	-6°39.3	-6°49.3	-6°59.2	-7°09.0	-7°18.9	-7°28.7	-7°38.5	-7°48.3	-9.9	55.2
Su 29	330°24.9	344°58.0	359°31.1	14°04.1	28°37.1	43°10.0	57°43.0	72°15.8	86°48.7	101°21.5	115°54.2	+32.9	15.0
	-6°19.4	-6°29.4	-6°39.3	-6°49.3	-6°59.2	-7°09.0	-7°18.9	-7°28.7	-7°38.5	-7°48.3	-7°58.0	-9.9	55.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 4 13h48 — NM: 11 06h24 — FQ: 18 03h29 — FM: 26 07h43

SUN

March 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	266°56.3	281°56.4	296°56.5	311°56.6	326°56.7	341°56.9	356°57.0	11°57.1	26°57.2	41°57.4	56°57.5	71°57.6	+0.1
	-7°21.5	-7°20.6	-7°19.6	-7°18.7	-7°17.7	-7°16.8	-7°15.8	-7°14.8	-7°13.9	-7°12.9	-7°12.0	-7°11.0	+1.0
Tu 2	266°59.3	281°59.4	296°59.5	311°59.7	326°59.8	341°59.9	357°00.1	12°00.2	27°00.3	42°00.5	57°00.6	72°00.7	+0.1
	-6°58.6	-6°57.7	-6°56.7	-6°55.7	-6°54.8	-6°53.8	-6°52.9	-6°51.9	-6°50.9	-6°50.0	-6°49.0	-6°48.1	+1.0
We 3	267°02.4	282°02.6	297°02.7	312°02.8	327°03.0	342°03.1	357°03.2	12°03.4	27°03.5	42°03.6	57°03.8	72°03.9	+0.1
	-6°35.6	-6°34.6	-6°33.7	-6°32.7	-6°31.8	-6°30.8	-6°29.8	-6°28.9	-6°27.9	-6°26.9	-6°26.0	-6°25.0	+1.0
Th 4	267°05.7	282°05.8	297°06.0	312°06.1	327°06.3	342°06.4	357°06.5	12°06.7	27°06.8	42°06.9	57°07.1	72°07.2	+0.1
	-6°12.5	-6°11.5	-6°10.6	-6°09.6	-6°08.6	-6°07.7	-6°06.7	-6°05.7	-6°04.8	-6°03.8	-6°02.8	-6°01.9	+1.0
Fr 5	267°09.1	282°09.2	297°09.4	312°09.5	327°09.6	342°09.8	357°09.9	12°10.1	27°10.2	42°10.4	57°10.5	72°10.6	+0.1
	-5°49.3	-5°48.3	-5°47.4	-5°46.4	-5°45.4	-5°44.5	-5°43.5	-5°42.5	-5°41.6	-5°40.6	-5°39.6	-5°38.6	+1.0
Sa 6	267°12.5	282°12.7	297°12.8	312°13.0	327°13.1	342°13.3	357°13.4	12°13.6	27°13.7	42°13.9	57°14.0	72°14.2	+0.1
	-5°26.0	-5°25.1	-5°24.1	-5°23.1	-5°22.1	-5°21.2	-5°20.2	-5°19.2	-5°18.3	-5°17.3	-5°16.3	-5°15.3	+1.0
Su 7	267°16.1	282°16.2	297°16.4	312°16.5	327°16.7	342°16.8	357°17.0	12°17.2	27°17.3	42°17.5	57°17.6	72°17.8	+0.2
	-5°02.7	-5°01.7	-5°00.7	-4°59.8	-4°58.8	-4°57.8	-4°56.8	-4°55.9	-4°54.9	-4°53.9	-4°52.9	-4°52.0	+1.0
Mo 8	267°19.7	282°19.9	297°20.1	312°20.2	327°20.4	342°20.5	357°20.7	12°20.8	27°21.0	42°21.1	57°21.3	72°21.5	+0.2
	-4°39.3	-4°38.3	-4°37.3	-4°36.3	-4°35.4	-4°34.4	-4°33.4	-4°32.4	-4°31.4	-4°30.5	-4°29.5	-4°28.5	+1.0
Tu 9	267°23.5	282°23.6	297°23.8	312°24.0	327°24.1	342°24.3	357°24.4	12°24.6	27°24.8	42°24.9	57°25.1	72°25.2	+0.2
	-4°15.8	-4°14.8	-4°13.8	-4°12.8	-4°11.9	-4°10.9	-4°09.9	-4°08.9	-4°07.9	-4°07.0	-4°06.0	-4°05.0	+1.0
We 10	267°27.3	282°27.5	297°27.6	312°27.8	327°28.0	342°28.1	357°28.3	12°28.4	27°28.6	42°28.8	57°28.9	72°29.1	+0.2
	-3°52.3	-3°51.3	-3°50.3	-3°49.3	-3°48.3	-3°47.3	-3°46.4	-3°45.4	-3°44.4	-3°43.4	-3°42.4	-3°41.5	+1.0
Th 11	267°31.2	282°31.4	297°31.5	312°31.7	327°31.9	342°32.0	357°32.2	12°32.4	27°32.5	42°32.7	57°32.9	72°33.0	+0.2
	-3°28.7	-3°27.7	-3°26.7	-3°25.7	-3°24.7	-3°23.8	-3°22.8	-3°21.8	-3°20.8	-3°19.8	-3°18.8	-3°17.9	+1.0
Fr 12	267°35.2	282°35.4	297°35.5	312°35.7	327°35.9	342°36.0	357°36.2	12°36.4	27°36.5	42°36.7	57°36.9	72°37.0	+0.2
	-3°05.1	-3°04.1	-3°03.1	-3°02.1	-3°01.1	-3°00.1	-2°59.2	-2°58.2	-2°57.2	-2°56.2	-2°55.2	-2°54.2	+1.0
Sa 13	267°39.2	282°39.4	297°39.6	312°39.8	327°39.9	342°40.1	357°40.3	12°40.4	27°40.6	42°40.8	57°40.9	72°41.1	+0.2
	-2°41.4	-2°40.4	-2°39.4	-2°38.5	-2°37.5	-2°36.5	-2°35.5	-2°34.5	-2°33.5	-2°32.5	-2°31.5	-2°30.6	+1.0
Su 14	267°43.4	282°43.5	297°43.7	312°43.9	327°44.0	342°44.2	357°44.4	12°44.6	27°44.7	42°44.9	57°45.1	72°45.3	+0.2
	-2°17.7	-2°16.7	-2°15.8	-2°14.8	-2°13.8	-2°12.8	-2°11.8	-2°10.8	-2°09.8	-2°08.8	-2°07.9	-2°06.9	+1.0
Mo 15	267°47.5	282°47.7	297°47.9	312°48.1	327°48.2	342°48.4	357°48.6	12°48.8	27°48.9	42°49.1	57°49.3	72°49.5	+0.2
	-1°54.0	-1°53.0	-1°52.1	-1°51.1	-1°50.1	-1°49.1	-1°48.1	-1°47.1	-1°46.1	-1°45.1	-1°44.1	-1°43.2	+1.0
Tu 16	267°51.8	282°51.9	297°52.1	312°52.3	327°52.5	342°52.7	357°52.8	12°53.0	27°53.2	42°53.4	57°53.6	72°53.7	+0.2
	-1°30.3	-1°29.3	-1°28.3	-1°27.3	-1°26.4	-1°25.4	-1°24.4	-1°23.4	-1°22.4	-1°21.4	-1°20.4	-1°19.4	+1.0
We 17	267°56.1	282°56.2	297°56.4	312°56.6	327°56.8	342°57.0	357°57.1	12°57.3	27°57.5	42°57.7	57°57.9	72°58.0	+0.2
	-1°06.6	-1°05.6	-1°04.6	-1°03.6	-1°02.6	-1°01.6	-1°00.7	-0°59.7	-0°58.7	-0°57.7	-0°56.7	-0°55.7	+1.0
Th 18	268°00.4	283°00.6	298°00.8	313°01.0	328°01.1	343°01.3	358°01.5	13°01.7	28°01.9	43°02.0	58°02.2	73°02.4	+0.2
	-0°42.9	-0°41.9	-0°40.9	-0°39.9	-0°38.9	-0°37.9	-0°36.9	-0°35.9	-0°35.0	-0°34.0	-0°33.0	-0°32.0	+1.0
Fr 19	268°04.8	283°05.0	298°05.2	313°05.3	328°05.5	343°05.7	358°05.9	13°06.1	28°06.3	43°06.4	58°06.6	73°06.8	+0.2
	-0°19.1	-0°18.2	-0°17.2	-0°16.2	-0°15.2	-0°14.2	-0°13.2	-0°12.2	-0°11.2	-0°10.2	-0°09.3	-0°08.3	+1.0
Sa 20	268°09.2	283°09.4	298°09.6	313°09.8	328°10.0	343°10.1	358°10.3	13°10.5	28°10.7	43°10.9	58°11.1	73°11.3	+0.2
	0°04.6	0°05.6	0°06.5	0°07.5	0°08.5	0°09.5	0°10.5	0°11.5	0°12.5	0°13.5	0°14.5	0°15.4	+1.0
Su 21	268°13.7	283°13.9	298°14.0	313°14.2	328°14.4	343°14.6	358°14.8	13°15.0	28°15.2	43°15.4	58°15.5	73°15.7	+0.2
	0°28.3	0°29.3	0°30.2	0°31.2	0°32.2	0°33.2	0°34.2	0°35.2	0°36.2	0°37.2	0°38.1	0°39.1	+1.0
Mo 22	268°18.2	283°18.3	298°18.5	313°18.7	328°18.9	343°19.1	358°19.3	13°19.5	28°19.7	43°19.8	58°20.0	73°20.2	+0.2
	0°51.9	0°52.9	0°53.9	0°54.9	0°55.9	0°56.9	0°57.9	0°58.8	0°59.8	1°00.8	1°01.8	1°02.8	+1.0
Tu 23	268°22.7	283°22.9	298°23.0	313°23.2	328°23.4	343°23.6	358°23.8	13°24.0	28°24.2	43°24.4	58°24.6	73°24.7	+0.2
	1°15.6	1°16.6	1°17.6	1°18.5	1°19.5	1°20.5	1°21.5	1°22.5	1°23.5	1°24.5	1°25.4	1°26.4	+1.0
We 24	268°27.2	283°27.4	298°27.6	313°27.8	328°28.0	343°28.1	358°28.3	13°28.5	28°28.7	43°28.9	58°29.1	73°29.3	+0.2
	1°39.2	1°40.2	1°41.2	1°42.2	1°43.1	1°44.1	1°45.1	1°46.1	1°47.1	1°48.1	1°49.0	1°50.0	+1.0
Th 25	268°31.7	283°31.9	298°32.1	313°32.3	328°32.5	343°32.7	358°32.9	13°33.1	28°33.3	43°33.4	58°33.6	73°33.8	+0.2
	2°02.8	2°03.8	2°04.7	2°05.7	2°06.7	2°07.7	2°08.7	2°09.6	2°10.6	2°11.6	2°12.6	2°13.6	+1.0
Fr 26	268°36.3	283°36.5	298°36.7	313°36.9	328°37.0	343°37.2	358°37.4	13°37.6	28°37.8	43°38.0	58°38.2	73°38.4	+0.2
	2°26.3	2°27.3	2°28.3	2°29.2	2°30.2	2°31.2	2°32.2	2°33.2	2°34.1	2°35.1	2°36.1	2°37.1	+1.0
Sa 27	268°40.8	283°41.0	298°41.2	313°41.4	328°41.6	343°41.8	358°42.0	13°42.2	28°42.3	43°42.5	58°42.7	73°42.9	+0.2
	2°49.8	2°50.8	2°51.7	2°52.7	2°53.7	2°54.7	2°55.7	2°56.6	2°57.6	2°58.6	2°59.6	3°00.5	+1.0
Su 28	268°45.4	283°45.6	298°45.7	313°45.9	328°46.1	343°46.3	358°46.5	13°46.7	28°46.9	43°47.1	58°47.3	73°47.4	+0.2
	3°13.2	3°14.2	3°15.2	3°16.1	3°17.1	3°18.1	3°19.1	3°20.0	3°21.0	3°22.0	3°23.0	3°23.9	+1.0
Mo 29	268°49.9	283°50.1	298°50.3	313°50.5	328°50.7	343°50.8	358°51.0	13°51.2	28°51.4	43°51.6	58°51.8	73°52.0	+0.2
	3°36.6	3°37.5	3°38.5	3°39.5	3°40.5	3°41.4	3°42.4	3°43.4	3°44.4	3°45.3	3°46.3	3°47.3	+1.0
Tu 30	268°54.4	283°54.6	298°54.8	313°55.0	328°55.2	343°55.3	358°55.5	13°55.7	28°55.9	43°56.1	58°56.3	73°56.5	+0.2
	3°59.9	4°00.8	4°01.8	4°02.8	4°03.7	4°04.7	4°05.7	4°06.7	4°07.6	4°08.6	4°09.6	4°10.5	+1.0
We 31	268°58.9	283°59.1	298°59.3	313°59.5	328°59.6	343°59.8	359°00.0	14°00.2	29°00.4	44°00.6	59°00.8	74°00.9	+0.2
	4°23.1	4°24.1	4°25.0	4°26.0	4°27.0	4°27.9	4°28.9	4°29.9	4°30.8	4°31.8	4°32.7	4°33.7	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2032

D	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	Δ'/h	SH
Mo 1	235°28.6	249°59.6	264°30.6	279°01.6	293°32.4	308°03.2	322°34.0	337°04.7	351°35.3	6°05.9	20°36.4	+30.8	15.3
	-12°58.0	-13°06.3	-13°14.5	-13°22.7	-13°30.8	-13°38.8	-13°46.8	-13°54.7	-14°02.6	-14°10.4	-14°18.1	-8.0	56.1
Tu 2	238°06.5	252°35.9	267°05.4	281°34.7	296°04.0	310°33.3	325°02.4	339°31.5	354°00.6	8°29.5	22°58.4	+29.2	15.5
	-16°05.7	-16°12.2	-16°18.7	-16°25.1	-16°31.5	-16°37.7	-16°43.9	-16°50.0	-16°56.0	-17°01.9	-17°07.7	-6.2	56.7
We 3	240°04.2	254°32.1	268°59.9	283°27.6	297°55.3	312°23.0	326°50.5	341°18.0	355°45.5	10°12.8	24°40.2	+27.6	15.7
	-18°24.2	-18°28.5	-18°32.7	-18°36.9	-18°40.9	-18°44.8	-18°48.6	-18°52.4	-18°56.0	-18°59.5	-19°02.9	-3.9	57.4
Th 4	241°23.2	255°49.6	270°16.0	284°42.4	299°08.6	313°34.9	328°01.1	342°27.2	356°53.4	11°19.4	25°45.4	+26.2	15.9
	-19°40.5	-19°42.0	-19°43.5	-19°44.9	-19°46.1	-19°47.2	-19°48.2	-19°49.1	-19°49.8	-19°50.4	-19°50.9	-1.1	58.2
◑ Fr 5	242°11.1	256°36.5	271°02.0	285°27.3	299°52.7	314°18.0	328°43.4	343°08.7	357°33.9	11°59.2	26°24.4	+25.3	16.1
	-19°43.5	-19°42.0	-19°40.4	-19°38.6	-19°36.7	-19°34.7	-19°32.5	-19°30.2	-19°27.8	-19°25.3	-19°22.6	+2.1	58.9
Sa 6	256°36.5	271°02.0	285°27.3	299°52.7	314°18.0	328°43.4	343°08.7	357°33.9	11°59.2	26°24.4	40°49.6	+25.3	16.1
	-19°42.0	-19°40.4	-19°38.6	-19°36.7	-19°34.7	-19°32.5	-19°30.2	-19°27.8	-19°25.3	-19°22.6	-19°19.8	+2.2	59.0
Su 7	257°06.2	271°31.2	285°56.2	300°21.3	314°46.3	329°11.4	343°36.4	358°01.5	12°26.5	26°51.5	41°16.6	+25.0	16.3
	-18°22.4	-18°17.6	-18°12.6	-18°07.5	-18°02.3	-17°56.9	-17°51.4	-17°45.8	-17°40.1	-17°34.3	-17°28.3	+5.4	59.7
Mo 8	257°33.6	271°58.8	286°24.1	300°49.4	315°14.7	329°40.0	344°05.3	358°30.7	12°56.1	27°21.5	41°46.9	+25.3	16.4
	-15°44.5	-15°36.6	-15°28.7	-15°20.6	-15°12.4	-15°04.2	-14°55.8	-14°47.3	-14°38.7	-14°30.0	-14°21.2	+8.3	60.3
Tu 9	258°11.2	272°37.1	287°02.9	301°28.8	315°54.7	330°20.7	344°46.6	359°12.6	13°38.7	28°04.7	42°30.8	+26.0	16.6
	-11°57.6	-11°47.3	-11°36.9	-11°26.4	-11°15.9	-11°05.3	-10°54.6	-10°43.8	-10°33.0	-10°22.0	-10°11.1	+10.7	60.7
We 10	259°05.7	273°32.2	287°58.8	302°25.4	316°52.0	331°18.7	345°45.4	0°12.1	14°38.9	29°05.6	43°32.4	+26.7	16.6
	-7°18.6	-7°06.6	-6°54.6	-6°42.6	-6°30.5	-6°18.4	-6°06.2	-5°54.0	-5°41.8	-5°29.5	-5°17.2	+12.1	60.8
● Th 11	260°17.5	274°44.7	289°11.9	303°39.1	318°06.4	332°33.6	347°00.9	1°28.3	15°55.6	30°22.9	44°50.3	+27.3	16.5
	-2°09.6	-1°57.0	-1°44.3	-1°31.7	-1°19.0	-1°06.4	-0°53.7	-0°41.1	-0°28.4	-0°15.8	-0°03.1	+12.7	60.7
Fr 12	261°43.0	276°10.6	290°38.3	305°05.9	319°33.6	334°01.3	348°29.0	2°56.7	17°24.4	31°52.2	46°19.9	+27.7	16.4
	3°04.9	3°17.3	3°29.6	3°41.9	3°54.2	4°06.4	4°18.6	4°30.8	4°42.9	4°54.9	5°07.0	+12.2	60.2
Sa 13	263°17.2	277°45.0	292°12.9	306°40.8	321°08.7	335°36.6	350°04.6	4°32.5	19°00.4	33°28.3	47°56.3	+27.9	16.2
	8°01.7	8°12.9	8°24.0	8°35.1	8°46.1	8°57.0	9°07.9	9°18.7	9°29.5	9°40.1	9°50.7	+10.9	59.4
Su 14	264°56.0	279°24.0	293°52.0	308°20.0	322°48.1	337°16.1	351°44.2	6°12.2	20°40.3	35°08.3	49°36.4	+28.0	16.0
	12°20.6	12°30.0	12°39.3	12°48.4	12°57.5	13°06.5	13°15.4	13°24.2	13°33.0	13°41.6	13°50.1	+9.0	58.5
Mo 15	266°38.3	281°06.4	295°34.6	310°02.8	324°31.1	338°59.3	353°27.5	7°55.8	22°24.0	36°52.3	51°20.6	+28.2	15.7
	15°47.0	15°54.0	16°00.9	16°07.7	16°14.4	16°21.0	16°27.5	16°33.9	16°40.2	16°46.4	16°52.5	+6.6	57.6
Tu 16	268°26.4	282°54.9	297°23.4	311°51.9	326°20.5	340°49.1	355°17.7	9°46.3	24°15.0	38°43.6	53°12.3	+28.6	15.4
	18°11.5	18°15.9	18°20.2	18°24.4	18°28.5	18°32.5	18°36.4	18°40.2	18°43.9	18°47.4	18°50.9	+3.9	56.6
We 17	270°25.3	284°54.4	299°23.5	313°52.6	328°21.8	342°51.0	357°20.2	11°49.4	26°18.7	40°48.0	55°17.3	+29.2	15.2
	19°30.2	19°32.0	19°33.7	19°35.2	19°36.7	19°38.1	19°39.3	19°40.5	19°41.5	19°42.5	19°43.3	+1.3	55.8
◐ Th 18	272°41.3	287°11.2	301°41.1	316°11.0	330°41.0	345°11.0	359°41.1	14°11.2	28°41.3	43°11.5	57°41.7	+30.0	15.0
	19°43.9	19°43.2	19°42.3	19°41.4	19°40.4	19°39.2	19°38.0	19°36.7	19°35.2	19°33.7	19°32.1	-1.2	55.1
Fr 19	275°19.5	289°50.3	304°21.2	318°52.1	333°23.1	347°54.1	2°25.1	16°56.2	31°27.3	45°58.5	60°29.7	+31.0	14.9
	18°56.8	18°53.8	18°50.6	18°47.4	18°44.1	18°40.7	18°37.2	18°33.6	18°29.9	18°26.2	18°22.3	-3.5	54.5
Sa 20	278°22.6	292°54.4	307°26.3	321°58.2	336°30.2	351°02.2	5°34.2	20°06.3	34°38.4	49°10.5	63°42.7	+32.0	14.8
	17°15.2	17°10.1	17°04.9	16°59.7	16°54.4	16°49.0	16°43.5	16°38.0	16°32.4	16°26.7	16°20.9	-5.4	54.2
Su 21	281°50.0	296°22.7	310°55.5	325°28.3	340°01.2	354°34.1	9°07.0	23°40.0	38°13.0	52°46.0	67°19.0	+32.9	14.7
	14°46.5	14°39.7	14°32.8	14°25.9	14°18.9	14°11.8	14°04.7	13°57.5	13°50.3	13°43.0	13°35.6	-7.1	54.0
Mo 22	285°38.1	300°11.6	314°45.1	329°18.6	343°52.2	358°25.8	12°59.4	27°33.0	42°06.6	56°40.3	71°13.9	+33.6	14.7
	11°38.7	11°30.5	11°22.2	11°13.9	11°05.5	10°57.1	10°48.7	10°40.2	10°31.6	10°23.1	10°14.4	-8.4	54.0
Tu 23	289°41.1	304°15.0	318°48.9	333°22.8	347°56.8	2°30.8	17°04.7	31°38.7	46°12.7	60°46.7	75°20.7	+34.0	14.8
	8°00.0	7°50.7	7°41.4	7°32.1	7°22.7	7°13.3	7°03.8	6°54.4	6°44.8	6°35.3	6°25.7	-9.4	54.2
We 24	293°51.0	308°25.0	322°59.0	337°33.0	352°07.0	6°41.0	21°15.0	35°49.0	50°23.0	64°57.0	79°31.0	+34.0	14.8
	3°59.0	3°49.0	3°39.0	3°29.0	3°18.9	3°08.9	2°58.8	2°48.7	2°38.6	2°28.5	2°18.4	-10.1	54.4
Th 25	297°59.0	312°32.8	327°06.5	341°40.2	356°13.9	10°47.6	25°21.3	39°54.9	54°28.5	69°02.1	83°35.7	+33.7	14.9
	-0°15.1	-0°25.4	-0°35.7	-0°46.0	-0°56.3	-1°06.6	-1°17.0	-1°27.3	-1°37.6	-1°47.9	-1°58.2	-10.3	54.8
Fr 26	301°55.9	316°29.0	331°02.1	345°35.1	0°08.1	14°41.1	29°14.0	43°46.9	58°19.8	72°52.6	87°25.4	+33.0	15.1
	-4°32.1	-4°42.3	-4°52.5	-5°02.7	-5°12.8	-5°22.9	-5°33.0	-5°43.1	-5°53.2	-6°03.2	-6°13.3	-10.1	55.2
○ Sa 27	305°32.3	320°04.4	334°36.4	349°08.5	3°40.4	18°12.4	32°44.2	47°16.0	61°47.8	76°19.5	90°51.2	+31.9	15.2
	-8°40.7	-8°50.3	-8°59.8	-9°09.3	-9°18.8	-9°28.3	-9°37.7	-9°47.0	-9°56.4	-10°05.7	-10°14.9	-9.4	55.7
Su 28	308°40.1	323°10.9	337°41.7	352°12.4	6°43.0	21°13.6	35°44.2	50°14.6	64°45.1	79°15.4	93°45.8	+30.6	15.3
	-12°28.0	-12°36.5	-12°44.9	-12°53.2	-13°01.5	-13°09.7	-13°17.9	-13°26.0	-13°34.0	-13°42.0	-13°49.9	-8.2	56.2
Mo 29	311°13.4	325°42.8	340°12.1	354°41.4	9°10.6	23°39.8	38°08.8	52°37.9	67°06.8	81°35.7	96°04.6	+29.1	15.5
	-15°40.4	-15°47.2	-15°53.8	-16°00.5	-16°07.0	-16°13.4	-16°19.8	-16°26.1	-16°32.3	-16°38.4	-16°44.4	-6.4	56.7
Tu 30	325°42.8	340°12.1	354°41.4	9°10.6	23°39.8	38°08.8	52°37.9	67°06.8	81°35.7	96°04.6	110°33.4	+29.1	15.5
	-15°47.2	-15°53.8	-16°00.5	-16°07.0	-16°13.4	-16°19.8	-16°26.1	-16°32.3	-16°38.4	-16°44.4	-16°50.4	-6.3	56.7
We 31	327°38.6	342°06.5	356°34.4	11°02.2	25°30.0	39°57.7	54°25.3	68°52.9	83°20.5	97°48.0	112°15.5	+27.7	15.6
	-18°08.4	-18°12.9	-18°17.2	-18°21.4	-18°25.6	-18°29.6	-18°33.5	-18°37.3	-18°41.1	-18°44.7	-18°48.2	-4.0	57.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 01h47 — NM: 11 16h24 — FQ: 18 20h56 — FM: 27 00h46

SUN

April 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269°03.4	284°03.5	299°03.7	314°03.9	329°04.1	344°04.3	359°04.5	14°04.7	29°04.8	44°05.0	59°05.2	74°05.4	+0.2
	4°46.2	4°47.2	4°48.2	4°49.1	4°50.1	4°51.1	4°52.0	4°53.0	4°53.9	4°54.9	4°55.9	4°56.8	+1.0
Fr 2	269°07.8	284°08.0	299°08.1	314°08.3	329°08.5	344°08.7	359°08.9	14°09.1	29°09.2	44°09.4	59°09.6	74°09.8	+0.2
	5°09.3	5°10.3	5°11.2	5°12.2	5°13.1	5°14.1	5°15.1	5°16.0	5°17.0	5°17.9	5°18.9	5°19.8	+1.0
Sa 3	269°12.2	284°12.4	299°12.5	314°12.7	329°12.9	344°13.1	359°13.3	14°13.4	29°13.6	44°13.8	59°14.0	74°14.2	+0.2
	5°32.3	5°33.2	5°34.2	5°35.1	5°36.1	5°37.0	5°38.0	5°39.0	5°39.9	5°40.9	5°41.8	5°42.8	+1.0
Su 4	269°16.5	284°16.7	299°16.9	314°17.1	329°17.2	344°17.4	359°17.6	14°17.8	29°17.9	44°18.1	59°18.3	74°18.5	+0.2
	5°55.2	5°56.1	5°57.1	5°58.0	5°59.0	5°59.9	6°00.9	6°01.8	6°02.8	6°03.7	6°04.7	6°05.6	+1.0
Mo 5	269°20.8	284°21.0	299°21.2	314°21.3	329°21.5	344°21.7	359°21.9	14°22.0	29°22.2	44°22.4	59°22.6	74°22.8	+0.2
	6°17.9	6°18.9	6°19.8	6°20.8	6°21.7	6°22.7	6°23.6	6°24.5	6°25.5	6°26.4	6°27.4	6°28.3	+0.9
Tu 6	269°25.0	284°25.2	299°25.4	314°25.6	329°25.7	344°25.9	359°26.1	14°26.3	29°26.4	44°26.6	59°26.8	74°27.0	+0.2
	6°40.6	6°41.5	6°42.5	6°43.4	6°44.4	6°45.3	6°46.2	6°47.2	6°48.1	6°49.1	6°50.0	6°50.9	+0.9
We 7	269°29.2	284°29.4	299°29.6	314°29.7	329°29.9	344°30.1	359°30.3	14°30.4	29°30.6	44°30.8	59°31.0	74°31.1	+0.2
	7°03.1	7°04.1	7°05.0	7°06.0	7°06.9	7°07.8	7°08.8	7°09.7	7°10.6	7°11.6	7°12.5	7°13.4	+0.9
Th 8	269°33.3	284°33.5	299°33.7	314°33.9	329°34.0	344°34.2	359°34.4	14°34.5	29°34.7	44°34.9	59°35.0	74°35.2	+0.2
	7°25.6	7°26.5	7°27.4	7°28.4	7°29.3	7°30.2	7°31.2	7°32.1	7°33.0	7°34.0	7°34.9	7°35.8	+0.9
Fr 9	269°37.4	284°37.6	299°37.7	314°37.9	329°38.1	344°38.2	359°38.4	14°38.6	29°38.7	44°38.9	59°39.1	74°39.2	+0.2
	7°47.9	7°48.8	7°49.7	7°50.7	7°51.6	7°52.5	7°53.4	7°54.4	7°55.3	7°56.2	7°57.1	7°58.1	+0.9
Sa 10	269°41.4	284°41.6	299°41.7	314°41.9	329°42.1	344°42.2	359°42.4	14°42.5	29°42.7	44°42.9	59°43.0	74°43.2	+0.2
	8°10.1	8°11.0	8°11.9	8°12.8	8°13.7	8°14.7	8°15.6	8°16.5	8°17.4	8°18.3	8°19.3	8°20.2	+0.9
Su 11	269°45.3	284°45.5	299°45.6	314°45.8	329°46.0	344°46.1	359°46.3	14°46.4	29°46.6	44°46.8	59°46.9	74°47.1	+0.2
	8°32.1	8°33.0	8°33.9	8°34.9	8°35.8	8°36.7	8°37.6	8°38.5	8°39.4	8°40.3	8°41.2	8°42.2	+0.9
Mo 12	269°49.2	284°49.3	299°49.5	314°49.6	329°49.8	344°50.0	359°50.1	14°50.3	29°50.4	44°50.6	59°50.7	74°50.9	+0.2
	8°54.0	8°54.9	8°55.8	8°56.7	8°57.6	8°58.5	8°59.5	9°00.4	9°01.3	9°02.2	9°03.1	9°04.0	+0.9
Tu 13	269°52.9	284°53.1	299°53.2	314°53.4	329°53.6	344°53.7	359°53.9	14°54.0	29°54.2	44°54.3	59°54.5	74°54.6	+0.2
	9°15.8	9°16.7	9°17.6	9°18.5	9°19.4	9°20.3	9°21.2	9°22.1	9°23.0	9°23.9	9°24.8	9°25.7	+0.9
We 14	269°56.6	284°56.8	299°56.9	314°57.1	329°57.2	344°57.4	359°57.5	14°57.7	29°57.8	44°58.0	59°58.1	74°58.3	+0.2
	9°37.3	9°38.2	9°39.1	9°40.0	9°40.9	9°41.8	9°42.7	9°43.6	9°44.5	9°45.4	9°46.3	9°47.2	+0.9
Th 15	270°00.2	285°00.4	300°00.5	315°00.7	330°00.8	345°01.0	0°01.1	15°01.3	30°01.4	45°01.6	60°01.7	75°01.9	+0.1
	9°58.8	9°59.7	10°00.6	10°01.4	10°02.3	10°03.2	10°04.1	10°05.0	10°05.9	10°06.8	10°07.7	10°08.5	+0.9
Fr 16	270°03.8	285°03.9	300°04.0	315°04.2	330°04.3	345°04.5	0°04.6	15°04.8	30°04.9	45°05.1	60°05.2	75°05.3	+0.1
	10°20.0	10°20.9	10°21.8	10°22.7	10°23.6	10°24.5	10°25.3	10°26.2	10°27.1	10°28.0	10°28.9	10°29.7	+0.9
Sa 17	270°07.2	285°07.3	300°07.5	315°07.6	330°07.7	345°07.9	0°08.0	15°08.2	30°08.3	45°08.4	60°08.6	75°08.7	+0.1
	10°41.1	10°42.0	10°42.9	10°43.8	10°44.6	10°45.5	10°46.4	10°47.3	10°48.1	10°49.0	10°49.9	10°50.7	+0.9
Su 18	270°10.5	285°10.7	300°10.8	315°10.9	330°11.1	345°11.2	0°11.3	15°11.5	30°11.6	45°11.8	60°11.9	75°12.0	+0.1
	11°02.1	11°02.9	11°03.8	11°04.7	11°05.5	11°06.4	11°07.3	11°08.1	11°09.0	11°09.8	11°10.7	11°11.6	+0.9
Mo 19	270°13.8	285°13.9	300°14.0	315°14.2	330°14.3	345°14.4	0°14.6	15°14.7	30°14.8	45°15.0	60°15.1	75°15.2	+0.1
	11°22.8	11°23.6	11°24.5	11°25.4	11°26.2	11°27.1	11°27.9	11°28.8	11°29.7	11°30.5	11°31.4	11°32.2	+0.9
Tu 20	270°16.9	285°17.0	300°17.2	315°17.3	330°17.4	345°17.6	0°17.7	15°17.8	30°17.9	45°18.1	60°18.2	75°18.3	+0.1
	11°43.3	11°44.2	11°45.0	11°45.9	11°46.7	11°47.6	11°48.4	11°49.3	11°50.1	11°51.0	11°51.8	11°52.7	+0.8
We 21	270°19.9	285°20.1	300°20.2	315°20.3	330°20.4	345°20.6	0°20.7	15°20.8	30°20.9	45°21.1	60°21.2	75°21.3	+0.1
	12°03.7	12°04.5	12°05.4	12°06.2	12°07.1	12°07.9	12°08.7	12°09.6	12°10.4	12°11.3	12°12.1	12°12.9	+0.8
Th 22	270°22.9	285°23.0	300°23.1	315°23.2	330°23.4	345°23.5	0°23.6	15°23.7	30°23.8	45°23.9	60°24.1	75°24.2	+0.1
	12°23.8	12°24.7	12°25.5	12°26.3	12°27.2	12°28.0	12°28.8	12°29.7	12°30.5	12°31.3	12°32.2	12°33.0	+0.8
Fr 23	270°25.7	285°25.8	300°25.9	315°26.0	330°26.2	345°26.3	0°26.4	15°26.5	30°26.6	45°26.7	60°26.8	75°27.0	+0.1
	12°43.8	12°44.6	12°45.4	12°46.3	12°47.1	12°47.9	12°48.7	12°49.6	12°50.4	12°51.2	12°52.0	12°52.8	+0.8
Sa 24	270°28.4	285°28.5	300°28.6	315°28.7	330°28.8	345°28.9	0°29.1	15°29.2	30°29.3	45°29.4	60°29.5	75°29.6	+0.1
	13°03.5	13°04.3	13°05.1	13°06.0	13°06.8	13°07.6	13°08.4	13°09.2	13°10.0	13°10.9	13°11.7	13°12.5	+0.8
Su 25	270°31.0	285°31.1	300°31.2	315°31.3	330°31.4	345°31.5	0°31.6	15°31.7	30°31.8	45°31.9	60°32.0	75°32.1	+0.1
	13°23.0	13°23.8	13°24.7	13°25.5	13°26.3	13°27.1	13°27.9	13°28.7	13°29.5	13°30.3	13°31.1	13°31.9	+0.8
Mo 26	270°33.5	285°33.6	300°33.7	315°33.8	330°33.9	345°34.0	0°34.0	15°34.1	30°34.2	45°34.3	60°34.4	75°34.5	+0.1
	13°42.3	13°43.1	13°43.9	13°44.7	13°45.5	13°46.3	13°47.1	13°47.9	13°48.7	13°49.5	13°50.3	13°51.1	+0.8
Tu 27	270°35.8	285°35.9	300°36.0	315°36.1	330°36.2	345°36.3	0°36.4	15°36.5	30°36.5	45°36.6	60°36.7	75°36.8	+0.1
	14°01.4	14°02.2	14°03.0	14°03.8	14°04.6	14°05.4	14°06.1	14°06.9	14°07.7	14°08.5	14°09.3	14°10.1	+0.8
We 28	270°38.0	285°38.1	300°38.2	315°38.3	330°38.4	345°38.4	0°38.5	15°38.6	30°38.7	45°38.8	60°38.9	75°39.0	+0.1
	14°20.3	14°21.0	14°21.8	14°22.6	14°23.4	14°24.2	14°24.9	14°25.7	14°26.5	14°27.3	14°28.0	14°28.8	+0.8
Th 29	270°40.1	285°40.2	300°40.2	315°40.3	330°40.4	345°40.5	0°40.6	15°40.7	30°40.7	45°40.8	60°40.9	75°41.0	+0.1
	14°38.9	14°39.6	14°40.4	14°41.2	14°41.9	14°42.7	14°43.5	14°44.3	14°45.0	14°45.8	14°46.6	14°47.3	+0.8
Fr 30	270°42.0	285°42.1	300°42.2	315°42.3	330°42.3	345°42.4	0°42.5	15°42.6	30°42.6	45°42.7	60°42.8	75°42.9	+0.1
	14°57.2	14°58.0	14°58.8	14°59.5	15°00.3	15°01.0	15°01.8	15°02.5	15°03.3	15°04.1	15°04.8	15°05.6	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2032

	D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
	Th 1	243°25.5	257°51.7	272°17.9	286°44.1	301°10.3	315°36.4	330°02.6	344°28.7	358°54.8	13°20.9	27°47.0	+26.1	15.9
		-19°40.3	-19°39.8	-19°39.1	-19°38.3	-19°37.4	-19°36.4	-19°35.3	-19°34.0	-19°32.6	-19°31.1	-19°29.5	+1.1	58.2
	Fr 2	244°17.2	258°43.2	273°09.2	287°35.1	302°01.1	316°27.1	330°53.1	345°19.1	359°45.2	14°11.2	28°37.2	+26.0	16.0
		-18°50.4	-18°46.8	-18°43.1	-18°39.3	-18°35.4	-18°31.3	-18°27.1	-18°22.8	-18°18.4	-18°13.9	-18°09.2	+4.1	58.7
◑	Sa 3	245°08.9	259°35.2	274°01.4	288°27.7	302°54.0	317°20.3	331°46.6	346°13.0	0°39.3	15°05.7	29°32.1	+26.3	16.1
		-16°45.6	-16°39.1	-16°32.5	-16°25.8	-16°19.0	-16°12.1	-16°05.1	-15°58.0	-15°50.8	-15°43.5	-15°36.0	+7.0	59.2
	Su 4	259°35.2	274°01.4	288°27.7	302°54.0	317°20.3	331°46.6	346°13.0	0°39.3	15°05.7	29°32.1	43°58.6	+26.3	16.2
		-16°39.1	-16°32.5	-16°25.8	-16°19.0	-16°12.1	-16°05.1	-15°58.0	-15°50.8	-15°43.5	-15°36.0	-15°28.5	+7.1	59.2
	Mo 5	260°37.8	275°04.7	289°31.5	303°58.4	318°25.3	332°52.2	347°19.1	1°46.1	16°13.1	30°40.1	45°07.1	+26.9	16.3
		-13°23.8	-13°14.8	-13°05.6	-12°56.4	-12°47.1	-12°37.7	-12°28.2	-12°18.6	-12°09.0	-11°59.3	-11°49.5	+9.4	59.6
	Tu 6	261°55.7	276°23.1	290°50.6	305°18.1	319°45.6	334°13.1	348°40.6	3°08.2	17°35.8	32°03.4	46°31.0	+27.5	16.3
		-9°13.7	-9°02.8	-8°51.9	-8°40.8	-8°29.7	-8°18.6	-8°07.4	-7°56.2	-7°44.9	-7°33.5	-7°22.1	+11.2	59.9
	We 7	263°27.7	277°55.6	292°23.5	306°51.4	321°19.4	335°47.3	350°15.3	4°43.3	19°11.3	33°39.3	48°07.3	+28.0	16.4
		-4°26.1	-4°14.1	-4°02.1	-3°50.0	-3°37.9	-3°25.8	-3°13.7	-3°01.5	-2°49.4	-2°37.2	-2°25.0	+12.1	60.0
	Th 8	265°08.6	279°36.8	294°04.9	308°33.0	323°01.2	337°29.3	351°57.5	6°25.6	20°53.8	35°21.9	49°50.1	+28.1	16.3
		0°38.9	0°51.2	1°03.5	1°15.7	1°27.9	1°40.2	1°52.4	2°04.6	2°16.8	2°28.9	2°41.1	+12.2	59.9
	Fr 9	266°52.1	281°20.2	295°48.3	310°16.4	324°44.5	339°12.5	353°40.6	8°08.7	22°36.8	37°04.8	51°32.9	+28.1	16.2
		5°40.0	5°51.7	6°03.3	6°14.9	6°26.4	6°37.9	6°49.4	7°00.8	7°12.1	7°23.4	7°34.6	+11.5	59.5
●	Sa 10	268°32.6	283°00.5	297°28.4	311°56.3	326°24.2	340°52.1	355°20.0	9°47.8	24°15.7	38°43.5	53°11.4	+27.9	16.1
		10°16.3	10°26.6	10°36.8	10°46.9	10°56.9	11°06.9	11°16.8	11°26.6	11°36.4	11°46.1	11°55.6	+9.9	59.0
	Su 11	270°08.1	284°35.8	299°03.5	313°31.2	327°59.0	342°26.7	356°54.4	11°22.1	25°49.8	40°17.5	54°45.2	+27.7	15.9
		14°09.4	14°17.7	14°25.8	14°33.8	14°41.7	14°49.6	14°57.3	15°04.9	15°12.5	15°19.9	15°27.3	+7.8	58.2
	Mo 12	271°40.9	286°08.7	300°36.4	315°04.2	329°31.9	343°59.7	358°27.5	12°55.3	27°23.1	41°50.9	56°18.7	+27.8	15.7
		17°05.4	17°11.1	17°16.7	17°22.2	17°27.6	17°32.9	17°38.1	17°43.1	17°48.1	17°53.0	17°57.7	+5.2	57.4
	Tu 13	273°18.0	287°46.1	302°14.2	316°42.3	331°10.5	345°38.7	0°06.9	14°35.1	29°03.4	43°31.7	58°00.0	+28.2	15.4
		18°55.8	18°58.9	19°01.7	19°04.5	19°07.2	19°09.8	19°12.2	19°14.6	19°16.8	19°18.9	19°21.0	+2.5	56.6
	We 14	275°08.5	289°37.3	304°06.2	318°35.1	333°04.1	347°33.0	2°02.1	16°31.1	31°00.2	45°29.4	59°58.6	+29.0	15.2
		19°38.4	19°38.7	19°38.9	19°39.0	19°39.0	19°38.9	19°38.7	19°38.4	19°38.0	19°37.5	19°36.8	-0.2	55.8
	Th 15	277°21.4	291°51.3	306°21.2	320°51.2	335°21.2	349°51.3	4°21.4	18°51.6	33°21.8	47°52.0	62°22.3	+30.1	15.0
		19°15.7	19°13.6	19°11.3	19°08.9	19°06.5	19°03.9	19°01.3	18°58.5	18°55.7	18°52.8	18°49.8	-2.6	55.2
	Fr 16	280°02.6	294°33.7	309°04.8	323°36.0	338°07.2	352°38.5	7°09.8	21°41.1	36°12.5	50°44.0	65°15.5	+31.3	14.9
		17°54.3	17°49.9	17°45.5	17°41.0	17°36.4	17°31.7	17°26.9	17°22.1	17°17.2	17°12.2	17°07.1	-4.7	54.6
◐	Sa 17	283°13.5	297°45.7	312°18.0	326°50.3	341°22.7	355°55.1	10°27.5	25°00.0	39°32.5	54°05.1	68°37.7	+32.4	14.8
		15°42.4	15°36.2	15°29.9	15°23.6	15°17.1	15°10.7	15°04.2	14°57.6	14°50.9	14°44.2	14°37.4	-6.5	54.3
	Su 18	286°51.2	301°24.4	315°57.6	330°30.9	345°04.2	359°37.5	14°10.8	28°44.2	43°17.6	57°51.0	72°24.5	+33.3	14.8
		12°48.6	12°40.9	12°33.2	12°25.4	12°17.5	12°09.6	12°01.7	11°53.7	11°45.6	11°37.5	11°29.4	-7.9	54.1
	Mo 19	290°49.4	305°23.2	319°57.0	334°30.9	349°04.8	3°38.7	18°12.6	32°46.5	47°20.5	61°54.4	76°28.4	+33.9	14.8
		9°21.7	9°12.8	9°04.0	8°55.0	8°46.1	8°37.1	8°28.0	8°18.9	8°09.8	8°00.7	7°51.5	-9.0	54.2
	Tu 20	294°59.2	309°33.3	324°07.4	338°41.5	353°15.6	7°49.7	22°23.8	36°57.8	51°31.9	66°06.0	80°40.1	+34.1	14.8
		5°29.8	5°20.1	5°10.4	5°00.7	4°50.9	4°41.2	4°31.4	4°21.5	4°11.7	4°01.8	3°51.9	-9.8	54.4
	We 21	299°10.5	313°44.4	328°18.4	342°52.3	357°26.1	12°00.0	26°33.9	41°07.7	55°41.5	70°15.3	84°49.0	+33.9	14.9
		1°21.3	1°11.2	1°01.0	0°50.8	0°40.6	0°30.4	0°20.2	0°10.0	-0°00.3	-0°10.5	-0°20.7	-10.2	54.7
	Th 22	303°12.5	317°45.9	332°19.2	346°52.4	1°25.7	15°58.8	30°32.0	45°05.1	59°38.2	74°11.3	88°44.3	+33.2	15.1
		-2°54.7	-3°05.0	-3°15.3	-3°25.5	-3°35.7	-3°46.0	-3°56.2	-4°06.4	-4°16.6	-4°26.8	-4°37.0	-10.2	55.2
	Fr 23	306°54.4	321°26.7	335°59.0	350°31.2	5°03.4	19°35.5	34°07.6	48°39.6	63°11.5	77°43.5	92°15.3	+32.1	15.2
		-7°07.9	-7°17.9	-7°27.7	-7°37.6	-7°47.4	-7°57.2	-8°07.0	-8°16.7	-8°26.4	-8°36.1	-8°45.8	-9.8	55.8
	Sa 24	310°06.4	324°37.4	339°08.3	353°39.1	8°09.9	22°40.6	37°11.2	51°41.8	66°12.3	80°42.7	95°13.1	+30.7	15.4
		-11°06.1	-11°15.1	-11°24.0	-11°33.0	-11°41.8	-11°50.7	-11°59.4	-12°08.1	-12°16.8	-12°25.4	-12°34.0	-8.8	56.4
○	Su 25	312°41.3	327°10.7	341°40.0	356°09.2	10°38.4	25°07.5	39°36.5	54°05.5	68°34.4	83°03.2	97°32.0	+29.1	15.5
		-14°34.9	-14°42.5	-14°49.9	-14°57.3	-15°04.6	-15°11.9	-15°19.0	-15°26.1	-15°33.1	-15°40.0	-15°46.9	-7.2	56.9
	Mo 26	314°36.2	329°04.0	343°31.7	357°59.4	12°27.0	26°54.6	41°22.1	55°49.5	70°16.9	84°44.2	99°11.5	+27.5	15.7
		-17°19.2	-17°24.7	-17°30.0	-17°35.2	-17°40.4	-17°45.4	-17°50.3	-17°55.2	-17°59.9	-18°04.5	-18°09.1	-5.0	57.5
	Tu 27	315°54.7	330°21.3	344°47.7	359°14.2	13°40.6	28°06.9	42°33.3	56°59.5	71°25.8	85°52.0	100°18.2	+26.3	15.8
		-19°04.2	-19°07.0	-19°09.6	-19°12.2	-19°14.6	-19°17.0	-19°19.2	-19°21.2	-19°23.2	-19°25.1	-19°26.8	-2.3	58.0
	We 28	330°21.3	344°47.7	359°14.2	13°40.6	28°06.9	42°33.3	56°59.5	71°25.8	85°52.0	100°18.2	114°44.3	+26.3	15.8
		-19°07.0	-19°09.6	-19°12.2	-19°14.6	-19°17.0	-19°19.2	-19°21.2	-19°23.2	-19°25.1	-19°26.8	-19°28.4	-2.1	58.0
	Th 29	331°13.5	345°39.3	0°05.1	14°30.8	28°56.6	43°22.3	57°48.0	72°13.8	86°39.5	101°05.2	115°30.9	+25.7	15.9
		-19°38.0	-19°37.7	-19°37.2	-19°36.6	-19°35.9	-19°35.1	-19°34.1	-19°33.0	-19°31.8	-19°30.4	-19°29.0	+0.9	58.4
	Fr 30	331°56.6	346°22.3	0°48.1	15°13.9	29°39.7	44°05.6	58°31.4	72°57.3	87°23.1	101°49.0	116°15.0	+25.8	16.0
		-18°52.2	-18°48.8	-18°45.2	-18°41.6	-18°37.8	-18°33.9	-18°29.8	-18°25.7	-18°21.4	-18°17.0	-18°12.5	+4.0	58.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 3 10h10 — NM: 10 02h39 — FQ: 17 15h24 — FM: 25 15h09

SUN

May 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	270° 43.8	285° 43.9	300° 44.0	315° 44.0	330° 44.1	345° 44.2	0° 44.3	15° 44.3	30° 44.4	45° 44.5	60° 44.5	75° 44.6	+0.1
	15° 15.4	15° 16.1	15° 16.9	15° 17.6	15° 18.4	15° 19.1	15° 19.9	15° 20.6	15° 21.3	15° 22.1	15° 22.8	15° 23.6	+0.7
Su 2	270° 45.5	285° 45.6	300° 45.6	315° 45.7	330° 45.8	345° 45.8	0° 45.9	15° 46.0	30° 46.0	45° 46.1	60° 46.2	75° 46.2	+0.1
	15° 33.2	15° 34.0	15° 34.7	15° 35.4	15° 36.2	15° 36.9	15° 37.7	15° 38.4	15° 39.1	15° 39.9	15° 40.6	15° 41.3	+0.7
Mo 3	270° 47.0	285° 47.1	300° 47.1	315° 47.2	330° 47.3	345° 47.3	0° 47.4	15° 47.4	30° 47.5	45° 47.6	60° 47.6	75° 47.7	+0.1
	15° 50.8	15° 51.6	15° 52.3	15° 53.0	15° 53.8	15° 54.5	15° 55.2	15° 55.9	15° 56.7	15° 57.4	15° 58.1	15° 58.8	+0.7
Tu 4	270° 48.4	285° 48.5	300° 48.5	315° 48.6	330° 48.6	345° 48.7	0° 48.7	15° 48.8	30° 48.8	45° 48.9	60° 48.9	75° 49.0	+0.1
	16° 08.2	16° 08.9	16° 09.6	16° 10.3	16° 11.1	16° 11.8	16° 12.5	16° 13.2	16° 13.9	16° 14.6	16° 15.4	16° 16.1	+0.7
We 5	270° 49.6	285° 49.7	300° 49.7	315° 49.8	330° 49.8	345° 49.9	0° 49.9	15° 50.0	30° 50.0	45° 50.1	60° 50.1	75° 50.2	+0.0
	16° 25.3	16° 26.0	16° 26.7	16° 27.4	16° 28.1	16° 28.8	16° 29.5	16° 30.2	16° 30.9	16° 31.6	16° 32.3	16° 33.0	+0.7
Th 6	270° 50.7	285° 50.8	300° 50.8	315° 50.9	330° 50.9	345° 50.9	0° 51.0	15° 51.0	30° 51.1	45° 51.1	60° 51.1	75° 51.2	+0.0
	16° 42.1	16° 42.8	16° 43.5	16° 44.2	16° 44.9	16° 45.6	16° 46.3	16° 46.9	16° 47.6	16° 48.3	16° 49.0	16° 49.7	+0.7
Fr 7	270° 51.7	285° 51.7	300° 51.8	315° 51.8	330° 51.8	345° 51.9	0° 51.9	15° 51.9	30° 52.0	45° 52.0	60° 52.0	75° 52.1	+0.0
	16° 58.6	16° 59.3	17° 00.0	17° 00.7	17° 01.4	17° 02.0	17° 02.7	17° 03.4	17° 04.1	17° 04.8	17° 05.4	17° 06.1	+0.7
Sa 8	270° 52.5	285° 52.5	300° 52.5	315° 52.6	330° 52.6	345° 52.6	0° 52.7	15° 52.7	30° 52.7	45° 52.7	60° 52.8	75° 52.8	+0.0
	17° 14.9	17° 15.6	17° 16.2	17° 16.9	17° 17.6	17° 18.2	17° 18.9	17° 19.6	17° 20.2	17° 20.9	17° 21.6	17° 22.2	+0.7
Su 9	270° 53.1	285° 53.2	300° 53.2	315° 53.2	330° 53.2	345° 53.3	0° 53.3	15° 53.3	30° 53.3	45° 53.4	60° 53.4	75° 53.4	+0.0
	17° 30.8	17° 31.5	17° 32.2	17° 32.8	17° 33.5	17° 34.1	17° 34.8	17° 35.4	17° 36.1	17° 36.8	17° 37.4	17° 38.1	+0.7
Mo 10	270° 53.7	285° 53.7	300° 53.7	315° 53.7	330° 53.7	345° 53.7	0° 53.8	15° 53.8	30° 53.8	45° 53.8	60° 53.8	75° 53.8	+0.0
	17° 46.5	17° 47.2	17° 47.8	17° 48.5	17° 49.1	17° 49.7	17° 50.4	17° 51.0	17° 51.7	17° 52.3	17° 53.0	17° 53.6	+0.6
Tu 11	270° 54.0	285° 54.0	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.1	75° 54.2	+0.0
	18° 01.9	18° 02.5	18° 03.2	18° 03.8	18° 04.4	18° 05.1	18° 05.7	18° 06.3	18° 06.9	18° 07.6	18° 08.2	18° 08.8	+0.6
We 12	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.3	60° 54.3	75° 54.3	+0.0
	18° 17.0	18° 17.6	18° 18.2	18° 18.8	18° 19.4	18° 20.1	18° 20.7	18° 21.3	18° 21.9	18° 22.5	18° 23.1	18° 23.8	+0.6
Th 13	270° 54.4	285° 54.4	300° 54.4	315° 54.4	330° 54.4	345° 54.4	0° 54.4	15° 54.4	30° 54.4	45° 54.4	60° 54.3	75° 54.3	-0.0
	18° 31.7	18° 32.3	18° 32.9	18° 33.5	18° 34.1	18° 34.8	18° 35.4	18° 36.0	18° 36.6	18° 37.2	18° 37.8	18° 38.4	+0.6
Fr 14	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.3	60° 54.2	75° 54.2	-0.0
	18° 46.2	18° 46.8	18° 47.4	18° 47.9	18° 48.5	18° 49.1	18° 49.7	18° 50.3	18° 50.9	18° 51.5	18° 52.1	18° 52.7	+0.6
Sa 15	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.0	30° 54.0	45° 54.0	60° 54.0	75° 54.0	-0.0
	19° 00.3	19° 00.9	19° 01.5	19° 02.0	19° 02.6	19° 03.2	19° 03.8	19° 04.4	19° 04.9	19° 05.5	19° 06.1	19° 06.7	+0.6
Su 16	270° 53.8	285° 53.8	300° 53.8	315° 53.7	330° 53.7	345° 53.7	0° 53.7	15° 53.7	30° 53.7	45° 53.6	60° 53.6	75° 53.6	-0.0
	19° 14.1	19° 14.7	19° 15.2	19° 15.8	19° 16.4	19° 16.9	19° 17.5	19° 18.1	19° 18.6	19° 19.2	19° 19.8	19° 20.3	+0.6
Mo 17	270° 53.3	285° 53.3	300° 53.3	315° 53.3	330° 53.2	345° 53.2	0° 53.2	15° 53.2	30° 53.2	45° 53.1	60° 53.1	75° 53.1	-0.0
	19° 27.6	19° 28.1	19° 28.7	19° 29.2	19° 29.8	19° 30.4	19° 30.9	19° 31.5	19° 32.0	19° 32.6	19° 33.1	19° 33.7	+0.6
Tu 18	270° 52.7	285° 52.7	300° 52.7	315° 52.7	330° 52.6	345° 52.6	0° 52.6	15° 52.5	30° 52.5	45° 52.5	60° 52.5	75° 52.4	-0.0
	19° 40.7	19° 41.3	19° 41.8	19° 42.4	19° 42.9	19° 43.4	19° 44.0	19° 44.5	19° 45.0	19° 45.6	19° 46.1	19° 46.6	+0.5
We 19	270° 52.0	285° 52.0	300° 52.0	315° 51.9	330° 51.9	345° 51.9	0° 51.8	15° 51.8	30° 51.8	45° 51.7	60° 51.7	75° 51.6	-0.0
	19° 53.5	19° 54.1	19° 54.6	19° 55.1	19° 55.6	19° 56.2	19° 56.7	19° 57.2	19° 57.7	19° 58.3	19° 58.8	19° 59.3	+0.5
Th 20	270° 51.2	285° 51.1	300° 51.1	315° 51.1	330° 51.0	345° 51.0	0° 50.9	15° 50.9	30° 50.9	45° 50.8	60° 50.8	75° 50.7	-0.0
	20° 06.0	20° 06.5	20° 07.0	20° 07.6	20° 08.1	20° 08.6	20° 09.1	20° 09.6	20° 10.1	20° 10.6	20° 11.1	20° 11.6	+0.5
Fr 21	270° 50.2	285° 50.1	300° 50.1	315° 50.0	330° 50.0	345° 50.0	0° 49.9	15° 49.9	30° 49.8	45° 49.8	60° 49.7	75° 49.7	-0.0
	20° 18.1	20° 18.6	20° 19.1	20° 19.6	20° 20.1	20° 20.6	20° 21.1	20° 21.6	20° 22.1	20° 22.6	20° 23.1	20° 23.6	+0.5
Sa 22	270° 49.1	285° 49.0	300° 49.0	315° 48.9	330° 48.9	345° 48.8	0° 48.8	15° 48.7	30° 48.7	45° 48.6	60° 48.6	75° 48.5	-0.1
	20° 29.9	20° 30.4	20° 30.9	20° 31.4	20° 31.9	20° 32.3	20° 32.8	20° 33.3	20° 33.8	20° 34.3	20° 34.7	20° 35.2	+0.5
Su 23	270° 47.8	285° 47.8	300° 47.7	315° 47.7	330° 47.6	345° 47.6	0° 47.5	15° 47.4	30° 47.4	45° 47.3	60° 47.3	75° 47.2	-0.1
	20° 41.4	20° 41.8	20° 42.3	20° 42.8	20° 43.2	20° 43.7	20° 44.2	20° 44.6	20° 45.1	20° 45.6	20° 46.0	20° 46.5	+0.5
Mo 24	270° 46.5	285° 46.4	300° 46.3	315° 46.3	330° 46.2	345° 46.2	0° 46.1	15° 46.0	30° 46.0	45° 45.9	60° 45.9	75° 45.8	-0.1
	20° 52.4	20° 52.9	20° 53.3	20° 53.8	20° 54.2	20° 54.7	20° 55.1	20° 55.6	20° 56.0	20° 56.5	20° 56.9	20° 57.4	+0.5
Tu 25	270° 45.0	285° 44.9	300° 44.8	315° 44.8	330° 44.7	345° 44.6	0° 44.6	15° 44.5	30° 44.5	45° 44.4	60° 44.3	75° 44.3	-0.1
	21° 03.1	21° 03.6	21° 04.0	21° 04.5	21° 04.9	21° 05.3	21° 05.8	21° 06.2	21° 06.6	21° 07.1	21° 07.5	21° 07.9	+0.4
We 26	270° 43.4	285° 43.3	300° 43.2	315° 43.2	330° 43.1	345° 43.0	0° 42.9	15° 42.9	30° 42.8	45° 42.7	60° 42.7	75° 42.6	-0.1
	21° 13.5	21° 13.9	21° 14.3	21° 14.8	21° 15.2	21° 15.6	21° 16.0	21° 16.4	21° 16.9	21° 17.3	21° 17.7	21° 18.1	+0.4
Th 27	270° 41.6	285° 41.6	300° 41.5	315° 41.4	330° 41.3	345° 41.3	0° 41.2	15° 41.1	30° 41.0	45° 41.0	60° 40.9	75° 40.8	-0.1
	21° 23.5	21° 23.9	21° 24.3	21° 24.7	21° 25.1	21° 25.5	21° 25.9	21° 26.3	21° 26.7	21° 27.1	21° 27.5	21° 27.9	+0.4
Fr 28	270° 39.8	285° 39.7	300° 39.6	315° 39.5	330° 39.5	345° 39.4	0° 39.3	15° 39.2	30° 39.1	45° 39.1	60° 39.0	75° 38.9	-0.1
	21° 33.1	21° 33.5	21° 33.9	21° 34.3	21° 34.7	21° 35.1	21° 35.4	21° 35.8	21° 36.2	21° 36.6	21° 37.0	21° 37.4	+0.4
Sa 29	270° 37.8	285° 37.7	300° 37.7	315° 37.6	330° 37.5	345° 37.4	0° 37.3	15° 37.2	30° 37.1	45° 37.1	60° 37.0	75° 36.9	-0.1
	21° 42.3	21° 42.7	21° 43.1	21° 43.5	21° 43.8	21° 44.2	21° 44.6	21° 45.0	21° 45.3	21° 45.7	21° 46.1	21° 46.4	+0.4
Su 30	270° 35.7	285° 35.7	300° 35.6	315° 35.5	330° 35.4	345° 35.3	0° 35.2	15° 35.1	30° 35.0	45° 34.9	60° 34.8	75° 34.8	-0.1
	21° 51.2	21° 51.6	21° 51.9	21° 52.3	21° 52.6	21° 53.0	21° 53.4	21° 53.7	21° 54.1	21° 54.4	21° 54.8	21° 55.1	+0.4
Mo 31	270° 33.6	285° 33.5	300° 33.4	315° 33.3	330° 33.2	345° 33.1	0° 33.0	15° 32.9	30° 32.8	45° 32.7	60° 32.6	75° 32.5	-0.1
	21° 59.7	22° 00.0	22° 00.4	22° 00.7	22° 01.1	22° 01.4	22° 01.7	22° 02.1	22° 02.4	22° 02.8	22° 03.1	22° 03.4	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2032

D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
Sa 1	232°45.5	247°12.5	261°39.4	276°06.4	290°33.5	305°00.6	319°27.7	333°54.9	348°22.1	2°49.3	17°16.6	+27.1	16.1
	-14°42.4	-14°34.3	-14°26.1	-14°17.9	-14°09.5	-14°01.1	-13°52.5	-13°43.9	-13°35.2	-13°26.4	-13°17.6	+8.5	59.1
◑ Su 2	234°10.1	248°38.0	263°05.8	277°33.8	292°01.7	306°29.7	320°57.7	335°25.8	349°53.9	4°22.0	18°50.1	+28.0	16.2
	-10°55.3	-10°45.2	-10°35.1	-10°24.9	-10°14.7	-10°04.4	-9°54.0	-9°43.6	-9°33.1	-9°22.6	-9°12.0	+10.3	59.3
Mo 3	235°55.9	250°24.5	264°53.1	279°21.8	293°50.5	308°19.2	322°47.9	337°16.6	351°45.3	6°14.1	20°42.9	+28.7	16.2
	-6°27.0	-6°15.7	-6°04.3	-5°52.9	-5°41.4	-5°30.0	-5°18.5	-5°06.9	-4°55.3	-4°43.7	-4°32.1	+11.5	59.3
Tu 4	250°24.5	264°53.1	279°21.8	293°50.5	308°19.2	322°47.9	337°16.6	351°45.3	6°14.1	20°42.9	35°11.7	+28.7	16.2
	-6°15.7	-6°04.3	-5°52.9	-5°41.4	-5°30.0	-5°18.5	-5°06.9	-4°55.3	-4°43.7	-4°32.1	-4°20.5	+11.5	59.3
We 5	252°25.7	266°54.7	281°23.8	295°52.8	310°21.9	324°50.9	339°20.0	353°49.1	8°18.1	22°47.2	37°16.3	+29.1	16.1
	-1°23.4	-1°11.5	-0°59.6	-0°47.7	-0°35.8	-0°23.9	-0°11.9	-0°00.0	0°11.9	0°23.8	0°35.7	+11.9	59.2
Th 6	254°32.5	269°01.6	283°30.6	297°59.7	312°28.7	326°57.8	341°26.8	355°55.8	10°24.8	24°53.8	39°22.8	+29.0	16.1
	3°33.1	3°44.7	3°56.4	4°08.0	4°19.6	4°31.2	4°42.8	4°54.3	5°05.8	5°17.2	5°28.7	+11.6	59.0
Fr 7	256°36.2	271°04.9	285°33.7	300°02.4	314°31.2	328°59.9	343°28.6	357°57.3	12°25.9	26°54.6	41°23.2	+28.7	16.0
	8°15.2	8°25.9	8°36.6	8°47.2	8°57.8	9°08.3	9°18.8	9°29.2	9°39.5	9°49.8	10°00.0	+10.5	58.6
Sa 8	258°30.4	272°58.8	287°27.1	301°55.4	316°23.7	330°51.9	345°20.2	359°48.4	14°16.6	28°44.8	43°13.0	+28.3	15.9
	12°25.2	12°34.3	12°43.4	12°52.3	13°01.2	13°10.0	13°18.7	13°27.3	13°35.8	13°44.3	13°52.7	+8.7	58.2
● Su 9	260°13.8	274°41.8	289°09.7	303°37.7	318°05.6	332°33.5	347°01.4	1°29.3	15°57.2	30°25.0	44°52.9	+27.9	15.7
	15°47.5	15°54.4	16°01.3	16°08.0	16°14.6	16°21.1	16°27.5	16°33.9	16°40.1	16°46.2	16°52.2	+6.5	57.6
Mo 10	261°50.6	276°18.4	290°46.3	305°14.1	319°42.0	334°09.9	348°37.7	3°05.6	17°33.5	32°01.4	46°29.3	+27.9	15.5
	18°10.1	18°14.4	18°18.6	18°22.8	18°26.8	18°30.7	18°34.5	18°38.2	18°41.8	18°45.3	18°48.6	+3.9	57.0
Tu 11	263°29.8	277°58.0	292°26.2	306°54.4	321°22.7	335°50.9	350°19.3	4°47.6	19°16.0	33°44.3	48°12.8	+28.3	15.4
	19°26.0	19°27.6	19°29.1	19°30.5	19°31.8	19°33.0	19°34.1	19°35.1	19°35.9	19°36.7	19°37.3	+1.1	56.3
We 12	265°23.1	279°52.1	294°21.1	308°50.1	323°19.2	337°48.4	352°17.6	6°46.8	21°16.1	35°45.4	50°14.8	+29.2	15.2
	19°34.3	19°33.3	19°32.2	19°30.9	19°29.6	19°28.2	19°26.6	19°25.0	19°23.3	19°21.4	19°19.5	-1.5	55.6
Th 13	267°40.8	282°10.9	296°41.1	311°11.3	325°41.6	340°11.9	354°42.3	9°12.7	23°43.1	38°13.7	52°44.3	+30.3	15.0
	18°39.2	18°35.8	18°32.3	18°28.7	18°25.0	18°21.2	18°17.3	18°13.4	18°09.4	18°05.2	18°01.0	-3.8	55.1
Fr 14	270°29.1	285°00.5	299°31.9	314°03.4	328°35.0	343°06.6	357°38.2	12°09.9	26°41.7	41°13.5	55°45.3	+31.6	14.9
	16°48.4	16°42.9	16°37.4	16°31.8	16°26.1	16°20.3	16°14.5	16°08.6	16°02.7	15°56.6	15°50.5	-5.8	54.6
Sa 15	273°48.8	288°21.4	302°54.0	317°26.7	331°59.5	346°32.2	1°05.0	15°37.9	30°10.8	44°43.7	59°16.7	+32.8	14.8
	14°11.3	14°04.2	13°57.0	13°49.8	13°42.5	13°35.1	13°27.7	13°20.3	13°12.8	13°05.2	12°57.6	-7.4	54.3
Su 16	277°35.8	292°09.4	306°42.9	321°16.5	335°50.2	350°23.8	4°57.5	19°31.3	34°05.0	48°38.8	63°12.6	+33.7	14.8
	10°57.5	10°49.1	10°40.7	10°32.2	10°23.7	10°15.1	10°06.5	9°57.9	9°49.2	9°40.5	9°31.7	-8.6	54.2
◐ Mo 17	281°42.2	296°16.4	310°50.5	325°24.6	339°58.8	354°33.0	9°07.2	23°41.4	38°15.6	52°49.8	67°24.0	+34.2	14.8
	7°16.0	7°06.7	6°57.3	6°47.9	6°38.5	6°29.1	6°19.6	6°10.1	6°00.6	5°51.1	5°41.5	-9.4	54.2
Tu 18	285°57.8	300°32.0	315°06.3	329°40.5	344°14.8	358°49.0	13°23.2	27°57.4	42°31.6	57°05.8	71°40.0	+34.2	14.9
	3°15.2	3°05.2	2°55.3	2°45.3	2°35.4	2°25.4	2°15.4	2°05.4	1°55.3	1°45.3	1°35.2	-10.0	54.5
We 19	290°10.8	304°44.6	319°18.5	333°52.4	348°26.2	3°00.0	17°33.7	32°07.4	46°41.1	61°14.8	75°48.5	+33.8	15.0
	-0°56.8	-1°06.9	-1°17.1	-1°27.3	-1°37.5	-1°47.7	-1°57.9	-2°08.1	-2°18.3	-2°28.5	-2°38.7	-10.2	54.9
Th 20	294°08.8	308°41.8	323°14.8	337°47.7	352°20.6	6°53.5	21°26.3	35°59.1	50°31.8	65°04.4	79°37.0	+32.8	15.1
	-5°10.8	-5°20.9	-5°31.0	-5°41.0	-5°51.0	-6°01.0	-6°11.0	-6°21.0	-6°31.0	-6°40.9	-6°50.8	-10.0	55.5
Fr 21	297°39.6	312°11.4	326°43.0	341°14.6	355°46.1	10°17.6	24°49.0	39°20.3	53°51.6	68°22.8	82°53.9	+31.4	15.3
	-9°16.6	-9°26.1	-9°35.6	-9°45.0	-9°54.4	-10°03.7	-10°13.0	-10°22.3	-10°31.5	-10°40.7	-10°49.9	-9.3	56.1
Sa 22	300°32.7	315°02.7	329°32.6	344°02.5	358°32.3	13°02.0	27°31.7	42°01.3	56°30.8	71°00.2	85°29.5	+29.7	15.5
	-13°01.4	-13°09.8	-13°18.1	-13°26.3	-13°34.5	-13°42.6	-13°50.6	-13°58.6	-14°06.5	-14°14.4	-14°22.2	-8.1	56.9
Su 23	302°40.7	317°08.9	331°37.0	346°05.0	0°32.9	15°00.7	29°28.5	43°56.2	58°23.9	72°51.4	87°18.9	+27.8	15.7
	-16°10.1	-16°16.7	-16°23.2	-16°29.6	-16°35.9	-16°42.1	-16°48.2	-16°54.3	-17°00.2	-17°06.1	-17°11.8	-6.2	57.6
Mo 24	304°03.0	318°29.4	332°55.8	347°22.0	1°48.3	16°14.5	30°40.6	45°06.6	59°32.7	73°58.6	88°24.5	+26.1	15.9
	-18°26.3	-18°30.4	-18°34.4	-18°38.3	-18°42.1	-18°45.8	-18°49.3	-18°52.8	-18°56.1	-18°59.3	-19°02.4	-3.6	58.3
○ Tu 25	304°47.3	319°12.5	333°37.6	348°02.8	2°27.9	16°52.9	31°18.0	45°43.0	60°08.0	74°32.9	88°57.9	+25.1	16.1
	-19°34.5	-19°35.7	-19°36.7	-19°37.6	-19°38.4	-19°39.0	-19°39.5	-19°39.9	-19°40.1	-19°40.3	-19°40.2	-0.6	58.9
We 26	305°10.1	319°34.9	333°59.6	348°24.4	2°49.2	17°13.9	31°38.7	46°03.5	60°28.3	74°53.1	89°17.9	+24.8	16.2
	-19°24.5	-19°22.4	-19°20.2	-19°17.8	-19°15.3	-19°12.7	-19°10.0	-19°07.1	-19°04.1	-19°01.0	-18°57.7	+2.7	59.3
Th 27	305°32.3	319°57.4	334°22.6	348°47.8	3°13.1	17°38.3	32°03.7	46°29.0	60°54.4	75°19.8	89°45.3	+25.3	16.2
	-17°53.8	-17°48.6	-17°43.2	-17°37.7	-17°32.1	-17°26.4	-17°20.6	-17°14.7	-17°08.6	-17°02.4	-16°56.2	+5.8	59.5
Fr 28	319°57.4	334°22.6	348°47.8	3°13.1	17°38.3	32°03.7	46°29.0	60°54.4	75°19.8	89°45.3	104°10.8	+25.3	16.2
	-17°48.6	-17°43.2	-17°37.7	-17°32.1	-17°26.4	-17°20.6	-17°14.7	-17°08.6	-17°02.4	-16°56.2	-16°49.8	+5.9	59.5
Sa 29	320°38.3	335°04.5	349°30.8	3°57.1	18°23.4	32°49.8	47°16.3	61°42.7	76°09.3	90°35.9	105°02.5	+26.4	16.2
	-15°01.2	-14°53.2	-14°45.1	-14°36.9	-14°28.5	-14°20.1	-14°11.6	-14°03.0	-13°54.4	-13°45.6	-13°36.8	+8.5	59.6
Su 30	321°48.0	336°15.4	350°42.9	5°10.4	19°37.9	34°05.6	48°33.2	63°00.9	77°28.7	91°56.5	106°24.3	+27.6	16.2
	-11°14.7	-11°04.6	-10°54.5	-10°44.3	-10°34.1	-10°23.8	-10°13.4	-10°03.0	-9°52.5	-9°42.0	-9°31.4	+10.3	59.5
◑ Mo 31	323°27.3	337°55.8	352°24.4	6°53.0	21°21.6	35°50.3	50°19.0	64°47.8	79°16.5	93°45.3	108°14.2	+28.7	16.2
	-6°46.9	-6°35.6	-6°24.3	-6°12.9	-6°01.5	-5°50.1	-5°38.6	-5°27.1	-5°15.6	-5°04.1	-4°52.5	+11.4	59.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 2 16h01 — NM: 9 13h35 — FQ: 17 09h43 — FM: 25 02h37 — LQ: 31 20h51

SUN

June 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	270°31.3	285°31.2	300°31.1	315°31.0	330°30.9	345°30.8	0°30.7	15°30.6	30°30.5	45°30.4	60°30.3	75°30.2	-0.1
	22°07.8	22°08.1	22°08.4	22°08.8	22°09.1	22°09.4	22°09.8	22°10.1	22°10.4	22°10.7	22°11.0	22°11.4	+0.3
We 2	270°28.9	285°28.8	300°28.7	315°28.6	330°28.5	345°28.4	0°28.3	15°28.2	30°28.1	45°27.9	60°27.8	75°27.7	-0.1
	22°15.5	22°15.8	22°16.1	22°16.4	22°16.8	22°17.1	22°17.4	22°17.7	22°18.0	22°18.3	22°18.6	22°18.9	+0.3
Th 3	270°26.4	285°26.3	300°26.2	315°26.1	330°26.0	345°25.8	0°25.7	15°25.6	30°25.5	45°25.4	60°25.3	75°25.2	-0.1
	22°22.8	22°23.1	22°23.4	22°23.7	22°24.0	22°24.3	22°24.6	22°24.9	22°25.2	22°25.5	22°25.8	22°26.1	+0.3
Fr 4	270°23.8	285°23.7	300°23.6	315°23.5	330°23.4	345°23.2	0°23.1	15°23.0	30°22.9	45°22.8	60°22.7	75°22.6	-0.1
	22°29.8	22°30.0	22°30.3	22°30.6	22°30.9	22°31.2	22°31.4	22°31.7	22°32.0	22°32.3	22°32.5	22°32.8	+0.3
Sa 5	270°21.1	285°21.0	300°20.9	315°20.8	330°20.7	345°20.6	0°20.4	15°20.3	30°20.2	45°20.1	60°20.0	75°19.9	-0.1
	22°36.3	22°36.6	22°36.8	22°37.1	22°37.4	22°37.6	22°37.9	22°38.1	22°38.4	22°38.7	22°38.9	22°39.2	+0.3
Su 6	270°18.4	285°18.3	300°18.1	315°18.0	330°17.9	345°17.8	0°17.7	15°17.5	30°17.4	45°17.3	60°17.2	75°17.1	-0.1
	22°42.5	22°42.7	22°42.9	22°43.2	22°43.4	22°43.7	22°43.9	22°44.2	22°44.4	22°44.7	22°44.9	22°45.1	+0.2
Mo 7	270°15.5	285°15.4	300°15.3	315°15.2	330°15.1	345°14.9	0°14.8	15°14.7	30°14.6	45°14.5	60°14.3	75°14.2	-0.1
	22°48.2	22°48.4	22°48.7	22°48.9	22°49.1	22°49.3	22°49.6	22°49.8	22°50.0	22°50.2	22°50.5	22°50.7	+0.2
Tu 8	270°12.6	285°12.5	300°12.4	315°12.3	330°12.2	345°12.0	0°11.9	15°11.8	30°11.7	45°11.5	60°11.4	75°11.3	-0.1
	22°53.5	22°53.8	22°54.0	22°54.2	22°54.4	22°54.6	22°54.8	22°55.0	22°55.2	22°55.4	22°55.7	22°55.9	+0.2
We 9	270°09.7	285°09.6	300°09.4	315°09.3	330°09.2	345°09.1	0°08.9	15°08.8	30°08.7	45°08.6	60°08.4	75°08.3	-0.1
	22°58.5	22°58.7	22°58.9	22°59.1	22°59.3	22°59.5	22°59.7	22°59.9	23°00.0	23°00.2	23°00.4	23°00.6	+0.2
Th 10	270°06.7	285°06.5	300°06.4	315°06.3	330°06.2	345°06.0	0°05.9	15°05.8	30°05.6	45°05.5	60°05.4	75°05.3	-0.1
	23°03.0	23°03.2	23°03.4	23°03.6	23°03.7	23°03.9	23°04.1	23°04.3	23°04.5	23°04.6	23°04.8	23°05.0	+0.2
Fr 11	270°03.6	285°03.5	300°03.3	315°03.2	330°03.1	345°02.9	0°02.8	15°02.7	30°02.6	45°02.4	60°02.3	75°02.2	-0.1
	23°07.2	23°07.3	23°07.5	23°07.7	23°07.8	23°08.0	23°08.1	23°08.3	23°08.4	23°08.6	23°08.8	23°08.9	+0.2
Sa 12	270°00.5	285°00.3	300°00.2	315°00.1	330°00.0	344°59.8	359°59.7	14°59.6	29°59.4	44°59.3	59°59.2	74°59.0	-0.1
	23°10.9	23°11.0	23°11.2	23°11.3	23°11.5	23°11.6	23°11.8	23°11.9	23°12.0	23°12.2	23°12.3	23°12.5	+0.1
Su 13	269°57.3	284°57.2	299°57.1	314°56.9	329°56.8	344°56.7	359°56.5	14°56.4	29°56.3	44°56.1	59°56.0	74°55.9	-0.1
	23°14.2	23°14.3	23°14.5	23°14.6	23°14.7	23°14.8	23°15.0	23°15.1	23°15.2	23°15.3	23°15.5	23°15.6	+0.1
Mo 14	269°54.1	284°54.0	299°53.9	314°53.7	329°53.6	344°53.5	359°53.3	14°53.2	29°53.1	44°52.9	59°52.8	74°52.7	-0.1
	23°17.1	23°17.2	23°17.3	23°17.5	23°17.6	23°17.7	23°17.8	23°17.9	23°18.0	23°18.1	23°18.2	23°18.3	+0.1
Tu 15	269°50.9	284°50.8	299°50.7	314°50.5	329°50.4	344°50.3	359°50.1	14°50.0	29°49.9	44°49.7	59°49.6	74°49.5	-0.1
	23°19.6	23°19.7	23°19.8	23°19.9	23°20.0	23°20.1	23°20.2	23°20.3	23°20.4	23°20.4	23°20.5	23°20.6	+0.1
We 16	269°47.7	284°47.6	299°47.4	314°47.3	329°47.2	344°47.0	359°46.9	14°46.8	29°46.6	44°46.5	59°46.4	74°46.2	-0.1
	23°21.7	23°21.8	23°21.9	23°21.9	23°22.0	23°22.1	23°22.2	23°22.2	23°22.3	23°22.4	23°22.4	23°22.5	+0.1
Th 17	269°44.5	284°44.3	299°44.2	314°44.1	329°43.9	344°43.8	359°43.6	14°43.5	29°43.4	44°43.2	59°43.1	74°43.0	-0.1
	23°23.4	23°23.4	23°23.5	23°23.6	23°23.6	23°23.7	23°23.7	23°23.8	23°23.8	23°23.9	23°23.9	23°24.0	+0.1
Fr 18	269°41.2	284°41.1	299°40.9	314°40.8	329°40.7	344°40.5	359°40.4	14°40.3	29°40.1	44°40.0	59°39.9	74°39.7	-0.1
	23°24.6	23°24.7	23°24.7	23°24.8	23°24.8	23°24.8	23°24.9	23°24.9	23°25.0	23°25.0	23°25.0	23°25.1	+0.0
Sa 19	269°38.0	284°37.8	299°37.7	314°37.6	329°37.4	344°37.3	359°37.1	14°37.0	29°36.9	44°36.7	59°36.6	74°36.5	-0.1
	23°25.5	23°25.5	23°25.5	23°25.6	23°25.6	23°25.6	23°25.6	23°25.6	23°25.7	23°25.7	23°25.7	23°25.7	+0.0
Su 20	269°34.7	284°34.6	299°34.4	314°34.3	329°34.2	344°34.0	359°33.9	14°33.8	29°33.6	44°33.5	59°33.4	74°33.2	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	23°26.0	+0.0
Mo 21	269°31.5	284°31.3	299°31.2	314°31.1	329°30.9	344°30.8	359°30.7	14°30.5	29°30.4	44°30.3	59°30.1	74°30.0	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.8	23°25.8	23°25.8	-0.0
Tu 22	269°28.2	284°28.1	299°28.0	314°27.8	329°27.7	344°27.6	359°27.4	14°27.3	29°27.2	44°27.0	59°26.9	74°26.8	-0.1
	23°25.5	23°25.5	23°25.5	23°25.5	23°25.4	23°25.4	23°25.4	23°25.4	23°25.3	23°25.3	23°25.3	23°25.2	-0.0
We 23	269°25.0	284°24.9	299°24.8	314°24.6	329°24.5	344°24.4	359°24.2	14°24.1	29°24.0	44°23.8	59°23.7	74°23.6	-0.1
	23°24.7	23°24.7	23°24.7	23°24.6	23°24.6	23°24.5	23°24.5	23°24.4	23°24.4	23°24.3	23°24.3	23°24.2	-0.0
Th 24	269°21.8	284°21.7	299°21.6	314°21.4	329°21.3	344°21.2	359°21.0	14°20.9	29°20.8	44°20.7	59°20.5	74°20.4	-0.1
	23°23.5	23°23.5	23°23.4	23°23.3	23°23.3	23°23.2	23°23.2	23°23.1	23°23.0	23°23.0	23°22.9	23°22.8	-0.1
Fr 25	269°18.7	284°18.6	299°18.4	314°18.3	329°18.2	344°18.0	359°17.9	14°17.8	29°17.6	44°17.5	59°17.4	74°17.2	-0.1
	23°21.9	23°21.8	23°21.7	23°21.7	23°21.6	23°21.5	23°21.4	23°21.3	23°21.3	23°21.2	23°21.1	23°21.0	-0.1
Sa 26	269°15.6	284°15.4	299°15.3	314°15.2	329°15.0	344°14.9	359°14.8	14°14.6	29°14.5	44°14.4	59°14.3	74°14.1	-0.1
	23°19.9	23°19.8	23°19.7	23°19.6	23°19.5	23°19.4	23°19.3	23°19.2	23°19.1	23°19.0	23°18.9	23°18.8	-0.1
Su 27	269°12.5	284°12.3	299°12.2	314°12.1	329°12.0	344°11.8	359°11.7	14°11.6	29°11.4	44°11.3	59°11.2	74°11.1	-0.1
	23°17.4	23°17.3	23°17.2	23°17.1	23°17.0	23°16.8	23°16.7	23°16.6	23°16.5	23°16.4	23°16.3	23°16.1	-0.1
Mo 28	269°09.4	284°09.3	299°09.2	314°09.0	329°08.9	344°08.8	359°08.7	14°08.5	29°08.4	44°08.3	59°08.2	74°08.0	-0.1
	23°14.5	23°14.4	23°14.3	23°14.2	23°14.0	23°13.9	23°13.8	23°13.6	23°13.5	23°13.4	23°13.2	23°13.1	-0.1
Tu 29	269°06.4	284°06.3	299°06.2	314°06.0	329°05.9	344°05.8	359°05.7	14°05.5	29°05.4	44°05.3	59°05.2	74°05.1	-0.1
	23°11.3	23°11.1	23°11.0	23°10.8	23°10.7	23°10.5	23°10.4	23°10.2	23°10.1	23°09.9	23°09.8	23°09.6	-0.1
We 30	269°03.5	284°03.3	299°03.2	314°03.1	329°03.0	344°02.9	359°02.7	14°02.6	29°02.5	44°02.4	59°02.2	74°02.1	-0.1
	23°07.6	23°07.4	23°07.3	23°07.1	23°07.0	23°06.8	23°06.6	23°06.5	23°06.3	23°06.1	23°06.0	23°05.8	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2032

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Tu 1	240°49.5	255°19.1	269°48.6	284°18.2	298°47.8	313°17.4	327°47.0	342°16.6	356°46.2	11°15.8	25°45.4	+29.6	16.0
	1°46.9	1°58.6	2°10.3	2°21.9	2°33.6	2°45.2	2°56.8	3°08.4	3°19.9	3°31.5	3°43.0	+11.6	58.7
We 2	255°19.1	269°48.6	284°18.2	298°47.8	313°17.4	327°47.0	342°16.6	356°46.2	11°15.8	25°45.4	40°15.0	+29.6	16.0
	1°58.6	2°10.3	2°21.9	2°33.6	2°45.2	2°56.8	3°08.4	3°19.9	3°31.5	3°43.0	3°54.4	+11.6	58.7
Th 3	257°38.9	272°08.5	286°38.0	301°07.6	315°37.1	330°06.6	344°36.1	359°05.6	13°35.1	28°04.6	42°34.0	+29.5	15.9
	6°42.9	6°53.8	7°04.7	7°15.5	7°26.3	7°37.1	7°47.8	7°58.4	8°09.1	8°19.6	8°30.1	+10.7	58.3
Fr 4	259°54.3	274°23.6	288°52.8	303°22.0	317°51.1	332°20.3	346°49.4	1°18.5	15°47.6	30°16.7	44°45.8	+29.1	15.8
	11°01.0	11°10.5	11°20.0	11°29.5	11°38.8	11°48.1	11°57.3	12°06.5	12°15.6	12°24.6	12°33.5	+9.3	57.8
Sa 5	261°59.5	276°28.2	290°57.0	305°25.7	319°54.4	334°23.1	348°51.8	3°20.4	17°49.1	32°17.7	46°46.3	+28.7	15.6
	14°38.3	14°45.9	14°53.5	15°01.0	15°08.4	15°15.7	15°22.9	15°30.0	15°37.1	15°44.0	15°50.9	+7.3	57.3
Su 6	263°53.7	278°22.1	292°50.5	307°18.9	321°47.2	336°15.6	350°43.9	5°12.3	19°40.6	34°09.0	48°37.3	+28.4	15.5
	17°22.5	17°27.8	17°33.1	17°38.2	17°43.2	17°48.1	17°52.9	17°57.7	18°02.3	18°06.8	18°11.2	+4.9	56.8
Mo 7	265°42.2	280°10.5	294°38.9	309°07.2	323°35.6	338°04.0	352°32.4	7°00.8	21°29.2	35°57.6	50°26.0	+28.4	15.3
	19°04.9	19°07.6	19°10.2	19°12.7	19°15.1	19°17.4	19°19.6	19°21.7	19°23.7	19°25.6	19°27.4	+2.3	56.3
● Tu 8	267°34.7	282°03.4	296°32.2	311°01.0	325°29.8	339°58.7	354°27.5	8°56.5	23°25.4	37°54.4	52°23.4	+28.9	15.2
	19°41.2	19°41.2	19°41.2	19°41.1	19°40.8	19°40.5	19°40.0	19°39.5	19°38.8	19°38.1	19°37.2	-0.4	55.7
We 9	269°42.6	284°12.2	298°41.9	313°11.5	327°41.2	342°11.0	356°40.8	11°10.7	25°40.5	40°10.5	54°40.4	+29.8	15.1
	19°12.4	19°09.9	19°07.4	19°04.8	19°02.0	18°59.2	18°56.3	18°53.3	18°50.2	18°47.0	18°43.7	-2.9	55.2
Th 10	272°15.7	286°46.4	301°17.2	315°48.1	330°18.9	344°49.9	359°20.8	13°51.9	28°23.0	42°54.1	57°25.3	+31.0	14.9
	17°44.0	17°39.4	17°34.6	17°29.8	17°24.9	17°19.9	17°14.9	17°09.7	17°04.5	16°59.2	16°53.9	-5.0	54.8
Fr 11	275°19.0	289°50.9	304°23.0	318°55.0	333°27.1	347°59.3	2°31.5	17°03.8	31°36.1	46°08.4	60°40.8	+32.2	14.8
	15°24.7	15°18.2	15°11.7	15°05.1	14°58.4	14°51.6	14°44.8	14°38.0	14°31.0	14°24.0	14°17.0	-6.8	54.4
Sa 12	278°52.2	293°25.3	307°58.4	322°31.6	337°04.8	351°38.1	6°11.4	20°44.7	35°18.1	49°51.5	64°24.9	+33.3	14.8
	12°24.5	12°16.6	12°08.6	12°00.6	11°52.5	11°44.4	11°36.2	11°28.0	11°19.8	11°11.5	11°03.1	-8.1	54.2
Su 13	282°50.4	297°24.4	311°58.4	326°32.3	341°06.4	355°40.4	10°14.5	24°48.6	39°22.7	53°56.8	68°31.0	+34.1	14.8
	8°53.2	8°44.2	8°35.2	8°26.1	8°17.1	8°08.0	7°58.8	7°49.7	7°40.5	7°31.3	7°22.0	-9.1	54.1
Mo 14	287°05.3	301°39.7	316°14.1	330°48.5	345°22.9	359°57.3	14°31.7	29°06.2	43°40.6	58°15.0	72°49.5	+34.4	14.8
	5°00.0	4°50.3	4°40.6	4°30.9	4°21.2	4°11.5	4°01.7	3°51.9	3°42.1	3°32.3	3°22.5	-9.7	54.2
Tu 15	291°25.9	306°00.2	320°34.6	335°09.0	349°43.3	4°17.6	18°51.9	33°26.2	48°00.5	62°34.8	77°09.0	+34.3	14.8
	0°53.4	0°43.4	0°33.4	0°23.4	0°13.3	0°03.3	-0°06.8	-0°16.8	-0°26.9	-0°37.0	-0°47.0	-10.1	54.4
◐ We 16	295°40.0	310°13.9	324°47.7	339°21.5	353°55.2	8°28.9	23°02.6	37°36.3	52°09.9	66°43.5	81°17.0	+33.7	15.0
	-3°18.1	-3°28.1	-3°38.2	-3°48.2	-3°58.2	-4°08.2	-4°18.2	-4°28.2	-4°38.2	-4°48.2	-4°58.1	-10.0	54.9
Th 17	299°34.8	314°07.6	328°40.3	343°13.0	357°45.7	12°18.3	26°50.8	41°23.3	55°55.7	70°28.1	85°00.4	+32.6	15.1
	-7°25.6	-7°35.3	-7°45.0	-7°54.6	-8°04.2	-8°13.8	-8°23.3	-8°32.8	-8°42.3	-8°51.8	-9°01.2	-9.6	55.5
Fr 18	302°57.4	317°28.7	331°59.9	346°31.0	1°02.1	15°33.1	30°04.0	44°34.8	59°05.6	73°36.3	88°06.9	+30.9	15.3
	-11°18.7	-11°27.5	-11°36.3	-11°45.1	-11°53.8	-12°02.5	-12°11.1	-12°19.6	-12°28.2	-12°36.6	-12°45.0	-8.6	56.3
Sa 19	305°36.8	320°06.2	334°35.5	349°04.7	3°33.8	18°02.8	32°31.8	47°00.6	61°29.4	75°58.1	90°26.7	+29.0	15.6
	-14°44.3	-14°51.8	-14°59.2	-15°06.5	-15°13.7	-15°20.9	-15°28.0	-15°35.0	-15°41.9	-15°48.8	-15°55.6	-7.1	57.1
Su 20	307°26.2	321°53.5	336°20.7	350°47.9	5°14.9	19°41.9	34°08.8	48°35.7	63°02.4	77°29.1	91°55.7	+27.0	15.8
	-17°27.2	-17°32.6	-17°37.9	-17°43.1	-17°48.2	-17°53.2	-17°58.1	-18°02.9	-18°07.6	-18°12.2	-18°16.7	-4.9	58.0
Mo 21	308°26.1	322°51.5	337°17.0	351°42.3	6°07.6	20°32.8	34°58.0	49°23.1	63°48.2	78°13.2	92°38.2	+25.2	16.1
	-19°10.7	-19°13.4	-19°15.9	-19°18.4	-19°20.7	-19°22.9	-19°25.0	-19°26.9	-19°28.7	-19°30.4	-19°32.0	-2.1	58.9
Tu 22	308°47.0	323°11.3	337°35.6	351°59.8	6°24.0	20°48.2	35°12.4	49°36.5	64°00.6	78°24.7	92°48.8	+24.2	16.3
	-19°39.9	-19°39.3	-19°38.7	-19°37.9	-19°36.9	-19°35.9	-19°34.7	-19°33.3	-19°31.8	-19°30.2	-19°28.5	+1.1	59.6
○ We 23	308°48.8	323°12.8	337°36.9	352°00.9	6°24.9	20°49.0	35°13.0	49°37.1	64°01.2	78°25.3	92°49.4	+24.1	16.4
	-18°45.9	-18°42.0	-18°38.0	-18°33.8	-18°29.5	-18°25.1	-18°20.5	-18°15.8	-18°11.0	-18°06.0	-18°00.9	+4.5	60.1
Th 24	308°54.6	323°19.3	337°43.9	352°08.6	6°33.3	20°58.1	35°22.9	49°47.8	64°12.7	78°37.6	93°02.6	+24.8	16.5
	-16°29.8	-16°22.8	-16°15.7	-16°08.4	-16°01.0	-15°53.6	-15°46.0	-15°38.3	-15°30.5	-15°22.6	-15°14.6	+7.5	60.4
Fr 25	309°23.4	323°49.2	338°15.0	352°40.9	7°06.9	21°32.9	35°58.9	50°25.1	64°51.2	79°17.5	93°43.7	+26.0	16.5
	-13°02.7	-12°53.2	-12°43.6	-12°33.9	-12°24.2	-12°14.3	-12°04.4	-11°54.4	-11°44.4	-11°34.2	-11°24.0	+9.9	60.4
Sa 26	323°49.2	338°15.0	352°40.9	7°06.9	21°32.9	35°58.9	50°25.1	64°51.2	79°17.5	93°43.7	108°10.1	+26.1	16.5
	-12°53.2	-12°43.6	-12°33.9	-12°24.2	-12°14.3	-12°04.4	-11°54.4	-11°44.4	-11°34.2	-11°24.0	-11°13.7	+10.0	60.4
Su 27	324°51.6	339°18.8	353°46.0	8°13.3	22°40.7	37°08.1	51°35.5	66°03.0	80°30.6	94°58.2	109°25.8	+27.4	16.4
	-8°32.1	-8°20.9	-8°09.6	-7°58.3	-7°47.0	-7°35.6	-7°24.1	-7°12.7	-7°01.2	-6°49.6	-6°38.1	+11.4	60.1
Mo 28	326°25.9	340°54.2	355°22.6	9°51.0	24°19.5	38°48.0	53°16.5	67°45.1	82°13.7	96°42.3	111°11.0	+28.5	16.3
	-3°41.2	-3°29.3	-3°17.3	-3°05.4	-2°53.4	-2°41.4	-2°29.4	-2°17.4	-2°05.4	-1°53.4	-1°41.4	+12.0	59.7
Tu 29	328°24.6	342°53.7	357°22.9	11°52.0	26°21.2	40°50.4	55°19.6	69°48.9	84°18.1	98°47.4	113°16.7	+29.2	16.1
	1°18.0	1°29.9	1°41.7	1°53.5	2°05.4	2°17.1	2°28.9	2°40.6	2°52.3	3°04.0	3°15.7	+11.8	59.1
◑ We 30	330°37.5	345°07.0	359°36.4	14°05.9	28°35.4	43°04.9	57°34.3	72°03.8	86°33.3	101°02.8	115°32.3	+29.5	15.9
	6°06.6	6°17.7	6°28.8	6°39.8	6°50.7	7°01.6	7°12.5	7°23.3	7°34.0	7°44.7	7°55.4	+10.9	58.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 8 01h32 — FQ: 16 02h59 — FM: 23 11h32 — LQ: 30 02h11

SUN

July 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269°00.6	284°00.4	299°00.3	314°00.2	329°00.1	344°00.0	358°59.9	13°59.7	28°59.6	43°59.5	58°59.4	73°59.3	-0.1
	23°03.5	23°03.3	23°03.2	23°03.0	23°02.8	23°02.6	23°02.4	23°02.3	23°02.1	23°01.9	23°01.7	23°01.5	-0.2
Fr 2	268°57.7	283°57.6	298°57.5	313°57.4	328°57.3	343°57.2	358°57.0	13°56.9	28°56.8	43°56.7	58°56.6	73°56.5	-0.1
	22°59.0	22°58.8	22°58.6	22°58.5	22°58.3	22°58.1	22°57.9	22°57.7	22°57.5	22°57.3	22°57.1	22°56.9	-0.2
Sa 3	268°55.0	283°54.9	298°54.7	313°54.6	328°54.5	343°54.4	358°54.3	13°54.2	28°54.1	43°54.0	58°53.8	73°53.7	-0.1
	22°54.2	22°53.9	22°53.7	22°53.5	22°53.3	22°53.1	22°52.9	22°52.7	22°52.4	22°52.2	22°52.0	22°51.8	-0.2
Su 4	268°52.3	283°52.2	298°52.1	313°51.9	328°51.8	343°51.7	358°51.6	13°51.5	28°51.4	43°51.3	58°51.2	73°51.1	-0.1
	22°48.9	22°48.6	22°48.4	22°48.2	22°48.0	22°47.7	22°47.5	22°47.3	22°47.0	22°46.8	22°46.6	22°46.3	-0.2
Mo 5	268°49.7	283°49.6	298°49.5	313°49.3	328°49.2	343°49.1	358°49.0	13°48.9	28°48.8	43°48.7	58°48.6	73°48.5	-0.1
	22°43.2	22°42.9	22°42.7	22°42.5	22°42.2	22°42.0	22°41.7	22°41.5	22°41.2	22°41.0	22°40.7	22°40.5	-0.2
Tu 6	268°47.1	283°47.0	298°46.9	313°46.8	328°46.7	343°46.6	358°46.5	13°46.4	28°46.3	43°46.2	58°46.1	73°46.0	-0.1
	22°37.1	22°36.9	22°36.6	22°36.3	22°36.1	22°35.8	22°35.5	22°35.3	22°35.0	22°34.7	22°34.5	22°34.2	-0.3
We 7	268°44.7	283°44.6	298°44.5	313°44.4	328°44.3	343°44.2	358°44.1	13°44.0	28°43.9	43°43.8	58°43.7	73°43.6	-0.1
	22°30.6	22°30.4	22°30.1	22°29.8	22°29.5	22°29.3	22°29.0	22°28.7	22°28.4	22°28.1	22°27.8	22°27.6	-0.3
Th 8	268°42.4	283°42.3	298°42.2	313°42.1	328°42.0	343°41.9	358°41.8	13°41.7	28°41.6	43°41.5	58°41.4	73°41.3	-0.1
	22°23.8	22°23.5	22°23.2	22°22.9	22°22.6	22°22.3	22°22.0	22°21.7	22°21.4	22°21.1	22°20.8	22°20.5	-0.3
Fr 9	268°40.1	283°40.1	298°40.0	313°39.9	328°39.8	343°39.7	358°39.6	13°39.5	28°39.4	43°39.3	58°39.2	73°39.2	-0.1
	22°16.6	22°16.2	22°15.9	22°15.6	22°15.3	22°15.0	22°14.7	22°14.4	22°14.1	22°13.7	22°13.4	22°13.1	-0.3
Sa 10	268°38.0	283°37.9	298°37.8	313°37.8	328°37.7	343°37.6	358°37.5	13°37.4	28°37.3	43°37.3	58°37.2	73°37.1	-0.1
	22°08.9	22°08.6	22°08.3	22°07.9	22°07.6	22°07.3	22°07.0	22°06.6	22°06.3	22°06.0	22°05.6	22°05.3	-0.3
Su 11	268°36.0	283°35.9	298°35.8	313°35.8	328°35.7	343°35.6	358°35.5	13°35.4	28°35.4	43°35.3	58°35.2	73°35.1	-0.1
	22°00.9	22°00.6	22°00.2	21°59.9	21°59.6	21°59.2	21°58.9	21°58.5	21°58.2	21°57.8	21°57.5	21°57.1	-0.3
Mo 12	268°34.1	283°34.0	298°34.0	313°33.9	328°33.8	343°33.7	358°33.7	13°33.6	28°33.5	43°33.4	58°33.4	73°33.3	-0.1
	21°52.5	21°52.2	21°51.8	21°51.5	21°51.1	21°50.7	21°50.4	21°50.0	21°49.7	21°49.3	21°48.9	21°48.6	-0.4
Tu 13	268°32.3	283°32.3	298°32.2	313°32.1	328°32.1	343°32.0	358°31.9	13°31.8	28°31.8	43°31.7	58°31.6	73°31.6	-0.1
	21°43.8	21°43.4	21°43.0	21°42.7	21°42.3	21°41.9	21°41.5	21°41.2	21°40.8	21°40.4	21°40.0	21°39.6	-0.4
We 14	268°30.7	283°30.6	298°30.6	313°30.5	328°30.4	343°30.4	358°30.3	13°30.2	28°30.2	43°30.1	58°30.0	73°30.0	-0.1
	21°34.7	21°34.3	21°33.9	21°33.5	21°33.1	21°32.7	21°32.3	21°31.9	21°31.5	21°31.1	21°30.7	21°30.4	-0.4
Th 15	268°29.2	283°29.1	298°29.0	313°29.0	328°28.9	343°28.9	358°28.8	13°28.8	28°28.7	43°28.6	58°28.6	73°28.5	-0.1
	21°25.2	21°24.8	21°24.4	21°24.0	21°23.5	21°23.1	21°22.7	21°22.3	21°21.9	21°21.5	21°21.1	21°20.7	-0.4
Fr 16	268°27.8	283°27.7	298°27.7	313°27.6	328°27.6	343°27.5	358°27.5	13°27.4	28°27.3	43°27.3	58°27.2	73°27.2	-0.1
	21°15.3	21°14.9	21°14.5	21°14.0	21°13.6	21°13.2	21°12.8	21°12.4	21°11.9	21°11.5	21°11.1	21°10.7	-0.4
Sa 17	268°26.5	283°26.5	298°26.4	313°26.4	328°26.3	343°26.3	358°26.2	13°26.2	28°26.1	43°26.1	58°26.0	73°26.0	-0.0
	21°05.1	21°04.7	21°04.2	21°03.8	21°03.4	21°02.9	21°02.5	21°02.0	21°01.6	21°01.2	21°00.7	21°00.3	-0.4
Su 18	268°25.4	283°25.4	298°25.3	313°25.3	328°25.2	343°25.2	358°25.2	13°25.1	28°25.1	43°25.0	58°25.0	73°25.0	-0.0
	20°54.5	20°54.1	20°53.6	20°53.2	20°52.7	20°52.3	20°51.8	20°51.4	20°50.9	20°50.5	20°50.0	20°49.6	-0.5
Mo 19	268°24.4	283°24.4	298°24.4	313°24.3	328°24.3	343°24.3	358°24.2	13°24.2	28°24.2	43°24.1	58°24.1	73°24.0	-0.0
	20°43.6	20°43.1	20°42.7	20°42.2	20°41.7	20°41.3	20°40.8	20°40.3	20°39.9	20°39.4	20°38.9	20°38.5	-0.5
Tu 20	268°23.6	283°23.6	298°23.6	313°23.5	328°23.5	343°23.5	358°23.4	13°23.4	28°23.4	43°23.3	58°23.3	73°23.3	-0.0
	20°32.3	20°31.8	20°31.4	20°30.9	20°30.4	20°29.9	20°29.4	20°29.0	20°28.5	20°28.0	20°27.5	20°27.0	-0.5
We 21	268°22.9	283°22.9	298°22.9	313°22.9	328°22.8	343°22.8	358°22.8	13°22.8	28°22.7	43°22.7	58°22.7	73°22.7	-0.0
	20°20.7	20°20.2	20°19.7	20°19.2	20°18.7	20°18.2	20°17.7	20°17.3	20°16.8	20°16.3	20°15.8	20°15.3	-0.5
Th 22	268°22.4	283°22.4	298°22.4	313°22.3	328°22.3	343°22.3	358°22.3	13°22.3	28°22.2	43°22.2	58°22.2	73°22.2	-0.0
	20°08.7	20°08.2	20°07.7	20°07.2	20°06.7	20°06.2	20°05.7	20°05.2	20°04.7	20°04.2	20°03.7	20°03.2	-0.5
Fr 23	268°22.0	283°22.0	298°22.0	313°22.0	328°21.9	343°21.9	358°21.9	13°21.9	28°21.9	43°21.9	58°21.9	73°21.9	-0.0
	19°56.5	19°55.9	19°55.4	19°54.9	19°54.4	19°53.9	19°53.3	19°52.8	19°52.3	19°51.8	19°51.2	19°50.7	-0.5
Sa 24	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	-0.0
	19°43.8	19°43.3	19°42.8	19°42.2	19°41.7	19°41.2	19°40.6	19°40.1	19°39.5	19°39.0	19°38.5	19°37.9	-0.5
Su 25	268°21.6	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.6	13°21.6	28°21.6	43°21.6	58°21.6	73°21.6	+0.0
	19°30.9	19°30.3	19°29.8	19°29.2	19°28.7	19°28.1	19°27.6	19°27.0	19°26.5	19°25.9	19°25.4	19°24.8	-0.5
Mo 26	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.7	13°21.7	28°21.7	43°21.7	58°21.7	73°21.8	+0.0
	19°17.6	19°17.0	19°16.5	19°15.9	19°15.4	19°14.8	19°14.2	19°13.7	19°13.1	19°12.5	19°12.0	19°11.4	-0.6
Tu 27	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.9	358°21.9	13°22.0	28°22.0	43°22.0	58°22.0	73°22.0	+0.0
	19°04.0	19°03.4	19°02.9	19°02.3	19°01.7	19°01.1	19°00.6	19°00.0	18°59.4	18°58.8	18°58.2	18°57.7	-0.6
We 28	268°22.2	283°22.2	298°22.2	313°22.3	328°22.3	343°22.3	358°22.3	13°22.3	28°22.4	43°22.4	58°22.4	73°22.4	+0.0
	18°50.1	18°49.5	18°48.9	18°48.3	18°47.7	18°47.1	18°46.6	18°46.0	18°45.4	18°44.8	18°44.2	18°43.6	-0.6
Th 29	268°22.7	283°22.7	298°22.7	313°22.8	328°22.8	343°22.8	358°22.8	13°22.9	28°22.9	43°22.9	58°22.9	73°23.0	+0.0
	18°35.9	18°35.3	18°34.7	18°34.1	18°33.5	18°32.9	18°32.3	18°31.7	18°31.1	18°30.4	18°29.8	18°29.2	-0.6
Fr 30	268°23.3	283°23.3	298°23.4	313°23.4	328°23.4	343°23.5	358°23.5	13°23.5	28°23.6	43°23.6	58°23.6	73°23.7	+0.0
	18°21.3	18°20.7	18°20.1	18°19.5	18°18.9	18°18.3	18°17.7	18°17.0	18°16.4	18°15.8	18°15.2	18°14.6	-0.6
Sa 31	268°24.1	283°24.1	298°24.2	313°24.2	328°24.2	343°24.3	358°24.3	13°24.3	28°24.4	43°24.4	58°24.5	73°24.5	+0.0
	18°06.5	18°05.9	18°05.2	18°04.6	18°04.0	18°03.4	18°02.7	18°02.1	18°01.5	18°00.9	18°00.2	17°59.6	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2032

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Th 1	233°43.1	248°12.3	262°41.6	277°10.9	291°40.1	306°09.3	320°38.6	335°07.8	349°37.0	4°06.1	18°35.3	+29.2	15.6
	13°12.6	13°21.0	13°29.4	13°37.6	13°45.8	13°53.9	14°01.9	14°09.9	14°17.7	14°25.5	14°33.2	+8.1	57.4
Fr 2	248°12.3	262°41.6	277°10.9	291°40.1	306°09.3	320°38.6	335°07.8	349°37.0	4°06.1	18°35.3	33°04.5	+29.2	15.6
	13°21.0	13°29.4	13°37.6	13°45.8	13°53.9	14°01.9	14°09.9	14°17.7	14°25.5	14°33.2	14°40.8	+8.0	57.3
Sa 3	250°20.6	264°49.5	279°18.5	293°47.5	308°16.4	322°45.4	337°14.3	351°43.3	6°12.2	20°41.1	35°10.0	+28.9	15.5
	16°24.3	16°30.5	16°36.5	16°42.5	16°48.4	16°54.2	16°59.9	17°05.5	17°11.1	17°16.5	17°21.8	+5.8	56.7
Su 4	252°22.9	266°51.8	281°20.6	295°49.4	310°18.3	324°47.1	339°15.9	353°44.8	8°13.6	22°42.5	37°11.3	+28.8	15.3
	18°29.8	18°33.5	18°37.2	18°40.7	18°44.1	18°47.4	18°50.7	18°53.8	18°56.8	18°59.7	19°02.5	+3.3	56.2
Mo 5	254°24.9	268°53.9	283°22.9	297°52.0	312°21.0	326°50.1	341°19.1	355°48.2	10°17.3	24°46.5	39°15.6	+29.1	15.2
	19°32.3	19°33.5	19°34.5	19°35.5	19°36.3	19°37.1	19°37.7	19°38.3	19°38.7	19°39.1	19°39.3	+0.7	55.6
Tu 6	256°35.5	271°05.0	285°34.6	300°04.2	314°33.8	329°03.5	343°33.2	358°02.9	12°32.6	27°02.4	41°32.2	+29.7	15.0
	19°30.7	19°29.4	19°27.9	19°26.3	19°24.7	19°22.9	19°21.0	19°19.1	19°17.1	19°14.9	19°12.7	-1.8	55.2
● We 7	259°03.9	273°34.3	288°04.8	302°35.3	317°05.8	331°36.4	346°07.1	0°37.7	15°08.4	29°39.2	44°10.0	+30.6	14.9
	18°28.1	18°24.4	18°20.6	18°16.7	18°12.8	18°08.7	18°04.6	18°00.4	17°56.1	17°51.7	17°47.3	-4.1	54.8
Th 8	261°57.3	276°28.8	291°00.4	305°32.0	320°03.6	334°35.3	349°07.0	3°38.8	18°10.7	32°42.5	47°14.4	+31.7	14.8
	16°30.9	16°25.3	16°19.5	16°13.6	16°07.7	16°01.8	15°55.7	15°49.6	15°43.4	15°37.1	15°30.8	-6.0	54.4
Fr 9	265°18.6	279°51.2	294°23.9	308°56.6	323°29.3	338°02.1	352°35.0	7°07.8	21°40.7	36°13.7	50°46.7	+32.8	14.8
	13°48.4	13°41.0	13°33.7	13°26.3	13°18.8	13°11.2	13°03.7	12°56.0	12°48.3	12°40.6	12°32.8	-7.6	54.2
Sa 10	269°06.2	283°39.8	298°13.4	312°47.1	327°20.7	341°54.5	356°28.2	11°02.0	25°35.8	40°09.6	54°43.5	+33.7	14.7
	10°30.2	10°21.7	10°13.1	10°04.5	9°55.9	9°47.2	9°38.5	9°29.7	9°20.9	9°12.1	9°03.2	-8.7	54.0
Su 11	273°14.7	287°48.9	302°23.2	316°57.5	331°31.8	346°06.2	0°40.5	15°14.9	29°49.3	44°23.7	58°58.1	+34.3	14.7
	6°46.4	6°37.0	6°27.6	6°18.2	6°08.8	5°59.3	5°49.9	5°40.4	5°30.8	5°21.3	5°11.7	-9.5	54.0
Mo 12	277°35.6	292°10.2	306°44.7	321°19.3	335°53.9	350°28.4	5°03.0	19°37.6	34°12.1	48°46.7	63°21.2	+34.6	14.7
	2°46.2	2°36.3	2°26.5	2°16.6	2°06.8	1°56.9	1°47.0	1°37.2	1°27.3	1°17.4	1°07.5	-9.9	54.1
Tu 13	281°58.7	296°33.1	311°07.5	325°41.8	340°16.2	354°50.5	9°24.8	23°59.1	38°33.4	53°07.6	67°41.9	+34.3	14.8
	-1°21.7	-1°31.6	-1°41.6	-1°51.5	-2°01.4	-2°11.4	-2°21.3	-2°31.2	-2°41.2	-2°51.1	-3°01.0	-9.9	54.3
We 14	286°12.1	300°45.9	315°19.6	329°53.3	344°26.9	359°00.6	13°34.1	28°07.7	42°41.2	57°14.6	71°48.0	+33.6	14.9
	-5°28.4	-5°38.2	-5°47.9	-5°57.6	-6°07.2	-6°16.9	-6°26.5	-6°36.1	-6°45.7	-6°55.3	-7°04.8	-9.6	54.8
◐ Th 15	290°03.6	304°36.2	319°08.8	333°41.3	348°13.8	2°46.2	17°18.5	31°50.8	46°23.1	60°55.2	75°27.3	+32.4	15.1
	-9°25.0	-9°34.1	-9°43.1	-9°52.2	-10°01.2	-10°10.2	-10°19.1	-10°28.0	-10°36.8	-10°45.6	-10°54.4	-8.9	55.4
Fr 16	293°21.1	307°52.1	322°23.1	336°54.0	351°24.8	5°55.6	20°26.2	34°56.8	49°27.4	63°57.8	78°28.2	+30.7	15.3
	-13°00.7	-13°08.7	-13°16.7	-13°24.6	-13°32.4	-13°40.2	-13°48.0	-13°55.7	-14°03.3	-14°10.9	-14°18.4	-7.8	56.2
Sa 17	295°54.4	310°23.5	324°52.5	339°21.4	353°50.3	8°19.1	22°47.8	37°16.4	51°44.9	66°13.4	80°41.7	+28.7	15.6
	-16°02.9	-16°09.3	-16°15.6	-16°21.9	-16°28.0	-16°34.1	-16°40.1	-16°46.0	-16°51.8	-16°57.6	-17°03.2	-6.0	57.1
Su 18	297°37.5	312°04.5	326°31.5	340°58.4	355°25.3	9°52.0	24°18.7	38°45.3	53°11.9	67°38.3	82°04.7	+26.7	15.8
	-18°17.1	-18°21.2	-18°25.2	-18°29.2	-18°33.0	-18°36.7	-18°40.4	-18°43.9	-18°47.3	-18°50.6	-18°53.7	-3.7	58.1
Mo 19	298°31.9	312°57.2	327°22.4	341°47.6	356°12.7	10°37.7	25°02.7	39°27.7	53°52.6	68°17.4	82°42.2	+25.0	16.1
	-19°27.6	-19°28.9	-19°30.0	-19°31.1	-19°32.0	-19°32.8	-19°33.5	-19°34.0	-19°34.4	-19°34.7	-19°34.8	-0.7	59.0
Tu 20	298°48.6	313°12.7	327°36.8	342°00.9	356°25.0	10°49.0	25°13.0	39°37.0	54°01.0	68°24.9	82°48.8	+24.0	16.3
	-19°21.2	-19°19.2	-19°17.1	-19°14.9	-19°12.5	-19°09.9	-19°07.3	-19°04.5	-19°01.6	-18°58.5	-18°55.3	+2.6	59.9
We 21	298°46.8	313°10.6	327°34.5	341°58.3	356°22.2	10°46.1	25°10.0	39°33.9	53°57.9	68°21.8	82°45.8	+23.9	16.5
	-17°51.1	-17°45.7	-17°40.3	-17°34.7	-17°29.0	-17°23.1	-17°17.1	-17°11.0	-17°04.8	-16°58.4	-16°51.9	+5.9	60.6
○ Th 22	298°48.1	313°12.5	327°36.9	342°01.4	356°25.9	10°50.4	25°15.0	39°39.6	54°04.2	68°28.9	82°53.7	+24.6	16.6
	-15°00.3	-14°51.9	-14°43.5	-14°34.9	-14°26.3	-14°17.5	-14°08.6	-13°59.6	-13°50.6	-13°41.4	-13°32.1	+8.8	61.0
Fr 23	299°09.8	313°35.3	328°00.8	342°26.3	356°51.9	11°17.5	25°43.2	40°08.9	54°34.7	69°00.5	83°26.4	+25.7	16.7
	-11°02.4	-10°51.8	-10°41.1	-10°30.3	-10°19.4	-10°08.5	-9°57.6	-9°46.5	-9°35.4	-9°24.3	-9°13.0	+10.9	61.1
Sa 24	300°00.3	314°26.9	328°53.6	343°20.3	357°47.1	12°13.9	26°40.8	41°07.7	55°34.6	70°01.6	84°28.6	+26.8	16.6
	-6°18.6	-6°06.6	-5°54.6	-5°42.6	-5°30.5	-5°18.4	-5°06.3	-4°54.2	-4°42.0	-4°29.9	-4°17.7	+12.1	60.8
Su 25	301°19.0	315°46.6	330°14.3	344°42.1	359°09.8	13°37.6	28°05.4	42°33.3	57°01.2	71°29.1	85°57.1	+27.8	16.4
	-1°13.2	-1°00.9	-0°48.6	-0°36.3	-0°24.0	-0°11.7	0°00.6	0°12.9	0°25.1	0°37.4	0°49.6	+12.3	60.3
Mo 26	315°46.6	330°14.3	344°42.1	359°09.8	13°37.6	28°05.4	42°33.3	57°01.2	71°29.1	85°57.1	100°25.1	+27.8	16.4
	-1°00.9	-0°48.6	-0°36.3	-0°24.0	-0°11.7	0°00.6	0°12.9	0°25.1	0°37.4	0°49.6	1°01.8	+12.3	60.3
Tu 27	317°28.1	331°56.4	346°24.9	0°53.3	15°21.7	29°50.2	44°18.7	58°47.2	73°15.7	87°44.3	102°12.8	+28.5	16.2
	4°02.0	4°13.8	4°25.5	4°37.2	4°48.8	5°00.5	5°12.0	5°23.5	5°35.0	5°46.4	5°57.8	+11.6	59.5
We 28	319°22.8	333°51.5	348°20.3	2°49.0	17°17.8	31°46.6	46°15.4	60°44.2	75°13.0	89°41.8	104°10.6	+28.8	16.0
	8°42.2	8°52.7	9°03.2	9°13.5	9°23.8	9°34.1	9°44.2	9°54.4	10°04.4	10°14.4	10°24.3	+10.2	58.7
◑ Th 29	321°23.2	335°52.1	350°20.9	4°49.8	19°18.6	33°47.5	48°16.4	62°45.2	77°14.1	91°43.0	106°11.8	+28.9	15.8
	12°43.9	12°52.6	13°01.2	13°09.7	13°18.1	13°26.5	13°34.8	13°42.9	13°51.0	13°59.1	14°07.0	+8.3	57.8
Fr 30	323°24.8	337°53.6	352°22.5	6°51.4	21°20.2	35°49.1	50°18.0	64°46.8	79°15.7	93°44.6	108°13.4	+28.9	15.5
	15°55.2	16°01.7	16°08.1	16°14.4	16°20.6	16°26.7	16°32.7	16°38.6	16°44.4	16°50.2	16°55.8	+6.1	57.0
Sa 31	325°26.9	339°55.8	354°24.7	8°53.7	23°22.6	37°51.6	52°20.6	66°49.5	81°18.5	95°47.5	110°16.5	+29.0	15.3
	18°08.3	18°12.4	18°16.3	18°20.2	18°23.9	18°27.5	18°31.1	18°34.5	18°37.8	18°41.1	18°44.2	+3.6	56.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 7 14h41 — FQ: 15 18h32 — FM: 22 18h51 — LQ: 29 09h25

SUN

August 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	268° 25.0	283° 25.1	298° 25.1	313° 25.1	328° 25.2	343° 25.2	358° 25.3	13° 25.3	28° 25.4	43° 25.4	58° 25.4	73° 25.5	+0.0
	17° 51.4	17° 50.7	17° 50.1	17° 49.5	17° 48.8	17° 48.2	17° 47.5	17° 46.9	17° 46.3	17° 45.6	17° 45.0	17° 44.3	-0.6
Mo 2	268° 26.1	283° 26.1	298° 26.2	313° 26.2	328° 26.3	343° 26.3	358° 26.4	13° 26.4	28° 26.5	43° 26.5	58° 26.6	73° 26.6	+0.0
	17° 35.9	17° 35.3	17° 34.7	17° 34.0	17° 33.4	17° 32.7	17° 32.0	17° 31.4	17° 30.7	17° 30.1	17° 29.4	17° 28.8	-0.7
Tu 3	268° 27.3	283° 27.4	298° 27.4	313° 27.5	328° 27.5	343° 27.6	358° 27.6	13° 27.7	28° 27.7	43° 27.8	58° 27.9	73° 27.9	+0.1
	17° 20.2	17° 19.6	17° 18.9	17° 18.3	17° 17.6	17° 16.9	17° 16.3	17° 15.6	17° 14.9	17° 14.3	17° 13.6	17° 12.9	-0.7
We 4	268° 28.7	283° 28.7	298° 28.8	313° 28.8	328° 28.9	343° 29.0	358° 29.0	13° 29.1	28° 29.2	43° 29.2	58° 29.3	73° 29.3	+0.1
	17° 04.3	17° 03.6	17° 02.9	17° 02.2	17° 01.6	17° 00.9	17° 00.2	16° 59.5	16° 58.9	16° 58.2	16° 57.5	16° 56.8	-0.7
Th 5	268° 30.2	283° 30.2	298° 30.3	313° 30.4	328° 30.4	343° 30.5	358° 30.6	13° 30.7	28° 30.7	43° 30.8	58° 30.9	73° 30.9	+0.1
	16° 48.0	16° 47.3	16° 46.6	16° 45.9	16° 45.3	16° 44.6	16° 43.9	16° 43.2	16° 42.5	16° 41.8	16° 41.1	16° 40.4	-0.7
Fr 6	268° 31.8	283° 31.9	298° 32.0	313° 32.1	328° 32.1	343° 32.2	358° 32.3	13° 32.4	28° 32.4	43° 32.5	58° 32.6	73° 32.7	+0.1
	16° 31.5	16° 30.8	16° 30.1	16° 29.4	16° 28.7	16° 28.0	16° 27.3	16° 26.6	16° 25.9	16° 25.2	16° 24.5	16° 23.8	-0.7
Sa 7	268° 33.7	283° 33.7	298° 33.8	313° 33.9	328° 34.0	343° 34.1	358° 34.1	13° 34.2	28° 34.3	43° 34.4	58° 34.5	73° 34.5	+0.1
	16° 14.7	16° 13.9	16° 13.2	16° 12.5	16° 11.8	16° 11.1	16° 10.4	16° 09.7	16° 09.0	16° 08.3	16° 07.6	16° 06.9	-0.7
Su 8	268° 35.6	283° 35.7	298° 35.8	313° 35.9	328° 36.0	343° 36.0	358° 36.1	13° 36.2	28° 36.3	43° 36.4	58° 36.5	73° 36.6	+0.1
	15° 57.6	15° 56.9	15° 56.2	15° 55.4	15° 54.7	15° 54.0	15° 53.3	15° 52.6	15° 51.8	15° 51.1	15° 50.4	15° 49.7	-0.7
Mo 9	268° 37.7	283° 37.8	298° 37.9	313° 38.0	328° 38.1	343° 38.2	358° 38.3	13° 38.4	28° 38.5	43° 38.6	58° 38.6	73° 38.7	+0.1
	15° 40.3	15° 39.5	15° 38.8	15° 38.1	15° 37.4	15° 36.6	15° 35.9	15° 35.2	15° 34.4	15° 33.7	15° 33.0	15° 32.3	-0.7
Tu 10	268° 40.0	283° 40.1	298° 40.2	313° 40.3	328° 40.4	343° 40.5	358° 40.6	13° 40.7	28° 40.8	43° 40.9	58° 41.0	73° 41.1	+0.1
	15° 22.7	15° 22.0	15° 21.2	15° 20.5	15° 19.8	15° 19.0	15° 18.3	15° 17.5	15° 16.8	15° 16.1	15° 15.3	15° 14.6	-0.7
We 11	268° 42.4	283° 42.5	298° 42.6	313° 42.7	328° 42.8	343° 42.9	358° 43.0	13° 43.1	28° 43.2	43° 43.3	58° 43.4	73° 43.5	+0.1
	15° 04.9	15° 04.2	15° 03.4	15° 02.7	15° 01.9	15° 01.2	15° 00.4	14° 59.7	14° 58.9	14° 58.2	14° 57.4	14° 56.7	-0.7
Th 12	268° 44.9	283° 45.0	298° 45.1	313° 45.3	328° 45.4	343° 45.5	358° 45.6	13° 45.7	28° 45.8	43° 45.9	58° 46.0	73° 46.1	+0.1
	14° 46.8	14° 46.1	14° 45.3	14° 44.6	14° 43.8	14° 43.1	14° 42.3	14° 41.5	14° 40.8	14° 40.0	14° 39.3	14° 38.5	-0.8
Fr 13	268° 47.6	283° 47.7	298° 47.8	313° 48.0	328° 48.1	343° 48.2	358° 48.3	13° 48.4	28° 48.5	43° 48.7	58° 48.8	73° 48.9	+0.1
	14° 28.6	14° 27.8	14° 27.0	14° 26.3	14° 25.5	14° 24.7	14° 24.0	14° 23.2	14° 22.4	14° 21.6	14° 20.9	14° 20.1	-0.8
Sa 14	268° 50.4	283° 50.6	298° 50.7	313° 50.8	328° 50.9	343° 51.0	358° 51.2	13° 51.3	28° 51.4	43° 51.5	58° 51.7	73° 51.8	+0.1
	14° 10.1	14° 09.3	14° 08.5	14° 07.7	14° 06.9	14° 06.2	14° 05.4	14° 04.6	14° 03.8	14° 03.0	14° 02.3	14° 01.5	-0.8
Su 15	268° 53.4	283° 53.5	298° 53.7	313° 53.8	328° 53.9	343° 54.0	358° 54.2	13° 54.3	28° 54.4	43° 54.6	58° 54.7	73° 54.8	+0.1
	13° 51.3	13° 50.5	13° 49.7	13° 49.0	13° 48.2	13° 47.4	13° 46.6	13° 45.8	13° 45.0	13° 44.2	13° 43.4	13° 42.7	-0.8
Mo 16	268° 56.5	283° 56.6	298° 56.8	313° 56.9	328° 57.0	343° 57.2	358° 57.3	13° 57.4	28° 57.6	43° 57.7	58° 57.8	73° 58.0	+0.1
	13° 32.4	13° 31.6	13° 30.8	13° 30.0	13° 29.2	13° 28.4	13° 27.6	13° 26.8	13° 26.0	13° 25.2	13° 24.4	13° 23.6	-0.8
Tu 17	268° 59.7	283° 59.9	299° 00.0	314° 00.2	329° 00.3	344° 00.4	359° 00.6	14° 00.7	29° 00.8	44° 01.0	59° 01.1	74° 01.3	+0.1
	13° 13.2	13° 12.4	13° 11.6	13° 10.8	13° 10.0	13° 09.2	13° 08.4	13° 07.6	13° 06.8	13° 05.9	13° 05.1	13° 04.3	-0.8
We 18	269° 03.1	284° 03.3	299° 03.4	314° 03.5	329° 03.7	344° 03.8	359° 04.0	14° 04.1	29° 04.3	44° 04.4	59° 04.5	74° 04.7	+0.1
	12° 53.8	12° 53.0	12° 52.2	12° 51.4	12° 50.6	12° 49.7	12° 48.9	12° 48.1	12° 47.3	12° 46.5	12° 45.7	12° 44.9	-0.8
Th 19	269° 06.6	284° 06.7	299° 06.9	314° 07.0	329° 07.2	344° 07.3	359° 07.5	14° 07.6	29° 07.8	44° 07.9	59° 08.1	74° 08.2	+0.1
	12° 34.2	12° 33.4	12° 32.6	12° 31.8	12° 30.9	12° 30.1	12° 29.3	12° 28.5	12° 27.7	12° 26.8	12° 26.0	12° 25.2	-0.8
Fr 20	269° 10.2	284° 10.4	299° 10.5	314° 10.7	329° 10.8	344° 11.0	359° 11.1	14° 11.3	29° 11.4	44° 11.6	59° 11.8	74° 11.9	+0.2
	12° 14.5	12° 13.6	12° 12.8	12° 12.0	12° 11.1	12° 10.3	12° 09.5	12° 08.6	12° 07.8	12° 07.0	12° 06.2	12° 05.3	-0.8
Sa 21	269° 13.9	284° 14.1	299° 14.3	314° 14.4	329° 14.6	344° 14.7	359° 14.9	14° 15.1	29° 15.2	44° 15.4	59° 15.5	74° 15.7	+0.2
	11° 54.5	11° 53.6	11° 52.8	11° 52.0	11° 51.1	11° 50.3	11° 49.5	11° 48.6	11° 47.8	11° 46.9	11° 46.1	11° 45.3	-0.8
Su 22	269° 17.8	284° 18.0	299° 18.1	314° 18.3	329° 18.4	344° 18.6	359° 18.8	14° 18.9	29° 19.1	44° 19.3	59° 19.4	74° 19.6	+0.2
	11° 34.3	11° 33.5	11° 32.6	11° 31.8	11° 30.9	11° 30.1	11° 29.3	11° 28.4	11° 27.6	11° 26.7	11° 25.9	11° 25.0	-0.8
Mo 23	269° 21.8	284° 21.9	299° 22.1	314° 22.3	329° 22.4	344° 22.6	359° 22.8	14° 22.9	29° 23.1	44° 23.3	59° 23.4	74° 23.6	+0.2
	11° 14.0	11° 13.1	11° 12.3	11° 11.4	11° 10.6	11° 09.7	11° 08.9	11° 08.0	11° 07.2	11° 06.3	11° 05.4	11° 04.6	-0.9
Tu 24	269° 25.8	284° 26.0	299° 26.2	314° 26.3	329° 26.5	344° 26.7	359° 26.8	14° 27.0	29° 27.2	44° 27.4	59° 27.5	74° 27.7	+0.2
	10° 53.5	10° 52.6	10° 51.7	10° 50.9	10° 50.0	10° 49.2	10° 48.3	10° 47.4	10° 46.6	10° 45.7	10° 44.9	10° 44.0	-0.9
We 25	269° 30.0	284° 30.2	299° 30.3	314° 30.5	329° 30.7	344° 30.9	359° 31.0	14° 31.2	29° 31.4	44° 31.6	59° 31.7	74° 31.9	+0.2
	10° 32.8	10° 31.9	10° 31.0	10° 30.2	10° 29.3	10° 28.4	10° 27.6	10° 26.7	10° 25.8	10° 25.0	10° 24.1	10° 23.2	-0.9
Th 26	269° 34.2	284° 34.4	299° 34.6	314° 34.8	329° 35.0	344° 35.1	359° 35.3	14° 35.5	29° 35.7	44° 35.9	59° 36.0	74° 36.2	+0.2
	10° 11.9	10° 11.0	10° 10.1	10° 09.3	10° 08.4	10° 07.5	10° 06.7	10° 05.8	10° 04.9	10° 04.0	10° 03.2	10° 02.3	-0.9
Fr 27	269° 38.6	284° 38.8	299° 39.0	314° 39.1	329° 39.3	344° 39.5	359° 39.7	14° 39.9	29° 40.1	44° 40.2	59° 40.4	74° 40.6	+0.2
	9° 50.9	9° 50.0	9° 49.1	9° 48.2	9° 47.3	9° 46.5	9° 45.6	9° 44.7	9° 43.8	9° 42.9	9° 42.1	9° 41.2	-0.9
Sa 28	269° 43.0	284° 43.2	299° 43.4	314° 43.6	329° 43.8	344° 44.0	359° 44.1	14° 44.3	29° 44.5	44° 44.7	59° 44.9	74° 45.1	+0.2
	9° 29.7	9° 28.8	9° 27.9	9° 27.0	9° 26.1	9° 25.2	9° 24.4	9° 23.5	9° 22.6	9° 21.7	9° 20.8	9° 19.9	-0.9
Su 29	269° 47.5	284° 47.7	299° 47.9	314° 48.1	329° 48.3	344° 48.5	359° 48.7	14° 48.9	29° 49.1	44° 49.3	59° 49.4	74° 49.6	+0.2
	9° 08.3	9° 07.5	9° 06.6	9° 05.7	9° 04.8	9° 03.9	9° 03.0	9° 02.1	9° 01.2	9° 00.3	8° 59.4	8° 58.5	-0.9
Mo 30	269° 52.1	284° 52.3	299° 52.5	314° 52.7	329° 52.9	344° 53.1	359° 53.3	14° 53.5	29° 53.7	44° 53.9	59° 54.1	74° 54.3	+0.2
	8° 46.9	8° 46.0	8° 45.1	8° 44.2	8° 43.3	8° 42.4	8° 41.5	8° 40.6	8° 39.7	8° 38.8	8° 37.9	8° 37.0	-0.9
Tu 31	269° 56.8	284° 57.0	299° 57.2	314° 57.4	329° 57.6	344° 57.8	359° 58.0	14° 58.2	29° 58.4	44° 58.6	59° 58.8	74° 59.0	+0.2
	8° 25.2	8° 24.3	8° 23.4	8° 22.5	8° 21.6	8° 20.7	8° 19.8	8° 18.9	8° 18.0	8° 17.1	8° 16.2	8° 15.3	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2032

