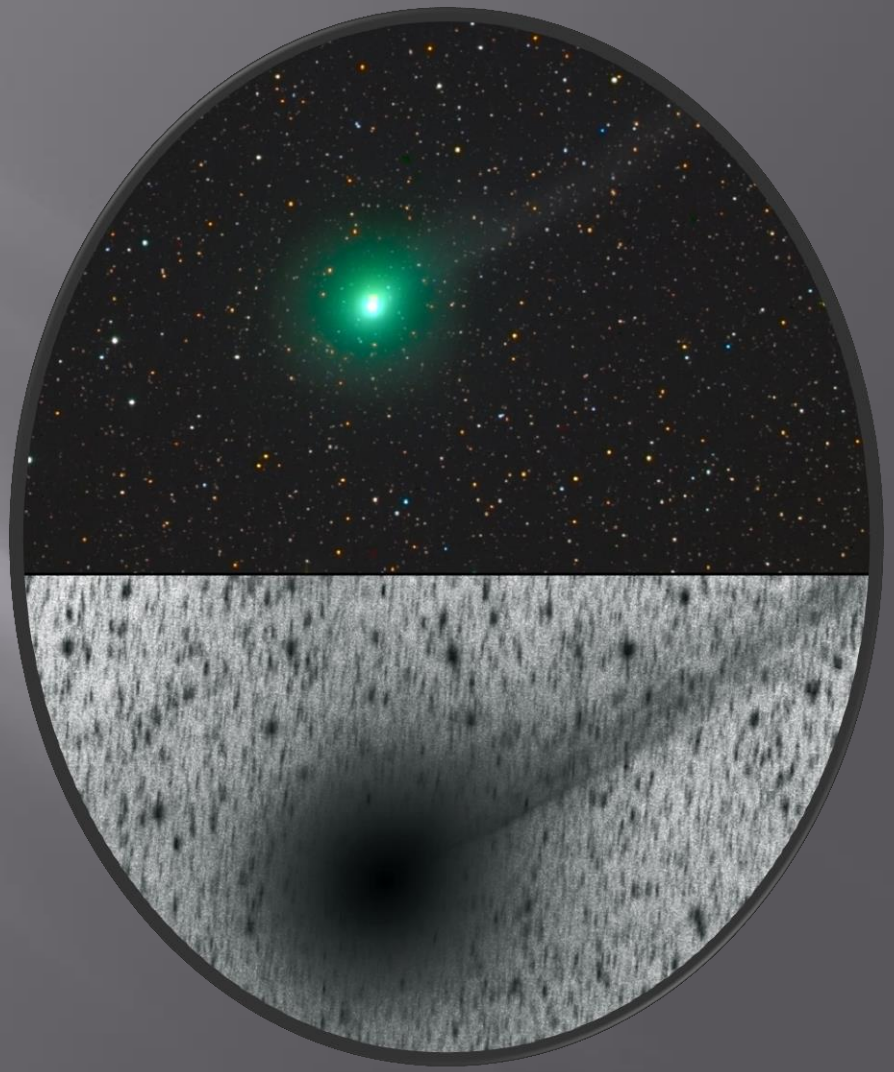
The Professor Comet's Report



Mr. Justin J McCollum (BS, MS Physics)
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Welcome to the comet report which is a monthly article on the observations of comets by the amateur astronomy community and comet hunters from around the world! This article is dedicated to the latest reports of available comets for observations, current state of those comets, future predictions, & projections for observations in comet astronomy!



C/2012 F6 (LEMMON)

11 January 2013

© Rolando Ligustri

Siding Spring Observatory, Australia.

Summer Season – July/August 2013



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Table of Contents

Table of Observable Comets……..……..3
Ephemeris Terminology……..……4
Degree of Condensation……..……5
Comet Morphology Terminology……..6
Comet Morphology (Diagrams & Images)…….……7 - 8
Synopsis of the Late Spring Comets……..……9
Finder Charts for C/2012 F6 (LEMMON)……..…10 – 12
Photometry Graph for C/2012 F6 (LEMMON)……...13
Ephemeris Table for C/2012 F6…….……..14
Finder Charts for C/2006 S3 (LENEOS)……..……15 – 16
Photometry Graph for C/2006 S3 (LEMMON)……..17
Ephemeris Table for C/2012 F6……18
Wide Angle & Multilayer images of C/2011 L4 ……..…19 - 20
Analysis of the Structure/Anti – Tail of C/2011 L4…….21 – 22
Finder Charts for C/2011 L4 (PanSTARRS)……..…23 – 24
Photometry Graph for C/2011 L4……25
Overview of Orbital types……..……..…26
Comets to Watch for this Summer……..…27
New Discovery {C/2013 N4 (Borisov) }……..28
Predominant Comets for the Summer 2013……29 - 31
Comet ISON (skychart for 10 December 2013)……..…32

The Professor Comet's Report

The Current Status of the Predominant Comets for Late - Spring 2013!

Comets	Designation (IAU – MPC)	Orbital Status	Magnitude Visual	Trend (Brightness Or Dimming)	Observation (Range in Lat.) (Alt. > 10° at zenith)	Constellations (Night Sky Location)	Visibility Period (July & August) (Alt. ≥ 15°)
LEMMON	C/2012 F6	C	9.6* (13 July)	*Gradual Fading*	60°N - 8°S	*Moving Westward across the central region of Cepheus.*	*(9:30 pm – 5:30 am) CDT*
LONEOS	C/2006 S3	C	10.5* (30 June)	**General decline in brightness with alternating periods of luminosity**	45°N - 77°S	Undergoing the northern half of it's current retrograde motion in close proximity to Spica (the brightest star in Virgo)!	*(9:00 – 10:55 pm) CDT*
LINEAR	C/2012 L2	C	11.2* (3 July)	Moderate rate of Fading	**N/A**	Moving SE thru the constellations in the SE region of the 'Winter Hexagon' asterism!	***Lost in the Daytime Glare!***
Schwassmann – Wachmann 1	29P	P	12.4* (6 July)	*Very faint with an alternating pattern in brightness!*	41°N - 90°S	*Moving ESE while undergoing retrograde motion at the southern edge of Virgo*	*(9:21 pm – 12:30 am) CDT*
NEAT	246P	P	12.9* (6 July)	Mid Period of peak Brightening	39°N - 90°S	Moving W along the southern half of a retrograde loop thru the constellation of Sagittarius	*(9:00 pm – 3:24 am) CDT*
LINEAR	C/2010 S1	C	13.1* (13 July)	Approaching peak brightness with eventual fading!	60°N - 43°S	SSW to SW direction thru the SE region of Cygnus in late July and across the W region of Vulpecula for the right of August!	*(9:00 pm – 06:00 am) CDT*
Borisov	***C/2013 N4***	***C***	***13.2* (12 July)***	***Brand New Comet (Brightening)***	60°N - 24°N	***Eastward thru Auriga thru the end of July and then the S region of Lynx well into mid August!***	***(5:33 – 5:45)am CDT***
Grigg – Skjellerup	26P	P	13.3* (8 July)	**Rapid increase in Brightness!**	43°N - 65°S	*Eastward across the N region of Virgo thru Early September*	***(9:15 – 10:30) pm CST***

*Visual Magnitude determined from last known field observation report!

Comets with visual magnitudes fainter than 13.5 , more suitable for observing in the Southern hemisphere , or in the tropics are not reported on this list!

Summer Season – July/August 2013

Ephemeris Data Terminology

Ephemeris Term	*Definition (plus additional comments)*
Date	Month and Year using the standard Gregorian calendar.
TT	Terrestrial Time (Day of the Month) as a substitute for the astronomical Julian date.
RA (2000)	Right Ascension based on the Epoch J2000 (longitudinal coordinate for the celestial sky) measured in hours, minutes, and seconds.
Dec (2000)	Declination based on the Epoch J2000 (latitudinal coordinate for the night sky) measured in degrees, arcminutes, and arcseconds.
Delta	The distance from Earth measured in AUs (1 AU = 1 Astronomical Unit = 92 955 807 mi = 149 597 871 km as the mean distance between the Earth and Sun).
R	The solar distance measured in AUs (the distance between the comet or comet – like body and the Sun)!
Elongation {El. (˚)}	Solar elongation which is the angle of separation between the observed object and the Sun as measured across the night sky as measured in degrees.
Phase (Ph.)	Phase angle between the Sun, the celestial object, and the observer on the surface of the Earth. Also known as the Sun – Object – Observer angle.
M1	M1: The visual magnitude of the celestial object as observed on the surface of the Earth at sea level. *(Note M1 values predicted by the Minor Planet Center can differ from actual visual reports obtain in the field!)*
M_{pred}	*The predicted absolute magnitude which is calculated from a series of initial observations upon the discovery or recapture of a periodic comet which can change if the comet gets brighter or fainter as the internal conditions of the comet's nucleus changes during it's close approach around the Sun!*
M2	The nuclear magnitude of the Comet which is also the visual magnitude of the false nucleus. *(Rarely shown on a Comet's ephemeris data spreadsheet unless all values show a visual brightness value above 19th magnitude!)*
"/min	The progression or motion across the sky as measured in arcseconds per minute.
P.A.	Position angle while undergoing motion in the celestial sky. *(P.A. is the same method applied to binary stars with starts at N goes counterclockwise in an easterly direction!)*
Moon Phase	*A Numerical value for designating the phases of the Moon on a scale of (0.00 – 1.00): A New Moon = 0.00, Waxing or Waning Crescent = (0.01 - 0.49), Half Moon (1st or Last Quarter = 0.50), Waxing or Waning Gibbous = (0.50 – 0.99), & Full Moon = 1.00*
Foreshortening (% Fore.)	The appearance of the comet's tail due to the geometric orientation between the Earth and a Comet. *(100% means the comet's tail is parallel with the face of the Earth where as 0% means the tail is exactly perpendicular with respect to the face of the Earth!)*
Altitude {Alt. (˚)}	Altitude is the angle of position for any celestial object visible in the night sky with respect to the horizon regardless of cardinal direction . The angle has a range of only (0˚ to 90˚) although (0˚ to -90˚) can be applied to objects not visible. The altitude position will change throughout the sidereal day.
Azimuth {Azi. (˚)}	Azimuth is the establish angle of position for any celestial object visible in the night sky. The range starts at the North (0˚) heading clockwise eastward with the following cardinal positions: *NNE (22.5˚), NE (45˚), ENE (67.5˚), E (90˚), ESE (112.5˚), SE (135˚), SSE (157.5˚), S (180˚), SSW (202.5˚), SW (225˚), WSW (247.5˚), W (270˚), WNW (292.5˚), NW (315˚), & NNW (337.5˚)*

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Degree of Condensation (DC)

All observations of comets are broken down into three factors: estimating magnitudes for light curves to predict future brightness, coma observations, and observations that concern with a comet's tail(s). For the coma or a comet's head there two characteristic features that are important for study: Degree of condensation (DC) and coma size measured in arcminutes. The classification system for determining the DC is based on a positive integer system from 0 to 9 as shown below.

DC value	*Definition to numerical DC designation*
0	***Diffuse coma of uniform brightness***
1	***Diffuse coma with slight brightening towards center***
2	***Diffuse coma with definite brightening towards center***
3	***Centre of coma much brighter than edges, though still diffuse***
4	***Diffuse condensation at centre of coma***
5	***Condensation appears as a diffuse spot at centre of coma – described as moderately condensed***
6	***Condensation appears as a bright diffuse spot at centre of coma***
7	***Condensation appears like a star that cannot be focused – described as strongly condensed***
8	***Coma virtually invisible***
9	***Stellar or disk like in appearance***

The Professor Comet's Report

Morphology (Structure) of Comets

6 *As a comet approaches or recedes from the Sun within the planetary domain of the solar system the solar pressure and energy from the Solar Wind & its radiation pressure react with the comet nucleus. This in turn will form a variety of structures to the comet that give it its' distinctive structure thru the processes of sublimation, evaporation, ionization, pressure outflow, etc.*

Structural Component	*Definition of Component*
Nucleus	***Comets are essentially 'dirty snowballs' or asteroids covered in and containing internal cavities (reservoirs) of frozen volatiles (ex.: H20, frozen Oxygen, Carbon compounds, etc.) and originate from outside the solar system from the Kuiper Belt (short to medium period comets) to the Oort Cloud (up to extremely long period comets). The details in composition and overall structure internal and external vary considerably and they range in size from 100m to 40 km across! As of June 2013 there are about 4300 known so far, but they may number in the trillions!***
False Nucleus	***The central brightening of the coma showing the position of the nucleus, but only the extremely 'high pressured' jets are visible containing the escaping volatiles from such internal cavities breaking thru to the surface of the nucleus (the actual nucleus is not visible in most telescopes).***
Coma	***The trace atmosphere of dust particles, icy crystals, evaporated or sublimated molecules, ions, etc.) that surround the nucleus before being pushed away by the radiation pressure and solar wind producing the comet's tails. The re are two sub components (inner and outer comas) differing only by concentration of materials emanating from the nucleus. The most common compounds C2 & C3 (carbon compounds) along with (CN-) cyanogen compounds make the nucleus appear greenish or some combination of blue and green to the human eye.***
Ion Tail (Type I)	***The volatiles that can come from the nucleus are ionized by solar Ultraviolet radiation (UV photons) and the magnetic field of the Sun will drive the particles in a tail away from the Sun (Anti – Solar) direction at speeds up to 500 km/s. The most common ions (CO+) carbon monoxide appears blue to the human eye.***
Dust Tail (Type II)	***Nanoscopic to tiny mesoscopic (up to millimeter sized) dust particles that pushed away from the Coma via pressure from the Solar radiation within the solar wind and can very diffuse structurally and only reradiate back long wavelength or low energy light (appearing white, yellowish, or soft – pink). The particles will spread in individual orbits around the Sun kept away from the Sun's gravity due to its' radiation pressure giving the tail its' curved shape. Dust Tails can extend up to 100 million km (62.1 million mi) from the Nucleus and Coma!***
Sodium Trail (Type III)	***Visible only in very, large telescopes there tails are composed of neutral atoms of Sodium striking out from the coma and not the nucleus possibly from either collisions between dust particles, UV solar erosion of the dust particles, or some unknown mechanism all occurring within the coma. Sodium tails can reach up to 50 million km away from the Sun along a similar path to the ion tail!***
Dust trail (Anti – Tail)	***Larger dust particles that have enough mass to be more attracted to the Sun's gravity and are less likely to be influenced by the Sun's radiation pressure and are geometrically opposite to the Types I & II tails. They will form a dust disk along the orbital path of the comet that only visible from Earth as a spike heading towards the Sun, but only visible when the comet crosses the orbital plane of the Earth!***
Cometary Bow Shock	***Once the solar wind interacts with a comet plunging thru the solar wind a bow shock forms around the outer coma much the same way the magnetic field of a planet forms a bow shock. The solar wind forms a Hydrogen envelope just outside the frontal boundary of the outer coma creating a plasma layer of hydrogen ions that release Lyman – alpha radiation as a byproduct!***

Comet Morphology

Figure 1: Visual Morphological layout of a comet as shown by several diagrams and images!

