

# Comet, Asteroid and Meteor Section

## CAMnotes 2022 No.2 July-August

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### Observing guide for Comet C/2017 K2 (PanSTARRS)

In the previous issue of CAMnotes I mentioned Comet C/2017 K2 (PanSTARRS) might peak at magnitude 6 and become bright enough to be visible in binoculars during the later months of 2022. In the months since that issue the comet appears to be brightening more slowly than predicted and at the time of writing (early July) is a little brighter than magnitude 9. It is still some months before it reaches perihelion on 2022 December 19.97, at a distance of 1.8 au

At right is an image of the comet taken by Kos Coronaios on June 25, showing a green coma and short slender tail. I currently have the comet visually at magnitude 8.9, with an angularly small coma and DC = 3-4, but punctuated with a sharp star-like point within the central condensation.

The comet has its closest approach to Earth on July 15 when it will be 1.81 a.u. distant from our planet. Thereafter it moves further away while still approaching the Sun, and on perihelion date will be nearly 2.5 a.u. from Earth. It will be interesting to see how the size and brightness change after close approach, and the comet will remain visible in the evening sky for most of the remainder of the year, at least until early November, after which it will become lost in early evening twilight.



## Locating the comet

Those who wish to prepare their own ephemerides can use the following orbital elements. Just enter these into your preferred desktop planetarium program.

Date of Perihelion T	2022 Dec 19.972698
Distance of perihelion q	1.799368
Eccentricity of orbit e	1.000411
Inclination of orbit i	87.542993
Argument of perihelion $\omega$	236.163473
Longitude of ascending node $\Omega$	88.265590

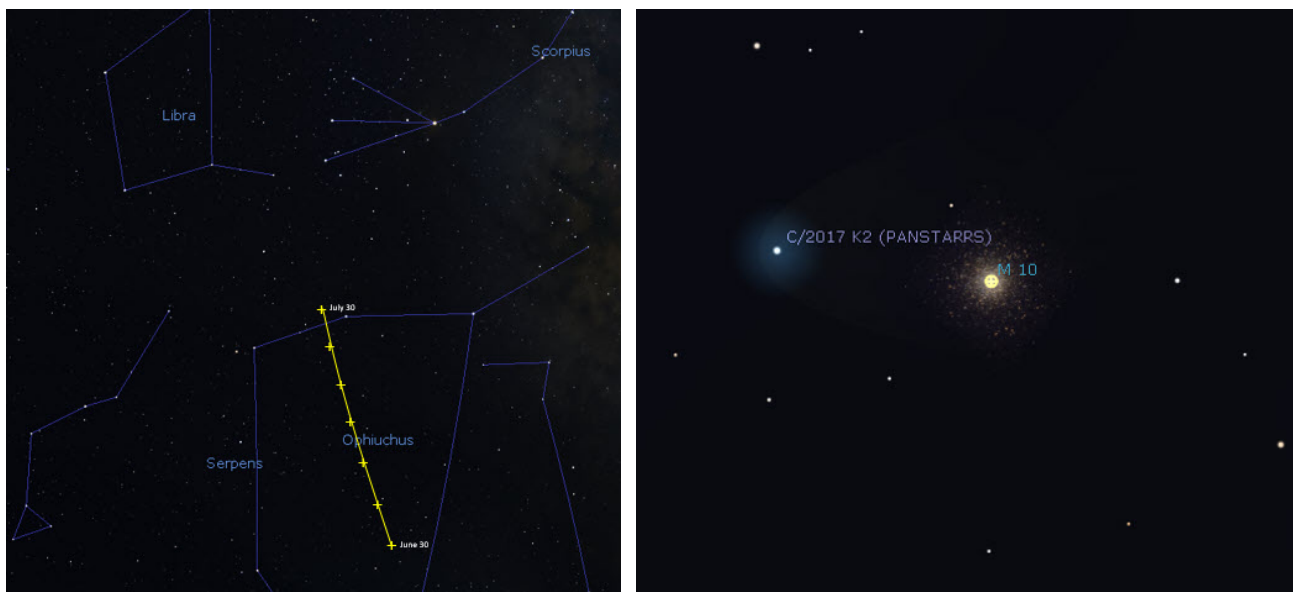
*Orbital elements (J2000) for comet C/2017 K2 (PanSTARRS)*

