October 2023 Astronomy Report

- ***Moon***:
  - Phases
  - Annular Solar Eclipse, October 14

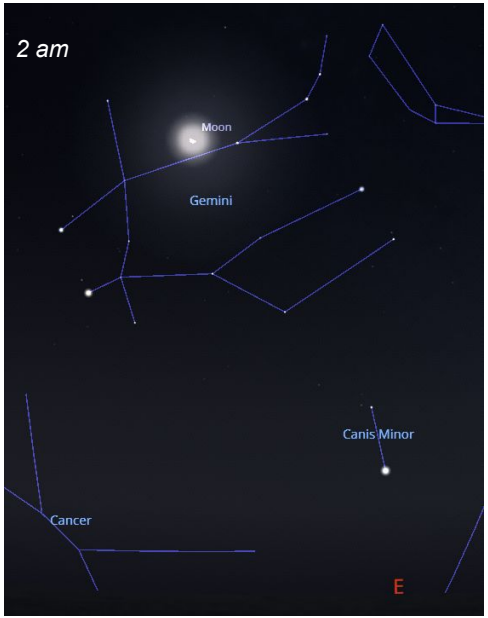
- ***Planets:***
  - Inner planets
    - Mercury shrinking from view
    - Venus a “brilliant morning star”
  - Outer planets
    - Mars approaching solar conjunction in November, too close to Sun for observation
    - Saturn & Jupiter dominate evening sky

- ***Dark Sky Star Party:***
  - Location Amberwood Ct., October 14
  - Comets & Asteroids, oh my!

- ***Public Viewing:***
  - Cub Lake, October 21
  - Orionid meteor shower

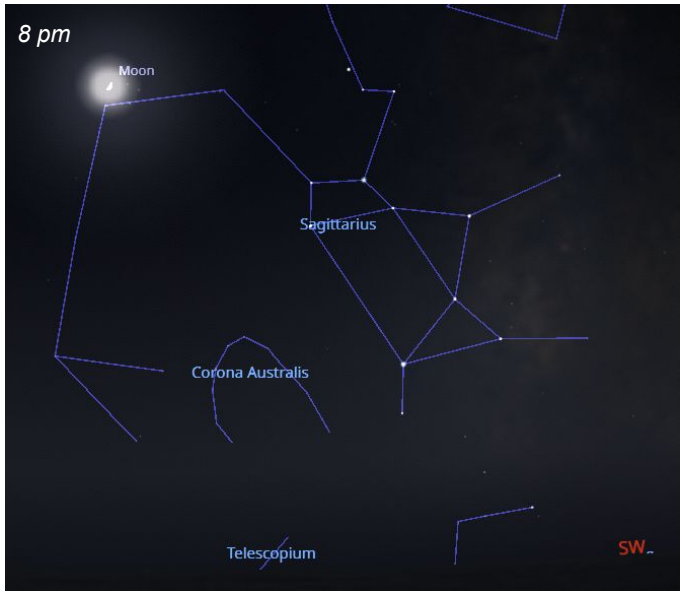
Moon - Phases

October 6 - Last Quarter (Gemini)



October 14 - New Moon (annular solar eclipse)

October 21 - First Quarter (Sagittarius)



October 28 - Full Moon (Aries, Cetus)

Apogee (252K miles) - 9th
Perigee (227K miles) - 25th

Moon - Phases

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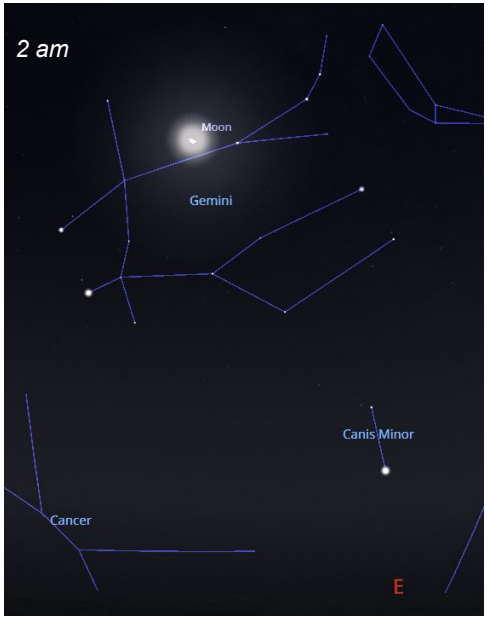

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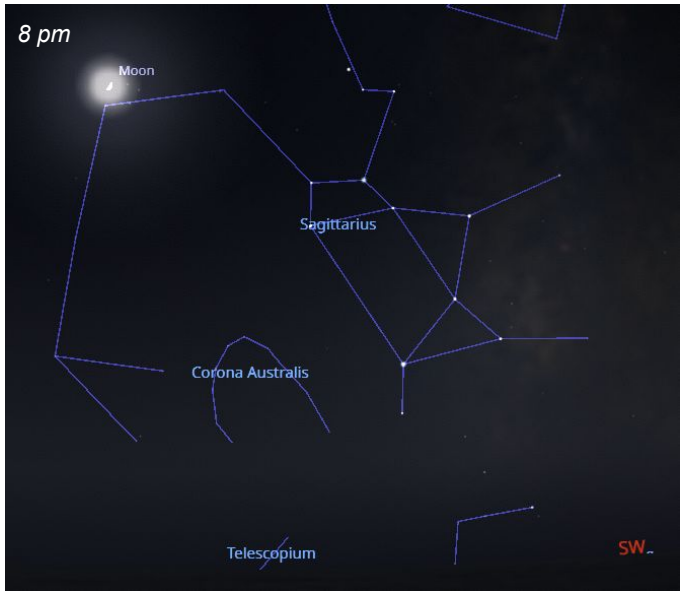

