

# VILLAGES STAR

Newsletter of The Villages Astronomy Club

**Volume 4, Number 11**

**November 2023**

Club Website:

<http://vlgastroclub.org/>

Facebook:

<https://www.facebook.com/groups/vlgastroclub/>

## **Club Officers & Directors**

President Mark Graybill

Vice President Ken Katta

Secretary/Historian Burt Salk

Treasurer Linda Meng

Education Coord. Randy Gilbert

## **Newsletter Contact**

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(please include TVAstro in subject line)

## **UPCOMING EVENTS**

### **Exec Directors' Meeting, November 3rd, 11am**

All members are welcome, join us at Fishhawk Recreation Center, 2318 Buttonwood Run, from 11a to 12p.

### **November 4th: Starry Starry Night**

On the evening of November 4th, we will be holding a Starry Starry Night event at the Picnic Pavilion at Truman Recreation Center. Our club's astronomers will be showing the sky through their telescopes for all residents of The Villages and guests with IDs.

Come see Saturn, Jupiter, the fall constellations, star clusters, double stars, and if we're lucky, some galaxies!

The event will run from 6:30 to 9pm at Truman Recreation Center's picnic pavilion (behind the pool from the parking lot) at 2705 Canal St. in The Villages.

### **Space Academy November 7th**

This month's Space Academy will feature a talk and video by member Frank Drake on the total solar eclipse of August 2017, and a video by Professor Alex Filippenko on The Afterglow of the Big Bang.

Note that there will be no Space Academy meeting in December or January. Space Academy will return in February 2024 with Astronomy 101, presented by Ken Katta.

### **Space Academy and Telescope Workshop Date Changes for 2024**

Space Academy and Telescope Workshop meetings to **first Mondays** in 2024.

The dates we will be meeting are:

Feb 5th, Mar 4th, Apr 1st, May 6th, Jun 3rd, Jul 1st, Aug 5th, Sep 2nd, Oct 7th, Dec 2nd.

Starting time for Space Academy will continue to be 6:30pm. Telescope Workshop starting times will follow sunset through the year.

Both events are at Truman Recreation Center, 2507 Canal Street.

### **November 18th, 5pm: Fruitland Park Astronomy**

The Fruitland Park Astronomy Club meets for an evening of observing and talk on the third Saturday of the month every month, conditions allowing, at the Cales Soccer Field in Fruitland Park at 300 Shiloh Road (at the corner of Shiloh Road and Dixie Avenue, north of the Fruitland Park water tower.) Village Astronomy Club members and the public are welcome. Bring your telescopes, binoculars, or just your eyes and your interest. Gate opens at 5pm.

Scopes can be set up directly off of tailgates onto pavement, or taken further into the park along paved walks, away from the road to avoid nearby lights. Power is available.

**General Meeting, November 21st, 2023:  
Officer Elections and  
High Energy X-Ray Astronomy  
by Toni Graybill**

At this month's meeting the membership will vote on the slate of candidates for club officers. Nominations were closed at our October meeting, the candidates are:

President: Mark Graybill  
Vice President: Ken Katta  
Treasurer: Linda Meng  
Secretary: Randy Gilbert

The vote will be held at the opening of the meeting between club news updates and the presentation.

This month's presentation will be on X-Ray and high energy astronomy, the means by which we are able to see and learn more about phenomena such as black holes, neutron stars, and other events that cannot be studied using visual light.



**Chandra X-Ray Observatory  
NASA Image**

**ERAU Astronomy Open House**

Embry Riddle Aeronautical University's Astronomy Department will be having an open house on November 17th. There will be a public lecture in the Willie Miller Auditorium at 7pm, followed by observations of the sky through telescopes at the College of Arts and Sciences. For further information, see the website at: <https://observatory.db.erau.edu/index.php/astronomy-open-house>

Contact Ken Katta to arrange for giving or getting a ride to ERAU's open house: (917)620-1081

**Calendar:** <https://vlgastroclub.org/calendar/>

**NEWS**

**Starship Regulatory Delays Threaten  
Moon Landing Schedule**

Delays to the FAA and Fish & Wildlife regulatory approvals for SpaceX's second Starship test flight are risking NASA's ability to maintain their schedule to land a crew on the Moon in 2023. During Congressional testimony on FAA delays, NASA officials stated the threat to the Artemis program's schedule. Also, several other launch providers testified concerning the effects of the FAA's review and approval delays on their work toward introducing new launch vehicles into the commercial market.

For its part, the FAA cited staff shortages and entanglements such as the environmental reviews for delays to launch licenses for SpaceX and others.

The lunar lander that will carry crew to the Moon's surface for the Artemis program is a specialized version of the SpaceX Starship vehicle. The 2023 NASA budget calls for it to be tested in an uncrewed configuration in 2024, with a crewed landing to be conducted in 2025. Launch license delays that reduce the Starship's test flight rate to once every six or eight months are likely to cause significant delays in the program, and possible issues with the SLS launch vehicle prepared for the Artemis III launch.

## Artemis III

The mission plan for the U.S. return to the Moon in 2025 is to have astronauts launch in the Orion space capsule aboard an SLS Block 1 launch vehicle. The Orion spacecraft will then rendezvous with the Starship-derived lunar lander in lunar orbit. The crew will then transfer to the lander to land on the Moon's surface. After their time on the surface, they will return to lunar orbit aboard the Starship lander, rendezvous with the Orion spacecraft, then return to Earth aboard the Orion.

Prior to the Artemis III mission, SpaceX will be demonstrating the ability of the Starship lander to land on the Moon then return to lunar orbit to accomplish this mission. A second landing may be performed by the test craft to pre-position resources aboard for use by later lunar landing missions.

To perform the lunar lander missions, SpaceX needs to not only demonstrate their ability to launch the Starship, but also to refuel it in Earth orbit. In order to travel to the Moon, and to have the necessary propellant on board to conduct the landing and takeoff, the Starship lander will require full tanks. Tests to refuel Starship in orbit are planned among the early test flights of Starship, but those tests will require multiple launches in a rapid cadence to bring fuel and oxidizer to the orbiting spacecraft faster than it boils off. A full retanking will require from 4 to 7 ferry flights of a Starship tanker spacecraft. So it's easy to see that a flight cadence of more than two flights per year will be required to successfully conduct the lunar mission.

At present, the FAA states that the remaining item to be completed is approval by the Fish & Wildlife Service. Fish & Wildlife personnel have been seen at Starbase, working with SpaceX to perform remediation of the effects on the surrounding wildland by SpaceX's IFT launch. Completion date for the work remains unknown, but could stretch past the end of the year.

## China Launches Crew to Space Station

On October 25th, China launched their 12th crewed mission into space aboard a Long March 2F rocket on the Shenzhou 17 mission. The destination for the 3 Taikonauts aboard is the Chinese space station, Tiangong.

There, the crew will be met by the crew of Shenzhou 16, who will spend about 4 days with the new crew before departing for Earth.

The Shenzhou 17 mission aboard the station will last 6 months, and will be used to perform the first EVA repairs on Tiangong. The craft's solar arrays will be their first target for work.



**Shenzhou 16 and 17 Crews aboard Tiangong  
CMSA Image**

## New Shepard to Return to Flight

Blue Origin's suborbital rocket New Shepard suffered a failure during flight in September 2022. That flight was carrying only test equipment, with no people on board, unlike their well-publicized tourist flights into space.

The capsule and its contents were unharmed as the capsule's escape system triggered when the booster's rocket motor failed.

The accident investigation determined that the rocket motor had a burn-through of its wall during the flight. The motor had been used on prior flights without issue, as the engine, booster vehicle, and the capsule are all designed to be reusable. No specific details on the investigation have been revealed, but the FAA has closed the investigation and cleared the New

Shepard to return to flight.

The next flight, NS-24, may occur as early as October 31st. Blue Origin has not revealed any details of the flight, such as whether it is carrying passengers or only equipment, at this time.

While best known as a tourist spaceflight vehicle, the New Shepard has been most used as a zero-g testbed for space equipment. On Earth, testing equipment in actual zero-g conditions is difficult and expensive. NASA's Lewis Test Center maintains a "drop test" facility, which includes a tall vacuum chamber so that test articles can be dropped to get a few seconds of zero-g conditions without the effects of air drag or any other acceleration. Activating and running this facility is expensive, and only gives a few brief moments of free-fall conditions before striking the bottom, often destroying the test hardware.

New Shepard provides a cheaper alternative, allowing for several minutes of free-fall operation, and intact recovery afterward.

It is also possible to allow an operator to fly with equipment being tested, a capability that has not yet been used aboard New Shepard, but is planned for its competitor, Starship 2.



**New Shepard Booster Returns to a Landing**  
NASA Image



**SpaceShipTwo Beneath Launch Craft Eve**  
Virgin Galactic Image

## Virgin Galactic Build Launch Cadence

Having resumed flights of the SpaceShipTwo craft after the completion of their own incident investigation caused by their craft deviating from its flight space, Virgin Galactic appears to be making regular monthly flights of their sub-orbital spacecraft.

Galactic-05, their fifth regular tourist flight, is expected to occur early in November. Like Blue Origin, Virgin does not reveal the details of their flights beforehand for the privacy of their customers. With the resumption of regular flights, though, Virgin is expected to begin working toward expansion plans discussed in the past, including launches from multiple locations with multiple aircraft and spacecraft.

An industrial customer has also announced that they have chartered a flight to test their equipment on board the spacecraft with human operators flown along for the ride.



**SpaceShipTwo**  
Image by Steve Jurvetson

## India Performs Crew Capsule Test

India moved one step closer to their first launch of a crew into space aboard their own rocket with an escape system test for their Gaganyaan capsule.



**Gaganyaan TV-D1 Test Flight, October 22nd  
ISRO Image**

The flight took place atop a subscale rocket tasked with placing the capsule and its escape system into the conditions that would be most difficult for it, at maximum dynamic pressure (Max Q), where the escape system would trigger to remove the capsule and set it on course for a safe recovery.

While delayed briefly by weather and by an engine ignition problem, the flight was conducted without any problems, and the capsule recovered in the Indian Ocean where it was recovered by

the Indian Navy. It has since been returned for examination and preparation for future flights.



**Gaganyaan Crew Capsule Aboard Recovery Ship  
ISRO Image**

## SOLAR ECLIPSE WITH TVAC!

On October 14th, our club held an event at Homestead Recreation Center to view the partial solar eclipse from The Villages. We had 14 volunteers from the club, 7 solar scopes, and about 800 attendees at the event.

The Solar Walk saw 3 tours given, with about 200 attendees enjoying the tour between the three tours.

Each telescope had about 100 viewers.

Our peak attendance was at the eclipse's peak, around 1:23pm, where we had about 450 people on site to see the maximum coverage of the Sun by the Moon.

We'd like to thank The Villages Recreation Department and the staff at Homestead Recreation Center for doing so much to accommodate us and help make our event such a success.

The Moon covered 55% of the Sun at the peak of the eclipse. The eclipse lasted almost 6 hours from first contact until final contact of the Moon's disk with the Sun. For those closer to the centerline of the eclipse, an S-shaped curve stretching from South America up through Texas then out through the Southwestern states, this

eclipse was an annular eclipse, meaning that the Moon covered almost all of the Sun, leaving only a ring of the Sun visible.

This happens when the Moon is far from Earth in its orbit. The Moon was only a short way from the highest point in its orbit during this eclipse, meaning that the Moon appeared nearly as small as it can appear in the sky. When it is closer, it appears slightly larger. This difference is enough to affect the appearance of an eclipse, because the Sun and Moon are so close to the same size in our sky.



**Member John Keller Shows the Eclipse Through a White Light Filter, Blocking 99.999% of the Sun's Light to Make it Safe to View the Sun**  
Image by Member Bob Averitt

Next April's eclipse will occur when the Moon is closer to the Earth, and this will allow the Moon to block out all of the Sun's light along a path close to the centerline of the eclipse (though not for us here in Florida.) On a path that stretches through the U.S. from Texas to Ohio, the Moon will block all the light from the Sun for a

few minutes.

The club will hold another event for the eclipse on April 8th, 2024. From The Villages, the Moon will cover about 55% of the Sun again. The April eclipse will fall on a Monday.



**Member Toni Graybill Views the Eclipse Through Randy Gilbert's Hydrogen Alpha Filter Telescope Which Allows Viewing of Prominences on The Sun**  
Image by Member Bob Averitt

## IN THE SKY THIS MONTH

### Starry Starry Night, November 4th

Come enjoy the sky with our club at Truman Recreation Center, 2705 Canal Street, The Villages. We will be showing the sky from 6:30 to 9pm. Astronomers, please come early to set up your instruments in time to be ready to share the sky at 6:30.

### The Moon:

Last Quarter, November 6th  
New Moon, November 13th  
1st Quarter, November 20th  
Full Moon, November 27th  
Last Quarter, December 5th

**Saturn** is high in the sky at sunset at magnitude 0.7, above the bright star Fomalhaut which lies halfway between Saturn and the horizon. Saturn is well placed for telescopic observation all month. It takes about 40x magnification to see its rings at all, they are best viewed at 75x or more.

Saturn's moon Titan is visible in binoculars or a telescope. It appears as a bright star, and can be several planetary diameters away from Saturn. Since the plane of its orbit is inclined at the same angle as Saturn's rings, it can appear to be out of line with the equator of the planet from Earth, unlike Jupiter's moons, which almost always appear to be in line, or nearly so, with Jupiter's equator.

**Jupiter** rises in the east in the early evening at the start of the month, and gets a little higher in the night sky each passing day. At magnitude -2.9 it appears as one of the brightest stars in the sky. It makes a very bright "evening star" through the month. It reaches opposition on the night of November 3rd, though it will be close enough to opposition for both a week before and after that it will appear equally bright as on the 3rd. So our view at Starry Starry Nights on the 4th will be just as good as on the 3rd.

Through binoculars no disk is visible, but it will look different than a star because even though its disk is below visual perception, it is still large enough compared to a star that it will not be refracted as readily as a star's light, so it will either not twinkle, or it will twinkle differently both to the eye and through binoculars than a star.

Its moons are visible in binoculars. The moons are bright enough to be visible by eye, but to our eyes they are lost in Jupiter's glare. Binoculars allow us to see them by reducing the area that the glare covers. They will look like stars in line with the brighter star of Jupiter.

**Uranus** rises about half an hour after Jupiter, and is at its brightest magnitude 5.7 which is too dim to be seen by eye under our local

conditions. It reaches opposition on November 13th, and will be in the constellation Ares about halfway between Jupiter and the Pleiades all month. It shows a disk at magnifications of about 75x and above.

Like Jupiter, it looks different from a star when viewed with some magnification. Sweeping the area with 7x50 or larger binoculars will turn up a blue or green star that doesn't look like an ordinary star. Uranus finder chart:

<https://in-the-sky.org//data/object.php?id=P7>

**Neptune** shines at magnitude 7.7 this month. It takes binoculars at minimum to see it. It is in Aquarius, near the border of Pisces. It is dimmer than Uranus, but behaves similarly when observed. It appears as a strongly colored star that doesn't look like other stars in a telescope. Most telescopes can catch its brightest moons as well. At 2.4 arcseconds in size, it takes about 75-100x magnification to display a disk.

Online finder chart for Neptune:

<https://in-the-sky.org//data/object.php?id=P8>

**Venus** is a morning star right now, greeting early risers. It shines at magnitude -4.4, making it easy to spot and identify in the early morning sky..

Its phase, visible even in small telescopes at magnifications of about 50x and greater, grows from 55% at the start of the month to about 67% illuminated at the end of the month..

**Mercury** returns to the evening sky at mid-month, visible as a thin crescent under magnification on the 14th near the crescent Moon before they both set shortly thereafter. As the month proceeds, it will rise to a higher position in the sky, farther from the Sun and up later before setting. It makes a good target for binoculars, though they will not show its phase. Take care not to veer into the Sun when viewing Mercury.

**Mars** sits close to the Sun this month, lost in its glare. It will return to the morning sky at the end of January shortly before sunrise.

Telrad finder charts for the Messier objects can be found at the following web page:

<https://sherwood-observatory.org.uk/astronomy/finder-charts/messier-finders>

More information on sky events this month: <https://in-the-sky.org/>

## Club Calendar

Yellow marks special events hosted by The Villages Astronomy Club

Blue marks events that are not hosted by The Villages Astronomy Club, but which we recommend.

Green Marks Volunteer Events for other groups.

### November

**3** Exec Meeting, 11am Fishhawk Rec Ctr

**4** Starry Starry Night, Truman Recreation Center, 6:30-9:30pm, Sunset 6:40pm, setup 5:30pm

**5** DST Ends

**7** Telescope Workshop 5:00pm/Space Academy 6:30pm at Truman Rec Ctr

**10** Girl Scout Observing, Camp Wildwood

**17** ERAU Open House

**18** Fruitland Park Observing, 300 Shiloh St. Fruitland Park, gates open at 5pm

**21** General Meeting: Toni Graybill, X Ray Astronomy, 6:30pm, Laurel Manor Rec Ctr

### December 2023

**1** Exec Meeting

**5** Telescope Workshop 5pm/ \*NO Space Academy this month\*

**8** Girl Scout Activity TBA

**16** Fruitland Park Observing

**19** General Meeting: Anne Holland, NASA Ambassador: Exoplanets Crash Course + Ice Cream Ritter's Frozen Custard

### January 2024

**Note: Space Academy/Telescope Workshop moving to 1st MONDAY in 2024!**

**1** No Space Academy. Telescope Workshop TBA  
Exec Meeting

**16** General Meeting: Pauline Schwartz, subject TBA

**20** Fruitland Park Observing

**26** ERAU Open House

Club Calendar on the web:

<https://vlgastroclub.org/calendar/>



Volunteer Booth and Information Table a  
Image by member Jeff Kahler, Sr



Toni Graybill Leads a Tour of the Solar Walk  
Image by Jeff Kahler, Sr



Eclipse at Peak by Member Ken Katta