

February 2012 Astronomy Calendar by Dave Mitsky
Some information supplied and/or added by Tony Donnangelo

Times are Eastern Standard Time (-5 hrs. U.T.).

Events listed are based on a location of 40°N in the Eastern US and may not be visible in all areas.

Concerning moderate and minor meteor shower activity:

Do not have any high expectations. This general information is to account for why you might be seeing a few more than normal meteors during your observing session.

Lunar light rays may occur prior to or after the predicted time. Initial observations might have occurred after the ray's inception or continued after the observer's session. Rays may last a very short time or for many hours. Obtain further information; send reports (including non-occurrences and miss-calculations), photos, and observations of new rays to:

The Robinson Lunar Observatory: <http://www.lunar-occultations.com/rlo/rlondx.htm>.

- 2/1 Copernicus (sunrise) lunar light ray predicted to occur at 6:11 p.m. Sunset at 5:25 p.m.
- 2/1 Cichus A (sunrise) lunar light ray predicted to occur at 6:39 p.m. Sunset at 5:25 p.m.
- 2/1 Kies (sunrise) lunar light ray predicted to occur at 7:47 p.m.
- 2/1 Lagalla (sunrise) lunar light ray predicted to occur at 10:14 p.m.
- 2/1 Palus Epidemiarum (sunrise) lunar light ray predicted to occur at 11:11 p.m.
- 2/1 Longomontanus (sunrise) lunar light ray predicted to occur at 11:24 p.m.
- 2/2 Scheiner (sunrise) lunar light ray predicted to occur at 8:48 p.m.
- 2/3 Casatus (sunrise) lunar light ray predicted to occur at 8:39 p.m.
- 2/3 Mersenius P (sunrise) lunar light ray predicted to occur at 10:52 p.m.
- 2/5 Phocylides (sunrise) lunar light ray predicted to occur at 7:08 p.m.
- 2/3 Asteroid (477) Italia is at closest approach to Earth at 1.858 A.U.
- 2/4 Today is the actual date of the astronomical cross-quarter day known as Imbolc or Candlemas.
- 2/4 Vieta (sunrise) lunar light ray predicted to occur at 9:56 p.m.
- 2/4 Clausius (sunrise) lunar light ray predicted to occur at 10:49 p.m.
- 2/5 Lacroix G (sunrise) lunar light ray predicted to occur at 1:02 a.m.
- 2/5 Aurigids meteor shower (minor activity) peaks through the 10th. Duration is from 1/31 through 2/23. Observing and History: <http://meteorshowersonline.com/showers/aurigids.html>
- 2/7 Asteroid (433) Eros (magnitude 8.6) at opposition.
- 2/7 Mercury is at its greatest heliocentric latitude south today.
- 2/7 Mercury is in superior conjunction at 4:00 a.m.
- 2/7 Full Moon (known as the Hunger, Snow, or Storm Moon) occurs at 4:54 p.m.
- 2/8 Saturn is stationary at 7:00 a.m.
- 2/8 20th Anniversay (1992) of Ulysses Jupiter flyby.
- 2/8 Alpha Centaurids meteor shower (minor activity) peaks 8/9. Duration is from 2nd to 25th. Observing and History: http://meteorshowersonline.com/showers/alpha-beta_centaurids.html
- 2/8 Beta Centaurids meteor shower (minor activity) peaks 8/9. Duration is from 2nd to 25th. Observing and History: http://meteorshowersonline.com/showers/alpha-beta_centaurids.html
- 2/9 Lame (sunset) lunar light ray predicted to occur at 5:46 a.m.
- 2/9 Endymion (sunset) lunar light ray predicted to occur at 11:04 p.m.
- 2/10 Comet 21P/Giacobini-Zinner is at closest approach to Earth at 1.850 A.U.
- 2/10 Venus is 0.3° north of Uranus at 12:00 a.m.
- 2/10 Mars is 10° north of the Moon at 7:00 a.m.
- 2/11 Comet 21P/Giacobini-Zinner is at perihelion at 1.030 A.U.
- 2/11 Asteroid (253) Mathilde is at closest approach to Earth at 2.334 A.U.
- 2/11 The Moon is at perigee, subtending 32'4" from a distance of 367,992 kilometers (231,619 miles), at 2:00 p.m.

2/12 Globe at Night through the 21st. <http://www.globeatnight.org/>

2/12 The Moon is 1.7° south of the first-magnitude star Spica (Alpha Virginis) at 8:00 a.m.

2/12 Saturn is 6° north of the Moon at 8:00 p.m.

2/13 John Dreyer's 160th Birthday (1852).

2/13 Chi Capricornids meteor shower (daylight activity) peaks 13/14. Duration is from 1/29 to 2/28. Observing and History: http://meteorshowersonline.com/showers/chi_capricornids.html

2/13 Aristoteles (sunset) lunar light ray predicted to occur at 12:30 a.m.

2/13 Maurolycus (sunset) lunar light ray predicted to occur at 4:35 a.m.

2/14 Mercury Passes 1.3° from Neptune.

2/14 Fernelius (sunset) lunar light ray predicted to occur at 12:47 a.m. Moonrise at 12:47 a.m.

2/14 Last Quarter Moon occurs at 12:04 p.m.

2/15 Mars is at aphelion (1.66598 a.u.) today.

2/15 Venus is at the ascending node today.

2/15 The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to occur at 8:42 p.m.

2/16 Asteroid (243) Ida is at closest approach to Earth at 1.837 A.U.

2/17 Asteroid (136) Austria is at closest approach to Earth at 1.503 A.U.

2/19 Neptune is in conjunction with the Sun at 5:00 p.m.

2/20 50th Anniversary (1962) of John Glenn's Friendship 7 Launch.

2/21 New Moon (lunation 1103) occurs at 5:35 p.m.

2/22 18th Annual Orange Blossom Special Star Party held through the 26th in Dade City, Florida.

2/22 Asteroid (2) Pallas is in conjunction with the Sun at 1:00 p.m.

2/22 Delta Leonids meteor shower (minor activity) peaks 22/23. Duration is from 2/5 to 3/19. Observing and History: http://meteorshowersonline.com/showers/delta_leonids.html

2/23 Asteroid (719) Albert Closest is at closest approach to Earth at 3.075 A.U.

2/23 25th Anniversary (1987) of Supernova 1987A explosion.

2/23 Mercury is 6° south of the Moon at 1:00 a.m.

2/24 Uranus is 6° south of the Moon at 8:00 a.m.

2/25 Venus is 3° south of the Moon at 5:00 p.m.

2/25 Sigma Leonids meteor shower (minor activity) peaks 25/26. Duration is from 2/9 to 3/13. Observing and History: http://meteorshowersonline.com/showers/sigma_leonids.html

2/26 Mercury is at the ascending node today.

2/27 Bernard Lyot's 115th Birthday (1897).

2/27 Jupiter is 4° south of the Moon at 1:00 a.m.

2/27 The Moon is at apogee, subtending 29'32" from a distance of 404,862 kilometers (251,345 miles), at 9:00 a.m.

2/27 Asteroid (6) Hebe (magnitude 9.4) is at opposition at 12:00 p.m.

2/28 Abenezra C (sunrise) lunar light ray predicted to occur at 6:23 p.m. Sunset at 5:57 p.m.

