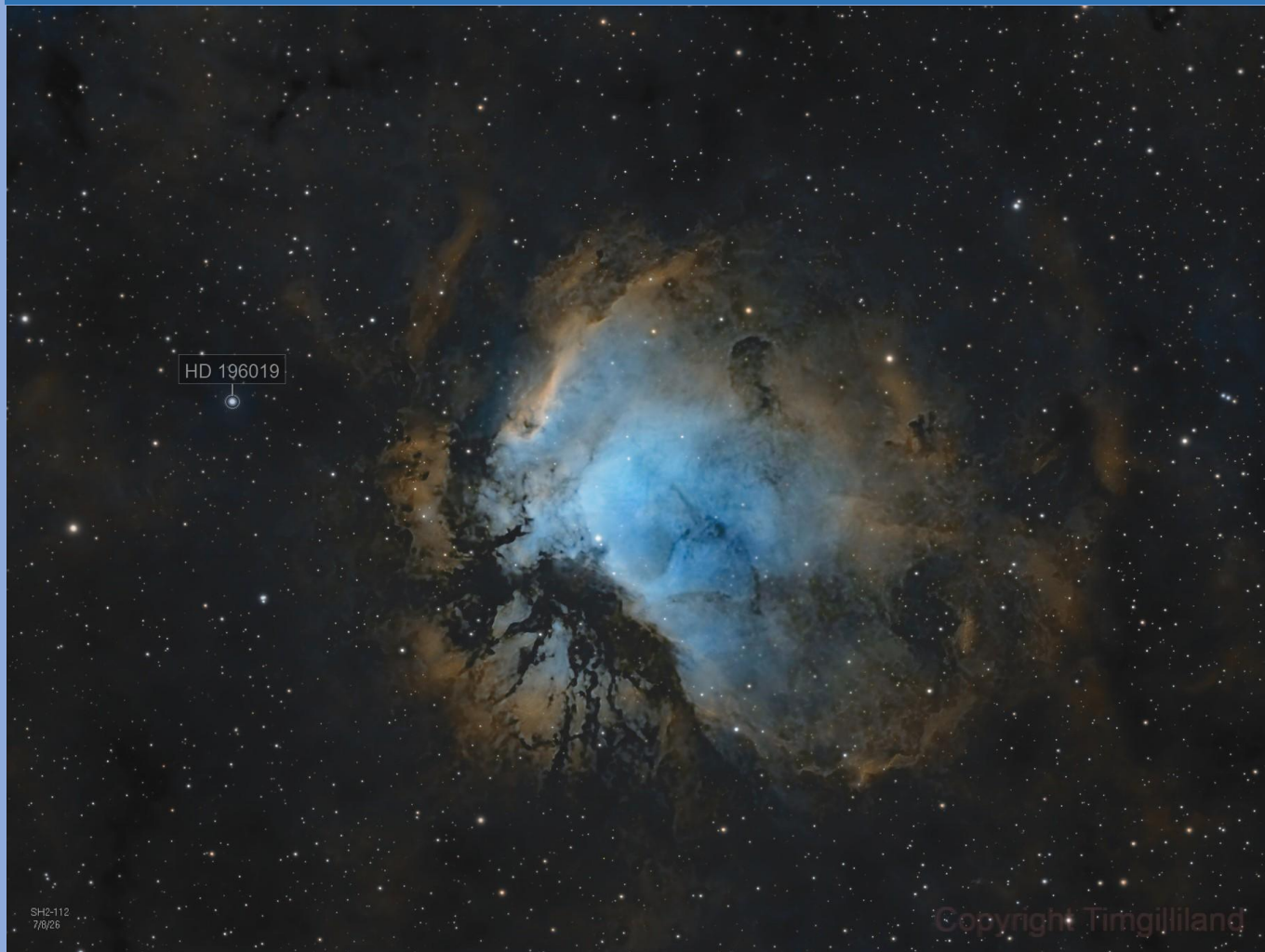


OBSERVER

August 2026

*Bringing Stars to the eyes of Tulsa
since 1937*

Editor – John Land



Sh2-112 is a diffuse emission nebula near the star Deneb in Cygnus By Tim Gilliland

At 15 arcmins Sh2-122 is about half the size of the full moon. It lies about 5600 light years away. Several dark dust lanes can be seen obscuring parts of the region.