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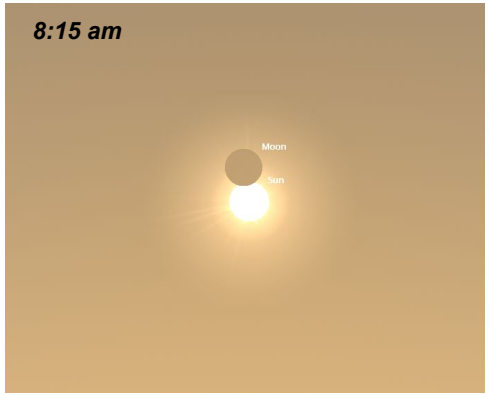
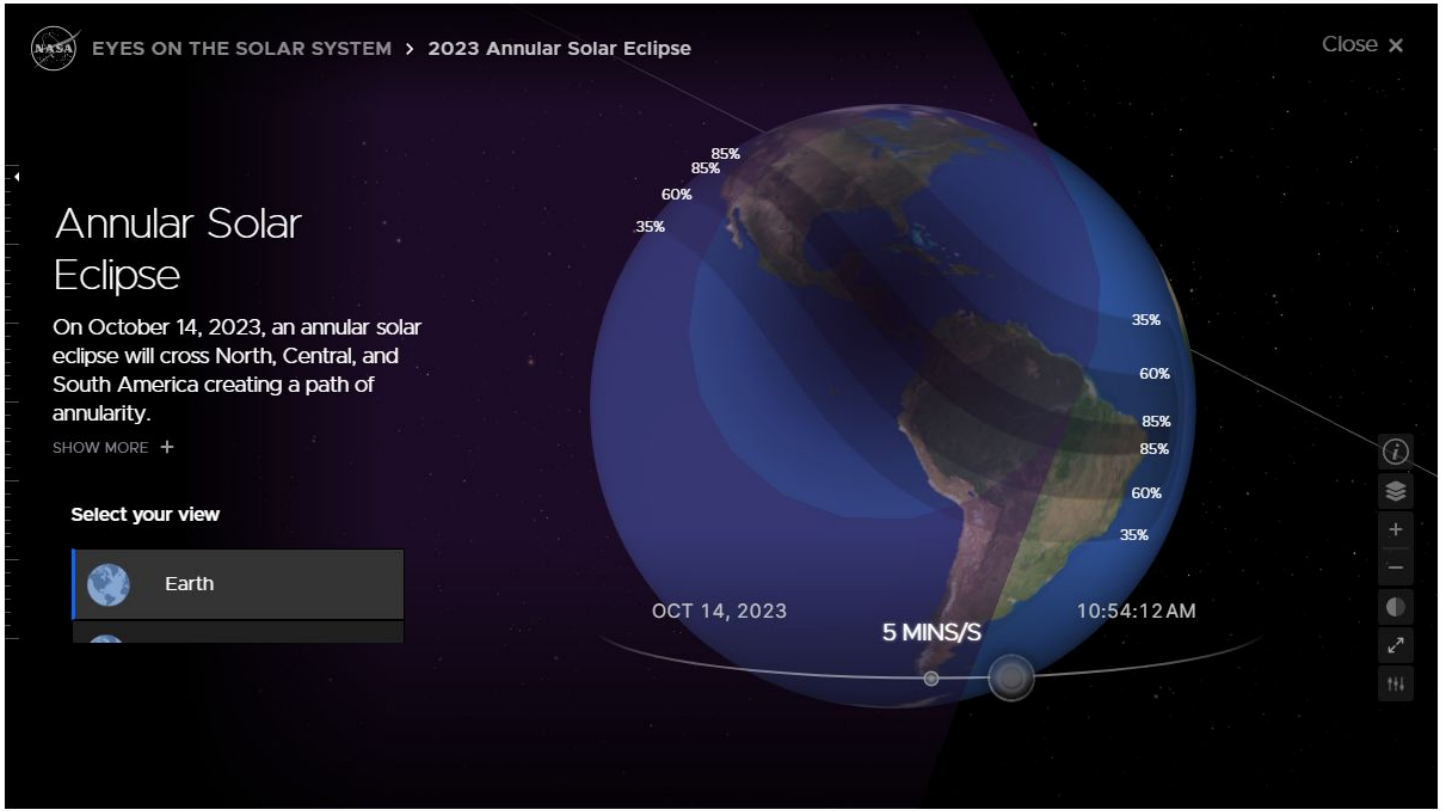
Did you know? The Moon's most common element is oxygen, although always bound to another element.

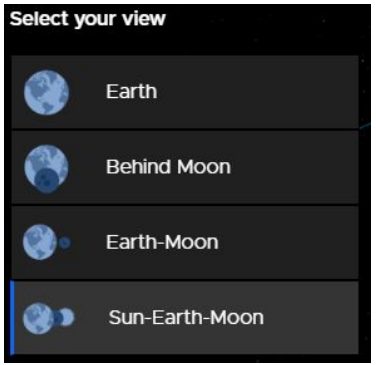
Moon - Annular Solar Eclipse (October 14)



Moon - Annular Solar Eclipse (October 14)

https://science.nasa.gov/eclipses/future-eclipses/eclipse-2023/





This 3D visualization of the 2023 annular eclipse is built with real science data.
NASA/JPL-Caltech/VTAD

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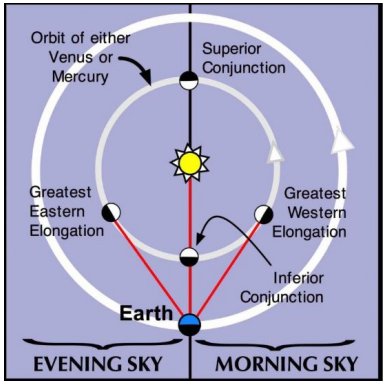
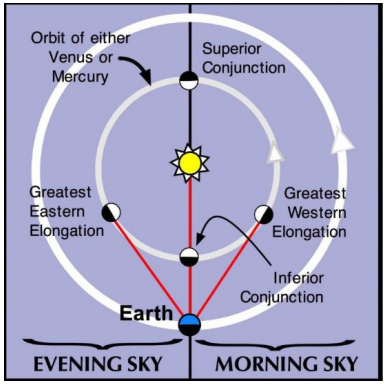
Morning: Mercury - *(Virgo)*

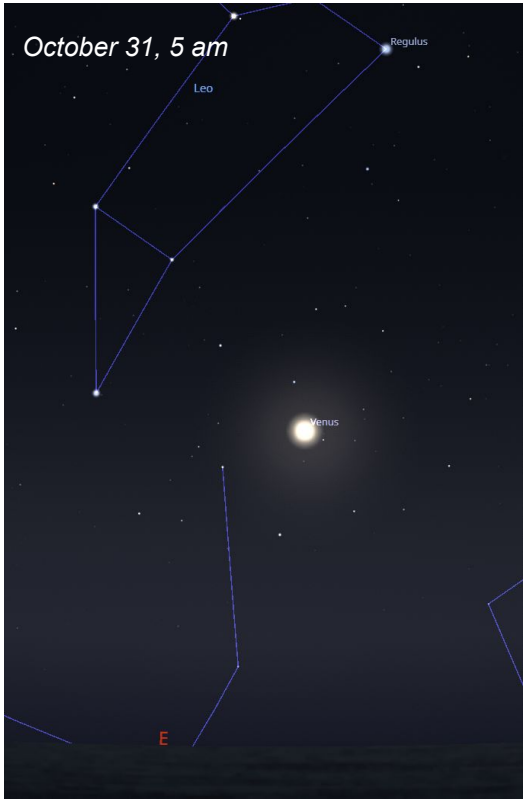
Brief morning appearances early in month; elongation from Sun decreasing quickly
Reaches superior conjunction October 20
Returns to evening sky later next month