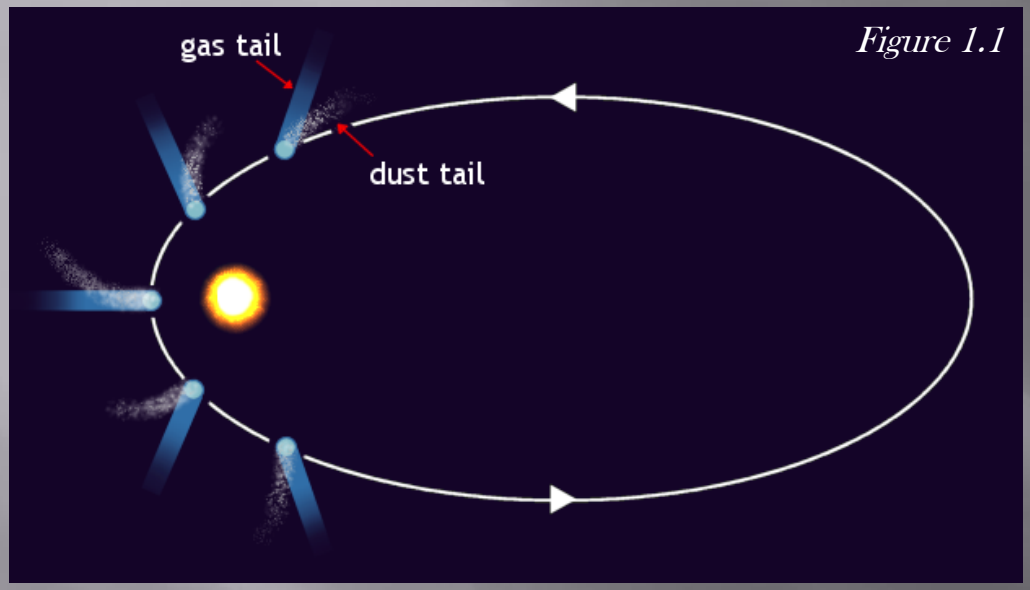


Figure 1.1

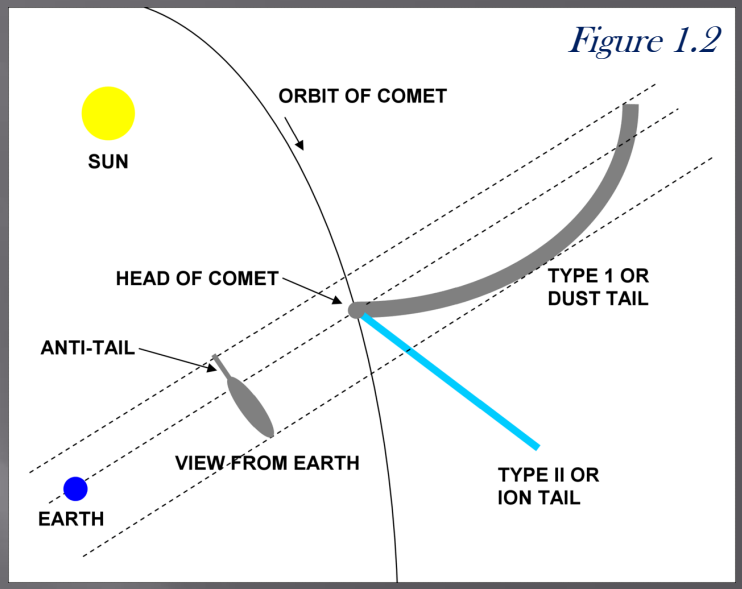


Figure 1.2



Figure 1.3

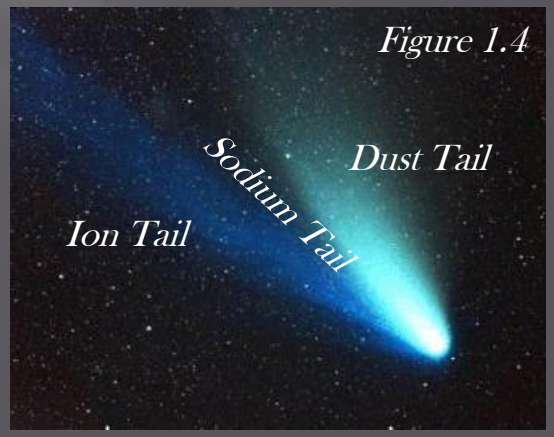


Figure 1.4

Comet Morphology

Figure 2: Morphology shown interaction between the Coma and the Solar Wind!

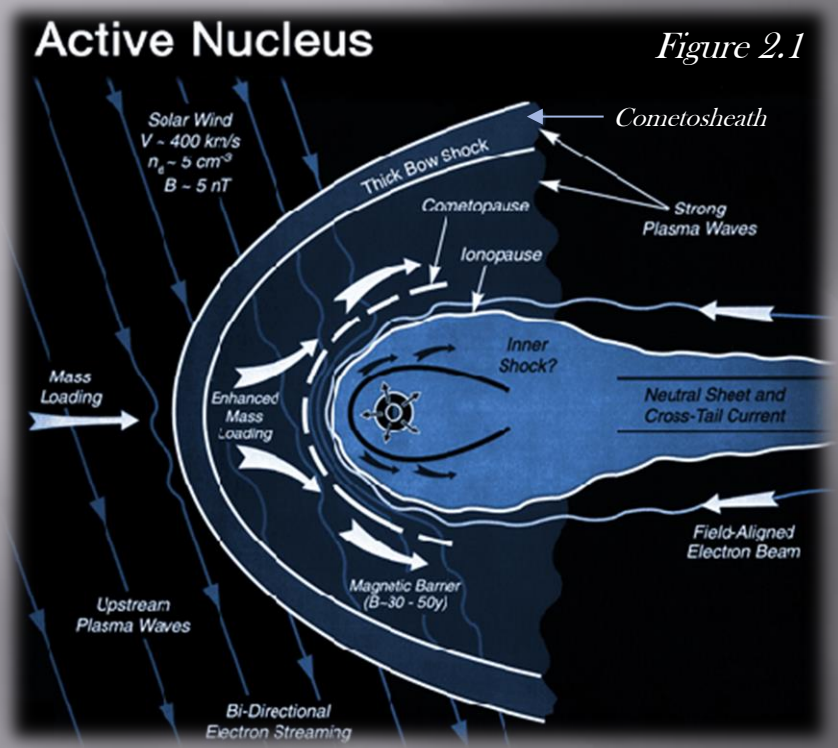


Figure 2.1



Figure 2.2

Earth's Magnetic Field

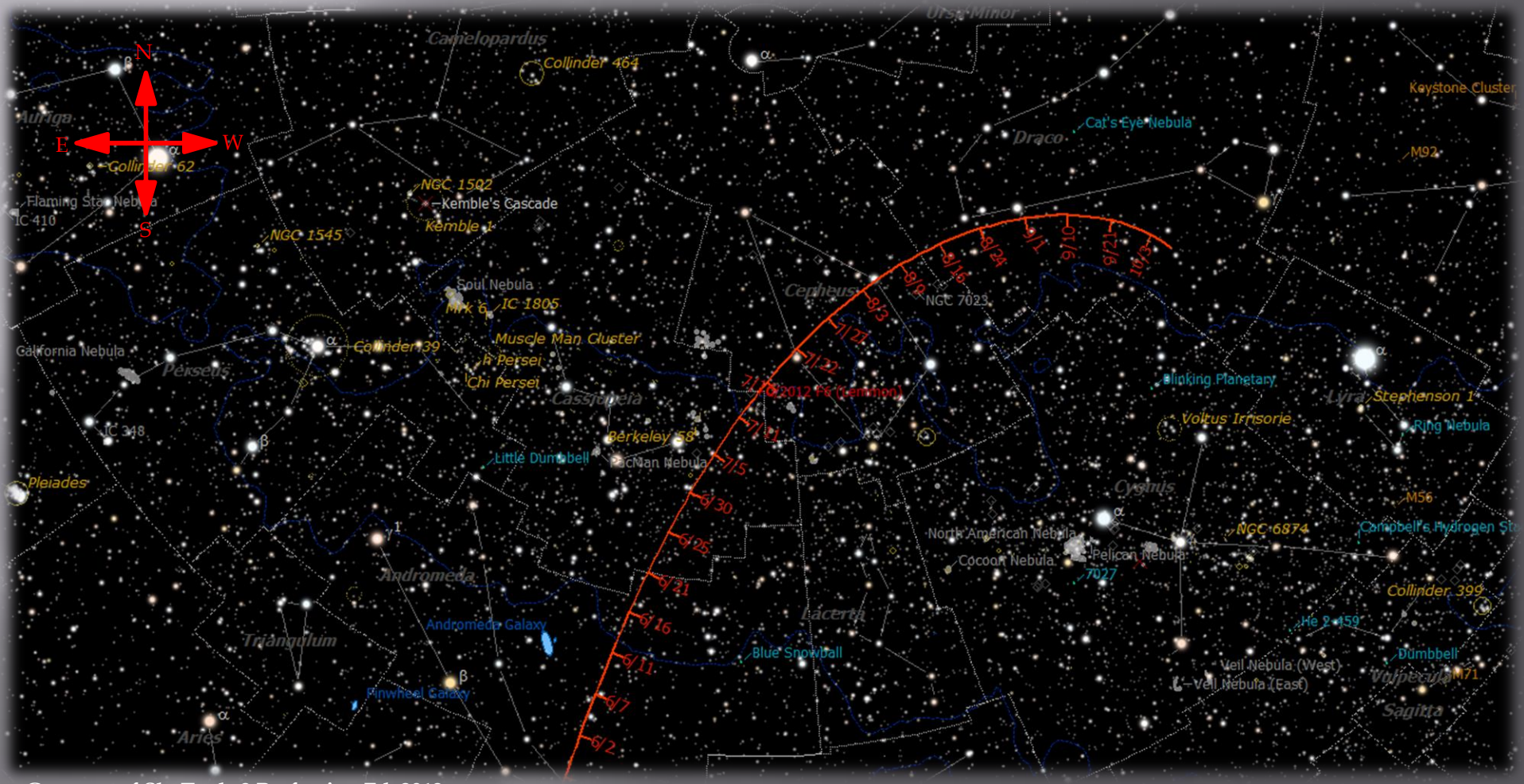
It is okay if you don't entirely understand what is going on here; the only important fact are the particles within the solar wind and the comet plunging thru it will force a massive buildup of particles between the bow shock and the cometopause (the boundary of the comet's induced magnetic field) forming the outer boundary of influence for the outer coma! This think bow shock that contains the Hydrogen plasma is also known as the cometosheath and works similar to that of planet's magnetosheath where the influence of the magnetic field is weaken and the behavior of the Sun's magnetic field propagating (moving) thru the solar wind begins to dominate going from the comet or planet outwards towards the solar wind! Figure 2.2 compared to Figure 2.1 shows similarities in the Earth's magnetic field to the behavior of the Coma and induced magnetic field of the Comet as a result of interaction with the charged particles and radiation of the solar wind!

A Short Synopsis of the Predominant Comets for Summer 2013!

The summer of 2013 is a low for observing bright comets. There are only three comets that are brighter than 11th magnitude until the middle of August; C/2012 F6 (LEMMON) and C/2012 F6 (LENEOS). Only one of them; LEMMON is still protruding a tail that is faintly visible to observers as it moves across the constellation of Cepheus moving westward towards the eastern edge of Draco. The LENEOS comet is currently undergoing a retrograde loop within proximity to the bright star of Virgo (Spica) and lasting thru January 2014. Further information about the comets are discussed in the later pages of this report with the fading of both comets thru the progression of Summer and well into late August. This will likely be the last report to give future details on comet PANSTARRS since it is now faded to mid 11th magnitude and has past the orbit of Mars and continues on it's onward march towards the outer solar system. There are on other comets to report about that will be brighter than 9th magnitude until comet c/2012 S1 ISON which is still meddling between 14th to mid 15th magnitude , but some reports have placed the brightness of comet ISON at 16th magnitude. The comet as of 20 July 2013 was 263 836 000 miles (424 512 124 km) from the sun and moving at about 55 400 mph (89 139 kmph). Comet ISON is now completed about 83.7% of the minimal distance between Jupiter and Mars, southeast of Pollux (eastern star of the Gemini), and will cross the position of the Autumnal Equinox on 8 November 2012 at 21:38:57 UTC. Autumnal Equinox is the crossing of the plane of the ecliptic with the celestial equator at the 12hr of RA. However, this only last until 28 November at 18:35 UTC when moves northward thru the plane of the ecliptic and back into the northern hemisphere of the solar system above the plane of the Earth's orbit. Comet ISON's closet approach has now been calculated for 28 November 2013 at a perihelion of 0.012 AU or (1 114 800 mi/1 793 713 km) with a perihelion passage of 21 minutes at 18:27 - 18:48 UTC. However, that is from the solar center, so taking into account the diameter of the Sun the distance of ISON from the photosphere (the Sun's surface) is reduced to 1 100 000 km (683 100 km). One must remember that this is a Sungrazer comet on an ejection trajectory to escape from the solar system entirely and become a rogue interstellar object, but they are unpredictable and can not be relied upon as a predictable object based on how bright it will be once it pass perihelion with the Sun. Only when comet ISON is more visible starting in September when the Spring constellations are once again visible in the morning Autumnal skies before dusk will the comet show it's true brightness before perihelion!

C/2012 F6 (LEMMON)

Figure 4: Projected path of C/2012 F6 (LEMMON) towards the northern 'Circumpolar' constellations (1 June – 3 Oct) 2013!

