VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 6, Number 7
July 2025

Club Website:
http://vlgastroclub.org/

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

UPCOMING EVENTS

Executive Directors' Meeting, July 4th, 11am-12pm, Fishhawk Rec Center, 2318 Buttonwood Run

All members welcome to our monthly planning meeting. This month we'll reviewing June's Camp Villages and planning this month's session. We will also be planning our fall speaker schedule and our winter/spring event schedule.

Space Academy, July 7th, 6:30pm
Truman Rec Ctr, 2705 Canal St.

This month features a video and discussion about the Voyager spacecraft, their construction, longevity, and how their teams have kept them working since 1977.

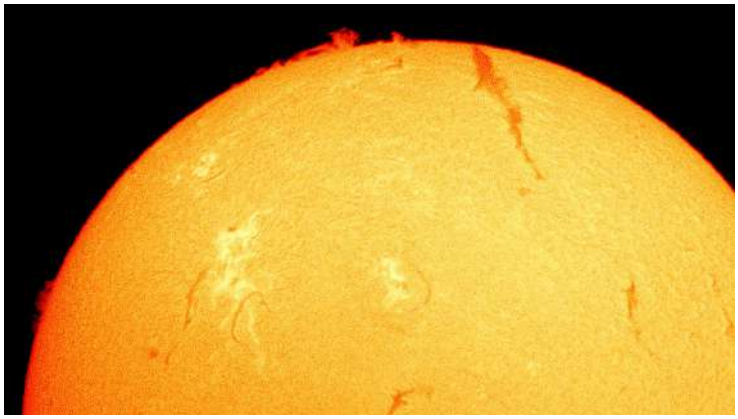
Observers' Workshop, July 7th, 8pm
Truman Rec Ctr Pavilion, 2705 Canal St.

This month we will meet inside after the Space Academy meeting due to the likelihood of poor weather and mosquitoes If you have a telescope you need help with, we will be available to assist you inside, after Space Academy.

General Meeting, July 15th, 6:30pm:
Round Table: Your Interests in Astronomy

Join us at Laurel Manor Rec Center, 1985 Laurel Manor Drive, at 6:30pm for our fourth annual members' summer round table meeting! This is where we talk about our interests in astronomy, and what the club can do to further support the members' interests.

So come, share a little of your interests or background (or not, if you prefer) and hear from your fellow members!



Solar Activity on June 12, 2025 by member Steve Maiaroto

Fruitland Park Astronomy Group, July 19th, 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
	Burt Salk, Bob Averitt

Newsletter Contact: saundby@gmail.com

Camp Villages, July 23rd, 10am, Homestead Recreation Center

Volunteers will be providing a program on space and astronomy for Campers and their grandparents at Homestead. If you would like to be involved, contact Randy Gilbert or attend our Executive Directors' Meeting on July 4th to volunteer & learn our presentations.

See Calendar at End of Newsletter, before star chart.

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

M92 by member Craig Henry. A globular cluster is a group of stars held together by mutual gravity. This cluster lies near the "head" of Hercules, and is visible by eye, in binoculars, & telescopes.

NEWS

This image one of several released to celebrate first light of the Vera Rubin Observatory. The Lagoon and Trifid Nebulas in Sagittarius (M8 and M20 respectively) are two complex star forming regions surrounded by gas and dust from which new stars are still forming. They lie toward the center of the galaxy from us, in the Sagittarius arm of the Milky Way.

Vera C. Rubin Observatory First Light

The Vera C. Rubin Observatory in Chile captured its first images in late 2024, achieving "first light." Located on Cerro Pachón, this facility, named for astronomer Vera Rubin, will transform astronomy with its Legacy Survey of Space and Time (LSST) which will perform a wide scale survey of the sky with regular releases of data to the public after a proprietary period.

The observatory's 8.4-meter telescope and 3.2-gigapixel camera took test shots of galaxies, stars, and asteroids, proving its ability to image distant objects clearly. Unlike observatories that target specific stars, Rubin's LSST will map the entire sky every few nights for 10 years, creating a detailed cosmic record.