One program I use, which is good enough to locate the comet visually, is Stellarium, and in this Newsletter I give a short tutorial on how to enter the comets details and display its position in Stellarium. You can also prepare an ephemeris using the Minor Planet Centre's Ephemeris Service. That which I prepared for the next few months is shown below. Details are given for 5 day intervals at 00hUT, and are prepared for Johannesburg.

Date	UT	R.A. (J2000)	Decl.	Delta	r	El.	Ph.	m1
	h m s							
2022 06 30	000000	17 28 11.0	+02 16 00	1.850	2.776	149.8	10.6	7.3
2022 07 05	000000	17 17 39.2	+00 26 26	1.825	2.733	146.8	11.8	7.2
2022 07 10	000000	17 07 14.2	-01 30 37	1.811	2.690	142.5	13.3	7.1
2022 07 15	000000	16 57 07.5	-03 33 10	1.808	2.648	137.4	15.0	7.0
2022 07 20	000000	16 47 29.5	-05 39 14	1.815	2.605	131.9	16.9	7.0
2022 07 25	000000	16 38 29.3	-07 46 51	1.831	2.564	126.1	18.7	6.9
2022 07 30	000000	16 30 14.0	-09 54 21	1.855	2.522	120.1	20.4	6.9
2022 08 04	000000	16 22 48.9	-12 00 20	1.886	2.482	114.2	21.9	6.8
2022 08 09	000000	16 16 16.8	-14 03 48	1.923	2.441	108.4	23.2	6.8
2022 08 14	000000	16 10 38.7	-16 04 07	1.965	2.401	102.8	24.3	6.8
2022 08 19	000000	16 05 54.5	-18 00 56	2.011	2.362	97.2	25.2	6.8
2022 08 24	000000	16 02 03.1	-19 54 14	2.059	2.324	91.9	25.8	6.7
2022 08 29	000000	15 59 03.1	-21 44 09	2.109	2.286	86.8	26.2	6.7
2022 09 03	000000	15 56 52.3	-23 30 55	2.160	2.250	81.8	26.4	6.7
2022 09 08	000000	15 55 28.1	-25 14 53	2.210	2.214	77.0	26.3	6.7
2022 09 13	000000	15 54 47.8	-26 56 24	2.260	2.179	72.4	26.1	6.7
2022 09 18	000000	15 54 49.2	-28 35 55	2.307	2.145	68.0	25.8	6.6
2022 09 23	000000	15 55 30.4	-30 13 49	2.353	2.112	63.8	25.2	6.6
2022 09 28	000000	15 56 49.7	-31 50 33	2.396	2.080	59.8	24.6	6.6
2022 10 03	000000	15 58 45.4	-33 26 30	2.435	2.050	55.9	23.9	6.5
2022 10 08	000000	16 01 16.0	-35 02 02	2.471	2.020	52.3	23.0	6.5
2022 10 13	000000	16 04 20.5	-36 37 29	2.502	1.993	48.9	22.2	6.5
2022 10 18	000000	16 07 58.9	-38 13 14	2.529	1.966	45.6	21.2	6.5
2022 10 23	000000	16 12 11.3	-39 49 36	2.552	1.942	42.7	20.3	6.4
2022 10 28	000000	16 16 58.4	-41 26 55	2.570	1.919	40.0	19.5	6.4

Note: delta is the Earth-comet distance in astronomical units (a.u.), r is the Sun-comet distance in a.u., El. is the elongation from the sun in degrees, Ph is the Sun-comet-Earth phase angle, and m1 is the total cometary magnitude, predicted from the discovery circumstances. The comet has been brightening more slowly than originally predicted and will likely be fainter than given in column m1.

## Path of comet C/2017 K2 (PanSTARRS) in July and August



Left, path of comet C/2017 K2 PanSTARRS during July. Right, Comet C/2017 K2 close to Messier 10 on July 15

The comet spends July crossing the constellation of Ophiuchus. An opportunity for astrophotographers comes on the evening of July 15, when the comet will be located less than half a degree from the magnitude 6.4 globular cluster Messier 10. The comet may be around magnitude 8.5 and much smaller than the 20 arc minute cluster, but nevertheless should make a fine sight. Try to capture images before the bright moon rises (7:45 pm Johannesburg)



Left, path of comet C/2017 K2 PanSTARRS during August. Right, Comet C/2017 K2 close to IC 4592 on August 19.

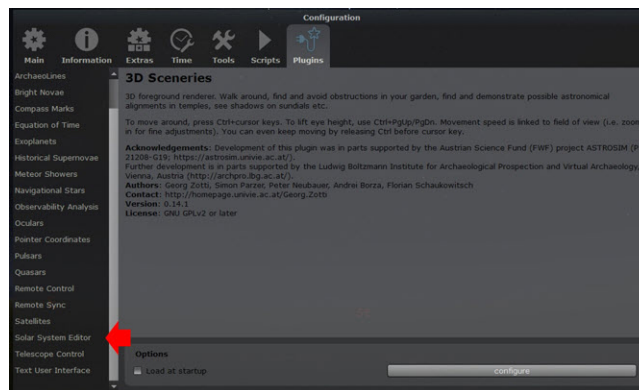
During August the comet crosses into Scorpius. On August 19 it is close to the Blue Horsehead Nebula (IC 4592) and depending on its length, the tail of the comet may merge with the faint nebulosity at the edge of the Blue Horsehead, a reflection nebula which shines by reflecting light from the star  $\nu$  Scorpii (Jabbah). On August 22 the comet is just 40' from  $\beta$  Scorpii (Acrab) and on August 30 just half a degree from  $\delta$  Scorpii (Dschubba), both affording easy opportunities to locate the comet close to bright stars.

## How to display comet C/2017 K2 (PanSTARRS) in Stellarium

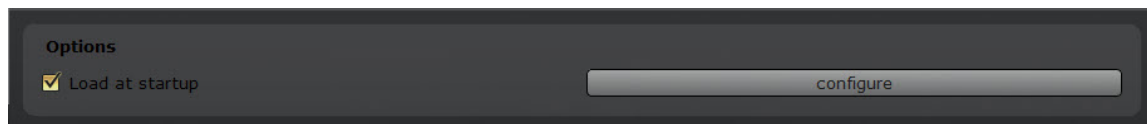
1. Place your cursor in the bottom left of the screen to invoke the toolbars
2. Click on the **Configuration window** (the spanner icon in the image below)



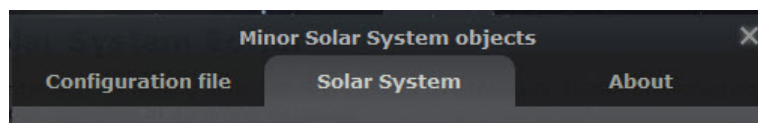
3. Click on **Plugins**
4. Click on **Solar System Editor**



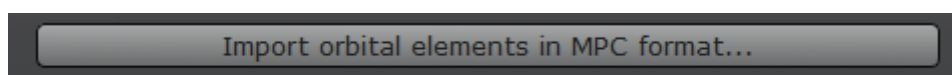
5. Click the check box **Load at startup**
6. Click on the wide button bottom right **Configure**