Morning: Venus - *(Leo)*

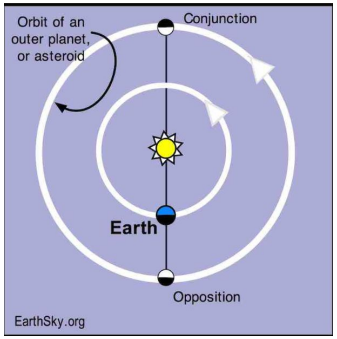
Venus dominates in early morning; traveling away from Earth - reaches western elongation on October 23rd



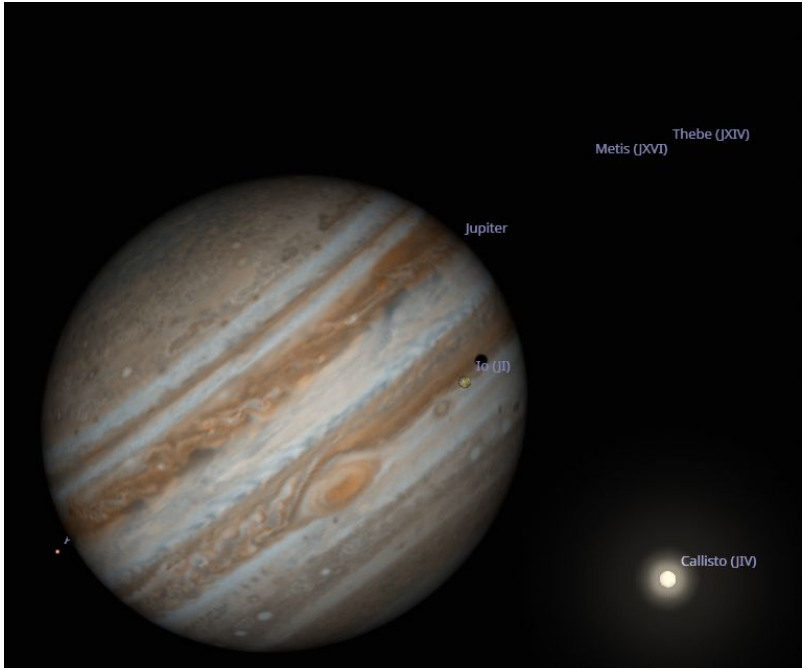


Evening / Morning: Jupiter - *(Cetus)*

Jupiter rises around 8 pm at beginning of October; gaining in diameter and brightness (highest of the year by month's end) - nearing opposition



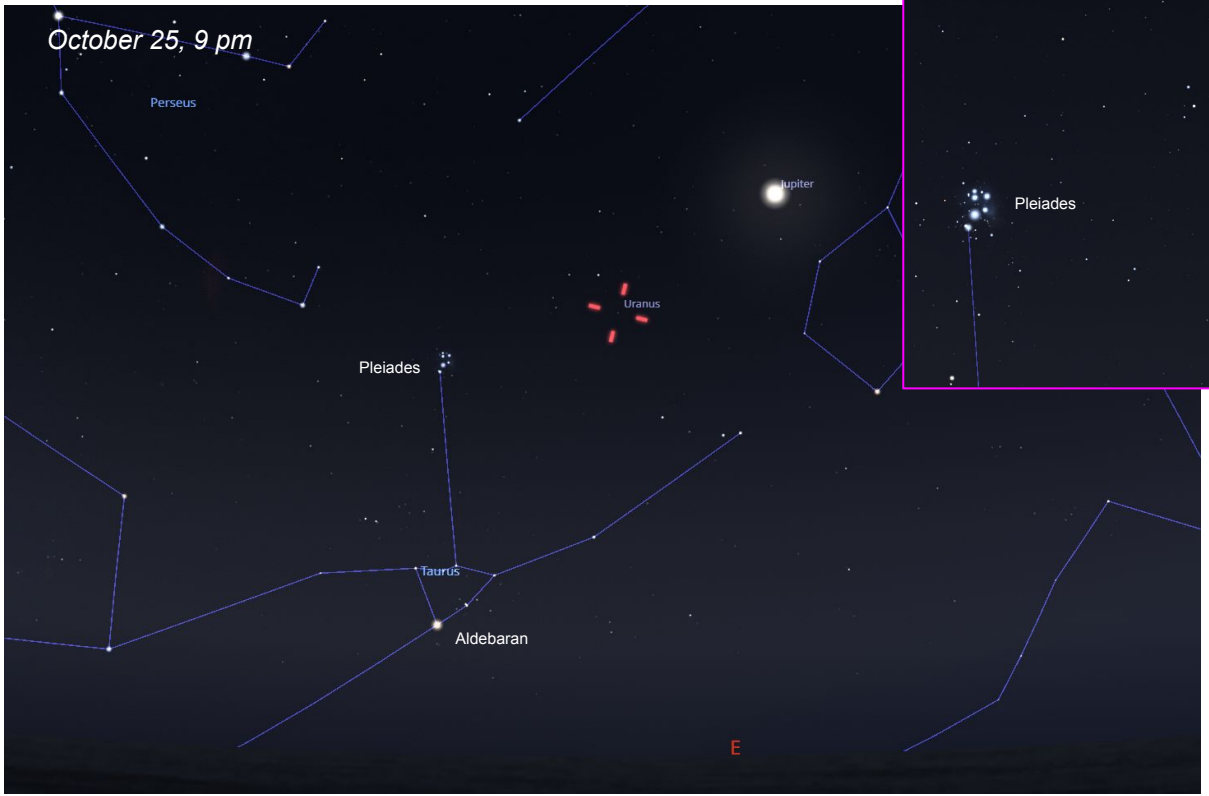
Io's shadow leads the moon by only nine minutes - runup to opposition