2/28 Stöfler (sunrise) lunar light ray predicted to occur at 6:23 p.m. Sunset at 5:57 p.m.

2/28 Abenezra P (sunrise) lunar light ray predicted to occur at 6:57 p.m.

2/28 Hind (SE of) (sunrise) lunar light ray predicted to occur at 9:01 p.m.

2/28 Saunder (sunrise) lunar light ray predicted to occur at 9:16 p.m.

2/29 The Lunar X (the Purbach or Werner Cross), an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to occur at 8:54 a.m.

Nicolas Copernicus (1473-1543), Galileo Galilei (1564-1642), and Clyde Tombaugh (1906-1997) were born this month.

During the first two weeks of February, the zodiacal light can be seen in the western sky after sunset from dark locations.

The Moon is 8.7 days old and is located in the constellation of Aries at 0:00 UT on February 1. The waxing crescent Moon has close pairings with Venus on the evening of February 25 and Jupiter on the night of February 26. The Moon is at its greatest northern declination of +22.4 degrees on February 3 and its greatest southern declination of -22.3 degrees on February 16. Latitudinal libration is at a maximum of +4.7 degrees on February 20 and a minimum of -5.8 degrees on February 5. Longitudinal libration is at a maximum of +6.6 degrees on February 9 and a minimum of -6.6 degrees on February 22. Visit <http://saberdoesthestars.wordpress.com/2011/07/05/saber-does-the-stars/> for tips on spotting extreme crescent Moons. Times and dates for the lunar light rays predicted to occur this month are available at <http://www.lunar-occultations.com/rlo/rays/rays.htm>

The Sun is located in the constellation of Capricornus on February 1.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on February 1: Mercury (magnitude -1.1, 4.8", 99% illuminated, 1.41 a.u., Sagittarius), Venus (magnitude -4.1, 15.1", 74% illuminated, 1.11 a.u., Sagittarius), Mars (magnitude -0.6, 11.8", 96% illuminated, 0.79 a.u., Capricornus), Jupiter (magnitude -2.3, 39.2", 99% illuminated, 5.03 a.u., Aries), Saturn (magnitude 0.6, 17.6", 100% illuminated, 9.45 a.u., Virgo), Uranus (magnitude 5.9, 3.4", 100% illuminated, 20.69 a.u., Pisces), Neptune (magnitude 8.0, 2.2", 100% illuminated, 30.93 a.u., Aquarius), and Pluto (magnitude 14.1, 0.1", 100% illuminated, 32.99 a.u., Sagittarius).

Mercury, Venus, and Uranus can be seen in the west and Jupiter in the southwest in the evening sky. Mars and Saturn lie in the southeast at midnight. Mars is in the west and Saturn is in the southwest in the morning sky.

Visibility of the classical planets at local time from 40 degrees north latitude at mid-month: Venus sets at 9:00 p.m.; Mars rises at 7:00 p.m. and transits at 2:00 a.m.; Jupiter sets at 11:00 p.m.; Saturn rises at 11:00 p.m. and transits at 4:00 a.m.

Mercury is visible low in the west at evening twilight during the last third of the month. The speediest planet sets about one hour after the sun does by February 22. A young crescent Moon lies about 5 degrees to the right of the planet that evening. By February 28, Mercury is greater than ten degrees above the western horizon 30 minutes after sunset. This will be the best evening apparition of Mercury for the year.

Venus increases in apparent size from 15.1 to 18.2 arc seconds but decreases in illuminated extent from 74% to 64%, as the month progresses. The most brilliant of the planets sets about two minutes later each day. By the end of February, Venus can be seen until 9:30 p.m. local time. Venus has close encounters with Uranus on February 10 and the Moon on February 25.

During February, Mars increases dramatically in brightness from magnitude -0.5 to magnitude -1.2 and increases two arc seconds in apparent size. Mars departs Virgo and reenters Leo on February 4. On February 19, the apparent brightness of the planet exceeds magnitude -1.0. Retrograde (westward) motion carries Mars to within 16 degrees of the first-magnitude star Regulus (Alpha Leonis) this month. At the end of February, Mars is approximately five degrees south of the third-magnitude star Theta Leonis. Information on the 2012 apparition of Mars can be found at <http://www.curtrenz.com/mars> and <http://spider.seds.org/spider/Mars/mars2012.html>

Jupiter drops to magnitude -2.2 and decreases in apparent size to 36.2 arc seconds by month's end. Browse http://skyandtelescope.com/observing/objects/planets/article_107_1.asp in order to determine transit times of Jupiter's central meridian by the Great Red Spot. Data on the Galilean satellites is available at <http://skytonight.com/observing/objects/javascript/3307071.html#>

Saturn begins retrograde motion on February 8. The tilt angle of Saturn's rings reaches 15 degrees this month. Eight-magnitude Titan is north of Saturn on February 7 and February 23 and south of the planet on February 15. Tenth-magnitude Iapetus is almost nine arc minutes west of Saturn when it reaches greatest eastern elongation on February 8. For further information on the satellites of Saturn, browse

<http://www.skyandtelescope.com/observing/objects/javascript/3308506.html>

Uranus is just one third of a degree south of Venus on February 10. Gerald Kuiper discovered the Uranian satellite Miranda (magnitude 15.8) on February 16, 1948.

Neptune is in conjunction with the Sun on February 19 and is not observable this month.

The dwarf planet Pluto is not readily observable during February. Clyde Tombaugh discovered Pluto on February 18, 1930.

For more on the planets and how to locate them, browse <http://www.nakedeyeplanets.com/>

During February, Comet C/2009 P1 (Garradd) shines at seventh magnitude and glides through Hercules and Draco before entering Ursa Minor. It passes less than one degree from the globular cluster M92 on February 2 and February 3. Visit <http://cometchasing.skyhound.com/> for additional information on comets visible in February.

Asteroid 433 Eros travels southwestward through Sextans and Hydra this month. It shines at magnitude 8.6 from February 1 to February 13 and decreases in brightness to magnitude 9.0 by February 25. An ephemeris is posted at <http://www.curtrenz.com/asteroids03.html> and a finder chart can be found on page 52 of the February issue of *Sky & Telescope*. There's an article about 433 Eros on pages 48 and 49 of the February issue of *Astronomy*. Asteroid 5 Astraea takes a northwestward path through Virgo during February. The ninth-magnitude main belt asteroid is due south of the fourth-magnitude star Mu Virginis on February 29.

Free star maps for February can be downloaded at <http://www.skymaps.com/downloads.html> and <http://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart>

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on February 3, 6, 9, 12, 15, 17, 20, 23, 26, and 29. Consult http://www.skyandtelescope.com/observing/objects/variablestars/Minima_of_Algol.html for the times of the eclipses. For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> and <http://www.solstation.com/stars2/algol3.htm>

Comet information for: February 22, 2012 (New Moon).

