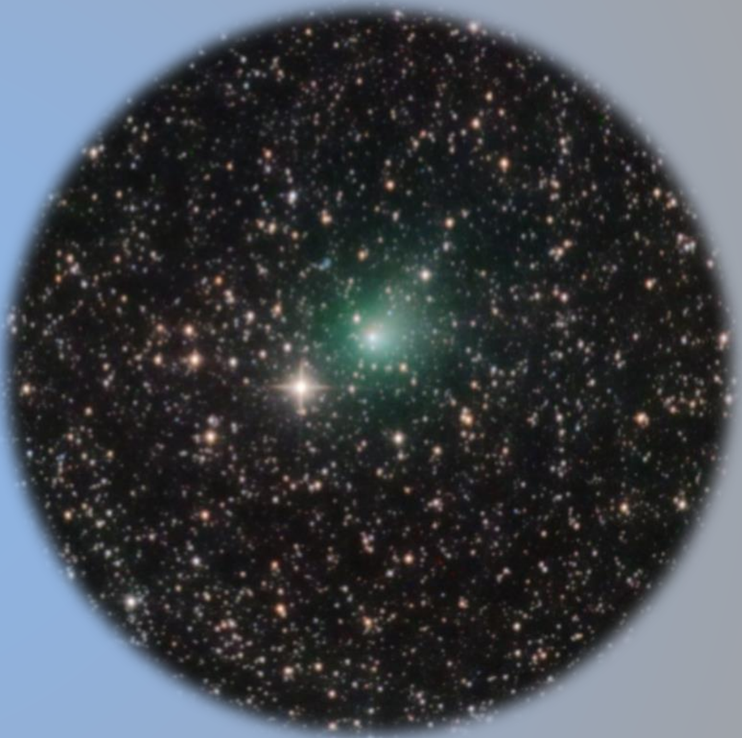
Professor Comet Report

Spring/Summer 2018

Welcome to the Professor Comet Report!
This is a monthly, bimonthly, or seasonal report on the latest information for the tracking, studying, and observation of comets. All comet reports will include tables of definitions & terminologies, basic understanding about comets, how to observer comets to the latest ephemeris data and tracking charts, photometry graphs, etc.! All information within this report can freely be referenced from a table of contents. Enjoy the world of comet astronomy!



Hazy, Green Glow with no prominent Tail!!!

C/2016 M1 (PanSTARRS)

2018 May 13 @ 02:53 UTC
GSO 8" f/3.8 & Atik 383L+
Courtesy of Jose J Chambo, Valencia, Spain ©

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Update on the current conditions for observational comets for Late May through 1 July!

Comets	Designation (IAU – MPC)	Orbital Status	Magnitude Visual	Trend (Brightness or Dimming)	Observations (Range in Lat.) (Alt. > 10° at Zenith)	Constellations (Night Sky Location)	Visibility Period (Late May – 1 July) (Alt. ≥ 15°)
PanSTARRS	C/2016 M1	C	9.5* (30 May)	Approaching Peak Brightness (Perihelion by Mid – July)	40°N - 90°S**	Heading SW between Sagittarius & Corona Australis towards Ara	(Midnight – 5:30 AM) Only until 15 June!
Du Toit	66P	P	10.6* (28 May)	Approaching Peak Brightness! (During Perihelion)	40°N - 90°S**	Heading SE across the N region of Sculptor to Cetus	(4:20 am – 5:30 AM) Earlier than 4 am after 15 June!
PanSTARRS	C/2016 R2	C	11.2* (20 May)	Progressive Dimming (Currently at Perihelion)	90°N - 18°S	Progressing Eastward from the W regions of Lynx into the W regions of Ursa Major.	(9:00 PM – Midnight) Lat. Coordinates N of 45°N visibility is not before 10 PM CDT!
Lemmon	C/2018 EF9	C	11.5* (21 May)	Rapid Brightening (No observations recorded during Perihelion passage!)	90°N - 15°N	Partial retrograde near the regions outside of Polaris opposite the Little Dipper!	All Night!
PanSTARRS	C/2015 O1	C	12.0* (15 May)	Complex oscillation of high and low before and after the time of Perihelion passage.	55°N - 10°S	Moving Southward from the star Alioth in the handle of the Big Dipper along the E regions of Ursa Major	*Sunset – 4 am North of 40° N Lat. until 8 July (30° N Lat. Until 9 June)*
PanSTARRS	C/2016 N6	C	12.2* (20 May)	Variation in Brightness before and possibly after the time of Perihelion passage.	58°N - 10°S	Moving Westward from Lynx to Cancer	(9:00 – 11:00 PM) *(9:00 - 10:15 PM) After June 15!*
Forbes	37P	P	12.7* (25 May)	Rapid Brightening before and after the time of Perihelion passage!	50°N - 43°S	Progressing Eastward from Aquarius to the NW region of Pisces	(3:00 – 5:30) AM CDT

*Visual Mag. value is given based on the latest observation field report!

**Comets that are only visible in the most southerly regions of the US and corresponding territories or visible only to observers in the Southern Hemisphere!

- C/2016 M1 is not visible at altitudes above 10° at Latitudes above 40°N after 20 June and 29° N after 8 July.
- Du Toit is not visible at altitudes above 10° at Latitudes above 43° N until after 29 June.

This spreadsheet table of data is applied only to bright comets defined by observable stellar magnitudes greater than 13.5 or 14.0 in times of sparely available comets for observation!

Visibility Periods are calculated for latitudes south of 30° N.

All Times during the Visibility periods are calculated for Central Daylight Time US (Add 5 hours for UTC).

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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***

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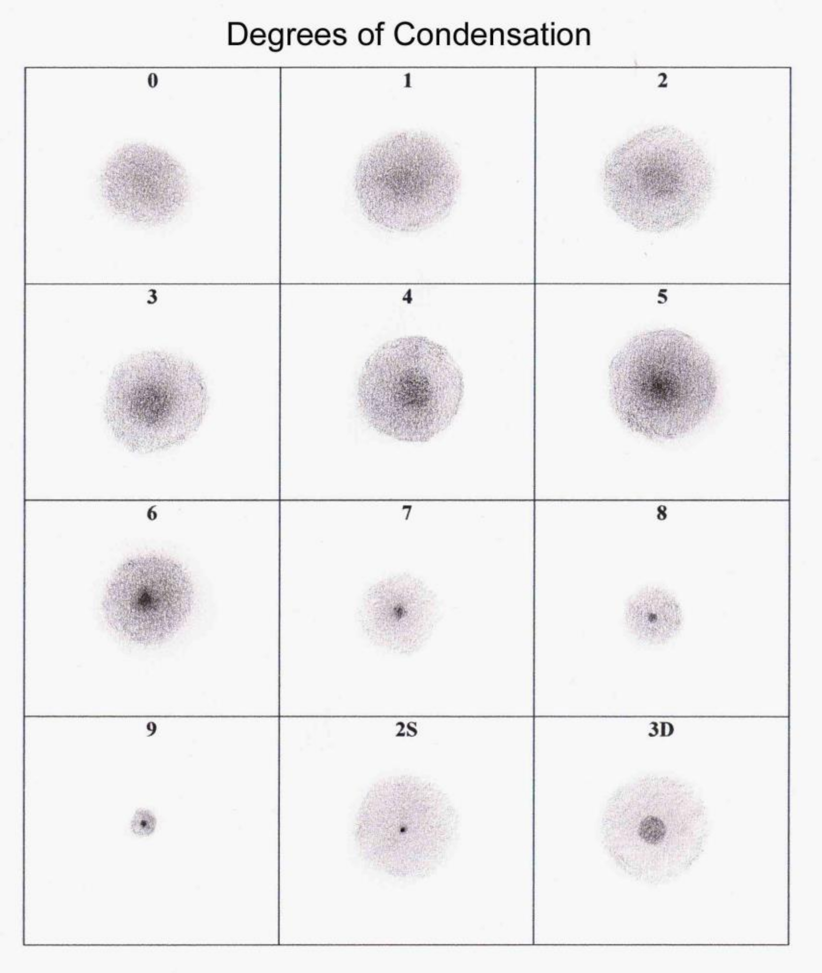
Degree of Condensation (DC)



The chart displayed shows a visual comparison to determining the degree of condensation for a comet's coma!

Note the two extra designations:

2S: A Sharp, distinct stellar center with an extremely dissipated outer coma barely visible form the night background.

3D: The central condensate disperses with an extremely faint outer coma very little contrast from the background. The condensate is sharply distinguishable from the outer coma.

The chart is courtesy of the Isle of Man Astronomy Club.
http://www.iomastronomy.org/sections/comets/comet.html
6 March 2015

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Morphology (Structure) of Comets

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!*

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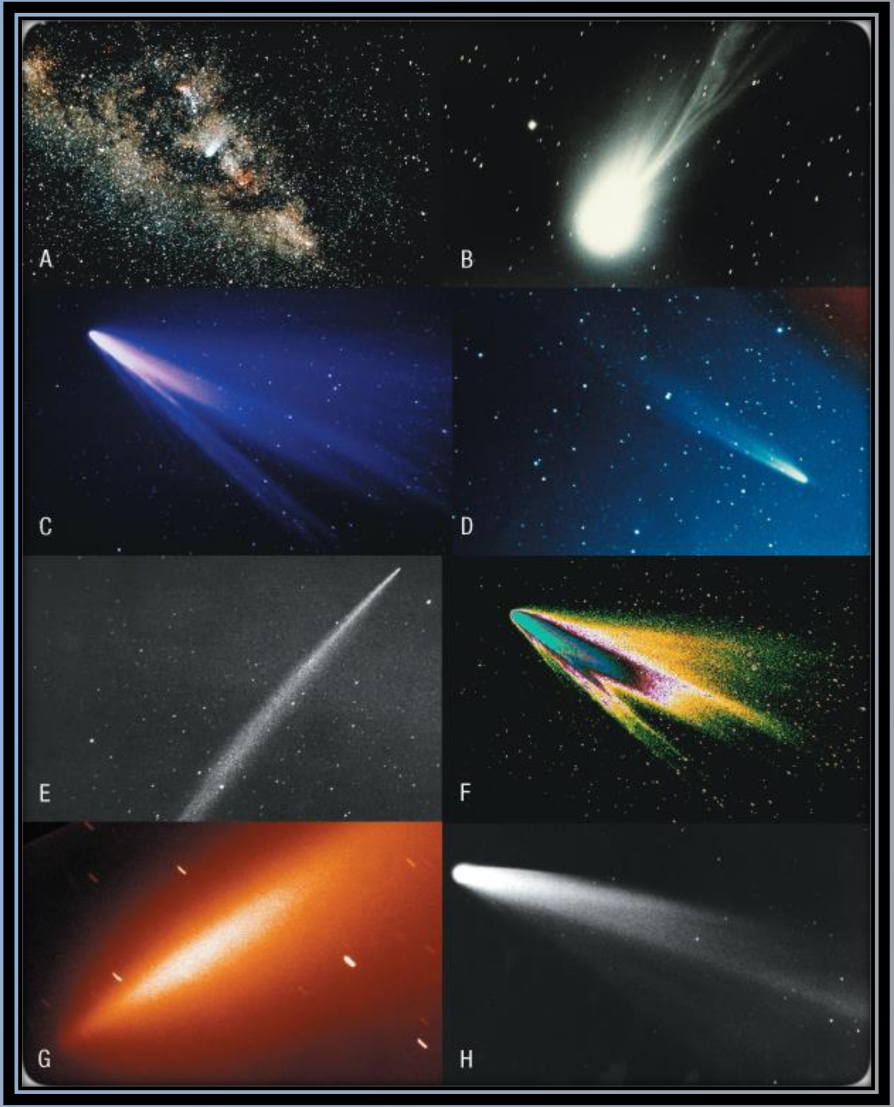
What are comet's?

- Comets are known as minor planets like asteroids or other small space debris.
- Bodies composed of metals (rocks), dust, & volatiles (examples: CO_2, H_2O, CN^-, C2, C3, CS, COS, HO^-, etc.)
- Frozen bodies of Dirty Ice (Asteroids coated in and Saturated with Icy Volatiles)!
- Clathrytes are minerals & denser ices containing less dense volatiles imbedded within the crystal structure of the materials.
- Comets are composed of three primary elements: (central nucleus, coma, and tail(s))
- The central nucleus can range anywhere in size from a few meters across and up to tens of kilometers across.
- They have no moons or rings.
- The coma can reach from a few thousands and up to over 2 million km across (example: 17P/Holmes)
- The tails can extend past 900 000 km in length can could theoretically extend up to 1 AU!
- The material from the dust tail is the primary, but not the only source of micrometeroids for meteor showers.
- There origin lie beyond the planets of the solar system to the Kuiper Belt & Oort Cloud.
- Short period comets (less than 200 years) from the Kuiper Belt & longer period comets (greater than 200 years) come from the Oort Cloud.
- Rotational period of cometary nuclei can vary substantially from a few seconds to several days!



A) Comet Halley in Milky Way, February 1986 , B) Comet Halley, February 1986, C) Comet West, March 1976, D) Comet Kohoutek, June 1973, E) Comet Ikeya-Seki, November 1965, F) Comet West, computer enhanced, G) Comet LINEAR, July 2000, H) Comet Hale-Bopp, March 1997

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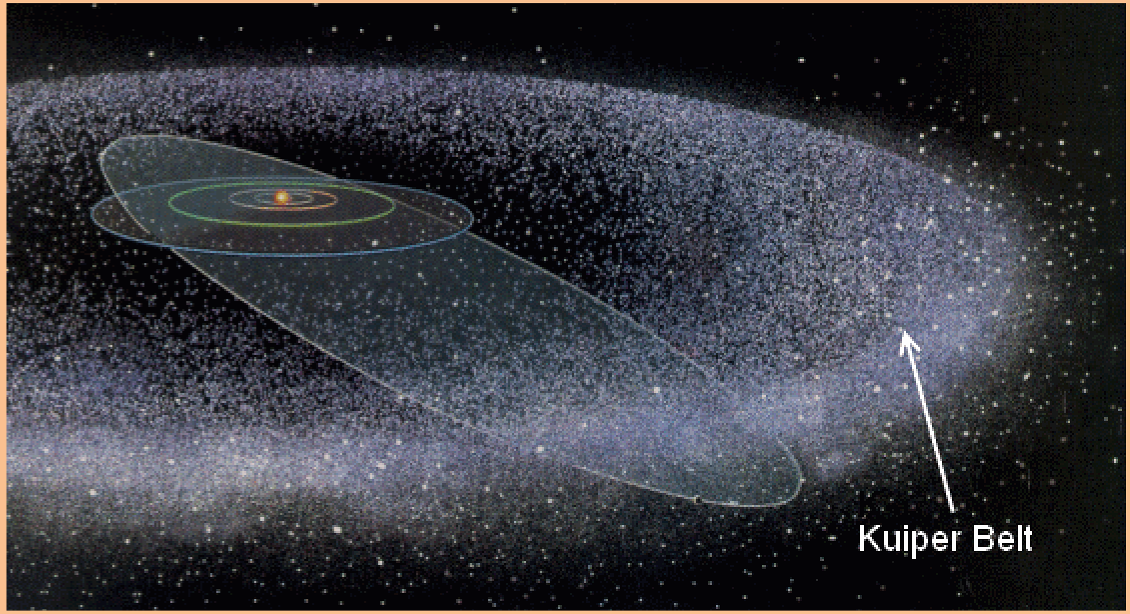
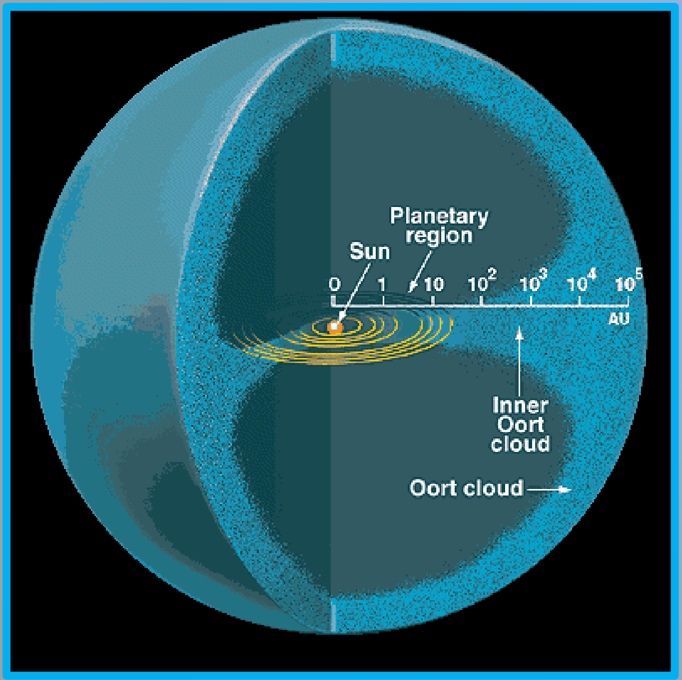
Kuiper Belt

Source of all short period comets that extends from the orbit of Neptune (30 AU) and out to about 50 AU from the Sun. It is just like the Asteroid Belt in structure, but 20x wider and upwards up 20x – 200x the mass. Many of the more massive bodies that came from the Oort cloud end up residing inside the Kuiper belt. These are huge icy bodies composed of the same or similar substances as the comets. About 100 000 KBOs up to 100 km across are hypothesized to exist with this region of the solar system.





Oort or Öpik – Oort Cloud

Oort cloud is the source of all intermediate and long period comets that extend from 2 000 AU and up to about 1 light year from the Sun. The Inner Oort cloud would contain the intermediate period comets while the long period comets & great comets would originate from the outer Oort cloud. Estimations on the number of cometary bodies vary substantially from several hundred billion to upwards of 2 trillion icy minor planets! All of the largest icy bodies in the solar system would have originated from this region of the solar system (example: Plutinos, Trans – Neptunian Objects, Scattered Disk Objects, comet nuclei up to 60 km across in size. Tidal gravitation forces from neighboring stars and density variations within region to region within the milky way galaxy plane would force these objects to orbits closer to the Sun!

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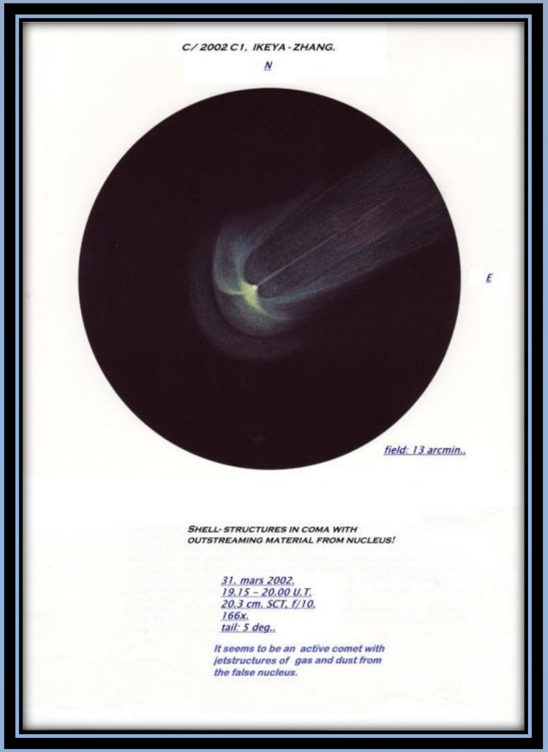
How to observe comets!

The eight main points to observing comets:

1. Visual Magnitudes that are reported for comets are in reference to their stellar magnitude.
2. Actual observable magnitudes for naked – eye observation is usually 2 – 3 mag fainter.
3. The most common colors observable depending on the intensity of the comet: Green, Greenish – Blues, or Bluish – Greens.
4. Not all comets have observable tails and you rarely get a change to see the false nucleus.
5. When and if the false nucleus is observable it is due to the jets emitting volatiles to resupply the coma.
6. Ion and Sodium tails are rarely seen if ever expect under exceptional sky conditions and depending on the comet!
7. Most comets are better appreciated for their detail when observing astrophotos of the object!
8. Most commons just look like fuzzy, out – of focus balls of very, faint light.



C/2002 C1 (Ikeya – Zhang)
31 Mar 2012
© Per – Jonny Bremseth.
Astronomy Sketch of the Day (posted 19 June 2013)

C/2002 C1 (Ikeya – Zhang)
14 April 2012
© H Mikuz, Crni Vrh Observatory, Slovenia.