Evening / Morning: Uranus - *(Cetus, Taurus)*

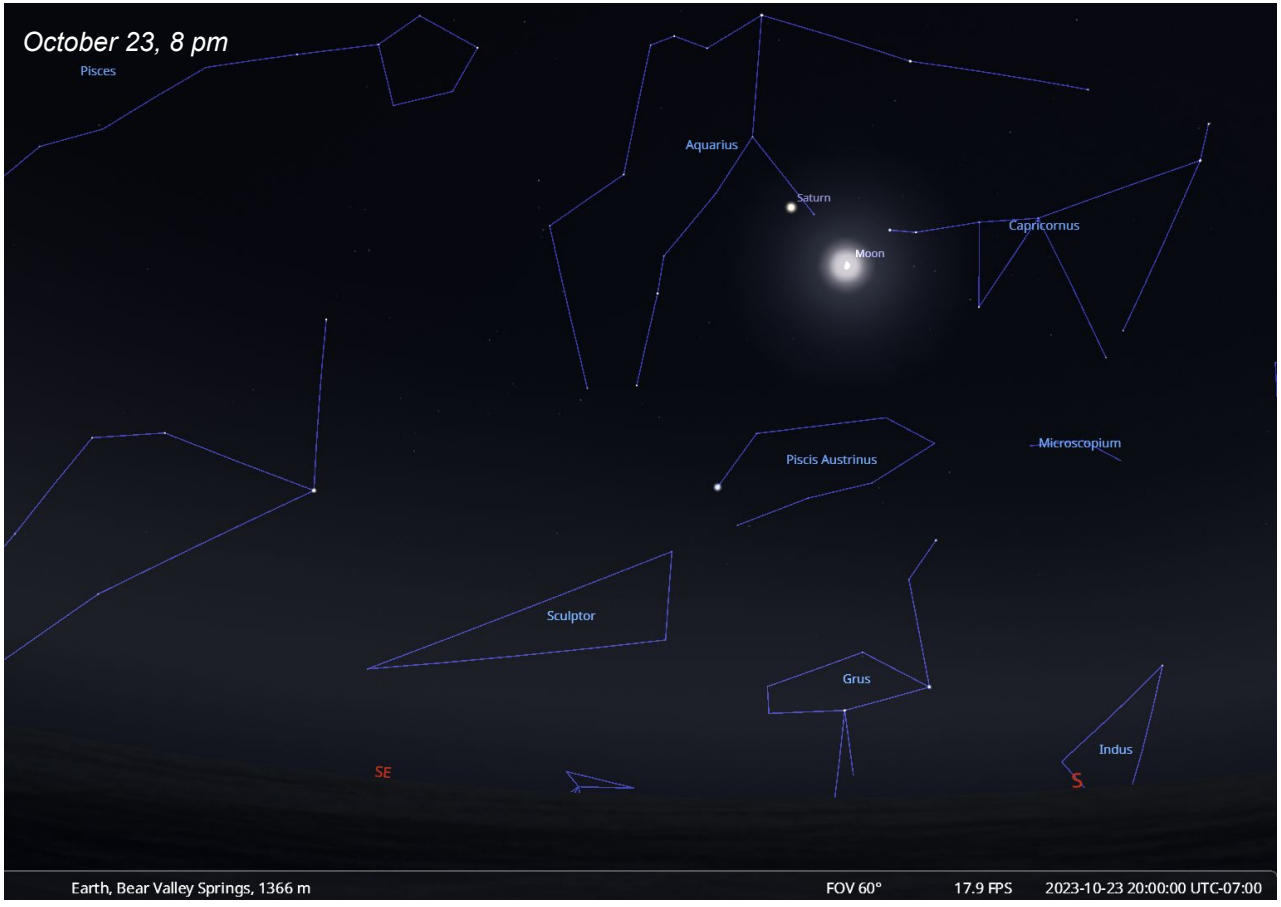
Uranus viewed between the Pleiades and Jupiter; nearing next month's opposition

