The Sky This Month

November 13 – December 12, 2013

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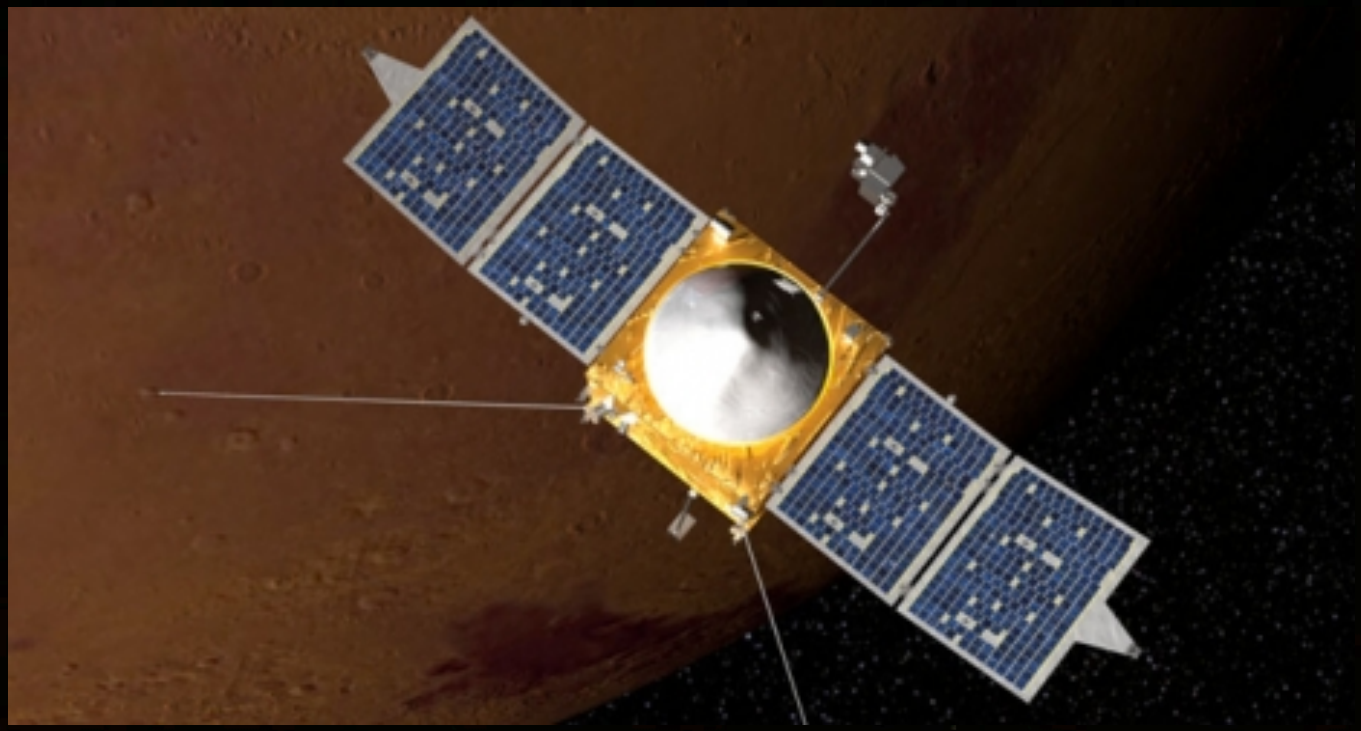
There's nothing to see ….

- For the next month because we have entered a cloudy period ….
- In fact, there's nothing to see for the next 3 – 4 months because of winter weather ….
- Unless you get up at O-Dark Thirty ….

Space Launch Activity

- Mars Atmosphere and Volatile Evolution (MAVEN)
  - November 18th



MAVEN

- The Mars Atmosphere and Volatile EvolutioN (MAVEN) mission is part of NASA's Mars Scout program, funded by NASA Headquarters. The mission will explore the Red Planet's upper atmosphere, ionosphere and interactions with the sun and solar wind.

  Scientists will use MAVEN data to determine the role that loss of volatile gases from the Mars atmosphere to space has played through time, giving insight into the history of Mars' atmosphere and climate, liquid water, and planetary habitability.

MAVEN

- MAVEN's instrument suite will consist of eight sensors:
  - Magnetometer
  - Neutral Gas and Ion Mass Spectrometer
  - Langmuir Probe and Waves
  - Imaging Ultraviolet Spectrometer
  - Solar Wind Electron Analyzer
  - Solar Wind Ion Analyzer
  - Solar Energetic Particles
  - SupraThermal And Thermal Ion Composition

Space Launch Activity

- **Soyuz Progress 53 Launch to Resupply the ISS**
- **Category**: Aeronautics and Astronautics
- **Topic**: Launches
- **Event Format**: Rocket Launch
- **Date**: November 20, 2013
- **Location**: Baikonur Cosmodrome, KZ
- **Launch Time:** TBA

The Russian Progress 53 will carry supplies, hardware, fuel and water to the International Space Station.

Space Launch Activity

- December 8th
- Orbital 1 Commercial Resupply Services flight
  Launch Vehicle: Antares
  Launch Site: Wallops Flight Facility
  Launch Pad: Mid-Atlantic Regional Spaceport Pad-0A
  Description: Orbital 1 will be the first commercial resupply mission to the International Space Station by Orbital Sciences.

Lunar Phases

- Moon
  - Full – Nov 17th
  - Last Q – Nov 25th
  - New – Dec 3rd
  - First – Dec 9th

Planets

- Mercury
  - Best view in the Northern hemisphere for 2013
  - Occurs November 18th – morning sky – greatest elongation W (19 degrees)!
  - On 26th – is .3 degrees S of Saturn
  - Continues for first 10 days in December

Planets II

- Venus
  - Visibility gets better during the month
  - December 6th is 8 degrees S of the Moon
- Mars
  - In the morning sky – in Leo and moving into Virgo late in the month.

Planets - III

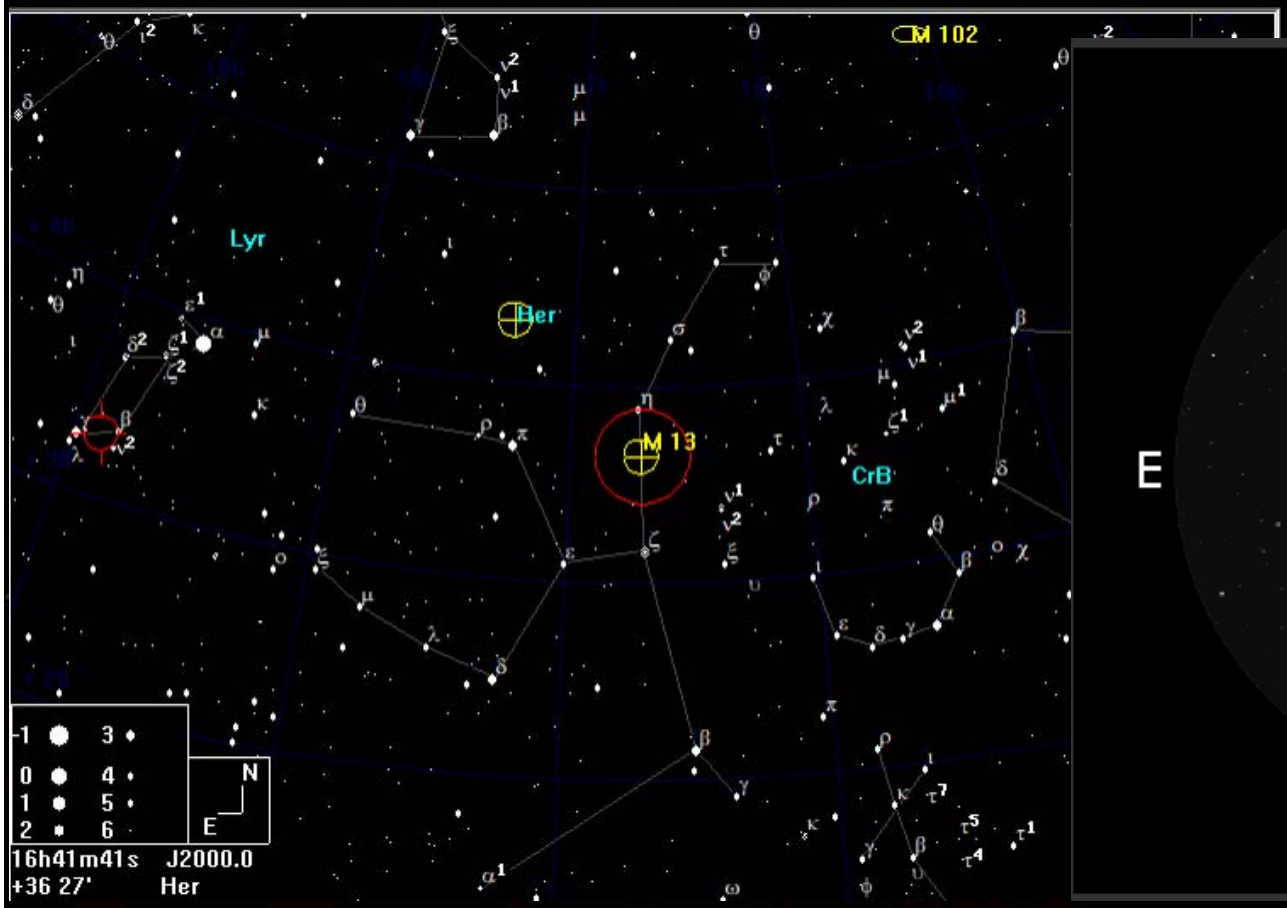
- Jupiter
  - Rises in ENE mid-evening November; early evening in December
- Saturn
  - Reappeared Nov 6th in the morning sky
  - In December, moves into Libra – there is an occultation with the Moon –BUT only if you are willing to travel to very remote – Antarctica!