The LSST will generate 20 terabytes of data nightly, driving discoveries about dark matter, dark energy, supernovae, and asteroids. First light images show the potential of this data to unlock cosmic secrets.

Rubin emphasizes open science. Within 60 seconds of detecting changes like supernovae or asteroids, alerts will be public via brokers like

ALeRCE (https://alerce.science/).

Annual data releases, starting with DR1 in mid-2026, will be available to researchers first, then the public after two years at the website https://data.lsst.cloud/.

Amateurs and citizen scientists can explore data using tools on Rubin's Education and Public Outreach platform.

Funded by the NSF, DOE, and private donors, Rubin will begin full operations in late 2025. First light signals the start of a thrilling era for anyone eager to explore the universe.

Learn more at:

Rubin Observatory

A Portion of the "Cosmic Treasure Chest" image released by the Vera Rubin Observatory.

Starship 36 Destroyed in Test

Starship 36, the vehicle being prepared for SpaceX's tenth flight of the full Starship flight test, was destroyed during preparations for a static fire test of its rocket engines at SpaceX's Massey test facility on June 18th at about 11pm Central Time. No personnel were on site during the test, according to plan, and nobody was harmed as a result of the explosion and fire.

A pressure vessel for holding high pressure inert gas, likely nitrogen gas, burst below its proof test pressure, causing the skin of the vehicle to rupture as high pressure gas was released into the payload bay of the Starship. This caused the propellant lines from the "header" tanks, positioned in the nose of the Starship, to be ruptured, releasing cryogenic methane and oxygen, which combust on contact.

Starship 36 Bursts Under Gas Pressure From COPV Failure. Image by DWise for NASASpaceFlight.com: https://dwisephoto.com/

This caused a first explosion, which damaged the barrier between the primary propellant tanks below the breach. This caused a secondary explosion that destroyed the vehicle completely, throwing it off the test stand while starting a fire that damaged the test stand and the surrounding propellant handling systems.

The header tanks in Starship are used for the landing burn of Starship. They are placed in the nose of the vehicle to balance it aerodynamically when the primary propellant tanks are empty.

During this test, the main methane fuel tank was not filled to capacity, but just with enough fuel for the test. This significantly reduced the fire and fire damage to the test stand and

surrounding area.

SpaceX has had third party analysis performed of the materials from which Starship is built to make sure that they do not present a health risk to the public, employees, or wildlife.

The Initial Combustion of Propellants from the Header Tanks can be seen in this image, also by DWise for NASASpaceFlight.com: https://dwisephoto.com/

Flight Test 10

The tenth flight test was expected to be performed near the end of June or in early July, but a new date for the flight is not yet known. SpaceX have been seen doing work to prepare Starship 37 for flight, including work on the heatshield, fins, and installation of Raptor rocket engines. Starship uses 6 Raptor engines in its current version (known as version 2), three of which are optimized for sea level flight, and three optimized for high efficiency in the vacuum of space.

The facilities that will be used to perform static fire testing for this Starship are unknown, as the facility at Massey was the only remaining Starship static test stand after the elimination of the two stands that used to be where SpaceX's new Launch Pad 2 is being built. SpaceX has demonstrated extreme resilience in the face of such challenges in the past, so it remains to be seen what they will do, and how rapidly in this case.

Meanwhile, a full investigation has been launched into the cause of the failure of the burst pressure vessel on Starship 36. It is a type of lightweight pressurized storage tank known as a Composite Overwrapped Pressure Vessel, or COPV. These tanks save weight by using a thin aluminum tank that has a composite material, such as carbon fiber, wrapped around it to give it strength against bursting from the pressure it holds. Two failures of the Falcon 9 rocket early in its history involved COPVs, one was caused by an improperly manufactured support strut for the COPV breaking and puncturing the COPV, causing the loss of ISS cargo supply mission CRS-7 on June 28th, 2015. The second was the AMOS-6 mission, on September 1st, 2016, which was destroyed on the launch pad during a static fire test when solid oxygen crystals formed in the overwrap material of a COPV which then exploded, breaking the composite and causing the tank to burst and destroy the rocket, which was being tested with the payload on top.

