VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 5, Number 3
March 2024

Club Website:
http://vlgastroclub.org/
Facebook:
https://www.facebook.com/groups/vlgastroclub/

Club Officers & Directors

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

Newsletter Contact
saundby@gmail.com
(please include TVAstro in subject line)

UPCOMING EVENTS

Exec Directors' Meeting, March 1st, 11am
All members are welcome, join us at Fishhawk Recreation Center, 2318 Buttonwood Run, from 11a to 12p as we plan 2024's events and meetings including CEMEX Earth Day and April's eclipse event.

Telescope Workshop, March 4th, 7pm
Our monthly Telescope Workshop will be held at the Picnic Pavilion at Truman Rec Center, 2507 Canal Street, at the Picnic Pavilion. Bring your new telescopes or other equipment to show off, find assistance in assembly or use, and learn about accessories that will make them easier to use!

Space Academy, March 4th, 6:30pm
Astronomy 101 Part 2 will cover the basics of astronomy and the sky this month. You need not have attended Part 1, this session will stand on its own. Learn about the basics of astronomy, including the movement of objects in the sky, what different types of objects there are and how they are defined, and the relative distances and scales in astronomy.

Space Academy is held at Truman Recreation Center, 2507 Canal Street, in the Studebaker room.

Club Volunteers at Wildwood Elementary STEM Night, Feb 22nd, 2024 Image by Jeff Kahler

General Meeting, March 19th, 2024:
Cecilia Payne Gaposchkin

Cecilia Payne Gaposhkin was a groundbreaking astrophysicist who is responsible for our current understanding of the chemical makeup of stars. She also developed methods for using stars to learn the structure of our galaxy. Learn about her life and career, and the impact she had on the study of astronomy and astrophysics through the 20th century.

March 16th, 5pm:
Fruitland Park Astronomy Group

The Fruitland Park Astronomy Group meets for an evening of observing and talk on the third Saturday of the month every month, conditions allowing. The meeting is 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. Gate opens at 5pm, solar observers can catch the sun while it's up, and astro observers can set up in daylight.

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.

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

Recent Events

Starry Starry Night, Feb 3rd 2024

Our most recent Starry Starry Nights event was a huge success. Over 800 attendees joined our 13 astronomers and our other volunteers for views of Jupiter, The Andromeda Galaxy, M41, The Orion Nebula, and many other objects in the sky.

The event opened to clear skies during twilight, but clouds soon blocked much of the sky above us as we reached full darkness. A band above the horizon and an area to the northeast remained clear, however, so we were able to continue showing objects in the sky until the clouds cleared about 40 minutes later. The area around Canis Major and Minor remained clear, as well as the northern part of Gemini with occasional breaks in Orion.

For the final hour of the event, we had clear skies allowing us free rein of the heavens above.

Unfortunately, we had two downsides to the event. One was that we overflowed the parking area at Truman. Many people who wished to come could not because the parking was full and there is no nearby mail center to use as overflow. We had some attendees return near the end of the event to let us know that they were unable to join us earlier, and we know that many others simply gave up.

The other was that we had someone trip over one of the horshoe pit covers at Truman, because we had a telescope set up in that area with a crowd formed around it, and the pit was invisible in the dark among the crowd. For any future events, we will ask our astronomers to stay clear of that area to avoid drawing anyone in that direction, and we'll see if we can get some sort of marker or barrier to keep people clear of it. The report on the person who fell was that they were shaken but uninjured. We are also looking at a site that will allow us to accommodate the larger numbers of people that our event now draws.

Telescope Workshop Feb 5th 2024

At February's Telescope Workshop, we had 9 people arrive who wanted assistance with telescopes, as well as a number of experienced observers to assist them. One of our experienced observers brought his new SeeStar S50 for assistance in getting the most out of it from our more experienced SeeStar users.

Our workshops cover not only the use of telescopes, but also binoculars and Electronically Aided Astronomy devices such as the SeeStar. The new age of astronomy devices are very popular, but easy as they are to use, there is still a lot for experienced users to pass on to new users!