	Constellation	Rises	Transits	Sets
C/2009 P1 (Garradd)	Draco	circumpolar	6:29 a.m.	
C/2010 G2 (Hill)	Eridanus	11:20 a.m.	5:03 p.m.	10:45 p.m.
78P/Gehrels 2	Cetus	9:39 a.m.	4:16 p.m.	10:54 p.m.
29P/Schwassmann-Wachmann 1	Corvus	9:26 p.m.	2:41 a.m.	7:56 a.m.
21P/Giacobini-Zinner	Pisces	7:58 a.m.	1:53 p.m.	7:47 p.m.
C/2011 F1 (LINEAR)	Boötes	circumpolar	5:43 a.m.	
C/2006 S3 (LONEOS)	Serpens Cauda	3:05 a.m.	8:18 a.m.	1:31 p.m.
P/2006 T1 (Levy)	Canis Major	4:13 p.m.	8:23 p.m.	12:33 a.m.

For location (40°16'N 76°45'W) Hummelstown, PA, USA:

February 1:

Astronomical twilight starts: 5:43 a.m.

Nautical twilight starts: 6:15 a.m.

Civil twilight starts: 6:48 a.m.

Sunrise: 7:16 a.m.

Sunset: 5:25 p.m.

Civil twilight ends: 5:54 p.m.

Nautical twilight ends: 6:26 p.m.

Astronomical twilight ends: 6:58 p.m.

March 1:

Astronomical twilight starts: 5:09 a.m.

Nautical twilight starts: 5:41 a.m.

Civil twilight starts: 6:12 a.m.

Sunrise: 6:40 a.m.

Sunset: 5:59 p.m.

Civil twilight ends: 6:26 p.m.

Nautical twilight ends: 6:58 p.m.

Astronomical twilight ends: 7:29 p.m.

For location (40°16'N 76°45'W) Hummelstown, PA, USA:

February 1 planet information (24 hr. clock):

	R.A.	DEC.	DIA."	MAG.	%ILL.	RISE	TRANSIT	SET
Mercury	20:41	-20°23'	4.7	-1.1	99.1	07:06	11:59	16:45
Venus	23:31	-04°08'	15.2	-4.1	74.2	09:00	14:47	20:37
Mars	11:39	+06°25'	11.8	-0.6	96.1	20:31	02:55	09:21
Jupiter	02:03	+11°23'	39.1	-2.3	99.0	10:43	17:17	00:07
Saturn	13:53	-08°53'	17.6	+0.5	99.8	23:37	05:09	10:14
Uranus	00:08	+00°03'	3.3	+5.9	100.0	09:19	15:21	21:25
Neptune	22:09	-12°00'	2.2	+8.0	100.0	08:06	13:23	18:49
Pluto	18:35	-19°15'	0.1	+14.1	100.0	04:59	09:49	14:48

March 1 planet information (24 hr. clock):

	R.A.	DEC.	DIA."	MAG.	%ILL.	RISE	TRANSIT	SET
Mercury	23:52	+00°02'	6.4	-0.8	64.8	07:09	13:15	19:14
Venus	01:32	+10°45'	18.6	-4.2	63.6	08:16	14:54	21:35
Mars	11:10	+09°54'	13.8	-1.2	99.9	18:07	00:32	07:21
Jupiter	02:20	+12°57'	36.0	-2.2	99.3	08:52	15:40	22:28
Saturn	13:52	-08°38'	18.5	+0.4	99.9	21:41	03:13	08:48
Uranus	00:13	+00°37'	3.3	+5.9	100.0	07:24	13:33	19:34
Neptune	22:13	-11°38'	2.2	+8.0	100.0	06:15	11:33	17:00
Pluto	18:38	-19°14'	0.1	+14.1	100.0	03:08	07:59	12:57

The objects listed below are located between 6:00 and 8:00 hours of right ascension.

Forty binary and multiple stars for February: 41 Aurigae, Struve 872, Otto Struve 147, Struve 929, 56 Aurigae (Auriga); Nu-1 Canis Majoris, 17 Canis Majoris, Pi Canis Majoris, Mu Canis Majoris, h3945, Tau Canis Majoris (Canis Major); Struve 1095, Struve 1103, Struve 1149, 14 Canis Minoris

(Canis Minor); 20 Geminorum, 38 Geminorum, Alpha Geminorum (Castor), 15 Geminorum, Lambda Geminorum, Delta Geminorum, Struve 1108, Kappa Geminorum (Gemini); 5 Lyncis, 12 Lyncis, 19 Lyncis, Struve 968, Struve 1025 (Lynx); Epsilon Monocerotis, Beta Monocerotis, 15 (S)Monocerotis (Monoceros); Struve 855 (Orion); Struve 1104, k Puppis, 5 Puppis (Puppis)

Fifty deep-sky objects for February: NGC 2146, NGC 2403(Camelopardalis); M41, NGC 2345, NGC 2359, NGC 2360, NGC 2362, NGC 2367, NGC 2383 (Canis Major); M35, NGC 2129, NGC 2158, NGC 2266, NGC 2355, NGC 2371-72, NGC 2392, NGC 2420 (Gemini); NGC 2419 (Lynx); M50, NGC 2232, NGC 2237, NGC 2238, NGC 2244, NGC 2245, NGC 2251, NGC 2261, NGC 2264, NGC 2286, NGC 2301, NGC 2311, NGC 2324, NGC 2335, NGC 2345, NGC 2346, NGC 2353 (Monoceros); NGC 2169, NGC 2174, NGC 2194 (Orion); M46, M47, M93, Mel 71, NGC 2421, NGC 2423, NGC 2438, NGC 2439, NGC 2440, NGC 2467, NGC 2506, NGC 2509 (Puppis)

Challenge deep-sky object for February: IC 443 (Gemini): 2509 (Puppis)

Top ten deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2261, NGC 2362, NGC 2392, NGC 2403

Top ten binocular deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2244, NGC 2264, NGC 2301, NGC 2360

February 2012 Jupiter Events

Table created using The Planets 2.02. A FREE program available from <http://www.cpac.org.uk>

Jupiter events are calculated for an observer in Hummelstown, PA, USA.

40°16'N 76°45'W

Times are Eastern Standard Time (-5 hrs. U.T)

Times may differ by a minute or two to those quoted in the Astronomical Almanac.

It's suggested that you start observing a few minutes before the event is scheduled. There may also be a slight deviation from my observing site.