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Comet Morphology

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

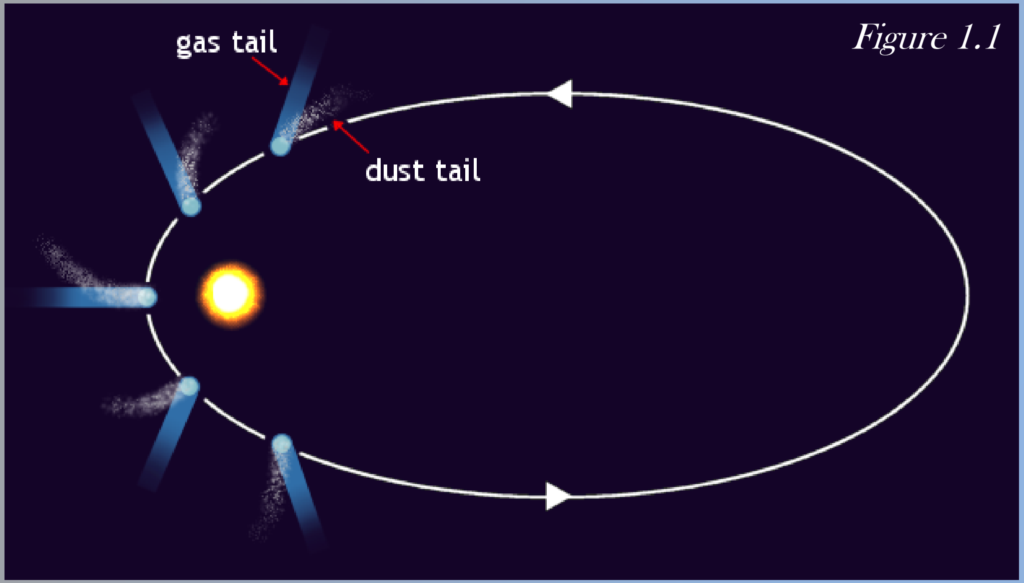

Figure 1.1

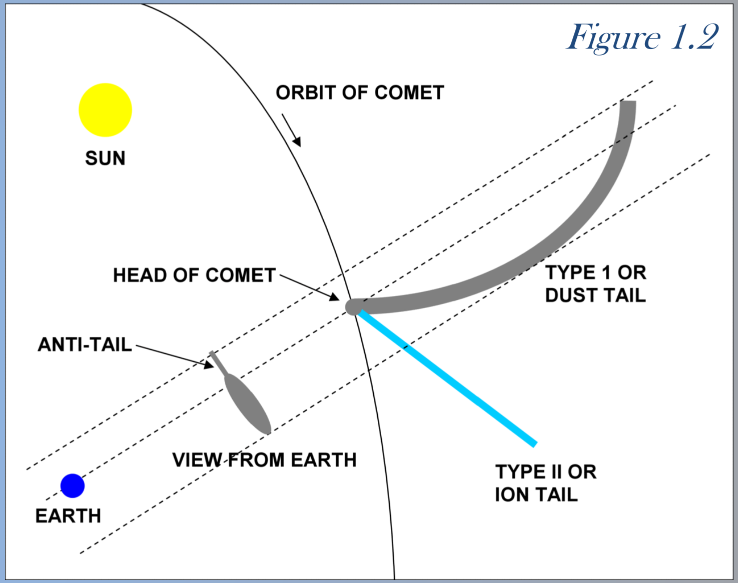

Figure 1.2

Figure 1.3

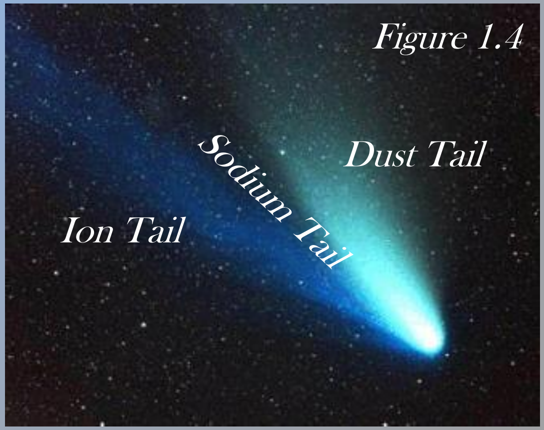

Figure 1.4

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Comet Morphology

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

Figure 2.1

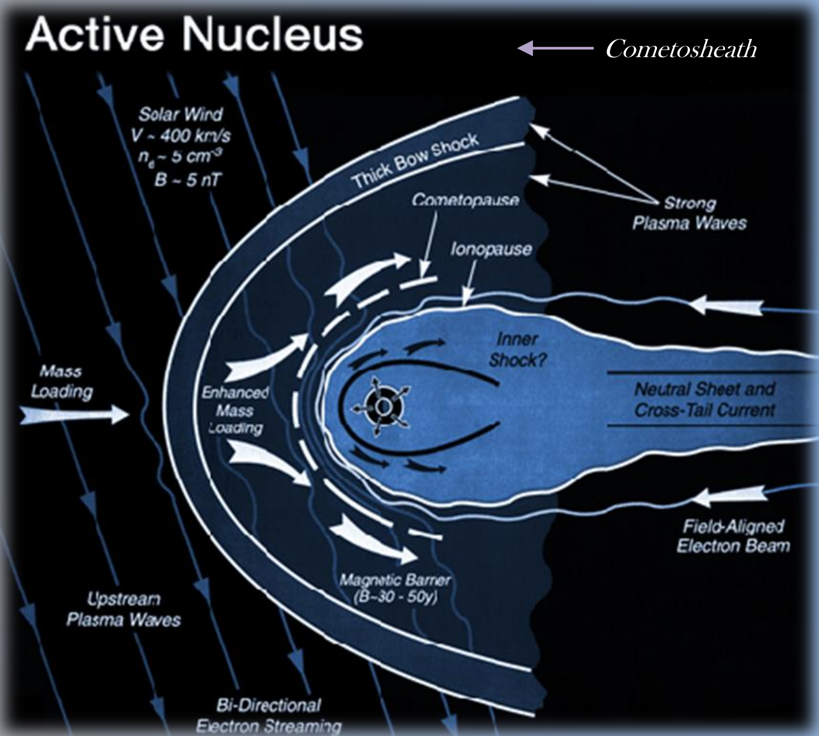

Figure 2.2

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!

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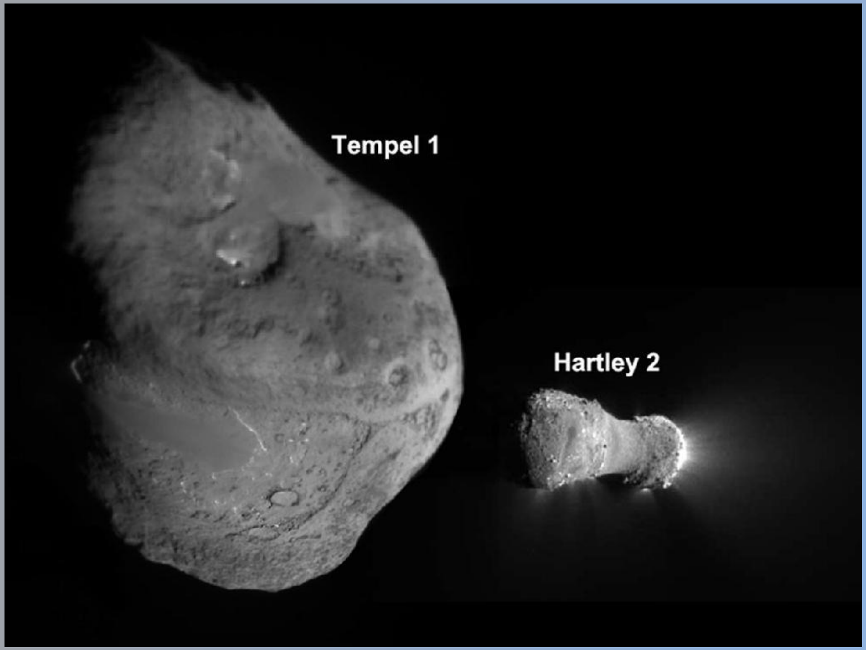
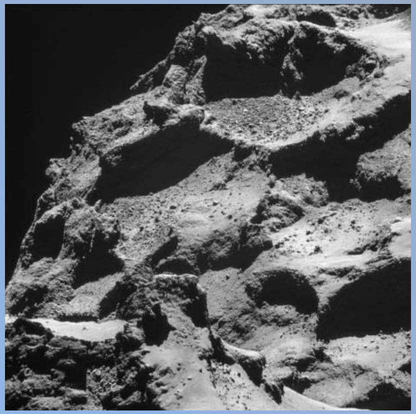
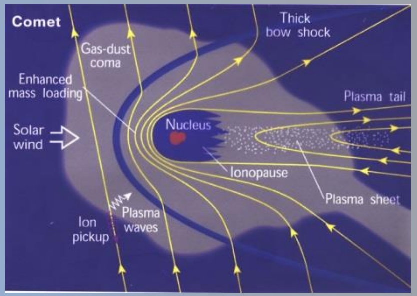
Morphology of a Comet's Nucleus I



Courtesy: NASA/JPL – Calteach/UMD, http://www.nasa.gov/mission_pages/epoxi/images/pia13629.html, 18 November 2010.



Courtesy: ESA/Rosetta
NAVCAM Top 10 at 10 km No. 7
30 September 2014



Tempel 1 Deep Impact	Tempel 1 Stardust	Borrelly Deep Space 1	Wild 2 Stardust	Hartley 2 Deep Impact	C-G Rosetta

Basic Facts about a Comet's Nucleus:

I) All Comet's Are Dirty Snowballs or Icy Dirtballs
II) A composition of Rock, Dust, and Icy Volatiles
III) The Volatiles are effected by the Solar Radiation and sublimate
IV) The sublimated Gas form an atmosphere around the Nucleus (Coma)
V) Average Albedo is 0.04 for the Nucleus (blacker than Coal)!
VI) Estimated Average Density: 0.6 g/cm^3 (60% of that of H_2O)
VII) Most Nucleus range between 1 – 10 km in size
VIII) Extreme Range: (SOHO) P/2007 R5 - 100 to 200 meters & (Hale Bopp) C/1995 O1 – 60 km!

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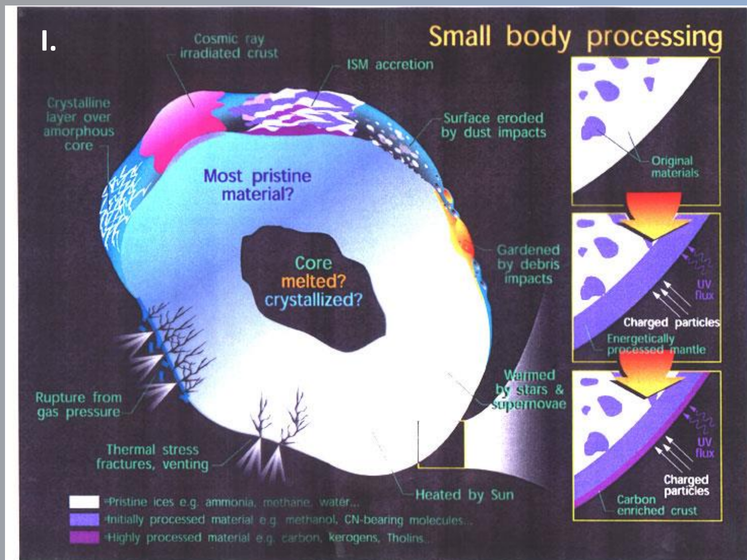
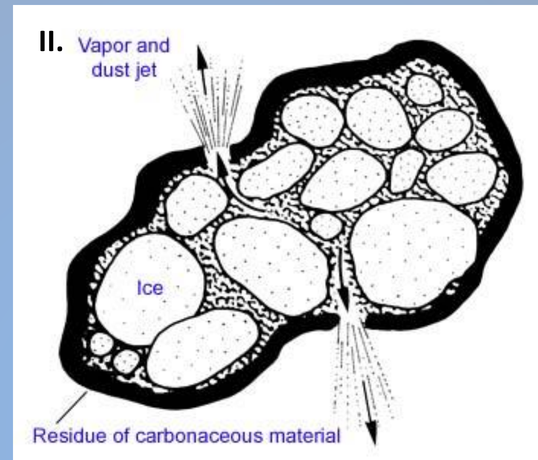
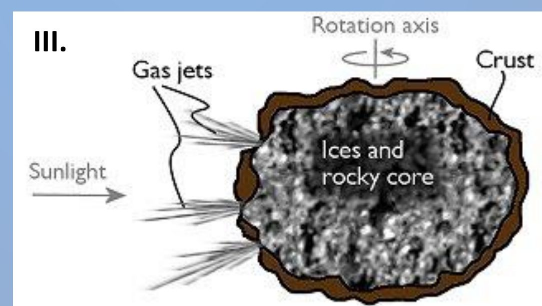
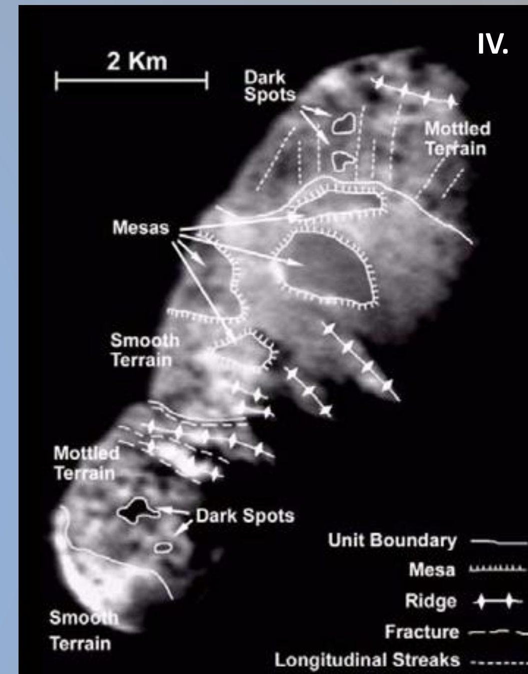
Morphology of a Comet's Nucleus II









I. Laboratory of Atmospheric and Space Physics, University of Colorado, Boulder, 2015.
II. National Maritime Museum & Royal Observatory Greenwich, 2015.
III. University of Maryland, Dept. of Geology, Planetary Geology, Fall 2014.
IV. University of Maryland, Dept. of Geology, Planetary Geology, Fall 2014.

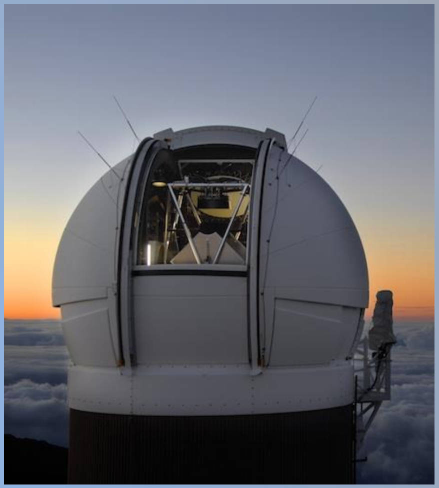
The structure of an comet's nucleus has varying degrees of fragility depending on the distribution, size, and composition of the icy volatiles distributed on the surface and the interior reservoirs within the nucleus.

Comet's that do survive many journeys around the Sun until there supply of volatiles is thoroughly exhausted can be reclassified as either C or S – group (stony) asteroids. A small concentration of heavier metals do exist in some nuclei based on spectral analysis. All cometary nuclei that have been studied by ground observations, orbiting observatories, and planetary spacecraft show pristine surfaces of simple chemistry with a lack of cratering. The solar radiation propagates through the nucleus exerting pressure on the interior reservoirs and the volatiles sublimate into gasses that exert pressure out to the nucleus surface as gas jets along with some of the dust coating the surface. This immediately forms a localized condensate that becomes the source material for the coma and tails!

Current Comets of 2018!

C/2016 M1 (PanSTARRS)

Courtesy of Raffaele Esposito
(18 May 2018)
iTelescope, Siding Spring Observatory, Australia
Planewave 20” CDK @ F/4.4



Pan-STARRS 1 Telescope

(Panoramic Survey Telescope And Rapid Response System)
1.8m Ritchey – Chrétien Telescope
Haleakala, Hawaii

Discoverers: Richard Wainscoat & Rob Weryk
Discovery Date/Time: 22 June 2016 @ 12:00:00 UTC
(4 W-band Exposures)

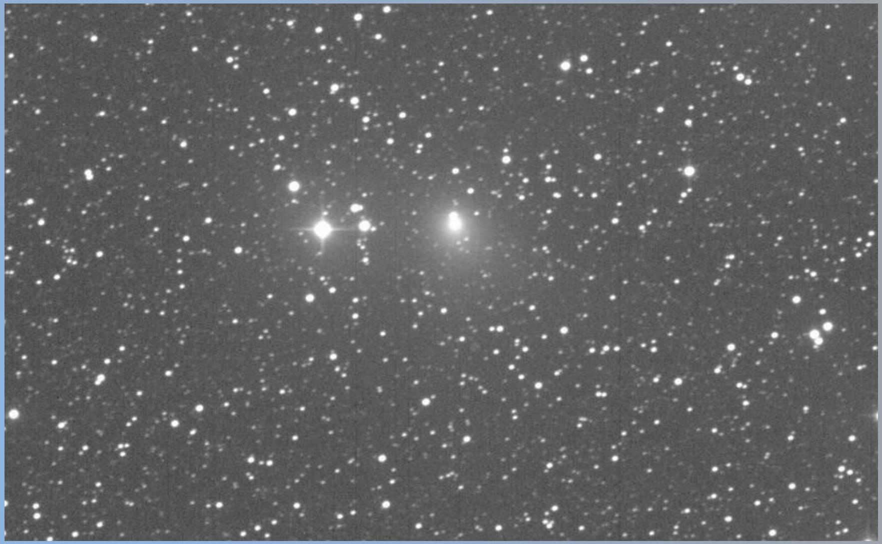
Follow Ups

Observer: E. Bryssinck, Kruibeke, Belgium, EU.
Date & Time: 23 June 2016 @ 06:41 UTC
Location: Sierra Remote Observatory, Auberry, CA, USA.
Instrument & Equipment: 0.61m f/6.5 Astrograph (+ Bassel I Filter)
(7 stacked – 180s exposures)

Current Comets of 2018!

C/2016 M1 (PanSTARRS)

Courtesy of Micheal Jager. Date: 12 May 2018
(Instrument: 12” f/4 Newtonian Astrograph)



Courtesy of Michael Hauss. Date: 18 May 2018 @ 16:52 UTC, Siding Spring Observatory, Australia. Planewave 431mm CDK f/6.8.

Basic Facts About C/2016 M1:

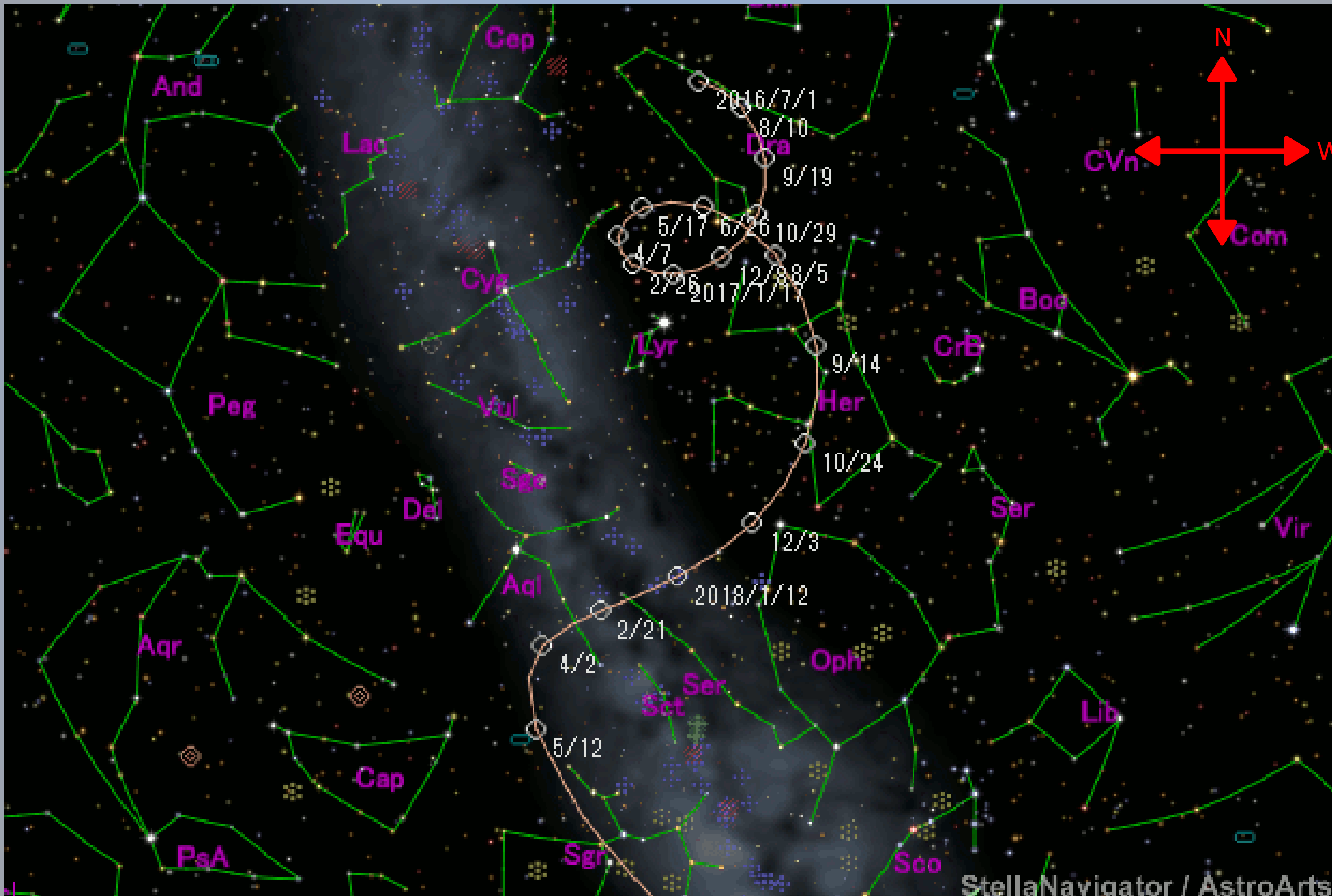
Classification: Long – Period Comet
Magnitude of Comet on Discovery Date: 19.7
Peak Magnitude (Predicted): 9.1 for
time period of (20 June – 6 July) 2018
Orbital Inclination: 90.994°
Orbital Period: (85488.5 ± 233.1) years
Longitude of the Ascending Node: 92.202°
Argument of Perihelion: 209.826°
Mean Anamoly: 359.995°

Orbital Eccentricity: 0.99886 (Extremely Elliptical, Semi – Parabolic)
Semi – Major Axis (Avg. Distance): (1940.6 ± 3.5) AU or 290.08 billion km (180.282 billion mi)
Perihelion Distance: 2.2107 AU
Time of Perihelion Passage: 9 Aug 2018 @ 01:00 UTC to 11 Aug 2018 @ 07:00 UTC
Perigee Distance: 1.289 AU (START: 23 Jun 2018 @ 04:00 UTC and END: 26 Jun 2018 @ 06:00 UTC)
Aphelion Distance: (3878 ± 7) AU (579.683 billion km or 360.266 billion mi)
Mean Motion: 0.71” /day on Jan 1, 0.66”/day on Feb 1, 0.58” on Mar 1, 0.50”/day on Apr 1,
0.50”/day on Apr 1, 0.81”/day on May 1, 2”/day on June 1, 2.47” day on July 1
1.10”/day on Aug 1, 0.31”/day on Sept 1
Peak Mean Motion: 2.61”/day on 22 June 2018 (1 Day before the time of Perigee Passage)

Reference back to the Ephemeris information section for further details.