Attendees at the Telescope Workshop Learn to Align Finders and Mounts for Observation
Image by Jeff Kahler

Space Academy, Feb 5th 2024

Our Space Academy meeting had a great turnout for Frank Ancona's Astronomy 101 Part 1 presentation. Attendees learned a lot of the basics of astronomy, about telescopes, observing, and the objects in the sky. Part 2 will be presented by Ken Katta in March (see above), and will be presented as a stand alone presentation, so you need not have attended Part 1 to fully enjoy this next session!

"Space Cadets" learn about the construction and types of telescopes used by amateur astronomers at February's Space Academy meeting.
Image by Jeff Kahler

The Villages Outdoor Expo, Feb 23-24 2024

The Villages Outdoor Expo, an event hosted by The Villages Recreation, is a chance for the lifestyle groups in The Villages to represent themselves to new residents or anyone else looking to expand their range of activities here in The Villages. Held at Everglades Recreation Center, the event runs from 10am-3pm on Friday and Saturday.

Friday had clouds and high winds. We had to take down the pop-up after two of us had been holding on to legs of the pop-up for a while to keep it upright, even after adding weights to its legs. That turned out to be a good call, as shortly after we took it down, strong gusts of wind destroyed another group's pop-up, and everyone else was taking theirs down in worse winds than we'd had to deal with.

Attendance on Friday was low, and we only spoke to about 60 people by the time we broke up the booth early as rain started about 1:30pm. Last year, we had spoken to about 400 people through the course of the day on Friday.

On Saturday, the weather was fair though the winds were still predicted to be high so we didn't set up our pop-up. We were able to set up solar scopes, a display telescope, 4 Solar Walk cards, banners, table displays, and John Keller's SeeStar S50 to populate our booth area. Attendance was much better than on Friday, we had people to speak to about the club almost constantly, and we had many great volunteers come out to assist the usual suspects at the booth, which was greatly appreciated.

On Saturday, we spoke with about 360 people, which compares favorably with last years' 400 people on Saturday, when we had warmer weather and less wind. Unlike last year, where crowds were light during the final hour, we had people coming to see us up to closing time for the event. Overall, the attendees who spoke with us this year seemed to have a much higher proportion of people with specific interest in coming to club meetings. I look forward to them joining us--the more the merrier!

The Club at Outdoor Expo
Image by Jeff Kahler

NEWS

IM-1 Nova-C/EagleCAM Launch

The mission was launched aboard a SpaceX Falcon 9 rocket on February 15th with no issues, then the Nova C lander detached from the Falcon second stage and made its way to the Moon. The Nova C successfully completed all checks of its propulsion systems on its cruise to the Moon, performing corrections and verifying that it would be able to establish an orbit once it arrived at the Moon.

At the Moon, it performed a firing autonomously while out of contact with Earth to place itself in a lunar polar orbit, to put itself in line with a landing near the south pole of the Moon. Once in this orbit, and back in contact with Earth, controllers at Intuitive Machines began preparing the vehicle's systems for landing.

During this time, they decided to perform an advance check of the laser rangefinder system that would be used to guide the Nova C to its final landing point. This system uses three lasers to both track the movement of the spacecraft relative to the ground below, and to detect any obstacles that may interfere with the landing. At that point they discovered that the system could not be powered on from the ground. A manual safety switch that prevents the lasers from being accidentally activated while workers are working on the spacecraft on the ground had been left in the off position, and there was no way to electronically bypass that safety switch.

Fortunately, by happenstance NASA had included a different laser system designed to perform similar duties as a payload on board IM-1. This laser system performs the same function for the Astrobotic lunar lander (which failed to arrive at the Moon due to a propulsion problem earlier this year, with another attempt planned for later this year.) IM-1's controllers were able to create a software patch for their lander that would allow the NASA laser rangefinder to replace their own rangefinder that couldn't be turned on.

