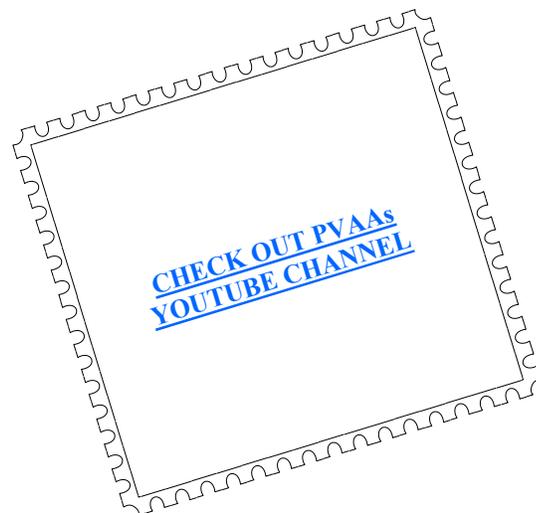




Newsletter of the Pomona Valley Amateur Astronomers

Astronomy, as nothing else can do, teaches men humility.  
*Arthur C. Clarke*



Volume 45 Number 12

*nightwatch*

December 2025

### President's Message - December 2025

With 2025 coming to a close, it's time for reviewing the past year and looking forward to 2026. It's been a year of transition for the PVAA. Following Matt Wedel's resignation as PVAA president I was asked in May to consider running for the position. I decided to accept the offer on June 11 and was subsequently elected by the membership on July 11. My two top items were to undertake the tasks necessary to assure that everything that needed to be done for this transition were accomplished and to then focus on growing the club's membership. Unfortunately, Richard Wismer resigned as Secretary a month later on July 11. That resulted in me taking over that position temporarily and changing my way of leading the PVAA by giving more responsibility to the other board members with a minimum amount of interference from me. Joe Hillberg was made Vice President Emeritus in recognition of all his years as a PVAA board member at the PVAA board meeting on August 27. Ron Hoekwater then ran for the position of Vice President and was elected unanimously by the PVAA membership on November 7.

As most of you probably know, the PVAA is an affiliate member of the Western Region of the Astronomical League (WRAL). This includes 28 astronomical clubs in California, Arizona, Hawaii and Nevada. On September 28, Claude and Teresa Plymate of the Bear Valley Springs Astronomy Club contacted all the clubs in WRAL to start the process of reinvigorating WRAL following COVID which put a stop to the annual WRAL meetings held at the Starry Night Festival in Yucca Valley. To that end, they have held monthly meetings to discuss how cooperation between clubs can help empower them to achieve their goals, begun brainstorming another in-person meeting somewhere and have started development of a WRAL website. With PVAA being a small club, we stand a very good chance of benefitting from this activity by opening up opportunities such as additional speakers via Zoom for our general meetings, getting more people to attend our meetings via Zoom, learning about how to attract more people to join the PVAA as well as ideas for star parties and public telescope viewing.

As we near the closing of 2025 during the semi quinquennial year of the United States, I wish all you members and your families a joyous and peaceful Christmas as well as a bountiful and prosperous new year. Always remember that the Christmas season begun over 2000 years ago, was marked by an astronomical event seen by wise men in the "East" who then traveled hundreds of miles to see a newborn king. The only thing they had to go on was faith and a star. So, whatever star all of you are following, may you also have faith and wisdom. Ad Astra Per Aspera!

*Ken Elchert*

#### PVAA Officers and Board

##### Officers

President ..... Ken Elchert ..... thespaceshuttle@aol.com  
 Vice President .. Open position  
 Secretary(acting) .....Ken Elchert ..... 626-541-8679  
 Treasurer ..... Gary Thompson ..... 909-935-5509

##### Board

Jim Bridgewater (2026)..... 909-599-7123  
 Claire Stover(2026) .....pvaanightwatch@gmail.com  
 Ron Hoekwater (2027)..... 909-445-9282  
 Howard Maculsay (2027).....909-913-1195

##### Directors

Membership / Publicity....Gary Thompson . 909-935-5509  
 Outreach ..... Jeff Schroeder ..... 909-758-1840  
 Programs ..... Ron Hoekwater ..... 909-445-9282