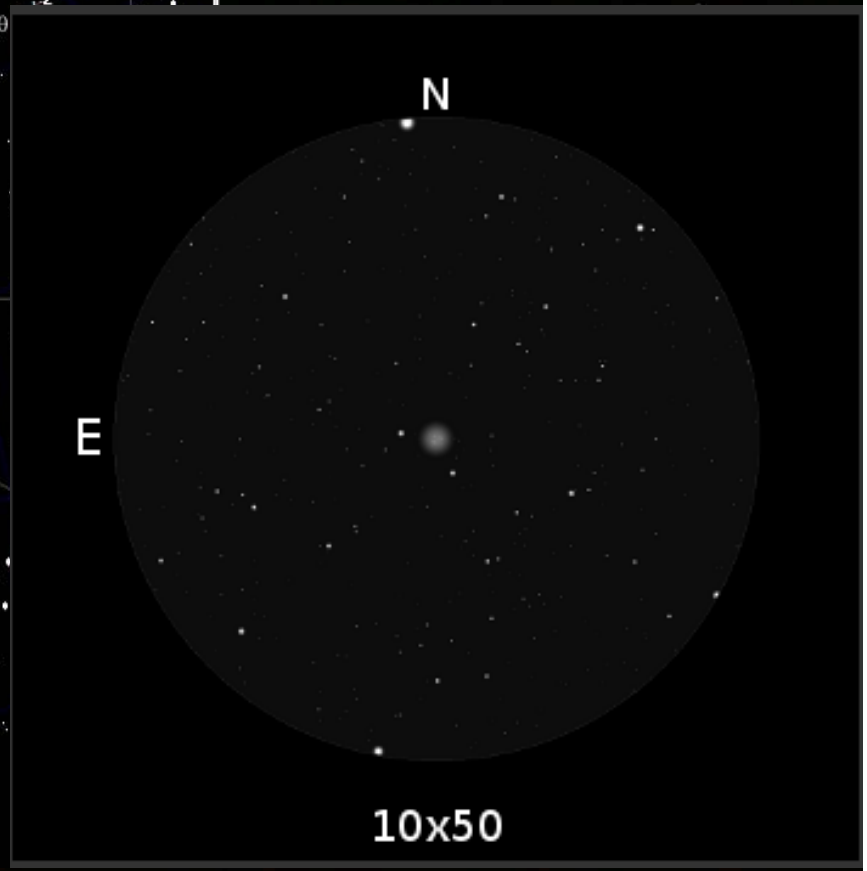
Occultation

- Nov 29th – Spica 0.9 degrees S of Moon – visible from N. America

Binocular Astronomy

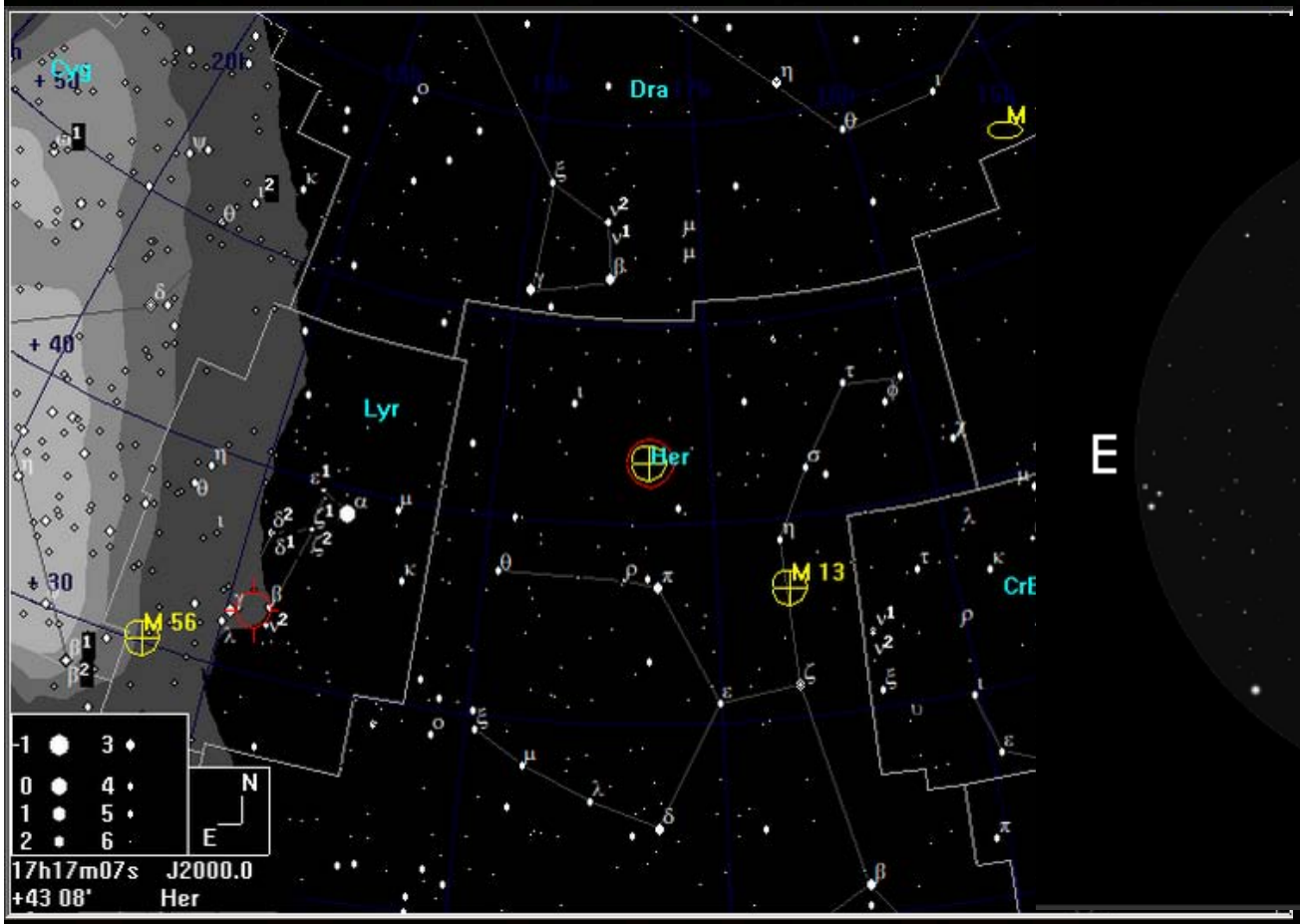
- M13 – Hercules Globular

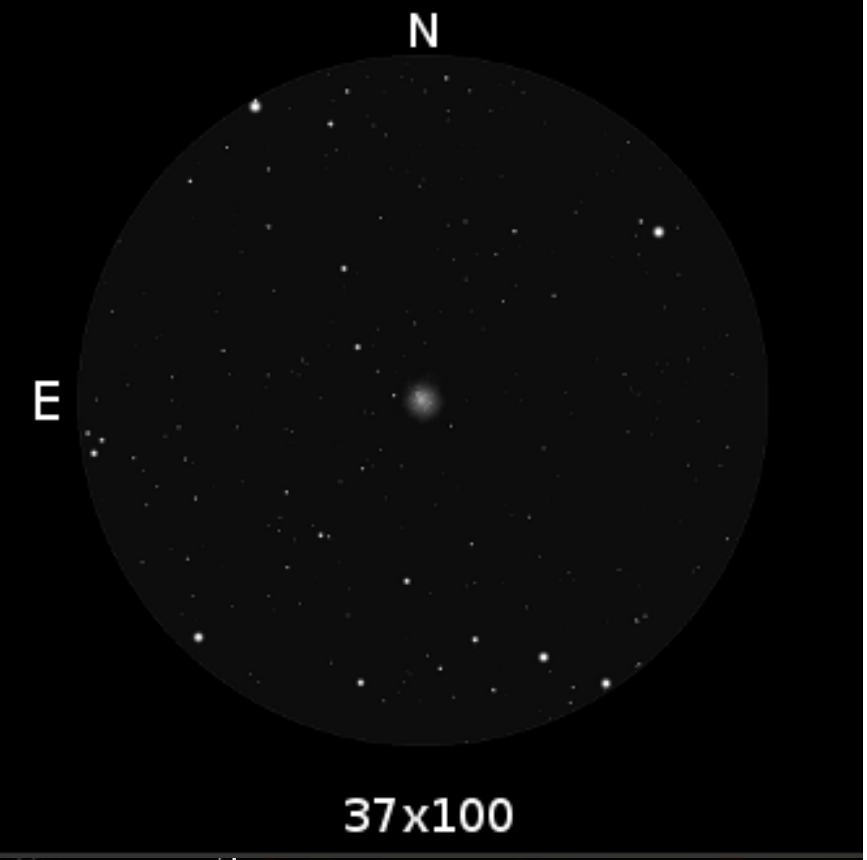




Binocular Astronomy

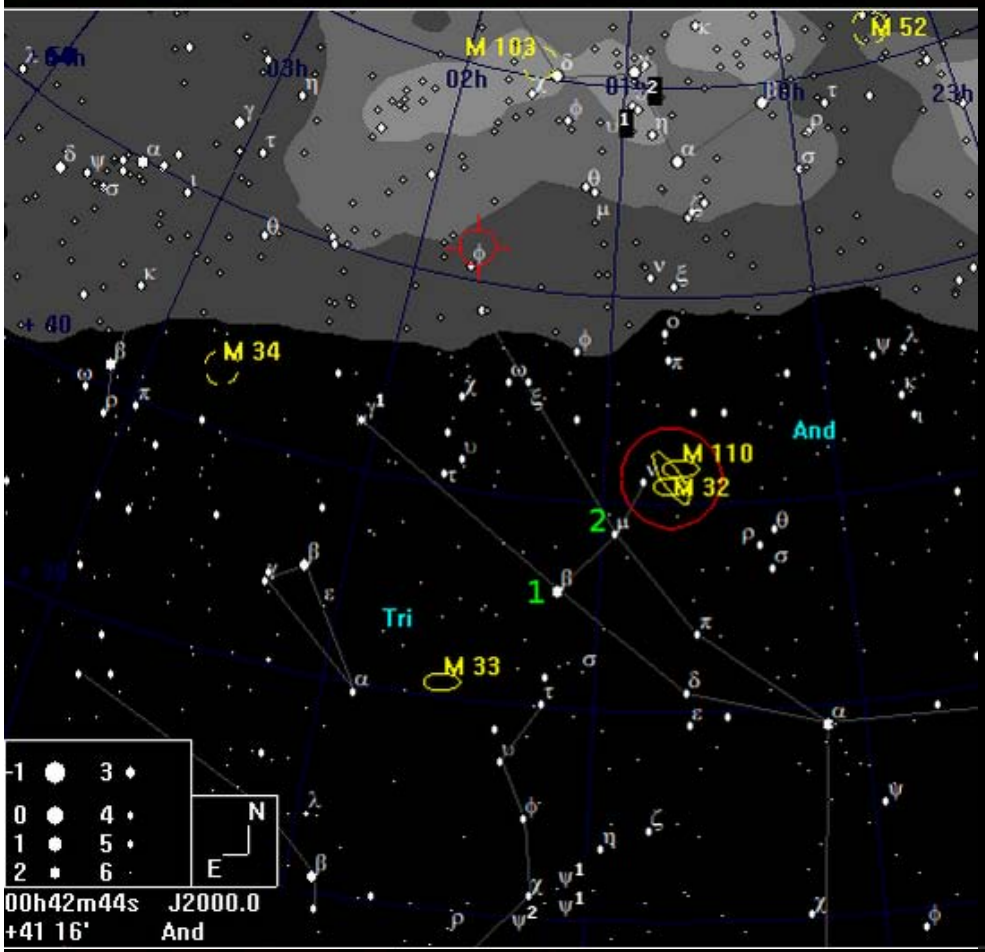
- M92 - Hercules

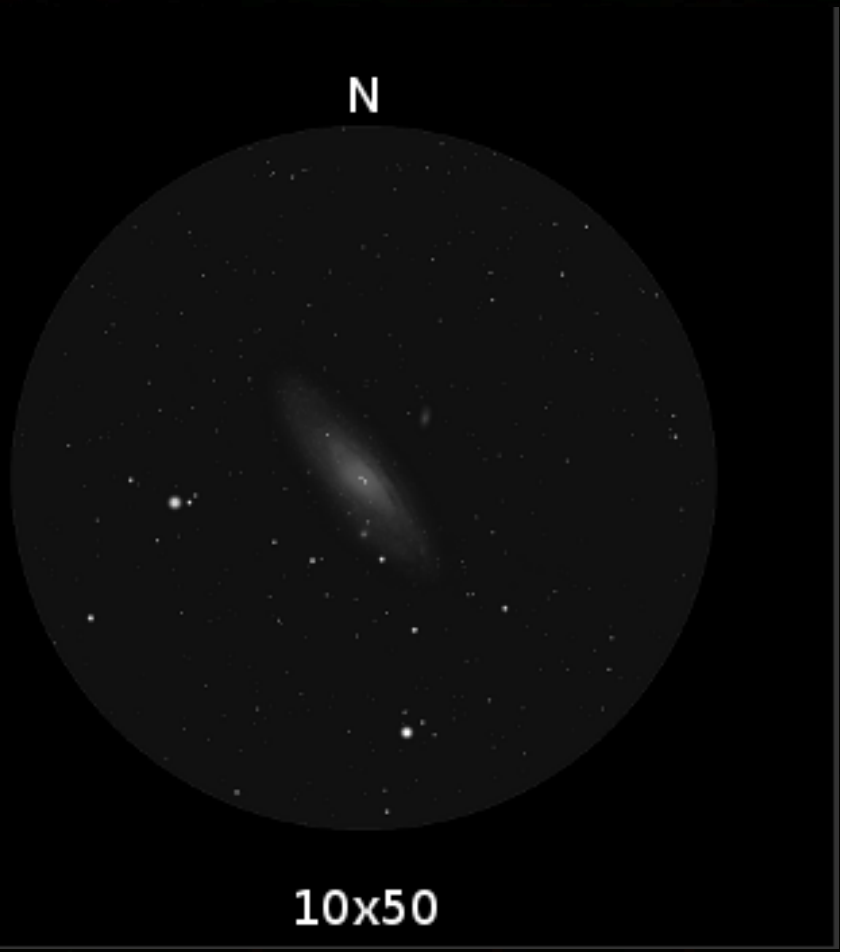




Binocular Astronomy

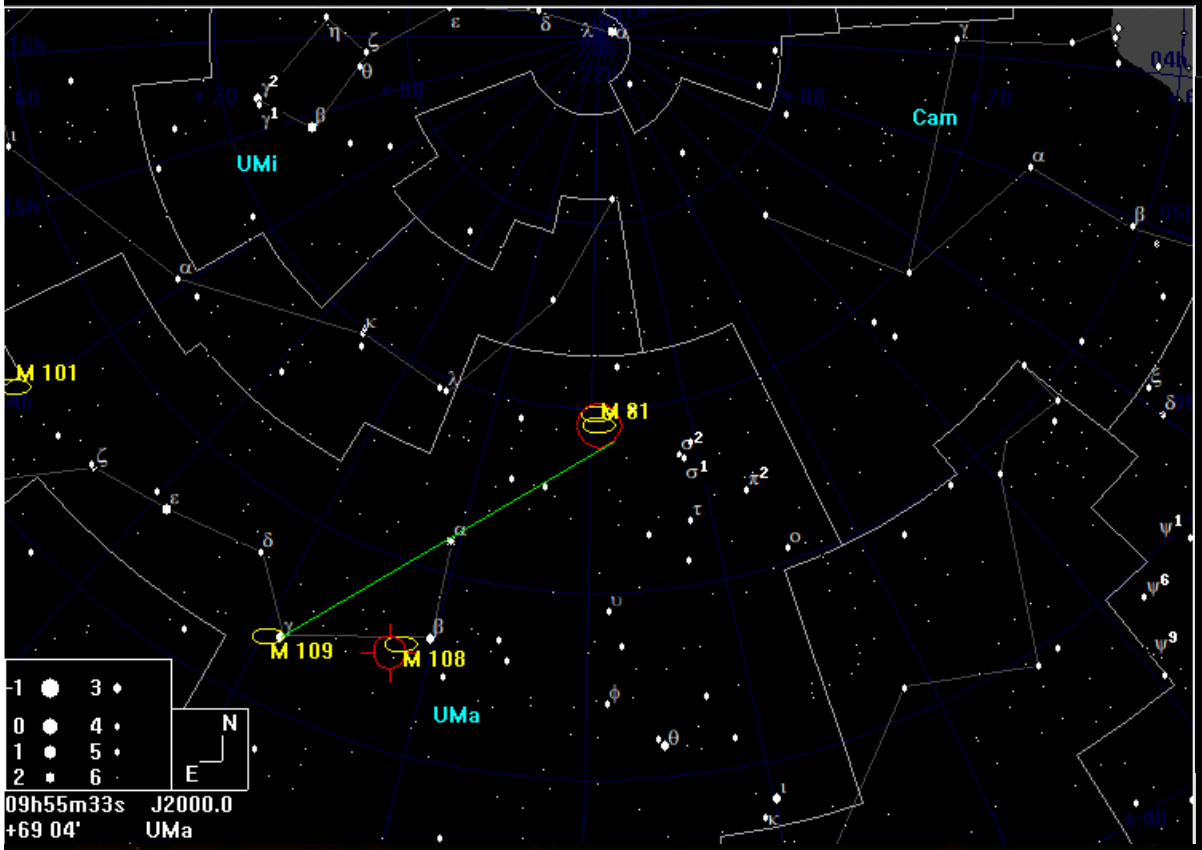
- M31 – Andromeda Galaxy

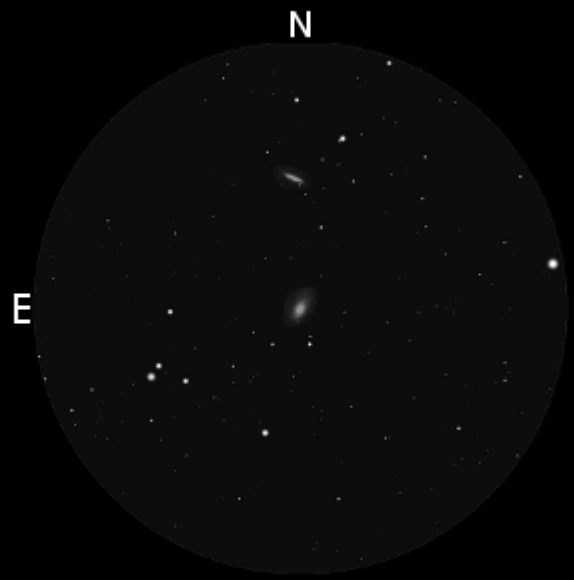




Binocular Astronomy

- M81 – Bode's Nebula / M82 – Cigar Galaxy
  - Use averted vision to see the galaxies





ISS Flyovers

- Next 10 days – viewing location - OSC

Date	Brightness	Start			Highest point			End			Pass type
	[Mag]	Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.	
13 Nov	-1.9	05:10:51	30°	S	05:11:39	35°	SE	05:14:45	10°	ENE	visible