The software change was made in only two hours, as the IM-1 craft took an extra orbit around the Moon before landing. Unfortunately, the time did not allow for other changes to the software, such as allowing EagleCAM to be ejected above the surface of the Moon.

Landing

The landing coverage provided by Intuitive Machines was particularly poor, with only a view of personnel working in a control room and no data shared during the descent and landing aside from occasional callouts of random bits of information. Animations that were poorly representative of events, and repetitive, were all that were shown and they had no relationship to vehicle telemetry.

At the time of landing, there was a long period where there was no information on whether the landing had occurred, whether it had been a success, or what. After some time a telemetry signal was detected from the craft and Intuitive Machines declared the landing successful, with Odysseus (the name of the IM-1 craft) having a new home.

Odysseus, the Nova C lander for IM-1, on Earth Prior to Launch. NASA image.

Subsequent to the landing, there was a dearth of data shared publicly. At a press conference on the following day, NASA and Intuitive Machines revealed that while the craft was healthy and operational, it had tipped onto its side at the moment of landing. This was most likely caused by a slow sideways drift at the time of landing, with the vehicle described as moving 6 miles per hour downward at contact, and 2 miles per hour sideways. It appears that one of the feet of the craft may have been caught by the surface, causing the tip.

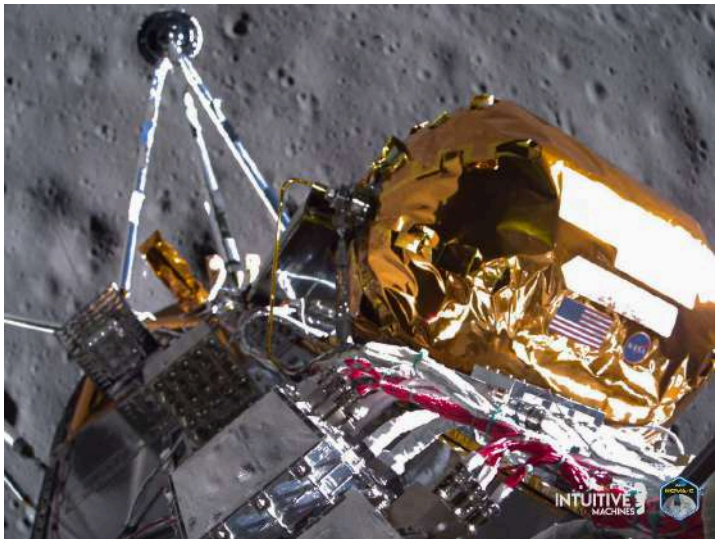
Being tipped places the high gain antennas of the craft in a bad position to connect with Earth. We were able to hear the craft's transmissions, but the craft was not able to hear the Earth's replies. This meant that Odysseus was following a communications procedure that would switch between its two different pairs of high gain antennas looking for a better signal every 15 minutes, interrupting any data transfers to Earth and any back from Earth. At the time of the press conference, Intuitive Machines was trying to issue a command to the spacecraft to stop this behavior, so that the craft could at least follow its program to return unbroken data back to Earth.

Since the press conference, a few images have been released. Unfortunately, Intuitive Machine's other information has been cryptic and difficult to understand without further context.

As of this writing, it appears that IM-1's power will run out sometime on February 27th or 28th. Controllers have managed to command the spacecraft to send its data without interrupting it with antenna switches. Multiple images taken by the craft during its landing have since been received and shared by Intuitive Machines.

Despite the problems, this has been a huge success for Intuitive Machines. They successfully soft-landed a vehicle on the Moon, a first for the U.S. since Apollo 17 in 1972. The Nova C lander is designed as a robotic cargo carrier to take payloads to the Moon to support the Artemis program. Plans are to have this and larger vehicles carrying supplies for the astronauts and an eventual moon base.

If this had been an operational use of the Nova C, it would have successfully delivered its cargo to the Moon. None of the cargo carried on this trip was damaged by the last minute fall.