### Club Events Calendar

<b>Dec 3</b>	<b>Board Meeting 6:15 PM</b>	<b>Mar 3</b>	<b>Full Moon</b>
<b>Dec 6</b>	<b>Holiday Party IHOP Upland</b>	<b>Mar 18</b>	<b>New Moon</b>
<b>Jan 3</b>	<b>Full Moon</b>	<b>Mar 21</b>	<b>Star Party – GMARS</b>
<b>Jan 17</b>	<b>Star Party – GMARS</b>	<b>Mar 25</b>	<b>Board Meeting IHOP 6:00 PM</b>
<b>Jan 21</b>	<b>Board Meeting IHOP 6:00 PM</b>	<b>April 1</b>	<b>Full Moon</b>
<b>Jan 18</b>	<b>New Moon</b>	<b>April 3</b>	<b>General Meeting 7:30 PM</b>
<b>Jan 24</b>	<b>Fontana Astronomy Night – Mary Vagle Nature Center, Fontana 4pm</b>	<b>April 17</b>	<b>New Moon</b>
<b>Jan 30</b>	<b>General Meeting 7:30 PM</b>	<b>April 18</b>	<b>Star Party – GMARS</b>
<b>Feb 1</b>	<b>Full Moon</b>	<b>April 22</b>	<b>Board Meeting IHOP 6:00 PM</b>
<b>Feb 17</b>	<b>New Moon</b>	<b>May 1</b>	<b>General Meeting 7:30 PM</b>
<b>Feb 18</b>	<b>Board Meeting IHOP 6:00 PM</b>	<b>May 16</b>	<b>Star Party – GMARS</b>
<b>Feb 21</b>	<b>Star Party – GMARS</b>	<b>May 16</b>	<b>New Moon</b>
<b>Feb 27</b>	<b>General Meeting 7:30 PM</b>	<b>May 20</b>	<b>Board Meeting IHOP 6:00 PM</b>
		<b>May 29</b>	<b>General Meeting 7:30 PM</b>
		<b>May 31</b>	<b>Full Moon</b>

### Upcoming Celestial Events December 2025

events visible in southern California  
highlighted in yellow

PST = UTC – 8 hrs  
PST = PDT – 1 hr  
PDT = UTC – 7 hrs  
PDT = PST + 1 hr

Date	Day	LA Time	Event	Direction	Altitude (deg)	Moon Phase/ Illumination
Dec 3	Wed	6:54 pm	Moon near the Pleiades $\delta = 0.8^\circ$	ENE	39	Waxing Gibbous 96%
Dec 4	Thu	3:14 pm Visible all night	Full Moon* Moon at perigee (supermoon)	ENE-S-W	5 – 84 – 5	Full Moon 100%
Dec 7	Sun	Before sunrise	Mercury at greatest western elongation Elong = 20.7°	ESE	5 – 14	Waning Gibbous 90%
Dec 7	Sun	9:51 pm	Moon near Jupiter $\delta = 3.6^\circ$	E	22 – 29	Waning Gibbous 89%
Dec 13-14	Sat – Sun	After sunset	Geminid meteor shower peaks ~150/hr	E	----	Waning Crescent 27%
Dec 19	Fri	5:43 pm	New Moon	----	----	New Moon 0%
Dec. 21	Sun	7:03 am	Winter Solstice (Northern hemisphere)	----	----	Waxing Crescent 2.6%
Dec 26	Fri	4:42 pm Visible after sunset	Moon near Saturn $\delta = 3.5^\circ$	S	52	Waxing Crescent 31%
Dec 31	Wed	5:21 am Visible 12:01 am – 3:30 am	Moon near the Pleiades $\delta = 0.9^\circ$	W	50 – 5 – 7.5	Waxing Gibbous 88%

\*conditions closely replicate those in Jules Verne’s novel “From the Earth to the Moon”

Lunation No. 1273  
Lunation No. 1274

## November 2025 General Meeting

The November 7<sup>th</sup> general meeting was opened by the PVAA president Ken Elchert. Ron Hoekwater was voted in as our vice president. Ken then gave his monthly presentation on current Astronomical and Aerospace events.

The Geminid Meteor shower peaks the night of Dec 13-14, and Comet 3I/Atlas is still making news. Space.com has a cool 40-day timelapse of the comet here: <https://www.space.com/astronomy/comets/nasa-spacecraft-tracks-comet-swan-in-incredible-40-day-timelapse-and-even-glimpses-interstellar-invader-3i-atlas>

On the aerospace side: SpaceX received approval to double its annual launch capacity from Vandenberg Space Force Base, so we should be able to see a lot of launches next year.

As of November 2<sup>nd</sup>, the International Space Station has been continuously manned for 25 years. Due to time dilation due to the speed they are traveling, they age approximately 0.01 less seconds per year than people on Earth.