Since that time, SpaceX has used COPVs aboard its Falcon 9 and Starship vehicles for nearly 500 launches without problems. COPVs do present unique challenges to handling, as the composite materials are subject to damage in many ways that metals are not. There may also be a problem with the testing performed by the supplier, or any of a number of different concerns that SpaceX will be investigating, particularly as the COPV on Starship 36 was pressurized below the pressure to which it was supposed to have been tested.

Video Here:
https://x.com/dwisecinema/status/1935552171912655045

SpaceX Statement Here:
SpaceX - Updates

SLC-37 Begins New Phase of Life

Space Launch Complex 37 at Cape Canaveral had its Mobile Service Structure, launch tower, and lightning arrestor towers demolished in June to support reconstruction of the facitlity for its next launch vehicle.

Originally constructed between 1959 and 1962 to support launches of the Saturn vehicle, SLC-37, then simply known as LC-37, hosted six flights of the original Saturn I. Three of those flights were tests of the boilderplate Apollo capsule, and three were Pegasus satellites, launched into orbit to assess the risks that meteors presented to spaceflight.

LC-37 received its first make-over in late 1965, to support the upgraded version of the Saturn, the Saturn IB. It had more powerful booster engines, and replaced the Saturn I's six Centaur rockets on the second stage with a single J-2 engine. LC-37 hosted two Saturn IB launches, Apollo 3 and Apollo 5, both tests for the Apollo lunar program.

Apollo 5 at LC-37, 1968. NASA image.

Though it had few launches, LC-37 was retained as a key part of a fallback plan for the lunar landings. If a problem with the Lunar Orbit Rendezvous technique that was used for Apollo cropped up, LC-37 would be able to support launches of Saturn IB for an Earth Orbit Rendezvous approach to reaching the Moon. In this case, a pair of launches would place the Apollo capsule, lunar lander, and a fully fueled transfer stage (Saturn IVB, the third stage of the Saturn V) into Earth orbit, where they would dock before heading for the Moon all together.

As events turned out, Lunar Orbit Rendezvous ended up working, so only a single Saturn V launch was required for a lunar landing.

LC-37 was deactivated in 1972 at the end of the lunar exploration program, and thus was unavailable for the launches of crews to Skylab later. Rather than reactivate the facility, NASA decided to build the "milk stool" adapter to allow the Saturn IB with Apollo capsule to be launched from LC-39, from the same pads as the Saturn V.

New Life

In 1998, the Air Force decided to use the facility as the east coast launch site for the Delta IV rocket, the new medium-to-heavy launch vehicle built as part of a program to replace Shuttle for military payloads.

The new design called for a Mobile Service Structure, an enclosed building capable of working on all versions of the Delta IV, that would enclose the Delta IV and its payload during assembly, then roll away on railroad tracks for each launch. The MST was 330 feet tall, capable of enclosing the Delta IV either horizontally during stage integration, or vertically prior to launch or to protect the rocket if weather threatened it while waiting for a launch opportunity.

SLC-37 returned to active service after 30 years on November 20th, 2002 with the maiden flight of the Delta IV carrying Eutelsat 30 to geosynchronous transfer orbit.

SLC-37 hosted 35 launches of the Delta IV

from then until the final launch of the long-lived Delta launch vehicle family April 9th, 2024.