Odysseus 100 Feet Above the Lunar Surface. Intuituve Machines image.

EagleCAM

Unfortunately, the loss of solar power for Odysseus appears to be bad news for EagleCAM. Based on the orientation of the IM-1 on the ground, it would be possible to eject EagleCAM, but with very limited time left for the IM-1 to be powered, coupled with slow transfers of data, it's not likely the team will choose to deploy it. By the time you receive this newsletter, the issue will probably have been decided. Unless IM-1 comes back to life when daylight returns after a cold lunar night, it's unlikely that EagleCAM will have a chance to show its stuff.

ERAU's team have communicated with EagleCAM on the Moon, and it is fully operational and ready to go. Should the opportunity present, they can still eject it to land about 10-20 feet from the IM-1 lander and capture pictures of it.

Japan's SLIM Lunar Lander Alive!

On January 19th, Japan's SLIM lander successfully landed on the Moon, unfortunately in a nose-down orientation that limited its solar

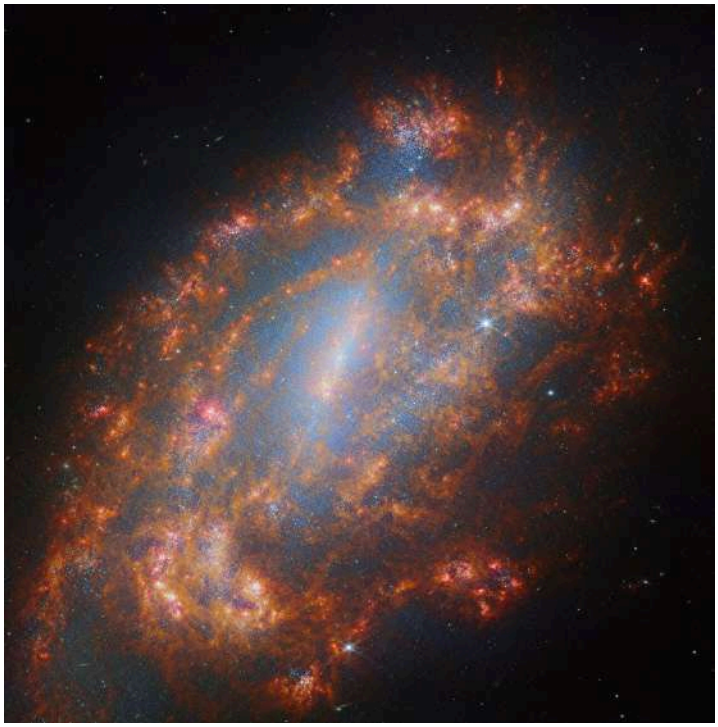
power and shortened its working life on the Moon. Five hours after landing, with just a few images returned, controllers at Japan's JAXA space agency turned off the SLIM lander in an attempt to preserve its remaining batteries to give it a chance of surviving the lunar night, which dips to temperatures under -200 degrees F.

On February 25th, their gamble paid off. They were able to briefly contact SLIM lander to establish that it is still alive. At that time, the sun angle meant that the craft couldn't cool itself properly, so they shut it back down again after a brief communication.

Since then, conditions have improved and SLIM (Smart Lander for Investigating the Moon) has started returning new images and new science data.

New Image of SLIM's Landing Area Returned Since Surviving the Lunar Night. Comparisons with an Image from the Same Camera Provide Additional Detail on the Features of the Lunar Surface. JAXA image.

Currently, JAXA plans to resume science operations of SLIM and will seek to see if they can survive another lunar night as they study both the Moon, and the engineering capabilities of their little spacecraft for lessons to apply in the future.



JWST Image of NGC1559, Captured in Two Ranges of Infrared Light, using NIRCam and MIRI. NASA image.