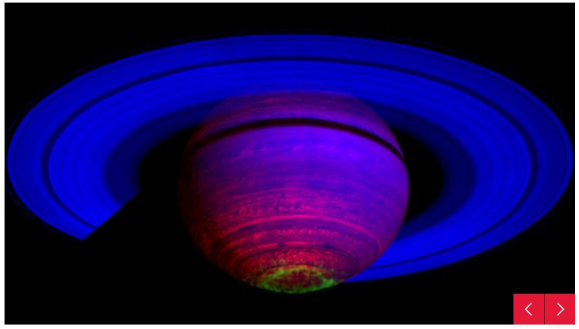
Visible with binoculars



Evening: Saturn - *(Aquarius)*

Saturn has good evening viewing, sets before 2 am by end of month



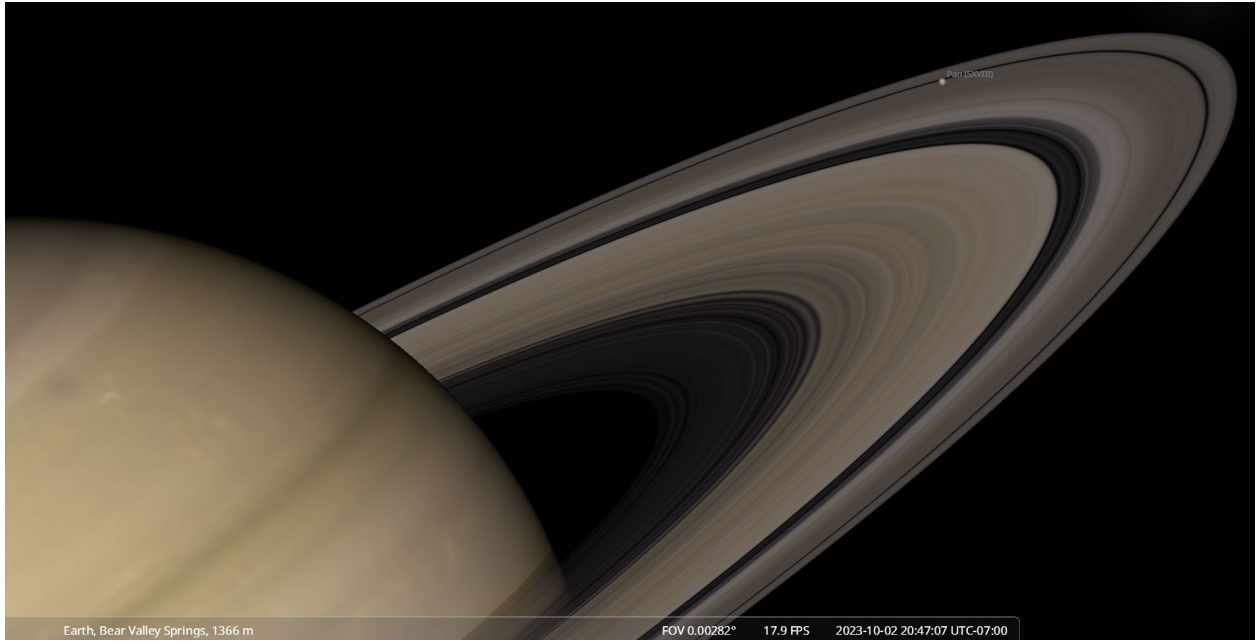


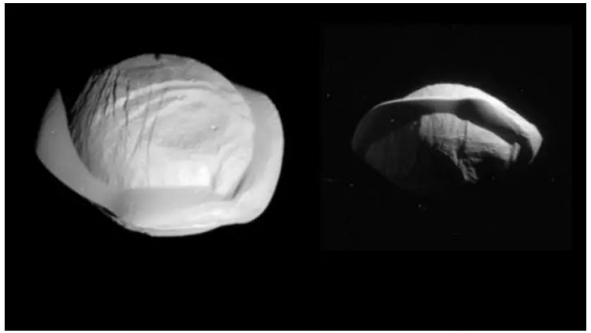
This false-color composite image, constructed from data obtained by NASA's Cassini spacecraft, shows the glow of auroras streaking out about 1,000 kilometers (600 miles) from the cloud tops of Saturn's south polar region. Full image and caption Credit: NASA/JPL/University of Arizona/University of Leicester |

https://www.jpl.nasa.gov/news/new-views-of-saturns-aurora-captured-by-cassini

Evening: Saturn - *(Aquarius)*

Saturn has 145 documented moons!





These images of Pan, Saturn's innermost moon, were taken from different perspectives: The left image appears to be a view from above the moon while the right image seems to be from below. The moon has a flat ridge around its midpoint and lines across its surface. (NASA / JPL-Caltech / Space Science Institute)

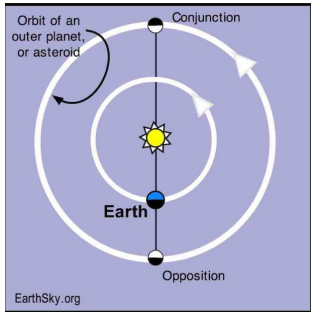
Cassini spacecraft passed within 15,300 miles (closest encounter) in March 2017

Pan is Saturn's innermost moon, orbiting every 13.8 hours at an altitude of 83,000 miles. Identified in 1990 from Voyager 2 images taken in 1981. It measures 35km x 23km and is a ring shepherd in the Encke Gap.

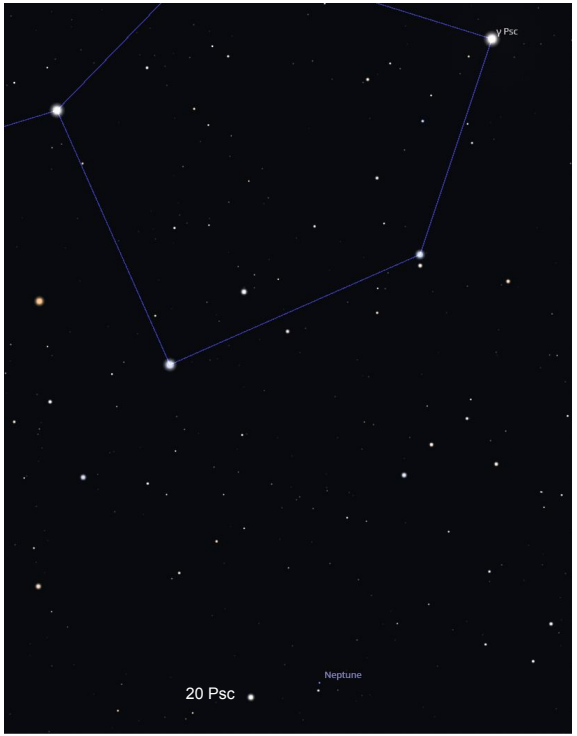
https://www.foxnews.com/us/nasa-publishes-never-before-seen-photos-ravioli-moon-orbiting-saturn

Evening / Morning: Neptune - *(Pisces)*

Neptune visible all night in Pisces, just past opposition at the start of October



Visible with binoculars



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October Dark Sky Party Amberwood Court, October 14

Ps 19:2

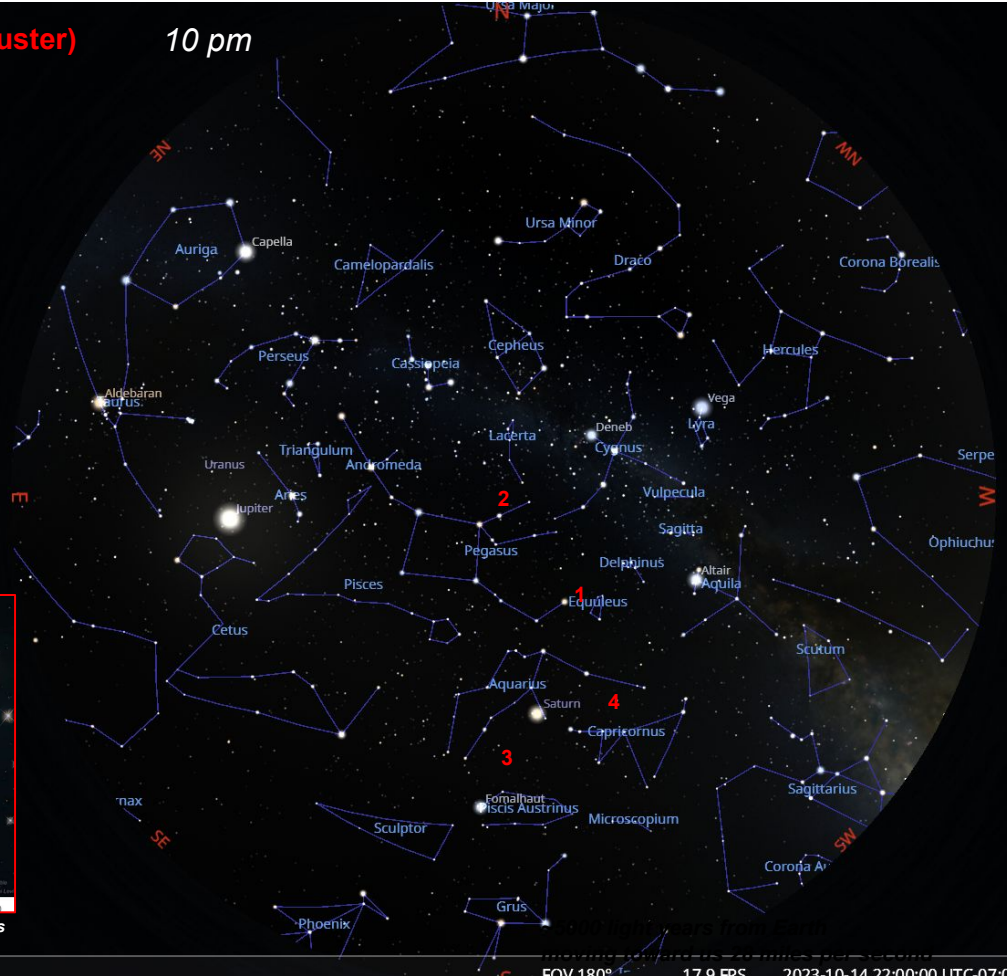
1 - M15 (Great Pegasus Cluster)