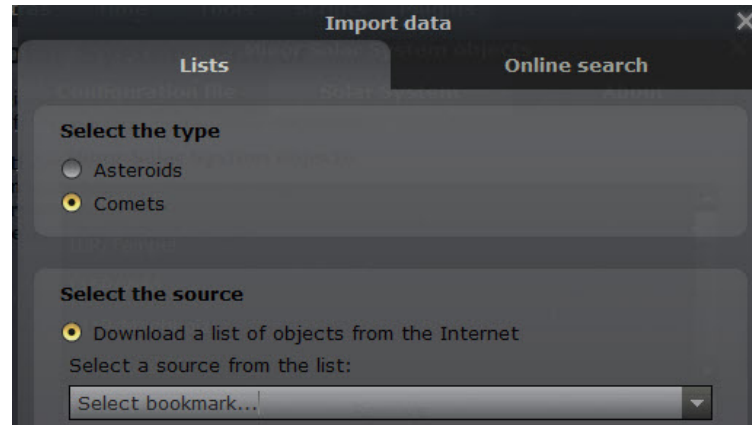
7. Click the middle of the three tabs **Solar System**



8. Click the bottom button **Import orbital elements in MPC format...**

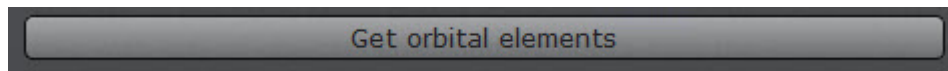


9. In the **Lists** tab select the **Comets** button and then the **Select the source** button

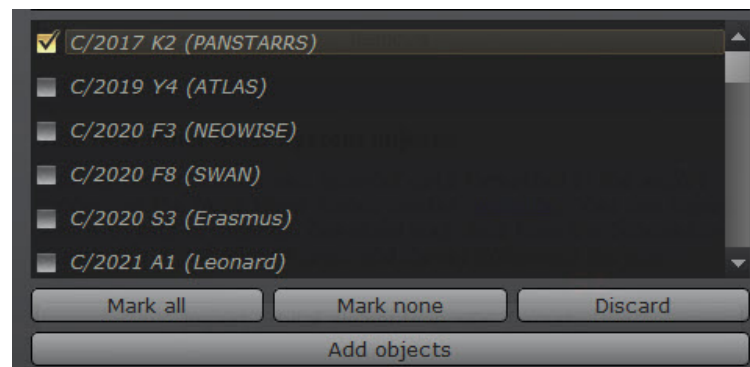


10. Click on **Select bookmark**, and then on **MPC's list of observable comets**

11. Click on the wide button **Get orbital elements**



12. Scroll down to comet C/2017 K2 (PANSTARRS), check its box on the left, and then click on **Add objects**



13. Exit all the Configuration windows that are open. You have now entered the orbital elements of the comet. You can do the same for any other comet or asteroid you wish to observe in the future.

14. To find the location of the comet for any time and date, and after entering your location, invoke the toolbars as in step 1, and click on the Search window (magnifying glass icon).

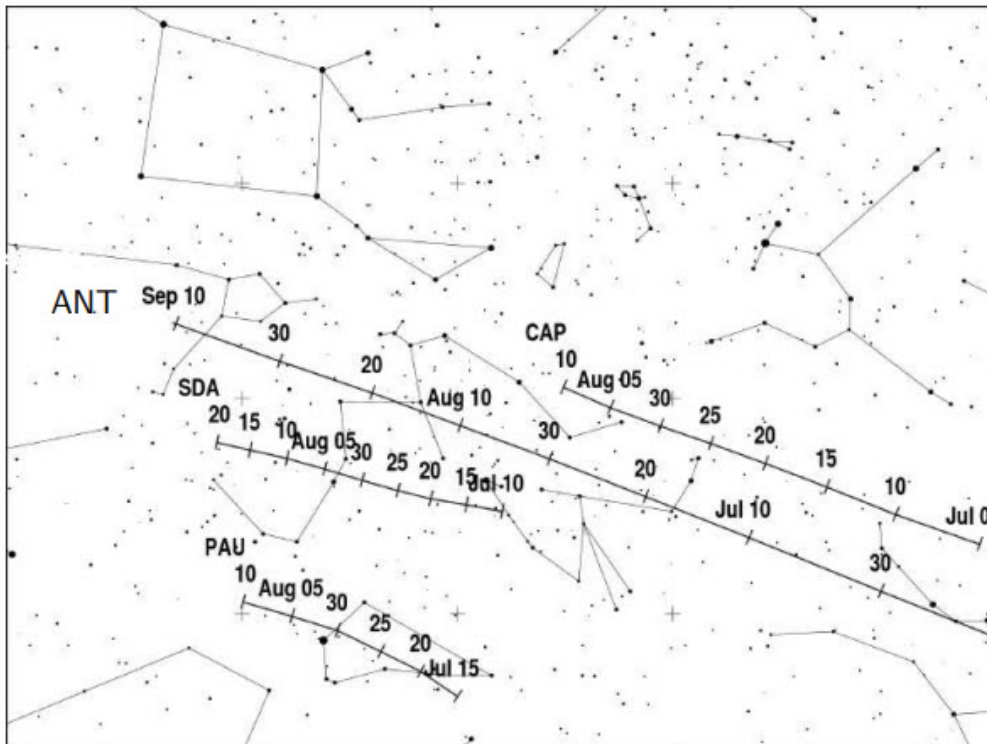
15. In the Objects tab, enter C/2017 K2 into the window and click the search icon. Zoom in to see the comet in the middle of the screen.