JWST Images Reveal Star Formation in Spiral Galaxies

The James Webb Space Telescope (JWST) is performing series of images of specific galaxies using two of its infrared cameras to collect data that will be combined with millimeter wave instruments to reveal the details of how stars form, and continue forming, in spiral galaxies.

Prior images from Hubble were unable to penetrate the thickest clouds of gas and dust in galaxies, which is where star formation occurs. Star formation affects the form of the galaxies, as the clouds condense in the galaxies then are dispersed and driven by the stars that form within them. Meanwhile, large clear areas within the dusty arms of spiral galaxies are created by supernovas, the shockwave clearing an area around the exploding star, but causing the compression of gas and dust ahead of the shock.

The instruments on JWST are able to see the distribution of the gas and dust in the galaxies with high resolution, down to individual clouds

cloaking the formation of a single star or a small cluster.

Combined with millimeter wave data from ALMA, the Atacama Large Millimeter/ submillimeter Array in South America, scientists hope to be able to see the specifics of the dynamics of star formation processes to help us better understand them, as well as their effects on the galaxy as a whole.

IN THE SKY THIS MONTH

The Moon:
Last Quarter, March 3rd
New Moon, March 10th
1st Quarter, March 17th
Full Moon, March 25th
Last Quarter, April 1st

Mercury will look its best for the year in March, reaching greatest elongation (greatest apparent distance from the Sun) on March 24th. It will begin to be visible in the twilight starting on about the 15th. It will be very low in the sky, and will set before full darkness. It will require binoculars to see, most likely, but once the Sun is below the horizon it will be safe to pull them out to find it as a small sharp yellow-orange star on the western horizon near where the Sun set.

With each passing day, it will rise higher until it gets its highest on the 24th, before racing back down toward the Sun again on following days. Telescope users will see Mercury go rapidly through its phases, from a gibbous disk at mid month to a half phase on the 22nd. Magnifications of 100-200x are recommended to see the phases of Mercury.
https://in-the-sky.org//data/object.php?id=P1

Jupiter starts the month high in the sky, but descends toward the western horizon as the month progresses. At the start of the month, it will be high in the southwest at magnitude -2.2 and with a disk 36 arcsec in diameter. By month's end, it will set about 2.5 hours after the Sun, and while it only dims slightly to -2.1, it will be down to 34 arcsec in diameter. Enjoy this large bright planet while it lasts! To see the ever more difficult to observe Great Red Spot, you can find the time when it crosses the center of Jupiter's disk. Use the transit time calculator on Sky & Telescope's website to find that time, then, knowing that time compare it to the time you're observing to see whether to look to the left or right of that center line. If you're looking earlier, it will be to the left of the centerline. Later, it will be to the right. It takes the GRS about 5 hours to cross the disk from left to right, but it's just about impossible to see when it's within 30 minutes of the edges of Jupiter's disk.:
Transit Times of Jupiter's Great Red Spot - Sky & Telescope

Here is a detailed guide to observing Jupiter's many features:
https://arksky.org/aso-guides/aso-observational-guides/35-observing-jupiter

Uranus is a few degrees west of Jupiter, and is at magnitude 5.8 and 4 arcseconds across. It will show as an object with a green or blue color depending on sky conditions, and when seen even through binoculars or a telescope at low magnification will be obviously different from the stars around it. At mid-level powers of 75x-150x it will show a small disk, 3.7 arcsec in diameter.

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

Neptune shines at magnitude 8 and is only 2.2 arcseconds across this month. It takes binoculars at minimum to see it. It is near the western fish of Pisces. It takes about 100x magnification to display a disk.

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

The Morning Sky sees **Venus** and **Mars** rising before the Sun, with **Saturn** joining them near the end of the month. **Mars** rises first, about 75

minutes before the Sun, then **Venus** rises about an hour before the Sun at month start, at magnitude -3.9. **Mars** is much dimmer, at magnitude 1.3, and will be hard to pick out in twilight. Look for an orange star in binoculars, above and a bit to the right of Venus.