Current Comets of 2018!

(Path of C/2016 M1 PanSTARRS during the period: 1 July 2016 – 1 June 2018)

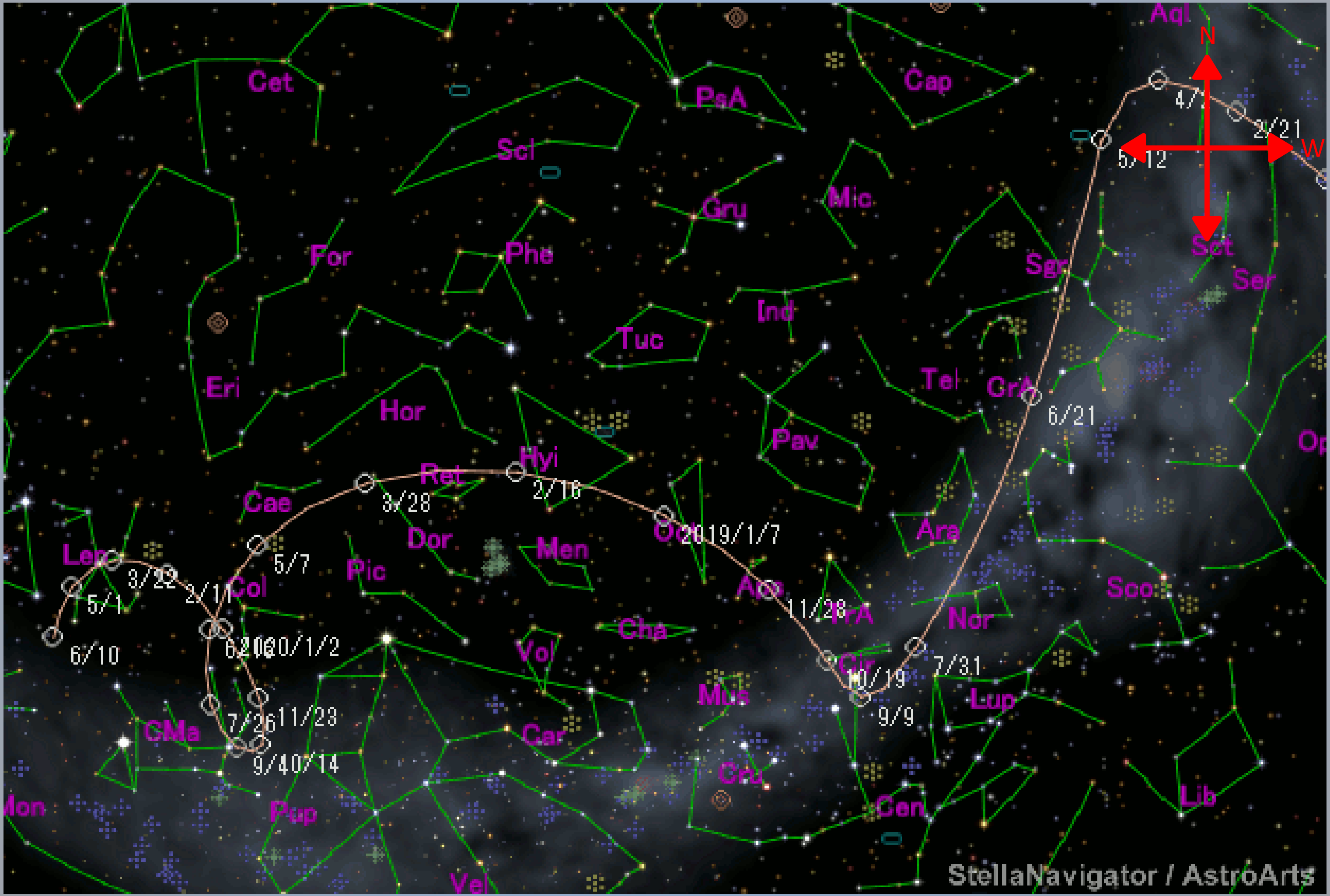


Courtesy of Seiichi Yoshida's Home Page (Weekly Information about Bright Comets – C/2016 M1 PanSTARRS), http://aerith.net/comet/catalog/2016M1/2016M1.html, 23 May 2018.

Note: Comet C/2016 M1 PanSTARRS is progressing southward from the region of Draco where it is originally discovered at the central region of its tail first undergoing a retrograde loop from November 2016 through mid – July 2017 between the Southern Region of Draco (Head – shaped Asterism) to the Northern regions of Hercules north of the Keystone. The comet performed a semi – retrograde lasting from late February 2018 near Aquila (Western Region) until early May 2018 in the NE region of the Teapot asterism (Sagittarius).

Current Comets of 2018!

(Path of C/2016 M1 PanSTARRS during the period: 1 July 2016 – 1 June 2018)

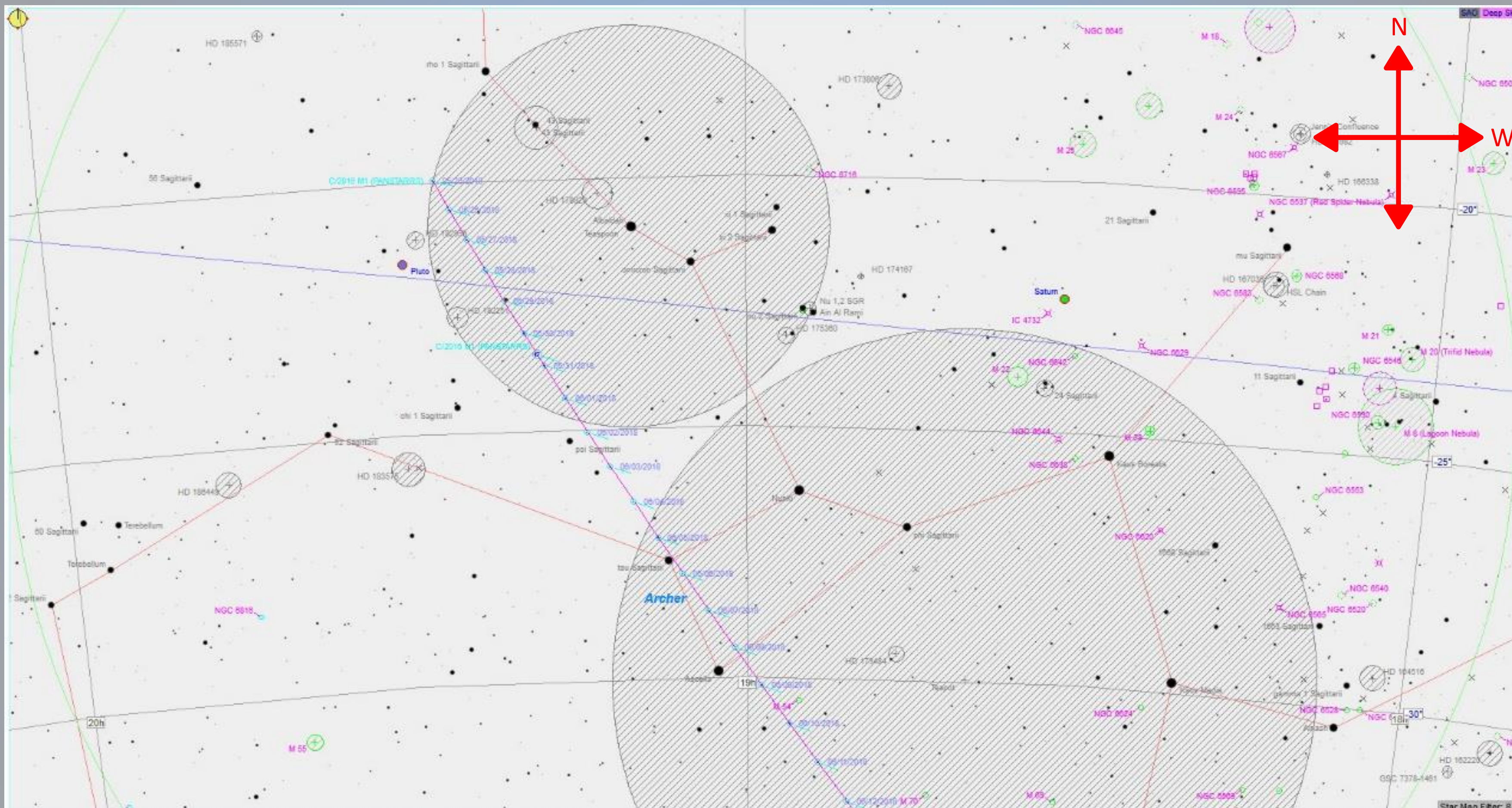


Courtesy of Seiichi Yoshida's Home Page (Weekly Information about Bright Comets – C/2016 M1 PanSTARRS), http://aerith.net/comet/catalog/2016M1/2016M1.html, 23 May 2018.

Note: Comet C/2016 M1 PanSTARRS will continue to be visible for astronomers in the Northern Hemisphere until the end of July when the comet will have trekked towards the constellation of Norma not visible for those astronomers above 30° N Latitude after 15 July. The comet will make a SE turn between Circinus and the E Regions of Centaurus in Early September towards Triangulum Australe and remain visible mostly in the Southern Hemisphere all through the rest of the year.

Current Comets of 2018!

Path of C/2016 M1 PanSTARRS passing through Sagittarius: (25 May – 12 June) 2018

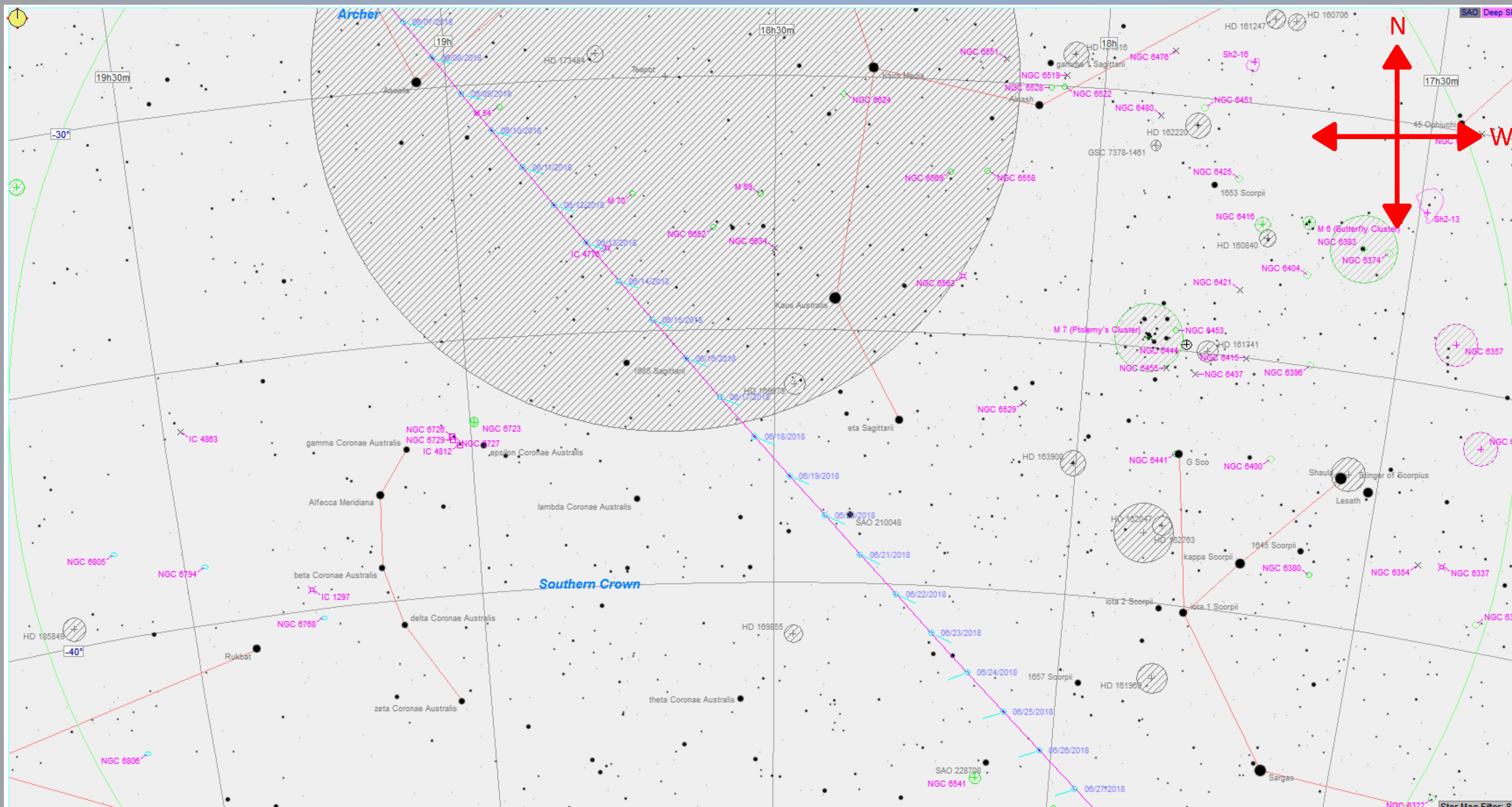


Courtesy of C2A Software, Phillipe Deverchére 2016.

Note: Comet C/2016 M1 PanSTARRS progresses in a southwestward direction from the NE regions of Sagittarius and passes through the southern areas of the 'Celestial Teapot' Asterism during the period of (4 – 10) June and will be 4° 28' 34.7" due S of Kaus Australis on Midnight of 19 June. The comet will graze to within 32' 13.2" W of the star Ascella ('ζ' Zeta Sagittarii) close to midnight on 7 June 2018.

Current Comets of 2018!

Path of C/2016 M1 PanSTARRS passing through Sagittarius: (7 – 27 June) 2018

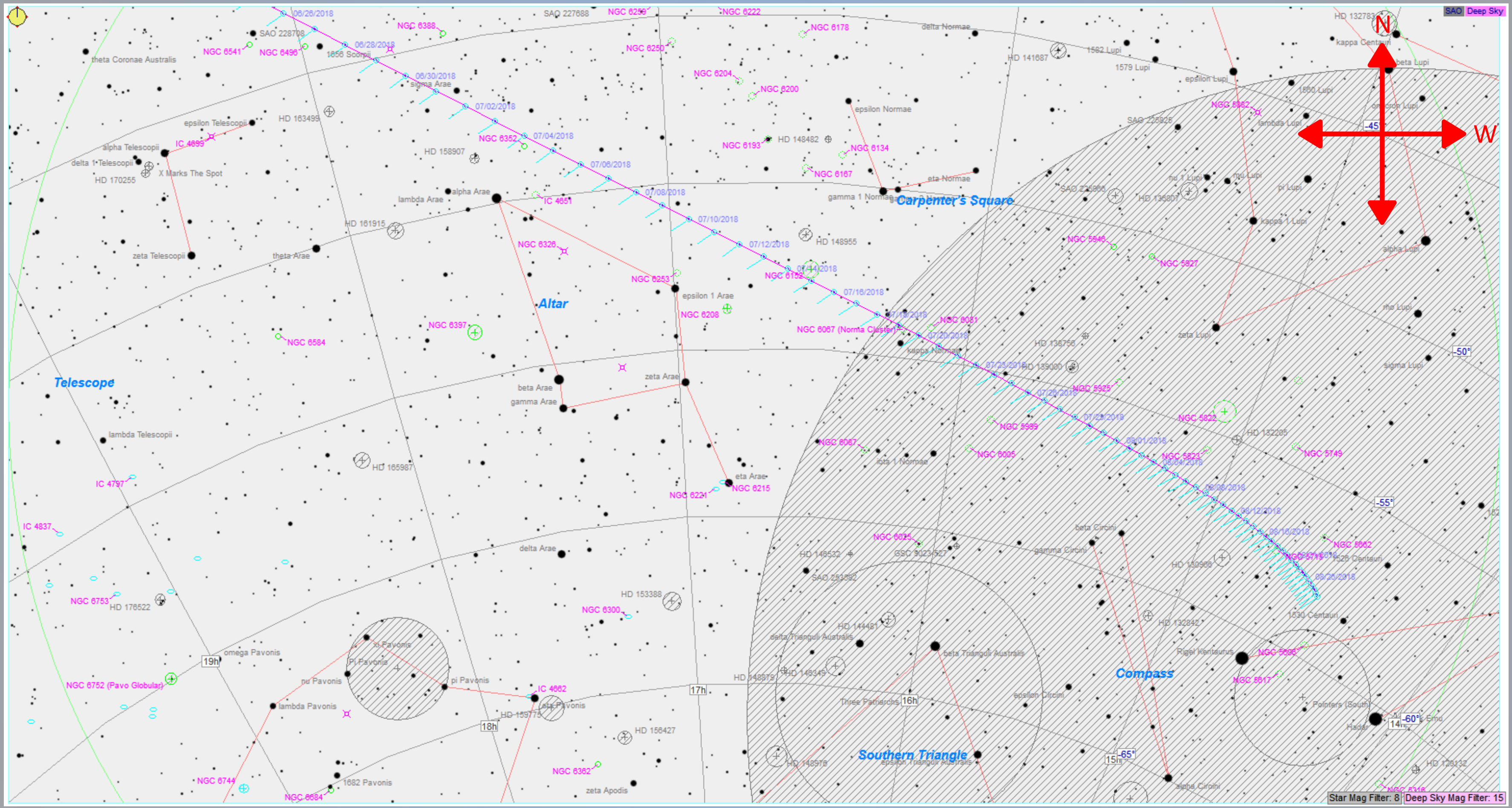


Courtesy of C2A Software, Phillipe Deverchére 2016.

Note: Comet C/2016 M1 PanSTARRS continues southwest travelling between Corona Australis (Southern Crown Asterism) and the tail of Scorpius towards the end of June. Note the many open star clusters and other DSOs within the same region as C/2016 M1. Expect this PanSTARRS Comet to increase in its progression across the sky from 2.25"/min to 2.63"/min up to 26 June 2018. It is not recommended for visual observers north of 30°N Latitude to track this comet since it maximum altitude above the horizon will stay below 15°.

Current Comets of 2018!

