

VILLAGES STAR

Newsletter of The Villages Astronomy Club

Volume 10, Number 10

October 2026

Club Website:

<http://vlgastroclub.org/>

Facebook:

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



SMART SCOPES ROUND UP

This month our special feature is a round up of current smart scope offerings! Learn how this new technology is revolutionizing access to the wonders of the sky, reducing the effort to do astronomy, and the commercial offerings available right now.

See our special section below, starting on page 14.

UPCOMING EVENTS

Executive Directors' Meeting, Fri Oct 2nd,
11am-12pm, Fishhawk Rec Center,
2318 Buttonwood Run

All members welcome to our monthly planning meeting. This month we'll be planning our Starry Starry Night and other outreach events, as well as upcoming meetings and club activities.

Smart Scope Meeting, Wed. Oct 7th, 7:30pm,
Everglades Rec Center, 5497 Marsh Bend Trl,
North Pavilion (by basketball court.)

Join us for our Smart Scope Meeting at Everglades Rec Center. Join us as we discuss the ever-developing world of smart telescopes, use our scopes to take images of the sky, and share techniques for image capturing, using software features, and otherwise getting the most out of

our telescopes.

Visual observers who wish to join us are welcome.

We will be at the Pavilion near the site where we hold Starry Starry Night. This is near the pickleball and platform tennis courts, not far from the multi-use field. This is **not** the pavilion near the pool!



Harvest Moon over the Village of St Catherine's.
Image by member Jeff Kahler.

Truman Rec Center will be closed for planned maintenance (both inside and outside), so there will be no Space Academy or Observers' Workshop in October.

Join us on November 2nd at the Pavilion for an Astronomy Club Star Party!

Fruitland Park Astronomy Group, Oct 17th, 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

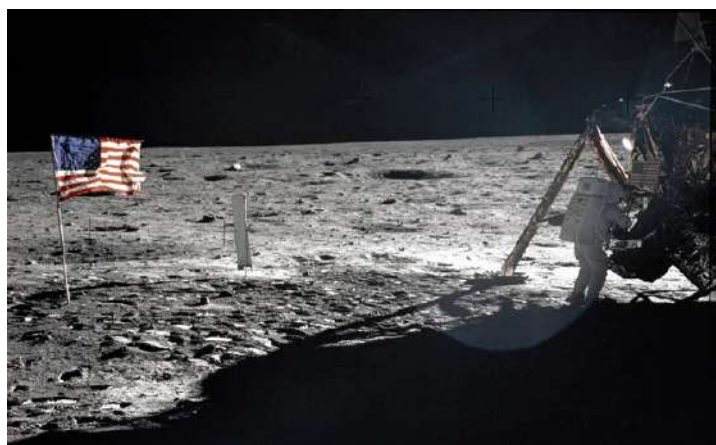
Park, 300 Shiloh Road (at the corner of Shiloh Road and Dixie Avenue, north of the Fruitland Park water tower.) Enter on Shiloh Road (some GPS's will guide you to the Dixie Avenue entrance.) Gate opens at 5pm. We will stay as late as conditions permit and people are interested in observing. Bring power if required.

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

General Meeting, Tue Oct 20th, 6:30pm:
Joel Nussbaum, Apollo Engineer, "Landing on the Moon", Laurel Manor Rec Ctr, 1985 Laurel Manor Dr.

Join us for a presentation from Apollo program engineer Joel Nussbaum on Landing on the Moon: "The Apollo Program and the Lunar Module. What 400,000 people and \$200 Billion can accomplish."

Hear from an insider about our historic landing on Earth's closest neighbor.



Neil Armstrong at an equipment storage site on the lunar lander. NASA image.

Club Star Party, Mon Nov 2nd, 6:30pm
Truman Rec Ctr, 2705 Canal St.

Truman Recreation Center's inside areas will be closed for use as a polling place during the election. So both Space Academy and Observers' Workshop will be replaced by a Club Star Party.

Observers, bring out your scopes and practice on the November sky in advance of

Starry Starry Night! We will assist you in choosing and practicing showing the sky to the public. Learn to show the sky at a star party. Experienced observers, come teach others how to do what we do, and get your rig checked out before the Big Night!

Everyone else, come enjoy a night under the sky at our annual warm-up star party.

Your Club Officers & Directors

President	Mark Graybill
Vice President	Ken Katta
Secretary	Randy Gilbert
Treasurer	David Meng
Space Academy	Toni Graybill
Public Relations	Jeffrey Kahler, Sr.
Directors	Craig Henry
	Burt Salk
	Tommy Kehne
	Tim Connolly

Newsletter Contact: saundby@gmail.com

See Calendar at End of Newsletter, before star chart.

Club Calendar Online:

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

Astronomy in The Enrichment Academy

For the first time to our knowledge, there will be a lecture on astronomy offered in The Villages Enrichment Academy. Last year at our March meeting we had a lecture on the birth, life and death of stars which was very well received by those attending the meeting. The same lecture is being provided to a much broader audience and, of course, any of you who missed that meeting and who have an interest in this aspect of astronomy.

The lecture provides a very good introduction to the subject. While it is an overview, it does get into some details. In a very understandable way, it ties some of the largest objects in the universe (giant stars) to some of the

smallest (sub-atomic particles). This clear approach will make sense to all attendees regardless of background.

You can sign up by going to The Enrichment Academy website:
TheEnrichmentAcademy.org

Look for the topic **“Stars: Birth, Life and Death”** in the Science section.



Citizen Science Interest Group

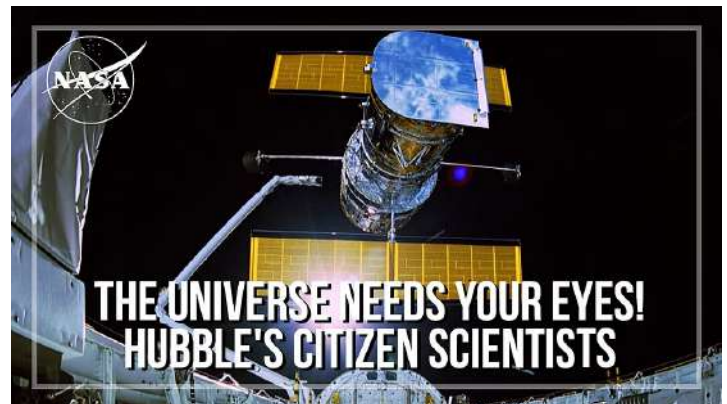
by Randy Gilbert

It's no surprise that those of us that are passionate about the night sky have a deep interest in science. Often, when we experience the awe and beauty of a galaxy or nebula it can be difficult to keep your mind from wondering what lies behind the reds and blues of the swirling gas clouds, how far away those stars are, so very old. Personally, as I gaze upon a star cluster or galaxy, I sometimes wonder if anyone on one of the countless worlds that are probably in my field of view, is looking back and pondering the same questions.

I have found that my pursuit of astronomy has evolved over the years. I first saw the rings of

Saturn when I was about eight-years-old – through a 2.4-inch refractor that my parents bought from the Sears catalog. I didn't know the 'star' I was aiming for was a planet; it was dumb luck. I was excited beyond words. I, a little boy, 'discovered' Saturn, in my mind at least. I still get excited when I image an object that I thought was too dim to capture, or locate a supernova millions, or a quasar billions, of light years away.

Astronomy is artistic; in it we experience the beauty of the universe – driven by mathematics, it is technical in the use of the tools we now have at our disposal to observe and analyze; it offers discovery. Within our club, it also offers opportunities of comradery and collaboration. Some of us are at the point where we want to delve into the details, not just the pretty pictures. While those too are important. We are looking to capture some of the workings of the universe.



Modern tools allow us, as amateurs, to see, image, analyze and discover things that would have been impossible a few short years ago. Professional scientists generate huge volumes of data that they simply don't have the capacity to properly analyze. They also need us to observe – they may also let us use their equipment to do so. As a result, the scientific community has created opportunities for interested lay people to contribute to their efforts in a real and meaningful way. They have built the tools and the training needed for us to do so.

So, now to the point...

Following the success of the Electronically

Assisted Astronomy (EAA) interest group, we will be forming another interest group – Citizen Science.

A few very important points:

1. *You don't need to be a scientist to participate.* This will be new to us all. We would all be starting from the same place and would need to learn as we go. Learning together would be part of the fun.

2. *You don't need a telescope or expensive equipment.* There are citizen science projects that simply need volunteers to view images and categorize them or look for specific features.

3. If you like data analysis, but don't want to own the equipment to capture the data – you're in luck. Data sets captured by both professionals and amateurs are available. Analysis software is available for free.

4. If you want to capture images but don't have equipment, there are projects offering access to remote telescopes – for free.

5. It won't need a major time commitment. You can do what you want, if you want, when you want.

Like so many things, there are no clear boundaries in our astronomical activities. The skill sets overlap to a large degree and this will hold true with Citizen Science. Observing skills, astrophotography/EAA, planning and data analysis are all important to success. So, if you're into EAA or astrophotography, we will be working to better our skills there too – either as a primary goal or a means to get better data.

If you would like to take part in the Citizen Science Interest Group, please arrive early for October's General Meeting--arrive at 6pm to learn how you can take part, and to get help in starting on a specific project.

If we find that we need more time, we will plan to gather in the lobby outside the room after the meeting as well.

We expect to make time for Citizen Science before Space Academy when those

meetings resume in December. We want to give an opportunity to everyone in our club who is interested to join in on the club's projects.

We will discuss individual interests, identify possible resources and training to support them as well as determine next steps. If you are motivated to learn some new skills, contribute to real-world research, and possibly be named as a contributor on a professional publication, please consider attending this meeting. Subsequent meetings will be posted on the club calendar and in the monthly newsletter. Until then, I have listed a few examples below of organizations supporting Citizen Science projects and an article discussing successes. I hope to see you at the meeting and work with you on the real science, discovering the rings all over again.

Randy Gilbert Secretary, Outreach Coordinator, ALCOR

Zooniverse: A Citizen Science Success Story:

<https://www.astronomy.com/science/zooniverse-a-citizen-science-success-story/>

Zooniverse: www.zooniverse.org - Many Citizen Science projects in multiple disciplines

Galaxy Zoo: <https://zoo4.galaxyzoo.org/> - Galaxy Classification

Exoplanet Watch:

<https://exoplanets.nasa.gov/exoplanet-watch/about-exoplanet-watch/overview/>

The American Association of Variable Star

Observers: <https://www.aavso.org/>

Association of Lunar and Planetary Observers (ALPO): <https://alpo-astronomy.org/>

Einstein@Home: <https://einsteinathome.org/> -

seeks gravitational wave from spinning neutron stars using LIGO data and radio telescopes.

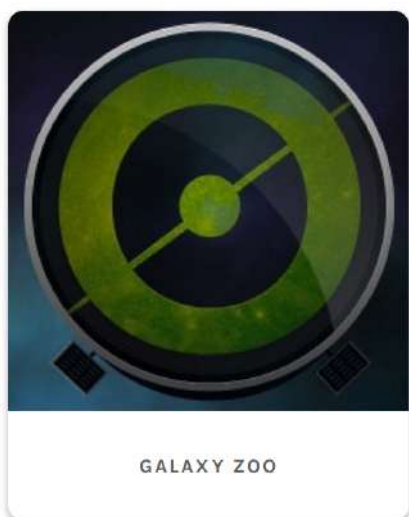
SCOPE: <http://scope.pari.edu/> - Stellar Classification

NASA Citizen Science Projects:

<https://www.nasa.gov/stem-content/nasa-citizen-science-opportunities/>

The Seti Institute: <https://www.seti.org/>

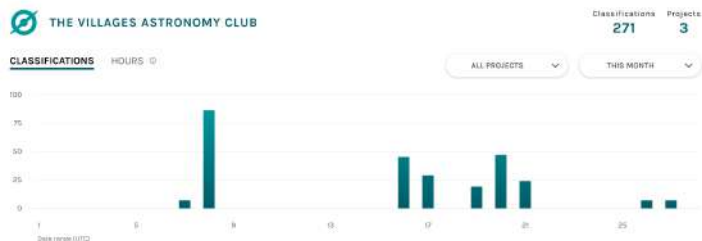
The Villages Astronomy Club's Zooniverse Group



As part of kicking off our club's Citizen Science projects, Space Academy coordinator Toni Graybill has established a Zooniverse group for our club members to join.

Before joining, you should create a Zooniverse account for yourself. Then you can join the group by following this link, which will automatically join your account to our group!
https://www.zooniverse.org/groups/2735269?start_date=2025-04-05

At this time, group members have made 274 classifications in 4 different astronomical projects.

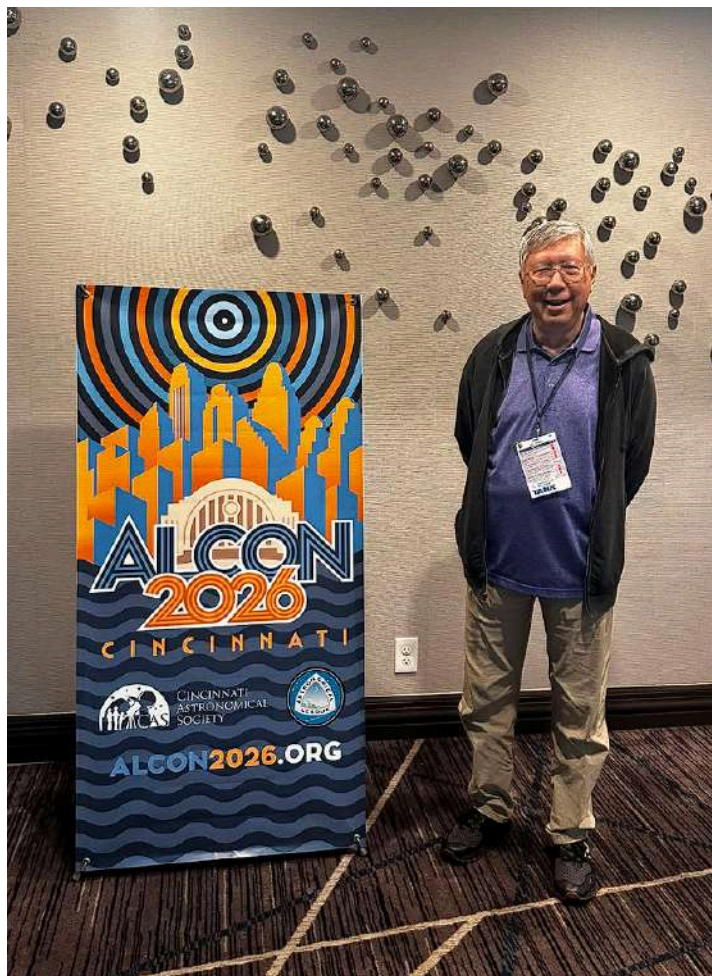


September's Statistics

Contributing to astronomy-related projects will qualify participants for Astronomical League Level 2 Citizen Science awards. 100 classifications in a project qualifies the participant for a Bronze level award. 500 for Silver, 1000 for a Gold award for each 1000 performed.

[Citizen Science Special Program - Astronomical League](#)

The Villages Astronomy Club Members Attend Alcon 2026



The Stanfords made it to Alcon 2026 in Cincinnati this year! Congratulations! We hope you had a great time with fellow astronomy enthusiasts!



Harvest Moon by member Raúl E Fernández. Celestron C8 Evo and Nikon Z9, processed in Lightroom.

NEWS

Starship Launches into Orbit



Starship Flight 14 Lifts Off Toward Orbit. SpaceX.

On the morning of September 28th, Starship achieved a new milestone on its 14th integrated flight test. It reached orbit, and deployed a working payload into orbit.

SpaceX has adopted an intensely conservative approach to placing Starship in orbit during its ongoing testing program. Starship is roughly the same size as the habitable areas of the International Space Station. It is designed to re-enter the atmosphere and remain intact all the way to the surface. Therefore, any loss of control

over when and where it returns to Earth could become a disaster. It would be even worse than China's Tiangong-1 space station, which was allowed to re-enter uncontrolled in April 2018. It had the potential of falling into a populated area, causing untold harm. SpaceX has worked very carefully to avoid even the possibility of such an event.

For this flight, Starship would initially be launched into a sub-orbital trajectory then checked out before another engine burn would place the Starship in orbit.

Liftoff

At 8:48am ET (7:48 CT) Starship took to flight with a rapid liftoff from Pad 2 at Starbase, Texas. All 33 Raptor 3 engines on the Superheavy booster fired to produce approximately 18 million pounds of thrust, hurtling it toward space. The timing of the liftoff was chosen to provide good lighting at the multiple possible recovery zones in the Pacific Ocean if it went to orbit.

After two minutes and 22 seconds of firing, the Superheavy booster shut down its engines. Two seconds later, Starship fired its engines while still attached to Superheavy. This separated the pair and flipped Superheavy around for its return flight to the Gulf near Starbase while Starship continued on into space under its own power.

Superheavy's Return

During ascent, Superheavy had one Raptor engine shut down shortly before staging of Starship. This left Superheavy with 32 engines for its boost-back burn that would send it backwards on its own path to return toward Starbase.

No catch of the booster at the tower was planned for this flight, since flight 12 and flight 13 both had problems with the booster's mock capture attempt over the Gulf. The hope was for this flight to give a clean mock capture flight, allowing the booster to actually be caught on the next flight.

During boostback, one more Raptor 3 went out, but there were still enough engines to continue. The number of engines ordered to fire reduced from 31 to 10 then to 5 then to 3 as the booster flew toward its aim point over the Gulf.

Finally, it made a controlled descent into the Gulf's waters, then it was destroyed using the onboard flight termination charges to prevent having the booster remain afloat as a hazard to navigation.

The successful return paves the way for a possible tower catch of flight 15's Superheavy Booster, though it seems some additional enhancements of the vehicle against engine failure will likely be performed.



Superheavy Descends Toward the Waters of the Gulf. SpaceX image.

ASCENT TO ORBIT

Eight minutes and eleven seconds after liftoff, Starship shut off its engines for the first time. One engine, a Raptor Vacuum engine, had shut down early. At first, SpaceX announced that they would not be attempting to reach orbit on this flight because of the early engine shutdown.

However, after additional analysis of the data downloaded from Starship, SpaceX's engineers decided to give the go-ahead for orbit. This would require only an eight second firing of one of Starship's central 3 Raptor engines to perform the maneuver. So, at 25 minutes, 17 seconds into flight Starship performed its second rocket firing, placing it into a full orbit around Earth.

Once in orbit, Starship began preparing to deploy its payload: 26 Starlink Version 3 (V3) satellites. It opened its payload bay door and at just after 35 minutes since liftoff, the first of the large Starlink satellites slid effortlessly out into space.



The first orbital Starlink V3 Satellite Exits Starship. SpaceX image.

It took about half an hour to deploy all 26 satellites. As it deployed them, Starship was oriented with its tail toward Earth. The payload door was pointed in its retrograde direction, that is, toward the back as it traveled in orbit, and slightly off to one side. This assists the satellites in moving away from Starship so that they will not interfere with each other during subsequent maneuvers.

The final four satellites were equipped with cameras and lights to collect information on Starship's heat shield after launch and before it re-entered the Earth's atmosphere. Some heat shield tiles had been purposely colored white to act as targets for the cameras and simulate lost or broken tiles.

The satellites remained near Starship while it performed a roll maneuver to show its entire heat shield to the nearby spacecraft.

Then it was time for SpaceX's flight crew to decide if Starship would be ready for a nine-hour stay in space, and a return to the Pacific off the

coast of Chile, or if it would come back to Earth sooner, at about 3 hours, in the Pacific north of Hawaii.



Starship Illuminated by Starlink “Flashlights” as Final Starlink Emerges into Space. SpaceX.

Starlink V3

Even as the Starlink satellites were still deploying from Starship, SpaceX announced that they had communications with the newly orbited satellites. Their antennas and solar panels deployed, and their radio and laser links were tested with the existing Starlink constellation.

Each Starlink V3 increases downlink capacity 10x over the prior generation of Starlink V2. It increases uplink capacity by 22x. And each has six laser links, with 400Gbps of link capacity.

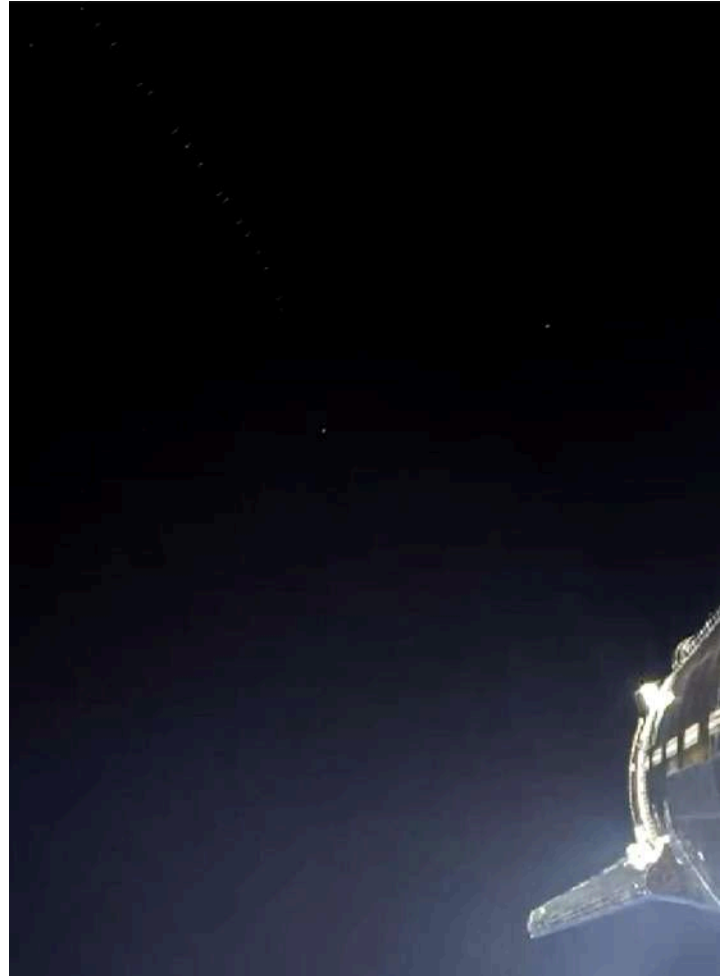
Today’s launch of 26 Starlink V3 satellites represents about the same network capacity as that launched by 10 Falcon 9’s carrying 29 Starlink V2 satellites, or a total of about 290 Starlink V2s. Future Starship flights are slated to carry 60 Starlink V3s, which will have the network capacity of 22 Falcon 9 flights of Starlink satellites, or about 640 Starlink V2s, all at once.

After deployment, the Starlink V3 satellites could be seen as a “constellation” of bright objects trailing Starship in space.

Return to Earth

After some time spent cruising in orbit, SpaceX announced that they would return

Starship to Earth on their earliest opportunity. This would put the de-orbit burn shortly after two hours in space, with splashdown occurring at about 3 hours after liftoff.



Starlink Satellites Form a Line Near Starship. SpaceX.

During the time in orbit, SpaceX performed a variety of tests on Starship to see how well its systems would perform during long periods in space, in preparation for long duration flights such as Artemis III and Artemis IV.

After an 8 second firing of a Raptor engine to slow Starship below orbital velocity at 2 hours and 12 minutes into flight, Starship was headed back to Earth, targeting a cleared landing corridor in the northern Pacific Ocean.

At three hours and eight minutes after takeoff, Starship S41 fired its Raptor engines once more and a few seconds later it touched down in the ocean.

Starship flight 14 not only went into orbit,

but it also spent over 3 times as long in flight as any other Starship so far. The engineers got lots of useful data on the ship and its behavior in space. This will improve future flights and pave the way for Starship carrying astronauts back to the Moon on Artemis IV.

The next flight is scheduled for mid-October, also from Starbase, Texas. The flight after that is currently scheduled as the first Florida flight, launching from Kennedy Space Center's Launch Complex 39A. The placeholder date for that is October 30th. The date is likely to slip, but in case it doesn't, keep an eye on launch news.



Starship Fires Its Engines While Facing Backward to Return to Earth. SpaceX.

SpaceX Article: [SpaceX - Starship Flight 14](#)

NASASpaceFlight Article:

<https://www.nasaspacespaceflight.com/2026/09/starship-flight-14-orbit/>

SpaceX Full Flight Video on X:

<https://x.com/SpaceX/status/2104354931595423762>

DwarfLab Releases Draco Smart Scope



Right on the heels of the release of Seestar's S50 Pro model, DwarfLab announced their new Draco smart scope and began taking pre-orders.

The Draco has two cameras, a wide field camera and a primary telephoto camera with a 320mm focal length. The aperture of the primary is about 90mm. A central obstruction reduces its light gathering power to about that of an 82-85mm objective.

Its primary sensor is an 8K format chip, providing about 53 Megapixels, far more than the 4K chips in other current midrange smart scope models. This level of resolution, coupled with the relatively long focal length of the scope (for a smart scope) means that this scope is likely to provide decent detail in planetary imaging. The lack of planetary imaging capability in all but the highest end smart scopes is a common complaint among smart scope owners, and if Draco performs as well as its specifications suggest, it will be the best smart scope for planetary images.

Also, the sensor chip is mounted on its own rotator, allowing it to perform field de-rotation in Alt/Az mode, giving it the advantage of an

Equatorial mode without needing to mount it at an angle.

Dwarflab says that it will allow exposures of up to 300 seconds (5 minutes) for deep sky astrophotography, thanks to a built-in off axis guide scope on the primary camera's optical train.

The scope comes in two versions. The standard version includes an internal solar filter, astronomy filter, and dual narrowband nebula filter. The SHO version includes an external solar filter, an internal astronomy filter, and a pair of narrowband filters for Hydrogen Alpha + Oxygen III and Sulphur II + Oxygen III to produce Hubble palette images automatically.

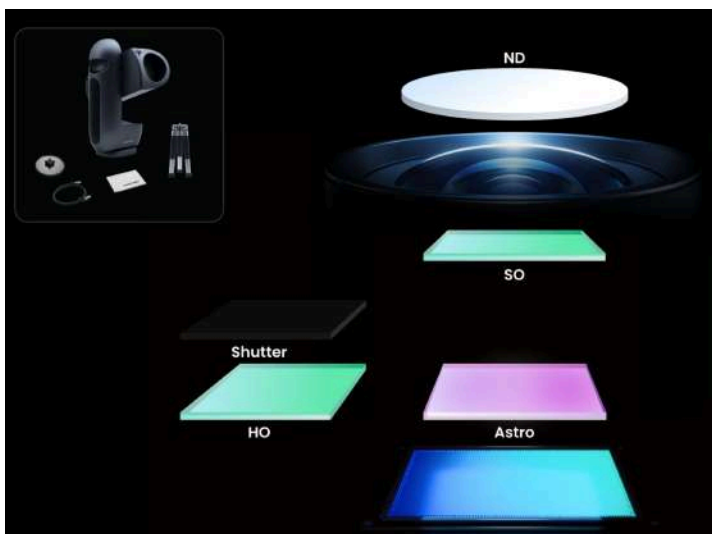
DwarfLab claim a 5 hour life for the internal battery.

Another new feature is PhotonLink, a built-in ability to connect to the scope over a USB Ethernet connection. This allows remote operation over the internet from anywhere in the world.

The standard edition is priced at \$1399, and the SHO edition at \$1599.

See more in our Smart Scope roundup, below.

[DRACO Smart Telescope - DWARFLAB](#)



DwarfLab Graphic of the SHO Filter System.

New Horizons Team Meets at Lowell



New Horizons Science Team. Image by Alan Stern (foreground.)

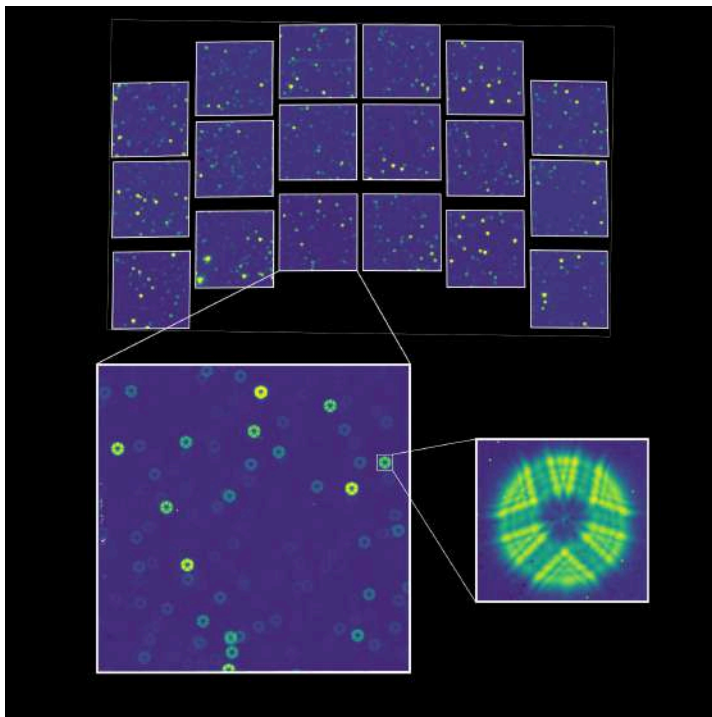
The New Horizons science team met at Lowell Observatory to share over 50 presentations of new results from New Horizons data. The conclave includes over 90 scientists, about half in person and half online to share recent science resulting from the avalanche of data that New Horizons has provided, not only during its Pluto and Kuiper Belt encounters, but also its ongoing measurements of conditions as it moves through the Kuiper Belt.

Recent data from New Horizons suggests that the Kuiper belt extends much farther out than previously thought, creating a new map of the solar system.

Certain geologic features on Pluto may be caused by wetting of glacial areas, not by water, but by liquid nitrogen. Since it's impossible for liquid nitrogen clouds and rain to form in Pluto's atmosphere, the nitrogen appears to be welling up from below the surface.

These and many other results will be discussed at the conference.

Roman Telescope Sees First Light



First Test Image Released by Roman Telescope Team. NASA image.

On September 15th the Nancy Grace Roman Telescope team released a “first light” image from the space observatory. It was going through instrument activation and commissioning at that time. It has since moved on to the next phase of its preparation for its science mission on its way to its destination, focus and alignment.

The image above is similar to the first look through a reflector telescope when you set it up. Before it has been focused and collimated, you can see the structure of the scope itself. In the image at lower right you can see the supports inside the Roman Telescope, the shadow of the secondary mirror obstruction, diffraction effects, and Airy rings.



Current Status of Roman. NASA.

Presently Roman is going through focus and alignment, and preparing for the first adjustment to its coronagraph instrument. Science operations will begin this December, when it arrives at its final orbit around the Sun-Earth L2 Lagrange Point.

Rubin Observes COSMOS Field



The COSMOS Field. NSF-DOE image.

The Vera Rubin Observatory has released its own image of the COSMOS field, one of the most observed areas of the universe that has been imaged by many different instruments over time. This allows us to not only learn more about our universe through repeated observations, but also to compare the capabilities of different instruments relative to each other.

Located away from the plane of our galaxy, we receive a nearly unobstructed view of deep space in this area. Observed previously by such instruments as Webb, Hubble, Chandra, and Spitzer space telescopes we can obtain a very deep knowledge about this area, and see changes over time.

In the Rubin image, over 50,000 stars within our galaxy are seen, along with over half a million remote galaxies. Clouds of “galactic cirrus” are clouds of gas and dust around our galaxy.

Full article:

[NSF-DOE Rubin Observatory Opens Deep Window on Famous Cosmic Field](#)

IN THE SKY THIS MONTH

Also refer to the sky map on the last page.

THE MOON

Last Quarter, Sept 4th

New Moon, Sept 10th

1st Quarter, Sept 18th

Full Moon, Sept 26th

Last Quarter, Oct 3rd

THE PLANETS

October 1, 2026

Planet	Rise	Transit	Set
Mercury	9:10 am	2:40 pm	8:10 pm
Venus	9:50 am	3:00 pm	8:10 pm
Mars	2:10 am	9:10 am	4:00 pm
Jupiter	3:40 am	10:20 am	4:50 pm
Saturn	7:20 pm	1:40 am	7:40 am

October 15, 2026

Planet	Rise	Transit	Set
Mercury	9:30 am	2:50 pm	8:00 pm
Venus	8:40 am	1:50 pm	7:10 pm
Mars	2:00 am	8:40 am	3:30 pm
Jupiter	3:00 am	9:30 am	4:10 pm
Saturn	6:30 pm	12:40 am	6:40 am

October 31, 2026

Planet	Rise	Transit	Set
Mercury	8:30 am	1:40 pm	7:00 pm
Venus	6:50 am	12:20 pm	5:50 pm
Mars	1:30 am	8:10 am	2:50 pm
Jupiter	2:00 am	8:40 am	3:10 pm
Saturn	5:20 pm	11:20 pm	5:30 am

Saturn at Opposition, Oct 4th

Saturn will be at opposition on October 4th. This puts it at its brightest and largest for the year, shining at magnitude 0.3 and with a disk size of 19.7 arcsec. The rings will span a magnificent 44 arcsec.

As with many astronomical events, this is

not a fleeting phenomenon. While the precise timing of the event places it at 8am ET on the 4th, observations a week or more to either side of that time will still provide an excellent show.

And Saturn will look great all month and next throughout the night.

If it's been a while since you've looked at Saturn, you'll find its rings have opened markedly since we last had clear evening skies with Saturn in view.

Any telescope will see Saturn and its rings, as well as its largest moon Titan. Better scopes will see from 3 to 7 of Saturn's moons. Saturn's official count of moons at present is 293, but no Earth-bound scope is ever going to see more than the brightest ones!

Locate and center Saturn using low powers (50-100x), and to see Saturn's moons with it. Titan is very bright and is usually the first moon you will see, but depending on your telescope and the sky conditions, from 5 to 9 moons may be visible.

Go to medium powers for observation of the disk and the rings (~150-250x). Light color filters can be used to bring out different features of Saturn, as can a variable density filter. I find light yellow and light red filters to be the most effective at seeing atmospheric detail, but a light blue filter can bring out white storms nicely when they are present. Some people swear by a light green or green filter--give it a try.

Saturn finder chart:

<https://in-the-sky.org//data/object.php?id=P6>

Saturn's Moons Location Calculator:

[Saturn's Moons](#)

Mercury is best viewed early in the month in the west-southwest sky near Venus. It reaches its highest point in the sky on the 10th, 12 degrees above the horizon. So it will require a clear horizon to see it, though it will be very bright at magnitude -0.1. It will be above Venus on that night.

Mercury reaches greatest elongation (greatest distance from the Sun) on the 12th. After this date, it will become increasingly difficult to view Mercury as it gets closer to the Sun.

Mercury's appearances, known as apparitions, alternate between evening and morning. By the end of this month, Mercury will be too close to the Sun to observe easily, and its next apparition will be in the morning in November.

Mercury online viewing chart:

<https://in-the-sky.org//data/object.php?id=P1>

Venus will be very difficult to observe this month, with the best opportunities at the start of the month when it will appear as a thin, but large, crescent under low and medium powers.

Venus reaches inferior solar conjunction on October 23rd. This is when it lies in a direct line between Earth and the Sun. About a week before that time it will be lost in the Sun's glare, and likely won't be easily observable until it emerges into the morning sky in November.

If you have a chance to observe it during the first week of the month, it will give you a big crescent smile, though!

Venus online finder chart:

<https://in-the-sky.org//data/object.php?id=P2>

Mars is an early morning object this month, but rising earlier than last month as it moves toward the evening sky.

On October 5th, the Moon will pass about 1 degree away from Mars, putting both within a single binocular view, a wide field telescopic view, or the field of a typical smart scope.

Mars will have a close approach with **M44, The Beehive Cluster** on October 11th. It will pass within a few arcminutes of the center of M44, putting it in the same field of view through a telescope's low power field. It will also make a magnificent sight through binoculars.

Observing information for Mars:

<https://in-the-sky.org//data/object.php?id=P4>

Jupiter will be occulted by the Moon in the early morning hours of October 6th. At 4:17am EDT Jupiter will disappear behind the Moon, and will reappear 59 minutes later. This occultation will only be viewable to a fraction of the Earth, and the U.S. Northeast are within that area.

Jupiter rises in the early morning this month, shining bright at magnitude -2. It spans 32 to 35 arcsec in size this month, putting on a dramatic show at medium powers (~150x) when our skies allow.

Jupiter occultation:

[Lunar occultation of Jupiter - In-The-Sky.org](#)

Jupiter observing information:

<https://in-the-sky.org//data/object.php?id=P5>

September was a worse month than normal for Septembers in The Villages for astronomy due to the continuation of summer cloud patterns for most of the month. While it appears this will continue into the first week of October, it looks like there is hope for improvements in the weather from around October 6th.

The strong El Nino weather patterns extend thunderstorm and cloudy evenings, and we're likely to have a worse than normal winter from that perspective as well. But there will be breaks that give us clear nights as well as nights with broken overcast that will allow some observing.

Broken clouds work well with visible scopes and an observer who can find their way around by eye, but they are trickier for smart scopes that rely on clear views for self-calibration. Hazy skies favor smart scopes, though, while limiting the types of objects that are suitable for visual observation to bright planets and stars.

SMART SCOPES



Unistellar first showed the world a smart telescope at CES 2017. It included automatic calibration of the mount against the sky, digital imaging and a digital eyepiece, with a mobile app for control. Unistellar image.

What is a Smart Scope?

Smart scopes are self-guiding photography-based telescopes. They are capable of self-aligning themselves against the sky, and use sensitive digital cameras to build up images of objects in the sky.

They combine a number of features seen individually before into a single integrated package to provide a seamless viewing and photography experience. Many are very small and light, especially compared to traditional astrophotography rigs. They come assembled and ready to use with user friendly interfaces that run on a tablet or smartphone.

Self-Alignment

One of the ‘killer app’ features of smart scopes is their ability to align themselves relative to the sky overhead, then guide themselves to objects in the sky.

Before the advent of the smart scope, a generation of budding astronomers got taken in by “Go-To” telescopes, not realizing that the user had to do the calibration of the mount against their sky. The smart scopes of today actually deliver on the promise of Go-To functionality. They use location sensors combined with the ability to recognize the stars in the sky to do all of the calibration and pointing on their own. The user simply needs to tell it what to look at. The smart scope will figure out where it is, what it’s pointing at, then move itself to the desired object.



The Vaonis Stellina was demonstrated at CES 2018, and was the first smart scope delivered to customers in May 2019. Vaonis image.

Live Stacking



The Dumbbell Nebula, M27, emerges in this Live Stack image. Image by Mark Graybill.

Smart scopes use their digital technology to stare at objects and take multiple images, which they then add together into a single image to give a better view of dim objects in the sky. Over time, the image shows greater detail, more color, and better contrast the longer it stays on one area of the sky.

Your eye accumulates about 1/30th of a second of data this way, and extended viewing with a relaxed eye accumulates more data thanks to how your brain processes images. This lets you look through a telescope and see more detail than a quick glance allows. But it soon reaches a limit.

Digital imaging in smart scopes exceeds this limit by stacking multiple images of many seconds apiece, in some cases minutes of imaging.

Ergonomics



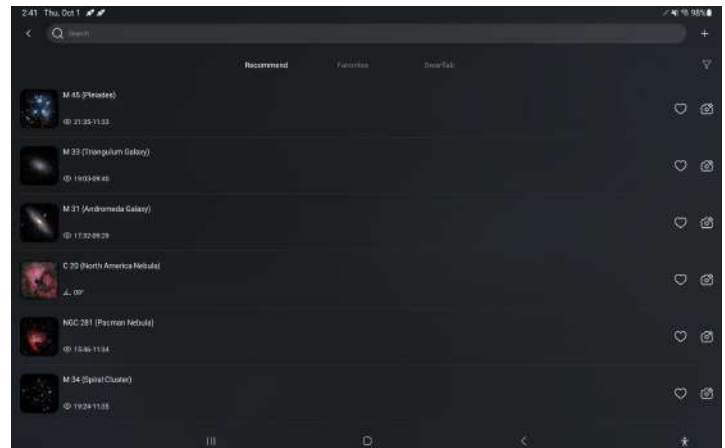
View the heavens from a comfortable setup rather than bending your back to reach an eyepiece. Image by Mark Graybill.

Smart scopes allow us to view the images on our hand-carried devices like tablets and phones without craning our necks or standing at odd angles. We can adapt the display to our own comfort, rather than having to bend to where the mechanics of the system place the image.

They also tend to be relatively light and portable. A high quality visual scope can weigh from 40 to 150 lb, and require a lot of toting and assembly before it's ready to use. Most smart scopes have a body and a mount that are light and can be assembled in moments. Even the large models can be carried and set up easily.

The heaviest model of smart scope is the Celestron Origin Mark II, at 42 lb., which includes the mount head and tripod. It weighs over twice as much as the next-heaviest models, the Unistellar eVScope 2 and eQuinox 2, which are about 20 lb. including mount and tripod.

Discovery at Your Own Pace



The apps for smart telescopes will recommend objects that are up for you to see.

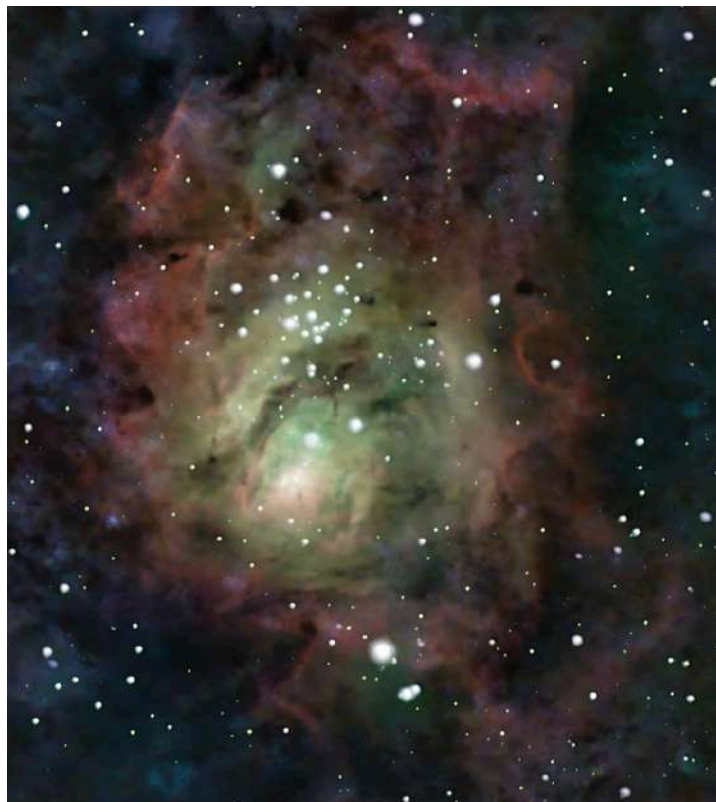
Because of the smart features, smart scopes allow users to discover the sky easily beyond the few astronomical objects that are easy to find. With traditional scopes, you generally need to already know what you're going to look at, where it is, and hope that you're able to see it in the size and type of scope you've got, under your local sky.

As a kid, it was only through sheer mule-headedness that I was able to find M51 after

many, many nights of looking under bright suburban skies with a little 3" reflector telescope. And then it looked like a little smudge of cloud, not like the magnificent spiral I had seen observatory pictures of.

Today, a smart telescope will find it easily, and a few minutes will allow it to show the spiral structure nicely.

Photography



The Lagoon Nebula, M8. Multiple hours of images, reduced to the best 25% of total time, stacked, denoised, separated into star and starless images, stretched, then recombined. Approximately 14 hours of processing time. Original images from Dwarf II taken during 9 sessions over 3 months. Mark Graybill.

Smart scopes can save the pictures as well so that they can be shared or processed further later. Most smart scopes will do some basic processing on Live View images to remove noise, improve contrast and color to give a good image of the objects viewed. For many, this gives images they are happy with viewing and sharing.

The original images used to build up the

Live View and final images can also be saved, allowing them to be processed using external software to produce professional quality images.

Some smart scopes now have sophisticated image editing studios incorporated into their apps. This allows the user to have more control over how the image is processed, and allows combining multiple sessions of imaging the same object to get a better final image.

Shortcomings

All this said, there are things that smart scopes are generally not good at that are simple with visual telescopes.

Planets are generally disappointing in smart scopes. Short focal length models show no significant detail. Long focal length models (>300mm) show minimal detail. The models with the longest focal lengths (>400mm) can show some detail equivalent to a small visual scope at low power. The Unistellar telescopes have the best performance in this regard. Poor planetary performance is usually the greatest complaint of smart scope owners.



Jupiter at 150mm focal length. Mark Graybill.

Small deep sky objects suffer for the same reason. Most planetary nebulas are similar in size to planets aside from a few standouts like the Rosette and Dumbbell nebulas. Small galaxies and star clusters similarly lack detail and any way of increasing magnification to bring it out.

Smart scopes operate at one or two focal lengths, usually a “telephoto” view in the range of a normal camera’s telephoto lens, and a “wide field” view comparable to a normal kit lens on a digital camera for landscapes and Milky Way views. A visual scope can have its effective focal length--and magnification--changed by changing out eyepieces, or adding a Barlow lens.

And while most telescopes used for photography are used with what’s called “Prime Focus” photography, where the camera is placed at the telescope’s point of focus without an eyepiece, they can also have the effective focal length changed using telecompressors (which lower the effective focal length and magnification) or by adding a Barlow or using Eyepiece projection to increase effective focal length far beyond any smart scope. Usually by an order of thousands.

The scope can be adapted to the subject you’re photographing or viewing, rather than being stuck at a single field of view and effective magnification, as on a smart scope.

Daylight viewing is generally impossible since the telescope cannot orient itself without star fields to view. While it is able to orient itself without fully dark skies, it generally needs deep twilight to get identifiable star field images. Whereas human observers can easily find planets in the daytime sky by knowing their locations relative to the sun, as well as other bright objects like the rare daytime visible comets.

However, most smart scope users don’t find this a limitation in their scope, but rather an incentive to supplement their scope with a good visual scope. Not just to see the things their smart scope isn’t good at seeing, but to get an eyeball-direct view of the things they’re seeing in their smart scope.

Smart Scope Adjacent

There are other products that are not specifically what we would normally consider smart scopes, but which are similar.

The **Mirrosky SPi53** comes the closest to being a regular smart scope, as it can be used as a stand-alone smart scope as well as a guider and mount for an added telescope.

[SPi53 Smart Telescope | Spectrum Optics](#)



Pegasus SmartEye is a “Smart Eyepiece” that adds many smart scope functions to a traditional visual telescope, including plate solving, live stack viewing, and astrocamera capabilities for about \$2000.

<https://smarteypiece.com/>



Entry Level Smart Scopes

Of the current crop of smart scopes, there are only two available models that sell for under \$600: The DwarfLab Dwarf Mini and the DwarfLab Dwarf 3. While I normally would have capped this category at \$500, recent cost increases in semiconductor components justify extending it to \$600.

Formerly, ZWO's Seestar models were in this range as well, but recently ZWO ceased manufacture of the Seestar S30 and Seestar S50.

Both Dwarf scopes are excellent beginner scopes. The Dwarf 3 is larger, and has a larger aperture, at 35mm vs 30mm, and a higher resolution sensor.

But the Dwarf Mini is very compact and much less expensive. Both can be used to produce excellent images, and are very easy to pack along wherever you go. The Dwarf 3 is about the size of a large hardback book, whereas the Dwarf Mini is about the size of a thick paperback.

Both use the same software, also used by the Dwarf 2 and Draco smart scopes. It includes an editing studio for personalizing your images and combining images from multiple sessions.

The software allows mosaic imaging (imaging larger areas of sky than the field of view would otherwise allow) and prescheduled imaging.

Dwarf Mini, \$419

30mm aperture, 707 sq mm collecting area.

150mm focal length.

Field of view: 2.46 x 1.35 degrees.

Resolution: 1920 x 1080 (2.1 Mpixels.)

Exposure durations: up to 90s in EQ mode,
up to 15s in Alt/Az mode.

Includes wide angle "Milky Way" camera.

Weight: 1.85 lb.



Dwarf Mini. DwarfLab image.

Dwarf 3, \$549

35mm aperture, 962 sq mm collecting area.
150mm focal length.

Field of View: 2.95 x 1.66 degrees.

Resolution: 3840 x 2160 (4K, 8.3 Mpixels.)

Exposure durations: up to 60s in EQ mode,
up to 15s in Alt/Az mode.

Includes wide angle "Milky Way" camera.

Weight: 2.9 lb.



Dwarf 3. DwarfLab image.

Both Dwarf scopes provide great images of large objects like the Rosette Nebula and Andromeda Galaxy even without using Mosaic Mode.

Mid Range Smart Scopes

The next price range for smart scopes goes from \$700 to \$2000. While this is a broad range, there is a substantial jump in price between this range and the premium tier scopes.

There is less of a capability gap between the low end of this range and the entry level Dwarf 3, however. The specifications of the Seestar S30 Pro and the Dwarf 3 are very similar. But I felt the \$150 price difference between the two was enough to push the Seestar S30 Pro into the higher price range.

Other than the Seestar S30 Pro, the midrange scopes provide a significant aperture increase over the entry level scopes. The S50 Pro and Vespera II's 50mm apertures provide roughly twice the light gathering area of the Dwarf 3. The Draco's 90mm aperture provides about six times the light gathering of the Dwarf 3, even when the central obstruction is accounted for..

Seestar S30 Pro: \$699

30mm aperture, 707 sq mm collecting area.
160mm focal length.

Field of View: 4.60 x 2.59 degrees.

Resolution: 3480 x 2160 (4K, 8.3 Mpixels.)

Exposure durations: up to 60s in EQ mode,
up to 30s in Alt/Az mode.

Includes wide angle "Milky Way" camera.

Weight: 3.6 lb.



Seestar S30 Pro. ZWO image.

Seestar S50 Pro: \$999

50mm aperture, 1,964 sq mm collecting area.
260mm focal length.

Field of View: 2.80 x 1.58 degrees.

Resolution: 3840 x 2160 (8.3 Mpixels.)

Exposure Durations: up to 60s in EQ mode,
up to 30s in Alt/Az mode.

Includes 4K wide angle camera.

Weight: 6.2 lb.



Seestar S50 Pro. ZWO image.

Dwarflab Draco: \$1399 / \$1599 (SHO edition)

90mm aperture, 6,362 sq mm collecting area.
340mm focal length.

Field of View: 2.06 x 1.16 degrees.

Resolution: 8192 x 6144 (50 Mpixel.)

Exposure Durations: Up to 300s (5 min.) in EQ or
Alt/Az modes.

Weight: 12.1 lb.



Dwarflab Draco. Dwarflab image.

Vaonis Vespera II: \$1690

50mm aperture, 1,964 sq mm collecting area.

250mm focal length.

Field of View: 1.6 x 0.9 degrees.

Resolution: 3840 x 2160 (4K, 8.3 Mpixel.)

Exposure Durations: Up to 10s. Alt/Az only.

Weight: 11 lb.



Vaonis Vespera II. Vaonis image.

Each scope in this range has its own way of standing out. The S30 Pro has a panoramic field of view in its primary sensor. Both Seestar Pro models feature a 4K wide field camera for Milky Way and landscape imaging.

The Vespera uses software control over its imagery to provide the effects of filtering and noise reduction performed by hardware on other models of scope.

And the Draco's sheer light collecting area and incredibly high resolution sensor, along with a rotating sensor to allow EQ style imaging in Alt/Az mode makes it a standout in this class.

The Draco also features cooling on its sensor. While it is not the same as the cooling used in standard cooled astrophotography cameras, it is able to reduce sensor noise to half or one quarter of that of an uncooled sensor, as used on other smart scopes in this class and below.

Premier Tier Smart Scopes

The upper tier of smart scopes have prices that rival those of traditional astrophotography rigs. Each model provides some specific benefit or design feature that justifies its price to the people who purchase it. These are not commodity smart scopes.

Some of these scopes offer an electronic eyepiece: an internal display that shows the current object in live view mode, giving a viewing experience that is like a traditional scope, but with the added advantage of image stacking over time to bring additional detail.

The apertures are the largest among the smart telescopes. Some require manual focusing and collimation. Some are entirely automatic. Some allow common 1.25" and 2" astronomical filters to be used, others use software filters, or support external filters.

Each should be researched fully by prospective buyers.

Among the extras provided is the Citizen Science mode of the Unistellar telescopes. Simply by starting it in the app, you can use your scope to partake in science projects with many other Unistellar owners. There is no significant effort on your part, but your scope is used as part of ongoing scientific studies.

The Celestron Origin Mark II stands out as an automated home observatory. It provides the features of a traditional astrophotography rig in a highly integrated package. No loose wires to manage, no work integrating controller with mount, guide camera, and main camera. It is a full astrophotography setup in a box. The camera can be upgraded by the user, and standard astrophotography filters can be used.

Each scope has an extensive online community. The community provide assistance, support for modifications and special uses, software add-ons, external filters and tips and techniques on using these scopes to get the most out of them.

Vaonis Vespera 3: \$2490

50mm aperture, 1,964 sq mm collecting area.

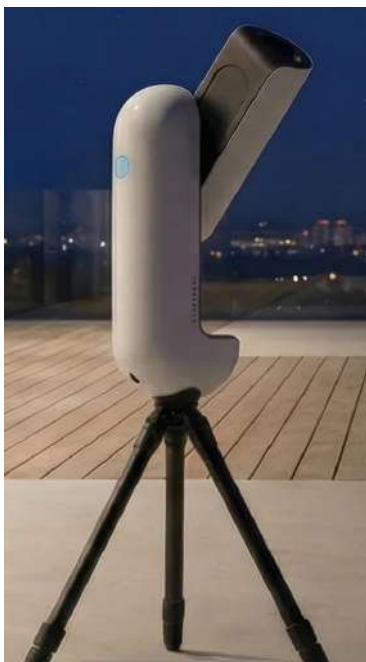
245mm focal length.

Field of View: 2.5 x 1.4 degrees.

Resolution: 3840 x 2160 (4K, 8.3 Mpixel.)

Exposure Durations: Up to 10s. Alt/Az only.

Weight: 11 lb.



Vespera 3. Vaonis image.

Unistellar Odyssey: \$2599

85mm aperture, 5,575 sq mm collecting area.

320mm focal length.

Field of View: 0.75 x 0.56 degrees.

Resolution: 2900 x 2160 (4.3 Mpixel.)

Exposure durations: Automatic, 4s.

Weight: 9 lb.



Unistellar Odyssey. Unistellar image.

Unistellar Odyssey Pro: \$4599

Same specifications as the Odyssey, the Pro model adds a Nikon digital eyepiece.



Unistellar Odyssey Pro with digital eyepiece.
Unistellar image.

Unistellar Equinox 2, \$2899

Unistellar Equinox 2. Unistellar image.

114mm aperture, 10,207 sq mm collecting area.

450 mm focal length.

Field of View: 0.75 x 0.56 degrees.

Resolution: 2712 x 1538 (6.2 Mpixel as processed.)

Exposure durations: Automatic, 4s.

Weight: 20 lb.

Vaonis Vespera Pro 2, \$2990



Vaonis Vespera Pro 2. Vaonis image.

50mm aperture, 1964 sq mm collecting area.
245 mm focal length.
Field of View: 1.6 x 1.6 degrees.
Resolution: 3536 x 3536 (12.5 MPixel.)
Exposure durations: Automatic.
Weight: 11 lb.

Celestron Origin Mark II, \$4299



Celestron Origin Mark II. Celestron image.

152mm aperture, 18,146 sq mm collecting area.
335 mm focal length.
Field of View: 1.32 x 0.75 degrees.
Resolution: 3156x 2180 (8.4 MPixel.)
User upgradeable camera.
Live cast images from scope.
Exposure durations: 10-30s Alt/Az. 60+s in EQ mode.
Weight: 42 lb.

Unistellar eVscope 2, \$4999



Unistellar eVscope 2. Unistellar image.

114mm aperture, 10,207 sq mm collecting area.
450 mm focal length.
Field of View: 0.75 x 0.56 degrees.
Resolution: 2712 x 1538 (6.2 Mpixel as processed.)
Includes Nikon digital eyepiece.
Exposure durations: Automatic, up to 4s.
Weight: 20 lb.

We're Just Getting Started

The technology of smart scopes continues to develop rapidly, in both hardware and software. Competition is intense, and companies are changing their market position with each new scope release, as we've seen with Seestar's move upmarket.

There are other companies that may enter the market in time to come as well.

We can also see that there is no one-size-fits-all smart scope. The Celestron Origin Mark II and Draco are serious astrophotography setups that compete against traditional astrophotography gear. And in the case of the Origin, it allows the user to perform upgrades, use conventional astrophotography filters, and get some of the flexibility of a high level astrophotography setup.

Many of the scopes provide ways of sharing the view as well, some more effective

than others. The Origin provides livecasting to nearby devices, and other provide for multiple view-only device connections at once.

We haven't quite seen a true user-friendly star party type interface, but this would be more a matter of software than hardware at this point.

Expect to see more large aperture devices at time goes on, even though devices with small apertures are surprisingly effective, even on dim objects. We are also seeing scopes with resolution sufficient for minimal viewing of the planets as resolutions and focal lengths increase in new systems.

Electronics prices going up have caused a general increase in prices from all tiers, hopefully sometime next year we start to see some relief there.

But there's no doubt that smart telescopes have earned their place in the standard equipment range for amateur astronomers. And they're not only here to stay, but are likely to get even more popular with time.

Club Calendar

Special events by The Villages Astronomy Club

Events not hosted by The Villages Astronomy Club

Notable dates with no event planned.

October 2026

2 Astro Exec Meeting, 11am, Fishhawk Rec Ctr, 2318 Buttonwood Ln.

5 No Space Academy, No Observing Workshop
Truman Rec Center Planned Maintenance.

7 Smart Scope Meeting, 7pm

13 camp geneva star party

17 Fruitland Park Observing, 5pm, 300 Shiloh St.
Fruitland Park

20 General Meeting, Laurel Manor Rec Ctr, 1985
Laurel Manor Dr., 6:30pm Joel Nussbaum, Apollo 11
engineer.

November 2026

1 DST ENDS

2 Observing Workshop 7pm. Star Party for All
Members., Truman Rec. Ctr. 2705 Canal St. Replaces
Space Academy this month during polling at Truman.

4 Smart Scope Meeting, 6:30pm

6 Astro Exec Meeting, 11am, Fishhawk Rec Ctr, 2318
Buttonwood Ln.

7 Observing Session - Scouts, Sandhill Scout
Reservation

14 Starry Starry Night, 6pm-8:30pm, 5 day Moon,
Saturn, Uranus, Cygnus, Lyra, Sagitta, Pisces, Taurus.

17 No General Meeting Laurel Manor Maintenance.

21 Fruitland Park Observing, 5pm, 300 Shiloh St.
Fruitland Park

December 2026

2 Smart Scope Meeting 6pm

4 Astro Exec Meeting, 11am, Fishhawk Rec Ctr, 2318
Buttonwood Ln.

7 Space Academy, Observing Workshop, Truman
Rec. Ctr. 2705 Canal St.

15 General Meeting, Special Presentation, To Be
Announced!, Holiday Treats

19 Fruitland Park Observing, 5pm, 300 Shiloh St.
Fruitland Park

Club Calendar on the web:

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

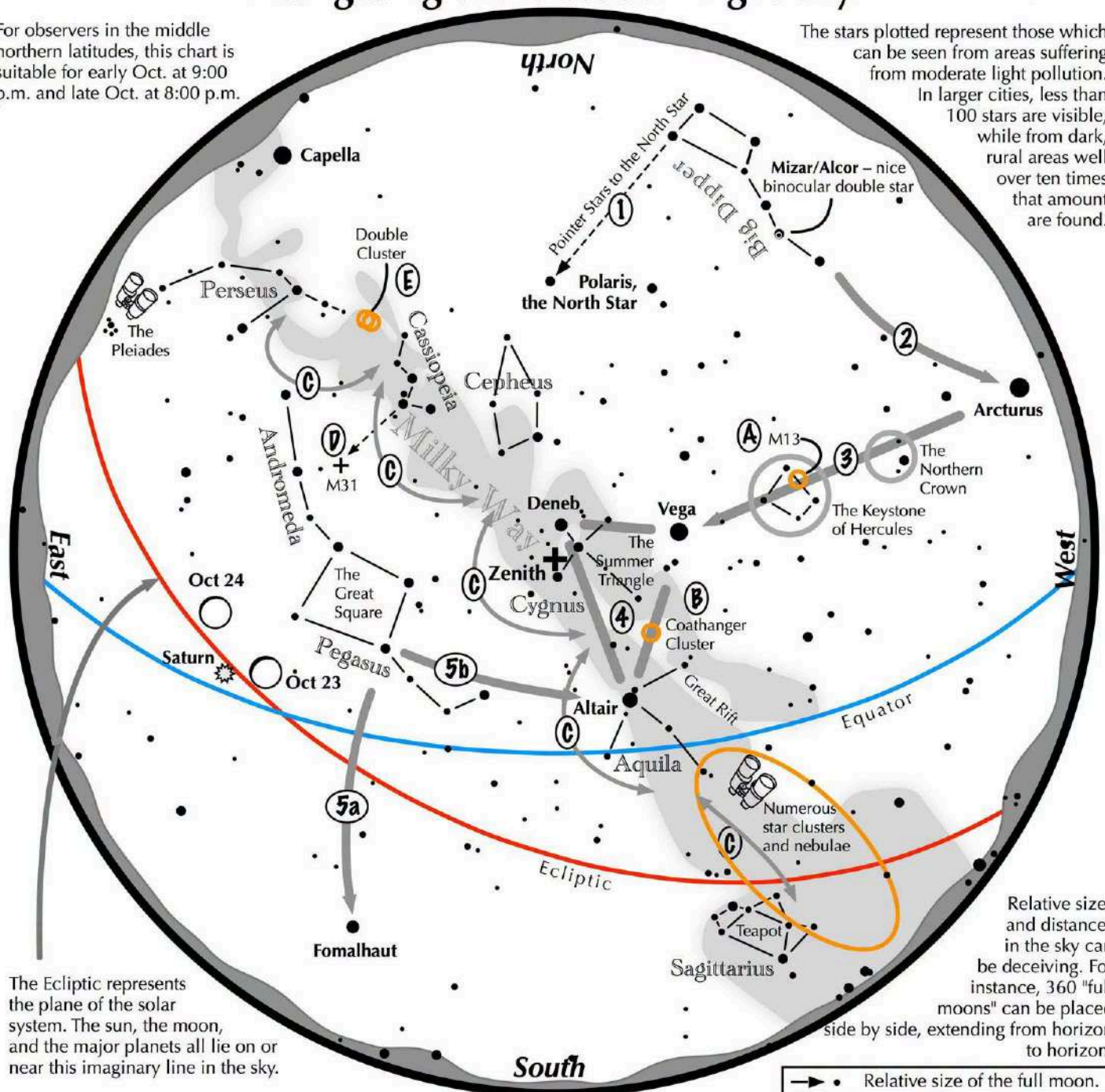
**See the monthly star charts on
following pages:**

Navigating the October Night Sky

2026

For observers in the middle northern latitudes, this chart is suitable for early Oct. at 9:00 p.m. and late Oct. at 8:00 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.



Navigating the October 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 intersects Arcturus, the brightest star in the early October evening sky.
- 3 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 Nearly overhead lie the summer triangle stars of Vega, Altair, and Deneb.
- 5 High in the east are the four moderately bright stars of the Great Square. Its two southern stars point west to Altair. Its two western stars point south to Fomalhaut.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster, a ball of 500,000 stars. **B:** 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger. **C:** Sweep along the Milky Way for an astounding number of fuzzy star clusters and nebulae amid many faint glows and dark bays, including the Great Rift. **D:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **E:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster.

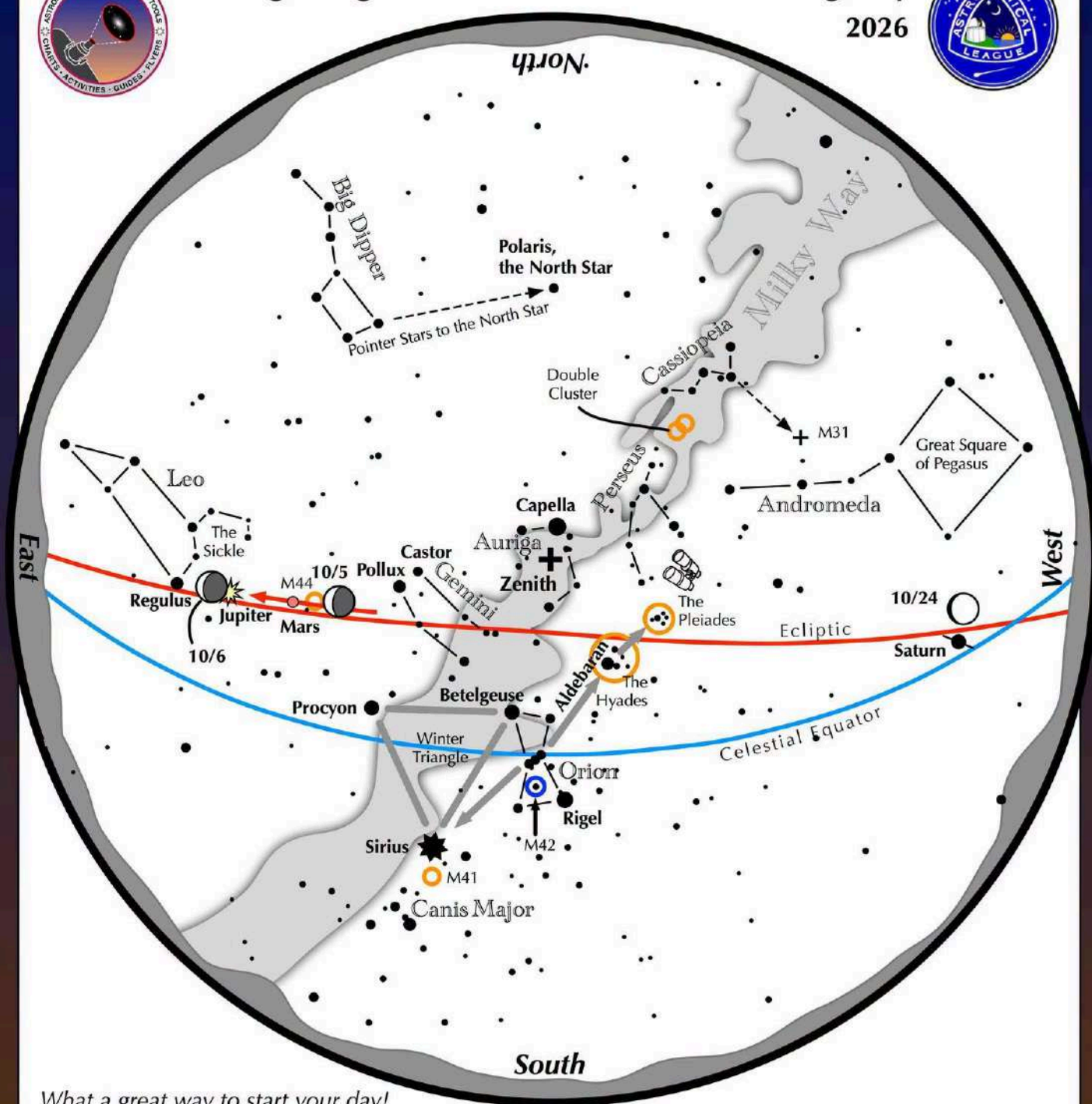
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Navigating the mid October Morning Sky

2026



What a great way to start your day!

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

Late sunrises in October provide opportunities for early morning skywatching.

- Bright Jupiter shines high in the east.
- Crescent moon lies just west of Mars on October 5.
- The crescent moon glows next to and occults bright Jupiter on October 6.
- The near full moon glows in the west next to Saturn on October 24.
- During the first half of October, gaze high in the south and overhead to see these many celestial features: the Pleiades, the Hyades with Aldebaran, Orion, Capella and Auriga, the Winter Triangle with Sirius and Procyon, Gemini, and, in the east, Jupiter.

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