Saturn appears ahead of the Sun as the month comes to a close, with a close conjunction with **Venus** on the 21st, though it will be very low in the morning sky. The two will be only about one quarter of a degree apart, close enough to see in the same field of view of a telescope at low or medium power (50-150x, depending on your scope's focal length.)

Venus online finder chart:
https://in-the-sky.org//data/object.php?id=P2
Online observing information for Mars:
https://in-the-sky.org//data/object.php?id=P4
Saturn finder chart:
https://in-the-sky.org//data/object.php?id=P6

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

This time of year we see the winter constellations like **Orion** and **Taurus** move off the stage to the west, as the spring constellations **Cancer**, **Leo**, **Ursa Major**, **Bootes**, and **Canes Venatici** rise higher in our sky.

Cancer contains the beautiful **Beehive Cluster (M44)** a collection of bright yellow stars that pop out in binoculars or low power telescope views. Look ahead of the head and mane of **Leo** to find it, between a pair of dim stars. In our skies, it is very difficult to see directly, but in places with lower humidity, you can look up and see the cluster as a cloudy patch of brightness in the sky in front of the Lion.

Leo gives us a view outward from our galaxy toward other galaxies. The constellation is anchored by the bright star **Regulus** at the base of a backwards question mark shape of stars, an asterism known as **The Sickle**. Forward from The Sickle lies **Cancer**, backward lies the body of **Leo the Lion**, with the legs below. The hindquarters of **Leo** are marked by a right triangle of stars, laying on its back. Between the star at the right angle, about halfway to the next bright star down that is Leo's leg, lie the **Leo Triplet**, three bright galaxies all in one field of view. They are **M65, M66,** and **NGC3628**. They lie about 37 million light years away, and can be seen even in modest size scopes.

There are many other galaxies in the area of Leo, plus the **Virgo Cluster** off Leo's tail once it rises high enough in the sky. A cluster of galaxies with so many members it takes a guide to figure out which is which.

Ursa Major has its own share of fine deep sky objects. Below the bowl of **The Big Dipper**, near the front, lies the bright planetary nebula **The Owl Nebula (M97)**. I have seen the "eyes" in telescopes as small as 90mm, though under typical Florida conditions it will likely require 5 inches or more of aperture and dark skies. The Big Bear also hosts a collection of showpiece galaxies. Normally, galaxies are very difficult to observe visually from The Villages. Even seeing bright galaxies like **M81** and **M82** as a dim smudge in your telescope is an accomplishment. However, for those using electronic enhancements, Ursa Major is a playground of beautiful galaxies including the aforementioned as well as **The Pinwheel Galaxy (M101), M108** and **M109.**

The Great Orion Nebula
by Norman Pettus, with Vespera EAA Telescope

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.

March 2024

1 Exec Meeting

4 Telescope Workshop 7pm/Space Academy 6:30pm

Ken Katta Astronomy 101 Session 2

10 DST Begins

16 Fruitland Park Observing

19 General Meeting: Linda Meng, Cecelia Payne-Goposhkin

21 Venus/Saturn Conjunction, closest approach 9:59pm, 20 arcminutes.

25 Penumbral Lunar Eclipse, 12:53am to 5:32am, peak 3:12am

29 ERAU Open House

April 2024

1 Telescope Workshop 8pm/Space Academy 6:30pm Truman Rec Ctr

5 Exec Meeting

8 Solar Eclipse (60% in TV.) 11am setup

Peak:3:02pm (Monday) 12-4pm

16 General Meeting: Ken Katta speaks on White Dwarfs and Cataclysmic Variables

20 (Deferred for eclipse) Astronomy Day, Homestead Rec Center, 11am to 2pm, setup 10am.