Path of C/2016 M1 PanSTARRS passing South of Scorpius to Circinus: (26 June – 31 August) 2018

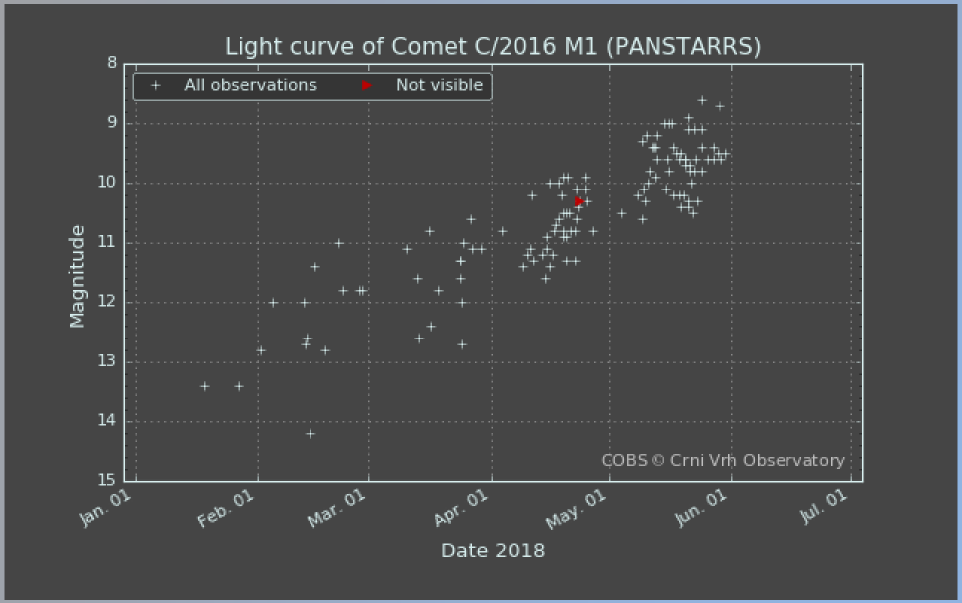


Courtesy of C2A Software, Phillipe Deverchére 2016.

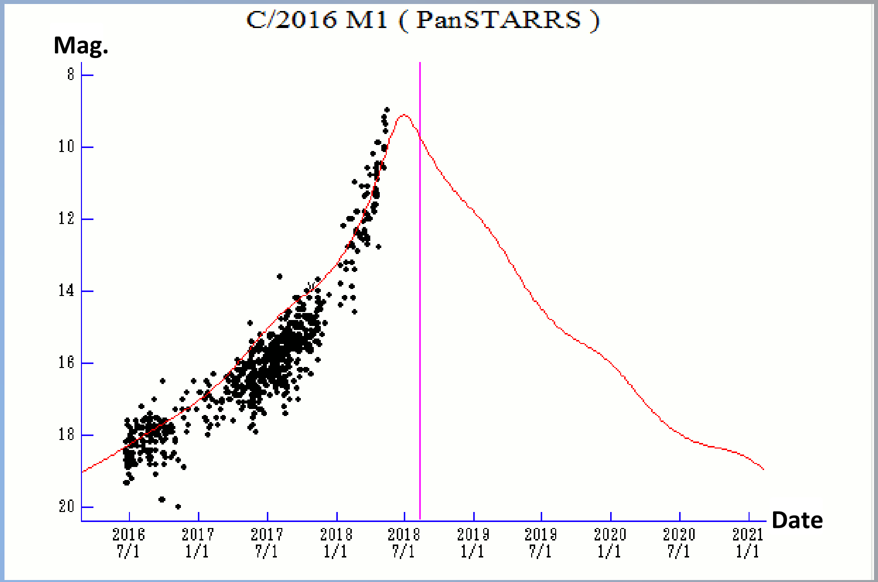
Note: Comet C/2016 M1 PanSTARRS will be visible in this part of the sky mostly for observers in the Southern Hemisphere. Note the SW progression from Altair towards the Compass Asterism of Circinus for the rest of the Summer Season 2018. The comet will decrease in progression below 2"/min after 14 July and below 1.5"/min after 24 July.

Current Comets of 2018!

Photometry Light Curve Profiles for C/2016 M1



Courtesy of Comet Observer's Database (Magnitude vs. Date Profile – C/2016 M1), https://cobs.si/analysis, 31 May 2018.



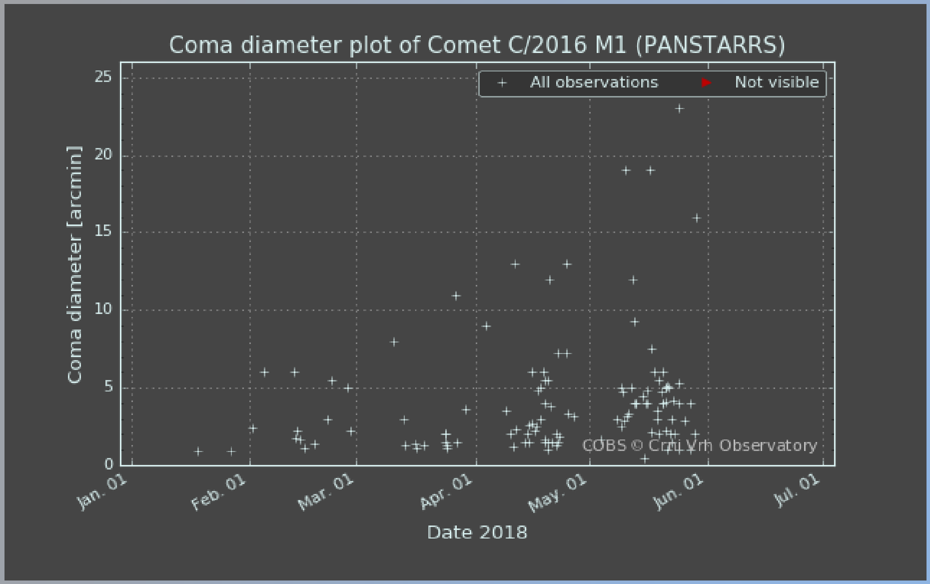
Courtesy of Seiichi Yoshida's Home Page (C/2016 M1 PanSTARRS), http://aerith.net/comet/catalog/2016M1/2016M1.html, 23 May 2018.

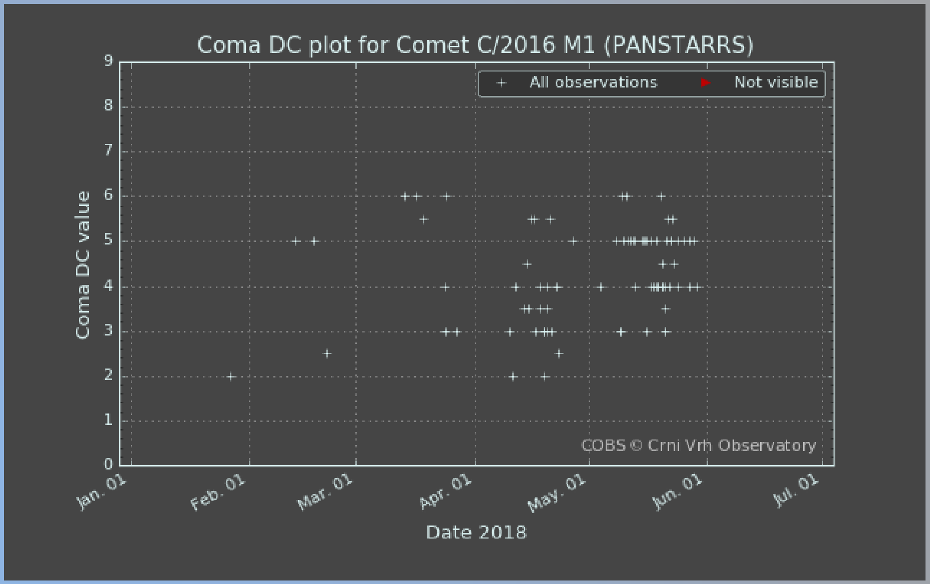
Comet C/2016 M1 PanSTARRS is gradually increasing in brightness from visual 14th Magnitude prior to 1 Feb 2018 to a predicted magnitude of 9.1 between the time period of 20 June – 7 July. Time of Perihelion passage which is the time period in which the comet will be at its closest approach to the Sun will be on 9 – 11 August (See Page 15 for more information). There are three batches of visual and photographic observations during the successive time periods of (1 July – 1 Nov) 2016, (1 April 2017 – 1 January 2018), and the most recent (1 Feb – 1 June) 2018. Note the greater spread of visual observation reports for the the second batch ranging from 18.0 – 14.0 visual magnitude while the last batch has a narrower, but rapid brightening range over a shorter time period: 9 months vs. 4 months from the second to the third batch of visual and photographic field observation reports.

The light cure graph to the right shows a pink line which denotes the date of the time of Perihelion passage!

Current Comets of 2018!

Photometry Coma Analysis of Diameter & DC vs. Date Profiles for C/2016 M1





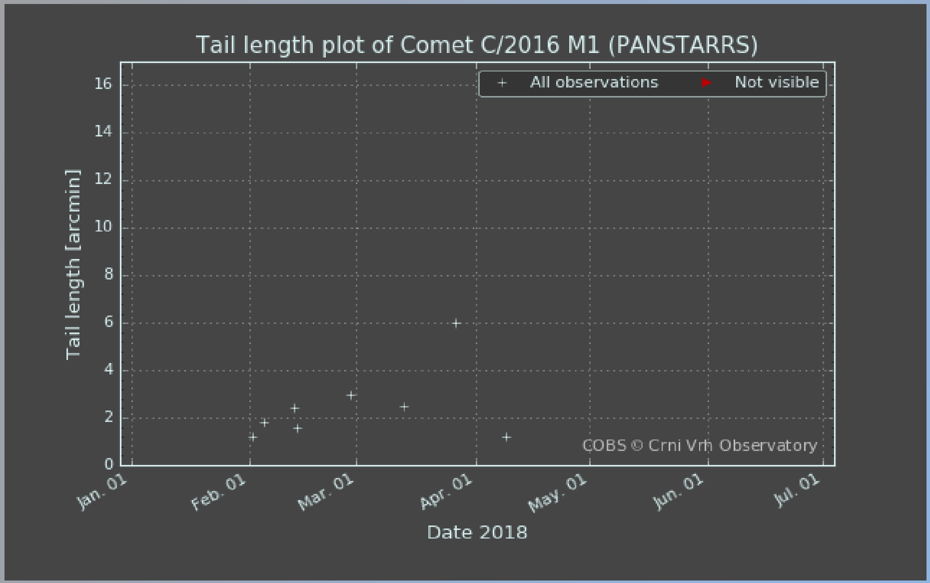
Courtesy of Comet Observer's Database (Coma Data - C/2016 M1), https://cobs.si/analysis, 31 May 2018.

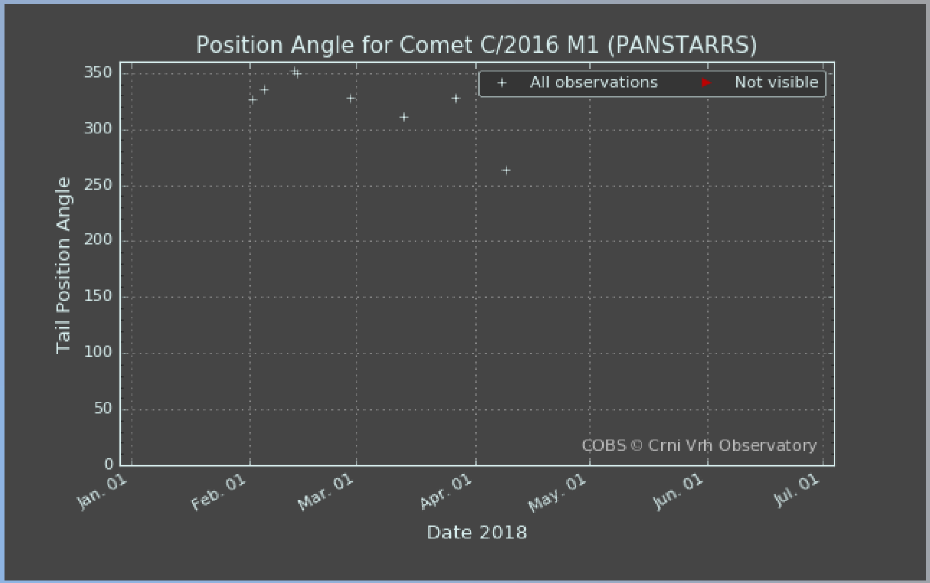
Visual and Photographic field reports on Comet C/2016 M1 PanSTARRS indicate a wide range of diameters for the Coma (the comet's atmosphere surrounding the central nucleus). The data points on the left plot show coma diameters mostly at the low end between 5 – 10 arcminutes and very few above 15 arcminutes. Averaging the values indicate a normalized coma diameter between 2.5 – 5 arcminutes. DC values for the Coma as shown in the right plot have a wide range from 2 – 6 which most of the values ranging from 4 – 5. Based on the range of all later field reports after 1 April the comet is tending to have a small coma diameter of 3 – 5 arcminutes with a DC from 4 – 5.

The conclusion is that the coma of C/2016 M1 PanSTARRS is very small (~12.9% - 32.25% the size of an average full Moon) with a moderate diffuse coma showing a very to a moderate slight concentration of light at the center of the Coma!

Current Comets of 2018!

Photometry Tail Analysis of Tail Length & Position Angle vs. Date Profiles for C/2016 M1



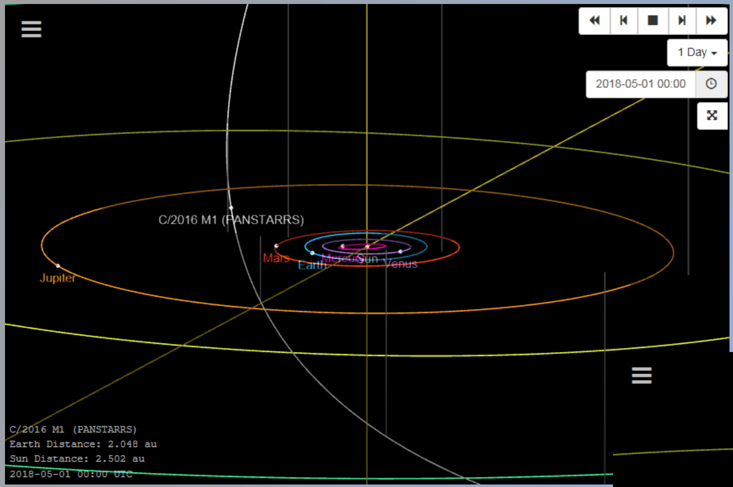


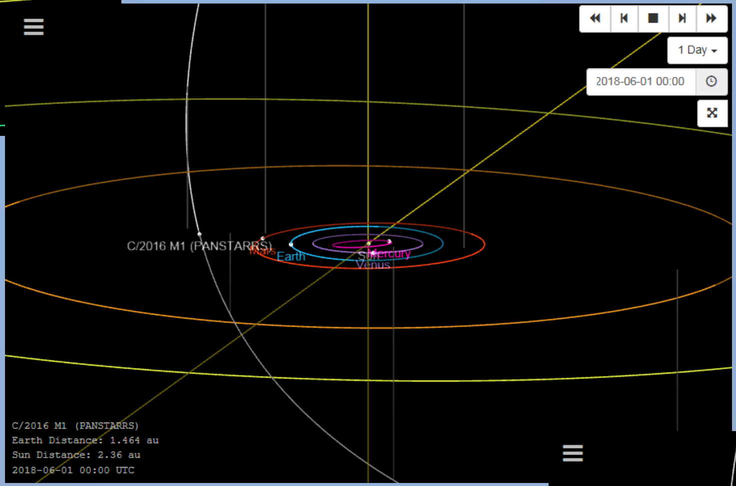
Courtesy of Comet Observer's Database (Coma Data - C/2016 M1), https://cobs.si/analysis, 31 May 2018.

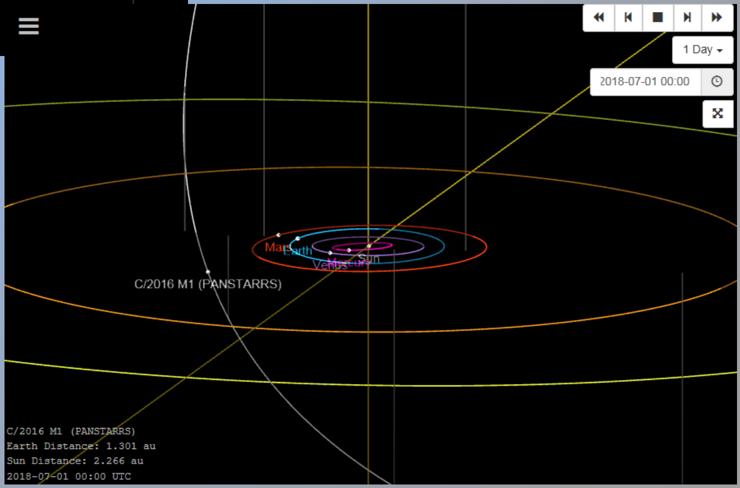
Visual and Photographic field reports on Comet C/2016 M1 PanSTARRS provides very little data for analysis of the tail length and position angle for the Comet's tail. The left plot has only 8 confirmed field reports from 1 Feb to 10 April with a length range of 1 – 6 arcminutes average at 2 – 2.5 arcminutes. The right plot with the same number of confirmed field reports during the same time period has the P.A. from 260° - 350° with the most of the data points between 325° - 330°.

The conclusion is that the tail of C/2016 M1 PanSTARRS averages 2 – 2.5 arcminutes (~8% - 16.1% the size of an average full Moon) in length with a P.A. between 325° - 330° indicating a very short comet tail possibly with foreshortening of less than 20% while oriented towards the NNW.

Progression Path: C/2016 M1!







Facts about the various snapshots of the path of Comet C/2016 M1 PanSTARRS:

- ***Comet C/2016 M1 crosses the plane of the Ecliptic on 28 May 2018 at Noon UTC.***
- ***C/2016 M1 crosses the Ecliptic within the Main Asteroid Belt.***
- ***The comet is moving in an extremely elliptical path perpendicular to the central meridian of the plane of the ecliptic.***
- ***Observed from Earth the comet is moving SW away from the Vernal Equinox.***
- ***Observed from Earth the comet will be south and SW of the J2000 Epoch position for the Winter Solstice.***

Courtesy of NASA/JPL Solar System Dynamics: JPL Small Body Database Browser, https://ssd.jpl.nasa.gov/sbdb.cgi?sstr=C%2F2016%20M1;old=0;orb=1;cov=0;log=0;cad=0#orb, 23 May 2018.

Current Comets of 2018!

(Ephemeris Data for C/2016 M1 PanSTARRS: (25 May – 1 July).