35,000 light years from Earth
12 billion yrs old
visible with binoculars

2 - Stephan's Quintet

300 million(!) light years from Earth in Pegasus will eventually merge with each other

10 pm



3 - Helix Nebula

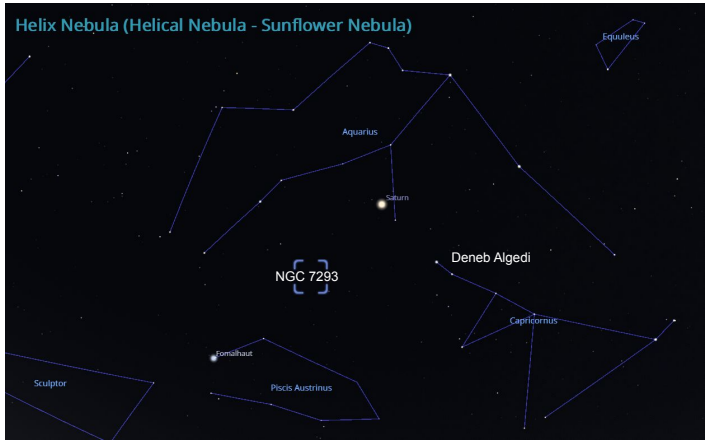
only ~10,600 years old
650 light years distant

4 - Saturn Nebula

~5000 light years from Earth
moving toward us 28 miles per second

Earth, Bear Valley Springs, 1366 m | FOV 180° | 17.9 FPS | 2023-10-14 22:00:00 UTC-07:00

October Dark Sky Party Asteroid 8 Flora

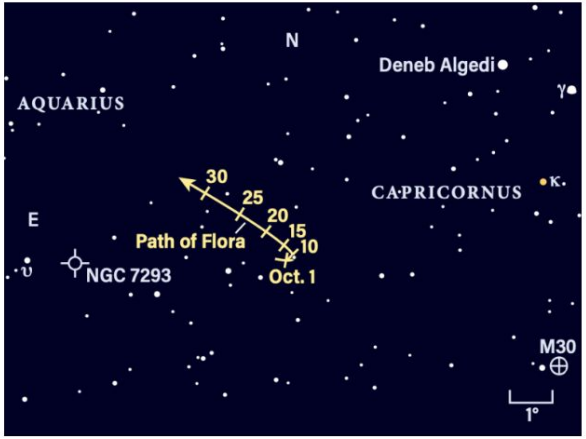


Locating Asteroids: A drop in the water

Can you move your scope straight up and down? That's all it takes to locate the large asteroid 8 Flora this month. Just before 10 p.m. local daylight time, Saturn and Iota (ι) Aquarii cross the meridian, the imaginary line rising overhead from the southern horizon. Shift the view 7° directly down to land on Flora. If you don't know your exact field of view, there are online calculators for any scope-eyepiece combination.

Use the chart to keep tabs on the patterns of triangles, voids, and clumps as you near the spot. On the 7th and 8th, Flora forms a tight pair with a magnitude 7.4 field star. The 85-mile-wide, nearly spherical mountain will be notably fainter at magnitude 9.2. You likely won't see any movement during your observing session because Flora is just exiting a hairpin retrograde arc, its motion briefly parallel to Earth's. Take a break from Oct. 22 to 25, when the passing waxing gibbous Moon throws out its veil of light.

Flora was discovered by Englishman John Hind in 1847, decades after Giuseppe Piazzi had pegged 1 Ceres in 1801.

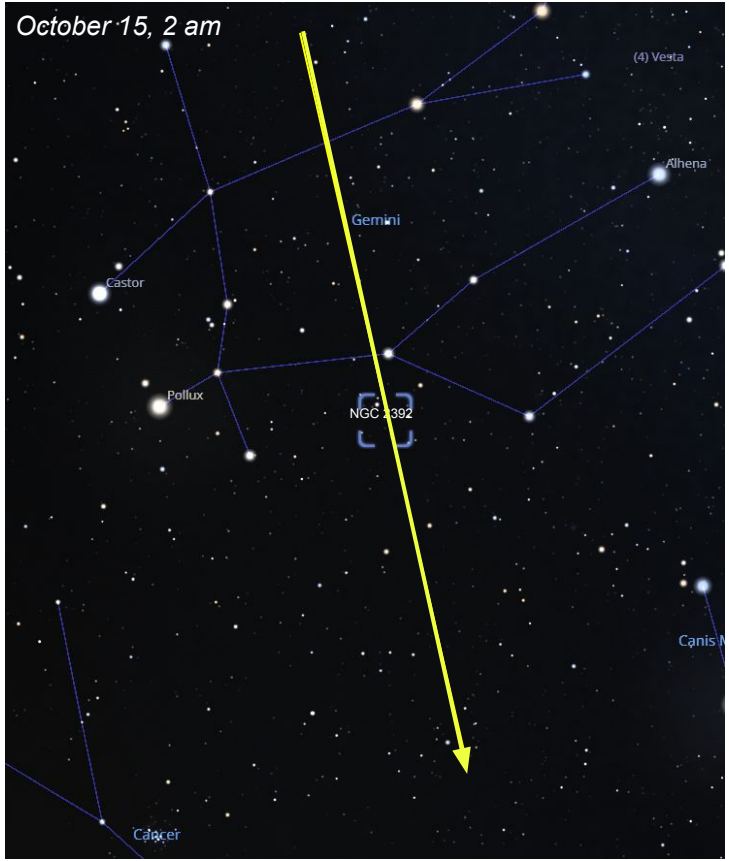


Side note: NASA-TV will air show on Bennu
October 11 @ 8am (findings & images)