14 Nov	-0.1	04:24:58	15°	E	04:24:58	15°	E	04:25:53	10°	E	visible
14 Nov	-3.1	05:57:54	23°	W	05:59:47	56°	NNW	06:03:05	10°	NE	visible
15 Nov	-2.8	05:11:47	59°	NE	05:11:47	59°	NE	05:14:34	10°	ENE	visible
16 Nov	0.0	04:25:31	13°	ENE	04:25:31	13°	ENE	04:25:57	10°	ENE	visible
16 Nov	-2.2	05:58:25	24°	NW	05:59:33	31°	NNW	06:02:35	10°	NE	visible
17 Nov	-1.7	05:12:00	29°	NNE	05:12:00	29°	NNE	05:14:01	10°	NE	visible
18 Nov	-1.7	05:58:22	20°	NW	05:59:19	22°	N	06:02:02	10°	NE	visible
19 Nov	-1.2	05:11:45	20°	NNE	05:11:45	20°	NNE	05:13:20	10°	NE	visible
19 Nov	-1.5	06:45:18	10°	NW	06:47:57	21°	N	06:50:35	10°	ENE	visible
20 Nov	-1.5	05:57:57	18°	NNW	05:59:01	20°	N	06:01:36	10°	NE	visible
21 Nov	-1.0	05:11:12	18°	NNE	05:11:12	18°	NNE	05:12:41	10°	NE	visible
21 Nov	-1.8	06:44:36	10°	NW	06:47:32	27°	NNE	06:50:27	10°	ENE	visible
22 Nov	-1.5	05:57:17	18°	NNW	05:58:34	23°	N	06:01:19	10°	ENE	visible