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object Position		Sun	Moon
	hh:mm:ss	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 05 25	0:00:00	19 26 30.4	-19 58 37	1.571	2.382	133.2	18.1	9.8	1.65	206.6	262	-57	14	0.79
2018 05 26	0:00:00	19 25 11.4	-20 34 14	1.555	2.378	134.6	17.7	9.7	1.69	207.2	264	-56	14	0.87
2018 05 27	0:00:00	19 23 48.2	-21 10 38	1.538	2.373	135.9	17.3	9.7	1.74	207.8	266	-55	14	0.93
2018 05 28	0:00:00	19 22 20.8	-21 47 50	1.523	2.369	137.3	16.8	9.7	1.79	208.4	267	-54	14	0.97
2018 05 29	0:00:00	19 20 49.0	-22 25 49	1.507	2.365	138.7	16.4	9.6	1.83	209	269	-53	14	1
2018 05 30	0:00:00	19 19 12.8	-23 04 34	1.492	2.361	140.1	16	9.6	1.88	209.5	271	-52	14	1
2018 05 31	0:00:00	19 17 32.0	-23 44 05	1.477	2.357	141.5	15.5	9.6	1.93	210.1	272	-51	14	0.98
2018 06 01	0:00:00	19 15 46.5	-24 24 20	1.463	2.353	143	15	9.5	1.98	210.7	274	-50	14	0.95
2018 06 02	0:00:00	19 13 56.1	-25 05 19	1.45	2.349	144.4	14.6	9.5	2.02	211.2	276	-49	15	0.9
2018 06 03	0:00:00	19 12 00.7	-25 46 59	1.436	2.346	145.8	14.1	9.5	2.07	211.8	277	-48	15	0.83
2018 06 04	0:00:00	19 10 00.3	-26 29 21	1.424	2.342	147.2	13.6	9.5	2.11	212.4	279	-47	15	0.76
2018 06 05	0:00:00	19 07 54.5	-27 12 20	1.411	2.338	148.6	13.1	9.4	2.16	212.9	280	-46	15	0.67
2018 06 06	0:00:00	19 05 43.5	-27 55 57	1.4	2.334	150	12.5	9.4	2.2	213.5	282	-44	15	0.58
2018 06 07	0:00:00	19 03 26.9	-28 40 07	1.388	2.331	151.4	12	9.4	2.25	214.1	283	-43	15	0.48
2018 06 08	0:00:00	19 01 04.8	-29 24 49	1.378	2.327	152.8	11.5	9.4	2.29	214.7	285	-42	15	0.38
2018 06 09	0:00:00	18 58 36.9	-30 10 00	1.368	2.324	154.1	11	9.3	2.33	215.3	286	-41	15	0.28
2018 06 10	0:00:00	18 56 03.2	-30 55 36	1.358	2.32	155.4	10.5	9.3	2.37	215.9	287	-40	15	0.19
2018 06 11	0:00:00	18 53 23.6	-31 41 35	1.349	2.317	156.7	10	9.3	2.4	216.5	289	-39	15	0.11
2018 06 12	0:00:00	18 50 38.0	-32 27 51	1.341	2.313	157.9	9.5	9.3	2.44	217.1	290	-37	15	0.05
2018 06 13	0:00:00	18 47 46.3	-33 14 23	1.333	2.31	159	9.1	9.3	2.47	217.7	292	-36	15	0.01
2018 06 14	0:00:00	18 44 48.5	-34 01 04	1.326	2.307	160.1	8.6	9.2	2.5	218.4	293	-35	16	0
2018 06 15	0:00:00	18 41 44.5	-34 47 52	1.319	2.303	161	8.3	9.2	2.53	219	294	-34	16	0.02
2018 06 16	0:00:00	18 38 34.2	-35 34 40	1.313	2.3	161.8	7.9	9.2	2.55	219.7	296	-33	16	0.07
2018 06 17	0:00:00	18 35 17.7	-36 21 26	1.308	2.297	162.4	7.7	9.2	2.57	220.4	297	-31	16	0.14
2018 06 18	0:00:00	18 31 55.0	-37 08 03	1.303	2.294	162.9	7.5	9.2	2.59	221.1	298	-30	16	0.24
2018 06 19	0:00:00	18 28 26.1	-37 54 28	1.299	2.291	163.2	7.4	9.2	2.61	221.8	300	-29	16	0.34
2018 06 20	0:00:00	18 24 50.9	-38 40 34	1.296	2.288	163.3	7.3	9.2	2.62	222.5	301	-28	16	0.45
2018 06 21	0:00:00	18 21 09.7	-39 26 17	1.293	2.285	163.2	7.4	9.1	2.63	223.3	302	-27	16	0.56
2018 06 22	0:00:00	18 17 22.4	-40 11 32	1.291	2.282	162.9	7.5	9.1	2.63	224	304	-25	16	0.67
2018 06 23	0:00:00	18 13 29.2	-40 56 13	1.29	2.279	162.4	7.7	9.1	2.63	224.8	305	-24	16	0.76
2018 06 24	0:00:00	18 09 30.2	-41 40 17	1.289	2.276	161.7	8	9.1	2.63	225.6	306	-23	16	0.84
2018 06 25	0:00:00	18 05 25.6	-42 23 38	1.289	2.274	160.9	8.4	9.1	2.62	226.4	307	-22	16	0.91
2018 06 26	0:00:00	18 01 15.5	-43 06 11	1.289	2.271	160	8.8	9.1	2.61	227.3	309	-21	16	0.95
2018 06 27	0:00:00	17 57 00.3	-43 47 52	1.29	2.268	158.9	9.3	9.1	2.6	228.1	310	-20	16	0.99
2018 06 28	0:00:00	17 52 40.1	-44 28 37	1.292	2.266	157.7	9.8	9.1	2.59	229	311	-18	16	1
2018 06 29	0:00:00	17 48 15.2	-45 08 23	1.295	2.263	156.5	10.3	9.1	2.57	229.9	313	-17	16	0.99
2018 06 30	0:00:00	17 43 46.0	-45 47 04	1.298	2.261	155.2	10.9	9.1	2.55	230.8	314	-16	16	0.97
2018 07 01	0:00:00	17 39 12.8	-46 24 39	1.301	2.259	153.8	11.5	9.1	2.52	231.8	315	-15	16	0.93

All Data is calculated from the starting date of 25 May 2018 to display the current and future predictions for the behavior and motion of the comet with respect to its position and distance from both the Sun and Earth. Note that the comet is approaching the Sun and Earth with the time of perigee passage indicated in the white box close to the date of the Full Buck Moon (Smallest Full Moon for 2018) on the night of 27 – 28 June.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22' 30" N , 95° 35' 37" W). Time is calculated for UTC (CDT = UTC – 5 HRS).

Current Comets of 2018!

(Ephemeris Data for C/2016 M1 PanSTARRS: (1 July – 1 August).

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object Position		Sun	Moon
	hh:mm:ss	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 07 01	0:00:00	17 39 12.8	-46 24 39	1.301	2.259	153.8	11.5	9.1	2.52	231.8	315	-15	16	0.93
2018 07 02	0:00:00	17 34 35.9	-47 01 03	1.306	2.256	152.4	12	9.1	2.49	232.7	316	-14	16	0.88
2018 07 03	0:00:00	17 29 55.8	-47 36 15	1.31	2.254	151	12.6	9.1	2.46	233.7	318	-13	16	0.81
2018 07 04	0:00:00	17 25 13.0	-48 10 12	1.316	2.252	149.5	13.2	9.1	2.43	234.6	319	-12	16	0.73
2018 07 05	0:00:00	17 20 27.7	-48 42 53	1.322	2.25	148	13.8	9.1	2.39	235.6	320	-11	16	0.63
2018 07 06	0:00:00	17 15 40.6	-49 14 16	1.328	2.247	146.6	14.4	9.1	2.36	236.6	321	-10	16	0.54
2018 07 07	0:00:00	17 10 52.1	-49 44 21	1.335	2.245	145.1	15	9.1	2.32	237.5	322	-9	16	0.43
2018 07 08	0:00:00	17 06 02.7	-50 13 06	1.343	2.243	143.6	15.6	9.1	2.28	238.5	324	-9	16	0.33
2018 07 09	0:00:00	17 01 12.9	-50 40 31	1.351	2.241	142	16.2	9.2	2.23	239.5	325	-8	16	0.23
2018 07 10	0:00:00	16 56 23.2	-51 06 38	1.359	2.24	140.5	16.8	9.2	2.19	240.5	326	-7	16	0.14
2018 07 11	0:00:00	16 51 34.2	-51 31 26	1.368	2.238	139	17.3	9.2	2.14	241.5	327	-6	16	0.07
2018 07 12	0:00:00	16 46 46.3	-51 54 57	1.378	2.236	137.6	17.9	9.2	2.1	242.5	329	-5	16	0.02
2018 07 13	0:00:00	16 42 00.0	-52 17 11	1.388	2.234	136.1	18.4	9.2	2.05	243.4	330	-5	16	0
2018 07 14	0:00:00	16 37 15.9	-52 38 11	1.398	2.233	134.6	18.9	9.2	2	244.4	331	-4	16	0.01
2018 07 15	0:00:00	16 32 34.5	-52 57 59	1.409	2.231	133.1	19.4	9.2	1.95	245.3	332	-3	16	0.05
2018 07 16	0:00:00	16 27 56.0	-53 16 36	1.42	2.23	131.7	19.9	9.2	1.9	246.2	333	-3	16	0.12
2018 07 17	0:00:00	16 23 21.1	-53 34 05	1.432	2.228	130.3	20.4	9.3	1.85	247.1	334	-2	16	0.21
2018 07 18	0:00:00	16 18 50.0	-53 50 29	1.444	2.227	128.8	20.8	9.3	1.8	248	336	-2	16	0.31
2018 07 19	0:00:00	16 14 23.1	-54 05 51	1.456	2.225	127.4	21.3	9.3	1.75	248.9	337	-1	16	0.41
2018 07 20	0:00:00	16 10 00.8	-54 20 12	1.469	2.224	126	21.7	9.3	1.7	249.7	338	-1	16	0.52
2018 07 21	0:00:00	16 05 43.4	-54 33 37	1.482	2.223	124.7	22.1	9.3	1.65	250.5	339	0	16	0.62
2018 07 22	0:00:00	16 01 31.0	-54 46 07	1.495	2.222	123.3	22.5	9.3	1.6	251.3	340	0	16	0.72
2018 07 23	0:00:00	15 57 24.1	-54 57 47	1.508	2.22	122	22.8	9.4	1.55	252.1	341	1	16	0.8
2018 07 24	0:00:00	15 53 22.7	-55 08 38	1.522	2.219	120.7	23.2	9.4	1.51	252.8	342	1	15	0.87
2018 07 25	0:00:00	15 49 27.0	-55 18 44	1.536	2.218	119.4	23.5	9.4	1.46	253.5	343	2	15	0.93
2018 07 26	0:00:00	15 45 37.2	-55 28 08	1.55	2.217	118.1	23.8	9.4	1.41	254.1	344	2	15	0.97
2018 07 27	0:00:00	15 41 53.5	-55 36 52	1.565	2.217	116.8	24.1	9.4	1.37	254.8	345	2	15	0.99
2018 07 28	0:00:00	15 38 15.8	-55 45 00	1.58	2.216	115.5	24.4	9.4	1.32	255.4	346	2	15	1
2018 07 29	0:00:00	15 34 44.4	-55 52 33	1.595	2.215	114.3	24.7	9.5	1.28	255.9	347	3	15	0.99
2018 07 30	0:00:00	15 31 19.1	-55 59 36	1.61	2.214	113.1	24.9	9.5	1.23	256.4	349	3	15	0.96
2018 07 31	0:00:00	15 28 00.1	-56 06 09	1.625	2.214	111.9	25.2	9.5	1.19	256.9	350	3	15	0.91
2018 08 01	0:00:00	15 24 47.4	-56 12 17	1.64	2.213	110.7	25.4	9.5	1.15	257.3	350	3	15	0.85

The Comet will be decreasing in its progression from 2.52"/min to 1.15"/min at a rate of 0.05"/min – 0.04"/min throughout the month of July. The comet will be changing its position of visibility from an Azimuth of 315° (NW) to 350° (NNW) as its moves southward away from most observers in the Northern Hemisphere. The next full Moon will be on the night of 27/28 July 2018 with the preceding New Moon on 13 July close to the time the comet will decrease its celestial progression to 2"/min.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22' 30" N , 95° 35' 37" W). Time is calculated for UTC (CDT = UTC – 5 HRS).

Current Comets of 2018!

C/2016 M1 (PANSTARRS): A Morning to Late Evening comet.

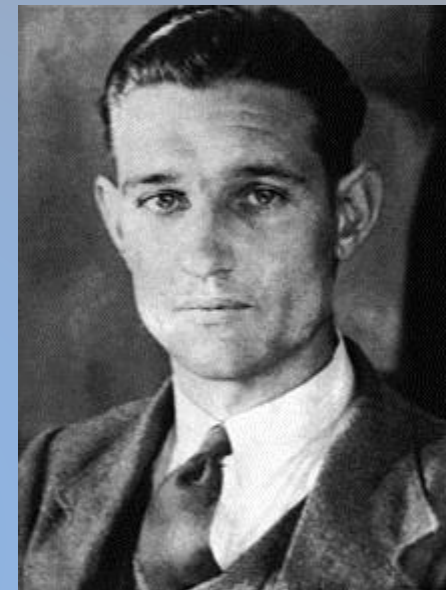
This comet begins the month of May as a Visual Magnitude 10.8 in the constellation of Sagittarius. It will brightening up to 9.0 – 9.1 through late June and past 1 July progressing southwestward between the bottom curve of the tail of Scorpius and North of the Southern Constellation of Ara.

Latitude	June 1	June 5	June 10	June 15	June 20	June 25	June 30	Nights Visible (1 – 30) June
45°N	Low in the southern sky rising above an altitude of 15° (1:10 AM – Sunrise) CDT (6:10 AM – Sunrise) UTC	Low in the southern sky rising above an altitude of 15° (2:20 AM – Sunrise) CDT (7:20 AM – Sunrise) UTC	Very Low in the southern sky rising above an altitude of 10° (1:25 AM – Sunrise) CDT (6:25 AM – Sunrise) UTC	Below an altitude of 10° and above 5° in the Southern Sky (12:30 AM – Sunrise) CDT (5:30 AM – Sunrise) UTC	Above an altitude of 5° in the Southern Sky (1:10 – 2:30) AM CDT (6:10 – 7:30) AM UTC	Not Visible	Not Visible	20
30°N	Fairly Low in the evening skies at an altitude above 15° 12:25 AM CDT Above 30° (2:20 – 5:35) AM CDT	Fairly Low in the evening skies at an altitude above 15° 12:15 AM CDT Above 30° (2:30 – 4:35) AM CDT	Low in the Southern skies at an altitude above 15° (12:05 – 5:20) AM CDT	Low in the Southern skies at an altitude above 15° (11:55 PM – 5:20 AM) CDT	Low in the Southern skies at an altitude above 15° (11:45 PM – 4:35 AM) CDT	Low in the Southern skies at an altitude above 15° (11:25 PM – 2:15 AM) CDT	Very Low in the Southern skies at an altitude above 10° (10:45 PM – 2:10 AM) CDT	30
25°N	Fairly Low in the Southern skies at an altitude above 15° 12:05 AM CDT Above 30° (1:40 – 6:15) AM CDT	Fairly Low in the Southern skies at an altitude above 15° 11:55 PM CDT Above 30° (1:40 – 4:35) AM CDT	Fairly Low in the Southern skies at an altitude above 15° (11:35 PM) CDT Above 30° (1:45 – 4:25) AM CDT	Low in the Southern skies at an altitude above 15° (2:20 – 5:35) AM CDT (7:20 – 10:35) AM UTC	Low in the Southern skies at an altitude above 15° (11:50 PM – 4:35 AM) CDT (4:50 – 9:35) AM UTC	Very Low in the Southern skies at an altitude above 15° (10:55 PM – 3:25 AM) CDT (3:50 – 8:25) AM UTC	Very Low in the Southern skies at an altitude above 15° (10:50 PM – 2:05 AM) CDT (3:55 – 7:05) AM UTC	30

Current Comets of 2018!

66P/Du Toit

Courtesy of Jean – Gabriel Bosch
(19 May 2018 @ 05:57:27 UTC)
Remote San Pedro de Atacama Observatory, Chile
0.4m f/5.4 Ritchey – Chrétien + QHY9 CCD



Daniel Stefanus du Toit
(South African Astronomer)
Boyden Observatory, Maselspoort, South Africa

Discovery Date: 16 May 1966
Magnitude (Max) in 1944: 10.0 for 3 months!

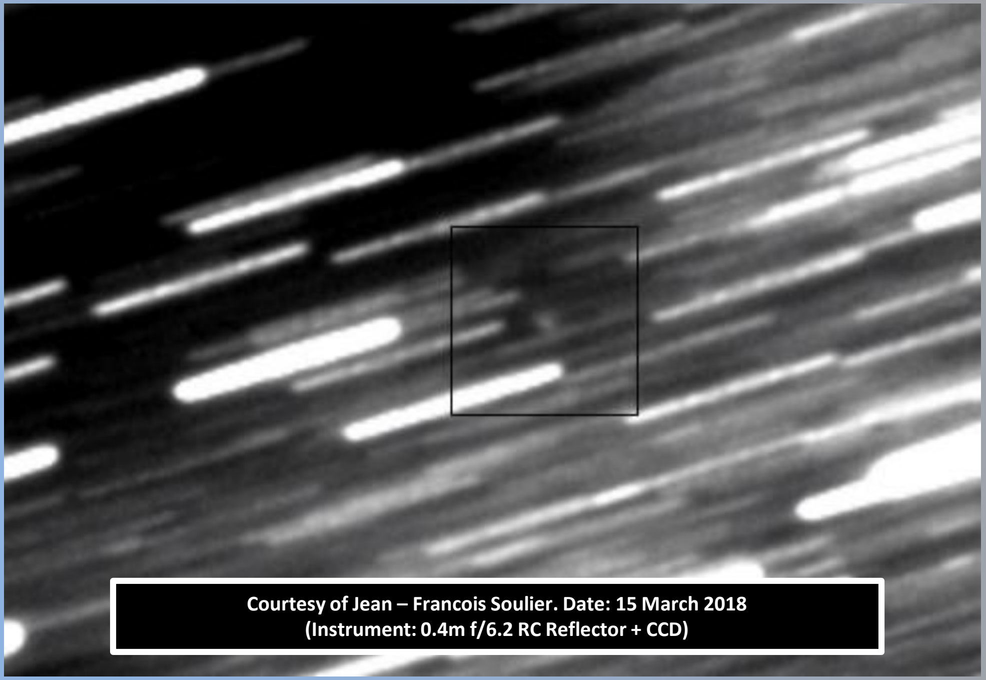
Lost in *Apparitions: 1959, 1998, & 2003

Follow Ups
(Carlos Torres @ University of Chile in 1973)
Cerro El Roble Astronomical Station, Chile
70 cm AST – 16 Maksutov Telescope

*Comet Apparition is the appearance of a comet in the night sky. When a comet is lost in apparition it means that it is not always visible on successive or future times of perihelion passage.

Current Comets of 2018!

66P/Du Toit



Basic Facts About 66P/Du Toit:

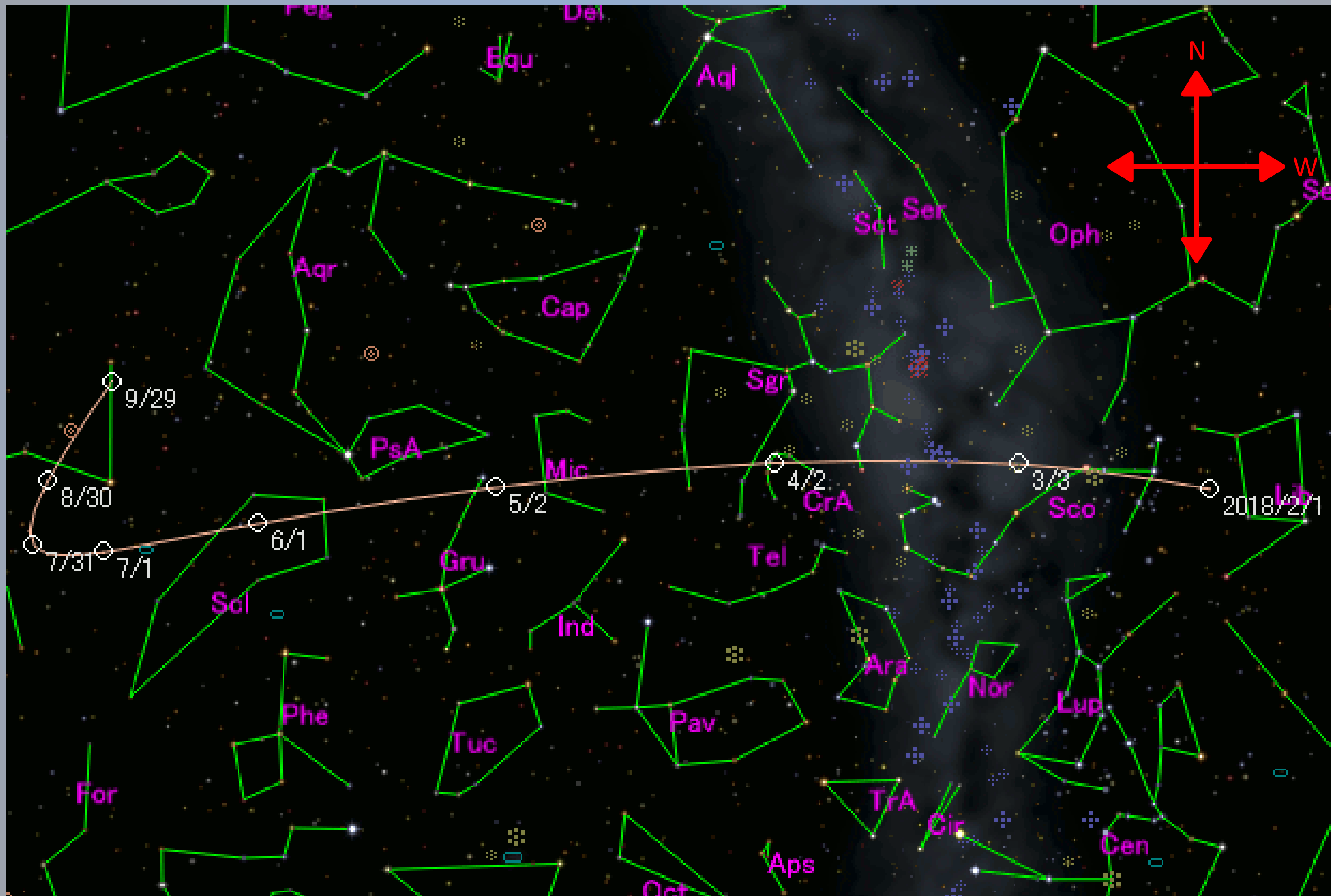
Classification: Long Duration Jupiter Comet
Magnitude of Comet on Discovery Date: 10.0
Peak Magnitude (Predicted): 9.1 for
time period of (20 June – 6 July) 2018
Orbital Inclination: 18.6928°
Orbital Period: 14.71 years
Longitude of the Ascending Node: 22.172°
Argument of Perihelion: 257.249°
Mean Anamoly: 93.487°

Orbital Eccentricity: 0.7883 (Highly Elliptical Orbit)
Semi – Major Axis (Avg. Distance): 6.003 AU or 897.328 million km (557.679 million mi)
Perihelion Distance: 1.290 AU or 192,829,200 km (119,841,000 mi)
Time of Perihelion Passage: 15 May 2018 @ 01:00 UTC to 20 May 2018 @ 07:00 UTC
Perigee Distance: 0.896 AU or 133,934.080 km (83,238,400 mi)
Time of Perigee Passage: (START: 15 May 2018 @ 04:00 UTC and END: 20 May 2018 @ 06:00 UTC)
Aphelion Distance: 10.7357 AU (1.604772 billion km or 996.563412 million mi)
Mean Motion: 1.34” /day on Jan 1, 1.60”/day on Feb 1, 2.00” on Mar 1, 2.55”/day on Apr 1, 2.60” on May 1, 1.92”/day on June 1, 1.09” day on July 1, 0.32”/day on Aug 1
Peak Mean Motion: 2.68”/day for (14 – 22) April – 23 Days before the Time of Perigee Passage.