16. Click on the comet to see its position from the location and the date and time entered.

# Late July/early August meteor showers

## Southern $\delta$ Aquariids / $\alpha$ Capricornids / Piscis Austrinids

The late winter months for us bring generally long cold nights, and perhaps the urge is to remain warm indoors with a cup of hot chocolate. But those who are prepared to venture outside, wrapped up in several layers of warm clothing, are rewarded with interesting meteor activity, which due to the number of showers active at this time, often peaks at this time of year. Key amongst the showers active in late July and early August are the Southern delta-Aquariids, alpha-Capricornids and Piscis Austrinids.



*Radiant position and drift for the Southern delta-Aquariids (SDA), alpha-Capricornids (CAP), Piscis Austrinids (PAU) and Antihelion (ANT) streams during July/August. Note that all these radiants close to the ecliptic appear to drift eastwards at about  $1^\circ$  per day, due to the daily motion of the earth through the stream. Diagram courtesy of the IMO, Meteor Calendar for 2022.*

The Southern delta-Aquariids (SDA) are active from July 12–August 23, and reach their maximum on July 30 from a radiant at RA 22h40m, Decl.  $-16^\circ$ . The meteors enter the atmosphere at 41 km/sec and will appear to have medium speed. ZHR at maximum is about 25/hour. Note the Zenithal Hourly Rate (ZHR) is the number of meteors that can be expected with the radiant at the zenith and under dark skies with magnitude 6.5 stars visible to the naked eye. Expect to see much lower rates when the radiant is at lower altitude and from light polluted locations.

Note the location of the Antihelion (ANT) sources are nearby to the SDAs at this time of year. The Antihelion meteors radiate throughout the year from a large oval area on the ecliptic and opposite the sun, from where they get the name Antihelion. Any ANTs seen are likely to be included with the SDAs.

The alpha-Capricornids (CAP) reach their peak on the same night as the SDAs, July 30, but show considerably lower activity with ZHR ~5/hr. The shower has been known to undergo enhancement in rates by about double that, and so for example, the ZHR in 1995 reached 10/hr. The radiant on the night of maximum is at RA 20h28, Decl. -10°, and the meteors enter at 23 km/s, and appear to be slow moving. The shower is also known for its occasional bright fireball, and so the prospect of seeing an occasional very bright, slow moving CAP makes braving the winter conditions well worth while.

The Piscis Austrinids are a minor shower, active at the same time as the SDAs and CAPs, and possibly reaching maximum two days earlier on July 28 this year. The rate is around the same as the CAPs or perhaps a little lower, but the shower is really in need of more observation to elucidate its properties. This is best done by plotting all meteors seen on gnomonic maps. If you want to participate in this program and need maps for plotting, please let me know. The radiant at maximum is at RA 22h44, Decl. -30° and the meteors enter at 35 km/sec, appearing with medium speed.

Clear skies

*Tim*