Wed	1	Feb	2012	00:04	Viewing Suspended - Jupiter Sets
Wed	1	Feb	2012	17:18	Viewing Resumed - Sun Sets
Wed	1	Feb	2012	17:20	Gan: Shadow Transit Begins S
Wed	1	Feb	2012	19:08	Gan: Shadow Transit Ends
Wed	1	Feb	2012	21:56	GRS: Crosses Central Meridian
Thu	2	Feb	2012	00:00	Viewing Suspended - Jupiter Sets
Thu	2	Feb	2012	17:20	Viewing Resumed - Sun Sets
Thu	2	Feb	2012	17:47	GRS: Crosses Central Meridian
Thu	2	Feb	2012	23:57	Viewing Suspended - Jupiter Sets
Fri	3	Feb	2012	17:21	Viewing Resumed - Sun Sets
Fri	3	Feb	2012	23:35	GRS: Crosses Central Meridian
Fri	3	Feb	2012	23:54	Viewing Suspended - Jupiter Sets
Sat	4	Feb	2012	17:22	Viewing Resumed - Sun Sets
Sat	4	Feb	2012	19:26	GRS: Crosses Central Meridian
Sat	4	Feb	2012	21:14	Io : Disappears into Occultation
Sat	4	Feb	2012	22:31	Eur: Transit Begins T
Sat	4	Feb	2012	23:50	Viewing Suspended - Jupiter Sets
Sun	5	Feb	2012	17:23	Viewing Resumed - Sun Sets
Sun	5	Feb	2012	18:29	Io : Transit Begins T
Sun	5	Feb	2012	19:49	Io : Shadow Transit Begins ST
Sun	5	Feb	2012	20:41	Io : Transit Ends S
Sun	5	Feb	2012	21:59	Io : Shadow Transit Ends
Sun	5	Feb	2012	23:47	Viewing Suspended - Jupiter Sets
Mon	6	Feb	2012	17:24	Viewing Resumed - Sun Sets
Mon	6	Feb	2012	19:11	Io : Reappears from Eclipse
Mon	6	Feb	2012	19:48	Eur: Reappears from Occultation
Mon	6	Feb	2012	20:00	Eur: Disappears into Eclipse
Mon	6	Feb	2012	21:05	GRS: Crosses Central Meridian
Mon	6	Feb	2012	22:25	Eur: Reappears from Eclipse

Mon	6	Feb	2012	23:44	Viewing Suspended - Jupiter Sets
Tue	7	Feb	2012	17:26	Viewing Resumed - Sun Sets
Tue	7	Feb	2012	23:41	Viewing Suspended - Jupiter Sets
Wed	8	Feb	2012	17:27	Viewing Resumed - Sun Sets
Wed	8	Feb	2012	18:07	Gan: Transit Ends
Wed	8	Feb	2012	21:22	Gan: Shadow Transit Begins S
Wed	8	Feb	2012	22:45	GRS: Crosses Central Meridian
Wed	8	Feb	2012	23:10	Gan: Shadow Transit Ends
Wed	8	Feb	2012	23:37	Viewing Suspended - Jupiter Sets
Thu	9	Feb	2012	17:28	Viewing Resumed - Sun Sets
Thu	9	Feb	2012	18:36	GRS: Crosses Central Meridian
Thu	9	Feb	2012	23:34	Viewing Suspended - Jupiter Sets
Fri	10	Feb	2012	17:29	Viewing Resumed - Sun Sets
Fri	10	Feb	2012	23:31	Viewing Suspended - Jupiter Sets
Sat	11	Feb	2012	17:31	Viewing Resumed - Sun Sets
Sat	11	Feb	2012	20:15	GRS: Crosses Central Meridian
Sat	11	Feb	2012	23:11	Io : Disappears into Occultation
Sat	11	Feb	2012	23:28	Viewing Suspended - Jupiter Sets
Sun	12	Feb	2012	17:32	Viewing Resumed - Sun Sets
Sun	12	Feb	2012	20:28	Io : Transit Begins T
Sun	12	Feb	2012	21:45	Io : Shadow Transit Begins ST
Sun	12	Feb	2012	22:39	Io : Transit Ends S
Sun	12	Feb	2012	23:24	Viewing Suspended - Jupiter Sets
Mon	13	Feb	2012	17:33	Viewing Resumed - Sun Sets
Mon	13	Feb	2012	17:41	Io : Disappears into Occultation
Mon	13	Feb	2012	20:00	Eur: Disappears into Occultation
Mon	13	Feb	2012	21:06	Io : Reappears from Eclipse
Mon	13	Feb	2012	21:54	GRS: Crosses Central Meridian
Mon	13	Feb	2012	22:32	Eur: Reappears from Occultation
Mon	13	Feb	2012	22:39	Eur: Disappears into Eclipse
Mon	13	Feb	2012	23:21	Viewing Suspended - Jupiter Sets
Tue	14	Feb	2012	17:34	Viewing Resumed - Sun Sets
Tue	14	Feb	2012	17:46	GRS: Crosses Central Meridian
Tue	14	Feb	2012	18:25	Io : Shadow Transit Ends
Tue	14	Feb	2012	23:18	Viewing Suspended - Jupiter Sets
Wed	15	Feb	2012	17:35	Viewing Resumed - Sun Sets
Wed	15	Feb	2012	19:28	Eur: Shadow Transit Ends
Wed	15	Feb	2012	20:07	Gan: Transit Begins T
Wed	15	Feb	2012	22:20	Gan: Transit Ends
Wed	15	Feb	2012	23:15	Viewing Suspended - Jupiter Sets
Thu	16	Feb	2012	17:36	Viewing Resumed - Sun Sets
Thu	16	Feb	2012	19:25	GRS: Crosses Central Meridian
Thu	16	Feb	2012	23:12	Viewing Suspended - Jupiter Sets
Fri	17	Feb	2012	17:38	Viewing Resumed - Sun Sets
Fri	17	Feb	2012	23:09	Viewing Suspended - Jupiter Sets
Sat	18	Feb	2012	17:39	Viewing Resumed - Sun Sets
Sat	18	Feb	2012	21:04	GRS: Crosses Central Meridian
Sat	18	Feb	2012	23:06	Viewing Suspended - Jupiter Sets
Sun	19	Feb	2012	17:40	Viewing Resumed - Sun Sets
Sun	19	Feb	2012	22:27	Io : Transit Begins T
Sun	19	Feb	2012	23:02	Viewing Suspended - Jupiter Sets
Mon	20	Feb	2012	17:41	Viewing Resumed - Sun Sets
Mon	20	Feb	2012	19:39	Io : Disappears into Occultation
Mon	20	Feb	2012	22:44	GRS: Crosses Central Meridian
Mon	20	Feb	2012	22:46	Eur: Disappears into Occultation
Mon	20	Feb	2012	22:59	Viewing Suspended - Jupiter Sets
Tue	21	Feb	2012	17:42	Viewing Resumed - Sun Sets
Tue	21	Feb	2012	18:10	Io : Shadow Transit Begins ST
Tue	21	Feb	2012	18:35	GRS: Crosses Central Meridian
Tue	21	Feb	2012	19:09	Io : Transit Ends S
Tue	21	Feb	2012	20:20	Io : Shadow Transit Ends
Tue	21	Feb	2012	22:56	Viewing Suspended - Jupiter Sets
Wed	22	Feb	2012	17:43	Viewing Resumed - Sun Sets
Wed	22	Feb	2012	19:40	Eur: Shadow Transit Begins ST