Tim took this image with his Celestron EdgeHD 1100 paired with a SBIG ST-8300M camera. The image is a result of 6 hrs 30 mins of exposures by with filters.
H-alpha 5 @ 1800 sec OIII 4 @ 1800 sec SII 4 @ 1800 sec --- combined with PixInsight

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Follow Us on Social Media

Facebook <https://www.facebook.com/AstronomyClubofTulsa>
Instagram <https://www.instagram.com/stories/tulsa.astronomyclub/>
Website <https://www.astrotulsa.com/>

Stargazing Nights and Observatory Nights

Come enjoy an evening of star gazing at our observatory located in dark rural skies SW of Tulsa
Details, Times and Direction Maps are posted on our Website <https://www.astrotulsa.com/events>

Guest and member Observatory nights

FRIDAY Aug 7 - 7:45 PM Guest & Members Night

FRIDAY Sept 4 - 7:15 PM Guest & Members Night

Astronomy Club Members Nights

Our members are invited to come work on their observing goals, do some Astro imaging and share ideas.

Friday Aug 14 - 7:45 PM Members Observatory Night

Friday Sept 11 - 7:15 PM Members Observatory Night

If a Friday event must be cancelled due to weather, we will try on Saturday 30 minutes before sunset -
Always check the website for event updates

Mark your August calendars ! August 12 -- Perseid Meteor Shower
August 27 – Partial Lunar Eclipse

August is time to register for **Okie-Tex Fri Oct 9 – Sat 17**



2026 ASTRONOMY CONFERENCES and STAR PARTIES

Are you looking for a way to combine a bit of vacation time and enjoy learning more about astronomy? A regional or national astronomy conference may be just the thing for you. You can make friends with like-minded astronomy enthusiasts and also get to hear some interesting presentations on a variety of topics. The door prize giveaways are also an extra little bonus.

ALCON2026.org

**National Astronomical League
convention Aug 12 -15**

The ALCON 2026 will be located in Cincinnati, OH.

Details are still in development but you can save the website <https://www.alcon2026.org/> and register for emailed updates. See an Overview starts About 8 mins in to YouTube – AL 80th anniversary <https://youtu.be/G2-tzvtob74?t=500>

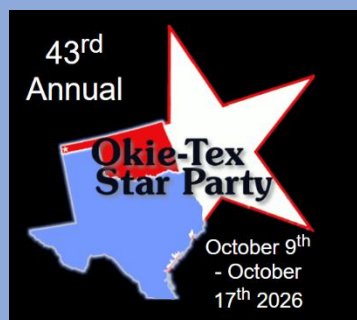
This Just In ! Astronomy@250: The Life & Legacy of Dr. Nancy Grace Roman
Aug 27, 2026 @ 07:00 PM in Central Time (US and Canada)

https://us02web.zoom.us/webinar/register/WN_DO9sMPgYRuya431PaB02lw#/registration

The Astronomical Society of the Pacific is celebrating the life and legacy of Dr. Nancy Grace Roman with a panel moderated by Dr. France Córdova, former director of the National Science Foundation. The panel will explore Dr. Roman's scientific vision, leadership, philanthropy, and enduring influence on astronomy. This free public event is part of the Astro Society 2026: Astronomy@250 Conference. Full conference registration is not required to attend this Zoom webinar.

REGISTRATION TIME is HERE for the 2026 Okie-Tex Star Party

You must register in advance – and reserve meals in advance. It's 35 miles to the nearest town !



Okie-Tex Star Party Oct 9 – 17 <https://www.okie-tex.com/index.php>

Several of our Tulsa area astronomers enjoy going to the Okie-Tex Star Party in the autumn. Each year about 500 astronomers arrive from all over the nation for a week-long feast of starlight. Okie-Tex is held on a spacious observing area just west of the Black Mesa State Park at the far western end of the Oklahoma Panhandle. Its Bortle 1 dark skies are acclaimed as some of the darkest on the planet. Each time I go I am overwhelmed by the late summer Milky Way flowing overhead like a river of stars engulfing the

sky. You need to register and reserve your meal choices **BEFORE August 31, 2025**

There are other extended Star Party events around the country. So, look for developing news in your Astronomical League quarterly newsletter [The Reflector](#), Astronomy Periodicals or search online.



"Salutations club members, near and far,

The dog days of summer have descended on Oklahoma, but even in the heat, our club persists! Our July 10th Guest Night at the observatory was nothing short of spectacular, with an estimated **100–120 people** in attendance, making it, in my opinion, one of the highlights of the year. People came by the dozens to experience the night sky, and it certainly didn't disappoint. Several guests shared that it was their very first time seeing the Milky Way with their own eyes—a reminder of why we do what we do. Moments like those are what make every outreach event worthwhile.

Our outreach efforts continued throughout the month as well. We had a wonderful time partnering with the City of Owasso during their movie night at Redbud Festival Park and later at Sapulpa's TeePee Drive-In Theatre, where we introduced even more members of our community to the wonders of the night sky. It's incredibly encouraging to see our club becoming a familiar presence throughout the Tulsa area.