20 Fruitland Park Observing

22 CEMEX/Girl Scouts Earth Day, CEMEX Center Hil Minel 530 W Kings Hwy, Center Hill, FL 10am-2pm (public open times)

May 2024

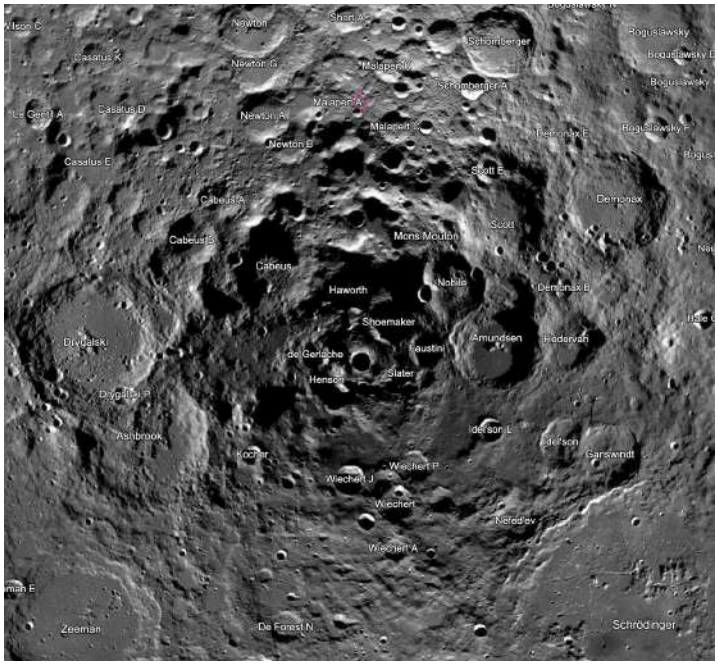
3 Exec Meeting

6 Telescope Workshop 8:30pm/Space Academy 6:30pm

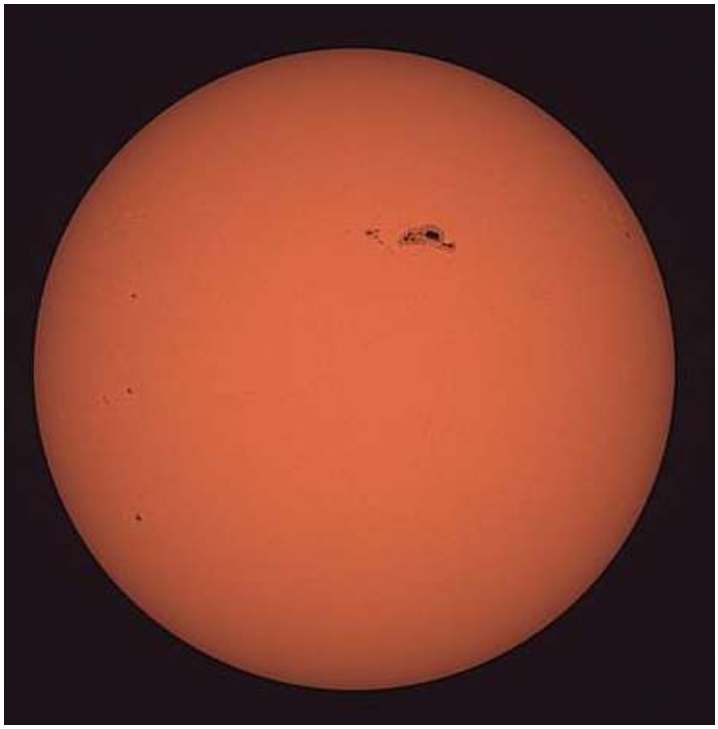
18 Fruitland Park Observing

21 General Meeting: Mike Petersen, “The Life and Death of Stars”

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



Location of IM-1’s Landing On the Moon
South Pole of Moon at Center
IM-1 Marked in Pink at Upper Center
NASA Image by LRO



Solar Image by John Keller
“I compiled this image from a 30 second video, taken this morning with my Seestar S50, using ASI Video Stack to stack the best 33% of the frames into this image. The very large and complex sunspot complex, AR3590, has produced multiple X class flares over the past few days including the most powerful flare of the current solar cycle.”