Reference back to the Ephemeris information section for further details.

Current Comets of 2018!

(Path of 66P/Du Toit during the period: 1 February – 29 September)

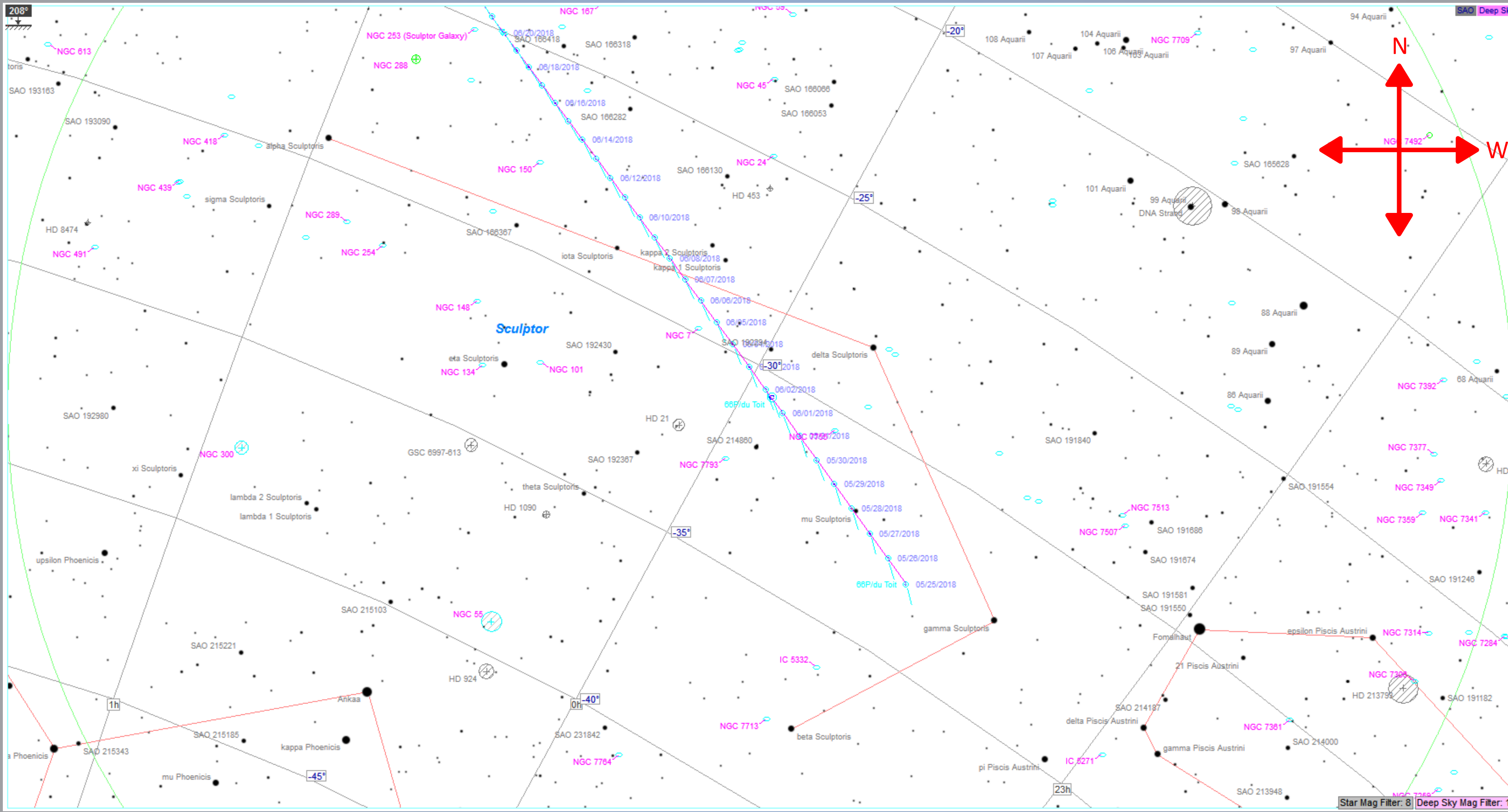


Courtesy of Seiichi Yoshida's Home Page (Weekly Information about Bright Comets – C/2016 M1 PanSTARRS), http://aerith.net/comet/catalog/0066P/2018.html, 23 May 2018.

Note: Comet 66P/Du Toit is moving in an eastward direction from the Summer Constellations starting in Libra back in Feb 2018 and across Scorpius in March, Corona Australis and Sagittarius in Early April to Mircoscopium and Grus for Early to Mid May, and is currently progressing in the region east of Grus and west of Sculptor where it will remain for most of June. It will eventually during go a partial retrograde in the western region of Cetus for the rest of the Summer into late September.

Current Comets of 2018!

Path of 66P/Du Toit progression through the constellation of Sculptor: (25 May – 20 June)

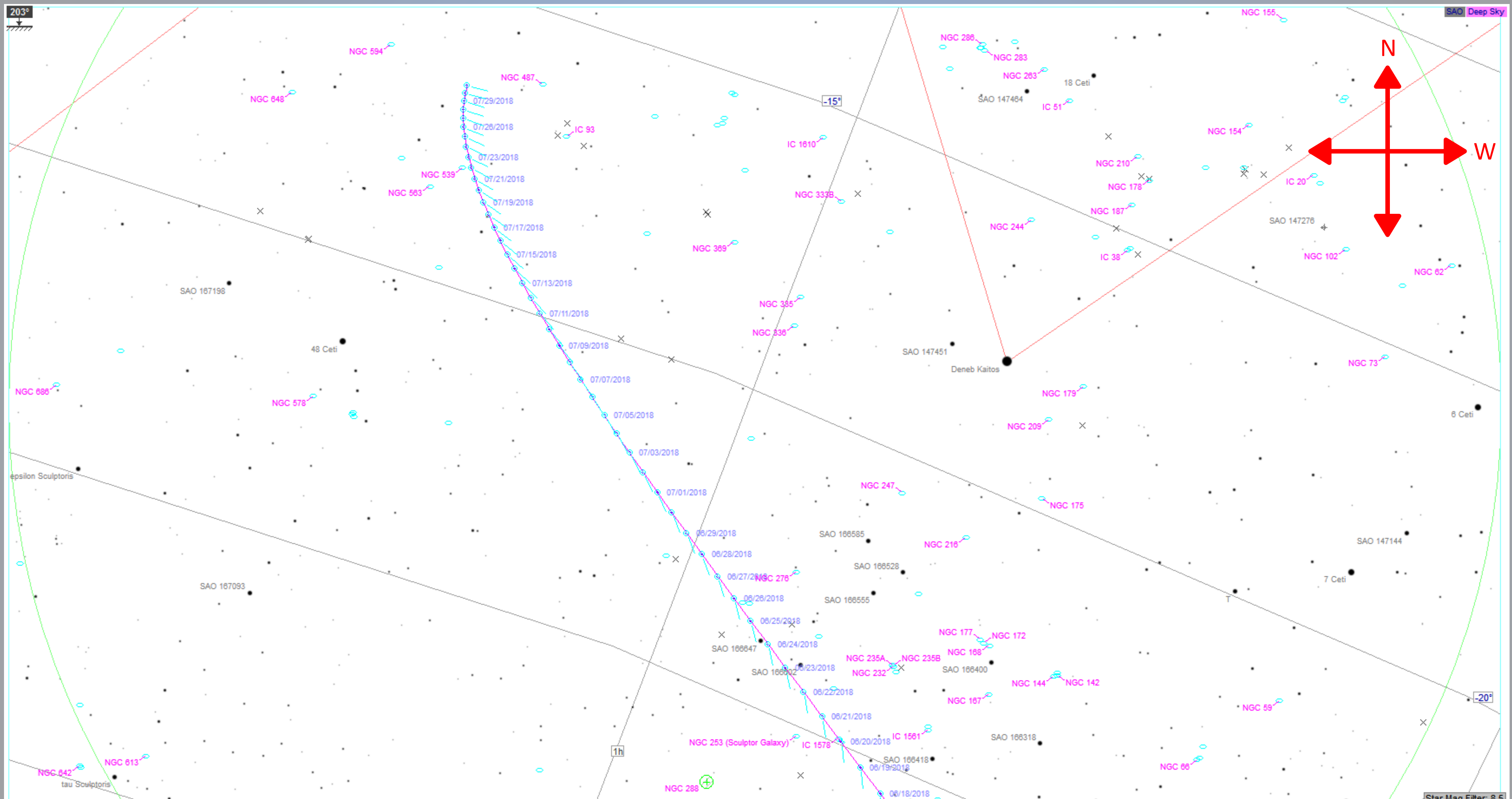


Courtesy of C2A Software, Phillipe Deverchére 2016.

Note: Comet 66P is moving in a general Eastern by East Northeast direction through the constellation of Sculptor and will travel closely by the Sculptor Galaxy (NGC 253) within 35" (just over one average Full Moon Width) on the morning night of 21 June 2018 and visible at a sky altitude above 15° after 4 am CDT. Du Toit is currently progressing across the sky at just under 2"/min for 29 – 31 May and will slow down to 1.9"/min in early June to 1.5"/min by 16 – 17 June 2018.

Current Comets of 2018!

Path of 66P/Du Toit progression from Sculptor to the W Regions of Cetus (18 June – 1 August)

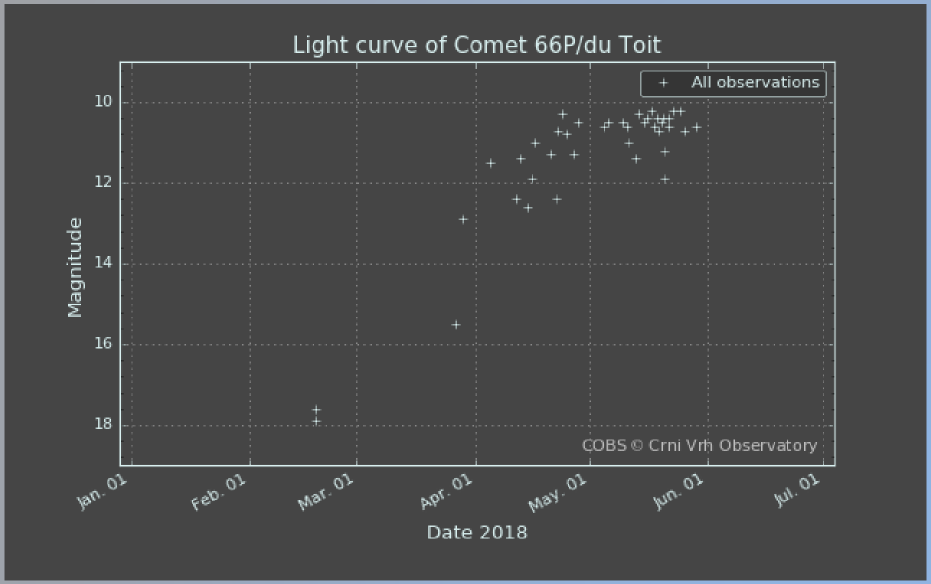


Courtesy of C2A Software, Phillipe Deverchére 2016.

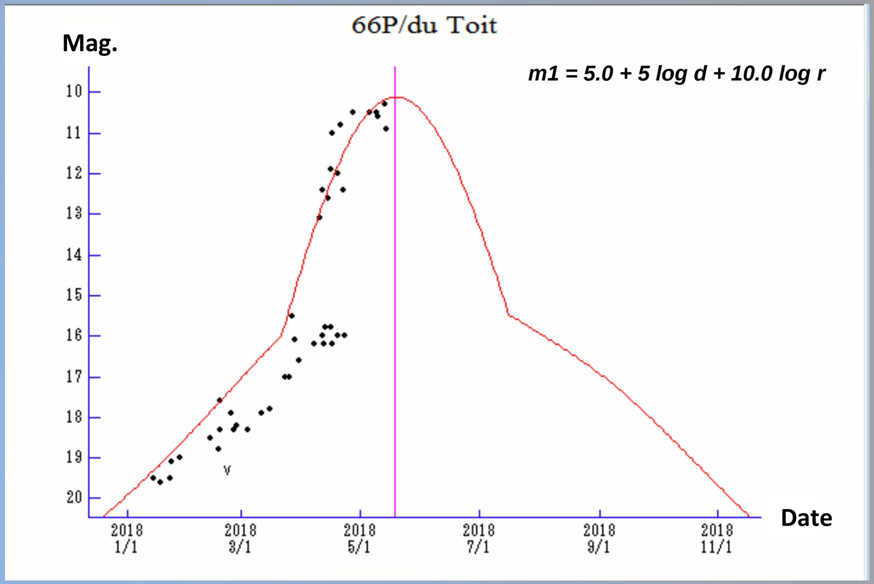
Note: Comet 66P will progress in a more NE direction into the Western regions of the constellation of Cetus passing to within 30" to 3° of several NGC galaxies such as ngc 539 on the morning night of 22 July when Du Toit will get to within 10" of the Spiral Galaxy (Classification Sc). Towards the end of August there will be NGC 539, 563, 583, and 487 all within less than 1°.

Current Comets of 2018!

Photometry Light Curve Profiles for 66P/du Toit



Courtesy of Comet Observer's Database (Magnitude vs. Date Profile – 66P/du Toit), https://cobs.si/analysis, 1 June 2018.



Courtesy of Seiichi Yoshida's Home Page (C/2016 M1 PanSTARRS) http://aerith.net/comet/catalog/0066P/2018.html, 23 May 2018.

Comet 66P/Du Toit has undergone a phase of gradual brightening from an extremely faint magnitude of 17.9 on 18 September to a visual magnitude of 10.5 by 27 April. Du Toit has recently since late April with an overlap with the previous set of field reports have shown itself in newer phase of rapid brightening that has levelled off just short of visual magnitude 10.0 at the eve of its' period of perihelion passage. The future projection shows the comet on the right graph is predicted to have a symmetric pattern of an initially rapid dimming in visual and photographic magnitude up to 1 July with a gradual dimming towards the mid – November 2018.

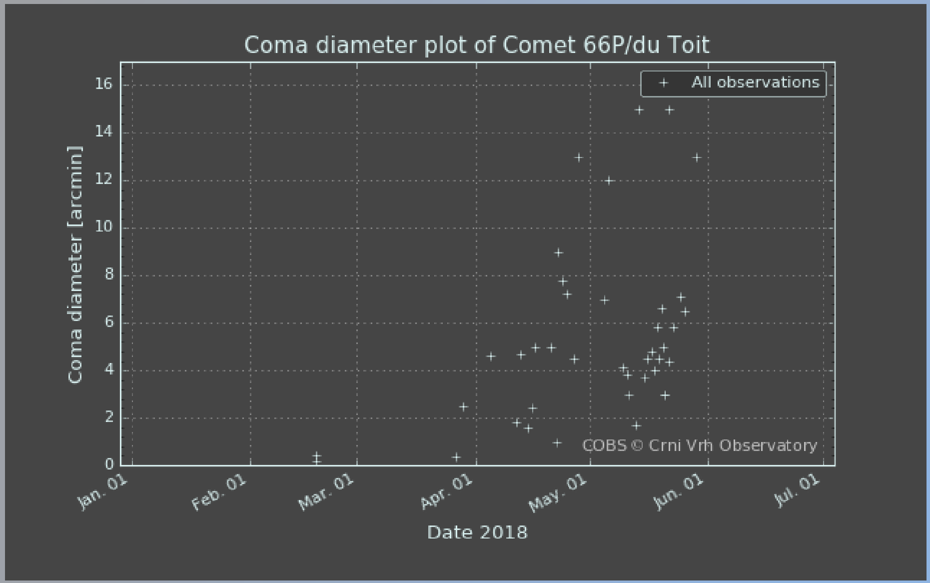
m1 = 13.0 + 5 log d + 15.0 log r [,-58] (- 2018 Mar. 22)
m1 = 1.5 + 5 log d + 80 log r [-58, 58] (2018 Mar. 22 - 2018 July 16)
m1 = 13.0 + 5 log d + 15.0 log r [58,] (2018 July 16 -)

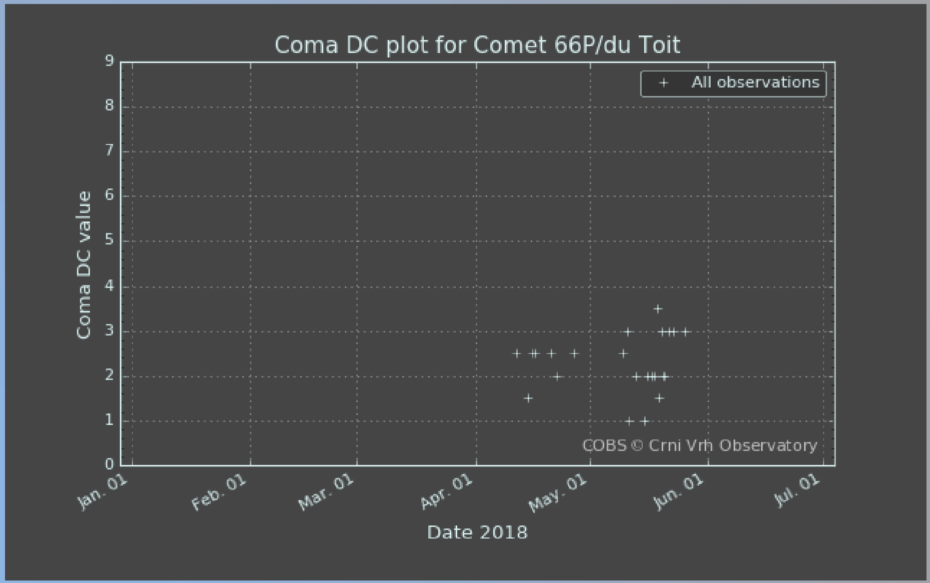
The formulas on the left were mathematically derived from the data points positioned on the light curve plot to the upper right!

The light cure graph to the right shows a pink line which denotes the date of the time of Perihelion passage!

Current Comets of 2018!

Photometry Coma Analysis of Diameter & DC vs. Date Profiles for 66P/du Toit





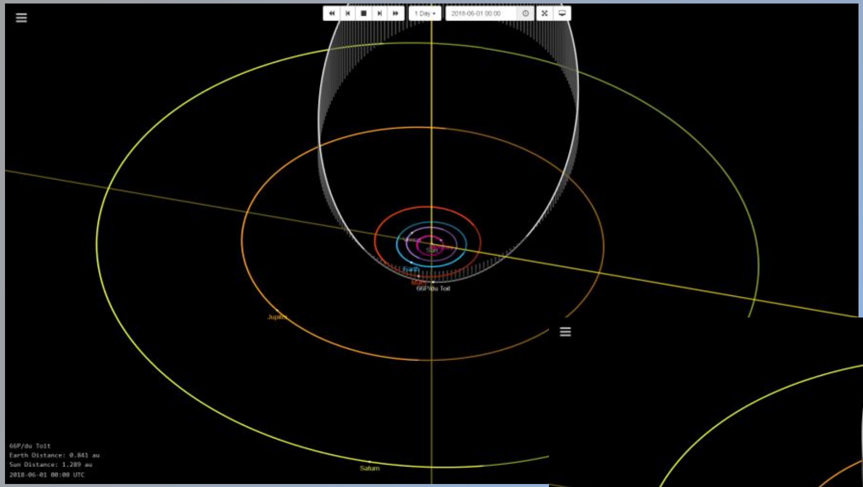
Courtesy of Comet Observer's Database (Coma Data – 66P/du Toit), https://cobs.si/analysis, 1 June 2018.

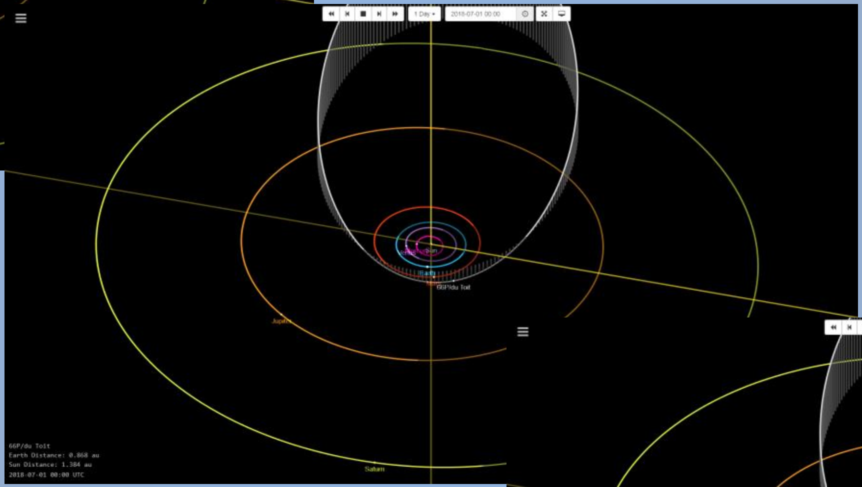
Comet 66P/Du Toit during its initial phase of gradual brightening also displayed a rapidly enlarging coma based on measurements of its' diameter in arcminutes. The earliest observations from 18 February 2018 had a tiny speak of a coma with the size of only 10 arcseconds across from the 18 February field report which continued into late March. Around the date and after 1 April the Coma grew rapidly prior to its' time of perihelion passage from 1 - 15 arcminutes. Field reports for the month of May has the Coma diameter for Du Toit averaging at 14 arcminutes (just under ½ of an average Full Moon width). The DC for the comet has varied between 1 – 3.5 with of the field observation reports both photographic and visual be acquiring during the period of 11 April to 25 May. Averaging the DC value to a range of 2.3 – 2.5 which indicating a big outer Coma with a distinct inner Coma increasing in definition and distinctness from the rest of the Comet!

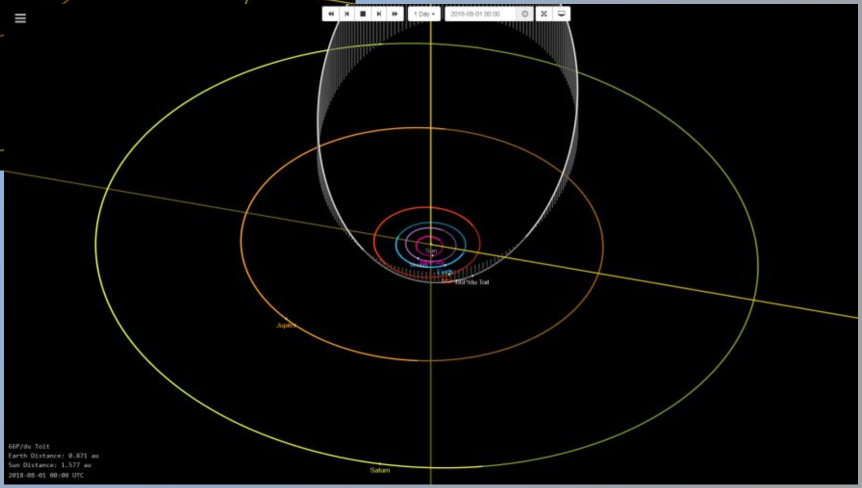
The left graph indicates the field reports for Coma Diameter in arcminutes (arcmin) and the right graph shows the DC as one of the primary physical characteristics for a comet's coma based on integer rating from 1 – 9, but starting at 0.

<u>(At this time there are no field reports either photographic or Visual indicating any presence of a tail which could be at a foreshortening of 0%)</u>

Progression Path: 66P/Du Toit!







Facts about the various snapshots of the path of 66P/Du Toit:

- ***Comet Du Toit has a orbital inclination greater than Pluto by 1.7°!***
- ***Du Toit is below the plane of the Ecliptic form 27 Jan to 14 December.***
- ***Du Toit is below the Ecliptic during one time of perihelion passage and two times of perigee passage.***
- ***In spite of its inclination the orbit of Du Toit extends for only a short distance beyond the orbit of Saturn and into the region of the inner Centaurs.***
- ***The Planets Mercury and Mars are both below the plane of the Ecliptic at the same period at Du Toit is at its first time of perigee passage and time of perihelion passage.***

Courtesy of NASA/JPL Solar System Dynamics: JPL Small Body Database Browser, https://ssd.jpl.nasa.gov/sbdb.cgi?sstr=66P;old=0;orb=1;cov=0;log=0;cad=0#orb, 1 June 2018 .

Current Comets of 2018!

(Ephemeris Data for 66P/Du Toit for the period: 25 May to 1 July.)

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object		Sun	Moon
	h m s	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 05 25	0:00:00	23 30 31.2	-33 00 02	0.898	1.292	84.9	51.3	12.8	2.11	68.1	74	-68	14	0.79
2018 05 26	0:00:00	23 34 09.3	-32 41 22	0.899	1.293	84.9	51.3	12.8	2.08	67.7	74	-68	14	0.87
2018 05 27	0:00:00	23 37 43.2	-32 22 36	0.899	1.294	85	51.2	12.8	2.06	67.3	75	-68	14	0.93
2018 05 28	0:00:00	23 41 13.0	-32 03 46	0.9	1.296	85	51.2	12.8	2.03	67	76	-68	14	0.97
2018 05 29	0:00:00	23 44 38.7	-31 44 53	0.9	1.297	85.1	51.1	12.8	2	66.6	77	-68	14	1
2018 05 30	0:00:00	23 48 00.4	-31 25 58	0.901	1.298	85.2	51.1	12.8	1.98	66.2	78	-68	14	1
2018 05 31	0:00:00	23 51 18.1	-31 07 02	0.902	1.3	85.2	51	12.8	1.95	65.9	79	-68	14	0.98
2018 06 01	0:00:00	23 54 31.9	-30 48 07	0.903	1.302	85.3	50.9	12.8	1.92	65.5	80	-69	14	0.95
2018 06 02	0:00:00	23 57 41.8	-30 29 12	0.903	1.303	85.4	50.9	12.8	1.9	65.2	80	-69	15	0.9
2018 06 03	0:00:00	00 00 47.8	-30 10 19	0.904	1.305	85.6	50.8	12.8	1.87	64.9	81	-69	15	0.83
2018 06 04	0:00:00	00 03 49.9	-29 51 29	0.905	1.307	85.7	50.7	12.8	1.84	64.5	82	-69	15	0.76
2018 06 05	0:00:00	00 06 48.3	-29 32 42	0.906	1.31	85.8	50.6	12.8	1.81	64.2	83	-69	15	0.67
2018 06 06	0:00:00	00 09 43.0	-29 14 00	0.907	1.312	85.9	50.5	12.8	1.79	63.9	84	-69	15	0.58
2018 06 07	0:00:00	00 12 33.9	-28 55 23	0.907	1.315	86.1	50.4	12.9	1.76	63.6	85	-70	15	0.48
2018 06 08	0:00:00	00 15 21.2	-28 36 52	0.908	1.317	86.3	50.3	12.9	1.73	63.3	86	-70	15	0.38
2018 06 09	0:00:00	00 18 04.8	-28 18 28	0.909	1.32	86.4	50.1	12.9	1.7	63.1	87	-70	15	0.28
2018 06 10	0:00:00	00 20 44.8	-28 00 10	0.91	1.323	86.6	50	12.9	1.67	62.8	88	-70	15	0.19
2018 06 11	0:00:00	00 23 21.3	-27 42 00	0.911	1.326	86.8	49.9	12.9	1.65	62.5	89	-71	15	0.11
2018 06 12	0:00:00	00 25 54.3	-27 23 59	0.912	1.329	87	49.7	12.9	1.62	62.2	90	-71	15	0.05
2018 06 13	0:00:00	00 28 23.7	-27 06 06	0.912	1.332	87.2	49.6	12.9	1.59	62	91	-71	15	0.01
2018 06 14	0:00:00	00 30 49.7	-26 48 23	0.913	1.336	87.5	49.4	12.9	1.56	61.7	92	-71	16	0
2018 06 15	0:00:00	00 33 12.3	-26 30 49	0.914	1.339	87.7	49.3	12.9	1.53	61.4	93	-72	16	0.02
2018 06 16	0:00:00	00 35 31.5	-26 13 26	0.915	1.343	88	49.1	13	1.51	61.2	95	-72	16	0.07
2018 06 17	0:00:00	00 37 47.4	-25 56 13	0.916	1.346	88.2	48.9	13	1.48	60.9	96	-72	16	0.14
2018 06 18	0:00:00	00 39 59.9	-25 39 10	0.916	1.35	88.5	48.8	13	1.45	60.6	97	-72	16	0.24
2018 06 19	0:00:00	00 42 09.1	-25 22 19	0.917	1.354	88.8	48.6	13	1.42	60.3	98	-73	16	0.34
2018 06 20	0:00:00	00 44 15.1	-25 05 39	0.918	1.358	89.1	48.4	13	1.39	60.1	100	-73	16	0.45
2018 06 21	0:00:00	00 46 17.9	-24 49 10	0.918	1.363	89.4	48.2	13	1.37	59.8	101	-73	16	0.56
2018 06 22	0:00:00	00 48 17.5	-24 32 53	0.919	1.367	89.7	48	13	1.34	59.5	102	-74	16	0.67
2018 06 23	0:00:00	00 50 14.0	-24 16 49	0.919	1.371	90.1	47.8	13.1	1.31	59.2	104	-74	16	0.76
2018 06 24	0:00:00	00 52 07.3	-24 00 56	0.92	1.376	90.4	47.6	13.1	1.28	58.9	106	-74	16	0.84
2018 06 25	0:00:00	00 53 57.5	-23 45 16	0.92	1.38	90.8	47.4	13.1	1.25	58.6	107	-75	16	0.91
2018 06 26	0:00:00	00 55 44.7	-23 29 48	0.921	1.385	91.1	47.2	13.1	1.23	58.3	109	-75	16	0.95
2018 06 27	0:00:00	00 57 28.8	-23 14 33	0.921	1.39	91.5	47	13.1	1.2	58	111	-75	16	0.99
2018 06 28	0:00:00	00 59 09.8	-22 59 31	0.922	1.395	91.9	46.7	13.1	1.17	57.7	112	-76	16	1
2018 06 29	0:00:00	01 00 47.9	-22 44 42	0.922	1.4	92.3	46.5	13.1	1.14	57.4	114	-76	16	0.99
2018 06 30	0:00:00	01 02 22.9	-22 30 07	0.923	1.405	92.7	46.3	13.2	1.12	57	116	-76	16	0.97
2018 07 01	0:00:00	01 03 55.0	-22 15 44	0.923	1.41	93.2	46	13.2	1.09	56.7	119	-77	16	0.93

All Data is calculated from the starting date of 25 May 2018 to display the current and future predictions for the behavior and motion of the comet with respect to its position and distance from both the Sun and Earth. Note that the comet is receding from both the Earth and Sun since Du Toit is now past both its time or perihelion and perigee passage.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22' 30" N , 95° 35' 37" W). Time is calculated for UTC (CDT = UTC – 5 HRS).

Current Comets of 2018!

(Ephemeris Data for 66P/Du Toit for the period: 1 July to 1 August.)

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object		Sun	Moon
	h m s	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 07 01	0:00:00	01 03 55.0	-22 15 44	0.923	1.41	93.2	46	13.2	1.09	56.7	119	-77	16	0.93
2018 07 02	0:00:00	01 05 24.1	-22 01 35	0.923	1.416	93.6	45.8	13.2	1.06	56.3	121	-77	16	0.88
2018 07 03	0:00:00	01 06 50.2	-21 47 40	0.923	1.421	94.1	45.5	13.2	1.03	55.9	123	-77	16	0.81
2018 07 04	0:00:00	01 08 13.4	-21 33 58	0.924	1.427	94.5	45.3	13.2	1	55.5	126	-78	16	0.73
2018 07 05	0:00:00	01 09 33.5	-21 20 30	0.924	1.432	95	45	13.2	0.98	55	129	-78	16	0.63
2018 07 06	0:00:00	01 10 50.8	-21 07 16	0.924	1.438	95.5	44.7	13.2	0.95	54.6	132	-78	16	0.54
2018 07 07	0:00:00	01 12 05.1	-20 54 15	0.924	1.444	96	44.5	13.3	0.92	54.1	135	-79	16	0.43
2018 07 08	0:00:00	01 13 16.4	-20 41 29	0.924	1.449	96.5	44.2	13.3	0.89	53.5	138	-79	16	0.33
2018 07 09	0:00:00	01 14 24.7	-20 28 56	0.924	1.455	97.1	43.9	13.3	0.86	52.9	141	-79	16	0.23
2018 07 10	0:00:00	01 15 30.1	-20 16 36	0.924	1.461	97.6	43.6	13.3	0.83	52.3	145	-79	16	0.14
2018 07 11	0:00:00	01 16 32.6	-20 04 31	0.924	1.467	98.2	43.3	13.3	0.81	51.6	148	-79	16	0.07
2018 07 12	0:00:00	01 17 32.0	-19 52 39	0.924	1.474	98.7	43	13.3	0.78	50.9	152	-80	16	0.02
2018 07 13	0:00:00	01 18 28.5	-19 41 01	0.924	1.48	99.3	42.7	13.4	0.75	50.1	156	-80	16	0
2018 07 14	0:00:00	01 19 22.0	-19 29 36	0.923	1.486	99.9	42.4	13.4	0.72	49.2	160	-80	16	0.01
2018 07 15	0:00:00	01 20 12.5	-19 18 25	0.923	1.493	100.5	42	13.4	0.69	48.3	165	-80	16	0.05
2018 07 16	0:00:00	01 21 00.1	-19 07 27	0.923	1.499	101.1	41.7	13.4	0.67	47.2	169	-80	16	0.12
2018 07 17	0:00:00	01 21 44.6	-18 56 42	0.923	1.506	101.8	41.4	13.4	0.64	46.1	173	-80	16	0.21
2018 07 18	0:00:00	01 22 26.2	-18 46 10	0.923	1.512	102.4	41	13.4	0.61	44.8	178	-80	16	0.31
2018 07 19	0:00:00	01 23 04.8	-18 35 50	0.922	1.519	103.1	40.7	13.5	0.59	43.4	182	-79	16	0.41
2018 07 20	0:00:00	01 23 40.4	-18 25 43	0.922	1.526	103.7	40.3	13.5	0.56	41.9	186	-79	16	0.52
2018 07 21	0:00:00	01 24 13.1	-18 15 49	0.922	1.532	104.4	40	13.5	0.53	40.2	190	-79	16	0.62
2018 07 22	0:00:00	01 24 42.7	-18 06 07	0.921	1.539	105.1	39.6	13.5	0.51	38.3	194	-79	16	0.72
2018 07 23	0:00:00	01 25 09.4	-17 56 36	0.921	1.546	105.8	39.2	13.5	0.48	36.2	198	-78	16	0.8
2018 07 24	0:00:00	01 25 33.1	-17 47 18	0.921	1.553	106.6	38.8	13.5	0.46	33.8	202	-78	15	0.87
2018 07 25	0:00:00	01 25 53.8	-17 38 11	0.92	1.56	107.3	38.4	13.6	0.44	31.2	205	-77	15	0.93
2018 07 26	0:00:00	01 26 11.5	-17 29 16	0.92	1.567	108	38	13.6	0.42	28.3	208	-77	15	0.97
2018 07 27	0:00:00	01 26 26.3	-17 20 31	0.92	1.575	108.8	37.6	13.6	0.4	25.1	211	-76	15	0.99
2018 07 28	0:00:00	01 26 38.0	-17 11 58	0.919	1.582	109.6	37.2	13.6	0.38	21.5	214	-76	15	1
2018 07 29	0:00:00	01 26 46.8	-17 03 36	0.919	1.589	110.4	36.8	13.6	0.36	17.5	217	-75	15	0.99
2018 07 30	0:00:00	01 26 52.5	-16 55 24	0.919	1.596	111.2	36.4	13.6	0.34	13.1	220	-75	15	0.96
2018 07 31	0:00:00	01 26 55.2	-16 47 23	0.918	1.604	112	35.9	13.7	0.33	8.3	222	-74	15	0.91
2018 08 01	0:00:00	01 26 55.0	-16 39 32	0.918	1.611	112.8	35.5	13.7	0.32	3.2	224	-73	15	0.85

Note from the Delta column that 66P will be in another period of perigee passage. The previous perigee passage (time of closest approach to Earth) commenced during the period of 15 – 20 May at 0.896 AU prior to its' time of perihelion passage. The next time of perigee passage will be during the period of 4 – 12 August at a further distance of 0.917 AU. A Difference of 0.021 AU means that Comet Du Toit will be 3,139,080 km (1,950,900 mi) further from Earth than the previous time of perigee passage. Du Toit will be fading in brightness as it moves away from the Sun and beyond the orbit of Mars by 20 July based on the 1.524 AU as the mean (average distance) between the Earth and Mars.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22' 30" N , 95° 35' 37" W). Time is calculated for UTC (CDT = UTC – 5 HRS).

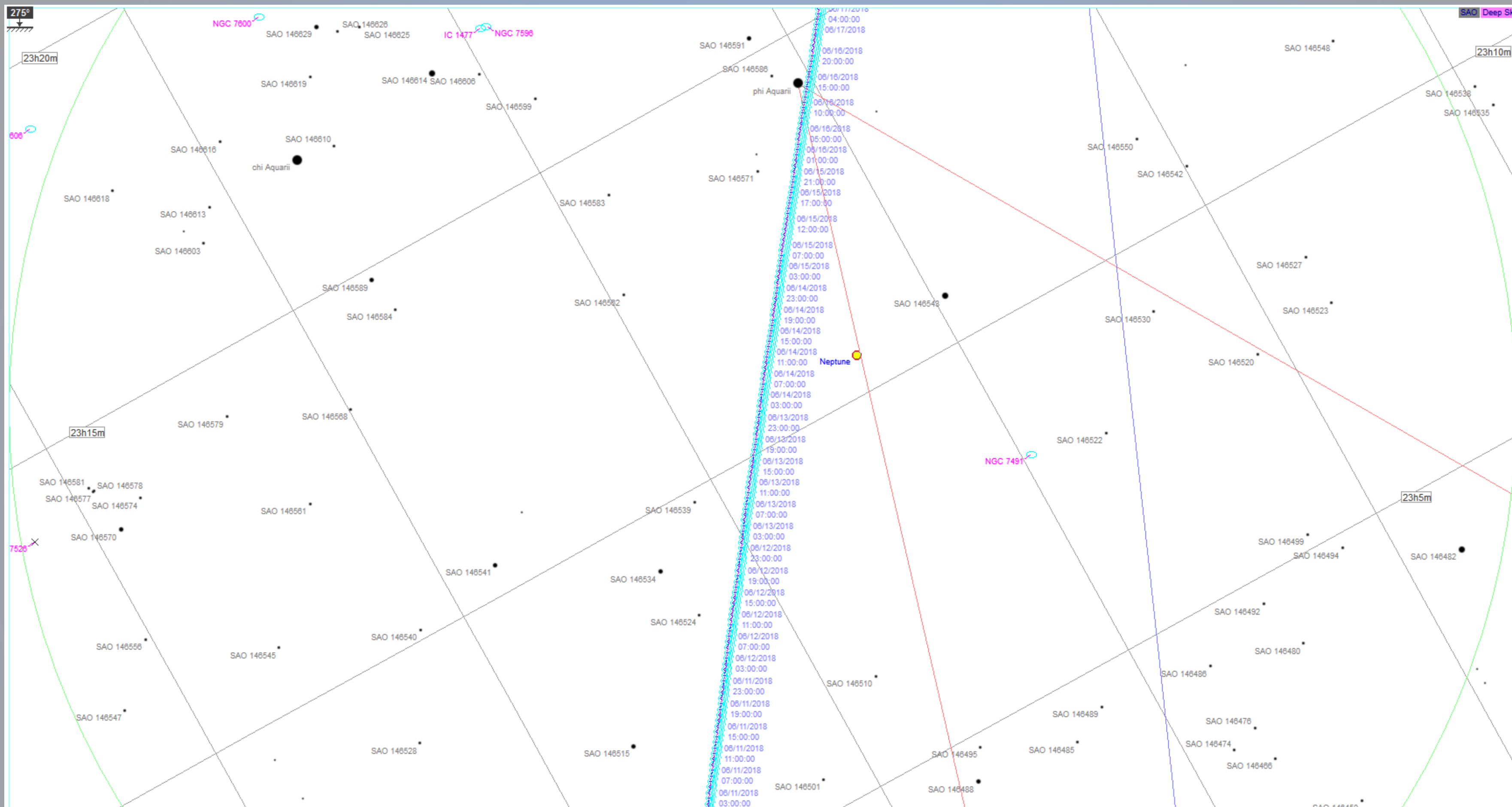
Current Comets of 2018!

66P/Du Toit: A Morning comet visible in moderate size telescopes

This comet appears in the constellation of Sculptor from late May through 1 July moving Eastward towards the Sunrise. This comet appears as a faint 13th magnitude comet that brightens to a visual magnitude close to 10.0 during its passage through Sculptor and fades to 12th magnitude upon reaching Cetus.

Latitude	June 1	June 5	June 10	June 15	June 20	June 25	June 30	Nights Visible (1 – 30) June
45°N	Low in the southern sky not visible in the Daytime	Low in the southern sky not visible in the Daytime	Low in the southern sky and below an altitude of 10°. Lost in the glare of Morning Twilight.	Low in the southern sky and below an altitude of 10°. Lost in the glare of Morning Twilight.	Low in the southern sky and below an altitude of 10°. Lost in the glare of Morning Twilight.	Low in the southern sky and below an altitude of 10°. Lost in the glare of Morning Twilight.	Low in the southern sky and below an altitude of 10°. Lost in the glare of Morning Twilight.	1
30°N	Very Low in the Southern skies at an altitude above 10° 5:00 AM CDT Above 15° 5:35 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:50 AM CDT Above 15° 5:25 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:40 AM CDT Above 15° 5:10 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:25 AM CDT Above 15° 4:55 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:10 AM CDT Above 15° 4:40 AM CDT	Very Low in the Southern skies at an altitude above 10° 3:55 AM CDT Above 15° 4:25 AM CDT	Very Low in the Southern skies at an altitude above 10° 3:40 AM CDT Above 15° 4:05 AM CDT	20
25°N	Very Low in the Southern skies at an altitude above 10° 4:35 AM CDT Above 15° 5:05 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:30 AM CDT Above 15° 4:55 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:20 AM CDT Above 15° 4:45 AM CDT	Very Low in the Southern skies at an altitude above 10° 4:05 AM CDT Above 15° 4:35 AM CDT	Very Low in the Southern skies at an altitude above 10° 3:55 AM CDT Above 15° 4:20 AM CDT	Very Low in the Southern skies at an altitude above 10° 3:40 AM CDT Above 15° 4:05 AM CDT	Very Low in the Southern skies at an altitude above 10° 3:25 AM CDT Above 15° 3:50 AM CDT	30

Current Comets of 2018!