As we begin looking toward the Fall season, the Board has been hard at work finalizing meeting dates, guest speakers, and perhaps most importantly, where we'll be holding our in-person meetings. At the time of writing this, I'm excited to share that, with the help of Bryan Kyle—club member, board member, and Director of the Tulsa Air and Space Museum Planetarium—we are moving forward with plans to begin holding our meetings at the **Tulsa Air and Space Museum Planetarium**. While we're still working out scheduling details, I truly believe this is a tremendous opportunity for both organizations. As the Astronomy Club of Tulsa, it feels only natural that we partner with Tulsa's public planetarium, creating an exciting new home for our meetings while strengthening astronomy education throughout our community.

Finally, work continues at the observatory. Thanks to the dedication of our volunteers, the interior of the dome has been scraped, cleaned, and is already looking better than it has in years. Our next steps are washing and repainting the interior before turning our attention to one of the club's biggest long-term priorities: restoring and upgrading the dome telescope. To help move that effort forward, the Board has assembled a small team to begin researching options and developing a plan for the telescope and mount. We'll be excited to share more details as that work progresses.

As always, this is **your club**, and I'd love to hear your ideas. If you have thoughts, suggestions, or recommendations regarding the observatory or potential telescope upgrades, please feel free to send me a message at the President's email. I'd be happy to hear your perspective as we begin planning the next chapter for our observatory.

Thank you for your continued support, whether through volunteering, attending events, sharing our posts online, or simply bringing your curiosity to the night sky. Together, we're building something truly special.

This is Jonathan Fussell, wondering... If black holes spaghetti-fy everything that falls into them... what happens if you throw spaghetti into one? Does it become spaghetti-spaghettification? Super-spaghetti? Spaghetti²? Spaghetti to the infinite power?

Who knew pasta related questions would keep astronomers awake at night?

Until next month, Clear skies, everyone

*President Jonathan Fussell,
Astronomy Club of Tulsa -
"Bringing Stars to the Eyes of Tulsa since 1937"*

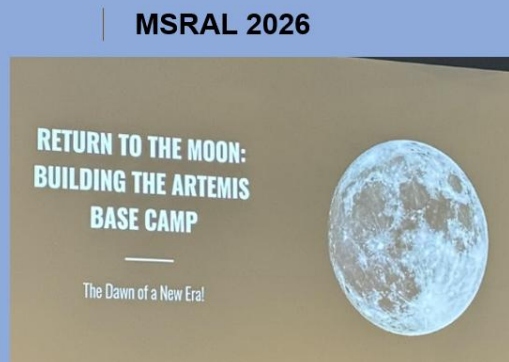


Review of MSRAL 2026 by Scott Bratt

The Mid-States Region Astronomical League convention was held June 26th, 27th, 28th, 2026 in St. Charles, MO and hosted by the Astronomical Society of Eastern Missouri (ASEM), and featured youth panels, an astrophotography competition, guest speakers, and viewing sessions, though Friday night's event was cancelled due to rain and thunderstorms. The three-day event featured an agenda designed for both amateur astronomers and youth participants, with a special focus on the youth.

Friday started out with registration and packet pickup, and a BBQ dinner held at Broemmelsiek Park, which was about 15 miles from the main event at St. Charles Community College. Kit and I did not participate in the BBQ dinner since we are on a special diet that contains no red meat. We instead settled on a nice Mexican food restaurant near our hotel.

Saturday began early with introduction and a summary of the event and updates on the status of the Astronomical League and business meeting, presented by our own Peggy Walker from the Broken Arrow Sidewalk Astronomy Club and current Mid-States Regional Representative. The event had 131 people register for the event from most of the member states. There was also a photo contest, several presentations and guest speakers, and a catered lunch.



Guest speakers gave program on “*The Vera Rubin Observatory*”, “*Artemis-Return to the Moon... This Time to Stay!*”, and “*Comets as Fossils: Why Comets Are Important for Understanding Our Origins*”. After lunch there was a panel of youth astronomers who talked about what inspired them to get into astronomy. They answered questions from the audience about the kind of things clubs should be doing to inspire other youth into the hobby or career fields. It was a very good program with a lot of great takeaways. I look forward to using their advice in our outreach events back home. Also in the afternoon there were a couple of more programs by guest speakers that included “*More than Meets the Eye: The Hidden Geology of Our Lunar Neighbor*”, and “*The Gus Grissom Story*”, and a prize drawing. Hey, I actually won a prize for a change, a cool T-shirt! There was also a catered banquet dinner with another guest speaker program that I did not attend, and another prize drawing. We went out for dinner and headed back to the hotel for a good night's rest.