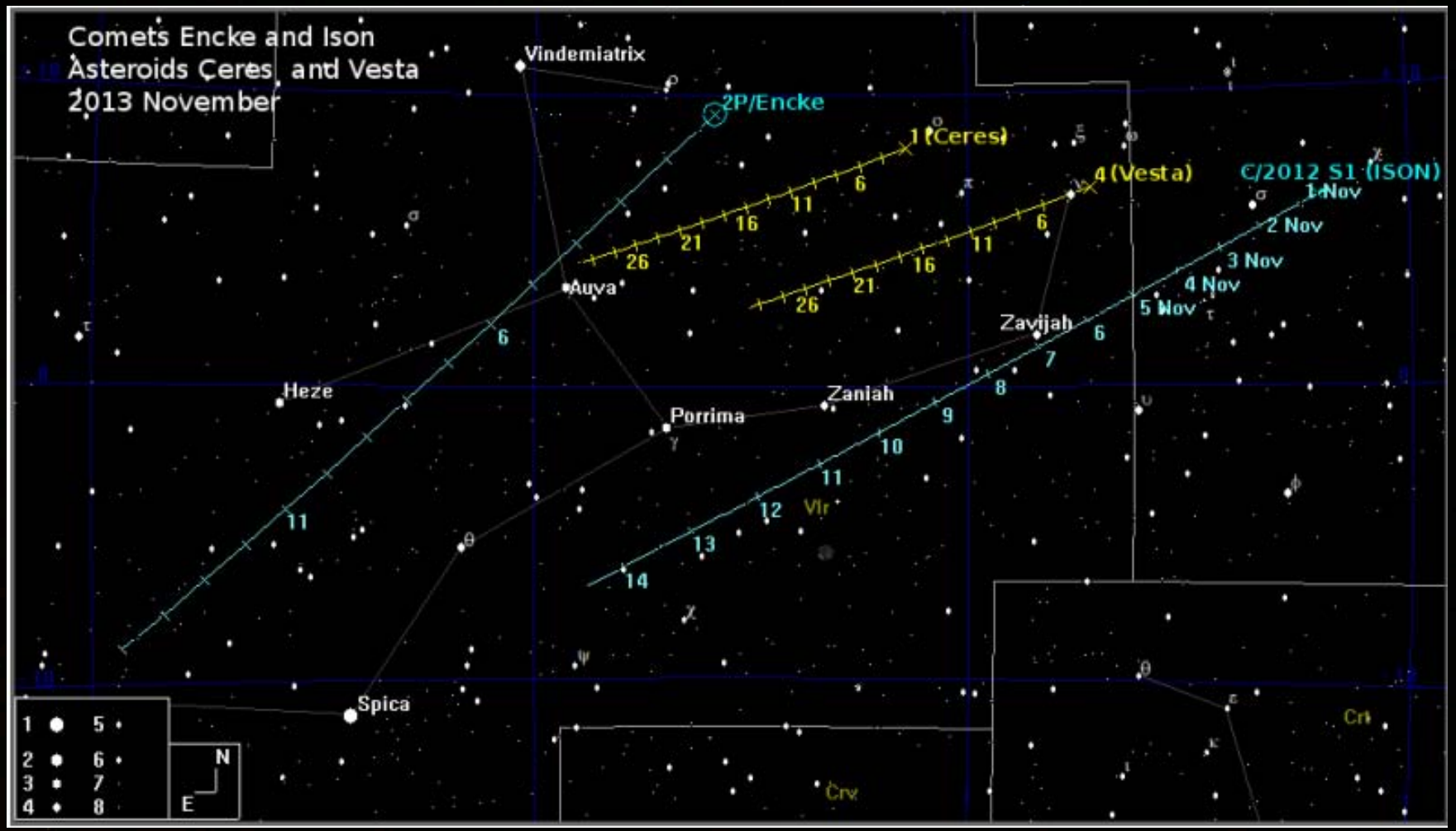
Iridium Flares

- Viewing location - OSC

Time	Brightness	Altitude	Azimuth	Satellite	Distance to flare centre	Brightness at flare centre	Sun altitude
Nov 14, 06:48:09	-3.7	65°	347° (NNW)	Iridium 6	11 km (W)	-8.4	-5°
Nov 14, 17:47:23	-4.6	11°	281° (W)	Iridium 59	49 km (E)	-5.2	-10°
Nov 14, 18:12:54	-1.8	37°	176° (S)	Iridium 19	21 km (W)	-7.6	-15°
Nov 15, 06:42:07	-8.3	64°	349° (NNW)	Iridium 96	2 km (W)	-8.4	-6°
Nov 15, 17:23:18	-0.1	16°	277° (W)	Iridium 60	118 km (E)	-5.6	-6°
Nov 15, 17:32:21	-2.2	13°	278° (W)	Iridium 55	65 km (W)	-5.3	-8°
Nov 15, 18:06:52	-0.5	37°	174° (S)	Iridium 97	30 km (E)	-7.6	-14°
Nov 16, 06:36:08	-3.3	62°	350° (N)	Iridium 19	11 km (E)	-8.4	-7°
Nov 16, 17:17:16	-4.7	16°	276° (W)	Iridium 29	27 km (W)	-5.6	-5°
Nov 19, 17:51:54	-7.3	34°	185° (S)	Iridium 6	0 km (W)	-7.3	-12°

Minor Planets

- Ceres and Vesta



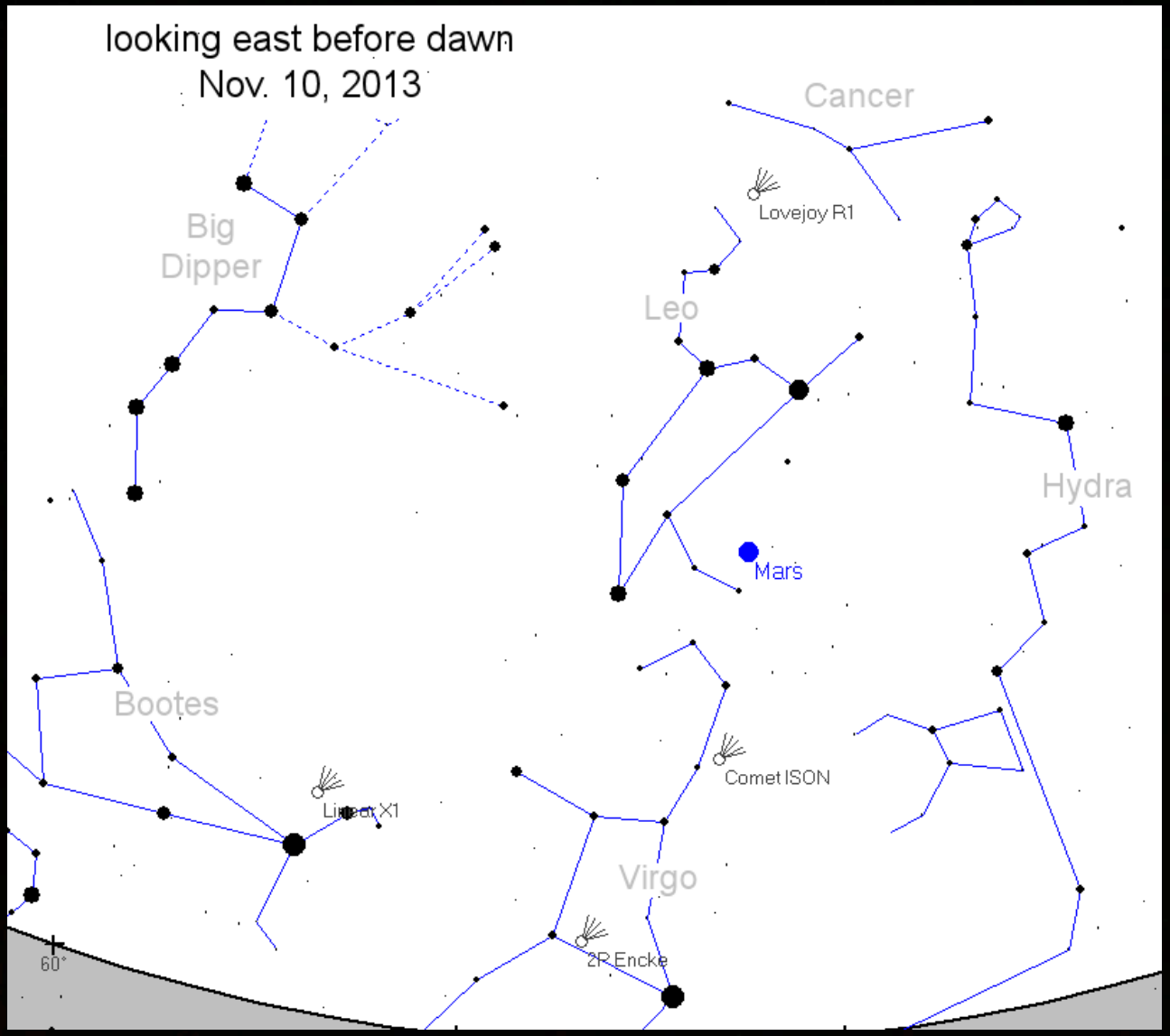
Currently Visible Comets

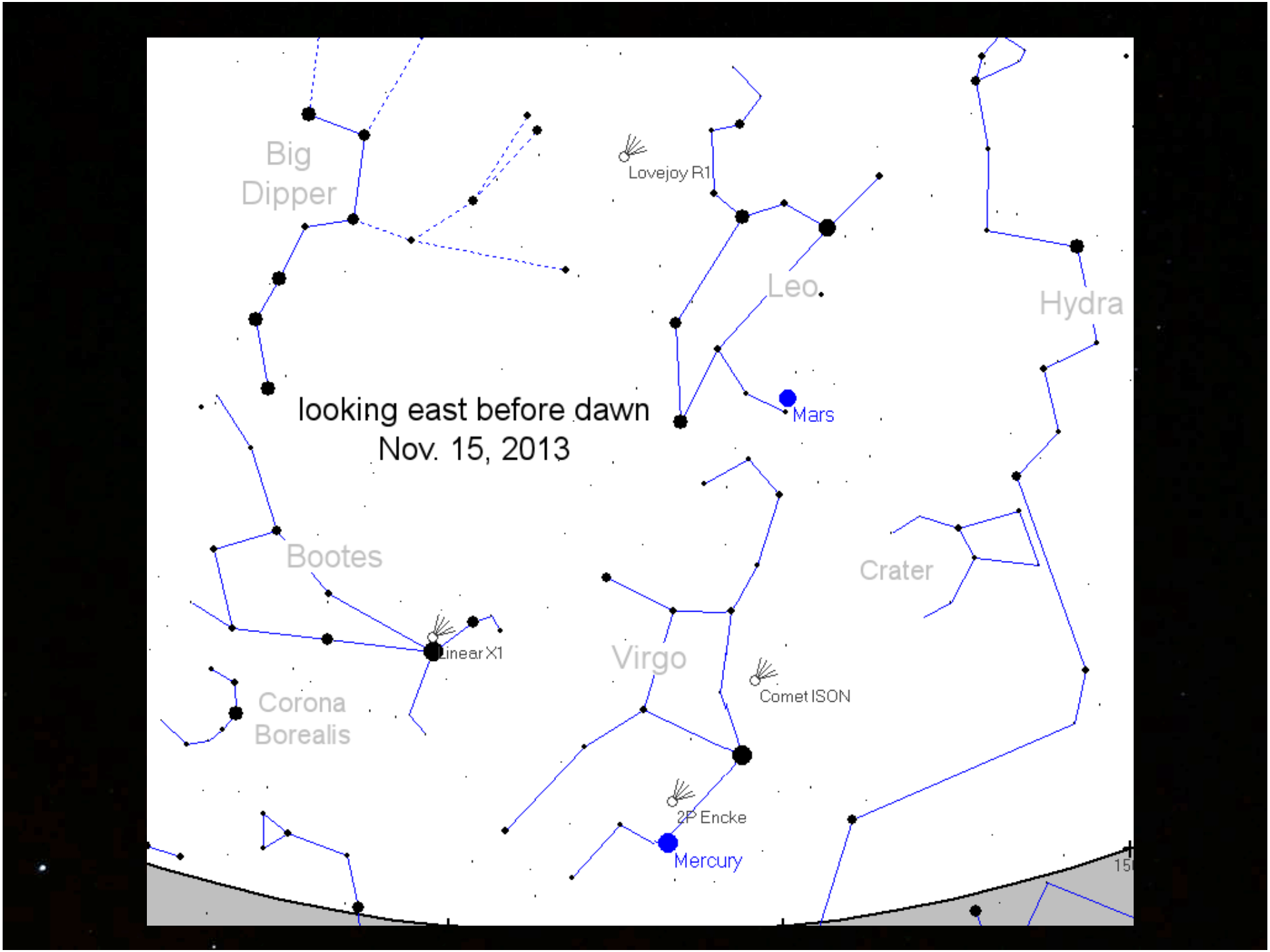
Comet	Brightness	Date of last reported observation	Angular separation from Sun	Altitude	Azimuth	Constellation
C/2013 R1 Lovejoy	10.8	10/11/2013	93°	-14.1°	29° (NNE)	Leo
C/2012 S1 ISON	12.1	10/11/2013	43°	-48.2°	342° (NNW)	Virgo
C/2012 X1 LINEAR	12.6	09/11/2013	42°	-17.2°	325° (NW)	Boötes
2P Encke	12.7	10/11/2013	25°	-43.1°	316° (NW)	Virgo
C/2012 V2 LINEAR	13.9	08/11/2013	50°	-78.3°	205° (SSW)	Centaurus
C/2012 K1 PANSTARRS	14.4	27/10/2013	30°	-10.4°	296° (WNW)	Serpens
C/2010 S1 LINEAR	15.0	10/11/2013	68°	25.8°	260° (W)	Aquila
C/2011 J2 LINEAR	15.1	09/11/2013	96°	26.7°	358° (N)	Draco
154P Brewington	15.2	10/11/2013	107°	46.3°	210° (SSW)	Pegasus
290P Jager	15.4	10/11/2013	127°	16.5°	47° (NE)	Auriga
17P Holmes	15.6	31/10/2013	53°	-7.3°	235° (SW)	Sagittarius
C/2012 F6 Lemmon	15.8	09/11/2013	85°	44.3°	304° (NW)	Draco
4P Faye	15.9	07/11/2013	68°	13.3°	236° (SW)	Sagittarius
C/2011 L4 PANSTARRS	16.0	09/11/2013	47°	5.1°	303° (WNW)	Corona Borealis
291P NEAT	16.0	09/11/2013	176°	42.0°	105° (ESE)	Aries

