Volume 4, Number 10
October 2023

Club Website (Currently Unavailable):
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
saundby@gmail.com
(please include TVAstro in subject line)

UPCOMING EVENTS

Exec Directors' Meeting, October 6th, 11am
All members are welcome to join our officers and directors at our monthly meeting to plan future events and activities for the club. We will be reviewing this years' Camp Villages activities, and planning our many fall activities, including our Starry Starry Day and Night on November 4th, the Solar Eclipse viewing on October 14th, and our regular meetings and activities.

Join us at Fishhawk Recreation Center, 2318 Buttonwood Run, from 11a to 12p.

No Space Academy in October

Due to a special event held by a different group, we will have no Space Academy meeting in October. Join us as Space Academy returns on November 7th for our final Space Academy meeting of 2023.

Space Academy and Telescope Workshop Date Changes for 2024

Due to conflicts with a different group for the Truman Rec Center's Studebaker room on first Tuesdays, we will be moving the 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 the sunset through the year.

Our hope is that we can continue to meet on first Mondays in 2025 and beyond, as well.

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

October 14th: Partial Solar Eclipse Viewing

See details for our eclipse viewing event in the In The Sky section, below.

October 21st, 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.

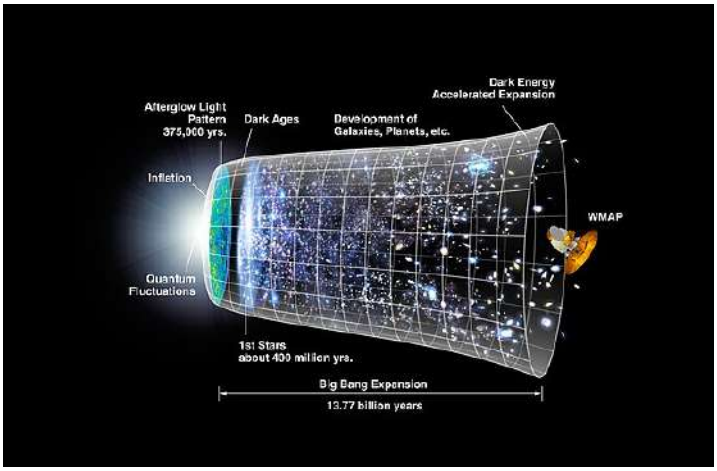
Scopes can be set up directly off of tailgates onto pavement, or taken further into the park along paved walks, away from the road to

avoid nearby lights. The front of the park has Bortle 5 skies. Power is available.

In the event of foul weather, the club is now able to use the pavilion at the Gardenia Park Recreation Complex, at 201 W Berckman St, Fruitland Park (across the street from Furniture Barn.) A talk on astronomy or observation will be given, along with instruction or assistance with telescopes.

General Meeting, October 17th, 2023: Cosmology of the Universe, Pt 2 by JB Smith

Following last June's highly popular presentation of Cosmology of the Universe Part 1, JB Smith returns with Part 2! You need not have attended Part 1 to enjoy this fun and interactive presentation on how science and math are used to understand the universe we live in. See how seemingly complex equations can be broken down into simple parts to make them comprehensible to everyone. Learn about the luminaries who used their genius to make the complex into simple rules that we can use to understand the universe, predict and understand its forces and the interaction of those forces in stars, black holes, galaxies, and the origins of everything we know.



Cosmological Expansion as Seen by WMAP NASA Image

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.

ERAU Astronomy Open House

Embry Riddle Aeronautical University's Astronomy Department will be having their first open house of the new academic year on October 27th. There will be a public lecture in the Willie Miller Auditorium at 7pm, followed by observations of the sky 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

Osiris-Rex Returns Asteroid Samples

NASA's Osiris-Rex mission returned its sample return capsule with material from asteroid Bennu to Earth on September 24th. This was the first return of asteroid material to Earth from space.

Asteroid Bennu represents a class of carbonaceous asteroids that orbit in the same part of the solar system as Earth. Through them we can study material that did not undergo the processes of planetary formation, while still being exposed to conditions similar to those of Earth, Mars, and Venus.

The carbon-rich material of Bennu can teach us about possible origins of life on Earth by

letting us see what organic molecules (carbon-based molecules) form on the asteroid, and by extension, which were available on Earth in its early development.

Osiris-Rex gathered the material using a “touch and go” technique at the asteroid. It opened the sample container in space, then struck the asteroid with its arm, casting material upward where it would be captured when the container closed. The resulting cloud of material far exceeded scientists’ expectations, so the hope is that a good range of materials from the asteroid’s surface to a few centimeters below will be represented in the capsule.

The Osiris-Rex spacecraft then headed back toward Earth, releasing the return capsule with the sample cannister inside it, which fell back to Earth at the Dugway Proving Ground in Utah on September 24th. The main spacecraft is continuing on a trajectory to visit another asteroid, Apophis.

The spacecraft has been renamed Osiris-Apex for this new phase of its mission. At Apophis, it will perform similar studies of the asteroid using its arm to strike the ground, obtaining spectrographic data on the asteroid to transmit back to Earth, as it no longer has a return capsule to send back samples. The comparison of that data to similar data from Bennu will determine whether the samples returned from Bennu are likely to be similar to material at Apohis or not.

The newly-opened sample return capsule includes a dusting of fine, dark dust that appears to be material from Bennu that was captured around the seal of the sample container. Images during the capture of the material samples at Bennu show a cloud of large rocks as well as dust surrounding the craft when the container was closed, enough that scientists were concerned about being able to close the capsule securely.

More: [The Mission | OSIRIS-REx]

Osiris-Rex Sample Return Capsule Open in Lab

NASA’s Psyche Mission to Launch

NASA’s latest mission to an asteroid is preparing for launch on October 12th. It will launch aboard SpaceX’s Falcon Heavy vehicle, the most powerful launch vehicle in service, to allow it to reach the metal-rich asteroid Psyche in with enough energy to allow the spacecraft to enter an orbit around the asteroid, rather than merely flying by..

SpaceX rolled out the Falcon Heavy to the launch pad for a static fire test on September 29th. Upon completion of the test, the Falcon Heavy will return to its hangar to have the Psyche spacecraft fitted to the top before returning to the pad for launch.

The launch is scheduled for Thursday October 12th. Initially scheduled to launch a week earlier, the Psyche team wanted to take extra time to check out the spacecraft’s thrusters before launch.

Once launched, Psyche will cruise to the asteroid, then enter orbit around it where it will begin our first close-up and extended study of a metal asteroid.

[Psyche (ASU)]

SpaceX Prepares the Mighty Falcon Heavy for Psyche's Launch at Cape Kennedy

Stoke Space Flies Hopper2

Stoke Space is a new commercial spaceflight startup developing a fully reusable 2 stage launch vehicle. Designed to launch payloads roughly the same size as those of the Falcon 9, both the booster stage and the upper stage are designed to be flown, landed, and reused within 24 hours.

While this may sound like a very tall order for a new space company, Stoke Space's team includes many SpaceX alumni, including Hans Koenigsmann, designer of SpaceX's Falcon 1 and Merlin rocket engines, and former SpaceX chief engineer Robb Kulin. The team's experience shows in their record-setting pace of development, going from seed funding to successful flight testing in less than 3 years.

The Hopper2 vehicle is a test version of the Stoke Space vehicle's second stage. Since it represented the greatest technical challenge to their program, they decided to build and test its concepts first.

The second stage uses a rocket that's integrated with the body of the spacecraft. The base of the stage is a large heat shield, through which the propellant for the rocket engine flows both for cooling the heat shield, and for pre-warming the propellant before it is fed into the rocket engine.

The engine itself has a single turbopump system feeding propellants to 15 thrust chambers around the periphery of the heat shield. In the final version of the rocket, there will be 30 chambers. The thrust generated by each chamber can be throttled, to give directional control of the rocket thrust without having to actually move the chambers. Simply increase thrust on the chambers on the side that you want to turn away from to guide the rocket.

The heat shield also acts as a nozzle, without using the bell-shaped nozzles of a conventional rocket. Known as a "plug nozzle", one advantage of this type of nozzle is that it can operate over a wide range of pressure conditions between the ground and orbit, whereas bell nozzles are designed to work at either atmospheric pressures or vacuum, with inefficiency and mechanical stresses when used at different pressures. For example, the Space Shuttle engines were operating at a pressure higher than their bell nozzles were designed for at launch, requiring structural reinforcement against the stresses of atmospheric pressure at launch to prevent the nozzles from being collapsed by the pressure of the atmosphere around them.

Legendary rocket designer Philip Bono envisioned similar reusable rockets in designs he created in the 1960s and 1970s. His designs never obtained the support required to test them in flight, as development efforts were limited to a few government supported designs like the Saturns and the Space Shuttle. Now, with commercial space companies becoming viable entities on their own, without requiring government sponsorship, concepts that were laid aside in earlier decades can be developed and tested.

Hopper2 combined all the basic systems required for Stoke Space's second stage reusable rocket. The engines, the heat shield, and the control systems required to perform a takeoff and landing of the stage. During the flight on September 17th, it successfully lifted off, maneuvered using differential thrust, then came

to a landing. The high-efficiency hydrogen-oxygen engines performed as expected despite their unconventional design, as did the regenerative heat shield.

Stoke Space Hopper2 Test Vehicle in Flight
Stoke Space Image

Having demonstrated the technologies of the second stage, Stoke Space's focus will now move to their first stage rocket. It will use a cluster of 7 rocket engines burning liquid natural gas and liquid oxygen. It is designed to land similarly to the Falcon 9 first stage, either downrange at sea on a landing barge, or return to its launch site for a landing.

https://www.stokespace.com/

SpaceX Starship Flight Test Delayed

The second integrated flight test of SpaceX's new Starship launch vehicle is expected to occur soon, but is currently delayed by government environmental reviews. The NASA team working with SpaceX on development of the Starship vehicle are very pleased with SpaceX's rapid work in correcting issues that arose during the first flight test, and feel very confident that SpaceX is ready to fly again. However, the FAA is withholding the launch license for the second flight test, stating that they must complete another environmental review that will take from 30-90 days.

This follows a series of confusing statements by the FAA about SpaceX's required corrective actions for this flight, where they seemed to imply that SpaceX had a long list of changes that would be required that had not been addressed, when in actuality both SpaceX and the FAA had already worked through the list and performed all the work required.

The environmental review itself would be nothing more than a paperwork review of prior work performed both before and after the first Starship flight test, no new data or work would be included in the review. SpaceX has completed all requested clean-up activities around the launch pad after the first test, as well as testing to ensure that no long-term effects were caused.

In this case, the FAA is again being obscure in the reasoning behind the sudden obstruction to releasing a launch license for the test flight in accordance with existing law and regulation.

The Starship itself is at this point ready for test. SpaceX is continuing to perform upgrades of their facilities that will not impact the flight schedule should a launch license be forthcoming soon. NASA personnel stated that they feel SpaceX is ready for the test at a press conference in Boca Chica, TX

.

IN THE SKY THIS MONTH

Parital Solar Eclipse Saturday, Oct 14th

A partial solar eclipse will be visible from The Villages on October 14th. First contact of the Moon with the Sun will be at 11:05 ET, the peak of 55% coverage of the Sun will be reached at 1:27pm, and last contact will be at 4:55pm.

We will be viewing the event at Homestead Recreation Center. We will have solar scopes, solar viewing glasses, and the Solar Walk, our scale model of the solar system that you can walk through. We will be set up along the walkways on the same side of the Homestead building as the Nature Walk (east side.)

6227 Meggison Road, The Villages.

This eclipse will appear as an annular eclipse along an S shaped path passing through northeast South America, to northern Mexico and southeastern Texas, up through the southwest and into the Pacific Northwest. An annular eclipse is when the Moon is farther from Earth in its orbit so that when it covers the Sun, it does not cover it completely as in a total eclipse. Enough of the Sun is still exposed that the darkness of a total eclipse does not occur. It does change the nature of the daylight, though, giving it an eerie gray feeling. It is not safe to look directly at the Sun during an annular eclipse. Protective glasses or indirect viewing must be used at all times, even during the peak of the eclipse.

The Moon:
Last Quarter, October 6th
New Moon, October 14th
1st Quarter, October 21st
Full Moon, October 28th
Last Quarter, November 6th

Saturn and Jupiter are the showpieces of our fall sky this year.Saturn sits high in the southeast at dusk, with Jupiter in the east. Saturn is magnitude 0.6, it stands out brightly among the 3rd and 4th magnitude stars of Aquarius. Jupiter shines at magnitude -2.9, easily the brightest object in the night sky other than the Moon.

Both planets look good in large and small telescopes, with magnifications of 50x and greater showing the disk and basic detail, as well as their brighter moons. Binoculars will not show a disk, but they will show the bright moons--the Galilean moons of Jupiter, Titan and possibly one or two other bright moons of Saturn. The Galilean Moons are easy to distinguish, they appear in a line across Jupiter. Titan will appear as a bright star near Saturn, other moons of Saturn will have to be distinguished from nearby stars.

In telescopes with excellent contrast, weather patterns can be made out on the surface of the two gas giants at magnifications of 150x and higher. The Great Red Spot of Jupiter has become smaller and is a duller color than its heyday in the 1970s, making it harder to spot now. It can be seen, with patience and careful observation at magnifications as low as about 100x. Knowing at what time it will cross the center of Jupter's disk helps, as well. You can get transit times for the Great Red Spot online at this link: [Transit Times of Jupiter's Great Red Spot - Sky & Telescope]

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 though it can be glimpsed under dark skies without light pollution or humid haze. It can be seen in binoculars or a telescope, and can be found using a finder chart. It appears as a greenish or bluish non-stellar object. It shows a disk at magnifications of about 75x and above. Chart:
https://in-the-sky.org//data/object.php?id=P7

Neptune rises shortly after Saturn, following it by about 45 minutes time in the sky. At magnitude 7.7 it takes binoculars at minimum to see it. Telesciope will see it as a blue non-stellar object. Most telescopes can catch its brightest

moons as well. At 2.4 arcseconds in size, it takes about 75-100x magnification to display any sign of 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 is at greatest elongation this month--at its farthest from the Sun, rising at about 4am at the start of the month.

Venus shows a disk at about 40x magnification, but shows no details other than its phase. Seeing details in Venus's clouds requires a variable neutral density filter and lots of patience, and even then only shows some minor variations in brightness.

Mercury has joined Venus in the morning sky, and will only be visible during morning twilight this month until it dives into the Sun's glare in midmonth.

Mars sits close to the Sun this month, lost in its glare.

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/

Astronomy Software Bundle

Humble Bundle is a fundraising site for charity that sells bundles of software and ebooks at greatly reduced prices with part of the procedes going to selected charities.

Until October 18th, they are offering a bundle of astronomy software for Android and Windows, the Redshift family of products. The bundle includes Redshift 9, the current product for Windows, Redshift 8, the prior generation Windows planetarium software package which is still liked by many for its interface, Redshift Pro for Android, and Redshift Solar Eclipse for Windows.

The entire bundle is available for under $20, a considerable savings given that the normal price for Redshift 9 is over $120.

The software is graphically very polished compared to free software like Stellarium. Features are similar, however, though many will find Redshift to be far more user friendly.

See the software bundle offer here: The Night Sky Navigators Bundle (pay what you want and help charity)

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.

October
3 Telescope Workshop 6:30pm/ *NO Space Academy this month* Truman Rec Center
6 Exec Meeting, 11am Fishhawk Rec Center
14 Partial Solar Eclipse, Homestead Recreation Center, 11am to 5pm, setup at 10am.
17 General Meeting: JB Smith, Cosmology of the Universe, Part 2, 6:30pm Laurel Manor Rec Ctr
21 Fruitland Park Observing, 300 Shiloh St, Fruitland Park, gates open at 5pm
27 ERAU Open House 7pm

November
3 Exec Meeting, 11am Fishhawk Rec Ctr
4 Starry Starry Night, Truman Recreation Center, 6:30-9:30p, Sunset 6:40pm, setup 5:30pm
5 DST Ends
7 Telescope Workshop 5:00pm/Space Academy 6:30p at Truman Rec Ctr
17 ERAU Open House
18 Fruitland Park Observing, 300 Shiloh St. Fruitland Park, gates open at 5pm
21 General Meeting: Toni Graybill, The Black Hole Zoo (Types of black holes), 6:30pm, Laurel Manor Rec Ctr

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