Source: Astronomy Magazine

October Dark Sky Party

Comet 103P/Hartley

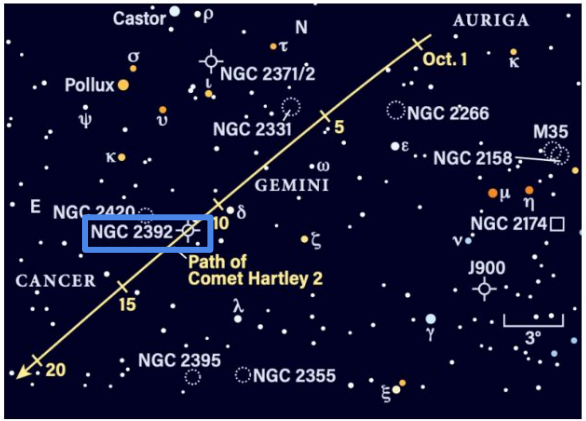


Comet Search: The clown with green hair

Peaking at 8th magnitude, Comet 103P/Hartley (also called Hartley 2) will be a decent telescopic sight after midnight from country skies with a 4-inch scope. Binoculars may pull it in, too. From the suburbs, it's in range of a 10-inch scope.

Although Hartley 2 passed closest to Earth last month, it is still closing in on the Sun for perihelion on the 12th. The mile-long, bowling-pin-shaped dirty snowball orbits Sol every 6.48 years. We get a good chance at it every 12.96 years, but that slight shortfall in time means that for each return, Earth arrives later so the comet is farther and fainter. Next month is our last view brighter than 10th magnitude for a few decades.

We do get a consolation prize: On the 12th and 13th, the "hairy star" is only 0.5° from NGC 2392 in Gemini, sometimes called the Lion or the Clown-faced nebula. To imagers, both will be green. The higher surface brightness of the planetary nebula will trigger our green cone receptors through 10-inch scopes, but visually the comet's fuzz will remain ashen gray. We are seeing the comet almost head-on. Can you notice which side is out of round?



Comet Hartley 2 covers a fair bit of sky this month, skating closely past NGC 2392 just before the 15th. Go online to find information on the comet's location later in October. Credit: Astronomy: Roen Kelly

Source: *Astronomy Magazine*

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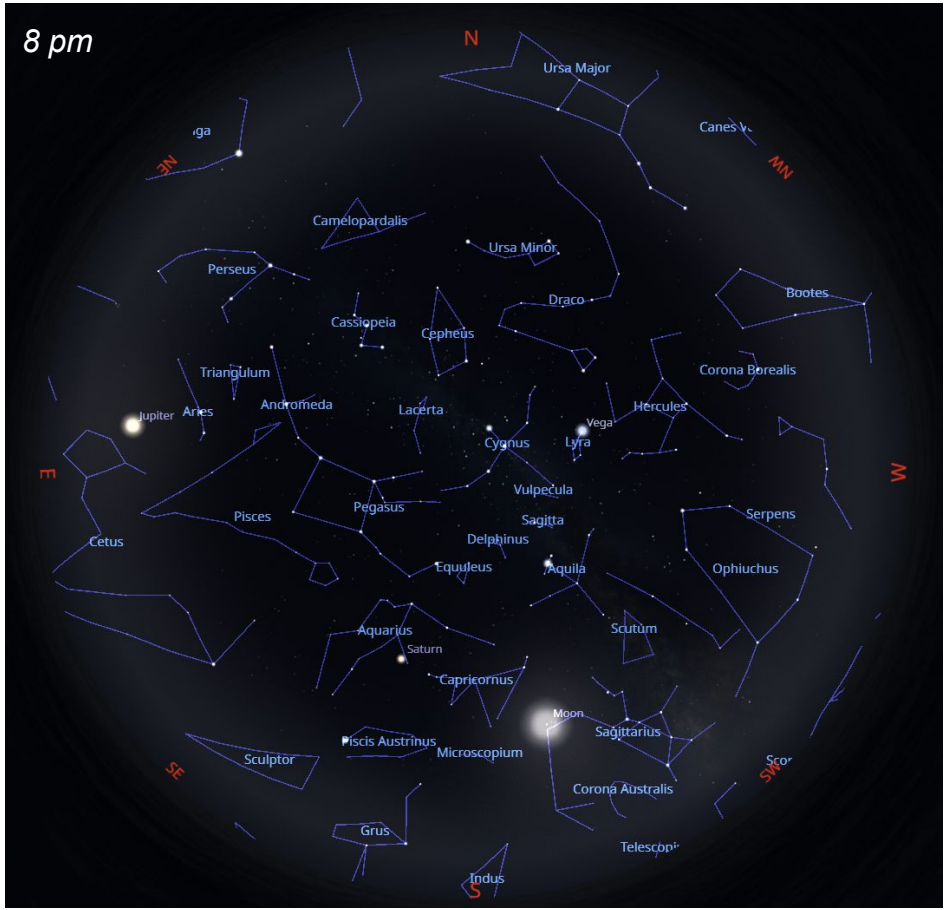
October Public Viewing

Cub Lake, October 21

Sun sets 6:20 pm; Jupiter rises 6:50 pm

First Quarter Moon



October Public Viewing

Cub Lake, October 21

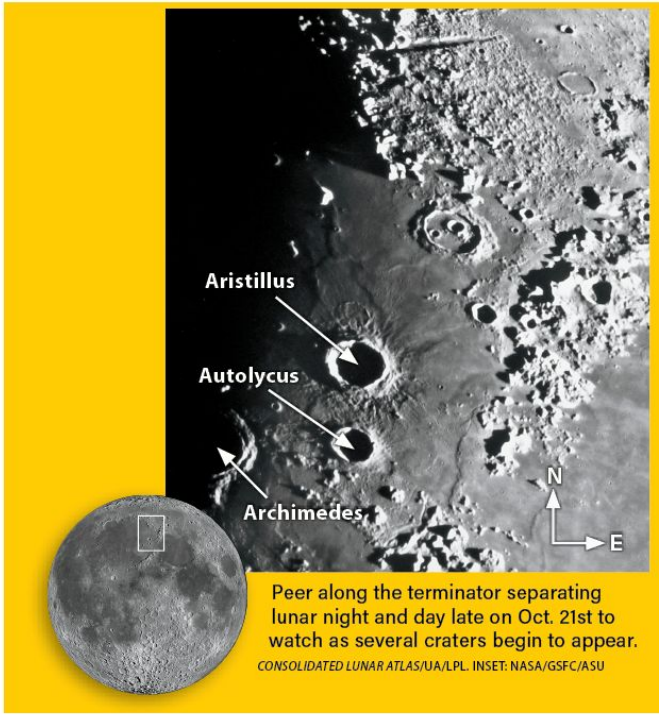
Rising Moon: One glorious sight after another