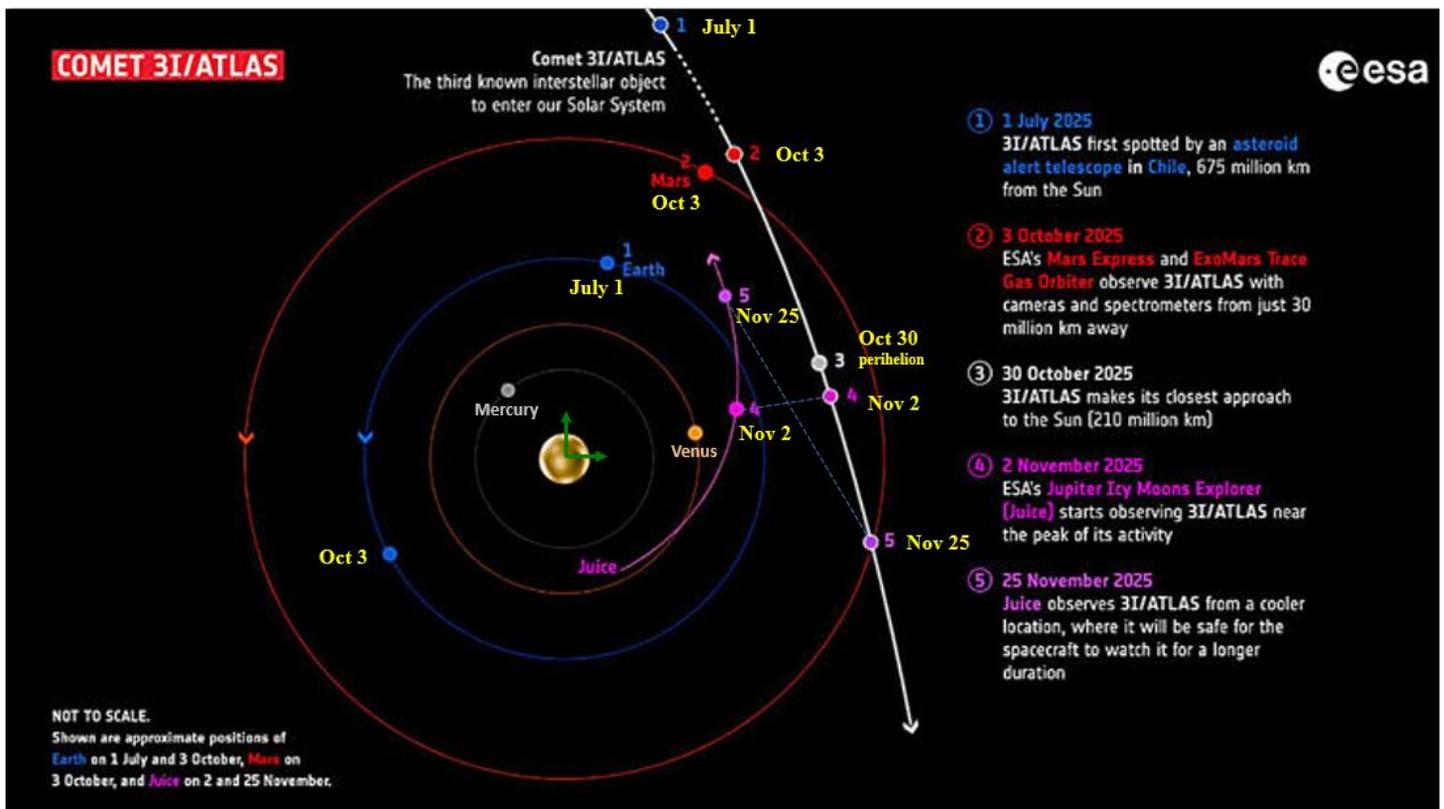
Our speaker for the month was Al Cangahuala – Deputy Mission System Manager at the Jet Propulsion Laboratory/California Institute of Technology (JPL). His presentation was on the “Europa Clipper: Launch and First Year of Operations.” Europa was discovered by Galileo in 1610, when he published the movements of the 4 moons. There is a counterclaim of discovery by Simon Mayr (Marius); also, Gan De may have observed Ganymede and Callisto in the fourth century BCE.

Europa is the 4<sup>th</sup> largest of Jupiter’s 95 known moons. It is the sixth-closest moon to the planet. Scientists believe a saltwater ocean lies beneath its icy shell, holding twice as much water as Earth. In March of this year the Europa Clipper flew by Mars and tested its thermal (infrared) camera on the planet. It did this to calibrate its instruments to precisely known values, so scientists could be sure it is operating correctly. The Europa Clipper will arrive in an orbit around Jupiter in 2030. After about a year the Europa Clipper will do a series of 49 close flybys of the moon. Global scans will map the temperatures and shed light on how active the surface is. Imaging will also tell scientists where the ocean is closest to the surface. The Clipper will orbit Jupiter, not Europa. That is because of the radiation from Jupiter would break down the instruments on the spacecraft, due to the high radiation environment. So, it spends a lot of its time further out from Jupiter. Europa Clipper is the largest spacecraft NASA has ever built for a planetary mission. With its solar arrays spread out, the spacecraft is longer than a basketball court.

To learn more about the Europa Clipper mission, visit:

<https://science.nasa.gov/mission/europa-clipper/mission-overview/>

Gary Thompson



# DISCOVERY\* OF EUROPA- 1610

*Observationes Jovianae*  
1610

20. Jovis mar. H. 12	○ **
30. mar.	** ○ *
2. Jun.	○ ** *
3. mar.	○ * *
3. Ho. s.	* ○ *
7. mar.	* ○ **
6. mar.	** ○ *
8. mar. H. 13.	* * * ○
10. mar.	* * * ○ *
11.	* * ○ *
12. H. 4. reg.	* ○ *
17. mar.	* * ○ *
14. Jun.	* * * ○ *



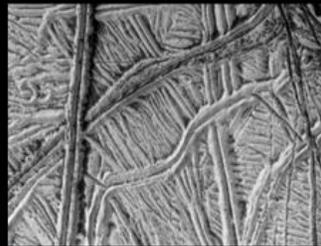
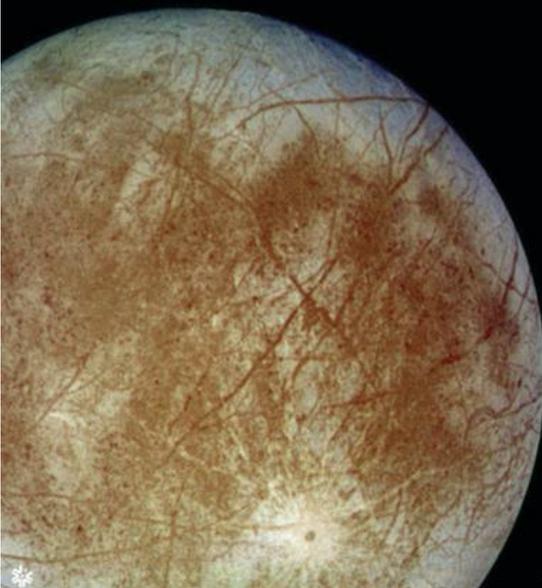
\*Counterclaim of discovery by Simon Mayr (Marius); also Gan De may have observed Ganymede and Callisto in the fourth century BCE

From *Sidereus Nuncius*

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4

## EUROPA'S SURFACE



### RIDGED PLAINS



### CHAOS



### CRATERS



### LENTICULAE

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5

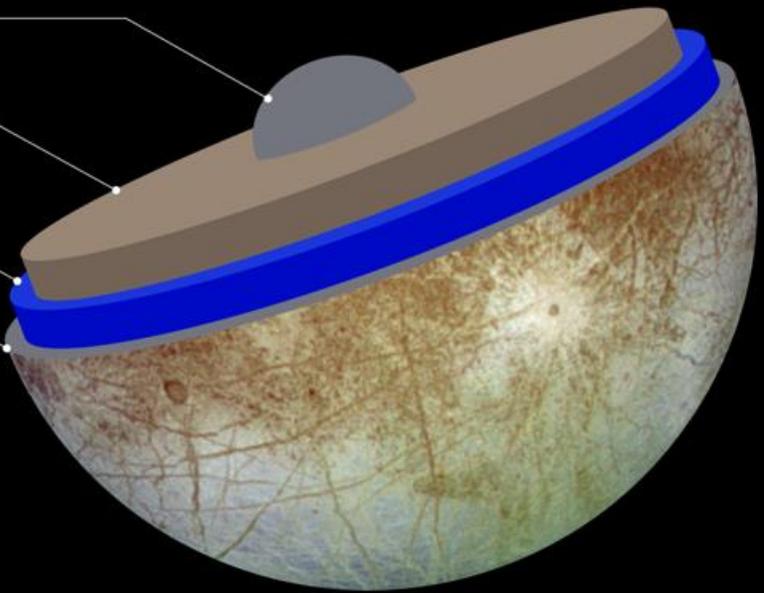
# EUROPA'S INTERIOR

METALLIC CORE

ROCK

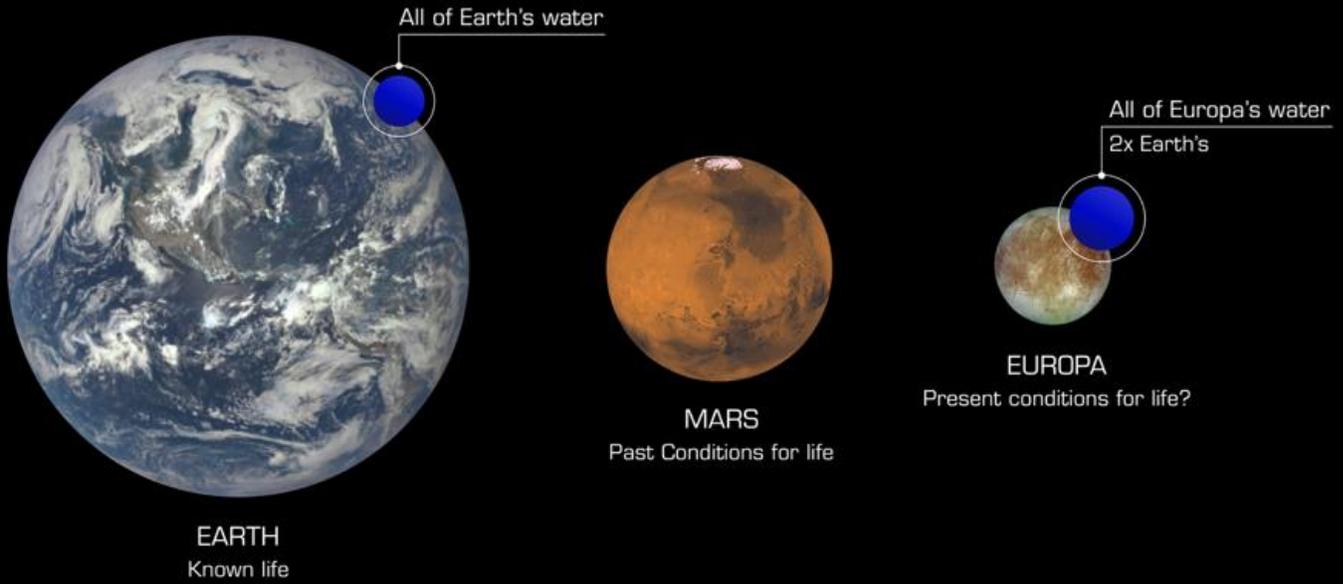
OCEAN

ICE CRUST



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# EUROPA: MORE WATER THAN EARTH



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# EUROPA CLIPPER SPACECRAFT

## SOLAR ARRAY PANELS

- ~13 FT x ~8 FT (4 M x 2.5 M) per panel
- ~41 FT (22.5 M) WIDE PER WING
- ~328 FT<sup>2</sup> (100 M<sup>2</sup>) AREA FOR BOTH WINGS
- ~100 FT (30.5 M) WIDE TIP-TO-TIP OF DEPLOYED WINGS



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# Europa Clipper Investigations



Remote Sensing In Situ  
Copyright 2025 California Institute of Technology. Government sponsorship acknowledged.

# FINAL VAULT CLOSURE

Just Prior to closing Vault

After Vault Closure



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# EUROPA CLIPPER'S INSTRUMENTS



Europa-UVS



EIS WAC



EIS NAC



MISE



E-THEMIS



REASON HF



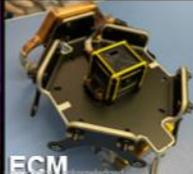
REASON VHF



MASPEX



SUDA



ECM



PIMS



14

# Europa Clipper from JPL to Kennedy Space Center



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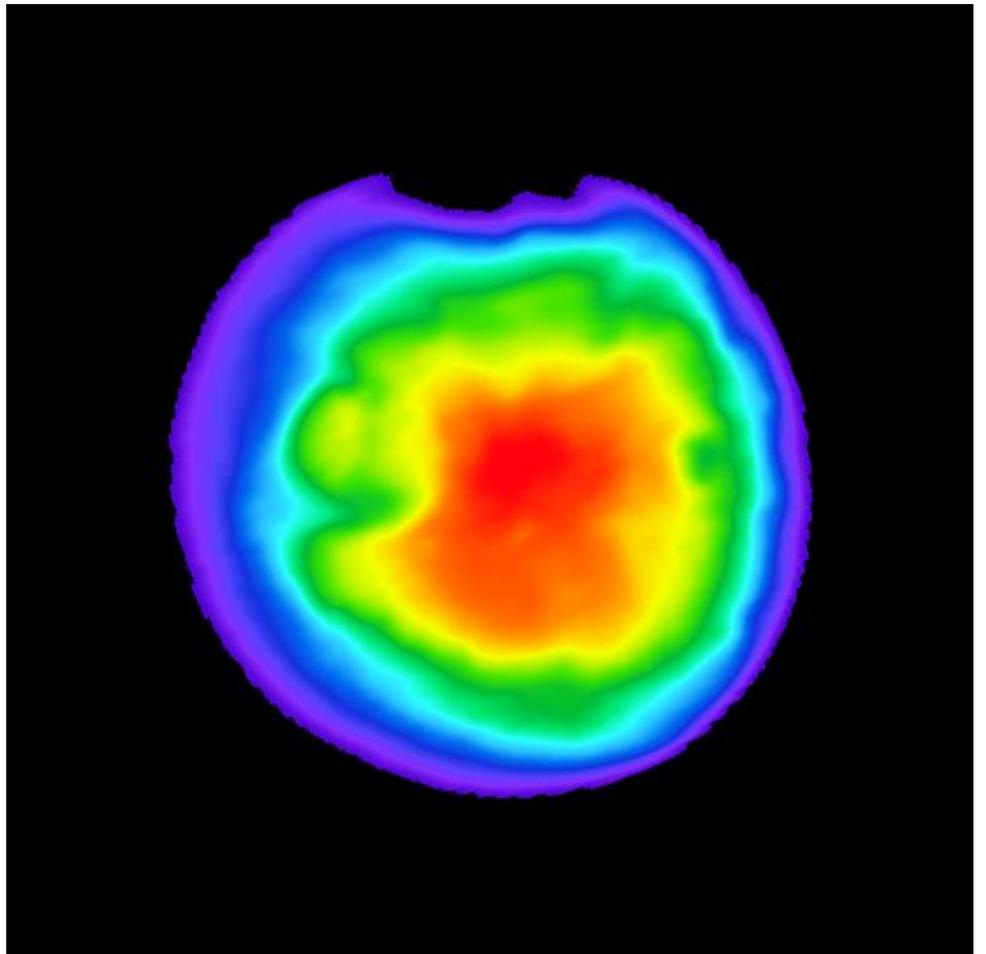
# Europa Clipper Encapsulated and Transported to Hangar 39A

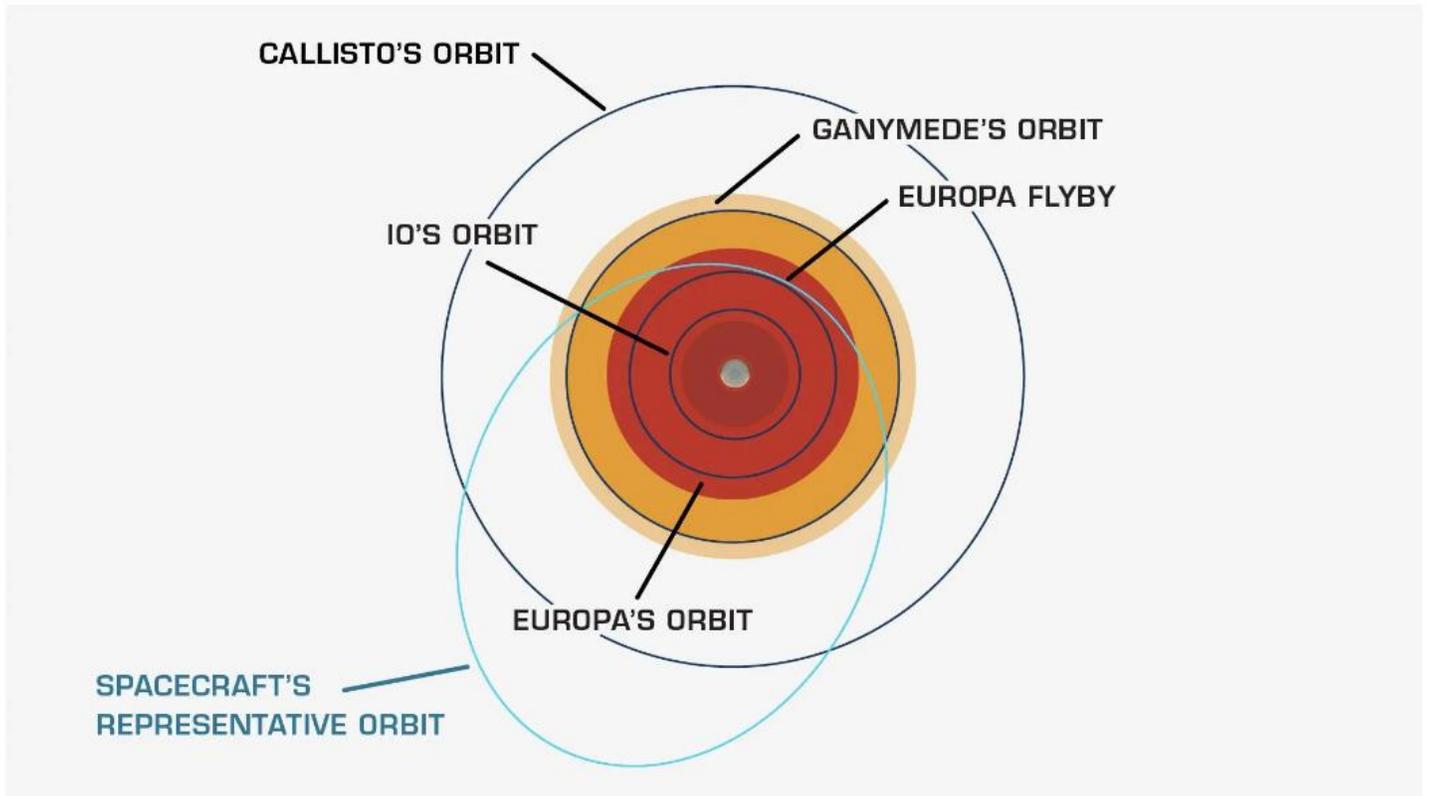


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This picture of Mars is a colored composite of several images captured by Europa Clipper's thermal imager. Warm colors represent relatively warm temperatures; red areas are about 32 degrees Fahrenheit (0 degrees Celsius), and purple regions are about minus 190 F (minus 125 C).  
NASA/JPL-Caltech/ASU