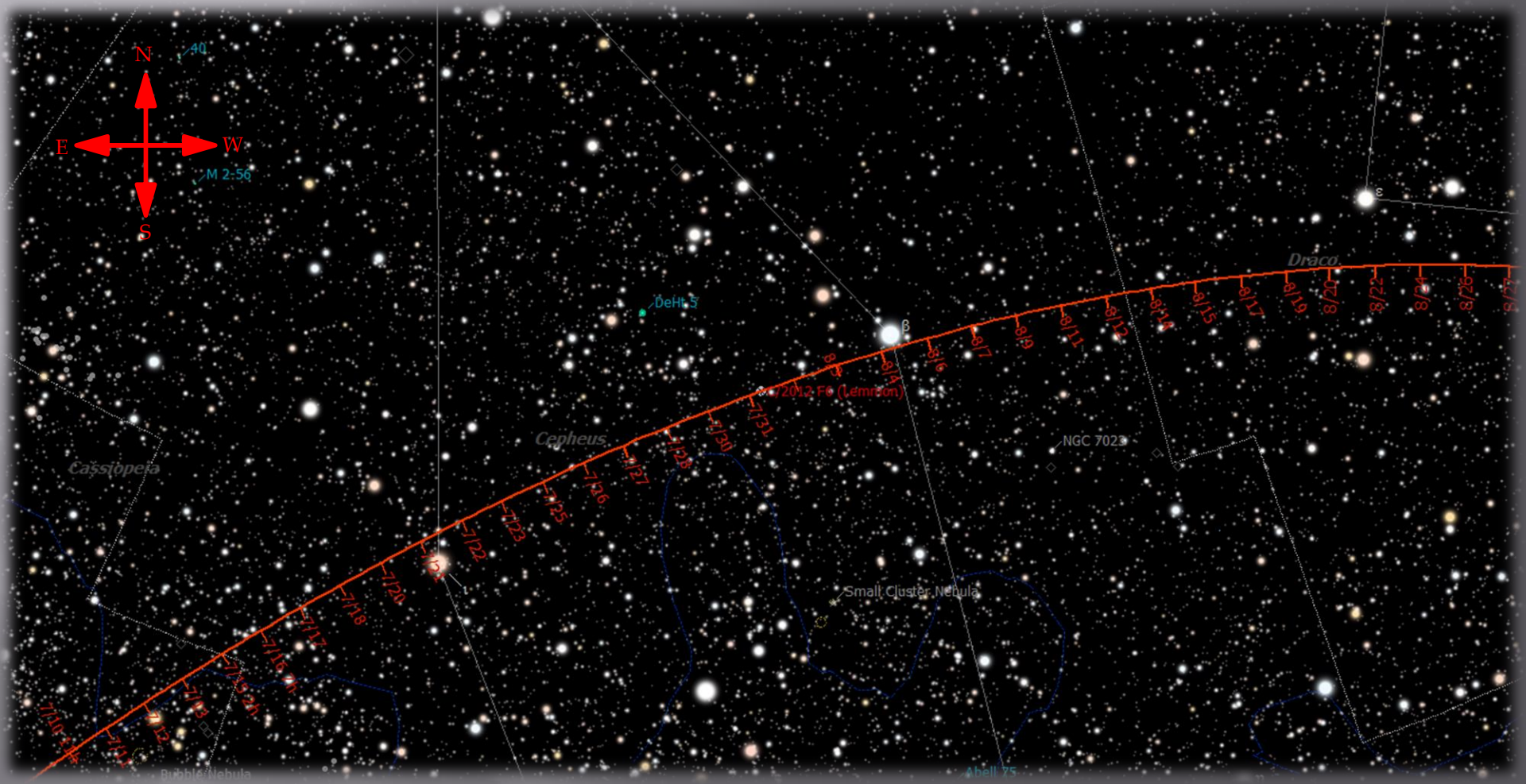


Courtesy of SkyTools 3 Profession Ed, 2012.

Note: Comet C/2012 F6 (LEMMON) is approaching the region of the 'Northern Circumpolar' constellations in a NNW to NW direction rising high above the plane of the ecliptic, but below that of C/2011 L4 (PanSTARRS) reaching a maximum position along the constellation boundary between Cepheus & Draco by mid – August 2013!

C/2012 F6 (LEMMON)

Figure 5: Projected path of C/2012 F6 (LEMMON) across Cepheus towards Andromeda (11 July – 27 August) 2013!

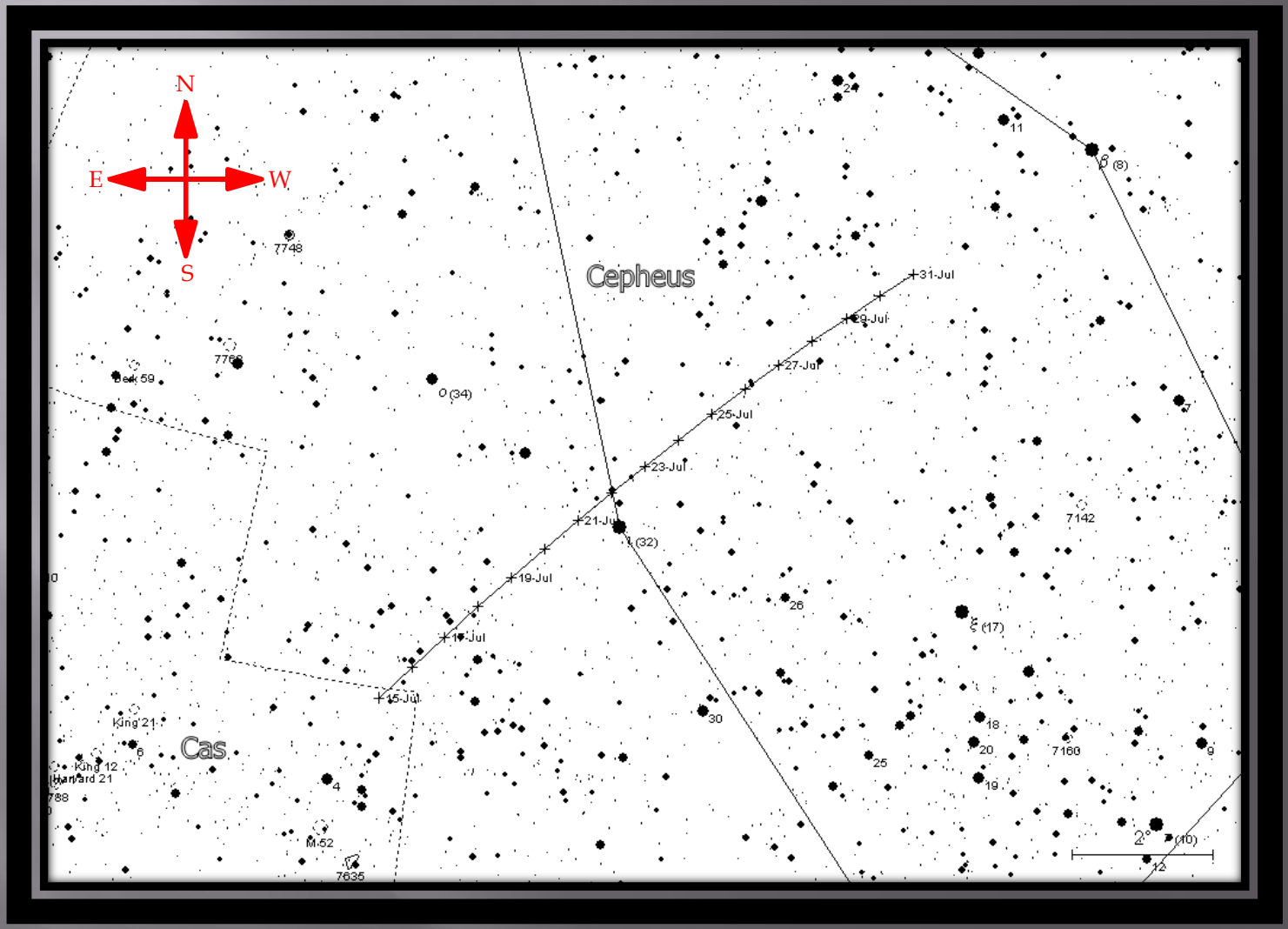


Courtesy of SkyTools 3 Profession Ed, 2012.

Snapshot @ 1 August 2013

C/2012 F6 (LEMMON)

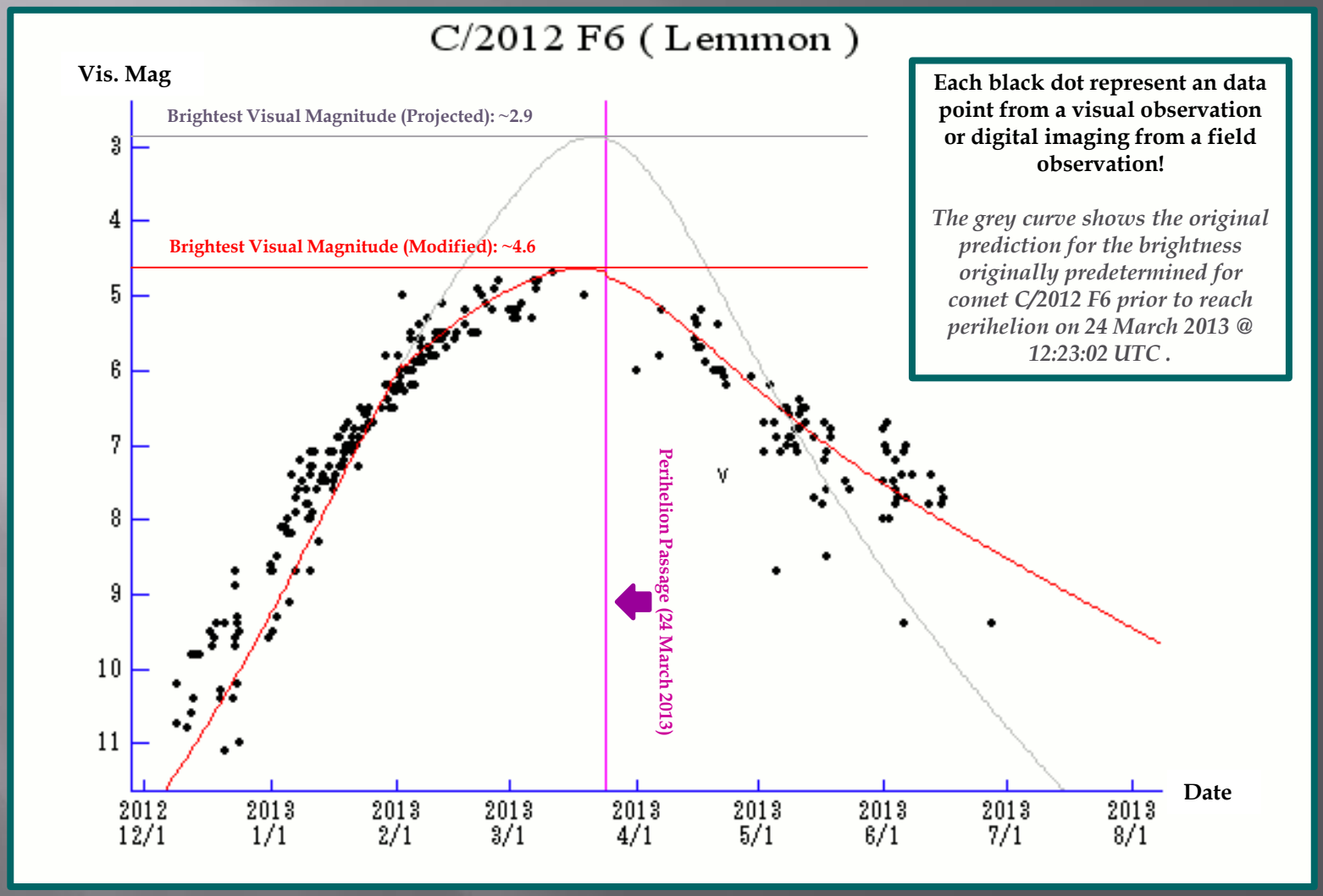
Figure 6: Negative star chart of the comet's path thru Cepheus (15 - 31) July 2013!



© **Winnie's Comet Pages,** http://www.ki.tng.de/~winnie/kometen/aktuell.html, 2013.

C/2012 F6 (LEMMON)

Photometry Graph of Comet LEMMON of Visual Magnitude vs. Date: 1 Jan 2012 – 1 July 2013



Courtesy of Seiichi Yoshida's Home Page: http://www.aerith.net/comet/weekly/current.html, 16 July 2013.

The Professor Comet's Report

IAU MPC Ephemeris data for C/2012 F6 (LEMMON): (15 July – 15 August) 2013

	CDT/CST	Epoch (J2000.0)		Basic Ephemeris						Sky Motion		Moon Phase	Moon Mag.
Date	hh:mm:ss	R.A.	Dec	Delta	R	El. (˚)	Ph.	M_1	% Fore.	"/min	P.A.	(0.00 - 1.00)	(Visual)
15-July -2013	00:00:00	09 49 47.3	15 43 33 N	4.622	3.792	31.4	8.0	12.96	51	0.47	132.8	0.15	-10.60
16-July-2013	00:00:00	09 50 21.1	15 35 59 N	4.620	3.781	30.7	7.9	12.94	52	0.47	132.6	0.08	-11.03
17-July-2013	00:00:00	09 50 55.3	15 28 22 N	4.617	3.770	29.9	7.7	12.93	52	0.47	132.4	0.04	-11.41
18-July-2013	00:00:00	09 51 30.0	15 20 42 N	4.614	3.759	29.1	7.6	12.92	52	0.48	132.2	0.01	-11.72
19-July-2013	00:00:00	09 52 05.1	15 13 00 N	4.611	3.747	28.3	7.4	12.91	52	0.48	132.0	0.00	-11.98
20-July-2013	00:00:00	09 52 40.6	15 05 15 N	4.608	3.736	27.5	7.2	12.90	53	0.49	131.8	0.01	-12.18
21-July-2013	00:00:00	09 53 16.5	14 57 27 N	4.604	3.725	26.8	7.1	12.88	53	0.49	131.6	0.05	-12.32
22-July-2013	00:00:00	09 53 52.8	14 49 37 N	4.600	3.714	26.0	6.9	12.87	53	0.50	131.5	0.10	-12.39
23-July-2013	00:00:00	09 54 29.5	14 41 44 N	4.596	3.702	25.2	6.7	12.86	53	0.50	131.3	0.17	-12.38
24-July-2013	00:00:00	09 55 06.5	14 33 49 N	4.592	3.691	24.4	6.5	12.85	54	0.51	131.2	0.27	-12.30
25-July-2013	00:00:00	09 55 43.9	14 25 51 N	4.587	3.680	23.7	6.4	12.83	54	0.51	131.0	0.37	-12.15
26-July-2013	00:00:00	09 56 21.7	14 17 50 N	4.583	3.668	22.9	6.2	12.82	54	0.51	130.9	0.48	-11.96
27-July-2013	00:00:00	09 56 59.8	14 09 46 N	4.578	3.657	22.1	6.0	12.81	55	0.52	130.8	0.60	-11.71
28-July-2013	00:00:00	09 57 38.3	14 01 40 N	4.573	3.646	21.4	5.8	12.80	55	0.52	130.7	0.71	-11.43
29-July-2013	00:00:00	09 58 17.1	13 53 31 N	4.567	3.634	20.6	5.6	12.78	55	0.53	130.5	0.81	-11.10
30-July-2013	00:00:00	09 58 56.3	13 45 19 N	4.562	3.623	19.8	5.5	12.77	55	0.53	130.4	0.89	-10.73
31-July-2013	00:00:00	09 59 35.8	13 37 04 N	4.556	3.612	19.1	5.3	12.75	56	0.53	130.3	0.95	-10.31
1-Aug-2013	00:00:00	10 00 15.6	13 28 46 N	4.550	3.600	18.3	5.1	12.74	56	0.54	130.3	0.99	-9.82
2-Aug-2013	00:00:00	10 00 55.8	13 20 26 N	4.543	3.589	17.5	4.9	12.73	56	0.54	130.2	1.00	-9.23
3-Aug-2013	00:00:00	10 01 36.2	13 12 02 N	4.537	3.577	16.8	4.7	12.71	56	0.55	130.1	0.99	-8.50
4-Aug-2013	00:00:00	10 02 17.0	13 03 36 N	4.530	3.566	16.0	4.5	12.70	57	0.55	130.0	0.95	-7.54
5-Aug-2013	00:00:00	10 02 58.1	12 55 06 N	4.523	3.554	15.3	4.3	12.68	57	0.55	130.0	0.89	-6.17
6-Aug-2013	00:00:00	10 03 39.5	12 46 34 N	4.516	3.543	14.5	4.1	12.67	57	0.56	129.9	0.82	-3.88
7-Aug-2013	00:00:00	10 04 21.2	12 37 58 N	4.508	3.531	13.8	3.9	12.65	57	0.56	129.8	0.74	-2.59
8-Aug-2013	00:00:00	10 05 03.2	12 29 20 N	4.500	3.520	13.0	3.7	12.64	58	0.57	129.8	0.65	-5.43
9-Aug-2013	00:00:00	10 05 45.5	12 20 38 N	4.492	3.508	12.3	3.5	12.62	58	0.57	129.8	0.56	-7.18
10-Aug-2013	00:00:00	10 06 28.0	12 11 53 N	4.484	3.497	11.5	3.3	12.61	58	0.57	129.7	0.46	-8.34
11-Aug-2013	00:00:00	10 07 10.9	12 03 05 N	4.476	3.485	10.8	3.1	12.59	58	0.58	129.7	0.37	-9.21
12-Aug-2013	00:00:00	10 07 54.0	11 54 14 N	4.467	3.474	10.0	2.9	12.58	59	0.58	129.7	0.28	-9.90
13-Aug-2013	00:00:00	10 08 37.4	11 45 19 N	4.458	3.462	9.3	2.7	12.56	59	0.58	129.6	0.20	-10.46
14-Aug-2013	00:00:00	10 09 21.1	11 36 21 N	4.449	3.450	8.5	2.5	12.54	59	0.59	129.6	0.12	-10.94
15-Aug-2013	00:00:00	10 10 05.1	11 27 20 N	4.440	3.439	7.8	2.3	12.53	59	0.59	129.6	0.07	-11.33

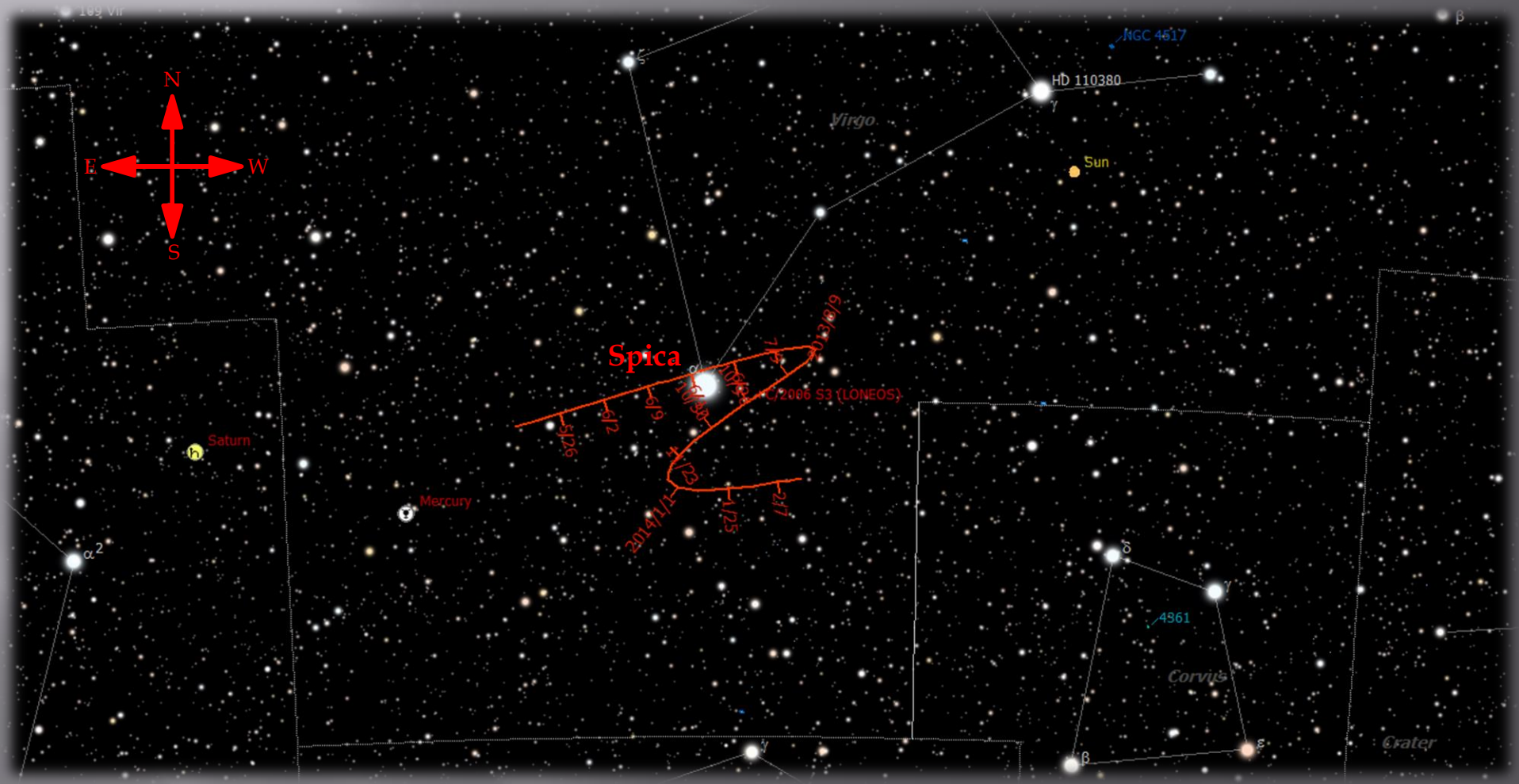
All ephemeris data is calculated based on the Geographical location of the George Observatory, SE Texas, United States.

29˚22'30" N, 95˚35'37" W

24 Mar 2013 onward: $M_1 = 5.0 + 5 \log d + 8.0 \log r$

C/2006 S3 (LENEOS)

Figure 6: Retrograde path of LENEOS in Virgo about Spica from (June 2013 thru January 2014)!

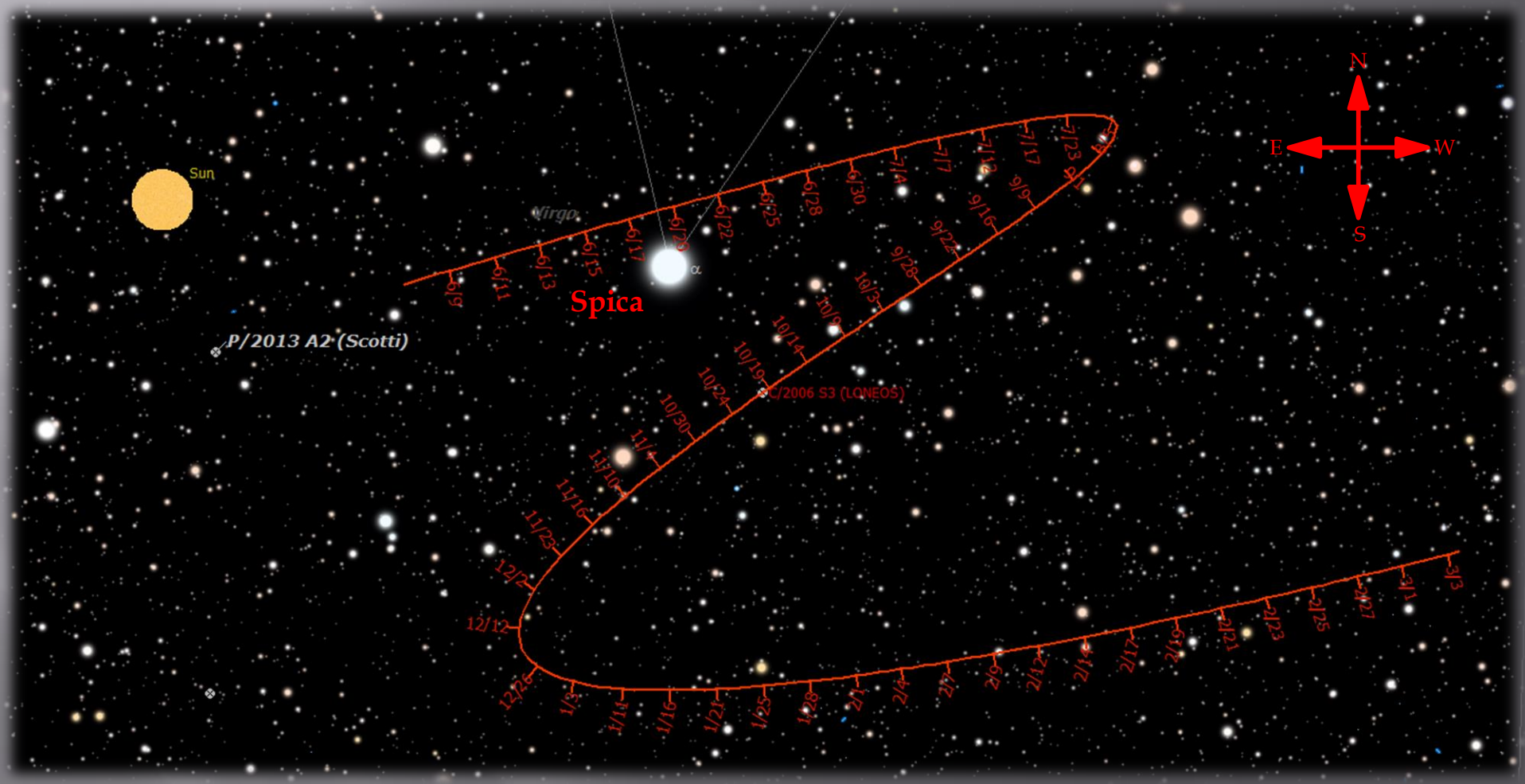


Courtesy of SkyTools 3 Profession Ed, 2012.

Snapshot @ 3 October 2013

C/2006 S3 (LENEOS)

Figure 6: Retrograde path of LENEOS from 2 – 14 Day increments from June 2013 – January 2014!

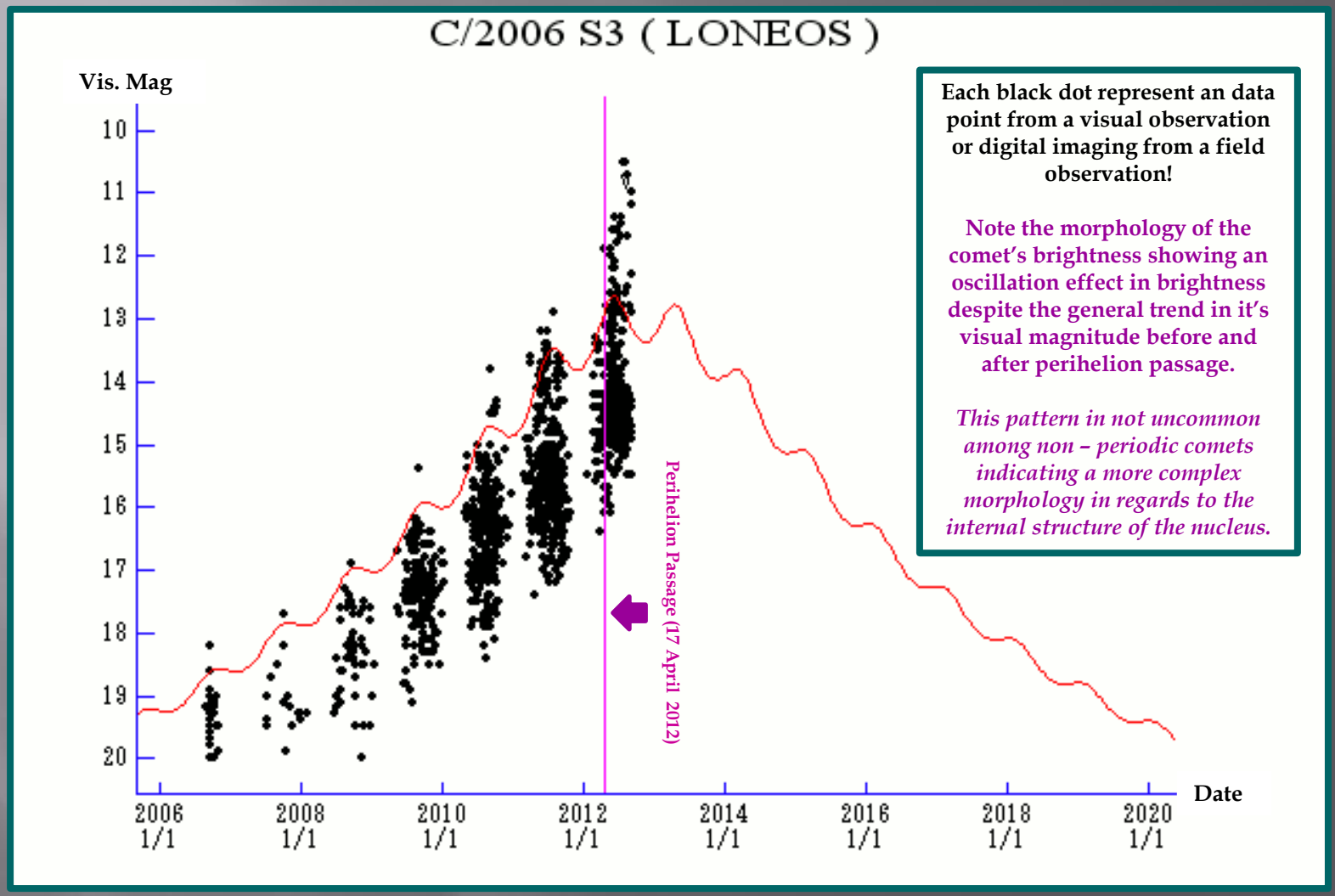


Courtesy of SkyTools 3 Profession Ed, 2012.