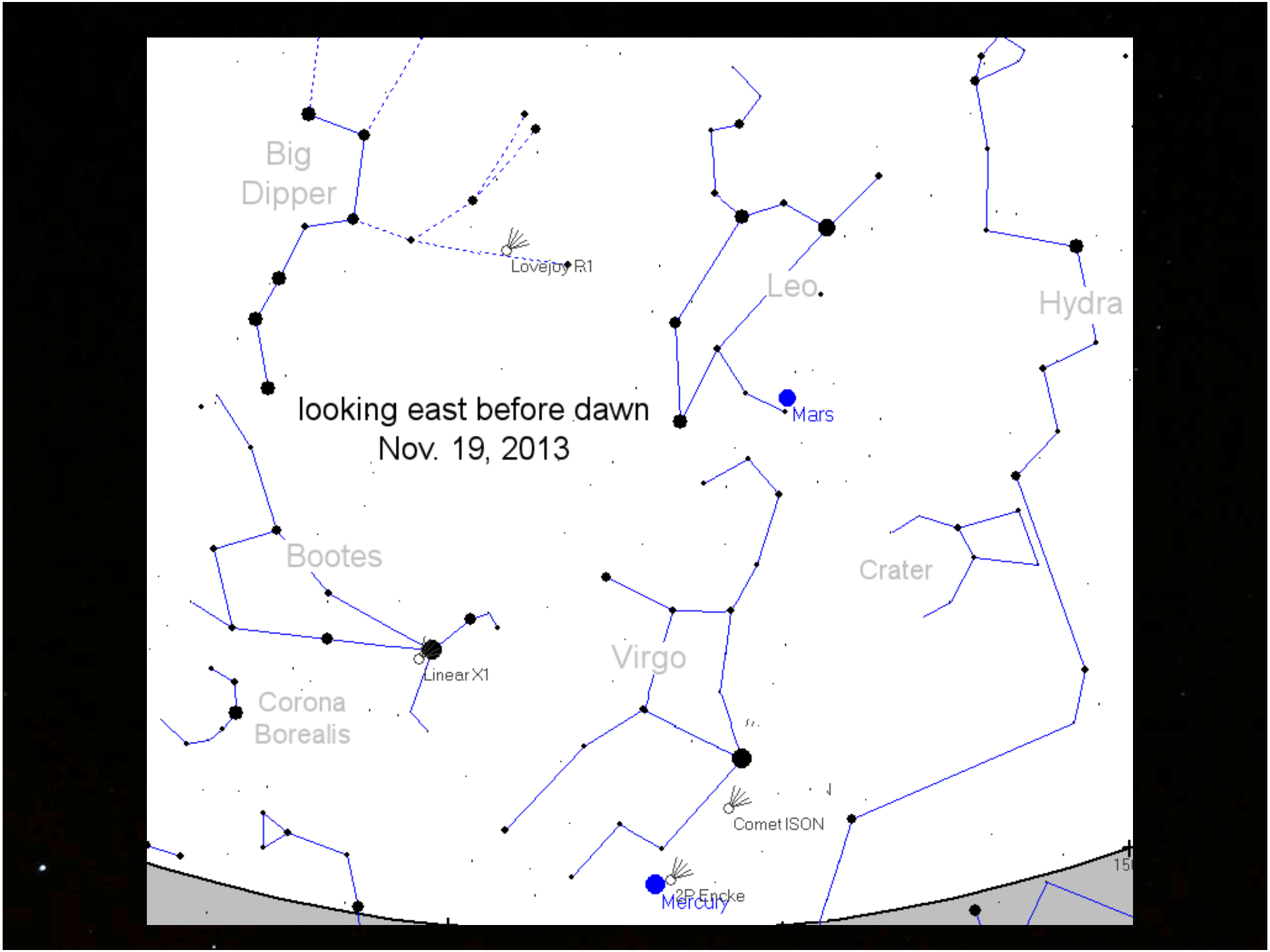
4 Comets in Morning Sky!

- Comet ISON
- Comet Encke
- Comet LINEAR
  - and
- Comet Lovejoy – which is putting on a spectacular show

Get up at 0-dark 30 ….

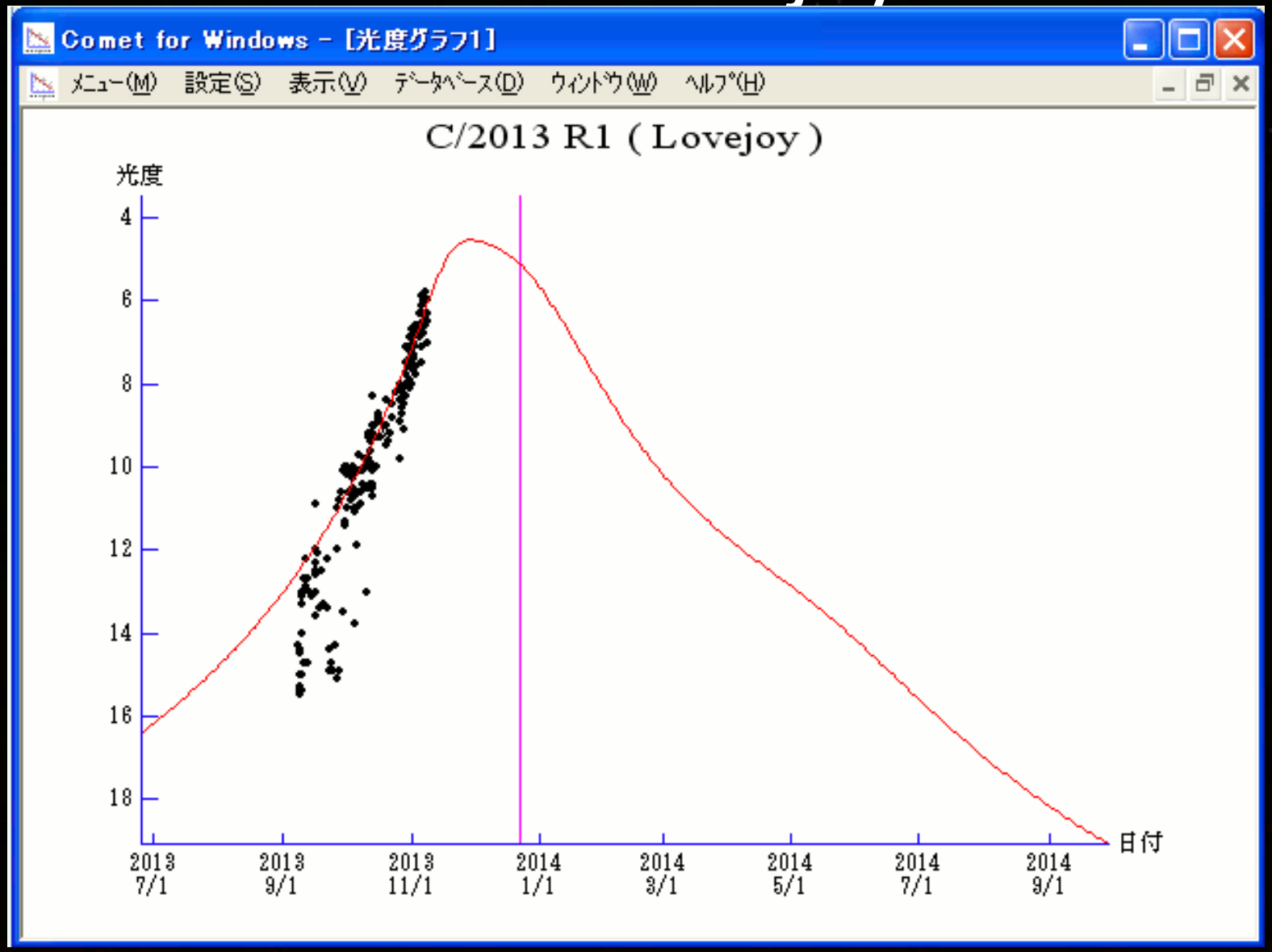



Big
Dipper
Lovejoy R1
Leo
Hydra
looking east before dawn
Nov. 15, 2013
Mars
Bootes
Crater
Linear X1
Virgo
Comet ISON
Corona
Borealis
2P Encke
Mercury

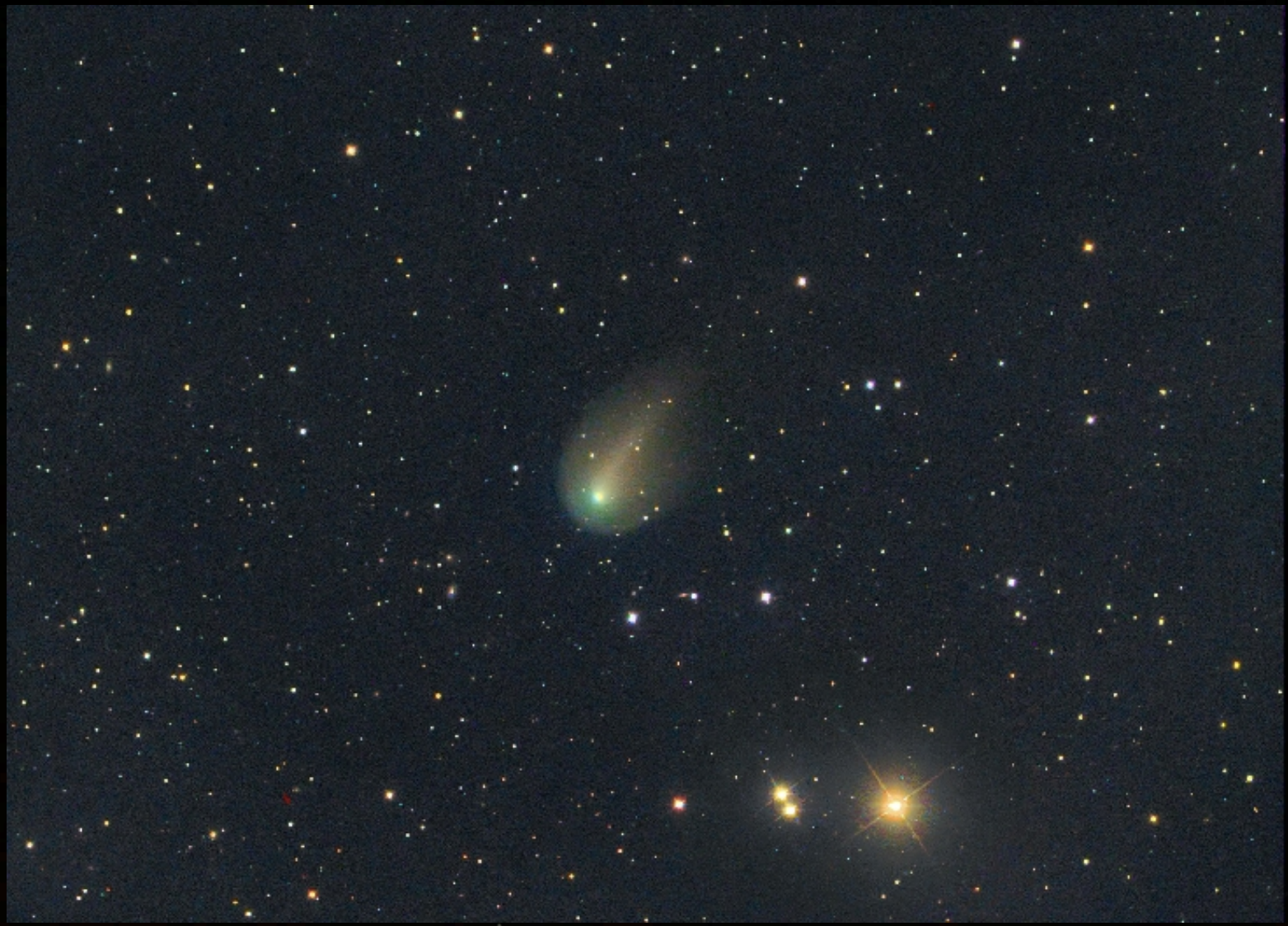

Big
Dipper
Lovejoy R1
Leo
Hydra
looking east before dawn
Nov. 19, 2013
Mars
Bootes
Crater
Linear X1
Virgo
Corona
Borealis
Comet ISON
2P Encke
Mercury