The waxing crescent Moon rides low in the autumnal evening sky yet sports a magnificent array of wonders along the light-dark terminator that make it worthwhile to watch each night.

On the 21st, the rugged lunar Apennines thrust diagonally into the sunlit domain near the lunar equator. Lying to their north along the terminator are two young craters — Autolycus and Aristillus — sticking up proudly above the lower plains. They formed a couple of billion years ago near the end of the last major lunar bombardment. The low Sun angle highlights the rugged apron of debris that splattered around each circular formation, while their steep, high walls prevent this light from reaching much of the floors. Stay for an hour on nearby fabulous Archimedes and watch the long shadows stretching into the terminator retreat as the rotation of the Moon causes the Sun to rise.

Consider the characteristics of these "youthful" craters. The larger impactor that created Aristillus was able to excavate a lot more material — there are many more streaks and ridges pointing radially away from this crater than Autolycus. Also compare the rims and aprons to those of the large, round craters Hipparchus and Albategnius south of the equator. Evidence of the latter's greater age comes from their degraded features, the result of incessant pounding from smaller impacts over time. Their central peaks are lower, their walls are rounded and pockmarked with dozens of craterlets, and their aprons have been smoothed out.

Return on the 22nd to see how the higher Sun angle begins to conceal the aprons' roughness. You may also notice the appearance of the Straight Wall located in the southern third of the Moon.

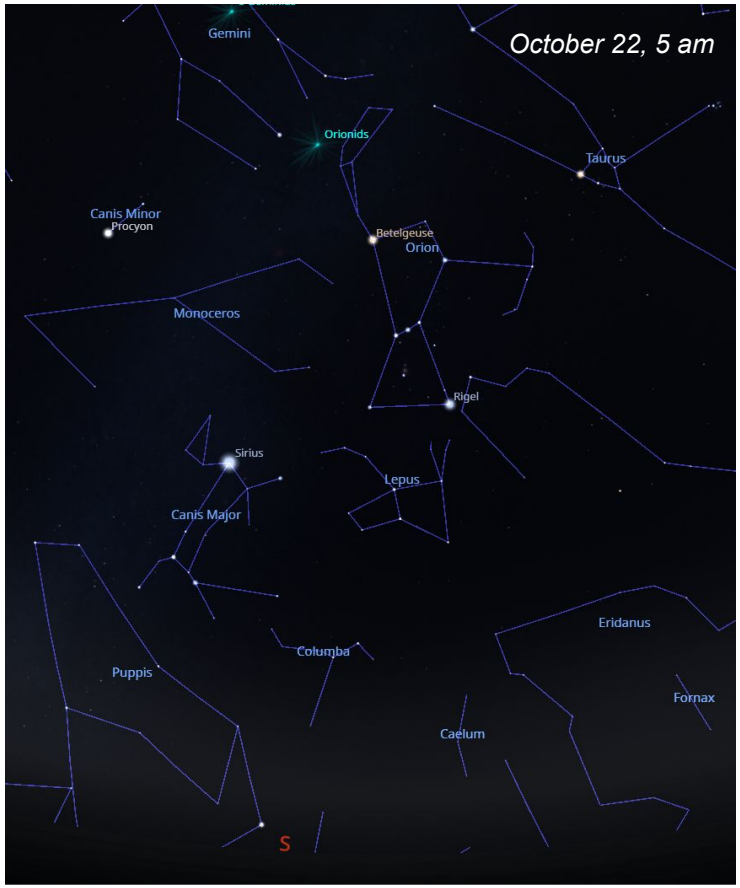


Source: Astronomy Magazine

October Public Viewing

Orionid Meteor Shower

Orionids rise October 21 ~10:30 pm

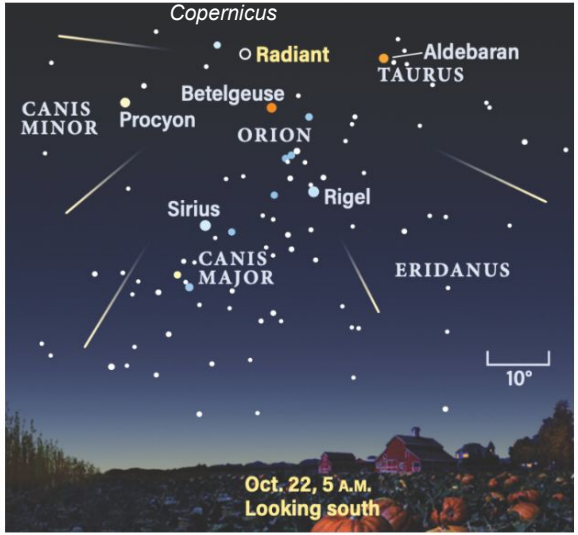


Meteor Watch: What Halley leaves behind

Source: Astronomy Magazine

The peak of the Orionid meteor shower coincides nicely with a First Quarter Moon this year. After the September lull, observers look forward to the Orionids in part because they are produced from debris shed during historic passes of the famous Halley's Comet. The Orionids could reach a zenithal hourly rate of 20 to 30 meteors per hour overnight on Oct. 21/22, the night of maximum, corresponding to an observable rate of 15 to 20 per hour between 2 a.m. and dawn as the radiant in northeastern Orion rises higher in the sky.

The shower is active from Oct. 2 through Nov. 7, and rates away from the maximum are much lower. The radiant rises by 11 p.m. local daylight time. As with all meteor showers, the best observing time is in the early morning, when you are on the leading side of Earth and heading directly into the meteor stream.



The Orionids' radiant in northeastern Orion is highest in the hours before dawn. Credit: Astronomy: