VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 6, Number 12
December 2025

Club Website:
http://vlgastroclub.org/

Facebook:
https://www.facebook.com/groups/vlgastroclub/

UPCOMING EVENTS

Observers Workshop, December 1st, 6pm, Truman Rec Ctr Pavilion, 2705 Canal St.

Join us at our monthly workshop for observers to get assistance with their instruments, learn their way around the sky, and share tips and tricks with their fellow observers.

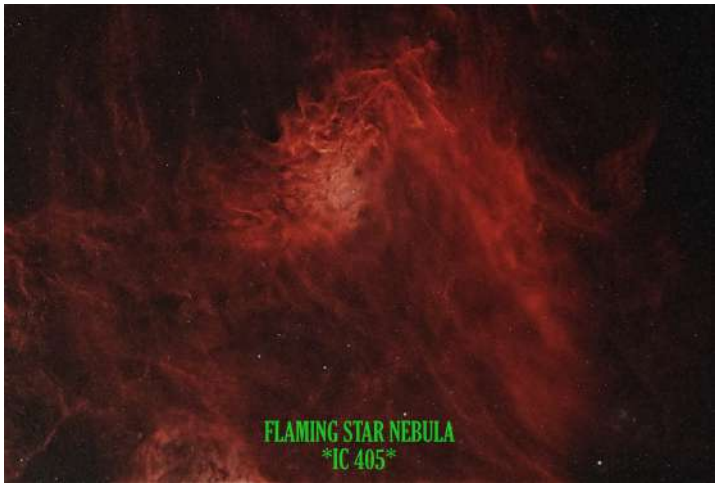
Location & time: Truman Recreation Center Picnic Pavilion, 2705 Canal Street, 7:30pm-8:30pm. The picnic pavilion is behind the recreation center, follow the sidewalk around the pool.

Space Academy, 1st, 6:30pm
Truman Rec Ctr, 2705 Canal St.

This month's space academy we will be discussing the latest discoveries about Comet 3/I Atlas, the launch & recovery of Blue Origin's New Glenn rocket, and other news in the world of astronomy.

Executive Directors' Meeting, Nov 5th, 11am-12pm, Fishhawk Rec Center, 2318 Buttonwood Run

All members welcome to our monthly planning meeting. This month we'll be reviewing the results of our Starry Starry Night event in November, planning our next one in February, as well as beginning preparations for The Villages Outdoor Expo in late February. We will also be discussing the upcoming Scout Astronomy Merit Badge session in January and a possible solar observing event with the STAR program in January.



Flaming Star Nebula by member Craig Henry.

General Meeting, Nov 16th, 6:30pm: Anne Holland, NASA Ambassador, "Comets & Asteroids"

Join us at Laurel Manor Rec Center, 1985 Laurel Manor Drive, at 6:30pm for a presentation by NASA Ambassador Anne Holland about comets, meteors, and asteroids. These leftovers of the building blocks of the solar system teach us a lot about how our solar system formed, and what it formed out of.

Also, we will be having Grumpy's Ice Cream truck serving ice cream to our members! Join us for our holiday meeting!

EAA Meeting, Homestead Astronomy Park, Nov 17th, 5pm, 6227 Meggison Road

Our EAA (Electronically Assisted Astronomy) meeting is focused on using smart telescopes, telescopes with smart controllers, and astrophotography both traditional and

live-stacking. If you want to know more about how smart controllers can put your astronomy in “easy mode”, come and see what current devices can do!

Visual observers are also welcome to come and take advantage of the Astronomy Park while we have it open after hours.

Fruitland Park Astronomy Group, Dec 20th, 5pm, 300 Shiloh Rd, Fruitland Park

Join us for an evening of observing and astronomy talk with the Fruitland Park Astronomy Group! Come to Cales Soccer Field in Fruitland Park, 300 Shiloh Road (at the corner of Shiloh Road and Dixie Avenue, north of the Fruitland Park water tower.) Enter on Shiloh Road (some GPS’s will guide you to the Dixie Avenue entrance.) Gate opens at 5pm. We will stay as late as conditions permit and people are interested in observing. Bring power if required. You can set up off your tailgate.

Public is welcome to this event, no Villages ID required! Bring family and friends to view the evening sky with our astronomers!

Your Club Officers & Directors

President	Mark Graybill
Vice President	Ken Katta
Secretary	Randy Gilbert
Treasurer	Linda Meng
Space Academy	Toni Graybill
Public Relations	Jeffrey Kahler, Sr.
Directors	Craig Henry
	John Roarke

Newsletter Contact: saundby@gmail.com

See Calendar at End of Newsletter, before star chart.

Club Calendar Online:
https://vlgastroclub.org/calendar/

NEWS

Star system “Apep” imaged by JWST. NASA image

JWST Shows Inner Detail in Chaotic Star System

A pair of Wolf-Rayet stars, stars that give strong outbursts of their atmosphere into local space, are orbiting each other in a system named after the Egyptian god of chaos, “Apep.” The two stars have unusually long orbits for this type of system, which usually have orbits between 2 and 10 years.

The stars in Apep not only take much longer, but the clouds of gas and dust around them are emitted periodically, during the 25 years that they are closest to each other in their orbits, rather than continuously. This contributes to the helical patterns in the dust clouds.

On top of that, a third star, a supergiant, orbits the pair outside the are shown in the image above. Its gravity ‘carves’ holes into the cloud, further defining its shape. The supergiant star is 40-50 times the mass of our Sun.

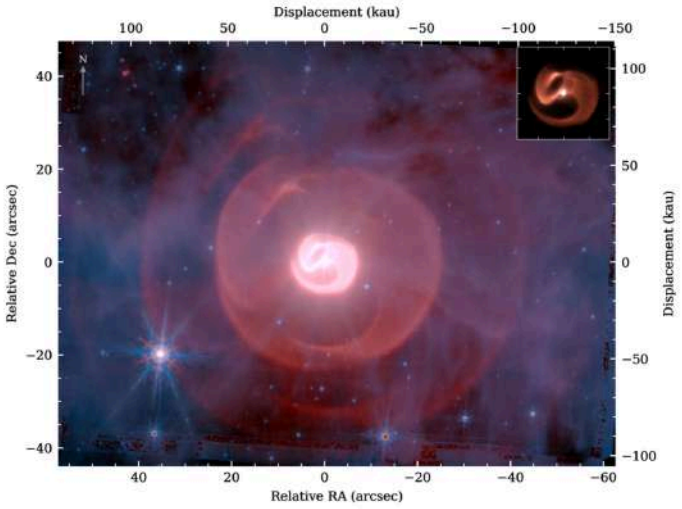
The two Wolf-Rayet stars were originally larger than the supergiant, but they have lost most of their mass into the cloud around them into space, and are not between 10 and 20 times the mass of our Sun.

Before JWST’s image of this system, only the inner ring of dust had been seen, though the outer rings has been hypothesized. Now we can

see 4 rings in all, and can figure out the dynamics of the system with the detailed images returned by JWST showing what we couldn't see before.

Full story:
https://science.nasa.gov/missions/webb/webb-first-to-show-4-dust-shells-spiraling-apep-limits-long-orbit/

Original paper "The formation and evolution of dust in the colliding-wind binary Apep revealed by JWST", Yinui Han, et al:
https://arxiv.org/abs/2507.14498



New JWST Image compared with prior image (inset). From the original paper, link above.

Artist's concept of white dwarf breaking up its planetary system by gravitational interaction in its outer atmosphere. STSci image.

White Dwarf Seen Eating Its Planets

Traces of chemicals from planets have been seen in the atmosphere of white dwarf star LSPM J0207+3331 using the Keck Telescope on Mauna Kea.

The traces of 13 elements in the outer atmosphere of this star gives evidence that the star is breaking up remnants of its planetary system. The elements, known as "metals" to astrophysicists, which includes all elements other than hydrogen & helium, would not normally be part of the outer atmosphere of any star or stellar remnant. In the past, the light of the hydrogen gas in this area would wash out the evidence of other elements here in lesser quantities, but new observations by the science team picked them out with enough clarity to identify them and their likely source--a small planetismal that was part of the white dwarf's planetary system.

The white dwarf appears to be roughly 3 billion years old, having formed after the full life of a sunlike star, and the abundances of the 13 elements, Na, Mg, Al, Si, Ca, Ti, Cr, Mn, Fe, Co, Ni, Cu, and Sr, are similar to those of the Earth, though there are some elements in lesser quantities than we have here.

This finding gives us the first information about the composition of exoplanets through direct observation. We have obtained some atmospheric spectra of exoplanets in the past, but never spectra of the actual solids from which those planets are made. Interstellar distances make it impossible to collect samples, so a finding like this opens up a new world of observations to us for learning about what planets are made of elsewhere outside our solar system.

Paper, "Tracing Planetary Accretion in a 3 Gyr old Hydrogen-rich White Dwarf: The Extremely Polluted Atmosphere of LSPM J0207+3331", Érika Le Bourdais, et al.:
https://iopscience.iop.org/article/10.3847/1538-4357/ae0ace/pdf

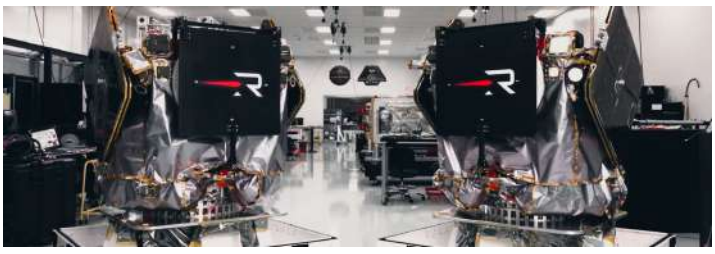
Article:
https://www.stsci.edu/contents/news-releases/2025/news-2025-404

Blue Origin Lands New Glenn Booster

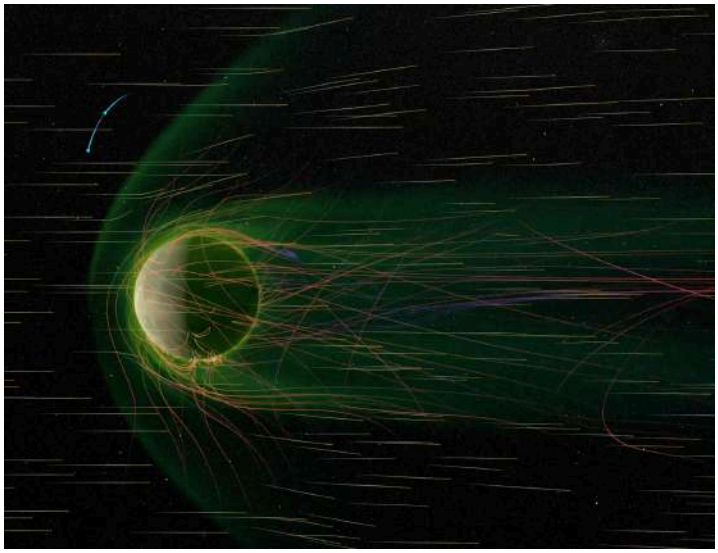
Blue Origin launches NG-2, the second launch of its New Glenn vehicle, featuring a re-usable first stage.

On its second flight, Blue Origin successfully landed their New Glenn vehicle booster aboard their landing ship, Jacklyn. The first flight, on January 16, 2025, resulted in a successful launch, but the booster was lost during recovery. Now, on only their second attempt at recovery, the booster, named “Never Tell Me the Odds”, landed and is now planned to be reflown on New Glenn’s next mission.

The payload aboard this flight was NASA’s Escapade mission to Mars. Escapade is a dual-craft mission to study the interaction between the solar wind and Mars’ weak magnetic field. This study will help us better understand the mechanisms by which Mars lost its thick atmosphere to become the thin and arid atmosphere it has today. Originally planned to be launched last year during the Mars launch window from October to November 2024, delays to the New Glenn vehicle prevented launch in this time frame.

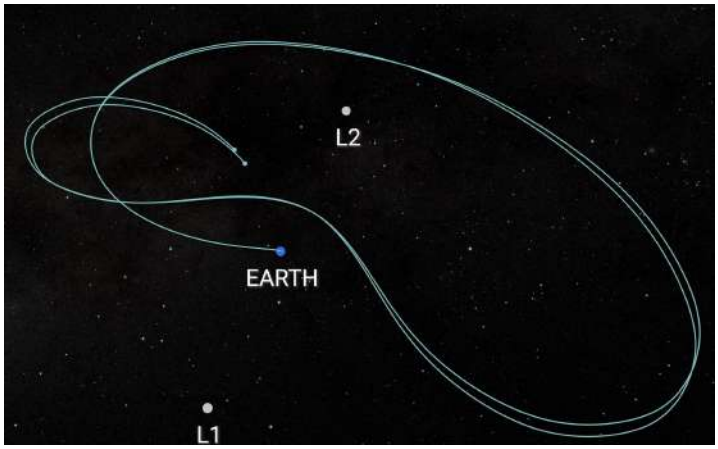


Escapade craft, by Rocketlab. Rocketlab image.



Escapade craft orbiting Mars to understand interactions between the solar wind and Mars’ magnetic field. NASA artist’s concept.

The delay meant a new plan for reaching Mars had to be developed that was within the capabilities of the Escapade spacecraft’s propulsion capacity, or the spacecraft would have to wait until the launch window opened again in late 2026. The chosen method was to launch to the Earth-Sun Lagrange Point 2, or L2, an area in space on the far side of Earth from the sun. The spacecraft will orbit the L2 point for about a year, then place themselves into a Mars transfer orbit. The gravitation in this area keeps the craft only loosely bound, with very little energy required to leave and enter a solar orbit that will intersect with Mars in September 2027.



Escapade’s orbital path around the L2 point while awaiting a Mars transfer window. NASA image.

New Glenn's launch successfully provided the energy to Escapade to reach the L2 point, about the same amount of energy as would be required for a transfer to Mars itself if the geometry between planets were correct. This is a high energy launch, which only a Falcon Heavy, New Glenn, or SLS would be capable of among operational launch vehicles today.

After the second stage carrying Escapade detached from the first stage, the first stage flew toward its attempt at a first successful landing. The first New Glenn flight had is booster break up at altitude, before it approached the landing ship.

Blue Origin provided video from several perspectives of the landing attempt. During the flight, they had video from NASA's WB-57 observation aircraft which was flying nearby to capture information about the booster as it approached landing and from the landing ship. Later additional video was released from drones.

For those watching the stream live, the views were very exciting. The aerial views from the WB-57 were lost as the New Glenn passed through a cloud deck. Our next view from the ship made it at first appear that the booster had missed, throwing up steam and water from one side of the ship. Then, after a camera cutout and frozen video showing the booster well off to the side of the ship in the air, the stream suddenly cut back to the booster seemingly impossibly settling on the deck of Jacklyn.

Full video later revealed that the steam and water beside the ship was caused by the booster doing its landing burn beside the ship, and, unlike the Falcon, the New Glenn booster was able to hover, redirect itself onto the deck of the ship, and land. Falcon's engines cannot throttle down to allow it to hover, so it is only able to perform a "suicide burn" where it only has one chance to land successfully by reaching zero velocity at it touches the landing barge's deck. If it is off target, it can't hover to correct.

The booster ended up looking very clean compared to the Falcons, as a result of the methane propellant not leaving soot like the RP-1 (purified kerosene) used by the Falcon.

Blue Origin Staff at the base of NG after return to Port Canaveral. Blue Origin image.

"Never Tell Me the Odds" returns to LC-36 for refurbishment for its next flight.

Since the flight, Blue Origin has announced that they will re-use the same booster for their next flight, NG-3. They will also be improving the performance of the New Glenn by changing to supercooled propellants, which increases the density of the propellant by chilling it below its liquification temperature, providing more thrust when it is heated then burned in the rocket engine.

Blue Origin also took the opportunity to unveil a new version of New Glenn in development, which they refer to as 9x4. The

current New Glenn design uses 7 BE-4 engines on its booster, and 2 BE-3U engines on its second stage. The 9x4 will use 9 BE-4 engines on its booster, and 4 BE-3U on its second stage. The overall vehicle will also be much larger to carry more propellant for the additional engines.

Comparison of engine layout between current New Glenn booster and 9x4. Blue Origin image.

Reusable Rockets

This adds a fifth reusable rocket to the current fleet of orbital class launch vehicles. The Falcon 9 and Falcon Heavy of SpaceX have reusable boosters, as does SpaceX's Starship, which has reused 2 boosters already during its prototype development phase. RocketLab's Electron rocket has had its booster recovered and reused, though this involves a higher degree of reconstruction than the other reusable rockets at this time. And now New Glenn joins the others.

The next New Glenn flight is likely to use new engines, however, ones that have been qualified for use with supercooled propellants. But the overall good condition of "Never Tell Me the Odds" suggests that the amount of rework otherwise is likely to be minimal.

Historically, the Space Shuttle reused its orbiters for multiple flights, with Discovery being the re-use record holder at 39 flights. A Gemini capsule was also reflown during testing as part of the cancelled Manned Orbiting Laboratory program in the 1960s to test its heat shield with a hatch to allow astronauts to transfer from the capsule to the MOL habitation space. Likewise, Saturn H-1 engines were tested for reuse as part of exploring the potential for recovery and reuse of Saturn and Saturn V booster engines for Apollo.

In the near future, RocketLab expects to launch their new Neutron launch vehicle, which will have a fully reusable first stage. Further out, Terran Space is planning to launch their Terran R rocket with a fully reusable first stage, and Stoke Space to launch their medium-lift Nova launch vehicle with both first and second stages recoverable and reusable.

Meanwhile, SpaceX is preparing their Starship development program to contine launches in early 2026. Their plans for 2026 include in-space propellant transfer as well as recovery and re-use of both the first and second stages of Starship.

Overseas, China's Space Pioneer company is developing the Tianlong-3 launch vehicle, intended to have a reusable booster similar to Falcon 9, and both China and India are developing reusable space planes, with each having completed test flights of prototype models of the craft. ArianeSpace has announced concepts for a partially reusable "Ariane Next" launch vehicle.

New Glenn flight NG-2 Video and Information:
https://www.blueorigin.com/missions/ng-2

Artist's comparison of New Glenn, Saturn V, and New Glenn 9x4. Blue Origin image.

Sights from our 22 November, 2025 Starry Starry Night event at Everglades Recreation Center. Images by Jeff Sr, Kathy, and Jeff Jr Kahler.

Starry Starry Night Draws 600

Our fall Starry Starry Night event drew 600 attendees from The Villages to come see the sky through our astronomers' instruments. We had an excellent turnout of astronomers, 24 of our members & friends who came to share the sky.

We viewed over 75 different objects including galaxies, planets, & star clusters, Saturn and the Moon. Thank you to all our volunteers who made this event a great success!

IN THE SKY THIS MONTH

Also refer to the sky map on the last page.

THE MOON

Full Moon, Dec 4th
Last Quarter, Dec 11th
New Moon, Dec 19th
1st Quarter, Dec 27th
Full Moon, Jan 3rd

The Planets, December 1, 2025

Planet	Rise	Transit	Set
Mercury	6:45 am	12:02 pm	5:19 pm
Venus	5:28 am	10:35 am	3:42 pm
Mars	7:12 am	12:05 pm	5:00 pm
Jupiter	11:48 am	5:01 pm	10:15 pm
Saturn	9:32 am	2:13 pm	6:55 pm
Uranus	2:18 pm	8:02 pm	1:47 am
Neptune	10:56 am	3:54 pm	8:53 pm

The Planets, December 15, 2025

Planet	Rise	Transit	Set
Mercury	6:55 am	12:04 pm	5:13 pm
Venus	5:25 am	10:30 am	3:35 pm
Mars	6:48 am	11:49 am	4:51 pm
Jupiter	11:26 am	4:40 pm	9:55 pm
Saturn	9:09 am	1:51 pm	6:34 pm
Uranus	1:57 pm	7:42 pm	1:28 am
Neptune	10:35 am	3:34 pm	8:34 pm

The Planets, December 30, 2025

Planet	Rise	Transit	Set
Mercury	7:07 am	12:07 pm	5:08 pm
Venus	5:22 am	10:26 am	3:30 pm
Mars	6:22 am	11:32 am	4:43 pm
Jupiter	11:03 am	4:19 pm	9:35 pm
Saturn	8:47 am	1:29 pm	6:13 pm
Uranus	1:35 pm	7:22 pm	1:10 am
Neptune	10:14 am	3:15 pm	8:16 pm

The Geminids Meteor Shower will be active from Dec 4th through 17th, with the peak in the early morning hours of the 14th (night of the 13th-14th.) The Moon will be dark during the peak this year, making for a better than usual show. This shower can be viewed at any time during the night thanks to the radiant (in Gemini near Castor & Pollux) being well above the horizon. The peak rate will be ~150 meteors per hour, though under our light-polluted skies it will be more like 60-70 or about one per minute on average.

Geminids tend to be slow-moving meteors, leaving nice fireballs in many cases. They can even move slowly enough to point them out to other people!

They are best viewed from a comfortable reclining seat or chaise lounge, by eye.

Later in the month, from the 17th to the 22nd, we will also have the **Ursid meteor shower**, but they appear at a rate about 1/10th that of the Geminids, but since the Moon is dark you will probably see some if you're out viewing the Geminids.

Mercury is in the morning sky moving toward greatest elongation on December 7th. This will be its best appearance for the year, starting the month at magnitude 0.1, brightening to mag. -0.5 on the 10th and staying at that brightness for the rest of the month. At only 10 degrees above the horizon, you'll want a clear view to the east to see it. Binoculars will reveal it as clearly not a star, though won't quite resolve the disk. A telescope will bring out the disk, but typically no features unless the air is very still and clear.

Mercury online viewing chart:
https://in-the-sky.org//data/object.php?id=P1

Venus is a morning star, shining at magnitude -4 in the predawn twilight.

Venus online finder chart:
https://in-the-sky.org//data/object.php?id=P2

Mars is on the far side of the Sun, lost in daylight. It will reappear in the morning sky in spring 2026.

Observing information for Mars:
https://in-the-sky.org//data/object.php?id=P4

Jupiter rules the sky this month, at magnitude -2.6 and 46 arcsec in apparent diameter. It will brighten and continue to grow in apparent size through the month as it approaches its opposition on January 10th, though the opposition show will start weeks before that and last for weeks after. This month and next Jupiter will be the largest we will see it for the next year, so this is the time to try to see details of its bands, zones, and weather in a telescope with good contrast at 150-250 powers. Color filters or neutral density filters can help bring out details and control the brightness of the image.

Jupiter observing information:
https://in-the-sky.org//data/object.php?id=P5

Saturn sets early in the evening, with its rings still nearly edge-on. At 18 arcsec, it still makes a great sight at low and medium powers before it leaves the evening sky. See it before we lose it, but also look forward to next October when it will put on a great show with its rings opened wider than they are now!

The Saturn Moon and Ring finder tool on theskylive will help you know where to look or what you are seeing:
https://theskylive.com/saturn-rings-and-moons

Saturn finder chart:
https://in-the-sky.org//data/object.php?id=P6

Uranus is visible in the evening sky in Taurus west of the Pleiades (The Seven Sisters) by about 7 degrees, and about 12 degrees north of Aldebaran (the Eye of the Bull.) At mag 5.6, it's too dim to see by eye in our skies, but it can be seen in binoculars or a telescope. At 3.8 arcsec in size, it is small, and will appear as a green or blue colored fuzzy "star".

Uranus finder chart:
https://in-the-sky.org//data/object.php?id=P7

Neptune lies near Saturn, about 4 degees north and 2.5 degrees east. Look for a bluish or greenish non-stellar object when using over 70 powers of magnification. Colors may be muted by sky conditions, but even with small apertures it should stand out as clearly not a star once over 100x magnification. It is at mag. 7.7 now, bright enough to stand out in binoculars.

Neptune finder chart:
https://in-the-sky.org//data/object.php?id=P8

Image of Andromeda Galaxy by member John Roarke, taken at Starry Starry Night.

Telescope Tips

EYEPIECES have a number marked on them, that's their FOCAL LENGTH. The longer the focal length, the wider the field of view it will give you in your telescope. And the eyepiece with the longest focal length will give the lowest magnification. *The eyepiece with the highest number is one you'll use the most.*

Most telescopes come with either a 20mm or 25mm eyepiece as their lowest power eyepiece.

Club Calendar

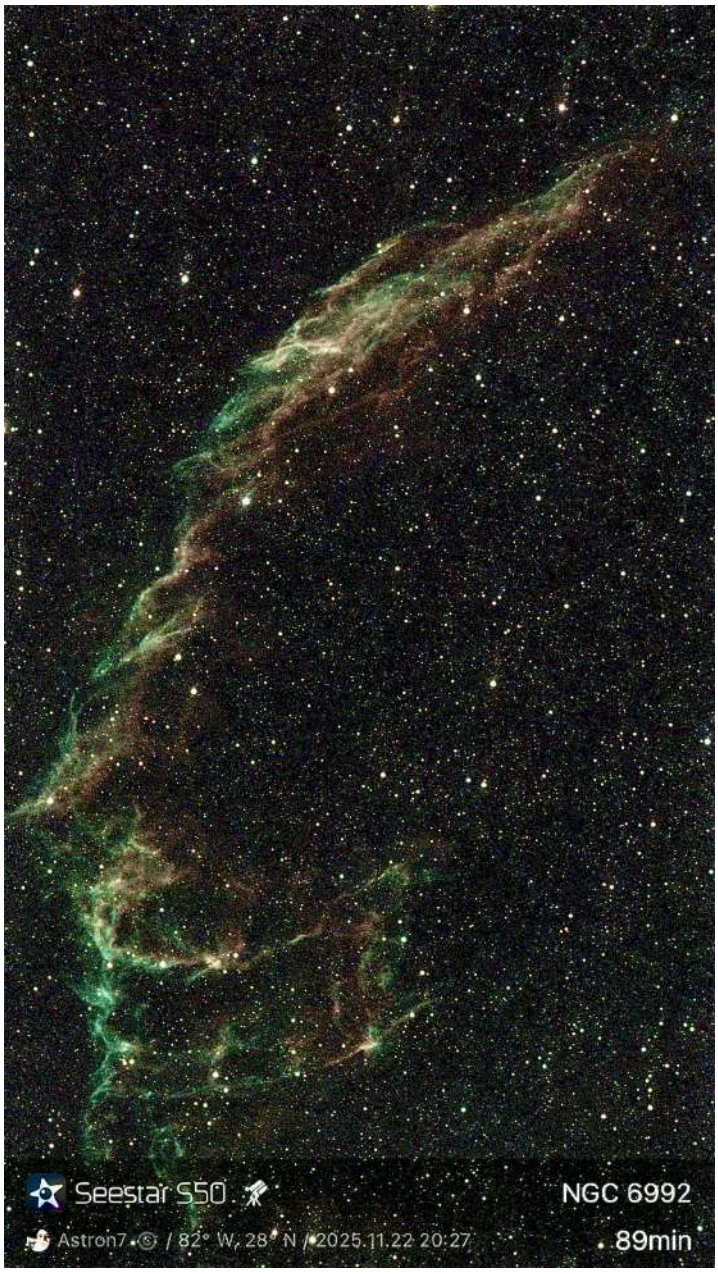
Special events by The Villages Astronomy Club
Events not hosted by The Villages Astronomy Club
Notable dates with no event planned.

December 2025
1 Space Academy, 6:30pm, Truman Rec Ctr, Observing Workshop 6pm
5 Exec Meeting, Fishhawk Rec Ctr, 11am
16 General Meeting, 6:30pm, Laurel Manor Rec Ctr, Anne Holland, NASA Ambassador, Asteroids & Comets.
17 EAA Meeting, Homestead Astronomy Park, 5pm
20 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park

January 2026
2 Exec Meeting, Fishhawk Rec Ctr. 11am.
5 Space Academy 6:30, Truman Rec Ctr., Observing Workshop, 6pm
17 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park
20 General Meeting, TBA
21 EAA Meeting, Homestead Astronomy Park, 5:30pm
31 Scout Merit Badge Counseling

February 2026
2 Space Academy 6:30pm, Observing Workshop 6:30pm, Truman Rec. Ctr. 2705 Canal St.
6 Exec Meeting
7 Starry Starry Night, Saturn, Jupiter, Winter Constellations, observing 6:30-8:30
17 General Meeting, Toni Graybill, *"The High Energy Physics of Our Sun"*
18 EAA Mtg, Homestead Astronomy Park, 6:30pm, New Moon
21 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park
27-28 The Villages Outdoor Expo, 10a-3pm

Club Calendar on the web:
https://vlgastroclub.org/calendar/

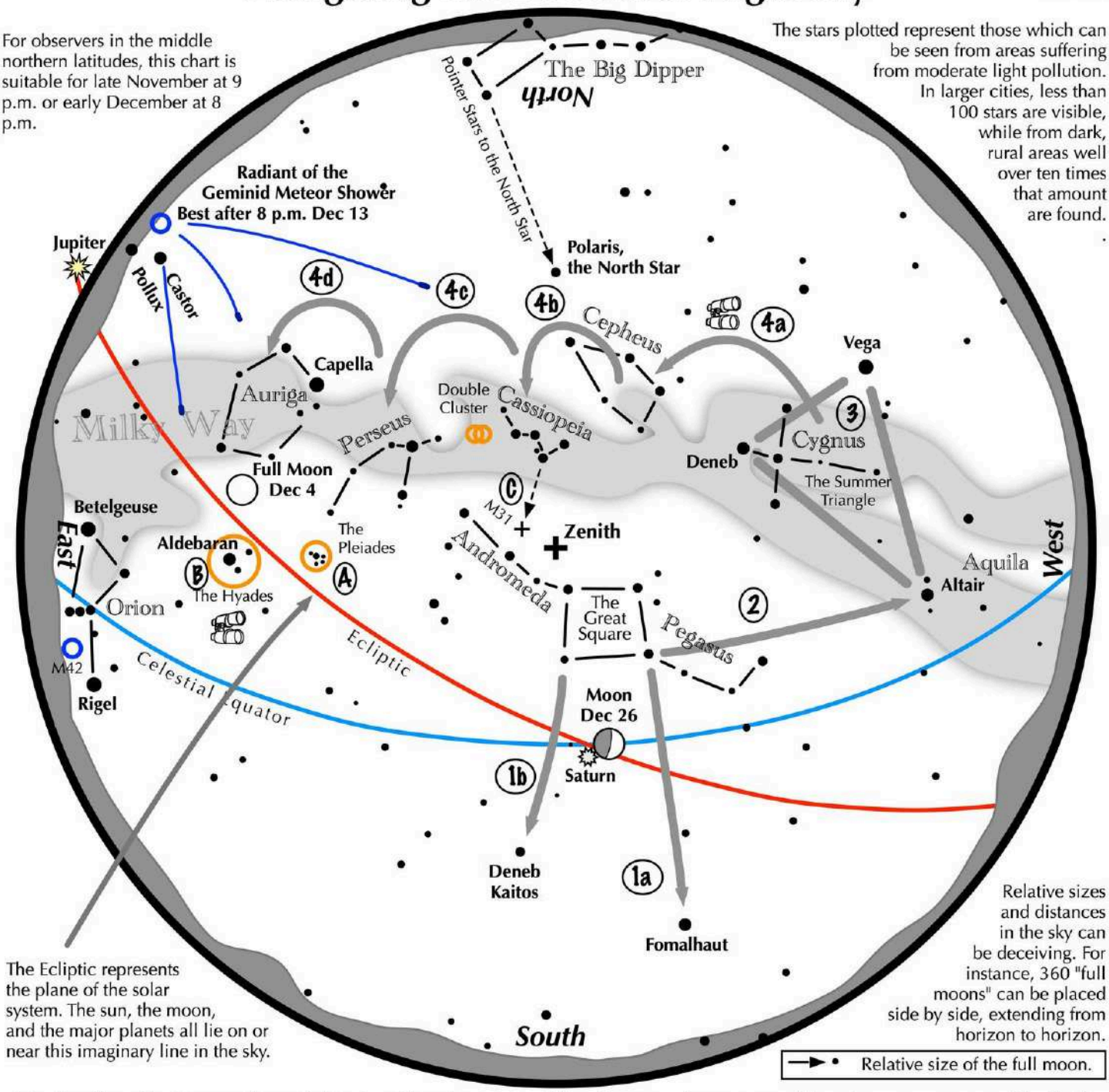


Eastern Veil Nebula. By member John Keller, taken at Starry Starry Night.

See star charts & special observing notes on following pages:

Navigating the December Night Sky

2025



Navigating the December night sky: Simply start with what you know or with what you can easily find.

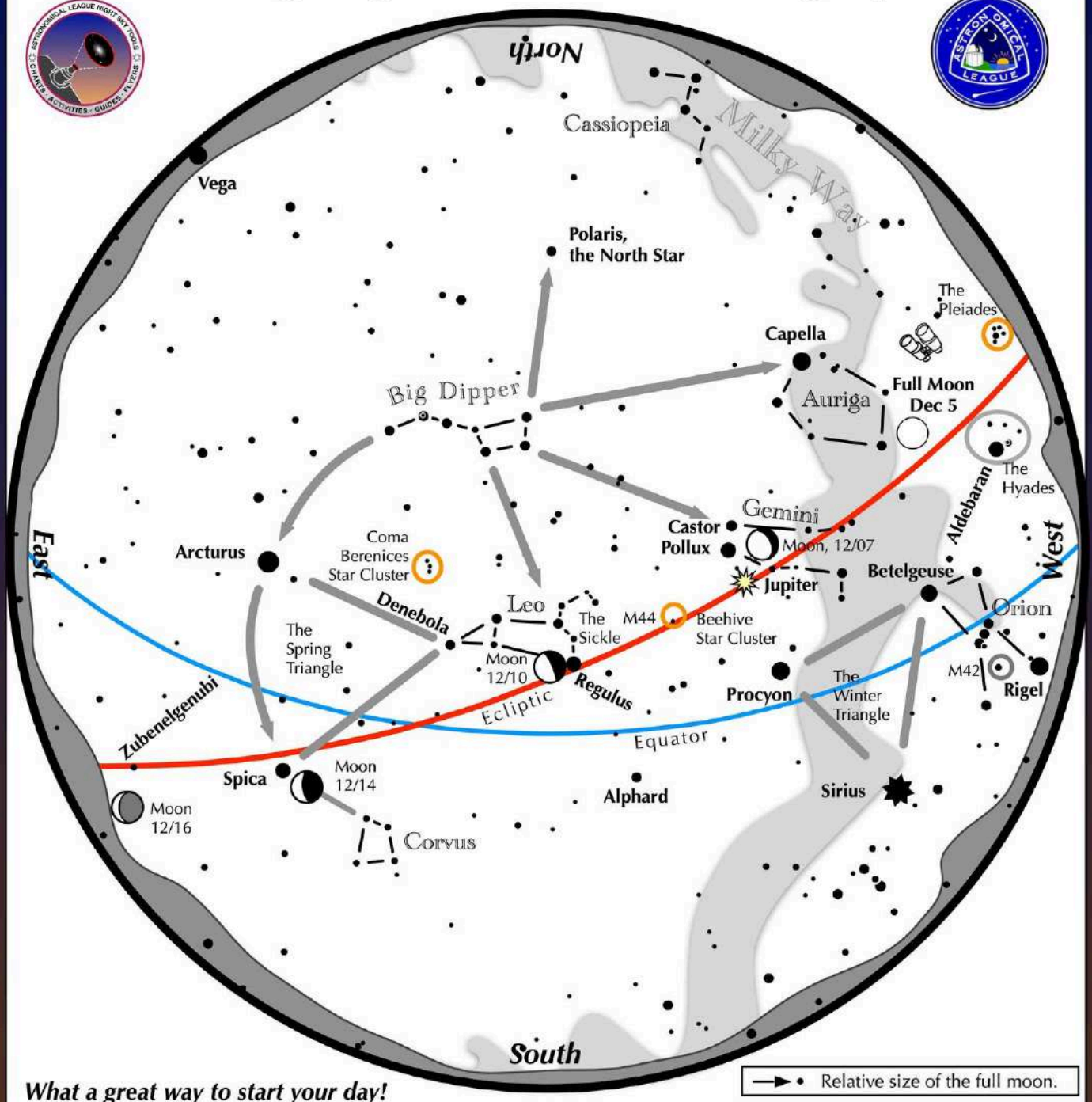
1. Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.
2. Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the "Summer Triangle. Vega is its brightest member while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
D: Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.

Navigating the December Morning Sky

2025



Relative size of the full moon.

What a great way to start your day!

For observers in the middle northern latitudes, this chart is suitable for mid December at 5:00 a.m.

Late sunrises in December provide opportunities for early morning skywatching.

- Bright Jupiter shines high in the west.
- The near third quarter moon floats above Regulus on December 10.
- The waning crescent moon glows next to Spica on December 14.
- The thin crescent moon rises near the double star Zubenelgenubi on December 16.
- A great time for viewing the Big Dipper, Leo, and the Spring Triangle. And, in the second half of the month, it is time for galaxy viewing!