Snapshot @ 20 October 2013

C/2006 S3 (LENEOS)

Photometry Graph of Comet LENEOS of Visual Magnitude vs. Date: Autumn 2007 thru Summer 2012



Courtesy of Seiichi Yoshida's Home Page: http://www.aerith.net/comet/weekly/current.html, 16 July 2013.

The Professor Comet's Report

IAU MPC Ephemeris data for C/2006 S3 (LENEOS): (15 July – 15 August) 2013

	CDT/CST	Epoch (J2000.0)		Basic Ephemeris						Sky Motion		Moon Phase	Moon Mag.
Date	hh:mm:ss	R.A.	Dec	Delta	R	El. (˚)	Ph.	M_1	% Fore.	"/min	P.A.	(0.00 - 1.00)	(Visual)
15-July -2013	00:00:00	13 13 59.5	09 59 48 S	6.106	6.158	88.2	9.5	>13.5	n/a	0.18	280.8	0.40	-10.60
16-July-2013	00:00:00	13 13 43.0	09 59 04 S	6.128	6.162	87.1	9.5	>13.5	n/a	0.17	280.4	0.51	-11.03
17-July-2013	00:00:00	13 13 27.3	09 58 23 S	6.151	6.166	86.1	9.5	>13.5	n/a	0.16	279.9	0.62	-11.41
18-July-2013	00:00:00	13 13 12.3	09 57 46 S	6.173	6.170	85.1	9.4	>13.5	n/a	0.15	279.4	0.72	-11.72
19-July-2013	00:00:00	13 12 58.0	09 57 13 S	6.195	6.174	84.1	9.4	>13.5	n/a	0.15	278.9	0.82	-11.98
20-July-2013	00:00:00	13 12 44.3	09 56 44 S	6.217	6.178	83.1	9.4	>13.5	n/a	0.14	278.2	0.90	-12.18
21-July-2013	00:00:00	13 12 31.4	09 56 19 S	6.239	6.182	82.1	9.4	>13.5	n/a	0.13	277.6	0.96	-12.32
22-July-2013	00:00:00	13 12 19.1	09 55 57 S	6.262	6.186	81.1	9.3	>13.5	n/a	0.12	276.8	1.00	-12.39
23-July-2013	00:00:00	13 12 07.5	09 55 39 S	6.284	6.190	80.1	9.3	>13.5	n/a	0.12	276.0	1.00	-12.38
24-July-2013	00:00:00	13 11 56.5	09 55 24 S	6.306	6.194	79.1	9.3	>13.5	n/a	0.11	275.1	0.97	-12.30
25-July-2013	00:00:00	13 11 46.2	09 55 13 S	6.328	6.198	78.1	9.2	>13.5	n/a	0.10	274.0	0.92	-12.15
26-July-2013	00:00:00	13 11 36.5	09 55 06 S	6.349	6.202	77.1	9.2	>13.5	n/a	0.097	272.8	0.84	-11.96
27-July-2013	00:00:00	13 11 27.5	09 55 02 S	6.371	6.206	76.1	9.1	>13.5	n/a	0.090	271.5	0.75	-11.71
28-July-2013	00:00:00	13 11 19.0	09 55 02 S	6.393	6.210	75.1	9.1	>13.5	n/a	0.084	270.0	0.65	-11.43
29-July-2013	00:00:00	13 11 11.2	09 55 05 S	6.415	6.214	74.1	9.0	>13.5	n/a	0.077	268.2	0.55	-11.10
30-July-2013	00:00:00	13 11 04.0	09 55 11 S	6.436	6.218	73.1	9.0	>13.5	n/a	0.071	266.2	0.45	-10.73
31-July-2013	00:00:00	13 10 57.3	09 55 21 S	6.458	6.222	72.1	8.9	>14.0	n/a	0.065	263.8	0.36	-10.31
1-Aug-2013	00:00:00	13 10 51.3	09 55 34 S	6.479	6.227	71.2	8.9	>14.0	n/a	0.060	261.0	0.27	-9.82
2-Aug-2013	00:00:00	13 10 45.8	09 55 51 S	6.501	6.231	70.2	8.8	>14.0	n/a	0.054	257.6	0.19	-9.23
3-Aug-2013	00:00:00	13 10 40.9	09 56 10 S	6.522	6.235	69.2	8.8	>14.0	n/a	0.049	253.6	0.12	-8.50
4-Aug-2013	00:00:00	13 10 36.6	09 56 33 S	6.543	6.239	68.3	8.7	>14.0	n/a	0.044	248.7	0.07	-7.54
5-Aug-2013	00:00:00	13 10 32.8	09 56 59 S	6.564	6.243	67.3	8.6	>14.0	n/a	0.040	242.9	0.03	-6.17
6-Aug-2013	00:00:00	13 10 29.5	09 57 28 S	6.585	6.247	66.3	8.6	>14.0	n/a	0.036	235.8	0.00	-3.88
7-Aug-2013	00:00:00	13 10 26.8	09 58 00 S	6.605	6.251	65.4	8.5	>14.0	n/a	0.033	227.4	0.00	-2.59
8-Aug-2013	00:00:00	13 10 24.6	09 58 36 S	6.626	6.255	64.4	8.4	>14.0	n/a	0.031	217.8	0.02	-5.43
9-Aug-2013	00:00:00	13 10 22.9	09 59 14 S	6.647	6.260	63.5	8.3	>14.0	n/a	0.030	207.3	0.05	-7.18
10-Aug-2013	00:00:00	13 10 21.8	09 59 55 S	6.667	6.264	62.5	8.3	>14.0	n/a	0.030	196.7	0.11	-8.34
11-Aug-2013	00:00:00	13 10 21.1	10 00 39 S	6.687	6.268	61.5	8.2	>14.0	n/a	0.031	186.5	0.18	-9.21
12-Aug-2013	00:00:00	13 10 20.9	10 01 26 S	6.707	6.272	60.6	8.1	>14.0	n/a	0.033	177.3	0.27	-9.90
13-Aug-2013	00:00:00	13 10 21.2	10 02 15 S	6.727	6.276	59.6	8.0	>14.0	n/a	0.035	169.4	0.37	-10.46
14-Aug-2013	00:00:00	13 10 21.9	10 03 08 S	6.747	6.280	58.7	7.9	>14.0	n/a	0.038	162.8	0.47	-10.94
15-Aug-2013	00:00:00	13 10 23.1	10 04 03 S	6.767	6.284	57.7	7.8	>14.0	n/a	0.042	157.3	0.59	-11.33

All ephemeris data is calculated based on the Geographical location of the George Observatory, SE Texas, United States.

29˚22'30" N, 95˚35'37" W

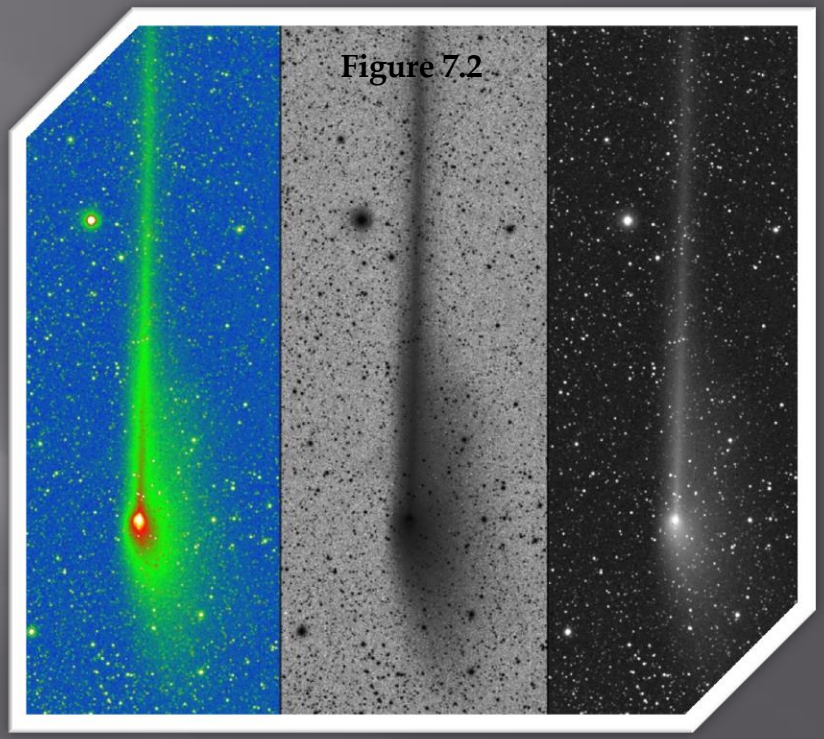
$M_1 = 4.0 + 5 \log d + 7.5 \log r$

C/2011 L4 PanSTARRS

Figure 7: A Wide Angle View of the Dust Tail at near – perpendicular orientation with the ecliptic!



(PanSTARRS) comet dust tail has now stretched to a length of up to 16˚ across the sky and in this image the tail spans about 7.5˚!



Beautiful array of the same image: l – r (False Color Enhancement, Negative, Luminescence or Black & White)

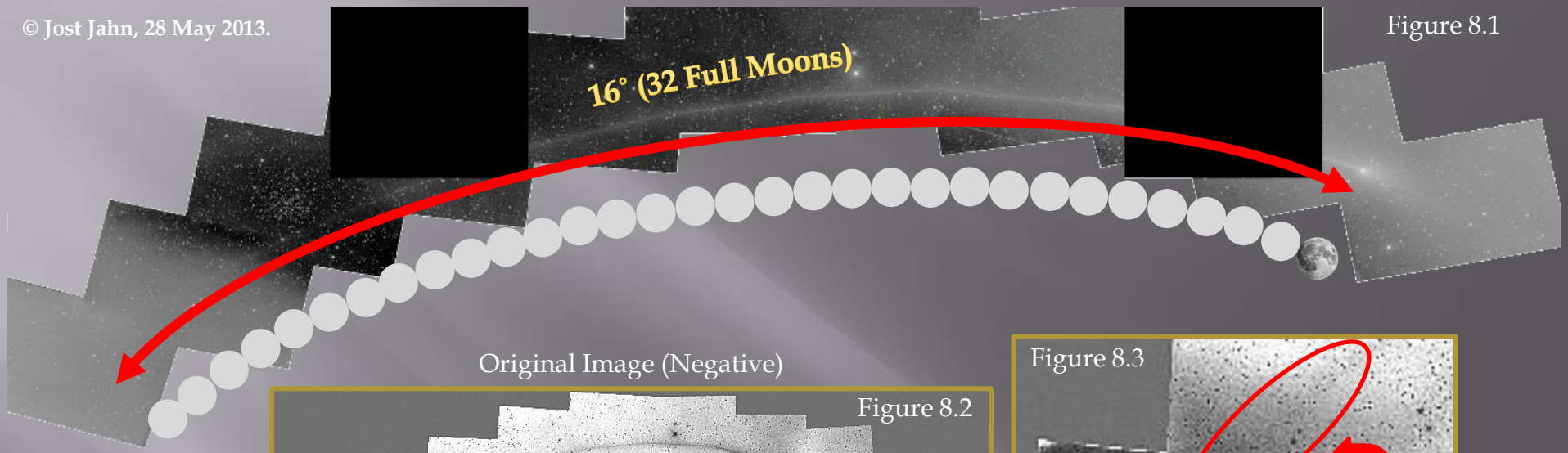
© Michael Jaeger, 28 May 2013.

C/2011 L4 PanSTARRS

Figure 8: An Extreme, Ultra -Wide Angle View of the Dust Tail as it crosses the orbital plane of the Earth!

© Jost Jahn, 28 May 2013.

Figure 8.1



Original Image (Negative)

Figure 8.2

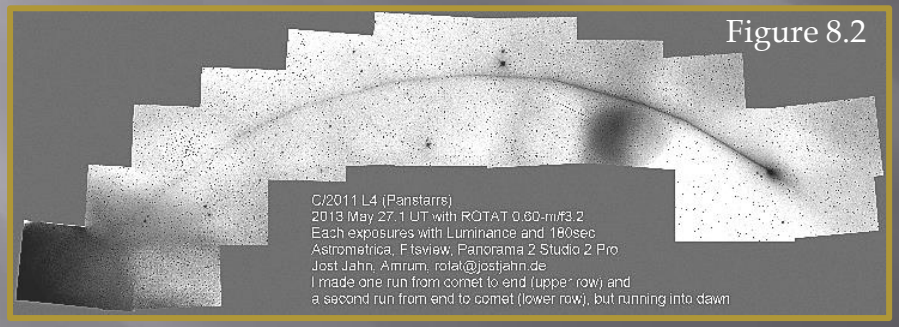
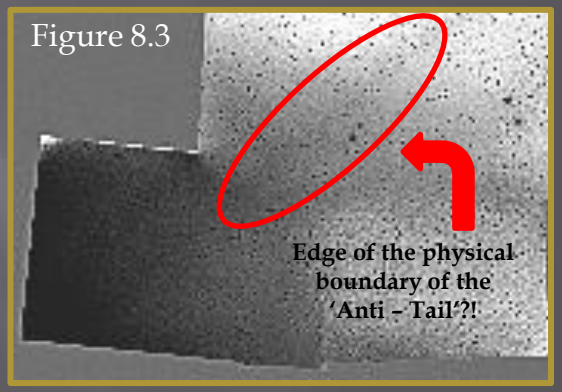


Figure 8.3



(PanSTARRS) comet total dust tail can be observed in the panorama of 11 images taking during the comet's crossing of the orbital plane of the Earth the night of 28 May 2013! The tail stretches an angular length of at least 16° of sky the equivalency of 32 Full Moons placed end to end giving the physical length measurement of 23 million miles (37.5 million km)! However, the tail is not exactly at a perpendicular orientation with the plane of the ecliptic (plane of the Earth's orbit) or 90° with respect to the ecliptic, so the tail foreshortening is below 100% making it likely that the tail is over 1 A.U. in length from the coma center to the homogeneous dissipation at the opposite edge of the tail's sustainable profile!

C/2011 L4 PanSTARRS

Figure 9.1: Side view (Slightly above the plane of the ecliptic)

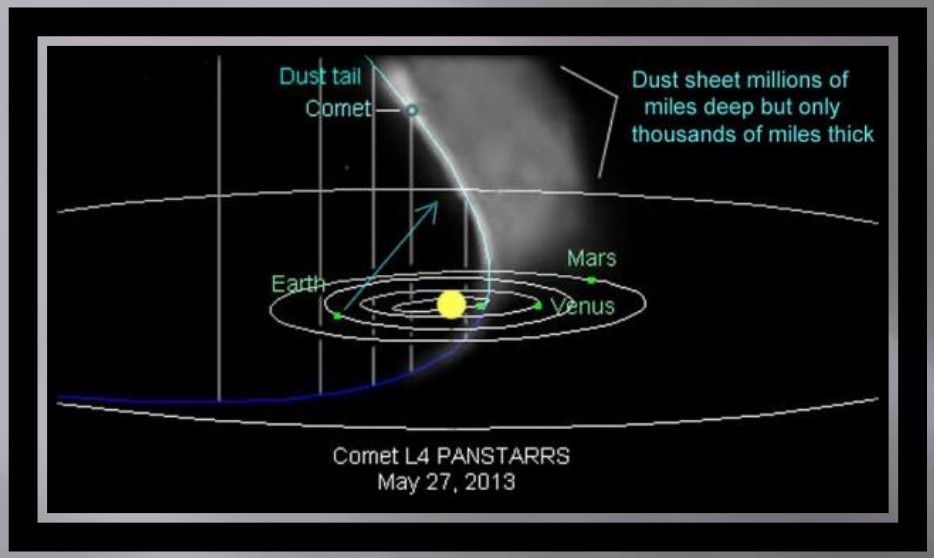


Figure 9.2: Overhead View (towards the north galactic hemisphere)!

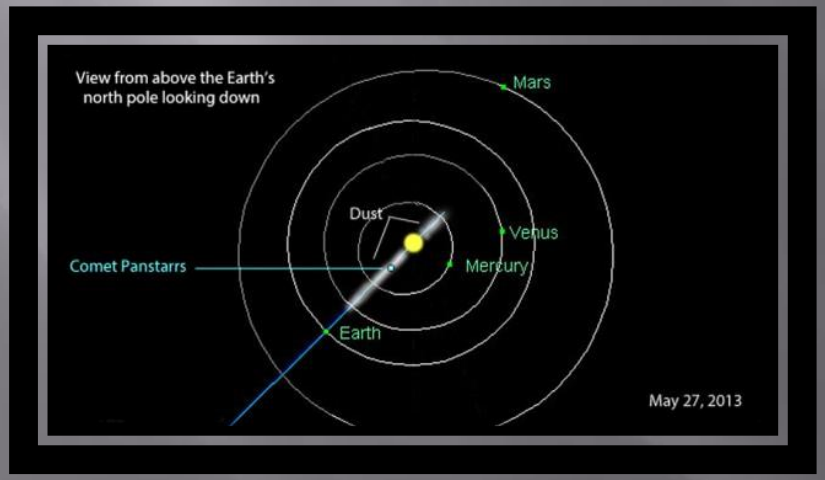


Figure 9.3: Oort Cloud perspective with the planetary solar system!

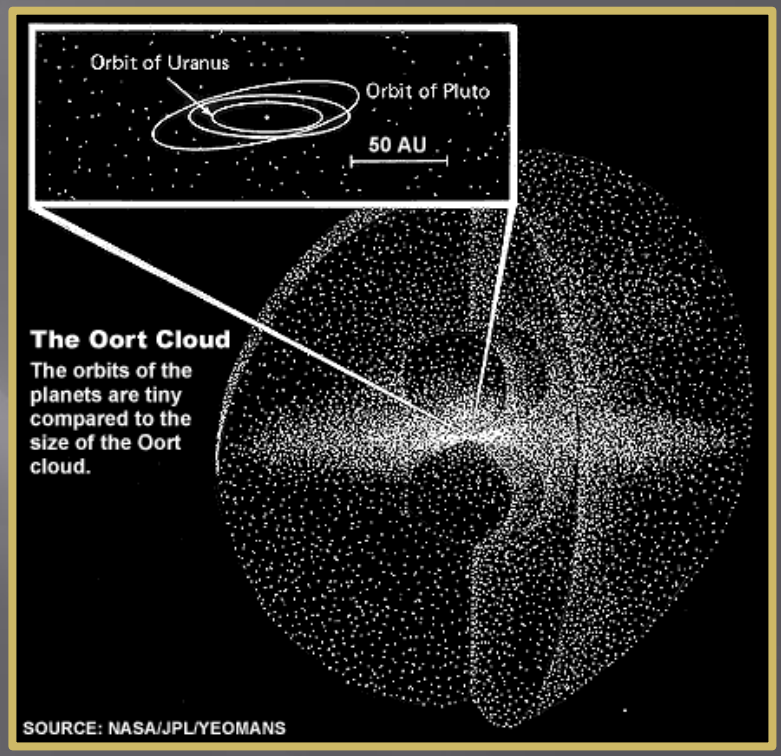
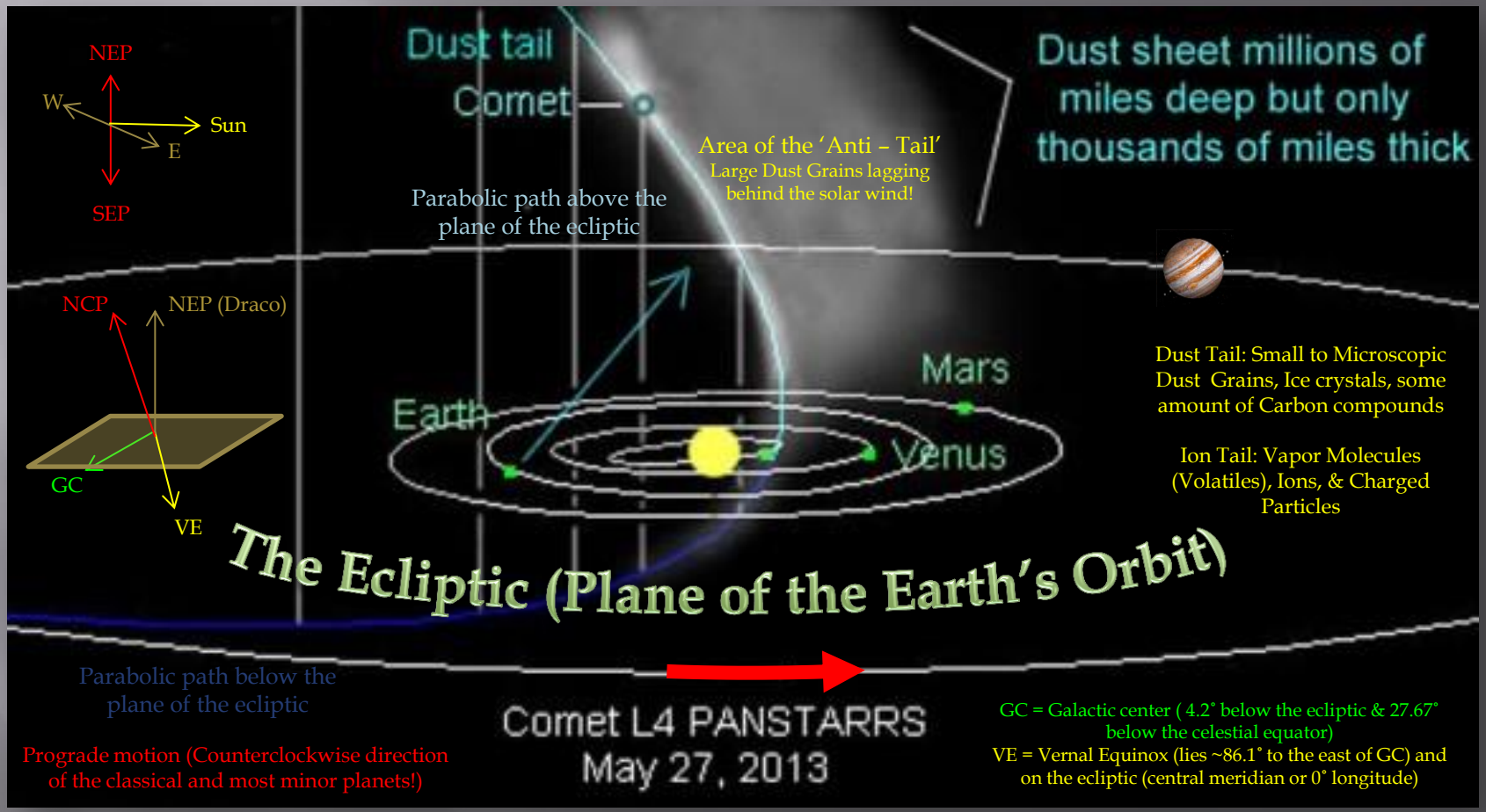


Figure 9.1 shows a side view of the path of Comet PanSTARRS as it recedes away from the Sun towards the northern celestial hemisphere of the Solar System (above the plane of the ecliptic) as it heads towards the inner region of the Oort Cloud (Figure 9.3). The anti – tail stays behind the coma left behind like a trail of 'bread crumbs' spanning millions of miles and wider than any of Earth's continents (5 000 – 10 000 miles in depth). This part of the tail continues to grow as the both the ion and dust tails recede in scale the greater its' solar distance!

Figures 9.1 & 9.2: Courtesy of NASA/JPL/Bob King of Universe Today, http://www.universetoday.com/102299/what-do-comet-panstarrs-and-pinocchio-have-in-common/, 22 May 2013.

C/2011 L4 PanSTARRS

Figure 10: Aspects of the semi – side view with respect to the plane of the ecliptic (further terminology)!

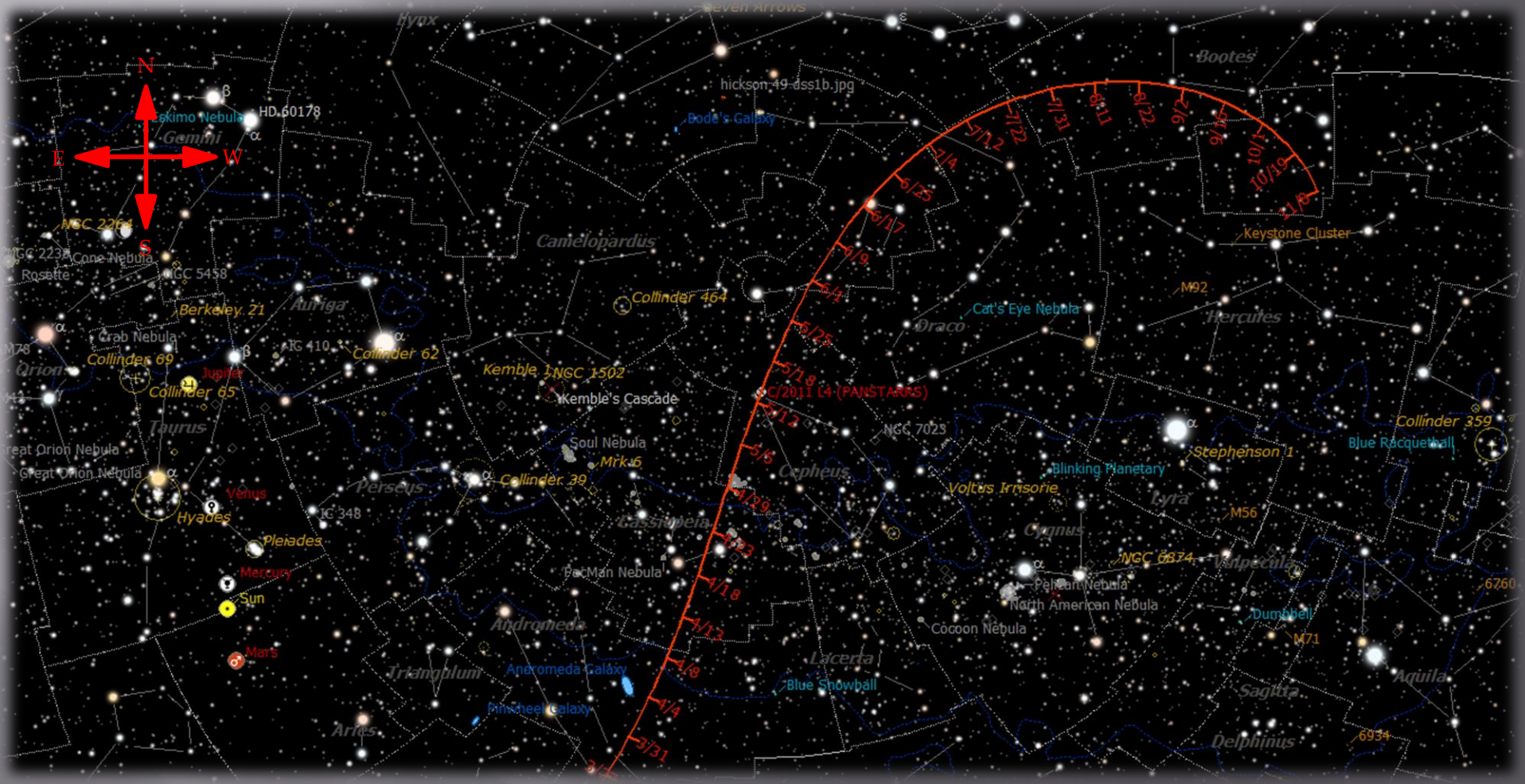


Note: GC is located within the constellation of Sagittarius (WNW of the spout end of the teapot asterism) & VE is located within the constellation of Pisces (ESE of the Circlet asterism which is a circle of stars at its western edge)! The North Galactic Pole is not located on this diagram, but it would be located further to the W in Coma Berenices and ~39.43° S from the position of declination for the NEP! Note: In this diagram NEP and SEP (the ecliptic poles) and NCP (North Celestial Pole) is separated by the NEP by angle of 23.44° as a consequence of the Earth's axial tilt with respect to the plane of the ecliptic. E is used for prograde direction where as W is used for the retrograde motion!

Courtesy of NASA/JPL/Bob King of Universe Today, 22 May 2013.