Comet Lovejoy

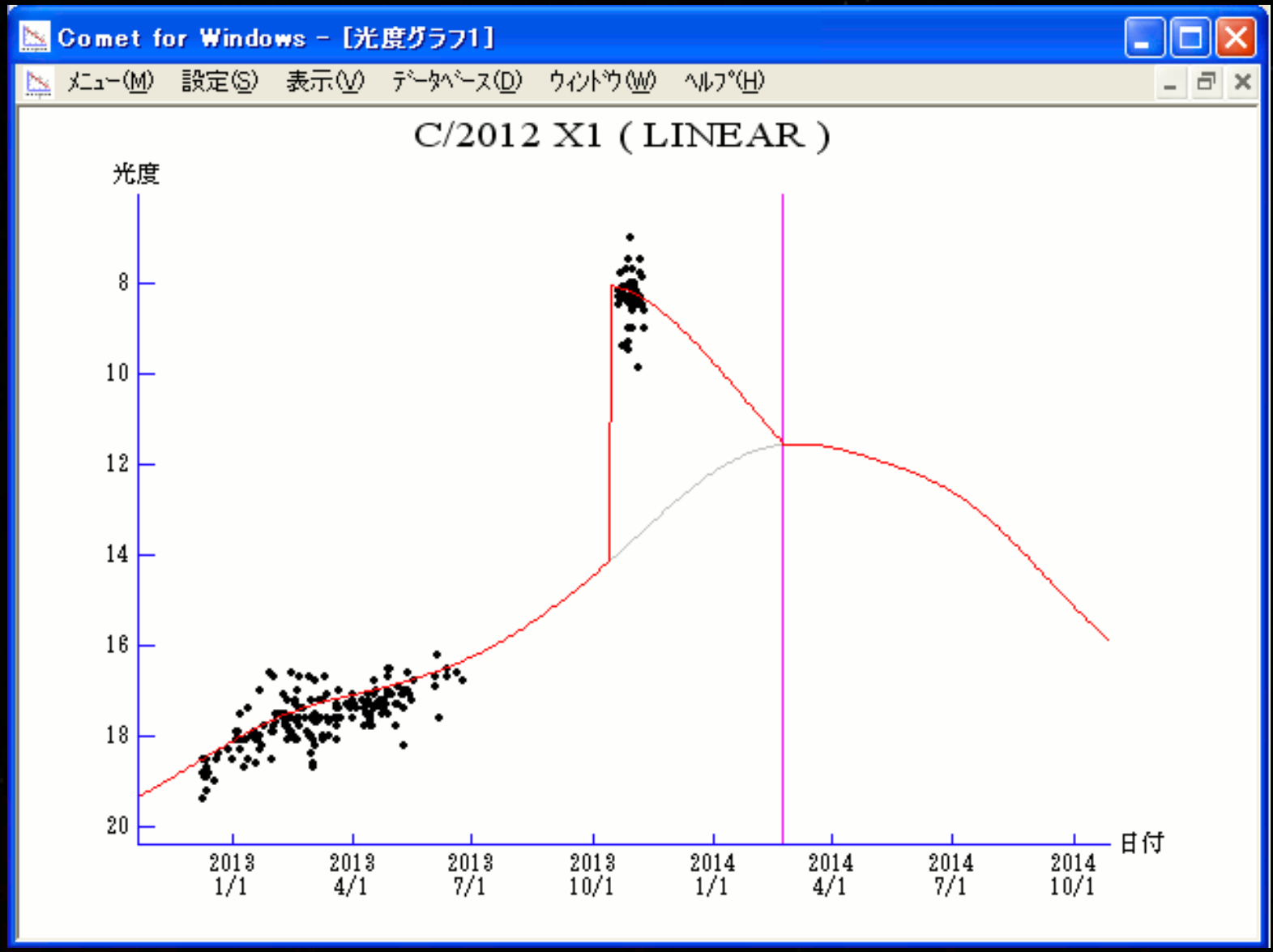
Comet Lovejoy



Comet LINEAR 2012 X1

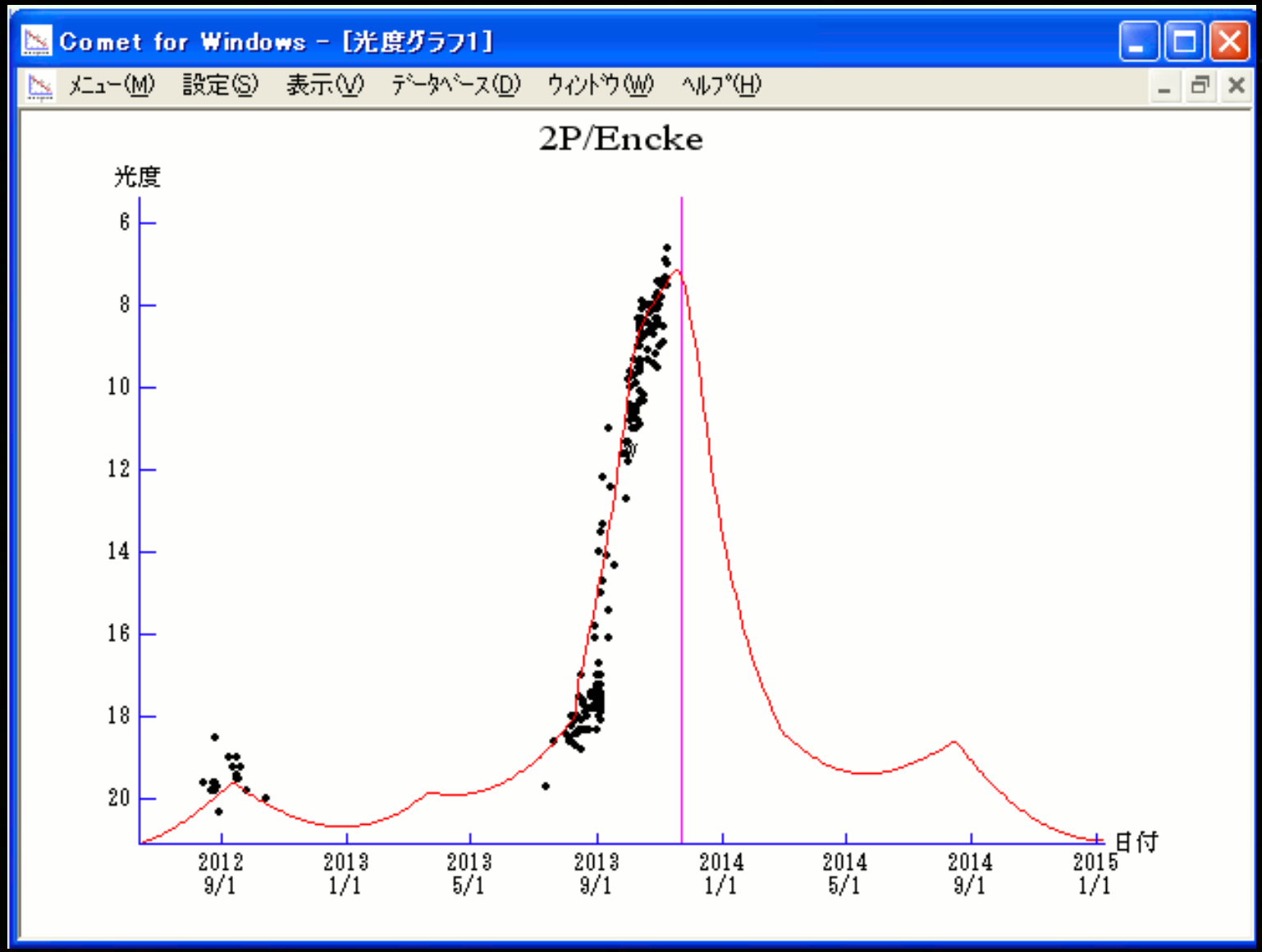


Comet LINEAR – 2012 X1

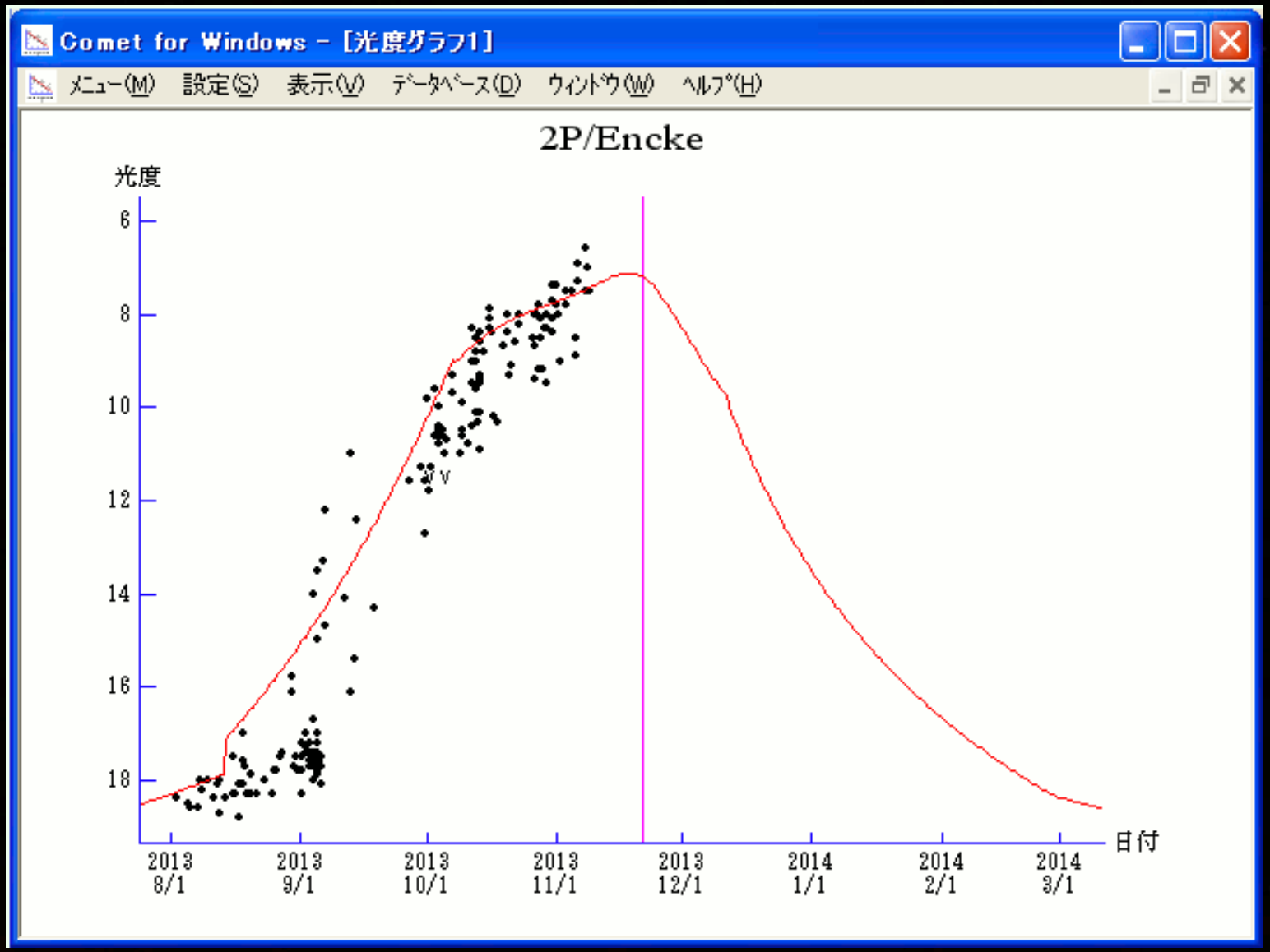


Comet 2P / Encke

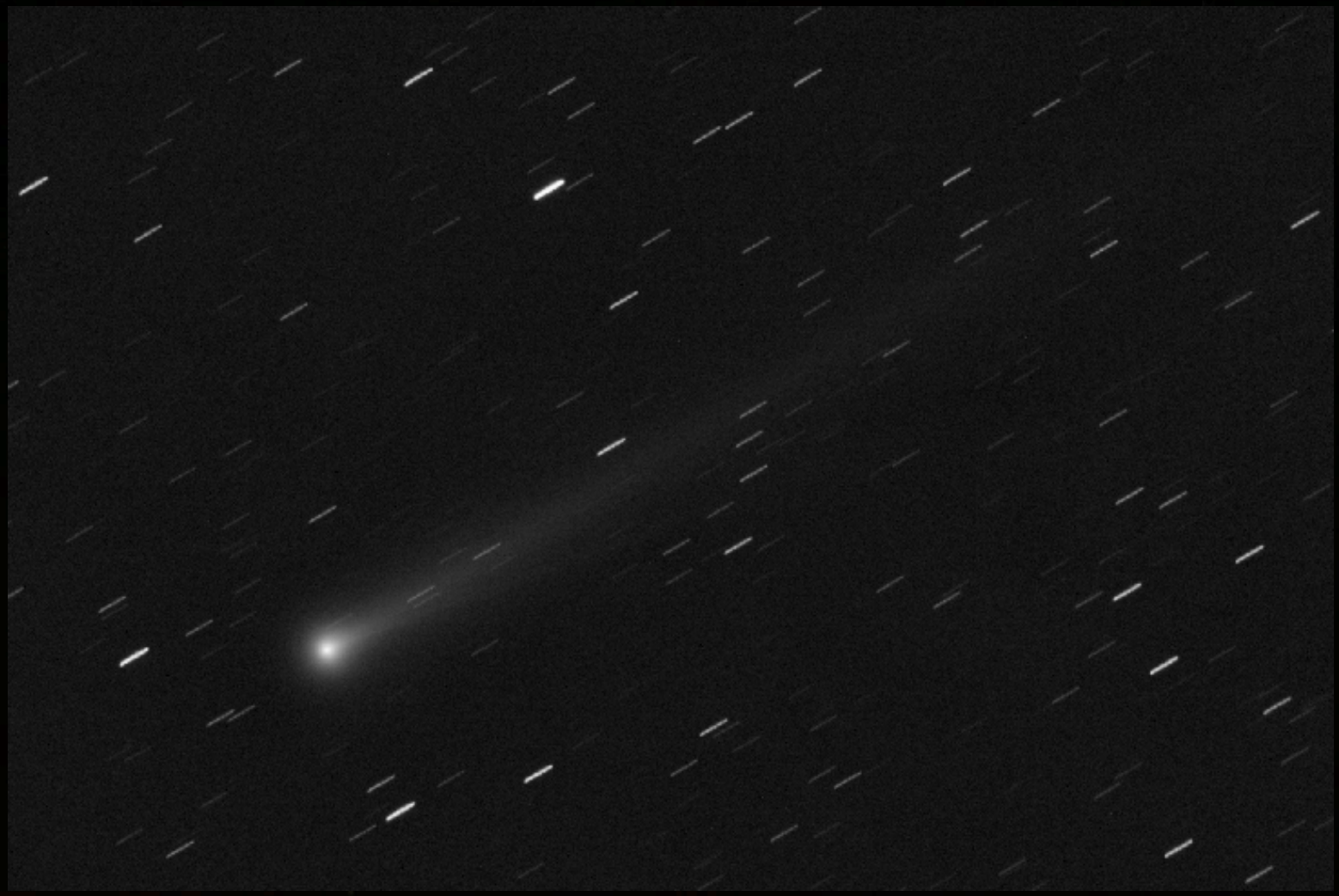
Comet 2P / Encke



Comet 2P / Encke

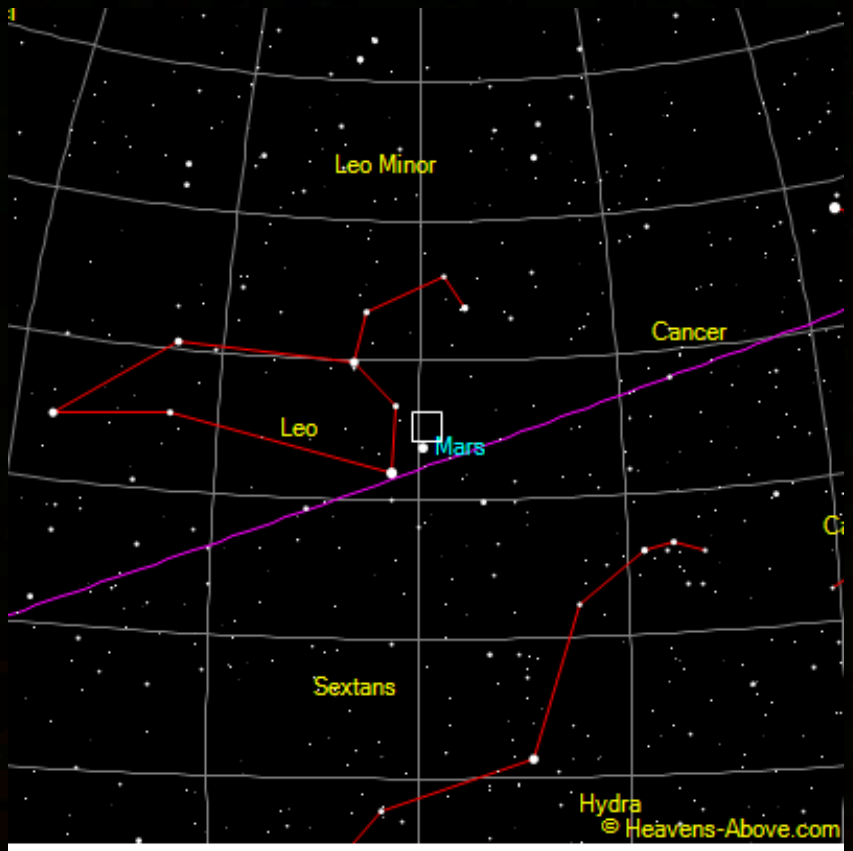


Comet ISON - C/2012 S1

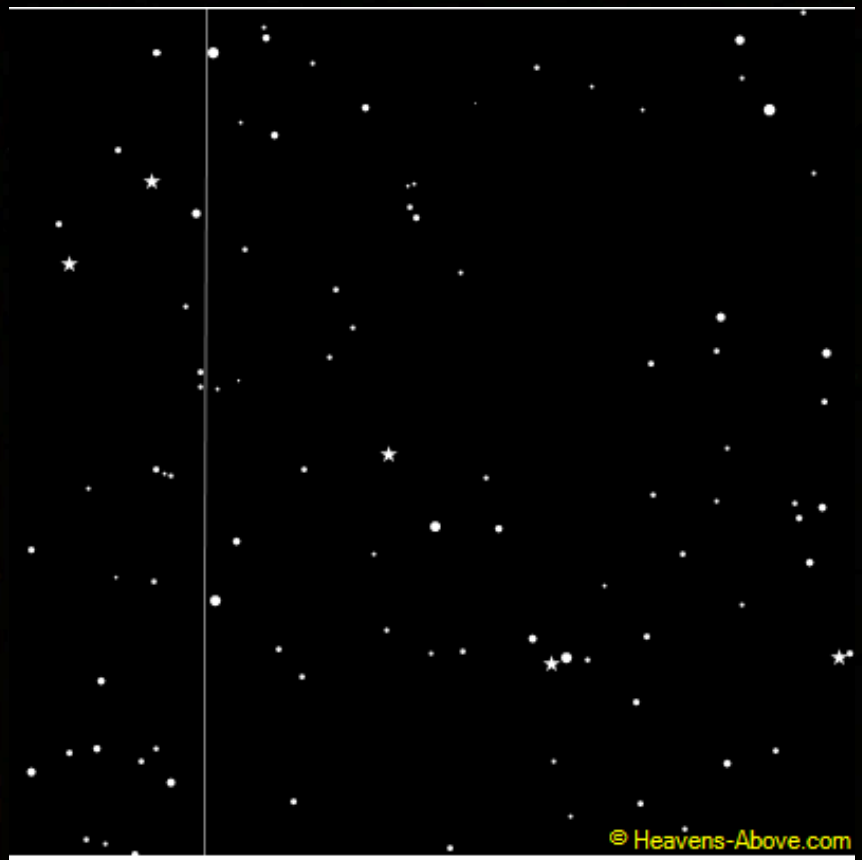


Comet ISON – C/2012 S1

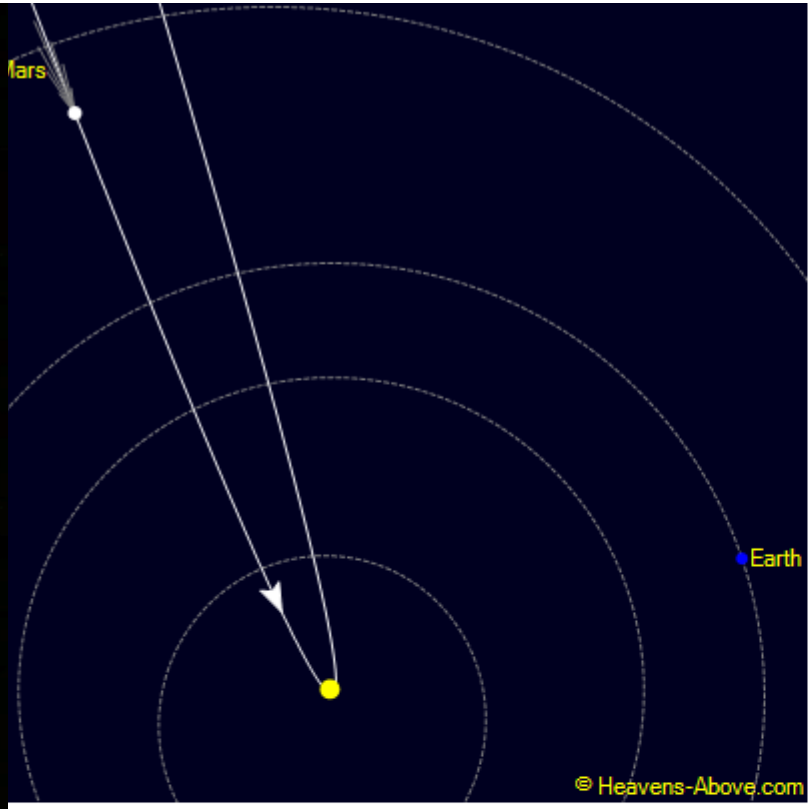
- Current finder charts (For November 10)



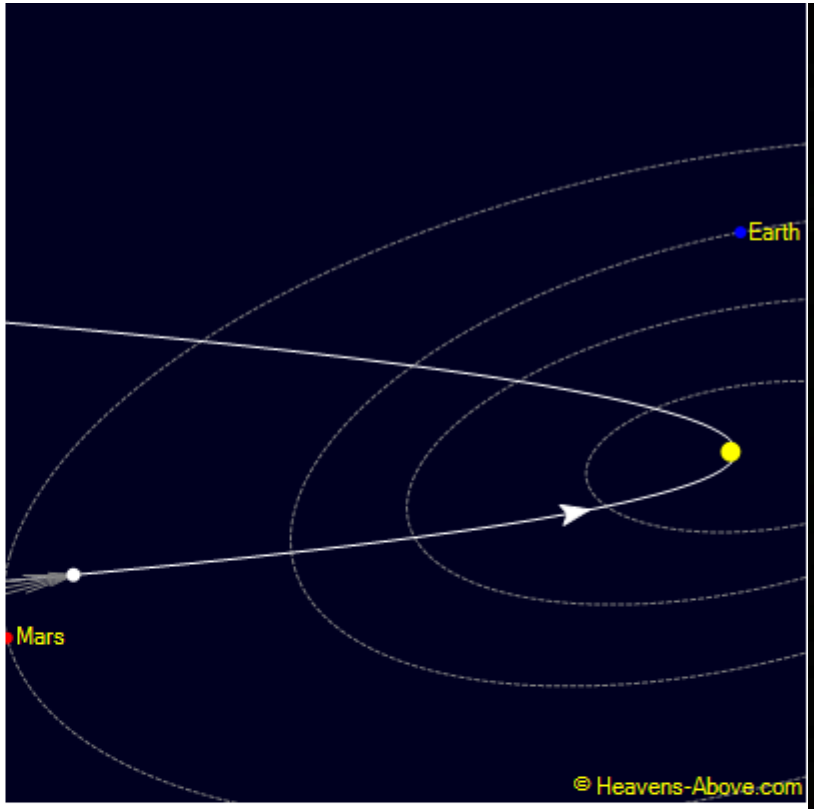
Coarse finder chart
(60° field-of-view, stars to mag. 6.5)



Fine finder chart
(2° field-of-view, stars to mag. 14)



View from above ecliptic plane

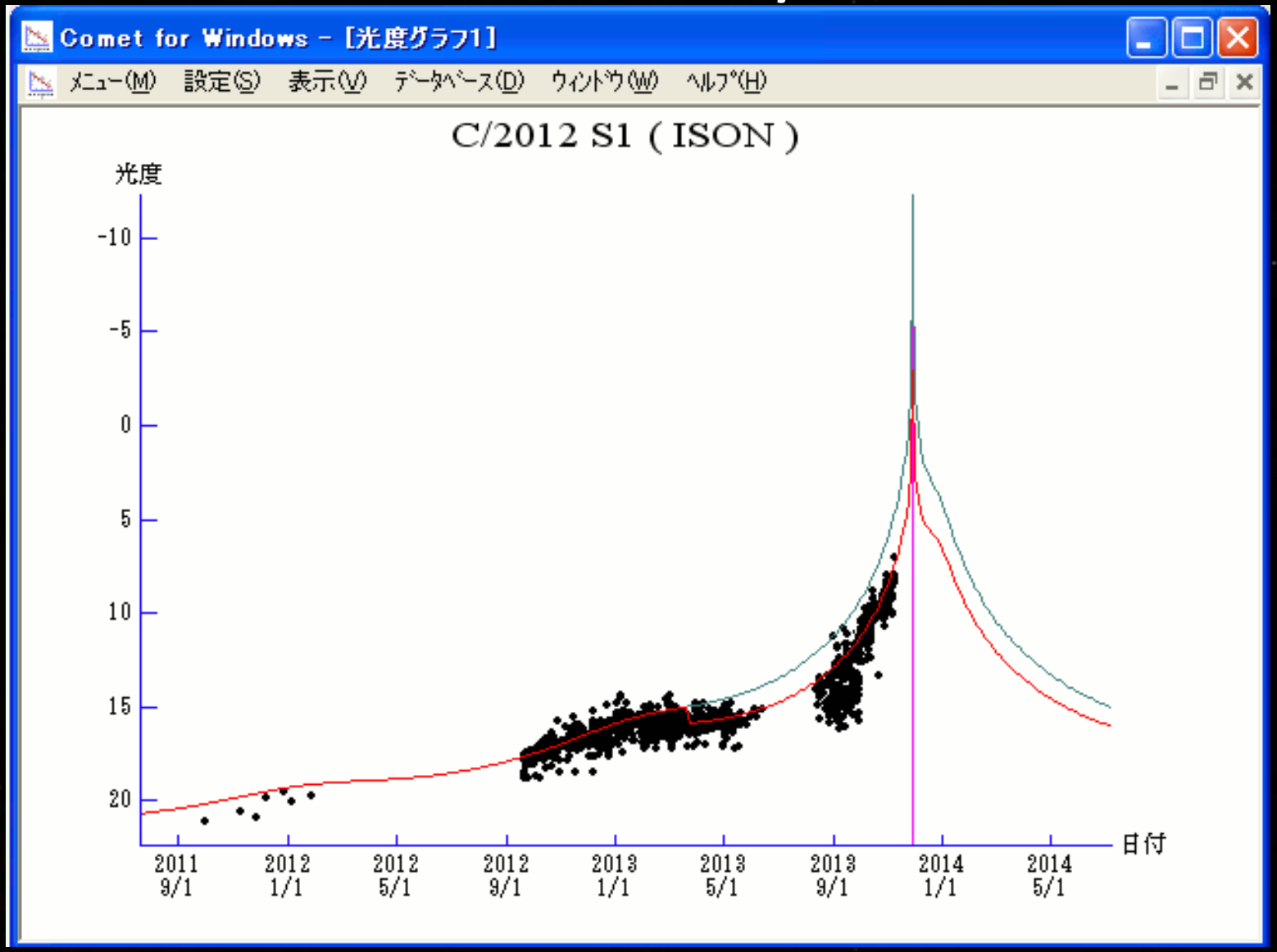


View above comet orbital plane

Position	
Right ascension	9^h 57.8^m
Declination	15° 16'
Constellation	Leo
Distance from Earth	1.854 AU
Last observed magnitude	14.2
Date of last reported observation	09/09/2013
Altitude	-15.7°
Azimuth	310° (NW)
Angular separation from Sun	51.4°
Ecliptic latitude	3.4°

Orbit	
Distance from Sun	1.457 AU
Perihelion	0.012 AU (28/11/2013)
Aphelion	-
Period	-
Eccentricity	1.000003
Inclination to ecliptic	62.4°
Speed relative to Sun	34.893 km/s

Comet ISON - C/2012 S1



Comet ISON - C/2012 S1