Courtesy of C2A Software, Phillipe Deverchére 2016.

Passage of Comet 37P/Forbes near the Planet Neptune

During the period of 11 am CDT (4 PM UTC) 10 June through 9 pm CDT on 17 June (2 am UTC on 18 June) comet 37P/Forbes will progressing very close to the Planet Neptune will moving eastward through the East central region of the constellation of Aquarius. Comet Forbes is currently at 12th magnitude with a maximum brightness of 10.7 from a visual field report on 21 May. The comet is expected to remain at lower to mid 13th magnitude visual and photographic while passing to within <30' Southwest or Southeast of the Planet during the morning hours of 13 - 14 June. The best time to observe would be between (5 – 5:30) am CDT just before nautical or civil twilight. It's minimal approach to the planet will be at 17' 19.7" South Southeast of the planet at 12:30 PM CDT (5:30 PM UTC) on 14 June 2018. Rate of progression at closest approach will be at 35.24" every half hour or 1.18"/min.

Current Comets of 2018!

(Ephemeris Data for 37P/Forbes for the period: 13 – 14 June: Part I)

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object Position		Sun	Moon
	hh:mm:ss	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 06 13	0:00:00	23 08 59.7	-07 00 46	1.206	1.658	96.2	37.5	13.5	1.2	54.2	176	-68	15	0.01
2018 06 13	1:00:00	23 09 03.6	-07 00 04	1.205	1.658	96.2	37.5	13.5	1.2	54.2	212	-64	3	0.01
2018 06 13	2:00:00	23 09 07.5	-06 59 22	1.205	1.658	96.2	37.5	13.5	1.19	54.2	236	-55	-8	0.01
2018 06 13	3:00:00	23 09 11.4	-06 58 40	1.205	1.658	96.2	37.5	13.5	1.19	54.1	250	-43	-19	0.01
2018 06 13	4:00:00	23 09 15.3	-06 57 58	1.205	1.658	96.2	37.5	13.5	1.18	53.9	260	-31	-28	0.01
2018 06 13	5:00:00	23 09 19.1	-06 57 16	1.205	1.658	96.3	37.5	13.5	1.18	53.7	268	-18	-34	0.01
2018 06 13	6:00:00	23 09 23.0	-06 56 34	1.204	1.658	96.3	37.5	13.5	1.17	53.5	275	-5	-37	0.01
2018 06 13	7:00:00	23 09 26.7	-06 55 52	1.204	1.658	96.3	37.5	13.5	1.17	53.3	283	8	-37	0
2018 06 13	8:00:00	23 09 30.5	-06 55 10	1.204	1.658	96.3	37.5	13.5	1.16	53	291	21	-32	0
2018 06 13	9:00:00	23 09 34.2	-06 54 29	1.204	1.658	96.3	37.5	13.5	1.15	52.8	301	33	-25	0
2018 06 13	10:00:00	23 09 37.9	-06 53 47	1.203	1.659	96.4	37.5	13.5	1.15	52.6	315	43	-16	0
2018 06 13	11:00:00	23 09 41.6	-06 53 05	1.203	1.659	96.4	37.5	13.5	1.15	52.5	334	51	-5	0
2018 06 13	12:00:00	23 09 45.2	-06 52 23	1.203	1.659	96.4	37.5	13.5	1.15	52.4	358	54	7	0
2018 06 13	13:00:00	23 09 48.9	-06 51 41	1.203	1.659	96.4	37.5	13.5	1.15	52.4	22	52	19	0
2018 06 13	14:00:00	23 09 52.6	-06 50 59	1.203	1.659	96.5	37.5	13.5	1.15	52.4	42	45	32	0
2018 06 13	15:00:00	23 09 56.3	-06 50 17	1.202	1.659	96.5	37.5	13.5	1.15	52.5	57	35	45	0
2018 06 13	16:00:00	23 09 59.9	-06 49 35	1.202	1.659	96.5	37.5	13.5	1.16	52.7	67	23	58	0
2018 06 13	17:00:00	23 10 03.7	-06 48 52	1.202	1.659	96.5	37.5	13.5	1.16	52.8	76	11	71	0
2018 06 13	18:00:00	23 10 07.4	-06 48 10	1.202	1.659	96.5	37.4	13.5	1.17	53	84	-2	82	0
2018 06 13	19:00:00	23 10 11.2	-06 47 28	1.201	1.659	96.6	37.4	13.5	1.17	53.2	91	-15	79	0
2018 06 13	20:00:00	23 10 15.0	-06 46 46	1.201	1.66	96.6	37.4	13.5	1.18	53.4	99	-28	67	0
2018 06 13	21:00:00	23 10 18.8	-06 46 04	1.201	1.66	96.6	37.4	13.5	1.18	53.6	108	-41	54	0
2018 06 13	22:00:00	23 10 22.6	-06 45 22	1.201	1.66	96.6	37.4	13.5	1.18	53.7	121	-53	41	0
2018 06 13	23:00:00	23 10 26.5	-06 44 40	1.201	1.66	96.6	37.4	13.5	1.18	53.8	143	-63	28	0

The next two pages provides two parts to the ephemeris data for anyone wanting to catch the comet in the vicinity of the Planet Neptune on the morning hours of 13 – 14 June before Sunrise.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22' 30" N , 95° 35' 37" W). Time is calculated for CDT (UTC = CDT + 5 HRS).

Current Comets of 2018!

(Ephemeris Data for 37P/Forbes for the period: 13 – 14 June: Part II)

Date	UT	(J2000) Epoch		Delta	r	El.	Ph.	m1	Sky Motion		Object Position		Sun	Moon
	hh:mm:ss	R.A.	Dec.						"/min	P.A.	Azi.	Alt.	Alt.	Phase
2018 06 14	0:00:00	23 10 30.3	-06 43 58	1.2	1.66	96.7	37.4	13.5	1.18	53.9	177	-68	16	0
2018 06 14	1:00:00	23 10 34.2	-06 43 16	1.2	1.66	96.7	37.4	13.5	1.18	53.9	213	-64	3	0
2018 06 14	2:00:00	23 10 38.0	-06 42 35	1.2	1.66	96.7	37.4	13.5	1.18	53.8	236	-55	-8	0
2018 06 14	3:00:00	23 10 41.8	-06 41 53	1.2	1.66	96.7	37.4	13.5	1.17	53.7	250	-43	-19	0
2018 06 14	4:00:00	23 10 45.6	-06 41 11	1.2	1.66	96.7	37.4	13.5	1.17	53.5	260	-30	-27	0
2018 06 14	5:00:00	23 10 49.4	-06 40 29	1.199	1.66	96.8	37.4	13.5	1.16	53.4	268	-17	-34	0
2018 06 14	6:00:00	23 10 53.2	-06 39 48	1.199	1.661	96.8	37.4	13.5	1.16	53.1	275	-4	-37	0
2018 06 14	7:00:00	23 10 56.9	-06 39 06	1.199	1.661	96.8	37.4	13.5	1.15	52.9	283	9	-37	0
2018 06 14	8:00:00	23 11 00.5	-06 38 24	1.199	1.661	96.8	37.4	13.5	1.14	52.7	291	22	-32	0
2018 06 14	9:00:00	23 11 04.2	-06 37 43	1.198	1.661	96.9	37.4	13.5	1.14	52.4	302	33	-25	0
2018 06 14	10:00:00	23 11 07.8	-06 37 01	1.198	1.661	96.9	37.4	13.5	1.14	52.3	316	44	-16	0.01
2018 06 14	11:00:00	23 11 11.4	-06 36 19	1.198	1.661	96.9	37.4	13.5	1.13	52.1	335	51	-5	0.01
2018 06 14	12:00:00	23 11 15.0	-06 35 38	1.198	1.661	96.9	37.4	13.5	1.13	52	359	54	7	0.01
2018 06 14	13:00:00	23 11 18.6	-06 34 56	1.198	1.661	96.9	37.4	13.5	1.13	52	23	52	19	0.01
2018 06 14	14:00:00	23 11 22.2	-06 34 14	1.197	1.661	97	37.4	13.5	1.13	52.1	43	44	32	0.01
2018 06 14	15:00:00	23 11 25.8	-06 33 32	1.197	1.661	97	37.4	13.5	1.14	52.1	57	34	45	0.01
2018 06 14	16:00:00	23 11 29.4	-06 32 50	1.197	1.662	97	37.4	13.5	1.14	52.3	68	23	58	0.01
2018 06 14	17:00:00	23 11 33.1	-06 32 08	1.197	1.662	97	37.3	13.5	1.15	52.5	77	10	71	0.01
2018 06 14	18:00:00	23 11 36.8	-06 31 27	1.196	1.662	97	37.3	13.5	1.15	52.7	84	-3	82	0.01
2018 06 14	19:00:00	23 11 40.5	-06 30 45	1.196	1.662	97.1	37.3	13.5	1.16	52.9	91	-16	80	0.01
2018 06 14	20:00:00	23 11 44.2	-06 30 03	1.196	1.662	97.1	37.3	13.5	1.16	53.1	99	-29	67	0.02
2018 06 14	21:00:00	23 11 47.9	-06 29 21	1.196	1.662	97.1	37.3	13.5	1.17	53.2	109	-42	54	0.02
2018 06 14	22:00:00	23 11 51.7	-06 28 39	1.196	1.662	97.1	37.3	13.5	1.17	53.4	122	-53	41	0.02
2018 06 14	23:00:00	23 11 55.5	-06 27 57	1.195	1.662	97.1	37.3	13.5	1.17	53.5	144	-63	28	0.02

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22’ 30” N , 95° 35’ 37” W). Time is calculated for CDT (UTC = CDT + 5 HRS).

Current Comets of 2018!

(Positions for the Planet Neptune on 13 – 14 June)

13 June @ Midnight:	23h 10m 48.1s R.A. -6° 18’ 49.9” Dec.
13 June @ 4 AM:	23h 10m 48.2s R.A. -6° 18’ 49.7” Dec.
13 June @ 8 AM:	23h 10m 48.4s R.A. -6° 18’ 49.3” Dec.
13 June @ Noon:	23h 10m 48.5s R.A. -6° 18’ 49.0” Dec.
13 June @ 4 PM:	23h 10m 48.6s R.A. -6° 18’ 48.8” Dec.
13 June @ 8 PM:	23h 10m 48.7s R.A. -6° 18’ 48.5” Dec.
14 June @ Midnight:	23h 10m 48.8s R.A. -6° 18’ 48.4” Dec.
14 June @ 4 AM:	23h 10m 48.9s R.A. -6° 18’ 48.2” Dec.
14 June @ 8 AM:	23h 10m 49.0s R.A. -6° 18’ 48.0” Dec.
14 June @ Noon:	23h 10m 49.1s R.A. -6° 18’ 47.9” Dec.
14 June @ 4 PM:	23h 10m 49.2s R.A. -6° 18’ 47.7” Dec.
14 June @ 8 PM:	23h 10m 49.3s R.A. -6° 18’ 47.6” Dec.

All Ephemeris Data Calculated for the HMNS George Observatory, Brazos Bend State Park, TX, US at Coordinates: 29°22’ 30” N , 95° 35’ 37” W). Time is calculated for CDT (UTC = CDT + 5 HRS).

Current Expectations for the rest of 2018!

Prediction for future Comets: (June – December) 2018 – Table I

Month	Evening			Midnight			Morning		
	Comet	Mag	h	Comet	Mag	h	Comet	Mag	h
2018 Jun	C/2016 M1 (PanSTARRS)	9	4	**C/2016 M1 (PanSTARRS)**	**9**	**25**	**C/2016 M1 (PanSTARRS)**	**9**	**29**
	C/2016 R2 (PanSTARRS)	**11**	**15**	**21P/Giacobini-Zinner**	**11**	**55**	66P/du Toit	10	14
	21P/Giacobini-Zinner	**11**	**28**	48P/Johnson	11	14	**21P/Giacobini-Zinner**	**11**	**83**
	364P/2018 A2 (PanSTARRS)	**11**	**26**	C/2017 S3 (PanSTARRS)	12	14	**48P/Johnson**	**11**	**37**
	C/2017 S3 (PanSTARRS)	12	5	C/2016 N6 (PanSTARRS)	12	2	**C/2017 S3 (PanSTARRS)**	**12**	**34**
	C/2016 N6 (PanSTARRS)	**12**	**27**	37P/Forbes	13	11	**37P/Forbes**	**13**	**44**
	C/2015 O1 (PanSTARRS)	**13**	**67**	**C/2015 O1 (PanSTARRS)**	**13**	**42**	**C/2015 O1 (PanSTARRS)**	**13**	**17**
	C/2018 EF9 (Lemmon)	**13**	**31**	**29P/Schwassmann-Wachmann 1**	**13**	**15**	**29P/Schwassmann-Wachmann 1**	**13**	**48**
				C/2018 EF9 (Lemmon)	**13**	**29**	**C/2018 EF9 (Lemmon)**	**13**	**30**
2018 Jul	**21P/Giacobini-Zinner**	**8**	**31**	C/2017 S3 (PanSTARRS)	8	14	**C/2017 S3 (PanSTARRS)**	**7**	**34**
	C/2016 M1 (PanSTARRS)	9	4	**21P/Giacobini-Zinner**	**8**	**56**	**21P/Giacobini-Zinner**	**8**	**74**
	C/2017 S3 (PanSTARRS)	9	5	C/2016 M1 (PanSTARRS)	9	7	**48P/Johnson**	**11**	**38**
	C/2016 R2 (PanSTARRS)	11	12	**48P/Johnson**	**11**	**26**	C/2016 R2 (PanSTARRS)	11	4
	C/2016 N6 (PanSTARRS)	12	4	**29P/Schwassmann-Wachmann 1**	**13**	**38**	**29P/Schwassmann-Wachmann 1**	**13**	**57**
	C/2015 O1 (PanSTARRS)	**13**	**45**	**64P/Swift- Gehrels**	**13**	**37**	**64P/Swift- Gehrels**	**13**	**64**
				37P/Forbes	**13**	**35**	**37P/Forbes**	**13**	**59**
				C/2015 O1 (PanSTARRS)	**13**	**17**	**66P/du Toit**	**13**	**18**
							38P/Stephan-Oterma	**13**	**32**

Courtesy of Seiichi Yoshida's Home Page (Visual Comets of the Future – Northern Hemisphere, http://aerith.net/comet/future-n.html, 1 June 2018.

*The **h** means the highest altitude in that month at lat. 35 deg in the Northern Hemisphere.*

Current Expectations for the rest of 2018!

Prediction for future Comets: (June – December) 2018 – Table II

Month	Evening			Midnight			Morning		
	Comet	Mag	h	Comet	Mag	h	Comet	Mag	h
2018 Aug	**21P/Giacobini-Zinner**	**7**	**27**	**21P/Giacobini-Zinner**	**7**	**47**	C/2017 S3 (PanSTARRS)	5	12
	48P/Johnson	11	5	**48P/Johnson**	**11**	**33**	**21P/Giacobini-Zinner**	**7**	**61**
	C/2016 R2 (PanSTARRS)	11	13	**64P/Swift- Gehrels**	**11**	**74**	**48P/Johnson**	**11**	**34**
	64P/Swift- Gehrels	11	14	38P/Stephan-Oterma	12	2	C/2016 R2 (PanSTARRS)	11	8
	29P/Schwassmann-Wachmann 1	**13**	**17**	**29P/Schwassmann-Wachmann 1**	**13**	**57**	**64P/Swift- Gehrels**	**11**	**72**
	37P/Forbes	13	2	**37P/Forbes**	**13**	**43**	**38P/Stephan-Oterma**	**12**	**49**
							C/2016 N6 (PanSTARRS)	12	7
							364P/2018 A2 (PanSTARRS)	13	12
							29P/Schwassmann-Wachmann 1	**13**	**57**
							37P/Forbes	**13**	**60**
2018 Sep	**64P/Swift- Gehrels**	**10**	**31**	**21P/Giacobini-Zinner**	**6**	**22**	**21P/Giacobini-Zinner**	**6**	**62**
	48P/Johnson	**11**	**15**	**64P/Swift- Gehrels**	**10**	**85**	**64P/Swift- Gehrels**	**10**	**55**
	C/2016 R2 (PanSTARRS)	11	13	38P/Stephan-Oterma	10	14	**38P/Stephan-Oterma**	**10**	**63**
	29P/Schwassmann-Wachmann 1	**13**	**33**	**48P/Johnson**	**11**	**28**	48P/Johnson	11	5
				46P/Wirtanen	**11**	**32**	**46P/Wirtanen**	**11**	**36**
				29P/Schwassmann-Wachmann 1	**13**	**56**	C/2016 R2 (PanSTARRS)	11	13
							C/2016 N6 (PanSTARRS)	**12**	**30**
							29P/Schwassmann-Wachmann 1	**13**	**29**

Courtesy of Seiichi Yoshida's Home Page (Visual Comets of the Future – Northern Hemisphere, http://aerith.net/comet/future-n.html, 1 June 2018.

*The **h** means the highest altitude in that month at lat. 35 deg in the Northern Hemisphere.*

Current Expectations for the rest of 2018!

Prediction for future Comets: (June – December) 2018 – Table III

Month	Evening			Midnight			Morning		
	Comet	Mag	h	Comet	Mag	h	Comet	Mag	h
2018 Oct	**64P/Swift- Gehrels**	**9**	**47**	**46P/Wirtanen**	**8**	**29**	**21P/Giacobini-Zinner**	**7**	**48**
	48P/Johnson	**11**	**30**	**38P/Stephan-Oterma**	**9**	**28**	**38P/Stephan-Oterma**	**9**	**73**
	C/2016 R2 (PanSTARRS)	12	13	**64P/Swift- Gehrels**	**9**	**90**	**64P/Swift- Gehrels**	**9**	**33**
	29P/Schwassmann-Wachmann 1	**13**	**55**	**48P/Johnson**	**11**	**20**	46P/Wirtanen	10	14
				29P/Schwassmann-Wachmann 1	**13**	**55**	**C/2016 R2 (PanSTARRS)**	**12**	**22**
							C/2016 N6 (PanSTARRS)	**12**	**52**
							C/2017 S3 (PanSTARRS)	13	8
2018 Nov	**46P/Wirtanen**	**4**	**35**	**46P/Wirtanen**	**4**	**28**	**38P/Stephan-Oterma**	**9**	**83**
	64P/Swift- Gehrels	**9**	**90**	**38P/Stephan-Oterma**	**9**	**44**	**21P/Giacobini-Zinner**	**9**	**26**
	C/2016 R2 (PanSTARRS)	12	8	**64P/Swift- Gehrels**	**9**	**88**	64P/Swift- Gehrels	9	11
	48P/Johnson	**13**	**33**	21P/Giacobini-Zinner	10	8	**C/2016 N6 (PanSTARRS)**	**12**	**54**
	29P/Schwassmann-Wachmann 1	**13**	**54**	**C/2016 N6 (PanSTARRS)**	**12**	**20**	**C/2016 R2 (PanSTARRS)**	**12**	**36**
				48P/Johnson	13	7			
				29P/Schwassmann-Wachmann 1	**13**	**23**			
2018 Dec	**46P/Wirtanen**	**3**	**53**	**46P/Wirtanen**	**3**	**85**	**46P/Wirtanen**	**3**	**32**
	38P/Stephan-Oterma	9	7	**38P/Stephan-Oterma**	**9**	**65**	**38P/Stephan-Oterma**	**9**	**90**
	64P/Swift- Gehrels	**10**	**89**	**64P/Swift- Gehrels**	**10**	**54**	**21P/Giacobini-Zinner**	**11**	**16**
	29P/Schwassmann-Wachmann 1	**13**	**54**	**21P/Giacobini-Zinner**	**11**	**17**	**C/2016 N6 (PanSTARRS)**	**12**	**46**
	78P/Gehrels 2	**13**	**44**	**C/2016 N6 (PanSTARRS)**	**12**	**40**	**C/2016 R2 (PanSTARRS)**	**12**	**52**

Courtesy of Seiichi Yoshida's Home Page (Visual Comets of the Future – Northern Hemisphere, http://aerith.net/comet/future-n.html, 1 June 2018.

*The **h** means the highest altitude in that month at lat. 35 deg in the Northern Hemisphere.*