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Su 1	240°38.0	255°07.1	269°36.2	284°05.4	298°34.5	313°03.7	327°32.9	342°02.1	356°31.3	11°00.6	25°29.8	+29.2	15.2
	19°07.8	19°09.9	19°11.9	19°13.8	19°15.6	19°17.3	19°18.9	19°20.4	19°21.8	19°23.1	19°24.3	+1.7	55.8
Mo 2	242°51.1	257°20.7	271°50.3	286°19.9	300°49.6	315°19.3	329°49.0	344°18.8	358°48.6	13°18.4	27°48.2	+29.7	15.1
	19°30.2	19°29.8	19°29.3	19°28.7	19°28.1	19°27.3	19°26.4	19°25.4	19°24.3	19°23.1	19°21.8	-0.8	55.2
Tu 3	245°19.6	259°49.9	274°20.3	288°50.7	303°21.2	317°51.7	332°22.2	346°52.8	1°23.4	15°54.1	30°24.7	+30.5	14.9
	18°51.5	18°48.7	18°45.8	18°42.9	18°39.9	18°36.8	18°33.6	18°30.3	18°26.9	18°23.4	18°19.9	-3.2	54.8
We 4	248°09.6	262°40.9	277°12.3	291°43.7	306°15.1	320°46.6	335°18.1	349°49.6	4°21.2	18°52.9	33°24.5	+31.5	14.8
	17°16.6	17°11.8	17°06.8	17°01.8	16°56.7	16°51.6	16°46.3	16°41.0	16°35.6	16°30.2	16°24.7	-5.2	54.4
Th 5	251°24.6	265°56.9	280°29.3	295°01.7	309°34.1	324°06.6	338°39.1	353°11.7	7°44.3	22°16.9	36°49.6	+32.5	14.8
	14°53.3	14°46.7	14°40.0	14°33.3	14°26.5	14°19.6	14°12.7	14°05.7	13°58.7	13°51.6	13°44.4	-6.9	54.1
● Fr 6	255°04.3	269°37.6	284°10.9	298°44.2	313°17.6	327°51.0	342°24.4	356°57.9	11°31.4	26°04.9	40°38.5	+33.4	14.7
	11°50.6	11°42.6	11°34.6	11°26.5	11°18.3	11°10.2	11°01.9	10°53.7	10°45.3	10°37.0	10°28.6	-8.2	54.0
Sa 7	259°05.4	273°39.4	288°13.4	302°47.4	317°21.5	331°55.6	346°29.7	1°03.9	15°38.0	30°12.2	44°46.4	+34.1	14.7
	8°18.0	8°09.0	8°00.0	7°50.9	7°41.8	7°32.7	7°23.6	7°14.4	7°05.2	6°56.0	6°46.8	-9.1	53.9
Su 8	263°21.5	277°56.0	292°30.4	307°04.9	321°39.4	336°13.9	350°48.4	5°22.9	19°57.4	34°31.9	49°06.4	+34.5	14.7
	4°25.1	4°15.5	4°05.9	3°56.3	3°46.6	3°37.0	3°27.3	3°17.6	3°07.9	2°58.2	2°48.4	-9.7	53.9
Mo 9	267°44.6	282°19.1	296°53.6	311°28.2	326°02.7	340°37.2	355°11.7	9°46.2	24°20.7	38°55.1	53°29.6	+34.5	14.7
	0°21.4	0°11.5	0°01.7	-0°08.2	-0°18.0	-0°27.9	-0°37.7	-0°47.6	-0°57.5	-1°07.3	-1°17.2	-9.9	54.0
Tu 10	272°04.9	286°39.1	301°13.3	315°47.4	330°21.6	344°55.7	359°29.8	14°03.8	28°37.9	43°11.9	57°45.9	+34.1	14.8
	-3°44.2	-3°53.9	-4°03.7	-4°13.4	-4°23.1	-4°32.7	-4°42.4	-4°52.0	-5°01.7	-5°11.3	-5°20.9	-9.7	54.3
We 11	276°11.9	290°45.4	305°18.8	319°52.2	334°25.5	348°58.8	3°32.1	18°05.3	32°38.5	47°11.6	61°44.7	+33.3	14.9
	-7°42.4	-7°51.6	-8°00.8	-8°10.0	-8°19.2	-8°28.3	-8°37.4	-8°46.5	-8°55.5	-9°04.5	-9°13.4	-9.1	54.7
Th 12	279°55.1	294°27.4	308°59.7	323°31.8	338°04.0	352°36.0	7°08.0	21°40.0	36°11.9	50°43.7	65°15.5	+32.0	15.1
	-11°23.5	-11°31.8	-11°40.1	-11°48.3	-11°56.5	-12°04.7	-12°12.8	-12°20.9	-12°28.9	-12°36.8	-12°44.7	-8.1	55.3
Fr 13	283°04.5	297°35.2	312°05.9	326°36.5	341°07.1	355°37.6	10°08.0	24°38.3	39°08.6	53°38.8	68°08.9	+30.4	15.3
	-14°36.6	-14°43.6	-14°50.5	-14°57.4	-15°04.1	-15°10.9	-15°17.5	-15°24.1	-15°30.6	-15°37.0	-15°43.4	-6.7	56.0
◐ Sa 14	285°32.2	300°01.2	314°30.1	328°59.0	343°27.7	357°56.4	12°25.0	26°53.5	41°22.0	55°50.4	70°18.7	+28.6	15.5
	-17°09.7	-17°14.8	-17°19.8	-17°24.8	-17°29.6	-17°34.4	-17°39.0	-17°43.6	-17°48.1	-17°52.5	-17°56.8	-4.7	56.8
Su 15	287°15.0	301°42.2	316°09.3	330°36.3	345°03.3	359°30.2	13°57.1	28°23.9	42°50.6	57°17.3	71°43.9	+26.9	15.8
	-18°49.5	-18°52.2	-18°54.8	-18°57.3	-18°59.6	-19°01.9	-19°04.1	-19°06.1	-19°08.0	-19°09.8	-19°11.5	-2.2	57.8
Mo 16	288°15.7	302°41.4	317°07.1	331°32.6	345°58.2	0°23.7	14°49.1	29°14.5	43°39.8	58°05.2	72°30.4	+25.5	16.0
	-19°23.0	-19°22.8	-19°22.5	-19°22.1	-19°21.5	-19°20.8	-19°20.0	-19°19.1	-19°18.0	-19°16.8	-19°15.5	+0.8	58.8
Tu 17	288°45.0	303°09.7	317°34.4	331°59.1	346°23.8	0°48.4	15°13.1	29°37.7	44°02.2	58°26.8	72°51.4	+24.6	16.3
	-18°40.2	-18°36.8	-18°33.3	-18°29.7	-18°25.9	-18°22.0	-18°18.0	-18°13.8	-18°09.5	-18°05.1	-18°00.5	+4.0	59.7
We 18	288°58.7	303°23.2	317°47.6	332°12.1	346°36.6	1°01.1	15°25.6	29°50.1	44°14.6	58°39.1	73°03.6	+24.5	16.5
	-16°37.1	-16°30.6	-16°23.9	-16°17.1	-16°10.2	-16°03.1	-15°56.0	-15°48.7	-15°41.3	-15°33.8	-15°26.2	+7.1	60.6
Th 19	289°13.5	303°38.3	318°03.2	332°28.0	346°52.9	1°17.8	15°42.8	30°07.7	44°32.7	58°57.7	73°22.8	+24.9	16.7
	-13°18.8	-13°09.5	-13°00.1	-12°50.6	-12°40.9	-12°31.2	-12°21.4	-12°11.6	-12°01.6	-11°51.5	-11°41.4	+9.7	61.1
Fr 20	289°42.0	304°07.5	318°33.0	332°58.6	347°24.2	1°49.9	16°15.6	30°41.3	45°07.1	59°32.8	73°58.6	+25.7	16.7
	-8°59.7	-8°48.4	-8°37.0	-8°25.5	-8°14.0	-8°02.4	-7°50.8	-7°39.1	-7°27.4	-7°15.6	-7°03.7	+11.6	61.4
○ Sa 21	290°29.7	304°56.0	319°22.3	333°48.7	348°15.1	2°41.5	17°08.0	31°34.5	46°01.0	60°27.6	74°54.1	+26.4	16.7
	-4°01.5	-3°49.1	-3°36.7	-3°24.3	-3°11.8	-2°59.4	-2°46.9	-2°34.4	-2°21.9	-2°09.4	-1°56.9	+12.5	61.2
Su 22	291°36.0	306°02.9	320°29.9	334°57.0	349°24.0	3°51.1	18°18.2	32°45.3	47°12.4	61°39.6	76°06.8	+27.1	16.6
	1°10.6	1°23.0	1°35.4	1°47.8	2°00.1	2°12.4	2°24.7	2°37.0	2°49.3	3°01.5	3°13.7	+12.3	60.8
Mo 23	292°56.5	307°23.9	321°51.4	336°18.9	350°46.3	5°13.8	19°41.3	34°08.9	48°36.4	63°04.0	77°31.5	+27.5	16.4
	6°11.9	6°23.4	6°34.9	6°46.3	6°57.6	7°08.9	7°20.1	7°31.3	7°42.4	7°53.5	8°04.5	+11.3	60.0
Tu 24	294°26.2	308°53.9	323°21.7	337°49.4	352°17.2	6°44.9	21°12.7	35°40.5	50°08.3	64°36.0	79°03.8	+27.8	16.1
	10°41.2	10°51.1	11°00.9	11°10.6	11°20.2	11°29.8	11°39.2	11°48.6	11°57.9	12°07.1	12°16.3	+9.5	59.1
We 25	308°53.9	323°21.7	337°49.4	352°17.2	6°44.9	21°12.7	35°40.5	50°08.3	64°36.0	79°03.8	93°31.7	+27.8	16.1
	10°51.1	11°00.9	11°10.6	11°20.2	11°29.8	11°39.2	11°48.6	11°57.9	12°07.1	12°16.3	12°25.3	+9.4	59.1
Th 26	310°29.8	324°57.7	339°25.7	353°53.6	8°21.6	22°49.6	37°17.6	51°45.6	66°13.6	80°41.6	95°09.6	+28.0	15.8
	14°30.3	14°37.9	14°45.4	14°52.8	15°00.1	15°07.3	15°14.4	15°21.4	15°28.3	15°35.1	15°41.9	+7.2	58.1
◑ Fr 27	312°11.4	326°39.6	341°07.9	355°36.1	10°04.4	24°32.7	39°01.0	53°29.3	67°57.6	82°25.9	96°54.3	+28.3	15.6
	17°10.5	17°15.6	17°20.6	17°25.5	17°30.3	17°35.0	17°39.6	17°44.0	17°48.4	17°52.7	17°56.8	+4.6	57.1
Sa 28	314°02.0	328°30.7	342°59.4	357°28.1	11°56.9	26°25.6	40°54.4	55°23.3	69°52.1	84°21.0	98°49.9	+28.8	15.3
	18°46.7	18°49.2	18°51.5	18°53.8	18°56.0	18°58.1	19°00.0	19°01.9	19°03.7	19°05.3	19°06.9	+2.0	56.3
Su 29	316°06.8	330°36.2	345°05.6	359°35.1	14°04.5	28°34.0	43°03.6	57°33.2	72°02.8	86°32.4	101°02.1	+29.5	15.1
	19°18.0	19°17.9	19°17.8	19°17.5	19°17.1	19°16.7	19°16.1	19°15.5	19°14.7	19°13.9	19°12.9	-0.5	55.5
Mo 30	318°31.7	333°01.9	347°32.2	2°02.6	16°33.0	31°03.4	45°33.9	60°04.4	74°35.0	89°05.6	103°36.2	+30.5	15.0
	18°47.4	18°45.0	18°42.5	18°39.9	18°37.2	18°34.4	18°31.5	18°28.5	18°25.5	18°22.3	18°19.1	-2.8	54.9
Tu 31	321°20.7	335°52.0	350°23.3	4°54.7	19°26.1	33°57.6	48°29.1	63°00.6	77°32.2	92°03.9	106°35.5	+31.5	14.9
	17°20.7	17°16.2	17°11.6	17°06.9	17°02.1	16°57.3	16°52.4	16°47.4	16°42.3	16°37.2	16°32.0	-4.9	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 05h11 — FQ: 14 07h51 — FM: 21 01h46 — LQ: 27 19h33

SUN

September 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	270°01.6	285°01.8	300°02.0	315°02.2	330°02.4	345°02.6	0°02.8	15°03.0	30°03.2	45°03.4	60°03.6	75°03.8	+0.2
	8°03.5	8°02.6	8°01.6	8°00.7	7°59.8	7°58.9	7°58.0	7°57.1	7°56.2	7°55.3	7°54.4	7°53.5	-0.9
Th 2	270°06.4	285°06.6	300°06.8	315°07.0	330°07.2	345°07.4	0°07.6	15°07.8	30°08.0	45°08.2	60°08.4	75°08.6	+0.2
	7°41.6	7°40.7	7°39.7	7°38.8	7°37.9	7°37.0	7°36.1	7°35.2	7°34.3	7°33.3	7°32.4	7°31.5	-0.9
Fr 3	270°11.3	285°11.5	300°11.7	315°11.9	330°12.1	345°12.3	0°12.5	15°12.7	30°12.9	45°13.1	60°13.3	75°13.5	+0.2
	7°19.6	7°18.6	7°17.7	7°16.8	7°15.9	7°15.0	7°14.0	7°13.1	7°12.2	7°11.3	7°10.4	7°09.4	-0.9
Sa 4	270°16.2	285°16.4	300°16.6	315°16.8	330°17.1	345°17.3	0°17.5	15°17.7	30°17.9	45°18.1	60°18.3	75°18.5	+0.2
	6°57.4	6°56.5	6°55.6	6°54.7	6°53.7	6°52.8	6°51.9	6°50.9	6°50.0	6°49.1	6°48.2	6°47.2	-0.9
Su 5	270°21.2	285°21.4	300°21.6	315°21.9	330°22.1	345°22.3	0°22.5	15°22.7	30°22.9	45°23.1	60°23.3	75°23.5	+0.2
	6°35.2	6°34.2	6°33.3	6°32.4	6°31.5	6°30.5	6°29.6	6°28.7	6°27.7	6°26.8	6°25.9	6°24.9	-0.9
Mo 6	270°26.3	285°26.5	300°26.7	315°26.9	330°27.1	345°27.4	0°27.6	15°27.8	30°28.0	45°28.2	60°28.4	75°28.6	+0.2
	6°12.8	6°11.9	6°11.0	6°10.0	6°09.1	6°08.2	6°07.2	6°06.3	6°05.3	6°04.4	6°03.5	6°02.5	-0.9
Tu 7	270°31.4	285°31.6	300°31.8	315°32.0	330°32.3	345°32.5	0°32.7	15°32.9	30°33.1	45°33.3	60°33.5	75°33.8	+0.2
	5°50.4	5°49.4	5°48.5	5°47.5	5°46.6	5°45.7	5°44.7	5°43.8	5°42.9	5°41.9	5°41.0	5°40.0	-0.9
We 8	270°36.6	285°36.8	300°37.0	315°37.2	330°37.4	345°37.6	0°37.9	15°38.1	30°38.3	45°38.5	60°38.7	75°38.9	+0.2
	5°27.8	5°26.9	5°25.9	5°25.0	5°24.0	5°23.1	5°22.2	5°21.2	5°20.3	5°19.3	5°18.4	5°17.4	-0.9
Th 9	270°41.8	285°42.0	300°42.2	315°42.4	330°42.6	345°42.9	0°43.1	15°43.3	30°43.5	45°43.7	60°43.9	75°44.2	+0.2
	5°05.2	5°04.2	5°03.3	5°02.3	5°01.4	5°00.4	4°59.5	4°58.5	4°57.6	4°56.6	4°55.7	4°54.8	-0.9
Fr 10	270°47.0	285°47.2	300°47.4	315°47.7	330°47.9	345°48.1	0°48.3	15°48.5	30°48.8	45°49.0	60°49.2	75°49.4	+0.2
	4°42.4	4°41.5	4°40.5	4°39.6	4°38.6	4°37.7	4°36.7	4°35.8	4°34.8	4°33.9	4°32.9	4°32.0	-0.9
Sa 11	270°52.3	285°52.5	300°52.7	315°52.9	330°53.2	345°53.4	0°53.6	15°53.8	30°54.0	45°54.3	60°54.5	75°54.7	+0.2
	4°19.6	4°18.7	4°17.7	4°16.8	4°15.8	4°14.9	4°13.9	4°13.0	4°12.0	4°11.1	4°10.1	4°09.1	-1.0
Su 12	270°57.6	285°57.8	300°58.0	315°58.2	330°58.5	345°58.7	0°58.9	15°59.1	30°59.4	45°59.6	60°59.8	76°00.0	+0.2
	3°56.7	3°55.8	3°54.8	3°53.9	3°52.9	3°52.0	3°51.0	3°50.1	3°49.1	3°48.1	3°47.2	3°46.2	-1.0
Mo 13	271°02.9	286°03.1	301°03.4	316°03.6	331°03.8	346°04.0	1°04.3	16°04.5	31°04.7	46°04.9	61°05.1	76°05.4	+0.2
	3°33.8	3°32.8	3°31.9	3°30.9	3°30.0	3°29.0	3°28.0	3°27.1	3°26.1	3°25.2	3°24.2	3°23.2	-1.0
Tu 14	271°08.3	286°08.5	301°08.7	316°08.9	331°09.2	346°09.4	1°09.6	16°09.8	31°10.1	46°10.3	61°10.5	76°10.7	+0.2
	3°10.8	3°09.8	3°08.9	3°07.9	3°06.9	3°06.0	3°05.0	3°04.0	3°03.1	3°02.1	3°01.2	3°00.2	-1.0
We 15	271°13.6	286°13.9	301°14.1	316°14.3	331°14.5	346°14.8	1°15.0	16°15.2	31°15.4	46°15.7	61°15.9	76°16.1	+0.2
	2°47.7	2°46.7	2°45.8	2°44.8	2°43.9	2°42.9	2°41.9	2°41.0	2°40.0	2°39.0	2°38.1	2°37.1	-1.0
Th 16	271°19.0	286°19.2	301°19.5	316°19.7	331°19.9	346°20.1	1°20.4	16°20.6	31°20.8	46°21.0	61°21.3	76°21.5	+0.2
	2°24.6	2°23.6	2°22.6	2°21.7	2°20.7	2°19.8	2°18.8	2°17.8	2°16.9	2°15.9	2°14.9	2°14.0	-1.0
Fr 17	271°24.4	286°24.6	301°24.8	316°25.1	331°25.3	346°25.5	1°25.7	16°26.0	31°26.2	46°26.4	61°26.6	76°26.9	+0.2
	2°01.4	2°00.4	1°59.5	1°58.5	1°57.5	1°56.6	1°55.6	1°54.6	1°53.7	1°52.7	1°51.7	1°50.8	-1.0
Sa 18	271°29.8	286°30.0	301°30.2	316°30.5	331°30.7	346°30.9	1°31.1	16°31.4	31°31.6	46°31.8	61°32.0	76°32.3	+0.2
	1°38.2	1°37.2	1°36.3	1°35.3	1°34.3	1°33.4	1°32.4	1°31.4	1°30.4	1°29.5	1°28.5	1°27.5	-1.0
Su 19	271°35.2	286°35.4	301°35.6	316°35.8	331°36.1	346°36.3	1°36.5	16°36.7	31°37.0	46°37.2	61°37.4	76°37.6	+0.2
	1°14.9	1°14.0	1°13.0	1°12.0	1°11.1	1°10.1	1°09.1	1°08.2	1°07.2	1°06.2	1°05.2	1°04.3	-1.0
Mo 20	271°40.5	286°40.7	301°41.0	316°41.2	331°41.4	346°41.6	1°41.9	16°42.1	31°42.3	46°42.5	61°42.8	76°43.0	+0.2
	0°51.7	0°50.7	0°49.7	0°48.8	0°47.8	0°46.8	0°45.8	0°44.9	0°43.9	0°42.9	0°42.0	0°41.0	-1.0
Tu 21	271°45.9	286°46.1	301°46.3	316°46.5	331°46.8	346°47.0	1°47.2	16°47.4	31°47.6	46°47.9	61°48.1	76°48.3	+0.2
	0°28.4	0°27.4	0°26.4	0°25.4	0°24.5	0°23.5	0°22.5	0°21.6	0°20.6	0°19.6	0°18.6	0°17.7	-1.0
We 22	271°51.2	286°51.4	301°51.6	316°51.9	331°52.1	346°52.3	1°52.5	16°52.7	31°53.0	46°53.2	61°53.4	76°53.6	+0.2
	0°05.0	0°04.1	0°03.1	0°02.1	0°01.1	0°00.2	-0°00.8	-0°01.8	-0°02.7	-0°03.7	-0°04.7	-0°05.7	-1.0
Th 23	271°56.5	286°56.7	301°56.9	316°57.1	331°57.4	346°57.6	1°57.8	16°58.0	31°58.2	46°58.4	61°58.7	76°58.9	+0.2
	-0°18.3	-0°19.3	-0°20.3	-0°21.2	-0°22.2	-0°23.2	-0°24.1	-0°25.1	-0°26.1	-0°27.1	-0°28.0	-0°29.0	-1.0
Fr 24	272°01.7	287°01.9	302°02.2	317°02.4	332°02.6	347°02.8	2°03.0	17°03.2	32°03.5	47°03.7	62°03.9	77°04.1	+0.2
	-0°41.7	-0°42.6	-0°43.6	-0°44.6	-0°45.6	-0°46.5	-0°47.5	-0°48.5	-0°49.4	-0°50.4	-0°51.4	-0°52.4	-1.0
Sa 25	272°06.9	287°07.1	302°07.4	317°07.6	332°07.8	347°08.0	2°08.2	17°08.4	32°08.7	47°08.9	62°09.1	77°09.3	+0.2
	-1°05.0	-1°06.0	-1°07.0	-1°07.9	-1°08.9	-1°09.9	-1°10.9	-1°11.8	-1°12.8	-1°13.8	-1°14.8	-1°15.7	-1.0
Su 26	272°12.1	287°12.3	302°12.5	317°12.7	332°12.9	347°13.2	2°13.4	17°13.6	32°13.8	47°14.0	62°14.2	77°14.4	+0.2
	-1°28.4	-1°29.3	-1°30.3	-1°31.3	-1°32.3	-1°33.2	-1°34.2	-1°35.2	-1°36.2	-1°37.1	-1°38.1	-1°39.1	-1.0
Mo 27	272°17.2	287°17.4	302°17.6	317°17.8	332°18.0	347°18.2	2°18.5	17°18.7	32°18.9	47°19.1	62°19.3	77°19.5	+0.2
	-1°51.7	-1°52.7	-1°53.7	-1°54.6	-1°55.6	-1°56.6	-1°57.6	-1°58.5	-1°59.5	-2°00.5	-2°01.4	-2°02.4	-1.0
Tu 28	272°22.2	287°22.4	302°22.6	317°22.9	332°23.1	347°23.3	2°23.5	17°23.7	32°23.9	47°24.1	62°24.3	77°24.5	+0.2
	-2°15.1	-2°16.0	-2°17.0	-2°18.0	-2°18.9	-2°19.9	-2°20.9	-2°21.9	-2°22.8	-2°23.8	-2°24.8	-2°25.7	-1.0
We 29	272°27.2	287°27.4	302°27.6	317°27.8	332°28.0	347°28.2	2°28.4	17°28.7	32°28.9	47°29.1	62°29.3	77°29.5	+0.2
	-2°38.4	-2°39.3	-2°40.3	-2°41.3	-2°42.3	-2°43.2	-2°44.2	-2°45.2	-2°46.1	-2°47.1	-2°48.1	-2°49.1	-1.0
Th 30	272°32.1	287°32.3	302°32.5	317°32.7	332°32.9	347°33.1	2°33.3	17°33.5	32°33.7	47°33.9	62°34.1	77°34.4	+0.2
	-3°01.7	-3°02.6	-3°03.6	-3°04.6	-3°05.5	-3°06.5	-3°07.5	-3°08.5	-3°09.4	-3°10.4	-3°11.4	-3°12.3	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2032

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
We 1	251°54.5	266°26.6	280°58.8	295°31.0	310°03.3	324°35.5	339°07.9	353°40.2	8°12.6	22°45.1	37°17.5	+32.3	14.8
	15°36.0	15°30.0	15°23.9	15°17.8	15°11.7	15°05.4	14°59.1	14°52.7	14°46.3	14°39.8	14°33.3	-6.3	54.2
Th 2	255°29.1	270°02.2	284°35.3	299°08.4	313°41.6	328°14.8	342°48.0	357°21.3	11°54.6	26°27.9	41°01.3	+33.2	14.7
	12°47.9	12°40.4	12°32.9	12°25.3	12°17.7	12°10.0	12°02.3	11°54.5	11°46.7	11°38.8	11°30.9	-7.7	54.0
Fr 3	259°25.1	273°58.9	288°32.7	303°06.6	317°40.5	332°14.4	346°48.3	1°22.2	15°56.2	30°30.2	45°04.2	+33.9	14.7
	9°26.8	9°18.2	9°09.6	9°00.9	8°52.2	8°43.5	8°34.7	8°25.9	8°17.1	8°08.2	7°59.3	-8.8	53.9
● Sa 4	263°36.5	278°10.8	292°45.1	307°19.4	321°53.7	336°28.0	351°02.4	5°36.7	20°11.1	34°45.4	49°19.8	+34.3	14.7
	5°42.1	5°32.7	5°23.3	5°13.9	5°04.5	4°55.1	4°45.6	4°36.1	4°26.6	4°17.1	4°07.6	-9.5	53.9
Su 5	267°56.0	282°30.5	297°04.9	311°39.3	326°13.8	340°48.2	355°22.6	9°57.0	24°31.4	39°05.8	53°40.2	+34.4	14.7
	1°42.8	1°33.0	1°23.3	1°13.5	1°03.8	0°54.0	0°44.2	0°34.5	0°24.7	0°14.9	0°05.1	-9.8	54.0
Mo 6	272°15.2	286°49.4	301°23.7	315°57.9	330°32.0	345°06.2	359°40.4	14°14.5	28°48.6	43°22.7	57°56.8	+34.2	14.8
	-2°21.7	-2°31.4	-2°41.2	-2°50.9	-3°00.6	-3°10.3	-3°20.0	-3°29.7	-3°39.4	-3°49.1	-3°58.7	-9.7	54.2
Tu 7	276°25.1	290°58.8	305°32.4	320°06.0	334°39.6	349°13.2	3°46.7	18°20.2	32°53.6	47°27.0	62°00.4	+33.5	14.9
	-6°21.7	-6°31.0	-6°40.4	-6°49.7	-6°59.0	-7°08.3	-7°17.5	-7°26.7	-7°35.9	-7°45.1	-7°54.2	-9.3	54.5
We 8	280°16.7	294°49.5	309°22.2	323°54.9	338°27.5	353°00.1	7°32.7	22°05.2	36°37.6	51°10.0	65°42.4	+32.6	15.0
	-10°07.3	-10°15.8	-10°24.4	-10°32.9	-10°41.3	-10°49.7	-10°58.1	-11°06.4	-11°14.7	-11°22.9	-11°31.1	-8.4	54.9
Th 9	283°41.9	298°13.4	312°44.9	327°16.4	341°47.8	356°19.1	10°50.4	25°21.6	39°52.8	54°23.9	68°55.0	+31.3	15.1
	-13°27.8	-13°35.2	-13°42.5	-13°49.7	-13°56.9	-14°04.0	-14°11.0	-14°18.0	-14°24.9	-14°31.8	-14°38.6	-7.1	55.4
Fr 10	286°34.0	301°04.1	315°34.2	330°04.2	344°34.2	359°04.1	13°33.9	28°03.7	42°33.4	57°03.1	71°32.7	+29.9	15.3
	-16°12.2	-16°17.8	-16°23.4	-16°28.9	-16°34.3	-16°39.7	-16°45.0	-16°50.1	-16°55.2	-17°00.3	-17°05.2	-5.3	56.0
Sa 11	288°49.6	303°18.2	317°46.8	332°15.4	346°43.9	1°12.3	15°40.7	30°09.0	44°37.2	59°05.4	73°33.6	+28.4	15.5
	-18°08.7	-18°12.2	-18°15.6	-18°19.0	-18°22.2	-18°25.3	-18°28.3	-18°31.2	-18°34.1	-18°36.8	-18°39.4	-3.1	56.7
◐ Su 12	290°29.5	304°56.8	319°24.1	333°51.3	348°18.5	2°45.6	17°12.7	31°39.7	46°06.7	60°33.7	75°00.6	+27.1	15.7
	-19°06.3	-19°07.2	-19°08.0	-19°08.7	-19°09.4	-19°09.8	-19°10.2	-19°10.5	-19°10.6	-19°10.7	-19°10.6	-0.4	57.5
Mo 13	291°39.6	306°06.0	320°32.2	334°58.5	349°24.7	3°50.9	18°17.1	32°43.3	47°09.4	61°35.5	76°01.6	+26.2	15.9
	-18°55.5	-18°53.6	-18°51.5	-18°49.3	-18°47.0	-18°44.6	-18°42.1	-18°39.4	-18°36.6	-18°33.7	-18°30.7	+2.5	58.4
Tu 14	292°30.2	306°56.0	321°21.7	335°47.5	350°13.3	4°39.0	19°04.7	33°30.4	47°56.2	62°21.9	76°47.6	+25.7	16.2
	-17°31.0	-17°26.1	-17°21.0	-17°15.9	-17°10.6	-17°05.2	-16°59.7	-16°54.0	-16°48.3	-16°42.4	-16°36.5	+5.5	59.3
We 15	293°12.8	307°38.5	322°04.2	336°29.9	350°55.6	5°21.3	19°47.0	34°12.8	48°38.5	63°04.2	77°30.0	+25.7	16.4
	-14°53.3	-14°45.5	-14°37.7	-14°29.7	-14°21.6	-14°13.5	-14°05.2	-13°56.8	-13°48.4	-13°39.8	-13°31.1	+8.2	60.1
Th 16	293°57.3	308°23.2	322°49.2	337°15.1	351°41.1	6°07.0	20°33.0	34°59.0	49°25.0	63°51.0	78°17.1	+26.0	16.6
	-11°09.9	-10°59.8	-10°49.6	-10°39.4	-10°29.0	-10°18.6	-10°08.1	-9°57.5	-9°46.9	-9°36.2	-9°25.4	+10.5	60.7
Fr 17	294°49.3	309°15.5	323°41.8	338°08.1	352°34.4	7°00.7	21°27.0	35°53.4	50°19.7	64°46.1	79°12.4	+26.3	16.7
	-6°36.0	-6°24.3	-6°12.5	-6°00.7	-5°48.8	-5°36.9	-5°24.9	-5°12.9	-5°00.9	-4°48.8	-4°36.8	+11.9	61.1
Sa 18	295°49.5	310°16.0	324°42.6	339°09.1	353°35.7	8°02.3	22°28.9	36°55.5	51°22.1	65°48.7	80°15.3	+26.6	16.7
	-1°32.3	-1°19.8	-1°07.4	-0°54.9	-0°42.5	-0°30.0	-0°17.6	-0°05.1	0°07.3	0°19.8	0°32.2	+12.5	61.1
○ Su 19	296°55.4	311°22.1	325°48.8	340°15.6	354°42.3	9°09.0	23°35.7	38°02.5	52°29.2	66°55.9	81°22.7	+26.7	16.6
	3°37.1	3°49.2	4°01.3	4°13.4	4°25.4	4°37.4	4°49.4	5°01.3	5°13.2	5°25.0	5°36.8	+12.0	60.8
Mo 20	298°03.9	312°30.7	326°57.4	341°24.2	355°50.9	10°17.7	24°44.5	39°11.2	53°38.0	68°04.8	82°31.5	+26.8	16.4
	8°27.6	8°38.5	8°49.4	9°00.2	9°10.9	9°21.5	9°32.1	9°42.6	9°53.0	10°03.4	10°13.7	+10.6	60.2
Tu 21	299°13.3	313°40.1	328°06.9	342°33.7	357°00.6	11°27.4	25°54.2	40°21.0	54°47.9	69°14.7	83°41.6	+26.8	16.2
	12°38.1	12°47.0	12°55.9	13°04.6	13°13.3	13°21.9	13°30.3	13°38.7	13°47.0	13°55.2	14°03.3	+8.5	59.4
We 22	300°25.4	314°52.4	329°19.4	343°46.4	358°13.5	12°40.5	27°07.6	41°34.7	56°01.8	70°28.9	84°56.1	+27.1	15.9
	15°52.5	15°58.9	16°05.3	16°11.5	16°17.7	16°23.7	16°29.6	16°35.4	16°41.1	16°46.7	16°52.2	+6.0	58.4
Th 23	314°52.4	329°19.4	343°46.4	358°13.5	12°40.5	27°07.6	41°34.7	56°01.8	70°28.9	84°56.1	99°23.2	+27.1	15.9
	15°58.9	16°05.3	16°11.5	16°17.7	16°23.7	16°29.6	16°35.4	16°41.1	16°46.7	16°52.2	16°57.6	+5.9	58.4
Fr 24	316°13.1	330°40.6	345°08.1	359°35.7	14°03.3	28°30.9	42°58.5	57°26.2	71°53.9	86°21.7	100°49.4	+27.6	15.6
	18°05.1	18°08.7	18°12.2	18°15.6	18°18.9	18°22.0	18°25.1	18°28.1	18°30.9	18°33.7	18°36.3	+3.1	57.4
Sa 25	317°50.0	332°18.3	346°46.7	1°15.1	15°43.5	30°12.0	44°40.6	59°09.1	73°37.7	88°06.4	102°35.1	+28.5	15.4
	19°02.7	19°03.6	19°04.4	19°05.0	19°05.6	19°06.1	19°06.5	19°06.8	19°06.9	19°07.0	19°06.9	+0.4	56.4
◑ Su 26	319°50.9	334°20.3	348°49.7	3°19.3	17°48.8	32°18.4	46°48.1	61°17.8	75°47.6	90°17.4	104°47.2	+29.6	15.2
	18°54.3	18°52.7	18°51.0	18°49.2	18°47.3	18°45.2	18°43.2	18°41.0	18°38.7	18°36.3	18°33.8	-2.0	55.6
Mo 27	322°21.0	336°51.7	351°22.4	5°53.1	20°23.9	34°54.8	49°25.7	63°56.6	78°27.6	92°58.7	107°29.8	+30.9	15.0
	17°46.3	17°42.5	17°38.5	17°34.5	17°30.4	17°26.2	17°22.0	17°17.7	17°13.2	17°08.8	17°04.2	-4.2	55.0
Tu 28	325°22.1	339°53.9	354°25.9	8°57.8	23°29.8	38°01.9	52°34.0	67°06.1	81°38.3	96°10.5	110°42.8	+32.1	14.9
	15°46.8	15°41.1	15°35.3	15°29.5	15°23.5	15°17.6	15°11.5	15°05.4	14°59.2	14°53.0	14°46.6	-6.0	54.5
We 29	328°52.0	343°24.9	357°57.9	12°30.9	27°03.9	41°37.0	56°10.1	70°43.2	85°16.4	99°49.6	114°22.9	+33.1	14.8
	13°04.9	12°57.6	12°50.4	12°43.0	12°35.6	12°28.2	12°20.7	12°13.1	12°05.5	11°57.9	11°50.2	-7.5	54.1
Th 30	332°45.5	347°19.2	1°53.0	16°26.8	31°00.6	45°34.4	60°08.3	74°42.2	89°16.1	103°50.0	118°24.0	+33.8	14.7
	9°49.4	9°41.0	9°32.6	9°24.1	9°15.6	9°07.0	8°58.5	8°49.8	8°41.2	8°32.5	8°23.8	-8.6	54.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 20h56 — FQ: 12 18h49 — FM: 19 09h30 — LQ: 26 09h12

SUN

October 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	272°37.0	287°37.2	302°37.4	317°37.6	332°37.8	347°38.0	2°38.2	17°38.4	32°38.6	47°38.8	62°39.0	77°39.2	+0.2
	-3°24.9	-3°25.9	-3°26.9	-3°27.8	-3°28.8	-3°29.8	-3°30.7	-3°31.7	-3°32.7	-3°33.6	-3°34.6	-3°35.6	-1.0
Sa 2	272°41.7	287°41.9	302°42.1	317°42.3	332°42.5	347°42.7	2°42.9	17°43.1	32°43.3	47°43.5	62°43.7	77°43.9	+0.2
	-3°48.1	-3°49.1	-3°50.1	-3°51.0	-3°52.0	-3°53.0	-3°53.9	-3°54.9	-3°55.9	-3°56.8	-3°57.8	-3°58.8	-1.0
Su 3	272°46.4	287°46.6	302°46.8	317°47.0	332°47.2	347°47.4	2°47.6	17°47.8	32°47.9	47°48.1	62°48.3	77°48.5	+0.2
	-4°11.3	-4°12.3	-4°13.3	-4°14.2	-4°15.2	-4°16.2	-4°17.1	-4°18.1	-4°19.0	-4°20.0	-4°21.0	-4°21.9	-1.0
Mo 4	272°51.0	287°51.2	302°51.4	317°51.6	332°51.8	347°51.9	2°52.1	17°52.3	32°52.5	47°52.7	62°52.9	77°53.1	+0.2
	-4°34.5	-4°35.4	-4°36.4	-4°37.3	-4°38.3	-4°39.3	-4°40.2	-4°41.2	-4°42.2	-4°43.1	-4°44.1	-4°45.0	-1.0
Tu 5	272°55.5	287°55.7	302°55.9	317°56.1	332°56.2	347°56.4	2°56.6	17°56.8	32°57.0	47°57.2	62°57.3	77°57.5	+0.2
	-4°57.5	-4°58.5	-4°59.5	-5°00.4	-5°01.4	-5°02.3	-5°03.3	-5°04.3	-5°05.2	-5°06.2	-5°07.1	-5°08.1	-1.0
We 6	272°59.9	288°00.1	303°00.3	318°00.5	333°00.6	348°00.8	3°01.0	18°01.2	33°01.4	48°01.5	63°01.7	78°01.9	+0.2
	-5°20.5	-5°21.5	-5°22.5	-5°23.4	-5°24.4	-5°25.3	-5°26.3	-5°27.2	-5°28.2	-5°29.2	-5°30.1	-5°31.1	-1.0
Th 7	273°04.2	288°04.4	303°04.6	318°04.7	333°04.9	348°05.1	3°05.3	18°05.5	33°05.6	48°05.8	63°06.0	78°06.2	+0.2
	-5°43.5	-5°44.4	-5°45.4	-5°46.4	-5°47.3	-5°48.3	-5°49.2	-5°50.2	-5°51.1	-5°52.1	-5°53.0	-5°54.0	-1.0
Fr 8	273°08.4	288°08.6	303°08.8	318°08.9	333°09.1	348°09.3	3°09.5	18°09.6	33°09.8	48°10.0	63°10.1	78°10.3	+0.2
	-6°06.4	-6°07.3	-6°08.3	-6°09.2	-6°10.2	-6°11.1	-6°12.1	-6°13.0	-6°14.0	-6°14.9	-6°15.9	-6°16.8	-1.0
Sa 9	273°12.5	288°12.7	303°12.9	318°13.0	333°13.2	348°13.4	3°13.5	18°13.7	33°13.9	48°14.0	63°14.2	78°14.4	+0.2
	-6°29.1	-6°30.1	-6°31.0	-6°32.0	-6°32.9	-6°33.9	-6°34.8	-6°35.8	-6°36.7	-6°37.7	-6°38.6	-6°39.6	-0.9
Su 10	273°16.5	288°16.7	303°16.8	318°17.0	333°17.2	348°17.3	3°17.5	18°17.7	33°17.8	48°18.0	63°18.1	78°18.3	+0.2
	-6°51.8	-6°52.8	-6°53.7	-6°54.7	-6°55.6	-6°56.6	-6°57.5	-6°58.5	-6°59.4	-7°00.3	-7°01.3	-7°02.2	-0.9
Mo 11	273°20.4	288°20.5	303°20.7	318°20.9	333°21.0	348°21.2	3°21.3	18°21.5	33°21.7	48°21.8	63°22.0	78°22.1	+0.2
	-7°14.5	-7°15.4	-7°16.3	-7°17.3	-7°18.2	-7°19.2	-7°20.1	-7°21.0	-7°22.0	-7°22.9	-7°23.8	-7°24.8	-0.9
Tu 12	273°24.1	288°24.3	303°24.5	318°24.6	333°24.8	348°24.9	3°25.1	18°25.2	33°25.4	48°25.5	63°25.7	78°25.8	+0.2
	-7°37.0	-7°37.9	-7°38.8	-7°39.8	-7°40.7	-7°41.6	-7°42.6	-7°43.5	-7°44.4	-7°45.4	-7°46.3	-7°47.2	-0.9
We 13	273°27.8	288°27.9	303°28.1	318°28.2	333°28.4	348°28.5	3°28.7	18°28.8	33°29.0	48°29.1	63°29.3	78°29.4	+0.1
	-7°59.4	-8°00.3	-8°01.2	-8°02.2	-8°03.1	-8°04.0	-8°05.0	-8°05.9	-8°06.8	-8°07.7	-8°08.7	-8°09.6	-0.9
Th 14	273°31.3	288°31.4	303°31.6	318°31.7	333°31.9	348°32.0	3°32.1	18°32.3	33°32.4	48°32.6	63°32.7	78°32.8	+0.1
	-8°21.7	-8°22.6	-8°23.5	-8°24.4	-8°25.4	-8°26.3	-8°27.2	-8°28.1	-8°29.1	-8°30.0	-8°30.9	-8°31.8	-0.9
Fr 15	273°34.7	288°34.8	303°34.9	318°35.1	333°35.2	348°35.3	3°35.5	18°35.6	33°35.7	48°35.9	63°36.0	78°36.2	+0.1
	-8°43.8	-8°44.8	-8°45.7	-8°46.6	-8°47.5	-8°48.4	-8°49.4	-8°50.3	-8°51.2	-8°52.1	-8°53.0	-8°54.0	-0.9
Sa 16	273°37.9	288°38.0	303°38.1	318°38.3	333°38.4	348°38.5	3°38.7	18°38.8	33°38.9	48°39.1	63°39.2	78°39.3	+0.1
	-9°05.9	-9°06.8	-9°07.7	-9°08.6	-9°09.5	-9°10.5	-9°11.4	-9°12.3	-9°13.2	-9°14.1	-9°15.0	-9°15.9	-0.9
Su 17	273°41.0	288°41.1	303°41.2	318°41.3	333°41.5	348°41.6	3°41.7	18°41.8	33°42.0	48°42.1	63°42.2	78°42.3	+0.1
	-9°27.8	-9°28.7	-9°29.6	-9°30.5	-9°31.4	-9°32.3	-9°33.3	-9°34.2	-9°35.1	-9°36.0	-9°36.9	-9°37.8	-0.9
Mo 18	273°43.9	288°44.0	303°44.2	318°44.3	333°44.4	348°44.5	3°44.6	18°44.7	33°44.9	48°45.0	63°45.1	78°45.2	+0.1
	-9°49.6	-9°50.5	-9°51.4	-9°52.3	-9°53.2	-9°54.1	-9°55.0	-9°55.9	-9°56.8	-9°57.7	-9°58.6	-9°59.5	-0.9
Tu 19	273°46.7	288°46.8	303°46.9	318°47.0	333°47.1	348°47.3	3°47.4	18°47.5	33°47.6	48°47.7	63°47.8	78°47.9	+0.1
	-10°11.2	-10°12.1	-10°13.0	-10°13.9	-10°14.8	-10°15.7	-10°16.6	-10°17.5	-10°18.4	-10°19.3	-10°20.2	-10°21.1	-0.9
We 20	273°49.3	288°49.4	303°49.5	318°49.6	333°49.7	348°49.9	3°50.0	18°50.1	33°50.2	48°50.3	63°50.4	78°50.5	+0.1
	-10°32.7	-10°33.6	-10°34.5	-10°35.4	-10°36.3	-10°37.2	-10°38.0	-10°38.9	-10°39.8	-10°40.7	-10°41.6	-10°42.5	-0.9
Th 21	273°51.8	288°51.9	303°52.0	318°52.1	333°52.2	348°52.3	3°52.4	18°52.5	33°52.6	48°52.7	63°52.8	78°52.9	+0.1
	-10°54.0	-10°54.9	-10°55.8	-10°56.7	-10°57.6	-10°58.5	-10°59.3	-11°00.2	-11°01.1	-11°02.0	-11°02.9	-11°03.8	-0.9
Fr 22	273°54.1	288°54.2	303°54.3	318°54.4	333°54.4	348°54.5	3°54.6	18°54.7	33°54.8	48°54.9	63°55.0	78°55.1	+0.1
	-11°15.2	-11°16.1	-11°17.0	-11°17.8	-11°18.7	-11°19.6	-11°20.5	-11°21.3	-11°22.2	-11°23.1	-11°24.0	-11°24.9	-0.9
Sa 23	273°56.2	288°56.3	303°56.4	318°56.4	333°56.5	348°56.6	3°56.7	18°56.8	33°56.9	48°56.9	63°57.0	78°57.1	+0.1
	-11°36.2	-11°37.1	-11°38.0	-11°38.8	-11°39.7	-11°40.6	-11°41.4	-11°42.3	-11°43.2	-11°44.0	-11°44.9	-11°45.8	-0.9
Su 24	273°58.1	288°58.2	303°58.3	318°58.4	333°58.4	348°58.5	3°58.6	18°58.7	33°58.7	48°58.8	63°58.9	78°59.0	+0.1
	-11°57.0	-11°57.9	-11°58.8	-11°59.6	-12°00.5	-12°01.4	-12°02.2	-12°03.1	-12°03.9	-12°04.8	-12°05.7	-12°06.5	-0.9
Mo 25	273°59.9	289°00.0	304°00.0	319°00.1	334°00.2	349°00.2	4°00.3	19°00.4	34°00.4	49°00.5	64°00.6	79°00.6	+0.1
	-12°17.7	-12°18.5	-12°19.4	-12°20.3	-12°21.1	-12°22.0	-12°22.8	-12°23.7	-12°24.5	-12°25.4	-12°26.2	-12°27.1	-0.9
Tu 26	274°01.5	289°01.5	304°01.6	319°01.6	334°01.7	349°01.8	4°01.8	19°01.9	34°01.9	49°02.0	64°02.1	79°02.1	+0.1
	-12°38.1	-12°39.0	-12°39.8	-12°40.7	-12°41.5	-12°42.4	-12°43.2	-12°44.1	-12°44.9	-12°45.8	-12°46.6	-12°47.5	-0.8
We 27	274°02.8	289°02.9	304°03.0	319°03.0	334°03.1	349°03.1	4°03.2	19°03.2	34°03.3	49°03.3	64°03.4	79°03.4	+0.1
	-12°58.4	-12°59.3	-13°00.1	-13°00.9	-13°01.8	-13°02.6	-13°03.5	-13°04.3	-13°05.1	-13°06.0	-13°06.8	-13°07.6	-0.8
Th 28	274°04.0	289°04.1	304°04.1	319°04.2	334°04.2	349°04.3	4°04.3	19°04.4	34°04.4	49°04.4	64°04.5	79°04.5	+0.0
	-13°18.5	-13°19.3	-13°20.1	-13°21.0	-13°21.8	-13°22.6	-13°23.5	-13°24.3	-13°25.1	-13°26.0	-13°26.8	-13°27.6	-0.8
Fr 29	274°05.0	289°05.1	304°05.1	319°05.1	334°05.2	349°05.2	4°05.3	19°05.3	34°05.3	49°05.4	64°05.4	79°05.4	+0.0
	-13°38.3	-13°39.2	-13°40.0	-13°40.8	-13°41.6	-13°42.4	-13°43.3	-13°44.1	-13°44.9	-13°45.7	-13°46.6	-13°47.4	-0.8
Sa 30	274°05.8	289°05.9	304°05.9	319°05.9	334°05.9	349°06.0	4°06.0	19°06.0	34°06.1	49°06.1	64°06.1	79°06.1	+0.0
	-13°58.0	-13°58.8	-13°59.6	-14°00.4	-14°01.2	-14°02.0	-14°02.9	-14°03.7	-14°04.5	-14°05.3	-14°06.1	-14°06.9	-0.8
Su 31	274°06.4	289°06.5	304°06.5	319°06.5	334°06.5	349°06.5	4°06.6	19°06.6	34°06.6	49°06.6	64°06.6	79°06.6	+0.0
	-14°17.4	-14°18.2	-14°19.0	-14°19.8	-14°20.6	-14°21.4	-14°22.2	-14°23.0	-14°23.8	-14°24.6	-14°25.4	-14°26.2	-0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2032

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
Fr 1	249°30.4	264°04.5	278°38.7	293°12.9	307°47.0	322°21.2	336°55.4	351°29.7	6°03.9	20°38.1	35°12.4	+34.2	14.7
	7°03.8	6°54.7	6°45.7	6°36.6	6°27.4	6°18.3	6°09.1	5°59.9	5°50.7	5°41.4	5°32.2	-9.2	54.0
Sa 2	253°47.2	268°21.5	282°55.9	297°30.3	312°04.6	326°39.0	341°13.3	355°47.7	10°22.0	24°56.4	39°30.7	+34.4	14.7
	3°10.5	3°00.9	2°51.3	2°41.7	2°32.1	2°22.5	2°12.8	2°03.1	1°53.5	1°43.8	1°34.1	-9.6	54.0
Su 3	258°05.1	272°39.3	287°13.5	301°47.6	316°21.8	330°56.0	345°30.1	0°04.2	14°38.3	29°12.4	43°46.5	+34.1	14.8
	-0°52.0	-1°01.8	-1°11.6	-1°21.3	-1°31.1	-1°40.8	-1°50.6	-2°00.3	-2°10.1	-2°19.8	-2°29.6	-9.8	54.2
● Mo 4	262°14.9	276°48.6	291°22.3	305°55.9	320°29.6	335°03.2	349°36.7	4°10.2	18°43.7	33°17.2	47°50.6	+33.6	14.9
	-4°54.5	-5°04.0	-5°13.6	-5°23.1	-5°32.6	-5°42.1	-5°51.5	-6°01.0	-6°10.4	-6°19.8	-6°29.2	-9.5	54.5
Tu 5	266°08.1	280°40.9	295°13.8	309°46.5	324°19.3	338°52.0	353°24.7	7°57.3	22°29.9	37°02.4	51°34.9	+32.7	15.0
	-8°46.7	-8°55.6	-9°04.5	-9°13.3	-9°22.1	-9°30.9	-9°39.7	-9°48.4	-9°57.0	-10°05.6	-10°14.2	-8.8	54.9
We 6	269°36.9	284°08.7	298°40.4	313°12.0	327°43.6	342°15.2	356°46.7	11°18.2	25°49.6	40°21.0	54°52.3	+31.5	15.1
	-12°17.6	-12°25.4	-12°33.2	-12°40.9	-12°48.6	-12°56.2	-13°03.8	-13°11.3	-13°18.7	-13°26.1	-13°33.4	-7.6	55.3
Th 7	272°35.9	287°06.4	301°36.8	316°07.2	330°37.5	345°07.8	359°38.0	14°08.2	28°38.4	43°08.4	57°38.5	+30.3	15.2
	-15°15.7	-15°21.9	-15°28.1	-15°34.3	-15°40.3	-15°46.3	-15°52.2	-15°58.0	-16°03.8	-16°09.5	-16°15.0	-5.9	55.7
Fr 8	275°02.6	289°31.9	304°01.0	318°30.1	332°59.2	347°28.2	1°57.2	16°26.1	30°55.0	45°23.8	59°52.6	+29.0	15.3
	-17°29.1	-17°33.4	-17°37.5	-17°41.6	-17°45.6	-17°49.4	-17°53.2	-17°56.9	-18°00.5	-18°04.1	-18°07.5	-3.8	56.3
Sa 9	276°59.0	291°27.1	305°55.1	320°23.2	334°51.1	349°19.1	3°47.0	18°14.9	32°42.7	47°10.5	61°38.2	+27.9	15.5
	-18°47.0	-18°48.8	-18°50.6	-18°52.2	-18°53.7	-18°55.1	-18°56.4	-18°57.6	-18°58.7	-18°59.7	-19°00.6	-1.4	56.9
Su 10	278°31.0	292°58.3	307°25.6	321°52.8	336°20.1	350°47.3	5°14.5	19°41.6	34°08.8	48°35.9	63°03.0	+27.2	15.7
	-19°00.7	-18°59.8	-18°58.8	-18°57.7	-18°56.5	-18°55.2	-18°53.8	-18°52.2	-18°50.5	-18°48.8	-18°46.9	+1.4	57.5
Mo 11	279°48.0	294°14.9	308°41.8	323°08.7	337°35.6	352°02.4	6°29.3	20°56.2	35°23.1	49°49.9	64°16.8	+26.9	15.9
	-18°05.1	-18°01.4	-17°57.6	-17°53.7	-17°49.7	-17°45.6	-17°41.3	-17°37.0	-17°32.5	-17°28.0	-17°23.3	+4.2	58.2
◐ Tu 12	280°59.7	295°26.6	309°53.5	324°20.4	338°47.3	353°14.2	7°41.1	22°08.0	36°34.9	51°01.8	65°28.8	+26.9	16.0
	-16°00.1	-15°53.7	-15°47.2	-15°40.6	-15°33.9	-15°27.1	-15°20.2	-15°13.2	-15°06.1	-14°58.9	-14°51.6	+6.8	58.8
We 13	282°13.8	296°40.9	311°08.0	325°35.1	340°02.2	354°29.3	8°56.4	23°23.6	37°50.7	52°17.9	66°45.0	+27.1	16.2
	-12°50.9	-12°42.1	-12°33.2	-12°24.3	-12°15.2	-12°06.1	-11°56.9	-11°47.7	-11°38.3	-11°28.9	-11°19.3	+9.2	59.5
Th 14	283°33.7	298°01.0	312°28.3	326°55.6	341°23.0	355°50.3	10°17.7	24°45.0	39°12.4	53°39.8	68°07.1	+27.3	16.4
	-8°47.8	-8°37.2	-8°26.5	-8°15.8	-8°04.9	-7°54.1	-7°43.1	-7°32.2	-7°21.1	-7°10.0	-6°58.9	+10.9	60.0
Fr 15	284°58.2	299°25.6	313°53.1	328°20.5	342°47.9	357°15.3	11°42.8	26°10.2	40°37.6	55°05.0	69°32.4	+27.4	16.5
	-4°06.4	-3°54.6	-3°42.8	-3°30.9	-3°19.0	-3°07.1	-2°55.2	-2°43.3	-2°31.3	-2°19.3	-2°07.3	+11.9	60.4
Sa 16	286°23.1	300°50.4	315°17.7	329°45.0	344°12.3	358°39.6	13°06.9	27°34.1	42°01.4	56°28.6	70°55.9	+27.3	16.5
	0°54.2	1°06.3	1°18.5	1°30.6	1°42.7	1°54.7	2°06.8	2°18.9	2°30.9	2°43.0	2°55.0	+12.1	60.5
Su 17	287°42.8	302°09.9	316°36.9	331°03.9	345°30.8	359°57.8	14°24.7	28°51.7	43°18.6	57°45.5	72°12.4	+27.0	16.5
	5°52.2	6°03.7	6°15.2	6°26.7	6°38.1	6°49.5	7°00.8	7°12.0	7°23.3	7°34.4	7°45.5	+11.3	60.4
○ Mo 18	288°53.7	303°20.4	317°47.0	332°13.6	346°40.2	1°06.8	15°33.3	29°59.9	44°26.4	58°53.0	73°19.5	+26.6	16.3
	10°25.1	10°35.1	10°45.2	10°55.1	11°05.0	11°14.8	11°24.5	11°34.1	11°43.7	11°53.1	12°02.5	+9.7	59.9
Tu 19	289°55.9	304°22.3	318°48.7	333°15.0	347°41.4	2°07.7	16°34.1	31°00.4	45°26.8	59°53.1	74°19.5	+26.3	16.2
	14°12.6	14°20.5	14°28.3	14°36.0	14°43.6	14°51.1	14°58.6	15°05.9	15°13.1	15°20.2	15°27.2	+7.5	59.3
We 20	290°55.0	305°21.5	319°47.9	334°14.4	348°40.8	3°07.3	17°33.8	32°00.3	46°26.8	60°53.4	75°20.0	+26.5	15.9
	16°59.2	17°04.5	17°09.6	17°14.6	17°19.6	17°24.4	17°29.0	17°33.6	17°38.1	17°42.4	17°46.7	+4.7	58.4
Th 21	292°01.2	306°28.2	320°55.2	335°22.2	349°49.3	4°16.4	18°43.5	33°10.7	47°37.9	62°05.1	76°32.4	+27.1	15.7
	18°36.4	18°38.8	18°41.1	18°43.2	18°45.3	18°47.2	18°49.0	18°50.8	18°52.4	18°53.9	18°55.2	+1.9	57.5
Fr 22	293°26.7	307°54.6	322°22.7	336°50.7	351°18.9	5°47.0	20°15.3	34°43.6	49°11.9	63°40.3	78°08.7	+28.2	15.4
	19°02.6	19°02.2	19°01.8	19°01.2	19°00.5	18°59.7	18°58.8	18°57.8	18°56.7	18°55.5	18°54.2	-0.8	56.6
Sa 23	307°54.6	322°22.7	336°50.7	351°18.9	5°47.0	20°15.3	34°43.6	49°11.9	63°40.3	78°08.7	92°37.2	+28.3	15.4
	19°02.2	19°01.8	19°01.2	19°00.5	18°59.7	18°58.8	18°57.8	18°56.7	18°55.5	18°54.2	18°52.8	-1.0	56.6
Su 24	309°51.2	324°20.6	338°50.0	353°19.5	7°49.1	22°18.7	36°48.3	51°18.1	65°47.9	80°17.7	94°47.6	+29.6	15.2
	18°19.8	18°16.9	18°13.8	18°10.7	18°07.5	18°04.2	18°00.8	17°57.3	17°53.7	17°50.0	17°46.3	-3.4	55.8
Mo 25	312°23.4	326°54.2	341°25.1	355°56.1	10°27.1	24°58.2	39°29.3	54°00.5	68°31.8	83°03.1	97°34.4	+31.1	15.0
	16°40.2	16°35.2	16°30.0	16°24.9	16°19.6	16°14.3	16°08.9	16°03.4	15°57.9	15°52.3	15°46.6	-5.4	55.1
◑ Tu 26	315°31.3	330°03.6	344°35.8	359°08.1	13°40.5	28°12.9	42°45.3	57°17.8	71°50.4	86°23.0	100°55.6	+32.4	14.9
	14°13.5	14°06.8	14°00.0	13°53.2	13°46.3	13°39.4	13°32.4	13°25.4	13°18.3	13°11.1	13°03.9	-7.0	54.6
We 27	319°10.5	333°43.8	348°17.1	2°50.5	17°23.9	31°57.4	46°30.9	61°04.4	75°37.9	90°11.5	104°45.2	+33.5	14.8
	11°09.9	11°01.9	10°53.9	10°45.8	10°37.7	10°29.5	10°21.3	10°13.1	10°04.8	9°56.5	9°48.2	-8.2	54.2
Th 28	323°12.9	337°46.9	352°21.0	6°55.1	21°29.2	36°03.3	50°37.5	65°11.6	79°45.8	94°20.0	108°54.2	+34.1	14.8
	7°38.6	7°29.7	7°20.8	7°11.8	7°02.8	6°53.8	6°44.8	6°35.7	6°26.6	6°17.5	6°08.3	-9.0	54.1
Fr 29	327°28.8	342°03.2	356°37.6	11°12.0	25°46.3	40°20.7	54°55.1	69°29.5	84°03.9	98°38.3	113°12.6	+34.4	14.8
	3°48.3	3°38.9	3°29.4	3°19.8	3°10.3	3°00.7	2°51.2	2°41.6	2°32.0	2°22.4	2°12.8	-9.6	54.1
Sa 30	331°47.7	346°22.0	0°56.3	15°30.5	30°04.7	44°38.9	59°13.1	73°47.3	88°21.5	102°55.6	117°29.7	+34.2	14.8
	-0°12.6	-0°22.3	-0°32.1	-0°41.8	-0°51.5	-1°01.3	-1°11.0	-1°20.8	-1°30.5	-1°40.3	-1°50.0	-9.7	54.3
Su 31	335°58.9	350°32.6	5°06.4	19°40.0	34°13.7	48°47.3	63°20.9	77°54.4	92°28.0	107°01.4	121°34.9	+33.6	14.9
	-4°15.5	-4°25.1	-4°34.7	-4°44.3	-4°53.9	-5°03.5	-5°13.0	-5°22.6	-5°32.1	-5°41.6	-5°51.1	-9.6	54.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 4 13h26 — FQ: 12 03h47 — FM: 18 18h58 — LQ: 26 02h28

SUN

November 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	274°06.8	289°06.8	304°06.9	319°06.9	334°06.9	349°06.9	4°06.9	19°06.9	34°06.9	49°06.9	64°06.9	79°06.9	+0.0
	-14°36.6	-14°37.4	-14°38.2	-14°39.0	-14°39.8	-14°40.6	-14°41.4	-14°42.1	-14°42.9	-14°43.7	-14°44.5	-14°45.3	-0.8
Tu 2	274°07.0	289°07.0	304°07.0	319°07.0	334°07.0	349°07.0	4°07.0	19°07.0	34°07.0	49°07.0	64°07.0	79°07.0	+0.0
	-14°55.6	-14°56.3	-14°57.1	-14°57.9	-14°58.7	-14°59.5	-15°00.3	-15°01.0	-15°01.8	-15°02.6	-15°03.4	-15°04.2	-0.8
We 3	274°07.0	289°07.0	304°07.0	319°07.0	334°07.0	349°07.0	4°07.0	19°07.0	34°07.0	49°07.0	64°07.0	79°06.9	-0.0
	-15°14.3	-15°15.0	-15°15.8	-15°16.6	-15°17.4	-15°18.1	-15°18.9	-15°19.7	-15°20.5	-15°21.2	-15°22.0	-15°22.8	-0.8
Th 4	274°06.8	289°06.8	304°06.8	319°06.8	334°06.8	349°06.7	4°06.7	19°06.7	34°06.7	49°06.7	64°06.7	79°06.6	-0.0
	-15°32.7	-15°33.5	-15°34.3	-15°35.0	-15°35.8	-15°36.5	-15°37.3	-15°38.1	-15°38.8	-15°39.6	-15°40.4	-15°41.1	-0.8
Fr 5	274°06.4	289°06.4	304°06.3	319°06.3	334°06.3	349°06.3	4°06.3	19°06.2	34°06.2	49°06.2	64°06.2	79°06.1	-0.0
	-15°50.9	-15°51.7	-15°52.4	-15°53.2	-15°54.0	-15°54.7	-15°55.5	-15°56.2	-15°57.0	-15°57.7	-15°58.5	-15°59.2	-0.8
Sa 6	274°05.8	289°05.7	304°05.7	319°05.7	334°05.6	349°05.6	4°05.6	19°05.5	34°05.5	49°05.5	64°05.4	79°05.4	-0.0
	-16°08.9	-16°09.6	-16°10.4	-16°11.1	-16°11.9	-16°12.6	-16°13.3	-16°14.1	-16°14.8	-16°15.5	-16°16.3	-16°17.0	-0.7
Su 7	274°04.9	289°04.9	304°04.9	319°04.8	334°04.8	349°04.7	4°04.7	19°04.6	34°04.6	49°04.6	64°04.5	79°04.5	-0.0
	-16°26.6	-16°27.3	-16°28.0	-16°28.8	-16°29.5	-16°30.2	-16°30.9	-16°31.7	-16°32.4	-16°33.1	-16°33.8	-16°34.6	-0.7
Mo 8	274°03.9	289°03.8	304°03.8	319°03.7	334°03.7	349°03.7	4°03.6	19°03.6	34°03.5	49°03.5	64°03.4	79°03.3	-0.0
	-16°44.0	-16°44.7	-16°45.4	-16°46.1	-16°46.8	-16°47.6	-16°48.3	-16°49.0	-16°49.7	-16°50.4	-16°51.1	-16°51.8	-0.7
Tu 9	274°02.6	289°02.6	304°02.5	319°02.5	334°02.4	349°02.4	4°02.3	19°02.2	34°02.2	49°02.1	64°02.1	79°02.0	-0.1
	-17°01.1	-17°01.8	-17°02.5	-17°03.2	-17°03.9	-17°04.6	-17°05.3	-17°06.0	-17°06.7	-17°07.4	-17°08.1	-17°08.8	-0.7
We 10	274°01.2	289°01.1	304°01.1	319°01.0	334°00.9	349°00.9	4°00.8	19°00.7	34°00.7	49°00.6	64°00.5	79°00.5	-0.1
	-17°17.9	-17°18.6	-17°19.3	-17°20.0	-17°20.7	-17°21.4	-17°22.1	-17°22.8	-17°23.5	-17°24.1	-17°24.8	-17°25.5	-0.7
Th 11	273°59.5	288°59.5	303°59.4	318°59.3	333°59.2	348°59.2	3°59.1	18°59.0	33°58.9	48°58.9	63°58.8	78°58.7	-0.1
	-17°34.4	-17°35.1	-17°35.8	-17°36.5	-17°37.2	-17°37.8	-17°38.5	-17°39.2	-17°39.9	-17°40.6	-17°41.2	-17°41.9	-0.7
Fr 12	273°57.7	288°57.6	303°57.5	318°57.4	333°57.3	348°57.3	3°57.2	18°57.1	33°57.0	48°56.9	63°56.8	78°56.7	-0.1
	-17°50.7	-17°51.3	-17°52.0	-17°52.7	-17°53.3	-17°54.0	-17°54.7	-17°55.3	-17°56.0	-17°56.7	-17°57.3	-17°58.0	-0.7
Sa 13	273°55.6	288°55.5	303°55.4	318°55.3	333°55.2	348°55.1	3°55.0	18°55.0	33°54.9	48°54.8	63°54.7	78°54.6	-0.1
	-18°06.6	-18°07.2	-18°07.9	-18°08.5	-18°09.2	-18°09.8	-18°10.5	-18°11.2	-18°11.8	-18°12.5	-18°13.1	-18°13.8	-0.7
Su 14	273°53.3	288°53.2	303°53.1	318°53.0	333°52.9	348°52.8	3°52.7	18°52.6	33°52.5	48°52.4	63°52.3	78°52.2	-0.1
	-18°22.2	-18°22.8	-18°23.5	-18°24.1	-18°24.7	-18°25.4	-18°26.0	-18°26.7	-18°27.3	-18°27.9	-18°28.6	-18°29.2	-0.6
Mo 15	273°50.8	288°50.7	303°50.6	318°50.5	333°50.4	348°50.3	3°50.2	18°50.1	33°50.0	48°49.8	63°49.7	78°49.6	-0.1
	-18°37.4	-18°38.1	-18°38.7	-18°39.3	-18°40.0	-18°40.6	-18°41.2	-18°41.8	-18°42.5	-18°43.1	-18°43.7	-18°44.3	-0.6
Tu 16	273°48.1	288°48.0	303°47.9	318°47.8	333°47.7	348°47.5	3°47.4	18°47.3	33°47.2	48°47.1	63°47.0	78°46.8	-0.1
	-18°52.4	-18°53.0	-18°53.6	-18°54.2	-18°54.8	-18°55.5	-18°56.1	-18°56.7	-18°57.3	-18°57.9	-18°58.5	-18°59.1	-0.6
We 17	273°45.2	288°45.1	303°45.0	318°44.9	333°44.7	348°44.6	3°44.5	18°44.3	33°44.2	48°44.1	63°44.0	78°43.8	-0.1
	-19°07.0	-19°07.6	-19°08.2	-19°08.8	-19°09.4	-19°10.0	-19°10.6	-19°11.2	-19°11.8	-19°12.4	-19°13.0	-19°13.6	-0.6
Th 18	273°42.1	288°42.0	303°41.9	318°41.7	333°41.6	348°41.4	3°41.3	18°41.2	33°41.0	48°40.9	63°40.8	78°40.6	-0.1
	-19°21.3	-19°21.9	-19°22.4	-19°23.0	-19°23.6	-19°24.2	-19°24.8	-19°25.4	-19°25.9	-19°26.5	-19°27.1	-19°27.7	-0.6
Fr 19	273°38.8	288°38.7	303°38.5	318°38.4	333°38.2	348°38.1	3°37.9	18°37.8	33°37.6	48°37.5	63°37.4	78°37.2	-0.1
	-19°35.2	-19°35.8	-19°36.3	-19°36.9	-19°37.5	-19°38.0	-19°38.6	-19°39.2	-19°39.7	-19°40.3	-19°40.9	-19°41.4	-0.6
Sa 20	273°35.3	288°35.1	303°35.0	318°34.8	333°34.7	348°34.5	3°34.4	18°34.2	33°34.1	48°33.9	63°33.7	78°33.6	-0.2
	-19°48.8	-19°49.3	-19°49.9	-19°50.4	-19°51.0	-19°51.5	-19°52.1	-19°52.6	-19°53.2	-19°53.7	-19°54.3	-19°54.8	-0.6
Su 21	273°31.5	288°31.4	303°31.2	318°31.1	333°30.9	348°30.7	3°30.6	18°30.4	33°30.3	48°30.1	63°29.9	78°29.8	-0.2
	-20°02.0	-20°02.5	-20°03.0	-20°03.6	-20°04.1	-20°04.7	-20°05.2	-20°05.7	-20°06.3	-20°06.8	-20°07.4	-20°07.9	-0.5
Mo 22	273°27.6	288°27.4	303°27.3	318°27.1	333°26.9	348°26.8	3°26.6	18°26.4	33°26.3	48°26.1	63°25.9	78°25.7	-0.2
	-20°14.8	-20°15.3	-20°15.9	-20°16.4	-20°16.9	-20°17.4	-20°18.0	-20°18.5	-20°19.0	-20°19.5	-20°20.0	-20°20.6	-0.5
Tu 23	273°23.5	288°23.3	303°23.1	318°22.9	333°22.8	348°22.6	3°22.4	18°22.2	33°22.1	48°21.9	63°21.7	78°21.5	-0.2
	-20°27.3	-20°27.8	-20°28.3	-20°28.8	-20°29.3	-20°29.8	-20°30.3	-20°30.8	-20°31.3	-20°31.8	-20°32.4	-20°32.9	-0.5
We 24	273°19.1	288°19.0	303°18.8	318°18.6	333°18.4	348°18.2	3°18.0	18°17.8	33°17.7	48°17.5	63°17.3	78°17.1	-0.2
	-20°39.4	-20°39.9	-20°40.4	-20°40.8	-20°41.3	-20°41.8	-20°42.3	-20°42.8	-20°43.3	-20°43.8	-20°44.3	-20°44.8	-0.5
Th 25	273°14.6	288°14.4	303°14.2	318°14.0	333°13.8	348°13.6	3°13.4	18°13.3	33°13.1	48°12.9	63°12.7	78°12.5	-0.2
	-20°51.1	-20°51.6	-20°52.0	-20°52.5	-20°53.0	-20°53.5	-20°53.9	-20°54.4	-20°54.9	-20°55.4	-20°55.8	-20°56.3	-0.5
Fr 26	273°09.9	288°09.7	303°09.5	318°09.3	333°09.1	348°08.9	3°08.7	18°08.5	33°08.3	48°08.1	63°07.9	78°07.7	-0.2
	-21°02.4	-21°02.9	-21°03.3	-21°03.8	-21°04.2	-21°04.7	-21°05.2	-21°05.6	-21°06.1	-21°06.5	-21°07.0	-21°07.4	-0.5
Sa 27	273°05.0	288°04.8	303°04.6	318°04.4	333°04.1	348°03.9	3°03.7	18°03.5	33°03.3	48°03.1	63°02.9	78°02.7	-0.2
	-21°13.3	-21°13.8	-21°14.2	-21°14.7	-21°15.1	-21°15.5	-21°16.0	-21°16.4	-21°16.9	-21°17.3	-21°17.8	-21°18.2	-0.4
Su 28	272°59.9	287°59.7	302°59.5	317°59.2	332°59.0	347°58.8	2°58.6	17°58.4	32°58.2	47°57.9	62°57.7	77°57.5	-0.2
	-21°23.8	-21°24.3	-21°24.7	-21°25.1	-21°25.6	-21°26.0	-21°26.4	-21°26.8	-21°27.3	-21°27.7	-21°28.1	-21°28.5	-0.4
Mo 29	272°54.6	287°54.4	302°54.2	317°54.0	332°53.7	347°53.5	2°53.3	17°53.1	32°52.8	47°52.6	62°52.4	77°52.2	-0.2
	-21°34.0	-21°34.4	-21°34.8	-21°35.2	-21°35.6	-21°36.0	-21°36.4	-21°36.8	-21°37.3	-21°37.7	-21°38.1	-21°38.5	-0.4
Tu 30	272°49.2	287°49.0	302°48.7	317°48.5	332°48.3	347°48.0	2°47.8	17°47.6	32°47.3	47°47.1	62°46.9	77°46.6	-0.2
	-21°43.7	-21°44.1	-21°44.5	-21°44.9	-21°45.3	-21°45.7	-21°46.0	-21°46.4	-21°46.8	-21°47.2	-21°47.6	-21°48.0	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2032

D	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	Δ'/h	SH
Mo 1	252°34.3	267°07.4	281°40.4	296°13.4	310°46.4	325°19.3	339°52.2	354°25.0	8°57.8	23°30.5	38°03.2	+32.9	15.0
	-7°15.5	-7°24.8	-7°34.1	-7°43.3	-7°52.5	-8°01.6	-8°10.7	-8°19.8	-8°28.9	-8°38.0	-8°47.0	-9.1	54.9
Tu 2	256°08.0	270°39.9	285°11.8	299°43.6	314°15.4	328°47.1	343°18.8	357°50.4	12°22.0	26°53.5	41°24.9	+31.7	15.1
	-10°57.7	-11°06.1	-11°14.5	-11°22.8	-11°31.0	-11°39.3	-11°47.4	-11°55.5	-12°03.6	-12°11.6	-12°19.5	-8.2	55.4
● We 3	259°10.1	273°40.6	288°11.2	302°41.6	317°12.0	331°42.3	346°12.6	0°42.8	15°13.0	29°43.1	44°13.2	+30.3	15.2
	-14°12.1	-14°19.2	-14°26.1	-14°33.0	-14°39.8	-14°46.6	-14°53.2	-14°59.9	-15°06.4	-15°12.9	-15°19.3	-6.7	55.9
Th 4	261°37.3	276°06.5	290°35.6	305°04.7	319°33.7	334°02.6	348°31.5	3°00.4	17°29.2	31°58.0	46°26.7	+28.9	15.4
	-16°45.9	-16°51.1	-16°56.1	-17°01.0	-17°05.9	-17°10.7	-17°15.4	-17°20.0	-17°24.5	-17°28.9	-17°33.2	-4.7	56.4
Fr 5	263°31.6	277°59.5	292°27.5	306°55.4	321°23.2	335°51.0	350°18.8	4°46.6	19°14.3	33°41.9	48°09.6	+27.8	15.5
	-18°26.7	-18°29.4	-18°32.1	-18°34.7	-18°37.1	-18°39.5	-18°41.7	-18°43.9	-18°45.9	-18°47.9	-18°49.7	-2.3	56.9
Sa 6	265°00.3	279°27.5	293°54.7	308°21.8	322°48.9	337°16.0	351°43.1	6°10.2	20°37.2	35°04.2	49°31.3	+27.1	15.7
	-19°04.1	-19°04.2	-19°04.2	-19°04.0	-19°03.8	-19°03.4	-19°02.9	-19°02.3	-19°01.6	-19°00.8	-18°59.9	+0.4	57.4
Su 7	266°15.3	280°42.2	295°09.1	309°36.0	324°02.9	338°29.8	352°56.7	7°23.6	21°50.5	36°17.4	50°44.3	+26.9	15.8
	-18°32.3	-18°29.6	-18°26.7	-18°23.8	-18°20.7	-18°17.5	-18°14.2	-18°10.8	-18°07.3	-18°03.7	-17°59.9	+3.2	57.9
Mo 8	267°29.2	281°56.3	296°23.4	310°50.5	325°17.6	339°44.8	354°11.9	8°39.1	23°06.3	37°33.6	52°00.8	+27.2	15.9
	-16°50.8	-16°45.3	-16°39.8	-16°34.1	-16°28.4	-16°22.5	-16°16.5	-16°10.5	-16°04.3	-15°58.0	-15°51.7	+5.9	58.3
Tu 9	268°51.8	283°19.4	297°47.0	312°14.6	326°42.3	341°09.9	355°37.6	10°05.3	24°33.0	39°00.8	53°28.6	+27.7	16.0
	-14°04.8	-13°56.9	-13°49.0	-13°41.0	-13°32.8	-13°24.7	-13°16.4	-13°08.0	-12°59.6	-12°51.0	-12°42.4	+8.2	58.7
◐ We 10	270°27.8	284°55.9	299°24.0	313°52.2	328°20.3	342°48.5	357°16.7	11°44.9	26°13.2	40°41.4	55°09.7	+28.2	16.1
	-10°24.3	-10°14.6	-10°04.7	-9°54.8	-9°44.9	-9°34.9	-9°24.8	-9°14.7	-9°04.5	-8°54.2	-8°43.9	+10.0	59.1
Th 11	272°15.6	286°44.1	301°12.6	315°41.1	330°09.6	344°38.1	359°06.6	13°35.2	28°03.7	42°32.2	57°00.8	+28.5	16.2
	-6°03.1	-5°52.0	-5°40.9	-5°29.8	-5°18.6	-5°07.4	-4°56.1	-4°44.8	-4°33.5	-4°22.1	-4°10.8	+11.2	59.4
Fr 12	274°09.3	288°37.8	303°06.4	317°34.9	332°03.5	346°32.0	1°00.5	15°29.1	29°57.6	44°26.1	58°54.6	+28.5	16.2
	-1°17.3	-1°05.6	-0°53.9	-0°42.2	-0°30.5	-0°18.7	-0°07.0	0°04.7	0°16.5	0°28.2	0°40.0	+11.7	59.6
Sa 13	276°00.6	290°28.9	304°57.1	319°25.4	333°53.6	348°21.8	2°50.0	17°18.2	31°46.3	46°14.4	60°42.5	+28.2	16.3
	3°35.2	3°46.7	3°58.3	4°09.8	4°21.3	4°32.7	4°44.2	4°55.6	5°07.0	5°18.4	5°29.7	+11.5	59.6
Su 14	277°41.4	292°09.2	306°36.9	321°04.5	335°32.2	349°59.8	4°27.4	18°55.0	33°22.6	47°50.1	62°17.6	+27.6	16.2
	8°15.0	8°25.6	8°36.2	8°46.8	8°57.2	9°07.7	9°18.1	9°28.4	9°38.6	9°48.8	9°59.0	+10.4	59.5
Mo 15	279°06.8	293°33.9	308°01.0	322°28.0	336°55.0	351°22.0	5°48.9	20°15.9	34°42.8	49°09.7	63°36.5	+27.0	16.1
	12°22.8	12°31.8	12°40.7	12°49.5	12°58.2	13°06.9	13°15.4	13°23.9	13°32.3	13°40.6	13°48.9	+8.6	59.2
Tu 16	280°17.2	294°43.8	309°10.3	323°36.9	338°03.4	352°30.0	6°56.5	21°23.0	35°49.5	50°16.0	64°42.5	+26.5	16.0
	15°40.9	15°47.6	15°54.1	16°00.6	16°07.0	16°13.3	16°19.4	16°25.5	16°31.4	16°37.3	16°43.0	+6.2	58.7
○ We 17	281°19.5	295°46.0	310°12.5	324°39.0	339°05.6	353°32.1	7°58.6	22°25.2	36°51.7	51°18.3	65°44.9	+26.5	15.8
	17°55.7	17°59.7	18°03.5	18°07.3	18°10.9	18°14.4	18°17.7	18°21.0	18°24.1	18°27.2	18°30.1	+3.4	58.1
Th 18	282°26.5	296°53.5	311°20.5	325°47.5	340°14.6	354°41.7	9°08.9	23°36.1	38°03.3	52°30.5	66°57.9	+27.1	15.6
	19°00.1	19°01.1	19°02.1	19°03.0	19°03.7	19°04.3	19°04.8	19°05.2	19°05.5	19°05.7	19°05.8	+0.6	57.3
Fr 19	283°52.6	298°20.7	312°48.8	327°16.9	341°45.1	356°13.3	10°41.6	25°10.0	39°38.4	54°06.9	68°35.4	+28.3	15.4
	18°53.7	18°52.1	18°50.3	18°48.5	18°46.5	18°44.4	18°42.3	18°40.0	18°37.7	18°35.2	18°32.6	-2.1	56.6
Sa 20	285°50.1	300°19.6	314°49.1	329°18.7	343°48.4	358°18.1	12°47.8	27°17.7	41°47.6	56°17.5	70°47.5	+29.7	15.2
	17°42.9	17°38.8	17°34.7	17°30.5	17°26.2	17°21.8	17°17.4	17°12.8	17°08.2	17°03.5	16°58.7	-4.4	55.8
Su 21	288°25.3	302°56.3	317°27.4	331°58.5	346°29.7	1°01.0	15°32.3	30°03.6	44°35.1	59°06.5	73°38.1	+31.3	15.0
	15°37.5	15°31.5	15°25.5	15°19.4	15°13.2	15°06.9	15°00.6	14°54.2	14°47.8	14°41.3	14°34.7	-6.3	55.2
Mo 22	302°56.3	317°27.4	331°58.5	346°29.7	1°01.0	15°32.3	30°03.6	44°35.1	59°06.5	73°38.1	88°09.7	+31.3	15.0
	15°31.5	15°25.5	15°19.4	15°13.2	15°06.9	15°00.6	14°54.2	14°47.8	14°41.3	14°34.7	14°28.0	-6.4	55.2
Tu 23	306°10.4	320°42.9	335°15.4	349°48.0	4°20.6	18°53.3	33°26.0	47°58.8	62°31.6	77°04.5	91°37.4	+32.7	14.9
	12°41.6	12°34.0	12°26.5	12°18.8	12°11.2	12°03.4	11°55.7	11°47.8	11°40.0	11°32.1	11°24.1	-7.7	54.7
◑ We 24	309°56.3	324°29.8	339°03.4	353°37.1	8°10.8	22°44.5	37°18.2	51°52.0	66°25.8	80°59.6	95°33.5	+33.7	14.8
	9°19.8	9°11.2	9°02.6	8°54.0	8°45.3	8°36.5	8°27.8	8°19.0	8°10.2	8°01.3	7°52.5	-8.7	54.3
Th 25	314°04.6	328°38.9	343°13.2	357°47.4	12°21.7	26°56.1	41°30.4	56°04.7	70°39.1	85°13.5	99°47.8	+34.3	14.8
	5°36.0	5°26.8	5°17.5	5°08.1	4°58.8	4°49.4	4°40.0	4°30.6	4°21.2	4°11.8	4°02.3	-9.4	54.2
Fr 26	318°24.4	332°58.9	347°33.3	2°07.8	16°42.3	31°16.7	45°51.2	60°25.6	75°00.0	89°34.5	104°08.9	+34.4	14.8
	1°38.9	1°29.2	1°19.5	1°09.9	1°00.2	0°50.5	0°40.8	0°31.1	0°21.4	0°11.7	0°02.0	-9.7	54.2
Sa 27	322°43.6	337°17.8	351°52.0	6°26.1	21°00.3	35°34.4	50°08.4	64°42.5	79°16.5	93°50.5	108°24.5	+34.1	14.8
	-2°23.6	-2°33.3	-2°43.0	-2°52.7	-3°02.4	-3°12.0	-3°21.7	-3°31.3	-3°41.0	-3°50.6	-4°00.2	-9.7	54.5
Su 28	326°50.2	341°23.6	355°57.0	10°30.4	25°03.7	39°37.0	54°10.2	68°43.4	83°16.5	97°49.6	112°22.7	+33.3	15.0
	-6°22.9	-6°32.3	-6°41.7	-6°51.0	-7°00.3	-7°09.6	-7°18.9	-7°28.1	-7°37.3	-7°46.5	-7°55.7	-9.3	54.8
Mo 29	330°32.7	345°05.0	359°37.2	14°09.3	28°41.4	43°13.4	57°45.4	72°17.3	86°49.2	101°21.0	115°52.7	+32.0	15.1
	-10°09.6	-10°18.2	-10°26.8	-10°35.4	-10°43.9	-10°52.4	-11°00.9	-11°09.3	-11°17.6	-11°26.0	-11°34.2	-8.5	55.4
Tu 30	333°41.6	348°12.3	2°43.0	17°13.6	31°44.2	46°14.7	60°45.1	75°15.5	89°45.8	104°16.0	118°46.2	+30.5	15.3
	-13°32.3	-13°39.7	-13°47.1	-13°54.4	-14°01.7	-14°08.9	-14°16.0	-14°23.1	-14°30.0	-14°37.0	-14°43.8	-7.2	56.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 3 05h44 — FQ: 10 11h33 — FM: 17 06h42 — LQ: 24 22h47

SUN

December 2032

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	272°43.6	287°43.3	302°43.1	317°42.9	332°42.6	347°42.4	2°42.2	17°41.9	32°41.7	47°41.4	62°41.2	77°41.0	-0.2
	-21°53.0	-21°53.4	-21°53.7	-21°54.1	-21°54.5	-21°54.9	-21°55.2	-21°55.6	-21°56.0	-21°56.4	-21°56.7	-21°57.1	-0.4
Th 2	272°37.8	287°37.6	302°37.3	317°37.1	332°36.8	347°36.6	2°36.3	17°36.1	32°35.9	47°35.6	62°35.4	77°35.1	-0.2
	-22°01.9	-22°02.2	-22°02.6	-22°02.9	-22°03.3	-22°03.7	-22°04.0	-22°04.4	-22°04.7	-22°05.1	-22°05.4	-22°05.8	-0.4
Fr 3	272°31.9	287°31.6	302°31.4	317°31.1	332°30.9	347°30.6	2°30.4	17°30.1	32°29.9	47°29.6	62°29.4	77°29.1	-0.3
	-22°10.3	-22°10.7	-22°11.0	-22°11.3	-22°11.7	-22°12.0	-22°12.4	-22°12.7	-22°13.0	-22°13.4	-22°13.7	-22°14.0	-0.3
Sa 4	272°25.8	287°25.6	302°25.3	317°25.1	332°24.8	347°24.5	2°24.3	17°24.0	32°23.8	47°23.5	62°23.3	77°23.0	-0.3
	-22°18.3	-22°18.7	-22°19.0	-22°19.3	-22°19.6	-22°20.0	-22°20.3	-22°20.6	-22°20.9	-22°21.2	-22°21.6	-22°21.9	-0.3
Su 5	272°19.6	287°19.4	302°19.1	317°18.8	332°18.6	347°18.3	2°18.0	17°17.8	32°17.5	47°17.3	62°17.0	77°16.7	-0.3
	-22°25.9	-22°26.2	-22°26.5	-22°26.8	-22°27.2	-22°27.5	-22°27.8	-22°28.1	-22°28.4	-22°28.7	-22°29.0	-22°29.3	-0.3
Mo 6	272°13.3	287°13.0	302°12.7	317°12.5	332°12.2	347°11.9	2°11.7	17°11.4	32°11.1	47°10.9	62°10.6	77°10.3	-0.3
	-22°33.1	-22°33.4	-22°33.7	-22°34.0	-22°34.2	-22°34.5	-22°34.8	-22°35.1	-22°35.4	-22°35.7	-22°35.9	-22°36.2	-0.3
Tu 7	272°06.8	287°06.5	302°06.3	317°06.0	332°05.7	347°05.4	2°05.2	17°04.9	32°04.6	47°04.4	62°04.1	77°03.8	-0.3
	-22°39.8	-22°40.1	-22°40.3	-22°40.6	-22°40.9	-22°41.1	-22°41.4	-22°41.7	-22°41.9	-22°42.2	-22°42.5	-22°42.7	-0.3
We 8	272°00.2	287°00.0	301°59.7	316°59.4	331°59.1	346°58.8	1°58.6	16°58.3	31°58.0	46°57.7	61°57.5	76°57.2	-0.3
	-22°46.1	-22°46.3	-22°46.6	-22°46.8	-22°47.1	-22°47.3	-22°47.6	-22°47.8	-22°48.1	-22°48.3	-22°48.6	-22°48.8	-0.2
Th 9	271°53.5	286°53.3	301°53.0	316°52.7	331°52.4	346°52.1	1°51.8	16°51.6	31°51.3	46°51.0	61°50.7	76°50.4	-0.3
	-22°51.9	-22°52.1	-22°52.4	-22°52.6	-22°52.8	-22°53.1	-22°53.3	-22°53.5	-22°53.7	-22°54.0	-22°54.2	-22°54.4	-0.2
Fr 10	271°46.7	286°46.5	301°46.2	316°45.9	331°45.6	346°45.3	1°45.0	16°44.7	31°44.5	46°44.2	61°43.9	76°43.6	-0.3
	-22°57.3	-22°57.5	-22°57.7	-22°57.9	-22°58.1	-22°58.3	-22°58.5	-22°58.8	-22°59.0	-22°59.2	-22°59.4	-22°59.6	-0.2
Sa 11	271°39.9	286°39.6	301°39.3	316°39.0	331°38.7	346°38.4	1°38.1	16°37.8	31°37.5	46°37.3	61°37.0	76°36.7	-0.3
	-23°02.2	-23°02.4	-23°02.6	-23°02.8	-23°03.0	-23°03.2	-23°03.4	-23°03.5	-23°03.7	-23°03.9	-23°04.1	-23°04.3	-0.2
Su 12	271°32.9	286°32.6	301°32.3	316°32.0	331°31.7	346°31.4	1°31.1	16°30.8	31°30.5	46°30.3	61°30.0	76°29.7	-0.3
	-23°06.7	-23°06.8	-23°07.0	-23°07.2	-23°07.4	-23°07.5	-23°07.7	-23°07.9	-23°08.0	-23°08.2	-23°08.4	-23°08.6	-0.2
Mo 13	271°25.8	286°25.5	301°25.2	316°24.9	331°24.7	346°24.4	1°24.1	16°23.8	31°23.5	46°23.2	61°22.9	76°22.6	-0.3
	-23°10.7	-23°10.8	-23°11.0	-23°11.1	-23°11.3	-23°11.4	-23°11.6	-23°11.7	-23°11.9	-23°12.0	-23°12.2	-23°12.3	-0.2
Tu 14	271°18.7	286°18.4	301°18.1	316°17.8	331°17.5	346°17.2	1°16.9	16°16.6	31°16.3	46°16.0	61°15.7	76°15.4	-0.3
	-23°14.2	-23°14.3	-23°14.5	-23°14.6	-23°14.8	-23°14.9	-23°15.0	-23°15.2	-23°15.3	-23°15.4	-23°15.5	-23°15.7	-0.1
We 15	271°11.5	286°11.2	301°10.9	316°10.6	331°10.3	346°10.0	1°09.7	16°09.4	31°09.1	46°08.8	61°08.5	76°08.2	-0.3
	-23°17.3	-23°17.4	-23°17.5	-23°17.6	-23°17.8	-23°17.9	-23°18.0	-23°18.1	-23°18.2	-23°18.3	-23°18.4	-23°18.5	-0.1
Th 16	271°04.3	286°04.0	301°03.7	316°03.4	331°03.1	346°02.8	1°02.5	16°02.1	31°01.8	46°01.5	61°01.2	76°00.9	-0.3
	-23°19.9	-23°20.0	-23°20.1	-23°20.2	-23°20.3	-23°20.4	-23°20.5	-23°20.6	-23°20.7	-23°20.8	-23°20.9	-23°20.9	-0.1
Fr 17	270°57.0	285°56.7	300°56.4	315°56.1	330°55.7	345°55.4	0°55.1	15°54.8	30°54.5	45°54.2	60°53.9	75°53.6	-0.3
	-23°22.1	-23°22.1	-23°22.2	-23°22.3	-23°22.4	-23°22.4	-23°22.5	-23°22.6	-23°22.7	-23°22.7	-23°22.8	-23°22.9	-0.1
Sa 18	270°49.6	285°49.3	300°49.0	315°48.7	330°48.4	345°48.1	0°47.8	15°47.5	30°47.2	45°46.9	60°46.6	75°46.2	-0.3
	-23°23.7	-23°23.8	-23°23.9	-23°23.9	-23°24.0	-23°24.0	-23°24.1	-23°24.1	-23°24.2	-23°24.2	-23°24.3	-23°24.4	-0.1
Su 19	270°42.2	285°41.9	300°41.6	315°41.3	330°41.0	345°40.7	0°40.4	15°40.1	30°39.8	45°39.5	60°39.2	75°38.8	-0.3
	-23°25.0	-23°25.0	-23°25.0	-23°25.1	-23°25.1	-23°25.1	-23°25.2	-23°25.2	-23°25.3	-23°25.3	-23°25.3	-23°25.4	-0.0
Mo 20	270°34.8	285°34.5	300°34.2	315°33.9	330°33.6	345°33.3	0°33.0	15°32.7	30°32.4	45°32.0	60°31.7	75°31.4	-0.3
	-23°25.7	-23°25.7	-23°25.7	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.9	-23°25.9	-23°25.9	-0.0
Tu 21	270°27.4	285°27.1	300°26.8	315°26.5	330°26.2	345°25.8	0°25.5	15°25.2	30°24.9	45°24.6	60°24.3	75°24.0	-0.3
	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°26.0	-23°25.9	-23°25.9	-23°25.9	+0.0
We 22	270°20.0	285°19.6	300°19.3	315°19.0	330°18.7	345°18.4	0°18.1	15°17.8	30°17.5	45°17.2	60°16.8	75°16.5	-0.3
	-23°25.8	-23°25.8	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.6	-23°25.6	-23°25.6	-23°25.6	-23°25.5	-23°25.5	+0.0
Th 23	270°12.5	285°12.2	300°11.9	315°11.6	330°11.3	345°10.9	0°10.6	15°10.3	30°10.0	45°09.7	60°09.4	75°09.1	-0.3
	-23°25.1	-23°25.1	-23°25.0	-23°25.0	-23°24.9	-23°24.9	-23°24.9	-23°24.8	-23°24.8	-23°24.7	-23°24.7	-23°24.6	+0.0
Fr 24	270°05.1	285°04.7	300°04.4	315°04.1	330°03.8	345°03.5	0°03.2	15°02.9	30°02.6	45°02.3	60°02.0	75°01.6	-0.3
	-23°24.0	-23°23.9	-23°23.8	-23°23.8	-23°23.7	-23°23.7	-23°23.6	-23°23.5	-23°23.5	-23°23.4	-23°23.3	-23°23.3	+0.1
Sa 25	269°57.6	284°57.3	299°57.0	314°56.7	329°56.4	344°56.1	359°55.8	14°55.4	29°55.1	44°54.8	59°54.5	74°54.2	-0.3
	-23°22.3	-23°22.3	-23°22.2	-23°22.1	-23°22.0	-23°22.0	-23°21.9	-23°21.8	-23°21.7	-23°21.6	-23°21.5	-23°21.5	+0.1
Su 26	269°50.2	284°49.9	299°49.6	314°49.3	329°49.0	344°48.7	359°48.3	14°48.0	29°47.7	44°47.4	59°47.1	74°46.8	-0.3
	-23°20.3	-23°20.2	-23°20.1	-23°20.0	-23°19.9	-23°19.8	-23°19.7	-23°19.6	-23°19.5	-23°19.4	-23°19.3	-23°19.2	+0.1
Mo 27	269°42.8	284°42.5	299°42.2	314°41.9	329°41.6	344°41.3	359°41.0	14°40.7	29°40.4	44°40.0	59°39.7	74°39.4	-0.3
	-23°17.7	-23°17.6	-23°17.5	-23°17.4	-23°17.2	-23°17.1	-23°17.0	-23°16.9	-23°16.8	-23°16.6	-23°16.5	-23°16.4	+0.1
Tu 28	269°35.5	284°35.1	299°34.8	314°34.5	329°34.2	344°33.9	359°33.6	14°33.3	29°33.0	44°32.7	59°32.4	74°32.1	-0.3
	-23°14.7	-23°14.6	-23°14.4	-23°14.3	-23°14.2	-23°14.0	-23°13.9	-23°13.7	-23°13.6	-23°13.4	-23°13.3	-23°13.2	+0.1
We 29	269°28.1	284°27.8	299°27.5	314°27.2	329°26.9	344°26.6	359°26.3	14°26.0	29°25.7	44°25.4	59°25.1	74°24.8	-0.3
	-23°11.2	-23°11.1	-23°10.9	-23°10.7	-23°10.6	-23°10.4	-23°10.3	-23°10.1	-23°10.0	-23°09.8	-23°09.6	-23°09.5	+0.2
Th 30	269°20.9	284°20.6	299°20.3	314°20.0	329°19.7	344°19.4	359°19.1	14°18.8	29°18.5	44°18.2	59°17.9	74°17.6	-0.3
	-23°07.3	-23°07.1	-23°06.9	-23°06.7	-23°06.6	-23°06.4	-23°06.2	-23°06.0	-23°05.8	-23°05.7	-23°05.5	-23°05.3	+0.2
Fr 31	269°13.7	284°13.4	299°13.1	314°12.8	329°12.5	344°12.2	359°11.9	14°11.6	29°11.3	44°11.0	59°10.7	74°10.4	-0.3
	-23°02.9	-23°02.7	-23°02.5	-23°02.3	-23°02.1	-23°01.9	-23°01.7	-23°01.5	-23°01.3	-23°01.1	-23°00.9	-23°00.7	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

December 2032

D	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	Δ'/h	SH
We 1	249°14.7	263°44.2	278°13.6	292°43.0	307°12.3	321°41.5	336°10.7	350°39.8	5°08.9	19°37.9	34°06.8	+29.2	15.4
	-15°42.5	-15°48.6	-15°54.7	-16°00.7	-16°06.6	-16°12.4	-16°18.2	-16°23.9	-16°29.4	-16°35.0	-16°40.4	-5.8	56.5
● Th 2	251°13.0	265°40.9	280°08.8	294°36.6	309°04.4	323°32.1	337°59.8	352°27.3	6°54.9	21°22.4	35°49.8	+27.7	15.6
	-17°51.1	-17°55.1	-17°59.0	-18°02.8	-18°06.4	-18°10.0	-18°13.5	-18°16.8	-18°20.1	-18°23.3	-18°26.4	-3.5	57.1
Fr 3	252°35.7	267°02.4	281°29.0	295°55.7	310°22.3	324°48.9	339°15.4	353°41.9	8°08.4	22°34.8	37°01.2	+26.6	15.7
	-18°59.5	-19°00.8	-19°02.0	-19°03.1	-19°04.1	-19°04.9	-19°05.7	-19°06.3	-19°06.9	-19°07.3	-19°07.6	-0.8	57.7
Sa 4	253°34.6	268°00.7	282°26.8	296°52.9	311°19.0	325°45.0	340°11.1	354°37.1	9°03.2	23°29.2	37°55.2	+26.1	15.9
	-18°57.8	-18°56.2	-18°54.5	-18°52.6	-18°50.7	-18°48.6	-18°46.4	-18°44.1	-18°41.7	-18°39.1	-18°36.4	+2.1	58.3
Su 5	254°26.3	268°52.5	283°18.6	297°44.8	312°11.0	326°37.2	341°03.5	355°29.7	9°56.0	24°22.3	38°48.6	+26.2	16.0
	-17°42.5	-17°37.9	-17°33.3	-17°28.6	-17°23.7	-17°18.7	-17°13.7	-17°08.5	-17°03.2	-16°57.8	-16°52.3	+5.0	58.7
Mo 6	255°26.4	269°53.2	284°20.0	298°46.8	313°13.6	327°40.5	342°07.4	356°34.4	11°01.3	25°28.3	39°55.4	+26.9	16.1
	-15°17.2	-15°10.0	-15°02.8	-14°55.5	-14°48.0	-14°40.5	-14°32.9	-14°25.2	-14°17.4	-14°09.6	-14°01.6	+7.6	58.9
Tu 7	256°45.3	271°12.9	285°40.5	300°08.2	314°35.9	329°03.7	343°31.5	357°59.3	12°27.1	26°55.0	41°22.9	+27.8	16.1
	-11°52.3	-11°43.0	-11°33.7	-11°24.3	-11°14.9	-11°05.4	-10°55.8	-10°46.1	-10°36.4	-10°26.6	-10°16.8	+9.5	59.1
We 8	258°25.7	272°54.1	287°22.5	301°51.0	316°19.5	330°48.1	345°16.6	359°45.2	14°13.8	28°42.5	43°11.1	+28.5	16.1
	-7°42.5	-7°31.8	-7°21.1	-7°10.3	-6°59.5	-6°48.6	-6°37.7	-6°26.8	-6°15.8	-6°04.8	-5°53.8	+10.9	59.2
◐ Th 9	260°23.6	274°52.5	289°21.5	303°50.5	318°19.5	332°48.5	347°17.6	1°46.6	16°15.7	30°44.7	45°13.8	+29.0	16.1
	-3°04.8	-2°53.4	-2°41.9	-2°30.4	-2°19.0	-2°07.5	-1°56.0	-1°44.4	-1°32.9	-1°21.4	-1°09.9	+11.5	59.1
Fr 10	262°30.5	276°59.7	291°28.8	305°57.9	320°27.0	334°56.1	349°25.2	3°54.3	18°23.4	32°52.5	47°21.6	+29.1	16.1
	1°43.2	1°54.7	2°06.2	2°17.7	2°29.1	2°40.5	2°51.9	3°03.3	3°14.7	3°26.1	3°37.4	+11.4	59.0
Sa 11	264°36.6	279°05.5	293°34.3	308°03.2	322°32.0	337°00.8	351°29.6	5°58.4	20°27.2	34°55.9	49°24.6	+28.8	16.0
	6°24.2	6°35.0	6°45.8	6°56.6	7°07.3	7°18.0	7°28.7	7°39.3	7°49.8	8°00.3	8°10.8	+10.7	58.9
Su 12	266°32.7	281°01.1	295°29.4	309°57.7	324°26.0	338°54.2	353°22.4	7°50.6	22°18.8	36°46.9	51°15.1	+28.2	16.0
	10°41.1	10°50.6	11°00.1	11°09.5	11°18.9	11°28.1	11°37.3	11°46.5	11°55.5	12°04.5	12°13.5	+9.2	58.6
Mo 13	268°13.7	282°41.4	297°09.1	311°36.8	326°04.4	340°32.0	354°59.6	9°27.2	23°54.7	38°22.2	52°49.7	+27.6	15.9
	14°17.9	14°25.5	14°33.0	14°40.5	14°47.9	14°55.1	15°02.3	15°09.4	15°16.4	15°23.3	15°30.1	+7.2	58.3
Tu 14	269°40.0	284°07.2	298°34.4	313°01.6	327°28.8	341°56.0	356°23.1	10°50.3	25°17.5	39°44.6	54°11.7	+27.2	15.8
	17°00.6	17°05.8	17°10.9	17°15.9	17°20.8	17°25.6	17°30.3	17°34.9	17°39.4	17°43.8	17°48.0	+4.7	57.8
We 15	270°58.6	285°25.7	299°52.9	314°20.0	328°47.2	343°14.4	357°41.6	12°08.8	26°36.0	41°03.2	55°30.5	+27.2	15.6
	18°38.9	18°41.5	18°43.9	18°46.1	18°48.3	18°50.4	18°52.3	18°54.2	18°55.9	18°57.5	18°59.0	+2.0	57.3
○ Th 16	272°21.7	286°49.3	301°17.0	315°44.7	330°12.4	344°40.1	359°07.9	13°35.7	28°03.6	42°31.5	56°59.4	+27.8	15.5
	19°08.3	19°08.0	19°07.6	19°07.1	19°06.5	19°05.9	19°05.0	19°04.1	19°03.1	19°02.0	19°00.8	-0.8	56.7
Fr 17	274°03.4	288°32.0	303°00.7	317°29.4	331°58.2	346°27.0	0°55.9	15°24.8	29°53.8	44°22.8	58°51.9	+28.9	15.3
	18°30.0	18°27.1	18°24.2	18°21.1	18°18.0	18°14.7	18°11.4	18°08.0	18°04.5	18°00.9	17°57.2	-3.3	56.1
Sa 18	276°14.8	290°44.8	305°14.9	319°45.0	334°15.1	348°45.3	3°15.6	17°45.9	32°16.3	46°46.8	61°17.3	+30.2	15.2
	16°51.1	16°46.0	16°40.8	16°35.6	16°30.3	16°24.9	16°19.4	16°13.9	16°08.3	16°02.6	15°56.8	-5.4	55.6
Su 19	279°01.9	293°33.3	308°04.8	322°36.4	337°08.0	351°39.6	6°11.4	20°43.1	35°15.0	49°46.8	64°18.8	+31.7	15.0
	14°22.0	14°15.2	14°08.3	14°01.3	13°54.3	13°47.2	13°40.0	13°32.9	13°25.6	13°18.3	13°10.9	-7.1	55.0
Mo 20	282°24.1	296°56.9	311°29.7	326°02.6	340°35.4	355°08.4	9°41.4	24°14.4	38°47.5	53°20.6	67°53.8	+33.0	14.9
	11°14.4	11°06.3	10°58.1	10°49.9	10°41.6	10°33.3	10°25.0	10°16.6	10°08.2	9°59.7	9°51.2	-8.3	54.6
Tu 21	286°16.0	300°49.8	315°23.6	329°57.4	344°31.3	359°05.2	13°39.1	28°13.1	42°47.1	57°21.1	71°55.1	+33.9	14.8
	7°39.6	7°30.6	7°21.6	7°12.5	7°03.4	6°54.3	6°45.2	6°36.0	6°26.8	6°17.6	6°08.4	-9.1	54.3
We 22	300°49.8	315°23.6	329°57.4	344°31.3	359°05.2	13°39.1	28°13.1	42°47.1	57°21.1	71°55.1	86°29.2	+33.9	14.8
	7°30.6	7°21.6	7°12.5	7°03.4	6°54.3	6°45.2	6°36.0	6°26.8	6°17.6	6°08.4	5°59.1	-9.2	54.3
Th 23	305°02.9	319°37.3	334°11.7	348°46.2	3°20.6	17°55.0	32°29.5	47°04.0	61°38.4	76°12.9	90°47.4	+34.5	14.8
	3°38.1	3°28.6	3°19.1	3°09.5	3°00.0	2°50.4	2°40.8	2°31.3	2°21.7	2°12.1	2°02.5	-9.6	54.2
◑ Fr 24	309°25.2	323°59.7	338°34.2	353°08.7	7°43.2	22°17.7	36°52.1	51°26.6	66°01.1	80°35.5	95°09.9	+34.5	14.8
	-0°22.3	-0°32.0	-0°41.7	-0°51.3	-1°01.0	-1°10.7	-1°20.3	-1°30.0	-1°39.6	-1°49.3	-1°58.9	-9.7	54.2
Sa 25	313°44.4	328°18.6	342°52.7	357°26.7	12°00.8	26°34.8	41°08.8	55°42.8	70°16.7	84°50.6	99°24.5	+34.0	14.8
	-4°22.7	-4°32.1	-4°41.6	-4°51.1	-5°00.5	-5°10.0	-5°19.4	-5°28.8	-5°38.2	-5°47.5	-5°56.9	-9.4	54.5
Su 26	317°48.2	332°21.5	346°54.7	1°27.9	16°01.0	30°34.1	45°07.1	59°40.1	74°13.0	88°45.9	103°18.7	+33.1	15.0
	-8°14.5	-8°23.4	-8°32.4	-8°41.3	-8°50.2	-8°59.0	-9°07.8	-9°16.6	-9°25.4	-9°34.1	-9°42.8	-8.8	54.9
Mo 27	321°24.7	335°56.7	350°28.5	5°00.4	19°32.1	34°03.8	48°35.4	63°07.0	77°38.5	92°10.0	106°41.3	+31.7	15.1
	-11°48.5	-11°56.5	-12°04.5	-12°12.4	-12°20.3	-12°28.2	-12°36.0	-12°43.7	-12°51.4	-12°59.1	-13°06.7	-7.8	55.5
Tu 28	324°23.8	338°54.1	353°24.3	7°54.5	22°24.5	36°54.5	51°24.4	65°54.3	80°24.1	94°53.8	109°23.4	+30.0	15.3
	-14°53.6	-15°00.2	-15°06.8	-15°13.3	-15°19.7	-15°26.0	-15°32.3	-15°38.5	-15°44.7	-15°50.7	-15°56.7	-6.3	56.2
We 29	326°39.2	341°07.7	355°36.1	10°04.4	24°32.7	39°00.9	53°29.0	67°57.1	82°25.0	96°53.0	111°20.8	+28.2	15.5
	-17°17.0	-17°21.7	-17°26.3	-17°30.7	-17°35.1	-17°39.5	-17°43.7	-17°47.8	-17°51.8	-17°55.8	-17°59.6	-4.3	57.0
Th 30	328°10.7	342°37.5	357°04.3	11°31.0	25°57.7	40°24.3	54°50.8	69°17.3	83°43.8	98°10.2	112°36.5	+26.6	15.8
	-18°45.0	-18°47.1	-18°49.2	-18°51.2	-18°53.0	-18°54.7	-18°56.4	-18°57.9	-18°59.3	-19°00.6	-19°01.7	-1.7	57.8
Fr 31	329°06.2	343°31.9	357°57.5	12°23.1	26°48.7	41°14.2	55°39.8	70°05.2	84°30.7	98°56.2	113°21.6	+25.5	16.0
	-19°05.1	-19°04.4	-19°03.5	-19°02.5	-19°01.4	-19°00.2	-18°58.9	-18°57.4	-18°55.8	-18°54.1	-18°52.2	+1.3	58.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 20h52 — FQ: 9 19h08 — FM: 16 20h49 — LQ: 24 20h39

SUN

January 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°06.6	284°06.3	299°06.0	314°05.7	329°05.4	344°05.1	359°04.8	14°04.5	29°04.2	44°03.9	59°03.6	74°03.3	-0.3
	-22°58.0	-22°57.8	-22°57.6	-22°57.3	-22°57.1	-22°56.9	-22°56.7	-22°56.5	-22°56.3	-22°56.0	-22°55.8	-22°55.6	+0.2
Su 2	268°59.5	283°59.3	298°59.0	313°58.7	328°58.4	343°58.1	358°57.8	13°57.5	28°57.2	43°56.9	58°56.6	73°56.3	-0.3
	-22°52.7	-22°52.4	-22°52.2	-22°52.0	-22°51.7	-22°51.5	-22°51.3	-22°51.0	-22°50.8	-22°50.5	-22°50.3	-22°50.1	+0.2
Mo 3	268°52.6	283°52.3	298°52.0	313°51.7	328°51.4	343°51.2	358°50.9	13°50.6	28°50.3	43°50.0	58°49.7	73°49.4	-0.3
	-22°46.9	-22°46.6	-22°46.4	-22°46.1	-22°45.9	-22°45.6	-22°45.4	-22°45.1	-22°44.8	-22°44.6	-22°44.3	-22°44.1	+0.3
Tu 4	268°45.7	283°45.5	298°45.2	313°44.9	328°44.6	343°44.3	358°44.1	13°43.8	28°43.5	43°43.2	58°42.9	73°42.6	-0.3
	-22°40.6	-22°40.4	-22°40.1	-22°39.8	-22°39.6	-22°39.3	-22°39.0	-22°38.7	-22°38.5	-22°38.2	-22°37.9	-22°37.6	+0.3
We 5	268°39.0	283°38.7	298°38.5	313°38.2	328°37.9	343°37.6	358°37.3	13°37.1	28°36.8	43°36.5	58°36.2	73°36.0	-0.3
	-22°34.0	-22°33.7	-22°33.4	-22°33.1	-22°32.8	-22°32.5	-22°32.2	-22°31.9	-22°31.6	-22°31.3	-22°31.0	-22°30.7	+0.3
Th 6	268°32.4	283°32.1	298°31.8	313°31.6	328°31.3	343°31.0	358°30.7	13°30.5	28°30.2	43°29.9	58°29.7	73°29.4	-0.3
	-22°26.8	-22°26.5	-22°26.2	-22°25.9	-22°25.6	-22°25.3	-22°25.0	-22°24.7	-22°24.3	-22°24.0	-22°23.7	-22°23.4	+0.3
Fr 7	268°25.9	283°25.6	298°25.3	313°25.1	328°24.8	343°24.5	358°24.3	13°24.0	28°23.7	43°23.5	58°23.2	73°22.9	-0.3
	-22°19.2	-22°18.9	-22°18.6	-22°18.3	-22°17.9	-22°17.6	-22°17.3	-22°17.0	-22°16.6	-22°16.3	-22°16.0	-22°15.6	+0.3
Sa 8	268°19.5	283°19.2	298°19.0	313°18.7	328°18.5	343°18.2	358°17.9	13°17.7	28°17.4	43°17.2	58°16.9	73°16.6	-0.3
	-22°11.2	-22°10.9	-22°10.5	-22°10.2	-22°09.9	-22°09.5	-22°09.2	-22°08.8	-22°08.5	-22°08.1	-22°07.8	-22°07.4	+0.3
Su 9	268°13.3	283°13.0	298°12.8	313°12.5	328°12.3	343°12.0	358°11.7	13°11.5	28°11.2	43°11.0	58°10.7	73°10.5	-0.3
	-22°02.8	-22°02.4	-22°02.1	-22°01.7	-22°01.3	-22°01.0	-22°00.6	-22°00.2	-21°59.9	-21°59.5	-21°59.1	-21°58.8	+0.4
Mo 10	268°07.2	283°06.9	298°06.7	313°06.4	328°06.2	343°05.9	358°05.7	13°05.4	28°05.2	43°04.9	58°04.7	73°04.4	-0.2
	-21°53.9	-21°53.5	-21°53.2	-21°52.8	-21°52.4	-21°52.0	-21°51.6	-21°51.2	-21°50.9	-21°50.5	-21°50.1	-21°49.7	+0.4
Tu 11	268°01.2	283°01.0	298°00.8	313°00.5	328°00.3	343°00.0	357°59.8	12°59.5	27°59.3	42°59.1	57°58.8	72°58.6	-0.2
	-21°44.6	-21°44.2	-21°43.8	-21°43.4	-21°43.0	-21°42.6	-21°42.2	-21°41.8	-21°41.4	-21°41.0	-21°40.6	-21°40.2	+0.4
We 12	267°55.5	282°55.2	297°55.0	312°54.7	327°54.5	342°54.3	357°54.0	12°53.8	27°53.6	42°53.3	57°53.1	72°52.8	-0.2
	-21°34.9	-21°34.5	-21°34.1	-21°33.6	-21°33.2	-21°32.8	-21°32.4	-21°32.0	-21°31.6	-21°31.1	-21°30.7	-21°30.3	+0.4
Th 13	267°49.8	282°49.6	297°49.4	312°49.1	327°48.9	342°48.7	357°48.4	12°48.2	27°48.0	42°47.7	57°47.5	72°47.3	-0.2
	-21°24.7	-21°24.3	-21°23.9	-21°23.4	-21°23.0	-21°22.6	-21°22.1	-21°21.7	-21°21.3	-21°20.8	-21°20.4	-21°20.0	+0.4
Fr 14	267°44.3	282°44.1	297°43.9	312°43.7	327°43.4	342°43.2	357°43.0	12°42.8	27°42.6	42°42.3	57°42.1	72°41.9	-0.2
	-21°14.2	-21°13.7	-21°13.3	-21°12.8	-21°12.4	-21°11.9	-21°11.5	-21°11.0	-21°10.6	-21°10.1	-21°09.7	-21°09.2	+0.5
Sa 15	267°39.0	282°38.8	297°38.6	312°38.4	327°38.2	342°38.0	357°37.7	12°37.5	27°37.3	42°37.1	57°36.9	72°36.7	-0.2
	-21°03.2	-21°02.8	-21°02.3	-21°01.8	-21°01.4	-21°00.9	-21°00.4	-21°00.0	-20°59.5	-20°59.0	-20°58.5	-20°58.1	+0.5
Su 16	267°33.9	282°33.7	297°33.5	312°33.3	327°33.1	342°32.8	357°32.6	12°32.4	27°32.2	42°32.0	57°31.8	72°31.6	-0.2
	-20°51.9	-20°51.4	-20°50.9	-20°50.4	-20°49.9	-20°49.4	-20°49.0	-20°48.5	-20°48.0	-20°47.5	-20°47.0	-20°46.5	+0.5
Mo 17	267°28.9	282°28.7	297°28.5	312°28.3	327°28.1	342°27.9	357°27.7	12°27.5	27°27.3	42°27.1	57°26.9	72°26.7	-0.2
	-20°40.1	-20°39.6	-20°39.1	-20°38.6	-20°38.1	-20°37.6	-20°37.1	-20°36.6	-20°36.1	-20°35.6	-20°35.1	-20°34.6	+0.5
Tu 18	267°24.1	282°23.9	297°23.8	312°23.6	327°23.4	342°23.2	357°23.0	12°22.8	27°22.6	42°22.4	57°22.2	72°22.0	-0.2
	-20°27.9	-20°27.4	-20°26.9	-20°26.4	-20°25.9	-20°25.4	-20°24.8	-20°24.3	-20°23.8	-20°23.3	-20°22.8	-20°22.2	+0.5
We 19	267°19.5	282°19.3	297°19.2	312°19.0	327°18.8	342°18.6	357°18.4	12°18.2	27°18.0	42°17.8	57°17.7	72°17.5	-0.2
	-20°15.4	-20°14.9	-20°14.3	-20°13.8	-20°13.3	-20°12.7	-20°12.2	-20°11.7	-20°11.1	-20°10.6	-20°10.1	-20°09.5	+0.5
Th 20	267°15.1	282°14.9	297°14.7	312°14.6	327°14.4	342°14.2	357°14.0	12°13.8	27°13.7	42°13.5	57°13.3	72°13.1	-0.2
	-20°02.5	-20°01.9	-20°01.4	-20°00.8	-20°00.3	-19°59.7	-19°59.2	-19°58.6	-19°58.1	-19°57.5	-19°57.0	-19°56.4	+0.6
Fr 21	267°10.9	282°10.7	297°10.5	312°10.3	327°10.2	342°10.0	357°09.8	12°09.6	27°09.5	42°09.3	57°09.1	72°09.0	-0.2
	-19°49.2	-19°48.6	-19°48.1	-19°47.5	-19°46.9	-19°46.4	-19°45.8	-19°45.2	-19°44.7	-19°44.1	-19°43.5	-19°43.0	+0.6
Sa 22	267°06.8	282°06.6	297°06.5	312°06.3	327°06.1	342°06.0	357°05.8	12°05.6	27°05.5	42°05.3	57°05.2	72°05.0	-0.2
	-19°35.5	-19°34.9	-19°34.3	-19°33.8	-19°33.2	-19°32.6	-19°32.0	-19°31.4	-19°30.9	-19°30.3	-19°29.7	-19°29.1	+0.6
Su 23	267°02.9	282°02.8	297°02.6	312°02.5	327°02.3	342°02.1	357°02.0	12°01.8	27°01.7	42°01.5	57°01.4	72°01.2	-0.2
	-19°21.5	-19°20.9	-19°20.3	-19°19.7	-19°19.1	-19°18.5	-19°17.9	-19°17.3	-19°16.7	-19°16.1	-19°15.5	-19°14.9	+0.6
Mo 24	266°59.2	281°59.1	296°58.9	311°58.8	326°58.6	341°58.5	356°58.4	11°58.2	26°58.1	41°57.9	56°57.8	71°57.6	-0.1
	-19°07.1	-19°06.5	-19°05.9	-19°05.3	-19°04.6	-19°04.0	-19°03.4	-19°02.8	-19°02.2	-19°01.6	-19°01.0	-19°00.4	+0.6
Tu 25	266°55.8	281°55.6	296°55.5	311°55.3	326°55.2	341°55.1	356°54.9	11°54.8	26°54.6	41°54.5	56°54.4	71°54.2	-0.1
	-18°52.3	-18°51.7	-18°51.1	-18°50.5	-18°49.8	-18°49.2	-18°48.6	-18°48.0	-18°47.3	-18°46.7	-18°46.1	-18°45.5	+0.6
We 26	266°52.5	281°52.3	296°52.2	311°52.1	326°51.9	341°51.8	356°51.7	11°51.5	26°51.4	41°51.3	56°51.1	71°51.0	-0.1
	-18°37.2	-18°36.6	-18°36.0	-18°35.3	-18°34.7	-18°34.0	-18°33.4	-18°32.8	-18°32.1	-18°31.5	-18°30.8	-18°30.2	+0.6
Th 27	266°49.4	281°49.2	296°49.1	311°49.0	326°48.9	341°48.7	356°48.6	11°48.5	26°48.4	41°48.3	56°48.1	71°48.0	-0.1
	-18°21.8	-18°21.2	-18°20.5	-18°19.9	-18°19.2	-18°18.5	-18°17.9	-18°17.2	-18°16.6	-18°15.9	-18°15.3	-18°14.6	+0.7
Fr 28	266°46.5	281°46.3	296°46.2	311°46.1	326°46.0	341°45.9	356°45.8	11°45.7	26°45.5	41°45.4	56°45.3	71°45.2	-0.1
	-18°06.0	-18°05.4	-18°04.7	-18°04.0	-18°03.4	-18°02.7	-18°02.0	-18°01.4	-18°00.7	-18°00.0	-17°59.4	-17°58.7	+0.7
Sa 29	266°43.8	281°43.7	296°43.5	311°43.4	326°43.3	341°43.2	356°43.1	11°43.0	26°42.9	41°42.8	56°42.7	71°42.6	-0.1
	-17°49.9	-17°49.3	-17°48.6	-17°47.9	-17°47.2	-17°46.6	-17°45.9	-17°45.2	-17°44.5	-17°43.8	-17°43.2	-17°42.5	+0.7
Su 30	266°41.3	281°41.2	296°41.1	311°41.0	326°40.9	341°40.8	356°40.7	11°40.6	26°40.5	41°40.4	56°40.3	71°40.2	-0.1
	-17°33.5	-17°32.9	-17°32.2	-17°31.5	-17°30.8	-17°30.1	-17°29.4	-17°28.7	-17°28.0	-17°27.3	-17°26.6	-17°25.9	+0.7
Mo 31	266°39.0	281°38.9	296°38.8	311°38.7	326°38.6	341°38.5	356°38.4	11°38.3	26°38.2	41°38.2	56°38.1	71°38.0	-0.1
	-17°16.8	-17°16.1	-17°15.4	-17°14.7	-17°14.0	-17°13.3	-17°12.6	-17°11.9	-17°11.2	-17°10.5	-17°09.8	-17°09.1	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2033

	D	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	Δ'/h	SH
●	Sa 1	243°09.5	257°34.8	272°00.0	286°25.3	300°50.5	315°15.8	329°41.0	344°06.2	358°31.4	12°56.7	27°21.9	+25.2	16.1
		-18°30.1	-18°27.0	-18°23.8	-18°20.5	-18°17.0	-18°13.5	-18°09.8	-18°06.0	-18°02.0	-17°58.0	-17°53.8	+3.6	59.1
	Su 2	243°41.1	258°06.4	272°31.8	286°57.3	301°22.7	315°48.2	330°13.6	344°39.2	359°04.7	13°30.2	27°55.8	+25.5	16.3
		-16°36.9	-16°30.8	-16°24.7	-16°18.4	-16°12.0	-16°05.5	-15°58.9	-15°52.2	-15°45.4	-15°38.5	-15°31.5	+6.5	59.6
	Mo 3	244°23.1	258°49.2	273°15.3	287°41.5	302°07.7	316°33.9	331°00.2	345°26.5	359°52.8	14°19.2	28°45.6	+26.2	16.3
		-13°34.0	-13°25.5	-13°16.8	-13°08.0	-12°59.2	-12°50.2	-12°41.2	-12°32.1	-12°23.0	-12°13.7	-12°04.4	+9.0	59.9
	Tu 4	245°26.6	259°53.7	274°20.8	288°47.9	303°15.1	317°42.3	332°09.5	346°36.8	1°04.1	15°31.5	29°58.9	+27.2	16.3
		-9°35.7	-9°25.3	-9°14.8	-9°04.3	-8°53.7	-8°43.0	-8°32.3	-8°21.6	-8°10.8	-7°59.9	-7°49.0	+10.7	59.9
	We 5	246°54.2	261°22.1	275°50.1	290°18.2	304°46.2	319°14.3	333°42.4	348°10.5	2°38.7	17°06.9	31°35.1	+28.1	16.3
		-5°00.8	-4°49.3	-4°37.8	-4°26.3	-4°14.8	-4°03.2	-3°51.6	-3°40.0	-3°28.4	-3°16.8	-3°05.2	+11.6	59.8
	Th 6	248°41.5	263°10.1	277°38.7	292°07.3	306°36.0	321°04.6	335°33.3	350°02.0	4°30.7	18°59.4	33°28.1	+28.7	16.2
		-0°09.6	0°02.1	0°13.8	0°25.5	0°37.1	0°48.8	1°00.5	1°12.1	1°23.8	1°35.4	1°47.0	+11.7	59.5
	Fr 7	250°40.3	265°09.1	279°38.0	294°06.9	308°35.7	323°04.6	337°33.4	352°02.3	6°31.2	21°00.0	35°28.9	+28.9	16.1
		4°38.3	4°49.5	5°00.7	5°11.8	5°22.9	5°33.9	5°45.0	5°55.9	6°06.9	6°17.7	6°28.6	+11.0	59.1
◐	Sa 8	252°41.3	267°10.1	281°38.8	296°07.6	310°36.3	325°05.0	339°33.8	354°02.5	8°31.2	22°59.9	37°28.5	+28.7	16.0
		9°05.5	9°15.5	9°25.4	9°35.4	9°45.2	9°55.0	10°04.7	10°14.4	10°24.0	10°33.5	10°43.0	+9.8	58.6
	Su 9	254°37.0	269°05.4	283°33.9	298°02.3	312°30.7	326°59.1	341°27.5	355°55.8	10°24.1	24°52.5	39°20.8	+28.4	15.8
		12°56.4	13°04.7	13°12.9	13°21.1	13°29.1	13°37.1	13°45.0	13°52.8	14°00.5	14°08.1	14°15.7	+7.9	58.1
	Mo 10	256°23.6	270°51.7	285°19.8	299°47.9	314°15.9	328°43.9	343°11.9	357°40.0	12°08.0	26°35.9	41°03.9	+28.0	15.7
		15°58.4	16°04.5	16°10.5	16°16.4	16°22.2	16°27.9	16°33.6	16°39.1	16°44.5	16°49.8	16°55.1	+5.7	57.5
	Tu 11	258°02.8	272°30.6	286°58.5	301°26.4	315°54.3	330°22.2	344°50.1	359°18.0	13°45.8	28°13.7	42°41.6	+27.9	15.5
		18°01.4	18°05.0	18°08.5	18°11.9	18°15.2	18°18.4	18°21.4	18°24.4	18°27.3	18°30.0	18°32.7	+3.1	57.0
	We 12	259°41.0	274°09.1	288°37.2	303°05.2	317°33.3	332°01.5	346°29.6	0°57.8	15°25.9	29°54.1	44°22.4	+28.1	15.4
		18°59.7	19°00.6	19°01.5	19°02.2	19°02.8	19°03.4	19°03.8	19°04.1	19°04.3	19°04.4	19°04.4	+0.5	56.5
	Th 13	261°28.7	275°57.4	290°26.1	304°54.8	319°23.6	333°52.4	348°21.2	2°50.1	17°19.0	31°47.9	46°16.9	+28.8	15.3
		18°51.9	18°50.3	18°48.5	18°46.7	18°44.7	18°42.7	18°40.6	18°38.3	18°36.0	18°33.5	18°31.0	-2.1	56.0
	Fr 14	263°36.5	278°06.1	292°35.8	307°05.6	321°35.3	336°05.2	350°35.1	5°05.0	19°35.0	34°05.0	48°35.1	+29.9	15.1
		17°41.8	17°37.8	17°33.7	17°29.5	17°25.3	17°20.9	17°16.5	17°12.0	17°07.4	17°02.7	16°57.9	-4.4	55.5
○	Sa 15	266°12.2	280°43.0	295°14.0	309°44.9	324°16.0	338°47.0	353°18.2	7°49.3	22°20.6	36°51.9	51°23.2	+31.1	15.0
		15°37.1	15°31.1	15°25.0	15°18.9	15°12.7	15°06.4	15°00.1	14°53.7	14°47.2	14°40.7	14°34.1	-6.3	55.1
	Su 16	269°19.1	283°51.3	298°23.4	312°55.7	327°27.9	342°00.2	356°32.6	11°05.0	25°37.5	40°10.0	54°42.5	+32.3	14.9
		12°47.9	12°40.4	12°32.8	12°25.2	12°17.5	12°09.8	12°02.0	11°54.1	11°46.3	11°38.3	11°30.4	-7.8	54.7
	Mo 17	272°55.9	287°29.1	302°02.4	316°35.7	331°09.0	345°42.4	0°15.8	14°49.2	29°22.7	43°56.2	58°29.8	+33.4	14.8
		9°25.6	9°17.0	9°08.4	8°59.7	8°50.9	8°42.2	8°33.4	8°24.6	8°15.7	8°06.8	7°57.9	-8.8	54.4
	Tu 18	276°56.9	291°30.9	306°05.0	320°39.1	335°13.2	349°47.3	4°21.4	18°55.6	33°29.8	48°04.0	62°38.3	+34.1	14.8
		5°41.1	5°31.8	5°22.5	5°13.2	5°03.8	4°54.5	4°45.1	4°35.7	4°26.2	4°16.8	4°07.4	-9.4	54.1
	We 19	281°13.8	295°48.3	310°22.7	324°57.2	339°31.7	354°06.2	8°40.7	23°15.2	37°49.8	52°24.3	66°58.8	+34.5	14.7
		1°44.4	1°34.8	1°25.2	1°15.6	1°06.0	0°56.4	0°46.8	0°37.2	0°27.6	0°18.0	0°08.3	-9.6	54.0
	Th 20	285°36.6	300°11.0	314°45.5	329°20.0	343°54.4	358°28.9	13°03.3	27°37.7	42°12.1	56°46.5	71°20.9	+34.4	14.8
		-2°15.5	-2°25.0	-2°34.5	-2°44.1	-2°53.6	-3°03.1	-3°12.6	-3°22.0	-3°31.5	-3°41.0	-3°50.4	-9.5	54.1
	Fr 21	300°11.0	314°45.5	329°20.0	343°54.4	358°28.9	13°03.3	27°37.7	42°12.1	56°46.5	71°20.9	85°55.2	+34.4	14.8
		-2°25.0	-2°34.5	-2°44.1	-2°53.6	-3°03.1	-3°12.6	-3°22.0	-3°31.5	-3°41.0	-3°50.4	-3°59.8	-9.5	54.1
	Sa 22	304°28.2	319°02.2	333°36.2	348°10.2	2°44.1	17°18.0	31°51.9	46°25.7	60°59.5	75°33.2	90°07.0	+33.9	14.8
		-6°19.2	-6°28.3	-6°37.4	-6°46.5	-6°55.5	-7°04.6	-7°13.6	-7°22.6	-7°31.5	-7°40.5	-7°49.4	-9.0	54.3
◑	Su 23	308°28.4	323°01.5	337°34.6	352°07.6	6°40.6	21°13.5	35°46.3	50°19.2	64°51.9	79°24.6	93°57.3	+32.9	14.9
		-9°59.2	-10°07.5	-10°15.9	-10°24.2	-10°32.5	-10°40.7	-10°48.9	-10°57.0	-11°05.1	-11°13.2	-11°21.2	-8.2	54.8
	Mo 24	312°00.8	326°32.6	341°04.3	355°36.0	10°07.6	24°39.1	39°10.6	53°42.0	68°13.3	82°44.6	97°15.8	+31.5	15.1
		-13°15.8	-13°23.0	-13°30.2	-13°37.3	-13°44.4	-13°51.4	-13°58.3	-14°05.2	-14°12.1	-14°18.8	-14°25.6	-7.0	55.4
	Tu 25	314°56.2	329°26.3	343°56.4	358°26.4	12°56.4	27°26.2	41°56.0	56°25.8	70°55.4	85°25.0	99°54.5	+29.8	15.3
		-15°58.4	-16°04.1	-16°09.6	-16°15.1	-16°20.5	-16°25.9	-16°31.1	-16°36.3	-16°41.4	-16°46.4	-16°51.4	-5.3	56.1
	We 26	317°08.8	331°37.2	346°05.6	0°33.8	15°02.0	29°30.1	43°58.2	58°26.2	72°54.1	87°21.9	101°49.7	+28.1	15.5
		-17°55.2	-17°58.8	-18°02.2	-18°05.6	-18°08.8	-18°12.0	-18°15.1	-18°18.0	-18°20.9	-18°23.6	-18°26.3	-3.1	57.0
	Th 27	318°38.7	333°05.5	347°32.2	1°58.9	16°25.5	30°52.1	45°18.6	59°45.0	74°11.4	88°37.8	103°04.1	+26.5	15.8
		-18°53.7	-18°54.7	-18°55.5	-18°56.2	-18°56.9	-18°57.4	-18°57.8	-18°58.0	-18°58.2	-18°58.2	-18°58.2	-0.4	58.0
	Fr 28	319°33.0	333°58.6	348°24.2	2°49.7	17°15.2	31°40.7	46°06.1	60°31.6	74°56.9	89°22.3	103°47.6	+25.5	16.1
		-18°42.8	-18°40.8	-18°38.7	-18°36.5	-18°34.1	-18°31.7	-18°29.0	-18°26.3	-18°23.5	-18°20.5	-18°17.4	+2.5	58.9
	Sa 29	320°05.3	334°30.4	348°55.4	3°20.5	17°45.5	32°10.6	46°35.6	61°00.6	75°25.7	89°50.7	104°15.8	+25.0	16.3
		-17°16.2	-17°11.2	-17°06.0	-17°00.7	-16°55.3	-16°49.8	-16°44.1	-16°38.4	-16°32.5	-16°26.5	-16°20.4	+5.6	59.7
●	Su 30	320°32.1	334°57.3	349°22.5	3°47.7	18°13.0	32°38.2	47°03.5	61°28.8	75°54.1	90°19.4	104°44.8	+25.3	16.5
		-14°35.1	-14°27.2	-14°19.3	-14°11.2	-14°03.0	-13°54.7	-13°46.3	-13°37.8	-13°29.2	-13°20.6	-13°11.8	+8.3	60.4
	Mo 31	321°07.9	335°33.7	349°59.5	4°25.3	18°51.1	33°17.0	47°42.9	62°08.9	76°34.8	91°00.8	105°26.8	+25.9	16.6
		-10°49.6	-10°39.4	-10°29.2	-10°18.9	-10°08.6	-9°58.2	-9°47.7	-9°37.1	-9°26.5	-9°15.8	-9°05.1	+10.5	60.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 1 10h17 — FQ: 8 03h34 — FM: 15 13h07 — LQ: 23 17h45 — NM: 30 21h59

SUN

February 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	266°36.9	281°36.8	296°36.7	311°36.6	326°36.6	341°36.5	356°36.4	11°36.3	26°36.2	41°36.1	56°36.1	71°36.0	-0.1
	-16°59.8	-16°59.1	-16°58.4	-16°57.6	-16°56.9	-16°56.2	-16°55.5	-16°54.8	-16°54.1	-16°53.3	-16°52.6	-16°51.9	+0.7
We 2	266°35.0	281°34.9	296°34.8	311°34.8	326°34.7	341°34.6	356°34.6	11°34.5	26°34.4	41°34.3	56°34.3	71°34.2	-0.1
	-16°42.5	-16°41.7	-16°41.0	-16°40.3	-16°39.6	-16°38.8	-16°38.1	-16°37.4	-16°36.6	-16°35.9	-16°35.2	-16°34.4	+0.7
Th 3	266°33.3	281°33.3	296°33.2	311°33.1	326°33.1	341°33.0	356°32.9	11°32.9	26°32.8	41°32.7	56°32.7	71°32.6	-0.1
	-16°24.9	-16°24.1	-16°23.4	-16°22.6	-16°21.9	-16°21.2	-16°20.4	-16°19.7	-16°18.9	-16°18.2	-16°17.4	-16°16.7	+0.7
Fr 4	266°31.8	281°31.8	296°31.7	311°31.7	326°31.6	341°31.6	356°31.5	11°31.5	26°31.4	41°31.3	56°31.3	71°31.2	-0.1
	-16°07.0	-16°06.2	-16°05.5	-16°04.7	-16°03.9	-16°03.2	-16°02.4	-16°01.7	-16°00.9	-16°00.2	-15°59.4	-15°58.7	+0.8
Sa 5	266°30.6	281°30.5	296°30.5	311°30.4	326°30.4	341°30.3	356°30.3	11°30.3	26°30.2	41°30.2	56°30.1	71°30.1	-0.0
	-15°48.8	-15°48.0	-15°47.3	-15°46.5	-15°45.7	-15°45.0	-15°44.2	-15°43.4	-15°42.7	-15°41.9	-15°41.1	-15°40.4	+0.8
Su 6	266°29.5	281°29.5	296°29.4	311°29.4	326°29.4	341°29.3	356°29.3	11°29.3	26°29.2	41°29.2	56°29.1	71°29.1	-0.0
	-15°30.3	-15°29.6	-15°28.8	-15°28.0	-15°27.2	-15°26.5	-15°25.7	-15°24.9	-15°24.1	-15°23.4	-15°22.6	-15°21.8	+0.8
Mo 7	266°28.7	281°28.6	296°28.6	311°28.6	326°28.5	341°28.5	356°28.5	11°28.5	26°28.4	41°28.4	56°28.4	71°28.3	-0.0
	-15°11.6	-15°10.8	-15°10.1	-15°09.3	-15°08.5	-15°07.7	-15°06.9	-15°06.1	-15°05.3	-15°04.5	-15°03.8	-15°03.0	+0.8
Tu 8	266°28.0	281°28.0	296°28.0	311°28.0	326°27.9	341°27.9	356°27.9	11°27.9	26°27.8	41°27.8	56°27.8	71°27.8	-0.0
	-14°52.7	-14°51.9	-14°51.1	-14°50.3	-14°49.5	-14°48.7	-14°47.9	-14°47.1	-14°46.3	-14°45.5	-14°44.7	-14°43.9	+0.8
We 9	266°27.6	281°27.6	296°27.5	311°27.5	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.5	56°27.4	71°27.4	-0.0
	-14°33.4	-14°32.6	-14°31.8	-14°31.0	-14°30.2	-14°29.4	-14°28.6	-14°27.8	-14°27.0	-14°26.2	-14°25.4	-14°24.6	+0.8
Th 10	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	-0.0
	-14°14.0	-14°13.2	-14°12.4	-14°11.5	-14°10.7	-14°09.9	-14°09.1	-14°08.3	-14°07.5	-14°06.6	-14°05.8	-14°05.0	+0.8
Fr 11	266°27.3	281°27.3	296°27.3	311°27.3	326°27.3	341°27.3	356°27.3	11°27.3	26°27.3	41°27.3	56°27.3	71°27.3	+0.0
	-13°54.3	-13°53.5	-13°52.6	-13°51.8	-13°51.0	-13°50.2	-13°49.3	-13°48.5	-13°47.7	-13°46.9	-13°46.0	-13°45.2	+0.8
Sa 12	266°27.4	281°27.4	296°27.4	311°27.4	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.5	56°27.5	71°27.5	+0.0
	-13°34.4	-13°33.5	-13°32.7	-13°31.9	-13°31.0	-13°30.2	-13°29.4	-13°28.5	-13°27.7	-13°26.8	-13°26.0	-13°25.2	+0.8
Su 13	266°27.7	281°27.8	296°27.8	311°27.8	326°27.8	341°27.8	356°27.9	11°27.9	26°27.9	41°27.9	56°27.9	71°28.0	+0.0
	-13°14.2	-13°13.4	-13°12.5	-13°11.7	-13°10.9	-13°10.0	-13°09.2	-13°08.3	-13°07.5	-13°06.6	-13°05.8	-13°04.9	+0.8
Mo 14	266°28.3	281°28.3	296°28.3	311°28.3	326°28.4	341°28.4	356°28.4	11°28.4	26°28.5	41°28.5	56°28.5	71°28.6	+0.0
	-12°53.9	-12°53.0	-12°52.2	-12°51.3	-12°50.5	-12°49.6	-12°48.7	-12°47.9	-12°47.0	-12°46.2	-12°45.3	-12°44.5	+0.9
Tu 15	266°29.0	281°29.0	296°29.0	311°29.1	326°29.1	341°29.1	356°29.2	11°29.2	26°29.2	41°29.3	56°29.3	71°29.3	+0.0
	-12°33.3	-12°32.4	-12°31.6	-12°30.7	-12°29.9	-12°29.0	-12°28.1	-12°27.3	-12°26.4	-12°25.5	-12°24.7	-12°23.8	+0.9
We 16	266°29.8	281°29.9	296°29.9	311°30.0	326°30.0	341°30.0	356°30.1	11°30.1	26°30.2	41°30.2	56°30.3	71°30.3	+0.0
	-12°12.5	-12°11.7	-12°10.8	-12°09.9	-12°09.0	-12°08.2	-12°07.3	-12°06.4	-12°05.6	-12°04.7	-12°03.8	-12°02.9	+0.9
Th 17	266°30.9	281°30.9	296°31.0	311°31.0	326°31.1	341°31.1	356°31.2	11°31.2	26°31.3	41°31.3	56°31.4	71°31.4	+0.0
	-11°51.6	-11°50.7	-11°49.8	-11°48.9	-11°48.0	-11°47.2	-11°46.3	-11°45.4	-11°44.5	-11°43.7	-11°42.8	-11°41.9	+0.9
Fr 18	266°32.1	281°32.2	296°32.2	311°32.3	326°32.3	341°32.4	356°32.4	11°32.5	26°32.6	41°32.6	56°32.7	71°32.7	+0.1
	-11°30.4	-11°29.5	-11°28.6	-11°27.7	-11°26.9	-11°26.0	-11°25.1	-11°24.2	-11°23.3	-11°22.4	-11°21.5	-11°20.6	+0.9
Sa 19	266°33.5	281°33.6	296°33.6	311°33.7	326°33.8	341°33.8	356°33.9	11°33.9	26°34.0	41°34.1	56°34.1	71°34.2	+0.1
	-11°09.1	-11°08.2	-11°07.3	-11°06.4	-11°05.5	-11°04.6	-11°03.7	-11°02.8	-11°01.9	-11°01.0	-11°00.1	-10°59.2	+0.9
Su 20	266°35.1	281°35.1	296°35.2	311°35.3	326°35.3	341°35.4	356°35.5	11°35.5	26°35.6	41°35.7	56°35.8	71°35.8	+0.1
	-10°47.6	-10°46.7	-10°45.8	-10°44.9	-10°44.0	-10°43.0	-10°42.1	-10°41.2	-10°40.3	-10°39.4	-10°38.5	-10°37.6	+0.9
Mo 21	266°36.8	281°36.8	296°36.9	311°37.0	326°37.1	341°37.1	356°37.2	11°37.3	26°37.4	41°37.5	56°37.5	71°37.6	+0.1
	-10°25.9	-10°25.0	-10°24.1	-10°23.1	-10°22.2	-10°21.3	-10°20.4	-10°19.5	-10°18.6	-10°17.7	-10°16.8	-10°15.9	+0.9
Tu 22	266°38.6	281°38.7	296°38.8	311°38.9	326°39.0	341°39.0	356°39.1	11°39.2	26°39.3	41°39.4	56°39.5	71°39.5	+0.1
	-10°04.0	-10°03.1	-10°02.2	-10°01.3	-10°00.4	-9°59.5	-9°58.5	-9°57.6	-9°56.7	-9°55.8	-9°54.9	-9°54.0	+0.9
We 23	266°40.7	281°40.7	296°40.8	311°40.9	326°41.0	341°41.1	356°41.2	11°41.3	26°41.4	41°41.5	56°41.5	71°41.6	+0.1
	-9°42.0	-9°41.1	-9°40.2	-9°39.3	-9°38.3	-9°37.4	-9°36.5	-9°35.6	-9°34.7	-9°33.7	-9°32.8	-9°31.9	+0.9
Th 24	266°42.8	281°42.9	296°43.0	311°43.1	326°43.2	341°43.3	356°43.4	11°43.5	26°43.6	41°43.7	56°43.8	71°43.9	+0.1
	-9°19.9	-9°18.9	-9°18.0	-9°17.1	-9°16.2	-9°15.2	-9°14.3	-9°13.4	-9°12.5	-9°11.5	-9°10.6	-9°09.7	+0.9
Fr 25	266°45.1	281°45.2	296°45.3	311°45.4	326°45.5	341°45.6	356°45.7	11°45.8	26°45.9	41°46.0	56°46.1	71°46.2	+0.1
	-8°57.6	-8°56.6	-8°55.7	-8°54.8	-8°53.9	-8°52.9	-8°52.0	-8°51.1	-8°50.1	-8°49.2	-8°48.3	-8°47.3	+0.9
Sa 26	266°47.6	281°47.7	296°47.8	311°47.9	326°48.0	341°48.1	356°48.2	11°48.3	26°48.4	41°48.5	56°48.6	71°48.7	+0.1
	-8°35.2	-8°34.2	-8°33.3	-8°32.3	-8°31.4	-8°30.5	-8°29.5	-8°28.6	-8°27.6	-8°26.7	-8°25.8	-8°24.8	+0.9
Su 27	266°50.2	281°50.3	296°50.4	311°50.5	326°50.6	341°50.7	356°50.8	11°50.9	26°51.0	41°51.2	56°51.3	71°51.4	+0.1
	-8°12.6	-8°11.7	-8°10.7	-8°09.8	-8°08.8	-8°07.9	-8°06.9	-8°06.0	-8°05.1	-8°04.1	-8°03.2	-8°02.2	+0.9
Mo 28	266°52.9	281°53.0	296°53.1	311°53.2	326°53.3	341°53.5	356°53.6	11°53.7	26°53.8	41°53.9	56°54.0	71°54.2	+0.1
	-7°49.9	-7°49.0	-7°48.0	-7°47.1	-7°46.1	-7°45.2	-7°44.2	-7°43.3	-7°42.3	-7°41.4	-7°40.4	-7°39.5	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2033

D	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	Δ'/h	SH
Tu 1	249°48.8	264°15.2	278°41.5	293°08.0	307°34.4	322°00.9	336°27.4	350°54.0	5°20.6	19°47.2	34°13.8	+26.5	16.6
	-7°14.4	-7°03.1	-6°51.7	-6°40.2	-6°28.8	-6°17.2	-6°05.7	-5°54.1	-5°42.5	-5°30.8	-5°19.1	+11.5	60.8
We 2	250°56.8	265°23.9	279°51.0	294°18.1	308°45.2	323°12.4	337°39.6	352°06.9	6°34.1	21°01.4	35°28.7	+27.2	16.5
	-2°20.6	-2°08.6	-1°56.6	-1°44.5	-1°32.5	-1°20.4	-1°08.4	-0°56.3	-0°44.3	-0°32.2	-0°20.2	+12.1	60.6
Th 3	252°20.5	266°48.1	281°15.7	295°43.3	310°11.0	324°38.6	339°06.3	353°34.0	8°01.7	22°29.4	36°57.1	+27.7	16.4
	2°39.1	2°50.9	3°02.6	3°14.4	3°26.1	3°37.8	3°49.4	4°01.0	4°12.6	4°24.1	4°35.6	+11.7	60.2
Fr 4	253°54.1	268°21.9	282°49.8	297°17.7	311°45.6	326°13.4	340°41.3	355°09.2	9°37.1	24°05.0	38°32.9	+27.9	16.2
	7°23.0	7°33.7	7°44.4	7°55.0	8°05.6	8°16.2	8°26.6	8°37.0	8°47.4	8°57.6	9°07.8	+10.5	59.5
Sa 5	255°31.6	269°59.5	284°27.4	298°55.3	313°23.2	327°51.2	342°19.1	356°47.0	11°14.9	25°42.8	40°10.7	+27.9	16.0
	11°32.7	11°41.7	11°50.7	11°59.6	12°08.5	12°17.2	12°25.9	12°34.4	12°42.9	12°51.3	12°59.7	+8.7	58.8
◐ Su 6	257°09.3	271°37.2	286°05.1	300°33.0	315°00.9	329°28.8	343°56.7	358°24.6	12°52.5	27°20.4	41°48.3	+27.9	15.8
	14°54.0	15°00.9	15°07.7	15°14.4	15°21.0	15°27.5	15°33.9	15°40.3	15°46.5	15°52.6	15°58.6	+6.5	58.0
Mo 7	258°47.3	273°15.2	287°43.2	302°11.2	316°39.2	331°07.2	345°35.2	0°03.2	14°31.2	28°59.2	43°27.3	+28.0	15.6
	17°17.1	17°21.5	17°25.8	17°30.0	17°34.2	17°38.2	17°42.1	17°45.9	17°49.6	17°53.2	17°56.6	+4.0	57.2
Tu 8	260°29.4	274°57.7	289°26.0	303°54.3	318°22.6	332°50.9	347°19.3	1°47.7	16°16.1	30°44.5	45°13.0	+28.4	15.4
	18°36.4	18°38.2	18°40.0	18°41.6	18°43.1	18°44.5	18°45.8	18°47.0	18°48.1	18°49.0	18°49.9	+1.3	56.6
We 9	262°22.6	276°51.5	291°20.4	305°49.3	320°18.3	334°47.3	349°16.3	3°45.3	18°14.4	32°43.6	47°12.7	+29.0	15.3
	18°50.9	18°50.1	18°49.3	18°48.3	18°47.3	18°46.1	18°44.9	18°43.6	18°42.1	18°40.6	18°39.0	-1.2	55.9
Th 10	264°34.4	279°04.2	293°33.9	308°03.8	322°33.7	337°03.6	351°33.5	6°03.5	20°33.6	35°03.6	49°33.8	+29.9	15.1
	18°03.3	18°00.2	17°56.9	17°53.7	17°50.3	17°46.8	17°43.3	17°39.6	17°35.9	17°32.1	17°28.2	-3.5	55.4
Fr 11	267°10.8	281°41.7	296°12.5	310°43.5	325°14.4	339°45.4	354°16.5	8°47.6	23°18.7	37°49.9	52°21.1	+31.0	15.0
	16°19.9	16°14.7	16°09.5	16°04.1	15°58.7	15°53.3	15°47.7	15°42.1	15°36.4	15°30.7	15°24.8	-5.5	55.0
Sa 12	270°15.0	284°46.9	299°18.9	313°50.9	328°23.0	342°55.1	357°27.3	11°59.5	26°31.7	41°04.0	55°36.3	+32.1	14.9
	13°49.4	13°42.6	13°35.6	13°28.7	13°21.6	13°14.5	13°07.4	13°00.2	12°52.9	12°45.6	12°38.3	-7.1	54.6
Su 13	273°46.1	288°19.1	302°52.1	317°25.1	331°58.2	346°31.3	1°04.4	15°37.6	30°10.8	44°44.1	59°17.4	+33.1	14.8
	10°41.8	10°33.7	10°25.5	10°17.3	10°09.0	10°00.7	9°52.4	9°44.0	9°35.6	9°27.2	9°18.7	-8.3	54.3
○ Mo 14	277°40.4	292°14.2	306°48.0	321°21.8	335°55.7	350°29.5	5°03.5	19°37.4	34°11.3	48°45.3	63°19.3	+33.9	14.8
	7°07.4	6°58.5	6°49.5	6°40.4	6°31.4	6°22.3	6°13.2	6°04.0	5°54.9	5°45.7	5°36.5	-9.1	54.1
Tu 15	281°51.6	296°25.9	311°00.2	325°34.5	340°08.9	354°43.2	9°17.5	23°51.9	38°26.3	53°00.7	67°35.1	+34.3	14.7
	3°16.5	3°07.1	2°57.6	2°48.2	2°38.7	2°29.2	2°19.7	2°10.2	2°00.7	1°51.2	1°41.7	-9.5	54.0
We 16	286°11.7	300°46.2	315°20.6	329°55.1	344°29.5	359°04.0	13°38.5	28°12.9	42°47.4	57°21.8	71°56.2	+34.5	14.7
	-0°41.3	-0°50.8	-1°00.3	-1°09.8	-1°19.3	-1°28.8	-1°38.3	-1°47.8	-1°57.3	-2°06.8	-2°16.3	-9.5	53.9
Th 17	290°31.7	305°06.0	319°40.2	334°14.5	348°48.7	3°22.9	17°57.1	32°31.2	47°05.4	61°39.5	76°13.6	+34.2	14.7
	-4°36.8	-4°46.0	-4°55.2	-5°04.5	-5°13.6	-5°22.8	-5°32.0	-5°41.1	-5°50.2	-5°59.3	-6°08.3	-9.2	54.0
Fr 18	294°42.3	309°16.0	323°49.6	338°23.3	352°56.9	7°30.4	22°04.0	36°37.5	51°10.9	65°44.4	80°17.8	+33.5	14.8
	-8°21.1	-8°29.7	-8°38.3	-8°46.8	-8°55.3	-9°03.8	-9°12.3	-9°20.7	-9°29.0	-9°37.4	-9°45.7	-8.5	54.3
Sa 19	309°16.0	323°49.6	338°23.3	352°56.9	7°30.4	22°04.0	36°37.5	51°10.9	65°44.4	80°17.8	94°51.1	+33.5	14.8
	-8°29.7	-8°38.3	-8°46.8	-8°55.3	-9°03.8	-9°12.3	-9°20.7	-9°29.0	-9°37.4	-9°45.7	-9°53.9	-8.4	54.3
Su 20	313°06.8	327°39.6	342°12.2	356°44.8	11°17.4	25°50.0	40°22.4	54°54.9	69°27.3	83°59.6	98°31.9	+32.5	14.9
	-11°52.9	-12°00.5	-12°08.0	-12°15.5	-12°22.9	-12°30.2	-12°37.6	-12°44.8	-12°52.1	-12°59.2	-13°06.3	-7.3	54.7
Mo 21	316°30.2	331°01.7	345°33.1	0°04.4	14°35.7	29°06.9	43°38.1	58°09.2	72°40.3	87°11.3	101°42.3	+31.2	15.1
	-14°46.2	-14°52.4	-14°58.5	-15°04.5	-15°10.5	-15°16.4	-15°22.2	-15°28.0	-15°33.7	-15°39.3	-15°44.9	-5.9	55.2
◑ Tu 22	319°19.6	333°49.6	348°19.5	2°49.4	17°19.2	31°49.0	46°18.7	60°48.3	75°17.9	89°47.5	104°16.9	+29.7	15.2
	-16°59.5	-17°03.9	-17°08.2	-17°12.4	-17°16.5	-17°20.5	-17°24.4	-17°28.3	-17°32.1	-17°35.7	-17°39.3	-4.0	55.9
We 23	321°31.8	336°00.3	350°28.7	4°57.2	19°25.5	33°53.8	48°22.0	62°50.2	77°18.3	91°46.4	106°14.4	+28.3	15.5
	-18°22.4	-18°24.5	-18°26.6	-18°28.5	-18°30.3	-18°32.0	-18°33.6	-18°35.2	-18°36.6	-18°37.9	-18°39.1	-1.7	56.8
Th 24	323°08.3	337°35.5	352°02.6	6°29.7	20°56.8	35°23.8	49°50.8	64°17.7	78°44.6	93°11.4	107°38.2	+27.0	15.7
	-18°44.7	-18°44.2	-18°43.6	-18°42.8	-18°42.0	-18°41.1	-18°40.0	-18°38.9	-18°37.6	-18°36.2	-18°34.7	+1.0	57.7
Fr 25	324°15.7	338°41.9	353°08.1	7°34.2	22°00.4	36°26.5	50°52.6	65°18.7	79°44.7	94°10.7	108°36.7	+26.1	16.0
	-17°58.3	-17°54.9	-17°51.4	-17°47.8	-17°44.1	-17°40.3	-17°36.4	-17°32.3	-17°28.1	-17°23.8	-17°19.4	+3.9	58.7
Sa 26	325°04.3	339°30.0	353°55.7	8°21.4	22°47.1	37°12.8	51°38.5	66°04.1	80°29.8	94°55.4	109°21.1	+25.7	16.3
	-15°59.5	-15°53.3	-15°46.9	-15°40.5	-15°33.9	-15°27.2	-15°20.4	-15°13.5	-15°06.5	-14°59.4	-14°52.2	+6.7	59.7
Su 27	325°45.6	340°11.3	354°36.9	9°02.6	23°28.2	37°53.9	52°19.5	66°45.2	81°10.9	95°36.6	110°02.3	+25.7	16.5
	-12°51.5	-12°42.6	-12°33.7	-12°24.7	-12°15.5	-12°06.3	-11°57.0	-11°47.6	-11°38.2	-11°28.6	-11°19.0	+9.3	60.5
Mo 28	326°28.8	340°54.7	355°20.5	9°46.4	24°12.3	38°38.2	53°04.1	67°30.0	81°56.0	96°21.9	110°47.9	+25.9	16.7
	-8°44.9	-8°34.0	-8°23.1	-8°12.1	-8°01.1	-7°50.0	-7°38.8	-7°27.6	-7°16.4	-7°05.0	-6°53.7	+11.1	61.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 13h34 — FM: 14 07h04 — LQ: 22 11h53

SUN

March 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	266°55.7	281°55.8	296°56.0	311°56.1	326°56.2	341°56.3	356°56.4	11°56.6	26°56.7	41°56.8	56°56.9	71°57.1	+0.1
	-7°27.1	-7°26.2	-7°25.2	-7°24.3	-7°23.3	-7°22.4	-7°21.4	-7°20.5	-7°19.5	-7°18.6	-7°17.6	-7°16.7	+1.0
We 2	266°58.7	281°58.8	296°58.9	311°59.1	326°59.2	341°59.3	356°59.4	11°59.6	26°59.7	41°59.8	57°00.0	72°00.1	+0.1
	-7°04.2	-7°03.3	-7°02.3	-7°01.4	-7°00.4	-6°59.5	-6°58.5	-6°57.5	-6°56.6	-6°55.6	-6°54.7	-6°53.7	+1.0
Th 3	267°01.8	282°01.9	297°02.0	312°02.2	327°02.3	342°02.4	357°02.6	12°02.7	27°02.8	42°03.0	57°03.1	72°03.2	+0.1
	-6°41.2	-6°40.3	-6°39.3	-6°38.4	-6°37.4	-6°36.4	-6°35.5	-6°34.5	-6°33.6	-6°32.6	-6°31.6	-6°30.7	+1.0
Fr 4	267°05.0	282°05.1	297°05.2	312°05.4	327°05.5	342°05.7	357°05.8	12°05.9	27°06.1	42°06.2	57°06.3	72°06.5	+0.1
	-6°18.2	-6°17.2	-6°16.2	-6°15.3	-6°14.3	-6°13.3	-6°12.4	-6°11.4	-6°10.4	-6°09.5	-6°08.5	-6°07.5	+1.0
Sa 5	267°08.3	282°08.4	297°08.6	312°08.7	327°08.9	342°09.0	357°09.1	12°09.3	27°09.4	42°09.6	57°09.7	72°09.9	+0.1
	-5°55.0	-5°54.0	-5°53.0	-5°52.1	-5°51.1	-5°50.1	-5°49.2	-5°48.2	-5°47.2	-5°46.3	-5°45.3	-5°44.3	+1.0
Su 6	267°11.7	282°11.9	297°12.0	312°12.2	327°12.3	342°12.5	357°12.6	12°12.7	27°12.9	42°13.0	57°13.2	72°13.3	+0.1
	-5°31.7	-5°30.8	-5°29.8	-5°28.8	-5°27.8	-5°26.9	-5°25.9	-5°24.9	-5°24.0	-5°23.0	-5°22.0	-5°21.0	+1.0
Mo 7	267°15.3	282°15.4	297°15.6	312°15.7	327°15.9	342°16.0	357°16.2	12°16.3	27°16.5	42°16.6	57°16.8	72°16.9	+0.2
	-5°08.4	-5°07.4	-5°06.5	-5°05.5	-5°04.5	-5°03.5	-5°02.6	-5°01.6	-5°00.6	-4°59.6	-4°58.7	-4°57.7	+1.0
Tu 8	267°18.9	282°19.1	297°19.2	312°19.4	327°19.5	342°19.7	357°19.8	12°20.0	27°20.1	42°20.3	57°20.4	72°20.6	+0.2
	-4°45.0	-4°44.0	-4°43.1	-4°42.1	-4°41.1	-4°40.1	-4°39.1	-4°38.2	-4°37.2	-4°36.2	-4°35.2	-4°34.3	+1.0
We 9	267°22.6	282°22.8	297°23.0	312°23.1	327°23.3	342°23.4	357°23.6	12°23.7	27°23.9	42°24.1	57°24.2	72°24.4	+0.2
	-4°21.6	-4°20.6	-4°19.6	-4°18.6	-4°17.6	-4°16.7	-4°15.7	-4°14.7	-4°13.7	-4°12.7	-4°11.8	-4°10.8	+1.0
Th 10	267°26.5	282°26.6	297°26.8	312°27.0	327°27.1	342°27.3	357°27.4	12°27.6	27°27.8	42°27.9	57°28.1	72°28.2	+0.2
	-3°58.0	-3°57.1	-3°56.1	-3°55.1	-3°54.1	-3°53.1	-3°52.2	-3°51.2	-3°50.2	-3°49.2	-3°48.2	-3°47.3	+1.0
Fr 11	267°30.4	282°30.5	297°30.7	312°30.9	327°31.0	342°31.2	357°31.4	12°31.5	27°31.7	42°31.9	57°32.0	72°32.2	+0.2
	-3°34.5	-3°33.5	-3°32.5	-3°31.5	-3°30.6	-3°29.6	-3°28.6	-3°27.6	-3°26.6	-3°25.6	-3°24.7	-3°23.7	+1.0
Sa 12	267°34.4	282°34.5	297°34.7	312°34.9	327°35.0	342°35.2	357°35.4	12°35.6	27°35.7	42°35.9	57°36.1	72°36.2	+0.2
	-3°10.9	-3°09.9	-3°08.9	-3°07.9	-3°07.0	-3°06.0	-3°05.0	-3°04.0	-3°03.0	-3°02.0	-3°01.1	-3°00.1	+1.0
Su 13	267°38.4	282°38.6	297°38.8	312°39.0	327°39.1	342°39.3	357°39.5	12°39.6	27°39.8	42°40.0	57°40.2	72°40.3	+0.2
	-2°47.3	-2°46.3	-2°45.3	-2°44.3	-2°43.3	-2°42.3	-2°41.4	-2°40.4	-2°39.4	-2°38.4	-2°37.4	-2°36.4	+1.0
Mo 14	267°42.6	282°42.8	297°42.9	312°43.1	327°43.3	342°43.4	357°43.6	12°43.8	27°44.0	42°44.1	57°44.3	72°44.5	+0.2
	-2°23.6	-2°22.6	-2°21.6	-2°20.6	-2°19.7	-2°18.7	-2°17.7	-2°16.7	-2°15.7	-2°14.7	-2°13.7	-2°12.8	+1.0
Tu 15	267°46.8	282°47.0	297°47.1	312°47.3	327°47.5	342°47.7	357°47.8	12°48.0	27°48.2	42°48.4	57°48.5	72°48.7	+0.2
	-1°59.9	-1°58.9	-1°57.9	-1°57.0	-1°56.0	-1°55.0	-1°54.0	-1°53.0	-1°52.0	-1°51.0	-1°50.0	-1°49.1	+1.0
We 16	267°51.0	282°51.2	297°51.4	312°51.6	327°51.8	342°51.9	357°52.1	12°52.3	27°52.5	42°52.6	57°52.8	72°53.0	+0.2
	-1°36.2	-1°35.2	-1°34.2	-1°33.3	-1°32.3	-1°31.3	-1°30.3	-1°29.3	-1°28.3	-1°27.3	-1°26.3	-1°25.4	+1.0
Th 17	267°55.3	282°55.5	297°55.7	312°55.9	327°56.1	342°56.2	357°56.4	12°56.6	27°56.8	42°57.0	57°57.2	72°57.3	+0.2
	-1°12.5	-1°11.5	-1°10.5	-1°09.5	-1°08.6	-1°07.6	-1°06.6	-1°05.6	-1°04.6	-1°03.6	-1°02.6	-1°01.6	+1.0
Fr 18	267°59.7	282°59.9	298°00.1	313°00.2	328°00.4	343°00.6	358°00.8	13°01.0	28°01.2	43°01.3	58°01.5	73°01.7	+0.2
	-0°48.8	-0°47.8	-0°46.8	-0°45.8	-0°44.8	-0°43.8	-0°42.9	-0°41.9	-0°40.9	-0°39.9	-0°38.9	-0°37.9	+1.0
Sa 19	268°04.1	283°04.3	298°04.5	313°04.6	328°04.8	343°05.0	358°05.2	13°05.4	28°05.6	43°05.7	58°05.9	73°06.1	+0.2
	-0°25.1	-0°24.1	-0°23.1	-0°22.1	-0°21.1	-0°20.1	-0°19.1	-0°18.2	-0°17.2	-0°16.2	-0°15.2	-0°14.2	+1.0
Su 20	268°08.5	283°08.7	298°08.9	313°09.1	328°09.3	343°09.4	358°09.6	13°09.8	28°10.0	43°10.2	58°10.4	73°10.6	+0.2
	-0°01.4	-0°00.4	0°00.6	0°01.6	0°02.6	0°03.6	0°04.6	0°05.6	0°06.5	0°07.5	0°08.5	0°09.5	+1.0
Mo 21	268°13.0	283°13.2	298°13.3	313°13.5	328°13.7	343°13.9	358°14.1	13°14.3	28°14.5	43°14.7	58°14.8	73°15.0	+0.2
	0°22.3	0°23.3	0°24.3	0°25.3	0°26.3	0°27.3	0°28.3	0°29.3	0°30.2	0°31.2	0°32.2	0°33.2	+1.0
Tu 22	268°17.5	283°17.6	298°17.8	313°18.0	328°18.2	343°18.4	358°18.6	13°18.8	28°19.0	43°19.1	58°19.3	73°19.5	+0.2
	0°46.0	0°47.0	0°48.0	0°49.0	0°50.0	0°51.0	0°51.9	0°52.9	0°53.9	0°54.9	0°55.9	0°56.9	+1.0
We 23	268°21.9	283°22.1	298°22.3	313°22.5	328°22.7	343°22.9	358°23.1	13°23.3	28°23.5	43°23.6	58°23.8	73°24.0	+0.2
	1°09.7	1°10.7	1°11.7	1°12.6	1°13.6	1°14.6	1°15.6	1°16.6	1°17.6	1°18.6	1°19.5	1°20.5	+1.0
Th 24	268°26.5	283°26.6	298°26.8	313°27.0	328°27.2	343°27.4	358°27.6	13°27.8	28°28.0	43°28.1	58°28.3	73°28.5	+0.2
	1°33.3	1°34.3	1°35.3	1°36.3	1°37.3	1°38.2	1°39.2	1°40.2	1°41.2	1°42.2	1°43.2	1°44.1	+1.0
Fr 25	268°31.0	283°31.2	298°31.3	313°31.5	328°31.7	343°31.9	358°32.1	13°32.3	28°32.5	43°32.7	58°32.8	73°33.0	+0.2
	1°56.9	1°57.9	1°58.9	1°59.9	2°00.8	2°01.8	2°02.8	2°03.8	2°04.8	2°05.8	2°06.7	2°07.7	+1.0
Sa 26	268°35.5	283°35.7	298°35.9	313°36.0	328°36.2	343°36.4	358°36.6	13°36.8	28°37.0	43°37.2	58°37.4	73°37.5	+0.2
	2°20.5	2°21.4	2°22.4	2°23.4	2°24.4	2°25.4	2°26.3	2°27.3	2°28.3	2°29.3	2°30.3	2°31.2	+1.0
Su 27	268°40.0	283°40.2	298°40.4	313°40.6	328°40.7	343°40.9	358°41.1	13°41.3	28°41.5	43°41.7	58°41.9	73°42.1	+0.2
	2°44.0	2°45.0	2°45.9	2°46.9	2°47.9	2°48.9	2°49.8	2°50.8	2°51.8	2°52.8	2°53.8	2°54.7	+1.0
Mo 28	268°44.5	283°44.7	298°44.9	313°45.1	328°45.2	343°45.4	358°45.6	13°45.8	28°46.0	43°46.2	58°46.4	73°46.5	+0.2
	3°07.4	3°08.4	3°09.4	3°10.4	3°11.3	3°12.3	3°13.3	3°14.3	3°15.2	3°16.2	3°17.2	3°18.2	+1.0
Tu 29	268°49.0	283°49.2	298°49.4	313°49.5	328°49.7	343°49.9	358°50.1	13°50.3	28°50.5	43°50.7	58°50.8	73°51.0	+0.2
	3°30.8	3°31.8	3°32.8	3°33.7	3°34.7	3°35.7	3°36.7	3°37.6	3°38.6	3°39.6	3°40.5	3°41.5	+1.0
We 30	268°53.4	283°53.6	298°53.8	313°54.0	328°54.2	343°54.4	358°54.6	13°54.8	28°54.9	43°55.1	58°55.3	73°55.5	+0.2
	3°54.1	3°55.1	3°56.1	3°57.1	3°58.0	3°59.0	4°00.0	4°00.9	4°01.9	4°02.9	4°03.8	4°04.8	+1.0
Th 31	268°57.9	283°58.1	298°58.3	313°58.5	328°58.6	343°58.8	358°59.0	13°59.2	28°59.4	43°59.6	58°59.8	73°59.9	+0.2
	4°17.4	4°18.4	4°19.3	4°20.3	4°21.3	4°22.2	4°23.2	4°24.2	4°25.1	4°26.1	4°27.1	4°28.0	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2033

	D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
●	Tu 1	255°08.1	269°34.2	284°00.3	298°26.5	312°52.6	327°18.7	341°44.9	356°11.0	10°37.2	25°03.4	39°29.6	+26.1	16.7
		-4°57.4	-4°45.5	-4°33.6	-4°21.7	-4°09.8	-3°57.8	-3°45.8	-3°33.8	-3°21.7	-3°09.6	-2°57.5	+12.0	61.3
	We 2	256°03.8	270°30.2	284°56.6	299°22.9	313°49.3	328°15.7	342°42.1	357°08.5	11°34.9	26°01.4	40°27.8	+26.4	16.7
		0°05.6	0°17.8	0°30.0	0°42.2	0°54.4	1°06.6	1°18.8	1°31.0	1°43.2	1°55.3	2°07.4	+12.2	61.2
	Th 3	257°04.9	271°31.4	285°58.0	300°24.5	314°51.0	329°17.5	343°44.1	358°10.6	12°37.2	27°03.7	41°30.3	+26.5	16.6
		5°06.1	5°17.7	5°29.3	5°40.8	5°52.3	6°03.8	6°15.2	6°26.5	6°37.8	6°49.1	7°00.3	+11.4	60.8
	Fr 4	258°08.8	272°35.4	287°02.0	301°28.5	315°55.1	330°21.7	344°48.3	359°14.9	13°41.6	28°08.2	42°34.8	+26.6	16.4
		9°40.7	9°50.9	10°01.0	10°11.0	10°20.9	10°30.8	10°40.5	10°50.2	10°59.8	11°09.4	11°18.8	+9.8	60.1
	Sa 5	259°14.4	273°41.1	288°07.8	302°34.5	317°01.2	331°27.9	345°54.6	0°21.3	14°48.1	29°14.8	43°41.5	+26.7	16.2
		13°30.1	13°38.1	13°46.0	13°53.8	14°01.6	14°09.2	14°16.7	14°24.2	14°31.5	14°38.7	14°45.9	+7.6	59.3
	Su 6	260°24.0	274°51.0	289°17.9	303°44.9	318°11.9	332°38.9	347°05.9	1°32.9	16°00.0	30°27.0	44°54.1	+27.0	15.9
		16°20.5	16°26.0	16°31.3	16°36.6	16°41.7	16°46.7	16°51.7	16°56.5	17°01.2	17°05.8	17°10.3	+5.0	58.3
	Mo 7	261°43.1	276°10.5	290°38.0	305°05.5	319°33.1	334°00.7	348°28.3	2°55.9	17°23.6	31°51.2	46°19.0	+27.6	15.6
		18°04.7	18°07.4	18°10.0	18°12.6	18°15.0	18°17.3	18°19.5	18°21.6	18°23.6	18°25.5	18°27.3	+2.3	57.4
◐	Tu 8	263°18.9	277°47.2	292°15.6	306°43.9	321°12.3	335°40.8	350°09.3	4°37.8	19°06.4	33°35.0	48°03.7	+28.5	15.4
		18°41.2	18°41.2	18°41.2	18°41.1	18°40.9	18°40.6	18°40.1	18°39.6	18°39.0	18°38.3	18°37.4	-0.4	56.5
	We 9	265°18.8	279°48.2	294°17.6	308°47.1	323°16.6	337°46.1	352°15.7	6°45.4	21°15.1	35°44.9	50°14.7	+29.6	15.2
		18°13.3	18°11.0	18°08.5	18°06.0	18°03.3	18°00.6	17°57.8	17°54.9	17°51.9	17°48.8	17°45.6	-2.8	55.8
	Th 10	267°47.6	282°18.2	296°48.8	311°19.5	325°50.2	340°21.0	354°51.8	9°22.7	23°53.6	38°24.6	52°55.6	+30.8	15.0
		16°47.9	16°43.4	16°38.9	16°34.2	16°29.5	16°24.7	16°19.8	16°14.9	16°09.8	16°04.7	15°59.5	-4.8	55.2
	Fr 11	270°46.8	285°18.6	299°50.4	314°22.3	328°54.2	343°26.2	357°58.2	12°30.3	27°02.4	41°34.5	56°06.7	+32.0	14.9
		14°33.6	14°27.3	14°21.0	14°14.6	14°08.2	14°01.7	13°55.1	13°48.5	13°41.8	13°35.1	13°28.3	-6.5	54.7
	Sa 12	274°14.6	288°47.5	303°20.4	317°53.3	332°26.2	346°59.2	1°32.3	16°05.4	30°38.5	45°11.6	59°44.8	+33.0	14.8
		11°39.9	11°32.2	11°24.5	11°16.8	11°09.1	11°01.2	10°53.4	10°45.5	10°37.5	10°29.5	10°21.5	-7.8	54.3
	Su 13	278°06.3	292°40.0	307°13.7	321°47.4	336°21.2	350°54.9	5°28.8	20°02.6	34°36.4	49°10.3	63°44.2	+33.8	14.7
		8°16.4	8°07.8	7°59.2	7°50.5	7°41.8	7°33.0	7°24.3	7°15.5	7°06.6	6°57.8	6°48.9	-8.8	54.1
	Mo 14	282°15.2	296°49.4	311°23.6	325°57.9	340°32.1	355°06.4	9°40.7	24°15.0	38°49.3	53°23.6	67°57.9	+34.3	14.7
		4°32.9	4°23.7	4°14.4	4°05.2	3°55.9	3°46.6	3°37.3	3°28.0	3°18.7	3°09.3	3°00.0	-9.3	53.9
	Tu 15	286°33.6	301°08.0	315°42.4	330°16.8	344°51.2	359°25.7	14°00.1	28°34.5	43°08.9	57°43.3	72°17.7	+34.4	14.7
		0°38.7	0°29.2	0°19.7	0°10.3	0°00.8	-0°08.6	-0°18.1	-0°27.6	-0°37.0	-0°46.5	-0°55.9	-9.5	53.9
○	We 16	290°53.1	305°27.4	320°01.6	334°35.9	349°10.2	3°44.4	18°18.6	32°52.8	47°27.0	62°01.2	76°35.3	+34.2	14.7
		-3°17.0	-3°26.3	-3°35.7	-3°45.0	-3°54.2	-4°03.5	-4°12.8	-4°22.0	-4°31.2	-4°40.4	-4°49.6	-9.3	54.0
	Th 17	295°05.4	309°39.2	324°13.0	338°46.8	353°20.6	7°54.3	22°28.0	37°01.7	51°35.3	66°08.9	80°42.5	+33.7	14.8
		-7°04.9	-7°13.7	-7°22.5	-7°31.3	-7°40.0	-7°48.7	-7°57.4	-8°06.0	-8°14.6	-8°23.2	-8°31.7	-8.7	54.1
	Fr 18	299°02.7	313°35.7	328°08.8	342°41.8	357°14.7	11°47.7	26°20.6	40°53.4	55°26.2	69°59.0	84°31.7	+32.9	14.8
		-10°35.5	-10°43.5	-10°51.4	-10°59.2	-11°07.0	-11°14.8	-11°22.5	-11°30.1	-11°37.8	-11°45.3	-11°52.8	-7.7	54.4
	Sa 19	302°37.9	317°10.0	331°42.0	346°14.0	0°46.0	15°17.9	29°49.7	44°21.5	58°53.3	73°25.0	87°56.7	+31.9	14.9
		-13°39.4	-13°46.1	-13°52.7	-13°59.2	-14°05.7	-14°12.1	-14°18.5	-14°24.8	-14°31.0	-14°37.2	-14°43.3	-6.4	54.7
	Su 20	317°10.0	331°42.0	346°14.0	0°46.0	15°17.9	29°49.7	44°21.5	58°53.3	73°25.0	87°56.7	102°28.3	+31.8	14.9
		-13°46.1	-13°52.7	-13°59.2	-14°05.7	-14°12.1	-14°18.5	-14°24.8	-14°31.0	-14°37.2	-14°43.3	-14°49.3	-6.3	54.7
	Mo 21	320°17.0	334°47.9	349°18.7	3°49.5	18°20.2	32°50.9	47°21.5	61°52.1	76°22.6	90°53.1	105°23.5	+30.7	15.1
		-16°11.8	-16°16.7	-16°21.6	-16°26.4	-16°31.1	-16°35.7	-16°40.2	-16°44.7	-16°49.1	-16°53.4	-16°57.6	-4.6	55.2
	Tu 22	322°54.3	337°23.9	351°53.6	6°23.1	20°52.7	35°22.2	49°51.6	64°21.0	78°50.4	93°19.7	107°48.9	+29.5	15.2
		-17°51.1	-17°54.0	-17°56.8	-17°59.5	-18°02.1	-18°04.6	-18°07.0	-18°09.4	-18°11.6	-18°13.8	-18°15.8	-2.5	55.8
	We 23	325°02.6	339°31.2	353°59.7	8°28.2	22°56.7	37°25.1	51°53.5	66°21.8	80°50.1	95°18.4	109°46.7	+28.4	15.4
		-18°35.2	-18°35.7	-18°36.1	-18°36.4	-18°36.6	-18°36.7	-18°36.7	-18°36.6	-18°36.4	-18°36.1	-18°35.6	-0.0	56.6
◑	Th 24	326°46.1	341°13.9	355°41.6	10°09.2	24°36.8	39°04.4	53°32.0	67°59.6	82°27.1	96°54.6	111°22.1	+27.6	15.7
		-18°16.8	-18°14.7	-18°12.5	-18°10.2	-18°07.8	-18°05.2	-18°02.6	-17°59.9	-17°57.0	-17°54.0	-17°51.0	+2.6	57.4
	Fr 25	328°11.6	342°38.7	357°05.9	11°33.0	26°00.1	40°27.1	54°54.2	69°21.3	83°48.3	98°15.3	112°42.3	+27.1	15.9
		-16°51.9	-16°47.1	-16°42.2	-16°37.2	-16°32.1	-16°26.9	-16°21.6	-16°16.1	-16°10.6	-16°05.0	-15°59.2	+5.3	58.4
	Sa 26	329°26.2	343°53.0	358°19.8	12°46.7	27°13.5	41°40.3	56°07.1	70°33.9	85°00.7	99°27.5	113°54.3	+26.8	16.2
		-14°20.7	-14°13.3	-14°05.8	-13°58.3	-13°50.6	-13°42.9	-13°35.0	-13°27.1	-13°19.0	-13°10.9	-13°02.6	+7.8	59.3
	Su 27	330°35.6	345°02.3	359°29.1	13°55.8	28°22.5	42°49.2	57°15.9	71°42.6	86°09.3	100°36.0	115°02.7	+26.7	16.4
		-10°48.6	-10°39.0	-10°29.4	-10°19.6	-10°09.8	-9°59.9	-9°49.9	-9°39.8	-9°29.7	-9°19.5	-9°09.2	+9.9	60.1
	Mo 28	331°42.7	346°09.3	0°35.9	15°02.6	29°29.2	43°55.8	58°22.4	72°49.0	87°15.6	101°42.2	116°08.8	+26.6	16.6
		-6°27.5	-6°16.2	-6°04.9	-5°53.6	-5°42.2	-5°30.8	-5°19.3	-5°07.8	-4°56.2	-4°44.6	-4°33.0	+11.5	60.8
	Tu 29	332°46.8	347°13.3	1°39.8	16°06.2	30°32.7	44°59.1	59°25.5	73°51.9	88°18.3	102°44.7	117°11.1	+26.4	16.7
		-1°34.6	-1°22.5	-1°10.5	-0°58.4	-0°46.3	-0°34.1	-0°22.0	-0°09.9	0°02.2	0°14.4	0°26.5	+12.1	61.2
●	We 30	333°45.5	348°11.7	2°37.8	17°04.0	31°30.1	45°56.3	60°22.4	74°48.5	89°14.6	103°40.7	118°06.8	+26.1	16.7
		3°27.7	3°39.7	3°51.6	4°03.5	4°15.4	4°27.2	4°39.0	4°50.8	5°02.5	5°14.2	5°25.9	+11.8	61.3
	Th 31	334°36.1	349°02.0	3°27.8	17°53.7	32°19.5	46°45.3	61°11.1	75°36.8	90°02.6	104°28.3	118°54.1	+25.8	16.6
		8°15.3	8°26.1	8°36.9	8°47.6	8°58.3	9°08.9	9°19.4	9°29.9	9°40.2	9°50.5	10°00.8	+10.6	60.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 1 08h23 — FQ: 8 01h27 — FM: 16 01h37 — LQ: 24 01h49 — NM: 30 17h51

SUN

April 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	269°02.3	284°02.5	299°02.7	314°02.9	329°03.1	344°03.3	359°03.4	14°03.6	29°03.8	44°04.0	59°04.2	74°04.4	+0.2
	4°40.6	4°41.5	4°42.5	4°43.5	4°44.4	4°45.4	4°46.4	4°47.3	4°48.3	4°49.2	4°50.2	4°51.2	+1.0
Sa 2	269°06.7	284°06.9	299°07.1	314°07.3	329°07.5	344°07.6	359°07.8	14°08.0	29°08.2	44°08.4	59°08.6	74°08.7	+0.2
	5°03.7	5°04.6	5°05.6	5°06.5	5°07.5	5°08.5	5°09.4	5°10.4	5°11.3	5°12.3	5°13.3	5°14.2	+1.0
Su 3	269°11.1	284°11.3	299°11.5	314°11.6	329°11.8	344°12.0	359°12.2	14°12.4	29°12.6	44°12.7	59°12.9	74°13.1	+0.2
	5°26.7	5°27.6	5°28.6	5°29.5	5°30.5	5°31.4	5°32.4	5°33.4	5°34.3	5°35.3	5°36.2	5°37.2	+1.0
Mo 4	269°15.4	284°15.6	299°15.8	314°16.0	329°16.2	344°16.3	359°16.5	14°16.7	29°16.9	44°17.1	59°17.2	74°17.4	+0.2
	5°49.6	5°50.5	5°51.5	5°52.4	5°53.4	5°54.3	5°55.3	5°56.2	5°57.2	5°58.1	5°59.1	6°00.0	+1.0
Tu 5	269°19.7	284°19.9	299°20.1	314°20.3	329°20.5	344°20.6	359°20.8	14°21.0	29°21.2	44°21.3	59°21.5	74°21.7	+0.2
	6°12.4	6°13.3	6°14.3	6°15.2	6°16.2	6°17.1	6°18.0	6°19.0	6°19.9	6°20.9	6°21.8	6°22.8	+0.9
We 6	269°24.0	284°24.2	299°24.3	314°24.5	329°24.7	344°24.9	359°25.1	14°25.2	29°25.4	44°25.6	59°25.8	74°25.9	+0.2
	6°35.1	6°36.0	6°36.9	6°37.9	6°38.8	6°39.8	6°40.7	6°41.7	6°42.6	6°43.5	6°44.5	6°45.4	+0.9
Th 7	269°28.2	284°28.4	299°28.6	314°28.7	329°28.9	344°29.1	359°29.2	14°29.4	29°29.6	44°29.8	59°29.9	74°30.1	+0.2
	6°57.6	6°58.6	6°59.5	7°00.4	7°01.4	7°02.3	7°03.3	7°04.2	7°05.1	7°06.1	7°07.0	7°07.9	+0.9
Fr 8	269°32.4	284°32.5	299°32.7	314°32.9	329°33.0	344°33.2	359°33.4	14°33.6	29°33.7	44°33.9	59°34.1	74°34.2	+0.2
	7°20.1	7°21.0	7°22.0	7°22.9	7°23.8	7°24.8	7°25.7	7°26.6	7°27.5	7°28.5	7°29.4	7°30.3	+0.9
Sa 9	269°36.5	284°36.6	299°36.8	314°37.0	329°37.1	344°37.3	359°37.5	14°37.6	29°37.8	44°38.0	59°38.2	74°38.3	+0.2
	7°42.4	7°43.3	7°44.3	7°45.2	7°46.1	7°47.1	7°48.0	7°48.9	7°49.8	7°50.8	7°51.7	7°52.6	+0.9
Su 10	269°40.5	284°40.7	299°40.8	314°41.0	329°41.2	344°41.3	359°41.5	14°41.7	29°41.8	44°42.0	59°42.2	74°42.3	+0.2
	8°04.6	8°05.5	8°06.5	8°07.4	8°08.3	8°09.2	8°10.2	8°11.1	8°12.0	8°12.9	8°13.8	8°14.8	+0.9
Mo 11	269°44.5	284°44.6	299°44.8	314°45.0	329°45.1	344°45.3	359°45.5	14°45.6	29°45.8	44°45.9	59°46.1	74°46.3	+0.2
	8°26.7	8°27.6	8°28.5	8°29.4	8°30.4	8°31.3	8°32.2	8°33.1	8°34.0	8°34.9	8°35.8	8°36.8	+0.9
Tu 12	269°48.4	284°48.5	299°48.7	314°48.9	329°49.0	344°49.2	359°49.3	14°49.5	29°49.7	44°49.8	59°50.0	74°50.1	+0.2
	8°48.6	8°49.5	8°50.4	8°51.3	8°52.2	8°53.2	8°54.1	8°55.0	8°55.9	8°56.8	8°57.7	8°58.6	+0.9
We 13	269°52.2	284°52.4	299°52.5	314°52.7	329°52.8	344°53.0	359°53.1	14°53.3	29°53.5	44°53.6	59°53.8	74°53.9	+0.2
	9°10.4	9°11.3	9°12.2	9°13.1	9°14.0	9°14.9	9°15.8	9°16.7	9°17.6	9°18.5	9°19.4	9°20.3	+0.9
Th 14	269°55.9	284°56.1	299°56.3	314°56.4	329°56.6	344°56.7	359°56.9	14°57.0	29°57.2	44°57.3	59°57.5	74°57.6	+0.2
	9°32.0	9°32.9	9°33.8	9°34.7	9°35.6	9°36.5	9°37.4	9°38.3	9°39.2	9°40.1	9°41.0	9°41.9	+0.9
Fr 15	269°59.6	284°59.8	299°59.9	315°00.1	330°00.2	345°00.4	0°00.5	15°00.7	30°00.8	45°01.0	60°01.1	75°01.3	+0.1
	9°53.5	9°54.4	9°55.2	9°56.1	9°57.0	9°57.9	9°58.8	9°59.7	10°00.6	10°01.5	10°02.4	10°03.3	+0.9
Sa 16	270°03.2	285°03.3	300°03.5	315°03.6	330°03.8	345°03.9	0°04.1	15°04.2	30°04.3	45°04.5	60°04.6	75°04.8	+0.1
	10°14.8	10°15.7	10°16.5	10°17.4	10°18.3	10°19.2	10°20.1	10°20.9	10°21.8	10°22.7	10°23.6	10°24.5	+0.9
Su 17	270°06.7	285°06.8	300°06.9	315°07.1	330°07.2	345°07.4	0°07.5	15°07.6	30°07.8	45°07.9	60°08.1	75°08.2	+0.1
	10°35.9	10°36.8	10°37.7	10°38.5	10°39.4	10°40.3	10°41.2	10°42.0	10°42.9	10°43.8	10°44.7	10°45.5	+0.9
Mo 18	270°10.0	285°10.2	300°10.3	315°10.4	330°10.6	345°10.7	0°10.9	15°11.0	30°11.1	45°11.3	60°11.4	75°11.5	+0.1
	10°56.9	10°57.7	10°58.6	10°59.5	11°00.3	11°01.2	11°02.1	11°02.9	11°03.8	11°04.7	11°05.5	11°06.4	+0.9
Tu 19	270°13.3	285°13.4	300°13.6	315°13.7	330°13.8	345°14.0	0°14.1	15°14.2	30°14.4	45°14.5	60°14.6	75°14.8	+0.1
	11°17.6	11°18.5	11°19.4	11°20.2	11°21.1	11°21.9	11°22.8	11°23.7	11°24.5	11°25.4	11°26.2	11°27.1	+0.9
We 20	270°16.5	285°16.6	300°16.7	315°16.9	330°17.0	345°17.1	0°17.2	15°17.4	30°17.5	45°17.6	60°17.8	75°17.9	+0.1
	11°38.2	11°39.1	11°39.9	11°40.8	11°41.6	11°42.5	11°43.3	11°44.2	11°45.0	11°45.9	11°46.7	11°47.6	+0.9
Th 21	270°19.5	285°19.7	300°19.8	315°19.9	330°20.0	345°20.2	0°20.3	15°20.4	30°20.5	45°20.6	60°20.8	75°20.9	+0.1
	11°58.6	11°59.5	12°00.3	12°01.2	12°02.0	12°02.9	12°03.7	12°04.5	12°05.4	12°06.2	12°07.1	12°07.9	+0.8
Fr 22	270°22.5	285°22.6	300°22.7	315°22.8	330°22.9	345°23.1	0°23.2	15°23.3	30°23.4	45°23.5	60°23.7	75°23.8	+0.1
	12°18.8	12°19.7	12°20.5	12°21.3	12°22.2	12°23.0	12°23.9	12°24.7	12°25.5	12°26.4	12°27.2	12°28.0	+0.8
Sa 23	270°25.3	285°25.4	300°25.5	315°25.6	330°25.8	345°25.9	0°26.0	15°26.1	30°26.2	45°26.3	60°26.4	75°26.5	+0.1
	12°38.8	12°39.7	12°40.5	12°41.3	12°42.1	12°43.0	12°43.8	12°44.6	12°45.5	12°46.3	12°47.1	12°47.9	+0.8
Su 24	270°28.0	285°28.1	300°28.2	315°28.3	330°28.4	345°28.5	0°28.7	15°28.8	30°28.9	45°29.0	60°29.1	75°29.2	+0.1
	12°58.6	12°59.5	13°00.3	13°01.1	13°01.9	13°02.7	13°03.5	13°04.4	13°05.2	13°06.0	13°06.8	13°07.6	+0.8
Mo 25	270°30.6	285°30.7	300°30.8	315°30.9	330°31.0	345°31.1	0°31.2	15°31.3	30°31.4	45°31.5	60°31.6	75°31.7	+0.1
	13°18.2	13°19.0	13°19.8	13°20.6	13°21.5	13°22.3	13°23.1	13°23.9	13°24.7	13°25.5	13°26.3	13°27.1	+0.8
Tu 26	270°33.0	285°33.1	300°33.2	315°33.3	330°33.4	345°33.5	0°33.6	15°33.7	30°33.8	45°33.9	60°34.0	75°34.1	+0.1
	13°37.6	13°38.4	13°39.2	13°40.0	13°40.8	13°41.6	13°42.4	13°43.2	13°44.0	13°44.8	13°45.6	13°46.4	+0.8
We 27	270°35.3	285°35.4	300°35.5	315°35.6	330°35.7	345°35.8	0°35.9	15°36.0	30°36.1	45°36.2	60°36.3	75°36.4	+0.1
	13°56.7	13°57.5	13°58.3	13°59.1	13°59.9	14°00.7	14°01.5	14°02.3	14°03.1	14°03.8	14°04.6	14°05.4	+0.8
Th 28	270°37.5	285°37.6	300°37.7	315°37.8	330°37.9	345°38.0	0°38.1	15°38.2	30°38.2	45°38.3	60°38.4	75°38.5	+0.1
	14°15.6	14°16.4	14°17.2	14°18.0	14°18.8	14°19.5	14°20.3	14°21.1	14°21.9	14°22.7	14°23.4	14°24.2	+0.8
Fr 29	270°39.6	285°39.7	300°39.8	315°39.9	330°39.9	345°40.0	0°40.1	15°40.2	30°40.3	45°40.4	60°40.4	75°40.5	+0.1
	14°34.3	14°35.1	14°35.9	14°36.6	14°37.4	14°38.2	14°38.9	14°39.7	14°40.5	14°41.3	14°42.0	14°42.8	+0.8
Sa 30	270°41.5	285°41.6	300°41.7	315°41.8	330°41.9	345°41.9	0°42.0	15°42.1	30°42.2	45°42.2	60°42.3	75°42.4	+0.1
	14°52.7	14°53.5	14°54.3	14°55.0	14°55.8	14°56.6	14°57.3	14°58.1	14°58.8	14°59.6	15°00.4	15°01.1	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2033

D	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	Δ'/h	SH
Fr 1	248°45.3	263°10.9	277°36.6	292°02.2	306°27.8	320°53.4	335°19.0	349°44.6	4°10.2	18°35.8	33°01.4	+25.6	16.5
	11°29.4	11°38.8	11°48.2	11°57.4	12°06.6	12°15.7	12°24.7	12°33.6	12°42.4	12°51.1	12°59.7	+9.0	60.5
Sa 2	249°25.1	263°50.7	278°16.3	292°41.9	307°07.5	321°33.1	335°58.7	350°24.4	4°50.0	19°15.7	33°41.3	+25.6	16.3
	14°57.0	15°04.0	15°10.9	15°17.6	15°24.3	15°30.9	15°37.3	15°43.6	15°49.8	15°56.0	16°01.9	+6.5	59.7
Su 3	250°08.3	264°34.2	279°00.2	293°26.2	307°52.2	322°18.3	336°44.4	351°10.5	5°36.7	20°02.8	34°29.0	+26.1	16.0
	17°18.2	17°22.4	17°26.4	17°30.4	17°34.2	17°37.9	17°41.5	17°44.9	17°48.3	17°51.5	17°54.6	+3.6	58.7
Mo 4	251°06.3	265°33.1	280°00.0	294°26.8	308°53.8	323°20.8	337°47.8	352°14.8	6°42.0	21°09.1	35°36.3	+27.0	15.7
	18°27.5	18°28.7	18°29.9	18°30.9	18°31.9	18°32.7	18°33.4	18°34.0	18°34.5	18°34.9	18°35.2	+0.8	57.7
Tu 5	252°30.6	266°58.7	281°26.8	295°55.0	310°23.2	324°51.5	339°19.8	353°48.2	8°16.6	22°45.1	37°13.7	+28.3	15.5
	18°26.4	18°25.0	18°23.4	18°21.8	18°20.1	18°18.3	18°16.4	18°14.3	18°12.2	18°10.0	18°07.7	-1.9	56.8
◐ We 6	254°29.4	268°59.0	283°28.6	297°58.2	312°27.9	326°57.7	341°27.5	355°57.4	10°27.4	24°57.4	39°27.5	+29.8	15.2
	17°22.0	17°18.2	17°14.4	17°10.5	17°06.4	17°02.3	16°58.2	16°53.9	16°49.6	16°45.1	16°40.6	-4.1	55.9
Th 7	257°05.9	271°36.9	286°08.0	300°39.1	315°10.3	329°41.6	344°12.9	358°44.3	13°15.7	27°47.2	42°18.7	+31.3	15.1
	15°24.1	15°18.4	15°12.7	15°06.9	15°01.0	14°55.0	14°49.0	14°42.9	14°36.8	14°30.6	14°24.3	-6.0	55.2
Fr 8	260°18.1	274°50.4	289°22.8	303°55.3	318°27.8	333°00.4	347°33.0	2°05.6	16°38.3	31°11.0	45°43.8	+32.6	14.9
	12°43.4	12°36.2	12°29.0	12°21.7	12°14.4	12°07.0	11°59.6	11°52.1	11°44.6	11°37.0	11°29.4	-7.4	54.6
Sa 9	264°00.4	278°33.8	293°07.2	307°40.7	322°14.2	336°47.8	351°21.4	5°55.0	20°28.6	35°02.3	49°36.0	+33.6	14.8
	9°30.1	9°21.9	9°13.5	9°05.2	8°56.8	8°48.4	8°40.0	8°31.5	8°23.0	8°14.5	8°05.9	-8.4	54.3
Su 10	268°04.8	282°38.9	297°13.0	311°47.1	326°21.3	340°55.5	355°29.7	10°03.9	24°38.1	39°12.4	53°46.6	+34.2	14.7
	5°54.0	5°45.0	5°35.9	5°26.9	5°17.9	5°08.8	4°59.7	4°50.6	4°41.4	4°32.3	4°23.1	-9.1	54.0
Mo 11	272°22.0	286°56.4	301°30.8	316°05.3	330°39.7	345°14.2	359°48.6	14°23.0	28°57.5	43°31.9	58°06.4	+34.4	14.7
	2°03.9	1°54.5	1°45.1	1°35.7	1°26.3	1°16.9	1°07.5	0°58.1	0°48.7	0°39.3	0°29.9	-9.4	53.9
Tu 12	276°42.6	291°16.9	305°51.3	320°25.6	335°00.0	349°34.3	4°08.6	18°42.9	33°17.2	47°51.4	62°25.7	+34.3	14.7
	-1°51.4	-2°00.8	-2°10.2	-2°19.6	-2°28.9	-2°38.3	-2°47.7	-2°57.0	-3°06.3	-3°15.7	-3°25.0	-9.4	54.0
We 13	280°57.3	295°31.3	310°05.2	324°39.1	339°12.9	353°46.8	8°20.6	22°54.4	37°28.2	52°01.9	66°35.6	+33.8	14.8
	-5°42.9	-5°52.0	-6°01.0	-6°10.0	-6°19.0	-6°28.0	-6°36.9	-6°45.8	-6°54.7	-7°03.6	-7°12.4	-9.0	54.1
○ Th 14	284°57.8	299°31.0	314°04.2	328°37.3	343°10.4	357°43.5	12°16.5	26°49.5	41°22.5	55°55.4	70°28.3	+33.1	14.8
	-9°21.4	-9°29.7	-9°38.0	-9°46.2	-9°54.5	-10°02.6	-10°10.8	-10°18.9	-10°26.9	-10°34.9	-10°42.9	-8.2	54.3
Fr 15	288°37.0	303°09.3	317°41.5	332°13.6	346°45.8	1°17.8	15°49.9	30°21.9	44°53.8	59°25.7	73°57.6	+32.1	14.9
	-12°36.8	-12°44.0	-12°51.2	-12°58.3	-13°05.3	-13°12.3	-13°19.2	-13°26.0	-13°32.8	-13°39.6	-13°46.3	-6.9	54.6
Sa 16	291°50.3	306°21.4	320°52.5	335°23.6	349°54.6	4°25.6	18°56.5	33°27.4	47°58.2	62°29.0	76°59.8	+31.0	15.0
	-15°19.0	-15°24.7	-15°30.3	-15°35.8	-15°41.2	-15°46.6	-15°51.9	-15°57.1	-16°02.2	-16°07.3	-16°12.3	-5.3	55.0
Su 17	294°35.8	309°05.8	323°35.9	338°05.8	352°35.8	7°05.7	21°35.5	36°05.3	50°35.1	65°04.8	79°34.5	+29.9	15.1
	-17°17.9	-17°21.6	-17°25.2	-17°28.8	-17°32.2	-17°35.6	-17°38.9	-17°42.1	-17°45.2	-17°48.2	-17°51.2	-3.3	55.5
Mo 18	296°55.4	311°24.5	325°53.6	340°22.6	354°51.6	9°20.6	23°49.6	38°18.5	52°47.4	67°16.2	81°45.0	+29.0	15.3
	-18°24.2	-18°25.7	-18°27.0	-18°28.3	-18°29.4	-18°30.5	-18°31.5	-18°32.4	-18°33.1	-18°33.8	-18°34.4	-1.0	56.0
Tu 19	311°24.5	325°53.6	340°22.6	354°51.6	9°20.6	23°49.6	38°18.5	52°47.4	67°16.2	81°45.0	96°13.8	+28.9	15.3
	-18°25.7	-18°27.0	-18°28.3	-18°29.4	-18°30.5	-18°31.5	-18°32.4	-18°33.1	-18°33.8	-18°34.4	-18°34.8	-0.9	56.0
We 20	313°22.7	327°51.1	342°19.5	356°47.8	11°16.2	25°44.5	40°12.8	54°41.1	69°09.3	83°37.6	98°05.8	+28.3	15.5
	-18°29.9	-18°28.8	-18°27.6	-18°26.2	-18°24.8	-18°23.2	-18°21.6	-18°19.8	-18°18.0	-18°16.0	-18°13.9	+1.6	56.7
Th 21	315°07.7	329°35.7	344°03.8	358°31.8	12°59.8	27°27.8	41°55.8	56°23.8	70°51.8	85°19.7	99°47.7	+28.0	15.6
	-17°30.6	-17°26.9	-17°23.1	-17°19.2	-17°15.1	-17°11.0	-17°06.8	-17°02.5	-16°58.0	-16°53.5	-16°48.9	+4.2	57.3
◑ Fr 22	316°46.8	331°14.7	345°42.7	0°10.6	14°38.5	29°06.4	43°34.3	58°02.3	72°30.2	86°58.1	101°26.0	+27.9	15.8
	-15°27.6	-15°21.5	-15°15.2	-15°08.8	-15°02.3	-14°55.7	-14°49.1	-14°42.3	-14°35.5	-14°28.5	-14°21.5	+6.6	58.1
Sa 23	318°24.9	332°52.9	347°20.8	1°48.7	16°16.7	30°44.6	45°12.6	59°40.5	74°08.4	88°36.4	103°04.3	+27.9	16.0
	-12°25.4	-12°17.0	-12°08.5	-11°59.9	-11°51.3	-11°42.5	-11°33.7	-11°24.8	-11°15.9	-11°06.8	-10°57.7	+8.8	58.8
Su 24	320°03.3	334°31.2	348°59.1	3°27.0	17°54.9	32°22.8	46°50.7	61°18.6	75°46.5	90°14.3	104°42.2	+27.9	16.2
	-8°32.5	-8°22.3	-8°12.0	-8°01.7	-7°51.3	-7°40.9	-7°30.4	-7°19.9	-7°09.2	-6°58.6	-6°47.9	+10.5	59.6
Mo 25	321°39.2	336°06.9	350°34.6	5°02.3	19°30.0	33°57.7	48°25.3	62°53.0	77°20.6	91°48.2	106°15.8	+27.7	16.4
	-4°01.7	-3°50.4	-3°38.9	-3°27.5	-3°16.0	-3°04.5	-2°52.9	-2°41.4	-2°29.8	-2°18.1	-2°06.5	+11.5	60.2
Tu 26	323°07.4	337°34.7	352°01.9	6°29.1	20°56.3	35°23.5	49°50.7	64°17.8	78°44.9	93°12.0	107°39.1	+27.2	16.5
	0°50.0	1°01.8	1°13.6	1°25.5	1°37.3	1°49.1	2°00.9	2°12.7	2°24.5	2°36.3	2°48.1	+11.8	60.6
We 27	324°21.7	338°48.3	353°14.9	7°41.4	22°08.0	36°34.4	51°00.9	65°27.3	79°53.7	94°20.1	108°46.5	+26.5	16.6
	5°42.3	5°53.7	6°05.0	6°16.3	6°27.6	6°38.9	6°50.1	7°01.2	7°12.3	7°23.4	7°34.4	+11.2	60.7
Th 28	325°18.0	339°43.9	354°09.7	8°35.5	23°01.3	37°27.1	51°52.8	66°18.5	80°44.2	95°09.8	109°35.4	+25.7	16.5
	10°12.7	10°22.8	10°32.8	10°42.7	10°52.5	11°02.2	11°11.9	11°21.5	11°31.0	11°40.4	11°49.8	+9.7	60.6
● Fr 29	325°57.1	340°22.3	354°47.6	9°12.9	23°38.1	38°03.3	52°28.5	66°53.7	81°18.9	95°44.1	110°09.3	+25.2	16.4
	13°59.4	14°07.3	14°15.1	14°22.8	14°30.3	14°37.8	14°45.2	14°52.5	14°59.6	15°06.7	15°13.6	+7.4	60.2
Sa 30	326°26.2	340°51.3	355°16.4	9°41.6	24°06.7	38°31.9	52°57.1	67°22.3	81°47.5	96°12.7	110°37.9	+25.2	16.2
	16°44.4	16°49.6	16°54.6	16°59.5	17°04.3	17°08.9	17°13.5	17°17.9	17°22.2	17°26.4	17°30.5	+4.6	59.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 15h13 — FM: 14 19h17 — LQ: 22 11h42 — NM: 29 02h46

SUN

May 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	270° 43.3	285° 43.4	300° 43.5	315° 43.6	330° 43.6	345° 43.7	0° 43.8	15° 43.8	30° 43.9	45° 44.0	60° 44.1	75° 44.1	+0.1
	15° 10.9	15° 11.7	15° 12.4	15° 13.2	15° 13.9	15° 14.7	15° 15.4	15° 16.2	15° 16.9	15° 17.7	15° 18.4	15° 19.2	+0.8
Mo 2	270° 45.0	285° 45.1	300° 45.2	315° 45.2	330° 45.3	345° 45.3	0° 45.4	15° 45.5	30° 45.5	45° 45.6	60° 45.7	75° 45.7	+0.1
	15° 28.9	15° 29.6	15° 30.4	15° 31.1	15° 31.8	15° 32.6	15° 33.3	15° 34.1	15° 34.8	15° 35.5	15° 36.3	15° 37.0	+0.7
Tu 3	270° 46.6	285° 46.6	300° 46.7	315° 46.7	330° 46.8	345° 46.9	0° 46.9	15° 47.0	30° 47.0	45° 47.1	60° 47.2	75° 47.2	+0.1
	15° 46.6	15° 47.3	15° 48.0	15° 48.8	15° 49.5	15° 50.2	15° 50.9	15° 51.7	15° 52.4	15° 53.1	15° 53.9	15° 54.6	+0.7
We 4	270° 48.0	285° 48.0	300° 48.1	315° 48.1	330° 48.2	345° 48.2	0° 48.3	15° 48.3	30° 48.4	45° 48.5	60° 48.5	75° 48.6	+0.1
	16° 04.0	16° 04.7	16° 05.4	16° 06.1	16° 06.9	16° 07.6	16° 08.3	16° 09.0	16° 09.7	16° 10.4	16° 11.2	16° 11.9	+0.7
Th 5	270° 49.2	285° 49.3	300° 49.3	315° 49.4	330° 49.4	345° 49.5	0° 49.5	15° 49.6	30° 49.6	45° 49.7	60° 49.7	75° 49.8	+0.0
	16° 21.1	16° 21.8	16° 22.6	16° 23.3	16° 24.0	16° 24.7	16° 25.4	16° 26.1	16° 26.8	16° 27.5	16° 28.2	16° 28.9	+0.7
Fr 6	270° 50.4	285° 50.4	300° 50.5	315° 50.5	330° 50.5	345° 50.6	0° 50.6	15° 50.7	30° 50.7	45° 50.8	60° 50.8	75° 50.8	+0.0
	16° 38.0	16° 38.7	16° 39.4	16° 40.1	16° 40.8	16° 41.5	16° 42.2	16° 42.9	16° 43.6	16° 44.3	16° 45.0	16° 45.7	+0.7
Sa 7	270° 51.4	285° 51.4	300° 51.4	315° 51.5	330° 51.5	345° 51.6	0° 51.6	15° 51.6	30° 51.7	45° 51.7	60° 51.7	75° 51.8	+0.0
	16° 54.6	16° 55.3	16° 56.0	16° 56.7	16° 57.4	16° 58.0	16° 58.7	16° 59.4	17° 00.1	17° 00.8	17° 01.4	17° 02.1	+0.7
Su 8	270° 52.3	285° 52.3	300° 52.3	315° 52.3	330° 52.4	345° 52.4	0° 52.4	15° 52.4	30° 52.5	45° 52.5	60° 52.5	75° 52.6	+0.0
	17° 10.9	17° 11.6	17° 12.3	17° 13.0	17° 13.6	17° 14.3	17° 15.0	17° 15.6	17° 16.3	17° 17.0	17° 17.6	17° 18.3	+0.7
Mo 9	270° 52.9	285° 53.0	300° 53.0	315° 53.0	330° 53.1	345° 53.1	0° 53.1	15° 53.1	30° 53.2	45° 53.2	60° 53.2	75° 53.2	+0.0
	17° 27.0	17° 27.6	17° 28.3	17° 28.9	17° 29.6	17° 30.3	17° 30.9	17° 31.6	17° 32.2	17° 32.9	17° 33.6	17° 34.2	+0.7
Tu 10	270° 53.5	285° 53.6	300° 53.6	315° 53.6	330° 53.6	345° 53.6	0° 53.7	15° 53.7	30° 53.7	45° 53.7	60° 53.7	75° 53.8	+0.0
	17° 42.7	17° 43.3	17° 44.0	17° 44.6	17° 45.3	17° 45.9	17° 46.6	17° 47.2	17° 47.9	17° 48.5	17° 49.2	17° 49.8	+0.6
We 11	270° 54.0	285° 54.0	300° 54.0	315° 54.0	330° 54.0	345° 54.0	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.1	75° 54.1	+0.0
	17° 58.1	17° 58.8	17° 59.4	18° 00.0	18° 00.7	18° 01.3	18° 02.0	18° 02.6	18° 03.2	18° 03.9	18° 04.5	18° 05.1	+0.6
Th 12	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.4	60° 54.4	75° 54.4	+0.0
	18° 13.3	18° 13.9	18° 14.5	18° 15.1	18° 15.8	18° 16.4	18° 17.0	18° 17.6	18° 18.3	18° 18.9	18° 19.5	18° 20.1	+0.6
Fr 13	270° 54.4	285° 54.4	300° 54.4	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	+0.0
	18° 28.1	18° 28.7	18° 29.3	18° 29.9	18° 30.5	18° 31.2	18° 31.8	18° 32.4	18° 33.0	18° 33.6	18° 34.2	18° 34.8	+0.6
Sa 14	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.4	0° 54.4	15° 54.4	30° 54.4	45° 54.4	60° 54.4	75° 54.4	-0.0
	18° 42.6	18° 43.2	18° 43.8	18° 44.4	18° 45.0	18° 45.6	18° 46.2	18° 46.8	18° 47.4	18° 48.0	18° 48.6	18° 49.2	+0.6
Su 15	270° 54.3	285° 54.3	300° 54.3	315° 54.3	330° 54.3	345° 54.3	0° 54.3	15° 54.3	30° 54.3	45° 54.3	60° 54.2	75° 54.2	-0.0
	18° 56.8	18° 57.4	18° 58.0	18° 58.6	18° 59.2	18° 59.7	19° 00.3	19° 00.9	19° 01.5	19° 02.1	19° 02.7	19° 03.2	+0.6
Mo 16	270° 54.1	285° 54.1	300° 54.0	315° 54.0	330° 54.0	345° 54.0	0° 54.0	15° 54.0	30° 54.0	45° 53.9	60° 53.9	75° 53.9	-0.0
	19° 10.7	19° 11.3	19° 11.9	19° 12.4	19° 13.0	19° 13.6	19° 14.1	19° 14.7	19° 15.3	19° 15.8	19° 16.4	19° 17.0	+0.6
Tu 17	270° 53.7	285° 53.7	300° 53.6	315° 53.6	330° 53.6	345° 53.6	0° 53.6	15° 53.5	30° 53.5	45° 53.5	60° 53.5	75° 53.4	-0.0
	19° 24.3	19° 24.8	19° 25.4	19° 25.9	19° 26.5	19° 27.1	19° 27.6	19° 28.2	19° 28.7	19° 29.3	19° 29.8	19° 30.4	+0.6
We 18	270° 53.1	285° 53.1	300° 53.1	315° 53.0	330° 53.0	345° 53.0	0° 53.0	15° 52.9	30° 52.9	45° 52.9	60° 52.9	75° 52.8	-0.0
	19° 37.5	19° 38.0	19° 38.6	19° 39.1	19° 39.7	19° 40.2	19° 40.8	19° 41.3	19° 41.8	19° 42.4	19° 42.9	19° 43.4	+0.5
Th 19	270° 52.4	285° 52.4	300° 52.4	315° 52.3	330° 52.3	345° 52.3	0° 52.2	15° 52.2	30° 52.2	45° 52.1	60° 52.1	75° 52.1	-0.0
	19° 50.4	19° 50.9	19° 51.4	19° 52.0	19° 52.5	19° 53.0	19° 53.6	19° 54.1	19° 54.6	19° 55.1	19° 55.7	19° 56.2	+0.5
Fr 20	270° 51.6	285° 51.6	300° 51.5	315° 51.5	330° 51.5	345° 51.4	0° 51.4	15° 51.3	30° 51.3	45° 51.3	60° 51.2	75° 51.2	-0.0
	20° 02.9	20° 03.5	20° 04.0	20° 04.5	20° 05.0	20° 05.5	20° 06.0	20° 06.5	20° 07.1	20° 07.6	20° 08.1	20° 08.6	+0.5
Sa 21	270° 50.6	285° 50.6	300° 50.6	315° 50.5	330° 50.5	345° 50.4	0° 50.4	15° 50.3	30° 50.3	45° 50.2	60° 50.2	75° 50.2	-0.0
	20° 15.2	20° 15.7	20° 16.2	20° 16.7	20° 17.2	20° 17.7	20° 18.2	20° 18.7	20° 19.2	20° 19.7	20° 20.1	20° 20.6	+0.5
Su 22	270° 49.5	285° 49.5	300° 49.4	315° 49.4	330° 49.3	345° 49.3	0° 49.2	15° 49.2	30° 49.1	45° 49.1	60° 49.0	75° 49.0	-0.1
	20° 27.0	20° 27.5	20° 28.0	20° 28.5	20° 29.0	20° 29.5	20° 29.9	20° 30.4	20° 30.9	20° 31.4	20° 31.9	20° 32.4	+0.5
Mo 23	270° 48.3	285° 48.2	300° 48.2	315° 48.1	330° 48.1	345° 48.0	0° 48.0	15° 47.9	30° 47.9	45° 47.8	60° 47.7	75° 47.7	-0.1
	20° 38.5	20° 39.0	20° 39.5	20° 40.0	20° 40.4	20° 40.9	20° 41.4	20° 41.8	20° 42.3	20° 42.8	20° 43.2	20° 43.7	+0.5
Tu 24	270° 46.9	285° 46.9	300° 46.8	315° 46.7	330° 46.7	345° 46.6	0° 46.6	15° 46.5	30° 46.4	45° 46.4	60° 46.3	75° 46.3	-0.1
	20° 49.7	20° 50.2	20° 50.6	20° 51.1	20° 51.5	20° 52.0	20° 52.4	20° 52.9	20° 53.4	20° 53.8	20° 54.3	20° 54.7	+0.5
We 25	270° 45.4	285° 45.4	300° 45.3	315° 45.2	330° 45.2	345° 45.1	0° 45.0	15° 45.0	30° 44.9	45° 44.8	60° 44.8	75° 44.7	-0.1
	21° 00.5	21° 01.0	21° 01.4	21° 01.8	21° 02.3	21° 02.7	21° 03.2	21° 03.6	21° 04.0	21° 04.5	21° 04.9	21° 05.3	+0.4
Th 26	270° 43.8	285° 43.7	300° 43.7	315° 43.6	330° 43.5	345° 43.4	0° 43.4	15° 43.3	30° 43.2	45° 43.2	60° 43.1	75° 43.0	-0.1
	21° 11.0	21° 11.4	21° 11.8	21° 12.2	21° 12.7	21° 13.1	21° 13.5	21° 13.9	21° 14.4	21° 14.8	21° 15.2	21° 15.6	+0.4
Fr 27	270° 42.0	285° 42.0	300° 41.9	315° 41.8	330° 41.7	345° 41.7	0° 41.6	15° 41.5	30° 41.4	45° 41.4	60° 41.3	75° 41.2	-0.1
	21° 21.0	21° 21.5	21° 21.9	21° 22.3	21° 22.7	21° 23.1	21° 23.5	21° 23.9	21° 24.3	21° 24.7	21° 25.1	21° 25.5	+0.4
Sa 28	270° 40.2	285° 40.1	300° 40.0	315° 39.9	330° 39.9	345° 39.8	0° 39.7	15° 39.6	30° 39.5	45° 39.4	60° 39.4	75° 39.3	-0.1
	21° 30.7	21° 31.1	21° 31.5	21° 31.9	21° 32.3	21° 32.7	21° 33.1	21° 33.5	21° 33.9	21° 34.3	21° 34.7	21° 35.1	+0.4
Su 29	270° 38.2	285° 38.1	300° 38.0	315° 37.9	330° 37.9	345° 37.8	0° 37.7	15° 37.6	30° 37.5	45° 37.4	60° 37.3	75° 37.2	-0.1
	21° 40.1	21° 40.5	21° 40.8	21° 41.2	21° 41.6	21° 42.0	21° 42.4	21° 42.7	21° 43.1	21° 43.5	21° 43.9	21° 44.2	+0.4
Mo 30	270° 36.1	285° 36.0	300° 35.9	315° 35.8	330° 35.7	345° 35.7	0° 35.6	15° 35.5	30° 35.4	45° 35.3	60° 35.2	75° 35.1	-0.1
	21° 49.0	21° 49.4	21° 49.8	21° 50.1	21° 50.5	21° 50.9	21° 51.2	21° 51.6	21° 51.9	21° 52.3	21° 52.7	21° 53.0	+0.4
Tu 31	270° 33.9	285° 33.8	300° 33.7	315° 33.6	330° 33.5	345° 33.4	0° 33.3	15° 33.2	30° 33.2	45° 33.1	60° 33.0	75° 32.9	-0.1
	21° 57.6	21° 58.0	21° 58.3	21° 58.7	21° 59.0	21° 59.4	21° 59.7	22° 00.1	22° 00.4	22° 00.7	22° 01.1	22° 01.4	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	Δ'/h	SH
Su 1	254°51.2	269°16.7	283°42.2	298°07.7	312°33.3	326°58.8	341°24.5	355°50.1	10°15.8	24°41.5	39°07.2	+25.6	16.0
	18°04.5	18°07.2	18°09.8	18°12.3	18°14.7	18°17.0	18°19.1	18°21.1	18°23.0	18°24.8	18°26.4	+2.2	58.8
Mo 2	255°38.5	270°04.9	284°31.4	298°58.0	313°24.6	327°51.3	342°18.0	356°44.8	11°11.6	25°38.5	40°05.4	+26.7	15.8
	18°37.1	18°36.9	18°36.5	18°36.1	18°35.5	18°34.9	18°34.1	18°33.2	18°32.2	18°31.1	18°29.9	-0.7	57.9
Tu 3	256°57.0	271°24.9	285°52.9	300°21.0	314°49.1	329°17.3	343°45.6	358°14.0	12°42.4	27°10.9	41°39.4	+28.2	15.5
	17°58.9	17°56.1	17°53.1	17°50.0	17°46.9	17°43.6	17°40.3	17°36.8	17°33.3	17°29.7	17°25.9	-3.3	56.9
We 4	258°55.9	273°25.6	287°55.3	302°25.1	316°55.0	331°24.9	345°54.9	0°25.0	14°55.1	29°25.3	43°55.6	+30.0	15.3
	16°19.7	16°14.7	16°09.5	16°04.3	15°59.0	15°53.6	15°48.2	15°42.7	15°37.1	15°31.4	15°25.7	-5.4	56.1
Th 5	261°37.6	276°08.9	290°40.3	305°11.7	319°43.2	334°14.8	348°46.4	3°18.1	17°49.8	32°21.6	46°53.5	+31.6	15.1
	13°51.6	13°44.8	13°38.0	13°31.1	13°24.2	13°17.2	13°10.1	13°03.0	12°55.8	12°48.6	12°41.4	-7.0	55.3
◐ Fr 6	264°57.9	279°30.7	294°03.4	308°36.2	323°09.1	337°42.0	352°14.9	6°47.9	21°21.0	35°54.0	50°27.2	+32.9	14.9
	10°46.6	10°38.6	10°30.5	10°22.4	10°14.3	10°06.2	9°57.9	9°49.7	9°41.4	9°33.1	9°24.8	-8.2	54.7
Sa 7	268°48.8	283°22.6	297°56.3	312°30.1	327°03.9	341°37.8	356°11.7	10°45.6	25°19.5	39°53.5	54°27.5	+33.9	14.8
	7°15.7	7°06.8	6°58.0	6°49.1	6°40.2	6°31.3	6°22.3	6°13.3	6°04.3	5°55.3	5°46.2	-8.9	54.3
Su 8	273°00.0	287°34.3	302°08.6	316°43.0	331°17.3	345°51.7	0°26.0	15°00.4	29°34.8	44°09.2	58°43.6	+34.4	14.8
	3°28.4	3°19.1	3°09.8	3°00.5	2°51.2	2°41.8	2°32.5	2°23.1	2°13.7	2°04.3	1°54.9	-9.4	54.1
Mo 9	277°20.3	291°54.7	306°29.2	321°03.6	335°38.0	350°12.5	4°46.9	19°21.3	33°55.7	48°30.1	63°04.5	+34.4	14.7
	-0°26.5	-0°35.9	-0°45.4	-0°54.8	-1°04.2	-1°13.7	-1°23.1	-1°32.5	-1°41.9	-1°51.3	-2°00.7	-9.4	54.1
Tu 10	281°38.7	296°12.8	310°47.0	325°21.1	339°55.2	354°29.2	9°03.3	23°37.3	38°11.3	52°45.3	67°19.2	+34.1	14.8
	-4°20.8	-4°30.0	-4°39.2	-4°48.4	-4°57.6	-5°06.8	-5°16.0	-5°25.1	-5°34.2	-5°43.3	-5°52.4	-9.2	54.2
We 11	285°44.9	300°18.4	314°51.8	329°25.2	343°58.6	358°31.9	13°05.2	27°38.5	42°11.7	56°44.8	71°18.0	+33.3	14.8
	-8°05.7	-8°14.4	-8°23.1	-8°31.7	-8°40.3	-8°48.8	-8°57.3	-9°05.8	-9°14.3	-9°22.7	-9°31.0	-8.5	54.4
Th 12	289°30.1	304°02.6	318°35.0	333°07.4	347°39.7	2°12.0	16°44.3	31°16.5	45°48.6	60°20.7	74°52.8	+32.3	14.9
	-11°31.9	-11°39.7	-11°47.3	-11°54.9	-12°02.5	-12°10.0	-12°17.5	-12°24.9	-12°32.3	-12°39.6	-12°46.9	-7.5	54.7
Fr 13	292°47.8	307°19.1	321°50.3	336°21.5	350°52.6	5°23.7	19°54.7	34°25.7	48°56.6	63°27.5	77°58.3	+31.1	15.0
	-14°29.0	-14°35.3	-14°41.6	-14°47.8	-14°53.9	-14°59.9	-15°05.9	-15°11.9	-15°17.7	-15°23.5	-15°29.2	-6.0	55.1
○ Sa 14	295°34.9	310°04.9	324°34.9	339°04.9	353°34.8	8°04.6	22°34.5	37°04.2	51°34.0	66°03.6	80°33.3	+29.8	15.2
	-16°46.0	-16°50.5	-16°54.9	-16°59.2	-17°03.5	-17°07.6	-17°11.7	-17°15.7	-17°19.6	-17°23.5	-17°27.2	-4.1	55.6
Su 15	297°52.8	312°21.7	326°50.7	341°19.6	355°48.5	10°17.3	24°46.1	39°14.9	53°43.6	68°12.3	82°41.0	+28.8	15.3
	-18°12.5	-18°14.8	-18°17.0	-18°19.1	-18°21.1	-18°23.0	-18°24.8	-18°26.5	-18°28.1	-18°29.6	-18°31.0	-1.8	56.1
Mo 16	299°47.6	314°15.9	328°44.1	343°12.3	357°40.5	12°08.6	26°36.8	41°04.9	55°33.0	70°01.1	84°29.2	+28.2	15.4
	-18°40.0	-18°39.8	-18°39.5	-18°39.1	-18°38.6	-18°37.9	-18°37.2	-18°36.4	-18°35.4	-18°34.4	-18°33.2	+0.7	56.6
Tu 17	301°29.0	315°56.9	330°24.8	344°52.7	359°20.6	13°48.5	28°16.4	42°44.4	57°12.3	71°40.2	86°08.1	+27.9	15.6
	-18°03.5	-18°00.7	-17°57.8	-17°54.7	-17°51.6	-17°48.4	-17°45.0	-17°41.6	-17°38.1	-17°34.4	-17°30.7	+3.3	57.1
We 18	315°56.9	330°24.8	344°52.7	359°20.6	13°48.5	28°16.4	42°44.4	57°12.3	71°40.2	86°08.1	100°36.0	+27.9	15.6
	-18°00.7	-17°57.8	-17°54.7	-17°51.6	-17°48.4	-17°45.0	-17°41.6	-17°38.1	-17°34.4	-17°30.7	-17°26.8	+3.4	57.1
Th 19	317°35.0	332°03.0	346°31.0	0°59.0	15°27.1	29°55.1	44°23.1	58°51.2	73°19.2	87°47.3	102°15.4	+28.0	15.7
	-16°17.1	-16°11.7	-16°06.1	-16°00.5	-15°54.8	-15°49.0	-15°43.0	-15°37.0	-15°30.9	-15°24.7	-15°18.5	+5.9	57.7
Fr 20	319°18.1	333°46.4	348°14.7	2°43.0	17°11.3	31°39.7	46°08.0	60°36.4	75°04.8	89°33.2	104°01.6	+28.3	15.9
	-13°33.5	-13°25.9	-13°18.1	-13°10.2	-13°02.3	-12°54.3	-12°46.2	-12°38.1	-12°29.8	-12°21.5	-12°13.1	+8.0	58.2
◑ Sa 21	321°09.2	335°37.8	350°06.4	4°35.1	19°03.7	33°32.3	48°01.0	62°29.6	76°58.3	91°27.0	105°55.6	+28.6	16.0
	-9°58.7	-9°49.2	-9°39.6	-9°30.0	-9°20.3	-9°10.6	-9°00.8	-8°50.9	-8°41.0	-8°31.0	-8°21.0	+9.8	58.7
Su 22	323°06.4	337°35.1	352°03.8	6°32.6	21°01.3	35°30.0	49°58.8	64°27.5	78°56.2	93°24.9	107°53.6	+28.7	16.1
	-5°44.5	-5°33.7	-5°22.9	-5°12.1	-5°01.2	-4°50.2	-4°39.3	-4°28.3	-4°17.2	-4°06.2	-3°55.1	+11.0	59.2
Mo 23	325°03.4	339°31.9	354°00.5	8°29.0	22°57.5	37°26.0	51°54.5	66°23.0	80°51.4	95°19.8	109°48.2	+28.5	16.2
	-1°05.7	-0°54.3	-0°42.9	-0°31.4	-0°19.9	-0°08.5	0°03.0	0°14.5	0°26.0	0°37.5	0°49.0	+11.5	59.6
Tu 24	326°51.7	341°19.8	355°47.8	10°15.7	24°43.7	39°11.6	53°39.5	68°07.4	82°35.2	97°03.0	111°30.8	+27.9	16.3
	3°40.8	3°52.1	4°03.5	4°14.8	4°26.1	4°37.4	4°48.6	4°59.8	5°11.0	5°22.2	5°33.3	+11.3	59.8
We 25	328°23.3	342°50.5	357°17.7	11°44.8	26°11.9	40°39.0	55°06.0	69°33.0	84°00.0	98°26.9	112°53.8	+27.1	16.3
	8°16.1	8°26.6	8°37.1	8°47.5	8°57.8	9°08.1	9°18.3	9°28.5	9°38.6	9°48.7	9°58.7	+10.3	59.9
Th 26	329°32.8	343°59.1	358°25.3	12°51.6	27°17.8	41°44.0	56°10.1	70°36.2	85°02.3	99°28.3	113°54.3	+26.2	16.3
	12°20.4	12°29.3	12°38.1	12°46.8	12°55.4	13°03.9	13°12.3	13°20.7	13°28.9	13°37.1	13°45.2	+8.5	59.8
Fr 27	330°21.1	344°46.6	359°12.2	13°37.7	28°03.3	42°28.8	56°54.3	71°19.7	85°45.2	100°10.6	114°36.1	+25.5	16.2
	15°34.8	15°41.3	15°47.7	15°54.0	16°00.2	16°06.2	16°12.2	16°18.1	16°23.8	16°29.4	16°35.0	+6.0	59.5
● Sa 28	330°56.6	345°22.0	359°47.3	14°12.7	28°38.1	43°03.4	57°28.8	71°54.2	86°19.6	100°45.1	115°10.5	+25.4	16.1
	17°44.0	17°47.7	17°51.2	17°54.7	17°58.0	18°01.2	18°04.2	18°07.2	18°10.0	18°12.7	18°15.3	+3.1	59.0
Su 29	331°34.6	346°00.4	0°26.2	14°52.1	29°18.0	43°44.0	58°10.0	72°36.0	87°02.1	101°28.2	115°54.4	+26.0	15.9
	18°39.7	18°40.4	18°40.9	18°41.3	18°41.7	18°41.8	18°41.9	18°41.9	18°41.7	18°41.5	18°41.1	+0.1	58.3
Mo 30	332°32.5	346°59.5	1°26.5	15°53.6	30°20.7	44°47.9	59°15.2	73°42.5	88°09.9	102°37.3	117°04.8	+27.2	15.7
	18°21.7	18°19.5	18°17.2	18°14.8	18°12.3	18°09.8	18°07.1	18°04.3	18°01.4	17°58.4	17°55.3	-2.6	57.5
Tu 31	334°05.2	348°33.7	3°02.4	17°31.1	31°59.8	46°28.7	60°57.6	75°26.6	89°55.6	104°24.7	118°53.9	+28.9	15.5
	16°57.2	16°52.6	16°47.9	16°43.1	16°38.2	16°33.3	16°28.3	16°23.2	16°18.0	16°12.7	16°07.3	-5.0	56.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 6 06h45 — FM: 14 10h42 — LQ: 21 18h29 — NM: 28 11h36

SUN

June 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	270°31.6	285°31.5	300°31.4	315°31.3	330°31.2	345°31.1	0°31.0	15°30.9	30°30.8	45°30.7	60°30.6	75°30.5	-0.1
	22°05.8	22°06.2	22°06.5	22°06.8	22°07.2	22°07.5	22°07.8	22°08.1	22°08.5	22°08.8	22°09.1	22°09.5	+0.3
Th 2	270°29.2	285°29.1	300°29.0	315°28.9	330°28.8	345°28.7	0°28.6	15°28.5	30°28.4	45°28.3	60°28.2	75°28.1	-0.1
	22°13.6	22°14.0	22°14.3	22°14.6	22°14.9	22°15.2	22°15.5	22°15.8	22°16.2	22°16.5	22°16.8	22°17.1	+0.3
Fr 3	270°26.8	285°26.6	300°26.5	315°26.4	330°26.3	345°26.2	0°26.1	15°26.0	30°25.9	45°25.8	60°25.7	75°25.6	-0.1
	22°21.1	22°21.4	22°21.7	22°22.0	22°22.3	22°22.6	22°22.9	22°23.2	22°23.4	22°23.7	22°24.0	22°24.3	+0.3
Sa 4	270°24.2	285°24.1	300°24.0	315°23.9	330°23.8	345°23.6	0°23.5	15°23.4	30°23.3	45°23.2	60°23.1	75°23.0	-0.1
	22°28.1	22°28.4	22°28.7	22°28.9	22°29.2	22°29.5	22°29.8	22°30.1	22°30.3	22°30.6	22°30.9	22°31.2	+0.3
Su 5	270°21.6	285°21.4	300°21.3	315°21.2	330°21.1	345°21.0	0°20.9	15°20.8	30°20.7	45°20.5	60°20.4	75°20.3	-0.1
	22°34.7	22°35.0	22°35.3	22°35.5	22°35.8	22°36.1	22°36.3	22°36.6	22°36.9	22°37.1	22°37.4	22°37.6	+0.3
Mo 6	270°18.8	285°18.7	300°18.6	315°18.5	330°18.4	345°18.3	0°18.1	15°18.0	30°17.9	45°17.8	60°17.7	75°17.6	-0.1
	22°41.0	22°41.2	22°41.5	22°41.7	22°42.0	22°42.2	22°42.5	22°42.7	22°43.0	22°43.2	22°43.5	22°43.7	+0.2
Tu 7	270°16.1	285°15.9	300°15.8	315°15.7	330°15.6	345°15.5	0°15.3	15°15.2	30°15.1	45°15.0	60°14.9	75°14.8	-0.1
	22°46.8	22°47.1	22°47.3	22°47.5	22°47.8	22°48.0	22°48.2	22°48.4	22°48.7	22°48.9	22°49.1	22°49.4	+0.2
We 8	270°13.2	285°13.1	300°13.0	315°12.8	330°12.7	345°12.6	0°12.5	15°12.4	30°12.2	45°12.1	60°12.0	75°11.9	-0.1
	22°52.3	22°52.5	22°52.7	22°52.9	22°53.1	22°53.3	22°53.6	22°53.8	22°54.0	22°54.2	22°54.4	22°54.6	+0.2
Th 9	270°10.3	285°10.2	300°10.0	315°09.9	330°09.8	345°09.7	0°09.6	15°09.4	30°09.3	45°09.2	60°09.1	75°08.9	-0.1
	22°57.3	22°57.5	22°57.7	22°57.9	22°58.1	22°58.3	22°58.5	22°58.7	22°58.9	22°59.1	22°59.3	22°59.5	+0.2
Fr 10	270°07.3	285°07.2	300°07.1	315°07.0	330°06.8	345°06.7	0°06.6	15°06.5	30°06.3	45°06.2	60°06.1	75°05.9	-0.1
	23°01.9	23°02.1	23°02.3	23°02.5	23°02.7	23°02.9	23°03.0	23°03.2	23°03.4	23°03.6	23°03.8	23°03.9	+0.2
Sa 11	270°04.3	285°04.2	300°04.1	315°03.9	330°03.8	345°03.7	0°03.5	15°03.4	30°03.3	45°03.2	60°03.0	75°02.9	-0.1
	23°06.2	23°06.3	23°06.5	23°06.7	23°06.8	23°07.0	23°07.2	23°07.3	23°07.5	23°07.7	23°07.8	23°08.0	+0.2
Su 12	270°01.2	285°01.1	300°01.0	315°00.9	330°00.7	345°00.6	0°00.5	15°00.3	30°00.2	45°00.1	60°00.0	74°59.8	-0.1
	23°10.0	23°10.1	23°10.3	23°10.4	23°10.6	23°10.7	23°10.9	23°11.0	23°11.2	23°11.3	23°11.5	23°11.6	+0.1
Mo 13	269°58.1	284°58.0	299°57.9	314°57.7	329°57.6	344°57.5	359°57.4	14°57.2	29°57.1	44°57.0	59°56.8	74°56.7	-0.1
	23°13.4	23°13.5	23°13.7	23°13.8	23°13.9	23°14.1	23°14.2	23°14.3	23°14.5	23°14.6	23°14.7	23°14.8	+0.1
Tu 14	269°55.0	284°54.9	299°54.7	314°54.6	329°54.5	344°54.3	359°54.2	14°54.1	29°53.9	44°53.8	59°53.7	74°53.5	-0.1
	23°16.4	23°16.5	23°16.7	23°16.8	23°16.9	23°17.0	23°17.1	23°17.2	23°17.3	23°17.4	23°17.6	23°17.7	+0.1
We 15	269°51.8	284°51.7	299°51.5	314°51.4	329°51.3	344°51.1	359°51.0	14°50.9	29°50.7	44°50.6	59°50.5	74°50.3	-0.1
	23°19.0	23°19.1	23°19.2	23°19.3	23°19.4	23°19.5	23°19.6	23°19.7	23°19.8	23°19.9	23°20.0	23°20.1	+0.1
Th 16	269°48.6	284°48.5	299°48.3	314°48.2	329°48.1	344°47.9	359°47.8	14°47.7	29°47.5	44°47.4	59°47.3	74°47.1	-0.1
	23°21.2	23°21.3	23°21.4	23°21.4	23°21.5	23°21.6	23°21.7	23°21.8	23°21.8	23°21.9	23°22.0	23°22.1	+0.1
Fr 17	269°45.4	284°45.2	299°45.1	314°45.0	329°44.8	344°44.7	359°44.6	14°44.4	29°44.3	44°44.2	59°44.0	74°43.9	-0.1
	23°23.0	23°23.0	23°23.1	23°23.2	23°23.2	23°23.3	23°23.4	23°23.4	23°23.5	23°23.5	23°23.6	23°23.6	+0.1
Sa 18	269°42.1	284°42.0	299°41.9	314°41.7	329°41.6	344°41.4	359°41.3	14°41.2	29°41.0	44°40.9	59°40.8	74°40.6	-0.1
	23°24.3	23°24.4	23°24.4	23°24.5	23°24.5	23°24.6	23°24.6	23°24.7	23°24.7	23°24.7	23°24.8	23°24.8	+0.0
Su 19	269°38.9	284°38.7	299°38.6	314°38.5	329°38.3	344°38.2	359°38.0	14°37.9	29°37.8	44°37.6	59°37.5	74°37.4	-0.1
	23°25.3	23°25.3	23°25.3	23°25.4	23°25.4	23°25.4	23°25.5	23°25.5	23°25.5	23°25.5	23°25.6	23°25.6	+0.0
Mo 20	269°35.6	284°35.5	299°35.3	314°35.2	329°35.0	344°34.9	359°34.8	14°34.6	29°34.5	44°34.4	59°34.2	74°34.1	-0.1
	23°25.8	23°25.8	23°25.8	23°25.8	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	+0.0
Tu 21	269°32.3	284°32.2	299°32.1	314°31.9	329°31.8	344°31.6	359°31.5	14°31.4	29°31.2	44°31.1	59°31.0	74°30.8	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.8	-0.0
We 22	269°29.1	284°28.9	299°28.8	314°28.6	329°28.5	344°28.4	359°28.2	14°28.1	29°28.0	44°27.8	59°27.7	74°27.6	-0.1
	23°25.6	23°25.6	23°25.6	23°25.6	23°25.5	23°25.5	23°25.5	23°25.5	23°25.4	23°25.4	23°25.4	23°25.4	-0.0
Th 23	269°25.8	284°25.7	299°25.5	314°25.4	329°25.3	344°25.1	359°25.0	14°24.8	29°24.7	44°24.6	59°24.4	74°24.3	-0.1
	23°24.9	23°24.9	23°24.8	23°24.8	23°24.8	23°24.7	23°24.7	23°24.6	23°24.6	23°24.6	23°24.5	23°24.5	-0.0
Fr 24	269°22.6	284°22.4	299°22.3	314°22.2	329°22.0	344°21.9	359°21.7	14°21.6	29°21.5	44°21.3	59°21.2	74°21.1	-0.1
	23°23.8	23°23.8	23°23.7	23°23.6	23°23.6	23°23.5	23°23.5	23°23.4	23°23.3	23°23.3	23°23.2	23°23.2	-0.1
Sa 25	269°19.3	284°19.2	299°19.1	314°18.9	329°18.8	344°18.7	359°18.5	14°18.4	29°18.3	44°18.1	59°18.0	74°17.9	-0.1
	23°22.3	23°22.2	23°22.1	23°22.1	23°22.0	23°21.9	23°21.8	23°21.7	23°21.7	23°21.6	23°21.5	23°21.4	-0.1
Su 26	269°16.2	284°16.0	299°15.9	314°15.8	329°15.6	344°15.5	359°15.4	14°15.2	29°15.1	44°15.0	59°14.8	74°14.7	-0.1
	23°20.3	23°20.2	23°20.1	23°20.1	23°20.0	23°19.9	23°19.8	23°19.7	23°19.6	23°19.5	23°19.4	23°19.3	-0.1
Mo 27	269°13.0	284°12.9	299°12.7	314°12.6	329°12.5	344°12.4	359°12.2	14°12.1	29°12.0	44°11.8	59°11.7	74°11.6	-0.1
	23°18.0	23°17.9	23°17.8	23°17.7	23°17.5	23°17.4	23°17.3	23°17.2	23°17.1	23°17.0	23°16.9	23°16.8	-0.1
Tu 28	269°09.9	284°09.8	299°09.6	314°09.5	329°09.4	344°09.3	359°09.1	14°09.0	29°08.9	44°08.8	59°08.6	74°08.5	-0.1
	23°15.2	23°15.1	23°15.0	23°14.8	23°14.7	23°14.6	23°14.5	23°14.3	23°14.2	23°14.1	23°13.9	23°13.8	-0.1
We 29	269°06.9	284°06.7	299°06.6	314°06.5	329°06.3	344°06.2	359°06.1	14°06.0	29°05.8	44°05.7	59°05.6	74°05.5	-0.1
	23°12.0	23°11.9	23°11.8	23°11.6	23°11.5	23°11.3	23°11.2	23°11.0	23°10.9	23°10.8	23°10.6	23°10.5	-0.1
Th 30	269°03.9	284°03.7	299°03.6	314°03.5	329°03.4	344°03.2	359°03.1	14°03.0	29°02.9	44°02.8	59°02.6	74°02.5	-0.1
	23°08.5	23°08.3	23°08.2	23°08.0	23°07.8	23°07.7	23°07.5	23°07.3	23°07.2	23°07.0	23°06.9	23°06.7	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2033

D	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h	SH
We 1	249°19.8	263°49.6	278°19.6	292°49.6	307°19.7	321°49.9	336°20.1	350°50.4	5°20.8	19°51.2	34°21.7	+30.2	15.3
	15°15.7	15°09.6	15°03.4	14°57.2	14°50.9	14°44.5	14°38.0	14°31.5	14°24.9	14°18.3	14°11.6	-6.4	56.1
Th 2	252°07.3	266°38.8	281°10.4	295°42.1	310°13.8	324°45.6	339°17.5	353°49.4	8°21.3	22°53.3	37°25.4	+31.8	15.1
	12°23.9	12°16.3	12°08.6	12°00.9	11°53.2	11°45.4	11°37.5	11°29.6	11°21.7	11°13.7	11°05.7	-7.8	55.4
Fr 3	255°33.1	270°06.0	284°39.0	299°12.0	313°45.0	328°18.1	342°51.2	357°24.4	11°57.6	26°30.9	41°04.2	+33.1	15.0
	9°00.5	8°51.8	8°43.2	8°34.5	8°25.8	8°17.0	8°08.2	7°59.4	7°50.6	7°41.7	7°32.8	-8.8	54.8
◐ Sa 4	259°28.3	274°02.1	288°36.0	303°10.0	317°43.9	332°17.9	346°51.9	1°25.9	15°59.9	30°34.0	45°08.1	+34.0	14.8
	5°16.7	5°07.5	4°58.2	4°48.9	4°39.7	4°30.4	4°21.1	4°11.7	4°02.4	3°53.1	3°43.7	-9.3	54.4
Su 5	263°41.7	278°16.0	292°50.4	307°24.8	321°59.1	336°33.5	351°07.9	5°42.3	20°16.7	34°51.1	49°25.5	+34.4	14.8
	1°22.2	1°12.8	1°03.3	0°53.8	0°44.3	0°34.8	0°25.3	0°15.9	0°06.4	-0°03.1	-0°12.6	-9.5	54.2
Mo 6	268°01.4	282°35.8	297°10.1	311°44.4	326°18.7	340°53.1	355°27.3	10°01.6	24°35.9	39°10.1	53°44.4	+34.3	14.8
	-2°34.4	-2°43.8	-2°53.2	-3°02.5	-3°11.9	-3°21.2	-3°30.6	-3°39.9	-3°49.2	-3°58.5	-4°07.8	-9.3	54.2
Tu 7	272°15.5	286°49.4	301°23.3	315°57.1	330°30.9	345°04.7	359°38.4	14°12.2	28°45.8	43°19.5	57°53.1	+33.8	14.8
	-6°25.0	-6°34.0	-6°43.0	-6°51.9	-7°00.8	-7°09.7	-7°18.6	-7°27.4	-7°36.2	-7°45.0	-7°53.7	-8.9	54.3
We 8	276°13.0	290°46.0	305°19.0	319°51.9	334°24.8	348°57.6	3°30.4	18°03.2	32°35.9	47°08.5	61°41.2	+32.8	14.9
	-10°01.2	-10°09.4	-10°17.6	-10°25.8	-10°33.9	-10°41.9	-10°49.9	-10°57.9	-11°05.8	-11°13.7	-11°21.6	-8.0	54.6
Th 9	279°44.5	294°16.3	308°48.0	323°19.7	337°51.4	352°23.0	6°54.5	21°26.0	35°57.4	50°28.8	65°00.2	+31.6	15.0
	-13°13.5	-13°20.5	-13°27.5	-13°34.5	-13°41.3	-13°48.1	-13°54.9	-14°01.6	-14°08.3	-14°14.8	-14°21.3	-6.8	55.1
Fr 10	282°43.4	297°13.8	311°44.2	326°14.5	340°44.8	355°15.0	9°45.1	24°15.2	38°45.3	53°15.3	67°45.2	+30.2	15.2
	-15°51.2	-15°56.7	-16°02.0	-16°07.3	-16°12.5	-16°17.6	-16°22.7	-16°27.7	-16°32.6	-16°37.4	-16°42.1	-5.1	55.6
Sa 11	285°07.7	299°36.8	314°05.8	328°34.8	343°03.7	357°32.6	12°01.5	26°30.2	40°59.0	55°27.7	69°56.3	+28.9	15.3
	-17°43.2	-17°46.6	-17°49.8	-17°53.0	-17°56.1	-17°59.1	-18°02.0	-18°04.9	-18°07.6	-18°10.2	-18°12.7	-3.0	56.2
○ Su 12	287°01.0	301°29.0	315°56.9	330°24.9	344°52.7	359°20.6	13°48.4	28°16.2	42°44.0	57°11.7	71°39.5	+27.8	15.5
	-18°38.9	-18°39.8	-18°40.6	-18°41.3	-18°42.0	-18°42.5	-18°42.9	-18°43.2	-18°43.4	-18°43.5	-18°43.5	-0.5	56.8
Mo 13	288°32.3	302°59.6	317°27.0	331°54.3	346°21.7	0°49.0	15°16.3	29°43.6	44°10.9	58°38.1	73°05.4	+27.3	15.6
	-18°30.3	-18°28.6	-18°26.7	-18°24.8	-18°22.7	-18°20.5	-18°18.2	-18°15.9	-18°13.3	-18°10.7	-18°08.0	+2.2	57.3
Tu 14	289°54.2	304°21.4	318°48.7	333°16.0	347°43.3	2°10.6	16°37.9	31°05.2	45°32.5	59°59.8	74°27.2	+27.3	15.8
	-17°14.4	-17°09.9	-17°05.4	-17°00.8	-16°56.0	-16°51.2	-16°46.3	-16°41.2	-16°36.1	-16°30.8	-16°25.5	+4.9	57.8
We 15	291°19.0	305°46.6	320°14.2	334°41.9	349°09.5	3°37.2	18°04.9	32°32.6	47°00.3	61°28.1	75°55.9	+27.7	15.9
	-14°53.6	-14°46.7	-14°39.8	-14°32.7	-14°25.5	-14°18.3	-14°11.0	-14°03.6	-13°56.1	-13°48.5	-13°40.8	+7.3	58.3
Th 16	292°55.2	307°23.4	321°51.5	336°19.7	350°47.9	5°16.1	19°44.4	34°12.7	48°41.0	63°09.3	77°37.6	+28.2	16.0
	-11°36.3	-11°27.4	-11°18.4	-11°09.4	-11°00.2	-10°51.1	-10°41.8	-10°32.5	-10°23.1	-10°13.7	-10°04.2	+9.2	58.7
Fr 17	307°23.4	321°51.5	336°19.7	350°47.9	5°16.1	19°44.4	34°12.7	48°41.0	63°09.3	77°37.6	92°06.0	+28.3	16.0
	-11°27.4	-11°18.4	-11°09.4	-11°00.2	-10°51.1	-10°41.8	-10°32.5	-10°23.1	-10°13.7	-10°04.2	-9°54.6	+9.3	58.7
Sa 18	309°13.8	323°42.5	338°11.1	352°39.8	7°08.6	21°37.3	36°06.0	50°34.8	65°03.6	79°32.4	94°01.2	+28.7	16.1
	-7°24.5	-7°14.1	-7°03.7	-6°53.2	-6°42.6	-6°32.1	-6°21.4	-6°10.8	-6°00.1	-5°49.4	-5°38.6	+10.6	59.0
◑ Su 19	311°14.3	325°43.3	340°12.2	354°41.2	9°10.1	23°39.1	38°08.0	52°36.9	67°05.9	81°34.8	96°03.8	+28.9	16.1
	-2°53.5	-2°42.3	-2°31.1	-2°19.8	-2°08.6	-1°57.3	-1°46.0	-1°34.8	-1°23.5	-1°12.2	-1°00.8	+11.3	59.1
Mo 20	313°17.4	327°46.3	342°15.1	356°43.9	11°12.7	25°41.5	40°10.3	54°39.0	69°07.8	83°36.5	98°05.2	+28.8	16.2
	1°49.2	2°00.5	2°11.8	2°23.1	2°34.4	2°45.6	2°56.9	3°08.1	3°19.3	3°30.5	3°41.7	+11.2	59.3
Tu 21	315°13.7	329°42.0	344°10.4	358°38.7	13°07.0	27°35.3	42°03.6	56°31.8	71°00.0	85°28.2	99°56.3	+28.3	16.2
	6°26.2	6°36.9	6°47.6	6°58.2	7°08.8	7°19.3	7°29.8	7°40.3	7°50.7	8°01.1	8°11.4	+10.5	59.3
We 22	316°54.8	331°22.4	345°50.0	0°17.6	14°45.1	29°12.6	43°40.1	58°07.6	72°35.0	87°02.4	101°29.7	+27.5	16.1
	10°39.9	10°49.3	10°58.7	11°07.9	11°17.2	11°26.3	11°35.4	11°44.4	11°53.3	12°02.2	12°11.0	+9.1	59.2
Th 23	318°16.0	332°42.8	347°09.6	1°36.4	16°03.1	30°29.8	44°56.5	59°23.2	73°49.8	88°16.4	102°43.0	+26.7	16.1
	14°13.3	14°20.7	14°28.1	14°35.4	14°42.6	14°49.7	14°56.7	15°03.6	15°10.4	15°17.2	15°23.8	+7.1	59.0
Fr 24	319°18.8	333°45.0	348°11.2	2°37.4	17°03.6	31°29.7	45°55.9	60°22.0	74°48.2	89°14.3	103°40.4	+26.2	16.0
	16°51.0	16°56.0	17°00.9	17°05.6	17°10.3	17°14.8	17°19.3	17°23.6	17°27.8	17°31.9	17°35.9	+4.5	58.7
Sa 25	320°11.7	334°37.8	349°03.9	3°30.1	17°56.2	32°22.3	46°48.5	61°14.7	75°40.8	90°07.0	104°33.2	+26.1	15.9
	18°22.0	18°24.2	18°26.2	18°28.1	18°29.9	18°31.6	18°33.2	18°34.6	18°36.0	18°37.2	18°38.3	+1.6	58.2
● Su 26	321°09.2	335°35.8	350°02.4	4°29.1	18°55.9	33°22.6	47°49.4	62°16.3	76°43.1	91°10.1	105°37.0	+26.8	15.7
	18°41.1	18°40.4	18°39.6	18°38.6	18°37.5	18°36.4	18°35.1	18°33.7	18°32.2	18°30.6	18°28.9	-1.2	57.7
Mo 27	322°27.0	336°54.7	351°22.5	5°50.4	20°18.3	34°46.2	49°14.2	63°42.3	78°10.4	92°38.6	107°06.9	+28.0	15.6
	17°50.4	17°47.0	17°43.5	17°40.0	17°36.3	17°32.5	17°28.7	17°24.7	17°20.6	17°16.5	17°12.3	-3.8	57.0
Tu 28	324°17.8	338°47.1	353°16.4	7°45.7	22°15.1	36°44.6	51°14.2	65°43.8	80°13.5	94°43.2	109°13.0	+29.5	15.4
	15°58.2	15°52.5	15°46.9	15°41.1	15°35.3	15°29.3	15°23.4	15°17.3	15°11.2	15°04.9	14°58.7	-6.0	56.4
We 29	326°47.9	341°18.7	355°49.6	10°20.5	24°51.5	39°22.6	53°53.7	68°24.9	82°56.2	97°27.5	111°58.9	+31.1	15.2
	13°16.5	13°09.2	13°01.8	12°54.4	12°46.9	12°39.4	12°31.8	12°24.2	12°16.5	12°08.7	12°00.9	-7.6	55.7
Th 30	329°56.4	344°28.7	359°01.0	13°33.4	28°05.8	42°38.3	57°10.8	71°43.4	86°16.0	100°48.7	115°21.4	+32.5	15.0
	9°58.6	9°50.1	9°41.6	9°33.1	9°24.5	9°15.8	9°07.2	8°58.5	8°49.8	8°41.0	8°32.2	-8.6	55.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 4 23h38 — FM: 12 23h19 — LQ: 19 23h29 — NM: 26 21h07

SUN

July 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	269°00.9	284°00.8	299°00.7	314°00.6	329°00.4	344°00.3	359°00.2	14°00.1	29°00.0	43°59.8	58°59.7	73°59.6	-0.1
	23°04.5	23°04.3	23°04.1	23°04.0	23°03.8	23°03.6	23°03.4	23°03.3	23°03.1	23°02.9	23°02.7	23°02.5	-0.2
Sa 2	268°58.1	283°58.0	298°57.8	313°57.7	328°57.6	343°57.5	358°57.4	13°57.3	28°57.1	43°57.0	58°56.9	73°56.8	-0.1
	23°00.1	22°59.9	22°59.7	22°59.5	22°59.3	22°59.1	22°58.9	22°58.7	22°58.6	22°58.4	22°58.2	22°58.0	-0.2
Su 3	268°55.3	283°55.2	298°55.1	313°54.9	328°54.8	343°54.7	358°54.6	13°54.5	28°54.4	43°54.3	58°54.2	73°54.0	-0.1
	22°55.3	22°55.1	22°54.9	22°54.7	22°54.5	22°54.3	22°54.1	22°53.8	22°53.6	22°53.4	22°53.2	22°53.0	-0.2
Mo 4	268°52.6	283°52.5	298°52.4	313°52.3	328°52.1	343°52.0	358°51.9	13°51.8	28°51.7	43°51.6	58°51.5	73°51.4	-0.1
	22°50.1	22°49.9	22°49.7	22°49.5	22°49.2	22°49.0	22°48.8	22°48.5	22°48.3	22°48.1	22°47.9	22°47.6	-0.2
Tu 5	268°50.0	283°49.9	298°49.8	313°49.7	328°49.5	343°49.4	358°49.3	13°49.2	28°49.1	43°49.0	58°48.9	73°48.8	-0.1
	22°44.6	22°44.3	22°44.1	22°43.8	22°43.6	22°43.3	22°43.1	22°42.9	22°42.6	22°42.4	22°42.1	22°41.9	-0.2
We 6	268°47.5	283°47.3	298°47.2	313°47.1	328°47.0	343°46.9	358°46.8	13°46.7	28°46.6	43°46.5	58°46.4	73°46.3	-0.1
	22°38.6	22°38.3	22°38.1	22°37.8	22°37.5	22°37.3	22°37.0	22°36.8	22°36.5	22°36.2	22°36.0	22°35.7	-0.3
Th 7	268°45.0	283°44.9	298°44.8	313°44.7	328°44.6	343°44.5	358°44.4	13°44.3	28°44.2	43°44.1	58°44.0	73°43.9	-0.1
	22°32.2	22°31.9	22°31.7	22°31.4	22°31.1	22°30.8	22°30.6	22°30.3	22°30.0	22°29.7	22°29.4	22°29.2	-0.3
Fr 8	268°42.7	283°42.6	298°42.5	313°42.4	328°42.3	343°42.2	358°42.1	13°42.0	28°41.9	43°41.9	58°41.8	73°41.7	-0.1
	22°25.5	22°25.2	22°24.9	22°24.6	22°24.3	22°24.0	22°23.7	22°23.4	22°23.1	22°22.8	22°22.5	22°22.2	-0.3
Sa 9	268°40.5	283°40.4	298°40.3	313°40.2	328°40.1	343°40.0	358°39.9	13°39.9	28°39.8	43°39.7	58°39.6	73°39.5	-0.1
	22°18.3	22°18.0	22°17.7	22°17.4	22°17.1	22°16.8	22°16.5	22°16.2	22°15.8	22°15.5	22°15.2	22°14.9	-0.3
Su 10	268°38.4	283°38.3	298°38.2	313°38.1	328°38.0	343°37.9	358°37.9	13°37.8	28°37.7	43°37.6	58°37.5	73°37.4	-0.1
	22°10.8	22°10.5	22°10.1	22°09.8	22°09.5	22°09.2	22°08.8	22°08.5	22°08.2	22°07.9	22°07.5	22°07.2	-0.3
Mo 11	268°36.4	283°36.3	298°36.2	313°36.1	328°36.0	343°36.0	358°35.9	13°35.8	28°35.7	43°35.6	58°35.6	73°35.5	-0.1
	22°02.9	22°02.5	22°02.2	22°01.9	22°01.5	22°01.2	22°00.8	22°00.5	22°00.2	21°59.8	21°59.5	21°59.1	-0.3
Tu 12	268°34.5	283°34.4	298°34.3	313°34.2	328°34.2	343°34.1	358°34.0	13°33.9	28°33.9	43°33.8	58°33.7	73°33.7	-0.1
	21°54.6	21°54.2	21°53.9	21°53.5	21°53.2	21°52.8	21°52.5	21°52.1	21°51.7	21°51.4	21°51.0	21°50.7	-0.4
We 13	268°32.7	283°32.6	298°32.6	313°32.5	328°32.4	343°32.4	358°32.3	13°32.2	28°32.1	43°32.1	58°32.0	73°31.9	-0.1
	21°45.9	21°45.6	21°45.2	21°44.8	21°44.4	21°44.1	21°43.7	21°43.3	21°43.0	21°42.6	21°42.2	21°41.8	-0.4
Th 14	268°31.1	283°31.0	298°30.9	313°30.9	328°30.8	343°30.7	358°30.7	13°30.6	28°30.5	43°30.5	58°30.4	73°30.3	-0.1
	21°36.9	21°36.5	21°36.1	21°35.7	21°35.3	21°35.0	21°34.6	21°34.2	21°33.8	21°33.4	21°33.0	21°32.6	-0.4
Fr 15	268°29.5	283°29.5	298°29.4	313°29.3	328°29.3	343°29.2	358°29.2	13°29.1	28°29.0	43°29.0	58°28.9	73°28.9	-0.1
	21°27.5	21°27.1	21°26.7	21°26.3	21°25.9	21°25.5	21°25.1	21°24.7	21°24.3	21°23.9	21°23.5	21°23.1	-0.4
Sa 16	268°28.1	283°28.1	298°28.0	313°28.0	328°27.9	343°27.8	358°27.8	13°27.7	28°27.7	43°27.6	58°27.6	73°27.5	-0.1
	21°17.7	21°17.3	21°16.9	21°16.5	21°16.1	21°15.6	21°15.2	21°14.8	21°14.4	21°14.0	21°13.5	21°13.1	-0.4
Su 17	268°26.8	283°26.8	298°26.7	313°26.7	328°26.6	343°26.6	358°26.5	13°26.5	28°26.4	43°26.4	58°26.3	73°26.3	-0.0
	21°07.6	21°07.2	21°06.7	21°06.3	21°05.9	21°05.4	21°05.0	21°04.6	21°04.1	21°03.7	21°03.3	21°02.8	-0.4
Mo 18	268°25.7	283°25.6	298°25.6	313°25.6	328°25.5	343°25.5	358°25.4	13°25.4	28°25.3	43°25.3	58°25.3	73°25.2	-0.0
	20°57.1	20°56.6	20°56.2	20°55.8	20°55.3	20°54.9	20°54.4	20°54.0	20°53.5	20°53.1	20°52.6	20°52.2	-0.4
Tu 19	268°24.7	283°24.6	298°24.6	313°24.6	328°24.5	343°24.5	358°24.4	13°24.4	28°24.4	43°24.3	58°24.3	73°24.2	-0.0
	20°46.2	20°45.8	20°45.3	20°44.9	20°44.4	20°43.9	20°43.5	20°43.0	20°42.6	20°42.1	20°41.6	20°41.2	-0.5
We 20	268°23.8	283°23.8	298°23.7	313°23.7	328°23.6	343°23.6	358°23.6	13°23.6	28°23.5	43°23.5	58°23.5	73°23.4	-0.0
	20°35.1	20°34.6	20°34.1	20°33.6	20°33.2	20°32.7	20°32.2	20°31.7	20°31.2	20°30.8	20°30.3	20°29.8	-0.5
Th 21	268°23.0	283°23.0	298°23.0	313°22.9	328°22.9	343°22.9	358°22.9	13°22.8	28°22.8	43°22.8	58°22.8	73°22.7	-0.0
	20°23.5	20°23.0	20°22.5	20°22.0	20°21.6	20°21.1	20°20.6	20°20.1	20°19.6	20°19.1	20°18.6	20°18.1	-0.5
Fr 22	268°22.4	283°22.4	298°22.4	313°22.3	328°22.3	343°22.3	358°22.3	13°22.3	28°22.2	43°22.2	58°22.2	73°22.2	-0.0
	20°11.6	20°11.1	20°10.6	20°10.1	20°09.6	20°09.1	20°08.6	20°08.1	20°07.6	20°07.1	20°06.6	20°06.1	-0.5
Sa 23	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.9	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.8	-0.0
	19°59.4	19°58.9	19°58.4	19°57.9	19°57.3	19°56.8	19°56.3	19°55.8	19°55.3	19°54.7	19°54.2	19°53.7	-0.5
Su 24	268°21.6	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.5	13°21.5	28°21.5	43°21.5	58°21.5	73°21.5	-0.0
	19°46.8	19°46.3	19°45.8	19°45.3	19°44.7	19°44.2	19°43.7	19°43.1	19°42.6	19°42.1	19°41.5	19°41.0	-0.5
Mo 25	268°21.4	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.4	13°21.4	28°21.4	43°21.4	58°21.4	73°21.4	-0.0
	19°34.0	19°33.4	19°32.9	19°32.3	19°31.8	19°31.2	19°30.7	19°30.1	19°29.6	19°29.0	19°28.5	19°27.9	-0.5
Tu 26	268°21.4	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.4	13°21.4	28°21.4	43°21.4	58°21.4	73°21.4	+0.0
	19°20.8	19°20.2	19°19.6	19°19.1	19°18.5	19°18.0	19°17.4	19°16.8	19°16.3	19°15.7	19°15.2	19°14.6	-0.6
We 27	268°21.5	283°21.5	298°21.5	313°21.5	328°21.5	343°21.5	358°21.5	13°21.6	28°21.6	43°21.6	58°21.6	73°21.6	+0.0
	19°07.2	19°06.7	19°06.1	19°05.5	19°04.9	19°04.4	19°03.8	19°03.2	19°02.6	19°02.1	19°01.5	19°00.9	-0.6
Th 28	268°21.8	283°21.8	298°21.8	313°21.8	328°21.8	343°21.8	358°21.8	13°21.9	28°21.9	43°21.9	58°21.9	73°21.9	+0.0
	18°53.4	18°52.8	18°52.2	18°51.6	18°51.0	18°50.5	18°49.9	18°49.3	18°48.7	18°48.1	18°47.5	18°46.9	-0.6
Fr 29	268°22.2	283°22.2	298°22.2	313°22.2	328°22.3	343°22.3	358°22.3	13°22.3	28°22.3	43°22.4	58°22.4	73°22.4	+0.0
	18°39.2	18°38.6	18°38.0	18°37.4	18°36.8	18°36.2	18°35.6	18°35.0	18°34.4	18°33.8	18°33.2	18°32.6	-0.6
Sa 30	268°22.7	283°22.8	298°22.8	313°22.8	328°22.9	343°22.9	358°22.9	13°22.9	28°23.0	43°23.0	58°23.0	73°23.1	+0.0
	18°24.8	18°24.2	18°23.5	18°22.9	18°22.3	18°21.7	18°21.1	18°20.5	18°19.9	18°19.3	18°18.7	18°18.0	-0.6
Su 31	268°23.5	283°23.5	298°23.5	313°23.6	328°23.6	343°23.6	358°23.7	13°23.7	28°23.7	43°23.8	58°23.8	73°23.9	+0.0
	18°10.0	18°09.4	18°08.8	18°08.1	18°07.5	18°06.9	18°06.3	18°05.6	18°05.0	18°04.4	18°03.8	18°03.1	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2033

D	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h	SH
Fr 1	246°18.0	260°51.1	275°24.4	289°57.6	304°30.9	319°04.2	333°37.6	348°11.0	2°44.4	17°17.9	31°51.4	+33.3	14.9
	7°11.8	7°02.8	6°53.7	6°44.6	6°35.5	6°26.3	6°17.1	6°08.0	5°58.7	5°49.5	5°40.3	-9.2	54.8
Sa 2	250°17.7	264°51.7	279°25.7	293°59.7	308°33.8	323°07.8	337°41.9	352°16.0	6°50.2	21°24.3	35°58.5	+34.1	14.8
	3°19.8	3°10.3	3°00.9	2°51.4	2°41.9	2°32.4	2°22.9	2°13.4	2°03.9	1°54.4	1°44.9	-9.5	54.4
Su 3	254°32.4	269°06.7	283°41.1	298°15.4	312°49.7	327°24.1	341°58.4	356°32.8	11°07.1	25°41.5	40°15.8	+34.3	14.8
	-0°37.7	-0°47.2	-0°56.7	-1°06.2	-1°15.7	-1°25.1	-1°34.6	-1°44.0	-1°53.5	-2°02.9	-2°12.3	-9.5	54.2
◐ Mo 4	258°50.2	273°24.5	287°58.7	302°32.8	317°07.0	331°41.2	346°15.3	0°49.4	15°23.5	29°57.6	44°31.6	+34.1	14.8
	-4°32.2	-4°41.4	-4°50.6	-4°59.8	-5°08.9	-5°18.0	-5°27.1	-5°36.2	-5°45.3	-5°54.3	-6°03.3	-9.1	54.2
Tu 5	262°59.6	277°33.2	292°06.9	306°40.4	321°14.0	335°47.5	350°20.9	4°54.4	19°27.8	34°01.1	48°34.5	+33.5	14.8
	-8°15.5	-8°24.1	-8°32.7	-8°41.2	-8°49.7	-8°58.1	-9°06.6	-9°14.9	-9°23.3	-9°31.6	-9°39.9	-8.4	54.4
We 6	266°49.5	281°22.1	295°54.7	310°27.3	324°59.8	339°32.2	354°04.6	8°37.0	23°09.3	37°41.6	52°13.8	+32.4	14.9
	-11°39.3	-11°47.0	-11°54.5	-12°02.0	-12°09.5	-12°16.9	-12°24.3	-12°31.7	-12°38.9	-12°46.2	-12°53.3	-7.4	54.7
Th 7	270°10.5	284°41.8	299°13.1	313°44.3	328°15.5	342°46.6	357°17.7	11°48.7	26°19.6	40°50.5	55°21.3	+31.1	15.1
	-14°34.3	-14°40.5	-14°46.7	-14°52.9	-14°58.9	-15°04.9	-15°10.8	-15°16.7	-15°22.5	-15°28.2	-15°33.9	-6.0	55.3
Fr 8	272°56.4	287°26.3	301°56.1	316°25.8	330°55.5	345°25.1	359°54.7	14°24.2	28°53.6	43°23.0	57°52.4	+29.6	15.2
	-16°50.0	-16°54.4	-16°58.8	-17°03.1	-17°07.3	-17°11.4	-17°15.4	-17°19.4	-17°23.3	-17°27.1	-17°30.8	-4.1	55.9
Sa 9	275°05.6	289°34.0	304°02.4	318°30.7	332°59.0	347°27.3	1°55.5	16°23.6	30°51.7	45°19.7	59°47.7	+28.2	15.4
	-18°15.3	-18°17.6	-18°19.7	-18°21.7	-18°23.6	-18°25.5	-18°27.2	-18°28.8	-18°30.3	-18°31.7	-18°33.1	-1.8	56.6
Su 10	276°42.4	291°09.7	305°37.0	320°04.3	334°31.5	348°58.7	3°25.9	17°53.0	32°20.1	46°47.2	61°14.2	+27.2	15.6
	-18°40.3	-18°39.9	-18°39.4	-18°38.8	-18°38.1	-18°37.3	-18°36.4	-18°35.4	-18°34.2	-18°33.0	-18°31.6	+0.9	57.4
Mo 11	277°57.1	292°23.8	306°50.5	321°17.2	335°43.9	350°10.5	4°37.2	19°03.8	33°30.5	47°57.1	62°23.8	+26.7	15.8
	-17°57.7	-17°54.6	-17°51.3	-17°47.9	-17°44.4	-17°40.8	-17°37.1	-17°33.3	-17°29.4	-17°25.4	-17°21.2	+3.7	58.1
○ Tu 12	279°03.1	293°29.8	307°56.4	322°23.1	336°49.8	351°16.5	5°43.2	20°09.9	34°36.6	49°03.3	63°30.1	+26.7	16.0
	-16°06.0	-16°00.1	-15°54.2	-15°48.1	-15°41.9	-15°35.7	-15°29.3	-15°22.8	-15°16.3	-15°09.6	-15°02.8	+6.3	58.7
We 13	280°13.3	294°40.3	309°07.4	323°34.4	338°01.5	352°28.7	6°55.8	21°23.0	35°50.1	50°17.3	64°44.6	+27.1	16.1
	-13°10.2	-13°01.9	-12°53.6	-12°45.2	-12°36.8	-12°28.2	-12°19.6	-12°10.9	-12°02.1	-11°53.2	-11°44.3	+8.6	59.1
Th 14	281°35.9	296°03.5	310°31.1	324°58.8	339°26.5	353°54.2	8°21.9	22°49.7	37°17.5	51°45.3	66°13.1	+27.7	16.2
	-9°21.6	-9°11.6	-9°01.5	-8°51.4	-8°41.2	-8°30.9	-8°20.6	-8°10.3	-7°59.9	-7°49.4	-7°38.9	+10.3	59.4
Fr 15	283°13.0	297°41.2	312°09.3	326°37.5	341°05.7	355°33.9	10°02.2	24°30.4	38°58.7	53°27.0	67°55.3	+28.2	16.2
	-4°56.3	-4°45.2	-4°34.1	-4°22.9	-4°11.7	-4°00.5	-3°49.2	-3°38.0	-3°26.7	-3°15.4	-3°04.0	+11.2	59.6
Sa 16	285°01.1	299°29.6	313°58.1	328°26.5	342°55.0	357°23.5	11°52.0	26°20.5	40°49.0	55°17.4	69°45.9	+28.5	16.2
	-0°12.7	-0°01.3	0°10.2	0°21.7	0°33.1	0°44.5	0°56.0	1°07.4	1°18.8	1°30.2	1°41.6	+11.4	59.5
Su 17	299°29.6	313°58.1	328°26.5	342°55.0	357°23.5	11°52.0	26°20.5	40°49.0	55°17.4	69°45.9	84°14.4	+28.5	16.2
	-0°01.3	0°10.2	0°21.7	0°33.1	0°44.5	0°56.0	1°07.4	1°18.8	1°30.2	1°41.6	1°53.0	+11.4	59.5
Mo 18	301°21.7	315°50.1	330°18.5	344°47.0	359°15.4	13°43.8	28°12.2	42°40.6	57°08.9	71°37.3	86°05.7	+28.4	16.2
	4°41.5	4°52.5	5°03.5	5°14.5	5°25.4	5°36.3	5°47.1	5°57.9	6°08.7	6°19.5	6°30.2	+10.9	59.4
◑ Tu 19	303°09.3	317°37.4	332°05.5	346°33.6	1°01.7	15°29.7	29°57.7	44°25.7	58°53.7	73°21.7	87°49.6	+28.0	16.1
	9°05.0	9°14.9	9°24.7	9°34.5	9°44.2	9°53.9	10°03.5	10°13.0	10°22.5	10°31.9	10°41.2	+9.6	59.1
We 20	304°46.2	319°13.8	333°41.4	348°09.0	2°36.5	17°04.0	31°31.5	45°59.0	60°26.4	74°53.9	89°21.3	+27.5	16.0
	12°52.7	13°00.8	13°08.9	13°16.9	13°24.8	13°32.6	13°40.4	13°48.0	13°55.6	14°03.1	14°10.5	+7.8	58.7
Th 21	306°10.1	320°37.2	335°04.3	349°31.4	3°58.4	18°25.5	32°52.5	47°19.5	61°46.5	76°13.5	90°40.5	+27.0	15.9
	15°50.4	15°56.3	16°02.1	16°07.7	16°13.3	16°18.8	16°24.2	16°29.5	16°34.7	16°39.8	16°44.8	+5.4	58.3
Fr 22	307°24.1	321°51.0	336°17.9	350°44.7	5°11.6	19°38.4	34°05.3	48°32.2	62°59.0	77°25.9	91°52.8	+26.9	15.8
	17°47.0	17°50.3	17°53.4	17°56.5	17°59.5	18°02.3	18°05.0	18°07.7	18°10.2	18°12.6	18°14.9	+2.8	57.9
Sa 23	308°37.1	323°04.2	337°31.3	351°58.4	6°25.5	20°52.6	35°19.8	49°47.0	64°14.2	78°41.4	93°08.7	+27.2	15.7
	18°36.1	18°36.6	18°37.0	18°37.3	18°37.5	18°37.6	18°37.6	18°37.4	18°37.2	18°36.8	18°36.4	+0.0	57.4
Su 24	310°01.2	324°29.0	338°56.8	353°24.6	7°52.5	22°20.4	36°48.4	51°16.4	65°44.5	80°12.6	94°40.7	+27.9	15.5
	18°16.7	18°14.5	18°12.3	18°09.9	18°07.5	18°04.9	18°02.3	17°59.5	17°56.7	17°53.7	17°50.7	-2.6	56.9
Mo 25	311°48.3	326°17.2	340°46.2	355°15.2	9°44.2	24°13.4	38°42.5	53°11.7	67°41.0	82°10.3	96°39.7	+29.1	15.4
	16°53.6	16°49.1	16°44.5	16°39.8	16°35.0	16°30.1	16°25.2	16°20.1	16°15.0	16°09.8	16°04.5	-4.9	56.4
● Tu 26	314°06.9	328°37.2	343°07.5	357°37.8	12°08.3	26°38.8	41°09.3	55°39.9	70°10.5	84°41.2	99°12.0	+30.5	15.2
	14°36.0	14°29.5	14°23.0	14°16.4	14°09.7	14°03.0	13°56.2	13°49.3	13°42.4	13°35.4	13°28.3	-6.8	55.8
We 27	317°00.0	331°31.6	346°03.3	0°35.0	15°06.8	29°38.6	44°10.5	58°42.4	73°14.4	87°46.4	102°18.5	+31.9	15.1
	11°35.7	11°27.8	11°19.8	11°11.8	11°03.7	10°55.6	10°47.5	10°39.3	10°31.1	10°22.8	10°14.5	-8.1	55.3
Th 28	320°25.3	334°58.2	349°31.0	4°03.9	18°36.8	33°09.8	47°42.8	62°15.9	76°49.0	91°22.1	105°55.3	+33.0	15.0
	8°05.2	7°56.3	7°47.4	7°38.5	7°29.5	7°20.6	7°11.5	7°02.5	6°53.4	6°44.4	6°35.3	-9.0	54.8
Fr 29	324°16.9	338°50.6	353°24.3	7°58.1	22°31.9	37°05.7	51°39.5	66°13.3	80°47.2	95°21.1	109°55.0	+33.8	14.9
	4°16.4	4°07.0	3°57.6	3°48.2	3°38.8	3°29.4	3°19.9	3°10.5	3°01.1	2°51.6	2°42.1	-9.4	54.5
Sa 30	328°26.1	343°00.3	357°34.5	12°08.7	26°42.9	41°17.1	55°51.4	70°25.6	84°59.9	99°34.2	114°08.4	+34.2	14.8
	0°19.8	0°10.3	0°00.9	-0°08.6	-0°18.1	-0°27.6	-0°37.0	-0°46.5	-0°55.9	-1°05.4	-1°14.8	-9.5	54.2
Su 31	332°42.7	347°17.0	1°51.3	16°25.5	30°59.8	45°34.0	60°08.3	74°42.5	89°16.7	103°50.9	118°25.1	+34.2	14.8
	-3°35.1	-3°44.3	-3°53.6	-4°02.8	-4°12.0	-4°21.1	-4°30.3	-4°39.4	-4°48.5	-4°57.6	-5°06.7	-9.2	54.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 4 17h12 — FM: 12 09h28 — LQ: 19 04h07 — NM: 26 08h12

SUN

August 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	268°24.3	283°24.4	298°24.4	313°24.5	328°24.5	343°24.6	358°24.6	13°24.6	28°24.7	43°24.7	58°24.8	73°24.8	+0.0
	17°55.0	17°54.3	17°53.7	17°53.0	17°52.4	17°51.8	17°51.1	17°50.5	17°49.9	17°49.2	17°48.6	17°48.0	-0.6
Tu 2	268°25.4	283°25.4	298°25.5	313°25.5	328°25.6	343°25.6	358°25.7	13°25.7	28°25.8	43°25.8	58°25.9	73°25.9	+0.0
	17°39.6	17°39.0	17°38.3	17°37.7	17°37.0	17°36.4	17°35.7	17°35.1	17°34.4	17°33.8	17°33.1	17°32.5	-0.6
We 3	268°26.6	283°26.6	298°26.7	313°26.7	328°26.8	343°26.8	358°26.9	13°27.0	28°27.0	43°27.1	58°27.1	73°27.2	+0.1
	17°24.0	17°23.3	17°22.7	17°22.0	17°21.3	17°20.7	17°20.0	17°19.4	17°18.7	17°18.0	17°17.4	17°16.7	-0.7
Th 4	268°27.9	283°28.0	298°28.0	313°28.1	328°28.2	343°28.2	358°28.3	13°28.4	28°28.4	43°28.5	58°28.5	73°28.6	+0.1
	17°08.1	17°07.4	17°06.7	17°06.0	17°05.4	17°04.7	17°04.0	17°03.4	17°02.7	17°02.0	17°01.3	17°00.7	-0.7
Fr 5	268°29.4	283°29.5	298°29.6	313°29.6	328°29.7	343°29.8	358°29.8	13°29.9	28°30.0	43°30.0	58°30.1	73°30.2	+0.1
	16°51.9	16°51.2	16°50.5	16°49.8	16°49.1	16°48.5	16°47.8	16°47.1	16°46.4	16°45.7	16°45.0	16°44.4	-0.7
Sa 6	268°31.1	283°31.2	298°31.2	313°31.3	328°31.4	343°31.5	358°31.5	13°31.6	28°31.7	43°31.7	58°31.8	73°31.9	+0.1
	16°35.4	16°34.7	16°34.0	16°33.3	16°32.6	16°31.9	16°31.2	16°30.6	16°29.9	16°29.2	16°28.5	16°27.8	-0.7
Su 7	268°32.9	283°33.0	298°33.1	313°33.1	328°33.2	343°33.3	358°33.4	13°33.5	28°33.5	43°33.6	58°33.7	73°33.8	+0.1
	16°18.7	16°18.0	16°17.3	16°16.6	16°15.9	16°15.2	16°14.5	16°13.7	16°13.0	16°12.3	16°11.6	16°10.9	-0.7
Mo 8	268°34.9	283°34.9	298°35.0	313°35.1	328°35.2	343°35.3	358°35.4	13°35.5	28°35.5	43°35.6	58°35.7	73°35.8	+0.1
	16°01.7	16°01.0	16°00.3	15°59.5	15°58.8	15°58.1	15°57.4	15°56.7	15°56.0	15°55.2	15°54.5	15°53.8	-0.7
Tu 9	268°37.0	283°37.1	298°37.2	313°37.2	328°37.3	343°37.4	358°37.5	13°37.6	28°37.7	43°37.8	58°37.9	73°38.0	+0.1
	15°44.4	15°43.7	15°43.0	15°42.3	15°41.5	15°40.8	15°40.1	15°39.4	15°38.6	15°37.9	15°37.2	15°36.5	-0.7
We 10	268°39.2	283°39.3	298°39.4	313°39.5	328°39.6	343°39.7	358°39.8	13°39.9	28°40.0	43°40.1	58°40.2	73°40.3	+0.1
	15°26.9	15°26.2	15°25.5	15°24.7	15°24.0	15°23.3	15°22.5	15°21.8	15°21.1	15°20.3	15°19.6	15°18.8	-0.7
Th 11	268°41.6	283°41.7	298°41.8	313°41.9	328°42.0	343°42.1	358°42.2	13°42.4	28°42.5	43°42.6	58°42.7	73°42.8	+0.1
	15°09.2	15°08.5	15°07.7	15°07.0	15°06.2	15°05.5	15°04.7	15°04.0	15°03.2	15°02.5	15°01.7	15°01.0	-0.7
Fr 12	268°44.2	283°44.3	298°44.4	313°44.5	328°44.6	343°44.7	358°44.8	13°44.9	28°45.0	43°45.2	58°45.3	73°45.4	+0.1
	14°51.2	14°50.5	14°49.7	14°48.9	14°48.2	14°47.4	14°46.7	14°45.9	14°45.2	14°44.4	14°43.6	14°42.9	-0.8
Sa 13	268°46.8	283°47.0	298°47.1	313°47.2	328°47.3	343°47.4	358°47.5	13°47.7	28°47.8	43°47.9	58°48.0	73°48.1	+0.1
	14°33.0	14°32.2	14°31.5	14°30.7	14°29.9	14°29.2	14°28.4	14°27.6	14°26.9	14°26.1	14°25.3	14°24.6	-0.8
Su 14	268°49.7	283°49.8	298°49.9	313°50.0	328°50.1	343°50.3	358°50.4	13°50.5	28°50.6	43°50.7	58°50.9	73°51.0	+0.1
	14°14.5	14°13.8	14°13.0	14°12.2	14°11.4	14°10.7	14°09.9	14°09.1	14°08.3	14°07.6	14°06.8	14°06.0	-0.8
Mo 15	268°52.6	283°52.7	298°52.8	313°53.0	328°53.1	343°53.2	358°53.4	13°53.5	28°53.6	43°53.7	58°53.9	73°54.0	+0.1
	13°55.8	13°55.1	13°54.3	13°53.5	13°52.7	13°51.9	13°51.1	13°50.4	13°49.6	13°48.8	13°48.0	13°47.2	-0.8
Tu 16	268°55.7	283°55.8	298°55.9	313°56.1	328°56.2	343°56.3	358°56.5	13°56.6	28°56.7	43°56.9	58°57.0	73°57.1	+0.1
	13°36.9	13°36.1	13°35.4	13°34.6	13°33.8	13°33.0	13°32.2	13°31.4	13°30.6	13°29.8	13°29.0	13°28.2	-0.8
We 17	268°58.9	283°59.0	298°59.1	313°59.3	328°59.4	343°59.5	358°59.7	13°59.8	29°00.0	44°00.1	59°00.2	74°00.4	+0.1
	13°17.8	13°17.0	13°16.2	13°15.4	13°14.6	13°13.8	13°13.0	13°12.2	13°11.4	13°10.6	13°09.8	13°09.0	-0.8
Th 18	269°02.2	284°02.3	299°02.5	314°02.6	329°02.7	344°02.9	359°03.0	14°03.2	29°03.3	44°03.5	59°03.6	74°03.7	+0.1
	12°58.5	12°57.7	12°56.9	12°56.0	12°55.2	12°54.4	12°53.6	12°52.8	12°52.0	12°51.2	12°50.4	12°49.5	-0.8
Fr 19	269°05.6	284°05.8	299°05.9	314°06.1	329°06.2	344°06.3	359°06.5	14°06.6	29°06.8	44°06.9	59°07.1	74°07.2	+0.1
	12°38.9	12°38.1	12°37.3	12°36.5	12°35.7	12°34.8	12°34.0	12°33.2	12°32.4	12°31.6	12°30.7	12°29.9	-0.8
Sa 20	269°09.2	284°09.3	299°09.5	314°09.6	329°09.8	344°09.9	359°10.1	14°10.2	29°10.4	44°10.5	59°10.7	74°10.8	+0.2
	12°19.2	12°18.4	12°17.5	12°16.7	12°15.9	12°15.1	12°14.2	12°13.4	12°12.6	12°11.7	12°10.9	12°10.1	-0.8
Su 21	269°12.8	284°13.0	299°13.1	314°13.3	329°13.5	344°13.6	359°13.8	14°13.9	29°14.1	44°14.2	59°14.4	74°14.5	+0.2
	11°59.3	11°58.4	11°57.6	11°56.7	11°55.9	11°55.1	11°54.2	11°53.4	11°52.6	11°51.7	11°50.9	11°50.1	-0.8
Mo 22	269°16.6	284°16.8	299°16.9	314°17.1	329°17.2	344°17.4	359°17.6	14°17.7	29°17.9	44°18.1	59°18.2	74°18.4	+0.2
	11°39.1	11°38.3	11°37.4	11°36.6	11°35.8	11°34.9	11°34.1	11°33.2	11°32.4	11°31.5	11°30.7	11°29.8	-0.8
Tu 23	269°20.5	284°20.7	299°20.8	314°21.0	329°21.2	344°21.3	359°21.5	14°21.6	29°21.8	44°22.0	59°22.1	74°22.3	+0.2
	11°18.8	11°18.0	11°17.1	11°16.3	11°15.4	11°14.6	11°13.7	11°12.9	11°12.0	11°11.1	11°10.3	11°09.4	-0.9
We 24	269°24.5	284°24.7	299°24.8	314°25.0	329°25.2	344°25.3	359°25.5	14°25.7	29°25.8	44°26.0	59°26.2	74°26.4	+0.2
	10°58.3	10°57.5	10°56.6	10°55.7	10°54.9	10°54.0	10°53.2	10°52.3	10°51.5	10°50.6	10°49.7	10°48.9	-0.9
Th 25	269°28.6	284°28.8	299°28.9	314°29.1	329°29.3	344°29.5	359°29.6	14°29.8	29°30.0	44°30.1	59°30.3	74°30.5	+0.2
	10°37.7	10°36.8	10°35.9	10°35.1	10°34.2	10°33.3	10°32.5	10°31.6	10°30.7	10°29.9	10°29.0	10°28.1	-0.9
Fr 26	269°32.8	284°33.0	299°33.1	314°33.3	329°33.5	344°33.7	359°33.9	14°34.0	29°34.2	44°34.4	59°34.6	74°34.7	+0.2
	10°16.8	10°16.0	10°15.1	10°14.2	10°13.3	10°12.5	10°11.6	10°10.7	10°09.8	10°09.0	10°08.1	10°07.2	-0.9
Sa 27	269°37.1	284°37.3	299°37.4	314°37.6	329°37.8	344°38.0	359°38.2	14°38.4	29°38.5	44°38.7	59°38.9	74°39.1	+0.2
	9°55.8	9°54.9	9°54.1	9°53.2	9°52.3	9°51.4	9°50.6	9°49.7	9°48.8	9°47.9	9°47.0	9°46.2	-0.9
Su 28	269°41.5	284°41.7	299°41.8	314°42.0	329°42.2	344°42.4	359°42.6	14°42.8	29°43.0	44°43.1	59°43.3	74°43.5	+0.2
	9°34.7	9°33.8	9°32.9	9°32.0	9°31.1	9°30.2	9°29.4	9°28.5	9°27.6	9°26.7	9°25.8	9°24.9	-0.9
Mo 29	269°46.0	284°46.1	299°46.3	314°46.5	329°46.7	344°46.9	359°47.1	14°47.3	29°47.5	44°47.7	59°47.9	74°48.0	+0.2
	9°13.4	9°12.5	9°11.6	9°10.7	9°09.8	9°08.9	9°08.0	9°07.1	9°06.2	9°05.3	9°04.4	9°03.6	-0.9
Tu 30	269°50.5	284°50.7	299°50.9	314°51.1	329°51.3	344°51.5	359°51.7	14°51.9	29°52.1	44°52.3	59°52.5	74°52.7	+0.2
	8°51.9	8°51.0	8°50.1	8°49.2	8°48.3	8°47.4	8°46.5	8°45.6	8°44.7	8°43.8	8°42.9	8°42.0	-0.9
We 31	269°55.2	284°55.4	299°55.6	314°55.8	329°56.0	344°56.2	359°56.4	14°56.6	29°56.8	44°57.0	59°57.2	74°57.4	+0.2
	8°30.3	8°29.4	8°28.5	8°27.6	8°26.7	8°25.8	8°24.9	8°24.0	8°23.1	8°22.2	8°21.3	8°20.4	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2033

D	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	Δ'/h	SH
Mo 1	249° 32.3	264° 06.4	278° 40.4	293° 14.4	307° 48.4	322° 22.4	336° 56.3	351° 30.3	6° 04.2	20° 38.1	35° 11.9	+34.0	14.8
	-6° 27.3	-6° 36.2	-6° 45.0	-6° 53.8	-7° 02.5	-7° 11.3	-7° 20.0	-7° 28.6	-7° 37.3	-7° 45.9	-7° 54.5	-8.7	54.1
Tu 2	253° 36.6	268° 10.0	282° 43.4	297° 16.7	311° 50.0	326° 23.3	340° 56.5	355° 29.7	10° 02.8	24° 35.9	39° 09.0	+33.2	14.8
	-9° 59.1	-10° 07.1	-10° 15.1	-10° 23.0	-10° 30.9	-10° 38.8	-10° 46.6	-10° 54.3	-11° 02.1	-11° 09.7	-11° 17.4	-7.8	54.3
◐ We 3	257° 20.0	271° 52.4	286° 24.7	300° 57.0	315° 29.2	330° 01.4	344° 33.6	359° 05.7	13° 37.7	28° 09.7	42° 41.6	+32.2	14.9
	-13° 06.2	-13° 13.1	-13° 19.9	-13° 26.6	-13° 33.3	-13° 39.9	-13° 46.5	-13° 53.0	-13° 59.4	-14° 05.8	-14° 12.2	-6.6	54.7
Th 4	260° 34.3	275° 05.4	289° 36.4	304° 07.4	318° 38.3	333° 09.1	347° 39.9	2° 10.6	16° 41.3	31° 11.9	45° 42.5	+30.8	15.1
	-15° 39.7	-15° 45.0	-15° 50.2	-15° 55.4	-16° 00.5	-16° 05.5	-16° 10.5	-16° 15.3	-16° 20.1	-16° 24.9	-16° 29.5	-5.0	55.3
Fr 5	263° 14.1	277° 43.7	292° 13.3	306° 42.8	321° 12.3	335° 41.7	350° 11.0	4° 40.3	19° 09.6	33° 38.8	48° 07.9	+29.4	15.3
	-17° 29.8	-17° 33.1	-17° 36.4	-17° 39.6	-17° 42.7	-17° 45.7	-17° 48.6	-17° 51.4	-17° 54.2	-17° 56.8	-17° 59.4	-3.0	56.0
Sa 6	265° 18.3	279° 46.5	294° 14.7	308° 42.9	323° 11.0	337° 39.1	352° 07.1	6° 35.1	21° 03.0	35° 30.9	49° 58.8	+28.0	15.5
	-18° 26.3	-18° 27.4	-18° 28.3	-18° 29.1	-18° 29.8	-18° 30.4	-18° 30.9	-18° 31.3	-18° 31.6	-18° 31.8	-18° 31.9	-0.6	56.8
Su 7	266° 51.2	281° 18.4	295° 45.5	310° 12.6	324° 39.7	339° 06.7	353° 33.8	8° 00.7	22° 27.7	36° 54.6	51° 21.5	+27.0	15.7
	-18° 20.5	-18° 18.9	-18° 17.1	-18° 15.3	-18° 13.3	-18° 11.3	-18° 09.1	-18° 06.8	-18° 04.4	-18° 01.9	-17° 59.2	+2.1	57.7
Mo 8	268° 02.0	282° 28.5	296° 55.1	311° 21.6	325° 48.1	340° 14.6	354° 41.0	9° 07.5	23° 33.9	38° 00.4	52° 26.8	+26.5	16.0
	-17° 06.5	-17° 02.1	-16° 57.6	-16° 52.9	-16° 48.2	-16° 43.3	-16° 38.4	-16° 33.3	-16° 28.2	-16° 22.9	-16° 17.5	+4.9	58.6
Tu 9	269° 02.6	283° 29.0	297° 55.3	312° 21.7	326° 48.1	341° 14.5	355° 40.9	10° 07.3	24° 33.7	39° 00.1	53° 26.5	+26.4	16.2
	-14° 44.0	-14° 36.9	-14° 29.8	-14° 22.5	-14° 15.1	-14° 07.7	-14° 00.2	-13° 52.5	-13° 44.8	-13° 36.9	-13° 29.0	+7.5	59.3
○ We 10	270° 03.8	284° 30.4	298° 57.0	313° 23.6	327° 50.3	342° 16.9	356° 43.5	11° 10.2	25° 36.9	40° 03.6	54° 30.3	+26.6	16.3
	-11° 19.5	-11° 10.2	-11° 00.9	-10° 51.4	-10° 41.9	-10° 32.3	-10° 22.6	-10° 12.9	-10° 03.1	-9° 53.2	-9° 43.2	+9.6	59.9
Th 11	271° 12.8	285° 39.8	300° 06.7	314° 33.7	329° 00.7	343° 27.8	357° 54.8	12° 21.9	26° 48.9	41° 16.0	55° 43.1	+27.0	16.4
	-7° 06.6	-6° 55.7	-6° 44.7	-6° 33.8	-6° 22.8	-6° 11.7	-6° 00.6	-5° 49.5	-5° 38.3	-5° 27.0	-5° 15.8	+11.1	60.3
Fr 12	272° 31.2	286° 58.5	301° 25.8	315° 53.2	330° 20.5	344° 47.9	359° 15.2	13° 42.6	28° 10.0	42° 37.4	57° 04.8	+27.4	16.5
	-2° 23.5	-2° 11.9	-2° 00.2	-1° 48.5	-1° 36.9	-1° 25.2	-1° 13.5	-1° 01.8	-0° 50.0	-0° 38.3	-0° 26.6	+11.7	60.4
Sa 13	273° 56.5	288° 24.0	302° 51.4	317° 18.9	331° 46.4	346° 13.9	0° 41.4	15° 08.9	29° 36.4	44° 03.9	58° 31.4	+27.5	16.4
	2° 28.4	2° 40.0	2° 51.5	3° 03.0	3° 14.5	3° 26.0	3° 37.4	3° 48.8	4° 00.2	4° 11.5	4° 22.9	+11.5	60.2
Su 14	275° 23.6	289° 51.0	304° 18.5	318° 45.9	333° 13.3	347° 40.8	2° 08.2	16° 35.6	31° 03.0	45° 30.4	59° 57.8	+27.4	16.3
	7° 08.0	7° 18.7	7° 29.3	7° 39.8	7° 50.3	8° 00.7	8° 11.1	8° 21.4	8° 31.7	8° 41.9	8° 52.0	+10.4	59.9
Mo 15	276° 47.8	291° 15.0	305° 42.3	320° 09.5	334° 36.8	349° 04.0	3° 31.2	17° 58.4	32° 25.6	46° 52.8	61° 20.0	+27.2	16.2
	11° 16.1	11° 25.1	11° 34.1	11° 43.0	11° 51.8	12° 00.5	12° 09.1	12° 17.7	12° 26.1	12° 34.5	12° 42.8	+8.7	59.3
Tu 16	291° 15.0	305° 42.3	320° 09.5	334° 36.8	349° 04.0	3° 31.2	17° 58.4	32° 25.6	46° 52.8	61° 20.0	75° 47.1	+27.2	16.2
	11° 25.1	11° 34.1	11° 43.0	11° 51.8	12° 00.5	12° 09.1	12° 17.7	12° 26.1	12° 34.5	12° 42.8	12° 51.0	+8.6	59.3
◑ We 17	292° 33.7	307° 00.8	321° 27.8	335° 54.9	350° 21.9	4° 48.9	19° 15.9	33° 43.0	48° 10.0	62° 37.0	77° 04.0	+27.0	16.0
	14° 43.7	14° 50.4	14° 57.1	15° 03.7	15° 10.2	15° 16.5	15° 22.8	15° 29.0	15° 35.1	15° 41.1	15° 46.9	+6.3	58.7
Th 18	293° 49.0	308° 16.0	322° 43.0	337° 10.0	351° 37.1	6° 04.1	20° 31.1	34° 58.2	49° 25.2	63° 52.3	78° 19.4	+27.0	15.8
	17° 02.8	17° 07.1	17° 11.2	17° 15.2	17° 19.1	17° 22.9	17° 26.6	17° 30.1	17° 33.6	17° 37.0	17° 40.2	+3.7	58.0
Fr 19	295° 06.9	309° 34.1	324° 01.5	338° 28.8	352° 56.1	7° 23.5	21° 50.9	36° 18.3	50° 45.7	65° 13.2	79° 40.7	+27.4	15.7
	18° 16.1	18° 17.6	18° 19.0	18° 20.3	18° 21.5	18° 22.6	18° 23.6	18° 24.5	18° 25.2	18° 25.9	18° 26.5	+1.0	57.4
Sa 20	296° 36.3	311° 04.2	325° 32.2	340° 00.2	354° 28.3	8° 56.4	23° 24.5	37° 52.7	52° 20.9	66° 49.1	81° 17.4	+28.1	15.5
	18° 22.0	18° 20.9	18° 19.7	18° 18.3	18° 16.9	18° 15.4	18° 13.7	18° 12.0	18° 10.2	18° 08.2	18° 06.2	-1.6	56.8
Su 21	298° 26.4	312° 55.4	327° 24.4	341° 53.4	356° 22.5	10° 51.7	25° 20.8	39° 50.1	54° 19.3	68° 48.7	83° 18.0	+29.2	15.3
	17° 24.1	17° 20.6	17° 16.9	17° 13.2	17° 09.4	17° 05.5	17° 01.5	16° 57.4	16° 53.2	16° 49.0	16° 44.6	-4.0	56.2
Mo 22	300° 44.4	315° 14.6	329° 44.8	344° 15.1	358° 45.4	13° 15.7	27° 46.1	42° 16.6	56° 47.1	71° 17.7	85° 48.3	+30.4	15.2
	15° 29.8	15° 24.2	15° 18.5	15° 12.7	15° 06.9	15° 01.0	14° 55.0	14° 49.0	14° 42.8	14° 36.7	14° 30.4	-5.9	55.7
Tu 23	303° 33.4	318° 04.8	332° 36.2	347° 07.7	1° 39.3	16° 10.8	30° 42.5	45° 14.2	59° 45.9	74° 17.7	88° 49.5	+31.6	15.1
	12° 49.0	12° 41.8	12° 34.5	12° 27.1	12° 19.7	12° 12.3	12° 04.8	11° 57.2	11° 49.6	11° 41.9	11° 34.2	-7.5	55.2
● We 24	306° 52.2	321° 24.8	335° 57.3	350° 29.9	5° 02.6	19° 35.3	34° 08.0	48° 40.8	63° 13.6	77° 46.4	92° 19.3	+32.7	15.0
	9° 33.2	9° 24.8	9° 16.3	9° 07.9	8° 59.3	8° 50.8	8° 42.2	8° 33.6	8° 25.0	8° 16.3	8° 07.6	-8.6	54.8
Th 25	310° 36.7	325° 10.1	339° 43.5	354° 17.0	8° 50.5	23° 24.1	37° 57.6	52° 31.2	67° 04.8	81° 38.5	96° 12.1	+33.5	14.9
	5° 53.7	5° 44.5	5° 35.4	5° 26.3	5° 17.1	5° 07.9	4° 58.7	4° 49.5	4° 40.2	4° 31.0	4° 21.7	-9.2	54.5
Fr 26	314° 39.9	329° 13.9	343° 47.9	358° 21.9	12° 56.0	27° 30.1	42° 04.1	56° 38.2	71° 12.3	85° 46.5	100° 20.6	+34.1	14.8
	2° 01.4	1° 52.0	1° 42.6	1° 33.2	1° 23.7	1° 14.3	1° 04.9	0° 55.5	0° 46.0	0° 36.6	0° 27.2	-9.4	54.2
Sa 27	318° 53.7	333° 27.9	348° 02.2	2° 36.4	17° 10.7	31° 44.9	46° 19.2	60° 53.4	75° 27.7	90° 01.9	104° 36.2	+34.3	14.7
	-1° 53.6	-2° 02.9	-2° 12.2	-2° 21.5	-2° 30.8	-2° 40.1	-2° 49.3	-2° 58.6	-3° 07.8	-3° 17.0	-3° 26.2	-9.3	54.0
Su 28	323° 09.2	337° 43.4	352° 17.5	6° 51.6	21° 25.7	35° 59.8	50° 33.8	65° 07.9	79° 41.9	94° 15.9	108° 49.9	+34.1	14.7
	-5° 42.0	-5° 50.9	-5° 59.7	-6° 08.6	-6° 17.4	-6° 26.1	-6° 34.9	-6° 43.6	-6° 52.3	-7° 01.0	-7° 09.6	-8.8	54.0
Mo 29	327° 17.6	341° 51.3	356° 24.9	10° 58.6	25° 32.1	40° 05.7	54° 39.2	69° 12.7	83° 46.2	98° 19.7	112° 53.1	+33.5	14.7
	-9° 15.3	-9° 23.4	-9° 31.4	-9° 39.5	-9° 47.5	-9° 55.4	-10° 03.3	-10° 11.2	-10° 19.0	-10° 26.8	-10° 34.5	-7.9	54.1
Tu 30	331° 10.5	345° 43.3	0° 16.2	14° 49.0	29° 21.7	43° 54.5	58° 27.2	72° 59.8	87° 32.4	102° 05.0	116° 37.5	+32.7	14.8
	-12° 25.1	-12° 32.0	-12° 39.0	-12° 45.9	-12° 52.7	-12° 59.5	-13° 06.2	-13° 12.8	-13° 19.5	-13° 26.0	-13° 32.5	-6.7	54.3
We 31	334° 40.3	349° 12.2	3° 43.9	18° 15.7	32° 47.4	47° 19.0	61° 50.6	76° 22.2	90° 53.7	105° 25.1	119° 56.5	+31.6	14.9
	-15° 02.9	-15° 08.4	-15° 13.9	-15° 19.3	-15° 24.6	-15° 29.9	-15° 35.1	-15° 40.2	-15° 45.3	-15° 50.2	-15° 55.2	-5.2	54.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 3 10h25 — FM: 10 18h07 — LQ: 17 09h42 — NM: 24 21h39

SUN

September 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	269°59.9	285°00.1	300°00.3	315°00.5	330°00.7	345°00.9	0°01.1	15°01.3	30°01.5	45°01.7	60°01.9	75°02.1	+0.2
	8°08.6	8°07.7	8°06.8	8°05.9	8°05.0	8°04.1	8°03.2	8°02.2	8°01.3	8°00.4	7°59.5	7°58.6	-0.9
Fr 2	270°04.7	285°05.0	300°05.2	315°05.4	330°05.6	345°05.8	0°06.0	15°06.2	30°06.4	45°06.6	60°06.8	75°07.0	+0.2
	7°46.7	7°45.8	7°44.9	7°44.0	7°43.1	7°42.2	7°41.3	7°40.3	7°39.4	7°38.5	7°37.6	7°36.7	-0.9
Sa 3	270°09.6	285°09.8	300°10.0	315°10.3	330°10.5	345°10.7	0°10.9	15°11.1	30°11.3	45°11.5	60°11.7	75°11.9	+0.2
	7°24.8	7°23.8	7°22.9	7°22.0	7°21.1	7°20.2	7°19.3	7°18.3	7°17.4	7°16.5	7°15.6	7°14.7	-0.9
Su 4	270°14.6	285°14.8	300°15.0	315°15.2	330°15.4	345°15.6	0°15.8	15°16.1	30°16.3	45°16.5	60°16.7	75°16.9	+0.2
	7°02.7	7°01.7	7°00.8	6°59.9	6°59.0	6°58.1	6°57.1	6°56.2	6°55.3	6°54.4	6°53.4	6°52.5	-0.9
Mo 5	270°19.6	285°19.8	300°20.0	315°20.3	330°20.5	345°20.7	0°20.9	15°21.1	30°21.3	45°21.5	60°21.7	75°21.9	+0.2
	6°40.5	6°39.5	6°38.6	6°37.7	6°36.7	6°35.8	6°34.9	6°34.0	6°33.0	6°32.1	6°31.2	6°30.2	-0.9
Tu 6	270°24.7	285°24.9	300°25.1	315°25.3	330°25.6	345°25.8	0°26.0	15°26.2	30°26.4	45°26.6	60°26.8	75°27.1	+0.2
	6°18.1	6°17.2	6°16.3	6°15.3	6°14.4	6°13.5	6°12.5	6°11.6	6°10.7	6°09.7	6°08.8	6°07.9	-0.9
We 7	270°29.8	285°30.1	300°30.3	315°30.5	330°30.7	345°30.9	0°31.1	15°31.3	30°31.6	45°31.8	60°32.0	75°32.2	+0.2
	5°55.7	5°54.8	5°53.8	5°52.9	5°52.0	5°51.0	5°50.1	5°49.2	5°48.2	5°47.3	5°46.3	5°45.4	-0.9
Th 8	270°35.0	285°35.2	300°35.5	315°35.7	330°35.9	345°36.1	0°36.3	15°36.5	30°36.8	45°37.0	60°37.2	75°37.4	+0.2
	5°33.2	5°32.3	5°31.3	5°30.4	5°29.4	5°28.5	5°27.6	5°26.6	5°25.7	5°24.7	5°23.8	5°22.8	-0.9
Fr 9	270°40.3	285°40.5	300°40.7	315°40.9	330°41.1	345°41.3	0°41.6	15°41.8	30°42.0	45°42.2	60°42.4	75°42.7	+0.2
	5°10.6	5°09.6	5°08.7	5°07.8	5°06.8	5°05.9	5°04.9	5°04.0	5°03.0	5°02.1	5°01.1	5°00.2	-0.9
Sa 10	270°45.5	285°45.7	300°46.0	315°46.2	330°46.4	345°46.6	0°46.8	15°47.1	30°47.3	45°47.5	60°47.7	75°47.9	+0.2
	4°47.9	4°46.9	4°46.0	4°45.0	4°44.1	4°43.1	4°42.2	4°41.2	4°40.3	4°39.4	4°38.4	4°37.5	-0.9
Su 11	270°50.8	285°51.0	300°51.3	315°51.5	330°51.7	345°51.9	0°52.1	15°52.4	30°52.6	45°52.8	60°53.0	75°53.3	+0.2
	4°25.1	4°24.2	4°23.2	4°22.3	4°21.3	4°20.3	4°19.4	4°18.4	4°17.5	4°16.5	4°15.6	4°14.6	-1.0
Mo 12	270°56.1	285°56.4	300°56.6	315°56.8	330°57.0	345°57.2	0°57.5	15°57.7	30°57.9	45°58.1	60°58.4	75°58.6	+0.2
	4°02.2	4°01.3	4°00.3	3°59.4	3°58.4	3°57.5	3°56.5	3°55.6	3°54.6	3°53.7	3°52.7	3°51.7	-1.0
Tu 13	271°01.5	286°01.7	301°01.9	316°02.1	331°02.4	346°02.6	1°02.8	16°03.0	31°03.3	46°03.5	61°03.7	76°03.9	+0.2
	3°39.3	3°38.4	3°37.4	3°36.4	3°35.5	3°34.5	3°33.6	3°32.6	3°31.7	3°30.7	3°29.7	3°28.8	-1.0
We 14	271°06.8	286°07.1	301°07.3	316°07.5	331°07.7	346°07.9	1°08.2	16°08.4	31°08.6	46°08.8	61°09.1	76°09.3	+0.2
	3°16.3	3°15.4	3°14.4	3°13.4	3°12.5	3°11.5	3°10.6	3°09.6	3°08.6	3°07.7	3°06.7	3°05.7	-1.0
Th 15	271°12.2	286°12.4	301°12.6	316°12.9	331°13.1	346°13.3	1°13.5	16°13.8	31°14.0	46°14.2	61°14.4	76°14.7	+0.2
	2°53.2	2°52.3	2°51.3	2°50.4	2°49.4	2°48.4	2°47.5	2°46.5	2°45.5	2°44.6	2°43.6	2°42.7	-1.0
Fr 16	271°17.6	286°17.8	301°18.0	316°18.2	331°18.5	346°18.7	1°18.9	16°19.1	31°19.3	46°19.6	61°19.8	76°20.0	+0.2
	2°30.1	2°29.2	2°28.2	2°27.2	2°26.3	2°25.3	2°24.3	2°23.4	2°22.4	2°21.4	2°20.5	2°19.5	-1.0
Sa 17	271°22.9	286°23.1	301°23.4	316°23.6	331°23.8	346°24.0	1°24.3	16°24.5	31°24.7	46°24.9	61°25.2	76°25.4	+0.2
	2°07.0	2°06.0	2°05.0	2°04.1	2°03.1	2°02.1	2°01.2	2°00.2	1°59.2	1°58.3	1°57.3	1°56.3	-1.0
Su 18	271°28.3	286°28.5	301°28.7	316°28.9	331°29.2	346°29.4	1°29.6	16°29.8	31°30.1	46°30.3	61°30.5	76°30.7	+0.2
	1°43.7	1°42.8	1°41.8	1°40.8	1°39.9	1°38.9	1°37.9	1°37.0	1°36.0	1°35.0	1°34.1	1°33.1	-1.0
Mo 19	271°33.6	286°33.8	301°34.1	316°34.3	331°34.5	346°34.7	1°35.0	16°35.2	31°35.4	46°35.6	61°35.8	76°36.1	+0.2
	1°20.5	1°19.5	1°18.6	1°17.6	1°16.6	1°15.6	1°14.7	1°13.7	1°12.7	1°11.8	1°10.8	1°09.8	-1.0
Tu 20	271°38.9	286°39.2	301°39.4	316°39.6	331°39.8	346°40.1	1°40.3	16°40.5	31°40.7	46°40.9	61°41.2	76°41.4	+0.2
	0°57.2	0°56.2	0°55.3	0°54.3	0°53.3	0°52.4	0°51.4	0°50.4	0°49.4	0°48.5	0°47.5	0°46.5	-1.0
We 21	271°44.3	286°44.5	301°44.7	316°44.9	331°45.1	346°45.4	1°45.6	16°45.8	31°46.0	46°46.2	61°46.5	76°46.7	+0.2
	0°33.9	0°32.9	0°32.0	0°31.0	0°30.0	0°29.0	0°28.1	0°27.1	0°26.1	0°25.1	0°24.2	0°23.2	-1.0
Th 22	271°49.5	286°49.8	301°50.0	316°50.2	331°50.4	346°50.6	1°50.9	16°51.1	31°51.3	46°51.5	61°51.7	76°52.0	+0.2
	0°10.6	0°09.6	0°08.6	0°07.6	0°06.7	0°05.7	0°04.7	0°03.8	0°02.8	0°01.8	0°00.8	-0°00.1	-1.0
Fr 23	271°54.8	286°55.0	301°55.2	316°55.5	331°55.7	346°55.9	1°56.1	16°56.3	31°56.5	46°56.8	61°57.0	76°57.2	+0.2
	-0°12.8	-0°13.8	-0°14.7	-0°15.7	-0°16.7	-0°17.7	-0°18.6	-0°19.6	-0°20.6	-0°21.5	-0°22.5	-0°23.5	-1.0
Sa 24	272°00.0	287°00.2	302°00.5	317°00.7	332°00.9	347°01.1	2°01.3	17°01.5	32°01.8	47°02.0	62°02.2	77°02.4	+0.2
	-0°36.1	-0°37.1	-0°38.1	-0°39.1	-0°40.0	-0°41.0	-0°42.0	-0°43.0	-0°43.9	-0°44.9	-0°45.9	-0°46.9	-1.0
Su 25	272°05.2	287°05.4	302°05.6	317°05.9	332°06.1	347°06.3	2°06.5	17°06.7	32°06.9	47°07.1	62°07.4	77°07.6	+0.2
	-0°59.5	-1°00.5	-1°01.5	-1°02.4	-1°03.4	-1°04.4	-1°05.4	-1°06.3	-1°07.3	-1°08.3	-1°09.2	-1°10.2	-1.0
Mo 26	272°10.4	287°10.6	302°10.8	317°11.0	332°11.2	347°11.4	2°11.6	17°11.8	32°12.1	47°12.3	62°12.5	77°12.7	+0.2
	-1°22.9	-1°23.8	-1°24.8	-1°25.8	-1°26.8	-1°27.7	-1°28.7	-1°29.7	-1°30.7	-1°31.6	-1°32.6	-1°33.6	-1.0
Tu 27	272°15.4	287°15.7	302°15.9	317°16.1	332°16.3	347°16.5	2°16.7	17°16.9	32°17.1	47°17.3	62°17.6	77°17.8	+0.2
	-1°46.2	-1°47.2	-1°48.2	-1°49.1	-1°50.1	-1°51.1	-1°52.1	-1°53.0	-1°54.0	-1°55.0	-1°56.0	-1°56.9	-1.0
We 28	272°20.5	287°20.7	302°20.9	317°21.1	332°21.3	347°21.5	2°21.7	17°22.0	32°22.2	47°22.4	62°22.6	77°22.8	+0.2
	-2°09.6	-2°10.5	-2°11.5	-2°12.5	-2°13.5	-2°14.4	-2°15.4	-2°16.4	-2°17.3	-2°18.3	-2°19.3	-2°20.3	-1.0
Th 29	272°25.5	287°25.7	302°25.9	317°26.1	332°26.3	347°26.5	2°26.7	17°26.9	32°27.1	47°27.3	62°27.6	77°27.8	+0.2
	-2°32.9	-2°33.9	-2°34.8	-2°35.8	-2°36.8	-2°37.7	-2°38.7	-2°39.7	-2°40.7	-2°41.6	-2°42.6	-2°43.6	-1.0
Fr 30	272°30.4	287°30.6	302°30.8	317°31.0	332°31.2	347°31.4	2°31.6	17°31.8	32°32.1	47°32.3	62°32.5	77°32.7	+0.2
	-2°56.2	-2°57.2	-2°58.1	-2°59.1	-3°00.1	-3°01.0	-3°02.0	-3°03.0	-3°03.9	-3°04.9	-3°05.9	-3°06.9	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2033

D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
Th 1	250°37.0	265°07.9	279°38.8	294°09.6	308°40.4	323°11.1	337°41.8	352°12.4	6°43.0	21°13.5	35°44.0	+30.7	15.0
	-16°36.2	-16°40.4	-16°44.5	-16°48.5	-16°52.5	-16°56.3	-17°00.1	-17°03.9	-17°07.5	-17°11.1	-17°14.6	-3.8	55.1
◐ Fr 2	253°15.0	267°44.7	282°14.3	296°43.9	311°13.4	325°42.9	340°12.3	354°41.7	9°11.0	23°40.3	38°09.6	+29.5	15.2
	-17°56.7	-17°58.8	-18°00.9	-18°02.8	-18°04.7	-18°06.4	-18°08.1	-18°09.6	-18°11.1	-18°12.5	-18°13.8	-1.7	55.8
Sa 3	255°22.6	269°51.1	284°19.5	298°48.0	313°16.3	327°44.7	342°13.0	356°41.3	11°09.5	25°37.7	40°05.8	+28.3	15.5
	-18°21.7	-18°21.4	-18°21.0	-18°20.6	-18°20.0	-18°19.3	-18°18.6	-18°17.7	-18°16.7	-18°15.6	-18°14.5	+0.7	56.7
Su 4	257°03.6	271°31.2	285°58.7	300°26.2	314°53.7	329°21.2	343°48.6	358°16.0	12°43.4	27°10.7	41°38.1	+27.4	15.7
	-17°44.2	-17°41.3	-17°38.3	-17°35.2	-17°32.1	-17°28.8	-17°25.4	-17°21.9	-17°18.2	-17°14.5	-17°10.7	+3.3	57.6
Mo 5	258°25.1	272°52.0	287°19.0	301°45.9	316°12.8	330°39.7	345°06.6	359°33.5	14°00.4	28°27.2	42°54.0	+26.9	16.0
	-16°00.5	-15°55.0	-15°49.3	-15°43.6	-15°37.8	-15°31.8	-15°25.8	-15°19.6	-15°13.4	-15°07.0	-15°00.6	+6.0	58.6
Tu 6	259°35.1	274°01.8	288°28.4	302°55.1	317°21.8	331°48.4	346°15.0	0°41.7	15°08.3	29°34.9	44°01.5	+26.6	16.2
	-13°11.9	-13°03.9	-12°55.8	-12°47.6	-12°39.3	-12°30.9	-12°22.5	-12°13.9	-12°05.3	-11°56.6	-11°47.7	+8.4	59.6
We 7	260°40.5	275°07.1	289°33.7	304°00.2	318°26.8	332°53.4	347°20.0	1°46.6	16°13.1	30°39.7	45°06.3	+26.6	16.5
	-9°25.8	-9°15.8	-9°05.6	-8°55.4	-8°45.2	-8°34.9	-8°24.5	-8°14.0	-8°03.5	-7°52.9	-7°42.2	+10.4	60.3
Th 8	261°44.9	276°11.5	290°38.1	305°04.7	319°31.2	333°57.8	348°24.4	2°50.9	17°17.5	31°44.1	46°10.6	+26.6	16.6
	-4°56.3	-4°44.9	-4°33.4	-4°21.9	-4°10.4	-3°58.8	-3°47.2	-3°35.6	-3°23.9	-3°12.3	-3°00.6	+11.6	60.9
○ Fr 9	262°48.8	277°15.3	291°41.8	306°08.3	320°34.8	335°01.3	349°27.8	3°54.3	18°20.8	32°47.3	47°13.7	+26.5	16.7
	-0°02.9	0°09.0	0°21.0	0°32.9	0°44.8	0°56.7	1°08.6	1°20.5	1°32.4	1°44.2	1°56.1	+11.9	61.1
Sa 10	263°50.0	278°16.4	292°42.7	307°09.1	321°35.4	336°01.8	350°28.1	4°54.4	19°20.7	33°47.0	48°13.3	+26.3	16.6
	4°51.5	5°02.9	5°14.4	5°25.7	5°37.1	5°48.4	5°59.6	6°10.8	6°22.0	6°33.1	6°44.2	+11.3	61.0
Su 11	264°46.5	279°12.7	293°38.8	308°05.0	322°31.1	336°57.2	351°23.3	5°49.4	20°15.5	34°41.6	49°07.7	+26.1	16.5
	9°23.4	9°33.6	9°43.6	9°53.6	10°03.4	10°13.3	10°23.0	10°32.7	10°42.3	10°51.8	11°01.2	+9.8	60.5
Mo 12	265°38.2	280°04.2	294°30.2	308°56.2	323°22.2	337°48.2	352°14.2	6°40.2	21°06.2	35°32.2	49°58.2	+26.0	16.3
	13°12.4	13°20.5	13°28.4	13°36.2	13°44.0	13°51.6	13°59.1	14°06.6	14°13.9	14°21.2	14°28.3	+7.6	59.9
Tu 13	266°28.6	280°54.6	295°20.7	309°46.8	324°12.9	338°39.1	353°05.2	7°31.4	21°57.5	36°23.7	50°49.9	+26.1	16.1
	16°02.9	16°08.4	16°13.7	16°19.0	16°24.1	16°29.1	16°34.0	16°38.8	16°43.5	16°48.1	16°52.5	+5.0	59.0
We 14	267°25.0	281°51.5	296°18.1	310°44.6	325°11.2	339°37.9	354°04.5	8°31.2	22°57.9	37°24.7	51°51.4	+26.6	15.9
	17°46.0	17°48.6	17°51.2	17°53.6	17°55.9	17°58.1	18°00.2	18°02.2	18°04.1	18°05.9	18°07.5	+2.2	58.2
◑ Th 15	281°51.5	296°18.1	310°44.6	325°11.2	339°37.9	354°04.5	8°31.2	22°57.9	37°24.7	51°51.4	66°18.2	+26.7	15.9
	17°48.6	17°51.2	17°53.6	17°55.9	17°58.1	18°00.2	18°02.2	18°04.1	18°05.9	18°07.5	18°09.1	+2.0	58.2
Fr 16	283°04.6	297°32.0	311°59.4	326°26.9	340°54.4	355°21.9	9°49.6	24°17.2	38°44.9	53°12.6	67°40.4	+27.6	15.6
	18°19.0	18°18.8	18°18.5	18°18.0	18°17.5	18°16.9	18°16.2	18°15.3	18°14.4	18°13.3	18°12.2	-0.7	57.3
Sa 17	284°42.9	299°11.5	313°40.1	328°08.8	342°37.5	357°06.2	11°35.1	26°03.9	40°32.9	55°01.8	69°30.9	+28.8	15.4
	17°43.0	17°40.3	17°37.5	17°34.6	17°31.6	17°28.5	17°25.3	17°22.0	17°18.6	17°15.2	17°11.6	-3.1	56.5
Su 18	286°52.8	301°22.7	315°52.7	330°22.7	344°52.7	359°22.8	13°53.0	28°23.2	42°53.5	57°23.8	71°54.2	+30.1	15.2
	16°08.3	16°03.4	15°58.4	15°53.4	15°48.3	15°43.1	15°37.9	15°32.5	15°27.1	15°21.6	15°16.1	-5.2	55.9
Mo 19	289°36.4	304°07.6	318°38.9	333°10.2	347°41.6	2°13.0	16°44.5	31°16.0	45°47.6	60°19.2	74°50.8	+31.5	15.1
	13°44.6	13°38.0	13°31.4	13°24.6	13°17.9	13°11.0	13°04.1	12°57.1	12°50.1	12°43.1	12°35.9	-6.9	55.3
Tu 20	292°51.5	307°23.9	321°56.4	336°28.8	351°01.4	5°33.9	20°06.5	34°39.2	49°11.9	63°44.6	78°17.4	+32.6	15.0
	10°42.9	10°35.0	10°27.1	10°19.1	10°11.0	10°03.0	9°54.9	9°46.7	9°38.5	9°30.3	9°22.0	-8.1	54.8
We 21	296°33.2	311°06.6	325°39.9	340°13.3	354°46.7	9°20.2	23°53.6	38°27.2	53°00.7	67°34.2	82°07.8	+33.5	14.8
	7°13.9	7°05.1	6°56.3	6°47.5	6°38.6	6°29.7	6°20.8	6°11.9	6°03.0	5°54.0	5°45.0	-8.9	54.5
Th 22	300°34.5	315°08.4	329°42.4	344°16.4	358°50.4	13°24.4	27°58.4	42°32.5	57°06.5	71°40.6	86°14.7	+34.0	14.8
	3°28.0	3°18.7	3°09.4	3°00.2	2°50.9	2°41.6	2°32.3	2°23.0	2°13.7	2°04.4	1°55.1	-9.3	54.2
● Fr 23	304°47.3	319°21.5	333°55.8	348°30.0	3°04.3	17°38.5	32°12.8	46°47.0	61°21.3	75°55.5	90°29.8	+34.3	14.7
	-0°25.0	-0°34.4	-0°43.7	-0°53.0	-1°02.3	-1°11.6	-1°20.9	-1°30.2	-1°39.5	-1°48.8	-1°58.1	-9.3	54.0
Sa 24	309°03.4	323°37.6	338°11.8	352°45.9	7°20.1	21°54.3	36°28.4	51°02.6	65°36.7	80°10.8	94°44.9	+34.2	14.7
	-4°15.6	-4°24.7	-4°33.7	-4°42.7	-4°51.7	-5°00.6	-5°09.6	-5°18.5	-5°27.4	-5°36.3	-5°45.1	-9.0	53.9
Su 25	313°14.8	327°48.6	342°22.4	356°56.3	11°30.0	26°03.8	40°37.6	55°11.3	69°45.0	84°18.7	98°52.3	+33.8	14.7
	-7°54.7	-8°03.1	-8°11.5	-8°19.8	-8°28.1	-8°36.4	-8°44.6	-8°52.8	-9°00.9	-9°09.1	-9°17.1	-8.2	53.9
Mo 26	317°14.2	331°47.4	346°20.6	0°53.8	15°26.9	30°00.0	44°33.1	59°06.2	73°39.2	88°12.2	102°45.1	+33.1	14.7
	-11°13.5	-11°20.9	-11°28.2	-11°35.5	-11°42.8	-11°50.0	-11°57.2	-12°04.3	-12°11.4	-12°18.4	-12°25.3	-7.2	54.0
Tu 27	320°55.4	335°27.8	350°00.2	4°32.5	19°04.8	33°37.1	48°09.3	62°41.5	77°13.7	91°45.8	106°17.8	+32.2	14.8
	-14°03.2	-14°09.3	-14°15.3	-14°21.3	-14°27.1	-14°33.0	-14°38.7	-14°44.4	-14°50.0	-14°55.6	-15°01.1	-5.8	54.3
We 28	324°14.2	338°45.7	353°17.1	7°48.4	22°19.8	36°51.1	51°22.3	65°53.5	80°24.7	94°55.8	109°26.9	+31.3	14.9
	-16°15.6	-16°20.0	-16°24.3	-16°28.6	-16°32.7	-16°36.8	-16°40.9	-16°44.8	-16°48.7	-16°52.5	-16°56.2	-4.1	54.6
Th 29	327°08.4	341°38.8	356°09.2	10°39.6	25°09.9	39°40.2	54°10.5	68°40.7	83°10.9	97°41.0	112°11.1	+30.3	15.0
	-17°42.5	-17°44.9	-17°47.2	-17°49.5	-17°51.7	-17°53.7	-17°55.7	-17°57.6	-17°59.5	-18°01.2	-18°02.9	-2.0	55.1
Fr 30	329°38.3	344°07.8	358°37.3	13°06.8	27°36.2	42°05.6	56°34.9	71°04.3	85°33.6	100°02.8	114°32.1	+29.4	15.2
	-18°16.7	-18°16.9	-18°17.0	-18°17.0	-18°16.9	-18°16.7	-18°16.4	-18°16.1	-18°15.6	-18°15.0	-18°14.3	+0.2	55.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 2 02h23 — FM: 9 02h20 — LQ: 15 17h33 — NM: 23 13h39

SUN

October 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	272°35.3	287°35.5	302°35.7	317°35.9	332°36.1	347°36.3	2°36.5	17°36.7	32°36.9	47°37.1	62°37.3	77°37.5	+0.2
	-3°19.4	-3°20.4	-3°21.4	-3°22.4	-3°23.3	-3°24.3	-3°25.3	-3°26.2	-3°27.2	-3°28.2	-3°29.1	-3°30.1	-1.0
Su 2	272°40.1	287°40.3	302°40.5	317°40.7	332°40.9	347°41.1	2°41.3	17°41.5	32°41.7	47°41.9	62°42.1	77°42.3	+0.2
	-3°42.7	-3°43.6	-3°44.6	-3°45.6	-3°46.5	-3°47.5	-3°48.5	-3°49.4	-3°50.4	-3°51.4	-3°52.3	-3°53.3	-1.0
Mo 3	272°44.8	287°45.0	302°45.2	317°45.4	332°45.6	347°45.8	2°46.0	17°46.2	32°46.4	47°46.6	62°46.8	77°47.0	+0.2
	-4°05.9	-4°06.8	-4°07.8	-4°08.7	-4°09.7	-4°10.7	-4°11.6	-4°12.6	-4°13.6	-4°14.5	-4°15.5	-4°16.5	-1.0
Tu 4	272°49.5	287°49.7	302°49.8	317°50.0	332°50.2	347°50.4	2°50.6	17°50.8	32°51.0	47°51.2	62°51.4	77°51.6	+0.2
	-4°29.0	-4°29.9	-4°30.9	-4°31.9	-4°32.8	-4°33.8	-4°34.8	-4°35.7	-4°36.7	-4°37.6	-4°38.6	-4°39.6	-1.0
We 5	272°54.0	287°54.2	302°54.4	317°54.6	332°54.8	347°55.0	2°55.1	17°55.3	32°55.5	47°55.7	62°55.9	77°56.1	+0.2
	-4°52.1	-4°53.0	-4°54.0	-4°54.9	-4°55.9	-4°56.9	-4°57.8	-4°58.8	-4°59.7	-5°00.7	-5°01.7	-5°02.6	-1.0
Th 6	272°58.5	287°58.7	302°58.9	317°59.0	332°59.2	347°59.4	2°59.6	17°59.8	33°00.0	48°00.1	63°00.3	78°00.5	+0.2
	-5°15.1	-5°16.0	-5°17.0	-5°17.9	-5°18.9	-5°19.9	-5°20.8	-5°21.8	-5°22.7	-5°23.7	-5°24.6	-5°25.6	-1.0
Fr 7	273°02.9	288°03.0	303°03.2	318°03.4	333°03.6	348°03.8	3°03.9	18°04.1	33°04.3	48°04.5	63°04.7	78°04.8	+0.2
	-5°38.0	-5°39.0	-5°39.9	-5°40.9	-5°41.8	-5°42.8	-5°43.7	-5°44.7	-5°45.7	-5°46.6	-5°47.6	-5°48.5	-1.0
Sa 8	273°07.1	288°07.3	303°07.5	318°07.7	333°07.8	348°08.0	3°08.2	18°08.4	33°08.5	48°08.7	63°08.9	78°09.1	+0.2
	-6°00.9	-6°01.8	-6°02.8	-6°03.8	-6°04.7	-6°05.7	-6°06.6	-6°07.6	-6°08.5	-6°09.5	-6°10.4	-6°11.4	-1.0
Su 9	273°11.3	288°11.5	303°11.7	318°11.8	333°12.0	348°12.2	3°12.3	18°12.5	33°12.7	48°12.8	63°13.0	78°13.2	+0.2
	-6°23.7	-6°24.6	-6°25.6	-6°26.5	-6°27.5	-6°28.4	-6°29.4	-6°30.3	-6°31.3	-6°32.2	-6°33.2	-6°34.1	-0.9
Mo 10	273°15.4	288°15.5	303°15.7	318°15.9	333°16.0	348°16.2	3°16.4	18°16.5	33°16.7	48°16.8	63°17.0	78°17.2	+0.2
	-6°46.4	-6°47.4	-6°48.3	-6°49.2	-6°50.2	-6°51.1	-6°52.1	-6°53.0	-6°54.0	-6°54.9	-6°55.8	-6°56.8	-0.9
Tu 11	273°19.3	288°19.5	303°19.6	318°19.8	333°19.9	348°20.1	3°20.3	18°20.4	33°20.6	48°20.7	63°20.9	78°21.1	+0.2
	-7°09.0	-7°10.0	-7°10.9	-7°11.8	-7°12.8	-7°13.7	-7°14.7	-7°15.6	-7°16.5	-7°17.5	-7°18.4	-7°19.4	-0.9
We 12	273°23.1	288°23.3	303°23.4	318°23.6	333°23.7	348°23.9	3°24.0	18°24.2	33°24.3	48°24.5	63°24.6	78°24.8	+0.2
	-7°31.6	-7°32.5	-7°33.4	-7°34.4	-7°35.3	-7°36.2	-7°37.2	-7°38.1	-7°39.0	-7°40.0	-7°40.9	-7°41.8	-0.9
Th 13	273°26.8	288°26.9	303°27.1	318°27.2	333°27.4	348°27.5	3°27.7	18°27.8	33°28.0	48°28.1	63°28.3	78°28.4	+0.1
	-7°54.0	-7°54.9	-7°55.8	-7°56.8	-7°57.7	-7°58.6	-7°59.6	-8°00.5	-8°01.4	-8°02.4	-8°03.3	-8°04.2	-0.9
Fr 14	273°30.3	288°30.5	303°30.6	318°30.7	333°30.9	348°31.0	3°31.2	18°31.3	33°31.5	48°31.6	63°31.7	78°31.9	+0.1
	-8°16.3	-8°17.2	-8°18.2	-8°19.1	-8°20.0	-8°20.9	-8°21.9	-8°22.8	-8°23.7	-8°24.6	-8°25.6	-8°26.5	-0.9
Sa 15	273°33.7	288°33.8	303°34.0	318°34.1	333°34.3	348°34.4	3°34.5	18°34.7	33°34.8	48°34.9	63°35.1	78°35.2	+0.1
	-8°38.5	-8°39.4	-8°40.3	-8°41.3	-8°42.2	-8°43.1	-8°44.0	-8°45.0	-8°45.9	-8°46.8	-8°47.7	-8°48.6	-0.9
Su 16	273°37.0	288°37.1	303°37.2	318°37.4	333°37.5	348°37.6	3°37.7	18°37.9	33°38.0	48°38.1	63°38.3	78°38.4	+0.1
	-9°00.6	-9°01.5	-9°02.4	-9°03.3	-9°04.2	-9°05.2	-9°06.1	-9°07.0	-9°07.9	-9°08.8	-9°09.7	-9°10.7	-0.9
Mo 17	273°40.1	288°40.2	303°40.3	318°40.4	333°40.6	348°40.7	3°40.8	18°40.9	33°41.1	48°41.2	63°41.3	78°41.4	+0.1
	-9°22.5	-9°23.4	-9°24.4	-9°25.3	-9°26.2	-9°27.1	-9°28.0	-9°28.9	-9°29.8	-9°30.7	-9°31.6	-9°32.6	-0.9
Tu 18	273°43.0	288°43.1	303°43.2	318°43.4	333°43.5	348°43.6	3°43.7	18°43.8	33°43.9	48°44.1	63°44.2	78°44.3	+0.1
	-9°44.4	-9°45.3	-9°46.2	-9°47.1	-9°48.0	-9°48.9	-9°49.8	-9°50.7	-9°51.6	-9°52.5	-9°53.4	-9°54.3	-0.9
We 19	273°45.8	288°45.9	303°46.0	318°46.1	333°46.2	348°46.4	3°46.5	18°46.6	33°46.7	48°46.8	63°46.9	78°47.0	+0.1
	-10°06.0	-10°06.9	-10°07.8	-10°08.7	-10°09.6	-10°10.5	-10°11.4	-10°12.3	-10°13.2	-10°14.1	-10°15.0	-10°15.9	-0.9
Th 20	273°48.4	288°48.5	303°48.6	318°48.7	333°48.8	348°48.9	3°49.1	18°49.2	33°49.3	48°49.4	63°49.5	78°49.6	+0.1
	-10°27.6	-10°28.5	-10°29.4	-10°30.3	-10°31.1	-10°32.0	-10°32.9	-10°33.8	-10°34.7	-10°35.6	-10°36.5	-10°37.4	-0.9
Fr 21	273°50.9	288°51.0	303°51.1	318°51.2	333°51.3	348°51.4	3°51.5	18°51.6	33°51.7	48°51.8	63°51.9	78°52.0	+0.1
	-10°48.9	-10°49.8	-10°50.7	-10°51.6	-10°52.5	-10°53.4	-10°54.3	-10°55.2	-10°56.0	-10°56.9	-10°57.8	-10°58.7	-0.9
Sa 22	273°53.2	288°53.3	303°53.4	318°53.5	333°53.5	348°53.6	3°53.7	18°53.8	33°53.9	48°54.0	63°54.1	78°54.2	+0.1
	-11°10.2	-11°11.0	-11°11.9	-11°12.8	-11°13.7	-11°14.6	-11°15.4	-11°16.3	-11°17.2	-11°18.1	-11°19.0	-11°19.8	-0.9
Su 23	273°55.3	288°55.4	303°55.5	318°55.6	333°55.6	348°55.7	3°55.8	18°55.9	33°56.0	48°56.1	63°56.1	78°56.2	+0.1
	-11°31.2	-11°32.1	-11°33.0	-11°33.8	-11°34.7	-11°35.6	-11°36.5	-11°37.3	-11°38.2	-11°39.1	-11°39.9	-11°40.8	-0.9
Mo 24	273°57.3	288°57.3	303°57.4	318°57.5	333°57.6	348°57.6	3°57.7	18°57.8	33°57.9	48°57.9	63°58.0	78°58.1	+0.1
	-11°52.1	-11°53.0	-11°53.8	-11°54.7	-11°55.6	-11°56.4	-11°57.3	-11°58.2	-11°59.0	-11°59.9	-12°00.7	-12°01.6	-0.9
Tu 25	273°59.0	288°59.1	303°59.2	318°59.2	333°59.3	348°59.4	3°59.4	18°59.5	33°59.6	48°59.7	63°59.7	78°59.8	+0.1
	-12°12.8	-12°13.7	-12°14.5	-12°15.4	-12°16.2	-12°17.1	-12°17.9	-12°18.8	-12°19.7	-12°20.5	-12°21.4	-12°22.2	-0.9
We 26	274°00.6	289°00.7	304°00.8	319°00.8	334°00.9	349°00.9	4°01.0	19°01.1	34°01.1	49°01.2	64°01.2	79°01.3	+0.1
	-12°33.3	-12°34.2	-12°35.0	-12°35.9	-12°36.7	-12°37.6	-12°38.4	-12°39.3	-12°40.1	-12°40.9	-12°41.8	-12°42.6	-0.8
Th 27	274°02.0	289°02.1	304°02.2	319°02.2	334°02.3	349°02.3	4°02.4	19°02.4	34°02.5	49°02.5	64°02.6	79°02.6	+0.1
	-12°53.6	-12°54.5	-12°55.3	-12°56.1	-12°57.0	-12°57.8	-12°58.7	-12°59.5	-13°00.3	-13°01.2	-13°02.0	-13°02.9	-0.8
Fr 28	274°03.3	289°03.3	304°03.4	319°03.4	334°03.5	349°03.5	4°03.6	19°03.6	34°03.6	49°03.7	64°03.7	79°03.8	+0.0
	-13°13.7	-13°14.6	-13°15.4	-13°16.2	-13°17.1	-13°17.9	-13°18.7	-13°19.6	-13°20.4	-13°21.2	-13°22.1	-13°22.9	-0.8
Sa 29	274°04.3	289°04.4	304°04.4	319°04.4	334°04.5	349°04.5	4°04.6	19°04.6	34°04.6	49°04.7	64°04.7	79°04.7	+0.0
	-13°33.6	-13°34.5	-13°35.3	-13°36.1	-13°36.9	-13°37.8	-13°38.6	-13°39.4	-13°40.2	-13°41.1	-13°41.9	-13°42.7	-0.8
Su 30	274°05.2	289°05.2	304°05.2	319°05.3	334°05.3	349°05.3	4°05.4	19°05.4	34°05.4	49°05.5	64°05.5	79°05.5	+0.0
	-13°53.3	-13°54.2	-13°55.0	-13°55.8	-13°56.6	-13°57.4	-13°58.2	-13°59.0	-13°59.9	-14°00.7	-14°01.5	-14°02.3	-0.8
Mo 31	274°05.8	289°05.9	304°05.9	319°05.9	334°05.9	349°06.0	4°06.0	19°06.0	34°06.0	49°06.0	64°06.1	79°06.1	+0.0
	-14°12.8	-14°13.6	-14°14.4	-14°15.2	-14°16.0	-14°16.8	-14°17.6	-14°18.4	-14°19.2	-14°20.0	-14°20.9	-14°21.7	-0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2033

	D	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	Δ'/h	SH
◐	Sa 1	244°53.7 -18°04.0	259°22.7 -18°02.3	273°51.6 -18°00.6	288°20.4 -17°58.8	302°49.3 -17°56.8	317°18.1 -17°54.8	331°46.9 -17°52.6	346°15.6 -17°50.4	0°44.3 -17°48.1	15°13.1 -17°45.6	29°41.7 -17°43.1	+28.8 +2.1	15.4 56.4
	Su 2	246°49.0 -16°53.2	261°17.3 -16°49.0	275°45.6 -16°44.8	290°13.8 -16°40.5	304°42.1 -16°36.0	319°10.3 -16°31.5	333°38.5 -16°26.9	348°06.7 -16°22.2	2°34.9 -16°17.3	17°03.0 -16°12.4	31°31.1 -16°07.4	+28.2 +4.6	15.6 57.3
	Mo 3	248°30.9 -14°40.4	262°58.8 -14°33.8	277°26.7 -14°27.1	291°54.5 -14°20.4	306°22.3 -14°13.5	320°50.1 -14°06.6	335°17.9 -13°59.5	349°45.7 -13°52.4	4°13.4 -13°45.2	18°41.2 -13°37.8	33°08.9 -13°30.4	+27.8 +7.0	15.9 58.3
	Tu 4	250°03.3 -11°28.8	264°30.9 -11°20.0	278°58.4 -11°11.2	293°25.9 -11°02.2	307°53.4 -10°53.2	322°20.8 -10°44.1	336°48.3 -10°34.9	351°15.8 -10°25.7	5°43.2 -10°16.3	20°10.6 -10°06.9	34°38.0 -9°57.5	+27.5 +9.1	16.2 59.3
	We 5	251°27.7 -7°26.9	265°54.9 -7°16.4	280°22.1 -7°05.8	294°49.2 -6°55.1	309°16.4 -6°44.4	323°43.5 -6°33.6	338°10.6 -6°22.8	352°37.8 -6°11.9	7°04.9 -6°01.0	21°31.9 -5°50.0	35°59.0 -5°38.9	+27.1 +10.8	16.4 60.2
	Th 6	252°42.9 -2°48.5	267°09.7 -2°36.8	281°36.4 -2°25.1	296°03.2 -2°13.5	310°29.9 -2°01.7	324°56.6 -1°50.0	339°23.3 -1°38.2	353°49.9 -1°26.4	8°16.6 -1°14.6	22°43.2 -1°02.8	37°09.8 -0°51.0	+26.7 +11.8	16.6 60.9
	Fr 7	253°46.0 2°07.3	268°12.2 2°19.2	282°38.5 2°31.0	297°04.6 2°42.9	311°30.8 2°54.7	325°56.9 3°06.5	340°23.0 3°18.4	354°49.1 3°30.1	9°15.2 3°41.9	23°41.2 3°53.6	38°07.2 4°05.4	+26.1 +11.8	16.7 61.3
○	Sa 8	254°34.2 6°57.2	268°59.8 7°08.4	283°25.3 7°19.5	297°50.9 7°30.5	312°16.4 7°41.5	326°41.9 7°52.4	341°07.3 8°03.2	355°32.8 8°14.0	9°58.2 8°24.8	24°23.6 8°35.5	38°49.0 8°46.1	+25.5 +10.9	16.7 61.4
	Su 9	255°06.9 11°17.0	269°31.9 11°26.5	283°56.9 11°35.8	298°21.9 11°45.1	312°46.9 11°54.3	327°11.8 12°03.4	341°36.8 12°12.4	356°01.7 12°21.3	10°26.6 12°30.1	24°51.5 12°38.8	39°16.4 12°47.4	+25.0 +9.0	16.6 61.0
	Mo 10	255°28.4 14°44.9	269°53.2 14°51.9	284°17.9 14°58.8	298°42.7 15°05.5	313°07.4 15°12.2	327°32.2 15°18.8	341°56.9 15°25.2	356°21.7 15°31.5	10°46.5 15°37.7	25°11.2 15°43.8	39°36.0 15°49.8	+24.8 +6.5	16.5 60.4
	Tu 11	255°48.9 17°05.4	270°13.8 17°09.5	284°38.8 17°13.5	299°03.9 17°17.4	313°28.9 17°21.1	327°54.0 17°24.7	342°19.1 17°28.2	356°44.2 17°31.5	11°09.4 17°34.8	25°34.6 17°37.9	39°59.8 17°40.9	+25.1 +3.5	16.2 59.5
	We 12	256°22.1 18°11.6	270°47.9 18°12.7	285°13.7 18°13.7	299°39.6 18°14.5	314°05.6 18°15.3	328°31.6 18°15.9	342°57.6 18°16.4	357°23.7 18°16.8	11°49.8 18°17.1	26°16.0 18°17.2	40°42.2 18°17.3	+26.0 +0.6	16.0 58.6
	Th 13	257°22.3 18°04.7	271°49.4 18°03.0	286°16.6 18°01.2	300°43.8 17°59.3	315°11.1 17°57.3	329°38.5 17°55.2	344°06.0 17°53.0	358°33.5 17°50.7	13°01.0 17°48.2	27°28.6 17°45.7	41°56.3 17°43.1	+27.4 -2.2	15.7 57.6
	Fr 14	258°59.6 16°52.5	273°28.3 16°48.4	287°57.1 16°44.2	302°26.0 16°40.0	316°54.9 16°35.6	331°24.0 16°31.2	345°53.0 16°26.7	0°22.2 16°22.1	14°51.4 16°17.4	29°20.7 16°12.6	43°50.0 16°07.8	+29.0 -4.5	15.5 56.7
◑	Sa 15	273°28.3 16°48.4	287°57.1 16°44.2	302°26.0 16°40.0	316°54.9 16°35.6	331°24.0 16°31.2	345°53.0 16°26.7	0°22.2 16°22.1	14°51.4 16°17.4	29°20.7 16°12.6	43°50.0 16°07.8	58°19.4 16°02.8	+29.1 -4.6	15.4 56.6
	Su 16	275°48.6 14°40.0	290°19.0 14°33.9	304°49.5 14°27.8	319°20.1 14°21.6	333°50.8 14°15.3	348°21.5 14°09.0	2°52.3 14°02.6	17°23.1 13°56.1	31°54.0 13°49.6	46°24.9 13°43.0	60°56.0 13°36.3	+30.7 -6.4	15.2 55.8
	Mo 17	278°48.2 11°49.9	293°20.1 11°42.4	307°52.1 11°34.8	322°24.2 11°27.2	336°56.2 11°19.6	351°28.4 11°11.9	6°00.6 11°04.1	20°32.8 10°56.4	35°05.1 10°48.5	49°37.4 10°40.7	64°09.8 10°32.7	+32.2 -7.7	15.0 55.2
	Tu 18	282°21.1 8°29.5	296°54.2 8°21.0	311°27.3 8°12.4	326°00.4 8°03.9	340°33.6 7°55.3	355°06.9 7°46.7	9°40.2 7°38.0	24°13.5 7°29.4	38°46.8 7°20.7	53°20.2 7°11.9	67°53.6 7°03.2	+33.3 -8.6	14.9 54.6
	We 19	286°18.5 4°49.2	300°52.4 4°40.1	315°26.3 4°31.0	330°00.2 4°21.9	344°34.2 4°12.8	359°08.1 4°03.6	13°42.1 3°54.5	28°16.1 3°45.3	42°50.2 3°36.1	57°24.2 3°26.9	71°58.3 3°17.7	+34.0 -9.2	14.8 54.3
	Th 20	290°31.0 0°58.6	305°05.3 0°49.3	319°39.6 0°40.0	334°13.9 0°30.7	348°48.2 0°21.4	3°22.5 0°12.1	17°56.8 0°02.8	32°31.1 -0°06.5	47°05.4 -0°15.8	61°39.8 -0°25.2	76°14.1 -0°34.5	+34.3 -9.3	14.7 54.0
	Fr 21	294°49.0 -2°53.2	309°23.3 -3°02.4	323°57.6 -3°11.6	338°31.9 -3°20.7	353°06.2 -3°29.9	7°40.5 -3°39.0	22°14.7 -3°48.1	36°49.0 -3°57.2	51°23.2 -4°06.3	65°57.5 -4°15.3	80°31.7 -4°24.4	+34.3 -9.1	14.7 53.9
	Sa 22	299°03.5 -6°37.5	313°37.5 -6°46.2	328°11.5 -6°54.9	342°45.4 -7°03.5	357°19.4 -7°12.1	11°53.3 -7°20.7	26°27.2 -7°29.2	41°01.1 -7°37.8	55°34.9 -7°46.3	70°08.7 -7°54.7	84°42.6 -8°03.1	+33.9 -8.6	14.7 53.9
●	Su 23	303°06.7 -10°05.3	317°40.1 -10°13.2	332°13.5 -10°21.0	346°46.9 -10°28.7	1°20.2 -10°36.4	15°53.5 -10°44.1	30°26.7 -10°51.7	44°59.9 -10°59.3	59°33.1 -11°06.9	74°06.3 -11°14.3	88°39.4 -11°21.8	+33.3 -7.6	14.7 54.0
	Mo 24	306°52.5 -13°07.5	321°25.1 -13°14.2	335°57.7 -13°20.7	350°30.2 -13°27.2	5°02.7 -13°33.7	19°35.2 -13°40.1	34°07.6 -13°46.4	48°40.0 -13°52.7	63°12.4 -13°59.0	77°44.7 -14°05.1	92°17.0 -14°11.2	+32.4 -6.4	14.8 54.1
	Tu 25	310°17.0 -15°35.1	324°48.7 -15°40.2	339°20.3 -15°45.2	353°52.0 -15°50.1	8°23.6 -15°55.0	22°55.1 -15°59.7	37°26.6 -16°04.4	51°58.1 -16°09.1	66°29.6 -16°13.6	81°01.0 -16°18.1	95°32.4 -16°22.5	+31.5 -4.7	14.8 54.4
	We 26	313°18.8 -17°19.6	327°49.6 -17°22.8	342°20.4 -17°25.9	356°51.2 -17°28.9	11°21.9 -17°31.8	25°52.6 -17°34.7	40°23.2 -17°37.4	54°53.9 -17°40.1	69°24.4 -17°42.7	83°55.0 -17°45.2	98°25.5 -17°47.6	+30.7 -2.8	14.9 54.8
	Th 27	315°59.8 -18°13.6	330°29.8 -18°14.6	344°59.9 -18°15.6	359°29.9 -18°16.4	13°59.8 -18°17.2	28°29.8 -18°17.8	42°59.7 -18°18.4	57°29.6 -18°18.9	71°59.5 -18°19.3	86°29.3 -18°19.6	100°59.2 -18°19.8	+29.9 -0.6	15.1 55.2
	Fr 28	318°23.9 -18°11.6	332°53.4 -18°10.3	347°22.9 -18°09.0	1°52.3 -18°07.5	16°21.8 -18°05.9	30°51.2 -18°04.2	45°20.6 -18°02.5	59°50.0 -18°00.6	74°19.3 -17°58.6	88°48.7 -17°56.6	103°18.0 -17°54.4	+29.4 +1.7	15.2 55.8
	Sa 29	320°36.5 -17°10.8	335°05.6 -17°07.1	349°34.8 -17°03.3	4°03.9 -16°59.5	18°33.0 -16°55.5	33°02.1 -16°51.5	47°31.2 -16°47.3	62°00.2 -16°43.1	76°29.3 -16°38.8	90°58.4 -16°34.3	105°27.4 -16°29.8	+29.1 +4.1	15.4 56.5
	Su 30	322°42.3 -15°11.0	337°11.2 -15°05.1	351°40.2 -14°59.0	6°09.1 -14°52.8	20°38.0 -14°46.6	35°06.9 -14°40.3	49°35.8 -14°33.9	64°04.7 -14°27.4	78°33.6 -14°20.8	93°02.5 -14°14.1	107°31.4 -14°07.3	+28.9 +6.4	15.6 57.3
◐	Mo 31	324°43.9 -12°15.8	339°12.7 -12°07.7	353°41.5 -11°59.6	8°10.2 -11°51.4	22°39.0 -11°43.0	37°07.8 -11°34.7	51°36.5 -11°26.2	66°05.2 -11°17.7	80°34.0 -11°09.0	95°02.7 -11°00.4	109°31.4 -10°51.6	+28.7 +8.4	15.9 58.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 1 16h32 — FM: 8 10h58 — LQ: 15 04h47 — NM: 23 07h28 — FQ: 31 04h46

SUN

November 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	274°06.3	289°06.3	304°06.4	319°06.4	334°06.4	349°06.4	4°06.4	19°06.4	34°06.4	49°06.4	64°06.5	79°06.5	+0.0
	-14°32.0	-14°32.8	-14°33.6	-14°34.4	-14°35.2	-14°36.0	-14°36.8	-14°37.6	-14°38.4	-14°39.2	-14°40.0	-14°40.8	-0.8
We 2	274°06.6	289°06.6	304°06.6	319°06.6	334°06.6	349°06.6	4°06.6	19°06.6	34°06.7	49°06.7	64°06.7	79°06.7	+0.0
	-14°51.1	-14°51.8	-14°52.6	-14°53.4	-14°54.2	-14°55.0	-14°55.8	-14°56.6	-14°57.3	-14°58.1	-14°58.9	-14°59.7	-0.8
Th 3	274°06.7	289°06.7	304°06.7	319°06.7	334°06.7	349°06.7	4°06.7	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	-0.0
	-15°09.8	-15°10.6	-15°11.4	-15°12.1	-15°12.9	-15°13.7	-15°14.5	-15°15.2	-15°16.0	-15°16.8	-15°17.6	-15°18.3	-0.8
Fr 4	274°06.6	289°06.6	304°06.5	319°06.5	334°06.5	349°06.5	4°06.5	19°06.5	34°06.5	49°06.5	64°06.5	79°06.4	-0.0
	-15°28.3	-15°29.1	-15°29.9	-15°30.6	-15°31.4	-15°32.2	-15°32.9	-15°33.7	-15°34.4	-15°35.2	-15°36.0	-15°36.7	-0.8
Sa 5	274°06.2	289°06.2	304°06.2	319°06.2	334°06.2	349°06.2	4°06.1	19°06.1	34°06.1	49°06.1	64°06.1	79°06.0	-0.0
	-15°46.6	-15°47.3	-15°48.1	-15°48.9	-15°49.6	-15°50.4	-15°51.1	-15°51.9	-15°52.6	-15°53.4	-15°54.1	-15°54.9	-0.8
Su 6	274°05.7	289°05.7	304°05.7	319°05.6	334°05.6	349°05.6	4°05.6	19°05.5	34°05.5	49°05.5	64°05.4	79°05.4	-0.0
	-16°04.6	-16°05.3	-16°06.1	-16°06.8	-16°07.6	-16°08.3	-16°09.0	-16°09.8	-16°10.5	-16°11.3	-16°12.0	-16°12.8	-0.7
Mo 7	274°05.0	289°05.0	304°04.9	319°04.9	334°04.8	349°04.8	4°04.8	19°04.7	34°04.7	49°04.7	64°04.6	79°04.6	-0.0
	-16°22.3	-16°23.1	-16°23.8	-16°24.5	-16°25.3	-16°26.0	-16°26.7	-16°27.4	-16°28.2	-16°28.9	-16°29.6	-16°30.4	-0.7
Tu 8	274°04.0	289°04.0	304°04.0	319°03.9	334°03.9	349°03.8	4°03.8	19°03.7	34°03.7	49°03.6	64°03.6	79°03.5	-0.0
	-16°39.8	-16°40.5	-16°41.2	-16°41.9	-16°42.7	-16°43.4	-16°44.1	-16°44.8	-16°45.5	-16°46.3	-16°47.0	-16°47.7	-0.7
We 9	274°02.9	289°02.8	304°02.8	319°02.7	334°02.7	349°02.6	4°02.6	19°02.5	34°02.4	49°02.4	64°02.3	79°02.3	-0.1
	-16°57.0	-16°57.7	-16°58.4	-16°59.1	-16°59.8	-17°00.5	-17°01.2	-17°01.9	-17°02.6	-17°03.3	-17°04.0	-17°04.7	-0.7
Th 10	274°01.5	289°01.4	304°01.4	319°01.3	334°01.3	349°01.2	4°01.1	19°01.1	34°01.0	49°00.9	64°00.9	79°00.8	-0.1
	-17°13.8	-17°14.5	-17°15.2	-17°15.9	-17°16.6	-17°17.3	-17°18.0	-17°18.7	-17°19.4	-17°20.1	-17°20.8	-17°21.5	-0.7
Fr 11	273°59.9	288°59.9	303°59.8	318°59.7	333°59.6	348°59.6	3°59.5	18°59.4	33°59.3	48°59.3	63°59.2	78°59.1	-0.1
	-17°30.4	-17°31.1	-17°31.8	-17°32.5	-17°33.2	-17°33.9	-17°34.5	-17°35.2	-17°35.9	-17°36.6	-17°37.3	-17°37.9	-0.7
Sa 12	273°58.1	288°58.0	303°58.0	318°57.9	333°57.8	348°57.7	3°57.6	18°57.6	33°57.5	48°57.4	63°57.3	78°57.2	-0.1
	-17°46.7	-17°47.4	-17°48.1	-17°48.7	-17°49.4	-17°50.1	-17°50.8	-17°51.4	-17°52.1	-17°52.8	-17°53.4	-17°54.1	-0.7
Su 13	273°56.1	288°56.0	303°55.9	318°55.8	333°55.7	348°55.6	3°55.6	18°55.5	33°55.4	48°55.3	63°55.2	78°55.1	-0.1
	-18°02.7	-18°03.4	-18°04.0	-18°04.7	-18°05.4	-18°06.0	-18°06.7	-18°07.3	-18°08.0	-18°08.6	-18°09.3	-18°09.9	-0.7
Mo 14	273°53.9	288°53.8	303°53.7	318°53.6	333°53.5	348°53.4	3°53.3	18°53.2	33°53.1	48°53.0	63°52.9	78°52.8	-0.1
	-18°18.4	-18°19.0	-18°19.7	-18°20.3	-18°21.0	-18°21.6	-18°22.3	-18°22.9	-18°23.5	-18°24.2	-18°24.8	-18°25.5	-0.6
Tu 15	273°51.4	288°51.3	303°51.2	318°51.1	333°51.0	348°50.9	3°50.8	18°50.6	33°50.5	48°50.4	63°50.3	78°50.2	-0.1
	-18°33.7	-18°34.4	-18°35.0	-18°35.6	-18°36.3	-18°36.9	-18°37.5	-18°38.2	-18°38.8	-18°39.4	-18°40.0	-18°40.7	-0.6
We 16	273°48.7	288°48.6	303°48.5	318°48.4	333°48.3	348°48.2	3°48.0	18°47.9	33°47.8	48°47.7	63°47.6	78°47.4	-0.1
	-18°48.8	-18°49.4	-18°50.0	-18°50.6	-18°51.2	-18°51.9	-18°52.5	-18°53.1	-18°53.7	-18°54.3	-18°54.9	-18°55.5	-0.6
Th 17	273°45.9	288°45.7	303°45.6	318°45.5	333°45.3	348°45.2	3°45.1	18°45.0	33°44.8	48°44.7	63°44.6	78°44.5	-0.1
	-19°03.5	-19°04.1	-19°04.7	-19°05.3	-19°05.9	-19°06.5	-19°07.1	-19°07.7	-19°08.3	-19°08.9	-19°09.5	-19°10.1	-0.6
Fr 18	273°42.8	288°42.6	303°42.5	318°42.4	333°42.2	348°42.1	3°41.9	18°41.8	33°41.7	48°41.5	63°41.4	78°41.3	-0.1
	-19°17.8	-19°18.4	-19°19.0	-19°19.6	-19°20.2	-19°20.8	-19°21.4	-19°21.9	-19°22.5	-19°23.1	-19°23.7	-19°24.3	-0.6
Sa 19	273°39.5	288°39.3	303°39.2	318°39.0	333°38.9	348°38.7	3°38.6	18°38.4	33°38.3	48°38.2	63°38.0	78°37.9	-0.1
	-19°31.8	-19°32.4	-19°33.0	-19°33.6	-19°34.1	-19°34.7	-19°35.3	-19°35.8	-19°36.4	-19°37.0	-19°37.6	-19°38.1	-0.6
Su 20	273°35.9	288°35.8	303°35.6	318°35.5	333°35.3	348°35.2	3°35.0	18°34.9	33°34.7	48°34.6	63°34.4	78°34.3	-0.2
	-19°45.5	-19°46.0	-19°46.6	-19°47.2	-19°47.7	-19°48.3	-19°48.8	-19°49.4	-19°50.0	-19°50.5	-19°51.1	-19°51.6	-0.6
Mo 21	273°32.2	288°32.1	303°31.9	318°31.7	333°31.6	348°31.4	3°31.3	18°31.1	33°30.9	48°30.8	63°30.6	78°30.5	-0.2
	-19°58.8	-19°59.3	-19°59.9	-20°00.4	-20°01.0	-20°01.5	-20°02.0	-20°02.6	-20°03.1	-20°03.7	-20°04.2	-20°04.8	-0.5
Tu 22	273°28.3	288°28.1	303°28.0	318°27.8	333°27.6	348°27.5	3°27.3	18°27.1	33°27.0	48°26.8	63°26.6	78°26.4	-0.2
	-20°11.7	-20°12.2	-20°12.8	-20°13.3	-20°13.8	-20°14.4	-20°14.9	-20°15.4	-20°15.9	-20°16.5	-20°17.0	-20°17.5	-0.5
We 23	273°24.2	288°24.0	303°23.8	318°23.7	333°23.5	348°23.3	3°23.1	18°23.0	33°22.8	48°22.6	63°22.4	78°22.2	-0.2
	-20°24.3	-20°24.8	-20°25.3	-20°25.8	-20°26.3	-20°26.8	-20°27.4	-20°27.9	-20°28.4	-20°28.9	-20°29.4	-20°29.9	-0.5
Th 24	273°19.9	288°19.7	303°19.5	318°19.3	333°19.1	348°19.0	3°18.8	18°18.6	33°18.4	48°18.2	63°18.0	78°17.8	-0.2
	-20°36.5	-20°37.0	-20°37.5	-20°38.0	-20°38.5	-20°39.0	-20°39.4	-20°39.9	-20°40.4	-20°40.9	-20°41.4	-20°41.9	-0.5
Fr 25	273°15.4	288°15.2	303°15.0	318°14.8	333°14.6	348°14.4	3°14.2	18°14.0	33°13.8	48°13.7	63°13.5	78°13.3	-0.2
	-20°48.3	-20°48.8	-20°49.2	-20°49.7	-20°50.2	-20°50.7	-20°51.2	-20°51.6	-20°52.1	-20°52.6	-20°53.1	-20°53.5	-0.5
Sa 26	273°10.7	288°10.5	303°10.3	318°10.1	333°09.9	348°09.7	3°09.5	18°09.3	33°09.1	48°08.9	63°08.7	78°08.5	-0.2
	-20°59.7	-21°00.2	-21°00.6	-21°01.1	-21°01.5	-21°02.0	-21°02.5	-21°02.9	-21°03.4	-21°03.9	-21°04.3	-21°04.8	-0.5
Su 27	273°05.8	288°05.6	303°05.4	318°05.2	333°05.0	348°04.8	3°04.6	18°04.4	33°04.2	48°04.0	63°03.8	78°03.6	-0.2
	-21°10.7	-21°11.2	-21°11.6	-21°12.1	-21°12.5	-21°13.0	-21°13.4	-21°13.8	-21°14.3	-21°14.7	-21°15.2	-21°15.6	-0.4
Mo 28	273°00.8	288°00.6	303°00.4	318°00.2	332°59.9	347°59.7	2°59.5	17°59.3	32°59.1	47°58.9	62°58.7	77°58.4	-0.2
	-21°21.3	-21°21.8	-21°22.2	-21°22.6	-21°23.1	-21°23.5	-21°23.9	-21°24.4	-21°24.8	-21°25.2	-21°25.6	-21°26.1	-0.4
Tu 29	272°55.6	287°55.4	302°55.2	317°54.9	332°54.7	347°54.5	2°54.3	17°54.1	32°53.8	47°53.6	62°53.4	77°53.2	-0.2
	-21°31.6	-21°32.0	-21°32.4	-21°32.8	-21°33.2	-21°33.6	-21°34.0	-21°34.5	-21°34.9	-21°35.3	-21°35.7	-21°36.1	-0.4
We 30	272°50.2	287°50.0	302°49.8	317°49.5	332°49.3	347°49.1	2°48.9	17°48.6	32°48.4	47°48.2	62°47.9	77°47.7	-0.2
	-21°41.4	-21°41.8	-21°42.2	-21°42.6	-21°43.0	-21°43.4	-21°43.8	-21°44.1	-21°44.5	-21°44.9	-21°45.3	-21°45.7	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2033

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Tu 1	254°18.0 -9°20.1	268°46.6 -9°10.6	283°15.1 -9°01.0	297°43.7 -8°51.4	312°12.3 -8°41.7	326°40.8 -8°31.9	341°09.4 -8°22.1	355°37.9 -8°12.2	10°06.4 -8°02.2	24°34.9 -7°52.2	39°03.3 -7°42.2	+28.5 +9.8	16.0 58.8
We 2	256°08.5 -5°04.8	270°36.6 -4°53.9	285°04.8 -4°43.0	299°32.9 -4°32.0	314°01.1 -4°21.0	328°29.2 -4°10.0	342°57.2 -3°58.9	357°25.3 -3°47.8	11°53.3 -3°36.6	26°21.3 -3°25.5	40°49.3 -3°14.3	+28.1 +11.1	16.3 59.7
Th 3	257°45.6 -0°22.8	272°13.1 -0°11.3	286°40.6 0°00.3	301°08.0 0°12.0	315°35.4 0°23.6	330°02.8 0°35.2	344°30.1 0°46.8	358°57.4 0°58.5	13°24.7 1°10.1	27°51.9 1°21.8	42°19.1 1°33.4	+27.4 +11.6	16.5 60.4
Fr 4	259°02.5 4°27.4	273°29.1 4°38.9	287°55.6 4°50.3	302°22.1 5°01.8	316°48.6 5°13.2	331°15.0 5°24.6	345°41.3 5°35.9	0°07.7 5°47.2	14°33.9 5°58.5	29°00.2 6°09.8	43°26.4 6°21.0	+26.4 +11.4	16.6 60.9
Sa 5	259°54.0 9°04.0	274°19.5 9°14.5	288°45.0 9°24.9	303°10.4 9°35.2	317°35.8 9°45.5	332°01.1 9°55.7	346°26.4 10°05.8	0°51.7 10°15.9	15°16.9 10°25.8	29°42.0 10°35.8	44°07.2 10°45.6	+25.3 +10.2	16.7 61.2
○ Su 6	260°19.5 13°03.6	274°44.0 13°12.1	289°08.6 13°20.5	303°33.0 13°28.8	317°57.5 13°37.0	332°21.9 13°45.1	346°46.3 13°53.1	1°10.7 14°01.0	15°35.0 14°08.8	29°59.3 14°16.5	44°23.6 14°24.1	+24.4 +8.1	16.6 61.0
Mo 7	260°25.7 16°04.7	274°49.8 16°10.5	289°13.8 16°16.2	303°37.8 16°21.7	318°01.8 16°27.2	332°25.8 16°32.5	346°49.9 16°37.7	1°13.9 16°42.7	15°37.9 16°47.7	30°01.9 16°52.5	44°25.9 16°57.2	+24.0 +5.2	16.5 60.6
Tu 8	260°27.5 17°52.6	274°51.7 17°55.3	289°16.0 17°57.8	303°40.3 18°00.2	318°04.7 18°02.5	332°29.0 18°04.7	346°53.4 18°06.7	1°17.8 18°08.7	15°42.3 18°10.5	30°06.8 18°12.1	44°31.3 18°13.7	+24.4 +2.1	16.3 59.8
We 9	260°44.3 18°21.8	275°09.6 18°21.4	289°34.9 18°20.8	304°00.3 18°20.2	318°25.7 18°19.4	332°51.2 18°18.5	347°16.7 18°17.5	1°42.3 18°16.3	16°08.0 18°15.1	30°33.7 18°13.7	44°59.5 18°12.2	+25.5 -1.0	16.1 58.9
Th 10	261°34.3 17°36.8	276°01.2 17°33.5	290°28.2 17°30.2	304°55.2 17°26.8	319°22.3 17°23.3	333°49.5 17°19.7	348°16.8 17°16.0	2°44.1 17°12.2	17°11.5 17°08.3	31°39.0 17°04.3	46°06.5 17°00.3	+27.2 -3.7	15.8 57.9
Fr 11	263°09.2 15°48.4	277°38.0 15°43.0	292°06.9 15°37.4	306°35.8 15°31.8	321°04.8 15°26.1	335°33.9 15°20.4	350°03.1 15°14.5	4°32.4 15°08.6	19°01.7 15°02.6	33°31.1 14°56.6	48°00.6 14°50.5	+29.1 -5.8	15.5 56.9
Sa 12	265°31.8 13°10.7	280°02.5 13°03.6	294°33.2 12°56.4	309°04.0 12°49.2	323°34.9 12°41.9	338°05.8 12°34.5	352°36.8 12°27.1	7°07.9 12°19.6	21°39.0 12°12.1	36°10.2 12°04.6	50°41.5 11°57.0	+31.0 -7.4	15.3 56.0
◑ Su 13	280°02.5 13°03.6	294°33.2 12°56.4	309°04.0 12°49.2	323°34.9 12°41.9	338°05.8 12°34.5	352°36.8 12°27.1	7°07.9 12°19.6	21°39.0 12°12.1	36°10.2 12°04.6	50°41.5 11°57.0	65°12.8 11°49.3	+31.0 -7.4	15.3 56.0
Mo 14	283°10.3 9°49.2	297°42.6 9°40.9	312°14.9 9°32.5	326°47.3 9°24.2	341°19.8 9°15.7	355°52.3 9°07.3	10°24.8 8°58.8	24°57.5 8°50.2	39°30.1 8°41.7	54°02.8 8°33.1	68°35.6 8°24.5	+32.5 -8.5	15.1 55.2
Tu 15	286°52.4 6°12.0	301°25.9 6°03.0	315°59.3 5°54.0	330°32.9 5°44.9	345°06.4 5°35.8	359°40.0 5°26.7	14°13.6 5°17.6	28°47.3 5°08.5	43°21.0 4°59.4	57°54.7 4°50.2	72°28.4 4°41.1	+33.6 -9.1	14.9 54.7
We 16	290°57.9 2°22.2	305°32.0 2°12.9	320°06.2 2°03.5	334°40.3 1°54.2	349°14.5 1°44.9	3°48.7 1°35.5	18°23.0 1°26.2	32°57.2 1°16.8	47°31.4 1°07.5	62°05.7 0°58.1	76°40.0 0°48.8	+34.2 -9.3	14.8 54.3
Th 17	295°15.1 -1°31.3	309°49.5 -1°40.5	324°23.8 -1°49.8	338°58.2 -1°59.1	353°32.6 -2°08.4	8°07.0 -2°17.6	22°41.3 -2°26.9	37°15.7 -2°36.1	51°50.1 -2°45.4	66°24.4 -2°54.6	80°58.8 -3°03.8	+34.4 -9.3	14.7 54.0
Fr 18	299°33.0 -5°20.0	314°07.2 -5°28.9	328°41.4 -5°37.8	343°15.6 -5°46.7	357°49.7 -5°55.6	12°23.8 -6°04.4	26°57.9 -6°13.2	41°32.0 -6°22.0	56°06.1 -6°30.8	70°40.1 -6°39.6	85°14.2 -6°48.3	+34.1 -8.8	14.7 54.0
Sa 19	303°41.8 -8°55.6	318°15.4 -9°03.9	332°49.0 -9°12.1	347°22.6 -9°20.2	1°56.2 -9°28.3	16°29.7 -9°36.4	31°03.2 -9°44.5	45°36.6 -9°52.5	60°10.1 -10°00.5	74°43.5 -10°08.4	89°16.8 -10°16.3	+33.5 -8.1	14.7 54.0
Su 20	307°33.2 -12°09.4	322°06.0 -12°16.6	336°38.8 -12°23.7	351°11.5 -12°30.8	5°44.2 -12°37.8	20°16.8 -12°44.8	34°49.5 -12°51.7	49°22.0 -12°58.5	63°54.6 -13°05.3	78°27.1 -13°12.1	92°59.5 -13°18.8	+32.6 -6.9	14.8 54.2
Mo 21	311°01.6 -14°52.1	325°33.4 -14°57.9	340°05.2 -15°03.5	354°37.0 -15°09.1	9°08.6 -15°14.7	23°40.3 -15°20.1	38°11.9 -15°25.5	52°43.5 -15°30.9	67°15.0 -15°36.1	81°46.5 -15°41.3	96°17.9 -15°46.4	+31.6 -5.4	14.9 54.5
● Tu 22	314°04.8 -16°54.4	328°35.7 -16°58.4	343°06.4 -17°02.2	357°37.2 -17°06.0	12°07.9 -17°09.7	26°38.5 -17°13.3	41°09.2 -17°16.8	55°39.8 -17°20.3	70°10.3 -17°23.6	84°40.8 -17°26.9	99°11.3 -17°30.1	+30.6 -3.6	14.9 54.8
We 23	316°44.5 -18°07.8	331°14.4 -18°09.6	345°44.4 -18°11.3	0°14.3 -18°13.0	14°44.2 -18°14.5	29°14.0 -18°16.0	43°43.8 -18°17.3	58°13.6 -18°18.6	72°43.4 -18°19.8	87°13.1 -18°20.8	101°42.8 -18°21.8	+29.8 -1.4	15.1 55.2
Th 24	319°05.9 -18°25.5	333°35.3 -18°25.0	348°04.6 -18°24.4	2°34.0 -18°23.7	17°03.3 -18°22.9	31°32.6 -18°22.0	46°01.9 -18°21.0	60°31.2 -18°19.9	75°00.5 -18°18.7	89°29.8 -18°17.5	103°59.0 -18°16.1	+29.3 +0.9	15.2 55.6
Fr 25	321°16.7 -17°43.9	335°45.8 -17°41.0	350°15.0 -17°38.0	4°44.1 -17°34.9	19°13.2 -17°31.7	33°42.3 -17°28.5	48°11.4 -17°25.1	62°40.6 -17°21.6	77°09.7 -17°18.0	91°38.8 -17°14.4	106°07.9 -17°10.6	+29.1 +3.3	15.3 56.1
Sa 26	323°24.7 -16°03.1	337°53.9 -15°57.9	352°23.0 -15°52.6	6°52.2 -15°47.2	21°21.4 -15°41.7	35°50.5 -15°36.1	50°19.7 -15°30.4	64°48.9 -15°24.7	79°18.1 -15°18.8	93°47.3 -15°12.9	108°16.5 -15°06.9	+29.2 +5.6	15.5 56.7
Su 27	325°35.3 -13°26.7	340°04.6 -13°19.4	354°34.0 -13°12.0	9°03.3 -13°04.5	23°32.6 -12°57.0	38°02.0 -12°49.3	52°31.3 -12°41.6	67°00.7 -12°33.9	81°30.0 -12°26.0	95°59.4 -12°18.1	110°28.7 -12°10.1	+29.3 +7.7	15.6 57.3
Mo 28	327°49.9 -10°01.8	342°19.3 -9°52.7	356°48.7 -9°43.6	11°18.2 -9°34.4	25°47.6 -9°25.2	40°17.1 -9°15.8	54°46.5 -9°06.5	69°15.9 -8°57.0	83°45.4 -8°47.5	98°14.8 -8°38.0	112°44.2 -8°28.4	+29.4 +9.3	15.8 58.0
◐ Tu 29	330°05.3 -5°58.2	344°34.6 -5°47.9	359°04.0 -5°37.4	13°33.3 -5°27.0	28°02.6 -5°16.5	42°31.9 -5°05.9	57°01.2 -4°55.3	71°30.5 -4°44.7	85°59.8 -4°34.1	100°29.0 -4°23.4	114°58.3 -4°12.7	+29.3 +10.6	16.0 58.6
We 30	332°14.8 -1°28.4	346°43.7 -1°17.2	1°12.6 -1°06.1	15°41.5 -0°54.9	30°10.3 -0°43.7	44°39.2 -0°32.5	59°08.0 -0°21.3	73°36.7 -0°10.1	88°05.5 0°01.2	102°34.2 0°12.4	117°02.9 0°23.7	+28.8 +11.2	16.2 59.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 6 20h32 — LQ: 13 20h08 — NM: 22 01h39 — FQ: 29 15h15

SUN

December 2033

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	272°44.7	287°44.5	302°44.2	317°44.0	332°43.8	347°43.5	2°43.3	17°43.1	32°42.8	47°42.6	62°42.4	77°42.1	-0.2
	-21°50.8	-21°51.1	-21°51.5	-21°51.9	-21°52.3	-21°52.7	-21°53.0	-21°53.4	-21°53.8	-21°54.2	-21°54.6	-21°54.9	-0.4
Fr 2	272°39.0	287°38.8	302°38.5	317°38.3	332°38.1	347°37.8	2°37.6	17°37.3	32°37.1	47°36.8	62°36.6	77°36.4	-0.2
	-21°59.7	-22°00.1	-22°00.5	-22°00.8	-22°01.2	-22°01.6	-22°01.9	-22°02.3	-22°02.6	-22°03.0	-22°03.4	-22°03.7	-0.4
Sa 3	272°33.2	287°32.9	302°32.7	317°32.4	332°32.2	347°31.9	2°31.7	17°31.5	32°31.2	47°31.0	62°30.7	77°30.5	-0.2
	-22°08.3	-22°08.6	-22°09.0	-22°09.3	-22°09.7	-22°10.0	-22°10.4	-22°10.7	-22°11.0	-22°11.4	-22°11.7	-22°12.1	-0.3
Su 4	272°27.2	287°27.0	302°26.7	317°26.4	332°26.2	347°25.9	2°25.7	17°25.4	32°25.2	47°24.9	62°24.7	77°24.4	-0.3
	-22°16.4	-22°16.7	-22°17.1	-22°17.4	-22°17.7	-22°18.1	-22°18.4	-22°18.7	-22°19.0	-22°19.4	-22°19.7	-22°20.0	-0.3
Mo 5	272°21.1	287°20.8	302°20.6	317°20.3	332°20.1	347°19.8	2°19.5	17°19.3	32°19.0	47°18.8	62°18.5	77°18.2	-0.3
	-22°24.1	-22°24.4	-22°24.7	-22°25.0	-22°25.4	-22°25.7	-22°26.0	-22°26.3	-22°26.6	-22°26.9	-22°27.2	-22°27.5	-0.3
Tu 6	272°14.8	287°14.6	302°14.3	317°14.0	332°13.8	347°13.5	2°13.2	17°13.0	32°12.7	47°12.5	62°12.2	77°11.9	-0.3
	-22°31.4	-22°31.7	-22°32.0	-22°32.2	-22°32.5	-22°32.8	-22°33.1	-22°33.4	-22°33.7	-22°34.0	-22°34.3	-22°34.5	-0.3
We 7	272°08.4	287°08.2	302°07.9	317°07.6	332°07.4	347°07.1	2°06.8	17°06.6	32°06.3	47°06.0	62°05.7	77°05.5	-0.3
	-22°38.2	-22°38.5	-22°38.7	-22°39.0	-22°39.3	-22°39.6	-22°39.8	-22°40.1	-22°40.4	-22°40.6	-22°40.9	-22°41.2	-0.3
Th 8	272°01.9	287°01.7	302°01.4	317°01.1	332°00.8	347°00.6	2°00.3	17°00.0	31°59.7	46°59.5	61°59.2	76°58.9	-0.3
	-22°44.6	-22°44.8	-22°45.1	-22°45.3	-22°45.6	-22°45.8	-22°46.1	-22°46.3	-22°46.6	-22°46.8	-22°47.1	-22°47.3	-0.3
Fr 9	271°55.3	286°55.0	301°54.8	316°54.5	331°54.2	346°53.9	1°53.6	16°53.4	31°53.1	46°52.8	61°52.5	76°52.2	-0.3
	-22°50.5	-22°50.7	-22°51.0	-22°51.2	-22°51.4	-22°51.7	-22°51.9	-22°52.1	-22°52.4	-22°52.6	-22°52.8	-22°53.1	-0.2
Sa 10	271°48.6	286°48.3	301°48.0	316°47.7	331°47.4	346°47.2	1°46.9	16°46.6	31°46.3	46°46.0	61°45.7	76°45.4	-0.3
	-22°56.0	-22°56.2	-22°56.4	-22°56.6	-22°56.8	-22°57.1	-22°57.3	-22°57.5	-22°57.7	-22°57.9	-22°58.1	-22°58.3	-0.2
Su 11	271°41.7	286°41.4	301°41.2	316°40.9	331°40.6	346°40.3	1°40.0	16°39.7	31°39.4	46°39.1	61°38.8	76°38.6	-0.3
	-23°01.0	-23°01.2	-23°01.4	-23°01.6	-23°01.8	-23°02.0	-23°02.2	-23°02.4	-23°02.6	-23°02.8	-23°03.0	-23°03.2	-0.2
Mo 12	271°34.8	286°34.5	301°34.2	316°33.9	331°33.6	346°33.3	1°33.0	16°32.7	31°32.5	46°32.2	61°31.9	76°31.6	-0.3
	-23°05.6	-23°05.8	-23°05.9	-23°06.1	-23°06.3	-23°06.5	-23°06.7	-23°06.8	-23°07.0	-23°07.2	-23°07.3	-23°07.5	-0.2
Tu 13	271°27.8	286°27.5	301°27.2	316°26.9	331°26.6	346°26.3	1°26.0	16°25.7	31°25.4	46°25.1	61°24.8	76°24.5	-0.3
	-23°09.7	-23°09.9	-23°10.0	-23°10.2	-23°10.3	-23°10.5	-23°10.7	-23°10.8	-23°11.0	-23°11.1	-23°11.3	-23°11.4	-0.2
We 14	271°20.6	286°20.3	301°20.0	316°19.7	331°19.4	346°19.1	1°18.8	16°18.5	31°18.2	46°17.9	61°17.6	76°17.3	-0.3
	-23°13.3	-23°13.5	-23°13.6	-23°13.8	-23°13.9	-23°14.1	-23°14.2	-23°14.3	-23°14.5	-23°14.6	-23°14.7	-23°14.9	-0.1
Th 15	271°13.4	286°13.1	301°12.8	316°12.5	331°12.2	346°11.9	1°11.6	16°11.3	31°11.0	46°10.7	61°10.4	76°10.1	-0.3
	-23°16.5	-23°16.7	-23°16.8	-23°16.9	-23°17.0	-23°17.1	-23°17.3	-23°17.4	-23°17.5	-23°17.6	-23°17.7	-23°17.8	-0.1
Fr 16	271°06.2	286°05.9	301°05.6	316°05.3	331°05.0	346°04.7	1°04.4	16°04.1	31°03.7	46°03.4	61°03.1	76°02.8	-0.3
	-23°19.3	-23°19.4	-23°19.5	-23°19.6	-23°19.7	-23°19.8	-23°19.9	-23°20.0	-23°20.1	-23°20.2	-23°20.3	-23°20.4	-0.1
Sa 17	270°58.9	285°58.6	300°58.2	315°57.9	330°57.6	345°57.3	0°57.0	15°56.7	30°56.4	45°56.1	60°55.8	75°55.5	-0.3
	-23°21.5	-23°21.6	-23°21.7	-23°21.8	-23°21.9	-23°21.9	-23°22.0	-23°22.1	-23°22.2	-23°22.3	-23°22.3	-23°22.4	-0.1
Su 18	270°51.5	285°51.2	300°50.9	315°50.6	330°50.3	345°50.0	0°49.6	15°49.3	30°49.0	45°48.7	60°48.4	75°48.1	-0.3
	-23°23.3	-23°23.4	-23°23.5	-23°23.5	-23°23.6	-23°23.6	-23°23.7	-23°23.8	-23°23.8	-23°23.9	-23°23.9	-23°24.0	-0.1
Mo 19	270°44.1	285°43.8	300°43.5	315°43.2	330°42.8	345°42.5	0°42.2	15°41.9	30°41.6	45°41.3	60°41.0	75°40.7	-0.3
	-23°24.7	-23°24.7	-23°24.7	-23°24.8	-23°24.8	-23°24.9	-23°24.9	-23°24.9	-23°25.0	-23°25.0	-23°25.1	-23°25.1	-0.0
Tu 20	270°36.6	285°36.3	300°36.0	315°35.7	330°35.4	345°35.1	0°34.8	15°34.5	30°34.2	45°33.8	60°33.5	75°33.2	-0.3
	-23°25.5	-23°25.5	-23°25.6	-23°25.6	-23°25.6	-23°25.6	-23°25.6	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-0.0
We 21	270°29.2	285°28.9	300°28.6	315°28.2	330°27.9	345°27.6	0°27.3	15°27.0	30°26.7	45°26.4	60°26.1	75°25.8	-0.3
	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-0.0
Th 22	270°21.7	285°21.4	300°21.1	315°20.8	330°20.5	345°20.1	0°19.8	15°19.5	30°19.2	45°18.9	60°18.6	75°18.3	-0.3
	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.7	-23°25.6	-23°25.6	+0.0
Fr 23	270°14.2	285°13.9	300°13.6	315°13.3	330°13.0	345°12.7	0°12.4	15°12.0	30°11.7	45°11.4	60°11.1	75°10.8	-0.3
	-23°25.3	-23°25.2	-23°25.2	-23°25.2	-23°25.1	-23°25.1	-23°25.0	-23°25.0	-23°25.0	-23°24.9	-23°24.9	-23°24.8	+0.0
Sa 24	270°06.8	285°06.4	300°06.1	315°05.8	330°05.5	345°05.2	0°04.9	15°04.6	30°04.3	45°04.0	60°03.6	75°03.3	-0.3
	-23°24.2	-23°24.2	-23°24.1	-23°24.1	-23°24.0	-23°24.0	-23°23.9	-23°23.8	-23°23.8	-23°23.7	-23°23.7	-23°23.6	+0.1
Su 25	269°59.3	284°59.0	299°58.7	314°58.4	329°58.1	344°57.8	359°57.4	14°57.1	29°56.8	44°56.5	59°56.2	74°55.9	-0.3
	-23°22.7	-23°22.7	-23°22.6	-23°22.5	-23°22.4	-23°22.4	-23°22.3	-23°22.2	-23°22.1	-23°22.1	-23°22.0	-23°21.9	+0.1
Mo 26	269°51.9	284°51.6	299°51.3	314°50.9	329°50.6	344°50.3	359°50.0	14°49.7	29°49.4	44°49.1	59°48.8	74°48.5	-0.3
	-23°20.8	-23°20.7	-23°20.6	-23°20.5	-23°20.4	-23°20.3	-23°20.2	-23°20.1	-23°20.0	-23°19.9	-23°19.8	-23°19.7	+0.1
Tu 27	269°44.5	284°44.2	299°43.9	314°43.6	329°43.3	344°42.9	359°42.6	14°42.3	29°42.0	44°41.7	59°41.4	74°41.1	-0.3
	-23°18.3	-23°18.2	-23°18.1	-23°18.0	-23°17.9	-23°17.8	-23°17.7	-23°17.5	-23°17.4	-23°17.3	-23°17.2	-23°17.1	+0.1
We 28	269°37.1	284°36.8	299°36.5	314°36.2	329°35.9	344°35.6	359°35.3	14°35.0	29°34.7	44°34.4	59°34.1	74°33.8	-0.3
	-23°15.4	-23°15.3	-23°15.2	-23°15.0	-23°14.9	-23°14.8	-23°14.6	-23°14.5	-23°14.4	-23°14.2	-23°14.1	-23°14.0	+0.1
Th 29	269°29.8	284°29.5	299°29.2	314°28.9	329°28.6	344°28.3	359°28.0	14°27.7	29°27.4	44°27.1	59°26.8	74°26.5	-0.3
	-23°12.1	-23°11.9	-23°11.8	-23°11.6	-23°11.5	-23°11.3	-23°11.2	-23°11.0	-23°10.9	-23°10.7	-23°10.5	-23°10.4	+0.2
Fr 30	269°22.6	284°22.3	299°22.0	314°21.7	329°21.4	344°21.1	359°20.8	14°20.5	29°20.2	44°19.9	59°19.6	74°19.3	-0.3
	-23°08.2	-23°08.1	-23°07.9	-23°07.7	-23°07.6	-23°07.4	-23°07.2	-23°07.0	-23°06.9	-23°06.7	-23°06.5	-23°06.3	+0.2
Sa 31	269°15.4	284°15.1	299°14.8	314°14.5	329°14.2	344°14.0	359°13.7	14°13.4	29°13.1	44°12.8	59°12.5	74°12.2	-0.3
	-23°04.0	-23°03.8	-23°03.6	-23°03.4	-23°03.2	-23°03.0	-23°02.8	-23°02.6	-23°02.4	-23°02.2	-23°02.0	-23°01.8	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

December 2033

D	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	Δ'/h	SH
Th 1	247°19.6	261°48.0	276°16.3	290°44.6	305°12.8	319°41.0	334°09.2	348°37.3	3°05.4	17°33.5	32°01.5	+28.2	16.3
	2°05.1	2°16.4	2°27.7	2°39.0	2°50.2	3°01.5	3°12.7	3°23.9	3°35.2	3°46.4	3°57.6	+11.2	59.7
Fr 2	248°56.4	263°23.7	277°50.9	292°18.1	306°45.3	321°12.4	335°39.5	350°06.5	4°33.4	19°00.3	33°27.2	+27.1	16.4
	6°43.0	6°53.7	7°04.5	7°15.2	7°25.9	7°36.6	7°47.2	7°57.7	8°08.2	8°18.7	8°29.1	+10.6	60.2
Sa 3	250°03.9	264°29.9	278°55.9	293°21.9	307°47.7	322°13.6	336°39.4	351°05.1	5°30.8	19°56.4	34°22.0	+25.8	16.5
	10°58.9	11°08.4	11°17.8	11°27.1	11°36.4	11°45.6	11°54.7	12°03.8	12°12.7	12°21.6	12°30.4	+9.2	60.4
Su 4	250°40.3	265°05.2	279°30.1	293°54.9	308°19.6	322°44.3	337°09.0	351°33.7	5°58.3	20°22.9	34°47.4	+24.7	16.5
	14°32.1	14°39.4	14°46.7	14°53.8	15°00.9	15°07.8	15°14.7	15°21.4	15°28.0	15°34.5	15°40.9	+6.9	60.4
Mo 5	250°52.6	265°16.7	279°40.9	294°05.1	308°29.2	322°53.4	337°17.5	351°41.6	6°05.7	20°29.9	34°54.0	+24.1	16.4
	17°03.4	17°08.0	17°12.4	17°16.7	17°20.9	17°25.0	17°28.9	17°32.7	17°36.4	17°40.0	17°43.4	+4.0	60.2
○ Tu 6	250°56.4	265°20.7	279°45.0	294°09.3	308°33.7	322°58.0	337°22.4	351°46.9	6°11.3	20°35.8	35°00.3	+24.4	16.3
	18°19.9	18°21.3	18°22.6	18°23.7	18°24.7	18°25.6	18°26.4	18°27.1	18°27.6	18°28.0	18°28.2	+0.8	59.6
We 7	251°13.2	265°38.4	280°03.7	294°29.1	308°54.5	323°19.9	337°45.5	352°11.0	6°36.7	21°02.4	35°28.2	+25.5	16.1
	18°17.5	18°15.8	18°14.0	18°12.0	18°10.0	18°07.9	18°05.6	18°03.2	18°00.7	17°58.1	17°55.4	-2.2	58.9
Th 8	252°02.8	266°29.7	280°56.6	295°23.6	309°50.7	324°17.9	338°45.2	353°12.5	7°39.9	22°07.4	36°35.0	+27.2	15.8
	17°01.9	16°57.5	16°53.0	16°48.4	16°43.8	16°39.0	16°34.1	16°29.2	16°24.1	16°19.0	16°13.8	-4.8	58.0
Fr 9	253°37.8	268°06.7	282°35.6	297°04.5	311°33.6	326°02.7	340°32.0	355°01.2	9°30.6	24°00.1	38°29.6	+29.2	15.6
	14°45.7	14°39.2	14°32.6	14°26.0	14°19.3	14°12.5	14°05.6	13°58.7	13°51.8	13°44.7	13°37.6	-6.8	57.1
Sa 10	256°01.6	270°32.3	285°03.1	299°33.9	314°04.8	328°35.8	343°06.9	357°38.0	12°09.2	26°40.5	41°11.8	+31.0	15.3
	11°44.2	11°36.3	11°28.2	11°20.2	11°12.0	11°03.9	10°55.7	10°47.4	10°39.1	10°30.8	10°22.4	-8.2	56.2
Su 11	259°09.3	273°41.6	288°14.0	302°46.4	317°18.9	331°51.4	346°24.0	0°56.6	15°29.3	30°02.0	44°34.8	+32.5	15.1
	8°12.6	8°03.7	7°54.7	7°45.8	7°36.8	7°27.8	7°18.7	7°09.7	7°00.6	6°51.5	6°42.4	-9.0	55.5
Mo 12	262°51.7	277°25.2	291°58.6	306°32.2	321°05.7	335°39.3	350°12.9	4°46.6	19°20.3	33°54.0	48°27.7	+33.6	15.0
	4°23.5	4°14.1	4°04.7	3°55.3	3°45.9	3°36.5	3°27.1	3°17.7	3°08.2	2°58.8	2°49.4	-9.4	54.8
◑ Tu 13	277°25.2	291°58.6	306°32.2	321°05.7	335°39.3	350°12.9	4°46.6	19°20.3	33°54.0	48°27.7	63°01.5	+33.6	15.0
	4°14.1	4°04.7	3°55.3	3°45.9	3°36.5	3°27.1	3°17.7	3°08.2	2°58.8	2°49.4	2°39.9	-9.4	54.8
We 14	281°31.0	296°05.1	310°39.3	325°13.4	339°47.6	354°21.8	8°55.9	23°30.1	38°04.4	52°38.6	67°12.8	+34.2	14.8
	0°18.0	0°08.6	-0°00.9	-0°10.3	-0°19.7	-0°29.2	-0°38.6	-0°48.0	-0°57.4	-1°06.8	-1°16.2	-9.4	54.4
Th 15	285°46.8	300°21.1	314°55.4	329°29.6	344°03.9	358°38.1	13°12.4	27°46.6	42°20.8	56°55.1	71°29.3	+34.2	14.8
	-3°35.7	-3°44.9	-3°54.1	-4°03.3	-4°12.4	-4°21.5	-4°30.6	-4°39.7	-4°48.8	-4°57.8	-5°06.8	-9.1	54.2
Fr 16	290°00.8	304°34.8	319°08.7	333°42.6	348°16.5	2°50.4	17°24.2	31°58.1	46°31.9	61°05.7	75°39.4	+33.9	14.8
	-7°19.3	-7°27.9	-7°36.5	-7°45.0	-7°53.5	-8°02.0	-8°10.5	-8°18.9	-8°27.3	-8°35.7	-8°44.0	-8.5	54.1
Sa 17	294°02.2	308°35.5	323°08.7	337°41.9	352°15.1	6°48.2	21°21.3	35°54.3	50°27.3	65°00.3	79°33.2	+33.1	14.8
	-10°44.6	-10°52.3	-11°00.0	-11°07.6	-11°15.2	-11°22.7	-11°30.2	-11°37.7	-11°45.1	-11°52.4	-11°59.7	-7.5	54.2
Su 18	297°42.4	312°14.7	326°46.9	341°19.1	355°51.2	10°23.3	24°55.4	39°27.4	53°59.4	68°31.3	83°03.1	+32.1	14.9
	-13°43.2	-13°49.7	-13°56.1	-14°02.5	-14°08.8	-14°15.0	-14°21.2	-14°27.3	-14°33.3	-14°39.3	-14°45.2	-6.2	54.5
Mo 19	300°55.7	315°26.8	329°57.9	344°28.9	358°59.9	13°30.9	28°01.8	42°32.6	57°03.4	71°34.2	86°04.9	+30.9	15.0
	-16°06.1	-16°10.9	-16°15.7	-16°20.4	-16°25.0	-16°29.6	-16°34.0	-16°38.4	-16°42.7	-16°47.0	-16°51.1	-4.5	54.8
Tu 20	303°40.4	318°10.4	332°40.4	347°10.3	1°40.2	16°10.1	30°39.9	45°09.7	59°39.4	74°09.1	88°38.8	+29.8	15.1
	-17°43.8	-17°46.7	-17°49.4	-17°52.1	-17°54.7	-17°57.2	-17°59.6	-18°01.9	-18°04.1	-18°06.3	-18°08.3	-2.5	55.3
● We 21	305°59.7	320°28.8	334°57.9	349°27.0	3°56.0	18°25.1	32°54.1	47°23.1	61°52.0	76°20.9	90°49.8	+29.0	15.2
	-18°27.9	-18°28.5	-18°29.0	-18°29.3	-18°29.6	-18°29.7	-18°29.8	-18°29.8	-18°29.6	-18°29.4	-18°29.1	-0.1	55.8
Th 22	308°01.1	322°29.7	336°58.3	351°26.9	5°55.5	20°24.1	34°52.6	49°21.2	63°49.8	78°18.3	92°46.9	+28.6	15.4
	-18°12.3	-18°10.4	-18°08.4	-18°06.3	-18°04.1	-18°01.8	-17°59.4	-17°56.9	-17°54.3	-17°51.6	-17°48.7	+2.4	56.3
Fr 23	309°54.6	324°23.2	338°51.7	353°20.2	7°48.8	22°17.3	36°45.9	51°14.4	65°43.0	80°11.5	94°40.1	+28.5	15.5
	-16°54.8	-16°50.5	-16°46.0	-16°41.5	-16°36.8	-16°32.0	-16°27.2	-16°22.3	-16°17.2	-16°12.1	-16°06.9	+4.8	56.8
Sa 24	311°49.9	326°18.7	340°47.4	355°16.2	9°45.0	24°13.8	38°42.6	53°11.5	67°40.3	82°09.2	96°38.1	+28.8	15.6
	-14°37.9	-14°31.3	-14°24.6	-14°17.8	-14°10.9	-14°03.9	-13°56.9	-13°49.8	-13°42.6	-13°35.3	-13°27.9	+7.0	57.3
Su 25	313°53.1	328°22.2	342°51.4	357°20.5	11°49.7	26°18.9	40°48.1	55°17.3	69°46.5	84°15.7	98°45.0	+29.2	15.8
	-11°28.5	-11°20.0	-11°11.4	-11°02.7	-10°54.0	-10°45.2	-10°36.3	-10°27.4	-10°18.5	-10°09.4	-10°00.3	+8.8	57.8
Mo 26	316°05.3	330°34.7	345°04.2	359°33.6	14°03.1	28°32.5	43°02.0	57°31.5	72°01.0	86°30.5	101°00.0	+29.5	15.9
	-7°37.2	-7°27.2	-7°17.2	-7°07.2	-6°57.1	-6°47.0	-6°36.8	-6°26.6	-6°16.4	-6°06.1	-5°55.8	+10.1	58.2
Tu 27	318°22.6	332°52.1	347°21.6	1°51.1	16°20.6	30°50.1	45°19.5	59°49.0	74°18.5	88°47.9	103°17.4	+29.5	16.0
	-3°16.9	-3°06.1	-2°55.3	-2°44.4	-2°33.6	-2°22.7	-2°11.8	-2°00.8	-1°49.9	-1°38.9	-1°28.0	+10.9	58.6
We 28	320°37.4	335°06.6	349°35.8	4°05.0	18°34.1	33°03.2	47°32.3	62°01.4	76°30.5	90°59.5	105°28.5	+29.1	16.1
	1°17.6	1°28.7	1°39.7	1°50.8	2°01.8	2°12.8	2°23.9	2°34.9	2°45.9	2°56.9	3°07.9	+11.0	59.0
◐ Th 29	322°40.1	337°08.6	351°37.1	6°05.6	20°34.0	35°02.3	49°30.7	63°59.0	78°27.2	92°55.5	107°23.7	+28.4	16.2
	5°50.5	6°01.1	6°11.8	6°22.3	6°32.9	6°43.4	6°53.9	7°04.3	7°14.7	7°25.1	7°35.4	+10.5	59.2
Fr 30	324°21.5	338°49.0	353°16.5	7°43.9	22°11.3	36°38.6	51°05.9	65°33.2	80°00.4	94°27.5	108°54.6	+27.3	16.2
	10°04.7	10°14.3	10°23.7	10°33.2	10°42.5	10°51.8	11°01.0	11°10.2	11°19.3	11°28.3	11°37.2	+9.3	59.4
Sa 31	325°35.7	340°02.1	354°28.5	8°54.7	23°21.0	37°47.2	52°13.4	66°39.5	81°05.6	95°31.6	109°57.6	+26.2	16.2
	13°42.6	13°50.3	13°57.9	14°05.5	14°12.9	14°20.3	14°27.5	14°34.7	14°41.8	14°48.8	14°55.7	+7.3	59.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 6 07h22 — LQ: 13 15h28 — NM: 21 18h46 — FQ: 29 00h20

SUN

January 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°08.3	284°08.1	299°07.8	314°07.5	329°07.2	344°06.9	359°06.6	14°06.3	29°06.0	44°05.7	59°05.4	74°05.1	-0.3
	-22°59.2	-22°59.0	-22°58.8	-22°58.6	-22°58.4	-22°58.2	-22°57.9	-22°57.7	-22°57.5	-22°57.3	-22°57.1	-22°56.9	+0.2
Mo 2	269°01.3	284°01.1	299°00.8	314°00.5	329°00.2	343°59.9	358°59.6	13°59.3	28°59.0	43°58.7	58°58.4	73°58.2	-0.3
	-22°54.0	-22°53.8	-22°53.5	-22°53.3	-22°53.1	-22°52.8	-22°52.6	-22°52.4	-22°52.2	-22°51.9	-22°51.7	-22°51.4	+0.2
Tu 3	268°54.4	283°54.1	298°53.9	313°53.6	328°53.3	343°53.0	358°52.7	13°52.4	28°52.1	43°51.9	58°51.6	73°51.3	-0.3
	-22°48.3	-22°48.1	-22°47.8	-22°47.6	-22°47.3	-22°47.1	-22°46.8	-22°46.6	-22°46.3	-22°46.1	-22°45.8	-22°45.6	+0.3
We 4	268°47.6	283°47.3	298°47.0	313°46.8	328°46.5	343°46.2	358°45.9	13°45.6	28°45.4	43°45.1	58°44.8	73°44.5	-0.3
	-22°42.2	-22°41.9	-22°41.7	-22°41.4	-22°41.1	-22°40.9	-22°40.6	-22°40.3	-22°40.1	-22°39.8	-22°39.5	-22°39.2	+0.3
Th 5	268°40.9	283°40.6	298°40.3	313°40.1	328°39.8	343°39.5	358°39.2	13°39.0	28°38.7	43°38.4	58°38.1	73°37.9	-0.3
	-22°35.6	-22°35.3	-22°35.1	-22°34.8	-22°34.5	-22°34.2	-22°33.9	-22°33.6	-22°33.3	-22°33.1	-22°32.8	-22°32.5	+0.3
Fr 6	268°34.3	283°34.0	298°33.7	313°33.5	328°33.2	343°32.9	358°32.7	13°32.4	28°32.1	43°31.8	58°31.6	73°31.3	-0.3
	-22°28.6	-22°28.3	-22°28.0	-22°27.7	-22°27.4	-22°27.1	-22°26.8	-22°26.5	-22°26.2	-22°25.9	-22°25.6	-22°25.3	+0.3
Sa 7	268°27.8	283°27.5	298°27.3	313°27.0	328°26.7	343°26.5	358°26.2	13°25.9	28°25.7	43°25.4	58°25.1	73°24.9	-0.3
	-22°21.2	-22°20.8	-22°20.5	-22°20.2	-22°19.9	-22°19.5	-22°19.2	-22°18.9	-22°18.6	-22°18.2	-22°17.9	-22°17.6	+0.3
Su 8	268°21.4	283°21.2	298°20.9	313°20.6	328°20.4	343°20.1	358°19.8	13°19.6	28°19.3	43°19.1	58°18.8	73°18.5	-0.3
	-22°13.3	-22°12.9	-22°12.6	-22°12.2	-22°11.9	-22°11.6	-22°11.2	-22°10.9	-22°10.5	-22°10.2	-22°09.8	-22°09.5	+0.3
Mo 9	268°15.2	283°14.9	298°14.7	313°14.4	328°14.1	343°13.9	358°13.6	13°13.4	28°13.1	43°12.9	58°12.6	73°12.4	-0.3
	-22°04.9	-22°04.6	-22°04.2	-22°03.8	-22°03.5	-22°03.1	-22°02.8	-22°02.4	-22°02.0	-22°01.7	-22°01.3	-22°00.9	+0.4
Tu 10	268°09.1	283°08.8	298°08.6	313°08.3	328°08.1	343°07.8	358°07.6	13°07.3	28°07.1	43°06.8	58°06.6	73°06.3	-0.3
	-21°56.1	-21°55.8	-21°55.4	-21°55.0	-21°54.6	-21°54.3	-21°53.9	-21°53.5	-21°53.1	-21°52.7	-21°52.4	-21°52.0	+0.4
We 11	268°03.1	283°02.8	298°02.6	313°02.3	328°02.1	343°01.9	358°01.6	13°01.4	28°01.1	43°00.9	58°00.6	73°00.4	-0.2
	-21°46.9	-21°46.6	-21°46.2	-21°45.8	-21°45.4	-21°45.0	-21°44.6	-21°44.2	-21°43.8	-21°43.4	-21°43.0	-21°42.6	+0.4
Th 12	267°57.3	282°57.0	297°56.8	312°56.5	327°56.3	342°56.1	357°55.8	12°55.6	27°55.3	42°55.1	57°54.9	72°54.6	-0.2
	-21°37.3	-21°36.9	-21°36.5	-21°36.1	-21°35.7	-21°35.3	-21°34.8	-21°34.4	-21°34.0	-21°33.6	-21°33.2	-21°32.8	+0.4
Fr 13	267°51.6	282°51.3	297°51.1	312°50.9	327°50.6	342°50.4	357°50.2	12°49.9	27°49.7	42°49.5	57°49.2	72°49.0	-0.2
	-21°27.3	-21°26.9	-21°26.4	-21°26.0	-21°25.6	-21°25.1	-21°24.7	-21°24.3	-21°23.8	-21°23.4	-21°23.0	-21°22.5	+0.4
Sa 14	267°46.0	282°45.8	297°45.6	312°45.4	327°45.1	342°44.9	357°44.7	12°44.4	27°44.2	42°44.0	57°43.8	72°43.5	-0.2
	-21°16.8	-21°16.4	-21°15.9	-21°15.5	-21°15.0	-21°14.6	-21°14.1	-21°13.7	-21°13.2	-21°12.8	-21°12.3	-21°11.9	+0.4
Su 15	267°40.7	282°40.4	297°40.2	312°40.0	327°39.8	342°39.6	357°39.3	12°39.1	27°38.9	42°38.7	57°38.5	72°38.2	-0.2
	-21°06.0	-21°05.5	-21°05.0	-21°04.6	-21°04.1	-21°03.6	-21°03.2	-21°02.7	-21°02.2	-21°01.8	-21°01.3	-21°00.8	+0.5
Mo 16	267°35.4	282°35.2	297°35.0	312°34.8	327°34.6	342°34.4	357°34.2	12°34.0	27°33.7	42°33.5	57°33.3	72°33.1	-0.2
	-20°54.7	-20°54.2	-20°53.7	-20°53.2	-20°52.8	-20°52.3	-20°51.8	-20°51.3	-20°50.8	-20°50.3	-20°49.9	-20°49.4	+0.5
Tu 17	267°30.4	282°30.2	297°30.0	312°29.8	327°29.6	342°29.4	357°29.2	12°29.0	27°28.8	42°28.6	57°28.3	72°28.1	-0.2
	-20°43.0	-20°42.5	-20°42.0	-20°41.5	-20°41.0	-20°40.5	-20°40.0	-20°39.5	-20°39.0	-20°38.5	-20°38.0	-20°37.5	+0.5
We 18	267°25.5	282°25.3	297°25.1	312°24.9	327°24.7	342°24.5	357°24.3	12°24.1	27°23.9	42°23.7	57°23.6	72°23.4	-0.2
	-20°30.9	-20°30.4	-20°29.9	-20°29.4	-20°28.9	-20°28.4	-20°27.9	-20°27.3	-20°26.8	-20°26.3	-20°25.8	-20°25.3	+0.5
Th 19	267°20.8	282°20.6	297°20.5	312°20.3	327°20.1	342°19.9	357°19.7	12°19.5	27°19.3	42°19.1	57°18.9	72°18.7	-0.2
	-20°18.5	-20°18.0	-20°17.4	-20°16.9	-20°16.4	-20°15.8	-20°15.3	-20°14.8	-20°14.3	-20°13.7	-20°13.2	-20°12.7	+0.5
Fr 20	267°16.3	282°16.1	297°16.0	312°15.8	327°15.6	342°15.4	357°15.2	12°15.0	27°14.9	42°14.7	57°14.5	72°14.3	-0.2
	-20°05.7	-20°05.1	-20°04.6	-20°04.0	-20°03.5	-20°02.9	-20°02.4	-20°01.8	-20°01.3	-20°00.7	-20°00.2	-19°59.6	+0.5
Sa 21	267°12.0	282°11.8	297°11.6	312°11.5	327°11.3	342°11.1	357°10.9	12°10.8	27°10.6	42°10.4	57°10.3	72°10.1	-0.2
	-19°52.4	-19°51.9	-19°51.3	-19°50.8	-19°50.2	-19°49.6	-19°49.1	-19°48.5	-19°48.0	-19°47.4	-19°46.8	-19°46.3	+0.6
Su 22	267°07.9	282°07.7	297°07.5	312°07.4	327°07.2	342°07.0	357°06.9	12°06.7	27°06.5	42°06.4	57°06.2	72°06.0	-0.2
	-19°38.9	-19°38.3	-19°37.7	-19°37.1	-19°36.6	-19°36.0	-19°35.4	-19°34.8	-19°34.2	-19°33.7	-19°33.1	-19°32.5	+0.6
Mo 23	267°03.9	282°03.8	297°03.6	312°03.4	327°03.3	342°03.1	357°03.0	12°02.8	27°02.7	42°02.5	57°02.3	72°02.2	-0.2
	-19°24.9	-19°24.3	-19°23.7	-19°23.1	-19°22.6	-19°22.0	-19°21.4	-19°20.8	-19°20.2	-19°19.6	-19°19.0	-19°18.4	+0.6
Tu 24	267°00.2	282°00.0	296°59.9	311°59.7	326°59.6	341°59.4	356°59.3	11°59.1	26°59.0	41°58.8	56°58.7	71°58.5	-0.1
	-19°10.6	-19°10.0	-19°09.4	-19°08.8	-19°08.2	-19°07.6	-19°07.0	-19°06.4	-19°05.8	-19°05.1	-19°04.5	-19°03.9	+0.6
We 25	266°56.6	281°56.5	296°56.4	311°56.2	326°56.1	341°55.9	356°55.8	11°55.6	26°55.5	41°55.4	56°55.2	71°55.1	-0.1
	-18°55.9	-18°55.3	-18°54.7	-18°54.1	-18°53.5	-18°52.9	-18°52.2	-18°51.6	-18°51.0	-18°50.4	-18°49.7	-18°49.1	+0.6
Th 26	266°53.3	281°53.2	296°53.0	311°52.9	326°52.8	341°52.6	356°52.5	11°52.4	26°52.2	41°52.1	56°52.0	71°51.8	-0.1
	-18°40.9	-18°40.3	-18°39.7	-18°39.0	-18°38.4	-18°37.8	-18°37.1	-18°36.5	-18°35.9	-18°35.2	-18°34.6	-18°34.0	+0.6
Fr 27	266°50.2	281°50.0	296°49.9	311°49.8	326°49.7	341°49.5	356°49.4	11°49.3	26°49.2	41°49.1	56°48.9	71°48.8	-0.1
	-18°25.6	-18°25.0	-18°24.3	-18°23.7	-18°23.0	-18°22.4	-18°21.7	-18°21.1	-18°20.4	-18°19.8	-18°19.1	-18°18.5	+0.6
Sa 28	266°47.2	281°47.1	296°47.0	311°46.9	326°46.8	341°46.7	356°46.6	11°46.4	26°46.3	41°46.2	56°46.1	71°46.0	-0.1
	-18°09.9	-18°09.3	-18°08.6	-18°07.9	-18°07.3	-18°06.6	-18°06.0	-18°05.3	-18°04.6	-18°04.0	-18°03.3	-18°02.6	+0.7
Su 29	266°44.5	281°44.4	296°44.3	311°44.2	326°44.1	341°44.0	356°43.9	11°43.8	26°43.7	41°43.6	56°43.5	71°43.4	-0.1
	-17°53.9	-17°53.3	-17°52.6	-17°51.9	-17°51.2	-17°50.6	-17°49.9	-17°49.2	-17°48.5	-17°47.8	-17°47.2	-17°46.5	+0.7
Mo 30	266°42.0	281°41.9	296°41.8	311°41.7	326°41.6	341°41.5	356°41.4	11°41.3	26°41.2	41°41.1	56°41.0	71°40.9	-0.1
	-17°37.6	-17°36.9	-17°36.2	-17°35.5	-17°34.9	-17°34.2	-17°33.5	-17°32.8	-17°32.1	-17°31.4	-17°30.7	-17°30.0	+0.7
Tu 31	266°39.7	281°39.6	296°39.5	311°39.4	326°39.4	341°39.3	356°39.2	11°39.1	26°39.0	41°38.9	56°38.8	71°38.7	-0.1
	-17°21.0	-17°20.3	-17°19.6	-17°18.9	-17°18.2	-17°17.5	-17°16.8	-17°16.1	-17°15.4	-17°14.7	-17°14.0	-17°13.3	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2034

D	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	Δ'/h	SH
Su 1	254°15.5	268°41.1	283°06.6	297°32.2	311°57.7	326°23.1	340°48.5	355°13.9	9°39.3	24°04.7	38°30.0	+25.4	16.2
	15°59.2	16°05.0	16°10.7	16°16.2	16°21.7	16°27.1	16°32.3	16°37.5	16°42.5	16°47.4	16°52.2	+5.3	59.5
Mo 2	254°47.2	269°12.2	283°37.2	298°02.2	312°27.2	326°52.2	341°17.2	355°42.2	10°07.2	24°32.2	38°57.2	+25.0	16.2
	17°50.7	17°53.7	17°56.5	17°59.2	18°01.8	18°04.3	18°06.7	18°08.9	18°11.0	18°13.0	18°14.9	+2.4	59.3
Tu 3	255°12.9	269°38.1	284°03.3	298°28.5	312°53.8	327°19.0	341°44.3	356°09.7	10°35.0	25°00.4	39°25.8	+25.3	16.1
	18°28.3	18°28.3	18°28.1	18°27.7	18°27.3	18°26.7	18°26.1	18°25.3	18°24.3	18°23.3	18°22.1	-0.6	58.9
○ We 4	255°51.8	270°17.9	284°44.0	299°10.2	313°36.5	328°02.8	342°29.1	356°55.5	11°22.0	25°48.5	40°15.1	+26.3	15.9
	17°50.9	17°47.9	17°44.9	17°41.7	17°38.4	17°34.9	17°31.4	17°27.8	17°24.1	17°20.2	17°16.3	-3.5	58.3
Th 5	257°01.1	271°28.7	285°56.4	300°24.1	314°51.9	329°19.7	343°47.6	358°15.6	12°43.7	27°11.8	41°40.0	+27.9	15.7
	16°05.5	16°00.1	15°54.5	15°48.9	15°43.2	15°37.4	15°31.5	15°25.5	15°19.5	15°13.3	15°07.1	-5.8	57.6
Fr 6	258°51.6	273°20.9	287°50.3	302°19.8	316°49.3	331°18.9	345°48.6	0°18.4	14°48.2	29°18.1	43°48.1	+29.7	15.5
	13°25.0	13°17.7	13°10.3	13°02.8	12°55.3	12°47.7	12°40.0	12°32.3	12°24.5	12°16.7	12°08.8	-7.6	56.9
Sa 7	261°25.6	275°56.7	290°27.7	304°58.9	319°30.1	334°01.4	348°32.7	3°04.1	17°35.6	32°07.1	46°38.7	+31.3	15.3
	10°04.7	9°56.1	9°47.5	9°38.8	9°30.0	9°21.3	9°12.4	9°03.6	8°54.7	8°45.8	8°36.9	-8.8	56.2
Su 8	264°39.0	279°11.4	293°43.9	308°16.4	322°49.0	337°21.6	351°54.3	6°27.0	20°59.8	35°32.6	50°05.4	+32.6	15.1
	6°19.6	6°10.2	6°00.9	5°51.5	5°42.1	5°32.7	5°23.3	5°13.9	5°04.4	4°54.9	4°45.5	-9.4	55.5
Mo 9	268°22.8	282°56.2	297°29.7	312°03.2	326°36.7	341°10.3	355°43.9	10°17.5	24°51.1	39°24.8	53°58.5	+33.6	15.0
	2°22.4	2°12.8	2°03.2	1°53.7	1°44.1	1°34.5	1°24.9	1°15.4	1°05.8	0°56.2	0°46.6	-9.6	54.9
Tu 10	272°26.2	287°00.2	301°34.1	316°08.1	330°42.2	345°16.2	359°50.2	14°24.2	28°58.3	43°32.3	58°06.4	+34.0	14.9
	-1°36.0	-1°45.5	-1°54.9	-2°04.3	-2°13.7	-2°23.1	-2°32.4	-2°41.8	-2°51.1	-3°00.4	-3°09.7	-9.4	54.5
We 11	287°00.2	301°34.1	316°08.1	330°42.2	345°16.2	359°50.2	14°24.2	28°58.3	43°32.3	58°06.4	72°40.5	+34.0	14.9
	-1°45.5	-1°54.9	-2°04.3	-2°13.7	-2°23.1	-2°32.4	-2°41.8	-2°51.1	-3°00.4	-3°09.7	-3°19.0	-9.4	54.5
◑ Th 12	291°11.5	305°45.5	320°19.6	334°53.6	349°27.6	4°01.6	18°35.6	33°09.6	47°43.6	62°17.6	76°51.5	+34.0	14.8
	-5°35.8	-5°44.7	-5°53.6	-6°02.5	-6°11.4	-6°20.2	-6°29.0	-6°37.8	-6°46.5	-6°55.2	-7°03.9	-8.8	54.2
Fr 13	295°18.9	309°52.5	324°26.2	338°59.8	353°33.4	8°06.9	22°40.5	37°14.0	51°47.5	66°20.9	80°54.3	+33.5	14.8
	-9°10.2	-9°18.4	-9°26.5	-9°34.6	-9°42.6	-9°50.6	-9°58.5	-10°06.4	-10°14.3	-10°22.1	-10°29.9	-8.0	54.2
Sa 14	299°12.0	313°44.9	328°17.7	342°50.5	357°23.3	11°56.1	26°28.8	41°01.4	55°34.1	70°06.7	84°39.2	+32.7	14.8
	-12°21.2	-12°28.2	-12°35.2	-12°42.1	-12°49.0	-12°55.8	-13°02.6	-13°09.3	-13°16.0	-13°22.6	-13°29.2	-6.8	54.3
Su 15	302°42.3	317°14.1	331°45.9	346°17.7	0°49.4	15°21.1	29°52.7	44°24.3	58°55.8	73°27.3	87°58.7	+31.6	14.9
	-15°00.5	-15°06.1	-15°11.6	-15°17.1	-15°22.5	-15°27.8	-15°33.1	-15°38.3	-15°43.4	-15°48.5	-15°53.5	-5.3	54.7
Mo 16	305°44.3	320°15.0	334°45.6	349°16.2	3°46.7	18°17.2	32°47.6	47°17.9	61°48.3	76°18.5	90°48.8	+30.4	15.0
	-16°59.6	-17°03.4	-17°07.1	-17°10.7	-17°14.3	-17°17.8	-17°21.2	-17°24.5	-17°27.7	-17°30.9	-17°33.9	-3.4	55.1
Tu 17	308°16.7	322°46.2	337°15.7	351°45.1	6°14.5	20°43.8	35°13.1	49°42.4	64°11.6	78°40.8	93°09.9	+29.3	15.2
	-18°09.6	-18°11.2	-18°12.8	-18°14.3	-18°15.7	-18°16.9	-18°18.1	-18°19.3	-18°20.3	-18°21.2	-18°22.0	-1.2	55.7
We 18	310°22.7	324°51.3	339°19.9	353°48.4	8°16.9	22°45.4	37°13.9	51°42.3	66°10.7	80°39.1	95°07.4	+28.5	15.4
	-18°22.6	-18°21.9	-18°21.0	-18°20.1	-18°19.0	-18°17.9	-18°16.6	-18°15.3	-18°13.8	-18°12.3	-18°10.6	+1.2	56.4
Th 19	312°10.3	326°38.3	341°06.4	355°34.4	10°02.4	24°30.4	38°58.4	53°26.4	67°54.4	82°22.4	96°50.4	+28.0	15.6
	-17°33.5	-17°30.2	-17°26.8	-17°23.4	-17°19.8	-17°16.1	-17°12.3	-17°08.4	-17°04.4	-17°00.3	-16°56.1	+3.7	57.0
● Fr 20	313°49.5	328°17.4	342°45.3	357°13.3	11°41.2	26°09.2	40°37.1	55°05.1	69°33.1	84°01.0	98°29.0	+28.0	15.7
	-15°41.3	-15°35.5	-15°29.7	-15°23.7	-15°17.7	-15°11.5	-15°05.3	-14°59.0	-14°52.6	-14°46.1	-14°39.5	+6.2	57.7
Sa 21	315°29.9	329°58.0	344°26.2	358°54.3	13°22.5	27°50.7	42°18.9	56°47.1	71°15.4	85°43.6	100°11.9	+28.2	15.9
	-12°50.3	-12°42.3	-12°34.3	-12°26.2	-12°18.0	-12°09.8	-12°01.4	-11°53.0	-11°44.6	-11°36.0	-11°27.4	+8.3	58.2
Su 22	317°17.5	331°46.0	346°14.5	0°43.1	15°11.6	29°40.1	44°08.7	58°37.3	73°05.9	87°34.5	102°03.1	+28.6	16.0
	-9°10.1	-9°00.4	-8°50.7	-8°41.0	-8°31.1	-8°21.3	-8°11.4	-8°01.4	-7°51.4	-7°41.3	-7°31.2	+9.9	58.7
Mo 23	319°13.7	333°42.5	348°11.2	2°40.0	17°08.9	31°37.7	46°06.5	60°35.3	75°04.2	89°33.0	104°01.8	+28.8	16.1
	-4°54.4	-4°43.6	-4°32.9	-4°22.1	-4°11.3	-4°00.4	-3°49.5	-3°38.6	-3°27.7	-3°16.7	-3°05.8	+10.9	59.0
Tu 24	321°14.7	335°43.6	350°12.5	4°41.3	19°10.2	33°39.0	48°07.8	62°36.7	77°05.5	91°34.3	106°03.1	+28.8	16.1
	-0°19.5	-0°08.4	0°02.8	0°13.9	0°25.1	0°36.2	0°47.4	0°58.5	1°09.7	1°20.8	1°31.9	+11.1	59.1
We 25	323°14.1	337°42.7	352°11.3	6°39.9	21°08.5	35°37.0	50°05.5	64°34.1	79°02.6	93°31.1	107°59.5	+28.5	16.1
	4°17.2	4°28.0	4°38.9	4°49.7	5°00.4	5°11.2	5°21.9	5°32.6	5°43.2	5°53.8	6°04.4	+10.7	59.2
Th 26	325°03.8	339°31.9	353°59.9	8°28.0	22°56.0	37°24.0	51°51.9	66°19.8	80°47.7	95°15.6	109°43.4	+28.0	16.1
	8°38.2	8°48.1	8°57.9	9°07.6	9°17.4	9°27.0	9°36.6	9°46.1	9°55.6	10°05.0	10°14.4	+9.6	59.2
◐ Fr 27	326°37.4	341°04.8	355°32.1	9°59.4	24°26.7	38°53.9	53°21.1	67°48.3	82°15.4	96°42.5	111°09.6	+27.2	16.1
	12°26.7	12°34.9	12°43.1	12°51.2	12°59.2	13°07.1	13°15.0	13°22.7	13°30.4	13°38.0	13°45.5	+7.9	59.0
Sa 28	327°52.2	342°18.8	356°45.4	11°12.0	25°38.5	40°05.0	54°31.5	68°58.0	83°24.4	97°50.9	112°17.3	+26.5	16.0
	15°27.4	15°33.5	15°39.4	15°45.3	15°51.0	15°56.6	16°02.2	16°07.6	16°13.0	16°18.2	16°23.4	+5.6	58.9
Su 29	328°51.0	343°17.2	357°43.3	12°09.4	26°35.5	41°01.6	55°27.7	69°53.8	84°19.8	98°45.9	113°12.0	+26.1	16.0
	17°27.7	17°31.1	17°34.4	17°37.6	17°40.7	17°43.7	17°46.5	17°49.3	17°51.9	17°54.4	17°56.8	+2.9	58.6
Mo 30	329°43.1	344°09.2	358°35.3	13°01.5	27°27.6	41°53.8	56°20.0	70°46.2	85°12.4	99°38.7	114°04.9	+26.2	15.9
	18°19.2	18°19.8	18°20.2	18°20.6	18°20.8	18°20.9	18°20.9	18°20.8	18°20.6	18°20.3	18°19.8	+0.1	58.3
Tu 31	330°41.8	345°08.5	359°35.2	14°02.0	28°28.8	42°55.6	57°22.5	71°49.4	86°16.3	100°43.3	115°10.4	+26.9	15.8
	17°59.6	17°57.4	17°55.1	17°52.6	17°50.1	17°47.4	17°44.7	17°41.8	17°38.9	17°35.8	17°32.6	-2.7	57.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 4 19h47 — LQ: 12 13h17 — NM: 20 10h01 — FQ: 27 08h32

SUN

February 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	266°37.6	281°37.5	296°37.5	311°37.4	326°37.3	341°37.2	356°37.1	11°37.1	26°37.0	41°36.9	56°36.8	71°36.7	-0.1
	-17°04.0	-17°03.3	-17°02.6	-17°01.9	-17°01.2	-17°00.5	-16°59.8	-16°59.0	-16°58.3	-16°57.6	-16°56.9	-16°56.2	+0.7
Th 2	266°35.7	281°35.7	296°35.6	311°35.5	326°35.4	341°35.4	356°35.3	11°35.2	26°35.2	41°35.1	56°35.0	71°34.9	-0.1
	-16°46.8	-16°46.1	-16°45.3	-16°44.6	-16°43.9	-16°43.2	-16°42.4	-16°41.7	-16°41.0	-16°40.3	-16°39.5	-16°38.8	+0.7
Fr 3	266°34.1	281°34.0	296°33.9	311°33.9	326°33.8	341°33.7	356°33.7	11°33.6	26°33.5	41°33.5	56°33.4	71°33.4	-0.1
	-16°29.3	-16°28.5	-16°27.8	-16°27.1	-16°26.3	-16°25.6	-16°24.8	-16°24.1	-16°23.4	-16°22.6	-16°21.9	-16°21.1	+0.7
Sa 4	266°32.6	281°32.5	296°32.5	311°32.4	326°32.3	341°32.3	356°32.2	11°32.2	26°32.1	41°32.1	56°32.0	71°32.0	-0.1
	-16°11.4	-16°10.7	-16°10.0	-16°09.2	-16°08.5	-16°07.7	-16°07.0	-16°06.2	-16°05.4	-16°04.7	-16°03.9	-16°03.2	+0.8
Su 5	266°31.3	281°31.2	296°31.2	311°31.2	326°31.1	341°31.1	356°31.0	11°31.0	26°30.9	41°30.9	56°30.8	71°30.8	-0.0
	-15°53.3	-15°52.6	-15°51.8	-15°51.1	-15°50.3	-15°49.5	-15°48.8	-15°48.0	-15°47.3	-15°46.5	-15°45.7	-15°45.0	+0.8
Mo 6	266°30.2	281°30.2	296°30.1	311°30.1	326°30.1	341°30.0	356°30.0	11°29.9	26°29.9	41°29.9	56°29.8	71°29.8	-0.0
	-15°35.0	-15°34.2	-15°33.4	-15°32.7	-15°31.9	-15°31.1	-15°30.3	-15°29.6	-15°28.8	-15°28.0	-15°27.2	-15°26.5	+0.8
Tu 7	266°29.3	281°29.3	296°29.3	311°29.2	326°29.2	341°29.2	356°29.1	11°29.1	26°29.1	41°29.1	56°29.0	71°29.0	-0.0
	-15°16.3	-15°15.6	-15°14.8	-15°14.0	-15°13.2	-15°12.4	-15°11.6	-15°10.9	-15°10.1	-15°09.3	-15°08.5	-15°07.7	+0.8
We 8	266°28.7	281°28.6	296°28.6	311°28.6	326°28.6	341°28.5	356°28.5	11°28.5	26°28.5	41°28.4	56°28.4	71°28.4	-0.0
	-14°57.4	-14°56.6	-14°55.9	-14°55.1	-14°54.3	-14°53.5	-14°52.7	-14°51.9	-14°51.1	-14°50.3	-14°49.5	-14°48.7	+0.8
Th 9	266°28.2	281°28.1	296°28.1	311°28.1	326°28.1	341°28.1	356°28.1	11°28.1	26°28.0	41°28.0	56°28.0	71°28.0	-0.0
	-14°38.3	-14°37.5	-14°36.7	-14°35.9	-14°35.1	-14°34.3	-14°33.5	-14°32.7	-14°31.8	-14°31.0	-14°30.2	-14°29.4	+0.8
Fr 10	266°27.9	281°27.8	296°27.8	311°27.8	326°27.8	341°27.8	356°27.8	11°27.8	26°27.8	41°27.8	56°27.8	71°27.8	-0.0
	-14°18.9	-14°18.1	-14°17.3	-14°16.4	-14°15.6	-14°14.8	-14°14.0	-14°13.2	-14°12.4	-14°11.5	-14°10.7	-14°09.9	+0.8
Sa 11	266°27.7	281°27.7	296°27.7	311°27.7	326°27.7	341°27.7	356°27.7	11°27.7	26°27.7	41°27.8	56°27.8	71°27.8	+0.0
	-13°59.2	-13°58.4	-13°57.6	-13°56.8	-13°55.9	-13°55.1	-13°54.3	-13°53.5	-13°52.6	-13°51.8	-13°51.0	-13°50.2	+0.8
Su 12	266°27.8	281°27.8	296°27.8	311°27.8	326°27.9	341°27.9	356°27.9	11°27.9	26°27.9	41°27.9	56°27.9	71°27.9	+0.0
	-13°39.4	-13°38.5	-13°37.7	-13°36.9	-13°36.0	-13°35.2	-13°34.4	-13°33.5	-13°32.7	-13°31.9	-13°31.0	-13°30.2	+0.8
Mo 13	266°28.1	281°28.1	296°28.1	311°28.1	326°28.1	341°28.2	356°28.2	11°28.2	26°28.2	41°28.2	56°28.2	71°28.3	+0.0
	-13°19.3	-13°18.4	-13°17.6	-13°16.7	-13°15.9	-13°15.1	-13°14.2	-13°13.4	-13°12.5	-13°11.7	-13°10.8	-13°10.0	+0.8
Tu 14	266°28.5	281°28.5	296°28.6	311°28.6	326°28.6	341°28.6	356°28.7	11°28.7	26°28.7	41°28.7	56°28.8	71°28.8	+0.0
	-12°59.0	-12°58.1	-12°57.3	-12°56.4	-12°55.5	-12°54.7	-12°53.8	-12°53.0	-12°52.1	-12°51.3	-12°50.4	-12°49.6	+0.9
We 15	266°29.1	281°29.2	296°29.2	311°29.2	326°29.3	341°29.3	356°29.3	11°29.4	26°29.4	41°29.4	56°29.4	71°29.5	+0.0
	-12°38.4	-12°37.6	-12°36.7	-12°35.8	-12°35.0	-12°34.1	-12°33.3	-12°32.4	-12°31.5	-12°30.7	-12°29.8	-12°29.0	+0.9
Th 16	266°29.9	281°30.0	296°30.0	311°30.0	326°30.1	341°30.1	356°30.2	11°30.2	26°30.2	41°30.3	56°30.3	71°30.4	+0.0
	-12°17.7	-12°16.8	-12°16.0	-12°15.1	-12°14.2	-12°13.4	-12°12.5	-12°11.6	-12°10.7	-12°09.9	-12°09.0	-12°08.1	+0.9
Fr 17	266°30.9	281°30.9	296°31.0	311°31.0	326°31.1	341°31.1	356°31.2	11°31.2	26°31.3	41°31.3	56°31.4	71°31.4	+0.0
	-11°56.8	-11°55.9	-11°55.0	-11°54.1	-11°53.3	-11°52.4	-11°51.5	-11°50.6	-11°49.7	-11°48.9	-11°48.0	-11°47.1	+0.9
Sa 18	266°32.0	281°32.1	296°32.1	311°32.2	326°32.3	341°32.3	356°32.4	11°32.4	26°32.5	41°32.5	56°32.6	71°32.6	+0.1
	-11°35.6	-11°34.8	-11°33.9	-11°33.0	-11°32.1	-11°31.2	-11°30.3	-11°29.4	-11°28.6	-11°27.7	-11°26.8	-11°25.9	+0.9
Su 19	266°33.4	281°33.4	296°33.5	311°33.5	326°33.6	341°33.7	356°33.7	11°33.8	26°33.8	41°33.9	56°34.0	71°34.0	+0.1
	-11°14.3	-11°13.4	-11°12.6	-11°11.7	-11°10.8	-11°09.9	-11°09.0	-11°08.1	-11°07.2	-11°06.3	-11°05.4	-11°04.5	+0.9
Mo 20	266°34.8	281°34.9	296°35.0	311°35.0	326°35.1	341°35.2	356°35.2	11°35.3	26°35.4	41°35.4	56°35.5	71°35.6	+0.1
	-10°52.9	-10°52.0	-10°51.1	-10°50.2	-10°49.3	-10°48.4	-10°47.5	-10°46.6	-10°45.7	-10°44.8	-10°43.9	-10°43.0	+0.9
Tu 21	266°36.5	281°36.6	296°36.6	311°36.7	326°36.8	341°36.8	356°36.9	11°37.0	26°37.1	41°37.1	56°37.2	71°37.3	+0.1
	-10°31.2	-10°30.3	-10°29.4	-10°28.5	-10°27.6	-10°26.7	-10°25.8	-10°24.9	-10°24.0	-10°23.1	-10°22.1	-10°21.2	+0.9
We 22	266°38.3	281°38.4	296°38.4	311°38.5	326°38.6	341°38.7	356°38.8	11°38.8	26°38.9	41°39.0	56°39.1	71°39.2	+0.1
	-10°09.4	-10°08.5	-10°07.6	-10°06.7	-10°05.8	-10°04.8	-10°03.9	-10°03.0	-10°02.1	-10°01.2	-10°00.3	-9°59.4	+0.9
Th 23	266°40.3	281°40.3	296°40.4	311°40.5	326°40.6	341°40.7	356°40.8	11°40.9	26°40.9	41°41.0	56°41.1	71°41.2	+0.1
	-9°47.4	-9°46.5	-9°45.6	-9°44.7	-9°43.8	-9°42.8	-9°41.9	-9°41.0	-9°40.1	-9°39.2	-9°38.2	-9°37.3	+0.9
Fr 24	266°42.4	281°42.5	296°42.6	311°42.7	326°42.7	341°42.8	356°42.9	11°43.0	26°43.1	41°43.2	56°43.3	71°43.4	+0.1
	-9°25.3	-9°24.4	-9°23.5	-9°22.6	-9°21.6	-9°20.7	-9°19.8	-9°18.8	-9°17.9	-9°17.0	-9°16.1	-9°15.1	+0.9
Sa 25	266°44.7	281°44.8	296°44.9	311°45.0	326°45.1	341°45.1	356°45.2	11°45.3	26°45.4	41°45.5	56°45.6	71°45.8	+0.1
	-9°03.1	-9°02.1	-9°01.2	-9°00.3	-8°59.3	-8°58.4	-8°57.5	-8°56.6	-8°55.6	-8°54.7	-8°53.8	-8°52.8	+0.9
Su 26	266°47.1	281°47.2	296°47.3	311°47.4	326°47.5	341°47.6	356°47.7	11°47.8	26°47.9	41°48.0	56°48.1	71°48.2	+0.1
	-8°40.7	-8°39.7	-8°38.8	-8°37.9	-8°36.9	-8°36.0	-8°35.1	-8°34.1	-8°33.2	-8°32.3	-8°31.3	-8°30.4	+0.9
Mo 27	266°49.7	281°49.8	296°49.9	311°50.0	326°50.1	341°50.2	356°50.3	11°50.4	26°50.5	41°50.7	56°50.8	71°50.9	+0.1
	-8°18.2	-8°17.2	-8°16.3	-8°15.3	-8°14.4	-8°13.5	-8°12.5	-8°11.6	-8°10.6	-8°09.7	-8°08.8	-8°07.8	+0.9
Tu 28	266°52.4	281°52.5	296°52.6	311°52.7	326°52.8	341°52.9	356°53.1	11°53.2	26°53.3	41°53.4	56°53.5	71°53.6	+0.1
	-7°55.5	-7°54.6	-7°53.6	-7°52.7	-7°51.7	-7°50.8	-7°49.9	-7°48.9	-7°48.0	-7°47.0	-7°46.1	-7°45.1	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2034

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
We 1	245°15.6	259°43.1	274°10.6	288°38.2	303°05.8	317°33.5	332°01.2	346°29.0	0°56.8	15°24.7	29°52.6	+27.7	15.7
	16°59.5	16°55.3	16°51.1	16°46.7	16°42.2	16°37.7	16°33.0	16°28.3	16°23.5	16°18.6	16°13.6	-4.6	57.5
Th 2	246°58.1	261°26.9	275°55.8	290°24.7	304°53.7	319°22.8	333°51.9	348°21.1	2°50.3	17°19.6	31°48.9	+29.1	15.5
	14°48.2	14°41.9	14°35.4	14°29.0	14°22.4	14°15.8	14°09.1	14°02.3	13°55.5	13°48.5	13°41.6	-6.7	57.0
○ Fr 3	249°16.1	263°46.4	278°16.7	292°47.1	307°17.5	321°48.0	336°18.6	350°49.2	5°19.9	19°50.6	34°21.4	+30.5	15.4
	11°49.2	11°41.3	11°33.3	11°25.2	11°17.1	11°09.0	11°00.8	10°52.5	10°44.2	10°35.9	10°27.5	-8.2	56.4
Sa 4	252°09.8	266°41.4	281°13.1	295°44.8	310°16.6	324°48.4	339°20.3	353°52.2	8°24.2	22°56.2	37°28.3	+31.9	15.2
	8°16.8	8°07.8	7°58.7	7°49.7	7°40.6	7°31.5	7°22.3	7°13.2	7°04.0	6°54.8	6°45.5	-9.1	55.8
Su 5	255°34.5	270°07.3	284°40.0	299°12.8	313°45.7	328°18.6	342°51.5	357°24.4	11°57.4	26°30.4	41°03.5	+32.9	15.1
	4°24.6	4°15.1	4°05.6	3°56.0	3°46.5	3°36.9	3°27.4	3°17.8	3°08.2	2°58.6	2°49.0	-9.6	55.3
Mo 6	259°22.7	273°56.1	288°29.6	303°03.2	317°36.7	332°10.3	346°43.9	1°17.5	15°51.1	30°24.7	44°58.4	+33.6	14.9
	0°25.1	0°15.5	0°06.0	-0°03.6	-0°13.1	-0°22.7	-0°32.2	-0°41.8	-0°51.3	-1°00.8	-1°10.3	-9.5	54.8
Tu 7	263°24.8	277°58.6	292°32.5	307°06.3	321°40.2	336°14.0	350°47.9	5°21.8	19°55.6	34°29.5	49°03.4	+33.9	14.8
	-3°31.0	-3°40.3	-3°49.5	-3°58.7	-4°07.9	-4°17.0	-4°26.2	-4°35.3	-4°44.4	-4°53.4	-5°02.5	-9.1	54.4
We 8	267°31.0	282°04.8	296°38.6	311°12.4	325°46.2	340°19.9	354°53.7	9°27.4	24°01.1	38°34.8	53°08.5	+33.7	14.8
	-7°14.8	-7°23.3	-7°31.9	-7°40.4	-7°48.9	-7°57.3	-8°05.7	-8°14.1	-8°22.4	-8°30.7	-8°39.0	-8.4	54.2
Th 9	271°31.7	286°05.1	300°38.4	315°11.8	329°45.1	344°18.4	358°51.6	13°24.8	27°58.1	42°31.2	57°04.4	+33.3	14.8
	-10°38.0	-10°45.6	-10°53.2	-11°00.7	-11°08.1	-11°15.5	-11°22.9	-11°30.2	-11°37.5	-11°44.7	-11°51.9	-7.4	54.2
Fr 10	286°05.1	300°38.4	315°11.8	329°45.1	344°18.4	358°51.6	13°24.8	27°58.1	42°31.2	57°04.4	71°37.5	+33.2	14.8
	-10°45.6	-10°53.2	-11°00.7	-11°08.1	-11°15.5	-11°22.9	-11°30.2	-11°37.5	-11°44.7	-11°51.9	-11°59.0	-7.3	54.2
◑ Sa 11	289°50.6	304°23.2	318°55.8	333°28.4	348°00.9	2°33.3	17°05.8	31°38.1	46°10.5	60°42.8	75°15.1	+32.4	14.8
	-13°39.5	-13°45.8	-13°52.0	-13°58.1	-14°04.2	-14°10.2	-14°16.2	-14°22.1	-14°27.9	-14°33.7	-14°39.4	-6.0	54.3
Su 12	293°14.4	307°46.1	322°17.6	336°49.2	351°20.7	5°52.1	20°23.5	34°54.9	49°26.2	63°57.5	78°28.8	+31.4	14.9
	-15°57.3	-16°02.0	-16°06.6	-16°11.1	-16°15.5	-16°19.9	-16°24.2	-16°28.4	-16°32.6	-16°36.6	-16°40.6	-4.3	54.7
Mo 13	296°12.0	310°42.5	325°13.0	339°43.4	354°13.8	8°44.2	23°14.5	37°44.7	52°14.9	66°45.1	81°15.2	+30.3	15.0
	-17°31.3	-17°34.1	-17°36.7	-17°39.3	-17°41.8	-17°44.2	-17°46.5	-17°48.7	-17°50.9	-17°52.9	-17°54.9	-2.4	55.2
Tu 14	298°42.1	313°11.6	327°41.0	342°10.4	356°39.7	11°09.0	25°38.3	40°07.5	54°36.7	69°05.9	83°35.0	+29.3	15.2
	-18°13.8	-18°14.4	-18°14.8	-18°15.1	-18°15.4	-18°15.5	-18°15.6	-18°15.6	-18°15.4	-18°15.2	-18°14.9	-0.1	55.8
We 15	300°47.6	315°16.2	329°44.7	344°13.3	358°41.8	13°10.2	27°38.7	42°07.1	56°35.5	71°03.8	85°32.2	+28.5	15.4
	-17°58.3	-17°56.4	-17°54.4	-17°52.3	-17°50.1	-17°47.8	-17°45.4	-17°42.9	-17°40.3	-17°37.5	-17°34.7	+2.4	56.6
Th 16	302°34.5	317°02.5	331°30.5	345°58.5	0°26.4	14°54.4	29°22.3	43°50.2	58°18.1	72°46.0	87°13.9	+27.9	15.7
	-16°40.5	-16°36.1	-16°31.6	-16°27.0	-16°22.3	-16°17.5	-16°12.5	-16°07.5	-16°02.4	-15°57.2	-15°51.9	+4.9	57.5
Fr 17	304°10.7	318°38.5	333°06.2	347°33.9	2°01.6	16°29.3	30°57.0	45°24.8	59°52.5	74°20.2	88°47.9	+27.7	15.9
	-14°20.7	-14°13.8	-14°06.9	-13°59.9	-13°52.8	-13°45.6	-13°38.3	-13°30.9	-13°23.5	-13°15.9	-13°08.3	+7.2	58.3
● Sa 18	305°43.3	320°11.0	334°38.7	349°06.5	3°34.2	18°01.9	32°29.6	46°57.3	61°25.0	75°52.8	90°20.5	+27.7	16.1
	-11°03.9	-10°54.9	-10°45.9	-10°36.9	-10°27.7	-10°18.5	-10°09.2	-9°59.9	-9°50.5	-9°41.0	-9°31.4	+9.2	59.0
Su 19	307°16.8	321°44.6	336°12.4	350°40.1	5°07.9	19°35.7	34°03.5	48°31.3	62°59.1	77°26.9	91°54.7	+27.8	16.2
	-7°01.0	-6°50.5	-6°40.0	-6°29.4	-6°18.8	-6°08.2	-5°57.5	-5°46.7	-5°36.0	-5°25.1	-5°14.3	+10.7	59.6
Mo 20	308°51.8	323°19.6	337°47.4	352°15.2	6°43.0	21°10.8	35°38.6	50°06.4	64°34.2	79°02.0	93°29.8	+27.8	16.3
	-2°27.7	-2°16.4	-2°05.1	-1°53.7	-1°42.4	-1°31.0	-1°19.6	-1°08.3	-0°56.9	-0°45.5	-0°34.1	+11.4	59.9
Tu 21	310°25.8	324°53.5	339°21.2	353°48.9	8°16.5	22°44.1	37°11.8	51°39.4	66°07.0	80°34.6	95°02.2	+27.6	16.4
	2°17.0	2°28.3	2°39.6	2°50.9	3°02.2	3°13.5	3°24.7	3°35.9	3°47.1	3°58.3	4°09.5	+11.3	60.0
We 22	311°54.5	326°21.8	340°49.2	355°16.5	9°43.8	24°11.2	38°38.4	53°05.7	67°33.0	82°00.2	96°27.4	+27.3	16.3
	6°52.7	7°03.3	7°13.8	7°24.2	7°34.6	7°45.0	7°55.3	8°05.6	8°15.8	8°25.9	8°36.0	+10.3	59.9
Th 23	313°13.6	327°40.6	342°07.5	356°34.4	11°01.3	25°28.1	39°55.0	54°21.8	68°48.6	83°15.4	97°42.2	+26.9	16.3
	10°59.9	11°09.0	11°17.9	11°26.8	11°35.6	11°44.4	11°53.0	12°01.6	12°10.1	12°18.5	12°26.9	+8.7	59.6
Fr 24	314°21.8	328°48.3	343°14.8	357°41.3	12°07.8	26°34.2	41°00.7	55°27.1	69°53.6	84°20.0	98°46.4	+26.5	16.1
	14°21.5	14°28.4	14°35.2	14°42.0	14°48.6	14°55.1	15°01.5	15°07.9	15°14.1	15°20.2	15°26.3	+6.5	59.2
◐ Sa 25	315°21.5	329°47.8	344°14.1	358°40.4	13°06.7	27°33.0	41°59.3	56°25.6	70°51.9	85°18.2	99°44.5	+26.3	16.0
	16°44.3	16°48.6	16°52.9	16°57.0	17°01.0	17°05.0	17°08.8	17°12.5	17°16.1	17°19.5	17°22.9	+3.9	58.7
Su 26	316°19.9	330°46.3	345°12.8	359°39.3	14°05.8	28°32.3	42°58.8	57°25.3	71°51.9	86°18.5	100°45.1	+26.5	15.9
	18°00.0	18°01.6	18°03.1	18°04.4	18°05.7	18°06.8	18°07.8	18°08.8	18°09.6	18°10.2	18°10.8	+1.1	58.2
Mo 27	317°27.2	331°54.2	346°21.3	0°48.4	15°15.5	29°42.7	44°09.9	58°37.1	73°04.4	87°31.7	101°59.1	+27.2	15.7
	18°06.2	18°05.1	18°03.8	18°02.4	18°00.9	17°59.3	17°57.6	17°55.8	17°53.9	17°51.9	17°49.7	-1.7	57.6
Tu 28	318°54.2	333°22.2	347°50.2	2°18.3	16°46.5	31°14.7	45°43.0	60°11.2	74°39.6	89°08.0	103°36.4	+28.2	15.6
	17°05.9	17°02.2	16°58.4	16°54.5	16°50.5	16°46.4	16°42.3	16°38.0	16°33.7	16°29.2	16°24.7	-4.1	57.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 10h04 — LQ: 11 11h09 — NM: 18 23h10 — FQ: 25 16h34

SUN

March 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	266°55.2	281°55.3	296°55.4	311°55.6	326°55.7	341°55.8	356°55.9	11°56.1	26°56.2	41°56.3	56°56.4	71°56.6	+0.1
	-7°32.8	-7°31.8	-7°30.9	-7°29.9	-7°29.0	-7°28.0	-7°27.1	-7°26.1	-7°25.2	-7°24.2	-7°23.3	-7°22.3	+1.0
Th 2	266°58.2	281°58.3	296°58.4	311°58.6	326°58.7	341°58.8	356°58.9	11°59.1	26°59.2	41°59.3	56°59.5	71°59.6	+0.1
	-7°09.9	-7°09.0	-7°08.0	-7°07.1	-7°06.1	-7°05.2	-7°04.2	-7°03.2	-7°02.3	-7°01.3	-7°00.4	-6°59.4	+1.0
Fr 3	267°01.3	282°01.4	297°01.5	312°01.7	327°01.8	342°01.9	357°02.1	12°02.2	27°02.3	42°02.5	57°02.6	72°02.7	+0.1
	-6°47.0	-6°46.0	-6°45.1	-6°44.1	-6°43.1	-6°42.2	-6°41.2	-6°40.3	-6°39.3	-6°38.3	-6°37.4	-6°36.4	+1.0
Sa 4	267°04.5	282°04.6	297°04.8	312°04.9	327°05.0	342°05.2	357°05.3	12°05.5	27°05.6	42°05.7	57°05.9	72°06.0	+0.1
	-6°23.9	-6°23.0	-6°22.0	-6°21.0	-6°20.1	-6°19.1	-6°18.1	-6°17.2	-6°16.2	-6°15.2	-6°14.3	-6°13.3	+1.0
Su 5	267°07.8	282°08.0	297°08.1	312°08.3	327°08.4	342°08.5	357°08.7	12°08.8	27°09.0	42°09.1	57°09.2	72°09.4	+0.1
	-6°00.8	-5°59.8	-5°58.8	-5°57.9	-5°56.9	-5°55.9	-5°55.0	-5°54.0	-5°53.0	-5°52.1	-5°51.1	-5°50.1	+1.0
Mo 6	267°11.3	282°11.4	297°11.6	312°11.7	327°11.8	342°12.0	357°12.1	12°12.3	27°12.4	42°12.6	57°12.7	72°12.9	+0.1
	-5°37.6	-5°36.6	-5°35.6	-5°34.6	-5°33.7	-5°32.7	-5°31.7	-5°30.8	-5°29.8	-5°28.8	-5°27.9	-5°26.9	+1.0
Tu 7	267°14.8	282°15.0	297°15.1	312°15.3	327°15.4	342°15.6	357°15.7	12°15.9	27°16.0	42°16.2	57°16.3	72°16.5	+0.2
	-5°14.2	-5°13.3	-5°12.3	-5°11.3	-5°10.4	-5°09.4	-5°08.4	-5°07.4	-5°06.5	-5°05.5	-5°04.5	-5°03.5	+1.0
We 8	267°18.4	282°18.6	297°18.7	312°18.9	327°19.1	342°19.2	357°19.4	12°19.5	27°19.7	42°19.8	57°20.0	72°20.1	+0.2
	-4°50.9	-4°49.9	-4°48.9	-4°48.0	-4°47.0	-4°46.0	-4°45.0	-4°44.0	-4°43.1	-4°42.1	-4°41.1	-4°40.1	+1.0
Th 9	267°22.2	282°22.3	297°22.5	312°22.6	327°22.8	342°23.0	357°23.1	12°23.3	27°23.4	42°23.6	57°23.7	72°23.9	+0.2
	-4°27.4	-4°26.5	-4°25.5	-4°24.5	-4°23.5	-4°22.6	-4°21.6	-4°20.6	-4°19.6	-4°18.6	-4°17.7	-4°16.7	+1.0
Fr 10	267°26.0	282°26.1	297°26.3	312°26.5	327°26.6	342°26.8	357°26.9	12°27.1	27°27.3	42°27.4	57°27.6	72°27.7	+0.2
	-4°03.9	-4°03.0	-4°02.0	-4°01.0	-4°00.0	-3°59.0	-3°58.1	-3°57.1	-3°56.1	-3°55.1	-3°54.1	-3°53.2	+1.0
Sa 11	267°29.9	282°30.0	297°30.2	312°30.4	327°30.5	342°30.7	357°30.8	12°31.0	27°31.2	42°31.3	57°31.5	72°31.7	+0.2
	-3°40.4	-3°39.4	-3°38.4	-3°37.5	-3°36.5	-3°35.5	-3°34.5	-3°33.5	-3°32.5	-3°31.6	-3°30.6	-3°29.6	+1.0
Su 12	267°33.8	282°34.0	297°34.2	312°34.3	327°34.5	342°34.7	357°34.8	12°35.0	27°35.2	42°35.3	57°35.5	72°35.7	+0.2
	-3°16.8	-3°15.8	-3°14.8	-3°13.9	-3°12.9	-3°11.9	-3°10.9	-3°09.9	-3°08.9	-3°08.0	-3°07.0	-3°06.0	+1.0
Mo 13	267°37.9	282°38.0	297°38.2	312°38.4	327°38.5	342°38.7	357°38.9	12°39.1	27°39.2	42°39.4	57°39.6	72°39.7	+0.2
	-2°53.2	-2°52.2	-2°51.2	-2°50.2	-2°49.2	-2°48.3	-2°47.3	-2°46.3	-2°45.3	-2°44.3	-2°43.3	-2°42.3	+1.0
Tu 14	267°42.0	282°42.1	297°42.3	312°42.5	327°42.6	342°42.8	357°43.0	12°43.2	27°43.3	42°43.5	57°43.7	72°43.9	+0.2
	-2°29.5	-2°28.5	-2°27.5	-2°26.6	-2°25.6	-2°24.6	-2°23.6	-2°22.6	-2°21.6	-2°20.6	-2°19.7	-2°18.7	+1.0
We 15	267°46.1	282°46.3	297°46.5	312°46.6	327°46.8	342°47.0	357°47.2	12°47.3	27°47.5	42°47.7	57°47.9	72°48.0	+0.2
	-2°05.8	-2°04.8	-2°03.9	-2°02.9	-2°01.9	-2°00.9	-1°59.9	-1°58.9	-1°57.9	-1°56.9	-1°56.0	-1°55.0	+1.0
Th 16	267°50.3	282°50.5	297°50.7	312°50.9	327°51.0	342°51.2	357°51.4	12°51.6	27°51.7	42°51.9	57°52.1	72°52.3	+0.2
	-1°42.1	-1°41.1	-1°40.1	-1°39.2	-1°38.2	-1°37.2	-1°36.2	-1°35.2	-1°34.2	-1°33.2	-1°32.2	-1°31.2	+1.0
Fr 17	267°54.6	282°54.8	297°54.9	312°55.1	327°55.3	342°55.5	357°55.7	12°55.8	27°56.0	42°56.2	57°56.4	72°56.5	+0.2
	-1°18.4	-1°17.4	-1°16.4	-1°15.4	-1°14.4	-1°13.5	-1°12.5	-1°11.5	-1°10.5	-1°09.5	-1°08.5	-1°07.5	+1.0
Sa 18	267°58.9	282°59.1	297°59.2	312°59.4	327°59.6	342°59.8	358°00.0	13°00.1	28°00.3	43°00.5	58°00.7	73°00.9	+0.2
	-0°54.7	-0°53.7	-0°52.7	-0°51.7	-0°50.7	-0°49.7	-0°48.7	-0°47.7	-0°46.8	-0°45.8	-0°44.8	-0°43.8	+1.0
Su 19	268°03.2	283°03.4	298°03.6	313°03.8	328°03.9	343°04.1	358°04.3	13°04.5	28°04.7	43°04.9	58°05.0	73°05.2	+0.2
	-0°30.9	-0°29.9	-0°29.0	-0°28.0	-0°27.0	-0°26.0	-0°25.0	-0°24.0	-0°23.0	-0°22.0	-0°21.0	-0°20.1	+1.0
Mo 20	268°07.6	283°07.8	298°08.0	313°08.1	328°08.3	343°08.5	358°08.7	13°08.9	28°09.1	43°09.2	58°09.4	73°09.6	+0.2
	-0°07.2	-0°06.2	-0°05.2	-0°04.2	-0°03.3	-0°02.3	-0°01.3	-0°00.3	0°00.7	0°01.7	0°02.7	0°03.7	+1.0
Tu 21	268°12.0	283°12.2	298°12.4	313°12.6	328°12.7	343°12.9	358°13.1	13°13.3	28°13.5	43°13.7	58°13.9	73°14.0	+0.2
	0°16.5	0°17.5	0°18.5	0°19.5	0°20.5	0°21.4	0°22.4	0°23.4	0°24.4	0°25.4	0°26.4	0°27.4	+1.0
We 22	268°16.4	283°16.6	298°16.8	313°17.0	328°17.2	343°17.4	358°17.6	13°17.7	28°17.9	43°18.1	58°18.3	73°18.5	+0.2
	0°40.2	0°41.2	0°42.2	0°43.2	0°44.2	0°45.1	0°46.1	0°47.1	0°48.1	0°49.1	0°50.1	0°51.1	+1.0
Th 23	268°20.9	283°21.1	298°21.3	313°21.5	328°21.7	343°21.8	358°22.0	13°22.2	28°22.4	43°22.6	58°22.8	73°23.0	+0.2
	1°03.9	1°04.9	1°05.9	1°06.8	1°07.8	1°08.8	1°09.8	1°10.8	1°11.8	1°12.8	1°13.7	1°14.7	+1.0
Fr 24	268°25.4	283°25.6	298°25.8	313°26.0	328°26.1	343°26.3	358°26.5	13°26.7	28°26.9	43°27.1	58°27.3	73°27.4	+0.2
	1°27.5	1°28.5	1°29.5	1°30.5	1°31.5	1°32.5	1°33.4	1°34.4	1°35.4	1°36.4	1°37.4	1°38.4	+1.0
Sa 25	268°29.9	283°30.1	298°30.3	313°30.4	328°30.6	343°30.8	358°31.0	13°31.2	28°31.4	43°31.6	58°31.8	73°32.0	+0.2
	1°51.1	1°52.1	1°53.1	1°54.1	1°55.1	1°56.0	1°57.0	1°58.0	1°59.0	2°00.0	2°01.0	2°01.9	+1.0
Su 26	268°34.4	283°34.6	298°34.8	313°35.0	328°35.1	343°35.3	358°35.5	13°35.7	28°35.9	43°36.1	58°36.3	73°36.5	+0.2
	2°14.7	2°15.7	2°16.7	2°17.6	2°18.6	2°19.6	2°20.6	2°21.6	2°22.5	2°23.5	2°24.5	2°25.5	+1.0
Mo 27	268°38.9	283°39.1	298°39.3	313°39.5	328°39.7	343°39.9	358°40.0	13°40.2	28°40.4	43°40.6	58°40.8	73°41.0	+0.2
	2°38.2	2°39.2	2°40.2	2°41.2	2°42.1	2°43.1	2°44.1	2°45.1	2°46.0	2°47.0	2°48.0	2°49.0	+1.0
Tu 28	268°43.4	283°43.6	298°43.8	313°44.0	328°44.2	343°44.4	358°44.6	13°44.7	28°44.9	43°45.1	58°45.3	73°45.5	+0.2
	3°01.7	3°02.7	3°03.6	3°04.6	3°05.6	3°06.6	3°07.5	3°08.5	3°09.5	3°10.5	3°11.4	3°12.4	+1.0
We 29	268°47.9	283°48.1	298°48.3	313°48.5	328°48.7	343°48.9	358°49.1	13°49.3	28°49.4	43°49.6	58°49.8	73°50.0	+0.2
	3°25.1	3°26.1	3°27.0	3°28.0	3°29.0	3°29.9	3°30.9	3°31.9	3°32.9	3°33.8	3°34.8	3°35.8	+1.0
Th 30	268°52.4	283°52.6	298°52.8	313°53.0	328°53.2	343°53.4	358°53.6	13°53.8	28°53.9	43°54.1	58°54.3	73°54.5	+0.2
	3°48.4	3°49.4	3°50.4	3°51.3	3°52.3	3°53.3	3°54.2	3°55.2	3°56.2	3°57.1	3°58.1	3°59.1	+1.0
Fr 31	268°56.9	283°57.1	298°57.3	313°57.5	328°57.7	343°57.9	358°58.1	13°58.2	28°58.4	43°58.6	58°58.8	73°59.0	+0.2
	4°11.7	4°12.6	4°13.6	4°14.6	4°15.5	4°16.5	4°17.5	4°18.4	4°19.4	4°20.4	4°21.3	4°22.3	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2034

D	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	Δ'/h	SH
We 1	248°23.6	262°52.6	277°21.6	291°50.7	306°19.9	320°49.1	335°18.3	349°47.6	4°17.0	18°46.4	33°15.8	+29.2	15.5
	15°34.8	15°29.3	15°23.8	15°18.2	15°12.5	15°06.7	15°00.8	14°54.9	14°48.9	14°42.9	14°36.7	-5.8	56.7
Th 2	250°43.9	265°14.2	279°44.6	294°15.0	308°45.4	323°15.9	337°46.4	352°17.0	6°47.7	21°18.4	35°49.1	+30.5	15.3
	12°56.2	12°49.0	12°41.7	12°34.3	12°27.0	12°19.5	12°12.0	12°04.4	11°56.8	11°49.1	11°41.4	-7.5	56.2
Fr 3	253°36.2	268°07.7	282°39.2	297°10.8	311°42.5	326°14.2	340°45.9	355°17.7	9°49.5	24°21.4	38°53.3	+31.7	15.2
	9°39.5	9°31.0	9°22.5	9°13.9	9°05.3	8°56.7	8°48.0	8°39.3	8°30.6	8°21.8	8°13.0	-8.7	55.7
Sa 4	256°56.7	271°29.2	286°01.8	300°34.4	315°07.0	329°39.7	344°12.4	358°45.1	13°17.9	27°50.7	42°23.5	+32.7	15.1
	5°57.4	5°48.1	5°38.9	5°29.6	5°20.3	5°11.0	5°01.7	4°52.3	4°43.0	4°33.6	4°24.2	-9.3	55.2
○ Su 5	260°39.3	275°12.6	289°45.9	304°19.2	318°52.5	333°25.8	347°59.2	2°32.6	17°06.0	31°39.4	46°12.9	+33.4	15.0
	2°02.1	1°52.5	1°43.0	1°33.5	1°24.0	1°14.4	1°04.9	0°55.4	0°45.8	0°36.3	0°26.8	-9.5	54.8
Mo 6	264°36.4	279°10.1	293°43.8	308°17.5	322°51.2	337°24.9	351°58.6	6°32.3	21°06.0	35°39.7	50°13.5	+33.7	14.9
	-1°55.2	-2°04.6	-2°13.9	-2°23.3	-2°32.6	-2°42.0	-2°51.3	-3°00.6	-3°09.8	-3°19.1	-3°28.3	-9.3	54.5
Tu 7	268°39.8	283°13.6	297°47.3	312°21.1	326°54.8	341°28.5	356°02.3	10°36.0	25°09.7	39°43.4	54°17.1	+33.7	14.8
	-5°44.3	-5°53.1	-6°02.0	-6°10.8	-6°19.6	-6°28.3	-6°37.0	-6°45.7	-6°54.4	-7°03.0	-7°11.6	-8.7	54.2
We 8	272°41.4	287°15.0	301°48.5	316°22.0	330°55.4	345°28.9	0°02.3	14°35.8	29°09.2	43°42.5	58°15.9	+33.4	14.7
	-9°16.1	-9°24.1	-9°32.1	-9°40.0	-9°47.9	-9°55.7	-10°03.5	-10°11.2	-10°18.9	-10°26.6	-10°34.2	-7.8	54.1
Th 9	276°33.9	291°07.0	305°40.0	320°12.9	334°45.9	349°18.8	3°51.7	18°24.5	32°57.4	47°30.2	62°03.0	+32.9	14.7
	-12°22.5	-12°29.4	-12°36.1	-12°42.8	-12°49.5	-12°56.1	-13°02.6	-13°09.1	-13°15.5	-13°21.9	-13°28.2	-6.6	54.1
Fr 10	280°11.1	294°43.4	309°15.7	323°47.9	338°20.1	352°52.3	7°24.4	21°56.5	36°28.6	51°00.6	65°32.6	+32.2	14.8
	-14°55.8	-15°01.1	-15°06.4	-15°11.6	-15°16.8	-15°21.8	-15°26.8	-15°31.8	-15°36.6	-15°41.5	-15°46.2	-5.0	54.2
Sa 11	294°43.4	309°15.7	323°47.9	338°20.1	352°52.3	7°24.4	21°56.5	36°28.6	51°00.6	65°32.6	80°04.6	+32.1	14.8
	-15°01.1	-15°06.4	-15°11.6	-15°16.8	-15°21.8	-15°26.8	-15°31.8	-15°36.6	-15°41.5	-15°46.2	-15°50.9	-5.0	54.2
Su 12	297°59.9	312°31.4	327°02.7	341°34.1	356°05.4	10°36.6	25°07.9	39°39.0	54°10.2	68°41.3	83°12.4	+31.2	14.9
	-16°52.3	-16°55.8	-16°59.2	-17°02.5	-17°05.8	-17°09.0	-17°12.1	-17°15.2	-17°18.1	-17°21.0	-17°23.8	-3.2	54.6
◑ Mo 13	300°54.3	315°24.8	329°55.3	344°25.8	358°56.2	13°26.5	27°56.9	42°27.2	56°57.4	71°27.7	85°57.9	+30.4	15.0
	-17°56.0	-17°57.4	-17°58.8	-18°00.1	-18°01.3	-18°02.5	-18°03.5	-18°04.5	-18°05.3	-18°06.1	-18°06.8	-1.1	55.1
Tu 14	303°26.9	317°56.5	332°26.2	346°55.8	1°25.4	15°54.9	30°24.5	44°54.0	59°23.4	73°52.9	88°22.3	+29.5	15.2
	-18°06.2	-18°05.5	-18°04.6	-18°03.6	-18°02.6	-18°01.4	-18°00.2	-17°58.9	-17°57.4	-17°55.9	-17°54.3	+1.2	55.8
We 15	305°40.1	320°09.1	334°38.1	349°07.0	3°35.9	18°04.8	32°33.7	47°02.5	61°31.3	76°00.1	90°28.9	+28.9	15.4
	-17°18.6	-17°15.4	-17°12.1	-17°08.8	-17°05.4	-17°01.8	-16°58.2	-16°54.5	-16°50.6	-16°46.7	-16°42.7	+3.6	56.6
Th 16	307°38.1	322°06.6	336°35.0	351°03.5	5°31.9	20°00.3	34°28.7	48°57.0	63°25.4	77°53.7	92°22.0	+28.4	15.7
	-15°30.8	-15°25.3	-15°19.6	-15°13.9	-15°08.1	-15°02.1	-14°56.1	-14°50.0	-14°43.8	-14°37.5	-14°31.1	+6.0	57.5
Fr 17	309°25.0	323°53.1	338°21.2	352°49.3	7°17.3	21°45.4	36°13.4	50°41.4	65°09.4	79°37.4	94°05.4	+28.0	15.9
	-12°44.5	-12°36.7	-12°28.9	-12°20.9	-12°12.8	-12°04.7	-11°56.5	-11°48.2	-11°39.8	-11°31.4	-11°22.8	+8.2	58.5
Sa 18	311°03.7	325°31.5	339°59.3	354°27.0	8°54.8	23°22.5	37°50.2	52°18.0	66°45.7	81°13.4	95°41.0	+27.7	16.2
	-9°05.8	-8°56.1	-8°46.3	-8°36.5	-8°26.6	-8°16.6	-8°06.6	-7°56.5	-7°46.4	-7°36.2	-7°25.9	+10.0	59.4
Su 19	312°34.7	327°02.1	341°29.6	355°57.0	10°24.4	24°51.9	39°19.2	53°46.6	68°14.0	82°41.3	97°08.6	+27.4	16.4
	-4°45.9	-4°34.8	-4°23.7	-4°12.6	-4°01.5	-3°50.3	-3°39.1	-3°27.8	-3°16.6	-3°05.2	-2°53.9	+11.2	60.1
● Mo 20	313°56.4	328°23.4	342°50.4	357°17.4	11°44.4	26°11.3	40°38.3	55°05.2	69°32.1	83°58.9	98°25.8	+26.9	16.5
	-0°01.3	0°10.3	0°21.9	0°33.5	0°45.2	0°56.8	1°08.4	1°20.0	1°31.6	1°43.3	1°54.9	+11.6	60.6
Tu 21	315°05.8	329°32.3	343°58.8	358°25.2	12°51.6	27°18.0	41°44.4	56°10.7	70°37.0	85°03.3	99°29.6	+26.4	16.6
	4°47.2	4°58.5	5°09.7	5°21.0	5°32.2	5°43.3	5°54.5	6°05.6	6°16.6	6°27.6	6°38.6	+11.1	60.8
We 22	316°00.7	330°26.6	344°52.5	359°18.3	13°44.2	28°10.0	42°35.7	57°01.5	71°27.2	85°52.9	100°18.6	+25.8	16.6
	9°16.9	9°27.0	9°37.0	9°47.0	9°56.8	10°06.6	10°16.4	10°26.0	10°35.6	10°45.2	10°54.6	+9.8	60.7
Th 23	316°41.7	331°07.1	345°32.4	359°57.8	14°23.2	28°48.5	43°13.8	57°39.2	72°04.5	86°29.8	100°55.1	+25.3	16.5
	13°06.2	13°14.3	13°22.2	13°30.1	13°37.9	13°45.6	13°53.1	14°00.6	14°08.0	14°15.3	14°22.4	+7.6	60.3
Fr 24	317°13.7	331°38.9	346°04.1	0°29.3	14°54.6	29°19.8	43°45.0	58°10.3	72°35.5	87°00.8	101°26.1	+25.2	16.3
	15°57.4	16°02.9	16°08.2	16°13.4	16°18.6	16°23.6	16°28.4	16°33.2	16°37.9	16°42.4	16°46.9	+4.9	59.7
Sa 25	317°46.6	332°12.1	346°37.7	1°03.2	15°28.8	29°54.4	44°20.1	58°45.7	73°11.4	87°37.1	102°02.9	+25.6	16.1
	17°39.3	17°41.9	17°44.3	17°46.7	17°48.9	17°51.0	17°52.9	17°54.8	17°56.5	17°58.1	17°59.6	+2.0	59.0
Su 26	318°33.2	332°59.5	347°25.8	1°52.3	16°18.7	30°45.2	45°11.7	59°38.3	74°05.0	88°31.6	102°58.4	+26.5	15.9
	18°08.3	18°08.0	18°07.5	18°07.0	18°06.3	18°05.5	18°04.6	18°03.7	18°02.5	18°01.3	18°00.0	-0.8	58.2
◐ Mo 27	319°45.3	334°12.8	348°40.4	3°08.1	17°35.8	32°03.6	46°31.4	60°59.3	75°27.3	89°55.3	104°23.3	+27.8	15.7
	17°27.6	17°24.6	17°21.5	17°18.4	17°15.1	17°11.7	17°08.3	17°04.7	17°01.1	16°57.3	16°53.5	-3.4	57.4
Tu 28	321°31.2	336°00.2	350°29.3	4°58.4	19°27.6	33°56.8	48°26.1	62°55.5	77°24.9	91°54.4	106°23.9	+29.3	15.5
	15°45.4	15°40.2	15°34.9	15°29.6	15°24.1	15°18.6	15°13.0	15°07.3	15°01.6	14°55.7	14°49.8	-5.6	56.7
We 29	323°53.9	338°24.3	352°54.8	7°25.4	21°56.0	36°26.7	50°57.4	65°28.2	79°59.1	94°30.0	109°00.9	+30.7	15.3
	13°13.0	13°06.1	12°59.0	12°52.0	12°44.8	12°37.6	12°30.3	12°23.0	12°15.7	12°08.2	12°00.7	-7.2	56.1
Th 30	326°51.2	341°23.0	355°54.8	10°26.6	24°58.5	39°30.4	54°02.4	68°34.4	83°06.5	97°38.6	112°10.7	+32.0	15.1
	10°02.6	9°54.3	9°46.0	9°37.7	9°29.4	9°21.0	9°12.5	9°04.0	8°55.5	8°47.0	8°38.4	-8.4	55.5
Fr 31	330°17.7	344°50.5	359°23.3	13°56.1	28°29.0	43°01.9	57°34.8	72°07.7	86°40.7	101°13.8	115°46.8	+32.9	15.0
	6°26.0	6°16.9	6°07.8	5°58.8	5°49.6	5°40.5	5°31.4	5°22.2	5°13.0	5°03.8	4°54.6	-9.1	55.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 5 02h10 — LQ: 13 06h44 — NM: 20 10h14 — FQ: 27 01h18

SUN

April 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°01.4	284°01.6	299°01.8	314°02.0	329°02.2	344°02.3	359°02.5	14°02.7	29°02.9	44°03.1	59°03.3	74°03.5	+0.2
	4°34.9	4°35.8	4°36.8	4°37.8	4°38.7	4°39.7	4°40.6	4°41.6	4°42.6	4°43.5	4°44.5	4°45.5	+1.0
Su 2	269°05.9	284°06.0	299°06.2	314°06.4	329°06.6	344°06.8	359°07.0	14°07.1	29°07.3	44°07.5	59°07.7	74°07.9	+0.2
	4°58.0	4°58.9	4°59.9	5°00.8	5°01.8	5°02.8	5°03.7	5°04.7	5°05.6	5°06.6	5°07.6	5°08.5	+1.0
Mo 3	269°10.3	284°10.5	299°10.6	314°10.8	329°11.0	344°11.2	359°11.4	14°11.6	29°11.7	44°11.9	59°12.1	74°12.3	+0.2
	5°21.0	5°21.9	5°22.9	5°23.8	5°24.8	5°25.8	5°26.7	5°27.7	5°28.6	5°29.6	5°30.5	5°31.5	+1.0
Tu 4	269°14.6	284°14.8	299°15.0	314°15.2	329°15.4	344°15.6	359°15.7	14°15.9	29°16.1	44°16.3	59°16.5	74°16.6	+0.2
	5°43.9	5°44.8	5°45.8	5°46.7	5°47.7	5°48.7	5°49.6	5°50.6	5°51.5	5°52.5	5°53.4	5°54.4	+1.0
We 5	269°19.0	284°19.2	299°19.3	314°19.5	329°19.7	344°19.9	359°20.1	14°20.2	29°20.4	44°20.6	59°20.8	74°21.0	+0.2
	6°06.7	6°07.7	6°08.6	6°09.6	6°10.5	6°11.4	6°12.4	6°13.3	6°14.3	6°15.2	6°16.2	6°17.1	+0.9
Th 6	269°23.3	284°23.5	299°23.6	314°23.8	329°24.0	344°24.2	359°24.3	14°24.5	29°24.7	44°24.9	59°25.0	74°25.2	+0.2
	6°29.4	6°30.4	6°31.3	6°32.2	6°33.2	6°34.1	6°35.1	6°36.0	6°37.0	6°37.9	6°38.8	6°39.8	+0.9
Fr 7	269°27.5	284°27.7	299°27.9	314°28.0	329°28.2	344°28.4	359°28.6	14°28.7	29°28.9	44°29.1	59°29.3	74°29.4	+0.2
	6°52.0	6°53.0	6°53.9	6°54.8	6°55.8	6°56.7	6°57.7	6°58.6	6°59.5	7°00.5	7°01.4	7°02.3	+0.9
Sa 8	269°31.7	284°31.9	299°32.0	314°32.2	329°32.4	344°32.5	359°32.7	14°32.9	29°33.1	44°33.2	59°33.4	74°33.6	+0.2
	7°14.5	7°15.4	7°16.4	7°17.3	7°18.2	7°19.2	7°20.1	7°21.0	7°22.0	7°22.9	7°23.8	7°24.8	+0.9
Su 9	269°35.8	284°36.0	299°36.1	314°36.3	329°36.5	344°36.6	359°36.8	14°37.0	29°37.2	44°37.3	59°37.5	74°37.7	+0.2
	7°36.9	7°37.8	7°38.7	7°39.7	7°40.6	7°41.5	7°42.4	7°43.4	7°44.3	7°45.2	7°46.1	7°47.1	+0.9
Mo 10	269°39.8	284°40.0	299°40.2	314°40.3	329°40.5	344°40.7	359°40.8	14°41.0	29°41.2	44°41.3	59°41.5	74°41.7	+0.2
	7°59.1	8°00.0	8°01.0	8°01.9	8°02.8	8°03.7	8°04.6	8°05.6	8°06.5	8°07.4	8°08.3	8°09.3	+0.9
Tu 11	269°43.8	284°44.0	299°44.2	314°44.3	329°44.5	344°44.6	359°44.8	14°45.0	29°45.1	44°45.3	59°45.5	74°45.6	+0.2
	8°21.2	8°22.1	8°23.0	8°24.0	8°24.9	8°25.8	8°26.7	8°27.6	8°28.5	8°29.5	8°30.4	8°31.3	+0.9
We 12	269°47.7	284°47.9	299°48.0	314°48.2	329°48.4	344°48.5	359°48.7	14°48.8	29°49.0	44°49.2	59°49.3	74°49.5	+0.2
	8°43.2	8°44.1	8°45.0	8°45.9	8°46.8	8°47.7	8°48.6	8°49.6	8°50.5	8°51.4	8°52.3	8°53.2	+0.9
Th 13	269°51.5	284°51.7	299°51.8	314°52.0	329°52.2	344°52.3	359°52.5	14°52.6	29°52.8	44°52.9	59°53.1	74°53.3	+0.2
	9°05.0	9°05.9	9°06.8	9°07.7	9°08.6	9°09.5	9°10.4	9°11.3	9°12.2	9°13.1	9°14.0	9°14.9	+0.9
Fr 14	269°55.3	284°55.4	299°55.6	314°55.7	329°55.9	344°56.0	359°56.2	14°56.3	29°56.5	44°56.6	59°56.8	74°56.9	+0.2
	9°26.7	9°27.6	9°28.5	9°29.4	9°30.3	9°31.2	9°32.1	9°33.0	9°33.9	9°34.7	9°35.6	9°36.5	+0.9
Sa 15	269°58.9	284°59.1	299°59.2	314°59.4	329°59.5	344°59.7	359°59.8	15°00.0	30°00.1	45°00.2	60°00.4	75°00.5	+0.1
	9°48.2	9°49.1	9°50.0	9°50.9	9°51.7	9°52.6	9°53.5	9°54.4	9°55.3	9°56.2	9°57.1	9°58.0	+0.9
Su 16	270°02.5	285°02.6	300°02.7	315°02.9	330°03.0	345°03.2	0°03.3	15°03.5	30°03.6	45°03.8	60°03.9	75°04.1	+0.1
	10°09.5	10°10.4	10°11.3	10°12.2	10°13.1	10°14.0	10°14.8	10°15.7	10°16.6	10°17.5	10°18.4	10°19.3	+0.9
Mo 17	270°05.9	285°06.1	300°06.2	315°06.3	330°06.5	345°06.6	0°06.8	15°06.9	30°07.0	45°07.2	60°07.3	75°07.5	+0.1
	10°30.7	10°31.6	10°32.5	10°33.4	10°34.2	10°35.1	10°36.0	10°36.9	10°37.7	10°38.6	10°39.5	10°40.4	+0.9
Tu 18	270°09.3	285°09.4	300°09.5	315°09.7	330°09.8	345°10.0	0°10.1	15°10.2	30°10.4	45°10.5	60°10.6	75°10.8	+0.1
	10°51.7	10°52.6	10°53.5	10°54.3	10°55.2	10°56.1	10°57.0	10°57.8	10°58.7	10°59.6	11°00.4	11°01.3	+0.9
We 19	270°12.5	285°12.7	300°12.8	315°12.9	330°13.1	345°13.2	0°13.3	15°13.5	30°13.6	45°13.7	60°13.8	75°14.0	+0.1
	11°12.6	11°13.4	11°14.3	11°15.2	11°16.0	11°16.9	11°17.7	11°18.6	11°19.5	11°20.3	11°21.2	11°22.0	+0.9
Th 20	270°15.7	285°15.8	300°15.9	315°16.1	330°16.2	345°16.3	0°16.4	15°16.6	30°16.7	45°16.8	60°17.0	75°17.1	+0.1
	11°33.2	11°34.1	11°34.9	11°35.8	11°36.6	11°37.5	11°38.3	11°39.2	11°40.0	11°40.9	11°41.8	11°42.6	+0.9
Fr 21	270°18.7	285°18.8	300°19.0	315°19.1	330°19.2	345°19.3	0°19.5	15°19.6	30°19.7	45°19.8	60°20.0	75°20.1	+0.1
	11°53.7	11°54.5	11°55.4	11°56.2	11°57.1	11°57.9	11°58.8	11°59.6	12°00.4	12°01.3	12°02.1	12°03.0	+0.8
Sa 22	270°21.7	285°21.8	300°21.9	315°22.0	330°22.1	345°22.3	0°22.4	15°22.5	30°22.6	45°22.7	60°22.9	75°23.0	+0.1
	12°13.9	12°14.8	12°15.6	12°16.4	12°17.3	12°18.1	12°19.0	12°19.8	12°20.6	12°21.5	12°22.3	12°23.1	+0.8
Su 23	270°24.5	285°24.6	300°24.7	315°24.8	330°25.0	345°25.1	0°25.2	15°25.3	30°25.4	45°25.5	60°25.7	75°25.8	+0.1
	12°34.0	12°34.8	12°35.6	12°36.5	12°37.3	12°38.1	12°39.0	12°39.8	12°40.6	12°41.5	12°42.3	12°43.1	+0.8
Mo 24	270°27.2	285°27.3	300°27.4	315°27.6	330°27.7	345°27.8	0°27.9	15°28.0	30°28.1	45°28.2	60°28.3	75°28.4	+0.1
	12°53.8	12°54.7	12°55.5	12°56.3	12°57.1	12°57.9	12°58.8	12°59.6	13°00.4	13°01.2	13°02.0	13°02.9	+0.8
Tu 25	270°29.8	285°29.9	300°30.0	315°30.2	330°30.3	345°30.4	0°30.5	15°30.6	30°30.7	45°30.8	60°30.9	75°31.0	+0.1
	13°13.5	13°14.3	13°15.1	13°15.9	13°16.7	13°17.5	13°18.4	13°19.2	13°20.0	13°20.8	13°21.6	13°22.4	+0.8
We 26	270°32.3	285°32.4	300°32.5	315°32.6	330°32.7	345°32.8	0°32.9	15°33.0	30°33.1	45°33.2	60°33.3	75°33.4	+0.1
	13°32.9	13°33.7	13°34.5	13°35.3	13°36.1	13°36.9	13°37.7	13°38.5	13°39.3	13°40.1	13°40.9	13°41.7	+0.8
Th 27	270°34.7	285°34.8	300°34.9	315°35.0	330°35.1	345°35.2	0°35.3	15°35.4	30°35.5	45°35.6	60°35.7	75°35.8	+0.1
	13°52.1	13°52.9	13°53.7	13°54.5	13°55.3	13°56.1	13°56.9	13°57.6	13°58.4	13°59.2	14°00.0	14°00.8	+0.8
Fr 28	270°37.0	285°37.1	300°37.1	315°37.2	330°37.3	345°37.4	0°37.5	15°37.6	30°37.7	45°37.8	60°37.9	75°38.0	+0.1
	14°11.1	14°11.8	14°12.6	14°13.4	14°14.2	14°15.0	14°15.8	14°16.5	14°17.3	14°18.1	14°18.9	14°19.7	+0.8
Sa 29	270°39.1	285°39.2	300°39.3	315°39.3	330°39.4	345°39.5	0°39.6	15°39.7	30°39.8	45°39.9	60°39.9	75°40.0	+0.1
	14°29.8	14°30.6	14°31.3	14°32.1	14°32.9	14°33.7	14°34.4	14°35.2	14°36.0	14°36.7	14°37.5	14°38.3	+0.8
Su 30	270°41.1	285°41.2	300°41.3	315°41.3	330°41.4	345°41.5	0°41.6	15°41.7	30°41.7	45°41.8	60°41.9	75°42.0	+0.1
	14°48.3	14°49.0	14°49.8	14°50.6	14°51.3	14°52.1	14°52.9	14°53.6	14°54.4	14°55.1	14°55.9	14°56.7	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2034

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
Sa 1	246°45.5 3°30.9	261°18.8 3°21.5	275°52.1 3°12.1	290°25.5 3°02.8	304°58.9 2°53.4	319°32.3 2°44.0	334°05.7 2°34.6	348°39.2 2°25.2	3°12.6 2°15.8	17°46.1 2°06.3	32°19.6 1°56.9	+33.4 -9.4	14.9 54.8
Su 2	250°44.2 -0°24.6	265°17.9 -0°34.0	279°51.7 -0°43.4	294°25.4 -0°52.8	308°59.2 -1°02.2	323°33.0 -1°11.6	338°06.8 -1°21.0	352°40.6 -1°30.3	7°14.4 -1°39.7	21°48.2 -1°49.0	36°22.0 -1°58.4	+33.8 -9.4	14.8 54.4
○ Mo 3	254°49.6 -4°16.7	269°23.5 -4°25.8	283°57.3 -4°34.8	298°31.2 -4°43.9	313°05.0 -4°52.9	327°38.8 -5°01.9	342°12.7 -5°10.8	356°46.5 -5°19.8	11°20.3 -5°28.7	25°54.1 -5°37.6	40°27.9 -5°46.4	+33.8 -9.0	14.8 54.2
Tu 4	258°54.0 -7°55.9	273°27.7 -8°04.3	288°01.3 -8°12.6	302°34.9 -8°21.0	317°08.5 -8°29.2	331°42.1 -8°37.4	346°15.7 -8°45.6	0°49.3 -8°53.8	15°22.8 -9°01.9	29°56.4 -9°10.0	44°29.9 -9°18.0	+33.6 -8.2	14.7 54.0
We 5	262°50.5 -11°13.4	277°23.7 -11°20.8	291°56.9 -11°28.0	306°30.1 -11°35.3	321°03.2 -11°42.4	335°36.3 -11°49.6	350°09.4 -11°56.7	4°42.5 -12°03.7	19°15.6 -12°10.7	33°48.6 -12°17.6	48°21.6 -12°24.4	+33.1 -7.1	14.7 53.9
Th 6	266°33.8 -14°00.8	281°06.4 -14°06.8	295°39.0 -14°12.7	310°11.5 -14°18.5	324°44.0 -14°24.3	339°16.5 -14°30.0	353°49.0 -14°35.6	8°21.4 -14°41.2	22°53.8 -14°46.8	37°26.2 -14°52.2	51°58.6 -14°57.6	+32.5 -5.7	14.7 54.0
Fr 7	270°00.5 -16°10.4	284°32.4 -16°14.7	299°04.2 -16°18.9	313°36.1 -16°23.1	328°07.9 -16°27.2	342°39.6 -16°31.2	357°11.4 -16°35.1	11°43.1 -16°39.0	26°14.8 -16°42.7	40°46.5 -16°46.5	55°18.1 -16°50.1	+31.8 -4.0	14.8 54.2
Sa 8	273°09.2 -17°35.3	287°40.3 -17°37.7	302°11.5 -17°40.0	316°42.6 -17°42.2	331°13.7 -17°44.4	345°44.8 -17°46.4	0°15.8 -17°48.4	14°46.8 -17°50.3	29°17.8 -17°52.1	43°48.8 -17°53.8	58°19.7 -17°55.5	+31.1 -2.0	14.9 54.5
Su 9	276°00.7 -18°09.9	290°31.2 -18°10.2	305°01.7 -18°10.3	319°32.2 -18°10.4	334°02.6 -18°10.4	348°33.1 -18°10.4	3°03.5 -18°10.2	17°33.9 -18°09.9	32°04.2 -18°09.6	46°34.6 -18°09.1	61°04.9 -18°08.6	+30.4 +0.1	15.0 54.9
Mo 10	290°31.2 -18°10.2	305°01.7 -18°10.3	319°32.2 -18°10.4	334°02.6 -18°10.4	348°33.1 -18°10.4	3°03.5 -18°10.2	17°33.9 -18°09.9	32°04.2 -18°09.6	46°34.6 -18°09.1	61°04.9 -18°08.6	75°35.2 -18°08.0	+30.4 +0.2	15.0 55.0
◑ Tu 11	293°07.2 -17°47.9	307°37.2 -17°45.9	322°07.2 -17°43.7	336°37.1 -17°41.5	351°07.0 -17°39.1	5°37.0 -17°36.7	20°06.8 -17°34.2	34°36.7 -17°31.6	49°06.6 -17°28.9	63°36.4 -17°26.1	78°06.2 -17°23.2	+29.9 +2.5	15.2 55.6
We 12	295°31.6 -16°28.9	310°01.1 -16°24.6	324°30.7 -16°20.1	339°00.2 -16°15.6	353°29.8 -16°11.0	7°59.3 -16°06.3	22°28.8 -16°01.5	36°58.3 -15°56.6	51°27.7 -15°51.6	65°57.2 -15°46.5	80°26.6 -15°41.4	+29.5 +4.8	15.4 56.4
Th 13	297°46.6 -14°13.5	312°15.9 -14°06.9	326°45.1 -14°00.3	341°14.3 -13°53.5	355°43.5 -13°46.7	10°12.7 -13°39.8	24°41.8 -13°32.9	39°11.0 -13°25.8	53°40.1 -13°18.7	68°09.2 -13°11.4	82°38.3 -13°04.1	+29.2 +6.9	15.6 57.3
Fr 14	299°53.2 -11°04.9	314°22.1 -10°56.4	328°51.0 -10°47.8	343°19.8 -10°39.0	357°48.6 -10°30.3	12°17.4 -10°21.4	26°46.2 -10°12.5	41°15.0 -10°03.5	55°43.8 -9°54.4	70°12.5 -9°45.3	84°41.2 -9°36.1	+28.8 +8.9	15.9 58.3
Sa 15	301°49.8 -7°10.4	316°18.2 -7°00.2	330°46.6 -6°50.0	345°14.9 -6°39.6	359°43.3 -6°29.3	14°11.6 -6°18.9	28°39.9 -6°08.4	43°08.1 -5°57.9	57°36.4 -5°47.3	72°04.6 -5°36.7	86°32.8 -5°26.1	+28.3 +10.4	16.2 59.3
Su 16	303°32.4 -2°41.2	318°00.2 -2°29.9	332°27.9 -2°18.6	346°55.5 -2°07.3	1°23.2 -1°56.0	15°50.8 -1°44.6	30°18.4 -1°33.2	44°45.9 -1°21.7	59°13.5 -1°10.3	73°40.9 -0°58.8	88°08.4 -0°47.3	+27.6 +11.4	16.4 60.2
Mo 17	304°55.8 2°06.3	319°22.6 2°17.9	333°49.5 2°29.5	348°16.2 2°41.1	2°43.0 2°52.7	17°09.7 3°04.3	31°36.3 3°15.8	46°03.0 3°27.4	60°29.5 3°38.9	74°56.1 3°50.5	89°22.6 4°02.0	+26.7 +11.6	16.6 60.8
● Tu 18	305°55.0 6°51.5	320°20.8 7°02.5	334°46.5 7°13.5	349°12.3 7°24.4	3°38.0 7°35.3	18°03.6 7°46.2	32°29.2 7°56.9	46°54.8 8°07.7	61°20.3 8°18.4	75°45.8 8°29.0	90°11.2 8°39.6	+25.6 +10.8	16.7 61.2
We 19	306°27.9 11°10.6	320°52.7 11°20.1	335°17.5 11°29.5	349°42.2 11°38.8	4°06.9 11°48.0	18°31.6 11°57.2	32°56.2 12°06.3	47°20.8 12°15.2	61°45.3 12°24.1	76°09.9 12°32.9	90°34.3 12°41.7	+24.6 +9.1	16.7 61.3
Th 20	306°38.4 14°40.6	321°02.5 14°47.7	335°26.6 14°54.7	349°50.7 15°01.5	4°14.7 15°08.3	18°38.7 15°14.9	33°02.7 15°21.5	47°26.7 15°27.9	61°50.7 15°34.2	76°14.7 15°40.4	90°38.6 15°46.5	+24.0 +6.6	16.6 60.9
Fr 21	306°37.7 17°03.2	321°01.7 17°07.3	335°25.7 17°11.3	349°49.7 17°15.2	4°13.7 17°18.9	18°37.7 17°22.6	33°01.7 17°26.1	47°25.7 17°29.4	61°49.8 17°32.7	76°13.9 17°35.8	90°38.0 17°38.8	+24.0 +3.6	16.5 60.3
Sa 22	306°42.8 18°08.6	321°07.4 18°09.6	335°32.1 18°10.4	349°56.7 18°11.1	4°21.5 18°11.7	18°46.2 18°12.2	33°11.0 18°12.6	47°35.9 18°12.8	62°00.8 18°12.9	76°25.7 18°12.9	90°50.7 18°12.8	+24.8 +0.4	16.2 59.5
Su 23	307°12.2 17°56.7	321°38.1 17°54.7	336°04.0 17°52.6	350°30.1 17°50.4	4°56.2 17°48.1	19°22.3 17°45.7	33°48.5 17°43.1	48°14.8 17°40.5	62°41.2 17°37.8	77°07.6 17°34.9	91°34.1 17°31.9	+26.2 -2.5	16.0 58.6
Mo 24	308°19.9 16°35.6	322°47.5 16°31.1	337°15.3 16°26.5	351°43.0 16°21.8	6°10.9 16°17.0	20°38.8 16°12.1	35°06.8 16°07.2	49°34.9 16°02.1	64°03.0 15°57.0	78°31.2 15°51.8	92°59.5 15°46.5	+28.0 -4.9	15.7 57.6
◐ Tu 25	310°12.7 14°17.8	324°42.2 14°11.3	339°11.7 14°04.7	353°41.3 13°58.1	8°11.0 13°51.4	22°40.7 13°44.6	37°10.5 13°37.8	51°40.4 13°30.9	66°10.3 13°24.0	80°40.4 13°17.0	95°10.4 13°09.9	+29.8 -6.8	15.5 56.7
We 26	312°49.7 11°17.2	327°20.8 11°09.3	341°52.0 11°01.3	356°23.2 10°53.3	10°54.5 10°45.3	25°25.9 10°37.2	39°57.3 10°29.0	54°28.8 10°20.9	69°00.3 10°12.6	83°31.9 10°04.4	98°03.5 9°56.1	+31.4 -8.1	15.3 56.0
Th 27	316°04.5 7°47.2	330°36.9 7°38.4	345°09.4 7°29.5	359°42.0 7°20.6	14°14.6 7°11.7	28°47.2 7°02.8	43°19.9 6°53.8	57°52.6 6°44.8	72°25.4 6°35.8	86°58.2 6°26.7	101°31.0 6°17.7	+32.7 -9.0	15.1 55.3
Fr 28	319°47.9 3°59.6	334°21.3 3°50.2	348°54.7 3°40.9	3°28.1 3°31.6	18°01.6 3°22.2	32°35.1 3°12.9	47°08.6 3°03.5	61°42.2 2°54.1	76°15.7 2°44.7	90°49.3 2°35.3	105°22.9 2°25.9	+33.5 -9.4	14.9 54.8
Sa 29	323°49.5 0°04.7	338°23.4 -0°04.7	352°57.3 -0°14.2	7°31.2 -0°23.6	22°05.2 -0°33.0	36°39.1 -0°42.3	51°13.1 -0°51.7	65°47.0 -1°01.1	80°21.0 -1°10.5	94°55.0 -1°19.8	109°29.0 -1°29.2	+33.9 -9.4	14.8 54.4
Su 30	327°59.2 -3°48.0	342°33.2 -3°57.2	357°07.2 -4°06.3	11°41.2 -4°15.4	26°15.2 -4°24.5	40°49.3 -4°33.5	55°23.3 -4°42.6	69°57.3 -4°51.6	84°31.2 -5°00.6	99°05.2 -5°09.6	113°39.2 -5°18.5	+34.0 -9.0	14.8 54.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 19h18 — LQ: 11 22h45 — NM: 18 19h25 — FQ: 25 11h34

SUN

May 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	270° 43.0	285° 43.0	300° 43.1	315° 43.2	330° 43.3	345° 43.3	0° 43.4	15° 43.5	30° 43.6	45° 43.6	60° 43.7	75° 43.8	+0.1
	15° 06.5	15° 07.3	15° 08.0	15° 08.8	15° 09.5	15° 10.3	15° 11.0	15° 11.8	15° 12.5	15° 13.3	15° 14.0	15° 14.8	+0.8
Tu 2	270° 44.7	285° 44.8	300° 44.8	315° 44.9	330° 45.0	345° 45.0	0° 45.1	15° 45.2	30° 45.3	45° 45.3	60° 45.4	75° 45.5	+0.1
	15° 24.5	15° 25.3	15° 26.0	15° 26.7	15° 27.5	15° 28.2	15° 29.0	15° 29.7	15° 30.5	15° 31.2	15° 31.9	15° 32.7	+0.7
We 3	270° 46.3	285° 46.4	300° 46.4	315° 46.5	330° 46.6	345° 46.6	0° 46.7	15° 46.8	30° 46.8	45° 46.9	60° 46.9	75° 47.0	+0.1
	15° 42.2	15° 43.0	15° 43.7	15° 44.4	15° 45.2	15° 45.9	15° 46.6	15° 47.4	15° 48.1	15° 48.8	15° 49.6	15° 50.3	+0.7
Th 4	270° 47.8	285° 47.8	300° 47.9	315° 47.9	330° 48.0	345° 48.1	0° 48.1	15° 48.2	30° 48.2	45° 48.3	60° 48.3	75° 48.4	+0.1
	15° 59.7	16° 00.4	16° 01.2	16° 01.9	16° 02.6	16° 03.3	16° 04.1	16° 04.8	16° 05.5	16° 06.2	16° 06.9	16° 07.6	+0.7
Fr 5	270° 49.1	285° 49.2	300° 49.2	315° 49.3	330° 49.3	345° 49.4	0° 49.4	15° 49.5	30° 49.5	45° 49.6	60° 49.6	75° 49.7	+0.1
	16° 16.9	16° 17.6	16° 18.4	16° 19.1	16° 19.8	16° 20.5	16° 21.2	16° 21.9	16° 22.6	16° 23.3	16° 24.0	16° 24.7	+0.7
Sa 6	270° 50.3	285° 50.3	300° 50.4	315° 50.4	330° 50.5	345° 50.5	0° 50.6	15° 50.6	30° 50.7	45° 50.7	60° 50.7	75° 50.8	+0.0
	16° 33.9	16° 34.6	16° 35.3	16° 36.0	16° 36.7	16° 37.4	16° 38.1	16° 38.8	16° 39.5	16° 40.2	16° 40.9	16° 41.5	+0.7
Su 7	270° 51.3	285° 51.4	300° 51.4	315° 51.5	330° 51.5	345° 51.5	0° 51.6	15° 51.6	30° 51.7	45° 51.7	60° 51.7	75° 51.8	+0.0
	16° 50.5	16° 51.2	16° 51.9	16° 52.6	16° 53.3	16° 54.0	16° 54.7	16° 55.4	16° 56.0	16° 56.7	16° 57.4	16° 58.1	+0.7
Mo 8	270° 52.2	285° 52.3	300° 52.3	315° 52.3	330° 52.4	345° 52.4	0° 52.4	15° 52.5	30° 52.5	45° 52.5	60° 52.6	75° 52.6	+0.0
	17° 06.9	17° 07.6	17° 08.3	17° 09.0	17° 09.6	17° 10.3	17° 11.0	17° 11.7	17° 12.3	17° 13.0	17° 13.7	17° 14.3	+0.7
Tu 9	270° 53.0	285° 53.0	300° 53.0	315° 53.1	330° 53.1	345° 53.1	0° 53.2	15° 53.2	30° 53.2	45° 53.2	60° 53.3	75° 53.3	+0.0
	17° 23.0	17° 23.7	17° 24.4	17° 25.0	17° 25.7	17° 26.3	17° 27.0	17° 27.7	17° 28.3	17° 29.0	17° 29.7	17° 30.3	+0.7
We 10	270° 53.6	285° 53.6	300° 53.6	315° 53.7	330° 53.7	345° 53.7	0° 53.7	15° 53.7	30° 53.8	45° 53.8	60° 53.8	75° 53.8	+0.0
	17° 38.8	17° 39.5	17° 40.1	17° 40.8	17° 41.4	17° 42.1	17° 42.7	17° 43.4	17° 44.0	17° 44.7	17° 45.3	17° 46.0	+0.6
Th 11	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.2	30° 54.2	45° 54.2	60° 54.2	75° 54.2	+0.0
	17° 54.4	17° 55.0	17° 55.6	17° 56.3	17° 56.9	17° 57.5	17° 58.2	17° 58.8	17° 59.5	18° 00.1	18° 00.7	18° 01.4	+0.6
Fr 12	270° 54.4	285° 54.4	300° 54.4	315° 54.4	330° 54.4	345° 54.4	0° 54.4	15° 54.4	30° 54.4	45° 54.4	60° 54.5	75° 54.5	+0.0
	18° 09.6	18° 10.2	18° 10.8	18° 11.4	18° 12.1	18° 12.7	18° 13.3	18° 13.9	18° 14.6	18° 15.2	18° 15.8	18° 16.4	+0.6
Sa 13	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.6	30° 54.6	45° 54.6	60° 54.6	75° 54.6	+0.0
	18° 24.5	18° 25.1	18° 25.7	18° 26.3	18° 26.9	18° 27.5	18° 28.2	18° 28.8	18° 29.4	18° 30.0	18° 30.6	18° 31.2	+0.6
Su 14	270° 54.5	285° 54.5	300° 54.5	315° 54.5	330° 54.5	345° 54.5	0° 54.5	15° 54.5	30° 54.5	45° 54.5	60° 54.5	75° 54.5	-0.0
	18° 39.1	18° 39.7	18° 40.3	18° 40.9	18° 41.5	18° 42.1	18° 42.7	18° 43.3	18° 43.9	18° 44.5	18° 45.1	18° 45.7	+0.6
Mo 15	270° 54.4	285° 54.4	300° 54.4	315° 54.4	330° 54.4	345° 54.4	0° 54.4	15° 54.3	30° 54.3	45° 54.3	60° 54.3	75° 54.3	-0.0
	18° 53.4	18° 54.0	18° 54.5	18° 55.1	18° 55.7	18° 56.3	18° 56.9	18° 57.5	18° 58.1	18° 58.6	18° 59.2	18° 59.8	+0.6
Tu 16	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.0	15° 54.0	30° 54.0	45° 54.0	60° 54.0	75° 54.0	-0.0
	19° 07.3	19° 07.9	19° 08.5	19° 09.1	19° 09.6	19° 10.2	19° 10.8	19° 11.3	19° 11.9	19° 12.5	19° 13.1	19° 13.6	+0.6
We 17	270° 53.7	285° 53.7	300° 53.7	315° 53.7	330° 53.6	345° 53.6	0° 53.6	15° 53.6	30° 53.5	45° 53.5	60° 53.5	75° 53.5	-0.0
	19° 21.0	19° 21.5	19° 22.1	19° 22.7	19° 23.2	19° 23.8	19° 24.3	19° 24.9	19° 25.5	19° 26.0	19° 26.6	19° 27.1	+0.6
Th 18	270° 53.2	285° 53.1	300° 53.1	315° 53.1	330° 53.1	345° 53.0	0° 53.0	15° 53.0	30° 52.9	45° 52.9	60° 52.9	75° 52.9	-0.0
	19° 34.3	19° 34.8	19° 35.4	19° 35.9	19° 36.5	19° 37.0	19° 37.6	19° 38.1	19° 38.7	19° 39.2	19° 39.7	19° 40.3	+0.5
Fr 19	270° 52.5	285° 52.4	300° 52.4	315° 52.4	330° 52.3	345° 52.3	0° 52.3	15° 52.2	30° 52.2	45° 52.2	60° 52.1	75° 52.1	-0.0
	19° 47.3	19° 47.8	19° 48.3	19° 48.9	19° 49.4	19° 49.9	19° 50.5	19° 51.0	19° 51.5	19° 52.1	19° 52.6	19° 53.1	+0.5
Sa 20	270° 51.6	285° 51.6	300° 51.6	315° 51.5	330° 51.5	345° 51.4	0° 51.4	15° 51.4	30° 51.3	45° 51.3	60° 51.2	75° 51.2	-0.0
	19° 59.9	20° 00.4	20° 01.0	20° 01.5	20° 02.0	20° 02.5	20° 03.0	20° 03.5	20° 04.1	20° 04.6	20° 05.1	20° 05.6	+0.5
Su 21	270° 50.7	285° 50.6	300° 50.6	315° 50.5	330° 50.5	345° 50.5	0° 50.4	15° 50.4	30° 50.3	45° 50.3	60° 50.2	75° 50.2	-0.0
	20° 12.2	20° 12.7	20° 13.2	20° 13.7	20° 14.2	20° 14.7	20° 15.3	20° 15.8	20° 16.3	20° 16.8	20° 17.3	20° 17.8	+0.5
Mo 22	270° 49.6	285° 49.5	300° 49.5	315° 49.4	330° 49.4	345° 49.3	0° 49.3	15° 49.2	30° 49.2	45° 49.1	60° 49.1	75° 49.0	-0.0
	20° 24.2	20° 24.7	20° 25.2	20° 25.7	20° 26.1	20° 26.6	20° 27.1	20° 27.6	20° 28.1	20° 28.6	20° 29.1	20° 29.6	+0.5
Tu 23	270° 48.4	285° 48.3	300° 48.2	315° 48.2	330° 48.1	345° 48.1	0° 48.0	15° 48.0	30° 47.9	45° 47.9	60° 47.8	75° 47.8	-0.1
	20° 35.8	20° 36.3	20° 36.7	20° 37.2	20° 37.7	20° 38.2	20° 38.6	20° 39.1	20° 39.6	20° 40.1	20° 40.5	20° 41.0	+0.5
We 24	270° 47.0	285° 47.0	300° 46.9	315° 46.8	330° 46.8	345° 46.7	0° 46.7	15° 46.6	30° 46.5	45° 46.5	60° 46.4	75° 46.4	-0.1
	20° 47.0	20° 47.5	20° 48.0	20° 48.4	20° 48.9	20° 49.3	20° 49.8	20° 50.3	20° 50.7	20° 51.2	20° 51.6	20° 52.1	+0.5
Th 25	270° 45.6	285° 45.5	300° 45.4	315° 45.4	330° 45.3	345° 45.2	0° 45.2	15° 45.1	30° 45.0	45° 45.0	60° 44.9	75° 44.8	-0.1
	20° 57.9	20° 58.4	20° 58.8	20° 59.3	20° 59.7	21° 00.2	21° 00.6	21° 01.1	21° 01.5	21° 01.9	21° 02.4	21° 02.8	+0.4
Fr 26	270° 44.0	285° 43.9	300° 43.8	315° 43.8	330° 43.7	345° 43.6	0° 43.6	15° 43.5	30° 43.4	45° 43.3	60° 43.3	75° 43.2	-0.1
	21° 08.5	21° 08.9	21° 09.3	21° 09.8	21° 10.2	21° 10.6	21° 11.1	21° 11.5	21° 11.9	21° 12.3	21° 12.8	21° 13.2	+0.4
Sa 27	270° 42.3	285° 42.2	300° 42.1	315° 42.1	330° 42.0	345° 41.9	0° 41.8	15° 41.8	30° 41.7	45° 41.6	60° 41.5	75° 41.5	-0.1
	21° 18.6	21° 19.1	21° 19.5	21° 19.9	21° 20.3	21° 20.7	21° 21.1	21° 21.5	21° 21.9	21° 22.4	21° 22.8	21° 23.2	+0.4
Su 28	270° 40.5	285° 40.4	300° 40.3	315° 40.2	330° 40.2	345° 40.1	0° 40.0	15° 39.9	30° 39.8	45° 39.8	60° 39.7	75° 39.6	-0.1
	21° 28.4	21° 28.8	21° 29.2	21° 29.6	21° 30.0	21° 30.4	21° 30.8	21° 31.2	21° 31.6	21° 32.0	21° 32.4	21° 32.8	+0.4
Mo 29	270° 38.5	285° 38.5	300° 38.4	315° 38.3	330° 38.2	345° 38.1	0° 38.1	15° 38.0	30° 37.9	45° 37.8	60° 37.7	75° 37.6	-0.1
	21° 37.9	21° 38.2	21° 38.6	21° 39.0	21° 39.4	21° 39.8	21° 40.2	21° 40.5	21° 40.9	21° 41.3	21° 41.7	21° 42.1	+0.4
Tu 30	270° 36.5	285° 36.4	300° 36.3	315° 36.3	330° 36.2	345° 36.1	0° 36.0	15° 35.9	30° 35.8	45° 35.7	60° 35.6	75° 35.6	-0.1
	21° 46.9	21° 47.3	21° 47.6	21° 48.0	21° 48.4	21° 48.7	21° 49.1	21° 49.5	21° 49.8	21° 50.2	21° 50.6	21° 50.9	+0.4
We 31	270° 34.4	285° 34.3	300° 34.2	315° 34.1	330° 34.0	345° 33.9	0° 33.8	15° 33.8	30° 33.7	45° 33.6	60° 33.5	75° 33.4	-0.1
	21° 55.6	21° 55.9	21° 56.3	21° 56.6	21° 57.0	21° 57.3	21° 57.7	21° 58.0	21° 58.4	21° 58.7	21° 59.1	21° 59.4	+0.3

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2034

D	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	Δ'/h	SH
Mo 1	244°44.6	259°18.5	273°52.4	288°26.2	303°00.1	317°33.9	332°07.7	346°41.5	1°15.3	15°49.1	30°22.8	+33.8	14.7
	-6°37.9	-6°46.6	-6°55.3	-7°03.9	-7°12.5	-7°21.1	-7°29.6	-7°38.1	-7°46.6	-7°55.0	-8°03.4	-8.6	54.0
Tu 2	248°47.0	263°20.4	277°53.8	292°27.2	307°00.6	321°34.0	336°07.3	350°40.6	5°13.9	19°47.2	34°20.4	+33.3	14.7
	-10°05.1	-10°12.9	-10°20.7	-10°28.4	-10°36.1	-10°43.7	-10°51.3	-10°58.8	-11°06.3	-11°13.7	-11°21.1	-7.6	53.9
○ We 3	252°35.9	267°08.7	281°41.5	296°14.3	310°47.0	325°19.7	339°52.4	354°25.0	8°57.7	23°30.2	38°02.8	+32.7	14.7
	-13°05.9	-13°12.5	-13°19.0	-13°25.4	-13°31.8	-13°38.2	-13°44.4	-13°50.7	-13°56.8	-14°02.9	-14°09.0	-6.3	53.9
Th 4	256°07.7	270°39.7	285°11.8	299°43.8	314°15.8	328°47.8	343°19.7	357°51.6	12°23.5	26°55.4	41°27.2	+32.0	14.7
	-15°31.9	-15°36.9	-15°41.9	-15°46.7	-15°51.5	-15°56.3	-16°00.9	-16°05.5	-16°10.0	-16°14.5	-16°18.8	-4.7	54.0
Fr 5	259°21.1	273°52.5	288°23.8	302°55.2	317°26.4	331°57.7	346°29.0	1°00.2	15°31.4	30°02.5	44°33.7	+31.3	14.8
	-17°15.5	-17°18.7	-17°21.7	-17°24.7	-17°27.7	-17°30.5	-17°33.3	-17°36.0	-17°38.6	-17°41.1	-17°43.5	-2.8	54.2
Sa 6	262°18.0	276°48.8	291°19.5	305°50.3	320°21.0	334°51.7	349°22.4	3°53.0	18°23.7	32°54.3	47°24.9	+30.7	14.9
	-18°10.2	-18°11.3	-18°12.3	-18°13.2	-18°14.1	-18°14.8	-18°15.5	-18°16.1	-18°16.6	-18°17.0	-18°17.3	-0.7	54.6
Su 7	265°02.1	279°32.4	294°02.8	308°33.1	323°03.5	337°33.8	352°04.1	6°34.4	21°04.7	35°35.0	50°05.2	+30.3	15.0
	-18°11.5	-18°10.4	-18°09.3	-18°08.0	-18°06.6	-18°05.2	-18°03.6	-18°02.0	-18°00.3	-17°58.5	-17°56.6	+1.5	55.0
Mo 8	267°38.1	282°08.3	296°38.4	311°08.5	325°38.7	340°08.8	354°38.9	9°09.0	23°39.1	38°09.2	52°39.3	+30.1	15.1
	-17°17.3	-17°14.0	-17°10.6	-17°07.1	-17°03.5	-16°59.8	-16°56.0	-16°52.1	-16°48.2	-16°44.2	-16°40.0	+3.7	55.5
Tu 9	270°10.1	284°40.2	299°10.2	313°40.2	328°10.2	342°40.2	357°10.2	11°40.3	26°10.3	40°40.3	55°10.3	+30.0	15.3
	-15°27.9	-15°22.4	-15°16.8	-15°11.1	-15°05.4	-14°59.6	-14°53.7	-14°47.7	-14°41.6	-14°35.5	-14°29.2	+5.9	56.2
We 10	284°40.2	299°10.2	313°40.2	328°10.2	342°40.2	357°10.2	11°40.3	26°10.3	40°40.3	55°10.3	69°40.3	+30.0	15.3
	-15°22.4	-15°16.8	-15°11.1	-15°05.4	-14°59.6	-14°53.7	-14°47.7	-14°41.6	-14°35.5	-14°29.2	-14°22.9	+5.9	56.3
◑ Th 11	287°09.7	301°39.6	316°09.5	330°39.4	345°09.3	359°39.2	14°09.1	28°39.0	43°08.9	57°38.8	72°08.6	+29.9	15.6
	-12°38.8	-12°31.2	-12°23.6	-12°15.9	-12°08.1	-12°00.2	-11°52.3	-11°44.3	-11°36.3	-11°28.1	-11°19.9	+7.9	57.1
Fr 12	289°35.3	304°05.0	318°34.7	333°04.4	347°34.0	2°03.6	16°33.2	31°02.8	45°32.4	60°02.0	74°31.5	+29.6	15.8
	-9°08.8	-8°59.6	-8°50.3	-8°40.9	-8°31.5	-8°22.0	-8°12.4	-8°02.8	-7°53.2	-7°43.5	-7°33.7	+9.5	57.9
Sa 13	291°52.3	306°21.5	320°50.6	335°19.8	349°48.9	4°18.0	18°47.0	33°16.1	47°45.1	62°14.1	76°43.0	+29.1	16.1
	-5°01.1	-4°50.6	-4°40.0	-4°29.4	-4°18.7	-4°08.0	-3°57.3	-3°46.5	-3°35.7	-3°24.9	-3°14.0	+10.7	58.9
Su 14	293°53.0	308°21.4	322°49.7	337°18.0	351°46.3	6°14.5	20°42.6	35°10.8	49°38.8	64°06.9	78°34.9	+28.2	16.3
	-0°27.5	-0°16.3	-0°05.0	0°06.3	0°17.6	0°29.0	0°40.3	0°51.6	1°03.0	1°14.4	1°25.7	+11.3	59.8
Mo 15	295°29.0	309°56.2	324°23.3	338°50.4	353°17.5	7°44.5	22°11.4	36°38.3	51°05.1	65°31.9	79°58.6	+27.0	16.5
	4°16.1	4°27.4	4°38.7	4°49.9	5°01.2	5°12.4	5°23.6	5°34.7	5°45.9	5°57.0	6°08.1	+11.2	60.5
Tu 16	296°32.6	310°58.4	325°24.2	339°49.9	354°15.5	8°41.1	23°06.6	37°32.1	51°57.5	66°22.8	80°48.1	+25.5	16.6
	8°49.9	9°00.4	9°10.7	9°21.1	9°31.3	9°41.5	9°51.7	10°01.8	10°11.8	10°21.7	10°31.6	+10.2	61.0
We 17	297°00.9	311°25.3	325°49.7	340°14.1	354°38.4	9°02.6	23°26.8	37°50.9	52°15.0	66°39.1	81°03.1	+24.2	16.7
	12°51.1	12°59.7	13°08.2	13°16.7	13°25.0	13°33.3	13°41.5	13°49.5	13°57.5	14°05.4	14°13.2	+8.2	61.2
● Th 18	296°58.8	311°22.3	325°45.7	340°09.1	354°32.5	8°55.9	23°19.2	37°42.6	52°05.9	66°29.2	80°52.5	+23.4	16.7
	15°56.8	16°02.8	16°08.7	16°14.4	16°20.0	16°25.6	16°31.0	16°36.2	16°41.4	16°46.4	16°51.3	+5.5	61.1
Fr 19	296°41.0	311°04.3	325°27.5	339°50.8	354°14.1	8°37.4	23°00.8	37°24.1	51°47.5	66°10.9	80°34.3	+23.3	16.5
	17°49.3	17°52.1	17°54.8	17°57.3	17°59.7	18°02.0	18°04.2	18°06.2	18°08.1	18°09.9	18°11.5	+2.2	60.6
Sa 20	296°29.5	310°53.6	325°17.6	339°41.7	354°05.9	8°30.1	22°54.4	37°18.7	51°43.0	66°07.5	80°32.0	+24.2	16.3
	18°20.1	18°19.6	18°19.0	18°18.3	18°17.5	18°16.5	18°15.4	18°14.2	18°12.8	18°11.4	18°09.8	-1.0	59.9
Su 21	296°47.1	311°12.6	325°38.3	340°04.0	354°29.8	8°55.7	23°21.6	37°47.6	52°13.7	66°39.9	81°06.1	+25.9	16.1
	17°31.8	17°28.3	17°24.8	17°21.1	17°17.4	17°13.5	17°09.5	17°05.4	17°01.3	16°57.0	16°52.6	-3.9	58.9
Mo 22	297°49.7	312°17.3	326°44.9	341°12.6	355°40.4	10°08.3	24°36.3	39°04.4	53°32.5	68°00.7	82°29.1	+27.9	15.8
	15°35.6	15°29.8	15°23.9	15°17.9	15°11.8	15°05.6	14°59.4	14°53.1	14°46.7	14°40.2	14°33.6	-6.2	57.9
Tu 23	299°43.5	314°13.1	328°42.8	343°12.5	357°42.3	12°12.2	26°42.2	41°12.3	55°42.4	70°12.6	84°42.9	+29.9	15.5
	12°47.4	12°39.8	12°32.1	12°24.4	12°16.7	12°08.9	12°01.0	11°53.1	11°45.2	11°37.1	11°29.1	-7.8	57.0
◐ We 24	302°25.6	316°56.9	331°28.4	345°59.9	0°31.4	15°03.1	29°34.7	44°06.5	58°38.3	73°10.2	87°42.1	+31.7	15.3
	9°23.0	9°14.3	9°05.5	8°56.7	8°47.9	8°39.1	8°30.2	8°21.3	8°12.3	8°03.4	7°54.4	-8.9	56.1
Th 25	305°47.2	320°20.0	334°52.8	349°25.6	3°58.4	18°31.4	33°04.3	47°37.3	62°10.3	76°43.4	91°16.5	+32.9	15.1
	5°36.7	5°27.4	5°18.0	5°08.6	4°59.3	4°49.9	4°40.5	4°31.1	4°21.6	4°12.2	4°02.7	-9.4	55.4
Fr 26	309°37.1	324°10.8	338°44.4	353°18.1	7°51.7	22°25.5	36°59.2	51°32.9	66°06.7	80°40.5	95°14.3	+33.7	14.9
	1°40.3	1°30.8	1°21.2	1°11.7	1°02.2	0°52.7	0°43.2	0°33.7	0°24.2	0°14.7	0°05.2	-9.5	54.8
Sa 27	313°43.3	328°17.3	342°51.3	357°25.3	11°59.4	26°33.4	41°07.4	55°41.5	70°15.5	84°49.6	99°23.6	+34.0	14.8
	-2°16.4	-2°25.7	-2°35.0	-2°44.3	-2°53.6	-3°02.9	-3°12.2	-3°21.5	-3°30.7	-3°39.9	-3°49.1	-9.3	54.3
Su 28	317°54.2	332°28.1	347°02.1	1°36.1	16°10.1	30°44.0	45°17.9	59°51.9	74°25.8	88°59.7	103°33.6	+33.9	14.7
	-6°04.5	-6°13.4	-6°22.2	-6°31.0	-6°39.7	-6°48.4	-6°57.1	-7°05.8	-7°14.4	-7°23.0	-7°31.6	-8.7	54.1
Mo 29	321°59.8	336°33.4	351°07.0	5°40.6	20°14.1	34°47.6	49°21.1	63°54.5	78°28.0	93°01.4	107°34.8	+33.5	14.7
	-9°36.0	-9°44.0	-9°52.0	-9°59.9	-10°07.8	-10°15.6	-10°23.4	-10°31.1	-10°38.8	-10°46.5	-10°54.1	-7.8	54.0
Tu 30	325°52.3	340°25.2	354°58.1	9°31.0	24°03.8	38°36.7	53°09.4	67°42.2	82°14.9	96°47.6	111°20.2	+32.8	14.7
	-12°42.6	-12°49.4	-12°56.2	-13°02.9	-13°09.6	-13°16.2	-13°22.8	-13°29.3	-13°35.7	-13°42.1	-13°48.4	-6.6	54.0
We 31	329°26.2	343°58.3	358°30.4	13°02.4	27°34.5	42°06.5	56°38.4	71°10.3	85°42.2	100°14.1	114°45.9	+32.0	14.7
	-15°16.0	-15°21.3	-15°26.6	-15°31.8	-15°36.9	-15°42.0	-15°46.9	-15°51.9	-15°56.7	-16°01.5	-16°06.2	-5.0	54.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 3 12h15 — LQ: 11 10h56 — NM: 18 03h12 — FQ: 24 23h57

SUN

June 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	270°32.2	285°32.1	300°32.0	315°31.9	330°31.8	345°31.7	0°31.6	15°31.5	30°31.4	45°31.3	60°31.2	75°31.1	-0.1
	22°03.9	22°04.2	22°04.5	22°04.9	22°05.2	22°05.5	22°05.9	22°06.2	22°06.5	22°06.9	22°07.2	22°07.5	+0.3
Fr 2	270°29.8	285°29.7	300°29.6	315°29.5	330°29.4	345°29.3	0°29.2	15°29.1	30°29.0	45°28.9	60°28.8	75°28.7	-0.1
	22°11.8	22°12.1	22°12.4	22°12.7	22°13.0	22°13.4	22°13.7	22°14.0	22°14.3	22°14.6	22°14.9	22°15.3	+0.3
Sa 3	270°27.4	285°27.3	300°27.2	315°27.1	330°27.0	345°26.9	0°26.8	15°26.7	30°26.6	45°26.5	60°26.4	75°26.3	-0.1
	22°19.3	22°19.6	22°19.9	22°20.2	22°20.5	22°20.8	22°21.1	22°21.4	22°21.7	22°22.0	22°22.3	22°22.6	+0.3
Su 4	270°24.9	285°24.8	300°24.7	315°24.6	330°24.5	345°24.4	0°24.3	15°24.1	30°24.0	45°23.9	60°23.8	75°23.7	-0.1
	22°26.4	22°26.7	22°27.0	22°27.3	22°27.6	22°27.8	22°28.1	22°28.4	22°28.7	22°29.0	22°29.3	22°29.5	+0.3
Mo 5	270°22.3	285°22.2	300°22.1	315°22.0	330°21.9	345°21.7	0°21.6	15°21.5	30°21.4	45°21.3	60°21.2	75°21.1	-0.1
	22°33.1	22°33.4	22°33.7	22°34.0	22°34.2	22°34.5	22°34.8	22°35.0	22°35.3	22°35.6	22°35.8	22°36.1	+0.3
Tu 6	270°19.6	285°19.5	300°19.4	315°19.3	330°19.2	345°19.0	0°18.9	15°18.8	30°18.7	45°18.6	60°18.5	75°18.4	-0.1
	22°39.5	22°39.7	22°40.0	22°40.2	22°40.5	22°40.7	22°41.0	22°41.2	22°41.5	22°41.7	22°42.0	22°42.2	+0.3
We 7	270°16.8	285°16.7	300°16.6	315°16.5	330°16.4	345°16.3	0°16.1	15°16.0	30°15.9	45°15.8	60°15.7	75°15.6	-0.1
	22°45.4	22°45.7	22°45.9	22°46.1	22°46.4	22°46.6	22°46.8	22°47.1	22°47.3	22°47.5	22°47.8	22°48.0	+0.2
Th 8	270°14.0	285°13.9	300°13.8	315°13.6	330°13.5	345°13.4	0°13.3	15°13.2	30°13.0	45°12.9	60°12.8	75°12.7	-0.1
	22°51.0	22°51.2	22°51.4	22°51.6	22°51.8	22°52.1	22°52.3	22°52.5	22°52.7	22°52.9	22°53.1	22°53.4	+0.2
Fr 9	270°11.1	285°11.0	300°10.9	315°10.7	330°10.6	345°10.5	0°10.4	15°10.2	30°10.1	45°10.0	60°09.9	75°09.7	-0.1
	22°56.1	22°56.3	22°56.5	22°56.7	22°56.9	22°57.1	22°57.3	22°57.5	22°57.7	22°57.9	22°58.1	22°58.3	+0.2
Sa 10	270°08.1	285°08.0	300°07.9	315°07.7	330°07.6	345°07.5	0°07.4	15°07.2	30°07.1	45°07.0	60°06.9	75°06.7	-0.1
	23°00.8	23°01.0	23°01.2	23°01.4	23°01.6	23°01.8	23°01.9	23°02.1	23°02.3	23°02.5	23°02.7	23°02.9	+0.2
Su 11	270°05.1	285°05.0	300°04.8	315°04.7	330°04.6	345°04.4	0°04.3	15°04.2	30°04.1	45°03.9	60°03.8	75°03.7	-0.1
	23°05.2	23°05.3	23°05.5	23°05.7	23°05.8	23°06.0	23°06.2	23°06.3	23°06.5	23°06.7	23°06.8	23°07.0	+0.2
Mo 12	270°02.0	285°01.9	300°01.7	315°01.6	330°01.5	345°01.3	0°01.2	15°01.1	30°01.0	45°00.8	60°00.7	75°00.6	-0.1
	23°09.1	23°09.2	23°09.4	23°09.5	23°09.7	23°09.8	23°10.0	23°10.1	23°10.3	23°10.4	23°10.6	23°10.7	+0.2
Tu 13	269°58.9	284°58.7	299°58.6	314°58.5	329°58.3	344°58.2	359°58.1	14°57.9	29°57.8	44°57.7	59°57.5	74°57.4	-0.1
	23°12.6	23°12.7	23°12.9	23°13.0	23°13.1	23°13.3	23°13.4	23°13.5	23°13.7	23°13.8	23°13.9	23°14.1	+0.1
We 14	269°55.7	284°55.5	299°55.4	314°55.3	329°55.1	344°55.0	359°54.9	14°54.7	29°54.6	44°54.5	59°54.3	74°54.2	-0.1
	23°15.7	23°15.8	23°15.9	23°16.1	23°16.2	23°16.3	23°16.4	23°16.5	23°16.6	23°16.8	23°16.9	23°17.0	+0.1
Th 15	269°52.5	284°52.3	299°52.2	314°52.1	329°51.9	344°51.8	359°51.6	14°51.5	29°51.4	44°51.2	59°51.1	74°51.0	-0.1
	23°18.4	23°18.5	23°18.6	23°18.7	23°18.8	23°18.9	23°19.0	23°19.1	23°19.2	23°19.3	23°19.4	23°19.5	+0.1
Fr 16	269°49.2	284°49.1	299°48.9	314°48.8	329°48.7	344°48.5	359°48.4	14°48.3	29°48.1	44°48.0	59°47.8	74°47.7	-0.1
	23°20.7	23°20.8	23°20.9	23°20.9	23°21.0	23°21.1	23°21.2	23°21.3	23°21.4	23°21.4	23°21.5	23°21.6	+0.1
Sa 17	269°45.9	284°45.8	299°45.7	314°45.5	329°45.4	344°45.3	359°45.1	14°45.0	29°44.8	44°44.7	59°44.6	74°44.4	-0.1
	23°22.6	23°22.6	23°22.7	23°22.8	23°22.8	23°22.9	23°23.0	23°23.0	23°23.1	23°23.2	23°23.2	23°23.3	+0.1
Su 18	269°42.7	284°42.5	299°42.4	314°42.2	329°42.1	344°42.0	359°41.8	14°41.7	29°41.6	44°41.4	59°41.3	74°41.1	-0.1
	23°24.0	23°24.1	23°24.1	23°24.2	23°24.2	23°24.3	23°24.3	23°24.4	23°24.4	23°24.5	23°24.5	23°24.5	+0.0
Mo 19	269°39.4	284°39.2	299°39.1	314°38.9	329°38.8	344°38.7	359°38.5	14°38.4	29°38.3	44°38.1	59°38.0	74°37.9	-0.1
	23°25.1	23°25.1	23°25.1	23°25.2	23°25.2	23°25.2	23°25.3	23°25.3	23°25.3	23°25.4	23°25.4	23°25.4	+0.0
Tu 20	269°36.1	284°35.9	299°35.8	314°35.7	329°35.5	344°35.4	359°35.2	14°35.1	29°35.0	44°34.8	59°34.7	74°34.6	-0.1
	23°25.7	23°25.7	23°25.7	23°25.7	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.9	+0.0
We 21	269°32.8	284°32.6	299°32.5	314°32.4	329°32.2	344°32.1	359°32.0	14°31.8	29°31.7	44°31.6	59°31.4	74°31.3	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	-0.0
Th 22	269°29.5	284°29.4	299°29.2	314°29.1	329°29.0	344°28.8	359°28.7	14°28.6	29°28.4	44°28.3	59°28.2	74°28.0	-0.1
	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.6	23°25.6	23°25.6	23°25.6	23°25.6	23°25.5	23°25.5	-0.0
Fr 23	269°26.3	284°26.1	299°26.0	314°25.9	329°25.7	344°25.6	359°25.4	14°25.3	29°25.2	44°25.0	59°24.9	74°24.8	-0.1
	23°25.1	23°25.1	23°25.1	23°25.0	23°25.0	23°24.9	23°24.9	23°24.9	23°24.8	23°24.8	23°24.8	23°24.7	-0.0
Sa 24	269°23.0	284°22.9	299°22.8	314°22.6	329°22.5	344°22.4	359°22.2	14°22.1	29°22.0	44°21.8	59°21.7	74°21.6	-0.1
	23°24.1	23°24.1	23°24.0	23°24.0	23°23.9	23°23.8	23°23.8	23°23.7	23°23.7	23°23.6	23°23.6	23°23.5	-0.1
Su 25	269°19.8	284°19.7	299°19.6	314°19.4	329°19.3	344°19.2	359°19.0	14°18.9	29°18.8	44°18.6	59°18.5	74°18.4	-0.1
	23°22.7	23°22.6	23°22.5	23°22.5	23°22.4	23°22.3	23°22.3	23°22.2	23°22.1	23°22.0	23°22.0	23°21.9	-0.1
Mo 26	269°16.7	284°16.5	299°16.4	314°16.3	329°16.1	344°16.0	359°15.9	14°15.8	29°15.6	44°15.5	59°15.4	74°15.2	-0.1
	23°20.8	23°20.7	23°20.7	23°20.6	23°20.5	23°20.4	23°20.3	23°20.2	23°20.1	23°20.0	23°19.9	23°19.9	-0.1
Tu 27	269°13.5	284°13.4	299°13.3	314°13.2	329°13.0	344°12.9	359°12.8	14°12.6	29°12.5	44°12.4	59°12.3	74°12.1	-0.1
	23°18.6	23°18.5	23°18.4	23°18.3	23°18.2	23°18.1	23°18.0	23°17.8	23°17.7	23°17.6	23°17.5	23°17.4	-0.1
We 28	269°10.5	284°10.3	299°10.2	314°10.1	329°10.0	344°09.8	359°09.7	14°09.6	29°09.5	44°09.3	59°09.2	74°09.1	-0.1
	23°15.9	23°15.8	23°15.7	23°15.6	23°15.4	23°15.3	23°15.2	23°15.1	23°14.9	23°14.8	23°14.7	23°14.6	-0.1
Th 29	269°07.5	284°07.3	299°07.2	314°07.1	329°07.0	344°06.8	359°06.7	14°06.6	29°06.5	44°06.3	59°06.2	74°06.1	-0.1
	23°12.9	23°12.7	23°12.6	23°12.4	23°12.3	23°12.2	23°12.0	23°11.9	23°11.7	23°11.6	23°11.5	23°11.3	-0.1
Fr 30	269°04.5	284°04.4	299°04.2	314°04.1	329°04.0	344°03.9	359°03.8	14°03.6	29°03.5	44°03.4	59°03.3	74°03.1	-0.1
	23°09.4	23°09.2	23°09.1	23°08.9	23°08.8	23°08.6	23°08.4	23°08.3	23°08.1	23°08.0	23°07.8	23°07.6	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2034

D	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	Δ'/h	SH
Th 1	245°30.9	260°02.4	274°33.9	289°05.3	303°36.7	318°08.1	332°39.4	347°10.7	1°42.0	16°13.3	30°44.5	+31.4	14.8
	-16°45.4	-16°49.3	-16°53.2	-16°57.1	-17°00.8	-17°04.5	-17°08.1	-17°11.6	-17°15.1	-17°18.4	-17°21.7	-3.6	54.2
○ Fr 2	248°29.4	263°00.1	277°30.9	292°01.6	306°32.3	321°03.0	335°33.6	350°04.3	4°34.9	19°05.5	33°36.0	+30.7	14.9
	-18°01.2	-18°03.2	-18°05.1	-18°06.9	-18°08.6	-18°10.2	-18°11.8	-18°13.2	-18°14.6	-18°15.9	-18°17.1	-1.6	54.5
Sa 3	251°12.1	265°42.4	280°12.6	294°42.9	309°13.1	323°43.3	338°13.5	352°43.7	7°13.9	21°44.1	36°14.2	+30.2	15.0
	-18°24.4	-18°24.2	-18°23.9	-18°23.5	-18°23.0	-18°22.4	-18°21.7	-18°21.0	-18°20.1	-18°19.2	-18°18.1	+0.6	54.9
Su 4	253°45.5	268°15.5	282°45.6	297°15.6	311°45.6	326°15.7	340°45.7	355°15.7	9°45.7	24°15.7	38°45.7	+30.0	15.1
	-17°51.7	-17°49.2	-17°46.6	-17°43.9	-17°41.2	-17°38.3	-17°35.4	-17°32.4	-17°29.2	-17°26.0	-17°22.7	+2.9	55.3
Mo 5	256°16.1	270°46.1	285°16.2	299°46.2	314°16.3	328°46.4	343°16.4	357°46.5	12°16.6	26°46.7	41°16.7	+30.1	15.2
	-16°22.7	-16°18.0	-16°13.2	-16°08.4	-16°03.4	-15°58.4	-15°53.3	-15°48.1	-15°42.8	-15°37.4	-15°32.0	+5.1	55.8
Tu 6	258°48.7	273°18.9	287°49.1	302°19.2	316°49.4	331°19.6	345°49.8	0°20.1	14°50.3	29°20.5	43°50.7	+30.2	15.4
	-14°00.5	-13°53.8	-13°47.0	-13°40.1	-13°33.2	-13°26.1	-13°19.0	-13°11.9	-13°04.6	-12°57.3	-12°49.9	+7.1	56.4
We 7	261°24.6	275°54.9	290°25.2	304°55.5	319°25.7	333°56.0	348°26.3	2°56.6	17°26.9	31°57.1	46°27.4	+30.3	15.6
	-10°50.8	-10°42.4	-10°33.9	-10°25.3	-10°16.6	-10°07.9	-9°59.1	-9°50.3	-9°41.4	-9°32.5	-9°23.5	+8.7	57.0
Th 8	264°01.1	278°31.3	293°01.5	307°31.6	322°01.8	336°31.9	351°02.1	5°32.2	20°02.3	34°32.4	49°02.5	+30.1	15.7
	-7°01.9	-6°52.1	-6°42.2	-6°32.3	-6°22.3	-6°12.3	-6°02.3	-5°52.2	-5°42.1	-5°31.9	-5°21.7	+10.0	57.8
◑ Fr 9	278°31.3	293°01.5	307°31.6	322°01.8	336°31.9	351°02.1	5°32.2	20°02.3	34°32.4	49°02.5	63°32.6	+30.1	15.8
	-6°52.1	-6°42.2	-6°32.3	-6°22.3	-6°12.3	-6°02.3	-5°52.2	-5°42.1	-5°31.9	-5°21.7	-5°11.4	+10.1	57.8
Sa 10	281°01.4	295°31.1	310°00.9	324°30.6	339°00.2	353°29.9	7°59.5	22°29.1	36°58.6	51°28.1	65°57.6	+29.6	16.0
	-2°33.5	-2°22.7	-2°12.0	-2°01.2	-1°50.3	-1°39.5	-1°28.6	-1°17.7	-1°06.8	-0°55.9	-0°44.9	+10.9	58.5
Su 11	283°15.9	297°44.8	312°13.7	326°42.5	341°11.3	355°40.0	10°08.7	24°37.3	39°05.9	53°34.5	68°03.0	+28.7	16.2
	2°00.5	2°11.6	2°22.7	2°33.7	2°44.8	2°55.9	3°06.9	3°18.0	3°29.0	3°40.0	3°51.0	+11.1	59.3
Mo 12	285°04.5	299°32.2	313°59.8	328°27.3	342°54.8	357°22.3	11°49.7	26°17.0	40°44.3	55°11.5	69°38.6	+27.4	16.3
	6°34.2	6°44.9	6°55.6	7°06.2	7°16.8	7°27.4	7°37.9	7°48.3	7°58.8	8°09.2	8°19.5	+10.5	59.9
Tu 13	286°18.6	300°44.7	315°10.8	329°36.9	344°02.9	358°28.8	12°54.7	27°20.4	41°46.2	56°11.9	70°37.5	+25.9	16.5
	10°48.9	10°58.4	11°07.8	11°17.2	11°26.5	11°35.7	11°44.9	11°54.0	12°03.0	12°11.9	12°20.8	+9.2	60.4
We 14	286°54.5	301°19.2	315°43.9	330°08.4	344°33.0	358°57.4	13°21.8	27°46.2	42°10.5	56°34.8	70°59.1	+24.4	16.6
	14°23.6	14°31.1	14°38.4	14°45.7	14°52.8	14°59.9	15°06.9	15°13.7	15°20.5	15°27.1	15°33.6	+7.0	60.7
Th 15	286°57.6	301°21.2	315°44.8	330°08.3	344°31.9	358°55.4	13°18.9	27°42.4	42°05.8	56°29.3	70°52.7	+23.5	16.6
	16°58.0	17°02.7	17°07.3	17°11.7	17°16.0	17°20.2	17°24.2	17°28.2	17°32.0	17°35.6	17°39.2	+4.1	60.7
● Fr 16	286°43.2	301°06.6	315°30.0	329°53.4	344°16.8	358°40.2	13°03.7	27°27.2	41°50.7	56°14.2	70°37.7	+23.4	16.5
	18°16.7	18°18.2	18°19.5	18°20.7	18°21.7	18°22.6	18°23.4	18°24.1	18°24.6	18°25.0	18°25.2	+0.8	60.4
Sa 17	286°34.6	300°58.8	315°22.9	329°47.2	344°11.4	358°35.8	13°00.2	27°24.6	41°49.1	56°13.6	70°38.3	+24.4	16.3
	18°13.4	18°11.6	18°09.7	18°07.6	18°05.5	18°03.2	18°00.7	17°58.2	17°55.5	17°52.7	17°49.8	-2.4	59.8
Su 18	286°55.2	301°20.9	315°46.7	330°12.5	344°38.5	359°04.4	13°30.5	27°56.7	42°22.9	56°49.2	71°15.6	+26.0	16.1
	16°52.7	16°48.0	16°43.2	16°38.3	16°33.3	16°28.3	16°23.1	16°17.8	16°12.4	16°07.0	16°01.4	-5.1	59.0
Mo 19	288°01.1	302°28.8	316°56.6	331°24.5	345°52.4	0°20.4	14°48.5	29°16.7	43°45.0	58°13.4	72°41.8	+28.1	15.8
	14°27.5	14°20.6	14°13.6	14°06.5	13°59.4	13°52.2	13°44.9	13°37.6	13°30.2	13°22.7	13°15.2	-7.2	58.1
Tu 20	289°58.0	304°27.8	318°57.5	333°27.4	347°57.4	2°27.4	16°57.5	31°27.6	45°57.9	60°28.2	74°58.6	+30.1	15.6
	11°15.0	11°06.6	10°58.1	10°49.6	10°41.0	10°32.4	10°23.7	10°15.0	10°06.3	9°57.5	9°48.7	-8.6	57.1
We 21	292°42.6	307°14.0	321°45.5	336°17.1	350°48.7	5°20.4	19°52.2	34°24.0	48°55.9	63°27.8	77°59.8	+31.7	15.3
	7°32.3	7°23.0	7°13.7	7°04.3	6°54.9	6°45.5	6°36.1	6°26.6	6°17.2	6°07.7	5°58.2	-9.4	56.3
Th 22	296°05.5	310°38.2	325°11.0	339°43.9	354°16.7	8°49.7	23°22.6	37°55.6	52°28.6	67°01.7	81°34.8	+32.9	15.1
	3°34.1	3°24.5	3°14.8	3°05.1	2°55.4	2°45.7	2°36.0	2°26.4	2°16.7	2°07.0	1°57.3	-9.7	55.5
◐ Fr 23	299°55.0	314°28.6	329°02.1	343°35.7	358°09.4	12°43.0	27°16.7	41°50.3	56°24.0	70°57.7	85°31.5	+33.7	15.0
	-0°27.6	-0°37.2	-0°46.8	-0°56.4	-1°06.0	-1°15.5	-1°25.1	-1°34.6	-1°44.1	-1°53.6	-2°03.1	-9.6	54.9
Sa 24	303°58.7	318°32.6	333°06.5	347°40.4	2°14.3	16°48.2	31°22.0	45°55.9	60°29.8	75°03.7	89°37.6	+33.9	14.8
	-4°23.3	-4°32.5	-4°41.7	-4°50.8	-4°59.9	-5°09.0	-5°18.0	-5°27.1	-5°36.1	-5°45.1	-5°54.0	-9.1	54.4
Su 25	308°05.0	322°38.8	337°12.5	351°46.2	6°19.9	20°53.6	35°27.3	50°01.0	64°34.6	79°08.2	93°41.8	+33.7	14.8
	-8°04.6	-8°13.1	-8°21.5	-8°29.9	-8°38.2	-8°46.5	-8°54.8	-9°03.0	-9°11.2	-9°19.3	-9°27.4	-8.3	54.2
Mo 26	312°03.5	326°36.8	341°10.0	355°43.2	10°16.4	24°49.6	39°22.7	53°55.8	68°28.8	83°01.9	97°34.9	+33.1	14.7
	-11°23.9	-11°31.3	-11°38.6	-11°45.9	-11°53.2	-12°00.4	-12°07.5	-12°14.6	-12°21.7	-12°28.7	-12°35.6	-7.2	54.1
Tu 27	315°46.3	330°18.8	344°51.2	359°23.7	13°56.1	28°28.4	43°00.7	57°33.0	72°05.3	86°37.5	101°09.7	+32.3	14.8
	-14°13.2	-14°19.3	-14°25.3	-14°31.2	-14°37.0	-14°42.8	-14°48.6	-14°54.2	-14°59.8	-15°05.4	-15°10.9	-5.8	54.1
We 28	319°08.2	333°39.8	348°11.3	2°42.9	17°14.4	31°45.8	46°17.3	60°48.7	75°20.0	89°51.3	104°22.6	+31.4	14.8
	-16°24.9	-16°29.3	-16°33.6	-16°37.8	-16°41.9	-16°46.0	-16°50.0	-16°53.9	-16°57.8	-17°01.5	-17°05.2	-4.0	54.3
Th 29	322°07.8	336°38.5	351°09.3	5°39.9	20°10.6	34°41.2	49°11.8	63°42.4	78°12.9	92°43.4	107°13.9	+30.6	14.9
	-17°51.1	-17°53.5	-17°55.9	-17°58.1	-18°00.2	-18°02.3	-18°04.3	-18°06.2	-18°08.0	-18°09.7	-18°11.4	-2.0	54.6
Fr 30	324°47.8	339°17.9	353°47.9	8°18.0	22°48.0	37°18.0	51°47.9	66°17.9	80°47.8	95°17.7	109°47.6	+30.0	15.0
	-18°25.3	-18°25.5	-18°25.7	-18°25.7	-18°25.6	-18°25.5	-18°25.2	-18°24.9	-18°24.5	-18°23.9	-18°23.3	+0.2	55.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FM: 2 03h54 — LQ: 9 19h43 — NM: 16 10h25 — FQ: 23 14h35

SUN

July 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°01.6	284°01.5	299°01.3	314°01.2	329°01.1	344°01.0	359°00.9	14°00.7	29°00.6	44°00.5	59°00.4	74°00.3	-0.1
	23°05.5	23°05.3	23°05.2	23°05.0	23°04.8	23°04.6	23°04.5	23°04.3	23°04.1	23°03.9	23°03.8	23°03.6	-0.2
Su 2	268°58.7	283°58.6	298°58.5	313°58.4	328°58.3	343°58.2	358°58.0	13°57.9	28°57.8	43°57.7	58°57.6	73°57.5	-0.1
	23°01.2	23°01.0	23°00.8	23°00.6	23°00.5	23°00.3	23°00.1	22°59.9	22°59.7	22°59.5	22°59.3	22°59.1	-0.2
Mo 3	268°56.0	283°55.9	298°55.7	313°55.6	328°55.5	343°55.4	358°55.3	13°55.2	28°55.1	43°55.0	58°54.8	73°54.7	-0.1
	22°56.5	22°56.3	22°56.1	22°55.9	22°55.7	22°55.5	22°55.3	22°55.1	22°54.9	22°54.7	22°54.4	22°54.2	-0.2
Tu 4	268°53.3	283°53.2	298°53.1	313°52.9	328°52.8	343°52.7	358°52.6	13°52.5	28°52.4	43°52.3	58°52.2	73°52.1	-0.1
	22°51.4	22°51.2	22°51.0	22°50.8	22°50.5	22°50.3	22°50.1	22°49.9	22°49.6	22°49.4	22°49.2	22°49.0	-0.2
We 5	268°50.7	283°50.6	298°50.5	313°50.3	328°50.2	343°50.1	358°50.0	13°49.9	28°49.8	43°49.7	58°49.6	73°49.5	-0.1
	22°45.9	22°45.7	22°45.5	22°45.2	22°45.0	22°44.8	22°44.5	22°44.3	22°44.0	22°43.8	22°43.5	22°43.3	-0.2
Th 6	268°48.1	283°48.0	298°47.9	313°47.8	328°47.7	343°47.6	358°47.5	13°47.4	28°47.3	43°47.2	58°47.1	73°47.0	-0.1
	22°40.1	22°39.8	22°39.6	22°39.3	22°39.0	22°38.8	22°38.5	22°38.3	22°38.0	22°37.8	22°37.5	22°37.2	-0.3
Fr 7	268°45.7	283°45.6	298°45.5	313°45.4	328°45.3	343°45.2	358°45.1	13°45.0	28°44.9	43°44.8	58°44.7	73°44.6	-0.1
	22°33.8	22°33.5	22°33.3	22°33.0	22°32.7	22°32.4	22°32.2	22°31.9	22°31.6	22°31.3	22°31.1	22°30.8	-0.3
Sa 8	268°43.3	283°43.2	298°43.1	313°43.0	328°42.9	343°42.9	358°42.8	13°42.7	28°42.6	43°42.5	58°42.4	73°42.3	-0.1
	22°27.1	22°26.8	22°26.6	22°26.3	22°26.0	22°25.7	22°25.4	22°25.1	22°24.8	22°24.5	22°24.2	22°23.9	-0.3
Su 9	268°41.1	283°41.0	298°40.9	313°40.8	328°40.7	343°40.6	358°40.5	13°40.4	28°40.3	43°40.2	58°40.2	73°40.1	-0.1
	22°20.1	22°19.8	22°19.5	22°19.2	22°18.9	22°18.6	22°18.2	22°17.9	22°17.6	22°17.3	22°17.0	22°16.7	-0.3
Mo 10	268°38.9	283°38.8	298°38.7	313°38.6	328°38.6	343°38.5	358°38.4	13°38.3	28°38.2	43°38.1	58°38.0	73°37.9	-0.1
	22°12.6	22°12.3	22°12.0	22°11.7	22°11.4	22°11.0	22°10.7	22°10.4	22°10.1	22°09.7	22°09.4	22°09.1	-0.3
Tu 11	268°36.8	283°36.8	298°36.7	313°36.6	328°36.5	343°36.4	358°36.3	13°36.3	28°36.2	43°36.1	58°36.0	73°35.9	-0.1
	22°04.8	22°04.5	22°04.1	22°03.8	22°03.5	22°03.1	22°02.8	22°02.5	22°02.1	22°01.8	22°01.4	22°01.1	-0.3
We 12	268°34.9	283°34.8	298°34.7	313°34.7	328°34.6	343°34.5	358°34.4	13°34.3	28°34.3	43°34.2	58°34.1	73°34.0	-0.1
	21°56.6	21°56.3	21°55.9	21°55.6	21°55.2	21°54.8	21°54.5	21°54.1	21°53.8	21°53.4	21°53.1	21°52.7	-0.4
Th 13	268°33.0	283°33.0	298°32.9	313°32.8	328°32.8	343°32.7	358°32.6	13°32.5	28°32.5	43°32.4	58°32.3	73°32.2	-0.1
	21°48.0	21°47.7	21°47.3	21°46.9	21°46.6	21°46.2	21°45.8	21°45.5	21°45.1	21°44.7	21°44.3	21°44.0	-0.4
Fr 14	268°31.3	283°31.3	298°31.2	313°31.1	328°31.0	343°31.0	358°30.9	13°30.8	28°30.8	43°30.7	58°30.6	73°30.6	-0.1
	21°39.1	21°38.7	21°38.3	21°37.9	21°37.5	21°37.2	21°36.8	21°36.4	21°36.0	21°35.6	21°35.2	21°34.8	-0.4
Sa 15	268°29.7	283°29.7	298°29.6	313°29.5	328°29.5	343°29.4	358°29.3	13°29.3	28°29.2	43°29.2	58°29.1	73°29.0	-0.1
	21°29.8	21°29.4	21°29.0	21°28.6	21°28.2	21°27.8	21°27.4	21°27.0	21°26.6	21°26.2	21°25.8	21°25.4	-0.4
Su 16	268°28.2	283°28.2	298°28.1	313°28.1	328°28.0	343°28.0	358°27.9	13°27.8	28°27.8	43°27.7	58°27.7	73°27.6	-0.1
	21°20.1	21°19.7	21°19.2	21°18.8	21°18.4	21°18.0	21°17.6	21°17.2	21°16.8	21°16.3	21°15.9	21°15.5	-0.4
Mo 17	268°26.9	283°26.8	298°26.8	313°26.7	328°26.7	343°26.6	358°26.6	13°26.5	28°26.5	43°26.4	58°26.4	73°26.3	-0.1
	21°10.0	21°09.6	21°09.2	21°08.7	21°08.3	21°07.9	21°07.5	21°07.0	21°06.6	21°06.2	21°05.7	21°05.3	-0.4
Tu 18	268°25.7	283°25.6	298°25.6	313°25.5	328°25.5	343°25.4	358°25.4	13°25.4	28°25.3	43°25.3	58°25.2	73°25.2	-0.0
	20°59.6	20°59.2	20°58.7	20°58.3	20°57.8	20°57.4	20°57.0	20°56.5	20°56.1	20°55.6	20°55.2	20°54.7	-0.4
We 19	268°24.6	283°24.6	298°24.5	313°24.5	328°24.4	343°24.4	358°24.4	13°24.3	28°24.3	43°24.2	58°24.2	73°24.2	-0.0
	20°48.9	20°48.4	20°47.9	20°47.5	20°47.0	20°46.6	20°46.1	20°45.7	20°45.2	20°44.7	20°44.3	20°43.8	-0.5
Th 20	268°23.7	283°23.6	298°23.6	313°23.6	328°23.5	343°23.5	358°23.5	13°23.4	28°23.4	43°23.4	58°23.3	73°23.3	-0.0
	20°37.7	20°37.3	20°36.8	20°36.3	20°35.9	20°35.4	20°34.9	20°34.4	20°34.0	20°33.5	20°33.0	20°32.5	-0.5
Fr 21	268°22.9	283°22.9	298°22.8	313°22.8	328°22.8	343°22.7	358°22.7	13°22.7	28°22.7	43°22.6	58°22.6	73°22.6	-0.0
	20°26.3	20°25.8	20°25.3	20°24.8	20°24.3	20°23.9	20°23.4	20°22.9	20°22.4	20°21.9	20°21.4	20°20.9	-0.5
Sa 22	268°22.2	283°22.2	298°22.2	313°22.2	328°22.1	343°22.1	358°22.1	13°22.1	28°22.1	43°22.0	58°22.0	73°22.0	-0.0
	20°14.5	20°14.0	20°13.5	20°13.0	20°12.5	20°12.0	20°11.5	20°11.0	20°10.5	20°10.0	20°09.5	20°09.0	-0.5
Su 23	268°21.7	283°21.7	298°21.7	313°21.7	328°21.7	343°21.7	358°21.6	13°21.6	28°21.6	43°21.6	58°21.6	73°21.6	-0.0
	20°02.4	20°01.8	20°01.3	20°00.8	20°00.3	19°59.8	19°59.3	19°58.8	19°58.2	19°57.7	19°57.2	19°56.7	-0.5
Mo 24	268°21.4	283°21.4	298°21.4	313°21.4	328°21.4	343°21.3	358°21.3	13°21.3	28°21.3	43°21.3	58°21.3	73°21.3	-0.0
	19°49.9	19°49.4	19°48.8	19°48.3	19°47.8	19°47.2	19°46.7	19°46.2	19°45.7	19°45.1	19°44.6	19°44.1	-0.5
Tu 25	268°21.2	283°21.2	298°21.2	313°21.2	328°21.2	343°21.2	358°21.2	13°21.2	28°21.2	43°21.2	58°21.2	73°21.2	-0.0
	19°37.1	19°36.5	19°36.0	19°35.5	19°34.9	19°34.4	19°33.8	19°33.3	19°32.7	19°32.2	19°31.7	19°31.1	-0.5
We 26	268°21.2	283°21.2	298°21.2	313°21.2	328°21.2	343°21.2	358°21.2	13°21.2	28°21.2	43°21.2	58°21.2	73°21.2	+0.0
	19°24.0	19°23.4	19°22.9	19°22.3	19°21.7	19°21.2	19°20.6	19°20.1	19°19.5	19°19.0	19°18.4	19°17.8	-0.6
Th 27	268°21.3	283°21.3	298°21.3	313°21.3	328°21.3	343°21.3	358°21.3	13°21.3	28°21.4	43°21.4	58°21.4	73°21.4	+0.0
	19°10.5	19°10.0	19°09.4	19°08.8	19°08.2	19°07.7	19°07.1	19°06.5	19°06.0	19°05.4	19°04.8	19°04.3	-0.6
Fr 28	268°21.5	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.6	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	+0.0
	18°56.8	18°56.2	18°55.6	18°55.0	18°54.4	18°53.9	18°53.3	18°52.7	18°52.1	18°51.5	18°50.9	18°50.3	-0.6
Sa 29	268°22.0	283°22.0	298°22.0	313°22.0	328°22.1	343°22.1	358°22.1	13°22.1	28°22.1	43°22.2	58°22.2	73°22.2	+0.0
	18°42.7	18°42.1	18°41.5	18°40.9	18°40.3	18°39.7	18°39.1	18°38.5	18°37.9	18°37.3	18°36.7	18°36.1	-0.6
Su 30	268°22.5	283°22.6	298°22.6	313°22.6	328°22.7	343°22.7	358°22.7	13°22.7	28°22.8	43°22.8	58°22.8	73°22.9	+0.0
	18°28.3	18°27.7	18°27.1	18°26.5	18°25.9	18°25.3	18°24.7	18°24.1	18°23.4	18°22.8	18°22.2	18°21.6	-0.6
Mo 31	268°23.3	283°23.3	298°23.3	313°23.4	328°23.4	343°23.4	358°23.5	13°23.5	28°23.5	43°23.6	58°23.6	73°23.7	+0.0
	18°13.6	18°13.0	18°12.4	18°11.8	18°11.2	18°10.5	18°09.9	18°09.3	18°08.7	18°08.0	18°07.4	18°06.8	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2034

	D	15h	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	Δ'/h	SH
○	Sa 1	240°16.0	254°45.7	269°15.5	283°45.2	298°14.9	312°44.6	327°14.3	341°44.0	356°13.7	10°43.4	25°13.0	+29.7	15.1
		-18°13.6	-18°12.1	-18°10.5	-18°08.7	-18°06.9	-18°05.0	-18°03.0	-18°00.9	-17°58.7	-17°56.4	-17°54.0	+2.0	55.4
	Su 2	242°37.4	257°07.0	271°36.6	286°06.2	300°35.9	315°05.5	329°35.1	344°04.7	358°34.3	13°03.9	27°33.6	+29.6	15.2
		-17°07.3	-17°03.5	-16°59.5	-16°55.5	-16°51.4	-16°47.2	-16°42.9	-16°38.5	-16°34.0	-16°29.5	-16°24.8	+4.3	55.8
	Mo 3	244°58.7	259°28.4	273°58.1	288°27.9	302°57.7	317°27.4	331°57.2	346°27.0	0°56.8	15°26.6	29°56.4	+29.8	15.4
		-15°04.7	-14°58.7	-14°52.6	-14°46.5	-14°40.2	-14°33.9	-14°27.5	-14°21.0	-14°14.4	-14°07.7	-14°01.0	+6.4	56.3
	Tu 4	247°24.8	261°54.8	276°24.8	290°54.8	305°24.8	319°54.8	334°24.9	348°54.9	3°24.9	17°55.0	32°25.1	+30.0	15.5
		-12°11.2	-12°03.3	-11°55.3	-11°47.3	-11°39.2	-11°31.1	-11°22.8	-11°14.6	-11°06.2	-10°57.8	-10°49.3	+8.2	56.9
	We 5	249°56.9	264°27.1	278°57.3	293°27.5	307°57.7	322°27.9	336°58.0	351°28.2	5°58.4	20°28.6	34°58.8	+30.2	15.7
		-8°35.1	-8°25.8	-8°16.3	-8°06.9	-7°57.3	-7°47.8	-7°38.1	-7°28.5	-7°18.8	-7°09.0	-6°59.2	+9.6	57.4
	Th 6	252°31.7	267°01.8	281°32.0	296°02.1	310°32.2	325°02.4	339°32.5	354°02.6	8°32.7	23°02.7	37°32.8	+30.1	15.8
		-4°27.5	-4°17.1	-4°06.7	-3°56.2	-3°45.8	-3°35.3	-3°24.7	-3°14.2	-3°03.6	-2°53.0	-2°42.4	+10.5	57.9
	Fr 7	255°02.0	269°31.8	284°01.5	298°31.3	313°01.0	327°30.7	342°00.4	356°30.0	10°59.6	25°29.2	39°58.8	+29.7	15.9
		-0°01.0	0°09.8	0°20.7	0°31.6	0°42.4	0°53.3	1°04.2	1°15.1	1°25.9	1°36.8	1°47.7	+10.9	58.5
	Sa 8	257°18.5	271°47.5	286°16.5	300°45.4	315°14.3	329°43.2	344°12.0	358°40.8	13°09.6	27°38.3	42°06.9	+28.8	16.1
		4°29.9	4°40.6	4°51.3	5°02.0	5°12.6	5°23.3	5°33.9	5°44.4	5°55.0	6°05.5	6°16.0	+10.6	59.0
◑	Su 9	271°47.5	286°16.5	300°45.4	315°14.3	329°43.2	344°12.0	358°40.8	13°09.6	27°38.3	42°06.9	56°35.5	+28.8	16.1
		4°40.6	4°51.3	5°02.0	5°12.6	5°23.3	5°33.9	5°44.4	5°55.0	6°05.5	6°16.0	6°26.4	+10.6	59.0
	Mo 10	273°39.1	288°07.0	302°34.8	317°02.5	331°30.2	345°57.8	0°25.4	14°52.9	29°20.4	43°47.8	58°15.2	+27.6	16.2
		8°59.1	9°08.9	9°18.7	9°28.4	9°38.1	9°47.8	9°57.3	10°06.9	10°16.3	10°25.7	10°35.1	+9.6	59.4
	Tu 11	274°59.1	289°25.5	303°52.0	318°18.3	332°44.7	347°10.9	1°37.1	16°03.3	30°29.4	44°55.4	59°21.4	+26.2	16.3
		12°47.5	12°55.8	13°04.0	13°12.1	13°20.1	13°28.0	13°35.9	13°43.6	13°51.3	13°58.9	14°06.4	+7.9	59.7
	We 12	275°45.0	290°10.2	304°35.4	319°00.5	333°25.5	347°50.5	2°15.5	16°40.4	31°05.3	45°30.2	59°55.0	+25.0	16.3
		15°47.8	15°53.8	15°59.7	16°05.4	16°11.1	16°16.6	16°22.0	16°27.3	16°32.6	16°37.7	16°42.6	+5.5	59.9
	Th 13	276°03.2	290°27.5	304°51.8	319°16.1	333°40.4	348°04.6	2°28.9	16°53.1	31°17.3	45°41.5	60°05.7	+24.3	16.3
		17°43.5	17°46.6	17°49.6	17°52.5	17°55.2	17°57.8	18°00.3	18°02.6	18°04.9	18°07.0	18°09.0	+2.5	59.9
	Fr 14	276°08.5	290°32.8	304°57.0	319°21.3	333°45.6	348°09.9	2°34.2	16°58.5	31°22.9	45°47.3	60°11.7	+24.3	16.3
		18°23.5	18°23.4	18°23.3	18°23.0	18°22.5	18°22.0	18°21.3	18°20.5	18°19.5	18°18.5	18°17.3	-0.6	59.7
●	Sa 15	276°22.0	290°47.0	305°12.0	319°37.1	334°02.3	348°27.5	2°52.7	17°18.0	31°43.4	46°08.8	60°34.3	+25.2	16.2
		17°44.9	17°41.8	17°38.6	17°35.2	17°31.8	17°28.2	17°24.5	17°20.7	17°16.8	17°12.8	17°08.7	-3.6	59.3
	Su 16	277°03.5	291°30.0	305°56.6	320°23.2	334°49.8	349°16.6	3°43.4	18°10.3	32°37.2	47°04.3	61°31.4	+26.8	16.0
		15°54.3	15°48.6	15°42.7	15°36.8	15°30.8	15°24.7	15°18.5	15°12.2	15°05.8	14°59.3	14°52.8	-6.2	58.6
	Mo 17	278°26.6	292°54.9	307°23.2	321°51.6	336°20.1	350°48.7	5°17.3	19°46.1	34°14.8	48°43.7	63°12.6	+28.6	15.8
		13°05.3	12°57.6	12°49.8	12°41.9	12°34.0	12°26.0	12°18.0	12°09.9	12°01.7	11°53.5	11°45.2	-8.0	57.9
	Tu 18	280°35.3	295°05.4	309°35.5	324°05.7	338°36.0	353°06.3	7°36.7	22°07.2	36°37.7	51°08.3	65°39.0	+30.4	15.6
		9°35.0	9°26.0	9°16.9	9°07.8	8°58.6	8°49.5	8°40.3	8°31.0	8°21.7	8°12.4	8°03.1	-9.2	57.1
	We 19	283°26.1	297°57.7	312°29.3	327°01.0	341°32.8	356°04.6	10°36.5	25°08.4	39°40.3	54°12.3	68°44.4	+31.8	15.3
		5°40.1	5°30.4	5°20.7	5°11.0	5°01.2	4°51.5	4°41.8	4°32.0	4°22.2	4°12.4	4°02.6	-9.7	56.3
	Th 20	286°50.5	301°23.2	315°55.9	330°28.7	345°01.6	359°34.4	14°07.3	28°40.2	43°13.2	57°46.2	72°19.2	+32.9	15.1
		1°35.3	1°25.5	1°15.6	1°05.8	0°56.0	0°46.2	0°36.4	0°26.6	0°16.9	0°07.1	-0°02.7	-9.8	55.5
	Fr 21	290°37.5	305°10.9	319°44.3	334°17.8	348°51.2	3°24.7	17°58.1	32°31.6	47°05.1	61°38.6	76°12.2	+33.5	15.0
		-2°27.5	-2°37.0	-2°46.6	-2°56.0	-3°05.5	-3°15.0	-3°24.4	-3°33.8	-3°43.2	-3°52.5	-4°01.9	-9.4	54.9
	Sa 22	294°35.9	309°09.5	323°43.1	338°16.7	352°50.3	7°23.9	21°57.5	36°31.1	51°04.7	65°38.3	80°11.9	+33.6	14.9
		-6°18.7	-6°27.6	-6°36.4	-6°45.2	-6°54.0	-7°02.8	-7°11.5	-7°20.2	-7°28.8	-7°37.4	-7°46.0	-8.7	54.5
◐	Su 23	298°34.6	313°08.0	327°41.4	342°14.8	356°48.2	11°21.5	25°54.9	40°28.2	55°01.5	69°34.8	84°08.0	+33.3	14.8
		-9°50.0	-9°58.0	-10°05.9	-10°13.7	-10°21.5	-10°29.3	-10°37.0	-10°44.6	-10°52.3	-10°59.8	-11°07.4	-7.7	54.2
	Mo 24	302°24.2	316°57.1	331°29.9	346°02.7	0°35.5	15°08.3	29°41.0	44°13.7	58°46.4	73°19.1	87°51.7	+32.8	14.8
		-12°54.2	-13°00.9	-13°07.5	-13°14.1	-13°20.6	-13°27.1	-13°33.5	-13°39.9	-13°46.2	-13°52.4	-13°58.6	-6.4	54.2
	Tu 25	305°57.1	320°29.2	335°01.3	349°33.3	4°05.3	18°37.3	33°09.2	47°41.1	62°12.9	76°44.8	91°16.5	+31.9	14.8
		-15°23.8	-15°29.0	-15°34.1	-15°39.1	-15°44.1	-15°49.0	-15°53.8	-15°58.6	-16°03.3	-16°07.9	-16°12.4	-4.9	54.3
	We 26	309°08.9	323°40.1	338°11.3	352°42.4	7°13.5	21°44.6	36°15.6	50°46.6	65°17.6	79°48.5	94°19.4	+31.0	14.9
		-17°11.7	-17°15.1	-17°18.3	-17°21.5	-17°24.6	-17°27.7	-17°30.6	-17°33.5	-17°36.3	-17°39.0	-17°41.6	-3.0	54.5
	Th 27	311°58.6	326°28.9	340°59.2	355°29.5	9°59.8	24°30.0	39°00.2	53°30.4	68°00.5	82°30.7	97°00.7	+30.2	15.0
		-18°10.9	-18°12.1	-18°13.3	-18°14.4	-18°15.4	-18°16.3	-18°17.1	-18°17.8	-18°18.5	-18°19.0	-18°19.5	-0.9	54.9
	Fr 28	314°28.9	328°58.6	343°28.3	357°57.9	12°27.6	26°57.2	41°26.8	55°56.3	70°25.9	84°55.4	99°24.9	+29.6	15.1
		-18°15.4	-18°14.4	-18°13.3	-18°12.1	-18°10.8	-18°09.4	-18°08.0	-18°06.4	-18°04.7	-18°02.9	-18°01.1	+1.4	55.5
	Sa 29	316°46.0	331°15.3	345°44.6	0°13.9	14°43.2	29°12.5	43°41.7	58°11.0	72°40.3	87°09.5	101°38.8	+29.3	15.3
		-17°21.9	-17°18.5	-17°15.1	-17°11.5	-17°07.9	-17°04.2	-17°00.3	-16°56.4	-16°52.4	-16°48.3	-16°44.1	+3.8	56.0
	Su 30	318°57.2	333°26.4	347°55.6	2°24.9	16°54.1	31°23.3	45°52.6	60°21.8	74°51.1	89°20.3	103°49.6	+29.2	15.4
		-15°30.2	-15°24.6	-15°18.8	-15°13.0	-15°07.1	-15°01.2	-14°55.1	-14°48.9	-14°42.7	-14°36.4	-14°30.0	+6.0	56.6
○	Mo 31	321°09.0	335°38.4	350°07.7	4°37.1	19°06.5	33°35.9	48°05.3	62°34.6	77°04.1	91°33.5	106°02.9	+29.4	15.6
		-12°44.3	-12°36.6	-12°28.9	-12°21.1	-12°13.2	-12°05.3	-11°57.2	-11°49.2	-11°41.0	-11°32.8	-11°24.5	+8.0	57.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24

FM: 1 17h44 — LQ: 9 01h59 — NM: 15 18h15 — FQ: 23 07h05 — FM: 31 05h54

SUN

August 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	268°24.1	283°24.2	298°24.2	313°24.3	328°24.3	343°24.3	358°24.4	13°24.4	28°24.5	43°24.5	58°24.6	73°24.6	+0.0
	17°58.6	17°58.0	17°57.4	17°56.8	17°56.1	17°55.5	17°54.9	17°54.2	17°53.6	17°53.0	17°52.3	17°51.7	-0.6
We 2	268°25.2	283°25.2	298°25.3	313°25.3	328°25.4	343°25.4	358°25.5	13°25.5	28°25.6	43°25.6	58°25.7	73°25.7	+0.0
	17°43.4	17°42.7	17°42.1	17°41.4	17°40.8	17°40.2	17°39.5	17°38.9	17°38.2	17°37.6	17°36.9	17°36.3	-0.6
Th 3	268°26.4	283°26.4	298°26.5	313°26.5	328°26.6	343°26.6	358°26.7	13°26.7	28°26.8	43°26.8	58°26.9	73°26.9	+0.1
	17°27.8	17°27.2	17°26.5	17°25.9	17°25.2	17°24.5	17°23.9	17°23.2	17°22.6	17°21.9	17°21.3	17°20.6	-0.7
Fr 4	268°27.7	283°27.7	298°27.8	313°27.9	328°27.9	343°28.0	358°28.0	13°28.1	28°28.2	43°28.2	58°28.3	73°28.3	+0.1
	17°12.0	17°11.3	17°10.6	17°10.0	17°09.3	17°08.6	17°08.0	17°07.3	17°06.6	17°06.0	17°05.3	17°04.6	-0.7
Sa 5	268°29.2	283°29.2	298°29.3	313°29.4	328°29.4	343°29.5	358°29.6	13°29.6	28°29.7	43°29.8	58°29.8	73°29.9	+0.1
	16°55.8	16°55.2	16°54.5	16°53.8	16°53.1	16°52.5	16°51.8	16°51.1	16°50.4	16°49.7	16°49.0	16°48.4	-0.7
Su 6	268°30.8	283°30.9	298°30.9	313°31.0	328°31.1	343°31.1	358°31.2	13°31.3	28°31.4	43°31.4	58°31.5	73°31.6	+0.1
	16°39.5	16°38.8	16°38.1	16°37.4	16°36.7	16°36.0	16°35.3	16°34.6	16°33.9	16°33.2	16°32.5	16°31.8	-0.7
Mo 7	268°32.5	283°32.6	298°32.7	313°32.8	328°32.9	343°32.9	358°33.0	13°33.1	28°33.2	43°33.2	58°33.3	73°33.4	+0.1
	16°22.8	16°22.1	16°21.4	16°20.7	16°20.0	16°19.3	16°18.6	16°17.9	16°17.2	16°16.5	16°15.8	16°15.1	-0.7
Tu 8	268°34.5	283°34.5	298°34.6	313°34.7	328°34.8	343°34.9	358°35.0	13°35.0	28°35.1	43°35.2	58°35.3	73°35.4	+0.1
	16°05.8	16°05.1	16°04.4	16°03.7	16°03.0	16°02.3	16°01.6	16°00.9	16°00.1	15°59.4	15°58.7	15°58.0	-0.7
We 9	268°36.5	283°36.6	298°36.7	313°36.8	328°36.9	343°36.9	358°37.0	13°37.1	28°37.2	43°37.3	58°37.4	73°37.5	+0.1
	15°48.7	15°47.9	15°47.2	15°46.5	15°45.8	15°45.0	15°44.3	15°43.6	15°42.9	15°42.1	15°41.4	15°40.7	-0.7
Th 10	268°38.7	283°38.8	298°38.9	313°39.0	328°39.1	343°39.2	358°39.3	13°39.4	28°39.4	43°39.5	58°39.6	73°39.7	+0.1
	15°31.2	15°30.5	15°29.7	15°29.0	15°28.3	15°27.5	15°26.8	15°26.1	15°25.3	15°24.6	15°23.9	15°23.1	-0.7
Fr 11	268°41.0	283°41.1	298°41.2	313°41.3	328°41.4	343°41.5	358°41.6	13°41.7	28°41.8	43°41.9	58°42.0	73°42.1	+0.1
	15°13.5	15°12.8	15°12.0	15°11.3	15°10.5	15°09.8	15°09.1	15°08.3	15°07.6	15°06.8	15°06.1	15°05.3	-0.7
Sa 12	268°43.5	283°43.6	298°43.7	313°43.8	328°43.9	343°44.0	358°44.1	13°44.2	28°44.3	43°44.4	58°44.5	73°44.7	+0.1
	14°55.6	14°54.8	14°54.1	14°53.3	14°52.6	14°51.8	14°51.1	14°50.3	14°49.5	14°48.8	14°48.0	14°47.3	-0.8
Su 13	268°46.1	283°46.2	298°46.3	313°46.4	328°46.5	343°46.6	358°46.8	13°46.9	28°47.0	43°47.1	58°47.2	73°47.3	+0.1
	14°37.4	14°36.6	14°35.9	14°35.1	14°34.3	14°33.6	14°32.8	14°32.1	14°31.3	14°30.5	14°29.8	14°29.0	-0.8
Mo 14	268°48.8	283°48.9	298°49.1	313°49.2	328°49.3	343°49.4	358°49.5	13°49.6	28°49.8	43°49.9	58°50.0	73°50.1	+0.1
	14°19.0	14°18.2	14°17.4	14°16.7	14°15.9	14°15.1	14°14.4	14°13.6	14°12.8	14°12.0	14°11.3	14°10.5	-0.8
Tu 15	268°51.7	283°51.8	298°51.9	313°52.1	328°52.2	343°52.3	358°52.4	13°52.6	28°52.7	43°52.8	58°52.9	73°53.1	+0.1
	14°00.4	13°59.6	13°58.8	13°58.0	13°57.2	13°56.4	13°55.7	13°54.9	13°54.1	13°53.3	13°52.5	13°51.7	-0.8
We 16	268°54.7	283°54.8	298°55.0	313°55.1	328°55.2	343°55.3	358°55.5	13°55.6	28°55.7	43°55.9	58°56.0	73°56.1	+0.1
	13°41.5	13°40.7	13°39.9	13°39.1	13°38.3	13°37.5	13°36.7	13°36.0	13°35.2	13°34.4	13°33.6	13°32.8	-0.8
Th 17	268°57.8	283°58.0	298°58.1	313°58.2	328°58.4	343°58.5	358°58.6	13°58.8	28°58.9	43°59.1	58°59.2	73°59.3	+0.1
	13°22.4	13°21.6	13°20.8	13°20.0	13°19.2	13°18.4	13°17.6	13°16.8	13°16.0	13°15.2	13°14.4	13°13.6	-0.8
Fr 18	269°01.1	284°01.3	299°01.4	314°01.5	329°01.7	344°01.8	359°02.0	14°02.1	29°02.2	44°02.4	59°02.5	74°02.7	+0.1
	13°03.1	13°02.3	13°01.5	13°00.7	12°59.9	12°59.1	12°58.3	12°57.5	12°56.7	12°55.8	12°55.0	12°54.2	-0.8
Sa 19	269°04.5	284°04.7	299°04.8	314°04.9	329°05.1	344°05.2	359°05.4	14°05.5	29°05.7	44°05.8	59°06.0	74°06.1	+0.1
	12°43.6	12°42.8	12°42.0	12°41.2	12°40.4	12°39.6	12°38.7	12°37.9	12°37.1	12°36.3	12°35.5	12°34.6	-0.8
Su 20	269°08.0	284°08.2	299°08.3	314°08.5	329°08.6	344°08.8	359°08.9	14°09.1	29°09.2	44°09.4	59°09.5	74°09.7	+0.2
	12°23.9	12°23.1	12°22.3	12°21.5	12°20.6	12°19.8	12°19.0	12°18.2	12°17.3	12°16.5	12°15.7	12°14.9	-0.8
Mo 21	269°11.7	284°11.8	299°12.0	314°12.2	329°12.3	344°12.5	359°12.6	14°12.8	29°12.9	44°13.1	59°13.2	74°13.4	+0.2
	12°04.1	12°03.2	12°02.4	12°01.6	12°00.7	11°59.9	11°59.1	11°58.2	11°57.4	11°56.6	11°55.7	11°54.9	-0.8
Tu 22	269°15.5	284°15.6	299°15.8	314°15.9	329°16.1	344°16.3	359°16.4	14°16.6	29°16.7	44°16.9	59°17.1	74°17.2	+0.2
	11°44.0	11°43.1	11°42.3	11°41.5	11°40.6	11°39.8	11°38.9	11°38.1	11°37.3	11°36.4	11°35.6	11°34.7	-0.8
We 23	269°19.3	284°19.5	299°19.7	314°19.8	329°20.0	344°20.2	359°20.3	14°20.5	29°20.7	44°20.8	59°21.0	74°21.2	+0.2
	11°23.7	11°22.9	11°22.0	11°21.2	11°20.3	11°19.5	11°18.6	11°17.8	11°16.9	11°16.1	11°15.2	11°14.4	-0.8
Th 24	269°23.3	284°23.5	299°23.7	314°23.8	329°24.0	344°24.2	359°24.4	14°24.5	29°24.7	44°24.9	59°25.0	74°25.2	+0.2
	11°03.3	11°02.4	11°01.6	11°00.7	10°59.9	10°59.0	10°58.1	10°57.3	10°56.4	10°55.6	10°54.7	10°53.9	-0.9
Fr 25	269°27.4	284°27.6	299°27.8	314°28.0	329°28.1	344°28.3	359°28.5	14°28.7	29°28.8	44°29.0	59°29.2	74°29.4	+0.2
	10°42.7	10°41.8	10°40.9	10°40.1	10°39.2	10°38.4	10°37.5	10°36.6	10°35.8	10°34.9	10°34.0	10°33.2	-0.9
Sa 26	269°31.7	284°31.8	299°32.0	314°32.2	329°32.4	344°32.5	359°32.7	14°32.9	29°33.1	44°33.3	59°33.4	74°33.6	+0.2
	10°21.9	10°21.0	10°20.1	10°19.3	10°18.4	10°17.5	10°16.7	10°15.8	10°14.9	10°14.1	10°13.2	10°12.3	-0.9
Su 27	269°36.0	284°36.2	299°36.3	314°36.5	329°36.7	344°36.9	359°37.1	14°37.2	29°37.4	44°37.6	59°37.8	74°38.0	+0.2
	10°00.9	10°00.1	9°59.2	9°58.3	9°57.4	9°56.6	9°55.7	9°54.8	9°53.9	9°53.0	9°52.2	9°51.3	-0.9
Mo 28	269°40.4	284°40.6	299°40.8	314°40.9	329°41.1	344°41.3	359°41.5	14°41.7	29°41.9	44°42.1	59°42.2	74°42.4	+0.2
	9°39.8	9°39.0	9°38.1	9°37.2	9°36.3	9°35.4	9°34.5	9°33.7	9°32.8	9°31.9	9°31.0	9°30.1	-0.9
Tu 29	269°44.9	284°45.1	299°45.3	314°45.5	329°45.6	344°45.8	359°46.0	14°46.2	29°46.4	44°46.6	59°46.8	74°47.0	+0.2
	9°18.6	9°17.7	9°16.8	9°15.9	9°15.0	9°14.1	9°13.2	9°12.4	9°11.5	9°10.6	9°09.7	9°08.8	-0.9
We 30	269°49.5	284°49.7	299°49.9	314°50.1	329°50.2	344°50.4	359°50.6	14°50.8	29°51.0	44°51.2	59°51.4	74°51.6	+0.2
	8°57.2	8°56.3	8°55.4	8°54.5	8°53.6	8°52.7	8°51.8	8°50.9	8°50.0	8°49.1	8°48.2	8°47.3	-0.9
Th 31	269°54.1	284°54.3	299°54.5	314°54.7	329°54.9	344°55.1	359°55.3	14°55.5	29°55.7	44°55.9	59°56.1	74°56.3	+0.2
	8°35.6	8°34.7	8°33.8	8°32.9	8°32.0	8°31.1	8°30.2	8°29.3	8°28.4	8°27.5	8°26.6	8°25.7	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2034

D	16h	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	Δ'/h	SH
Tu 1	236°28.0	250°57.5	265°27.0	279°56.5	294°26.1	308°55.6	323°25.1	337°54.7	352°24.2	6°53.8	21°23.3	+29.5	15.7
	-10°06.8	-9°57.9	-9°48.9	-9°39.8	-9°30.7	-9°21.5	-9°12.3	-9°03.0	-8°53.7	-8°44.3	-8°34.8	+9.2	57.6
We 2	238°47.3	253°17.0	267°46.6	282°16.2	296°45.9	311°15.5	325°45.1	340°14.8	354°44.4	9°14.0	23°43.6	+29.6	15.8
	-6°07.3	-5°57.2	-5°46.9	-5°36.7	-5°26.4	-5°16.1	-5°05.7	-4°55.3	-4°44.9	-4°34.5	-4°24.0	+10.3	58.1
Th 3	241°07.7	255°37.2	270°06.8	284°36.3	299°05.8	313°35.3	328°04.8	342°34.3	357°03.8	11°33.3	26°02.7	+29.5	16.0
	-1°43.8	-1°32.9	-1°22.1	-1°11.2	-1°00.4	-0°49.5	-0°38.6	-0°27.7	-0°16.8	-0°05.9	0°05.0	+10.9	58.5
Fr 4	243°22.6	257°51.8	272°20.9	286°50.0	301°19.1	315°48.2	330°17.3	344°46.3	359°15.3	13°44.3	28°13.3	+29.1	16.0
	2°48.5	2°59.4	3°10.2	3°21.0	3°31.8	3°42.6	3°53.4	4°04.1	4°14.8	4°25.6	4°36.2	+10.8	58.8
Sa 5	245°24.1	259°52.6	274°21.0	288°49.4	303°17.8	317°46.1	332°14.4	346°42.7	1°10.9	15°39.1	30°07.3	+28.3	16.1
	7°13.1	7°23.3	7°33.4	7°43.5	7°53.6	8°03.6	8°13.6	8°23.5	8°33.4	8°43.2	8°53.0	+10.0	59.1
Su 6	247°04.8	261°32.3	275°59.8	290°27.2	304°54.6	319°22.0	333°49.3	348°16.6	2°43.8	17°11.0	31°38.1	+27.3	16.1
	11°13.0	11°21.9	11°30.6	11°39.3	11°48.0	11°56.5	12°05.0	12°13.5	12°21.8	12°30.1	12°38.3	+8.5	59.2
◑ Mo 7	248°20.2	262°46.7	277°13.1	291°39.5	306°05.8	320°32.2	334°58.5	349°24.7	3°50.9	18°17.1	32°43.2	+26.3	16.2
	14°31.6	14°38.4	14°45.2	14°51.9	14°58.5	15°04.9	15°11.3	15°17.6	15°23.8	15°29.9	15°35.9	+6.4	59.3
Tu 8	262°46.7	277°13.1	291°39.5	306°05.8	320°32.2	334°58.5	349°24.7	3°50.9	18°17.1	32°43.2	47°09.3	+26.3	16.2
	14°38.4	14°45.2	14°51.9	14°58.5	15°04.9	15°11.3	15°17.6	15°23.8	15°29.9	15°35.9	15°41.8	+6.3	59.3
We 9	263°36.8	278°02.3	292°27.9	306°53.5	321°19.0	335°44.5	350°09.9	4°35.4	19°00.8	33°26.2	47°51.6	+25.5	16.2
	16°58.0	17°02.2	17°06.3	17°10.3	17°14.2	17°17.9	17°21.6	17°25.1	17°28.6	17°31.9	17°35.1	+3.7	59.2
Th 10	264°10.8	278°36.1	293°01.3	307°26.5	321°51.7	336°16.9	350°42.1	5°07.4	19°32.6	33°57.8	48°23.0	+25.2	16.1
	18°09.0	18°10.4	18°11.6	18°12.6	18°13.6	18°14.4	18°15.1	18°15.7	18°16.2	18°16.6	18°16.8	+0.8	59.1
Fr 11	264°43.1	279°08.6	293°34.2	307°59.7	322°25.3	336°50.9	351°16.5	5°42.2	20°07.8	34°33.6	48°59.3	+25.6	16.0
	18°06.0	18°04.4	18°02.6	18°00.7	17°58.7	17°56.6	17°54.3	17°52.0	17°49.5	17°46.9	17°44.2	-2.2	58.8
Sa 12	265°30.3	279°56.7	294°23.1	308°49.6	323°16.2	337°42.8	352°09.4	6°36.1	21°02.9	35°29.7	49°56.6	+26.6	15.9
	16°50.7	16°46.3	16°41.7	16°37.1	16°32.4	16°27.6	16°22.7	16°17.7	16°12.6	16°07.3	16°02.0	-4.9	58.4
Su 13	266°46.2	281°14.0	295°41.8	310°09.7	324°37.6	339°05.6	353°33.7	8°01.9	22°30.1	36°58.3	51°26.6	+28.0	15.8
	14°31.7	14°25.0	14°18.2	14°11.4	14°04.4	13°57.4	13°50.4	13°43.2	13°36.0	13°28.7	13°21.3	-7.0	57.9
● Mo 14	268°38.9	283°08.2	297°37.5	312°07.0	326°36.5	341°06.0	355°35.6	10°05.3	24°35.0	39°04.8	53°34.7	+29.6	15.6
	11°22.8	11°14.5	11°06.0	10°57.6	10°49.0	10°40.5	10°31.8	10°23.2	10°14.4	10°05.7	9°56.9	-8.6	57.3
Tu 15	271°09.4	285°40.2	300°11.0	314°41.9	329°12.8	343°43.8	358°14.8	12°45.9	27°17.0	41°48.2	56°19.4	+31.0	15.4
	7°39.9	7°30.5	7°21.1	7°11.6	7°02.1	6°52.6	6°43.1	6°33.5	6°24.0	6°14.4	6°04.7	-9.5	56.7
We 16	274°13.6	288°45.5	303°17.5	317°49.6	332°21.7	346°53.8	1°25.9	15°58.1	30°30.4	45°02.6	59°34.9	+32.1	15.3
	3°38.5	3°28.6	3°18.8	3°08.9	2°59.1	2°49.2	2°39.4	2°29.5	2°19.6	2°09.8	1°59.9	-9.9	56.0
Th 17	277°43.5	292°16.3	306°49.1	321°22.0	335°54.9	350°27.8	5°00.7	19°33.6	34°06.6	48°39.6	63°12.6	+32.9	15.1
	-0°27.6	-0°37.4	-0°47.2	-0°56.9	-1°06.6	-1°16.4	-1°26.1	-1°35.7	-1°45.4	-1°55.1	-2°04.7	-9.7	55.4
Fr 18	281°29.9	296°03.1	310°36.4	325°09.7	339°43.0	354°16.3	8°49.6	23°22.9	37°56.2	52°29.5	67°02.9	+33.3	15.0
	-4°26.8	-4°36.1	-4°45.3	-4°54.6	-5°03.7	-5°12.9	-5°22.1	-5°31.2	-5°40.2	-5°49.3	-5°58.3	-9.2	54.9
Sa 19	285°23.1	299°56.4	314°29.8	329°03.1	343°36.4	358°09.7	12°43.0	27°16.3	41°49.6	56°22.9	70°56.2	+33.3	14.9
	-8°09.4	-8°17.8	-8°26.2	-8°34.6	-8°42.9	-8°51.2	-8°59.4	-9°07.6	-9°15.8	-9°23.9	-9°31.9	-8.3	54.5
Su 20	289°14.1	303°47.1	318°20.2	332°53.2	347°26.3	1°59.3	16°32.3	31°05.2	45°38.2	60°11.1	74°44.0	+33.0	14.8
	-11°27.3	-11°34.6	-11°41.8	-11°49.0	-11°56.2	-12°03.3	-12°10.3	-12°17.3	-12°24.2	-12°31.1	-12°37.9	-7.1	54.2
Mo 21	292°55.0	307°27.5	322°00.0	336°32.5	351°05.0	5°37.4	20°09.8	34°42.2	49°14.5	63°46.9	78°19.1	+32.4	14.8
	-14°13.2	-14°19.1	-14°24.9	-14°30.7	-14°36.4	-14°42.0	-14°47.5	-14°53.0	-14°58.5	-15°03.8	-15°09.1	-5.6	54.2
◐ Tu 22	296°19.9	310°51.8	325°23.5	339°55.3	354°27.0	8°58.7	23°30.3	38°01.9	52°33.5	67°05.1	81°36.6	+31.7	14.8
	-16°20.4	-16°24.6	-16°28.7	-16°32.8	-16°36.8	-16°40.6	-16°44.5	-16°48.2	-16°51.9	-16°55.5	-16°59.0	-3.9	54.3
We 23	299°25.5	313°56.5	328°27.5	342°58.4	357°29.3	12°00.2	26°31.0	41°01.8	55°32.6	70°03.4	84°34.1	+30.9	14.9
	-17°42.4	-17°44.7	-17°46.8	-17°48.9	-17°50.9	-17°52.8	-17°54.7	-17°56.4	-17°58.1	-17°59.7	-18°01.2	-1.9	54.6
Th 24	302°11.2	316°41.4	331°11.7	345°41.8	0°12.0	14°42.1	29°12.2	43°42.3	58°12.4	72°42.4	87°12.4	+30.1	15.0
	-18°13.3	-18°13.4	-18°13.4	-18°13.3	-18°13.2	-18°12.9	-18°12.5	-18°12.1	-18°11.6	-18°11.0	-18°10.2	+0.3	55.1
Fr 25	304°39.5	319°09.1	333°38.8	348°08.3	2°37.9	17°07.5	31°37.0	46°06.5	60°36.0	75°05.5	89°35.0	+29.5	15.2
	-17°48.5	-17°46.3	-17°44.0	-17°41.6	-17°39.1	-17°36.6	-17°33.9	-17°31.1	-17°28.3	-17°25.4	-17°22.3	+2.6	55.8
Sa 26	306°55.1	321°24.3	335°53.6	350°22.8	4°52.0	19°21.2	33°50.4	48°19.5	62°48.7	77°17.9	91°47.0	+29.2	15.4
	-16°25.6	-16°21.1	-16°16.5	-16°11.8	-16°07.0	-16°02.1	-15°57.1	-15°52.0	-15°46.9	-15°41.6	-15°36.3	+4.9	56.5
Su 27	309°03.4	323°32.4	338°01.5	352°30.5	6°59.5	21°28.6	35°57.6	50°26.6	64°55.6	79°24.6	93°53.7	+29.0	15.6
	-14°05.6	-13°58.9	-13°52.0	-13°45.2	-13°38.2	-13°31.1	-13°24.0	-13°16.7	-13°09.4	-13°02.0	-12°54.6	+7.1	57.2
Mo 28	311°08.6	325°37.6	340°06.6	354°35.6	9°04.5	23°33.5	38°02.5	52°31.5	67°00.4	81°29.4	95°58.4	+29.0	15.8
	-10°53.5	-10°44.8	-10°36.1	-10°27.3	-10°18.5	-10°09.5	-10°00.5	-9°51.5	-9°42.4	-9°33.2	-9°24.0	+9.0	57.9
○ Tu 29	313°12.7	327°41.6	342°10.6	356°39.5	11°08.4	25°37.3	40°06.2	54°35.1	69°04.1	83°32.9	98°01.8	+28.9	16.0
	-6°58.5	-6°48.4	-6°38.3	-6°28.1	-6°17.8	-6°07.5	-5°57.2	-5°46.8	-5°36.4	-5°25.9	-5°15.5	+10.3	58.6
We 30	315°14.4	329°43.2	344°11.9	358°40.7	13°09.4	27°38.2	42°06.9	56°35.6	71°04.3	85°33.0	100°01.6	+28.7	16.1
	-2°34.2	-2°23.2	-2°12.2	-2°01.2	-1°50.2	-1°39.2	-1°28.1	-1°17.0	-1°06.0	-0°54.9	-0°43.8	+11.0	59.1
Th 31	317°09.9	331°38.3	346°06.7	0°35.0	15°03.4	29°31.7	44°00.0	58°28.3	72°56.6	87°24.9	101°53.1	+28.3	16.2
	2°03.2	2°14.3	2°25.4	2°36.5	2°47.5	2°58.6	3°09.6	3°20.7	3°31.7	3°42.7	3°53.6	+11.1	59.4

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 7 06h50 — NM: 14 03h53 — FQ: 22 00h43 — FM: 29 16h49

SUN

September 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	269°58.9	284°59.1	299°59.3	314°59.5	329°59.7	344°59.9	0°00.1	15°00.3	30°00.5	45°00.7	60°00.9	75°01.1	+0.2
	8°13.9	8°13.0	8°12.1	8°11.2	8°10.3	8°09.4	8°08.5	8°07.6	8°06.7	8°05.8	8°04.9	8°04.0	-0.9
Sa 2	270°03.7	285°03.9	300°04.1	315°04.3	330°04.5	345°04.7	0°04.9	15°05.1	30°05.3	45°05.5	60°05.7	75°05.9	+0.2
	7°52.1	7°51.2	7°50.3	7°49.4	7°48.5	7°47.6	7°46.7	7°45.7	7°44.8	7°43.9	7°43.0	7°42.1	-0.9
Su 3	270°08.6	285°08.8	300°09.0	315°09.2	330°09.4	345°09.6	0°09.8	15°10.0	30°10.2	45°10.4	60°10.6	75°10.9	+0.2
	7°30.2	7°29.3	7°28.3	7°27.4	7°26.5	7°25.6	7°24.7	7°23.8	7°22.8	7°21.9	7°21.0	7°20.1	-0.9
Mo 4	270°13.5	285°13.7	300°14.0	315°14.2	330°14.4	345°14.6	0°14.8	15°15.0	30°15.2	45°15.4	60°15.6	75°15.8	+0.2
	7°08.1	7°07.2	7°06.3	7°05.3	7°04.4	7°03.5	7°02.6	7°01.6	7°00.7	6°59.8	6°58.9	6°58.0	-0.9
Tu 5	270°18.5	285°18.8	300°19.0	315°19.2	330°19.4	345°19.6	0°19.8	15°20.0	30°20.2	45°20.4	60°20.6	75°20.9	+0.2
	6°45.9	6°45.0	6°44.1	6°43.1	6°42.2	6°41.3	6°40.4	6°39.4	6°38.5	6°37.6	6°36.6	6°35.7	-0.9
We 6	270°23.6	285°23.8	300°24.0	315°24.2	330°24.4	345°24.7	0°24.9	15°25.1	30°25.3	45°25.5	60°25.7	75°25.9	+0.2
	6°23.6	6°22.7	6°21.8	6°20.8	6°19.9	6°19.0	6°18.0	6°17.1	6°16.2	6°15.2	6°14.3	6°13.4	-0.9
Th 7	270°28.7	285°28.9	300°29.1	315°29.3	330°29.6	345°29.8	0°30.0	15°30.2	30°30.4	45°30.6	60°30.8	75°31.1	+0.2
	6°01.2	6°00.3	5°59.3	5°58.4	5°57.5	5°56.5	5°55.6	5°54.7	5°53.7	5°52.8	5°51.9	5°50.9	-0.9
Fr 8	270°33.8	285°34.1	300°34.3	315°34.5	330°34.7	345°34.9	0°35.1	15°35.4	30°35.6	45°35.8	60°36.0	75°36.2	+0.2
	5°38.7	5°37.8	5°36.8	5°35.9	5°35.0	5°34.0	5°33.1	5°32.1	5°31.2	5°30.2	5°29.3	5°28.4	-0.9
Sa 9	270°39.0	285°39.2	300°39.5	315°39.7	330°39.9	345°40.1	0°40.3	15°40.5	30°40.8	45°41.0	60°41.2	75°41.4	+0.2
	5°16.1	5°15.2	5°14.2	5°13.3	5°12.3	5°11.4	5°10.4	5°09.5	5°08.6	5°07.6	5°06.7	5°05.7	-0.9
Su 10	270°44.2	285°44.5	300°44.7	315°44.9	330°45.1	345°45.3	0°45.6	15°45.8	30°46.0	45°46.2	60°46.4	75°46.6	+0.2
	4°53.4	4°52.5	4°51.5	4°50.6	4°49.6	4°48.7	4°47.7	4°46.8	4°45.8	4°44.9	4°43.9	4°43.0	-0.9
Mo 11	270°49.5	285°49.7	300°49.9	315°50.1	330°50.4	345°50.6	0°50.8	15°51.0	30°51.2	45°51.5	60°51.7	75°51.9	+0.2
	4°30.6	4°29.7	4°28.7	4°27.8	4°26.8	4°25.9	4°24.9	4°24.0	4°23.0	4°22.1	4°21.1	4°20.2	-1.0
Tu 12	270°54.8	285°55.0	300°55.2	315°55.4	330°55.6	345°55.9	0°56.1	15°56.3	30°56.5	45°56.8	60°57.0	75°57.2	+0.2
	4°07.8	4°06.8	4°05.9	4°04.9	4°04.0	4°03.0	4°02.1	4°01.1	4°00.2	3°59.2	3°58.2	3°57.3	-1.0
We 13	271°00.1	286°00.3	301°00.5	316°00.7	331°01.0	346°01.2	1°01.4	16°01.6	31°01.8	46°02.1	61°02.3	76°02.5	+0.2
	3°44.9	3°43.9	3°43.0	3°42.0	3°41.0	3°40.1	3°39.1	3°38.2	3°37.2	3°36.2	3°35.3	3°34.3	-1.0
Th 14	271°05.4	286°05.6	301°05.8	316°06.1	331°06.3	346°06.5	1°06.7	16°06.9	31°07.2	46°07.4	61°07.6	76°07.8	+0.2
	3°21.9	3°20.9	3°20.0	3°19.0	3°18.0	3°17.1	3°16.1	3°15.2	3°14.2	3°13.2	3°12.3	3°11.3	-1.0
Fr 15	271°10.7	286°10.9	301°11.2	316°11.4	331°11.6	346°11.8	1°12.1	16°12.3	31°12.5	46°12.7	61°12.9	76°13.2	+0.2
	2°58.8	2°57.9	2°56.9	2°55.9	2°55.0	2°54.0	2°53.0	2°52.1	2°51.1	2°50.2	2°49.2	2°48.2	-1.0
Sa 16	271°16.1	286°16.3	301°16.5	316°16.7	331°17.0	346°17.2	1°17.4	16°17.6	31°17.8	46°18.1	61°18.3	76°18.5	+0.2
	2°35.7	2°34.7	2°33.8	2°32.8	2°31.9	2°30.9	2°29.9	2°29.0	2°28.0	2°27.0	2°26.1	2°25.1	-1.0
Su 17	271°21.4	286°21.6	301°21.9	316°22.1	331°22.3	346°22.5	1°22.8	16°23.0	31°23.2	46°23.4	61°23.6	76°23.9	+0.2
	2°12.5	2°11.6	2°10.6	2°09.7	2°08.7	2°07.7	2°06.8	2°05.8	2°04.8	2°03.9	2°02.9	2°01.9	-1.0
Mo 18	271°26.8	286°27.0	301°27.2	316°27.4	331°27.7	346°27.9	1°28.1	16°28.3	31°28.6	46°28.8	61°29.0	76°29.2	+0.2
	1°49.3	1°48.4	1°47.4	1°46.4	1°45.5	1°44.5	1°43.5	1°42.6	1°41.6	1°40.6	1°39.7	1°38.7	-1.0
Tu 19	271°32.1	286°32.3	301°32.6	316°32.8	331°33.0	346°33.2	1°33.5	16°33.7	31°33.9	46°34.1	61°34.4	76°34.6	+0.2
	1°26.1	1°25.1	1°24.2	1°23.2	1°22.2	1°21.3	1°20.3	1°19.3	1°18.3	1°17.4	1°16.4	1°15.4	-1.0
We 20	271°37.5	286°37.7	301°37.9	316°38.1	331°38.4	346°38.6	1°38.8	16°39.0	31°39.2	46°39.5	61°39.7	76°39.9	+0.2
	1°02.8	1°01.9	1°00.9	0°59.9	0°58.9	0°58.0	0°57.0	0°56.0	0°55.1	0°54.1	0°53.1	0°52.2	-1.0
Th 21	271°42.8	286°43.0	301°43.2	316°43.5	331°43.7	346°43.9	1°44.1	16°44.4	31°44.6	46°44.8	61°45.0	76°45.2	+0.2
	0°39.5	0°38.6	0°37.6	0°36.6	0°35.6	0°34.7	0°33.7	0°32.7	0°31.8	0°30.8	0°29.8	0°28.8	-1.0
Fr 22	271°48.1	286°48.3	301°48.6	316°48.8	331°49.0	346°49.2	1°49.4	16°49.7	31°49.9	46°50.1	61°50.3	76°50.5	+0.2
	0°16.2	0°15.2	0°14.3	0°13.3	0°12.3	0°11.3	0°10.4	0°09.4	0°08.4	0°07.5	0°06.5	0°05.5	-1.0
Sa 23	271°53.4	286°53.6	301°53.8	316°54.1	331°54.3	346°54.5	1°54.7	16°54.9	31°55.2	46°55.4	61°55.6	76°55.8	+0.2
	-0°07.1	-0°08.1	-0°09.1	-0°10.0	-0°11.0	-0°12.0	-0°13.0	-0°13.9	-0°14.9	-0°15.9	-0°16.9	-0°17.8	-1.0
Su 24	271°58.7	286°58.9	301°59.1	316°59.3	331°59.6	346°59.8	2°00.0	17°00.2	32°00.4	47°00.6	62°00.9	77°01.1	+0.2
	-0°30.5	-0°31.5	-0°32.4	-0°33.4	-0°34.4	-0°35.3	-0°36.3	-0°37.3	-0°38.3	-0°39.2	-0°40.2	-0°41.2	-1.0
Mo 25	272°03.9	287°04.1	302°04.3	317°04.6	332°04.8	347°05.0	2°05.2	17°05.4	32°05.6	47°05.9	62°06.1	77°06.3	+0.2
	-0°53.8	-0°54.8	-0°55.8	-0°56.7	-0°57.7	-0°58.7	-0°59.7	-1°00.6	-1°01.6	-1°02.6	-1°03.6	-1°04.5	-1.0
Tu 26	272°09.1	287°09.3	302°09.5	317°09.7	332°10.0	347°10.2	2°10.4	17°10.6	32°10.8	47°11.0	62°11.3	77°11.5	+0.2
	-1°17.2	-1°18.2	-1°19.1	-1°20.1	-1°21.1	-1°22.0	-1°23.0	-1°24.0	-1°25.0	-1°25.9	-1°26.9	-1°27.9	-1.0
We 27	272°14.3	287°14.5	302°14.7	317°14.9	332°15.1	347°15.3	2°15.5	17°15.7	32°16.0	47°16.2	62°16.4	77°16.6	+0.2
	-1°40.5	-1°41.5	-1°42.5	-1°43.4	-1°44.4	-1°45.4	-1°46.4	-1°47.3	-1°48.3	-1°49.3	-1°50.2	-1°51.2	-1.0
Th 28	272°19.4	287°19.6	302°19.8	317°20.0	332°20.2	347°20.4	2°20.6	17°20.8	32°21.0	47°21.2	62°21.5	77°21.7	+0.2
	-2°03.9	-2°04.8	-2°05.8	-2°06.8	-2°07.7	-2°08.7	-2°09.7	-2°10.7	-2°11.6	-2°12.6	-2°13.6	-2°14.5	-1.0
Fr 29	272°24.4	287°24.6	302°24.8	317°25.0	332°25.2	347°25.4	2°25.6	17°25.9	32°26.1	47°26.3	62°26.5	77°26.7	+0.2
	-2°27.2	-2°28.1	-2°29.1	-2°30.1	-2°31.1	-2°32.0	-2°33.0	-2°34.0	-2°34.9	-2°35.9	-2°36.9	-2°37.8	-1.0
Sa 30	272°29.4	287°29.6	302°29.8	317°30.0	332°30.2	347°30.4	2°30.6	17°30.8	32°31.0	47°31.2	62°31.4	77°31.6	+0.2
	-2°50.5	-2°51.4	-2°52.4	-2°53.4	-2°54.3	-2°55.3	-2°56.3	-2°57.2	-2°58.2	-2°59.2	-3°00.2	-3°01.1	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2034

D	17h	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	Δ'/h	SH
Fr 1	232°06.1	246°34.1	261°02.1	275°30.0	289°58.0	304°25.8	318°53.7	333°21.6	347°49.4	2°17.1	16°44.9	+27.9	16.2
	5°31.3	5°42.0	5°52.7	6°03.3	6°13.9	6°24.5	6°35.0	6°45.5	6°56.0	7°06.4	7°16.8	+10.6	59.5
Sa 2	233°37.8	248°05.1	262°32.4	276°59.6	291°26.8	305°54.0	320°21.1	334°48.2	349°15.3	3°42.3	18°09.4	+27.2	16.2
	9°46.4	9°55.9	10°05.4	10°14.8	10°24.1	10°33.4	10°42.6	10°51.7	11°00.8	11°09.8	11°18.7	+9.2	59.6
Su 3	234°50.9	249°17.5	263°44.0	278°10.5	292°36.9	307°03.3	321°29.7	335°56.1	350°22.4	4°48.8	19°15.1	+26.4	16.2
	13°23.4	13°31.1	13°38.6	13°46.1	13°53.5	14°00.8	14°08.0	14°15.1	14°22.1	14°29.1	14°35.9	+7.3	59.5
Mo 4	235°46.5	250°12.4	264°38.3	279°04.2	293°30.1	307°56.0	322°21.8	336°47.6	351°13.5	5°39.3	20°05.0	+25.9	16.1
	16°06.7	16°11.9	16°17.0	16°22.0	16°26.9	16°31.7	16°36.4	16°41.0	16°45.5	16°49.9	16°54.1	+4.7	59.2
◑ Tu 5	236°30.8	250°56.5	265°22.1	279°47.8	294°13.5	308°39.2	323°04.9	337°30.6	351°56.3	6°22.0	20°47.7	+25.7	16.1
	17°44.5	17°46.9	17°49.2	17°51.5	17°53.6	17°55.5	17°57.4	17°59.1	18°00.8	18°02.3	18°03.7	+1.9	58.9
We 6	237°14.8	251°40.7	266°06.7	280°32.7	294°58.7	309°24.7	323°50.8	338°16.9	352°43.0	7°09.1	21°35.3	+26.0	16.0
	18°10.7	18°10.3	18°09.7	18°09.0	18°08.2	18°07.3	18°06.3	18°05.2	18°03.9	18°02.5	18°01.1	-1.0	58.5
Th 7	251°40.7	266°06.7	280°32.7	294°58.7	309°24.7	323°50.8	338°16.9	352°43.0	7°09.1	21°35.3	36°01.5	+26.1	16.0
	18°10.3	18°09.7	18°09.0	18°08.2	18°07.3	18°06.3	18°05.2	18°03.9	18°02.5	18°01.1	17°59.5	-1.1	58.5
Fr 8	252°38.4	267°05.1	281°31.9	295°58.8	310°25.6	324°52.6	339°19.5	353°46.6	8°13.6	22°40.7	37°07.9	+26.9	15.8
	17°22.5	17°19.2	17°15.8	17°12.3	17°08.7	17°04.9	17°01.1	16°57.2	16°53.1	16°49.0	16°44.8	-3.8	58.1
Sa 9	254°00.8	268°28.8	282°56.8	297°24.8	311°52.9	326°21.0	340°49.2	355°17.5	9°45.8	24°14.1	38°42.5	+28.2	15.7
	15°30.1	15°24.4	15°18.7	15°12.8	15°06.9	15°00.8	14°54.7	14°48.5	14°42.2	14°35.9	14°29.5	-6.1	57.6
Su 10	255°55.2	270°24.5	284°53.8	299°23.2	313°52.6	328°22.1	342°51.7	357°21.3	11°50.9	26°20.6	40°50.4	+29.5	15.6
	12°44.1	12°36.6	12°28.9	12°21.3	12°13.5	12°05.7	11°57.8	11°49.9	11°41.9	11°33.8	11°25.7	-7.8	57.1
Mo 11	258°23.0	272°53.6	287°24.2	301°54.9	316°25.7	330°56.4	345°27.3	359°58.1	14°29.0	29°00.0	43°31.0	+30.8	15.4
	9°18.1	9°09.3	9°00.3	8°51.4	8°42.4	8°33.4	8°24.3	8°15.2	8°06.1	7°56.9	7°47.7	-9.0	56.6
● Tu 12	261°21.4	275°53.1	290°24.9	304°56.6	319°28.5	334°00.3	348°32.2	3°04.1	17°36.1	32°08.1	46°40.1	+31.9	15.3
	5°26.4	5°16.8	5°07.2	4°57.6	4°47.9	4°38.3	4°28.6	4°18.9	4°09.2	3°59.4	3°49.7	-9.7	56.0
We 13	264°44.4	279°16.9	293°49.4	308°22.0	322°54.6	337°27.2	351°59.9	6°32.5	21°05.2	35°38.0	50°10.7	+32.6	15.1
	1°22.9	1°13.1	1°03.3	0°53.5	0°43.7	0°33.9	0°24.1	0°14.3	0°04.5	-0°05.2	-0°15.0	-9.8	55.5
Th 14	268°24.1	282°57.2	297°30.2	312°03.3	326°36.3	341°09.4	355°42.5	10°15.6	24°48.7	39°21.8	53°55.0	+33.1	15.0
	-2°40.0	-2°49.6	-2°59.1	-3°08.6	-3°18.1	-3°27.5	-3°37.0	-3°46.4	-3°55.8	-4°05.1	-4°14.5	-9.5	55.0
Fr 15	272°12.7	286°45.9	301°19.2	315°52.4	330°25.6	344°58.8	359°32.0	14°05.2	28°38.4	43°11.7	57°44.9	+33.2	14.9
	-6°31.3	-6°40.2	-6°49.0	-6°57.8	-7°06.6	-7°15.3	-7°24.0	-7°32.7	-7°41.3	-7°49.9	-7°58.4	-8.7	54.6
Sa 16	276°02.4	290°35.5	305°08.6	319°41.7	334°14.8	348°47.9	3°20.9	17°54.0	32°27.0	47°00.0	61°33.1	+33.1	14.8
	-10°01.6	-10°09.4	-10°17.2	-10°25.0	-10°32.7	-10°40.4	-10°48.0	-10°55.5	-11°03.1	-11°10.5	-11°17.9	-7.6	54.3
Su 17	279°46.5	294°19.3	308°52.0	323°24.7	337°57.4	352°30.1	7°02.8	21°35.5	36°08.1	50°40.7	65°13.3	+32.7	14.8
	-13°02.6	-13°09.2	-13°15.6	-13°22.0	-13°28.4	-13°34.7	-13°40.9	-13°47.1	-13°53.2	-13°59.3	-14°05.2	-6.3	54.1
Mo 18	283°19.7	297°51.9	312°24.1	326°56.3	341°28.5	356°00.6	10°32.8	25°04.9	39°36.9	54°09.0	68°41.0	+32.1	14.8
	-15°27.3	-15°32.3	-15°37.1	-15°41.9	-15°46.7	-15°51.3	-15°55.9	-16°00.5	-16°04.9	-16°09.3	-16°13.6	-4.6	54.1
Tu 19	286°38.4	301°10.1	315°41.6	330°13.2	344°44.8	359°16.3	13°47.8	28°19.3	42°50.7	57°22.1	71°53.5	+31.5	14.8
	-17°09.4	-17°12.5	-17°15.6	-17°18.5	-17°21.4	-17°24.2	-17°26.9	-17°29.6	-17°32.1	-17°34.6	-17°37.0	-2.8	54.2
◐ We 20	289°41.3	304°12.3	318°43.3	333°14.2	347°45.1	2°16.0	16°46.9	31°17.7	45°48.6	60°19.4	74°50.1	+30.9	14.9
	-18°03.4	-18°04.5	-18°05.5	-18°06.4	-18°07.2	-18°08.0	-18°08.7	-18°09.2	-18°09.7	-18°10.2	-18°10.5	-0.7	54.6
Th 21	292°28.9	306°59.3	321°29.7	336°00.1	350°30.5	5°00.8	19°31.1	34°01.4	48°31.6	63°01.9	77°32.1	+30.3	15.0
	-18°04.8	-18°03.8	-18°02.6	-18°01.3	-18°00.0	-17°58.5	-17°57.0	-17°55.4	-17°53.7	-17°51.9	-17°50.0	+1.5	55.1
Fr 22	295°03.3	309°33.3	324°03.2	338°33.1	353°03.0	7°32.8	22°02.7	36°32.5	51°02.4	65°32.2	80°02.0	+29.9	15.2
	-17°10.9	-17°07.5	-17°04.1	-17°00.6	-16°57.0	-16°53.3	-16°49.5	-16°45.6	-16°41.7	-16°37.6	-16°33.5	+3.7	55.8
Sa 23	297°27.2	311°56.8	326°26.3	340°55.9	355°25.4	9°54.9	24°24.5	38°54.0	53°23.4	67°52.9	82°22.4	+29.5	15.4
	-15°20.6	-15°15.0	-15°09.4	-15°03.6	-14°57.8	-14°51.9	-14°45.9	-14°39.8	-14°33.6	-14°27.4	-14°21.0	+6.0	56.6
Su 24	299°42.9	314°12.2	328°41.4	343°10.7	357°39.9	12°09.1	26°38.3	41°07.5	55°36.7	70°05.9	84°35.1	+29.2	15.7
	-12°36.0	-12°28.4	-12°20.6	-12°12.8	-12°05.0	-11°57.0	-11°49.0	-11°40.9	-11°32.7	-11°24.4	-11°16.1	+8.0	57.5
Mo 25	301°51.1	316°20.0	330°49.0	345°17.9	359°46.8	14°15.7	28°44.6	43°13.5	57°42.4	72°11.2	86°40.0	+28.9	15.9
	-9°02.8	-8°53.3	-8°43.9	-8°34.3	-8°24.7	-8°15.1	-8°05.3	-7°55.6	-7°45.7	-7°35.8	-7°25.9	+9.7	58.4
Tu 26	303°50.5	318°19.0	332°47.5	347°16.0	1°44.5	16°13.0	30°41.5	45°09.9	59°38.3	74°06.7	88°35.0	+28.5	16.1
	-4°50.7	-4°40.0	-4°29.2	-4°18.4	-4°07.6	-3°56.8	-3°45.9	-3°34.9	-3°24.0	-3°13.0	-3°02.0	+10.9	59.2
We 27	305°37.6	320°05.6	334°33.6	349°01.5	3°29.4	17°57.2	32°25.1	46°52.9	61°20.6	75°48.4	90°16.1	+27.8	16.3
	-0°13.9	-0°02.6	0°08.7	0°20.1	0°31.5	0°42.8	0°54.2	1°05.6	1°16.9	1°28.3	1°39.7	+11.4	59.9
○ Th 28	307°08.2	321°35.4	336°02.6	350°29.7	4°56.9	19°23.9	33°51.0	48°18.0	62°45.0	77°11.9	91°38.8	+27.1	16.4
	4°29.2	4°40.3	4°51.5	5°02.6	5°13.7	5°24.7	5°35.7	5°46.7	5°57.7	6°08.6	6°19.5	+11.0	60.3
Fr 29	308°18.3	322°44.7	337°11.0	351°37.3	6°03.5	20°29.8	34°55.9	49°22.1	63°48.2	78°14.3	92°40.3	+26.2	16.5
	8°57.7	9°07.8	9°17.9	9°27.9	9°37.8	9°47.7	9°57.5	10°07.3	10°17.0	10°26.6	10°36.1	+9.9	60.4
Sa 30	309°07.1	323°32.6	337°58.2	352°23.6	6°49.1	21°14.5	35°39.9	50°05.3	64°30.7	78°56.0	93°21.3	+25.4	16.4
	12°50.2	12°58.5	13°06.7	13°14.8	13°22.8	13°30.7	13°38.5	13°46.2	13°53.8	14°01.4	14°08.8	+7.9	60.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 5 11h41 — NM: 12 16h13 — FQ: 20 18h39 — FM: 28 02h56

SUN

October 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	272°34.3 -3°13.7	287°34.5 -3°14.7	302°34.7 -3°15.7	317°34.9 -3°16.6	332°35.1 -3°17.6	347°35.3 -3°18.6	2°35.5 -3°19.5	17°35.7 -3°20.5	32°35.9 -3°21.5	47°36.1 -3°22.4	62°36.3 -3°23.4	77°36.5 -3°24.4	+0.2 -1.0
Mo 2	272°39.1 -3°37.0	287°39.3 -3°37.9	302°39.5 -3°38.9	317°39.7 -3°39.9	332°39.9 -3°40.8	347°40.1 -3°41.8	2°40.3 -3°42.8	17°40.5 -3°43.7	32°40.7 -3°44.7	47°40.9 -3°45.7	62°41.1 -3°46.6	77°41.3 -3°47.6	+0.2 -1.0
Tu 3	272°43.9 -4°00.1	287°44.1 -4°01.1	302°44.3 -4°02.1	317°44.4 -4°03.0	332°44.6 -4°04.0	347°44.8 -4°05.0	2°45.0 -4°05.9	17°45.2 -4°06.9	32°45.4 -4°07.9	47°45.6 -4°08.8	62°45.8 -4°09.8	77°46.0 -4°10.8	+0.2 -1.0
We 4	272°48.5 -4°23.3	287°48.7 -4°24.3	302°48.9 -4°25.2	317°49.1 -4°26.2	332°49.3 -4°27.1	347°49.5 -4°28.1	2°49.7 -4°29.1	17°49.9 -4°30.0	32°50.1 -4°31.0	47°50.2 -4°32.0	62°50.4 -4°32.9	77°50.6 -4°33.9	+0.2 -1.0
Th 5	272°53.1 -4°46.4	287°53.3 -4°47.3	302°53.5 -4°48.3	317°53.7 -4°49.3	332°53.8 -4°50.2	347°54.0 -4°51.2	2°54.2 -4°52.1	17°54.4 -4°53.1	32°54.6 -4°54.1	47°54.8 -4°55.0	62°55.0 -4°56.0	77°55.2 -4°56.9	+0.2 -1.0
Fr 6	272°57.6 -5°09.4	287°57.7 -5°10.4	302°57.9 -5°11.3	317°58.1 -5°12.3	332°58.3 -5°13.3	347°58.5 -5°14.2	2°58.7 -5°15.2	17°58.9 -5°16.1	32°59.0 -5°17.1	47°59.2 -5°18.0	62°59.4 -5°19.0	77°59.6 -5°20.0	+0.2 -1.0
Sa 7	273°01.9 -5°32.4	288°02.1 -5°33.3	303°02.3 -5°34.3	318°02.5 -5°35.3	333°02.7 -5°36.2	348°02.8 -5°37.2	3°03.0 -5°38.1	18°03.2 -5°39.1	33°03.4 -5°40.0	48°03.5 -5°41.0	63°03.7 -5°41.9	78°03.9 -5°42.9	+0.2 -1.0
Su 8	273°06.2 -5°55.3	288°06.4 -5°56.2	303°06.6 -5°57.2	318°06.7 -5°58.2	333°06.9 -5°59.1	348°07.1 -6°00.1	3°07.2 -6°01.0	18°07.4 -6°02.0	33°07.6 -6°02.9	48°07.8 -6°03.9	63°07.9 -6°04.8	78°08.1 -6°05.8	+0.2 -1.0
Mo 9	273°10.4 -6°18.1	288°10.5 -6°19.1	303°10.7 -6°20.0	318°10.9 -6°21.0	333°11.0 -6°21.9	348°11.2 -6°22.9	3°11.4 -6°23.8	18°11.5 -6°24.8	33°11.7 -6°25.7	48°11.9 -6°26.7	63°12.1 -6°27.6	78°12.2 -6°28.6	+0.2 -0.9
Tu 10	273°14.4 -6°40.9	288°14.6 -6°41.8	303°14.7 -6°42.8	318°14.9 -6°43.7	333°15.1 -6°44.7	348°15.2 -6°45.6	3°15.4 -6°46.5	18°15.5 -6°47.5	33°15.7 -6°48.4	48°15.9 -6°49.4	63°16.0 -6°50.3	78°16.2 -6°51.3	+0.2 -0.9
We 11	273°18.3 -7°03.5	288°18.5 -7°04.5	303°18.6 -7°05.4	318°18.8 -7°06.3	333°19.0 -7°07.3	348°19.1 -7°08.2	3°19.3 -7°09.2	18°19.4 -7°10.1	33°19.6 -7°11.1	48°19.8 -7°12.0	63°19.9 -7°12.9	78°20.1 -7°13.9	+0.2 -0.9
Th 12	273°22.1 -7°26.1	288°22.3 -7°27.0	303°22.4 -7°28.0	318°22.6 -7°28.9	333°22.7 -7°29.8	348°22.9 -7°30.8	3°23.0 -7°31.7	18°23.2 -7°32.6	33°23.3 -7°33.6	48°23.5 -7°34.5	63°23.7 -7°35.5	78°23.8 -7°36.4	+0.2 -0.9
Fr 13	273°25.8 -7°48.5	288°25.9 -7°49.5	303°26.1 -7°50.4	318°26.2 -7°51.3	333°26.4 -7°52.3	348°26.5 -7°53.2	3°26.7 -7°54.1	18°26.8 -7°55.1	33°27.0 -7°56.0	48°27.1 -7°56.9	63°27.3 -7°57.9	78°27.4 -7°58.8	+0.1 -0.9
Sa 14	273°29.3 -8°10.9	288°29.5 -8°11.8	303°29.6 -8°12.8	318°29.8 -8°13.7	333°29.9 -8°14.6	348°30.0 -8°15.5	3°30.2 -8°16.5	18°30.3 -8°17.4	33°30.5 -8°18.3	48°30.6 -8°19.2	63°30.8 -8°20.2	78°30.9 -8°21.1	+0.1 -0.9
Su 15	273°32.7 -8°33.1	288°32.9 -8°34.1	303°33.0 -8°35.0	318°33.1 -8°35.9	333°33.3 -8°36.8	348°33.4 -8°37.8	3°33.6 -8°38.7	18°33.7 -8°39.6	33°33.8 -8°40.5	48°34.0 -8°41.4	63°34.1 -8°42.4	78°34.2 -8°43.3	+0.1 -0.9
Mo 16	273°36.0 -8°55.3	288°36.1 -8°56.2	303°36.3 -8°57.1	318°36.4 -8°58.0	333°36.5 -8°58.9	348°36.7 -8°59.8	3°36.8 -9°00.8	18°36.9 -9°01.7	33°37.1 -9°02.6	48°37.2 -9°03.5	63°37.3 -9°04.4	78°37.5 -9°05.3	+0.1 -0.9
Tu 17	273°39.1 -9°17.2	288°39.3 -9°18.2	303°39.4 -9°19.1	318°39.5 -9°20.0	333°39.6 -9°20.9	348°39.8 -9°21.8	3°39.9 -9°22.7	18°40.0 -9°23.6	33°40.1 -9°24.5	48°40.3 -9°25.5	63°40.4 -9°26.4	78°40.5 -9°27.3	+0.1 -0.9
We 18	273°42.1 -9°39.1	288°42.2 -9°40.0	303°42.4 -9°40.9	318°42.5 -9°41.8	333°42.6 -9°42.7	348°42.7 -9°43.6	3°42.8 -9°44.5	18°43.0 -9°45.4	33°43.1 -9°46.3	48°43.2 -9°47.3	63°43.3 -9°48.2	78°43.4 -9°49.1	+0.1 -0.9
Th 19	273°44.9 -10°00.8	288°45.1 -10°01.7	303°45.2 -10°02.6	318°45.3 -10°03.5	333°45.4 -10°04.4	348°45.5 -10°05.3	3°45.6 -10°06.2	18°45.7 -10°07.1	33°45.9 -10°08.0	48°46.0 -10°08.9	63°46.1 -10°09.8	78°46.2 -10°10.7	+0.1 -0.9
Fr 20	273°47.6 -10°22.4	288°47.7 -10°23.3	303°47.8 -10°24.2	318°48.0 -10°25.1	333°48.1 -10°26.0	348°48.2 -10°26.9	3°48.3 -10°27.7	18°48.4 -10°28.6	33°48.5 -10°29.5	48°48.6 -10°30.4	63°48.7 -10°31.3	78°48.8 -10°32.2	+0.1 -0.9
Sa 21	273°50.2 -10°43.8	288°50.3 -10°44.7	303°50.4 -10°45.6	318°50.5 -10°46.5	333°50.6 -10°47.3	348°50.7 -10°48.2	3°50.8 -10°49.1	18°50.9 -10°50.0	33°51.0 -10°50.9	48°51.1 -10°51.8	63°51.2 -10°52.7	78°51.3 -10°53.6	+0.1 -0.9
Su 22	273°52.5 -11°05.0	288°52.6 -11°05.9	303°52.7 -11°06.8	318°52.8 -11°07.7	333°52.9 -11°08.6	348°53.0 -11°09.5	3°53.1 -11°10.3	18°53.2 -11°11.2	33°53.3 -11°12.1	48°53.4 -11°13.0	63°53.5 -11°13.8	78°53.5 -11°14.7	+0.1 -0.9
Mo 23	273°54.7 -11°26.1	288°54.8 -11°27.0	303°54.9 -11°27.9	318°55.0 -11°28.8	333°55.1 -11°29.6	348°55.2 -11°30.5	3°55.2 -11°31.4	18°55.3 -11°32.2	33°55.4 -11°33.1	48°55.5 -11°34.0	63°55.6 -11°34.9	78°55.7 -11°35.7	+0.1 -0.9
Tu 24	273°56.7 -11°47.0	288°56.8 -11°47.9	303°56.9 -11°48.8	318°57.0 -11°49.6	333°57.1 -11°50.5	348°57.2 -11°51.4	3°57.2 -11°52.2	18°57.3 -11°53.1	33°57.4 -11°54.0	48°57.5 -11°54.8	63°57.5 -11°55.7	78°57.6 -11°56.6	+0.1 -0.9
We 25	273°58.6 -12°07.8	288°58.7 -12°08.6	303°58.8 -12°09.5	318°58.8 -12°10.4	333°58.9 -12°11.2	348°59.0 -12°12.1	3°59.0 -12°12.9	18°59.1 -12°13.8	33°59.2 -12°14.6	48°59.3 -12°15.5	63°59.3 -12°16.4	78°59.4 -12°17.2	+0.1 -0.9
Th 26	274°00.3 -12°28.3	289°00.4 -12°29.2	304°00.4 -12°30.0	319°00.5 -12°30.9	334°00.6 -12°31.7	349°00.6 -12°32.6	4°00.7 -12°33.4	19°00.7 -12°34.3	34°00.8 -12°35.1	49°00.9 -12°36.0	64°00.9 -12°36.8	79°01.0 -12°37.7	+0.1 -0.9
Fr 27	274°01.8 -12°48.7	289°01.8 -12°49.5	304°01.9 -12°50.4	319°02.0 -12°51.2	334°02.0 -12°52.0	349°02.1 -12°52.9	4°02.1 -12°53.7	19°02.2 -12°54.6	34°02.3 -12°55.4	49°02.3 -12°56.3	64°02.4 -12°57.1	79°02.4 -12°57.9	+0.1 -0.8
Sa 28	274°03.1 -13°08.8	289°03.2 -13°09.7	304°03.2 -13°10.5	319°03.3 -13°11.3	334°03.3 -13°12.2	349°03.4 -13°13.0	4°03.4 -13°13.8	19°03.5 -13°14.7	34°03.5 -13°15.5	49°03.6 -13°16.3	64°03.6 -13°17.2	79°03.6 -13°18.0	+0.0 -0.8
Su 29	274°04.2 -13°28.8	289°04.3 -13°29.6	304°04.3 -13°30.4	319°04.4 -13°31.2	334°04.4 -13°32.1	349°04.4 -13°32.9	4°04.5 -13°33.7	19°04.5 -13°34.5	34°04.6 -13°35.4	49°04.6 -13°36.2	64°04.6 -13°37.0	79°04.7 -13°37.8	+0.0 -0.8
Mo 30	274°05.2 -13°48.5	289°05.2 -13°49.3	304°05.2 -13°50.1	319°05.3 -13°51.0	334°05.3 -13°51.8	349°05.3 -13°52.6	4°05.4 -13°53.4	19°05.4 -13°54.2	34°05.4 -13°55.0	49°05.5 -13°55.9	64°05.5 -13°56.7	79°05.5 -13°57.5	+0.0 -0.8
Tu 31	274°05.9 -14°08.0	289°05.9 -14°08.8	304°05.9 -14°09.6	319°06.0 -14°10.5	334°06.0 -14°11.3	349°06.0 -14°12.1	4°06.0 -14°12.9	19°06.1 -14°13.7	34°06.1 -14°14.5	49°06.1 -14°15.3	64°06.1 -14°16.1	79°06.2 -14°16.9	+0.0 -0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2034

	D	18h	19h	20h	21h	22h	23h	0h	1h	2h	3h	4h	Δ'/h	SH
	Su 1	237°33.2	251°58.2	266°23.3	280°48.4	295°13.4	309°38.4	324°03.4	338°28.4	352°53.4	7°18.4	21°43.3	+25.0	16.4
		15°17.5	15°23.8	15°30.0	15°36.1	15°42.1	15°48.0	15°53.7	15°59.4	16°04.9	16°10.3	16°15.6	+5.8	60.1
	Mo 2	237°57.2	252°22.2	266°47.1	281°12.0	295°37.0	310°01.9	324°26.9	338°51.9	353°16.9	7°41.9	22°06.9	+25.0	16.2
		17°21.4	17°24.8	17°28.1	17°31.3	17°34.4	17°37.4	17°40.2	17°42.9	17°45.5	17°48.0	17°50.4	+2.9	59.6
	Tu 3	238°24.4	252°49.8	267°15.2	281°40.6	296°06.0	310°31.5	324°57.0	339°22.6	353°48.2	8°13.8	22°39.5	+25.5	16.1
		18°11.3	18°11.7	18°12.0	18°12.2	18°12.3	18°12.2	18°12.1	18°11.8	18°11.4	18°10.9	18°10.3	-0.1	59.0
◑	We 4	239°09.3	253°35.6	268°02.0	282°28.5	296°55.0	311°21.5	325°48.1	340°14.8	354°41.5	9°08.2	23°35.0	+26.6	15.9
		17°47.2	17°44.8	17°42.3	17°39.6	17°36.9	17°34.0	17°31.1	17°28.0	17°24.8	17°21.6	17°18.2	-2.9	58.3
	Th 5	240°23.8	254°51.5	269°19.3	283°47.1	298°15.0	312°42.9	327°11.0	341°39.0	356°07.1	10°35.3	25°03.6	+28.0	15.7
		16°15.8	16°10.9	16°05.9	16°00.8	15°55.6	15°50.3	15°45.0	15°39.5	15°34.0	15°28.4	15°22.7	-5.3	57.7
	Fr 6	254°51.5	269°19.3	283°47.1	298°15.0	312°42.9	327°11.0	341°39.0	356°07.1	10°35.3	25°03.6	39°31.9	+28.0	15.7
		16°10.9	16°05.9	16°00.8	15°55.6	15°50.3	15°45.0	15°39.5	15°34.0	15°28.4	15°22.7	15°16.9	-5.4	57.7
	Sa 7	256°43.7	271°12.9	285°42.2	300°11.6	314°41.1	329°10.6	343°40.1	358°09.7	12°39.4	27°09.1	41°38.9	+29.5	15.6
		13°41.1	13°34.1	13°27.1	13°19.9	13°12.8	13°05.5	12°58.2	12°50.9	12°43.5	12°36.0	12°28.4	-7.3	57.0
	Su 8	259°12.3	273°43.0	288°13.7	302°44.5	317°15.3	331°46.1	346°17.0	0°48.0	15°19.0	29°50.1	44°21.2	+30.9	15.4
		10°28.5	10°20.1	10°11.7	10°03.2	9°54.7	9°46.1	9°37.5	9°28.8	9°20.1	9°11.4	9°02.6	-8.6	56.4
	Mo 9	262°13.2	276°45.0	291°16.9	305°48.7	320°20.7	334°52.6	349°24.6	3°56.7	18°28.7	33°00.9	47°33.0	+32.0	15.2
		6°46.7	6°37.4	6°28.1	6°18.8	6°09.4	6°00.0	5°50.6	5°41.2	5°31.7	5°22.3	5°12.8	-9.4	55.9
	Tu 10	265°39.1	280°11.7	294°44.4	309°17.1	323°49.8	338°22.6	352°55.3	7°28.1	22°00.9	36°33.8	51°06.6	+32.8	15.1
		2°48.6	2°38.9	2°29.2	2°19.5	2°09.8	2°00.1	1°50.4	1°40.7	1°30.9	1°21.2	1°11.5	-9.7	55.4
	We 11	269°21.7	283°54.8	298°28.0	313°01.2	327°34.3	342°07.5	356°40.7	11°13.9	25°47.1	40°20.3	54°53.6	+33.2	15.0
		-1°13.9	-1°23.5	-1°33.2	-1°42.8	-1°52.4	-2°01.9	-2°11.5	-2°21.1	-2°30.6	-2°40.1	-2°49.6	-9.6	55.0
●	Th 12	273°12.7	287°46.0	302°19.4	316°52.7	331°26.0	345°59.3	0°32.6	15°05.9	29°39.2	44°12.5	58°45.8	+33.3	14.9
		-5°09.8	-5°18.9	-5°28.1	-5°37.2	-5°46.2	-5°55.3	-6°04.3	-6°13.3	-6°22.2	-6°31.1	-6°40.0	-9.0	54.6
	Fr 13	277°04.7	291°37.9	306°11.1	320°44.3	335°17.4	349°50.6	4°23.7	18°56.9	33°30.0	48°03.1	62°36.3	+33.2	14.8
		-8°49.0	-8°57.3	-9°05.6	-9°13.8	-9°21.9	-9°30.1	-9°38.1	-9°46.2	-9°54.2	-10°02.1	-10°10.0	-8.1	54.3
	Sa 14	280°51.3	295°24.2	309°57.1	324°29.9	339°02.8	353°35.6	8°08.4	22°41.2	37°14.0	51°46.7	66°19.5	+32.8	14.7
		-12°02.6	-12°09.6	-12°16.7	-12°23.7	-12°30.6	-12°37.4	-12°44.3	-12°51.0	-12°57.7	-13°04.3	-13°10.9	-6.8	54.1
	Su 15	284°28.3	299°00.7	313°33.1	328°05.5	342°37.9	357°10.3	11°42.6	26°14.9	40°47.2	55°19.5	69°51.7	+32.3	14.7
		-14°42.3	-14°47.9	-14°53.4	-14°58.9	-15°04.3	-15°09.6	-15°14.8	-15°20.0	-15°25.1	-15°30.2	-15°35.2	-5.3	54.0
	Mo 16	287°53.1	302°25.0	316°56.9	331°28.8	346°00.7	0°32.6	15°04.4	29°36.2	44°08.0	58°39.7	73°11.5	+31.8	14.7
		-16°41.4	-16°45.2	-16°49.0	-16°52.6	-16°56.3	-16°59.8	-17°03.2	-17°06.6	-17°09.9	-17°13.1	-17°16.3	-3.5	54.0
	Tu 17	291°05.4	305°36.8	320°08.2	334°39.6	349°11.0	3°42.4	18°13.8	32°45.1	47°16.4	61°47.7	76°19.0	+31.4	14.8
		-17°54.0	-17°55.9	-17°57.7	-17°59.4	-18°01.1	-18°02.6	-18°04.1	-18°05.5	-18°06.8	-18°08.0	-18°09.1	-1.5	54.1
	We 18	294°06.3	308°37.3	323°08.4	337°39.4	352°10.4	6°41.3	21°12.3	35°43.2	50°14.2	64°45.1	79°16.0	+31.0	14.9
		-18°16.1	-18°15.8	-18°15.5	-18°15.1	-18°14.7	-18°14.1	-18°13.5	-18°12.7	-18°11.9	-18°11.0	-18°10.0	+0.6	54.5
	Th 19	296°58.1	311°28.8	325°59.6	340°30.2	355°00.9	9°31.6	24°02.3	38°32.9	53°03.6	67°34.2	82°04.8	+30.7	15.0
		-17°44.8	-17°42.4	-17°39.9	-17°37.4	-17°34.7	-17°32.0	-17°29.2	-17°26.3	-17°23.3	-17°20.3	-17°17.1	+2.8	55.0
◐	Fr 20	299°43.0	314°13.5	328°43.9	343°14.4	357°44.8	12°15.2	26°45.7	41°16.1	55°46.5	70°16.9	84°47.3	+30.4	15.2
		-16°19.4	-16°14.9	-16°10.2	-16°05.5	-16°00.7	-15°55.9	-15°50.9	-15°45.9	-15°40.8	-15°35.5	-15°30.3	+4.9	55.6
	Sa 21	302°21.9	316°52.1	331°22.4	345°52.6	0°22.8	14°52.9	29°23.1	43°53.3	58°23.4	72°53.6	87°23.7	+30.2	15.4
		-14°01.0	-13°54.4	-13°47.8	-13°41.0	-13°34.2	-13°27.3	-13°20.3	-13°13.2	-13°06.1	-12°58.9	-12°51.6	+6.9	56.5
	Su 22	304°54.0	319°23.9	333°53.8	348°23.7	2°53.5	17°23.4	31°53.2	46°23.0	60°52.8	75°22.6	89°52.3	+29.8	15.7
		-10°53.3	-10°44.8	-10°36.3	-10°27.7	-10°19.0	-10°10.3	-10°01.5	-9°52.6	-9°43.7	-9°34.7	-9°25.6	+8.8	57.4
	Mo 23	307°16.0	321°45.4	336°14.8	350°44.2	5°13.5	19°42.8	34°12.1	48°41.3	63°10.5	77°39.7	92°08.9	+29.3	15.9
		-7°02.5	-6°52.5	-6°42.4	-6°32.3	-6°22.2	-6°11.9	-6°01.7	-5°51.4	-5°41.0	-5°30.6	-5°20.2	+10.2	58.4
	Tu 24	309°22.5	323°51.2	338°19.8	352°48.4	7°16.9	21°45.4	36°13.9	50°42.3	65°10.7	79°39.0	94°07.3	+28.5	16.2
		-2°38.6	-2°27.6	-2°16.5	-2°05.4	-1°54.2	-1°43.1	-1°31.9	-1°20.7	-1°09.4	-0°58.2	-0°46.9	+11.2	59.4
	We 25	311°06.7	325°34.3	340°01.9	354°29.4	8°56.9	23°24.3	37°51.7	52°19.0	66°46.2	81°13.5	95°40.6	+27.4	16.4
		2°03.9	2°15.3	2°26.7	2°38.2	2°49.6	3°01.0	3°12.4	3°23.8	3°35.2	3°46.6	3°58.0	+11.4	60.2
	Th 26	312°22.1	326°48.4	341°14.7	355°41.0	10°07.2	24°33.3	38°59.4	53°25.4	67°51.4	82°17.3	96°43.2	+26.1	16.6
		6°46.1	6°57.1	7°08.0	7°18.9	7°29.8	7°40.6	7°51.4	8°02.1	8°12.8	8°23.4	8°34.0	+10.8	60.9
○	Fr 27	313°05.0	327°30.0	341°55.0	356°20.0	10°44.9	25°09.7	39°34.5	53°59.3	68°24.0	82°48.6	97°13.3	+24.8	16.7
		11°05.6	11°15.2	11°24.7	11°34.1	11°43.4	11°52.7	12°01.8	12°10.9	12°19.9	12°28.9	12°37.7	+9.2	61.1
	Sa 28	313°17.6	327°41.6	342°05.6	356°29.5	10°53.4	25°17.3	39°41.1	54°04.9	68°28.7	82°52.5	97°16.2	+23.9	16.7
		14°38.9	14°46.2	14°53.4	15°00.4	15°07.3	15°14.2	15°20.9	15°27.5	15°34.0	15°40.4	15°46.6	+6.8	61.1
	Su 29	313°10.4	327°33.9	341°57.5	356°21.0	10°44.5	25°08.0	39°31.6	53°55.1	68°18.7	82°42.2	97°05.8	+23.5	16.6
		17°06.2	17°10.5	17°14.6	17°18.7	17°22.6	17°26.4	17°30.1	17°33.6	17°37.0	17°40.3	17°43.5	+3.7	60.7
	Mo 30	327°33.9	341°57.5	356°21.0	10°44.5	25°08.0	39°31.6	53°55.1	68°18.7	82°42.2	97°05.8	111°29.4	+23.5	16.5
		17°10.5	17°14.6	17°18.7	17°22.6	17°26.4	17°30.1	17°33.6	17°37.0	17°40.3	17°43.5	17°46.5	+3.6	60.7
	Tu 31	327°25.1	341°49.0	356°12.9	10°36.9	25°01.0	39°25.0	53°49.1	68°13.3	82°37.4	97°01.7	111°25.9	+24.1	16.4
		18°16.2	18°17.1	18°17.9	18°18.6	18°19.2	18°19.6	18°19.9	18°20.0	18°20.1	18°20.0	18°19.8	+0.4	60.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 4 18h04 — NM: 12 07h32 — FQ: 20 12h03 — FM: 27 12h42

SUN

November 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	274°06.4	289°06.4	304°06.5	319°06.5	334°06.5	349°06.5	4°06.5	19°06.5	34°06.6	49°06.6	64°06.6	79°06.6	+0.0
	-14°27.3	-14°28.1	-14°28.9	-14°29.7	-14°30.5	-14°31.3	-14°32.1	-14°32.9	-14°33.7	-14°34.5	-14°35.3	-14°36.1	-0.8
Th 2	274°06.8	289°06.8	304°06.8	319°06.8	334°06.8	349°06.8	4°06.8	19°06.8	34°06.8	49°06.8	64°06.8	79°06.8	+0.0
	-14°46.4	-14°47.2	-14°48.0	-14°48.7	-14°49.5	-14°50.3	-14°51.1	-14°51.9	-14°52.7	-14°53.5	-14°54.3	-14°55.0	-0.8
Fr 3	274°06.9	289°06.9	304°06.9	319°06.9	334°06.9	349°06.9	4°06.9	19°06.9	34°06.9	49°06.9	64°06.9	79°06.9	-0.0
	-15°05.2	-15°06.0	-15°06.8	-15°07.5	-15°08.3	-15°09.1	-15°09.9	-15°10.7	-15°11.4	-15°12.2	-15°13.0	-15°13.8	-0.8
Sa 4	274°06.8	289°06.8	304°06.8	319°06.8	334°06.8	349°06.7	4°06.7	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	-0.0
	-15°23.8	-15°24.6	-15°25.3	-15°26.1	-15°26.9	-15°27.6	-15°28.4	-15°29.2	-15°29.9	-15°30.7	-15°31.5	-15°32.2	-0.8
Su 5	274°06.5	289°06.5	304°06.5	319°06.4	334°06.4	349°06.4	4°06.4	19°06.4	34°06.3	49°06.3	64°06.3	79°06.3	-0.0
	-15°42.1	-15°42.9	-15°43.6	-15°44.4	-15°45.1	-15°45.9	-15°46.7	-15°47.4	-15°48.2	-15°48.9	-15°49.7	-15°50.4	-0.8
Mo 6	274°06.0	289°06.0	304°05.9	319°05.9	334°05.9	349°05.8	4°05.8	19°05.8	34°05.8	49°05.7	64°05.7	79°05.7	-0.0
	-16°00.2	-16°00.9	-16°01.7	-16°02.4	-16°03.2	-16°03.9	-16°04.7	-16°05.4	-16°06.2	-16°06.9	-16°07.6	-16°08.4	-0.7
Tu 7	274°05.3	289°05.2	304°05.2	319°05.1	334°05.1	349°05.1	4°05.0	19°05.0	34°05.0	49°04.9	64°04.9	79°04.9	-0.0
	-16°18.0	-16°18.7	-16°19.5	-16°20.2	-16°20.9	-16°21.7	-16°22.4	-16°23.1	-16°23.9	-16°24.6	-16°25.3	-16°26.1	-0.7
We 8	274°04.3	289°04.3	304°04.2	319°04.2	334°04.1	349°04.1	4°04.1	19°04.0	34°04.0	49°03.9	64°03.9	79°03.8	-0.0
	-16°35.5	-16°36.2	-16°37.0	-16°37.7	-16°38.4	-16°39.1	-16°39.9	-16°40.6	-16°41.3	-16°42.0	-16°42.7	-16°43.5	-0.7
Th 9	274°03.2	289°03.1	304°03.1	319°03.0	334°03.0	349°02.9	4°02.8	19°02.8	34°02.7	49°02.7	64°02.6	79°02.6	-0.1
	-16°52.8	-16°53.5	-16°54.2	-16°54.9	-16°55.6	-16°56.3	-16°57.0	-16°57.8	-16°58.5	-16°59.2	-16°59.9	-17°00.6	-0.7
Fr 10	274°01.8	289°01.7	304°01.7	319°01.6	334°01.6	349°01.5	4°01.4	19°01.4	34°01.3	49°01.2	64°01.2	79°01.1	-0.1
	-17°09.7	-17°10.4	-17°11.1	-17°11.8	-17°12.5	-17°13.2	-17°13.9	-17°14.6	-17°15.3	-17°16.0	-17°16.7	-17°17.4	-0.7
Sa 11	274°00.2	289°00.2	304°00.1	319°00.0	333°59.9	348°59.9	3°59.8	18°59.7	33°59.7	48°59.6	63°59.5	78°59.4	-0.1
	-17°26.4	-17°27.1	-17°27.8	-17°28.5	-17°29.2	-17°29.9	-17°30.5	-17°31.2	-17°31.9	-17°32.6	-17°33.3	-17°34.0	-0.7
Su 12	273°58.4	288°58.4	303°58.3	318°58.2	333°58.1	348°58.0	3°58.0	18°57.9	33°57.8	48°57.7	63°57.6	78°57.6	-0.1
	-17°42.8	-17°43.5	-17°44.1	-17°44.8	-17°45.5	-17°46.2	-17°46.8	-17°47.5	-17°48.2	-17°48.9	-17°49.5	-17°50.2	-0.7
Mo 13	273°56.4	288°56.4	303°56.3	318°56.2	333°56.1	348°56.0	3°55.9	18°55.8	33°55.7	48°55.6	63°55.6	78°55.5	-0.1
	-17°58.9	-17°59.5	-18°00.2	-18°00.8	-18°01.5	-18°02.2	-18°02.8	-18°03.5	-18°04.1	-18°04.8	-18°05.5	-18°06.1	-0.7
Tu 14	273°54.2	288°54.1	303°54.0	318°53.9	333°53.8	348°53.8	3°53.7	18°53.6	33°53.5	48°53.4	63°53.3	78°53.2	-0.1
	-18°14.6	-18°15.3	-18°15.9	-18°16.6	-18°17.2	-18°17.9	-18°18.5	-18°19.2	-18°19.8	-18°20.4	-18°21.1	-18°21.7	-0.6
We 15	273°51.8	288°51.7	303°51.6	318°51.5	333°51.4	348°51.3	3°51.2	18°51.1	33°51.0	48°50.9	63°50.8	78°50.6	-0.1
	-18°30.1	-18°30.7	-18°31.3	-18°32.0	-18°32.6	-18°33.2	-18°33.9	-18°34.5	-18°35.1	-18°35.8	-18°36.4	-18°37.0	-0.6
Th 16	273°49.2	288°49.1	303°49.0	318°48.9	333°48.7	348°48.6	3°48.5	18°48.4	33°48.3	48°48.2	63°48.0	78°47.9	-0.1
	-18°45.2	-18°45.8	-18°46.4	-18°47.0	-18°47.7	-18°48.3	-18°48.9	-18°49.5	-18°50.1	-18°50.7	-18°51.4	-18°52.0	-0.6
Fr 17	273°46.4	288°46.2	303°46.1	318°46.0	333°45.9	348°45.7	3°45.6	18°45.5	33°45.4	48°45.2	63°45.1	78°45.0	-0.1
	-18°59.9	-19°00.6	-19°01.2	-19°01.8	-19°02.4	-19°03.0	-19°03.6	-19°04.2	-19°04.8	-19°05.4	-19°06.0	-19°06.6	-0.6
Sa 18	273°43.3	288°43.2	303°43.1	318°42.9	333°42.8	348°42.7	3°42.5	18°42.4	33°42.3	48°42.1	63°42.0	78°41.9	-0.1
	-19°14.4	-19°15.0	-19°15.6	-19°16.2	-19°16.8	-19°17.3	-19°17.9	-19°18.5	-19°19.1	-19°19.7	-19°20.3	-19°20.9	-0.6
Su 19	273°40.1	288°39.9	303°39.8	318°39.7	333°39.5	348°39.4	3°39.2	18°39.1	33°39.0	48°38.8	63°38.7	78°38.5	-0.1
	-19°28.5	-19°29.1	-19°29.6	-19°30.2	-19°30.8	-19°31.4	-19°31.9	-19°32.5	-19°33.1	-19°33.7	-19°34.2	-19°34.8	-0.6
Mo 20	273°36.7	288°36.5	303°36.4	318°36.2	333°36.1	348°35.9	3°35.8	18°35.6	33°35.5	48°35.3	63°35.2	78°35.0	-0.1
	-19°42.2	-19°42.8	-19°43.3	-19°43.9	-19°44.5	-19°45.0	-19°45.6	-19°46.2	-19°46.7	-19°47.3	-19°47.8	-19°48.4	-0.6
Tu 21	273°33.0	288°32.9	303°32.7	318°32.5	333°32.4	348°32.2	3°32.1	18°31.9	33°31.8	48°31.6	63°31.4	78°31.3	-0.2
	-19°55.6	-19°56.1	-19°56.7	-19°57.2	-19°57.8	-19°58.3	-19°58.9	-19°59.4	-20°00.0	-20°00.5	-20°01.1	-20°01.6	-0.5
We 22	273°29.2	288°29.0	303°28.9	318°28.7	333°28.5	348°28.4	3°28.2	18°28.0	33°27.9	48°27.7	63°27.5	78°27.4	-0.2
	-20°08.6	-20°09.1	-20°09.7	-20°10.2	-20°10.7	-20°11.3	-20°11.8	-20°12.3	-20°12.9	-20°13.4	-20°13.9	-20°14.5	-0.5
Th 23	273°25.2	288°25.0	303°24.8	318°24.6	333°24.5	348°24.3	3°24.1	18°23.9	33°23.8	48°23.6	63°23.4	78°23.2	-0.2
	-20°21.3	-20°21.8	-20°22.3	-20°22.8	-20°23.3	-20°23.8	-20°24.4	-20°24.9	-20°25.4	-20°25.9	-20°26.4	-20°26.9	-0.5
Fr 24	273°20.9	288°20.8	303°20.6	318°20.4	333°20.2	348°20.0	3°19.9	18°19.7	33°19.5	48°19.3	63°19.1	78°18.9	-0.2
	-20°33.5	-20°34.0	-20°34.5	-20°35.0	-20°35.5	-20°36.0	-20°36.5	-20°37.0	-20°37.5	-20°38.0	-20°38.5	-20°39.0	-0.5
Sa 25	273°16.5	288°16.3	303°16.2	318°16.0	333°15.8	348°15.6	3°15.4	18°15.2	33°15.0	48°14.8	63°14.6	78°14.5	-0.2
	-20°45.4	-20°45.9	-20°46.4	-20°46.9	-20°47.4	-20°47.9	-20°48.3	-20°48.8	-20°49.3	-20°49.8	-20°50.3	-20°50.7	-0.5
Su 26	273°11.9	288°11.7	303°11.5	318°11.4	333°11.2	348°11.0	3°10.8	18°10.6	33°10.4	48°10.2	63°10.0	78°09.8	-0.2
	-20°56.9	-20°57.4	-20°57.9	-20°58.3	-20°58.8	-20°59.3	-20°59.7	-21°00.2	-21°00.7	-21°01.1	-21°01.6	-21°02.1	-0.5
Mo 27	273°07.2	288°07.0	303°06.8	318°06.6	333°06.3	348°06.1	3°05.9	18°05.7	33°05.5	48°05.3	63°05.1	78°04.9	-0.2
	-21°08.0	-21°08.5	-21°08.9	-21°09.4	-21°09.9	-21°10.3	-21°10.8	-21°11.2	-21°11.7	-21°12.1	-21°12.6	-21°13.0	-0.5
Tu 28	273°02.2	288°02.0	303°01.8	318°01.6	333°01.4	348°01.1	3°00.9	18°00.7	33°00.5	48°00.3	63°00.1	77°59.9	-0.2
	-21°18.8	-21°19.2	-21°19.6	-21°20.1	-21°20.5	-21°20.9	-21°21.4	-21°21.8	-21°22.2	-21°22.7	-21°23.1	-21°23.5	-0.4
We 29	272°57.1	287°56.8	302°56.6	317°56.4	332°56.2	347°56.0	2°55.7	17°55.5	32°55.3	47°55.1	62°54.9	77°54.6	-0.2
	-21°29.1	-21°29.5	-21°29.9	-21°30.3	-21°30.8	-21°31.2	-21°31.6	-21°32.0	-21°32.4	-21°32.8	-21°33.2	-21°33.7	-0.4
Th 30	272°51.7	287°51.5	302°51.3	317°51.1	332°50.8	347°50.6	2°50.4	17°50.2	32°49.9	47°49.7	62°49.5	77°49.2	-0.2
	-21°39.0	-21°39.4	-21°39.8	-21°40.2	-21°40.6	-21°41.0	-21°41.4	-21°41.8	-21°42.2	-21°42.6	-21°43.0	-21°43.4	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2034

D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
We 1	241°43.8	256°10.1	270°36.6	285°03.1	299°29.7	313°56.3	328°23.1	342°49.9	357°16.8	11°43.7	26°10.7	+26.7	16.0
	17°01.5	16°57.2	16°52.9	16°48.5	16°43.9	16°39.3	16°34.6	16°29.8	16°24.8	16°19.8	16°14.7	-4.7	58.6
Th 2	243°05.2	257°33.4	272°01.7	286°30.1	300°58.6	315°27.1	329°55.7	344°24.4	358°53.2	13°22.0	27°50.9	+28.6	15.7
	14°47.8	14°41.4	14°34.8	14°28.2	14°21.6	14°14.8	14°08.0	14°01.1	13°54.2	13°47.2	13°40.1	-6.8	57.7
◑ Fr 3	245°13.0	259°43.0	274°13.1	288°43.3	303°13.5	317°43.8	332°14.1	346°44.5	1°15.0	15°45.6	30°16.2	+30.3	15.5
	11°46.2	11°38.2	11°30.1	11°22.0	11°13.8	11°05.5	10°57.2	10°48.9	10°40.5	10°32.1	10°23.6	-8.3	56.9
Sa 4	259°43.0	274°13.1	288°43.3	303°13.5	317°43.8	332°14.1	346°44.5	1°15.0	15°45.6	30°16.2	44°46.8	+30.4	15.5
	11°38.2	11°30.1	11°22.0	11°13.8	11°05.5	10°57.2	10°48.9	10°40.5	10°32.1	10°23.6	10°15.1	-8.3	56.8
Su 5	262°33.9	277°05.5	291°37.1	306°08.8	320°40.5	335°12.3	349°44.1	4°16.0	18°47.9	33°19.8	47°51.9	+31.8	15.3
	8°02.6	7°53.5	7°44.4	7°35.2	7°26.0	7°16.8	7°07.6	6°58.3	6°49.0	6°39.7	6°30.4	-9.2	56.1
Mo 6	265°57.1	280°29.8	295°02.5	309°35.2	324°07.9	338°40.7	353°13.5	7°46.4	22°19.3	36°52.2	51°25.1	+32.8	15.1
	4°08.0	3°58.4	3°48.8	3°39.2	3°29.6	3°19.9	3°10.3	3°00.6	2°50.9	2°41.2	2°31.6	-9.7	55.5
Tu 7	269°42.2	284°15.5	298°48.8	313°22.2	327°55.5	342°28.9	357°02.3	11°35.7	26°09.1	40°42.5	55°16.0	+33.4	15.0
	0°06.2	-0°03.5	-0°13.1	-0°22.8	-0°32.5	-0°42.1	-0°51.7	-1°01.4	-1°11.0	-1°20.6	-1°30.2	-9.6	55.0
We 8	273°38.7	288°12.3	302°45.8	317°19.4	331°53.0	346°26.5	1°00.1	15°33.7	30°07.2	44°40.8	59°14.4	+33.6	14.9
	-3°52.5	-4°01.8	-4°11.1	-4°20.4	-4°29.7	-4°39.0	-4°48.2	-4°57.4	-5°06.6	-5°15.8	-5°24.9	-9.2	54.6
Th 9	277°37.3	292°10.8	306°44.3	321°17.7	335°51.1	350°24.6	4°58.0	19°31.4	34°04.8	48°38.2	63°11.6	+33.4	14.8
	-7°38.4	-7°47.0	-7°55.6	-8°04.2	-8°12.8	-8°21.2	-8°29.7	-8°38.1	-8°46.5	-8°54.9	-9°03.2	-8.5	54.2
Fr 10	281°30.4	296°03.5	310°36.6	325°09.7	339°42.8	354°15.8	8°48.9	23°21.9	37°54.9	52°27.9	67°00.8	+33.0	14.7
	-11°02.5	-11°10.1	-11°17.6	-11°25.1	-11°32.6	-11°40.0	-11°47.3	-11°54.6	-12°01.8	-12°09.0	-12°16.1	-7.4	54.0
● Sa 11	285°12.6	299°45.3	314°17.8	328°50.4	343°23.0	357°55.5	12°28.0	27°00.5	41°32.9	56°05.4	70°37.8	+32.5	14.7
	-13°56.3	-14°02.5	-14°08.7	-14°14.7	-14°20.8	-14°26.7	-14°32.6	-14°38.5	-14°44.2	-14°49.9	-14°55.6	-5.9	53.9
Su 12	288°41.3	303°13.4	317°45.4	332°17.5	346°49.4	1°21.4	15°53.4	30°25.3	44°57.2	59°29.1	74°01.0	+32.0	14.7
	-16°12.0	-16°16.5	-16°21.0	-16°25.4	-16°29.7	-16°33.9	-16°38.1	-16°42.2	-16°46.2	-16°50.2	-16°54.0	-4.2	53.9
Mo 13	291°56.6	306°28.2	320°59.7	335°31.3	350°02.8	4°34.3	19°05.7	33°37.2	48°08.6	62°40.1	77°11.5	+31.5	14.7
	-17°42.9	-17°45.5	-17°48.1	-17°50.5	-17°52.9	-17°55.2	-17°57.4	-17°59.6	-18°01.7	-18°03.6	-18°05.5	-2.3	53.9
Tu 14	295°01.0	309°32.2	324°03.4	338°34.6	353°05.8	7°37.0	22°08.1	36°39.2	51°10.4	65°41.5	80°12.6	+31.2	14.8
	-18°24.0	-18°24.6	-18°25.1	-18°25.5	-18°25.8	-18°26.0	-18°26.1	-18°26.2	-18°26.1	-18°26.0	-18°25.8	-0.2	54.1
We 15	297°58.6	312°29.6	327°00.6	341°31.6	356°02.6	10°33.6	25°04.6	39°35.6	54°06.6	68°37.6	83°08.6	+31.0	14.8
	-18°12.5	-18°10.9	-18°09.2	-18°07.5	-18°05.7	-18°03.7	-18°01.7	-17°59.6	-17°57.5	-17°55.2	-17°52.9	+2.0	54.4
Th 16	300°53.3	315°24.3	329°55.2	344°26.2	358°57.2	13°28.2	27°59.2	42°30.1	57°01.1	71°32.1	86°03.1	+31.0	15.0
	-17°07.5	-17°03.8	-17°00.0	-16°56.2	-16°52.2	-16°48.2	-16°44.1	-16°39.9	-16°35.6	-16°31.3	-16°26.8	+4.1	54.9
Fr 17	303°47.8	318°18.8	332°49.8	347°20.8	1°51.8	16°22.8	30°53.8	45°24.7	59°55.7	74°26.7	88°57.7	+31.0	15.1
	-15°10.6	-15°04.9	-14°59.1	-14°53.3	-14°47.3	-14°41.3	-14°35.2	-14°29.0	-14°22.8	-14°16.5	-14°10.1	+6.1	55.5
Sa 18	306°42.2	321°13.1	335°44.0	350°15.0	4°45.9	19°16.8	33°47.7	48°18.6	62°49.5	77°20.4	91°51.2	+30.9	15.3
	-12°25.3	-12°17.8	-12°10.2	-12°02.5	-11°54.7	-11°46.9	-11°39.0	-11°31.1	-11°23.0	-11°14.9	-11°06.8	+7.9	56.2
◐ Su 19	309°33.1	324°03.8	338°34.5	353°05.1	7°35.7	22°06.4	36°37.0	51°07.6	65°38.1	80°08.7	94°39.2	+30.6	15.6
	-8°57.0	-8°47.9	-8°38.7	-8°29.4	-8°20.1	-8°10.8	-8°01.4	-7°51.9	-7°42.4	-7°32.8	-7°23.2	+9.4	57.1
Mo 20	312°14.3	326°44.4	341°14.5	355°44.6	10°14.6	24°44.6	39°14.6	53°44.5	68°14.4	82°44.3	97°14.1	+30.0	15.8
	-4°53.2	-4°42.8	-4°32.4	-4°22.0	-4°11.5	-4°01.0	-3°50.5	-3°39.9	-3°29.3	-3°18.6	-3°07.9	+10.5	58.1
Tu 21	314°36.9	329°06.1	343°35.2	358°04.3	12°33.3	27°02.3	41°31.2	56°00.1	70°29.0	84°57.7	99°26.5	+29.0	16.1
	-0°24.3	-0°13.2	-0°02.1	0°09.1	0°20.2	0°31.4	0°42.6	0°53.7	1°04.9	1°16.1	1°27.3	+11.2	59.1
We 22	316°30.8	330°58.7	345°26.4	359°54.1	14°21.8	28°49.3	43°16.8	57°44.3	72°11.7	86°39.0	101°06.2	+27.5	16.4
	4°15.8	4°26.9	4°38.1	4°49.3	5°00.4	5°11.5	5°22.7	5°33.7	5°44.8	5°55.9	6°06.9	+11.1	60.1
Th 23	317°46.9	332°13.1	346°39.2	1°05.2	15°31.2	29°57.0	44°22.9	58°48.6	73°14.3	87°39.9	102°05.4	+25.8	16.6
	8°48.4	8°58.9	9°09.3	9°19.6	9°29.9	9°40.2	9°50.4	10°00.5	10°10.6	10°20.6	10°30.6	+10.2	60.8
Fr 24	318°20.1	332°44.6	347°09.0	1°33.3	15°57.5	30°21.7	44°45.9	59°09.9	73°33.9	87°57.9	102°21.8	+24.2	16.7
	12°51.5	13°00.2	13°08.9	13°17.5	13°26.0	13°34.4	13°42.7	13°50.9	13°59.1	14°07.1	14°15.0	+8.4	61.3
○ Sa 25	318°13.7	332°36.8	346°59.8	1°22.9	15°45.8	30°08.7	44°31.6	58°54.5	73°17.3	87°40.1	102°02.9	+22.9	16.8
	16°01.1	16°07.3	16°13.3	16°19.3	16°25.1	16°30.7	16°36.3	16°41.7	16°47.0	16°52.2	16°57.3	+5.6	61.4
Su 26	317°42.1	332°04.6	346°27.1	0°49.6	15°12.2	29°34.7	43°57.2	58°19.8	72°42.3	87°04.9	101°27.5	+22.5	16.7
	17°57.2	18°00.1	18°02.9	18°05.6	18°08.1	18°10.4	18°12.7	18°14.8	18°16.7	18°18.5	18°20.2	+2.3	61.2
Mo 27	317°09.0	331°32.1	345°55.2	0°18.3	14°41.4	29°04.7	43°27.9	57°51.2	72°14.6	86°38.0	101°01.5	+23.2	16.5
	18°28.7	18°28.2	18°27.5	18°26.7	18°25.8	18°24.7	18°23.5	18°22.2	18°20.8	18°19.2	18°17.4	-1.1	60.6
Tu 28	331°32.1	345°55.2	0°18.3	14°41.4	29°04.7	43°27.9	57°51.2	72°14.6	86°38.0	101°01.5	115°25.0	+23.3	16.5
	18°28.2	18°27.5	18°26.7	18°25.8	18°24.7	18°23.5	18°22.2	18°20.8	18°19.2	18°17.4	18°15.6	-1.3	60.6
We 29	331°25.5	345°50.1	0°14.8	14°39.5	29°04.4	43°29.3	57°54.2	72°19.3	86°44.4	101°09.6	115°34.9	+24.9	16.3
	17°32.9	17°29.1	17°25.2	17°21.2	17°17.0	17°12.8	17°08.4	17°03.9	16°59.4	16°54.7	16°49.9	-4.3	59.7
Th 30	332°04.5	346°31.1	0°57.9	15°24.7	29°51.6	44°18.6	58°45.7	73°12.9	87°40.2	102°07.6	116°35.0	+27.1	16.0
	15°26.2	15°19.8	15°13.4	15°06.9	15°00.4	14°53.7	14°47.0	14°40.2	14°33.3	14°26.3	14°19.3	-6.7	58.8

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 3 03h27 — NM: 11 01h16 — FQ: 19 04h01 — FM: 25 22h32

SUN

December 2034

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	272°46.3	287°46.0	302°45.8	317°45.6	332°45.3	347°45.1	2°44.9	17°44.6	32°44.4	47°44.2	62°43.9	77°43.7	-0.2
	-21°48.5	-21°48.9	-21°49.2	-21°49.6	-21°50.0	-21°50.4	-21°50.8	-21°51.2	-21°51.5	-21°51.9	-21°52.3	-21°52.7	-0.4
Sa 2	272°40.6	287°40.4	302°40.1	317°39.9	332°39.6	347°39.4	2°39.2	17°38.9	32°38.7	47°38.4	62°38.2	77°38.0	-0.2
	-21°57.6	-21°57.9	-21°58.3	-21°58.7	-21°59.0	-21°59.4	-21°59.8	-22°00.1	-22°00.5	-22°00.8	-22°01.2	-22°01.6	-0.4
Su 3	272°34.8	287°34.5	302°34.3	317°34.1	332°33.8	347°33.6	2°33.3	17°33.1	32°32.8	47°32.6	62°32.3	77°32.1	-0.2
	-22°06.2	-22°06.6	-22°06.9	-22°07.3	-22°07.6	-22°08.0	-22°08.3	-22°08.7	-22°09.0	-22°09.3	-22°09.7	-22°10.0	-0.3
Mo 4	272°28.8	287°28.6	302°28.3	317°28.1	332°27.8	347°27.6	2°27.3	17°27.0	32°26.8	47°26.5	62°26.3	77°26.0	-0.3
	-22°14.4	-22°14.8	-22°15.1	-22°15.4	-22°15.8	-22°16.1	-22°16.4	-22°16.8	-22°17.1	-22°17.4	-22°17.7	-22°18.1	-0.3
Tu 5	272°22.7	287°22.4	302°22.2	317°21.9	332°21.7	347°21.4	2°21.1	17°20.9	32°20.6	47°20.4	62°20.1	77°19.8	-0.3
	-22°22.2	-22°22.6	-22°22.9	-22°23.2	-22°23.5	-22°23.8	-22°24.1	-22°24.4	-22°24.7	-22°25.1	-22°25.4	-22°25.7	-0.3
We 6	272°16.4	287°16.2	302°15.9	317°15.6	332°15.4	347°15.1	2°14.9	17°14.6	32°14.3	47°14.1	62°13.8	77°13.5	-0.3
	-22°29.6	-22°29.9	-22°30.2	-22°30.5	-22°30.8	-22°31.1	-22°31.4	-22°31.7	-22°32.0	-22°32.3	-22°32.5	-22°32.8	-0.3
Th 7	272°10.0	287°09.8	302°09.5	317°09.2	332°09.0	347°08.7	2°08.4	17°08.2	32°07.9	47°07.6	62°07.3	77°07.1	-0.3
	-22°36.5	-22°36.8	-22°37.1	-22°37.4	-22°37.6	-22°37.9	-22°38.2	-22°38.5	-22°38.7	-22°39.0	-22°39.3	-22°39.6	-0.3
Fr 8	272°03.5	287°03.2	302°03.0	317°02.7	332°02.4	347°02.1	2°01.9	17°01.6	32°01.3	47°01.0	62°00.8	77°00.5	-0.3
	-22°43.0	-22°43.3	-22°43.5	-22°43.8	-22°44.1	-22°44.3	-22°44.6	-22°44.8	-22°45.1	-22°45.3	-22°45.6	-22°45.8	-0.3
Sa 9	271°56.9	286°56.6	301°56.3	316°56.0	331°55.8	346°55.5	1°55.2	16°54.9	31°54.6	46°54.4	61°54.1	76°53.8	-0.3
	-22°49.1	-22°49.3	-22°49.6	-22°49.8	-22°50.0	-22°50.3	-22°50.5	-22°50.7	-22°51.0	-22°51.2	-22°51.5	-22°51.7	-0.2
Su 10	271°50.1	286°49.8	301°49.6	316°49.3	331°49.0	346°48.7	1°48.4	16°48.1	31°47.8	46°47.6	61°47.3	76°47.0	-0.3
	-22°54.7	-22°54.9	-22°55.1	-22°55.3	-22°55.5	-22°55.8	-22°56.0	-22°56.2	-22°56.4	-22°56.6	-22°56.9	-22°57.1	-0.2
Mo 11	271°43.3	286°43.0	301°42.7	316°42.4	331°42.1	346°41.8	1°41.5	16°41.2	31°41.0	46°40.7	61°40.4	76°40.1	-0.3
	-22°59.8	-23°00.0	-23°00.2	-23°00.4	-23°00.6	-23°00.8	-23°01.0	-23°01.2	-23°01.4	-23°01.6	-23°01.8	-23°02.0	-0.2
Tu 12	271°36.3	286°36.0	301°35.7	316°35.4	331°35.1	346°34.8	1°34.6	16°34.3	31°34.0	46°33.7	61°33.4	76°33.1	-0.3
	-23°04.5	-23°04.7	-23°04.9	-23°05.0	-23°05.2	-23°05.4	-23°05.6	-23°05.8	-23°05.9	-23°06.1	-23°06.3	-23°06.5	-0.2
We 13	271°29.3	286°29.0	301°28.7	316°28.4	331°28.1	346°27.8	1°27.5	16°27.2	31°26.9	46°26.6	61°26.3	76°26.0	-0.3
	-23°08.7	-23°08.9	-23°09.1	-23°09.2	-23°09.4	-23°09.5	-23°09.7	-23°09.9	-23°10.0	-23°10.2	-23°10.3	-23°10.5	-0.2
Th 14	271°22.1	286°21.8	301°21.5	316°21.2	331°20.9	346°20.6	1°20.3	16°20.0	31°19.7	46°19.4	61°19.2	76°18.9	-0.3
	-23°12.5	-23°12.6	-23°12.8	-23°12.9	-23°13.1	-23°13.2	-23°13.4	-23°13.5	-23°13.6	-23°13.8	-23°13.9	-23°14.1	-0.1
Fr 15	271°14.9	286°14.6	301°14.3	316°14.0	331°13.7	346°13.4	1°13.1	16°12.8	31°12.5	46°12.2	61°11.9	76°11.6	-0.3
	-23°15.8	-23°15.9	-23°16.1	-23°16.2	-23°16.3	-23°16.4	-23°16.6	-23°16.7	-23°16.8	-23°16.9	-23°17.0	-23°17.2	-0.1
Sa 16	271°07.7	286°07.4	301°07.1	316°06.8	331°06.5	346°06.2	1°05.9	16°05.6	31°05.3	46°05.0	61°04.7	76°04.4	-0.3
	-23°18.6	-23°18.8	-23°18.9	-23°19.0	-23°19.1	-23°19.2	-23°19.3	-23°19.4	-23°19.5	-23°19.6	-23°19.7	-23°19.8	-0.1
Su 17	271°00.4	286°00.1	300°59.8	315°59.5	330°59.2	345°58.9	0°58.6	15°58.3	30°57.9	45°57.6	60°57.3	75°57.0	-0.3
	-23°21.0	-23°21.1	-23°21.2	-23°21.3	-23°21.4	-23°21.5	-23°21.5	-23°21.6	-23°21.7	-23°21.8	-23°21.9	-23°22.0	-0.1
Mo 18	270°53.0	285°52.7	300°52.4	315°52.1	330°51.8	345°51.5	0°51.2	15°50.9	30°50.6	45°50.3	60°50.0	75°49.7	-0.3
	-23°22.9	-23°23.0	-23°23.1	-23°23.1	-23°23.2	-23°23.3	-23°23.3	-23°23.4	-23°23.5	-23°23.5	-23°23.6	-23°23.7	-0.1
Tu 19	270°45.7	285°45.4	300°45.1	315°44.7	330°44.4	345°44.1	0°43.8	15°43.5	30°43.2	45°42.9	60°42.6	75°42.3	-0.3
	-23°24.4	-23°24.4	-23°24.5	-23°24.5	-23°24.6	-23°24.6	-23°24.7	-23°24.7	-23°24.7	-23°24.8	-23°24.8	-23°24.9	-0.0
We 20	270°38.3	285°38.0	300°37.6	315°37.3	330°37.0	345°36.7	0°36.4	15°36.1	30°35.8	45°35.5	60°35.2	75°34.9	-0.3
	-23°25.3	-23°25.4	-23°25.4	-23°25.4	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-23°25.6	-23°25.6	-23°25.6	-23°25.6	-0.0
Th 21	270°30.8	285°30.5	300°30.2	315°29.9	330°29.6	345°29.3	0°29.0	15°28.7	30°28.4	45°28.1	60°27.7	75°27.4	-0.3
	-23°25.8	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-0.0
Fr 22	270°23.4	285°23.1	300°22.8	315°22.5	330°22.2	345°21.9	0°21.5	15°21.2	30°20.9	45°20.6	60°20.3	75°20.0	-0.3
	-23°25.9	-23°25.9	-23°25.9	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.7	+0.0
Sa 23	270°16.0	285°15.7	300°15.4	315°15.0	330°14.7	345°14.4	0°14.1	15°13.8	30°13.5	45°13.2	60°12.9	75°12.6	-0.3
	-23°25.4	-23°25.4	-23°25.4	-23°25.4	-23°25.3	-23°25.3	-23°25.3	-23°25.2	-23°25.2	-23°25.2	-23°25.1	-23°25.1	+0.0
Su 24	270°08.5	285°08.2	300°07.9	315°07.6	330°07.3	345°07.0	0°06.7	15°06.4	30°06.1	45°05.8	60°05.5	75°05.1	-0.3
	-23°24.5	-23°24.5	-23°24.4	-23°24.4	-23°24.3	-23°24.3	-23°24.2	-23°24.2	-23°24.1	-23°24.1	-23°24.0	-23°24.0	+0.1
Mo 25	270°01.1	285°00.8	300°00.5	315°00.2	329°59.9	344°59.6	359°59.3	14°59.0	29°58.7	44°58.4	59°58.0	74°57.7	-0.3
	-23°23.1	-23°23.1	-23°23.0	-23°22.9	-23°22.9	-23°22.8	-23°22.7	-23°22.7	-23°22.6	-23°22.5	-23°22.4	-23°22.4	+0.1
Tu 26	269°53.7	284°53.4	299°53.1	314°52.8	329°52.5	344°52.2	359°51.9	14°51.6	29°51.3	44°51.0	59°50.7	74°50.4	-0.3
	-23°21.3	-23°21.2	-23°21.1	-23°21.0	-23°20.9	-23°20.9	-23°20.8	-23°20.7	-23°20.6	-23°20.5	-23°20.4	-23°20.3	+0.1
We 27	269°46.4	284°46.1	299°45.8	314°45.5	329°45.1	344°44.8	359°44.5	14°44.2	29°43.9	44°43.6	59°43.3	74°43.0	-0.3
	-23°19.0	-23°18.9	-23°18.8	-23°18.7	-23°18.5	-23°18.4	-23°18.3	-23°18.2	-23°18.1	-23°18.0	-23°17.9	-23°17.8	+0.1
Th 28	269°39.0	284°38.7	299°38.4	314°38.1	329°37.8	344°37.5	359°37.2	14°36.9	29°36.6	44°36.3	59°36.0	74°35.7	-0.3
	-23°16.2	-23°16.1	-23°15.9	-23°15.8	-23°15.7	-23°15.6	-23°15.4	-23°15.3	-23°15.2	-23°15.0	-23°14.9	-23°14.8	+0.1
Fr 29	269°31.8	284°31.5	299°31.1	314°30.8	329°30.5	344°30.2	359°29.9	14°29.6	29°29.3	44°29.0	59°28.7	74°28.4	-0.3
	-23°12.9	-23°12.8	-23°12.6	-23°12.5	-23°12.4	-23°12.2	-23°12.1	-23°11.9	-23°11.8	-23°11.6	-23°11.4	-23°11.3	+0.2
Sa 30	269°24.5	284°24.2	299°23.9	314°23.6	329°23.3	344°23.0	359°22.7	14°22.4	29°22.1	44°21.8	59°21.5	74°21.2	-0.3
	-23°09.2	-23°09.1	-23°08.9	-23°08.7	-23°08.6	-23°08.4	-23°08.2	-23°08.0	-23°07.9	-23°07.7	-23°07.5	-23°07.4	+0.2
Su 31	269°17.3	284°17.0	299°16.7	314°16.4	329°16.1	344°15.8	359°15.5	14°15.2	29°14.9	44°14.7	59°14.4	74°14.1	-0.3
	-23°05.0	-23°04.9	-23°04.7	-23°04.5	-23°04.3	-23°04.1	-23°03.9	-23°03.7	-23°03.5	-23°03.4	-23°03.2	-23°03.0	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

December 2034

D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
Fr 1	234°28.0 9°51.6	248°58.3 9°42.6	263°28.6 9°33.6	277°58.9 9°24.6	292°29.4 9°15.5	306°59.9 9°06.4	321°30.5 8°57.3	336°01.1 8°48.1	350°31.8 8°38.9	5°02.6 8°29.7	19°33.5 8°20.4	+30.5 -9.1	15.6 57.1
◑ Sa 2	237°23.8 5°58.4	251°55.6 5°48.7	266°27.5 5°39.1	280°59.4 5°29.4	295°31.4 5°19.7	310°03.4 5°10.0	324°35.5 5°00.3	339°07.6 4°50.6	353°39.8 4°40.9	8°12.0 4°31.1	22°44.3 4°21.4	+32.1 -9.7	15.3 56.2
Su 3	240°53.5 1°54.4	255°26.5 1°44.6	269°59.4 1°34.8	284°32.4 1°24.9	299°05.4 1°15.1	313°38.5 1°05.3	328°11.6 0°55.5	342°44.7 0°45.7	357°17.8 0°35.9	11°51.0 0°26.1	26°24.2 0°16.4	+33.1 -9.8	15.1 55.4
Mo 4	255°26.5 1°44.6	269°59.4 1°34.8	284°32.4 1°24.9	299°05.4 1°15.1	313°38.5 1°05.3	328°11.6 0°55.5	342°44.7 0°45.7	357°17.8 0°35.9	11°51.0 0°26.1	26°24.2 0°16.4	40°57.4 0°06.6	+33.1 -9.8	15.1 55.4
Tu 5	259°18.3 -2°18.7	273°51.9 -2°28.3	288°25.4 -2°37.9	302°59.0 -2°47.4	317°32.6 -2°57.0	332°06.2 -3°06.5	346°39.8 -3°15.9	1°13.4 -3°25.4	15°47.0 -3°34.9	30°20.6 -3°44.3	44°54.2 -3°53.7	+33.6 -9.5	14.9 54.8
We 6	263°19.3 -6°11.8	277°53.0 -6°20.8	292°26.6 -6°29.8	307°00.3 -6°38.7	321°34.0 -6°47.6	336°07.6 -6°56.5	350°41.3 -7°05.3	5°14.9 -7°14.1	19°48.6 -7°22.8	34°22.2 -7°31.6	48°55.8 -7°40.3	+33.7 -8.8	14.8 54.4
Th 7	267°19.0 -9°46.2	281°52.5 -9°54.3	296°25.9 -10°02.3	310°59.3 -10°10.3	325°32.7 -10°18.2	340°06.1 -10°26.1	354°39.4 -10°33.9	9°12.8 -10°41.8	23°46.1 -10°49.5	38°19.4 -10°57.2	52°52.7 -11°04.9	+33.4 -7.9	14.7 54.1
Fr 8	271°09.5 -12°53.8	285°42.5 -13°00.6	300°15.4 -13°07.4	314°48.3 -13°14.1	329°21.1 -13°20.8	343°54.0 -13°27.4	358°26.8 -13°33.9	12°59.6 -13°40.4	27°32.4 -13°46.8	42°05.1 -13°53.2	56°37.8 -13°59.5	+32.8 -6.6	14.7 53.9
Sa 9	274°45.6 -15°26.7	289°17.9 -15°32.0	303°50.1 -15°37.2	318°22.4 -15°42.4	332°54.6 -15°47.5	347°26.8 -15°52.5	1°59.0 -15°57.4	16°31.1 -16°02.3	31°03.3 -16°07.1	45°35.4 -16°11.9	60°07.4 -16°16.5	+32.2 -5.0	14.7 53.9
● Su 10	278°05.4 -17°17.7	292°37.1 -17°21.2	307°08.7 -17°24.6	321°40.3 -17°27.9	336°11.9 -17°31.1	350°43.5 -17°34.3	5°15.0 -17°37.4	19°46.6 -17°40.4	34°18.1 -17°43.3	48°49.6 -17°46.1	63°21.0 -17°48.9	+31.6 -3.1	14.7 53.9
Mo 11	281°10.7 -18°20.5	295°41.8 -18°22.0	310°13.0 -18°23.3	324°44.1 -18°24.6	339°15.2 -18°25.8	353°46.3 -18°26.9	8°17.4 -18°27.9	22°48.5 -18°28.9	37°19.6 -18°29.7	51°50.6 -18°30.5	66°21.7 -18°31.1	+31.1 -1.1	14.7 54.1
Tu 12	284°06.0 -18°30.9	298°36.9 -18°30.2	313°07.8 -18°29.4	327°38.6 -18°28.5	342°09.5 -18°27.6	356°40.4 -18°26.5	11°11.2 -18°25.4	25°42.1 -18°24.1	40°13.0 -18°22.8	54°43.8 -18°21.4	69°14.7 -18°19.9	+30.9 +1.1	14.8 54.3
We 13	286°57.4 -17°47.2	301°28.2 -17°44.3	315°59.1 -17°41.3	330°30.0 -17°38.3	345°00.8 -17°35.2	359°31.7 -17°31.9	14°02.6 -17°28.6	28°33.5 -17°25.3	43°04.4 -17°21.8	57°35.3 -17°18.3	72°06.2 -17°14.6	+30.9 +3.3	14.9 54.6
Th 14	289°50.5 -16°10.3	304°21.5 -16°05.3	318°52.5 -16°00.3	333°23.5 -15°55.2	347°54.6 -15°50.1	2°25.6 -15°44.8	16°56.7 -15°39.5	31°27.7 -15°34.1	45°58.8 -15°28.6	60°29.9 -15°23.0	75°01.0 -15°17.4	+31.1 +5.3	15.0 55.0
Fr 15	292°48.4 -13°44.0	307°19.6 -13°37.2	321°50.9 -13°30.3	336°22.1 -13°23.4	350°53.4 -13°16.4	5°24.6 -13°09.3	19°55.9 -13°02.1	34°27.2 -12°54.9	48°58.4 -12°47.6	63°29.7 -12°40.3	78°01.0 -12°32.9	+31.3 +7.1	15.1 55.5
Sa 16	295°50.9 -10°34.1	310°22.3 -10°25.7	324°53.6 -10°17.2	339°25.0 -10°08.7	353°56.3 -10°00.1	8°27.7 -9°51.5	22°59.0 -9°42.8	37°30.4 -9°34.1	52°01.7 -9°25.3	66°33.1 -9°16.5	81°04.4 -9°07.6	+31.3 +8.7	15.3 56.2
Su 17	298°53.8 -6°48.2	313°25.0 -6°38.5	327°56.2 -6°28.8	342°27.4 -6°19.0	356°58.6 -6°09.3	11°29.8 -5°59.4	26°00.9 -5°49.6	40°32.1 -5°39.6	55°03.2 -5°29.7	69°34.3 -5°19.7	84°05.4 -5°09.7	+31.2 +9.8	15.5 56.9
◐ Mo 18	301°49.3 -2°35.4	316°20.0 -2°24.8	330°50.7 -2°14.3	345°21.3 -2°03.7	359°52.0 -1°53.1	14°22.6 -1°42.5	28°53.1 -1°31.9	43°23.7 -1°21.2	57°54.2 -1°10.5	72°24.7 -0°59.8	86°55.1 -0°49.1	+30.6 +10.6	15.7 57.7
Tu 19	304°26.9 1°53.1	318°56.7 2°04.0	333°26.4 2°14.9	347°56.1 2°25.8	2°25.7 2°36.7	16°55.3 2°47.6	31°24.8 2°58.5	45°54.3 3°09.3	60°23.7 3°20.2	74°53.0 3°31.1	89°22.4 3°41.9	+29.5 +10.9	16.0 58.6
We 20	306°35.1 6°23.5	321°03.4 6°34.1	335°31.7 6°44.7	350°00.0 6°55.2	4°28.1 7°05.8	18°56.2 7°16.3	33°24.2 7°26.8	47°52.2 7°37.2	62°20.1 7°47.6	76°47.9 7°58.0	91°15.6 8°08.3	+28.1 +10.5	16.2 59.5
Th 21	308°03.2 10°38.3	322°29.8 10°47.8	336°56.3 10°57.4	351°22.7 11°06.8	5°49.1 11°16.3	20°15.3 11°25.6	34°41.5 11°34.9	49°07.7 11°44.1	63°33.7 11°53.2	77°59.7 12°02.3	92°25.6 12°11.3	+26.2 +9.3	16.4 60.2
Fr 22	308°45.1 14°17.0	323°09.8 14°24.7	337°34.4 14°32.3	351°59.0 14°39.8	6°23.5 14°47.2	20°47.9 14°54.5	35°12.3 15°01.7	49°36.6 15°08.8	64°00.8 15°15.8	78°25.0 15°22.7	92°49.1 15°29.5	+24.4 +7.3	16.6 60.8
Sa 23	308°43.4 16°58.1	323°06.5 17°03.0	337°29.7 17°07.9	351°52.8 17°12.6	6°15.8 17°17.2	20°38.8 17°21.6	35°01.8 17°26.0	49°24.7 17°30.2	63°47.6 17°34.2	78°10.5 17°38.2	92°33.3 17°42.0	+23.0 +4.4	16.7 61.1
Su 24	308°12.6 18°23.0	322°35.1 18°24.7	336°57.6 18°26.2	351°20.1 18°27.5	5°42.6 18°28.7	20°05.0 18°29.8	34°27.5 18°30.8	48°50.0 18°31.6	63°12.5 18°32.2	77°35.0 18°32.7	91°57.5 18°33.1	+22.5 +1.0	16.7 61.1
○ Mo 25	307°37.7 18°22.2	322°00.6 18°20.4	336°23.6 18°18.5	350°46.6 18°16.4	5°09.6 18°14.2	19°32.7 18°11.8	33°55.9 18°09.3	48°19.1 18°06.7	62°42.3 18°04.0	77°05.6 18°01.1	91°28.9 17°58.1	+23.1 -2.4	16.6 60.7
Tu 26	307°26.4 16°58.3	321°50.8 16°53.4	336°15.2 16°48.3	350°39.7 16°43.2	5°04.3 16°37.9	19°29.0 16°32.5	33°53.7 16°27.1	48°18.6 16°21.5	62°43.5 16°15.8	77°08.5 16°10.0	91°33.5 16°04.1	+24.7 -5.4	16.4 60.1
We 27	307°59.6 14°24.5	322°26.0 14°17.1	336°52.6 14°09.7	351°19.2 14°02.2	5°45.9 13°54.6	20°12.6 13°47.0	34°39.5 13°39.3	49°06.5 13°31.5	63°33.5 13°23.6	78°00.6 13°15.6	92°27.8 13°07.6	+26.8 -7.7	16.1 59.2
Th 28	322°26.0 14°17.1	336°52.6 14°09.7	351°19.2 14°02.2	5°45.9 13°54.6	20°12.6 13°47.0	34°39.5 13°39.3	49°06.5 13°31.5	63°33.5 13°23.6	78°00.6 13°15.6	92°27.8 13°07.6	106°55.1 12°59.6	+26.9 -7.8	16.1 59.1
Fr 29	323°55.2 10°51.0	338°23.8 10°42.0	352°52.6 10°33.0	7°21.4 10°23.9	21°50.4 10°14.8	36°19.4 10°05.6	50°48.5 9°56.4	65°17.7 9°47.1	79°46.9 9°37.8	94°16.2 9°28.5	108°45.6 9°19.1	+29.1 -9.2	15.9 58.1
Sa 30	326°15.9 6°54.6	340°46.4 6°44.8	355°17.1 6°34.9	9°47.8 6°25.1	24°18.6 6°15.2	38°49.5 6°05.3	53°20.4 5°55.3	67°51.4 5°45.4	82°22.4 5°35.4	96°53.5 5°25.5	111°24.7 5°15.5	+30.9 -9.9	15.6 57.1
Su 31	329°19.0 2°44.8	343°51.0 2°34.8	358°23.1 2°24.7	12°55.3 2°14.6	27°27.4 2°04.6	41°59.7 1°54.5	56°31.9 1°44.4	71°04.2 1°34.4	85°36.6 1°24.3	100°09.0 1°14.3	114°41.4 1°04.3	+32.2 -10.1	15.3 56.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 2 16h46 — NM: 10 20h14 — FQ: 18 17h44 — FM: 25 08h54

SUN

January 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	269° 10.2	284° 09.9	299° 09.6	314° 09.3	329° 09.0	344° 08.7	359° 08.4	14° 08.1	29° 07.9	44° 07.6	59° 07.3	74° 07.0	-0.3
	-23° 00.4	-23° 00.2	-23° 00.0	-22° 59.8	-22° 59.6	-22° 59.4	-22° 59.2	-22° 59.0	-22° 58.7	-22° 58.5	-22° 58.3	-22° 58.1	+0.2
Tu 2	269° 03.2	284° 02.9	299° 02.6	314° 02.3	329° 02.0	344° 01.7	359° 01.4	14° 01.1	29° 00.8	44° 00.5	59° 00.3	74° 00.0	-0.3
	-22° 55.3	-22° 55.1	-22° 54.8	-22° 54.6	-22° 54.4	-22° 54.2	-22° 53.9	-22° 53.7	-22° 53.5	-22° 53.3	-22° 53.0	-22° 52.8	+0.2
We 3	268° 56.2	283° 55.9	298° 55.6	313° 55.3	328° 55.0	343° 54.8	358° 54.5	13° 54.2	28° 53.9	43° 53.6	58° 53.3	73° 53.0	-0.3
	-22° 49.7	-22° 49.5	-22° 49.2	-22° 49.0	-22° 48.8	-22° 48.5	-22° 48.3	-22° 48.0	-22° 47.8	-22° 47.5	-22° 47.3	-22° 47.0	+0.2
Th 4	268° 49.3	283° 49.0	298° 48.8	313° 48.5	328° 48.2	343° 47.9	358° 47.6	13° 47.3	28° 47.1	43° 46.8	58° 46.5	73° 46.2	-0.3
	-22° 43.7	-22° 43.5	-22° 43.2	-22° 42.9	-22° 42.7	-22° 42.4	-22° 42.1	-22° 41.9	-22° 41.6	-22° 41.3	-22° 41.1	-22° 40.8	+0.3
Fr 5	268° 42.5	283° 42.3	298° 42.0	313° 41.7	328° 41.4	343° 41.1	358° 40.9	13° 40.6	28° 40.3	43° 40.0	58° 39.7	73° 39.5	-0.3
	-22° 37.2	-22° 37.0	-22° 36.7	-22° 36.4	-22° 36.1	-22° 35.8	-22° 35.6	-22° 35.3	-22° 35.0	-22° 34.7	-22° 34.4	-22° 34.1	+0.3
Sa 6	268° 35.9	283° 35.6	298° 35.3	313° 35.0	328° 34.8	343° 34.5	358° 34.2	13° 33.9	28° 33.7	43° 33.4	58° 33.1	73° 32.8	-0.3
	-22° 30.3	-22° 30.0	-22° 29.7	-22° 29.4	-22° 29.1	-22° 28.8	-22° 28.5	-22° 28.2	-22° 27.9	-22° 27.6	-22° 27.3	-22° 27.0	+0.3
Su 7	268° 29.3	283° 29.0	298° 28.8	313° 28.5	328° 28.2	343° 27.9	358° 27.7	13° 27.4	28° 27.1	43° 26.9	58° 26.6	73° 26.3	-0.3
	-22° 23.0	-22° 22.7	-22° 22.3	-22° 22.0	-22° 21.7	-22° 21.4	-22° 21.1	-22° 20.7	-22° 20.4	-22° 20.1	-22° 19.8	-22° 19.5	+0.3
Mo 8	268° 22.9	283° 22.6	298° 22.3	313° 22.1	328° 21.8	343° 21.5	358° 21.3	13° 21.0	28° 20.7	43° 20.5	58° 20.2	73° 19.9	-0.3
	-22° 15.2	-22° 14.8	-22° 14.5	-22° 14.2	-22° 13.8	-22° 13.5	-22° 13.2	-22° 12.8	-22° 12.5	-22° 12.1	-22° 11.8	-22° 11.5	+0.3
Tu 9	268° 16.5	283° 16.3	298° 16.0	313° 15.8	328° 15.5	343° 15.2	358° 15.0	13° 14.7	28° 14.5	43° 14.2	58° 13.9	73° 13.7	-0.3
	-22° 06.9	-22° 06.6	-22° 06.2	-22° 05.9	-22° 05.5	-22° 05.2	-22° 04.8	-22° 04.5	-22° 04.1	-22° 03.7	-22° 03.4	-22° 03.0	+0.4
We 10	268° 10.3	283° 10.1	298° 09.8	313° 09.6	328° 09.3	343° 09.1	358° 08.8	13° 08.6	28° 08.3	43° 08.1	58° 07.8	73° 07.6	-0.3
	-21° 58.3	-21° 57.9	-21° 57.5	-21° 57.2	-21° 56.8	-21° 56.4	-21° 56.0	-21° 55.7	-21° 55.3	-21° 54.9	-21° 54.5	-21° 54.2	+0.4
Th 11	268° 04.3	283° 04.1	298° 03.8	313° 03.6	328° 03.3	343° 03.1	358° 02.8	13° 02.6	28° 02.3	43° 02.1	58° 01.8	73° 01.6	-0.2
	-21° 49.2	-21° 48.8	-21° 48.4	-21° 48.0	-21° 47.6	-21° 47.2	-21° 46.8	-21° 46.4	-21° 46.0	-21° 45.7	-21° 45.3	-21° 44.9	+0.4
Fr 12	267° 58.4	282° 58.2	297° 57.9	312° 57.7	327° 57.4	342° 57.2	357° 57.0	12° 56.7	27° 56.5	42° 56.2	57° 56.0	72° 55.8	-0.2
	-21° 39.7	-21° 39.2	-21° 38.8	-21° 38.4	-21° 38.0	-21° 37.6	-21° 37.2	-21° 36.8	-21° 36.4	-21° 36.0	-21° 35.6	-21° 35.1	+0.4
Sa 13	267° 52.7	282° 52.4	297° 52.2	312° 52.0	327° 51.7	342° 51.5	357° 51.2	12° 51.0	27° 50.8	42° 50.5	57° 50.3	72° 50.1	-0.2
	-21° 29.7	-21° 29.3	-21° 28.9	-21° 28.4	-21° 28.0	-21° 27.6	-21° 27.2	-21° 26.7	-21° 26.3	-21° 25.9	-21° 25.4	-21° 25.0	+0.4
Su 14	267° 47.1	282° 46.8	297° 46.6	312° 46.4	327° 46.2	342° 45.9	357° 45.7	12° 45.5	27° 45.2	42° 45.0	57° 44.8	72° 44.6	-0.2
	-21° 19.4	-21° 18.9	-21° 18.5	-21° 18.0	-21° 17.6	-21° 17.1	-21° 16.7	-21° 16.3	-21° 15.8	-21° 15.4	-21° 14.9	-21° 14.5	+0.4
Mo 15	267° 41.7	282° 41.4	297° 41.2	312° 41.0	327° 40.8	342° 40.5	357° 40.3	12° 40.1	27° 39.9	42° 39.7	57° 39.4	72° 39.2	-0.2
	-21° 08.6	-21° 08.1	-21° 07.7	-21° 07.2	-21° 06.8	-21° 06.3	-21° 05.8	-21° 05.4	-21° 04.9	-21° 04.4	-21° 04.0	-21° 03.5	+0.5
Tu 16	267° 36.4	282° 36.2	297° 36.0	312° 35.8	327° 35.6	342° 35.3	357° 35.1	12° 34.9	27° 34.7	42° 34.5	57° 34.3	72° 34.1	-0.2
	-20° 57.4	-20° 56.9	-20° 56.5	-20° 56.0	-20° 55.5	-20° 55.0	-20° 54.6	-20° 54.1	-20° 53.6	-20° 53.1	-20° 52.6	-20° 52.2	+0.5
We 17	267° 31.3	282° 31.1	297° 30.9	312° 30.7	327° 30.5	342° 30.3	357° 30.1	12° 29.9	27° 29.7	42° 29.5	57° 29.3	72° 29.1	-0.2
	-20° 45.8	-20° 45.4	-20° 44.9	-20° 44.4	-20° 43.9	-20° 43.4	-20° 42.9	-20° 42.4	-20° 41.9	-20° 41.4	-20° 40.9	-20° 40.4	+0.5
Th 18	267° 26.4	282° 26.2	297° 26.0	312° 25.9	327° 25.7	342° 25.5	357° 25.3	12° 25.1	27° 24.9	42° 24.7	57° 24.5	72° 24.3	-0.2
	-20° 33.9	-20° 33.4	-20° 32.9	-20° 32.4	-20° 31.8	-20° 31.3	-20° 30.8	-20° 30.3	-20° 29.8	-20° 29.3	-20° 28.8	-20° 28.3	+0.5
Fr 19	267° 21.7	282° 21.6	297° 21.4	312° 21.2	327° 21.0	342° 20.8	357° 20.6	12° 20.4	27° 20.2	42° 20.0	57° 19.8	72° 19.6	-0.2
	-20° 21.5	-20° 21.0	-20° 20.5	-20° 20.0	-20° 19.4	-20° 18.9	-20° 18.4	-20° 17.8	-20° 17.3	-20° 16.8	-20° 16.3	-20° 15.7	+0.5
Sa 20	267° 17.2	282° 17.0	297° 16.9	312° 16.7	327° 16.5	342° 16.3	357° 16.1	12° 15.9	27° 15.8	42° 15.6	57° 15.4	72° 15.2	-0.2
	-20° 08.8	-20° 08.2	-20° 07.7	-20° 07.2	-20° 06.6	-20° 06.1	-20° 05.5	-20° 05.0	-20° 04.5	-20° 03.9	-20° 03.4	-20° 02.8	+0.5
Su 21	267° 12.9	282° 12.7	297° 12.5	312° 12.4	327° 12.2	342° 12.0	357° 11.8	12° 11.7	27° 11.5	42° 11.3	57° 11.2	72° 11.0	-0.2
	-19° 55.7	-19° 55.1	-19° 54.6	-19° 54.0	-19° 53.4	-19° 52.9	-19° 52.3	-19° 51.8	-19° 51.2	-19° 50.7	-19° 50.1	-19° 49.5	+0.6
Mo 22	267° 08.8	282° 08.6	297° 08.4	312° 08.3	327° 08.1	342° 07.9	357° 07.8	12° 07.6	27° 07.4	42° 07.3	57° 07.1	72° 06.9	-0.2
	-19° 42.2	-19° 41.6	-19° 41.0	-19° 40.5	-19° 39.9	-19° 39.3	-19° 38.8	-19° 38.2	-19° 37.6	-19° 37.0	-19° 36.5	-19° 35.9	+0.6
Tu 23	267° 04.8	282° 04.7	297° 04.5	312° 04.3	327° 04.2	342° 04.0	357° 03.9	12° 03.7	27° 03.5	42° 03.4	57° 03.2	72° 03.1	-0.2
	-19° 28.3	-19° 27.7	-19° 27.2	-19° 26.6	-19° 26.0	-19° 25.4	-19° 24.8	-19° 24.2	-19° 23.6	-19° 23.0	-19° 22.5	-19° 21.9	+0.6
We 24	267° 01.1	282° 00.9	297° 00.8	312° 00.6	327° 00.5	342° 00.3	357° 00.2	12° 00.0	26° 59.9	41° 59.7	56° 59.6	71° 59.4	-0.2
	-19° 14.1	-19° 13.5	-19° 12.9	-19° 12.3	-19° 11.7	-19° 11.1	-19° 10.5	-19° 09.9	-19° 09.3	-19° 08.7	-19° 08.1	-19° 07.5	+0.6
Th 25	266° 57.5	281° 57.4	296° 57.2	311° 57.1	326° 56.9	341° 56.8	356° 56.7	11° 56.5	26° 56.4	41° 56.2	56° 56.1	71° 56.0	-0.1
	-18° 59.6	-18° 58.9	-18° 58.3	-18° 57.7	-18° 57.1	-18° 56.5	-18° 55.9	-18° 55.2	-18° 54.6	-18° 54.0	-18° 53.4	-18° 52.8	+0.6
Fr 26	266° 54.2	281° 54.0	296° 53.9	311° 53.8	326° 53.6	341° 53.5	356° 53.4	11° 53.2	26° 53.1	41° 53.0	56° 52.8	71° 52.7	-0.1
	-18° 44.6	-18° 44.0	-18° 43.4	-18° 42.7	-18° 42.1	-18° 41.5	-18° 40.9	-18° 40.2	-18° 39.6	-18° 39.0	-18° 38.3	-18° 37.7	+0.6
Sa 27	266° 51.0	281° 50.9	296° 50.8	311° 50.6	326° 50.5	341° 50.4	356° 50.2	11° 50.1	26° 50.0	41° 49.9	56° 49.8	71° 49.6	-0.1
	-18° 29.4	-18° 28.7	-18° 28.1	-18° 27.4	-18° 26.8	-18° 26.2	-18° 25.5	-18° 24.9	-18° 24.2	-18° 23.6	-18° 22.9	-18° 22.3	+0.6
Su 28	266° 48.0	281° 47.9	296° 47.8	311° 47.7	326° 47.6	341° 47.5	356° 47.3	11° 47.2	26° 47.1	41° 47.0	56° 46.9	71° 46.8	-0.1
	-18° 13.8	-18° 13.1	-18° 12.5	-18° 11.8	-18° 11.2	-18° 10.5	-18° 09.8	-18° 09.2	-18° 08.5	-18° 07.9	-18° 07.2	-18° 06.5	+0.7
Mo 29	266° 45.3	281° 45.2	296° 45.1	311° 45.0	326° 44.8	341° 44.7	356° 44.6	11° 44.5	26° 44.4	41° 44.3	56° 44.2	71° 44.1	-0.1
	-17° 57.9	-17° 57.2	-17° 56.5	-17° 55.9	-17° 55.2	-17° 54.5	-17° 53.8	-17° 53.2	-17° 52.5	-17° 51.8	-17° 51.1	-17° 50.5	+0.7
Tu 30	266° 42.7	281° 42.6	296° 42.5	311° 42.4	326° 42.3	341° 42.2	356° 42.1	11° 42.0	26° 41.9	41° 41.8	56° 41.7	71° 41.6	-0.1
	-17° 41.6	-17° 40.9	-17° 40.3	-17° 39.6	-17° 38.9	-17° 38.2	-17° 37.5	-17° 36.8	-17° 36.1	-17° 35.4	-17° 34.8	-17° 34.1	+0.7
We 31	266° 40.4	281° 40.3	296° 40.2	311° 40.1	326° 40.0	341° 39.9	356° 39.8	11° 39.7	26° 39.6	41° 39.5	56° 39.4	71° 39.3	-0.1
	-17° 25.1	-17° 24.4	-17° 23.7	-17° 23.0	-17° 22.3	-17° 21.6	-17° 20.9	-17° 20.2	-17° 19.5	-17° 18.8	-17° 18.1	-17° 17.4	+0.7

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.3'

MOON

January 2035

	D	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	Δ'/h	SH
◑	Mo 1	234°49.4	249°22.8	263°56.1	278°29.5	293°02.9	307°36.3	322°09.7	336°43.1	351°16.5	5°49.9	20°23.4	+33.4	15.0
		-4°18.9	-4°28.3	-4°37.7	-4°47.1	-4°56.5	-5°05.8	-5°15.1	-5°24.4	-5°33.6	-5°42.8	-5°52.0	-9.3	54.9
	Tu 2	238°45.3	253°18.8	267°52.3	282°25.7	296°59.2	311°32.6	326°06.0	340°39.5	355°12.9	9°46.3	24°19.7	+33.4	14.8
		-8°05.4	-8°14.0	-8°22.6	-8°31.1	-8°39.6	-8°48.0	-8°56.4	-9°04.8	-9°13.1	-9°21.4	-9°29.6	-8.4	54.4
	We 3	253°18.8	267°52.3	282°25.7	296°59.2	311°32.6	326°06.0	340°39.5	355°12.9	9°46.3	24°19.7	38°53.1	+33.4	14.8
		-8°14.0	-8°22.6	-8°31.1	-8°39.6	-8°48.0	-8°56.4	-9°04.8	-9°13.1	-9°21.4	-9°29.6	-9°37.8	-8.4	54.4
	Th 4	257°12.6	271°45.8	286°19.0	300°52.1	315°25.3	329°58.4	344°31.5	359°04.5	13°37.6	28°10.6	42°43.6	+33.1	14.8
		-11°35.0	-11°42.4	-11°49.8	-11°57.1	-12°04.4	-12°11.6	-12°18.8	-12°25.9	-12°32.9	-12°39.9	-12°46.8	-7.2	54.1
	Fr 5	260°56.1	275°28.8	290°01.4	304°34.0	319°06.6	333°39.1	348°11.6	2°44.1	17°16.6	31°49.0	46°21.4	+32.5	14.7
		-14°24.0	-14°30.0	-14°36.0	-14°41.8	-14°47.7	-14°53.4	-14°59.1	-15°04.7	-15°10.2	-15°15.7	-15°21.1	-5.7	54.0
	Sa 6	264°24.2	278°56.2	293°28.1	308°00.0	322°31.9	337°03.8	351°35.6	6°07.4	20°39.2	35°10.9	49°42.7	+31.8	14.7
		-16°34.2	-16°38.5	-16°42.7	-16°46.8	-16°50.9	-16°54.9	-16°58.9	-17°02.7	-17°06.5	-17°10.2	-17°13.8	-4.0	54.0
	Su 7	267°35.3	282°06.6	296°37.9	311°09.2	325°40.4	340°11.7	354°42.8	9°14.0	23°45.2	38°16.3	52°47.4	+31.2	14.8
		-17°58.8	-18°01.2	-18°03.5	-18°05.7	-18°07.8	-18°09.8	-18°11.8	-18°13.6	-18°15.4	-18°17.1	-18°18.7	-2.0	54.1
	Mo 8	270°31.7	285°02.5	299°33.3	314°04.1	328°34.8	343°05.6	357°36.3	12°07.1	26°37.8	41°08.5	55°39.2	+30.7	14.8
		-18°32.6	-18°32.9	-18°33.0	-18°33.1	-18°33.0	-18°32.9	-18°32.7	-18°32.4	-18°32.1	-18°31.6	-18°31.0	+0.2	54.3
●	Tu 9	273°18.5	287°49.0	302°19.6	316°50.2	331°20.7	345°51.3	0°21.8	14°52.4	29°22.9	43°53.5	58°24.0	+30.6	14.9
		-18°12.1	-18°10.1	-18°08.1	-18°05.9	-18°03.7	-18°01.4	-17°58.9	-17°56.4	-17°53.9	-17°51.2	-17°48.4	+2.4	54.7
	We 10	276°02.3	290°32.9	305°03.5	319°34.1	334°04.7	348°35.3	3°05.9	17°36.6	32°07.2	46°37.8	61°08.5	+30.6	15.0
		-16°56.6	-16°52.4	-16°48.2	-16°43.9	-16°39.5	-16°35.1	-16°30.5	-16°25.9	-16°21.1	-16°16.3	-16°11.5	+4.5	55.0
	Th 11	278°49.3	293°20.1	307°50.9	322°21.7	336°52.5	351°23.4	5°54.2	20°25.1	34°56.0	49°26.9	63°57.8	+30.9	15.1
		-14°48.6	-14°42.5	-14°36.3	-14°30.0	-14°23.6	-14°17.2	-14°10.7	-14°04.1	-13°57.5	-13°50.7	-13°43.9	+6.5	55.5
	Fr 12	281°42.6	296°13.7	310°44.8	325°15.9	339°47.0	354°18.1	8°49.2	23°20.4	37°51.5	52°22.7	66°53.8	+31.1	15.3
		-11°53.8	-11°45.9	-11°38.0	-11°30.0	-11°22.0	-11°13.9	-11°05.7	-10°57.5	-10°49.2	-10°40.9	-10°32.5	+8.1	55.9
	Sa 13	284°42.0	299°13.3	313°44.5	328°15.8	342°47.0	357°18.3	11°49.6	26°20.8	40°52.1	55°23.4	69°54.6	+31.3	15.4
		-8°20.1	-8°10.9	-8°01.6	-7°52.3	-7°42.9	-7°33.5	-7°24.1	-7°14.6	-7°05.1	-6°55.5	-6°45.9	+9.4	56.5
	Su 14	287°43.1	302°14.3	316°45.4	331°16.6	345°47.7	0°18.9	14°50.0	29°21.1	43°52.2	58°23.3	72°54.3	+31.1	15.6
		-4°17.3	-4°07.2	-3°57.0	-3°46.8	-3°36.6	-3°26.3	-3°16.0	-3°05.7	-2°55.3	-2°45.0	-2°34.6	+10.3	57.0
	Mo 15	290°38.1	305°08.8	319°39.5	334°10.2	348°40.8	3°11.5	17°42.1	32°12.6	46°43.2	61°13.7	75°44.1	+30.6	15.7
		0°03.1	0°13.7	0°24.4	0°35.0	0°45.6	0°56.2	1°06.9	1°17.5	1°28.2	1°38.8	1°49.5	+10.6	57.7
	Tu 16	293°16.8	307°46.7	322°16.5	336°46.3	351°16.0	5°45.7	20°15.3	34°44.9	49°14.4	63°43.9	78°13.3	+29.7	15.9
		4°28.5	4°39.1	4°49.6	5°00.1	5°10.5	5°21.0	5°31.4	5°41.8	5°52.2	6°02.6	6°12.9	+10.4	58.3
◐	We 17	295°28.5	309°57.0	324°25.5	338°54.0	353°22.4	7°50.7	22°18.9	36°47.1	51°15.2	65°43.3	80°11.3	+28.3	16.1
		8°44.4	8°54.2	9°03.9	9°13.7	9°23.3	9°33.0	9°42.6	9°52.1	10°01.6	10°11.0	10°20.4	+9.6	58.9
	Th 18	297°03.6	311°30.5	325°57.4	340°24.2	354°51.0	9°17.6	23°44.2	38°10.8	52°37.3	67°03.7	81°30.0	+26.6	16.2
		12°34.1	12°42.5	12°50.8	12°59.0	13°07.2	13°15.3	13°23.3	13°31.2	13°39.1	13°46.9	13°54.6	+8.1	59.5
	Fr 19	297°57.2	312°22.5	326°47.7	341°12.9	355°38.0	10°03.1	24°28.1	38°53.0	53°17.9	67°42.7	82°07.5	+25.0	16.4
		15°39.5	15°45.7	15°51.9	15°57.9	16°03.8	16°09.6	16°15.4	16°21.0	16°26.5	16°31.9	16°37.2	+5.8	60.0
	Sa 20	298°12.8	312°36.8	327°00.7	341°24.6	355°48.5	10°12.3	24°36.1	38°59.9	53°23.7	67°47.4	82°11.1	+23.8	16.4
		17°42.7	17°46.2	17°49.5	17°52.6	17°55.7	17°58.6	18°01.4	18°04.0	18°06.6	18°09.0	18°11.3	+2.9	60.3
	Su 21	298°03.9	312°27.3	326°50.8	341°14.2	355°37.6	10°01.0	24°24.5	38°47.9	53°11.4	67°34.8	81°58.3	+23.4	16.5
		18°29.8	18°30.0	18°30.0	18°29.9	18°29.7	18°29.4	18°28.9	18°28.3	18°27.5	18°26.6	18°25.6	-0.4	60.4
	Mo 22	297°52.5	312°16.3	326°40.2	341°04.1	355°28.0	9°52.0	24°16.1	38°40.1	53°04.3	67°28.4	81°52.6	+24.0	16.4
		17°54.6	17°51.6	17°48.3	17°45.0	17°41.5	17°38.0	17°34.2	17°30.4	17°26.5	17°22.4	17°18.2	-3.6	60.2
○	Tu 23	298°02.1	312°27.2	326°52.4	341°17.6	355°42.9	10°08.3	24°33.7	38°59.2	53°24.8	67°50.5	82°16.2	+25.4	16.3
		16°01.7	15°55.7	15°49.6	15°43.4	15°37.2	15°30.8	15°24.3	15°17.8	15°11.1	15°04.3	14°57.5	-6.4	59.7
	We 24	298°50.5	313°17.4	327°44.4	342°11.4	356°38.6	11°05.7	25°33.0	40°00.4	54°27.8	68°55.3	83°22.9	+27.2	16.1
		13°04.5	12°56.3	12°48.1	12°39.8	12°31.4	12°23.0	12°14.5	12°05.9	11°57.3	11°48.6	11°39.8	-8.5	59.1
	Th 25	300°25.5	314°54.3	329°23.2	343°52.1	358°21.1	12°50.1	27°19.3	41°48.5	56°17.8	70°47.1	85°16.5	+29.1	15.9
		9°22.0	9°12.4	9°02.8	8°53.2	8°43.5	8°33.8	8°24.0	8°14.2	8°04.4	7°54.6	7°44.7	-9.7	58.2
	Fr 26	302°45.7	317°16.1	331°46.6	346°17.2	0°47.8	15°18.5	29°49.3	44°20.1	58°50.9	73°21.8	87°52.8	+30.7	15.6
		5°13.7	5°03.5	4°53.2	4°43.0	4°32.8	4°22.5	4°12.2	4°02.0	3°51.7	3°41.4	3°31.1	-10.3	57.3
	Sa 27	317°16.1	331°46.6	346°17.2	0°47.8	15°18.5	29°49.3	44°20.1	58°50.9	73°21.8	87°52.8	102°23.8	+30.8	15.6
		5°03.5	4°53.2	4°43.0	4°32.8	4°22.5	4°12.2	4°02.0	3°51.7	3°41.4	3°31.1	3°20.8	-10.3	57.3
	Su 28	320°15.1	334°46.9	349°18.7	3°50.6	18°22.5	32°54.4	47°26.4	61°58.4	76°30.5	91°02.6	105°34.7	+32.0	15.4
		0°46.6	0°36.4	0°26.2	0°16.0	0°05.8	-0°04.4	-0°14.6	-0°24.8	-0°34.9	-0°45.0	-0°55.1	-10.2	56.4
	Mo 29	323°40.5	338°13.1	352°45.8	7°18.4	21°51.1	36°23.8	50°56.5	65°29.3	80°02.0	94°34.8	109°07.6	+32.7	15.2
		-3°24.4	-3°34.1	-3°43.9	-3°53.6	-4°03.2	-4°12.9	-4°22.5	-4°32.1	-4°41.6	-4°51.1	-5°00.6	-9.6	55.6
	Tu 30	327°21.2	341°54.2	356°27.2	11°00.2	25°33.2	40°06.2	54°39.3	69°12.3	83°45.3	98°18.3	112°51.4	+33.0	15.0
		-7°18.8	-7°27.7	-7°36.6	-7°45.4	-7°54.2	-8°02.9	-8°11.6	-8°20.3	-8°28.9	-8°37.5	-8°46.0	-8.7	55.0
◑	We 31	331°06.6	345°39.6	0°12.6	14°45.5	29°18.5	43°51.4	58°24.4	72°57.3	87°30.2	102°03.1	116°36.0	+32.9	14.9
		-10°48.3	-10°56.0	-11°03.7	-11°11.4	-11°19.0	-11°26.5	-11°34.0	-11°41.4	-11°48.8	-11°56.2	-12°03.4	-7.5	54.5

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 1 10h01 — NM: 9 15h03 — FQ: 17 04h45 — FM: 23 20h16 — LQ: 31 06h02

SUN

February 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	266°38.2	281°38.1	296°38.0	311°37.9	326°37.8	341°37.8	356°37.7	11°37.6	26°37.5	41°37.4	56°37.3	71°37.3	-0.1
	-17°08.2	-17°07.5	-17°06.8	-17°06.1	-17°05.3	-17°04.6	-17°03.9	-17°03.2	-17°02.5	-17°01.8	-17°01.1	-17°00.4	+0.7
Fr 2	266°36.2	281°36.1	296°36.1	311°36.0	326°35.9	341°35.8	356°35.8	11°35.7	26°35.6	41°35.5	56°35.5	71°35.4	-0.1
	-16°51.0	-16°50.3	-16°49.6	-16°48.8	-16°48.1	-16°47.4	-16°46.7	-16°45.9	-16°45.2	-16°44.5	-16°43.8	-16°43.0	+0.7
Sa 3	266°34.5	281°34.4	296°34.3	311°34.3	326°34.2	341°34.1	356°34.0	11°34.0	26°33.9	41°33.8	56°33.8	71°33.7	-0.1
	-16°33.5	-16°32.8	-16°32.1	-16°31.3	-16°30.6	-16°29.9	-16°29.1	-16°28.4	-16°27.7	-16°26.9	-16°26.2	-16°25.4	+0.7
Su 4	266°32.9	281°32.8	296°32.8	311°32.7	326°32.6	341°32.6	356°32.5	11°32.5	26°32.4	41°32.4	56°32.3	71°32.2	-0.1
	-16°15.8	-16°15.0	-16°14.3	-16°13.5	-16°12.8	-16°12.0	-16°11.3	-16°10.5	-16°09.8	-16°09.0	-16°08.3	-16°07.5	+0.7
Mo 5	266°31.5	281°31.5	296°31.4	311°31.4	326°31.3	341°31.3	356°31.2	11°31.2	26°31.1	41°31.1	56°31.0	71°31.0	-0.1
	-15°57.7	-15°57.0	-15°56.2	-15°55.5	-15°54.7	-15°53.9	-15°53.2	-15°52.4	-15°51.7	-15°50.9	-15°50.1	-15°49.4	+0.8
Tu 6	266°30.4	281°30.3	296°30.3	311°30.2	326°30.2	341°30.1	356°30.1	11°30.0	26°30.0	41°30.0	56°29.9	71°29.9	-0.0
	-15°39.4	-15°38.7	-15°37.9	-15°37.1	-15°36.3	-15°35.6	-15°34.8	-15°34.0	-15°33.3	-15°32.5	-15°31.7	-15°30.9	+0.8
We 7	266°29.4	281°29.3	296°29.3	311°29.3	326°29.2	341°29.2	356°29.2	11°29.1	26°29.1	41°29.1	56°29.0	71°29.0	-0.0
	-15°20.8	-15°20.1	-15°19.3	-15°18.5	-15°17.7	-15°16.9	-15°16.2	-15°15.4	-15°14.6	-15°13.8	-15°13.0	-15°12.2	+0.8
Th 8	266°28.6	281°28.6	296°28.6	311°28.5	326°28.5	341°28.5	356°28.4	11°28.4	26°28.4	41°28.4	56°28.3	71°28.3	-0.0
	-15°02.0	-15°01.2	-15°00.4	-14°59.6	-14°58.8	-14°58.0	-14°57.2	-14°56.4	-14°55.7	-14°54.9	-14°54.1	-14°53.3	+0.8
Fr 9	266°28.0	281°28.0	296°28.0	311°28.0	326°28.0	341°27.9	356°27.9	11°27.9	26°27.9	41°27.9	56°27.9	71°27.8	-0.0
	-14°42.9	-14°42.1	-14°41.3	-14°40.5	-14°39.7	-14°38.9	-14°38.1	-14°37.3	-14°36.5	-14°35.7	-14°34.9	-14°34.1	+0.8
Sa 10	266°27.7	281°27.6	296°27.6	311°27.6	326°27.6	341°27.6	356°27.6	11°27.6	26°27.6	41°27.6	56°27.6	71°27.5	-0.0
	-14°23.5	-14°22.7	-14°21.9	-14°21.1	-14°20.3	-14°19.5	-14°18.7	-14°17.9	-14°17.0	-14°16.2	-14°15.4	-14°14.6	+0.8
Su 11	266°27.5	281°27.5	296°27.5	311°27.5	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.5	56°27.5	71°27.5	-0.0
	-14°04.0	-14°03.1	-14°02.3	-14°01.5	-14°00.7	-13°59.8	-13°59.0	-13°58.2	-13°57.4	-13°56.6	-13°55.7	-13°54.9	+0.8
Mo 12	266°27.5	281°27.5	296°27.5	311°27.5	326°27.5	341°27.5	356°27.5	11°27.5	26°27.5	41°27.5	56°27.5	71°27.6	+0.0
	-13°44.1	-13°43.3	-13°42.5	-13°41.6	-13°40.8	-13°40.0	-13°39.1	-13°38.3	-13°37.5	-13°36.6	-13°35.8	-13°35.0	+0.8
Tu 13	266°27.7	281°27.7	296°27.7	311°27.7	326°27.7	341°27.8	356°27.8	11°27.8	26°27.8	41°27.8	56°27.8	71°27.8	+0.0
	-13°24.1	-13°23.3	-13°22.4	-13°21.6	-13°20.7	-13°19.9	-13°19.0	-13°18.2	-13°17.4	-13°16.5	-13°15.7	-13°14.8	+0.8
We 14	266°28.1	281°28.1	296°28.1	311°28.1	326°28.2	341°28.2	356°28.2	11°28.2	26°28.3	41°28.3	56°28.3	71°28.3	+0.0
	-13°03.8	-13°03.0	-13°02.1	-13°01.3	-13°00.4	-12°59.6	-12°58.7	-12°57.9	-12°57.0	-12°56.2	-12°55.3	-12°54.5	+0.9
Th 15	266°28.7	281°28.7	296°28.7	311°28.8	326°28.8	341°28.8	356°28.8	11°28.9	26°28.9	41°28.9	56°29.0	71°29.0	+0.0
	-12°43.4	-12°42.5	-12°41.6	-12°40.8	-12°39.9	-12°39.1	-12°38.2	-12°37.3	-12°36.5	-12°35.6	-12°34.8	-12°33.9	+0.9
Fr 16	266°29.4	281°29.5	296°29.5	311°29.5	326°29.6	341°29.6	356°29.7	11°29.7	26°29.7	41°29.8	56°29.8	71°29.9	+0.0
	-12°22.7	-12°21.8	-12°20.9	-12°20.1	-12°19.2	-12°18.3	-12°17.5	-12°16.6	-12°15.7	-12°14.9	-12°14.0	-12°13.1	+0.9
Sa 17	266°30.4	281°30.4	296°30.5	311°30.5	326°30.6	341°30.6	356°30.7	11°30.7	26°30.8	41°30.8	56°30.8	71°30.9	+0.0
	-12°01.8	-12°00.9	-12°00.1	-11°59.2	-11°58.3	-11°57.4	-11°56.6	-11°55.7	-11°54.8	-11°53.9	-11°53.0	-11°52.2	+0.9
Su 18	266°31.5	281°31.6	296°31.6	311°31.7	326°31.7	341°31.8	356°31.8	11°31.9	26°31.9	41°32.0	56°32.1	71°32.1	+0.1
	-11°40.7	-11°39.9	-11°39.0	-11°38.1	-11°37.2	-11°36.3	-11°35.4	-11°34.6	-11°33.7	-11°32.8	-11°31.9	-11°31.0	+0.9
Mo 19	266°32.8	281°32.9	296°33.0	311°33.0	326°33.1	341°33.1	356°33.2	11°33.2	26°33.3	41°33.4	56°33.4	71°33.5	+0.1
	-11°19.5	-11°18.6	-11°17.7	-11°16.8	-11°15.9	-11°15.0	-11°14.1	-11°13.3	-11°12.4	-11°11.5	-11°10.6	-11°09.7	+0.9
Tu 20	266°34.3	281°34.4	296°34.4	311°34.5	326°34.6	341°34.6	356°34.7	11°34.8	26°34.8	41°34.9	56°35.0	71°35.1	+0.1
	-10°58.1	-10°57.2	-10°56.3	-10°55.4	-10°54.5	-10°53.6	-10°52.7	-10°51.8	-10°50.9	-10°50.0	-10°49.1	-10°48.2	+0.9
We 21	266°36.0	281°36.0	296°36.1	311°36.2	326°36.3	341°36.3	356°36.4	11°36.5	26°36.5	41°36.6	56°36.7	71°36.8	+0.1
	-10°36.5	-10°35.6	-10°34.7	-10°33.7	-10°32.8	-10°31.9	-10°31.0	-10°30.1	-10°29.2	-10°28.3	-10°27.4	-10°26.5	+0.9
Th 22	266°37.8	281°37.9	296°37.9	311°38.0	326°38.1	341°38.2	356°38.3	11°38.3	26°38.4	41°38.5	56°38.6	71°38.7	+0.1
	-10°14.7	-10°13.8	-10°12.9	-10°12.0	-10°11.1	-10°10.1	-10°09.2	-10°08.3	-10°07.4	-10°06.5	-10°05.6	-10°04.7	+0.9
Fr 23	266°39.7	281°39.8	296°39.9	311°40.0	326°40.1	341°40.2	356°40.3	11°40.3	26°40.4	41°40.5	56°40.6	71°40.7	+0.1
	-9°52.8	-9°51.9	-9°50.9	-9°50.0	-9°49.1	-9°48.2	-9°47.3	-9°46.4	-9°45.4	-9°44.5	-9°43.6	-9°42.7	+0.9
Sa 24	266°41.9	281°41.9	296°42.0	311°42.1	326°42.2	341°42.3	356°42.4	11°42.5	26°42.6	41°42.7	56°42.8	71°42.9	+0.1
	-9°30.7	-9°29.8	-9°28.9	-9°27.9	-9°27.0	-9°26.1	-9°25.2	-9°24.2	-9°23.3	-9°22.4	-9°21.5	-9°20.6	+0.9
Su 25	266°44.1	281°44.2	296°44.3	311°44.4	326°44.5	341°44.6	356°44.7	11°44.8	26°44.9	41°45.0	56°45.1	71°45.2	+0.1
	-9°08.5	-9°07.6	-9°06.6	-9°05.7	-9°04.8	-9°03.9	-9°02.9	-9°02.0	-9°01.1	-9°00.1	-8°59.2	-8°58.3	+0.9
Mo 26	266°46.5	281°46.6	296°46.7	311°46.8	326°46.9	341°47.1	356°47.2	11°47.3	26°47.4	41°47.5	56°47.6	71°47.7	+0.1
	-8°46.2	-8°45.2	-8°44.3	-8°43.3	-8°42.4	-8°41.5	-8°40.5	-8°39.6	-8°38.7	-8°37.7	-8°36.8	-8°35.9	+0.9
Tu 27	266°49.1	281°49.2	296°49.3	311°49.4	326°49.5	341°49.6	356°49.7	11°49.8	26°50.0	41°50.1	56°50.2	71°50.3	+0.1
	-8°23.7	-8°22.7	-8°21.8	-8°20.8	-8°19.9	-8°19.0	-8°18.0	-8°17.1	-8°16.1	-8°15.2	-8°14.3	-8°13.3	+0.9
We 28	266°51.8	281°51.9	296°52.0	311°52.1	326°52.2	341°52.3	356°52.4	11°52.6	26°52.7	41°52.8	56°52.9	71°53.0	+0.1
	-8°01.1	-8°00.1	-7°59.2	-7°58.2	-7°57.3	-7°56.3	-7°55.4	-7°54.4	-7°53.5	-7°52.6	-7°51.6	-7°50.7	+0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

February 2035

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Th 1	236° 32.7	251° 05.0	265° 37.2	280° 09.5	294° 41.7	309° 13.9	323° 46.1	338° 18.2	352° 50.4	7° 22.5	21° 54.6	+32.2	14.8
	-15° 29.9	-15° 35.0	-15° 40.1	-15° 45.1	-15° 50.1	-15° 55.0	-15° 59.8	-16° 04.5	-16° 09.2	-16° 13.8	-16° 18.3	-4.8	54.1
Fr 2	251° 05.0	265° 37.2	280° 09.5	294° 41.7	309° 13.9	323° 46.1	338° 18.2	352° 50.4	7° 22.5	21° 54.6	36° 26.6	+32.2	14.8
	-15° 35.0	-15° 40.1	-15° 45.1	-15° 50.1	-15° 55.0	-15° 59.8	-16° 04.5	-16° 09.2	-16° 13.8	-16° 18.3	-16° 22.8	-4.8	54.1
Sa 3	254° 24.5	268° 56.2	283° 27.8	297° 59.4	312° 31.0	327° 02.6	341° 34.1	356° 05.6	10° 37.1	25° 08.6	39° 40.0	+31.6	14.8
	-17° 20.7	-17° 23.9	-17° 27.1	-17° 30.2	-17° 33.2	-17° 36.2	-17° 39.0	-17° 41.8	-17° 44.5	-17° 47.1	-17° 49.7	-2.9	54.1
Su 4	257° 28.9	272° 00.0	286° 31.0	301° 02.1	315° 33.1	330° 04.1	344° 35.0	359° 06.0	13° 36.9	28° 07.8	42° 38.7	+31.0	14.8
	-18° 17.9	-18° 19.1	-18° 20.3	-18° 21.3	-18° 22.3	-18° 23.1	-18° 23.9	-18° 24.6	-18° 25.2	-18° 25.8	-18° 26.2	-0.8	54.3
Mo 5	260° 20.0	274° 50.6	289° 21.2	303° 51.8	318° 22.4	332° 53.0	347° 23.5	1° 54.1	16° 24.6	30° 55.1	45° 25.7	+30.6	14.9
	-18° 22.4	-18° 21.4	-18° 20.4	-18° 19.2	-18° 18.0	-18° 16.7	-18° 15.3	-18° 13.8	-18° 12.2	-18° 10.6	-18° 08.8	+1.4	54.6
Tu 6	263° 02.3	277° 32.7	292° 03.0	306° 33.4	321° 03.8	335° 34.1	350° 04.5	4° 34.9	19° 05.2	33° 35.6	48° 05.9	+30.4	15.0
	-17° 31.7	-17° 28.6	-17° 25.3	-17° 22.0	-17° 18.5	-17° 15.0	-17° 11.4	-17° 07.7	-17° 03.9	-17° 00.0	-16° 56.0	+3.6	55.1
We 7	265° 41.2	280° 11.6	294° 41.9	309° 12.3	323° 42.7	338° 13.0	352° 43.4	7° 13.8	21° 44.2	36° 14.6	50° 45.0	+30.4	15.2
	-15° 46.3	-15° 41.0	-15° 35.6	-15° 30.2	-15° 24.6	-15° 19.0	-15° 13.2	-15° 07.4	-15° 01.5	-14° 55.6	-14° 49.5	+5.7	55.6
● Th 8	268° 21.5	282° 52.0	297° 22.5	311° 53.0	326° 23.5	340° 54.0	355° 24.5	9° 55.0	24° 25.6	38° 56.1	53° 26.7	+30.5	15.3
	-13° 09.7	-13° 02.5	-12° 55.2	-12° 47.8	-12° 40.4	-12° 32.8	-12° 25.2	-12° 17.6	-12° 09.9	-12° 02.1	-11° 54.2	+7.6	56.1
Fr 9	271° 05.6	285° 36.2	300° 06.9	314° 37.5	329° 08.2	343° 38.8	358° 09.5	12° 40.2	27° 10.8	41° 41.5	56° 12.2	+30.7	15.4
	-9° 48.8	-9° 40.0	-9° 31.1	-9° 22.1	-9° 13.1	-9° 04.1	-8° 55.0	-8° 45.8	-8° 36.6	-8° 27.4	-8° 18.1	+9.1	56.7
Sa 10	273° 52.5	288° 23.2	302° 53.9	317° 24.6	331° 55.3	346° 26.0	0° 56.6	15° 27.3	29° 58.0	44° 28.6	58° 59.3	+30.7	15.6
	-5° 53.2	-5° 43.3	-5° 33.2	-5° 23.2	-5° 13.1	-5° 03.0	-4° 52.9	-4° 42.7	-4° 32.5	-4° 22.2	-4° 12.0	+10.1	57.2
Su 11	276° 38.1	291° 08.6	305° 39.1	320° 09.6	334° 40.1	349° 10.5	3° 41.0	18° 11.4	32° 41.8	47° 12.2	61° 42.5	+30.4	15.7
	-1° 35.1	-1° 24.5	-1° 13.9	-1° 03.3	-0° 52.7	-0° 42.0	-0° 31.4	-0° 20.7	-0° 10.0	0° 00.7	0° 11.4	+10.7	57.7
Mo 12	279° 15.5	293° 45.5	308° 15.5	322° 45.5	337° 15.4	351° 45.3	6° 15.1	20° 45.0	35° 14.8	49° 44.6	64° 14.3	+29.9	15.8
	2° 51.7	3° 02.3	3° 13.0	3° 23.6	3° 34.2	3° 44.8	3° 55.4	4° 05.9	4° 16.5	4° 27.0	4° 37.5	+10.6	58.1
Tu 13	281° 36.3	296° 05.5	310° 34.6	325° 03.7	339° 32.7	354° 01.7	8° 30.7	22° 59.6	37° 28.5	51° 57.3	66° 26.1	+29.0	15.9
	7° 12.2	7° 22.3	7° 32.3	7° 42.3	7° 52.3	8° 02.2	8° 12.1	8° 21.9	8° 31.7	8° 41.4	8° 51.1	+9.9	58.5
We 14	283° 32.3	298° 00.4	312° 28.3	326° 56.3	341° 24.2	355° 52.0	10° 19.8	24° 47.5	39° 15.2	53° 42.8	68° 10.4	+27.8	16.0
	11° 10.5	11° 19.3	11° 28.1	11° 36.8	11° 45.5	11° 54.1	12° 02.6	12° 11.0	12° 19.4	12° 27.7	12° 35.9	+8.5	58.8
◐ Th 15	284° 58.0	299° 24.7	313° 51.4	328° 18.1	342° 44.7	357° 11.3	11° 37.8	26° 04.2	40° 30.7	54° 57.0	69° 23.3	+26.5	16.1
	14° 30.2	14° 37.1	14° 44.0	14° 50.8	14° 57.5	15° 04.1	15° 10.6	15° 17.0	15° 23.3	15° 29.5	15° 35.7	+6.6	59.1
Fr 16	285° 52.6	300° 18.2	314° 43.7	329° 09.3	343° 34.8	358° 00.2	12° 25.6	26° 51.0	41° 16.3	55° 41.6	70° 06.9	+25.4	16.2
	16° 55.6	17° 00.0	17° 04.4	17° 08.7	17° 12.8	17° 16.9	17° 20.8	17° 24.6	17° 28.3	17° 31.9	17° 35.4	+4.0	59.3
Sa 17	286° 22.6	300° 47.5	315° 12.4	329° 37.2	344° 02.0	358° 26.8	12° 51.6	27° 16.4	41° 41.2	56° 05.9	70° 30.7	+24.8	16.2
	18° 13.5	18° 15.1	18° 16.5	18° 17.8	18° 19.1	18° 20.1	18° 21.1	18° 21.9	18° 22.7	18° 23.3	18° 23.7	+1.0	59.5
Su 18	286° 41.8	301° 06.5	315° 31.3	329° 56.1	344° 21.0	358° 45.8	13° 10.6	27° 35.5	42° 00.4	56° 25.3	70° 50.2	+24.8	16.2
	18° 15.9	18° 14.4	18° 12.8	18° 11.0	18° 09.2	18° 07.2	18° 05.0	18° 02.8	18° 00.4	17° 58.0	17° 55.4	-2.1	59.4
Mo 19	287° 07.5	301° 32.9	315° 58.3	330° 23.8	344° 49.3	359° 14.9	13° 40.5	28° 06.2	42° 31.9	56° 57.6	71° 23.4	+25.6	16.2
	17° 02.3	16° 57.8	16° 53.3	16° 48.6	16° 43.8	16° 38.9	16° 33.9	16° 28.8	16° 23.6	16° 18.3	16° 12.9	-4.9	59.3
Tu 20	287° 56.2	302° 22.8	316° 49.4	331° 16.1	345° 42.9	0° 09.7	14° 36.6	29° 03.6	43° 30.6	57° 57.6	72° 24.7	+26.9	16.1
	14° 39.9	14° 32.9	14° 25.9	14° 18.8	14° 11.6	14° 04.3	13° 56.9	13° 49.5	13° 41.9	13° 34.3	13° 26.6	-7.3	58.9
We 21	289° 18.6	303° 46.7	318° 14.8	332° 43.0	347° 11.3	1° 39.6	16° 07.9	30° 36.4	45° 04.9	59° 33.4	74° 02.0	+28.3	15.9
	11° 22.6	11° 13.8	11° 04.9	10° 56.0	10° 47.1	10° 38.0	10° 29.0	10° 19.8	10° 10.6	10° 01.4	9° 52.1	-9.1	58.4
○ Th 22	291° 18.3	305° 47.8	320° 17.4	334° 47.1	349° 16.8	3° 46.6	18° 16.4	32° 46.2	47° 16.2	61° 46.1	76° 16.2	+29.8	15.8
	7° 27.7	7° 17.8	7° 07.8	6° 57.9	6° 47.9	6° 37.8	6° 27.8	6° 17.7	6° 07.6	5° 57.4	5° 47.3	-10.0	57.8
Fr 23	293° 52.5	308° 23.3	322° 54.1	337° 25.0	351° 56.0	6° 26.9	20° 58.0	35° 29.0	50° 00.1	64° 31.2	79° 02.4	+31.0	15.6
	3° 13.1	3° 02.8	2° 52.4	2° 42.1	2° 31.7	2° 21.3	2° 11.0	2° 00.6	1° 50.2	1° 39.9	1° 29.5	-10.4	57.1
Sa 24	296° 54.5	311° 26.2	325° 58.0	340° 29.8	355° 01.6	9° 33.5	24° 05.4	38° 37.3	53° 09.2	67° 41.2	82° 13.2	+31.9	15.4
	-1° 04.9	-1° 15.1	-1° 25.3	-1° 35.4	-1° 45.6	-1° 55.7	-2° 05.8	-2° 15.9	-2° 25.9	-2° 35.9	-2° 46.0	-10.1	56.3
Su 25	300° 15.7	314° 48.0	329° 20.3	343° 52.7	358° 25.1	12° 57.4	27° 29.8	42° 02.2	56° 34.7	71° 07.1	85° 39.5	+32.4	15.2
	-5° 12.8	-5° 22.4	-5° 31.9	-5° 41.3	-5° 50.8	-6° 00.2	-6° 09.5	-6° 18.9	-6° 28.1	-6° 37.4	-6° 46.6	-9.4	55.6
Mo 26	314° 48.0	329° 20.3	343° 52.7	358° 25.1	12° 57.4	27° 29.8	42° 02.2	56° 34.7	71° 07.1	85° 39.5	100° 12.0	+32.4	15.2
	-5° 22.4	-5° 31.9	-5° 41.3	-5° 50.8	-6° 00.2	-6° 09.5	-6° 18.9	-6° 28.1	-6° 37.4	-6° 46.6	-6° 55.8	-9.3	55.6
Tu 27	318° 19.8	332° 52.4	347° 24.9	1° 57.5	16° 30.1	31° 02.7	45° 35.2	60° 07.8	74° 40.4	89° 12.9	103° 45.5	+32.6	15.0
	-9° 08.1	-9° 16.6	-9° 25.0	-9° 33.3	-9° 41.6	-9° 49.9	-9° 58.1	-10° 06.3	-10° 14.4	-10° 22.4	-10° 30.4	-8.2	55.0
We 28	321° 53.7	336° 26.2	350° 58.6	5° 31.1	20° 03.6	34° 36.1	49° 08.5	63° 41.0	78° 13.4	92° 45.8	107° 18.2	+32.5	14.9
	-12° 23.8	-12° 30.9	-12° 37.9	-12° 44.9	-12° 51.8	-12° 58.7	-13° 05.4	-13° 12.2	-13° 18.8	-13° 25.5	-13° 32.0	-6.8	54.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 8 08h22 — FQ: 15 13h17 — FM: 22 08h53

SUN

March 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	266°54.6	281°54.7	296°54.8	311°54.9	326°55.0	341°55.2	356°55.3	11°55.4	26°55.5	41°55.6	56°55.8	71°55.9	+0.1
	-7°38.3	-7°37.4	-7°36.4	-7°35.5	-7°34.5	-7°33.6	-7°32.6	-7°31.7	-7°30.7	-7°29.8	-7°28.8	-7°27.9	+1.0
Fr 2	266°57.5	281°57.6	296°57.7	311°57.9	326°58.0	341°58.1	356°58.2	11°58.4	26°58.5	41°58.6	56°58.7	71°58.9	+0.1
	-7°15.5	-7°14.5	-7°13.6	-7°12.6	-7°11.7	-7°10.7	-7°09.8	-7°08.8	-7°07.9	-7°06.9	-7°06.0	-7°05.0	+1.0
Sa 3	267°00.5	282°00.7	297°00.8	312°00.9	327°01.1	342°01.2	357°01.3	12°01.4	27°01.6	42°01.7	57°01.8	72°02.0	+0.1
	-6°52.6	-6°51.6	-6°50.6	-6°49.7	-6°48.7	-6°47.8	-6°46.8	-6°45.8	-6°44.9	-6°43.9	-6°43.0	-6°42.0	+1.0
Su 4	267°03.7	282°03.8	297°04.0	312°04.1	327°04.2	342°04.4	357°04.5	12°04.6	27°04.8	42°04.9	57°05.0	72°05.2	+0.1
	-6°29.5	-6°28.6	-6°27.6	-6°26.6	-6°25.7	-6°24.7	-6°23.7	-6°22.8	-6°21.8	-6°20.9	-6°19.9	-6°18.9	+1.0
Mo 5	267°07.0	282°07.1	297°07.2	312°07.4	327°07.5	342°07.7	357°07.8	12°07.9	27°08.1	42°08.2	57°08.4	72°08.5	+0.1
	-6°06.4	-6°05.4	-6°04.5	-6°03.5	-6°02.5	-6°01.6	-6°00.6	-5°59.6	-5°58.7	-5°57.7	-5°56.7	-5°55.8	+1.0
Tu 6	267°10.3	282°10.5	297°10.6	312°10.8	327°10.9	342°11.1	357°11.2	12°11.3	27°11.5	42°11.6	57°11.8	72°11.9	+0.1
	-5°43.2	-5°42.2	-5°41.2	-5°40.3	-5°39.3	-5°38.3	-5°37.4	-5°36.4	-5°35.4	-5°34.4	-5°33.5	-5°32.5	+1.0
We 7	267°13.8	282°14.0	297°14.1	312°14.3	327°14.4	342°14.6	357°14.7	12°14.8	27°15.0	42°15.1	57°15.3	72°15.4	+0.1
	-5°19.9	-5°18.9	-5°17.9	-5°17.0	-5°16.0	-5°15.0	-5°14.0	-5°13.1	-5°12.1	-5°11.1	-5°10.1	-5°09.2	+1.0
Th 8	267°17.4	282°17.5	297°17.7	312°17.8	327°18.0	342°18.1	357°18.3	12°18.4	27°18.6	42°18.7	57°18.9	72°19.1	+0.2
	-4°56.5	-4°55.5	-4°54.6	-4°53.6	-4°52.6	-4°51.6	-4°50.7	-4°49.7	-4°48.7	-4°47.7	-4°46.8	-4°45.8	+1.0
Fr 9	267°21.1	282°21.2	297°21.4	312°21.5	327°21.7	342°21.8	357°22.0	12°22.1	27°22.3	42°22.4	57°22.6	72°22.8	+0.2
	-4°33.1	-4°32.1	-4°31.1	-4°30.1	-4°29.2	-4°28.2	-4°27.2	-4°26.2	-4°25.2	-4°24.3	-4°23.3	-4°22.3	+1.0
Sa 10	267°24.8	282°25.0	297°25.1	312°25.3	327°25.4	342°25.6	357°25.8	12°25.9	27°26.1	42°26.2	57°26.4	72°26.6	+0.2
	-4°09.6	-4°08.6	-4°07.6	-4°06.6	-4°05.7	-4°04.7	-4°03.7	-4°02.7	-4°01.7	-4°00.8	-3°59.8	-3°58.8	+1.0
Su 11	267°28.6	282°28.8	297°29.0	312°29.1	327°29.3	342°29.5	357°29.6	12°29.8	27°29.9	42°30.1	57°30.3	72°30.4	+0.2
	-3°46.0	-3°45.1	-3°44.1	-3°43.1	-3°42.1	-3°41.1	-3°40.1	-3°39.2	-3°38.2	-3°37.2	-3°36.2	-3°35.2	+1.0
Mo 12	267°32.6	282°32.7	297°32.9	312°33.1	327°33.2	342°33.4	357°33.6	12°33.7	27°33.9	42°34.1	57°34.2	72°34.4	+0.2
	-3°22.5	-3°21.5	-3°20.5	-3°19.5	-3°18.5	-3°17.5	-3°16.5	-3°15.6	-3°14.6	-3°13.6	-3°12.6	-3°11.6	+1.0
Tu 13	267°36.6	282°36.7	297°36.9	312°37.1	327°37.2	342°37.4	357°37.6	12°37.7	27°37.9	42°38.1	57°38.2	72°38.4	+0.2
	-2°58.8	-2°57.8	-2°56.9	-2°55.9	-2°54.9	-2°53.9	-2°52.9	-2°51.9	-2°50.9	-2°50.0	-2°49.0	-2°48.0	+1.0
We 14	267°40.6	282°40.8	297°41.0	312°41.1	327°41.3	342°41.5	357°41.7	12°41.8	27°42.0	42°42.2	57°42.3	72°42.5	+0.2
	-2°35.2	-2°34.2	-2°33.2	-2°32.2	-2°31.2	-2°30.2	-2°29.2	-2°28.3	-2°27.3	-2°26.3	-2°25.3	-2°24.3	+1.0
Th 15	267°44.8	282°44.9	297°45.1	312°45.3	327°45.5	342°45.6	357°45.8	12°46.0	27°46.2	42°46.3	57°46.5	72°46.7	+0.2
	-2°11.5	-2°10.5	-2°09.5	-2°08.5	-2°07.5	-2°06.5	-2°05.6	-2°04.6	-2°03.6	-2°02.6	-2°01.6	-2°00.6	+1.0
Fr 16	267°49.0	282°49.1	297°49.3	312°49.5	327°49.7	342°49.8	357°50.0	12°50.2	27°50.4	42°50.5	57°50.7	72°50.9	+0.2
	-1°47.8	-1°46.8	-1°45.8	-1°44.8	-1°43.8	-1°42.8	-1°41.8	-1°40.9	-1°39.9	-1°38.9	-1°37.9	-1°36.9	+1.0
Sa 17	267°53.2	282°53.4	297°53.6	312°53.8	327°53.9	342°54.1	357°54.3	12°54.5	27°54.6	42°54.8	57°55.0	72°55.2	+0.2
	-1°24.1	-1°23.1	-1°22.1	-1°21.1	-1°20.1	-1°19.1	-1°18.1	-1°17.1	-1°16.1	-1°15.2	-1°14.2	-1°13.2	+1.0
Su 18	267°57.5	282°57.7	297°57.9	312°58.1	327°58.3	342°58.4	357°58.6	12°58.8	27°59.0	42°59.2	57°59.3	72°59.5	+0.2
	-1°00.3	-0°59.3	-0°58.4	-0°57.4	-0°56.4	-0°55.4	-0°54.4	-0°53.4	-0°52.4	-0°51.4	-0°50.4	-0°49.5	+1.0
Mo 19	268°01.9	283°02.1	298°02.3	313°02.4	328°02.6	343°02.8	358°03.0	13°03.2	28°03.4	43°03.5	58°03.7	73°03.9	+0.2
	-0°36.6	-0°35.6	-0°34.6	-0°33.6	-0°32.7	-0°31.7	-0°30.7	-0°29.7	-0°28.7	-0°27.7	-0°26.7	-0°25.7	+1.0
Tu 20	268°06.3	283°06.5	298°06.7	313°06.8	328°07.0	343°07.2	358°07.4	13°07.6	28°07.8	43°08.0	58°08.1	73°08.3	+0.2
	-0°12.9	-0°11.9	-0°10.9	-0°09.9	-0°08.9	-0°07.9	-0°07.0	-0°06.0	-0°05.0	-0°04.0	-0°03.0	-0°02.0	+1.0
We 21	268°10.7	283°10.9	298°11.1	313°11.3	328°11.5	343°11.7	358°11.9	13°12.0	28°12.2	43°12.4	58°12.6	73°12.8	+0.2
	0°10.8	0°11.8	0°12.8	0°13.8	0°14.8	0°15.8	0°16.7	0°17.7	0°18.7	0°19.7	0°20.7	0°21.7	+1.0
Th 22	268°15.2	283°15.4	298°15.6	313°15.8	328°16.0	343°16.1	358°16.3	13°16.5	28°16.7	43°16.9	58°17.1	73°17.3	+0.2
	0°34.5	0°35.5	0°36.5	0°37.5	0°38.5	0°39.4	0°40.4	0°41.4	0°42.4	0°43.4	0°44.4	0°45.4	+1.0
Fr 23	268°19.7	283°19.9	298°20.1	313°20.3	328°20.5	343°20.6	358°20.8	13°21.0	28°21.2	43°21.4	58°21.6	73°21.8	+0.2
	0°58.2	0°59.2	1°00.2	1°01.1	1°02.1	1°03.1	1°04.1	1°05.1	1°06.1	1°07.0	1°08.0	1°09.0	+1.0
Sa 24	268°24.2	283°24.4	298°24.6	313°24.8	328°25.0	343°25.2	358°25.3	13°25.5	28°25.7	43°25.9	58°26.1	73°26.3	+0.2
	1°21.8	1°22.8	1°23.8	1°24.8	1°25.8	1°26.7	1°27.7	1°28.7	1°29.7	1°30.7	1°31.7	1°32.6	+1.0
Su 25	268°28.7	283°28.9	298°29.1	313°29.3	328°29.5	343°29.7	358°29.9	13°30.1	28°30.3	43°30.4	58°30.6	73°30.8	+0.2
	1°45.4	1°46.4	1°47.4	1°48.4	1°49.4	1°50.3	1°51.3	1°52.3	1°53.3	1°54.3	1°55.2	1°56.2	+1.0
Mo 26	268°33.3	283°33.5	298°33.7	313°33.8	328°34.0	343°34.2	358°34.4	13°34.6	28°34.8	43°35.0	58°35.2	73°35.4	+0.2
	2°09.0	2°10.0	2°11.0	2°11.9	2°12.9	2°13.9	2°14.9	2°15.9	2°16.8	2°17.8	2°18.8	2°19.8	+1.0
Tu 27	268°37.8	283°38.0	298°38.2	313°38.4	328°38.6	343°38.8	358°39.0	13°39.1	28°39.3	43°39.5	58°39.7	73°39.9	+0.2
	2°32.5	2°33.5	2°34.5	2°35.4	2°36.4	2°37.4	2°38.4	2°39.4	2°40.3	2°41.3	2°42.3	2°43.3	+1.0
We 28	268°42.3	283°42.5	298°42.7	313°42.9	328°43.1	343°43.3	358°43.5	13°43.7	28°43.9	43°44.0	58°44.2	73°44.4	+0.2
	2°56.0	2°57.0	2°57.9	2°58.9	2°59.9	3°00.9	3°01.8	3°02.8	3°03.8	3°04.8	3°05.7	3°06.7	+1.0
Th 29	268°46.9	283°47.1	298°47.2	313°47.4	328°47.6	343°47.8	358°48.0	13°48.2	28°48.4	43°48.6	58°48.7	73°48.9	+0.2
	3°19.4	3°20.4	3°21.3	3°22.3	3°23.3	3°24.3	3°25.2	3°26.2	3°27.2	3°28.2	3°29.1	3°30.1	+1.0
Fr 30	268°51.4	283°51.6	298°51.7	313°51.9	328°52.1	343°52.3	358°52.5	13°52.7	28°52.9	43°53.1	58°53.2	73°53.4	+0.2
	3°42.7	3°43.7	3°44.7	3°45.7	3°46.6	3°47.6	3°48.6	3°49.5	3°50.5	3°51.5	3°52.5	3°53.4	+1.0
Sa 31	268°55.9	283°56.0	298°56.2	313°56.4	328°56.6	343°56.8	358°57.0	13°57.2	28°57.3	43°57.5	58°57.7	73°57.9	+0.2
	4°06.0	4°07.0	4°08.0	4°08.9	4°09.9	4°10.9	4°11.8	4°12.8	4°13.8	4°14.7	4°15.7	4°16.7	+1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.1'

MOON

March 2035

D	20h	21h	22h	23h	0h	1h	2h	3h	4h	5h	6h	Δ'/h	SH
Th 1	227°00.4	241°32.3	256°04.2	270°36.1	285°07.9	299°39.8	314°11.6	328°43.4	343°15.2	357°47.0	12°18.7	+31.8	14.8
	-16°30.2	-16°34.4	-16°38.5	-16°42.6	-16°46.5	-16°50.4	-16°54.3	-16°58.0	-17°01.7	-17°05.2	-17°08.7	-3.9	54.2
◑ Fr 2	230°12.8	244°44.2	259°15.7	273°47.1	288°18.5	302°49.9	317°21.2	331°52.6	346°23.9	0°55.2	15°26.5	+31.4	14.8
	-17°51.9	-17°54.2	-17°56.3	-17°58.4	-18°00.4	-18°02.3	-18°04.1	-18°05.9	-18°07.5	-18°09.1	-18°10.6	-1.9	54.2
Sa 3	233°13.8	247°44.9	262°15.9	276°46.9	291°17.8	305°48.8	320°19.7	334°50.7	349°21.6	3°52.5	18°23.4	+31.0	14.8
	-18°22.9	-18°23.1	-18°23.1	-18°23.1	-18°23.0	-18°22.8	-18°22.5	-18°22.1	-18°21.6	-18°21.1	-18°20.5	+0.2	54.4
Su 4	247°44.9	262°15.9	276°46.9	291°17.8	305°48.8	320°19.7	334°50.7	349°21.6	3°52.5	18°23.4	32°54.3	+30.9	14.8
	-18°23.1	-18°23.1	-18°23.1	-18°23.0	-18°22.8	-18°22.5	-18°22.1	-18°21.6	-18°21.1	-18°20.5	-18°19.7	+0.3	54.5
Mo 5	250°35.8	265°06.5	279°37.2	294°07.8	308°38.5	323°09.1	337°39.7	352°10.3	6°40.9	21°11.5	35°42.1	+30.6	15.0
	-17°58.4	-17°56.2	-17°54.0	-17°51.7	-17°49.3	-17°46.9	-17°44.3	-17°41.6	-17°38.9	-17°36.1	-17°33.2	+2.5	54.9
Tu 6	253°20.0	267°50.5	282°20.9	296°51.4	311°21.9	325°52.3	340°22.8	354°53.2	9°23.6	23°54.1	38°24.5	+30.4	15.1
	-16°39.0	-16°34.7	-16°30.3	-16°25.8	-16°21.3	-16°16.6	-16°11.9	-16°07.1	-16°02.2	-15°57.2	-15°52.2	+4.7	55.4
We 7	256°00.5	270°30.9	285°01.2	299°31.6	314°02.0	328°32.3	343°02.7	357°33.1	12°03.4	26°33.8	41°04.1	+30.4	15.3
	-14°26.3	-14°20.0	-14°13.5	-14°07.0	-14°00.4	-13°53.7	-13°47.0	-13°40.2	-13°33.3	-13°26.3	-13°19.2	+6.7	56.0
Th 8	258°39.2	273°09.5	287°39.8	302°10.1	316°40.4	331°10.8	345°41.1	0°11.4	14°41.7	29°12.0	43°42.2	+30.3	15.5
	-11°24.7	-11°16.5	-11°08.3	-10°59.9	-10°51.5	-10°43.1	-10°34.6	-10°26.0	-10°17.4	-10°08.7	-9°59.9	+8.5	56.7
● Fr 9	261°16.0	275°46.3	290°16.5	304°46.7	319°16.8	333°47.0	348°17.2	2°47.4	17°17.5	31°47.7	46°17.8	+30.2	15.7
	-7°41.6	-7°31.9	-7°22.2	-7°12.5	-7°02.7	-6°52.9	-6°43.0	-6°33.1	-6°23.1	-6°13.1	-6°03.0	+9.9	57.4
Sa 10	263°48.5	278°18.5	292°48.4	307°18.3	321°48.2	336°18.1	350°48.0	5°17.8	19°47.7	34°17.5	48°47.3	+29.9	15.8
	-3°27.8	-3°17.2	-3°06.6	-2°55.9	-2°45.3	-2°34.6	-2°23.8	-2°13.1	-2°02.3	-1°51.5	-1°40.7	+10.7	58.0
Su 11	266°11.9	280°41.4	295°10.8	309°40.2	324°09.6	338°39.0	353°08.3	7°37.6	22°06.9	36°36.2	51°05.4	+29.3	16.0
	1°02.7	1°13.7	1°24.6	1°35.6	1°46.5	1°57.5	2°08.4	2°19.3	2°30.3	2°41.2	2°52.1	+10.9	58.5
Mo 12	268°20.2	282°48.9	297°17.6	311°46.3	326°14.9	340°43.5	355°12.1	9°40.6	24°09.1	38°37.5	53°05.9	+28.6	16.1
	5°33.8	5°44.4	5°55.0	6°05.5	6°16.1	6°26.5	6°37.0	6°47.4	6°57.8	7°08.1	7°18.4	+10.5	58.9
Tu 13	270°07.5	284°35.3	299°03.1	313°30.8	327°58.5	342°26.1	356°53.7	11°21.2	25°48.8	40°16.2	54°43.6	+27.6	16.1
	9°47.6	9°57.2	10°06.6	10°16.1	10°25.4	10°34.7	10°43.9	10°53.1	11°02.2	11°11.3	11°20.2	+9.3	59.2
We 14	271°30.1	285°56.9	300°23.7	314°50.4	329°17.0	343°43.6	358°10.2	12°36.8	27°03.3	41°29.7	55°56.2	+26.6	16.2
	13°26.2	13°33.9	13°41.6	13°49.2	13°56.7	14°04.1	14°11.5	14°18.7	14°25.9	14°32.9	14°39.9	+7.4	59.3
Th 15	272°28.4	286°54.3	301°20.1	315°46.0	330°11.8	344°37.6	359°03.3	13°29.0	27°54.7	42°20.4	56°46.0	+25.8	16.2
	16°12.9	16°18.3	16°23.6	16°28.7	16°33.8	16°38.8	16°43.6	16°48.4	16°53.0	16°57.5	17°01.9	+4.9	59.3
◐ Fr 16	273°08.3	287°33.7	301°59.0	316°24.4	330°49.7	345°15.0	359°40.4	14°05.7	28°31.0	42°56.3	57°21.6	+25.3	16.1
	17°54.6	17°57.2	17°59.6	18°02.0	18°04.2	18°06.3	18°08.3	18°10.2	18°11.9	18°13.5	18°15.1	+2.0	59.2
Sa 17	273°41.4	288°06.7	302°32.1	316°57.5	331°23.0	345°48.4	0°13.8	14°39.3	29°04.8	43°30.3	57°55.8	+25.4	16.1
	18°23.3	18°22.9	18°22.4	18°21.7	18°21.0	18°20.1	18°19.1	18°18.0	18°16.7	18°15.4	18°13.9	-0.9	59.0
Su 18	274°21.8	288°47.8	303°13.8	317°39.8	332°05.9	346°32.0	0°58.2	15°24.4	29°50.6	44°16.9	58°43.2	+26.1	16.0
	17°37.8	17°34.5	17°31.1	17°27.6	17°23.9	17°20.2	17°16.3	17°12.4	17°08.3	17°04.1	16°59.8	-3.8	58.7
Mo 19	275°23.0	289°50.0	304°17.1	318°44.2	333°11.3	347°38.6	2°05.8	16°33.1	31°00.5	45°27.9	59°55.4	+27.2	15.9
	15°43.5	15°37.6	15°31.6	15°25.6	15°19.4	15°13.2	15°06.9	15°00.5	14°54.0	14°47.4	14°40.7	-6.3	58.4
Tu 20	276°53.6	291°21.9	305°50.3	320°18.7	334°47.1	349°15.7	3°44.2	18°12.8	32°41.5	47°10.2	61°39.0	+28.5	15.8
	12°51.1	12°43.2	12°35.3	12°27.2	12°19.1	12°10.9	12°02.7	11°54.4	11°46.0	11°37.6	11°29.1	-8.2	58.0
We 21	278°56.7	293°26.3	307°56.0	322°25.6	336°55.4	351°25.2	5°55.0	20°24.8	34°54.8	49°24.7	63°54.7	+29.8	15.7
	9°15.2	9°05.9	8°56.5	8°47.1	8°37.7	8°28.2	8°18.7	8°09.1	7°59.5	7°49.8	7°40.2	-9.5	57.5
Th 22	281°30.2	296°00.9	310°31.6	325°02.4	339°33.2	354°04.0	8°34.9	23°05.8	37°36.8	52°07.8	66°38.8	+30.9	15.5
	5°11.5	5°01.4	4°51.2	4°41.1	4°31.0	4°20.8	4°10.6	4°00.4	3°50.2	3°39.9	3°29.7	-10.2	57.0
○ Fr 23	284°28.3	298°59.8	313°31.4	328°02.9	342°34.6	357°06.2	11°37.9	26°09.6	40°41.3	55°13.0	69°44.8	+31.7	15.4
	0°55.5	0°45.2	0°34.9	0°24.6	0°14.4	0°04.1	-0°06.1	-0°16.4	-0°26.6	-0°36.9	-0°47.1	-10.3	56.5
Sa 24	287°43.7	302°15.8	316°47.9	331°20.0	345°52.1	0°24.2	14°56.4	29°28.5	44°00.7	58°32.9	73°05.0	+32.1	15.2
	-3°18.4	-3°28.3	-3°38.2	-3°48.1	-3°58.0	-4°07.8	-4°17.6	-4°27.4	-4°37.1	-4°46.8	-4°56.5	-9.8	55.9
Su 25	291°09.0	305°41.3	320°13.6	334°45.9	349°18.3	3°50.6	18°22.9	32°55.3	47°27.6	61°59.9	76°32.3	+32.3	15.1
	-7°17.6	-7°26.7	-7°35.8	-7°44.8	-7°53.8	-8°02.7	-8°11.6	-8°20.5	-8°29.3	-8°38.0	-8°46.8	-8.9	55.3
Mo 26	294°37.3	309°09.6	323°41.9	338°14.2	352°46.5	7°18.8	21°51.1	36°23.4	50°55.7	65°27.9	80°00.2	+32.3	15.0
	-10°51.5	-10°59.4	-11°07.3	-11°15.1	-11°22.8	-11°30.5	-11°38.1	-11°45.7	-11°53.2	-12°00.6	-12°08.0	-7.6	54.9
Tu 27	298°03.3	312°35.4	327°07.5	341°39.6	356°11.7	10°43.8	25°15.9	39°48.0	54°20.0	68°52.1	83°24.1	+32.1	14.9
	-13°51.4	-13°57.8	-14°04.1	-14°10.3	-14°16.5	-14°22.6	-14°28.7	-14°34.6	-14°40.5	-14°46.4	-14°52.2	-6.1	54.5
We 28	312°35.4	327°07.5	341°39.6	356°11.7	10°43.8	25°15.9	39°48.0	54°20.0	68°52.1	83°24.1	97°56.1	+32.1	14.9
	-13°57.8	-14°04.1	-14°10.3	-14°16.5	-14°22.6	-14°28.7	-14°34.6	-14°40.5	-14°46.4	-14°52.2	-14°57.9	-6.0	54.5
Th 29	315°55.1	330°27.0	344°58.8	359°30.6	14°02.4	28°34.2	43°06.0	57°37.7	72°09.5	86°41.2	101°12.9	+31.8	14.8
	-16°14.8	-16°19.3	-16°23.8	-16°28.2	-16°32.5	-16°36.7	-16°40.9	-16°45.0	-16°49.0	-16°52.9	-16°56.8	-4.2	54.2
Fr 30	319°07.2	333°38.8	348°10.3	2°41.8	17°13.3	31°44.7	46°16.2	60°47.6	75°19.1	89°50.5	104°21.9	+31.5	14.8
	-17°45.1	-17°47.7	-17°50.2	-17°52.6	-17°55.0	-17°57.2	-17°59.4	-18°01.5	-18°03.5	-18°05.5	-18°07.3	-2.2	54.1
◑ Sa 31	322°11.9	336°43.1	351°14.4	5°45.6	20°16.8	34°48.0	49°19.2	63°50.4	78°21.6	92°52.8	107°23.9	+31.2	14.8
	-18°25.0	-18°25.5	-18°25.9	-18°26.2	-18°26.5	-18°26.7	-18°26.7	-18°26.7	-18°26.6	-18°26.5	-18°26.2	-0.1	54.2

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
LQ: 2 03h01 — NM: 9 23h09 — FQ: 16 20h15 — FM: 23 22h42 — LQ: 31 23h06

SUN

April 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°00.3	284°00.5	299°00.7	314°00.9	329°01.1	344°01.2	359°01.4	14°01.6	29°01.8	44°02.0	59°02.2	74°02.4	+0.2
	4°29.2	4°30.2	4°31.2	4°32.1	4°33.1	4°34.1	4°35.0	4°36.0	4°37.0	4°37.9	4°38.9	4°39.8	+1.0
Mo 2	269°04.7	284°04.9	299°05.1	314°05.3	329°05.5	344°05.7	359°05.8	14°06.0	29°06.2	44°06.4	59°06.6	74°06.8	+0.2
	4°52.4	4°53.3	4°54.3	4°55.2	4°56.2	4°57.2	4°58.1	4°59.1	5°00.1	5°01.0	5°02.0	5°02.9	+1.0
Tu 3	269°09.1	284°09.3	299°09.5	314°09.7	329°09.9	344°10.0	359°10.2	14°10.4	29°10.6	44°10.8	59°11.0	74°11.1	+0.2
	5°15.4	5°16.4	5°17.3	5°18.3	5°19.2	5°20.2	5°21.2	5°22.1	5°23.1	5°24.0	5°25.0	5°25.9	+1.0
We 4	269°13.5	284°13.7	299°13.9	314°14.0	329°14.2	344°14.4	359°14.6	14°14.8	29°14.9	44°15.1	59°15.3	74°15.5	+0.2
	5°38.4	5°39.3	5°40.3	5°41.2	5°42.2	5°43.1	5°44.1	5°45.0	5°46.0	5°46.9	5°47.9	5°48.8	+1.0
Th 5	269°17.8	284°18.0	299°18.2	314°18.3	329°18.5	344°18.7	359°18.9	14°19.0	29°19.2	44°19.4	59°19.6	74°19.8	+0.2
	6°01.2	6°02.2	6°03.1	6°04.1	6°05.0	6°06.0	6°06.9	6°07.9	6°08.8	6°09.8	6°10.7	6°11.7	+0.9
Fr 6	269°22.1	284°22.2	299°22.4	314°22.6	329°22.8	344°22.9	359°23.1	14°23.3	29°23.5	44°23.6	59°23.8	74°24.0	+0.2
	6°24.0	6°24.9	6°25.9	6°26.8	6°27.7	6°28.7	6°29.6	6°30.6	6°31.5	6°32.5	6°33.4	6°34.4	+0.9
Sa 7	269°26.3	284°26.4	299°26.6	314°26.8	329°27.0	344°27.1	359°27.3	14°27.5	29°27.7	44°27.8	59°28.0	74°28.2	+0.2
	6°46.6	6°47.5	6°48.5	6°49.4	6°50.4	6°51.3	6°52.2	6°53.2	6°54.1	6°55.1	6°56.0	6°56.9	+0.9
Su 8	269°30.4	284°30.6	299°30.8	314°30.9	329°31.1	344°31.3	359°31.4	14°31.6	29°31.8	44°32.0	59°32.1	74°32.3	+0.2
	7°09.1	7°10.1	7°11.0	7°11.9	7°12.9	7°13.8	7°14.7	7°15.7	7°16.6	7°17.5	7°18.5	7°19.4	+0.9
Mo 9	269°34.5	284°34.7	299°34.9	314°35.0	329°35.2	344°35.4	359°35.5	14°35.7	29°35.9	44°36.0	59°36.2	74°36.4	+0.2
	7°31.5	7°32.5	7°33.4	7°34.3	7°35.3	7°36.2	7°37.1	7°38.0	7°39.0	7°39.9	7°40.8	7°41.8	+0.9
Tu 10	269°38.5	284°38.7	299°38.9	314°39.0	329°39.2	344°39.4	359°39.5	14°39.7	29°39.9	44°40.0	59°40.2	74°40.4	+0.2
	7°53.8	7°54.7	7°55.7	7°56.6	7°57.5	7°58.4	7°59.4	8°00.3	8°01.2	8°02.1	8°03.1	8°04.0	+0.9
We 11	269°42.5	284°42.7	299°42.8	314°43.0	329°43.2	344°43.3	359°43.5	14°43.7	29°43.8	44°44.0	59°44.1	74°44.3	+0.2
	8°16.0	8°16.9	8°17.8	8°18.7	8°19.6	8°20.5	8°21.5	8°22.4	8°23.3	8°24.2	8°25.1	8°26.1	+0.9
Th 12	269°46.4	284°46.6	299°46.7	314°46.9	329°47.1	344°47.2	359°47.4	14°47.5	29°47.7	44°47.9	59°48.0	74°48.2	+0.2
	8°38.0	8°38.9	8°39.8	8°40.7	8°41.6	8°42.5	8°43.4	8°44.3	8°45.3	8°46.2	8°47.1	8°48.0	+0.9
Fr 13	269°50.2	284°50.4	299°50.6	314°50.7	329°50.9	344°51.0	359°51.2	14°51.3	29°51.5	44°51.7	59°51.8	74°52.0	+0.2
	8°59.8	9°00.7	9°01.6	9°02.5	9°03.4	9°04.4	9°05.3	9°06.2	9°07.1	9°08.0	9°08.9	9°09.8	+0.9
Sa 14	269°54.0	284°54.1	299°54.3	314°54.4	329°54.6	344°54.8	359°54.9	14°55.1	29°55.2	44°55.4	59°55.5	74°55.7	+0.2
	9°21.5	9°22.4	9°23.3	9°24.2	9°25.1	9°26.0	9°26.9	9°27.8	9°28.7	9°29.6	9°30.5	9°31.4	+0.9
Su 15	269°57.7	284°57.8	299°58.0	314°58.1	329°58.3	344°58.4	359°58.6	14°58.7	29°58.9	44°59.0	59°59.2	74°59.3	+0.2
	9°43.1	9°44.0	9°44.9	9°45.8	9°46.7	9°47.5	9°48.4	9°49.3	9°50.2	9°51.1	9°52.0	9°52.9	+0.9
Mo 16	270°01.2	285°01.4	300°01.5	315°01.7	330°01.8	345°02.0	0°02.1	15°02.3	30°02.4	45°02.6	60°02.7	75°02.9	+0.1
	10°04.5	10°05.4	10°06.2	10°07.1	10°08.0	10°08.9	10°09.8	10°10.7	10°11.6	10°12.4	10°13.3	10°14.2	+0.9
Tu 17	270°04.8	285°04.9	300°05.0	315°05.2	330°05.3	345°05.5	0°05.6	15°05.8	30°05.9	45°06.0	60°06.2	75°06.3	+0.1
	10°25.7	10°26.6	10°27.4	10°28.3	10°29.2	10°30.1	10°31.0	10°31.8	10°32.7	10°33.6	10°34.5	10°35.4	+0.9
We 18	270°08.2	285°08.3	300°08.4	315°08.6	330°08.7	345°08.9	0°09.0	15°09.1	30°09.3	45°09.4	60°09.6	75°09.7	+0.1
	10°46.7	10°47.6	10°48.5	10°49.4	10°50.2	10°51.1	10°52.0	10°52.8	10°53.7	10°54.6	10°55.5	10°56.3	+0.9
Th 19	270°11.5	285°11.6	300°11.8	315°11.9	330°12.0	345°12.2	0°12.3	15°12.4	30°12.6	45°12.7	60°12.8	75°13.0	+0.1
	11°07.6	11°08.5	11°09.3	11°10.2	11°11.1	11°11.9	11°12.8	11°13.7	11°14.5	11°15.4	11°16.2	11°17.1	+0.9
Fr 20	270°14.7	285°14.8	300°15.0	315°15.1	330°15.2	345°15.4	0°15.5	15°15.6	30°15.8	45°15.9	60°16.0	75°16.1	+0.1
	11°28.3	11°29.1	11°30.0	11°30.9	11°31.7	11°32.6	11°33.4	11°34.3	11°35.1	11°36.0	11°36.8	11°37.7	+0.9
Sa 21	270°17.8	285°17.9	300°18.1	315°18.2	330°18.3	345°18.5	0°18.6	15°18.7	30°18.8	45°19.0	60°19.1	75°19.2	+0.1
	11°48.8	11°49.6	11°50.5	11°51.3	11°52.2	11°53.0	11°53.9	11°54.7	11°55.6	11°56.4	11°57.3	11°58.1	+0.8
Su 22	270°20.8	285°21.0	300°21.1	315°21.2	330°21.3	345°21.4	0°21.6	15°21.7	30°21.8	45°21.9	60°22.0	75°22.2	+0.1
	12°09.1	12°09.9	12°10.8	12°11.6	12°12.4	12°13.3	12°14.1	12°15.0	12°15.8	12°16.6	12°17.5	12°18.3	+0.8
Mo 23	270°23.7	285°23.8	300°24.0	315°24.1	330°24.2	345°24.3	0°24.4	15°24.5	30°24.7	45°24.8	60°24.9	75°25.0	+0.1
	12°29.2	12°30.0	12°30.8	12°31.7	12°32.5	12°33.3	12°34.2	12°35.0	12°35.8	12°36.7	12°37.5	12°38.3	+0.8
Tu 24	270°26.5	285°26.6	300°26.7	315°26.8	330°27.0	345°27.1	0°27.2	15°27.3	30°27.4	45°27.5	60°27.6	75°27.7	+0.1
	12°49.1	12°49.9	12°50.7	12°51.5	12°52.4	12°53.2	12°54.0	12°54.8	12°55.6	12°56.5	12°57.3	12°58.1	+0.8
We 25	270°29.2	285°29.3	300°29.4	315°29.5	330°29.6	345°29.7	0°29.8	15°29.9	30°30.0	45°30.1	60°30.2	75°30.3	+0.1
	13°08.7	13°09.6	13°10.4	13°11.2	13°12.0	13°12.8	13°13.6	13°14.4	13°15.3	13°16.1	13°16.9	13°17.7	+0.8
Th 26	270°31.7	285°31.8	300°31.9	315°32.0	330°32.1	345°32.2	0°32.3	15°32.4	30°32.5	45°32.6	60°32.7	75°32.8	+0.1
	13°28.2	13°29.0	13°29.8	13°30.6	13°31.4	13°32.2	13°33.0	13°33.8	13°34.6	13°35.5	13°36.3	13°37.1	+0.8
Fr 27	270°34.1	285°34.2	300°34.3	315°34.4	330°34.5	345°34.6	0°34.7	15°34.8	30°34.9	45°35.0	60°35.1	75°35.2	+0.1
	13°47.5	13°48.3	13°49.0	13°49.8	13°50.6	13°51.4	13°52.2	13°53.0	13°53.8	13°54.6	13°55.4	13°56.2	+0.8
Sa 28	270°36.4	285°36.5	300°36.6	315°36.7	330°36.8	345°36.9	0°37.0	15°37.0	30°37.1	45°37.2	60°37.3	75°37.4	+0.1
	14°06.5	14°07.3	14°08.0	14°08.8	14°09.6	14°10.4	14°11.2	14°12.0	14°12.8	14°13.5	14°14.3	14°15.1	+0.8
Su 29	270°38.6	285°38.6	300°38.7	315°38.8	330°38.9	345°39.0	0°39.1	15°39.2	30°39.2	45°39.3	60°39.4	75°39.5	+0.1
	14°25.3	14°26.0	14°26.8	14°27.6	14°28.4	14°29.1	14°29.9	14°30.7	14°31.5	14°32.2	14°33.0	14°33.8	+0.8
Mo 30	270°40.6	285°40.7	300°40.7	315°40.8	330°40.9	345°41.0	0°41.1	15°41.1	30°41.2	45°41.3	60°41.4	75°41.5	+0.1
	14°43.8	14°44.6	14°45.3	14°46.1	14°46.9	14°47.6	14°48.4	14°49.2	14°49.9	14°50.7	14°51.5	14°52.2	+0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

April 2035

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Su 1	240°59.4	255°30.3	270°01.2	284°32.2	299°03.1	313°34.0	328°04.9	342°35.9	357°06.8	11°37.7	26°08.6	+30.9	15.0
	-17°26.2	-17°22.9	-17°19.6	-17°16.2	-17°12.6	-17°09.0	-17°05.3	-17°01.6	-16°57.7	-16°53.8	-16°49.8	+3.6	54.9
Mo 2	255°30.3	270°01.2	284°32.2	299°03.1	313°34.0	328°04.9	342°35.9	357°06.8	11°37.7	26°08.6	40°39.5	+30.9	15.0
	-17°22.9	-17°19.6	-17°16.2	-17°12.6	-17°09.0	-17°05.3	-17°01.6	-16°57.7	-16°53.8	-16°49.8	-16°45.6	+3.7	54.9
Tu 3	258°22.4	272°53.3	287°24.1	301°54.9	316°25.7	330°56.6	345°27.4	359°58.2	14°29.0	28°59.8	43°30.6	+30.8	15.1
	-15°34.1	-15°28.7	-15°23.2	-15°17.6	-15°11.9	-15°06.2	-15°00.3	-14°54.4	-14°48.5	-14°42.4	-14°36.2	+5.8	55.5
We 4	261°11.8	275°42.5	290°13.2	304°43.9	319°14.6	333°45.3	348°16.0	2°46.6	17°17.3	31°47.9	46°18.6	+30.7	15.3
	-12°55.0	-12°47.6	-12°40.2	-12°32.7	-12°25.2	-12°17.5	-12°09.8	-12°02.0	-11°54.2	-11°46.3	-11°38.3	+7.7	56.2
Th 5	263°56.9	278°27.4	292°57.9	307°28.3	321°58.8	336°29.2	350°59.6	5°30.0	20°00.3	34°30.7	49°01.0	+30.4	15.6
	-9°30.7	-9°21.7	-9°12.6	-9°03.5	-8°54.3	-8°45.0	-8°35.7	-8°26.4	-8°17.0	-8°07.5	-7°58.0	+9.3	57.1
Fr 6	266°34.1	281°04.2	295°34.2	310°04.2	324°34.2	339°04.1	353°34.1	8°04.0	22°33.9	37°03.7	51°33.6	+29.9	15.8
	-5°29.1	-5°18.8	-5°08.5	-4°58.1	-4°47.7	-4°37.3	-4°26.8	-4°16.3	-4°05.7	-3°55.1	-3°44.5	+10.5	57.9
Sa 7	268°57.8	283°27.2	297°56.5	312°25.9	326°55.1	341°24.4	355°53.6	10°22.8	24°51.9	39°21.0	53°50.1	+29.2	16.0
	-1°01.6	-0°50.6	-0°39.6	-0°28.5	-0°17.4	-0°06.3	0°04.8	0°15.9	0°27.1	0°38.2	0°49.4	+11.1	58.7
● Su 8	271°01.6	285°30.0	299°58.4	314°26.8	328°55.1	343°23.3	357°51.6	12°19.8	26°47.9	41°16.0	55°44.0	+28.2	16.2
	3°36.7	3°47.8	3°58.9	4°10.0	4°21.1	4°32.1	4°43.2	4°54.2	5°05.2	5°16.2	5°27.1	+11.0	59.4
Mo 9	272°39.2	287°06.5	301°33.8	316°01.0	330°28.1	344°55.2	359°22.3	13°49.3	28°16.2	42°43.2	57°10.0	+27.1	16.3
	8°07.6	8°18.0	8°28.4	8°38.7	8°48.9	8°59.1	9°09.3	9°19.4	9°29.4	9°39.4	9°49.3	+10.2	59.8
Tu 10	273°47.2	288°13.3	302°39.3	317°05.3	331°31.3	345°57.2	0°23.1	14°48.9	29°14.7	43°40.5	58°06.2	+25.9	16.4
	12°10.6	12°19.4	12°28.2	12°36.9	12°45.5	12°54.0	13°02.4	13°10.8	13°19.1	13°27.2	13°35.3	+8.5	60.1
We 11	274°26.9	288°51.9	303°17.0	317°42.0	332°07.0	346°32.0	0°56.9	15°21.8	29°46.7	44°11.6	58°36.4	+24.9	16.4
	15°25.4	15°31.9	15°38.3	15°44.6	15°50.8	15°56.9	16°02.9	16°08.8	16°14.6	16°20.3	16°25.8	+6.0	60.1
Th 12	274°46.3	289°10.9	303°35.4	317°59.9	332°24.4	346°49.0	1°13.5	15°38.0	30°02.5	44°27.0	58°51.5	+24.5	16.3
	17°35.1	17°38.7	17°42.3	17°45.7	17°49.0	17°52.2	17°55.2	17°58.1	18°00.9	18°03.6	18°06.2	+3.1	59.9
Fr 13	274°59.9	289°24.6	303°49.3	318°14.0	332°38.7	347°03.5	1°28.2	15°53.0	30°17.9	44°42.7	59°07.6	+24.8	16.2
	18°29.4	18°29.9	18°30.3	18°30.6	18°30.8	18°30.8	18°30.7	18°30.5	18°30.2	18°29.7	18°29.2	-0.0	59.5
Sa 14	275°24.9	289°50.4	304°15.9	318°41.4	333°07.1	347°32.7	1°58.4	16°24.1	30°49.9	45°15.8	59°41.7	+25.7	16.1
	18°06.0	18°03.5	18°00.9	17°58.2	17°55.3	17°52.4	17°49.3	17°46.1	17°42.9	17°39.5	17°35.9	-3.0	59.0
◐ Su 15	276°16.4	290°43.2	305°10.0	319°36.9	334°03.8	348°30.8	2°57.9	17°25.0	31°52.2	46°19.4	60°46.7	+27.0	15.9
	16°30.6	16°25.5	16°20.2	16°14.9	16°09.4	16°03.9	15°58.2	15°52.5	15°46.7	15°40.8	15°34.8	-5.6	58.5
Mo 16	277°43.5	292°11.8	306°40.1	321°08.5	335°37.0	350°05.5	4°34.1	19°02.7	33°31.4	48°00.2	62°29.0	+28.5	15.8
	13°54.6	13°47.3	13°40.0	13°32.5	13°25.0	13°17.4	13°09.7	13°02.0	12°54.2	12°46.3	12°38.4	-7.6	57.9
Tu 17	279°48.2	294°17.9	308°47.7	323°17.5	337°47.4	352°17.4	6°47.4	21°17.4	35°47.5	50°17.7	64°47.9	+30.0	15.6
	10°32.3	10°23.4	10°14.5	10°05.6	9°56.6	9°47.6	9°38.5	9°29.3	9°20.2	9°11.0	9°01.7	-9.1	57.3
We 18	282°26.6	296°57.6	311°28.6	325°59.6	340°30.7	355°01.8	9°32.9	24°04.1	38°35.3	53°06.6	67°37.9	+31.1	15.5
	6°38.6	6°28.8	6°18.9	6°09.1	5°59.2	5°49.3	5°39.4	5°29.5	5°19.5	5°09.6	4°59.6	-9.9	56.8
Th 19	285°31.5	300°03.3	314°35.2	329°07.0	343°38.9	358°10.9	12°42.8	27°14.8	41°46.8	56°18.8	70°50.9	+31.9	15.3
	2°28.0	2°17.8	2°07.6	1°57.4	1°47.3	1°37.1	1°26.9	1°16.7	1°06.5	0°56.3	0°46.1	-10.2	56.3
Fr 20	288°54.0	303°26.4	317°58.7	332°31.1	347°03.5	1°35.9	16°08.3	30°40.7	45°13.1	59°45.5	74°18.0	+32.4	15.2
	-1°46.0	-1°56.0	-2°06.0	-2°16.1	-2°26.1	-2°36.1	-2°46.0	-2°56.0	-3°05.9	-3°15.8	-3°25.7	-10.0	55.8
Sa 21	292°25.5	306°58.1	321°30.6	336°03.1	350°35.7	5°08.2	19°40.7	34°13.3	48°45.8	63°18.4	77°50.9	+32.5	15.1
	-5°51.0	-6°00.5	-6°09.9	-6°19.3	-6°28.7	-6°38.0	-6°47.3	-6°56.5	-7°05.7	-7°14.9	-7°24.1	-9.3	55.3
○ Su 22	295°58.5	310°31.0	325°03.4	339°35.9	354°08.3	8°40.8	23°13.2	37°45.6	52°18.0	66°50.4	81°22.8	+32.4	15.0
	-9°36.2	-9°44.6	-9°53.0	-10°01.3	-10°09.6	-10°17.9	-10°26.1	-10°34.2	-10°42.3	-10°50.4	-10°58.4	-8.2	54.9
Mo 23	299°27.4	313°59.6	328°31.8	343°04.0	357°36.2	12°08.4	26°40.5	41°12.7	55°44.8	70°16.9	84°49.0	+32.2	14.9
	-12°51.5	-12°58.6	-13°05.6	-13°12.6	-13°19.4	-13°26.3	-13°33.0	-13°39.7	-13°46.3	-13°52.9	-13°59.4	-6.8	54.5
Tu 24	302°48.9	317°20.8	331°52.7	346°24.5	0°56.4	15°28.2	30°00.0	44°31.8	59°03.6	73°35.4	88°07.2	+31.8	14.8
	-15°28.8	-15°34.2	-15°39.5	-15°44.7	-15°49.9	-15°55.0	-16°00.1	-16°05.0	-16°09.9	-16°14.7	-16°19.4	-5.1	54.2
We 25	306°02.1	320°33.7	335°05.3	349°36.8	4°08.4	18°39.9	33°11.4	47°42.9	62°14.4	76°45.9	91°17.4	+31.5	14.7
	-17°21.2	-17°24.7	-17°28.1	-17°31.4	-17°34.7	-17°37.8	-17°40.9	-17°43.9	-17°46.9	-17°49.7	-17°52.5	-3.1	54.1
Th 26	320°33.7	335°05.3	349°36.8	4°08.4	18°39.9	33°11.4	47°42.9	62°14.4	76°45.9	91°17.4	105°48.8	+31.5	14.7
	-17°24.7	-17°28.1	-17°31.4	-17°34.7	-17°37.8	-17°40.9	-17°43.9	-17°46.9	-17°49.7	-17°52.5	-17°55.1	-3.0	54.1
Fr 27	323°39.8	338°11.2	352°42.5	7°13.9	21°45.2	36°16.5	50°47.8	65°19.1	79°50.4	94°21.7	108°53.0	+31.3	14.7
	-18°25.4	-18°26.8	-18°28.0	-18°29.2	-18°30.3	-18°31.3	-18°32.2	-18°33.1	-18°33.8	-18°34.5	-18°35.1	-1.0	54.0
Sa 28	326°42.0	341°13.3	355°44.5	10°15.8	24°47.0	39°18.3	53°49.5	68°20.8	82°52.0	97°23.2	111°54.5	+31.2	14.8
	-18°33.6	-18°32.8	-18°32.0	-18°31.0	-18°30.0	-18°28.8	-18°27.6	-18°26.3	-18°25.0	-18°23.5	-18°21.9	+1.2	54.2
Su 29	329°43.3	344°14.6	358°45.9	13°17.1	27°48.4	42°19.7	56°51.0	71°22.3	85°53.5	100°24.8	114°56.1	+31.3	14.9
	-17°48.5	-17°45.6	-17°42.7	-17°39.6	-17°36.4	-17°33.2	-17°29.9	-17°26.5	-17°23.0	-17°19.4	-17°15.8	+3.3	54.5
◑ Mo 30	332°45.8	347°17.2	1°48.5	16°19.8	30°51.2	45°22.5	59°53.9	74°25.2	88°56.6	103°27.9	117°59.3	+31.3	15.0
	-16°11.3	-16°06.4	-16°01.4	-15°56.3	-15°51.1	-15°45.9	-15°40.5	-15°35.1	-15°29.6	-15°24.1	-15°18.4	+5.3	54.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 8 10h57 — FQ: 15 02h54 — FM: 22 13h20 — LQ: 30 16h53

SUN

May 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Tu 1	270° 42.5	285° 42.5	300° 42.6	315° 42.7	330° 42.8	345° 42.8	0° 42.9	15° 43.0	30° 43.1	45° 43.1	60° 43.2	75° 43.3	+0.1
	15° 02.1	15° 02.9	15° 03.6	15° 04.4	15° 05.1	15° 05.9	15° 06.7	15° 07.4	15° 08.2	15° 08.9	15° 09.7	15° 10.4	+0.8
We 2	270° 44.2	285° 44.3	300° 44.3	315° 44.4	330° 44.5	345° 44.6	0° 44.6	15° 44.7	30° 44.8	45° 44.8	60° 44.9	75° 45.0	+0.1
	15° 20.2	15° 20.9	15° 21.7	15° 22.4	15° 23.2	15° 23.9	15° 24.6	15° 25.4	15° 26.1	15° 26.9	15° 27.6	15° 28.4	+0.7
Th 3	270° 45.8	285° 45.9	300° 45.9	315° 46.0	330° 46.1	345° 46.1	0° 46.2	15° 46.3	30° 46.3	45° 46.4	60° 46.4	75° 46.5	+0.1
	15° 38.0	15° 38.7	15° 39.4	15° 40.2	15° 40.9	15° 41.7	15° 42.4	15° 43.1	15° 43.9	15° 44.6	15° 45.3	15° 46.1	+0.7
Fr 4	270° 47.3	285° 47.3	300° 47.4	315° 47.5	330° 47.5	345° 47.6	0° 47.6	15° 47.7	30° 47.7	45° 47.8	60° 47.8	75° 47.9	+0.1
	15° 55.5	15° 56.3	15° 57.0	15° 57.7	15° 58.4	15° 59.1	15° 59.9	16° 00.6	16° 01.3	16° 02.0	16° 02.8	16° 03.5	+0.7
Sa 5	270° 48.6	285° 48.7	300° 48.7	315° 48.8	330° 48.8	345° 48.9	0° 48.9	15° 49.0	30° 49.0	45° 49.1	60° 49.1	75° 49.2	+0.1
	16° 12.8	16° 13.5	16° 14.2	16° 15.0	16° 15.7	16° 16.4	16° 17.1	16° 17.8	16° 18.5	16° 19.2	16° 19.9	16° 20.6	+0.7
Su 6	270° 49.8	285° 49.8	300° 49.9	315° 49.9	330° 50.0	345° 50.0	0° 50.1	15° 50.1	30° 50.1	45° 50.2	60° 50.2	75° 50.3	+0.0
	16° 29.8	16° 30.5	16° 31.2	16° 31.9	16° 32.6	16° 33.3	16° 34.0	16° 34.7	16° 35.4	16° 36.1	16° 36.8	16° 37.5	+0.7
Mo 7	270° 50.8	285° 50.9	300° 50.9	315° 50.9	330° 51.0	345° 51.0	0° 51.1	15° 51.1	30° 51.1	45° 51.2	60° 51.2	75° 51.2	+0.0
	16° 46.6	16° 47.3	16° 48.0	16° 48.6	16° 49.3	16° 50.0	16° 50.7	16° 51.4	16° 52.1	16° 52.8	16° 53.5	16° 54.1	+0.7
Tu 8	270° 51.7	285° 51.7	300° 51.8	315° 51.8	330° 51.8	345° 51.9	0° 51.9	15° 51.9	30° 52.0	45° 52.0	60° 52.0	75° 52.1	+0.0
	17° 03.0	17° 03.7	17° 04.4	17° 05.1	17° 05.7	17° 06.4	17° 07.1	17° 07.8	17° 08.5	17° 09.1	17° 09.8	17° 10.5	+0.7
We 9	270° 52.5	285° 52.5	300° 52.5	315° 52.5	330° 52.6	345° 52.6	0° 52.6	15° 52.7	30° 52.7	45° 52.7	60° 52.7	75° 52.8	+0.0
	17° 19.2	17° 19.9	17° 20.5	17° 21.2	17° 21.9	17° 22.5	17° 23.2	17° 23.9	17° 24.5	17° 25.2	17° 25.9	17° 26.5	+0.7
Th 10	270° 53.1	285° 53.1	300° 53.1	315° 53.1	330° 53.2	345° 53.2	0° 53.2	15° 53.2	30° 53.2	45° 53.3	60° 53.3	75° 53.3	+0.0
	17° 35.1	17° 35.8	17° 36.4	17° 37.1	17° 37.7	17° 38.4	17° 39.0	17° 39.7	17° 40.3	17° 41.0	17° 41.6	17° 42.3	+0.7
Fr 11	270° 53.5	285° 53.6	300° 53.6	315° 53.6	330° 53.6	345° 53.6	0° 53.6	15° 53.7	30° 53.7	45° 53.7	60° 53.7	75° 53.7	+0.0
	17° 50.7	17° 51.3	17° 52.0	17° 52.6	17° 53.3	17° 53.9	17° 54.5	17° 55.2	17° 55.8	17° 56.5	17° 57.1	17° 57.7	+0.6
Sa 12	270° 53.9	285° 53.9	300° 53.9	315° 53.9	330° 53.9	345° 53.9	0° 53.9	15° 54.0	30° 54.0	45° 54.0	60° 54.0	75° 54.0	+0.0
	18° 06.0	18° 06.6	18° 07.2	18° 07.9	18° 08.5	18° 09.1	18° 09.8	18° 10.4	18° 11.0	18° 11.6	18° 12.3	18° 12.9	+0.6
Su 13	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.1	75° 54.1	+0.0
	18° 21.0	18° 21.6	18° 22.2	18° 22.8	18° 23.4	18° 24.1	18° 24.7	18° 25.3	18° 25.9	18° 26.5	18° 27.1	18° 27.7	+0.6
Mo 14	270° 54.1	285° 54.1	300° 54.1	315° 54.1	330° 54.1	345° 54.1	0° 54.1	15° 54.1	30° 54.1	45° 54.1	60° 54.1	75° 54.1	-0.0
	18° 35.6	18° 36.3	18° 36.9	18° 37.5	18° 38.1	18° 38.7	18° 39.3	18° 39.9	18° 40.5	18° 41.1	18° 41.7	18° 42.3	+0.6
Tu 15	270° 54.1	285° 54.0	300° 54.0	315° 54.0	330° 54.0	345° 54.0	0° 54.0	15° 54.0	30° 54.0	45° 54.0	60° 54.0	75° 54.0	-0.0
	18° 50.0	18° 50.6	18° 51.2	18° 51.8	18° 52.4	18° 53.0	18° 53.6	18° 54.1	18° 54.7	18° 55.3	18° 55.9	18° 56.5	+0.6
We 16	270° 53.8	285° 53.8	300° 53.8	315° 53.8	330° 53.8	345° 53.8	0° 53.8	15° 53.8	30° 53.7	45° 53.7	60° 53.7	75° 53.7	-0.0
	19° 04.1	19° 04.6	19° 05.2	19° 05.8	19° 06.4	19° 06.9	19° 07.5	19° 08.1	19° 08.7	19° 09.2	19° 09.8	19° 10.4	+0.6
Th 17	270° 53.5	285° 53.5	300° 53.5	315° 53.4	330° 53.4	345° 53.4	0° 53.4	15° 53.4	30° 53.3	45° 53.3	60° 53.3	75° 53.3	-0.0
	19° 17.8	19° 18.3	19° 18.9	19° 19.5	19° 20.0	19° 20.6	19° 21.2	19° 21.7	19° 22.3	19° 22.8	19° 23.4	19° 23.9	+0.6
Fr 18	270° 53.0	285° 53.0	300° 53.0	315° 52.9	330° 52.9	345° 52.9	0° 52.9	15° 52.8	30° 52.8	45° 52.8	60° 52.8	75° 52.7	-0.0
	19° 31.2	19° 31.7	19° 32.3	19° 32.8	19° 33.4	19° 33.9	19° 34.5	19° 35.0	19° 35.6	19° 36.1	19° 36.6	19° 37.2	+0.5
Sa 19	270° 52.4	285° 52.4	300° 52.3	315° 52.3	330° 52.3	345° 52.2	0° 52.2	15° 52.2	30° 52.1	45° 52.1	60° 52.1	75° 52.1	-0.0
	19° 44.2	19° 44.8	19° 45.3	19° 45.8	19° 46.4	19° 46.9	19° 47.4	19° 48.0	19° 48.5	19° 49.0	19° 49.6	19° 50.1	+0.5
Su 20	270° 51.6	285° 51.6	300° 51.6	315° 51.5	330° 51.5	345° 51.5	0° 51.4	15° 51.4	30° 51.3	45° 51.3	60° 51.3	75° 51.2	-0.0
	19° 56.9	19° 57.5	19° 58.0	19° 58.5	19° 59.0	19° 59.5	20° 00.1	20° 00.6	20° 01.1	20° 01.6	20° 02.1	20° 02.7	+0.5
Mo 21	270° 50.7	285° 50.7	300° 50.7	315° 50.6	330° 50.6	345° 50.5	0° 50.5	15° 50.5	30° 50.4	45° 50.4	60° 50.3	75° 50.3	-0.0
	20° 09.3	20° 09.8	20° 10.3	20° 10.8	20° 11.3	20° 11.9	20° 12.4	20° 12.9	20° 13.4	20° 13.9	20° 14.4	20° 14.9	+0.5
Tu 22	270° 49.7	285° 49.7	300° 49.6	315° 49.6	330° 49.5	345° 49.5	0° 49.4	15° 49.4	30° 49.3	45° 49.3	60° 49.2	75° 49.2	-0.0
	20° 21.3	20° 21.8	20° 22.3	20° 22.8	20° 23.3	20° 23.8	20° 24.3	20° 24.8	20° 25.3	20° 25.8	20° 26.3	20° 26.7	+0.5
We 23	270° 48.6	285° 48.5	300° 48.5	315° 48.4	330° 48.4	345° 48.3	0° 48.3	15° 48.2	30° 48.1	45° 48.1	60° 48.0	75° 48.0	-0.1
	20° 33.0	20° 33.5	20° 34.0	20° 34.5	20° 34.9	20° 35.4	20° 35.9	20° 36.4	20° 36.8	20° 37.3	20° 37.8	20° 38.3	+0.5
Th 24	270° 47.3	285° 47.2	300° 47.2	315° 47.1	330° 47.1	345° 47.0	0° 46.9	15° 46.9	30° 46.8	45° 46.8	60° 46.7	75° 46.6	-0.1
	20° 44.4	20° 44.8	20° 45.3	20° 45.8	20° 46.2	20° 46.7	20° 47.1	20° 47.6	20° 48.1	20° 48.5	20° 49.0	20° 49.4	+0.5
Fr 25	270° 45.9	285° 45.8	300° 45.7	315° 45.7	330° 45.6	345° 45.6	0° 45.5	15° 45.4	30° 45.4	45° 45.3	60° 45.2	75° 45.2	-0.1
	20° 55.3	20° 55.8	20° 56.2	20° 56.7	20° 57.1	20° 57.6	20° 58.0	20° 58.5	20° 58.9	20° 59.4	20° 59.8	21° 00.2	+0.4
Sa 26	270° 44.3	285° 44.3	300° 44.2	315° 44.1	330° 44.1	345° 44.0	0° 43.9	15° 43.9	30° 43.8	45° 43.7	60° 43.7	75° 43.6	-0.1
	21° 06.0	21° 06.4	21° 06.8	21° 07.3	21° 07.7	21° 08.1	21° 08.6	21° 09.0	21° 09.4	21° 09.8	21° 10.3	21° 10.7	+0.4
Su 27	270° 42.7	285° 42.6	300° 42.5	315° 42.5	330° 42.4	345° 42.3	0° 42.2	15° 42.2	30° 42.1	45° 42.0	60° 41.9	75° 41.9	-0.1
	21° 16.2	21° 16.6	21° 17.0	21° 17.5	21° 17.9	21° 18.3	21° 18.7	21° 19.1	21° 19.5	21° 20.0	21° 20.4	21° 20.8	+0.4
Mo 28	270° 40.9	285° 40.8	300° 40.7	315° 40.7	330° 40.6	345° 40.5	0° 40.4	15° 40.3	30° 40.3	45° 40.2	60° 40.1	75° 40.0	-0.1
	21° 26.1	21° 26.5	21° 26.9	21° 27.3	21° 27.7	21° 28.1	21° 28.5	21° 28.9	21° 29.3	21° 29.7	21° 30.1	21° 30.5	+0.4
Tu 29	270° 39.0	285° 38.9	300° 38.8	315° 38.7	330° 38.7	345° 38.6	0° 38.5	15° 38.4	30° 38.3	45° 38.2	60° 38.2	75° 38.1	-0.1
	21° 35.6	21° 36.0	21° 36.4	21° 36.8	21° 37.2	21° 37.5	21° 37.9	21° 38.3	21° 38.7	21° 39.1	21° 39.5	21° 39.8	+0.4
We 30	270° 37.0	285° 36.9	300° 36.8	315° 36.7	330° 36.6	345° 36.5	0° 36.5	15° 36.4	30° 36.3	45° 36.2	60° 36.1	75° 36.0	-0.1
	21° 44.7	21° 45.1	21° 45.5	21° 45.9	21° 46.2	21° 46.6	21° 47.0	21° 47.3	21° 47.7	21° 48.1	21° 48.4	21° 48.8	+0.4
Th 31	270° 34.8	285° 34.8	300° 34.7	315° 34.6	330° 34.5	345° 34.4	0° 34.3	15° 34.2	30° 34.1	45° 34.0	60° 33.9	75° 33.8	-0.1
	21° 53.5	21° 53.9	21° 54.2	21° 54.6	21° 54.9	21° 55.3	21° 55.6	21° 56.0	21° 56.3	21° 56.7	21° 57.0	21° 57.4	+0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

May 2035

D	22h	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	Δ'/h	SH
Tu 1	237°13.4	251°44.6	266°15.9	280°47.1	295°18.4	309°49.6	324°20.9	338°52.1	353°23.3	7°54.5	22°25.7	+31.2	15.3
	-11°31.2	-11°23.2	-11°15.1	-11°06.9	-10°58.6	-10°50.3	-10°41.9	-10°33.5	-10°25.0	-10°16.4	-10°07.8	+8.3	56.2
We 2	251°44.6	266°15.9	280°47.1	295°18.4	309°49.6	324°20.9	338°52.1	353°23.3	7°54.5	22°25.7	36°56.8	+31.2	15.3
	-11°23.2	-11°15.1	-11°06.9	-10°58.6	-10°50.3	-10°41.9	-10°33.5	-10°25.0	-10°16.4	-10°07.8	-9°59.1	+8.4	56.2
Th 3	254°42.8	269°13.7	283°44.6	298°15.5	312°46.4	327°17.2	341°48.1	356°18.9	10°49.6	25°20.4	39°51.1	+30.8	15.6
	-7°41.9	-7°32.3	-7°22.7	-7°13.0	-7°03.3	-6°53.5	-6°43.7	-6°33.8	-6°23.9	-6°13.9	-6°03.9	+9.8	57.1
Fr 4	257°28.9	271°59.2	286°29.4	300°59.6	315°29.8	329°59.9	344°30.0	359°00.1	13°30.1	28°00.1	42°30.0	+30.1	15.8
	-3°28.7	-3°18.1	-3°07.4	-2°56.7	-2°46.0	-2°35.2	-2°24.4	-2°13.6	-2°02.7	-1°51.8	-1°40.9	+10.8	58.0
Sa 5	259°54.2	274°23.4	288°52.6	303°21.7	317°50.8	332°19.9	346°48.9	1°17.8	15°46.7	30°15.6	44°44.3	+29.0	16.1
	1°05.1	1°16.2	1°27.4	1°38.6	1°49.8	2°01.0	2°12.2	2°23.5	2°34.7	2°45.9	2°57.1	+11.2	59.0
Su 6	261°49.4	276°17.3	290°45.1	305°12.8	319°40.5	334°08.1	348°35.7	3°03.2	17°30.6	31°58.0	46°25.3	+27.6	16.3
	5°44.2	5°55.2	6°06.2	6°17.2	6°28.1	6°39.1	6°49.9	7°00.8	7°11.6	7°22.4	7°33.2	+10.9	59.8
● Mo 7	263°07.1	277°33.4	291°59.6	306°25.7	320°51.8	335°17.8	349°43.7	4°09.6	18°35.4	33°01.1	47°26.8	+26.0	16.5
	10°09.4	10°19.4	10°29.4	10°39.2	10°49.1	10°58.8	11°08.5	11°18.2	11°27.7	11°37.2	11°46.6	+9.7	60.5
Tu 8	263°44.5	278°09.2	292°33.9	306°58.5	321°23.0	335°47.5	350°11.9	4°36.3	19°00.6	33°24.9	47°49.1	+24.5	16.6
	13°58.4	14°06.5	14°14.5	14°22.3	14°30.1	14°37.8	14°45.4	14°52.9	15°00.3	15°07.6	15°14.8	+7.6	60.8
We 9	263°47.0	278°10.6	292°34.1	306°57.6	321°21.1	335°44.5	350°07.9	4°31.3	18°54.7	33°18.0	47°41.4	+23.4	16.6
	16°49.1	16°54.4	16°59.7	17°04.8	17°09.7	17°14.6	17°19.3	17°23.9	17°28.4	17°32.7	17°36.9	+4.8	60.9
Th 10	263°29.8	277°53.0	292°16.2	306°39.4	321°02.7	335°25.9	349°49.1	4°12.4	18°35.7	32°59.0	47°22.3	+23.2	16.5
	18°24.3	18°26.4	18°28.4	18°30.2	18°31.9	18°33.4	18°34.8	18°36.1	18°37.2	18°38.2	18°39.1	+1.5	60.6
Fr 11	263°15.1	277°38.9	292°02.8	306°26.6	320°50.6	335°14.6	349°38.6	4°02.7	18°26.8	32°51.0	47°15.2	+24.0	16.4
	18°36.0	18°34.8	18°33.4	18°31.9	18°30.2	18°28.4	18°26.5	18°24.5	18°22.3	18°20.0	18°17.6	-1.8	60.1
Sa 12	263°25.6	277°50.8	292°16.1	306°41.4	321°06.8	335°32.3	349°57.9	4°23.5	18°49.2	33°14.9	47°40.8	+25.5	16.2
	17°27.1	17°22.8	17°18.4	17°13.8	17°09.2	17°04.5	16°59.7	16°54.7	16°49.7	16°44.5	16°39.3	-4.8	59.4
Su 13	264°17.3	278°44.3	293°11.4	307°38.6	322°05.9	336°33.2	351°00.7	5°28.2	19°55.8	34°23.4	48°51.1	+27.4	16.0
	15°09.0	15°02.2	14°55.4	14°48.5	14°41.5	14°34.4	14°27.3	14°20.1	14°12.8	14°05.4	13°57.9	-7.1	58.6
◐ Mo 14	265°56.1	280°25.0	294°54.0	309°23.0	323°52.2	338°21.4	352°50.6	7°20.0	21°49.4	36°18.8	50°48.4	+29.2	15.8
	11°57.9	11°49.4	11°40.9	11°32.3	11°23.6	11°14.9	11°06.1	10°57.3	10°48.4	10°39.5	10°30.5	-8.7	57.8
Tu 15	268°19.2	282°49.7	297°20.3	311°51.0	326°21.7	340°52.4	355°23.3	9°54.1	24°25.0	38°56.0	53°27.1	+30.8	15.6
	8°10.9	8°01.3	7°51.7	7°42.0	7°32.3	7°22.6	7°12.9	7°03.1	6°53.3	6°43.5	6°33.6	-9.7	57.1
We 16	271°18.2	285°49.9	300°21.7	314°53.6	329°25.4	343°57.3	358°29.3	13°01.3	27°33.3	42°05.3	56°37.4	+31.9	15.4
	4°03.5	3°53.4	3°43.3	3°33.1	3°23.0	3°12.8	3°02.7	2°52.5	2°42.3	2°32.2	2°22.0	-10.2	56.4
Th 17	274°42.2	289°14.7	303°47.3	318°19.8	332°52.4	347°25.0	1°57.6	16°30.3	31°02.9	45°35.6	60°08.3	+32.6	15.2
	-0°10.6	-0°20.8	-0°30.9	-0°41.0	-0°51.1	-1°01.2	-1°11.3	-1°21.4	-1°31.4	-1°41.5	-1°51.5	-10.1	55.8
Fr 18	278°20.2	292°53.1	307°25.9	321°58.8	336°31.7	351°04.6	5°37.5	20°10.4	34°43.3	49°16.2	63°49.0	+32.9	15.1
	-4°19.8	-4°29.5	-4°39.2	-4°48.8	-4°58.4	-5°08.0	-5°17.6	-5°27.2	-5°36.7	-5°46.2	-5°55.6	-9.6	55.2
Sa 19	282°02.3	296°35.1	311°08.0	325°40.8	340°13.7	354°46.5	9°19.3	23°52.1	38°24.9	52°57.7	67°30.4	+32.8	14.9
	-8°13.3	-8°22.2	-8°31.0	-8°39.8	-8°48.6	-8°57.3	-9°06.0	-9°14.6	-9°23.2	-9°31.7	-9°40.2	-8.7	54.8
Su 20	285°40.6	300°13.2	314°45.7	329°18.3	343°50.8	358°23.3	12°55.8	27°28.3	42°00.8	56°33.2	71°05.6	+32.5	14.9
	-11°41.7	-11°49.3	-11°57.0	-12°04.5	-12°12.1	-12°19.5	-12°26.9	-12°34.3	-12°41.6	-12°48.8	-12°55.9	-7.4	54.5
Mo 21	289°10.0	303°42.2	318°14.3	332°46.4	347°18.5	1°50.6	16°22.7	30°54.7	45°26.8	59°58.8	74°30.8	+32.1	14.8
	-14°36.0	-14°42.2	-14°48.3	-14°54.3	-15°00.2	-15°06.1	-15°11.9	-15°17.7	-15°23.4	-15°29.0	-15°34.5	-5.8	54.2
○ Tu 22	292°28.5	307°00.3	321°32.0	336°03.6	350°35.3	5°07.0	19°38.6	34°10.2	48°41.8	63°13.4	77°45.0	+31.6	14.7
	-16°48.7	-16°53.1	-16°57.4	-17°01.5	-17°05.7	-17°09.7	-17°13.7	-17°17.5	-17°21.3	-17°25.1	-17°28.7	-4.0	54.0
We 23	295°37.2	310°08.6	324°40.0	339°11.3	353°42.7	8°14.1	22°45.4	37°16.7	51°48.1	66°19.4	80°50.7	+31.3	14.7
	-18°13.6	-18°16.0	-18°18.2	-18°20.4	-18°22.5	-18°24.5	-18°26.4	-18°28.2	-18°30.0	-18°31.6	-18°33.2	-2.0	53.9
Th 24	298°39.7	313°10.9	327°42.2	342°13.4	356°44.7	11°15.9	25°47.1	40°18.4	54°49.6	69°20.8	83°52.1	+31.2	14.7
	-18°46.7	-18°46.9	-18°47.0	-18°47.0	-18°47.0	-18°46.9	-18°46.6	-18°46.3	-18°45.9	-18°45.5	-18°44.9	+0.2	54.0
Fr 25	301°40.9	316°12.2	330°43.5	345°14.8	359°46.1	14°17.4	28°48.8	43°20.1	57°51.4	72°22.8	86°54.1	+31.3	14.8
	-18°26.1	-18°24.2	-18°22.2	-18°20.1	-18°17.9	-18°15.6	-18°13.3	-18°10.8	-18°08.3	-18°05.7	-18°03.0	+2.3	54.1
Sa 26	316°12.2	330°43.5	345°14.8	359°46.1	14°17.4	28°48.8	43°20.1	57°51.4	72°22.8	86°54.1	101°25.5	+31.3	14.8
	-18°24.2	-18°22.2	-18°20.1	-18°17.9	-18°15.6	-18°13.3	-18°10.8	-18°08.3	-18°05.7	-18°03.0	-18°00.2	+2.4	54.1
Su 27	319°16.8	333°48.3	348°19.8	2°51.4	17°22.9	31°54.4	46°26.0	60°57.5	75°29.1	90°00.7	104°32.3	+31.5	14.8
	-17°08.7	-17°04.6	-17°00.5	-16°56.2	-16°51.9	-16°47.5	-16°43.0	-16°38.5	-16°33.9	-16°29.1	-16°24.4	+4.4	54.4
Mo 28	322°27.2	336°58.9	351°30.7	6°02.4	20°34.2	35°05.9	49°37.7	64°09.5	78°41.3	93°13.1	107°44.9	+31.8	15.0
	-15°03.4	-14°57.4	-14°51.3	-14°45.2	-14°39.0	-14°32.7	-14°26.4	-14°19.9	-14°13.5	-14°06.9	-14°00.3	+6.3	54.9
Tu 29	325°42.5	340°14.4	354°46.3	9°18.2	23°50.0	38°21.9	52°53.8	67°25.7	81°57.5	96°29.4	111°01.3	+31.9	15.1
	-12°12.8	-12°05.1	-11°57.3	-11°49.5	-11°41.6	-11°33.7	-11°25.7	-11°17.7	-11°09.5	-11°01.4	-10°53.1	+8.0	55.5
◑ We 30	328°58.8	343°30.6	358°02.3	12°34.1	27°05.8	41°37.6	56°09.3	70°41.0	85°12.7	99°44.3	114°16.0	+31.7	15.3
	-8°42.8	-8°33.7	-8°24.5	-8°15.3	-8°06.1	-7°56.7	-7°47.4	-7°38.0	-7°28.5	-7°19.0	-7°09.4	+9.3	56.2
Th 31	332°08.6	346°39.9	1°11.2	15°42.5	30°13.7	44°44.9	59°16.1	73°47.3	88°18.4	102°49.5	117°20.6	+31.2	15.6
	-4°41.0	-4°30.7	-4°20.5	-4°10.2	-3°59.9	-3°49.5	-3°39.1	-3°28.7	-3°18.3	-3°07.8	-2°57.3	+10.4	57.1

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 7 20h03 — FQ: 14 10h28 — FM: 22 04h25 — LQ: 30 07h30

SUN

June 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Fr 1	270°32.6	285°32.5	300°32.4	315°32.3	330°32.2	345°32.1	0°32.0	15°31.9	30°31.8	45°31.7	60°31.6	75°31.5	-0.1
	22°01.9	22°02.2	22°02.6	22°02.9	22°03.2	22°03.6	22°03.9	22°04.3	22°04.6	22°04.9	22°05.3	22°05.6	+0.3
Sa 2	270°30.3	285°30.2	300°30.1	315°30.0	330°29.9	345°29.8	0°29.7	15°29.6	30°29.5	45°29.4	60°29.3	75°29.2	-0.1
	22°09.9	22°10.2	22°10.5	22°10.9	22°11.2	22°11.5	22°11.8	22°12.1	22°12.5	22°12.8	22°13.1	22°13.4	+0.3
Su 3	270°27.8	285°27.7	300°27.6	315°27.5	330°27.4	345°27.3	0°27.2	15°27.1	30°27.0	45°26.9	60°26.8	75°26.7	-0.1
	22°17.5	22°17.8	22°18.1	22°18.4	22°18.7	22°19.0	22°19.3	22°19.6	22°19.9	22°20.2	22°20.5	22°20.8	+0.3
Mo 4	270°25.3	285°25.2	300°25.1	315°25.0	330°24.9	345°24.8	0°24.6	15°24.5	30°24.4	45°24.3	60°24.2	75°24.1	-0.1
	22°24.7	22°25.0	22°25.3	22°25.6	22°25.9	22°26.2	22°26.5	22°26.7	22°27.0	22°27.3	22°27.6	22°27.9	+0.3
Tu 5	270°22.7	285°22.6	300°22.4	315°22.3	330°22.2	345°22.1	0°22.0	15°21.9	30°21.8	45°21.7	60°21.5	75°21.4	-0.1
	22°31.5	22°31.8	22°32.1	22°32.4	22°32.6	22°32.9	22°33.2	22°33.5	22°33.7	22°34.0	22°34.3	22°34.5	+0.3
We 6	270°20.0	285°19.8	300°19.7	315°19.6	330°19.5	345°19.4	0°19.3	15°19.2	30°19.0	45°18.9	60°18.8	75°18.7	-0.1
	22°38.0	22°38.2	22°38.5	22°38.8	22°39.0	22°39.3	22°39.5	22°39.8	22°40.0	22°40.3	22°40.5	22°40.8	+0.3
Th 7	270°17.2	285°17.1	300°16.9	315°16.8	330°16.7	345°16.6	0°16.5	15°16.3	30°16.2	45°16.1	60°16.0	75°15.9	-0.1
	22°44.0	22°44.3	22°44.5	22°44.7	22°45.0	22°45.2	22°45.5	22°45.7	22°45.9	22°46.2	22°46.4	22°46.7	+0.2
Fr 8	270°14.3	285°14.2	300°14.1	315°14.0	330°13.8	345°13.7	0°13.6	15°13.5	30°13.4	45°13.2	60°13.1	75°13.0	-0.1
	22°49.7	22°49.9	22°50.1	22°50.3	22°50.6	22°50.8	22°51.0	22°51.2	22°51.4	22°51.7	22°51.9	22°52.1	+0.2
Sa 9	270°11.4	285°11.3	300°11.2	315°11.0	330°10.9	345°10.8	0°10.7	15°10.5	30°10.4	45°10.3	60°10.2	75°10.0	-0.1
	22°54.9	22°55.1	22°55.3	22°55.5	22°55.7	22°55.9	22°56.1	22°56.4	22°56.6	22°56.8	22°57.0	22°57.2	+0.2
Su 10	270°08.4	285°08.3	300°08.2	315°08.0	330°07.9	345°07.8	0°07.7	15°07.5	30°07.4	45°07.3	60°07.2	75°07.0	-0.1
	22°59.7	22°59.9	23°00.1	23°00.3	23°00.5	23°00.7	23°00.9	23°01.1	23°01.3	23°01.4	23°01.6	23°01.8	+0.2
Mo 11	270°05.4	285°05.3	300°05.1	315°05.0	330°04.9	345°04.8	0°04.6	15°04.5	30°04.4	45°04.2	60°04.1	75°04.0	-0.1
	23°04.2	23°04.3	23°04.5	23°04.7	23°04.9	23°05.0	23°05.2	23°05.4	23°05.6	23°05.7	23°05.9	23°06.1	+0.2
Tu 12	270°02.3	285°02.2	300°02.1	315°01.9	330°01.8	345°01.7	0°01.5	15°01.4	30°01.3	45°01.2	60°01.0	75°00.9	-0.1
	23°08.2	23°08.3	23°08.5	23°08.7	23°08.8	23°09.0	23°09.1	23°09.3	23°09.4	23°09.6	23°09.7	23°09.9	+0.2
We 13	269°59.2	284°59.1	299°58.9	314°58.8	329°58.7	344°58.6	359°58.4	14°58.3	29°58.2	44°58.0	59°57.9	74°57.8	-0.1
	23°11.8	23°11.9	23°12.1	23°12.2	23°12.4	23°12.5	23°12.6	23°12.8	23°12.9	23°13.1	23°13.2	23°13.3	+0.1
Th 14	269°56.1	284°55.9	299°55.8	314°55.7	329°55.5	344°55.4	359°55.3	14°55.1	29°55.0	44°54.9	59°54.7	74°54.6	-0.1
	23°15.0	23°15.1	23°15.3	23°15.4	23°15.5	23°15.6	23°15.7	23°15.9	23°16.0	23°16.1	23°16.2	23°16.3	+0.1
Fr 15	269°52.9	284°52.7	299°52.6	314°52.5	329°52.4	344°52.2	359°52.1	14°52.0	29°51.8	44°51.7	59°51.6	74°51.4	-0.1
	23°17.8	23°17.9	23°18.0	23°18.1	23°18.2	23°18.3	23°18.4	23°18.5	23°18.6	23°18.7	23°18.8	23°18.9	+0.1
Sa 16	269°49.7	284°49.5	299°49.4	314°49.3	329°49.1	344°49.0	359°48.9	14°48.7	29°48.6	44°48.5	59°48.3	74°48.2	-0.1
	23°20.2	23°20.3	23°20.4	23°20.5	23°20.5	23°20.6	23°20.7	23°20.8	23°20.9	23°21.0	23°21.1	23°21.1	+0.1
Su 17	269°46.5	284°46.3	299°46.2	314°46.1	329°45.9	344°45.8	359°45.7	14°45.5	29°45.4	44°45.2	59°45.1	74°45.0	-0.1
	23°22.2	23°22.2	23°22.3	23°22.4	23°22.4	23°22.5	23°22.6	23°22.7	23°22.7	23°22.8	23°22.9	23°22.9	+0.1
Mo 18	269°43.2	284°43.1	299°43.0	314°42.8	329°42.7	344°42.5	359°42.4	14°42.3	29°42.1	44°42.0	59°41.9	74°41.7	-0.1
	23°23.7	23°23.8	23°23.8	23°23.9	23°23.9	23°24.0	23°24.0	23°24.1	23°24.1	23°24.2	23°24.2	23°24.3	+0.1
Tu 19	269°40.0	284°39.8	299°39.7	314°39.6	329°39.4	344°39.3	359°39.2	14°39.0	29°38.9	44°38.8	59°38.6	74°38.5	-0.1
	23°24.9	23°24.9	23°24.9	23°25.0	23°25.0	23°25.0	23°25.1	23°25.1	23°25.2	23°25.2	23°25.2	23°25.2	+0.0
We 20	269°36.7	284°36.6	299°36.5	314°36.3	329°36.2	344°36.1	359°35.9	14°35.8	29°35.6	44°35.5	59°35.4	74°35.2	-0.1
	23°25.6	23°25.6	23°25.6	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.8	23°25.8	23°25.8	+0.0
Th 21	269°33.5	284°33.3	299°33.2	314°33.1	329°32.9	344°32.8	359°32.7	14°32.5	29°32.4	44°32.3	59°32.1	74°32.0	-0.1
	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	23°25.9	+0.0
Fr 22	269°30.2	284°30.1	299°30.0	314°29.8	329°29.7	344°29.6	359°29.4	14°29.3	29°29.2	44°29.0	59°28.9	74°28.8	-0.1
	23°25.8	23°25.8	23°25.8	23°25.8	23°25.8	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.7	23°25.6	-0.0
Sa 23	269°27.0	284°26.9	299°26.7	314°26.6	329°26.5	344°26.3	359°26.2	14°26.1	29°25.9	44°25.8	59°25.7	74°25.5	-0.1
	23°25.3	23°25.3	23°25.2	23°25.2	23°25.2	23°25.2	23°25.1	23°25.1	23°25.0	23°25.0	23°25.0	23°24.9	-0.0
Su 24	269°23.8	284°23.7	299°23.5	314°23.4	329°23.3	344°23.1	359°23.0	14°22.9	29°22.7	44°22.6	59°22.5	74°22.3	-0.1
	23°24.4	23°24.3	23°24.3	23°24.2	23°24.2	23°24.1	23°24.1	23°24.0	23°24.0	23°23.9	23°23.9	23°23.8	-0.1
Mo 25	269°20.6	284°20.5	299°20.3	314°20.2	329°20.1	344°20.0	359°19.8	14°19.7	29°19.6	44°19.4	59°19.3	74°19.2	-0.1
	23°23.1	23°23.0	23°22.9	23°22.9	23°22.8	23°22.7	23°22.7	23°22.6	23°22.5	23°22.5	23°22.4	23°22.3	-0.1
Tu 26	269°17.4	284°17.3	299°17.2	314°17.1	329°16.9	344°16.8	359°16.7	14°16.5	29°16.4	44°16.3	59°16.1	74°16.0	-0.1
	23°21.3	23°21.2	23°21.1	23°21.1	23°21.0	23°20.9	23°20.8	23°20.7	23°20.6	23°20.6	23°20.5	23°20.4	-0.1
We 27	269°14.3	284°14.2	299°14.1	314°13.9	329°13.8	344°13.7	359°13.5	14°13.4	29°13.3	44°13.2	59°13.0	74°12.9	-0.1
	23°19.2	23°19.1	23°19.0	23°18.9	23°18.8	23°18.7	23°18.6	23°18.5	23°18.3	23°18.2	23°18.1	23°18.0	-0.1
Th 28	269°11.2	284°11.1	299°11.0	314°10.8	329°10.7	344°10.6	359°10.5	14°10.3	29°10.2	44°10.1	59°09.9	74°09.8	-0.1
	23°16.6	23°16.5	23°16.4	23°16.2	23°16.1	23°16.0	23°15.9	23°15.8	23°15.6	23°15.5	23°15.4	23°15.3	-0.1
Fr 29	269°08.2	284°08.0	299°07.9	314°07.8	329°07.7	344°07.5	359°07.4	14°07.3	29°07.2	44°07.0	59°06.9	74°06.8	-0.1
	23°13.6	23°13.5	23°13.4	23°13.2	23°13.1	23°12.9	23°12.8	23°12.7	23°12.5	23°12.4	23°12.3	23°12.1	-0.1
Sa 30	269°05.2	284°05.0	299°04.9	314°04.8	329°04.7	344°04.5	359°04.4	14°04.3	29°04.2	44°04.1	59°03.9	74°03.8	-0.1
	23°10.2	23°10.1	23°09.9	23°09.8	23°09.6	23°09.5	23°09.3	23°09.2	23°09.0	23°08.9	23°08.7	23°08.6	-0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

June 2035

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Fr 1	247°58.5	262°29.2	276°59.8	291°30.5	306°01.0	320°31.6	335°02.0	349°32.5	4°02.9	18°33.2	33°03.5	+30.5	15.8
	-1°21.5	-1°10.7	-0°59.9	-0°49.1	-0°38.3	-0°27.4	-0°16.5	-0°05.7	0°05.3	0°16.2	0°27.1	+10.9	57.8
Sa 2	250°31.9	265°01.3	279°30.7	294°00.1	308°29.3	322°58.5	337°27.7	351°56.8	6°25.8	20°54.8	35°23.6	+29.2	16.0
	3°12.1	3°23.2	3°34.2	3°45.2	3°56.2	4°07.2	4°18.2	4°29.2	4°40.2	4°51.2	5°02.1	+11.0	58.8
Su 3	252°28.8	266°56.6	281°24.3	295°51.9	310°19.5	324°47.0	339°14.4	353°41.7	8°08.9	22°36.1	37°03.2	+27.4	16.3
	7°44.3	7°54.9	8°05.4	8°15.9	8°26.4	8°36.9	8°47.3	8°57.7	9°08.0	9°18.3	9°28.5	+10.4	59.8
Mo 4	253°40.1	268°06.0	282°31.7	296°57.4	311°23.0	325°48.5	340°13.9	354°39.3	9°04.6	23°29.8	37°54.9	+25.5	16.5
	11°55.7	12°05.1	12°14.3	12°23.5	12°32.6	12°41.6	12°50.6	12°59.4	13°08.2	13°16.9	13°25.6	+9.0	60.6
Tu 5	254°02.8	268°26.7	282°50.6	297°14.5	311°38.2	326°01.9	340°25.6	354°49.1	9°12.6	23°36.1	37°59.5	+23.7	16.7
	15°24.2	15°31.3	15°38.3	15°45.2	15°52.0	15°58.6	16°05.2	16°11.7	16°18.0	16°24.2	16°30.3	+6.6	61.1
● We 6	253°44.3	268°06.9	282°29.5	296°52.1	311°14.6	325°37.2	339°59.6	354°22.1	8°44.6	23°07.0	37°29.4	+22.5	16.7
	17°47.1	17°51.2	17°55.2	17°59.0	18°02.7	18°06.2	18°09.6	18°12.9	18°16.1	18°19.1	18°21.9	+3.5	61.3
Th 7	253°04.2	267°26.5	281°48.9	296°11.2	310°33.6	324°56.0	339°18.4	353°40.8	8°03.3	22°25.7	36°48.2	+22.4	16.7
	18°47.9	18°48.5	18°48.9	18°49.2	18°49.4	18°49.4	18°49.3	18°49.0	18°48.6	18°48.1	18°47.4	-0.0	61.1
Fr 8	252°30.2	266°53.3	281°16.5	295°39.8	310°03.2	324°26.5	338°50.0	353°13.5	7°37.1	22°00.7	36°24.4	+23.4	16.5
	18°20.5	18°17.6	18°14.6	18°11.5	18°08.2	18°04.8	18°01.3	17°57.6	17°53.9	17°50.0	17°45.9	-3.5	60.6
Sa 9	252°28.6	266°53.5	281°18.4	295°43.5	310°08.6	324°33.8	338°59.1	353°24.5	7°50.0	22°15.5	36°41.2	+25.3	16.3
	16°31.6	16°25.7	16°19.8	16°13.7	16°07.5	16°01.3	15°54.9	15°48.5	15°41.9	15°35.3	15°28.5	-6.3	59.9
Su 10	253°16.0	267°43.1	282°10.2	296°37.4	311°04.6	325°32.0	339°59.4	354°27.0	8°54.6	23°22.3	37°50.1	+27.4	16.1
	13°37.1	13°29.0	13°20.9	13°12.7	13°04.4	12°56.1	12°47.6	12°39.2	12°30.6	12°22.0	12°13.4	-8.4	59.0
Mo 11	254°56.8	269°25.9	283°55.0	298°24.3	312°53.6	327°23.0	341°52.4	356°22.0	10°51.6	25°21.3	39°51.0	+29.4	15.8
	9°56.8	9°47.3	9°37.8	9°28.3	9°18.6	9°09.0	8°59.3	8°49.6	8°39.9	8°30.1	8°20.3	-9.7	58.1
◐ Tu 12	257°25.4	271°56.2	286°27.0	300°57.9	315°28.9	329°59.9	344°31.0	359°02.1	13°33.3	28°04.6	42°35.9	+31.1	15.6
	5°49.8	5°39.6	5°29.4	5°19.2	5°08.9	4°58.7	4°48.4	4°38.1	4°27.8	4°17.5	4°07.2	-10.3	57.1
We 13	260°31.0	275°03.0	289°35.1	304°07.1	318°39.3	333°11.4	347°43.6	2°15.9	16°48.1	31°20.4	45°52.8	+32.2	15.4
	1°32.2	1°21.9	1°11.5	1°01.2	0°50.9	0°40.6	0°30.3	0°20.0	0°09.7	-0°00.6	-0°10.8	-10.3	56.3
Th 14	264°01.0	278°33.8	293°06.5	307°39.3	322°12.1	336°44.9	351°17.7	5°50.5	20°23.4	34°56.3	49°29.1	+32.8	15.2
	-2°43.0	-2°53.0	-3°02.9	-3°12.9	-3°22.8	-3°32.7	-3°42.6	-3°52.5	-4°02.3	-4°12.1	-4°21.9	-9.9	55.6
Fr 15	267°43.4	282°16.3	296°49.3	311°22.3	325°55.3	340°28.3	355°01.3	9°34.3	24°07.3	38°40.3	53°13.3	+33.0	15.0
	-6°44.9	-6°54.2	-7°03.4	-7°12.6	-7°21.8	-7°30.9	-7°40.0	-7°49.0	-7°58.0	-8°07.0	-8°15.9	-9.1	55.0
Sa 16	271°27.4	286°00.3	300°33.2	315°06.0	329°38.9	344°11.7	358°44.5	13°17.3	27°50.1	42°22.9	56°55.7	+32.8	14.9
	-10°24.5	-10°32.7	-10°40.8	-10°48.9	-10°57.0	-11°05.0	-11°12.9	-11°20.8	-11°28.6	-11°36.4	-11°44.1	-8.0	54.5
Su 17	275°05.3	289°37.8	304°10.3	318°42.8	333°15.2	347°47.6	2°20.0	16°52.4	31°24.8	45°57.2	60°29.5	+32.4	14.8
	-13°33.3	-13°40.1	-13°46.8	-13°53.5	-14°00.1	-14°06.7	-14°13.2	-14°19.6	-14°25.9	-14°32.2	-14°38.5	-6.5	54.2
Mo 18	278°32.1	293°04.1	307°36.1	322°08.1	336°40.1	351°12.0	5°43.9	20°15.8	34°47.7	49°19.5	63°51.4	+31.9	14.7
	-16°03.7	-16°08.8	-16°13.9	-16°18.9	-16°23.8	-16°28.6	-16°33.3	-16°38.0	-16°42.6	-16°47.2	-16°51.6	-4.8	54.0
Tu 19	281°46.7	296°18.3	310°49.8	325°21.3	339°52.8	354°24.3	8°55.8	23°27.3	37°58.7	52°30.1	67°01.5	+31.5	14.7
	-17°49.1	-17°52.3	-17°55.4	-17°58.4	-18°01.4	-18°04.2	-18°07.0	-18°09.7	-18°12.4	-18°14.9	-18°17.4	-2.8	53.9
○ We 20	284°51.3	299°22.6	313°53.8	328°25.0	342°56.3	357°27.5	11°58.7	26°29.9	41°01.1	55°32.2	70°03.4	+31.2	14.7
	-18°44.1	-18°45.2	-18°46.2	-18°47.2	-18°48.0	-18°48.8	-18°49.5	-18°50.0	-18°50.5	-18°51.0	-18°51.3	-0.7	53.9
Th 21	287°50.9	302°22.0	316°53.2	331°24.4	345°55.5	0°26.7	14°57.9	29°29.1	44°00.2	58°31.4	73°02.6	+31.2	14.7
	-18°45.8	-18°44.7	-18°43.6	-18°42.3	-18°41.0	-18°39.6	-18°38.1	-18°36.5	-18°34.9	-18°33.1	-18°31.3	+1.4	54.0
Fr 22	290°51.3	305°22.6	319°54.0	334°25.3	348°56.6	3°28.0	17°59.4	32°30.7	47°02.1	61°33.5	76°05.0	+31.4	14.8
	-17°53.5	-17°50.4	-17°47.1	-17°43.7	-17°40.3	-17°36.8	-17°33.2	-17°29.5	-17°25.7	-17°21.9	-17°18.0	+3.6	54.2
Sa 23	293°57.7	308°29.3	323°01.0	337°32.6	352°04.3	6°36.0	21°07.7	35°39.4	50°11.1	64°42.9	79°14.6	+31.7	14.9
	-16°09.6	-16°04.4	-15°59.2	-15°53.9	-15°48.5	-15°43.0	-15°37.4	-15°31.8	-15°26.1	-15°20.4	-15°14.5	+5.5	54.5
Su 24	297°12.5	311°44.5	326°16.5	340°48.5	355°20.5	9°52.5	24°24.5	38°56.5	53°28.6	68°00.6	82°32.7	+32.0	15.0
	-13°38.5	-13°31.5	-13°24.5	-13°17.4	-13°10.3	-13°03.1	-12°55.8	-12°48.5	-12°41.1	-12°33.7	-12°26.1	+7.2	54.9
Mo 25	311°44.5	326°16.5	340°48.5	355°20.5	9°52.5	24°24.5	38°56.5	53°28.6	68°00.6	82°32.7	97°04.8	+32.0	15.0
	-13°31.5	-13°24.5	-13°17.4	-13°10.3	-13°03.1	-12°55.8	-12°48.5	-12°41.1	-12°33.7	-12°26.1	-12°18.6	+7.3	54.9
Tu 26	315°06.8	329°39.0	344°11.2	358°43.4	13°15.6	27°47.8	42°20.0	56°52.2	71°24.4	85°56.6	100°28.8	+32.2	15.1
	-10°17.9	-10°09.4	-10°00.9	-9°52.3	-9°43.6	-9°35.0	-9°26.2	-9°17.4	-9°08.6	-8°59.7	-8°50.7	+8.7	55.5
We 27	318°31.3	333°03.4	347°35.5	2°07.6	16°39.7	31°11.8	45°43.8	60°15.9	74°47.9	89°19.9	103°51.9	+32.1	15.3
	-6°31.2	-6°21.5	-6°11.8	-6°02.1	-5°52.4	-5°42.6	-5°32.7	-5°22.9	-5°13.0	-5°03.1	-4°53.1	+9.8	56.1
◑ Th 28	321°49.6	336°21.3	350°52.9	5°24.5	19°56.1	34°27.6	48°59.2	63°30.6	78°02.1	92°33.5	107°04.9	+31.5	15.5
	-2°20.0	-2°09.6	-1°59.2	-1°48.7	-1°38.2	-1°27.7	-1°17.2	-1°06.7	-0°56.1	-0°45.5	-0°34.9	+10.5	56.9
Fr 29	324°50.9	339°21.7	353°52.3	8°23.0	22°53.5	37°24.1	51°54.5	66°25.0	80°55.3	95°25.7	109°55.9	+30.5	15.8
	2°05.3	2°16.0	2°26.7	2°37.5	2°48.2	2°58.9	3°09.7	3°20.4	3°31.1	3°41.9	3°52.6	+10.7	57.8
Sa 30	327°22.9	341°52.2	356°21.4	10°50.5	25°19.6	39°48.6	54°17.6	68°46.5	83°15.3	97°44.0	112°12.7	+29.0	16.0
	6°32.0	6°42.5	6°53.0	7°03.4	7°13.8	7°24.2	7°34.6	7°44.9	7°55.2	8°05.5	8°15.7	+10.4	58.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 6 03h20 — FQ: 12 19h50 — FM: 20 19h37 — LQ: 28 18h42

SUN

July 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Su 1	269°02.2	284°02.1	299°02.0	314°01.8	329°01.7	344°01.6	359°01.5	14°01.4	29°01.2	44°01.1	59°01.0	74°00.9	-0.1
	23°06.5	23°06.3	23°06.1	23°05.9	23°05.8	23°05.6	23°05.4	23°05.3	23°05.1	23°04.9	23°04.8	23°04.6	-0.2
Mo 2	268°59.3	283°59.2	298°59.1	313°59.0	328°58.8	343°58.7	358°58.6	13°58.5	28°58.4	43°58.3	58°58.1	73°58.0	-0.1
	23°02.3	23°02.1	23°01.9	23°01.7	23°01.5	23°01.3	23°01.1	23°01.0	23°00.8	23°00.6	23°00.4	23°00.2	-0.2
Tu 3	268°56.5	283°56.4	298°56.3	313°56.1	328°56.0	343°55.9	358°55.8	13°55.7	28°55.6	43°55.5	58°55.3	73°55.2	-0.1
	22°57.7	22°57.5	22°57.3	22°57.1	22°56.9	22°56.7	22°56.5	22°56.3	22°56.0	22°55.8	22°55.6	22°55.4	-0.2
We 4	268°53.7	283°53.6	298°53.5	313°53.4	328°53.3	343°53.2	358°53.1	13°52.9	28°52.8	43°52.7	58°52.6	73°52.5	-0.1
	22°52.7	22°52.5	22°52.2	22°52.0	22°51.8	22°51.6	22°51.4	22°51.1	22°50.9	22°50.7	22°50.5	22°50.3	-0.2
Th 5	268°51.1	283°50.9	298°50.8	313°50.7	328°50.6	343°50.5	358°50.4	13°50.3	28°50.2	43°50.1	58°50.0	73°49.9	-0.1
	22°47.3	22°47.0	22°46.8	22°46.6	22°46.3	22°46.1	22°45.9	22°45.6	22°45.4	22°45.2	22°44.9	22°44.7	-0.2
Fr 6	268°48.5	283°48.4	298°48.3	313°48.1	328°48.0	343°47.9	358°47.8	13°47.7	28°47.6	43°47.5	58°47.4	73°47.3	-0.1
	22°41.5	22°41.2	22°41.0	22°40.7	22°40.5	22°40.2	22°40.0	22°39.7	22°39.5	22°39.2	22°39.0	22°38.7	-0.3
Sa 7	268°46.0	283°45.9	298°45.8	313°45.7	328°45.6	343°45.5	358°45.4	13°45.3	28°45.2	43°45.0	58°44.9	73°44.8	-0.1
	22°35.3	22°35.0	22°34.8	22°34.5	22°34.2	22°34.0	22°33.7	22°33.4	22°33.2	22°32.9	22°32.6	22°32.4	-0.3
Su 8	268°43.6	283°43.5	298°43.4	313°43.3	328°43.2	343°43.1	358°43.0	13°42.9	28°42.8	43°42.7	58°42.6	73°42.5	-0.1
	22°28.7	22°28.5	22°28.2	22°27.9	22°27.6	22°27.3	22°27.0	22°26.8	22°26.5	22°26.2	22°25.9	22°25.6	-0.3
Mo 9	268°41.3	283°41.2	298°41.1	313°41.0	328°40.9	343°40.8	358°40.7	13°40.6	28°40.5	43°40.4	58°40.3	73°40.2	-0.1
	22°21.8	22°21.5	22°21.2	22°20.9	22°20.6	22°20.3	22°20.0	22°19.7	22°19.4	22°19.1	22°18.8	22°18.5	-0.3
Tu 10	268°39.1	283°39.0	298°38.9	313°38.8	328°38.7	343°38.6	358°38.5	13°38.4	28°38.4	43°38.3	58°38.2	73°38.1	-0.1
	22°14.4	22°14.1	22°13.8	22°13.5	22°13.2	22°12.9	22°12.5	22°12.2	22°11.9	22°11.6	22°11.3	22°10.9	-0.3
We 11	268°37.0	283°36.9	298°36.8	313°36.7	328°36.6	343°36.6	358°36.5	13°36.4	28°36.3	43°36.2	58°36.1	73°36.1	-0.1
	22°06.7	22°06.4	22°06.1	22°05.7	22°05.4	22°05.1	22°04.7	22°04.4	22°04.1	22°03.7	22°03.4	22°03.0	-0.3
Th 12	268°35.0	283°34.9	298°34.9	313°34.8	328°34.7	343°34.6	358°34.5	13°34.5	28°34.4	43°34.3	58°34.2	73°34.1	-0.1
	21°58.6	21°58.3	21°57.9	21°57.6	21°57.2	21°56.9	21°56.5	21°56.2	21°55.8	21°55.5	21°55.1	21°54.8	-0.3
Fr 13	268°33.2	283°33.1	298°33.0	313°32.9	328°32.9	343°32.8	358°32.7	13°32.6	28°32.6	43°32.5	58°32.4	73°32.4	-0.1
	21°50.1	21°49.8	21°49.4	21°49.0	21°48.7	21°48.3	21°47.9	21°47.6	21°47.2	21°46.8	21°46.5	21°46.1	-0.4
Sa 14	268°31.4	283°31.4	298°31.3	313°31.2	328°31.2	343°31.1	358°31.0	13°31.0	28°30.9	43°30.8	58°30.8	73°30.7	-0.1
	21°41.3	21°40.9	21°40.5	21°40.1	21°39.8	21°39.4	21°39.0	21°38.6	21°38.2	21°37.8	21°37.5	21°37.1	-0.4
Su 15	268°29.8	283°29.8	298°29.7	313°29.7	328°29.6	343°29.5	358°29.5	13°29.4	28°29.3	43°29.3	58°29.2	73°29.2	-0.1
	21°32.0	21°31.6	21°31.3	21°30.9	21°30.5	21°30.1	21°29.7	21°29.3	21°28.9	21°28.5	21°28.1	21°27.7	-0.4
Mo 16	268°28.4	283°28.3	298°28.3	313°28.2	328°28.1	343°28.1	358°28.0	13°28.0	28°27.9	43°27.9	58°27.8	73°27.8	-0.1
	21°22.4	21°22.0	21°21.6	21°21.2	21°20.8	21°20.4	21°20.0	21°19.6	21°19.2	21°18.8	21°18.3	21°17.9	-0.4
Tu 17	268°27.0	283°27.0	298°26.9	313°26.9	328°26.8	343°26.8	358°26.7	13°26.7	28°26.6	43°26.6	58°26.5	73°26.5	-0.1
	21°12.5	21°12.1	21°11.6	21°11.2	21°10.8	21°10.4	21°09.9	21°09.5	21°09.1	21°08.7	21°08.2	21°07.8	-0.4
We 18	268°25.8	283°25.8	298°25.8	313°25.7	328°25.7	343°25.6	358°25.6	13°25.5	28°25.5	43°25.4	58°25.4	73°25.3	-0.0
	21°02.2	21°01.7	21°01.3	21°00.9	21°00.4	21°00.0	20°59.5	20°59.1	20°58.7	20°58.2	20°57.8	20°57.3	-0.4
Th 19	268°24.8	283°24.7	298°24.7	313°24.7	328°24.6	343°24.6	358°24.5	13°24.5	28°24.5	43°24.4	58°24.4	73°24.3	-0.0
	20°51.5	20°51.1	20°50.6	20°50.1	20°49.7	20°49.2	20°48.8	20°48.3	20°47.9	20°47.4	20°47.0	20°46.5	-0.5
Fr 20	268°23.9	283°23.8	298°23.8	313°23.7	328°23.7	343°23.7	358°23.6	13°23.6	28°23.6	43°23.5	58°23.5	73°23.5	-0.0
	20°40.5	20°40.0	20°39.5	20°39.1	20°38.6	20°38.1	20°37.7	20°37.2	20°36.7	20°36.3	20°35.8	20°35.3	-0.5
Sa 21	268°23.1	283°23.0	298°23.0	313°23.0	328°23.0	343°22.9	358°22.9	13°22.9	28°22.8	43°22.8	58°22.8	73°22.8	-0.0
	20°29.1	20°28.6	20°28.1	20°27.7	20°27.2	20°26.7	20°26.2	20°25.7	20°25.2	20°24.8	20°24.3	20°23.8	-0.5
Su 22	268°22.4	283°22.4	298°22.4	313°22.4	328°22.3	343°22.3	358°22.3	13°22.3	28°22.2	43°22.2	58°22.2	73°22.2	-0.0
	20°17.4	20°16.9	20°16.4	20°15.9	20°15.4	20°14.9	20°14.4	20°13.9	20°13.4	20°12.9	20°12.4	20°11.9	-0.5
Mo 23	268°21.9	283°21.9	298°21.9	313°21.9	328°21.9	343°21.8	358°21.8	13°21.8	28°21.8	43°21.8	58°21.8	73°21.7	-0.0
	20°05.3	20°04.8	20°04.3	20°03.8	20°03.3	20°02.8	20°02.3	20°01.8	20°01.3	20°00.7	20°00.2	19°59.7	-0.5
Tu 24	268°21.6	283°21.5	298°21.5	313°21.5	328°21.5	343°21.5	358°21.5	13°21.5	28°21.5	43°21.5	58°21.5	73°21.4	-0.0
	19°53.0	19°52.4	19°51.9	19°51.4	19°50.9	19°50.3	19°49.8	19°49.3	19°48.8	19°48.2	19°47.7	19°47.2	-0.5
We 25	268°21.3	283°21.3	298°21.3	313°21.3	328°21.3	343°21.3	358°21.3	13°21.3	28°21.3	43°21.3	58°21.3	73°21.3	-0.0
	19°40.2	19°39.7	19°39.2	19°38.6	19°38.1	19°37.6	19°37.0	19°36.5	19°35.9	19°35.4	19°34.8	19°34.3	-0.5
Th 26	268°21.3	283°21.3	298°21.3	313°21.3	328°21.3	343°21.3	358°21.3	13°21.3	28°21.3	43°21.3	58°21.3	73°21.3	+0.0
	19°27.2	19°26.6	19°26.1	19°25.5	19°25.0	19°24.4	19°23.9	19°23.3	19°22.8	19°22.2	19°21.7	19°21.1	-0.6
Fr 27	268°21.3	283°21.4	298°21.4	313°21.4	328°21.4	343°21.4	358°21.4	13°21.4	28°21.4	43°21.4	58°21.4	73°21.4	+0.0
	19°13.8	19°13.3	19°12.7	19°12.1	19°11.6	19°11.0	19°10.4	19°09.9	19°09.3	19°08.7	19°08.2	19°07.6	-0.6
Sa 28	268°21.6	283°21.6	298°21.6	313°21.6	328°21.6	343°21.6	358°21.6	13°21.7	28°21.7	43°21.7	58°21.7	73°21.7	+0.0
	19°00.1	18°59.6	18°59.0	18°58.4	18°57.8	18°57.3	18°56.7	18°56.1	18°55.5	18°54.9	18°54.3	18°53.8	-0.6
Su 29	268°21.9	283°21.9	298°22.0	313°22.0	328°22.0	343°22.0	358°22.0	13°22.1	28°22.1	43°22.1	58°22.1	73°22.1	+0.0
	18°46.1	18°45.6	18°45.0	18°44.4	18°43.8	18°43.2	18°42.6	18°42.0	18°41.4	18°40.8	18°40.2	18°39.6	-0.6
Mo 30	268°22.4	283°22.5	298°22.5	313°22.5	328°22.5	343°22.6	358°22.6	13°22.6	28°22.6	43°22.7	58°22.7	73°22.7	+0.0
	18°31.8	18°31.2	18°30.6	18°30.0	18°29.4	18°28.8	18°28.2	18°27.6	18°27.0	18°26.4	18°25.8	18°25.2	-0.6
Tu 31	268°23.1	283°23.1	298°23.2	313°23.2	328°23.2	343°23.2	358°23.3	13°23.3	28°23.3	43°23.4	58°23.4	73°23.4	+0.0
	18°17.2	18°16.6	18°16.0	18°15.4	18°14.8	18°14.1	18°13.5	18°12.9	18°12.3	18°11.7	18°11.0	18°10.4	-0.6

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.7'

MOON

July 2035

D	23h	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	Δ'/h	SH
Su 1	242°27.3	256°55.2	271°23.1	285°50.8	300°18.5	314°46.1	329°13.6	343°41.0	358°08.4	12°35.6	27°02.8	+27.6	16.2
	9°46.2	9°56.1	10°05.9	10°15.6	10°25.3	10°35.0	10°44.6	10°54.1	11°03.6	11°13.0	11°22.4	+9.6	59.4
Mo 2	243°40.8	258°06.7	272°32.5	286°58.2	301°23.8	315°49.3	330°14.8	344°40.2	359°05.5	13°30.7	27°55.8	+25.5	16.4
	13°35.2	13°43.5	13°51.7	13°59.8	14°07.8	14°15.8	14°23.6	14°31.4	14°39.1	14°46.7	14°54.2	+7.9	60.2
Tu 3	244°03.5	258°27.4	272°51.2	287°15.0	301°38.7	316°02.4	330°26.0	344°49.5	359°13.0	13°36.4	27°59.7	+23.6	16.6
	16°34.7	16°40.5	16°46.3	16°51.9	16°57.4	17°02.7	17°08.0	17°13.1	17°18.2	17°23.1	17°27.8	+5.3	60.8
We 4	243°43.6	258°06.2	272°28.7	286°51.2	301°13.7	315°36.1	329°58.6	344°21.0	358°43.3	13°05.7	27°28.0	+22.4	16.7
	18°24.0	18°26.7	18°29.2	18°31.6	18°33.9	18°36.0	18°38.0	18°39.8	18°41.5	18°43.1	18°44.5	+2.1	61.2
● Th 5	243°02.0	257°24.2	271°46.5	286°08.8	300°31.2	314°53.5	329°15.9	343°38.3	358°00.7	12°23.1	26°45.6	+22.4	16.7
	18°48.6	18°47.7	18°46.7	18°45.5	18°44.2	18°42.8	18°41.2	18°39.5	18°37.6	18°35.6	18°33.5	-1.5	61.2
Fr 6	242°27.2	256°50.3	271°13.5	285°36.8	300°00.1	314°23.5	328°46.9	343°10.4	357°34.0	11°57.7	26°21.4	+23.4	16.6
	17°44.9	17°40.7	17°36.2	17°31.7	17°27.0	17°22.2	17°17.3	17°12.3	17°07.1	17°01.9	16°56.5	-4.9	60.8
Sa 7	242°25.6	256°50.5	271°15.5	285°40.5	300°05.7	314°30.9	328°56.2	343°21.6	357°47.1	12°12.6	26°38.3	+25.3	16.4
	15°22.2	15°15.1	15°07.9	15°00.6	14°53.2	14°45.7	14°38.1	14°30.5	14°22.7	14°14.8	14°06.9	-7.5	60.2
Su 8	243°13.2	257°40.2	272°07.3	286°34.5	301°01.8	315°29.1	329°56.6	344°24.1	358°51.7	13°19.4	27°47.2	+27.4	16.2
	11°58.7	11°49.6	11°40.5	11°31.2	11°22.0	11°12.6	11°03.2	10°53.8	10°44.3	10°34.7	10°25.1	-9.4	59.3
Mo 9	244°53.5	259°22.5	273°51.6	288°20.8	302°50.1	317°19.4	331°48.9	346°18.3	0°47.9	15°17.5	29°47.2	+29.4	15.9
	7°56.0	7°45.8	7°35.6	7°25.3	7°15.0	7°04.6	6°54.3	6°43.9	6°33.5	6°23.1	6°12.6	-10.3	58.4
Tu 10	247°20.4	261°51.1	276°21.9	290°52.7	305°23.5	319°54.5	334°25.4	348°56.5	3°27.5	17°58.7	32°29.8	+30.9	15.6
	3°34.4	3°23.8	3°13.2	3°02.6	2°52.0	2°41.4	2°30.8	2°20.1	2°09.5	1°58.9	1°48.3	-10.6	57.4
We 11	250°22.9	264°54.8	279°26.7	293°58.6	308°30.6	323°02.6	337°34.7	352°06.7	6°38.8	21°11.0	35°43.1	+32.0	15.4
	-0°49.5	-0°59.9	-1°10.3	-1°20.7	-1°31.0	-1°41.3	-1°51.6	-2°01.9	-2°12.2	-2°22.5	-2°32.7	-10.3	56.5
◐ Th 12	253°48.6	268°21.1	282°53.7	297°26.2	311°58.8	326°31.4	341°04.0	355°36.6	10°09.3	24°41.9	39°14.6	+32.6	15.2
	-5°02.7	-5°12.5	-5°22.2	-5°31.9	-5°41.5	-5°51.2	-6°00.7	-6°10.3	-6°19.8	-6°29.3	-6°38.7	-9.6	55.6
Fr 13	257°25.4	271°58.1	286°30.9	301°03.6	315°36.4	330°09.1	344°41.9	359°14.6	13°47.4	28°20.1	42°52.9	+32.8	15.0
	-8°55.2	-9°03.9	-9°12.6	-9°21.3	-9°29.9	-9°38.4	-9°46.9	-9°55.4	-10°03.8	-10°12.1	-10°20.4	-8.5	55.0
Sa 14	261°03.2	275°35.8	290°08.4	304°41.0	319°13.6	333°46.2	348°18.7	2°51.3	17°23.8	31°56.3	46°28.8	+32.6	14.9
	-12°18.6	-12°26.0	-12°33.4	-12°40.7	-12°47.9	-12°55.1	-13°02.2	-13°09.3	-13°16.3	-13°23.3	-13°30.1	-7.2	54.5
Su 15	264°34.6	279°06.8	293°39.1	308°11.3	322°43.5	337°15.7	351°47.8	6°20.0	20°52.1	35°24.2	49°56.3	+32.2	14.8
	-15°05.6	-15°11.5	-15°17.2	-15°22.9	-15°28.6	-15°34.1	-15°39.6	-15°45.0	-15°50.4	-15°55.6	-16°00.8	-5.5	54.2
Mo 16	267°55.3	282°27.1	296°58.9	311°30.6	326°02.3	340°34.1	355°05.7	9°37.4	24°09.1	38°40.7	53°12.3	+31.7	14.7
	-17°10.0	-17°14.0	-17°17.9	-17°21.7	-17°25.5	-17°29.2	-17°32.8	-17°36.3	-17°39.8	-17°43.2	-17°46.4	-3.6	54.0
Tu 17	271°04.7	285°36.1	300°07.4	314°38.8	329°10.1	343°41.4	358°12.7	12°44.0	27°15.3	41°46.6	56°17.8	+31.3	14.7
	-18°26.0	-18°28.0	-18°29.9	-18°31.7	-18°33.4	-18°35.1	-18°36.6	-18°38.1	-18°39.5	-18°40.8	-18°42.0	-1.6	53.9
We 18	274°05.5	288°36.6	303°07.7	317°38.9	332°10.0	346°41.1	1°12.2	15°43.2	30°14.3	44°45.4	59°16.5	+31.1	14.7
	-18°49.8	-18°49.6	-18°49.4	-18°49.0	-18°48.6	-18°48.1	-18°47.5	-18°46.8	-18°46.0	-18°45.1	-18°44.2	+0.6	54.0
Th 19	277°02.8	291°33.9	306°05.0	320°36.1	335°07.2	349°38.3	4°09.5	18°40.6	33°11.7	47°42.9	62°14.0	+31.1	14.8
	-18°19.4	-18°17.0	-18°14.6	-18°12.1	-18°09.5	-18°06.8	-18°04.0	-18°01.2	-17°58.3	-17°55.2	-17°52.1	+2.7	54.2
○ Fr 20	280°02.3	294°33.6	309°04.9	323°36.2	338°07.6	352°38.9	7°10.3	21°41.7	36°13.0	50°44.4	65°15.8	+31.4	14.9
	-16°55.5	-16°51.1	-16°46.6	-16°42.0	-16°37.4	-16°32.6	-16°27.8	-16°22.9	-16°17.9	-16°12.9	-16°07.7	+4.8	54.5
Sa 21	283°08.6	297°40.3	312°11.9	326°43.6	341°15.3	355°47.0	10°18.7	24°50.4	39°22.1	53°53.9	68°25.6	+31.7	14.9
	-14°41.8	-14°35.4	-14°29.1	-14°22.6	-14°16.1	-14°09.5	-14°02.8	-13°56.1	-13°49.3	-13°42.4	-13°35.5	+6.6	54.8
Su 22	286°23.6	300°55.6	315°27.6	329°59.6	344°31.6	359°03.6	13°35.6	28°07.6	42°39.7	57°11.7	71°43.8	+32.0	15.1
	-11°43.9	-11°36.0	-11°28.0	-11°20.0	-11°11.9	-11°03.7	-10°55.5	-10°47.3	-10°38.9	-10°30.6	-10°22.1	+8.2	55.2
Mo 23	289°45.5	304°17.7	318°49.8	333°22.0	347°54.1	2°26.3	16°58.5	31°30.6	46°02.8	60°35.0	75°07.1	+32.2	15.2
	-8°09.8	-8°00.6	-7°51.4	-7°42.1	-7°32.8	-7°23.5	-7°14.1	-7°04.6	-6°55.1	-6°45.6	-6°36.1	+9.4	55.7
Tu 24	293°09.0	307°41.1	322°13.2	336°45.2	351°17.2	5°49.2	20°21.3	34°53.2	49°25.2	63°57.2	78°29.1	+32.0	15.3
	-4°08.7	-3°58.6	-3°48.5	-3°38.4	-3°28.3	-3°18.1	-3°07.9	-2°57.7	-2°47.5	-2°37.2	-2°26.9	+10.2	56.3
We 25	307°41.1	322°13.2	336°45.2	351°17.2	5°49.2	20°21.3	34°53.2	49°25.2	63°57.2	78°29.1	93°01.0	+32.0	15.4
	-3°58.6	-3°48.5	-3°38.4	-3°28.3	-3°18.1	-3°07.9	-2°57.7	-2°47.5	-2°37.2	-2°26.9	-2°16.6	+10.2	56.3
Th 26	310°57.5	325°29.0	340°00.6	354°32.1	9°03.5	23°35.0	38°06.4	52°37.8	67°09.1	81°40.4	96°11.7	+31.4	15.5
	0°19.7	0°30.2	0°40.7	0°51.2	1°01.8	1°12.3	1°22.8	1°33.4	1°43.9	1°54.4	2°05.0	+10.5	57.0
Fr 27	313°56.1	328°26.8	342°57.3	357°27.8	11°58.3	26°28.7	40°59.1	55°29.4	69°59.7	84°29.9	99°00.1	+30.4	15.7
	4°42.5	4°52.9	5°03.4	5°13.7	5°24.1	5°34.5	5°44.8	5°55.1	6°05.4	6°15.7	6°26.0	+10.3	57.7
◑ Sa 28	316°25.7	330°54.9	345°24.0	359°53.1	14°22.1	28°51.1	43°20.0	57°48.8	72°17.6	86°46.2	101°14.9	+28.9	15.9
	8°56.4	9°06.1	9°15.9	9°25.5	9°35.2	9°44.7	9°54.3	10°03.8	10°13.2	10°22.6	10°32.0	+9.6	58.4
Su 29	318°15.6	332°43.1	347°10.4	1°37.8	16°05.0	30°32.2	44°59.2	59°26.3	73°53.2	88°20.1	102°46.8	+27.1	16.1
	12°45.6	12°54.0	13°02.3	13°10.6	13°18.8	13°26.9	13°34.9	13°42.9	13°50.8	13°58.6	14°06.4	+8.1	59.1
Mo 30	319°19.6	333°45.2	348°10.7	2°36.2	17°01.5	31°26.8	45°52.1	60°17.2	74°42.3	89°07.4	103°32.3	+25.3	16.3
	15°52.2	15°58.5	16°04.7	16°10.9	16°16.9	16°22.8	16°28.6	16°34.3	16°39.9	16°45.4	16°50.8	+5.9	59.8
Tu 31	319°39.2	334°03.2	348°27.1	2°51.0	17°14.8	31°38.6	46°02.4	60°26.1	74°49.7	89°13.3	103°36.9	+23.8	16.5
	17°57.9	18°01.4	18°04.8	18°08.1	18°11.2	18°14.2	18°17.1	18°19.9	18°22.5	18°25.0	18°27.4	+3.0	60.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 5 09h59 — FQ: 12 07h32 — FM: 20 10h36 — LQ: 28 02h55

SUN

August 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
We 1	268°23.9	283°23.9	298°24.0	313°24.0	328°24.0	343°24.1	358°24.1	13°24.2	28°24.2	43°24.2	58°24.3	73°24.3	+0.0
	18°02.3	18°01.7	18°01.0	18°00.4	17°59.8	17°59.2	17°58.5	17°57.9	17°57.3	17°56.6	17°56.0	17°55.4	-0.6
Th 2	268°24.9	283°24.9	298°24.9	313°25.0	328°25.0	343°25.1	358°25.1	13°25.2	28°25.2	43°25.2	58°25.3	73°25.3	+0.0
	17°47.1	17°46.5	17°45.8	17°45.2	17°44.5	17°43.9	17°43.2	17°42.6	17°42.0	17°41.3	17°40.7	17°40.0	-0.6
Fr 3	268°26.0	283°26.0	298°26.1	313°26.1	328°26.2	343°26.2	358°26.3	13°26.3	28°26.4	43°26.4	58°26.5	73°26.5	+0.1
	17°31.6	17°30.9	17°30.3	17°29.6	17°29.0	17°28.3	17°27.7	17°27.0	17°26.4	17°25.7	17°25.1	17°24.4	-0.7
Sa 4	268°27.2	283°27.3	298°27.3	313°27.4	328°27.4	343°27.5	358°27.5	13°27.6	28°27.7	43°27.7	58°27.8	73°27.8	+0.1
	17°15.8	17°15.1	17°14.5	17°13.8	17°13.2	17°12.5	17°11.8	17°11.2	17°10.5	17°09.8	17°09.2	17°08.5	-0.7
Su 5	268°28.6	283°28.7	298°28.7	313°28.8	328°28.9	343°28.9	358°29.0	13°29.1	28°29.1	43°29.2	58°29.2	73°29.3	+0.1
	16°59.8	16°59.1	16°58.4	16°57.7	16°57.0	16°56.4	16°55.7	16°55.0	16°54.3	16°53.7	16°53.0	16°52.3	-0.7
Mo 6	268°30.2	283°30.2	298°30.3	313°30.4	328°30.4	343°30.5	358°30.6	13°30.7	28°30.7	43°30.8	58°30.9	73°30.9	+0.1
	16°43.4	16°42.7	16°42.0	16°41.4	16°40.7	16°40.0	16°39.3	16°38.6	16°37.9	16°37.2	16°36.5	16°35.8	-0.7
Tu 7	268°31.9	283°32.0	298°32.0	313°32.1	328°32.2	343°32.3	358°32.3	13°32.4	28°32.5	43°32.6	58°32.6	73°32.7	+0.1
	16°26.8	16°26.1	16°25.4	16°24.7	16°24.0	16°23.3	16°22.6	16°21.9	16°21.2	16°20.5	16°19.8	16°19.1	-0.7
We 8	268°33.7	283°33.8	298°33.9	313°34.0	328°34.1	343°34.2	358°34.2	13°34.3	28°34.4	43°34.5	58°34.6	73°34.6	+0.1
	16°09.9	16°09.2	16°08.5	16°07.8	16°07.1	16°06.4	16°05.7	16°05.0	16°04.3	16°03.5	16°02.8	16°02.1	-0.7
Th 9	268°35.8	283°35.8	298°35.9	313°36.0	328°36.1	343°36.2	358°36.3	13°36.4	28°36.5	43°36.6	58°36.6	73°36.7	+0.1
	15°52.8	15°52.1	15°51.4	15°50.7	15°49.9	15°49.2	15°48.5	15°47.8	15°47.0	15°46.3	15°45.6	15°44.9	-0.7
Fr 10	268°37.9	283°38.0	298°38.1	313°38.2	328°38.3	343°38.4	358°38.5	13°38.6	28°38.7	43°38.8	58°38.9	73°39.0	+0.1
	15°35.4	15°34.7	15°34.0	15°33.2	15°32.5	15°31.8	15°31.0	15°30.3	15°29.6	15°28.9	15°28.1	15°27.4	-0.7
Sa 11	268°40.2	283°40.3	298°40.4	313°40.5	328°40.6	343°40.7	358°40.8	13°40.9	28°41.0	43°41.1	58°41.2	73°41.3	+0.1
	15°17.8	15°17.1	15°16.3	15°15.6	15°14.8	15°14.1	15°13.4	15°12.6	15°11.9	15°11.1	15°10.4	15°09.6	-0.7
Su 12	268°42.7	283°42.8	298°42.9	313°43.0	328°43.1	343°43.2	358°43.3	13°43.4	28°43.5	43°43.7	58°43.8	73°43.9	+0.1
	14°59.9	14°59.2	14°58.4	14°57.7	14°56.9	14°56.2	14°55.4	14°54.7	14°53.9	14°53.2	14°52.4	14°51.7	-0.8
Mo 13	268°45.3	283°45.4	298°45.5	313°45.6	328°45.7	343°45.9	358°46.0	13°46.1	28°46.2	43°46.3	58°46.4	73°46.5	+0.1
	14°41.8	14°41.1	14°40.3	14°39.5	14°38.8	14°38.0	14°37.3	14°36.5	14°35.7	14°35.0	14°34.2	14°33.4	-0.8
Tu 14	268°48.0	283°48.2	298°48.3	313°48.4	328°48.5	343°48.6	358°48.7	13°48.9	28°49.0	43°49.1	58°49.2	73°49.3	+0.1
	14°23.5	14°22.7	14°21.9	14°21.2	14°20.4	14°19.6	14°18.9	14°18.1	14°17.3	14°16.5	14°15.8	14°15.0	-0.8
We 15	268°50.9	283°51.0	298°51.2	313°51.3	328°51.4	343°51.5	358°51.7	13°51.8	28°51.9	43°52.0	58°52.2	73°52.3	+0.1
	14°04.9	14°04.1	14°03.3	14°02.6	14°01.8	14°01.0	14°00.2	13°59.4	13°58.7	13°57.9	13°57.1	13°56.3	-0.8
Th 16	268°53.9	283°54.1	298°54.2	313°54.3	328°54.5	343°54.6	358°54.7	13°54.8	28°55.0	43°55.1	58°55.2	73°55.4	+0.1
	13°46.1	13°45.3	13°44.5	13°43.7	13°43.0	13°42.2	13°41.4	13°40.6	13°39.8	13°39.0	13°38.2	13°37.4	-0.8
Fr 17	268°57.1	283°57.2	298°57.4	313°57.5	328°57.6	343°57.8	358°57.9	13°58.0	28°58.2	43°58.3	58°58.4	73°58.6	+0.1
	13°27.1	13°26.3	13°25.5	13°24.7	13°23.9	13°23.1	13°22.3	13°21.5	13°20.7	13°19.9	13°19.1	13°18.3	-0.8
Sa 18	269°00.4	284°00.5	299°00.7	314°00.8	329°00.9	344°01.1	359°01.2	14°01.4	29°01.5	44°01.6	59°01.8	74°01.9	+0.1
	13°07.9	13°07.1	13°06.3	13°05.5	13°04.6	13°03.8	13°03.0	13°02.2	13°01.4	13°00.6	12°59.8	12°59.0	-0.8
Su 19	269°03.8	284°03.9	299°04.1	314°04.2	329°04.4	344°04.5	359°04.7	14°04.8	29°04.9	44°05.1	59°05.2	74°05.4	+0.1
	12°48.4	12°47.6	12°46.8	12°46.0	12°45.2	12°44.4	12°43.5	12°42.7	12°41.9	12°41.1	12°40.3	12°39.5	-0.8
Mo 20	269°07.3	284°07.5	299°07.6	314°07.8	329°07.9	344°08.1	359°08.2	14°08.4	29°08.5	44°08.7	59°08.8	74°09.0	+0.2
	12°28.8	12°28.0	12°27.2	12°26.3	12°25.5	12°24.7	12°23.9	12°23.0	12°22.2	12°21.4	12°20.6	12°19.7	-0.8
Tu 21	269°11.0	284°11.1	299°11.3	314°11.4	329°11.6	344°11.7	359°11.9	14°12.0	29°12.2	44°12.4	59°12.5	74°12.7	+0.2
	12°09.0	12°08.1	12°07.3	12°06.5	12°05.6	12°04.8	12°04.0	12°03.2	12°02.3	12°01.5	12°00.7	11°59.8	-0.8
We 22	269°14.7	284°14.9	299°15.0	314°15.2	329°15.4	344°15.5	359°15.7	14°15.8	29°16.0	44°16.2	59°16.3	74°16.5	+0.2
	11°48.9	11°48.1	11°47.3	11°46.4	11°45.6	11°44.8	11°43.9	11°43.1	11°42.2	11°41.4	11°40.5	11°39.7	-0.8
Th 23	269°18.6	284°18.8	299°18.9	314°19.1	329°19.3	344°19.4	359°19.6	14°19.8	29°19.9	44°20.1	59°20.2	74°20.4	+0.2
	11°28.7	11°27.9	11°27.0	11°26.2	11°25.3	11°24.5	11°23.7	11°22.8	11°22.0	11°21.1	11°20.3	11°19.4	-0.8
Fr 24	269°22.6	284°22.7	299°22.9	314°23.1	329°23.3	344°23.4	359°23.6	14°23.8	29°23.9	44°24.1	59°24.3	74°24.4	+0.2
	11°08.3	11°07.5	11°06.6	11°05.8	11°04.9	11°04.1	11°03.2	11°02.4	11°01.5	11°00.6	10°59.8	10°58.9	-0.9
Sa 25	269°26.7	284°26.8	299°27.0	314°27.2	329°27.4	344°27.5	359°27.7	14°27.9	29°28.0	44°28.2	59°28.4	74°28.6	+0.2
	10°47.8	10°46.9	10°46.0	10°45.2	10°44.3	10°43.5	10°42.6	10°41.7	10°40.9	10°40.0	10°39.1	10°38.3	-0.9
Su 26	269°30.8	284°31.0	299°31.2	314°31.4	329°31.5	344°31.7	359°31.9	14°32.1	29°32.3	44°32.4	59°32.6	74°32.8	+0.2
	10°27.0	10°26.2	10°25.3	10°24.4	10°23.6	10°22.7	10°21.8	10°20.9	10°20.1	10°19.2	10°18.3	10°17.5	-0.9
Mo 27	269°35.1	284°35.3	299°35.5	314°35.7	329°35.8	344°36.0	359°36.2	14°36.4	29°36.6	44°36.7	59°36.9	74°37.1	+0.2
	10°06.1	10°05.2	10°04.4	10°03.5	10°02.6	10°01.7	10°00.9	10°00.0	9°59.1	9°58.2	9°57.4	9°56.5	-0.9
Tu 28	269°39.5	284°39.7	299°39.8	314°40.0	329°40.2	344°40.4	359°40.6	14°40.8	29°41.0	44°41.1	59°41.3	74°41.5	+0.2
	9°45.0	9°44.2	9°43.3	9°42.4	9°41.5	9°40.6	9°39.7	9°38.9	9°38.0	9°37.1	9°36.2	9°35.3	-0.9
We 29	269°43.9	284°44.1	299°44.3	314°44.5	329°44.7	344°44.9	359°45.1	14°45.2	29°45.4	44°45.6	59°45.8	74°46.0	+0.2
	9°23.8	9°22.9	9°22.0	9°21.1	9°20.3	9°19.4	9°18.5	9°17.6	9°16.7	9°15.8	9°14.9	9°14.0	-0.9
Th 30	269°48.5	284°48.7	299°48.8	314°49.0	329°49.2	344°49.4	359°49.6	14°49.8	29°50.0	44°50.2	59°50.4	74°50.6	+0.2
	9°02.4	9°01.5	9°00.6	8°59.8	8°58.9	8°58.0	8°57.1	8°56.2	8°55.3	8°54.4	8°53.5	8°52.6	-0.9
Fr 31	269°53.1	284°53.3	299°53.5	314°53.7	329°53.8	344°54.0	359°54.2	14°54.4	29°54.6	44°54.8	59°55.0	74°55.2	+0.2
	8°40.9	8°40.0	8°39.1	8°38.2	8°37.3	8°36.4	8°35.5	8°34.6	8°33.7	8°32.8	8°31.9	8°31.0	-0.9

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.8'

MOON

August 2035

D	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	Δ'/h	SH
We 1	247°30.6	261°53.8	276°17.0	290°40.2	305°03.3	319°26.4	333°49.5	348°12.6	2°35.7	16°58.8	31°21.8	+23.1	16.5
	18°43.9	18°44.8	18°45.6	18°46.2	18°46.7	18°47.0	18°47.3	18°47.4	18°47.3	18°47.1	18°46.8	+0.3	60.6
Th 2	247°07.4	261°30.5	275°53.7	290°16.8	304°40.0	319°03.2	333°26.4	347°49.6	2°12.9	16°36.2	30°59.5	+23.2	16.6
	18°25.4	18°22.9	18°20.2	18°17.5	18°14.5	18°11.5	18°08.3	18°05.0	18°01.5	17°58.0	17°54.2	-3.1	60.7
● Fr 3	246°54.0	261°18.0	275°42.0	290°06.1	304°30.3	318°54.5	333°18.8	347°43.1	2°07.5	16°32.0	30°56.5	+24.2	16.5
	16°43.5	16°37.8	16°32.0	16°26.1	16°20.0	16°13.9	16°07.6	16°01.3	15°54.8	15°48.2	15°41.5	-6.2	60.5
Sa 4	247°12.0	261°37.6	276°03.3	290°29.0	304°54.8	319°20.7	333°46.7	348°12.7	2°38.8	17°05.0	31°31.2	+25.9	16.4
	13°49.3	13°41.1	13°32.8	13°24.4	13°16.0	13°07.4	12°58.8	12°50.1	12°41.3	12°32.5	12°23.6	-8.6	60.0
Su 5	248°13.9	262°41.4	277°08.9	291°36.5	306°04.2	320°31.9	334°59.7	349°27.6	3°55.6	18°23.6	32°51.7	+27.8	16.2
	10°02.0	9°52.1	9°42.2	9°32.2	9°22.1	9°12.1	9°01.9	8°51.8	8°41.6	8°31.3	8°21.0	-10.1	59.3
Mo 6	250°01.5	264°30.7	279°00.0	293°29.3	307°58.7	322°28.1	336°57.6	351°27.2	5°56.8	20°26.5	34°56.2	+29.5	15.9
	5°43.1	5°32.4	5°21.6	5°10.9	5°00.1	4°49.3	4°38.5	4°27.7	4°16.9	4°06.1	3°55.3	-10.8	58.4
Tu 7	252°29.0	266°59.6	281°30.2	296°00.9	310°31.7	325°02.4	339°33.3	354°04.1	8°35.1	23°06.0	37°37.0	+30.8	15.7
	1°12.7	1°01.9	0°51.1	0°40.3	0°29.5	0°18.8	0°08.0	-0°02.7	-0°13.4	-0°24.1	-0°34.8	-10.8	57.5
We 8	255°26.6	269°58.1	284°29.7	299°01.4	313°33.0	328°04.7	342°36.4	357°08.2	11°40.0	26°11.7	40°43.6	+31.7	15.4
	-3°12.5	-3°22.8	-3°33.1	-3°43.3	-3°53.6	-4°03.7	-4°13.9	-4°24.0	-4°34.1	-4°44.1	-4°54.2	-10.2	56.6
Th 9	258°43.3	273°15.4	287°47.6	302°19.7	316°51.9	331°24.0	345°56.2	0°28.4	15°00.6	29°32.8	44°05.1	+32.2	15.2
	-7°19.7	-7°29.0	-7°38.3	-7°47.6	-7°56.8	-8°06.0	-8°15.2	-8°24.2	-8°33.3	-8°42.3	-8°51.2	-9.2	55.8
◐ Fr 10	262°09.0	276°41.3	291°13.6	305°45.9	320°18.2	334°50.5	349°22.7	3°55.0	18°27.3	32°59.6	47°31.9	+32.3	15.0
	-10°58.9	-11°07.0	-11°15.0	-11°23.0	-11°30.9	-11°38.7	-11°46.5	-11°54.3	-12°01.9	-12°09.5	-12°17.1	-7.8	55.1
Sa 11	265°35.2	280°07.4	294°39.6	309°11.7	323°43.8	338°16.0	352°48.1	7°20.2	21°52.3	36°24.4	50°56.4	+32.1	14.9
	-14°02.6	-14°09.2	-14°15.6	-14°22.0	-14°28.3	-14°34.5	-14°40.7	-14°46.8	-14°52.9	-14°58.8	-15°04.7	-6.2	54.6
Su 12	268°56.0	283°27.8	297°59.7	312°31.5	327°03.3	341°35.2	356°06.9	10°38.7	25°10.5	39°42.2	54°14.0	+31.8	14.8
	-16°24.5	-16°29.2	-16°33.9	-16°38.4	-16°42.9	-16°47.4	-16°51.7	-16°56.0	-17°00.2	-17°04.3	-17°08.3	-4.4	54.2
Mo 13	272°08.3	286°39.8	301°11.3	315°42.7	330°14.2	344°45.7	359°17.1	13°48.5	28°19.9	42°51.3	57°22.7	+31.4	14.7
	-17°59.3	-18°02.0	-18°04.7	-18°07.3	-18°09.8	-18°12.2	-18°14.5	-18°16.8	-18°19.0	-18°21.1	-18°23.1	-2.4	54.1
Tu 14	275°12.1	289°43.4	304°14.6	318°45.8	333°16.9	347°48.1	2°19.3	16°50.4	31°21.6	45°52.7	60°23.9	+31.2	14.7
	-18°42.9	-18°43.6	-18°44.1	-18°44.6	-18°45.0	-18°45.3	-18°45.5	-18°45.6	-18°45.6	-18°45.6	-18°45.4	-0.3	54.1
We 15	278°10.3	292°41.4	307°12.4	321°43.5	336°14.6	350°45.6	5°16.7	19°47.8	34°18.8	48°49.9	63°20.9	+31.1	14.8
	-18°32.9	-18°31.4	-18°29.8	-18°28.1	-18°26.3	-18°24.4	-18°22.4	-18°20.4	-18°18.2	-18°16.0	-18°13.7	+1.9	54.2
Th 16	281°07.0	295°38.1	310°09.3	324°40.4	339°11.5	353°42.6	8°13.7	22°44.9	37°16.0	51°47.2	66°18.3	+31.1	14.9
	-17°28.8	-17°25.1	-17°21.4	-17°17.5	-17°13.6	-17°09.6	-17°05.5	-17°01.3	-16°57.1	-16°52.7	-16°48.3	+4.0	54.5
Fr 17	284°06.6	298°37.9	313°09.2	327°40.5	342°11.9	356°43.2	11°14.5	25°45.9	40°17.2	54°48.6	69°20.0	+31.3	15.0
	-15°32.5	-15°26.8	-15°21.1	-15°15.3	-15°09.4	-15°03.4	-14°57.3	-14°51.2	-14°45.0	-14°38.7	-14°32.4	+6.0	54.9
Sa 18	287°11.9	301°43.5	316°15.0	330°46.6	345°18.2	359°49.7	14°21.3	28°52.9	43°24.6	57°56.2	72°27.8	+31.6	15.1
	-12°48.8	-12°41.3	-12°33.8	-12°26.2	-12°18.6	-12°10.9	-12°03.1	-11°55.3	-11°47.4	-11°39.5	-11°31.5	+7.7	55.3
○ Su 19	290°23.2	304°54.9	319°26.7	333°58.4	348°30.2	3°02.0	17°33.7	32°05.5	46°37.3	61°09.1	75°40.9	+31.8	15.2
	-9°24.6	-9°15.7	-9°06.7	-8°57.8	-8°48.7	-8°39.7	-8°30.5	-8°21.4	-8°12.1	-8°02.9	-7°53.6	+9.1	55.8
Mo 20	293°37.6	308°09.4	322°41.2	337°13.0	351°44.7	6°16.5	20°48.2	35°20.0	49°51.7	64°23.4	78°55.1	+31.8	15.3
	-5°29.2	-5°19.2	-5°09.3	-4°59.3	-4°49.3	-4°39.3	-4°29.2	-4°19.1	-4°09.0	-3°58.8	-3°48.6	+10.1	56.3
Tu 21	296°49.6	311°21.1	325°52.6	340°24.1	354°55.6	9°27.0	23°58.5	38°29.9	53°01.3	67°32.6	82°04.0	+31.4	15.5
	-1°13.4	-1°03.0	-0°52.5	-0°42.0	-0°31.4	-0°20.9	-0°10.4	0°00.1	0°10.7	0°21.2	0°31.8	+10.5	56.8
We 22	299°51.1	314°22.0	328°52.9	343°23.8	357°54.6	12°25.4	26°56.1	41°26.8	55°57.5	70°28.1	84°58.7	+30.8	15.6
	3°10.2	3°20.7	3°31.2	3°41.7	3°52.2	4°02.7	4°13.2	4°23.6	4°34.0	4°44.5	4°54.9	+10.5	57.3
Th 23	314°22.0	328°52.9	343°23.8	357°54.6	12°25.4	26°56.1	41°26.8	55°57.5	70°28.1	84°58.7	99°29.3	+30.7	15.6
	3°20.7	3°31.2	3°41.7	3°52.2	4°02.7	4°13.2	4°23.6	4°34.0	4°44.5	4°54.9	5°05.2	+10.5	57.4
Fr 24	317°02.9	331°32.7	346°02.6	0°32.4	15°02.1	29°31.8	44°01.4	58°31.0	73°00.6	87°30.0	101°59.5	+29.7	15.8
	7°38.1	7°48.0	7°57.9	8°07.8	8°17.7	8°27.5	8°37.3	8°47.0	8°56.7	9°06.3	9°15.9	+9.8	57.9
Sa 25	319°14.5	333°43.1	348°11.6	2°40.0	17°08.4	31°36.7	46°05.0	60°33.2	75°01.3	89°29.4	103°57.4	+28.3	15.9
	11°34.1	11°42.8	11°51.6	12°00.2	12°08.8	12°17.3	12°25.8	12°34.2	12°42.5	12°50.7	12°58.9	+8.5	58.4
◑ Su 26	320°50.4	335°17.4	349°44.4	4°11.3	18°38.2	33°05.0	47°31.7	61°58.4	76°25.0	90°51.6	105°18.1	+26.8	16.1
	14°52.7	14°59.6	15°06.5	15°13.2	15°19.9	15°26.5	15°33.0	15°39.4	15°45.7	15°51.9	15°58.0	+6.5	58.9
Mo 27	321°48.7	336°14.3	350°39.9	5°05.4	19°30.8	33°56.2	48°21.6	62°46.9	77°12.2	91°37.4	106°02.6	+25.4	16.2
	17°17.8	17°22.2	17°26.6	17°30.8	17°35.0	17°39.0	17°42.9	17°46.7	17°50.4	17°54.0	17°57.4	+4.0	59.3
Tu 28	322°15.3	336°39.9	351°04.5	5°29.0	19°53.5	34°17.9	48°42.4	63°06.8	77°31.2	91°55.6	106°19.9	+24.5	16.3
	18°34.9	18°36.4	18°37.8	18°39.0	18°40.2	18°41.2	18°42.0	18°42.8	18°43.4	18°43.9	18°44.3	+0.9	59.7
We 29	322°24.0	336°48.2	351°12.4	5°36.7	20°00.9	34°25.2	48°49.4	63°13.7	77°38.0	92°02.3	106°26.6	+24.3	16.3
	18°34.3	18°32.6	18°30.8	18°28.9	18°26.8	18°24.6	18°22.2	18°19.8	18°17.2	18°14.4	18°11.6	-2.3	59.9
Th 30	322°33.5	336°58.2	351°22.9	5°47.6	20°12.4	34°37.2	49°02.0	63°26.9	77°51.8	92°16.8	106°41.8	+24.8	16.3
	17°14.0	17°09.2	17°04.3	16°59.3	16°54.1	16°48.9	16°43.5	16°38.0	16°32.4	16°26.7	16°20.8	-5.3	59.9
Fr 31	323°02.3	337°28.0	351°53.8	6°19.7	20°45.6	35°11.6	49°37.6	64°03.7	78°29.8	92°56.0	107°22.3	+26.0	16.3
	14°40.8	14°33.4	14°25.8	14°18.2	14°10.4	14°02.6	13°54.7	13°46.7	13°38.6	13°30.4	13°22.2	-7.9	59.7

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 3 17h11 — FQ: 10 21h52 — FM: 19 01h00 — LQ: 26 09h08

SUN

September 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	269°57.8	284°58.0	299°58.2	314°58.4	329°58.6	344°58.8	359°58.9	14°59.1	29°59.3	44°59.5	59°59.7	74°59.9	+0.2
	8°19.2	8°18.3	8°17.4	8°16.5	8°15.6	8°14.7	8°13.8	8°12.9	8°12.0	8°11.1	8°10.2	8°09.3	-0.9
Su 2	270°02.5	285°02.7	300°02.9	315°03.1	330°03.3	345°03.5	0°03.7	15°03.9	30°04.1	45°04.3	60°04.5	75°04.7	+0.2
	7°57.5	7°56.5	7°55.6	7°54.7	7°53.8	7°52.9	7°52.0	7°51.1	7°50.2	7°49.2	7°48.3	7°47.4	-0.9
Mo 3	270°07.4	285°07.6	300°07.8	315°08.0	330°08.2	345°08.4	0°08.6	15°08.8	30°09.0	45°09.2	60°09.4	75°09.6	+0.2
	7°35.5	7°34.6	7°33.7	7°32.8	7°31.9	7°30.9	7°30.0	7°29.1	7°28.2	7°27.3	7°26.4	7°25.4	-0.9
Tu 4	270°12.3	285°12.5	300°12.7	315°12.9	330°13.1	345°13.3	0°13.5	15°13.7	30°13.9	45°14.1	60°14.3	75°14.5	+0.2
	7°13.5	7°12.6	7°11.6	7°10.7	7°09.8	7°08.9	7°08.0	7°07.0	7°06.1	7°05.2	7°04.3	7°03.3	-0.9
We 5	270°17.2	285°17.4	300°17.7	315°17.9	330°18.1	345°18.3	0°18.5	15°18.7	30°18.9	45°19.1	60°19.3	75°19.5	+0.2
	6°51.3	6°50.4	6°49.5	6°48.5	6°47.6	6°46.7	6°45.8	6°44.8	6°43.9	6°43.0	6°42.0	6°41.1	-0.9
Th 6	270°22.3	285°22.5	300°22.7	315°22.9	330°23.1	345°23.3	0°23.5	15°23.7	30°24.0	45°24.2	60°24.4	75°24.6	+0.2
	6°29.0	6°28.1	6°27.2	6°26.3	6°25.3	6°24.4	6°23.5	6°22.5	6°21.6	6°20.7	6°19.7	6°18.8	-0.9
Fr 7	270°27.4	285°27.6	300°27.8	315°28.0	330°28.2	345°28.4	0°28.6	15°28.8	30°29.1	45°29.3	60°29.5	75°29.7	+0.2
	6°06.7	6°05.7	6°04.8	6°03.9	6°02.9	6°02.0	6°01.1	6°00.1	5°59.2	5°58.2	5°57.3	5°56.4	-0.9
Sa 8	270°32.5	285°32.7	300°32.9	315°33.1	330°33.4	345°33.6	0°33.8	15°34.0	30°34.2	45°34.4	60°34.6	75°34.9	+0.2
	5°44.2	5°43.2	5°42.3	5°41.4	5°40.4	5°39.5	5°38.5	5°37.6	5°36.7	5°35.7	5°34.8	5°33.8	-0.9
Su 9	270°37.7	285°37.9	300°38.1	315°38.3	330°38.5	345°38.8	0°39.0	15°39.2	30°39.4	45°39.6	60°39.9	75°40.1	+0.2
	5°21.6	5°20.7	5°19.7	5°18.8	5°17.8	5°16.9	5°15.9	5°15.0	5°14.1	5°13.1	5°12.2	5°11.2	-0.9
Mo 10	270°42.9	285°43.1	300°43.3	315°43.6	330°43.8	345°44.0	0°44.2	15°44.4	30°44.7	45°44.9	60°45.1	75°45.3	+0.2
	4°58.9	4°58.0	4°57.0	4°56.1	4°55.2	4°54.2	4°53.3	4°52.3	4°51.4	4°50.4	4°49.5	4°48.5	-0.9
Tu 11	270°48.2	285°48.4	300°48.6	315°48.8	330°49.1	345°49.3	0°49.5	15°49.7	30°49.9	45°50.2	60°50.4	75°50.6	+0.2
	4°36.2	4°35.2	4°34.3	4°33.3	4°32.4	4°31.4	4°30.5	4°29.5	4°28.6	4°27.6	4°26.7	4°25.7	-1.0
We 12	270°53.5	285°53.7	300°53.9	315°54.1	330°54.4	345°54.6	0°54.8	15°55.0	30°55.3	45°55.5	60°55.7	75°55.9	+0.2
	4°13.4	4°12.4	4°11.5	4°10.5	4°09.6	4°08.6	4°07.7	4°06.7	4°05.7	4°04.8	4°03.8	4°02.9	-1.0
Th 13	270°58.8	285°59.0	300°59.3	315°59.5	330°59.7	345°59.9	1°00.1	16°00.4	31°00.6	46°00.8	61°01.0	76°01.3	+0.2
	3°50.5	3°49.5	3°48.6	3°47.6	3°46.6	3°45.7	3°44.7	3°43.8	3°42.8	3°41.9	3°40.9	3°40.0	-1.0
Fr 14	271°04.2	286°04.4	301°04.6	316°04.8	331°05.1	346°05.3	1°05.5	16°05.7	31°06.0	46°06.2	61°06.4	76°06.6	+0.2
	3°27.5	3°26.5	3°25.6	3°24.6	3°23.7	3°22.7	3°21.8	3°20.8	3°19.8	3°18.9	3°17.9	3°17.0	-1.0
Sa 15	271°09.5	286°09.8	301°10.0	316°10.2	331°10.4	346°10.7	1°10.9	16°11.1	31°11.3	46°11.6	61°11.8	76°12.0	+0.2
	3°04.5	3°03.5	3°02.6	3°01.6	3°00.6	2°59.7	2°58.7	2°57.8	2°56.8	2°55.8	2°54.9	2°53.9	-1.0
Su 16	271°14.9	286°15.1	301°15.4	316°15.6	331°15.8	346°16.0	1°16.3	16°16.5	31°16.7	46°16.9	61°17.2	76°17.4	+0.2
	2°41.4	2°40.4	2°39.5	2°38.5	2°37.5	2°36.6	2°35.6	2°34.7	2°33.7	2°32.7	2°31.8	2°30.8	-1.0
Mo 17	271°20.3	286°20.5	301°20.8	316°21.0	331°21.2	346°21.4	1°21.7	16°21.9	31°22.1	46°22.3	61°22.6	76°22.8	+0.2
	2°18.3	2°17.3	2°16.3	2°15.4	2°14.4	2°13.4	2°12.5	2°11.5	2°10.5	2°09.6	2°08.6	2°07.6	-1.0
Tu 18	271°25.7	286°25.9	301°26.1	316°26.4	331°26.6	346°26.8	1°27.0	16°27.3	31°27.5	46°27.7	61°27.9	76°28.2	+0.2
	1°55.1	1°54.1	1°53.1	1°52.2	1°51.2	1°50.2	1°49.3	1°48.3	1°47.3	1°46.4	1°45.4	1°44.4	-1.0
We 19	271°31.1	286°31.3	301°31.5	316°31.8	331°32.0	346°32.2	1°32.4	16°32.7	31°32.9	46°33.1	61°33.3	76°33.5	+0.2
	1°31.9	1°30.9	1°29.9	1°29.0	1°28.0	1°27.0	1°26.0	1°25.1	1°24.1	1°23.1	1°22.2	1°21.2	-1.0
Th 20	271°36.5	286°36.7	301°36.9	316°37.1	331°37.4	346°37.6	1°37.8	16°38.0	31°38.2	46°38.5	61°38.7	76°38.9	+0.2
	1°08.6	1°07.6	1°06.7	1°05.7	1°04.7	1°03.8	1°02.8	1°01.8	1°00.8	0°59.9	0°58.9	0°57.9	-1.0
Fr 21	271°41.8	286°42.0	301°42.3	316°42.5	331°42.7	346°42.9	1°43.1	16°43.4	31°43.6	46°43.8	61°44.0	76°44.3	+0.2
	0°45.3	0°44.3	0°43.4	0°42.4	0°41.4	0°40.5	0°39.5	0°38.5	0°37.5	0°36.6	0°35.6	0°34.6	-1.0
Sa 22	271°47.1	286°47.4	301°47.6	316°47.8	331°48.0	346°48.3	1°48.5	16°48.7	31°48.9	46°49.1	61°49.4	76°49.6	+0.2
	0°22.0	0°21.0	0°20.1	0°19.1	0°18.1	0°17.1	0°16.2	0°15.2	0°14.2	0°13.3	0°12.3	0°11.3	-1.0
Su 23	271°52.4	286°52.7	301°52.9	316°53.1	331°53.3	346°53.5	1°53.8	16°54.0	31°54.2	46°54.4	61°54.6	76°54.9	+0.2
	-0°01.3	-0°02.3	-0°03.3	-0°04.2	-0°05.2	-0°06.2	-0°07.2	-0°08.1	-0°09.1	-0°10.1	-0°11.1	-0°12.0	-1.0
Mo 24	271°57.7	286°57.9	301°58.2	316°58.4	331°58.6	346°58.8	1°59.0	16°59.2	31°59.5	46°59.7	61°59.9	77°00.1	+0.2
	-0°24.7	-0°25.6	-0°26.6	-0°27.6	-0°28.6	-0°29.5	-0°30.5	-0°31.5	-0°32.5	-0°33.4	-0°34.4	-0°35.4	-1.0
Tu 25	272°02.9	287°03.2	302°03.4	317°03.6	332°03.8	347°04.0	2°04.2	17°04.5	32°04.7	47°04.9	62°05.1	77°05.3	+0.2
	-0°48.0	-0°49.0	-0°50.0	-0°50.9	-0°51.9	-0°52.9	-0°53.9	-0°54.8	-0°55.8	-0°56.8	-0°57.8	-0°58.7	-1.0
We 26	272°08.1	287°08.3	302°08.6	317°08.8	332°09.0	347°09.2	2°09.4	17°09.6	32°09.8	47°10.1	62°10.3	77°10.5	+0.2
	-1°11.4	-1°12.4	-1°13.3	-1°14.3	-1°15.3	-1°16.3	-1°17.2	-1°18.2	-1°19.2	-1°20.1	-1°21.1	-1°22.1	-1.0
Th 27	272°13.3	287°13.5	302°13.7	317°13.9	332°14.1	347°14.3	2°14.5	17°14.7	32°15.0	47°15.2	62°15.4	77°15.6	+0.2
	-1°34.7	-1°35.7	-1°36.7	-1°37.7	-1°38.6	-1°39.6	-1°40.6	-1°41.6	-1°42.5	-1°43.5	-1°44.5	-1°45.4	-1.0
Fr 28	272°18.3	287°18.5	302°18.7	317°19.0	332°19.2	347°19.4	2°19.6	17°19.8	32°20.0	47°20.2	62°20.4	77°20.6	+0.2
	-1°58.1	-1°59.1	-2°00.0	-2°01.0	-2°02.0	-2°03.0	-2°03.9	-2°04.9	-2°05.9	-2°06.8	-2°07.8	-2°08.8	-1.0
Sa 29	272°23.3	287°23.6	302°23.8	317°24.0	332°24.2	347°24.4	2°24.6	17°24.8	32°25.0	47°25.2	62°25.4	77°25.6	+0.2
	-2°21.4	-2°22.4	-2°23.4	-2°24.3	-2°25.3	-2°26.3	-2°27.2	-2°28.2	-2°29.2	-2°30.2	-2°31.1	-2°32.1	-1.0
Su 30	272°28.3	287°28.5	302°28.7	317°28.9	332°29.1	347°29.3	2°29.5	17°29.7	32°29.9	47°30.1	62°30.3	77°30.5	+0.2
	-2°44.7	-2°45.7	-2°46.7	-2°47.6	-2°48.6	-2°49.6	-2°50.6	-2°51.5	-2°52.5	-2°53.5	-2°54.4	-2°55.4	-1.0

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 15.9'

MOON

September 2035

D	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	Δ'/h	SH
Sa 1	251°47.9	266°14.8	280°41.7	295°08.7	309°35.8	324°02.9	338°30.1	352°57.3	7°24.6	21°52.0	36°19.4	+27.2	16.2
	11°55.3	11°46.2	11°37.0	11°27.8	11°18.5	11°09.2	10°59.7	10°50.3	10°40.7	10°31.1	10°21.5	-9.4	59.4
Su 2	253°17.8	267°46.2	282°14.6	296°43.1	311°11.6	325°40.2	340°08.8	354°37.5	9°06.2	23°35.1	38°03.9	+28.6	16.0
	7°50.5	7°40.1	7°29.6	7°19.2	7°08.6	6°58.1	6°47.5	6°36.9	6°26.3	6°15.6	6°04.9	-10.6	58.8
Mo 3	255°23.0	269°52.7	284°22.4	298°52.2	313°22.0	327°51.8	342°21.7	356°51.7	11°21.7	25°51.7	40°21.8	+29.9	15.9
	3°22.4	3°11.5	3°00.5	2°49.6	2°38.6	2°27.7	2°16.7	2°05.8	1°54.8	1°43.9	1°32.9	-11.0	58.1
Tu 4	257°57.6	272°28.3	286°59.0	301°29.8	316°00.6	330°31.4	345°02.2	359°33.1	14°04.0	28°34.9	43°05.9	+30.8	15.6
	-1°10.2	-1°21.0	-1°31.7	-1°42.4	-1°53.1	-2°03.8	-2°14.4	-2°25.1	-2°35.7	-2°46.3	-2°56.8	-10.7	57.3
We 5	260°53.5	275°24.8	289°56.2	304°27.6	318°59.0	333°30.4	348°01.9	2°33.3	17°04.8	31°36.3	46°07.8	+31.4	15.4
	-5°31.3	-5°41.3	-5°51.3	-6°01.2	-6°11.1	-6°21.0	-6°30.8	-6°40.5	-6°50.2	-6°59.9	-7°09.6	-9.8	56.5
Th 6	264°02.1	278°33.8	293°05.5	307°37.2	322°08.9	336°40.6	351°12.4	5°44.1	20°15.9	34°47.6	49°19.4	+31.7	15.2
	-9°28.2	-9°37.0	-9°45.8	-9°54.5	-10°03.1	-10°11.7	-10°20.3	-10°28.8	-10°37.2	-10°45.6	-10°53.9	-8.6	55.8
Fr 7	267°15.9	281°47.7	296°19.5	310°51.3	325°23.0	339°54.8	354°26.6	8°58.3	23°30.1	38°01.9	52°33.6	+31.8	15.0
	-12°51.1	-12°58.4	-13°05.7	-13°12.8	-13°19.9	-13°27.0	-13°33.9	-13°40.8	-13°47.6	-13°54.4	-14°01.1	-7.0	55.1
Sa 8	270°29.4	285°01.0	299°32.7	314°04.4	328°36.0	343°07.7	357°39.3	12°10.9	26°42.6	41°14.2	55°45.8	+31.6	14.9
	-15°32.8	-15°38.3	-15°43.8	-15°49.2	-15°54.5	-15°59.7	-16°04.8	-16°09.9	-16°14.9	-16°19.8	-16°24.6	-5.2	54.6
Su 9	273°38.9	288°10.4	302°41.9	317°13.3	331°44.8	346°16.2	0°47.7	15°19.1	29°50.5	44°21.9	58°53.3	+31.4	14.8
	-17°27.7	-17°31.3	-17°34.8	-17°38.2	-17°41.5	-17°44.7	-17°47.9	-17°50.9	-17°53.9	-17°56.8	-17°59.7	-3.2	54.3
Mo 10	276°43.5	291°14.8	305°46.1	320°17.3	334°48.6	349°19.9	3°51.1	18°22.4	32°53.6	47°24.9	61°56.1	+31.3	14.8
	-18°31.9	-18°33.4	-18°34.8	-18°36.1	-18°37.3	-18°38.4	-18°39.5	-18°40.4	-18°41.3	-18°42.1	-18°42.8	-1.1	54.2
Tu 11	279°44.1	294°15.2	308°46.4	323°17.6	337°48.7	352°19.9	6°51.0	21°22.2	35°53.3	50°24.5	64°55.6	+31.2	14.8
	-18°42.9	-18°42.2	-18°41.5	-18°40.6	-18°39.7	-18°38.6	-18°37.5	-18°36.3	-18°35.0	-18°33.6	-18°32.2	+1.1	54.2
We 12	282°42.9	297°14.1	311°45.2	326°16.4	340°47.6	355°18.7	9°49.9	24°21.1	38°52.3	53°23.4	67°54.6	+31.2	14.8
	-17°59.9	-17°57.0	-17°54.1	-17°51.1	-17°48.0	-17°44.8	-17°41.6	-17°38.2	-17°34.8	-17°31.3	-17°27.7	+3.2	54.4
Th 13	285°42.8	300°14.0	314°45.3	329°16.5	343°47.8	358°19.0	12°50.3	27°21.6	41°52.9	56°24.1	70°55.4	+31.3	14.9
	-16°23.8	-16°18.8	-16°13.9	-16°08.8	-16°03.6	-15°58.4	-15°53.1	-15°47.7	-15°42.2	-15°36.7	-15°31.1	+5.3	54.8
Fr 14	288°45.4	303°16.8	317°48.2	332°19.5	346°50.9	1°22.3	15°53.7	30°25.1	44°56.5	59°27.9	73°59.3	+31.4	15.1
	-13°57.7	-13°50.9	-13°44.0	-13°37.1	-13°30.0	-13°22.9	-13°15.8	-13°08.6	-13°01.3	-12°53.9	-12°46.4	+7.1	55.3
Sa 15	291°50.9	306°22.4	320°53.9	335°25.3	349°56.8	4°28.2	18°59.7	33°31.2	48°02.6	62°34.1	77°05.6	+31.5	15.2
	-10°47.2	-10°38.7	-10°30.2	-10°21.7	-10°13.0	-10°04.4	-9°55.6	-9°46.8	-9°38.0	-9°29.1	-9°20.2	+8.7	55.9
Su 16	294°57.2	309°28.6	324°00.0	338°31.4	353°02.8	7°34.2	22°05.5	36°36.9	51°08.3	65°39.6	80°11.0	+31.4	15.4
	-6°59.9	-6°50.2	-6°40.5	-6°30.7	-6°20.8	-6°10.9	-6°01.0	-5°51.1	-5°41.1	-5°31.1	-5°21.0	+9.9	56.5
Mo 17	297°59.7	312°30.8	327°01.9	341°33.0	356°04.1	10°35.2	25°06.2	39°37.2	54°08.3	68°39.2	83°10.2	+31.1	15.6
	-2°46.3	-2°35.8	-2°25.2	-2°14.6	-2°04.1	-1°53.5	-1°42.8	-1°32.2	-1°21.5	-1°10.9	-1°00.2	+10.6	57.0
Tu 18	300°52.0	315°22.6	329°53.1	344°23.6	358°54.1	13°24.6	27°55.0	42°25.4	56°55.8	71°26.1	85°56.4	+30.4	15.7
	1°41.2	1°52.0	2°02.8	2°13.6	2°24.4	2°35.1	2°45.9	2°56.7	3°07.4	3°18.2	3°28.9	+10.8	57.6
We 19	303°26.7	317°56.5	332°26.1	346°55.8	1°25.4	15°54.9	30°24.4	44°53.9	59°23.3	73°52.7	88°22.0	+29.5	15.8
	6°08.0	6°18.4	6°28.8	6°39.2	6°49.5	6°59.8	7°10.1	7°20.4	7°30.6	7°40.8	7°50.9	+10.3	58.1
Th 20	305°36.7	320°05.3	334°33.8	349°02.3	3°30.8	17°59.2	32°27.5	46°55.9	61°24.1	75°52.3	90°20.5	+28.4	15.9
	10°17.8	10°27.2	10°36.5	10°45.8	10°55.1	11°04.2	11°13.3	11°22.4	11°31.4	11°40.3	11°49.2	+9.1	58.5
Fr 21	320°05.3	334°33.8	349°02.3	3°30.8	17°59.2	32°27.5	46°55.9	61°24.1	75°52.3	90°20.5	104°48.6	+28.3	16.0
	10°27.2	10°36.5	10°45.8	10°55.1	11°04.2	11°13.3	11°22.4	11°31.4	11°40.3	11°49.2	11°58.0	+9.1	58.5
Sa 22	321°44.0	336°11.3	350°38.6	5°05.8	19°32.9	34°00.0	48°27.1	62°54.1	77°21.0	91°47.9	106°14.8	+27.1	16.0
	14°01.4	14°09.0	14°16.5	14°23.9	14°31.3	14°38.6	14°45.8	14°52.9	14°59.9	15°06.8	15°13.6	+7.2	58.8
Su 23	322°51.9	337°18.0	351°44.1	6°10.2	20°36.2	35°02.1	49°28.1	63°54.0	78°19.8	92°45.6	107°11.4	+25.9	16.1
	16°44.5	16°49.8	16°54.9	17°00.0	17°04.9	17°09.8	17°14.5	17°19.1	17°23.6	17°28.0	17°32.3	+4.8	59.0
Mo 24	323°34.2	337°59.5	352°24.8	6°50.0	21°15.3	35°40.5	50°05.7	64°30.9	78°56.0	93°21.2	107°46.3	+25.2	16.1
	18°22.7	18°25.2	18°27.5	18°29.6	18°31.7	18°33.6	18°35.5	18°37.2	18°38.7	18°40.2	18°41.5	+1.9	59.2
Tu 25	324°02.3	338°27.3	352°52.3	7°17.4	21°42.4	36°07.5	50°32.6	64°57.6	79°22.7	93°47.8	108°12.9	+25.1	16.2
	18°46.6	18°46.0	18°45.2	18°44.3	18°43.3	18°42.1	18°40.9	18°39.5	18°38.0	18°36.3	18°34.6	-1.2	59.2
We 26	324°31.5	338°56.9	353°22.4	7°47.8	22°13.3	36°38.9	51°04.4	65°30.0	79°55.6	94°21.3	108°47.0	+25.5	16.1
	17°53.5	17°49.9	17°46.1	17°42.1	17°38.1	17°34.0	17°29.7	17°25.3	17°20.8	17°16.2	17°11.5	-4.2	59.2
Th 27	325°16.8	339°43.1	354°09.5	8°35.9	23°02.4	37°28.8	51°55.4	66°22.0	80°48.6	95°15.3	109°42.0	+26.5	16.1
	15°48.0	15°41.6	15°35.1	15°28.5	15°21.9	15°15.1	15°08.2	15°01.2	14°54.2	14°47.0	14°39.8	-6.8	59.1
Fr 28	326°28.7	340°56.2	355°23.8	9°51.4	24°19.1	38°46.8	53°14.5	67°42.3	82°10.2	96°38.1	111°06.1	+27.7	16.0
	12°41.1	12°32.5	12°23.9	12°15.2	12°06.4	11°57.6	11°48.7	11°39.7	11°30.7	11°21.6	11°12.5	-8.9	58.8
Sa 29	328°11.4	342°40.1	357°08.9	11°37.8	26°06.6	40°35.6	55°04.5	69°33.6	84°02.6	98°31.7	113°00.9	+29.0	15.9
	8°48.2	8°38.2	8°28.1	8°18.0	8°07.8	7°57.6	7°47.4	7°37.1	7°26.8	7°16.5	7°06.1	-10.2	58.4
Su 30	330°23.3	344°53.1	359°23.0	13°52.8	28°22.8	42°52.7	57°22.7	71°52.8	86°22.8	100°53.0	115°23.1	+30.0	15.8
	4°27.0	4°16.2	4°05.4	3°54.6	3°43.8	3°32.9	3°22.1	3°11.2	3°00.3	2°49.5	2°38.6	-10.8	58.0

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 2 01h59 — FQ: 9 14h47 — FM: 17 14h23 — LQ: 24 14h39

SUN

October 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Mo 1	272°33.2 -3°08.0	287°33.4 -3°09.0	302°33.6 -3°10.0	317°33.8 -3°10.9	332°34.0 -3°11.9	347°34.2 -3°12.9	2°34.4 -3°13.8	17°34.6 -3°14.8	32°34.8 -3°15.8	47°35.0 -3°16.7	62°35.2 -3°17.7	77°35.4 -3°18.7	+0.2 -1.0
Tu 2	272°38.0 -3°31.3	287°38.2 -3°32.2	302°38.4 -3°33.2	317°38.6 -3°34.2	332°38.8 -3°35.1	347°39.0 -3°36.1	2°39.2 -3°37.1	17°39.4 -3°38.0	32°39.6 -3°39.0	47°39.8 -3°40.0	62°40.0 -3°40.9	77°40.2 -3°41.9	+0.2 -1.0
We 3	272°42.7 -3°54.5	287°42.9 -3°55.4	302°43.1 -3°56.4	317°43.3 -3°57.4	332°43.5 -3°58.3	347°43.7 -3°59.3	2°43.9 -4°00.3	17°44.1 -4°01.2	32°44.3 -4°02.2	47°44.5 -4°03.2	62°44.7 -4°04.1	77°44.9 -4°05.1	+0.2 -1.0
Th 4	272°47.4 -4°17.6	287°47.6 -4°18.6	302°47.8 -4°19.6	317°48.0 -4°20.5	332°48.2 -4°21.5	347°48.4 -4°22.5	2°48.5 -4°23.4	17°48.7 -4°24.4	32°48.9 -4°25.3	47°49.1 -4°26.3	62°49.3 -4°27.3	77°49.5 -4°28.2	+0.2 -1.0
Fr 5	272°52.0 -4°40.8	287°52.2 -4°41.7	302°52.4 -4°42.7	317°52.5 -4°43.6	332°52.7 -4°44.6	347°52.9 -4°45.6	2°53.1 -4°46.5	17°53.3 -4°47.5	32°53.5 -4°48.4	47°53.7 -4°49.4	62°53.9 -4°50.4	77°54.0 -4°51.3	+0.2 -1.0
Sa 6	272°56.5 -5°03.8	287°56.6 -5°04.8	302°56.8 -5°05.7	317°57.0 -5°06.7	332°57.2 -5°07.6	347°57.4 -5°08.6	2°57.6 -5°09.6	17°57.8 -5°10.5	32°57.9 -5°11.5	47°58.1 -5°12.4	62°58.3 -5°13.4	77°58.5 -5°14.4	+0.2 -1.0
Su 7	273°00.9 -5°26.8	288°01.0 -5°27.8	303°01.2 -5°28.7	318°01.4 -5°29.7	333°01.6 -5°30.6	348°01.8 -5°31.6	3°01.9 -5°32.5	18°02.1 -5°33.5	33°02.3 -5°34.4	48°02.5 -5°35.4	63°02.7 -5°36.4	78°02.8 -5°37.3	+0.2 -1.0
Mo 8	273°05.2 -5°49.7	288°05.3 -5°50.7	303°05.5 -5°51.6	318°05.7 -5°52.6	333°05.9 -5°53.5	348°06.0 -5°54.5	3°06.2 -5°55.4	18°06.4 -5°56.4	33°06.6 -5°57.3	48°06.7 -5°58.3	63°06.9 -5°59.2	78°07.1 -6°00.2	+0.2 -1.0
Tu 9	273°09.3 -6°12.6	288°09.5 -6°13.5	303°09.7 -6°14.5	318°09.9 -6°15.4	333°10.0 -6°16.4	348°10.2 -6°17.3	3°10.4 -6°18.3	18°10.5 -6°19.2	33°10.7 -6°20.2	48°10.9 -6°21.1	63°11.1 -6°22.1	78°11.2 -6°23.0	+0.2 -0.9
We 10	273°13.4 -6°35.3	288°13.6 -6°36.3	303°13.8 -6°37.2	318°13.9 -6°38.2	333°14.1 -6°39.1	348°14.3 -6°40.1	3°14.4 -6°41.0	18°14.6 -6°41.9	33°14.8 -6°42.9	48°14.9 -6°43.8	63°15.1 -6°44.8	78°15.3 -6°45.7	+0.2 -0.9
Th 11	273°17.4 -6°58.0	288°17.6 -6°58.9	303°17.7 -6°59.9	318°17.9 -7°00.8	333°18.1 -7°01.8	348°18.2 -7°02.7	3°18.4 -7°03.7	18°18.5 -7°04.6	33°18.7 -7°05.5	48°18.9 -7°06.5	63°19.0 -7°07.4	78°19.2 -7°08.4	+0.2 -0.9
Fr 12	273°21.3 -7°20.6	288°21.4 -7°21.5	303°21.6 -7°22.5	318°21.7 -7°23.4	333°21.9 -7°24.3	348°22.1 -7°25.3	3°22.2 -7°26.2	18°22.4 -7°27.1	33°22.5 -7°28.1	48°22.7 -7°29.0	63°22.8 -7°30.0	78°23.0 -7°30.9	+0.2 -0.9
Sa 13	273°25.0 -7°43.1	288°25.2 -7°44.0	303°25.3 -7°44.9	318°25.5 -7°45.9	333°25.6 -7°46.8	348°25.8 -7°47.7	3°25.9 -7°48.7	18°26.1 -7°49.6	33°26.2 -7°50.5	48°26.4 -7°51.5	63°26.5 -7°52.4	78°26.7 -7°53.3	+0.2 -0.9
Su 14	273°28.6 -8°05.4	288°28.8 -8°06.4	303°28.9 -8°07.3	318°29.1 -8°08.2	333°29.2 -8°09.1	348°29.4 -8°10.1	3°29.5 -8°11.0	18°29.6 -8°11.9	33°29.8 -8°12.9	48°29.9 -8°13.8	63°30.1 -8°14.7	78°30.2 -8°15.6	+0.1 -0.9
Mo 15	273°32.1 -8°27.7	288°32.2 -8°28.6	303°32.4 -8°29.5	318°32.5 -8°30.4	333°32.7 -8°31.4	348°32.8 -8°32.3	3°32.9 -8°33.2	18°33.1 -8°34.1	33°33.2 -8°35.1	48°33.4 -8°36.0	63°33.5 -8°36.9	78°33.7 -8°37.8	+0.1 -0.9
Tu 16	273°35.4 -8°49.8	288°35.6 -8°50.7	303°35.7 -8°51.6	318°35.9 -8°52.6	333°36.0 -8°53.5	348°36.1 -8°54.4	3°36.3 -8°55.3	18°36.4 -8°56.2	33°36.5 -8°57.2	48°36.7 -8°58.1	63°36.8 -8°59.0	78°36.9 -8°59.9	+0.1 -0.9
We 17	273°38.6 -9°11.8	288°38.8 -9°12.7	303°38.9 -9°13.6	318°39.0 -9°14.6	333°39.2 -9°15.5	348°39.3 -9°16.4	3°39.4 -9°17.3	18°39.6 -9°18.2	33°39.7 -9°19.1	48°39.8 -9°20.0	63°39.9 -9°21.0	78°40.1 -9°21.9	+0.1 -0.9
Th 18	273°41.7 -9°33.7	288°41.8 -9°34.6	303°41.9 -9°35.5	318°42.1 -9°36.4	333°42.2 -9°37.3	348°42.3 -9°38.2	3°42.4 -9°39.1	18°42.6 -9°40.1	33°42.7 -9°41.0	48°42.8 -9°41.9	63°42.9 -9°42.8	78°43.0 -9°43.7	+0.1 -0.9
Fr 19	273°44.6 -9°55.4	288°44.7 -9°56.3	303°44.8 -9°57.2	318°44.9 -9°58.1	333°45.1 -9°59.0	348°45.2 -9°59.9	3°45.3 -10°00.8	18°45.4 -10°01.7	33°45.5 -10°02.6	48°45.6 -10°03.6	63°45.8 -10°04.5	78°45.9 -10°05.4	+0.1 -0.9
Sa 20	273°47.3 -10°17.0	288°47.4 -10°17.9	303°47.6 -10°18.8	318°47.7 -10°19.7	333°47.8 -10°20.6	348°47.9 -10°21.5	3°48.0 -10°22.4	18°48.1 -10°23.3	33°48.2 -10°24.2	48°48.3 -10°25.1	63°48.4 -10°26.0	78°48.5 -10°26.9	+0.1 -0.9
Su 21	273°49.9 -10°38.5	288°50.0 -10°39.4	303°50.1 -10°40.3	318°50.2 -10°41.1	333°50.3 -10°42.0	348°50.4 -10°42.9	3°50.5 -10°43.8	18°50.6 -10°44.7	33°50.7 -10°45.6	48°50.8 -10°46.5	63°50.9 -10°47.4	78°51.0 -10°48.3	+0.1 -0.9
Mo 22	273°52.3 -10°59.8	288°52.4 -11°00.6	303°52.5 -11°01.5	318°52.6 -11°02.4	333°52.7 -11°03.3	348°52.8 -11°04.2	3°52.9 -11°05.1	18°53.0 -11°05.9	33°53.1 -11°06.8	48°53.2 -11°07.7	63°53.3 -11°08.6	78°53.4 -11°09.5	+0.1 -0.9
Tu 23	273°54.6 -11°20.9	288°54.6 -11°21.8	303°54.7 -11°22.6	318°54.8 -11°23.5	333°54.9 -11°24.4	348°55.0 -11°25.3	3°55.1 -11°26.1	18°55.2 -11°27.0	33°55.3 -11°27.9	48°55.4 -11°28.8	63°55.4 -11°29.6	78°55.5 -11°30.5	+0.1 -0.9
We 24	273°56.6 -11°41.9	288°56.7 -11°42.7	303°56.8 -11°43.6	318°56.9 -11°44.5	333°56.9 -11°45.3	348°57.0 -11°46.2	3°57.1 -11°47.1	18°57.2 -11°47.9	33°57.3 -11°48.8	48°57.3 -11°49.7	63°57.4 -11°50.5	78°57.5 -11°51.4	+0.1 -0.9
Th 25	273°58.5 -12°02.6	288°58.6 -12°03.5	303°58.6 -12°04.4	318°58.7 -12°05.2	333°58.8 -12°06.1	348°58.9 -12°06.9	3°58.9 -12°07.8	18°59.0 -12°08.7	33°59.1 -12°09.5	48°59.2 -12°10.4	63°59.2 -12°11.2	78°59.3 -12°12.1	+0.1 -0.9
Fr 26	274°00.2 -12°23.2	289°00.3 -12°24.1	304°00.3 -12°24.9	319°00.4 -12°25.8	334°00.5 -12°26.6	349°00.5 -12°27.5	4°00.6 -12°28.4	19°00.7 -12°29.2	34°00.7 -12°30.1	49°00.8 -12°30.9	64°00.8 -12°31.8	79°00.9 -12°32.6	+0.1 -0.9
Sa 27	274°01.7 -12°43.6	289°01.8 -12°44.5	304°01.8 -12°45.3	319°01.9 -12°46.2	334°01.9 -12°47.0	349°02.0 -12°47.9	4°02.0 -12°48.7	19°02.1 -12°49.6	34°02.2 -12°50.4	49°02.2 -12°51.2	64°02.3 -12°52.1	79°02.3 -12°52.9	+0.1 -0.8
Su 28	274°03.0 -13°03.9	289°03.1 -13°04.7	304°03.1 -13°05.5	319°03.2 -13°06.4	334°03.2 -13°07.2	349°03.3 -13°08.0	4°03.3 -13°08.9	19°03.4 -13°09.7	34°03.4 -13°10.5	49°03.5 -13°11.4	64°03.5 -13°12.2	79°03.6 -13°13.1	+0.0 -0.8
Mo 29	274°04.1 -13°23.9	289°04.2 -13°24.7	304°04.2 -13°25.5	319°04.3 -13°26.4	334°04.3 -13°27.2	349°04.4 -13°28.0	4°04.4 -13°28.8	19°04.4 -13°29.7	34°04.5 -13°30.5	49°04.5 -13°31.3	64°04.6 -13°32.1	79°04.6 -13°33.0	+0.0 -0.8
Tu 30	274°05.1 -13°43.7	289°05.1 -13°44.5	304°05.2 -13°45.3	319°05.2 -13°46.1	334°05.2 -13°46.9	349°05.3 -13°47.8	4°05.3 -13°48.6	19°05.3 -13°49.4	34°05.4 -13°50.2	49°05.4 -13°51.0	64°05.4 -13°51.9	79°05.4 -13°52.7	+0.0 -0.8
We 31	274°05.8 -14°03.3	289°05.8 -14°04.1	304°05.9 -14°04.9	319°05.9 -14°05.7	334°05.9 -14°06.5	349°06.0 -14°07.3	4°06.0 -14°08.1	19°06.0 -14°08.9	34°06.0 -14°09.7	49°06.0 -14°10.5	64°06.1 -14°11.3	79°06.1 -14°12.2	+0.0 -0.8

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.0'

MOON

October 2035

	D	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	Δ'/h	SH
●	Mo 1	245°55.8	260°26.3	274°56.8	289°27.3	303°57.8	318°28.4	332°59.0	347°29.6	2°00.3	16°30.9	31°01.7	+30.6	15.7
		1°00.4	0°49.5	0°38.6	0°27.7	0°16.9	0°06.0	-0°04.9	-0°15.7	-0°26.6	-0°37.4	-0°48.3	-10.9	57.5
	Tu 2	248°44.9	263°15.9	277°47.0	292°18.1	306°49.2	321°20.3	335°51.4	350°22.5	4°53.7	19°24.9	33°56.1	+31.1	15.5
		-3°28.5	-3°39.0	-3°49.5	-3°59.9	-4°10.3	-4°20.7	-4°31.1	-4°41.4	-4°51.7	-5°02.0	-5°12.2	-10.4	56.9
	We 3	251°45.2	266°16.5	280°47.9	295°19.3	309°50.6	324°22.0	338°53.4	353°24.8	7°56.2	22°27.6	36°59.0	+31.4	15.3
		-7°40.8	-7°50.4	-7°59.9	-8°09.4	-8°18.8	-8°28.2	-8°37.5	-8°46.7	-8°56.0	-9°05.1	-9°14.2	-9.3	56.2
	Th 4	254°50.3	269°21.8	283°53.2	298°24.7	312°56.1	327°27.5	341°59.0	356°30.4	11°01.8	25°33.2	40°04.7	+31.4	15.2
		-11°24.2	-11°32.4	-11°40.5	-11°48.6	-11°56.6	-12°04.5	-12°12.4	-12°20.2	-12°28.0	-12°35.6	-12°43.2	-7.9	55.6
	Fr 5	257°55.8	272°27.2	286°58.5	301°29.9	316°01.3	330°32.6	345°04.0	359°35.4	14°06.7	28°38.1	43°09.4	+31.4	15.0
		-14°29.1	-14°35.6	-14°42.0	-14°48.3	-14°54.6	-15°00.8	-15°06.9	-15°12.9	-15°18.9	-15°24.7	-15°30.6	-6.1	55.0
	Sa 6	260°59.0	275°30.3	290°01.6	304°32.9	319°04.1	333°35.4	348°06.6	2°37.9	17°09.1	31°40.4	46°11.6	+31.3	14.9
		-16°48.2	-16°52.8	-16°57.2	-17°01.6	-17°05.9	-17°10.1	-17°14.2	-17°18.3	-17°22.3	-17°26.1	-17°29.9	-4.2	54.6
	Su 7	263°59.8	278°31.0	293°02.2	307°33.4	322°04.6	336°35.8	351°07.0	5°38.1	20°09.3	34°40.5	49°11.7	+31.2	14.8
		-18°16.8	-18°19.2	-18°21.6	-18°23.9	-18°26.1	-18°28.2	-18°30.2	-18°32.1	-18°34.0	-18°35.7	-18°37.4	-2.1	54.3
	Mo 8	266°59.5	281°30.7	296°01.9	310°33.0	325°04.2	339°35.5	354°06.7	8°37.9	23°09.1	37°40.3	52°11.5	+31.2	14.8
		-18°52.0	-18°52.3	-18°52.5	-18°52.6	-18°52.6	-18°52.5	-18°52.4	-18°52.1	-18°51.8	-18°51.4	-18°50.9	+0.1	54.2
◐	Tu 9	270°00.2	284°31.5	299°02.8	313°34.1	328°05.4	342°36.7	357°08.0	11°39.3	26°10.6	40°41.9	55°13.3	+31.3	14.8
		-18°33.0	-18°31.1	-18°29.1	-18°27.1	-18°24.9	-18°22.7	-18°20.4	-18°18.0	-18°15.5	-18°12.9	-18°10.3	+2.3	54.2
	We 10	273°04.1	287°35.5	302°06.9	316°38.4	331°09.8	345°41.3	0°12.8	14°44.3	29°15.7	43°47.2	58°18.7	+31.5	14.9
		-17°20.5	-17°16.5	-17°12.5	-17°08.3	-17°04.1	-16°59.8	-16°55.4	-16°51.0	-16°46.4	-16°41.8	-16°37.1	+4.3	54.5
	Th 11	276°11.9	290°43.5	305°15.1	319°46.7	334°18.3	348°49.9	3°21.5	17°53.2	32°24.8	46°56.4	61°28.0	+31.6	15.0
		-15°17.1	-15°11.2	-15°05.1	-14°59.1	-14°52.9	-14°46.6	-14°40.3	-14°33.9	-14°27.5	-14°20.9	-14°14.3	+6.3	54.9
	Fr 12	279°22.8	293°54.5	308°26.1	322°57.8	337°29.5	352°01.1	6°32.8	21°04.4	35°36.1	50°07.8	64°39.4	+31.7	15.1
		-12°26.8	-12°19.1	-12°11.4	-12°03.5	-11°55.6	-11°47.7	-11°39.6	-11°31.5	-11°23.4	-11°15.2	-11°06.9	+8.0	55.5
	Sa 13	282°33.6	297°05.2	311°36.7	326°08.3	340°39.8	355°11.3	9°42.8	24°14.3	38°45.8	53°17.3	67°48.8	+31.5	15.3
		-8°55.6	-8°46.4	-8°37.2	-8°27.9	-8°18.5	-8°09.1	-7°59.7	-7°50.2	-7°40.6	-7°31.0	-7°21.4	+9.4	56.2
	Su 14	285°38.9	300°10.2	314°41.3	329°12.5	343°43.6	358°14.8	12°45.9	27°16.9	41°48.0	56°19.0	70°50.0	+31.1	15.5
		-4°51.5	-4°41.1	-4°30.8	-4°20.4	-4°10.0	-3°59.6	-3°49.1	-3°38.6	-3°28.0	-3°17.5	-3°06.9	+10.5	57.0
	Mo 15	288°31.8	303°02.4	317°32.9	332°03.4	346°33.8	1°04.2	15°34.6	30°05.0	44°35.3	59°05.5	73°35.8	+30.4	15.7
		-0°25.0	-0°14.1	-0°03.1	0°07.8	0°18.8	0°29.8	0°40.8	0°51.8	1°02.8	1°13.8	1°24.8	+11.0	57.7
	Tu 16	291°04.4	305°33.9	320°03.5	334°32.9	349°02.4	3°31.7	18°01.1	32°30.4	46°59.6	61°28.8	75°57.9	+29.4	15.9
		4°10.0	4°21.0	4°31.9	4°42.8	4°53.7	5°04.6	5°15.5	5°26.4	5°37.2	5°48.0	5°58.8	+10.9	58.4
○	We 17	293°09.0	307°37.3	322°05.5	336°33.7	351°01.9	5°30.0	19°58.0	34°26.0	48°54.0	63°21.8	77°49.7	+28.1	16.1
		8°37.0	8°47.3	8°57.5	9°07.7	9°17.8	9°27.8	9°37.9	9°47.8	9°57.7	10°07.6	10°17.4	+10.0	59.0
	Th 18	294°40.4	309°07.3	323°34.2	338°01.0	352°27.8	6°54.5	21°21.2	35°47.8	50°14.3	64°40.8	79°07.3	+26.7	16.2
		12°37.2	12°46.0	12°54.6	13°03.3	13°11.8	13°20.3	13°28.6	13°36.9	13°45.2	13°53.3	14°01.3	+8.4	59.4
	Fr 19	295°38.1	310°03.8	324°29.4	338°55.0	353°20.5	7°46.0	22°11.5	36°36.9	51°02.3	65°27.6	79°52.9	+25.5	16.2
		15°51.1	15°57.6	16°04.0	16°10.4	16°16.6	16°22.7	16°28.7	16°34.6	16°40.4	16°46.1	16°51.7	+6.1	59.6
	Sa 20	296°08.4	310°33.3	324°58.0	339°22.8	353°47.6	8°12.3	22°37.0	37°01.7	51°26.4	65°51.1	80°15.7	+24.7	16.3
		18°01.5	18°05.3	18°08.8	18°12.3	18°15.7	18°18.9	18°22.0	18°24.9	18°27.8	18°30.5	18°33.1	+3.2	59.6
	Su 21	310°33.3	324°58.0	339°22.8	353°47.6	8°12.3	22°37.0	37°01.7	51°26.4	65°51.1	80°15.7	94°40.4	+24.7	16.3
		18°05.3	18°08.8	18°12.3	18°15.7	18°18.9	18°22.0	18°24.9	18°27.8	18°30.5	18°33.1	18°35.6	+3.0	59.6
	Mo 22	310°49.4	325°14.0	339°38.6	354°03.3	8°27.9	22°52.6	37°17.2	51°41.9	66°06.6	80°31.3	94°56.0	+24.7	16.2
		18°57.4	18°57.8	18°58.1	18°58.3	18°58.3	18°58.2	18°58.0	18°57.7	18°57.2	18°56.7	18°55.9	-0.1	59.5
◑	Tu 23	311°09.8	325°35.0	340°00.2	354°25.4	8°50.6	23°15.9	37°41.3	52°06.7	66°32.1	80°57.5	95°23.0	+25.3	16.2
		18°30.2	18°27.5	18°24.6	18°21.7	18°18.6	18°15.5	18°12.2	18°08.7	18°05.2	18°01.6	17°57.8	-3.2	59.2
	We 24	311°51.0	326°17.3	340°43.6	355°10.0	9°36.4	24°02.8	38°29.4	52°55.9	67°22.6	81°49.3	96°16.0	+26.5	16.1
		16°48.0	16°42.5	16°36.8	16°31.1	16°25.3	16°19.4	16°13.4	16°07.3	16°01.1	15°54.8	15°48.4	-6.0	58.9
	Th 25	313°03.9	327°31.5	341°59.2	356°27.0	10°54.8	25°22.6	39°50.6	54°18.5	68°46.6	83°14.7	97°42.8	+27.9	16.0
		14°01.6	13°53.9	13°46.0	13°38.0	13°30.0	13°21.9	13°13.8	13°05.5	12°57.2	12°48.8	12°40.4	-8.1	58.5
	Fr 26	314°51.7	329°20.7	343°49.8	358°18.9	12°48.1	27°17.3	41°46.6	56°15.9	70°45.2	85°14.7	99°44.1	+29.2	15.8
		10°25.9	10°16.5	10°07.0	9°57.4	9°47.9	9°38.2	9°28.5	9°18.8	9°09.0	8°59.2	8°49.4	-9.7	58.1
	Sa 27	317°11.5	331°41.7	346°11.9	0°42.2	15°12.4	29°42.8	44°13.1	58°43.5	73°14.0	87°44.4	102°14.9	+30.3	15.7
		6°16.9	6°06.4	5°56.0	5°45.5	5°35.0	5°24.5	5°14.0	5°03.4	4°52.8	4°42.2	4°31.6	-10.5	57.6
	Su 28	319°56.3	334°27.3	348°58.3	3°29.4	18°00.4	32°31.5	47°02.6	61°33.8	76°04.9	90°36.1	105°07.3	+31.1	15.6
		1°50.7	1°39.9	1°29.1	1°18.3	1°07.5	0°56.8	0°46.0	0°35.2	0°24.4	0°13.6	0°02.9	-10.8	57.1
	Mo 29	322°57.4	337°28.9	352°00.4	6°31.9	21°03.4	35°34.9	50°06.4	64°37.9	79°09.4	93°41.0	108°12.5	+31.5	15.4
		-2°37.4	-2°48.0	-2°58.5	-3°09.0	-3°19.5	-3°30.0	-3°40.5	-3°50.9	-4°01.3	-4°11.7	-4°22.0	-10.5	56.6
	Tu 30	326°06.4	340°38.0	355°09.6	9°41.3	24°12.9	38°44.5	53°16.1	67°47.7	82°19.3	96°51.0	111°22.6	+31.6	15.3
		-6°53.4	-7°03.2	-7°13.0	-7°22.7	-7°32.4	-7°42.0	-7°51.6	-8°01.2	-8°10.7	-8°20.1	-8°29.5	-9.6	56.1
●	We 31	329°16.3	343°47.8	358°19.4	12°50.9	27°22.4	41°53.9	56°25.5	70°57.0	85°28.4	99°59.9	114°31.4	+31.5	15.2
		-10°44.7	-10°53.3	-11°01.8	-11°10.3	-11°18.7	-11°27.1	-11°35.4	-11°43.6	-11°51.7	-11°59.8	-12°07.9	-8.3	55.6

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
NM: 1 13h06 — FQ: 9 09h49 — FM: 17 02h35 — LQ: 23 20h56 — NM: 31 02h58

SUN

November 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Th 1	274°06.4	289°06.4	304°06.4	319°06.4	334°06.4	349°06.5	4°06.5	19°06.5	34°06.5	49°06.5	64°06.5	79°06.5	+0.0
	-14°22.6	-14°23.4	-14°24.2	-14°25.0	-14°25.8	-14°26.6	-14°27.4	-14°28.2	-14°29.0	-14°29.8	-14°30.6	-14°31.4	-0.8
Fr 2	274°06.7	289°06.7	304°06.7	319°06.7	334°06.7	349°06.8	4°06.8	19°06.8	34°06.8	49°06.8	64°06.8	79°06.8	+0.0
	-14°41.7	-14°42.5	-14°43.3	-14°44.1	-14°44.9	-14°45.7	-14°46.5	-14°47.3	-14°48.1	-14°48.9	-14°49.6	-14°50.4	-0.8
Sa 3	274°06.9	289°06.9	304°06.9	319°06.9	334°06.9	349°06.9	4°06.9	19°06.9	34°06.9	49°06.9	64°06.9	79°06.9	-0.0
	-15°00.6	-15°01.4	-15°02.2	-15°03.0	-15°03.8	-15°04.5	-15°05.3	-15°06.1	-15°06.9	-15°07.7	-15°08.4	-15°09.2	-0.8
Su 4	274°06.8	289°06.8	304°06.8	319°06.8	334°06.8	349°06.8	4°06.8	19°06.7	34°06.7	49°06.7	64°06.7	79°06.7	-0.0
	-15°19.3	-15°20.1	-15°20.8	-15°21.6	-15°22.4	-15°23.1	-15°23.9	-15°24.7	-15°25.4	-15°26.2	-15°27.0	-15°27.7	-0.8
Mo 5	274°06.5	289°06.5	304°06.5	319°06.5	334°06.5	349°06.5	4°06.5	19°06.4	34°06.4	49°06.4	64°06.4	79°06.4	-0.0
	-15°37.7	-15°38.4	-15°39.2	-15°40.0	-15°40.7	-15°41.5	-15°42.2	-15°43.0	-15°43.8	-15°44.5	-15°45.3	-15°46.0	-0.8
Tu 6	274°06.1	289°06.1	304°06.0	319°06.0	334°06.0	349°06.0	4°05.9	19°05.9	34°05.9	49°05.9	64°05.8	79°05.8	-0.0
	-15°55.8	-15°56.6	-15°57.3	-15°58.1	-15°58.8	-15°59.6	-16°00.3	-16°01.1	-16°01.8	-16°02.6	-16°03.3	-16°04.0	-0.7
We 7	274°05.4	289°05.4	304°05.4	319°05.3	334°05.3	349°05.3	4°05.2	19°05.2	34°05.2	49°05.1	64°05.1	79°05.0	-0.0
	-16°13.7	-16°14.4	-16°15.2	-16°15.9	-16°16.6	-16°17.4	-16°18.1	-16°18.9	-16°19.6	-16°20.3	-16°21.1	-16°21.8	-0.7
Th 8	274°04.6	289°04.5	304°04.5	319°04.4	334°04.4	349°04.3	4°04.3	19°04.3	34°04.2	49°04.2	64°04.1	79°04.1	-0.0
	-16°31.3	-16°32.0	-16°32.7	-16°33.5	-16°34.2	-16°34.9	-16°35.6	-16°36.4	-16°37.1	-16°37.8	-16°38.5	-16°39.3	-0.7
Fr 9	274°03.5	289°03.4	304°03.4	319°03.3	334°03.3	349°03.2	4°03.2	19°03.1	34°03.1	49°03.0	64°03.0	79°02.9	-0.1
	-16°48.6	-16°49.3	-16°50.0	-16°50.8	-16°51.5	-16°52.2	-16°52.9	-16°53.6	-16°54.3	-16°55.0	-16°55.7	-16°56.5	-0.7
Sa 10	274°02.2	289°02.1	304°02.1	319°02.0	334°02.0	349°01.9	4°01.8	19°01.8	34°01.7	49°01.7	64°01.6	79°01.5	-0.1
	-17°05.6	-17°06.3	-17°07.1	-17°07.8	-17°08.5	-17°09.2	-17°09.9	-17°10.6	-17°11.3	-17°12.0	-17°12.7	-17°13.4	-0.7
Su 11	274°00.7	289°00.6	304°00.6	319°00.5	334°00.4	349°00.4	4°00.3	19°00.2	34°00.2	49°00.1	64°00.0	79°00.0	-0.1
	-17°22.4	-17°23.1	-17°23.8	-17°24.5	-17°25.1	-17°25.8	-17°26.5	-17°27.2	-17°27.9	-17°28.6	-17°29.3	-17°30.0	-0.7
Mo 12	273°59.0	288°58.9	303°58.9	318°58.8	333°58.7	348°58.6	3°58.5	18°58.5	33°58.4	48°58.3	63°58.2	78°58.2	-0.1
	-17°38.8	-17°39.5	-17°40.2	-17°40.9	-17°41.5	-17°42.2	-17°42.9	-17°43.6	-17°44.2	-17°44.9	-17°45.6	-17°46.3	-0.7
Tu 13	273°57.1	288°57.0	303°56.9	318°56.8	333°56.8	348°56.7	3°56.6	18°56.5	33°56.4	48°56.3	63°56.2	78°56.2	-0.1
	-17°55.0	-17°55.6	-17°56.3	-17°57.0	-17°57.6	-17°58.3	-17°59.0	-17°59.6	-18°00.3	-18°00.9	-18°01.6	-18°02.3	-0.7
We 14	273°55.0	288°54.9	303°54.8	318°54.7	333°54.6	348°54.5	3°54.4	18°54.3	33°54.2	48°54.1	63°54.0	78°53.9	-0.1
	-18°10.8	-18°11.4	-18°12.1	-18°12.7	-18°13.4	-18°14.0	-18°14.7	-18°15.3	-18°16.0	-18°16.6	-18°17.3	-18°17.9	-0.6
Th 15	273°52.7	288°52.6	303°52.5	318°52.3	333°52.2	348°52.1	3°52.0	18°51.9	33°51.8	48°51.7	63°51.6	78°51.5	-0.1
	-18°26.3	-18°26.9	-18°27.6	-18°28.2	-18°28.8	-18°29.5	-18°30.1	-18°30.8	-18°31.4	-18°32.0	-18°32.7	-18°33.3	-0.6
Fr 16	273°50.1	288°50.0	303°49.9	318°49.8	333°49.7	348°49.6	3°49.5	18°49.3	33°49.2	48°49.1	63°49.0	78°48.9	-0.1
	-18°41.5	-18°42.1	-18°42.7	-18°43.4	-18°44.0	-18°44.6	-18°45.2	-18°45.8	-18°46.5	-18°47.1	-18°47.7	-18°48.3	-0.6
Sa 17	273°47.4	288°47.2	303°47.1	318°47.0	333°46.9	348°46.8	3°46.6	18°46.5	33°46.4	48°46.3	63°46.2	78°46.0	-0.1
	-18°56.3	-18°56.9	-18°57.6	-18°58.2	-18°58.8	-18°59.4	-19°00.0	-19°00.6	-19°01.2	-19°01.8	-19°02.4	-19°03.0	-0.6
Su 18	273°44.4	288°44.3	303°44.2	318°44.0	333°43.9	348°43.8	3°43.6	18°43.5	33°43.4	48°43.2	63°43.1	78°43.0	-0.1
	-19°10.8	-19°11.4	-19°12.0	-19°12.6	-19°13.2	-19°13.8	-19°14.4	-19°15.0	-19°15.6	-19°16.2	-19°16.8	-19°17.4	-0.6
Mo 19	273°41.2	288°41.1	303°41.0	318°40.8	333°40.7	348°40.6	3°40.4	18°40.3	33°40.1	48°40.0	63°39.9	78°39.7	-0.1
	-19°25.0	-19°25.6	-19°26.2	-19°26.8	-19°27.3	-19°27.9	-19°28.5	-19°29.1	-19°29.7	-19°30.2	-19°30.8	-19°31.4	-0.6
Tu 20	273°37.9	288°37.7	303°37.6	318°37.4	333°37.3	348°37.1	3°37.0	18°36.8	33°36.7	48°36.5	63°36.4	78°36.2	-0.1
	-19°38.8	-19°39.4	-19°40.0	-19°40.5	-19°41.1	-19°41.7	-19°42.2	-19°42.8	-19°43.4	-19°43.9	-19°44.5	-19°45.1	-0.6
We 21	273°34.3	288°34.1	303°34.0	318°33.8	333°33.6	348°33.5	3°33.3	18°33.2	33°33.0	48°32.9	63°32.7	78°32.6	-0.2
	-19°52.3	-19°52.9	-19°53.4	-19°54.0	-19°54.5	-19°55.1	-19°55.6	-19°56.2	-19°56.7	-19°57.3	-19°57.8	-19°58.4	-0.5
Th 22	273°30.5	288°30.3	303°30.1	318°30.0	333°29.8	348°29.7	3°29.5	18°29.3	33°29.2	48°29.0	63°28.8	78°28.7	-0.2
	-20°05.4	-20°06.0	-20°06.5	-20°07.0	-20°07.6	-20°08.1	-20°08.6	-20°09.2	-20°09.7	-20°10.2	-20°10.8	-20°11.3	-0.5
Fr 23	273°26.5	288°26.3	303°26.1	318°26.0	333°25.8	348°25.6	3°25.4	18°25.3	33°25.1	48°24.9	63°24.7	78°24.6	-0.2
	-20°18.2	-20°18.7	-20°19.2	-20°19.7	-20°20.2	-20°20.8	-20°21.3	-20°21.8	-20°22.3	-20°22.8	-20°23.4	-20°23.9	-0.5
Sa 24	273°22.3	288°22.1	303°21.9	318°21.7	333°21.6	348°21.4	3°21.2	18°21.0	33°20.8	48°20.6	63°20.5	78°20.3	-0.2
	-20°30.5	-20°31.0	-20°31.5	-20°32.0	-20°32.6	-20°33.1	-20°33.6	-20°34.1	-20°34.6	-20°35.1	-20°35.6	-20°36.1	-0.5
Su 25	273°17.9	288°17.7	303°17.5	318°17.3	333°17.1	348°16.9	3°16.7	18°16.6	33°16.4	48°16.2	63°16.0	78°15.8	-0.2
	-20°42.5	-20°43.0	-20°43.5	-20°44.0	-20°44.5	-20°45.0	-20°45.5	-20°45.9	-20°46.4	-20°46.9	-20°47.4	-20°47.9	-0.5
Mo 26	273°13.3	288°13.1	303°12.9	318°12.7	333°12.5	348°12.3	3°12.1	18°11.9	33°11.7	48°11.5	63°11.3	78°11.1	-0.2
	-20°54.1	-20°54.6	-20°55.1	-20°55.5	-20°56.0	-20°56.5	-20°57.0	-20°57.4	-20°57.9	-20°58.4	-20°58.8	-20°59.3	-0.5
Tu 27	273°08.5	288°08.3	303°08.1	318°07.9	333°07.7	348°07.5	3°07.3	18°07.1	33°06.9	48°06.7	63°06.5	78°06.2	-0.2
	-21°05.3	-21°05.8	-21°06.3	-21°06.7	-21°07.2	-21°07.6	-21°08.1	-21°08.5	-21°09.0	-21°09.4	-21°09.9	-21°10.3	-0.5
We 28	273°03.5	288°03.3	303°03.1	318°02.9	333°02.7	348°02.5	3°02.3	18°02.1	33°01.8	48°01.6	63°01.4	78°01.2	-0.2
	-21°16.2	-21°16.6	-21°17.0	-21°17.5	-21°17.9	-21°18.4	-21°18.8	-21°19.2	-21°19.7	-21°20.1	-21°20.6	-21°21.0	-0.4
Th 29	272°58.4	287°58.2	302°58.0	317°57.7	332°57.5	347°57.3	2°57.1	17°56.9	32°56.6	47°56.4	62°56.2	77°56.0	-0.2
	-21°26.6	-21°27.0	-21°27.4	-21°27.9	-21°28.3	-21°28.7	-21°29.1	-21°29.5	-21°30.0	-21°30.4	-21°30.8	-21°31.2	-0.4
Fr 30	272°53.1	287°52.8	302°52.6	317°52.4	332°52.2	347°51.9	2°51.7	17°51.5	32°51.3	47°51.0	62°50.8	77°50.6	-0.2
	-21°36.6	-21°37.0	-21°37.4	-21°37.8	-21°38.2	-21°38.6	-21°39.0	-21°39.4	-21°39.8	-21°40.2	-21°40.6	-21°41.0	-0.4

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

November 2035

D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
Th 1	245°14.3	259°45.7	274°17.1	288°48.5	303°19.9	317°51.2	332°22.6	346°53.9	1°25.3	15°56.6	30°27.9	+31.4	15.1
	-13°17.4	-13°24.8	-13°32.1	-13°39.3	-13°46.5	-13°53.6	-14°00.7	-14°07.6	-14°14.5	-14°21.3	-14°28.1	-7.1	55.2
Fr 2	248°16.6	262°47.8	277°19.0	291°50.1	306°21.3	320°52.4	335°23.6	349°54.7	4°25.9	18°57.0	33°28.1	+31.1	14.9
	-16°00.4	-16°06.0	-16°11.4	-16°16.8	-16°22.1	-16°27.3	-16°32.5	-16°37.5	-16°42.5	-16°47.4	-16°52.2	-5.2	54.8
Sa 3	251°14.2	265°45.3	280°16.3	294°47.3	309°18.4	323°49.4	338°20.4	352°51.5	7°22.5	21°53.5	36°24.5	+31.0	14.8
	-17°54.4	-17°57.9	-18°01.3	-18°04.6	-18°07.8	-18°10.9	-18°14.0	-18°16.9	-18°19.8	-18°22.6	-18°25.3	-3.1	54.4
Su 4	254°10.0	268°41.1	283°12.1	297°43.2	312°14.2	326°45.3	341°16.4	355°47.4	10°18.5	24°49.6	39°20.7	+31.1	14.8
	-18°55.2	-18°56.4	-18°57.6	-18°58.7	-18°59.8	-19°00.7	-19°01.6	-19°02.3	-19°03.0	-19°03.6	-19°04.1	-0.9	54.2
Mo 5	257°08.0	271°39.2	286°10.5	300°41.7	315°13.0	329°44.2	344°15.5	358°46.8	13°18.1	27°49.4	42°20.7	+31.3	14.7
	-19°00.9	-19°00.0	-18°59.0	-18°57.9	-18°56.7	-18°55.5	-18°54.1	-18°52.7	-18°51.2	-18°49.6	-18°47.9	+1.3	54.1
Tu 6	260°12.0	274°43.5	289°15.1	303°46.6	318°18.2	332°49.8	347°21.3	1°53.0	16°24.6	30°56.2	45°27.8	+31.6	14.8
	-18°12.3	-18°09.3	-18°06.2	-18°03.0	-17°59.7	-17°56.3	-17°52.8	-17°49.3	-17°45.7	-17°42.0	-17°38.2	+3.4	54.1
We 7	263°24.2	277°56.0	292°27.9	306°59.8	321°31.7	336°03.6	350°35.5	5°07.5	19°39.4	34°11.4	48°43.3	+31.9	14.8
	-16°32.0	-16°27.0	-16°21.9	-16°16.7	-16°11.4	-16°06.1	-16°00.7	-15°55.2	-15°49.6	-15°44.0	-15°38.3	+5.4	54.4
◐ Th 8	266°44.1	281°16.2	295°48.3	310°20.5	324°52.6	339°24.7	353°56.9	8°29.1	23°01.2	37°33.4	52°05.6	+32.1	15.0
	-14°04.0	-13°57.2	-13°50.3	-13°43.3	-13°36.2	-13°29.1	-13°21.9	-13°14.7	-13°07.4	-13°00.0	-12°52.6	+7.1	54.9
Fr 9	270°08.4	284°40.6	299°12.8	313°44.9	328°17.1	342°49.3	357°21.5	11°53.6	26°25.8	40°57.9	55°30.1	+32.2	15.1
	-10°53.4	-10°45.0	-10°36.5	-10°28.0	-10°19.4	-10°10.7	-10°02.0	-9°53.3	-9°44.5	-9°35.6	-9°26.7	+8.7	55.5
Sa 10	273°31.0	288°02.9	302°34.9	317°06.8	331°38.7	346°10.6	0°42.5	15°14.3	29°46.1	44°17.9	58°49.7	+31.9	15.3
	-7°06.6	-6°56.9	-6°47.1	-6°37.3	-6°27.5	-6°17.6	-6°07.7	-5°57.7	-5°47.7	-5°37.6	-5°27.5	+9.9	56.3
Su 11	276°43.4	291°14.8	305°46.1	320°17.4	334°48.6	349°19.8	3°51.0	18°22.1	32°53.2	47°24.3	61°55.3	+31.2	15.6
	-2°51.7	-2°41.0	-2°30.3	-2°19.6	-2°08.9	-1°58.2	-1°47.4	-1°36.6	-1°25.8	-1°14.9	-1°04.1	+10.8	57.2
Mo 12	279°35.6	294°05.9	308°36.2	323°06.4	337°36.6	352°06.7	6°36.8	21°06.8	35°36.7	50°06.6	64°36.5	+30.1	15.8
	1°40.9	1°52.0	2°03.1	2°14.2	2°25.3	2°36.4	2°47.5	2°58.6	3°09.7	3°20.8	3°31.9	+11.1	58.1
Tu 13	281°57.1	296°26.0	310°54.8	325°23.6	339°52.3	354°20.9	8°49.5	23°18.0	37°46.4	52°14.7	66°43.0	+28.6	16.1
	6°17.2	6°28.1	6°39.0	6°49.8	7°00.7	7°11.4	7°22.2	7°32.9	7°43.6	7°54.3	8°04.9	+10.8	59.0
We 14	283°38.9	298°06.1	312°33.2	327°00.2	341°27.1	355°54.0	10°20.8	24°47.5	39°14.2	53°40.8	68°07.3	+26.8	16.3
	10°39.5	10°49.4	10°59.3	11°09.1	11°18.8	11°28.5	11°38.1	11°47.6	11°57.1	12°06.5	12°15.9	+9.6	59.7
○ Th 15	284°36.4	299°01.8	313°27.2	327°52.4	342°17.6	356°42.7	11°07.8	25°32.8	39°57.7	54°22.6	68°47.4	+25.1	16.4
	14°26.8	14°34.9	14°42.8	14°50.7	14°58.5	15°06.2	15°13.7	15°21.2	15°28.6	15°35.9	15°43.0	+7.6	60.2
Fr 16	284°52.9	299°16.9	313°40.8	328°04.7	342°28.5	356°52.3	11°16.1	25°39.8	40°03.5	54°27.2	68°50.8	+23.8	16.5
	17°17.5	17°22.9	17°28.1	17°33.2	17°38.2	17°43.1	17°47.9	17°52.5	17°57.0	18°01.4	18°05.6	+4.8	60.5
Sa 17	284°42.0	299°05.3	313°28.5	327°51.8	342°15.1	356°38.3	11°01.6	25°24.9	39°48.1	54°11.4	68°34.7	+23.3	16.5
	18°53.4	18°55.5	18°57.5	18°59.3	19°01.0	19°02.6	19°04.0	19°05.3	19°06.4	19°07.4	19°08.3	+1.5	60.5
Su 18	284°25.6	298°49.2	313°12.8	327°36.4	342°00.1	356°23.8	10°47.6	25°11.4	39°35.2	53°59.1	68°23.0	+23.7	16.4
	19°04.8	19°03.4	19°02.0	19°00.4	18°58.7	18°56.8	18°54.8	18°52.7	18°50.4	18°48.0	18°45.5	-1.9	60.2
Mo 19	284°27.8	298°52.5	313°17.3	327°42.2	342°07.2	356°32.2	10°57.3	25°22.4	39°47.6	54°12.9	68°38.3	+25.0	16.3
	17°52.6	17°48.1	17°43.5	17°38.8	17°33.9	17°29.0	17°23.9	17°18.7	17°13.4	17°08.0	17°02.5	-5.0	59.7
Tu 20	298°52.5	313°17.3	327°42.2	342°07.2	356°32.2	10°57.3	25°22.4	39°47.6	54°12.9	68°38.3	83°03.7	+25.1	16.3
	17°48.1	17°43.5	17°38.8	17°33.9	17°29.0	17°23.9	17°18.7	17°13.4	17°08.0	17°02.5	16°56.9	-5.1	59.7
We 21	299°33.2	313°59.8	328°26.4	342°53.1	357°19.9	11°46.7	26°13.6	40°40.6	55°07.7	69°34.8	84°02.1	+26.9	16.1
	15°20.5	15°13.3	15°06.1	14°58.7	14°51.3	14°43.7	14°36.1	14°28.4	14°20.6	14°12.8	14°04.8	-7.6	59.1
◑ Th 22	300°58.9	315°27.3	329°55.7	344°24.2	358°52.8	13°21.4	27°50.1	42°18.9	56°47.7	71°16.6	85°45.6	+28.7	15.9
	11°57.1	11°48.1	11°39.0	11°29.9	11°20.6	11°11.4	11°02.0	10°52.7	10°43.2	10°33.8	10°24.2	-9.3	58.4
Fr 23	303°07.6	317°37.6	332°07.6	346°37.6	1°07.7	15°37.9	30°08.1	44°38.4	59°08.7	73°39.0	88°09.4	+30.2	15.7
	7°56.0	7°45.8	7°35.6	7°25.3	7°15.1	7°04.7	6°54.4	6°44.0	6°33.7	6°23.2	6°12.8	-10.3	57.7
Sa 24	305°51.1	320°22.3	334°53.4	349°24.6	3°55.8	18°27.1	32°58.4	47°29.7	62°01.1	76°32.4	91°03.9	+31.3	15.6
	3°34.0	3°23.3	3°12.6	3°01.9	2°51.1	2°40.4	2°29.7	2°19.0	2°08.2	1°57.5	1°46.8	-10.7	57.1
Su 25	308°58.5	323°30.3	338°02.2	352°34.0	7°05.9	21°37.8	36°09.7	50°41.7	65°13.6	79°45.6	94°17.6	+31.9	15.4
	-0°53.9	-1°04.5	-1°15.2	-1°25.8	-1°36.4	-1°47.0	-1°57.6	-2°08.1	-2°18.6	-2°29.2	-2°39.7	-10.6	56.5
Mo 26	312°18.4	326°50.6	341°22.7	355°54.8	10°26.9	24°59.0	39°31.2	54°03.3	68°35.4	83°07.5	97°39.7	+32.1	15.3
	-5°14.4	-5°24.5	-5°34.6	-5°44.6	-5°54.6	-6°04.6	-6°14.5	-6°24.4	-6°34.3	-6°44.1	-6°53.9	-9.9	55.9
Tu 27	315°41.2	330°13.2	344°45.3	359°17.3	13°49.3	28°21.4	42°53.4	57°25.4	71°57.4	86°29.3	101°01.3	+32.0	15.1
	-9°15.8	-9°24.9	-9°33.9	-9°42.9	-9°51.9	-10°00.8	-10°09.6	-10°18.4	-10°27.2	-10°35.9	-10°44.5	-8.9	55.5
We 28	318°59.4	333°31.2	348°02.9	2°34.7	17°06.4	31°38.1	46°09.8	60°41.5	75°13.1	89°44.8	104°16.4	+31.7	15.0
	-12°47.3	-12°55.0	-13°02.6	-13°10.2	-13°17.7	-13°25.1	-13°32.5	-13°39.8	-13°47.1	-13°54.3	-14°01.4	-7.4	55.0
● Th 29	322°09.1	336°40.5	351°11.9	5°43.3	20°14.6	34°46.0	49°17.3	63°48.6	78°19.9	92°51.2	107°22.5	+31.3	14.9
	-15°39.5	-15°45.5	-15°51.4	-15°57.2	-16°02.9	-16°08.6	-16°14.1	-16°19.6	-16°25.1	-16°30.4	-16°35.7	-5.6	54.6
Fr 30	325°10.1	339°41.2	354°12.3	8°43.4	23°14.5	37°45.5	52°16.6	66°47.6	81°18.7	95°49.7	110°20.7	+31.1	14.8
	-17°44.8	-17°48.7	-17°52.6	-17°56.4	-18°00.1	-18°03.7	-18°07.2	-18°10.6	-18°14.0	-18°17.2	-18°20.4	-3.6	54.3

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 8 05h50 — FM: 15 13h48 — LQ: 22 05h16 — NM: 29 19h37

SUN

December 2035

D	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	Δ'/h
Sa 1	272°47.6	287°47.4	302°47.1	317°46.9	332°46.7	347°46.4	2°46.2	17°46.0	32°45.7	47°45.5	62°45.3	77°45.0	-0.2
	-21°46.2	-21°46.6	-21°47.0	-21°47.4	-21°47.8	-21°48.1	-21°48.5	-21°48.9	-21°49.3	-21°49.7	-21°50.1	-21°50.5	-0.4
Su 2	272°41.9	287°41.7	302°41.5	317°41.2	332°41.0	347°40.7	2°40.5	17°40.3	32°40.0	47°39.8	62°39.5	77°39.3	-0.2
	-21°55.4	-21°55.8	-21°56.1	-21°56.5	-21°56.9	-21°57.2	-21°57.6	-21°58.0	-21°58.4	-21°58.7	-21°59.1	-21°59.5	-0.4
Mo 3	272°36.1	287°35.9	302°35.7	317°35.4	332°35.2	347°34.9	2°34.7	17°34.4	32°34.2	47°33.9	62°33.7	77°33.4	-0.2
	-22°04.2	-22°04.5	-22°04.9	-22°05.2	-22°05.6	-22°05.9	-22°06.3	-22°06.6	-22°07.0	-22°07.3	-22°07.7	-22°08.0	-0.4
Tu 4	272°30.2	287°29.9	302°29.7	317°29.4	332°29.2	347°28.9	2°28.7	17°28.4	32°28.2	47°27.9	62°27.7	77°27.4	-0.3
	-22°12.5	-22°12.8	-22°13.2	-22°13.5	-22°13.8	-22°14.2	-22°14.5	-22°14.8	-22°15.2	-22°15.5	-22°15.8	-22°16.2	-0.3
We 5	272°24.1	287°23.8	302°23.6	317°23.3	332°23.1	347°22.8	2°22.6	17°22.3	32°22.0	47°21.8	62°21.5	77°21.3	-0.3
	-22°20.4	-22°20.7	-22°21.0	-22°21.4	-22°21.7	-22°22.0	-22°22.3	-22°22.6	-22°22.9	-22°23.3	-22°23.6	-22°23.9	-0.3
Th 6	272°17.9	287°17.6	302°17.4	317°17.1	332°16.8	347°16.6	2°16.3	17°16.0	32°15.8	47°15.5	62°15.2	77°15.0	-0.3
	-22°27.9	-22°28.2	-22°28.5	-22°28.8	-22°29.1	-22°29.4	-22°29.7	-22°30.0	-22°30.3	-22°30.6	-22°30.9	-22°31.2	-0.3
Fr 7	272°11.5	287°11.3	302°11.0	317°10.7	332°10.4	347°10.2	2°09.9	17°09.6	32°09.4	47°09.1	62°08.8	77°08.6	-0.3
	-22°34.9	-22°35.2	-22°35.5	-22°35.8	-22°36.1	-22°36.3	-22°36.6	-22°36.9	-22°37.2	-22°37.4	-22°37.7	-22°38.0	-0.3
Sa 8	272°05.0	287°04.8	302°04.5	317°04.2	332°04.0	347°03.7	2°03.4	17°03.1	32°02.9	47°02.6	62°02.3	77°02.0	-0.3
	-22°41.5	-22°41.8	-22°42.0	-22°42.3	-22°42.6	-22°42.8	-22°43.1	-22°43.4	-22°43.6	-22°43.9	-22°44.1	-22°44.4	-0.3
Su 9	271°58.5	286°58.2	301°57.9	316°57.6	331°57.3	346°57.1	1°56.8	16°56.5	31°56.2	46°56.0	61°55.7	76°55.4	-0.3
	-22°47.7	-22°47.9	-22°48.2	-22°48.4	-22°48.7	-22°48.9	-22°49.1	-22°49.4	-22°49.6	-22°49.9	-22°50.1	-22°50.3	-0.2
Mo 10	271°51.8	286°51.5	301°51.2	316°50.9	331°50.6	346°50.3	1°50.1	16°49.8	31°49.5	46°49.2	61°48.9	76°48.7	-0.3
	-22°53.4	-22°53.6	-22°53.8	-22°54.1	-22°54.3	-22°54.5	-22°54.7	-22°54.9	-22°55.2	-22°55.4	-22°55.6	-22°55.8	-0.2
Tu 11	271°45.0	286°44.7	301°44.4	316°44.1	331°43.8	346°43.5	1°43.2	16°43.0	31°42.7	46°42.4	61°42.1	76°41.8	-0.3
	-22°58.6	-22°58.8	-22°59.0	-22°59.2	-22°59.5	-22°59.7	-22°59.9	-23°00.1	-23°00.3	-23°00.5	-23°00.7	-23°00.9	-0.2
We 12	271°38.1	286°37.8	301°37.5	316°37.2	331°36.9	346°36.6	1°36.3	16°36.0	31°35.7	46°35.5	61°35.2	76°34.9	-0.3
	-23°03.4	-23°03.6	-23°03.8	-23°04.0	-23°04.2	-23°04.4	-23°04.5	-23°04.7	-23°04.9	-23°05.1	-23°05.3	-23°05.5	-0.2
Th 13	271°31.1	286°30.8	301°30.5	316°30.2	331°29.9	346°29.6	1°29.3	16°29.0	31°28.7	46°28.4	61°28.2	76°27.9	-0.3
	-23°07.8	-23°07.9	-23°08.1	-23°08.3	-23°08.4	-23°08.6	-23°08.8	-23°08.9	-23°09.1	-23°09.3	-23°09.4	-23°09.6	-0.2
Fr 14	271°24.0	286°23.7	301°23.4	316°23.1	331°22.8	346°22.5	1°22.2	16°22.0	31°21.7	46°21.4	61°21.1	76°20.8	-0.3
	-23°11.6	-23°11.8	-23°11.9	-23°12.1	-23°12.2	-23°12.4	-23°12.5	-23°12.7	-23°12.8	-23°13.0	-23°13.1	-23°13.3	-0.1
Sa 15	271°16.9	286°16.6	301°16.3	316°16.0	331°15.7	346°15.4	1°15.1	16°14.8	31°14.5	46°14.2	61°13.9	76°13.6	-0.3
	-23°15.1	-23°15.2	-23°15.3	-23°15.4	-23°15.6	-23°15.7	-23°15.8	-23°16.0	-23°16.1	-23°16.2	-23°16.3	-23°16.5	-0.1
Su 16	271°09.7	286°09.4	301°09.1	316°08.8	331°08.5	346°08.2	1°07.9	16°07.6	31°07.3	46°07.0	61°06.7	76°06.4	-0.3
	-23°18.0	-23°18.1	-23°18.2	-23°18.3	-23°18.5	-23°18.6	-23°18.7	-23°18.8	-23°18.9	-23°19.0	-23°19.1	-23°19.2	-0.1
Mo 17	271°02.4	286°02.1	301°01.8	316°01.5	331°01.2	346°00.9	1°00.6	16°00.3	31°00.0	45°59.7	60°59.4	75°59.1	-0.3
	-23°20.5	-23°20.6	-23°20.7	-23°20.8	-23°20.9	-23°21.0	-23°21.0	-23°21.1	-23°21.2	-23°21.3	-23°21.4	-23°21.5	-0.1
Tu 18	270°55.1	285°54.8	300°54.5	315°54.2	330°53.9	345°53.6	0°53.3	15°53.0	30°52.7	45°52.4	60°52.1	75°51.8	-0.3
	-23°22.5	-23°22.6	-23°22.7	-23°22.7	-23°22.8	-23°22.9	-23°22.9	-23°23.0	-23°23.1	-23°23.2	-23°23.2	-23°23.3	-0.1
We 19	270°47.8	285°47.5	300°47.2	315°46.8	330°46.5	345°46.2	0°45.9	15°45.6	30°45.3	45°45.0	60°44.7	75°44.4	-0.3
	-23°24.1	-23°24.1	-23°24.2	-23°24.2	-23°24.3	-23°24.3	-23°24.4	-23°24.4	-23°24.5	-23°24.5	-23°24.6	-23°24.6	-0.1
Th 20	270°40.4	285°40.1	300°39.8	315°39.4	330°39.1	345°38.8	0°38.5	15°38.2	30°37.9	45°37.6	60°37.3	75°37.0	-0.3
	-23°25.2	-23°25.2	-23°25.2	-23°25.3	-23°25.3	-23°25.3	-23°25.4	-23°25.4	-23°25.4	-23°25.4	-23°25.5	-23°25.5	-0.0
Fr 21	270°32.9	285°32.6	300°32.3	315°32.0	330°31.7	345°31.4	0°31.1	15°30.8	30°30.5	45°30.2	60°29.8	75°29.5	-0.3
	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.8	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-0.0
Sa 22	270°25.5	285°25.2	300°24.9	315°24.6	330°24.3	345°23.9	0°23.6	15°23.3	30°23.0	45°22.7	60°22.4	75°22.1	-0.3
	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.9	-23°25.8	-23°25.8	-23°25.8	+0.0
Su 23	270°18.0	285°17.7	300°17.4	315°17.1	330°16.8	345°16.5	0°16.2	15°15.9	30°15.6	45°15.2	60°14.9	75°14.6	-0.3
	-23°25.6	-23°25.6	-23°25.5	-23°25.5	-23°25.5	-23°25.5	-23°25.4	-23°25.4	-23°25.4	-23°25.3	-23°25.3	-23°25.3	+0.0
Mo 24	270°10.6	285°10.3	300°10.0	315°09.6	330°09.3	345°09.0	0°08.7	15°08.4	30°08.1	45°07.8	60°07.5	75°07.2	-0.3
	-23°24.8	-23°24.8	-23°24.7	-23°24.7	-23°24.6	-23°24.6	-23°24.5	-23°24.5	-23°24.4	-23°24.4	-23°24.3	-23°24.3	+0.0
Tu 25	270°03.1	285°02.8	300°02.5	315°02.2	330°01.9	345°01.6	0°01.3	15°00.9	30°00.6	45°00.3	60°00.0	74°59.7	-0.3
	-23°23.5	-23°23.5	-23°23.4	-23°23.3	-23°23.3	-23°23.2	-23°23.1	-23°23.1	-23°23.0	-23°22.9	-23°22.9	-23°22.8	+0.1
We 26	269°55.7	284°55.4	299°55.1	314°54.7	329°54.4	344°54.1	359°53.8	14°53.5	29°53.2	44°52.9	59°52.6	74°52.3	-0.3
	-23°21.8	-23°21.7	-23°21.6	-23°21.5	-23°21.5	-23°21.4	-23°21.3	-23°21.2	-23°21.1	-23°21.0	-23°20.9	-23°20.8	+0.1
Th 27	269°48.3	284°47.9	299°47.6	314°47.3	329°47.0	344°46.7	359°46.4	14°46.1	29°45.8	44°45.5	59°45.2	74°44.9	-0.3
	-23°19.6	-23°19.5	-23°19.4	-23°19.3	-23°19.2	-23°19.1	-23°19.0	-23°18.9	-23°18.7	-23°18.6	-23°18.5	-23°18.4	+0.1
Fr 28	269°40.9	284°40.6	299°40.3	314°39.9	329°39.6	344°39.3	359°39.0	14°38.7	29°38.4	44°38.1	59°37.8	74°37.5	-0.3
	-23°16.9	-23°16.8	-23°16.7	-23°16.5	-23°16.4	-23°16.3	-23°16.2	-23°16.0	-23°15.9	-23°15.8	-23°15.7	-23°15.5	+0.1
Sa 29	269°33.5	284°33.2	299°32.9	314°32.6	329°32.3	344°32.0	359°31.7	14°31.4	29°31.1	44°30.8	59°30.5	74°30.2	-0.3
	-23°13.8	-23°13.6	-23°13.5	-23°13.3	-23°13.2	-23°13.1	-23°12.9	-23°12.8	-23°12.6	-23°12.5	-23°12.3	-23°12.2	+0.1
Su 30	269°26.2	284°25.9	299°25.6	314°25.3	329°25.0	344°24.7	359°24.4	14°24.1	29°23.8	44°23.5	59°23.2	74°22.9	-0.3
	-23°10.2	-23°10.0	-23°09.8	-23°09.7	-23°09.5	-23°09.4	-23°09.2	-23°09.0	-23°08.9	-23°08.7	-23°08.5	-23°08.4	+0.2
Mo 31	269°19.0	284°18.7	299°18.4	314°18.1	329°17.8	344°17.5	359°17.2	14°16.9	29°16.6	44°16.3	59°16.0	74°15.7	-0.3
	-23°06.1	-23°05.9	-23°05.7	-23°05.6	-23°05.4	-23°05.2	-23°05.0	-23°04.8	-23°04.6	-23°04.5	-23°04.3	-23°04.1	+0.2

Row 1: GHA (Greenwich Hour Angle), Δ'/h = GHA change − 15°
Row 2: Dec (Declination, − = South), Δ'/h = dec. change
Semi-diameter: 16.2'

MOON

December 2035

D	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	Δ'/h	SH
Sa 1	240°59.7	255°30.7	270°01.7	284°32.6	299°03.6	313°34.6	328°05.6	342°36.5	357°07.5	11°38.5	26°09.5	+31.0	14.8
	-18°45.1	-18°47.4	-18°49.6	-18°51.7	-18°53.7	-18°55.7	-18°57.5	-18°59.3	-19°01.0	-19°02.6	-19°04.1	-1.9	54.1
Su 2	243°54.5	258°25.6	272°56.6	287°27.7	301°58.8	316°29.9	331°01.0	345°32.1	0°03.2	14°34.3	29°05.4	+31.1	14.7
	-19°15.9	-19°16.0	-19°16.0	-19°15.9	-19°15.7	-19°15.4	-19°15.0	-19°14.6	-19°14.0	-19°13.4	-19°12.7	+0.3	54.0
Mo 3	246°53.9	261°25.3	275°56.7	290°28.1	304°59.5	319°30.9	334°02.3	348°33.8	3°05.2	17°36.7	32°08.2	+31.4	14.7
	-18°51.3	-18°49.2	-18°47.0	-18°44.7	-18°42.4	-18°39.9	-18°37.4	-18°34.7	-18°32.0	-18°29.2	-18°26.4	+2.5	53.9
Tu 4	250°03.1	264°34.9	279°06.7	293°38.6	308°10.4	322°42.3	337°14.2	351°46.2	6°18.1	20°50.1	35°22.1	+31.9	14.7
	-17°33.4	-17°29.2	-17°25.0	-17°20.7	-17°16.3	-17°11.8	-17°07.2	-17°02.6	-16°57.9	-16°53.1	-16°48.2	+4.5	54.0
We 5	253°24.3	267°56.6	282°28.9	297°01.3	311°33.6	326°06.0	340°38.4	355°10.8	9°43.2	24°15.7	38°48.1	+32.4	14.8
	-15°26.4	-15°20.4	-15°14.3	-15°08.1	-15°01.8	-14°55.5	-14°49.2	-14°42.7	-14°36.2	-14°29.7	-14°23.0	+6.3	54.3
Th 6	256°56.7	271°29.3	286°02.0	300°34.7	315°07.4	329°40.1	344°12.8	358°45.5	13°18.3	27°51.0	42°23.7	+32.7	14.9
	-12°35.7	-12°28.1	-12°20.4	-12°12.6	-12°04.8	-11°56.9	-11°49.0	-11°41.0	-11°32.9	-11°24.8	-11°16.7	+7.9	54.7
Fr 7	260°35.3	275°08.1	289°40.9	304°13.6	318°46.4	333°19.1	347°51.9	2°24.7	16°57.4	31°30.1	46°02.9	+32.8	15.1
	-9°07.8	-8°58.9	-8°49.8	-8°40.7	-8°31.6	-8°22.4	-8°13.2	-8°03.9	-7°54.6	-7°45.2	-7°35.8	+9.2	55.3
◐ Sa 8	264°12.3	278°44.8	293°17.3	307°49.8	322°22.2	336°54.6	351°27.0	5°59.4	20°31.7	35°04.1	49°36.4	+32.4	15.3
	-5°09.9	-4°59.8	-4°49.8	-4°39.6	-4°29.5	-4°19.3	-4°09.1	-3°58.9	-3°48.6	-3°38.4	-3°28.0	+10.2	56.0
Su 9	267°37.1	282°08.9	296°40.6	311°12.3	325°43.9	340°15.5	354°47.1	9°18.6	23°50.1	38°21.5	52°52.9	+31.6	15.5
	-0°50.0	-0°39.3	-0°28.6	-0°17.9	-0°07.1	0°03.7	0°14.5	0°25.3	0°36.1	0°46.9	0°57.8	+10.8	57.0
Mo 10	270°37.3	285°07.9	299°38.3	314°08.7	328°39.0	343°09.3	357°39.5	12°09.6	26°39.7	41°09.7	55°39.7	+30.2	15.8
	3°41.2	3°52.1	4°03.1	4°14.0	4°24.9	4°35.7	4°46.6	4°57.5	5°08.4	5°19.2	5°30.1	+10.9	57.9
Tu 11	273°00.2	287°29.0	301°57.7	316°26.3	330°54.8	345°23.3	359°51.6	14°19.9	28°48.1	43°16.3	57°44.3	+28.4	16.1
	8°10.5	8°20.9	8°31.4	8°41.8	8°52.2	9°02.6	9°12.9	9°23.2	9°33.4	9°43.6	9°53.8	+10.3	59.0
We 12	274°34.7	289°01.4	303°28.0	317°54.5	332°20.9	346°47.2	1°13.4	15°39.6	30°05.6	44°31.6	58°57.5	+26.3	16.3
	12°20.0	12°29.3	12°38.5	12°47.7	12°56.7	13°05.7	13°14.7	13°23.5	13°32.3	13°41.0	13°49.6	+9.0	59.9
Th 13	275°15.5	289°40.0	304°04.4	318°28.8	332°53.1	347°17.3	1°41.5	16°05.5	30°29.5	44°53.5	59°17.3	+24.2	16.5
	15°48.6	15°55.7	16°02.8	16°09.7	16°16.6	16°23.3	16°30.0	16°36.5	16°42.9	16°49.2	16°55.4	+6.7	60.6
Fr 14	275°07.1	289°29.9	303°52.8	318°15.5	332°38.2	347°00.9	1°23.5	15°46.1	30°08.6	44°31.1	58°53.6	+22.6	16.7
	18°13.5	18°17.7	18°21.7	18°25.6	18°29.4	18°33.0	18°36.5	18°39.9	18°43.1	18°46.2	18°49.2	+3.6	61.1
○ Sa 15	274°27.5	288°49.6	303°11.8	317°33.9	331°56.0	346°18.2	0°40.3	15°02.5	29°24.6	43°46.8	58°09.0	+22.1	16.7
	19°16.2	19°16.8	19°17.3	19°17.7	19°17.9	19°17.9	19°17.8	19°17.6	19°17.2	19°16.6	19°16.0	-0.0	61.2
Su 16	273°44.6	288°07.3	302°30.0	316°52.7	331°15.5	345°38.4	0°01.2	14°24.2	28°47.2	43°10.2	57°33.3	+22.9	16.6
	18°48.3	18°45.3	18°42.2	18°38.9	18°35.6	18°32.0	18°28.4	18°24.6	18°20.6	18°16.6	18°12.4	-3.6	61.0
Mo 17	273°27.6	287°51.8	302°16.1	316°40.4	331°04.8	345°29.3	359°53.9	14°18.6	28°43.3	43°08.1	57°33.0	+24.5	16.5
	16°54.5	16°48.3	16°42.1	16°35.7	16°29.2	16°22.6	16°15.9	16°09.1	16°02.2	15°55.2	15°48.1	-6.6	60.5
Tu 18	273°56.5	288°22.7	302°49.1	317°15.5	331°42.0	346°08.6	0°35.3	15°02.0	29°28.9	43°55.8	58°22.8	+26.6	16.3
	13°50.4	13°41.8	13°33.2	13°24.5	13°15.8	13°06.9	12°58.0	12°49.1	12°40.0	12°30.9	12°21.7	-8.9	59.7
We 19	275°18.0	289°46.3	304°14.7	318°43.2	333°11.8	347°40.4	2°09.1	16°37.9	31°06.8	45°35.7	60°04.7	+28.7	16.0
	9°57.0	9°46.9	9°36.8	9°26.7	9°16.5	9°06.3	8°56.0	8°45.7	8°35.4	8°25.0	8°14.6	-10.2	58.8
Th 20	289°46.3	304°14.7	318°43.2	333°11.8	347°40.4	2°09.1	16°37.9	31°06.8	45°35.7	60°04.7	74°33.8	+28.7	16.0
	9°46.9	9°36.8	9°26.7	9°16.5	9°06.3	8°56.0	8°45.7	8°35.4	8°25.0	8°14.6	8°04.2	-10.3	58.8
◑ Fr 21	291°58.0	306°28.2	320°58.4	335°28.6	349°58.9	4°29.3	18°59.7	33°30.2	48°00.7	62°31.3	77°01.9	+30.4	15.8
	5°24.5	5°13.6	5°02.8	4°52.0	4°41.1	4°30.3	4°19.4	4°08.6	3°57.7	3°46.8	3°35.9	-10.9	57.9
Sa 22	294°47.1	309°18.5	323°49.8	338°21.3	352°52.7	7°24.3	21°55.8	36°27.4	50°59.0	65°30.6	80°02.3	+31.5	15.6
	0°52.4	0°41.5	0°30.6	0°19.8	0°08.9	-0°01.9	-0°12.7	-0°23.5	-0°34.3	-0°45.1	-0°55.8	-10.8	57.0
Su 23	298°00.6	312°32.7	327°04.7	341°36.8	356°09.0	10°41.1	25°13.3	39°45.4	54°17.6	68°49.8	83°22.0	+32.1	15.3
	-3°34.8	-3°45.2	-3°55.6	-4°05.9	-4°16.3	-4°26.6	-4°36.8	-4°47.1	-4°57.3	-5°07.4	-5°17.6	-10.3	56.3
Mo 24	301°26.1	315°58.4	330°30.7	345°03.0	359°35.3	14°07.7	28°40.0	43°12.3	57°44.6	72°16.9	86°49.2	+32.3	15.2
	-7°45.2	-7°54.7	-8°04.2	-8°13.6	-8°23.0	-8°32.4	-8°41.7	-8°50.9	-9°00.1	-9°09.3	-9°18.4	-9.3	55.6
Tu 25	304°53.1	319°25.3	333°57.5	348°29.7	3°01.8	17°34.0	32°06.1	46°38.3	61°10.4	75°42.5	90°14.6	+32.1	15.0
	-11°28.8	-11°37.1	-11°45.3	-11°53.4	-12°01.5	-12°09.5	-12°17.5	-12°25.4	-12°33.2	-12°41.0	-12°48.7	-8.0	55.0
We 26	308°14.2	322°46.1	337°17.9	351°49.8	6°21.6	20°53.4	35°25.1	49°56.9	64°28.6	79°00.4	93°32.1	+31.8	14.9
	-14°36.8	-14°43.5	-14°50.1	-14°56.6	-15°03.1	-15°09.5	-15°15.8	-15°22.0	-15°28.2	-15°34.3	-15°40.3	-6.3	54.6
Th 27	311°25.7	325°57.2	340°28.6	355°00.1	9°31.5	24°02.9	38°34.2	53°05.6	67°36.9	82°08.3	96°39.6	+31.4	14.8
	-17°01.5	-17°06.3	-17°11.0	-17°15.7	-17°20.2	-17°24.7	-17°29.1	-17°33.4	-17°37.6	-17°41.7	-17°45.8	-4.4	54.3
Fr 28	314°28.0	328°59.1	343°30.2	358°01.4	12°32.5	27°03.6	41°34.7	56°05.8	70°36.9	85°08.0	99°39.0	+31.1	14.7
	-18°36.6	-18°39.3	-18°41.9	-18°44.4	-18°46.9	-18°49.2	-18°51.5	-18°53.7	-18°55.8	-18°57.8	-18°59.7	-2.3	54.1
● Sa 29	317°24.9	331°55.9	346°27.0	0°58.0	15°29.1	30°00.2	44°31.2	59°02.3	73°33.4	88°04.4	102°35.5	+31.1	14.7
	-19°17.7	-19°18.2	-19°18.6	-19°19.0	-19°19.2	-19°19.3	-19°19.4	-19°19.3	-19°19.2	-19°19.0	-19°18.7	-0.1	53.9
Su 30	320°22.8	334°54.0	349°25.2	3°56.5	18°27.8	32°59.1	47°30.4	62°01.7	76°33.0	91°04.4	105°35.7	+31.3	14.7
	-19°03.4	-19°01.7	-18°59.8	-18°58.0	-18°56.0	-18°53.9	-18°51.7	-18°49.5	-18°47.2	-18°44.8	-18°42.3	+2.1	53.9
Mo 31	323°28.2	337°59.9	352°31.6	7°03.3	21°35.0	36°06.7	50°38.5	65°10.2	79°42.0	94°13.9	108°45.7	+31.7	14.7
	-17°54.8	-17°51.0	-17°47.0	-17°43.1	-17°39.0	-17°34.9	-17°30.6	-17°26.3	-17°22.0	-17°17.5	-17°13.0	+4.2	53.9

Row 1: GHA, Δ'/h = GHA change − 14°, SH = semi-diameter
Row 2: Dec (− = South), Δ'/h = dec. change, SH = horizontal parallax
Column = (UTC hour − day) mod 24
FQ: 8 01h05 — FM: 15 00h33 — LQ: 21 16h28 — NM: 29 14h30