NASA's Europa Clipper will study Jupiter's moon Europa, which orbits the gas giant within a band of powerful radiation generated by the planet's strong magnetic field. The relative intensity of Jupiter's radiation bands is illustrated in this diagram, along with the orbits of Jupiter's three other largest moons: Io, Ganymede, and Callisto.

NASA/JPL-Caltech

## Pac-Man - The Nebula

Some good news and some bad news. The good news is that I was able to get 4 days of practice on my planned target before heading out to the dark site on Oct. 23. The bad news is that on the morning of the 23<sup>rd</sup> I went down to check on the RV and was startled when I ran into a big spider web. I spun around, fell, and after 6 hours in the ER, found out I probably broke my right wrist. Instructions were no lifting, so no camping or setting up in the yard would be possible. It looks like this is probably the last write-up for at least 2 months! Update after a second doctor visit – not broken but the same result as far as lifting astro-equipment goes. I've also found it very hard to hold things in my right hand, much less type, so this update is very late.

### TARGET

I settled on a target I haven't shot in 7 years, the Pac-Man Nebula (NGC 281, SH2-184, or IC11). Old time gamers will immediately see the resemblance to its namesake. In November 2018, I shot the nebula with the same telescope and mount as this year but only collected about 8 hours of images with a monochrome camera having a smaller-sized imaging chip. For this year's effort I used a color camera with an APS-C vs. a 4/3 chip and collected more than 26 hours of images.



The Pac-Man is a reasonably large H-alpha emission nebula located in Cassiopeia measuring about 20x30 arcminutes, making it about the size of our moon in the sky. The nebula has several Bok globules (small, dark, dense clouds of dust and gas) that can be seen in this image and may be stellar nurseries. In the center of the Pac-Man is a small cluster, IC1590, some of whose stars illuminate the nebula. The Pac-Man and embedded star cluster lie between 9,000 and 9,500 light years away. The cluster is estimated to be about 3.5 million years old.

There are a couple of small reflection nebulae in the image also. I'm not able to definitively identify either of them, unfortunately. One is to the left (east) of the Pac-Man and the other is in the lower right corner. The other thing to note is the amount of dust and hydrogen scattered throughout the frame.

### IMAGING AND PROCESSING

The data for the RGB image was collected before my fall over the nights of October 17 through October 20. The StellarVue SVR90T refractor fitted with an Optec electronic focuser, reduced to f/5.6, and mounted on the Paramount MYT was used to collect images. The ASI2600MC Pro camera was used for photon capture, and its guide chip was used for guiding. No imaging filters were used. Calibration was done using 15 frames of darks and 30 frames of flats and dark flats.

A total of 315 300-second exposure images were calibrated, deBayered, stacked, and cropped using PixInsight's *WeightedBatchPreprocessing* script. *BlurXterminator* (BLX) in correct-only mode was applied to the resulting 26 hour,



**About the Celestial Objects**

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

**Tips for Observing the Night Sky**

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

**Astronomical Glossary**

- Conjunction** – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.
- Constellation** – A defined area of the sky containing a star pattern.
- Diffuse Nebula** – A cloud of gas illuminated by nearby stars.
- Double Star** – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").
- Ecliptic** – The path of the Sun's center on the celestial sphere as seen from Earth.
- Elongation** – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.
- Galaxy** – A mass of up to several billion stars held together by gravity.
- Globular Star Cluster** – A ball-shaped group of several thousand old stars.
- Light Year (ly)** – The distance a beam of light travels at 300,000 km/sec in one year.
- Magnitude** – The brightness of a celestial object as it appears in the sky.
- Open Star Cluster** – A group of tens or hundreds of relatively young stars.
- Opposition** – When a celestial body is opposite the Sun in the sky.
- Planetary Nebula** – The remnants of a shell of gas blown off by a star.
- Universal Time (UT)** – A time system used by astronomers. Also known as Greenwich Mean Time. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.
- Variable Star** – A star that changes brightness over a period of time.

NORTHERN HEMISPHERE  
 DECEMBER 2025  
**CELESTIAL OBJECTS**  
 Sky maps.com

**Easily Seen with the Naked Eye**

- Altair • Brightest star in Aquila. Name means "the flying eagle". Dist=16.7 ly.
- Capella • The 6th brightest star. Appears yellowish in color. Spectroscopic binary. Dist=42 ly.
- Cep • Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.
- Cyg • Brightest star in Cygnus. One of the greatest known supergiants. Dist=1,400±200 ly.
- Gem • Multiple star system with 6 components. 3 stars visible in telescope. Dist=52 ly.
- Gem • With Castor, the twin sons of Leda in classical mythology. Dist=34 ly.
- Lyr • The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
- Ori • The brightest star in Orion. Blue supergiant star with mag 7 companion. Dist=770 ly.
- Ori • One of the largest red supergiant stars known. Diameter=300 times that of Sun. Dist=430 ly.
- Per • Famous eclipsing binary star. Magnitude varies between 2.1 & 3.4 over 2.867 days.
- PSa • Brightest star in Piscis Austrinus. In Arabic the "fish's mouth". Dist=25 ly.
- Tau • The Seven Sisters. Spectacular cluster. Many more stars visible in binoculars. Dist=399 ly.
- Tau • Large Y-shaped star cluster. Binoculars reveal many more stars. Dist=152 ly.
- Tau • Brightest star in Taurus. It is not associated with the Hyades star cluster. Dist=65 ly.
- UMi • The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433 ly.

**Easily Seen with Binoculars**

- M31 • The Andromeda Galaxy. Most distant object visible to naked eye. Dist=2.5 million ly.
- M2 • Resembles a fuzzy star in binoculars.
- Aql • Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly.
- Aur • Stars appear arranged in "pi" or cross shape. Dist=4,300 ly.
- Aur • About half size of M38. Located in rich Milky Way star field. Dist=4,100 ly.
- Aur • Very fine star cluster. Discovered by Messier in 1764. Dist=4,400 ly.
- Cep • Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
- Cet • Famous long period variable star. Mag varies between 3.0 & 10.1 over 332 days.
- Cyg • Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.
- Cyg • May be visible to the naked eye under good conditions. Dist=900 ly.
- Dra • Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.
- Gem • Fine open cluster located near foot of the twin Castor. Dist=2,800 ly.
- Her • Fainter and smaller than M13. Use a telescope to resolve its stars.
- Lyr • Famous Double Double. Binoculars show a double star. High power reveals each a double.
- Lyr • Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
- Ori • Lambda Orionis Cluster. Dist=1,630 ly.
- Ori • The Great Orion Nebula. Spectacular bright nebula. Best in telescope. Dist=1,300 light years.
- Peg • Only globular known to contain a planetary nebula (Mag 14, d=1"). Dist=30,000 ly.
- Per • Double Cluster in Perseus. NGC 869 & 884. Excellent in binoculars. Dist=7,300 ly.
- Scl • Fine, large, cigar-shaped galaxy. Requires dark sky. Member of Sculptor Group.
- Vul • Coathanger asterism or "Brocchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.

**Telescopic Objects**

- γ Andromedae • Attractive double star. Bright orange star with mag 5 blue companion. Sep=9.8".
- 7009 • Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.
- 7293 • Helix Nebula. Spans nearly 1/4 deg. Requires dark sky. Dist=300 ly.
- γ Arietis • Impressive looking double blue-white star. Visible in a small telescope. Sep=7.8".
- γ Cassiopeiae • Yellow star mag 3.4 & orange star mag 7.5. Dist=19 ly. Orbit=480 years. Sep=12".
- Albireo • Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4".
- 61 Cygni • Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4".
- γ Delphini • Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field.
- ε Eridani • Striking blue-white double star. Mags 3.2 & 4.3. Visible in a small telescope. Sep=8.2".
- β Lyrae • Eclipsing binary. Mag varies between 3.3 & 4.3 over 12.940 days. Fainter mag 7.2 blue star.
- M57 • Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly.
- α Orionis • Superb multiple star. 2 mag 7 stars one side, mag 9 star on other. Struve 761 triple in field.
- M1 • Crab Nebula. Remnant from supernova which was visible in 1054. Dist=6,500 ly.
- M33 • Fine face-on spiral galaxy. Requires a large aperture telescope. Dist=2.3 million ly.
- M81 • Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.
- UMA • Close to M81 but much fainter and smaller.
- M27 • Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.

The Evening Sky Map (ISSN 1839-7735) Copyright © 2000-2025 Kym Thalassoudis. All Rights Reserved.

Richard Wismer is selling a Meade model 2080 8-inch SC telescope with tripod, mount and 2 eyepieces that has only been used 3 times. He is asking \$850 and you can see the manual below. He can be contacted at [richardwismer858@gmail.com](mailto:richardwismer858@gmail.com).

Also, Richard advises us that Glendora Ridge Road is closed until July 2026 due to mud and landslides.

For more specifications on the scope, please contact Richard.