Wed 22 Feb 2012 19:46	Eur: Transit Ends	S
Wed 22 Feb 2012 22:04	Eur: Shadow Transit Ends	
Wed 22 Feb 2012 22:53	Viewing Suspended - Jupiter Sets	
Thu 23 Feb 2012 17:45	Viewing Resumed - Sun Sets	
Thu 23 Feb 2012 20:15	GRS: Crosses Central Meridian	
Thu 23 Feb 2012 22:50	Viewing Suspended - Jupiter Sets	
Fri 24 Feb 2012 17:46	Viewing Resumed - Sun Sets	
Fri 24 Feb 2012 22:47	Viewing Suspended - Jupiter Sets	
Sat 25 Feb 2012 17:47	Viewing Resumed - Sun Sets	
Sat 25 Feb 2012 21:54	GRS: Crosses Central Meridian	
Sat 25 Feb 2012 22:44	Viewing Suspended - Jupiter Sets	
Sun 26 Feb 2012 17:48	Viewing Resumed - Sun Sets	
Sun 26 Feb 2012 19:14	Gan: Disappears into Eclipse	
Sun 26 Feb 2012 21:01	Gan: Reappears from Eclipse	
Sun 26 Feb 2012 22:41	Viewing Suspended - Jupiter Sets	
Mon 27 Feb 2012 17:49	Viewing Resumed - Sun Sets	
Mon 27 Feb 2012 21:39	Io : Disappears into Occultation	
Mon 27 Feb 2012 22:38	Viewing Suspended - Jupiter Sets	
Tue 28 Feb 2012 17:50	Viewing Resumed - Sun Sets	
Tue 28 Feb 2012 18:57	Io : Transit Begins	T
Tue 28 Feb 2012 19:25	GRS: Crosses Central Meridian	
Tue 28 Feb 2012 20:06	Io : Shadow Transit Begins	ST
Tue 28 Feb 2012 21:09	Io : Transit Ends	S
Tue 28 Feb 2012 22:16	Io : Shadow Transit Ends	
Tue 28 Feb 2012 22:35	Viewing Suspended - Jupiter Sets	
Wed 29 Feb 2012 17:51	Viewing Resumed - Sun Sets	
Wed 29 Feb 2012 19:26	Io : Reappears from Eclipse	
Wed 29 Feb 2012 20:00	Eur: Transit Begins	T
Wed 29 Feb 2012 22:16	Eur: Shadow Transit Begins	ST
Wed 29 Feb 2012 22:30	Eur: Transit Ends	S
Wed 29 Feb 2012 22:32	Viewing Suspended - Jupiter Sets	

February 2012 Comets

C/2009 P1 (Garradd)

Date	TT	R.	A.	(2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01		17	17	18.6	+41 17 28	1.5478	1.6421	77.3	35.8	7.1	
2012 02 02		17	16	11.0	+41 58 32	1.5345	1.6467	78.3	35.9	7.1	
2012 02 03		17	14	58.4	+42 40 35	1.5213	1.6513	79.3	35.9	7.1	
2012 02 04		17	13	40.4	+43 23 38	1.5081	1.6560	80.2	35.9	7.1	
2012 02 05		17	12	16.7	+44 07 40	1.4952	1.6609	81.2	35.9	7.1	
2012 02 06		17	10	46.7	+44 52 41	1.4823	1.6658	82.2	35.9	7.1	
2012 02 07		17	09	10.0	+45 38 42	1.4697	1.6708	83.2	35.9	7.1	
2012 02 08		17	07	26.0	+46 25 42	1.4572	1.6759	84.3	35.8	7.1	
2012 02 09		17	05	34.2	+47 13 41	1.4449	1.6811	85.3	35.8	7.1	
2012 02 10		17	03	34.0	+48 02 38	1.4329	1.6863	86.3	35.7	7.1	
2012 02 11		17	01	24.6	+48 52 32	1.4211	1.6917	87.3	35.6	7.0	
2012 02 12		16	59	05.3	+49 43 20	1.4096	1.6972	88.3	35.5	7.0	
2012 02 13		16	56	35.2	+50 35 02	1.3983	1.7027	89.4	35.4	7.0	
2012 02 14		16	53	53.4	+51 27 35	1.3874	1.7083	90.4	35.3	7.0	
2012 02 15		16	50	58.9	+52 20 55	1.3767	1.7140	91.4	35.2	7.0	
2012 02 16		16	47	50.6	+53 14 59	1.3665	1.7198	92.4	35.0	7.0	
2012 02 17		16	44	27.1	+54 09 43	1.3566	1.7257	93.5	34.9	7.0	
2012 02 18		16	40	47.1	+55 05 02	1.3471	1.7316	94.5	34.7	7.0	
2012 02 19		16	36	49.0	+56 00 50	1.3380	1.7376	95.5	34.5	7.0	
2012 02 20		16	32	31.3	+56 57 00	1.3294	1.7437	96.5	34.3	7.0	
2012 02 21		16	27	52.1	+57 53 24	1.3212	1.7499	97.4	34.1	7.0	
2012 02 22		16	22	49.4	+58 49 53	1.3135	1.7561	98.4	33.9	7.0	
2012 02 23		16	17	20.9	+59 46 16	1.3063	1.7625	99.4	33.6	7.0	
2012 02 24		16	11	24.5	+60 42 23	1.2996	1.7689	100.3	33.4	7.0	
2012 02 25		16	04	57.5	+61 37 59	1.2935	1.7753	101.2	33.1	7.1	
2012 02 26		15	57	57.4	+62 32 50	1.2879	1.7819	102.1	32.9	7.1	

2012 02 27	15 50 21.3 +63 26 40	1.2830	1.7885	103.0	32.6	7.1
2012 02 28	15 42 06.6 +64 19 10	1.2786	1.7951	103.9	32.4	7.1
2012 02 29	15 33 10.4 +65 09 59	1.2748	1.8019	104.7	32.1	7.1

C/2010 G2 (Hill)

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01	02 51 50.7 -03 44 38	2.5100	2.6655	88.1	21.7	14.3			
2012 02 02	02 51 55.6 -03 52 58	2.5351	2.6730	87.1	21.6	14.3			
2012 02 03	02 52 01.8 -04 01 02	2.5601	2.6804	86.1	21.5	14.3			
2012 02 04	02 52 09.4 -04 08 51	2.5851	2.6880	85.2	21.4	14.4			
2012 02 05	02 52 18.3 -04 16 24	2.6101	2.6955	84.2	21.3	14.4			
2012 02 06	02 52 28.5 -04 23 42	2.6350	2.7030	83.3	21.2	14.4			
2012 02 07	02 52 39.9 -04 30 46	2.6598	2.7106	82.3	21.1	14.5			
2012 02 08	02 52 52.6 -04 37 36	2.6846	2.7182	81.4	21.0	14.5			
2012 02 09	02 53 06.4 -04 44 14	2.7093	2.7258	80.5	20.9	14.5			
2012 02 10	02 53 21.3 -04 50 39	2.7339	2.7334	79.6	20.8	14.6			
2012 02 11	02 53 37.4 -04 56 51	2.7585	2.7410	78.7	20.7	14.6			
2012 02 12	02 53 54.5 -05 02 53	2.7830	2.7487	77.8	20.5	14.6			
2012 02 13	02 54 12.7 -05 08 43	2.8074	2.7563	76.9	20.4	14.6			
2012 02 14	02 54 32.0 -05 14 22	2.8316	2.7640	76.0	20.3	14.7			
2012 02 15	02 54 52.2 -05 19 51	2.8558	2.7717	75.1	20.1	14.7			
2012 02 16	02 55 13.5 -05 25 11	2.8799	2.7795	74.2	20.0	14.7			
2012 02 17	02 55 35.6 -05 30 20	2.9039	2.7872	73.4	19.9	14.8			
2012 02 18	02 55 58.8 -05 35 21	2.9278	2.7949	72.5	19.7	14.8			
2012 02 19	02 56 22.8 -05 40 14	2.9516	2.8027	71.7	19.6	14.8			
2012 02 20	02 56 47.7 -05 44 58	2.9753	2.8105	70.8	19.4	14.9			
2012 02 21	02 57 13.5 -05 49 34	2.9988	2.8183	70.0	19.3	14.9			
2012 02 22	02 57 40.1 -05 54 03	3.0222	2.8261	69.2	19.1	14.9			
2012 02 23	02 58 07.5 -05 58 25	3.0455	2.8339	68.4	18.9	14.9			
2012 02 24	02 58 35.7 -06 02 40	3.0687	2.8417	67.5	18.8	15.0			
2012 02 25	02 59 04.8 -06 06 49	3.0917	2.8496	66.7	18.6	15.0			
2012 02 26	02 59 34.5 -06 10 51	3.1146	2.8575	65.9	18.4	15.0			
2012 02 27	03 00 05.0 -06 14 48	3.1374	2.8653	65.1	18.3	15.1			
2012 02 28	03 00 36.2 -06 18 39	3.1600	2.8732	64.3	18.1	15.1			
2012 02 29	03 01 08.1 -06 22 25	3.1824	2.8811	63.6	17.9	15.1			

78P/Gehrels

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01	01 30 01.4 +07 07 24	2.0857	2.0147	72.1	27.7	13.2	21.4		
2012 02 02	01 31 58.1 +07 16 50	2.0961	2.0154	71.6	27.6	13.2	21.4		
2012 02 03	01 33 55.2 +07 26 17	2.1066	2.0161	71.1	27.5	13.2	21.4		
2012 02 04	01 35 52.8 +07 35 46	2.1170	2.0168	70.6	27.5	13.2	21.4		
2012 02 05	01 37 50.9 +07 45 15	2.1275	2.0176	70.1	27.4	13.2	21.4		
2012 02 06	01 39 49.5 +07 54 46	2.1379	2.0184	69.6	27.2	13.3	21.4		
2012 02 07	01 41 48.5 +08 04 17	2.1484	2.0192	69.1	27.1	13.3	21.4		
2012 02 08	01 43 48.0 +08 13 48	2.1589	2.0201	68.6	27.0	13.3	21.4		
2012 02 09	01 45 47.9 +08 23 20	2.1693	2.0210	68.1	26.9	13.3	21.4		
2012 02 10	01 47 48.3 +08 32 53	2.1798	2.0219	67.6	26.8	13.3	21.4		
2012 02 11	01 49 49.0 +08 42 25	2.1902	2.0229	67.1	26.7	13.3	21.4		
2012 02 12	01 51 50.2 +08 51 58	2.2007	2.0238	66.7	26.6	13.3	21.4		
2012 02 13	01 53 51.8 +09 01 30	2.2112	2.0249	66.2	26.5	13.4	21.5		
2012 02 14	01 55 53.8 +09 11 02	2.2216	2.0259	65.7	26.4	13.4	21.5		
2012 02 15	01 57 56.3 +09 20 33	2.2321	2.0270	65.2	26.3	13.4	21.5		
2012 02 16	01 59 59.1 +09 30 04	2.2426	2.0281	64.7	26.1	13.4	21.5		
2012 02 17	02 02 02.3 +09 39 35	2.2530	2.0293	64.2	26.0	13.4	21.5		
2012 02 18	02 04 06.0 +09 49 04	2.2635	2.0305	63.8	25.9	13.4	21.5		

2012 02 19	02 06	10.0	+09	58	32	2.2740	2.0317	63.3	25.8	13.4	21.5
2012 02 20	02 08	14.4	+10	07	59	2.2844	2.0330	62.8	25.6	13.5	21.5
2012 02 21	02 10	19.1	+10	17	25	2.2949	2.0342	62.4	25.5	13.5	21.5
2012 02 22	02 12	24.3	+10	26	50	2.3053	2.0356	61.9	25.4	13.5	21.5
2012 02 23	02 14	29.8	+10	36	13	2.3158	2.0369	61.4	25.2	13.5	21.5
2012 02 24	02 16	35.6	+10	45	34	2.3262	2.0383	60.9	25.1	13.5	21.5
2012 02 25	02 18	41.8	+10	54	53	2.3366	2.0397	60.5	25.0	13.5	21.5
2012 02 26	02 20	48.3	+11	04	10	2.3471	2.0411	60.0	24.8	13.6	21.6
2012 02 27	02 22	55.2	+11	13	25	2.3575	2.0426	59.6	24.7	13.6	21.6
2012 02 28	02 25	02.4	+11	22	38	2.3679	2.0441	59.1	24.6	13.6	21.6
2012 02 29	02 27	09.9	+11	31	48	2.3783	2.0456	58.6	24.4	13.6	21.6

P/2006 T1 (Leavy)

Date	TT	R. A. (2000) Decl.				Delta	r	Elong.	Phase	m1	m2
2012 02 01	04 03	20.7	-18	01	54	0.2128	1.0434	100.0	68.4	7.3	
2012 02 02	04 11	44.3	-19	05	57	0.2162	1.0471	100.6	67.7	7.4	
2012 02 03	04 20	00.6	-20	06	16	0.2200	1.0509	101.3	66.9	7.4	
2012 02 04	04 28	09.0	-21	02	48	0.2239	1.0549	101.9	66.1	7.5	
2012 02 05	04 36	08.9	-21	55	35	0.2282	1.0591	102.6	65.3	7.5	
2012 02 06	04 43	59.7	-22	44	40	0.2327	1.0634	103.2	64.5	7.6	
2012 02 07	04 51	40.9	-23	30	09	0.2374	1.0679	103.8	63.7	7.7	
2012 02 08	04 59	12.2	-24	12	06	0.2423	1.0725	104.4	63.0	7.7	
2012 02 09	05 06	33.4	-24	50	40	0.2474	1.0773	105.0	62.2	7.8	
2012 02 10	05 13	44.1	-25	25	58	0.2527	1.0822	105.6	61.4	7.9	
2012 02 11	05 20	44.4	-25	58	08	0.2582	1.0872	106.1	60.7	7.9	
2012 02 12	05 27	34.2	-26	27	19	0.2639	1.0924	106.7	59.9	8.0	
2012 02 13	05 34	13.5	-26	53	40	0.2697	1.0977	107.2	59.2	8.1	
2012 02 14	05 40	42.5	-27	17	20	0.2757	1.1031	107.8	58.5	8.1	
2012 02 15	05 47	01.2	-27	38	28	0.2818	1.1087	108.3	57.8	8.2	
2012 02 16	05 53	09.8	-27	57	13	0.2881	1.1144	108.8	57.1	8.3	
2012 02 17	05 59	08.6	-28	13	42	0.2945	1.1202	109.3	56.4	8.3	
2012 02 18	06 04	57.8	-28	28	06	0.3011	1.1262	109.8	55.7	8.4	
2012 02 19	06 10	37.7	-28	40	30	0.3077	1.1322	110.2	55.0	8.5	
2012 02 20	06 16	08.5	-28	51	04	0.3145	1.1384	110.7	54.3	8.6	
2012 02 21	06 21	30.6	-28	59	54	0.3214	1.1447	111.1	53.7	8.6	
2012 02 22	06 26	44.2	-29	07	07	0.3284	1.1510	111.6	53.0	8.7	
2012 02 23	06 31	49.6	-29	12	50	0.3355	1.1575	112.0	52.4	8.8	
2012 02 24	06 36	47.2	-29	17	09	0.3427	1.1641	112.4	51.8	8.8	
2012 02 25	06 41	37.1	-29	20	10	0.3500	1.1708	112.8	51.2	8.9	
2012 02 26	06 46	19.8	-29	21	57	0.3574	1.1775	113.2	50.6	9.0	
2012 02 27	06 50	55.5	-29	22	38	0.3649	1.1844	113.6	50.0	9.0	
2012 02 28	06 55	24.5	-29	22	15	0.3725	1.1913	114.0	49.4	9.1	
2012 02 29	06 59	47.0	-29	20	54	0.3802	1.1984	114.3	48.9	9.2	

21P/Giacobini-Zinner

Date	TT	R. A. (2000) Decl.				Delta	r	Elong.	Phase	m1	m2
2012 02 01	22 18	42.5	-04	06	19	1.8565	1.0418	24.4	23.0	10.6	18.0
2012 02 02	22 23	03.8	-04	03	10	1.8552	1.0398	24.3	23.0	10.6	18.0
2012 02 03	22 27	25.5	-03	59	54	1.8541	1.0380	24.3	23.0	10.6	18.0
2012 02 04	22 31	47.5	-03	56	31	1.8531	1.0364	24.2	23.0	10.6	18.0
2012 02 05	22 36	09.9	-03	53	03	1.8522	1.0350	24.2	23.0	10.6	18.0
2012 02 06	22 40	32.6	-03	49	28	1.8515	1.0337	24.1	23.0	10.6	18.0
2012 02 07	22 44	55.5	-03	45	47	1.8509	1.0327	24.1	23.0	10.5	18.0
2012 02 08	22 49	18.6	-03	42	00	1.8505	1.0319	24.1	23.0	10.5	18.0
2012 02 09	22 53	41.9	-03	38	07	1.8502	1.0312	24.1	23.0	10.5	18.0
2012 02 10	22 58	05.3	-03	34	09	1.8501	1.0308	24.1	23.0	10.5	18.0
2012 02 11	23 02	28.7	-03	30	05	1.8501	1.0305	24.0	23.0	10.5	18.0
2012 02 12	23 06	52.2	-03	25	55	1.8503	1.0305	24.0	23.0	10.5	18.0

2012 02 13	23 11 15.7	-03 21 40	1.8506	1.0306	24.0	23.0	10.5	18.0
2012 02 14	23 15 39.2	-03 17 21	1.8510	1.0310	24.0	23.0	10.5	18.0
2012 02 15	23 20 02.6	-03 12 56	1.8516	1.0315	24.1	23.0	10.5	18.0
2012 02 16	23 24 25.9	-03 08 26	1.8524	1.0323	24.1	23.0	10.5	18.0
2012 02 17	23 28 49.0	-03 03 52	1.8532	1.0332	24.1	23.0	10.6	18.0
2012 02 18	23 33 11.9	-02 59 13	1.8543	1.0343	24.1	23.0	10.6	18.0
2012 02 19	23 37 34.6	-02 54 30	1.8555	1.0357	24.1	23.0	10.6	18.0
2012 02 20	23 41 57.1	-02 49 42	1.8568	1.0372	24.2	23.0	10.6	18.0
2012 02 21	23 46 19.2	-02 44 51	1.8583	1.0389	24.2	23.0	10.6	18.0
2012 02 22	23 50 40.9	-02 39 56	1.8599	1.0408	24.3	23.0	10.6	18.0
2012 02 23	23 55 02.3	-02 34 57	1.8617	1.0429	24.3	23.0	10.6	18.0
2012 02 24	23 59 23.3	-02 29 55	1.8636	1.0451	24.4	23.0	10.6	18.0
2012 02 25	00 03 43.8	-02 24 50	1.8657	1.0476	24.4	23.0	10.7	18.0
2012 02 26	00 08 03.8	-02 19 41	1.8679	1.0502	24.5	23.0	10.7	18.1
2012 02 27	00 12 23.2	-02 14 30	1.8703	1.0531	24.5	23.0	10.7	18.1
2012 02 28	00 16 42.2	-02 09 16	1.8728	1.0561	24.6	23.0	10.7	18.1
2012 02 29	00 21 00.5	-02 04 00	1.8754	1.0592	24.7	23.0	10.7	18.1

29P/Schwassmann-Wachmann 1

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01	12 40 11.5	-13 18 14	5.7581	6.2613	116.6	8.1	15.8	19.4	
2012 02 02	12 40 06.0	-13 19 26	5.7437	6.2612	117.6	8.0	15.8	19.3	
2012 02 03	12 39 59.8	-13 20 35	5.7293	6.2612	118.6	7.9	15.8	19.3	
2012 02 04	12 39 53.0	-13 21 39	5.7151	6.2612	119.6	7.9	15.8	19.3	
2012 02 05	12 39 45.6	-13 22 39	5.7011	6.2612	120.6	7.8	15.7	19.3	
2012 02 06	12 39 37.7	-13 23 35	5.6872	6.2611	121.7	7.7	15.7	19.3	
2012 02 07	12 39 29.1	-13 24 26	5.6734	6.2611	122.7	7.6	15.7	19.3	
2012 02 08	12 39 19.9	-13 25 14	5.6598	6.2611	123.7	7.5	15.7	19.3	
2012 02 09	12 39 10.1	-13 25 57	5.6464	6.2611	124.7	7.4	15.7	19.3	
2012 02 10	12 38 59.8	-13 26 36	5.6332	6.2611	125.8	7.3	15.7	19.3	
2012 02 11	12 38 48.8	-13 27 11	5.6201	6.2610	126.8	7.3	15.7	19.3	
2012 02 12	12 38 37.3	-13 27 41	5.6072	6.2610	127.8	7.2	15.7	19.3	
2012 02 13	12 38 25.2	-13 28 07	5.5944	6.2610	128.8	7.1	15.7	19.2	
2012 02 14	12 38 12.5	-13 28 29	5.5819	6.2610	129.9	7.0	15.7	19.2	
2012 02 15	12 37 59.2	-13 28 46	5.5695	6.2609	130.9	6.8	15.7	19.2	
2012 02 16	12 37 45.4	-13 28 59	5.5574	6.2609	131.9	6.7	15.7	19.2	
2012 02 17	12 37 31.1	-13 29 08	5.5454	6.2609	133.0	6.6	15.7	19.2	
2012 02 18	12 37 16.2	-13 29 12	5.5337	6.2609	134.0	6.5	15.7	19.2	
2012 02 19	12 37 00.7	-13 29 12	5.5221	6.2608	135.1	6.4	15.7	19.2	
2012 02 20	12 36 44.7	-13 29 08	5.5108	6.2608	136.1	6.3	15.7	19.2	
2012 02 21	12 36 28.2	-13 29 00	5.4997	6.2608	137.1	6.2	15.7	19.2	
2012 02 22	12 36 11.2	-13 28 47	5.4888	6.2608	138.2	6.0	15.7	19.2	
2012 02 23	12 35 53.7	-13 28 29	5.4781	6.2607	139.2	5.9	15.7	19.1	
2012 02 24	12 35 35.7	-13 28 08	5.4677	6.2607	140.3	5.8	15.7	19.1	
2012 02 25	12 35 17.2	-13 27 42	5.4575	6.2607	141.3	5.7	15.7	19.1	
2012 02 26	12 34 58.3	-13 27 12	5.4476	6.2607	142.4	5.5	15.6	19.1	
2012 02 27	12 34 38.8	-13 26 38	5.4379	6.2606	143.4	5.4	15.6	19.1	
2012 02 28	12 34 19.0	-13 25 59	5.4284	6.2606	144.4	5.3	15.6	19.1	
2012 02 29	12 33 58.7	-13 25 17	5.4192	6.2606	145.5	5.1	15.6	19.1	

C/2011 F1 (LINEAR)

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01	15 26 29.3	+46 48 52	4.0553	4.2949	97.4	13.1	14.4		
2012 02 02	15 27 16.9	+46 55 45	4.0400	4.2859	97.8	13.2	14.4		
2012 02 03	15 28 03.7	+47 02 45	4.0249	4.2770	98.1	13.2	14.3		
2012 02 04	15 28 49.6	+47 09 50	4.0097	4.2681	98.5	13.2	14.3		
2012 02 05	15 29 34.7	+47 17 02	3.9947	4.2592	98.8	13.2	14.3		
2012 02 06	15 30 18.7	+47 24 19	3.9797	4.2503	99.2	13.2	14.3		
2012 02 07	15 31 01.9	+47 31 43	3.9648	4.2413	99.5	13.3	14.3		
2012 02 08	15 31 44.1	+47 39 12	3.9500	4.2324	99.9	13.3	14.2		

2012 02 09	15 32 25.3	+47 46 47	3.9352	4.2235	100.2	13.3	14.2
2012 02 10	15 33 05.6	+47 54 27	3.9206	4.2145	100.6	13.3	14.2
2012 02 11	15 33 44.8	+48 02 13	3.9059	4.2056	100.9	13.3	14.2
2012 02 12	15 34 23.0	+48 10 03	3.8914	4.1967	101.2	13.3	14.2
2012 02 13	15 35 00.1	+48 18 00	3.8769	4.1877	101.5	13.4	14.2
2012 02 14	15 35 36.1	+48 26 01	3.8626	4.1788	101.9	13.4	14.1
2012 02 15	15 36 11.1	+48 34 06	3.8483	4.1698	102.2	13.4	14.1
2012 02 16	15 36 44.9	+48 42 17	3.8340	4.1609	102.5	13.4	14.1
2012 02 17	15 37 17.5	+48 50 32	3.8199	4.1519	102.8	13.4	14.1
2012 02 18	15 37 49.0	+48 58 52	3.8058	4.1430	103.1	13.4	14.1
2012 02 19	15 38 19.2	+49 07 15	3.7918	4.1340	103.4	13.4	14.1
2012 02 20	15 38 48.2	+49 15 43	3.7779	4.1251	103.7	13.5	14.0
2012 02 21	15 39 16.0	+49 24 14	3.7641	4.1161	104.0	13.5	14.0
2012 02 22	15 39 42.5	+49 32 49	3.7504	4.1071	104.2	13.5	14.0
2012 02 23	15 40 07.6	+49 41 27	3.7367	4.0982	104.5	13.5	14.0
2012 02 24	15 40 31.5	+49 50 08	3.7232	4.0892	104.8	13.5	14.0
2012 02 25	15 40 54.0	+49 58 52	3.7097	4.0803	105.1	13.5	14.0
2012 02 26	15 41 15.1	+50 07 39	3.6963	4.0713	105.3	13.6	13.9
2012 02 27	15 41 34.9	+50 16 28	3.6830	4.0623	105.6	13.6	13.9
2012 02 28	15 41 53.2	+50 25 19	3.6698	4.0533	105.8	13.6	13.9
2012 02 29	15 42 10.1	+50 34 12	3.6567	4.0444	106.1	13.6	13.9

C/2006 S3 (LONEOS)

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2012 02 01		18 13 19.2	-14 13 55	5.8912	5.1630	39.0	6.9	13.0	
2012 02 02		18 13 27.2	-14 13 46	5.8785	5.1621	40.0	7.0	13.0	
2012 02 03		18 13 34.8	-14 13 36	5.8656	5.1613	40.9	7.2	13.0	
2012 02 04		18 13 41.9	-14 13 25	5.8524	5.1605	41.9	7.3	13.0	
2012 02 05		18 13 48.6	-14 13 13	5.8390	5.1597	42.8	7.5	13.0	
2012 02 06		18 13 54.8	-14 12 59	5.8254	5.1589	43.8	7.6	13.0	
2012 02 07		18 14 00.5	-14 12 44	5.8115	5.1581	44.7	7.7	12.9	
2012 02 08		18 14 05.8	-14 12 29	5.7974	5.1573	45.7	7.9	12.9	
2012 02 09		18 14 10.6	-14 12 12	5.7831	5.1566	46.7	8.0	12.9	
2012 02 10		18 14 14.8	-14 11 54	5.7686	5.1558	47.7	8.1	12.9	
2012 02 11		18 14 18.5	-14 11 35	5.7538	5.1551	48.6	8.3	12.9	
2012 02 12		18 14 21.7	-14 11 14	5.7388	5.1544	49.6	8.4	12.9	
2012 02 13		18 14 24.4	-14 10 53	5.7237	5.1536	50.6	8.5	12.9	
2012 02 14		18 14 26.5	-14 10 31	5.7083	5.1529	51.6	8.6	12.9	
2012 02 15		18 14 28.0	-14 10 08	5.6927	5.1522	52.6	8.8	12.9	
2012 02 16		18 14 28.9	-14 09 43	5.6770	5.1516	53.5	8.9	12.9	
2012 02 17		18 14 29.3	-14 09 18	5.6610	5.1509	54.5	9.0	12.9	
2012 02 18		18 14 29.0	-14 08 52	5.6448	5.1502	55.5	9.1	12.9	
2012 02 19		18 14 28.1	-14 08 24	5.6285	5.1496	56.5	9.2	12.9	
2012 02 20		18 14 26.6	-14 07 56	5.6120	5.1489	57.5	9.3	12.9	
2012 02 21		18 14 24.4	-14 07 27	5.5953	5.1483	58.5	9.4	12.9	
2012 02 22		18 14 21.5	-14 06 57	5.5784	5.1477	59.5	9.5	12.8	
2012 02 23		18 14 18.0	-14 06 27	5.5614	5.1471	60.5	9.6	12.8	
2012 02 24		18 14 13.8	-14 05 55	5.5442	5.1465	61.5	9.7	12.8	
2012 02 25		18 14 08.9	-14 05 23	5.5269	5.1459	62.5	9.8	12.8	
2012 02 26		18 14 03.2	-14 04 49	5.5094	5.1453	63.5	9.9	12.8	
2012 02 27		18 13 56.9	-14 04 15	5.4918	5.1448	64.6	10.0	12.8	
2012 02 28		18 13 49.7	-14 03 40	5.4740	5.1442	65.6	10.1	12.8	
2012 02 29		18 13 41.9	-14 03 05	5.4561	5.1437	66.6	10.2	12.8	