C/2011 L4 PanSTARRS

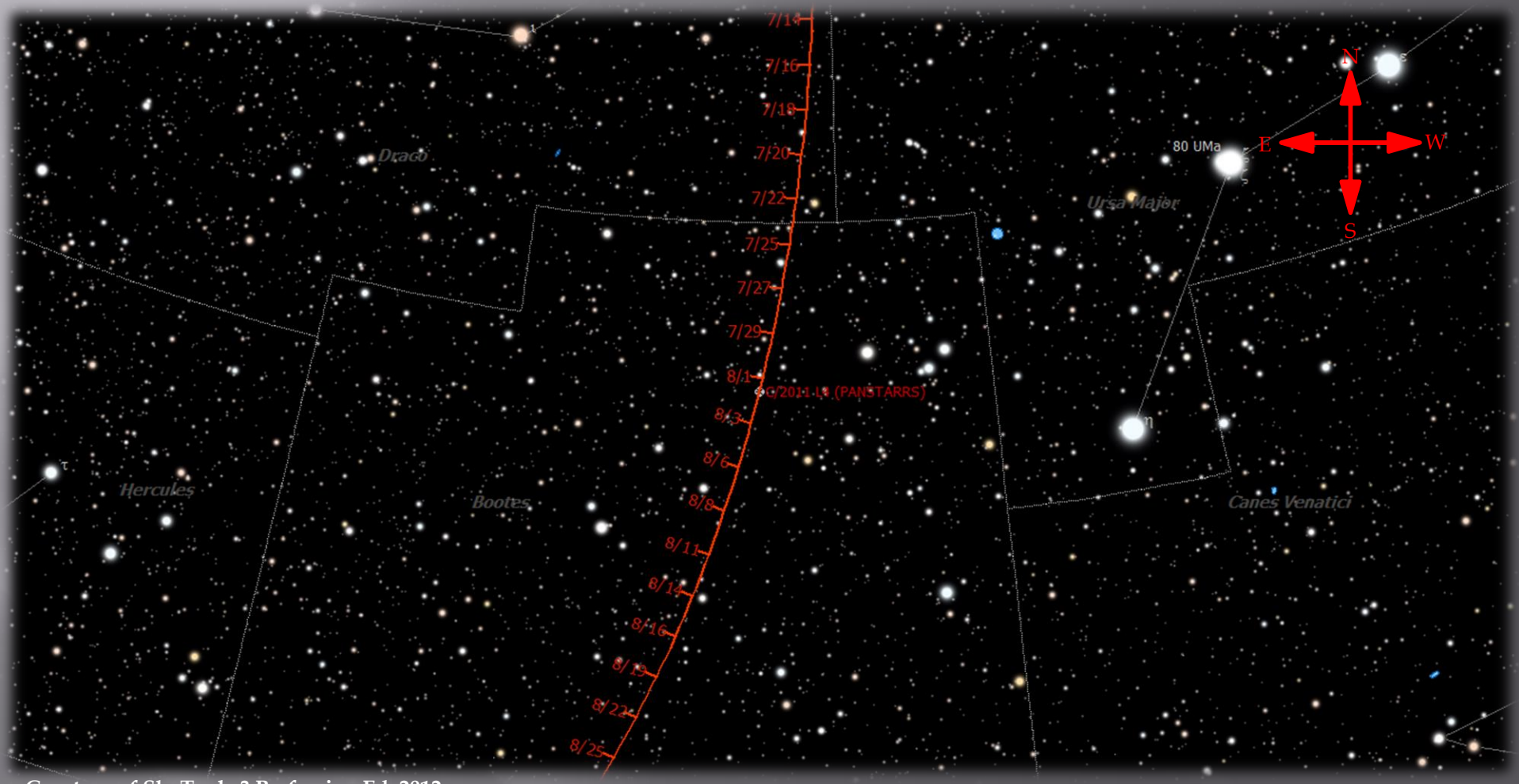
Figure 14: The projected path of the PanSTARRS comet towards the circumpolar region: (1 Apr – Early Nov) 2013!



Courtesy of SkyTools 3 Profession Ed, 2012.

C/2011 L4 PanSTARRS

Figure 12: Projection of the path of comet PanSTARRS heading southward thru Boötes (14 July – 25 August) 2013.

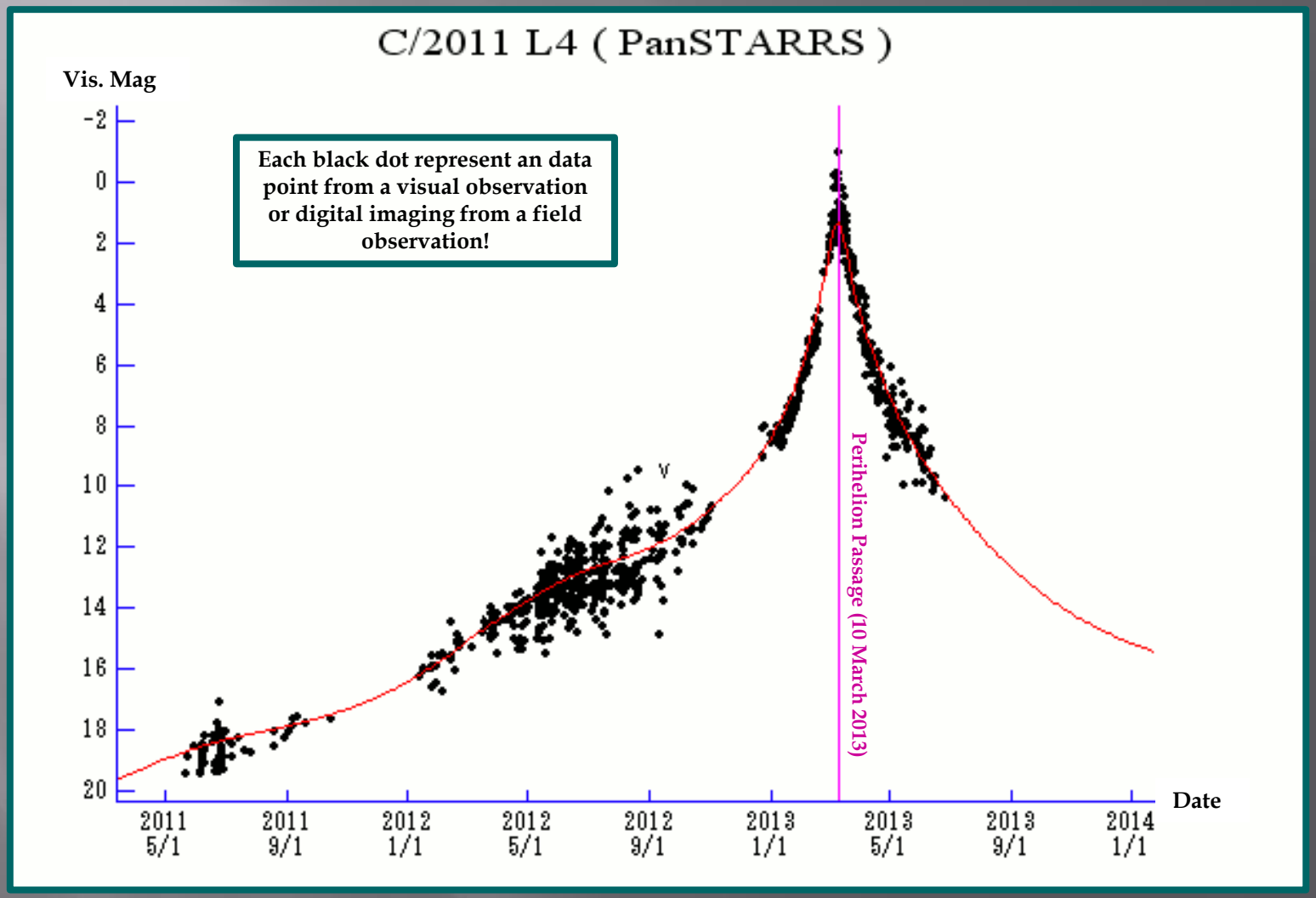


Courtesy of SkyTools 3 Profession Ed, 2012.

Snapshot @ 1 August 2013

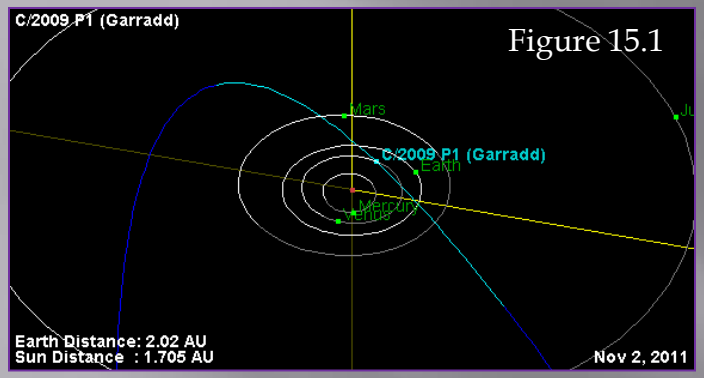
C/2011 L4 PanSTARRS

Photometry Graph of Comet PanSTARRS of Visual Magnitude vs. Date (1 May 2012 – 1 July 2013)



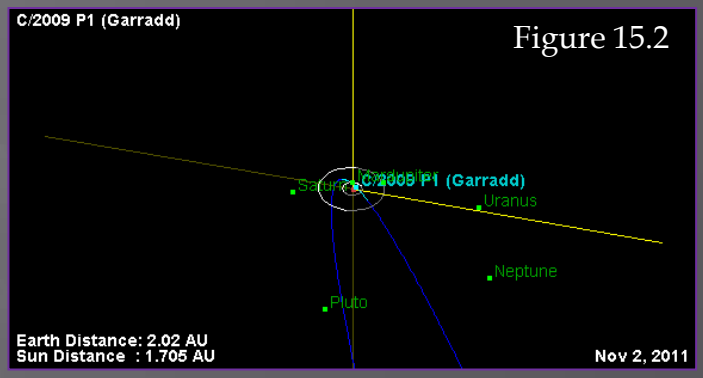
Courtesy of Seiichi Yoshida's Home Page: http://www.aerith.net/comet/weekly/current.html, 16 July 2013.

Overview of the Orbital Differences for Comets!



P – Periodic Comets

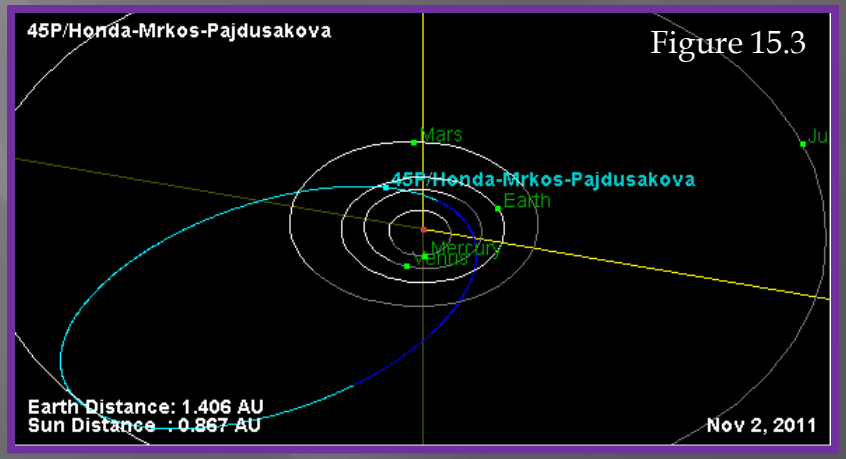
C – Non Periodic Comets



Comet Garradd is the perfect example of a non – periodic comet! The path is hyperbolic in nature. Comet 45P/Honda – Mrkos – Pajdusakova however is the perfect example of a periodic comet which is elliptical in nature.

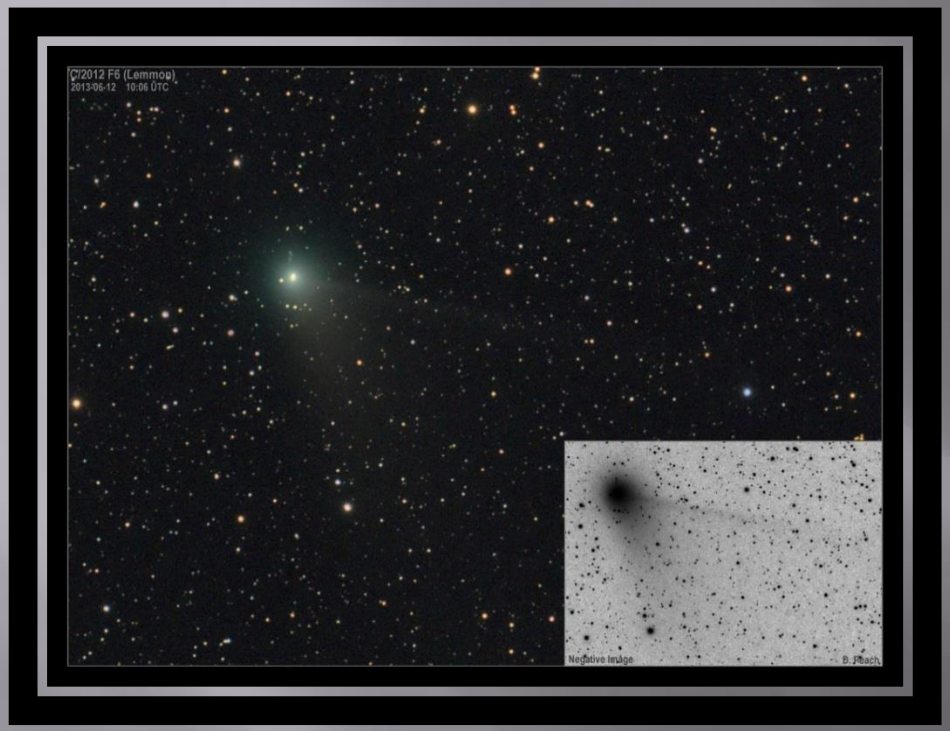
Figures 15.1 & 15.2 are of Comet C/Garradd 2009 P1 and Figure 15.3 below shows the orbit of 45P.

All images were obtained from the JPL Solar System Dynamics/Small Body Database Browser .
Courtesy of NASA/JPL/CalTech



Summer Season
July/August 2013

Comets to Watch for this Summer!



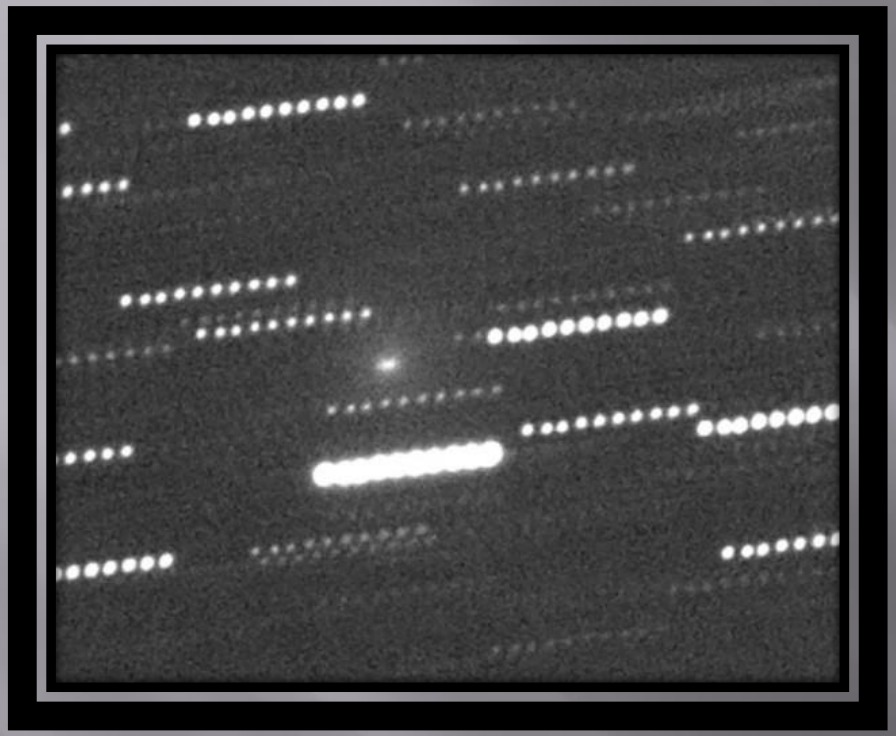
C/2012 F6 (LEMMON)
(12 June 2013)
© Damian Peach



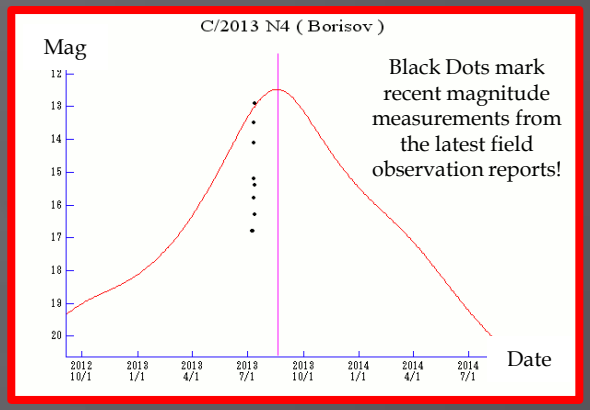
C/2006 S3 (LONEOS)
(14 May 2013)
© Rolando Ligustri

Newest Discovery among the Comets!

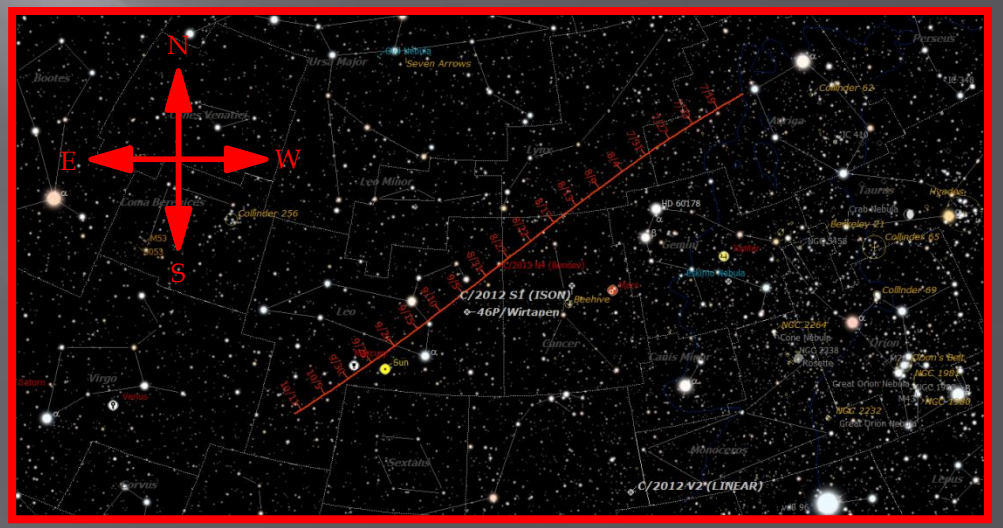
Borisov C/2013 N4







Discoverer: Gennady Borisov
Professional Optician
(Discovery Date: 8 July 2013)
Officially Christened: 13 July 2013
Magnitude at Date: 16.8
Republic of Ukraine
Crimean Laboratory of the
Sternberg Astronomical Institute
Instruments: 8" (20cm) f/1.5
Wild Field Telescope with CCD camera



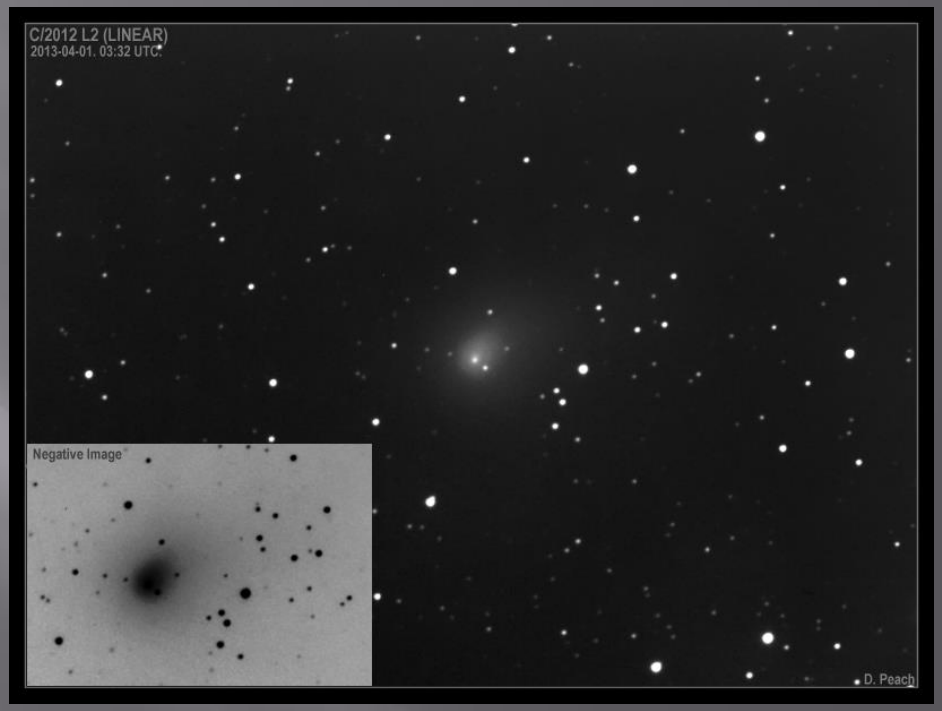
Path of Comet Borisov heading SE from Auriga to Leo
(19 July – 11 October) 2013

Summer Season – July/August 2013

Predominant Comets for the Summer 2013 (July/August)!

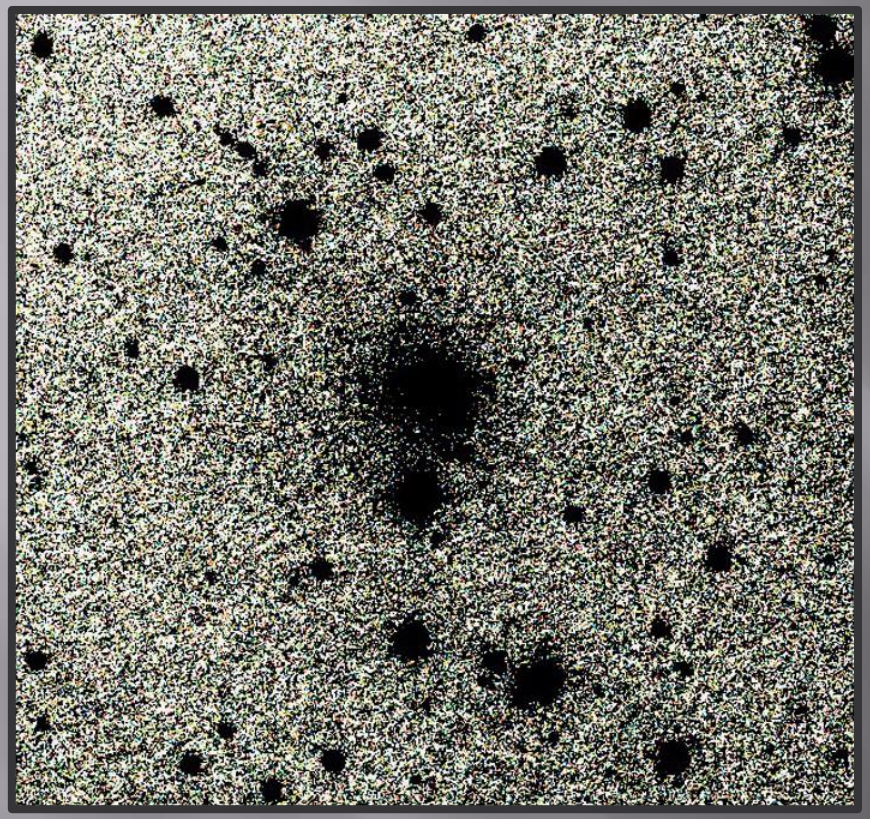


C/2011 L4 (PanSTARRS)
(11 June 2013)
© Damian Peach

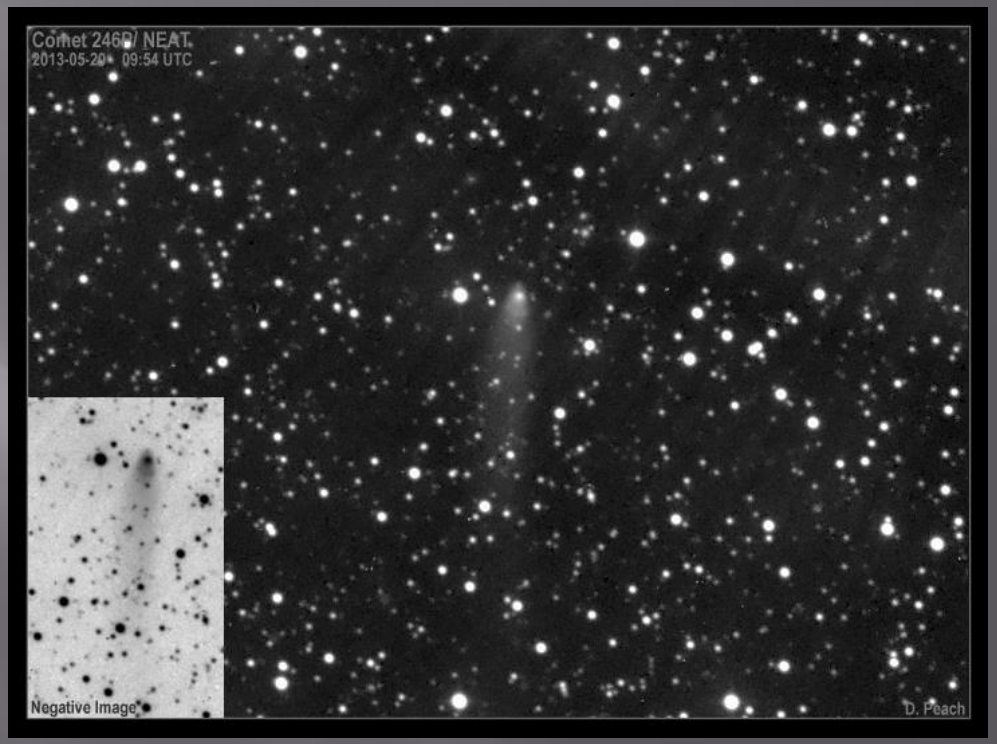


C/2012 L2 (LINEAR)
(1 April 2013)
© Damian Peach

Predominant Comets for the Summer 2013 (July/August)!



29P/Schwassmann – Wachmann 1
(13 June 2013)
© Jean – Francois Soulier

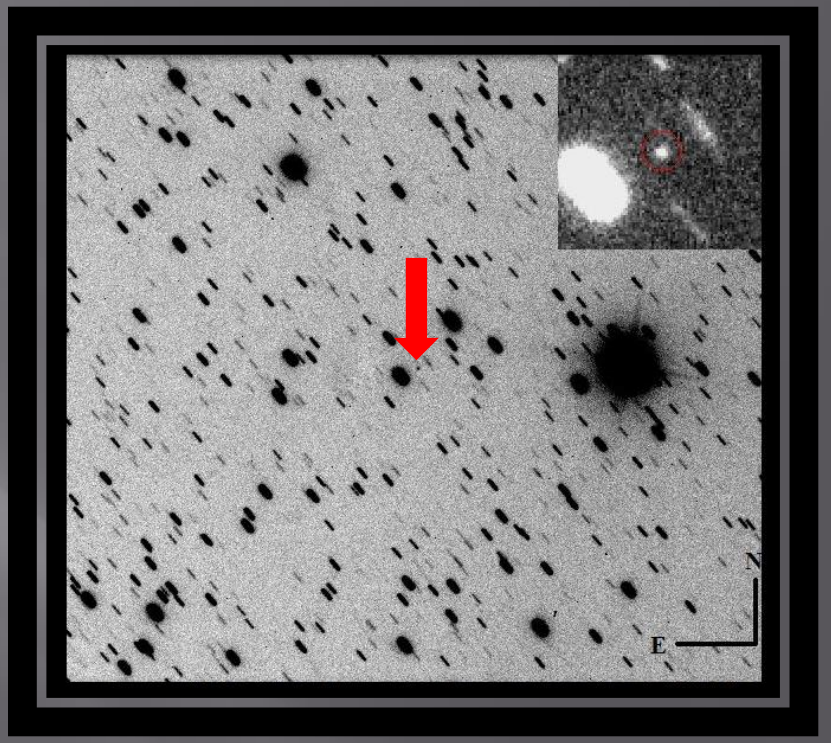


246P/NEAT
(20 May 2013)
© Damian Peach

Predominant Comets for the Summer 2013 (July/August)!



C/2010 S1 (LINEAR)
(13 May 2013)
© Damian Peach



26P/Grigg - Skjellerup
(5 December 2012)
© N Howes & E Guido
Siding Spring Faulkes Telescope South

GO OUT AND OBSERVE THOSE COMETS!



Courtesy of EarthSky.org & Dave Eagle, www.eagleseye.me.uk, 2013.

Summer Season – July/August 2013