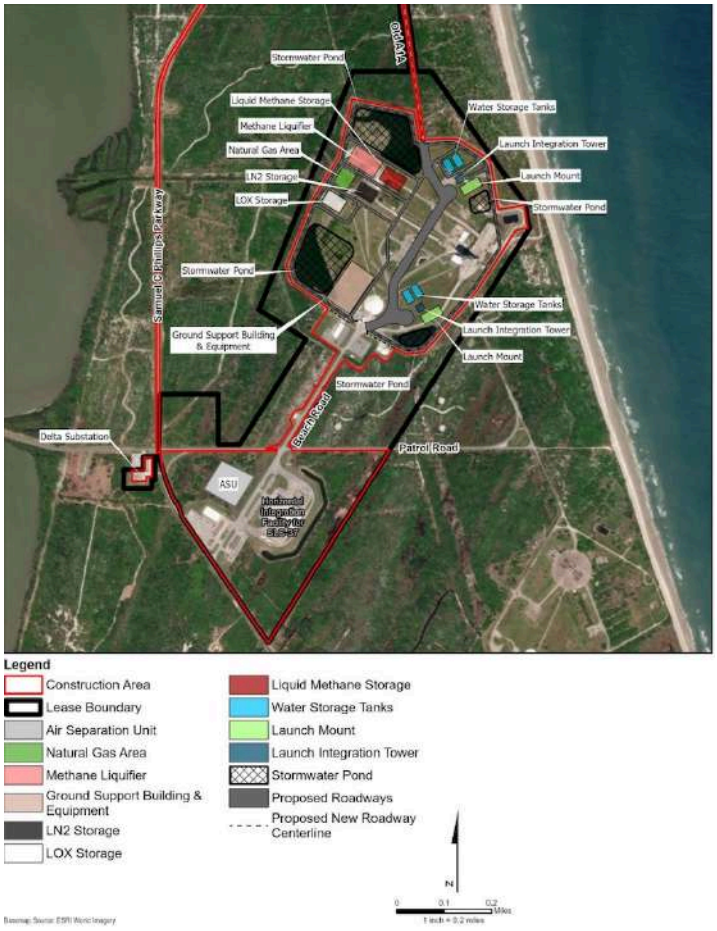
See our May, 2024 issue for a full article on the history of the Delta launch vehicles. https://vlgastroclub.org/newsletter/

A Delta IV Takes Off From SLC-37 in 2016. USAF image.

Another New Life

Now, SLC-37 is being cleared once again for a new launch vehicle and a new life as part of the growing commercial space launch economy. The tall structures there were demolished on June 12th. Contractors working for SpaceX are performing the cleanup of the site, preparing for new construction to start near the end of this year.

The Air Force has released an environmental review document outlining the plan to construct two new Starship launch pads and integration towers at SLC-37. The pair of pads will join LC-39A to provide three Florida-based launch pads for Starship, allowing as many as 120 Starship launches each year from Florida, with 44 from LC-39A, and 76 from SLC-37.



SLC-39 Plan Shows 2 Launch Pads and Catch Towers. USAF image from SpaceX Env. Plan

While site construction for Starship won't start before completion of the review process in September of this year, components for the new launch pads and towers are already visible under construction at SpaceX's nearby assembly site. Just as we've seen in Starbase, TX and with LC-39A, SpaceX is expected to use modular assembly techniques to simplify and speed up the construction of the new launch sites, if the plan is accepted.

The high flight rate of Starship is necessary as part of SpaceX's Moon and Mars plans, to deliver propellant to fuel depots in Earth orbit for

the SpaceX lunar lander and Mars landing versions of Starship. Each one that goes to either the Moon or Mars is estimated to need about 7 tanker flights to carry the propellants it will need into orbit, not counting the flight of the propellant depot itself, or the lander, for a total of about 9 flights for each Starship that travels into deep space.

This sounds like a lot of flights but having Starship be reusable decreases the costs versus having a single-use expendable vehicle. It also allows for far more cargo mass to be carried to the Moon or Mars, allowing bases to be constructed and supported, as well as heavy equipment to allow the use of in-site resources in both locations. If SpaceX's current timelines hold, we may hear the roar of the world's largest flying vehicle taking off from SLC-37 before 2028!

IN THE SKY THIS MONTH

Also refer to the sky map on the last page.

THE MOON

1st Quarter, July 2nd
Full Moon, July 10th
Last Quarter, July 17th
New Moon, July 24th
1st Quarter, July 31st

The Crescent Nebula by Craig Henry.

July marks the heart of summer in The Villages, FL, with cloudy skies most nights, but the occasional rare clear night giving views of the wonders of the summer sky. The days are gradually shortening since the Summer Solstice last month, with sunset occurring around 8:29pm at the start of July and about 8:24pm by month's end. Evening twilight lingers, with the latest end of twilight around July 1st, offering a slightly shorter window for deep-sky observing.

Mercury is a challenging evening target this month, low in the western sky after sunset. Shining at magnitude 0.2 early in July, it dims to 1.3 by month's end as it moves closer to the Sun's glare. Look for it within 30 minutes of sunset, using binoculars to spot it near the horizon. By mid-month, it becomes nearly impossible to observe as it heads toward inferior conjunction with the Sun.

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

Venus remains a brilliant morning star, glowing at magnitude -4.4. Rising around 3:45am, it's high in the eastern sky well before dawn. This month, Venus appears as a gibbous phase in telescopes, about 70% illuminated. Its brightness and altitude make it an easy target for binoculars or small telescopes.

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

Mars continues its journey through Leo, dimming slightly to magnitude 1.5 as it moves farther from Earth. It rises around 8:45pm at the start of July, setting near midnight. By month's end, it shifts into Virgo, setting earlier each night. Look for Mars near the bright star Regulus early in the month, with the pair creating a striking contrast in binoculars.

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

Jupiter reappears as a morning planet this month, emerging from its June solar conjunction. By mid-July, it rises around 4:30am at magnitude -1.9, climbing higher each morning. Views remain challenging due to its low altitude, but by late July, it's better positioned for observation in Taurus. A small telescope will reveal its cloud bands and moons, though atmospheric turbulence may blur details.
Jupiter observing information:
https://in-the-sky.org//data/object.php?id=P5

Saturn is a highlight this month, rising around 11:30pm in early July and by 10:30pm by month's end. At magnitude 0.9, it's easily visible in Aquarius. The rings are barely tilted to show their southern face the low angle enhancing views of the planet's cloud bands. On July 25th, Saturn reaches opposition, making it brightest and closest to Earth, ideal for observing. Use a 4-inch or larger telescope to spot its moons, including Titan.

The conjunction with **Neptune** continues, with the two planets about 2 degrees apart—use Saturn to locate Neptune in binoculars.

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

Pluto deserves special mention this month, as it reaches opposition on July 22nd, shining at magnitude 15.1 in Capricornus. This distant dwarf planet is a challenging target, requiring at least an 10-inch reflector or 8" refractor telescope under good skies to detect its faint, star-like appearance. Use a detailed star chart to pinpoint Pluto among the dense star field, as it's far too faint for binoculars. Observe near midnight when it's highest in the sky to minimize atmospheric distortion.
Pluto finder chart:
https://in-the-sky.org//data/object.php?id=P9

Finding Clear Skies in June

Summer skies are seldom good for observing in central Florida, yet several evenings in June turned out to be quite good for astronomy, providing direct views of the summer sky in the evening.

A general rule of thumb seems to be that the earlier in the day that the thunderstorms roll through, the better the chance that there will be time to observe before midnight that day. Midday storms and rain often allow the sky to clear after dusk, and if all other conditions that affect our haze and humidity cooperate, a dark sky can be out for astronomers!

A general rule of observing is that if you want a preview of the evening sky for 3 months from now, get up before sunrise to have a look at it. Our early morning sky currently holds the fall constellations. Fortunately we often have clear nights in fall.

But summer constellations get short shrift in the evening hours. Some years we have almost no clear summer nights, so the only way to get a look at the summer skies is to get up early in spring.

But why bother?

The Lagoon Nebula, M20, A Jewel of the Summer Sky. Image by Mark Graybill

Summer skies contain the best views of the Milky Way and the many objects in the densest parts of our galaxy. While our low altitude and hazy, light polluted skies make unaided observation of the Milky Way and dense star

fields very difficult without going someplace like the Chiefland Astronomy Park, a pair of binoculars will bring the sky to the homebound observer in The Villages!

Any binoculars will improve the view, no matter how small. A pair of opera glasses will give very wide field views while also brightening the stars and bringing nebulas and star clusters embedded in the Milky Way into view.

The area around Scorpius, Sagittarius, and Ophiuschus is full of bright, beautiful objects to view in binoculars or any telescope.

Chief among these is **M8, The Lagoon Nebula** (see image, above,) a bright star forming region above the spout of the "Teapot" in Sagittarius. It is every bit as spectacular as the Orion Nebula of winter. Visible as a cloudy object even in small instruments, it is one of the few non-stellar objects that can show color even in a small scope. Sometimes it has a greenish cast, other times reddish, depending upon atmospheric conditions.

Not far away, a bit north, is **M20, The Trifid Nebula.** Smaller, but still quite bright, it is also visible in binoculars and small telescopes. Seeing the three small dark lanes from which it takes its name requires a telescope at 50x or higher.

The Arkenstone, M22, Named for the Bright Jewel in The Hobbit, Shines near the top of the Teapot in Sagittarius. Image by Mark Graybill

At the top of the Teapot, just above and left of the star at the top of the lid, lies **M22, The Arkenstone Cluster**. This globular cluster is every bit as good as, or better, than the Hercules Cluster (M13.) It has a softer spread of light, and is also a binocular or telescope object best viewed at low to medium powers.

Binocular Highlight

If you're using binoculars, keep sweeping left and up from the M22 to view **M24, The Scutum Star Cloud**. Looking with a telescope is rewarding as well, but binoculars capture it the best thanks to their very wide field of view. This rich star field seems to have endless breadth and depth. In fact, it is only some of the stars that lie between us and the center of our galaxy, as the stars closer to the core are blocked off by dark clouds of gas and dust that hide the actual center of our galaxy from our view.

The Rich Field of Stars in the Scutum Star Cloud, M24. Fabulous in Binoculars! Image by Mark Graybill

While we only get rare peeks of our summer sky here in central Florida, the many objects there are to see make it worth interrupting your schedule to get out and enjoy them when the rare clear sky presents itself.

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

Camp Villages Solar Observing, June 23rd. White light scopes by Harry Orlind and John Keller, Hydrogen Alpha by Mark Graybill, Seestar views by John Keller. Jeff Kahler & Toni Graybill assist viewers.

Camp Villages, June 23rd, Indoor Activities. Balloon rockets & meteor craters.

CAMP VILLAGES, JUNE 2025

On June 23rd, our club held a Camp Villages session on space & astronomy for campers and their grandparents at the Homestead Recreation Center. We had two main indoor activities, balloon rockets shot along a string to demonstrate how rockets produce thrust, and an activity for creating meteor craters by dropping stones into layered strata of flour, cocoa, and paprika in foil roasting pans. The different materials create ejecta patterns like real meteors. We encourage the campers to experiment with how the “meteor” strikes to see the effects on the resulting crater. We also had solar scopes showing the sun outside the center, in both white light and hydrogen-alpha so that solar prominences could be viewed. Back inside we had many displays on the history of the space program thanks to Jeff Kahler, Sr. and a Black Hole coin funnel thanks to Toni Graybill.

Club Calendar

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

July 2025
4 Exec Meeting: Drafting Additional Backup Officers at Round Table Meetings?
7 Space Academy 6:30pm, Telescope Workshop 8pm
15 General Meeting, 6:30pm, Round Table
19 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park
23 CAMP VILLAGES 10am, Homestead Rec Center
24 EAA Meeting Cancelled

August 2025
1 Exec Meeting, Fishhawk Rec Ctr, 11am
4 Space Academy 6:30pm, Telescope Workshop 8pm
16 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park
19 General Meeting 6:30pm, Round Table: Resources
27 EAA Meeting Cancelled

September 2025
1 Space Academy, 6:30pm, Truman Rec Ctr, Observing Workshop 8pm
5 Exec Meeting, Fishhawk Rec Center, 11am
16 General Meeting, 6:30pm, Laurel Manor Rec Ctr
20 Fruitland Park Observing, 5pm, 300 Shiloh St. Fruitland Park
24 EAA Meeting, Homestead Rec Center, 7pm

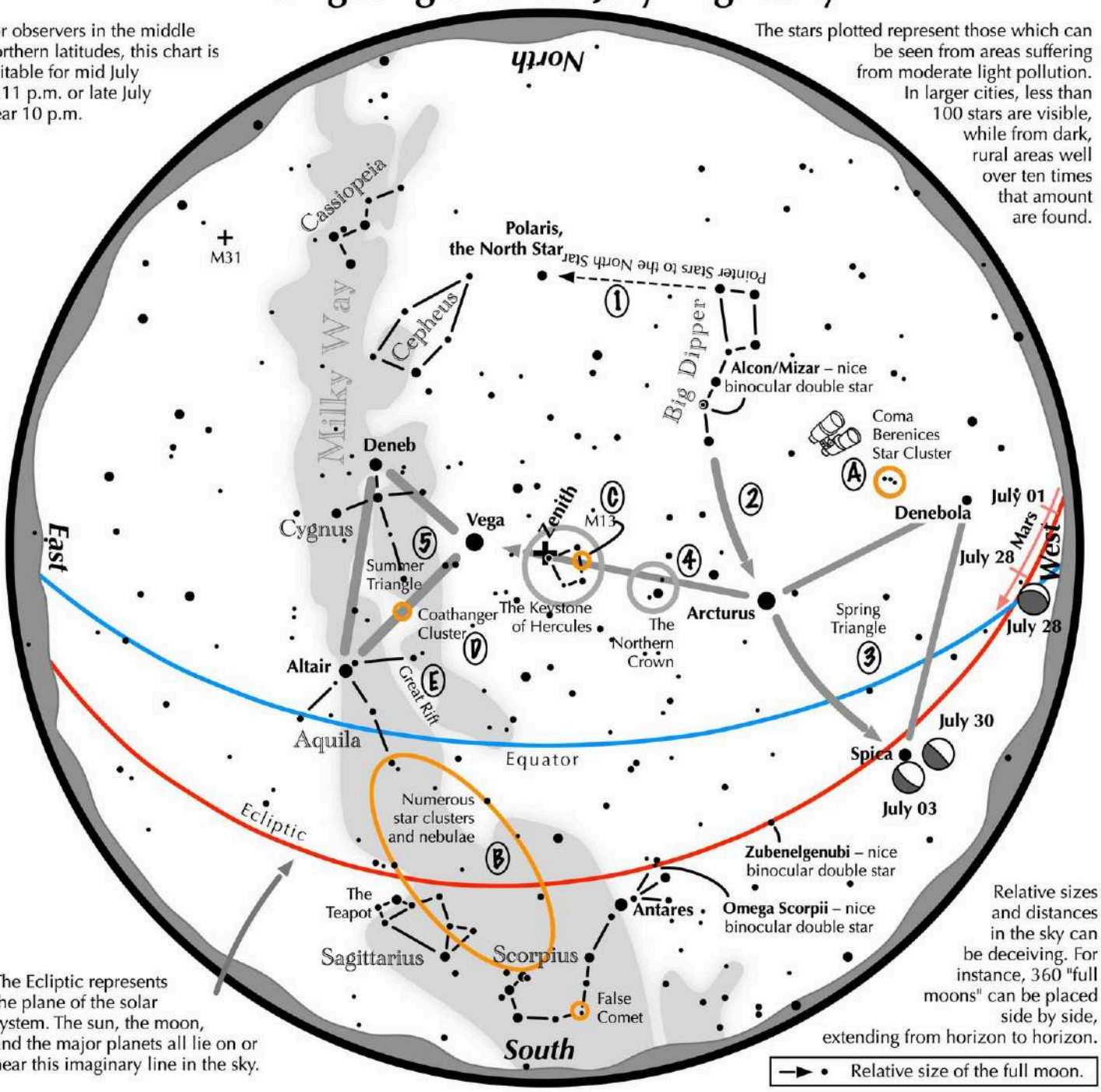
Club Calendar on the web:
https://vlgastroclub.org/calendar/

See star chart & special observing graphics on following pages:

Navigating the mid July Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

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

1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
3. To the northeast of Arcturus shines another star of similar brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The
4. Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
5. High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

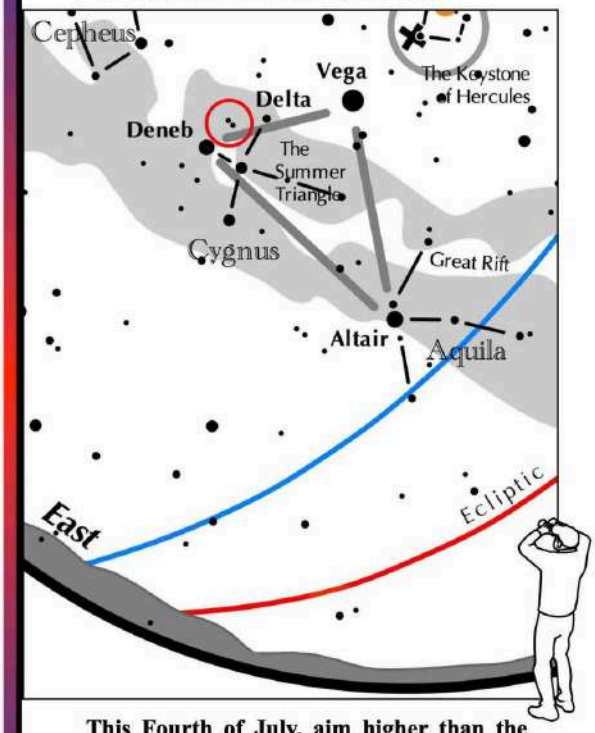
Binocular Highlights

A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly 1 million stars.
D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.

Just in time for July 4th: The Patriotic Star

This time of year, Cygnus rises high in the northeast after sunset.

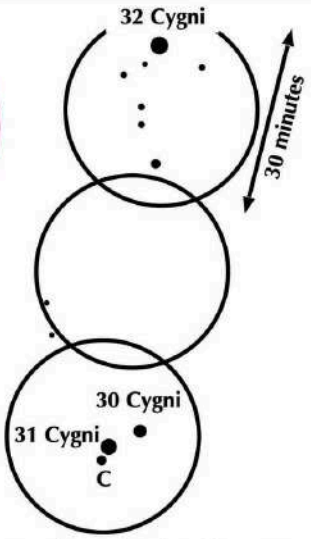
- Draw an imaginary line from Deneb, its brightest star to Delta, the western star on the constellation's cross bar.
- About half way between Deneb and Delta lies an intriguing stellar jumble.
- Binoculars reveal two groups of stars.



This Fourth of July, aim higher than the exploding fireworks to the "Patriotic Star." Can you see the red, white and blue?

Just in time for Independence Day is the sky's own "Patriotic Star." Actually, it is a grouping of three stars, each being the brightest component of its own multiple system.

- The brightest partner, twinkling at magnitude 3.8, is 31 Cygni (aka Omicron-1 Cygni).
- Six minutes to its northwest glows the 4.9 magnitude 30 Cygni, while the dimmest member, "C," immediately to the southeast of 31 Cygni, claims a magnitude of 7.0.



Aim your scope at these three stars to make your own color estimations. You may agree with some observers that their advertised red, white, and blue colors may be a bit of a stretch. Slightly de-focus the trio to give small, round blurs instead of crisp points. Now can you distinguish color differences among these three very different stars?

Orangish-red 31 Cygni is classified as a super giant with a surface temperature of approximately 4000°F, about 2000°F cooler than our own sun. Incredibly, if placed within our own solar system, its radius bloats the star's surface beyond Mars! 30 Cygni is hotter at 8700°F, giving it a white appearance. Finally, "C" fires the hottest, possessing a temperature over 11000°F. If you look closely, it appears bluish.

About 1° north of 30&31 Cygni shines the 3.9 magnitude 32 Cygni, sometimes called Omicron-2. It is the northern member of a group of 7th and 8th magnitude stars, forming the shape of a "micro-Cygnus" with 32 Cygni playing the role of Deneb. The pretty flock of Cygnets points south to the stellar family headed by 31 Cygni.