Sunday morning began at 8:15 at the at the Weldon Springs interpretive Center a few miles away from the community college, out in a rural area away from town. After the Welcome introduction there were a few more programs, including one titled “*Cosmic Horizons*” presented by AI President Chuck Allen. You may remember that name recently, as he sent an open letter to the Jenks School Board in support of keeping the Jenks Planetarium open to the public. He gave a great program about just how big is the universe and why. There were a few more programs running concurrently and our club president Jonathan Fussell was one of those speakers. As we were leaving there was a solar viewing session outside in front of the building with a couple of different types of solar telescopes. Peggy Walker brought a very interestingly designed home built solar scope. Maybe we can ask her how it works at a meeting or public event. Another interesting design was a telescope that used eyepieces like a refractor type scope but it projected a sharp clear image onto a piece of white cardboard material about 10” below the eyepiece. I was surprised how sharp the images were.

Since noon was approaching, we decided to get on the road home. The drive was long, boring, and uneventful. I wish I had time to stop at the Uranus Fudge Factory along I-44 (*It is real, I promise*) and bring home some of that wonderful chocolate, but I had to detour to Branson to meet my cousin to pick up something for my sister here in Tulsa.

This was my first MSRAL a great weekend and great learning experience. Similar to going to a Star Party but more about the convention and the guest speakers than the starry night skies. Next up is ALCON in Cincinnati, OH in August. Since we used to live in the area of SW Ohio it might be a great trip to go back and visit old friends still in that area, but I'm not sure I will be able to go this time around. But maybe...

July Astronomy Club Activities

June and July have been busy months for our astronomy. We have had several opportunities to share our passion for astronomy with the Tulsa area communities.

Over 100 guests attended our **July 10th Observatory Telescope Guest Night**. The skies were fantastic! Several of our members had telescopes set up to share the views of a variety of celestial wonders. Venus shone brightly in the west at sunset. We saw many satellites going overhead including a pass of the International Space Station. As it grew darker John Land did a laser guided tour of the constellations and brighter stars. The Milky Way could be seen arching up from the region of Sagittarius all the way up through Cygnus.



July 18 & 19 Double Header Weekend

On Saturday July 18 we set up telescopes in Owasso prior to an outdoor showing of a movie for kids. Despite early clouds and showers nearby many kids got their first ever telescopic views of the moon etc.

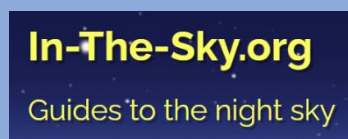


On Saturday July 19 the club set up scopes at the Teepee Drive In movie in Sapulpa. Scott & Kit were joined by the newest member of our club, their daughter Alisha. There were lots of oohs and awes from kids and parents seeing through a telescope for the first time. The Teepee Drive-In Movie owner made a nice donation to our club for our efforts.



Volunteering for these types of outreach events can be a joyful experience for our volunteers as they see the sparkle in the eyes of young kids and generate interest in the wonders of the heavens above. We would love to have more members volunteer for these and other events. If you are interested, contact one of our officers in person or through the contact page on our website. So that the Astronomy Club can continue

“Bringing Stars to the Eyes of many New Generations of Tulsans”



Clickable Hyperlink Images

CHECK OUT OUR NEW SELECTION OF ONLINE SKY LINKS ABOVE

[Astronomy Calendar 2026: All Major Celestial Events of the Year](#)

Explore a Month-by-Month listing of Celestial Events – Many have links to Details or Videos

[Daily Moon Guide](#) | Observe – Moon: NASA Science

GOT A NEW TELESCOPE? Here are some sites to help you get started with your telescope.

Getting Started with Your New Telescope

<https://skyandtelescope.org/astronomy-news/getting-started-with-your-new-telescope-2/>

Astronomy for Beginners | Night Sky Facts, FAQs & Resources

<https://skyandtelescope.org/astronomy-information/>

[What to Know Before Buying a Telescope](#)

A collection of [Interactive Sky Watching Tools](#)

Explore Astronomical League has a wide variety of [Observing Certificate Programs](#)

Find a [Printable Observing Here](#)

Moon Phases - -

3rd Q Weds Aug 05 - **New** Weds Aug 12 - **1st Q** Weds Aug 19 - **Full** Thurs Aug 27 * Eclipse !

Lunar conjunctions – **Evening** Midnight Aug 3 **Neptune** Aug 4 & 30 **Saturn** Sat Aug 15 **Venus** **Before Dawn** **Mars** Sun Aug 9 after 3:30 AM
Jupiter & Mercury are too close to the Sun this month

VENUS reigns as our Evening Planet. It reaches its maximum elongation from the Sun on August 15 setting alongside the Moon at 10:00 PM **SATURN** is finally emerging into the evening sky. Rising at midnight in early August and 9:30 PM by the end of August. Saturn will be a main viewing attraction when it reaches opposition on Oct 4th this fall.

MARS rises about 3:00 AM as it moves from Taurus into Gemini. We'll have to wait until next year for good observations as it reaches opposition on Feb. 19, 2027

Get ready for an eclipse of the [Full Sturgeon Moon](#) on Thursday August 12 - see details later



Watch for the Moon rising next to the Pleiades cluster about 1:00 AM on the morning of August 7. It will still be nearby before dawn.



Periodic Comet 10P/Tempel 2 reaches perihelion on Aug 2 and is closest to Earth @ 0.41 AUs on Aug 3. Late July observations place it at about 7.5 mag. It is currently leaving Capricorn and sinking south into Piscis Austrinus. It rises about 10:00 PM but is better observed nearer midnight. Check out the image of its [Razor Thin Trail](#) of orbiting debris.

See latest data at <https://astro.vanbuitenen.nl/comet/10>



The Perseid Meteor shower peaks on the moonless night of August 12-13. The shower is active several days before and afterwards. We should be able to see some of them on our Guest Observatory night Aug 7th as well as the Member night on the 14th. The Meteor Shower Radiant is in the constellation of Perseus which rises in NE about 9:00 PM and will continue to climb higher during the night.

Plan to sit outside in your lawn chair for at least a half hour. Face toward the west and watch for the meteors. They will appear randomly streaking across the sky. Some of the brighter ones may even leave a faint smoke trail. Have some paper, pencil and a tablet handy to make a tally mark each time you see a meteor.

The Perseid shower is the result from Earth passing through debris — bits of ice and rock — left behind by [Comet 109/P Swift-Tuttle](#), which last passed close to Earth in 1992. A typical Perseid meteoroid (which is what they're called while in space) moves at 133,200 mph when it hits [Earth's atmosphere](#) (and then it is called a meteor). Most of the Perseids are tiny, about the size of a sand grain. The particles themselves are tiny, but what we see as a meteor streaking across the sky is mostly a trail of hot glowing ionized gases compressed heated to temperatures as high as 3,000 F

Resources:

<https://www.space.com/perseid-meteor-shower-2026-guide>

<https://www.space.com/33677-comet-swift-tuttle-perseid-meteor-shower-source.html>

Partial Lunar Eclipse Night of Aug 27-28

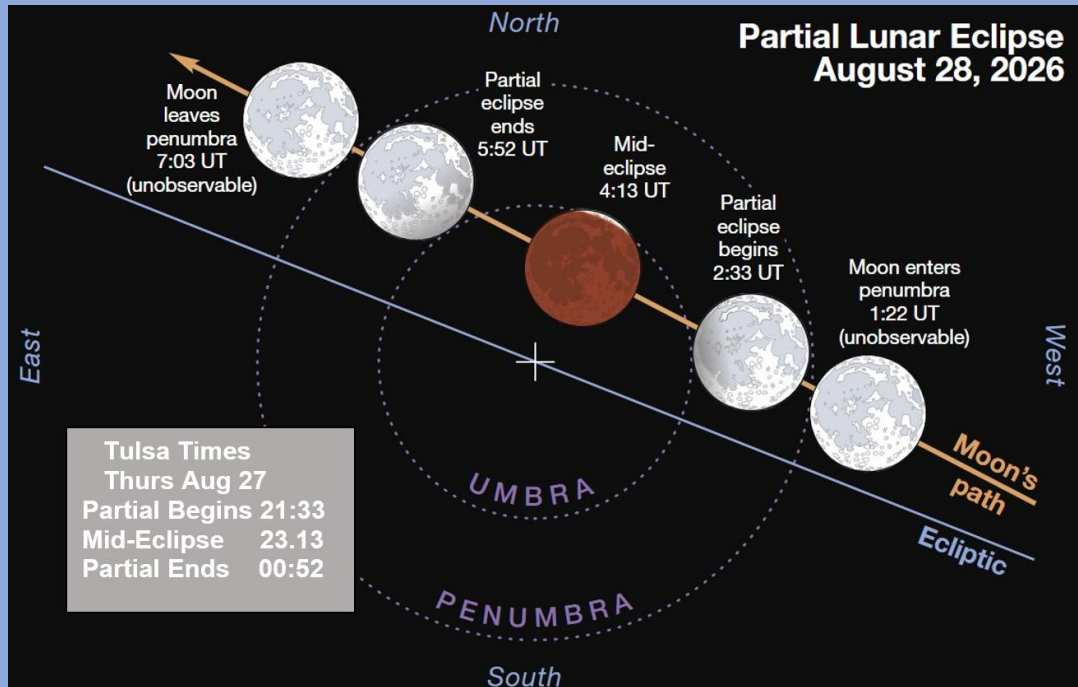


Diagram from August 2026 issue of Sky & Telescope

On the evening of Thursday August 27, we will have the opportunity to observe a 96.2 % Partial Eclipse of the moon. A lunar eclipse occurs when the Sun, Earth and Moon are aligned so that the moon passes into the Earth's shadow. [See Diagram of lunar eclipse](#) Begin your evening enjoying the Full Sturgeon Moon rising in the ESE. You don't have to go to dark skies to enjoy the eclipse. It can be enjoyed naked eye; however binoculars or a low power telescope will enhance your view.

About 9:10 PM you will begin to notice of the left side of the moon is a bit dimmer and dusky shaded. By this time the moon will be in Earth's outer shadow, the **Penumbra**. Next it will begin entering the **Umbra**, Earth's full shadow. Look for a darker "bite" on the left side. As the moon continues to slip deeper into the umbra more of the moon will be covered. The shaded part of the moon will begin to take on a dull reddish or orange shade. As the Earth's atmosphere bends the sunlight the color is the combined light of all the sunsets along the Earth's limb. At maximum eclipse 11:13 PM only a tiny slice at the top of the moon will still see some sunlight.

Historical Astronomical Note: Aristotle concluded that the Earth was a sphere by observing that its shadow was always curved during a lunar eclipse.

The diagrams below from <https://stellarium-web.org/> will give you a general idea of its appearance. You can probably get a decent picture by bracing your smart phone and zooming it to take the image. If your phone has night-time mode try that as well.



Midnight



Maximum 11:13



10:30 PM



10:00 PM

Visiting the Very Large Array (VLA) by Richard Morgan with editor additions



Astronomy club member Richard Morgan and his wife Lyn stopped by the [Very Large Array](#) on their way back from LA. The VLA is located about two hours south of Albuquerque New Mexico. He says the facility is kind of sparse. There is a two-story office building, a small visitor center, a HUGE telescope maintenance shed, and about a dozen small maintenance buildings. And of course, hundreds of antennas of all sizes. All the science takes place at the Albuquerque control center.

After driving past a dozen signs telling, you to turn off ALL radios including your cell phones, you get to the visitor center where you register using a WIRELESS terminal. Go figure. The visitor center has two films running, one science based, and one historical. Movie posters of all the films shot there, a few glass encased exhibits, rest rooms, and a pretty FANTASTIC gift shop. Everything there is self-guided, we saw no employees other than a couple of people in the gift shop. Outside you can explore the mile and a half self-guided walking tour.

The tour starts with a solar telescope which you get to play with. Then a bit of history followed by a huge Sundial. Next, we went off to the [Long Wavelength Array](#) the newest set of antennas that are fixed but number in the hundreds working on a new frequency. These are only about five feet high, and you can touch a sample one.



After bunch of science stops and we got within 100 feet from one of the giant 82-foot-wide radio dishes.

(*Wide enough to park two school buses end to end !*) Each of the 27 radio telescopes weigh 230 tons and stand 94 ft high when pointed directly up.

Moving on we came to the rail system used to move these monster antennas. They can move an antenna in about 4 hours. Although the system is in a Y configuration measuring 13 miles, by 13 miles, by 11 miles they move all the antennas every 3 months or so. There are three standard configurations used depending on what they are looking at.

(Just for a matter of reference of the size of the fully deployed array, when spread into their longest configuration. The north leg would be in Owasso, west leg in Sapulpa and east leg in Broken Arrow.)

There are couple of the Next Gen Very Large Array Antennas set up. These antennas do not move but they are located worldwide and all link back to here. They will become part of the next generation Very Large Array ([ngVLA](#)) with 244, 59-foot (18-meter) dishes spread over 5,505 miles (8,860 km). An additional 19 twenty foot (6m) dishes will make up a short-spacing array at the heart of the telescope

Richard adds that they were there for about 3 ½ hours, took about 200 photos, spent WAY too much at the gift shop, and saw several deer in the area.



For more see the [July 2026 VLA Newsletter and Podcast](#)

How to Discover a Satellite Orbiting an Asteroid

By Skip Whitehurst and Don Sailing

In astronomy, when a celestial body passes directly between a more distant body and an observer, the observer experiences what is called an occultation of the distant body. If a minor planet occults a star, highly accurate information about the position, size, and other characteristics of the minor planet can be determined from earth with relatively modest equipment if precise times of the disappearance and reappearance of the star can be determined.

On the night of February 9, 2026, Don Sailing and Skip Whitehurst set up equipment to record the occultation of a magnitude 9 star (very bright for this sort of thing) by minor planet #40724, a.k.a. 1999 SY8, from four locations north of Tulsa, spread across the predicted path of the shadow. 1999 SY8 is a nondescript 4 to 5-km size asteroid. This particular event was especially attractive because the star was so bright, it was early (around 10 PM local time), and a relatively short travel distance.

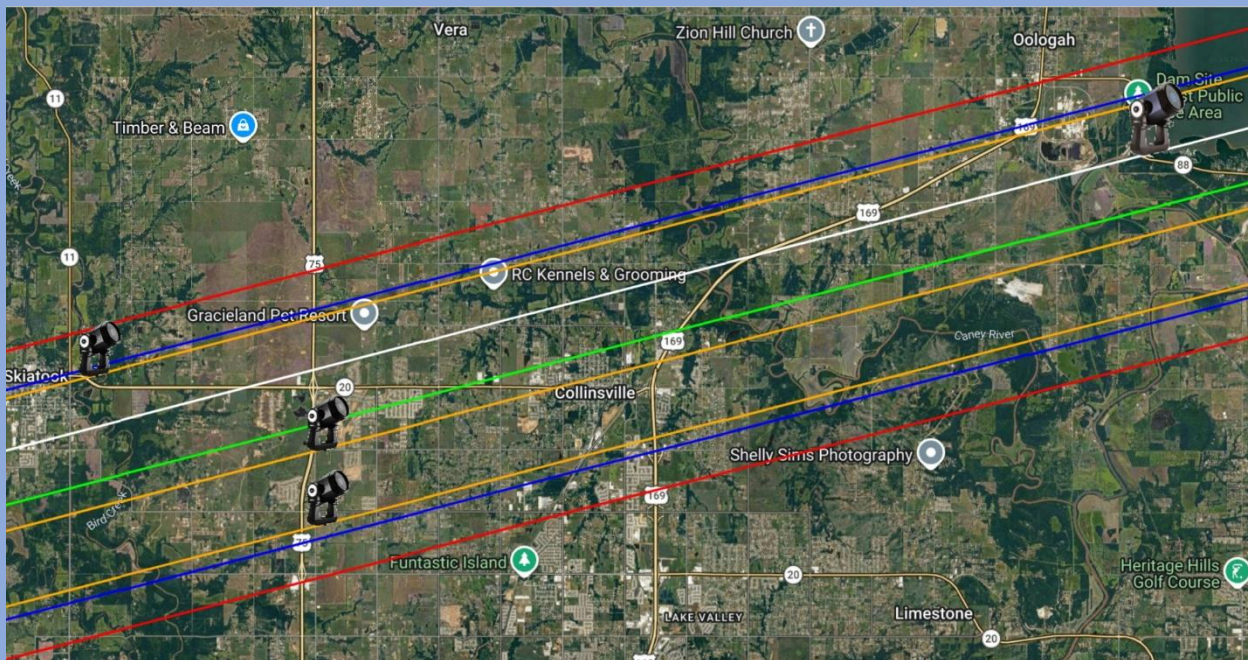


Figure 1: Shadow path and station locations north of Tulsa, OK

Figure 1 shows the path where the occultation was predicted to be visible along with the locations of the four stations and their chords. The green line is the center and blue lines mark the edges of the predicted shadow path. Red lines mark the edges of the one sigma zone (there is 95% probability that the event will occur between the red lines – at least in theory). A chord is the line between the points where the star disappears behind the outline of the occulting body and where it reappears – the missing line segments in Figure 2 (yellow line segments in Figure 3) are examples of chords. In Figure 1, the lines on the map representing all the places that should observe the same chord are also referred to as chords. The three telescope icons on the left represent Skip's three stations, and the orange lines are these stations' chords. The icon at upper right is Don's station and the white line is its chord. The shadow was moving from east to west (right to left on the map).

These locations were selected because they were good places to set up and they span almost the entire predicted width of the shadow. If the predicted path were exactly right, all four stations would record a different chord where the star passed behind the object, providing valuable information about its size and shape. If the prediction was somewhat off (a common occurrence), this arrangement improves the odds

that at least one of our stations will be in the actual path, record an occultation, and provide information which can be used to improve knowledge of the minor planet's orbit.

Equipment for occultation timing typically consists of a telescope, sensitive video camera, an accurate timing source, and a recording device. The gold standard for timing is based on GPS time that has been validated to be accurate to the millisecond or better. The goal is to record a sequence of images at a uniform cadence in a way that the time of exposure for each image can be accurately determined. All four of our stations recorded using Astrid cameras. These are purpose designed for occultation recording; they include a Sony IMX sensor, GPS receiver, and Raspberry Pi computer. The self-contained system records accurately time-stamped video data to a high-performance USB drive. Other systems for recording time-stamped data are also commonly used, but Astrids provide a convenient self-contained unit and several aids that make planning and set up easier.

Depending on the brightness of the target star, and because image quality is not of paramount importance, small, inexpensive telescopes will often suffice. Since short exposure videos usually lasting no more than a few minutes are collected, even inexpensive telescopes and inexpensive non-tracking mounts can be used.

Preliminary Results

As it happened, three of our four stations recorded positives – occultations were observed. Chord #5, the southernmost chord was a miss – no occultation. The brightness drop at chord #4, the chord just south of the predicted center line, was much shorter and not as deep as seen in chords #1 and #2, the two chords further north (see Figure 4). Based on this, it appeared that the actual shadow path location was north of the predicted path, and we naively presumed that the short occultation was near the southern edge of the asteroid. Don and I processed our data, filled out reports which include detailed disappearance and reappearance times, exact locations, and other data, and then submitted them for review and consolidation into an integrated astrometric analysis. This analysis is typically reviewed once more and prepared for submission to professional organizations for inclusion in their astrometric data sets and used for various purposes like validating or improving orbit calculations for the asteroid.

At this point, both of us thought our involvement with this particular observation was over.

We were wrong ! !

After Review

A few weeks after submitting our reports we received an email from the regional reviewer who was analyzing and consolidating the data from this event, saying he believed the southernmost positive was most likely due to a previously unknown satellite orbiting 1999 SY8, not the main body itself. In review, the light curves (target star brightness as a function of time) are corrected to compensate for their different positions along the direction of motion – Don's times at Oologah Dam were expected to be earlier than Skip's times further west. After adjusting for the expected time difference, the two northern chords aligned well. The short event on the third chord, however, after correction was about 0.7 seconds later than it "should" be if it were the same body – that's a lot. After confirming details and processing the data again from the original video data (which is not normally done for more routine observations), the data set was sent to the subject matter experts who do the formal reporting of observations to professional agencies, but flagged for further analysis.

The second review checked for confounding factors such as the star being an unknown double and other problems. After review, a small satellite orbiting the main body remained the most plausible explanation for the anomalous chord #4 light curve.

This analysis was followed by detailed photometric interpretation of the light curve characteristics, including comparison of the magnitude of the dimming compared with nearby dimmer stars with known magnitudes. Because light will be diffracted when it encounters an obstruction with a hard edge, theoretically the distant star should momentarily brighten slightly when it's barely beyond the obstructing body (the white “halos” around the of the bodies in Figure 3), and some of its light will be diffracted into the region where otherwise none of its light would reach. The fact that the event in the light curve for chord #4 bottoms out well above zero (Figure 4, third panel down), unlike chords #1 and #2 (Figure 4, top two panels) which went much further from the edges of the larger and likely better-centered body (Figure 2 and Figure 3), suggests that this chord is never very far from the edge of the occulting body.

In Conclusion

On May 30, 2026, the CBAT (Central Bureau for Astronomical Telegrams [of the IAU]) issued CBET #5697 (Central Bureau Electronic Telegrams) officially announcing the discovery to the astronomical community.

Interestingly, the location planned for chord #4, the one that detected the satellite, was originally planned to be a few hundred meters further north, almost exactly on the predicted center line. It was moved at the last minute because the location initially selected was found to be unsuitable when visited on the ground, so it was moved to the south to also give more separation between it and Don's chord. If the station had been set up in the intended location instead of where it actually was, the occultation by the unexpected small moon may have been missed entirely – or it may have been closer to the center of the moon. With a single chord observation, it is not possible to tell for sure.

How to discover a satellite orbiting an asteroid?

1. Get out and collect data.
2. Be lucky in your selection of target and the location you pick!

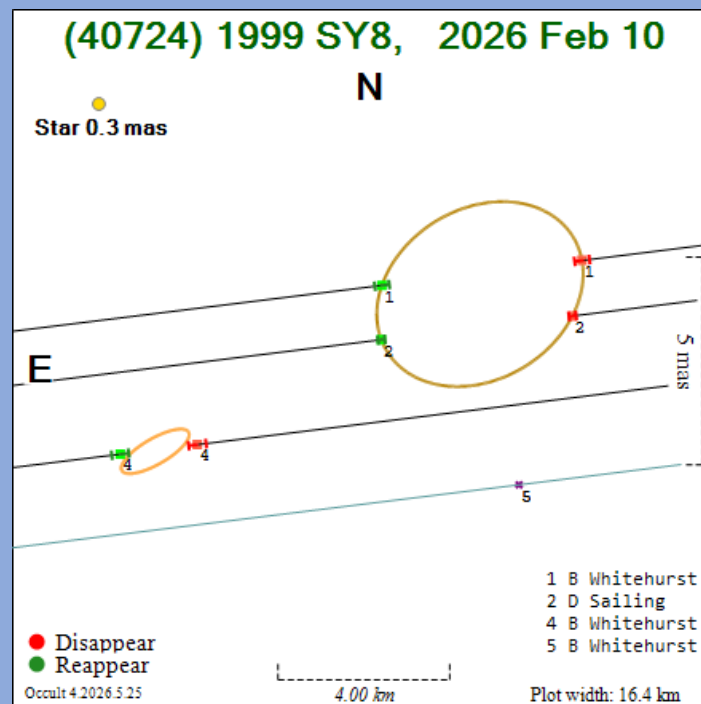


Figure 2: Sky-Plane Projection identifying the four chords and a possibility for the size and location of the satellite

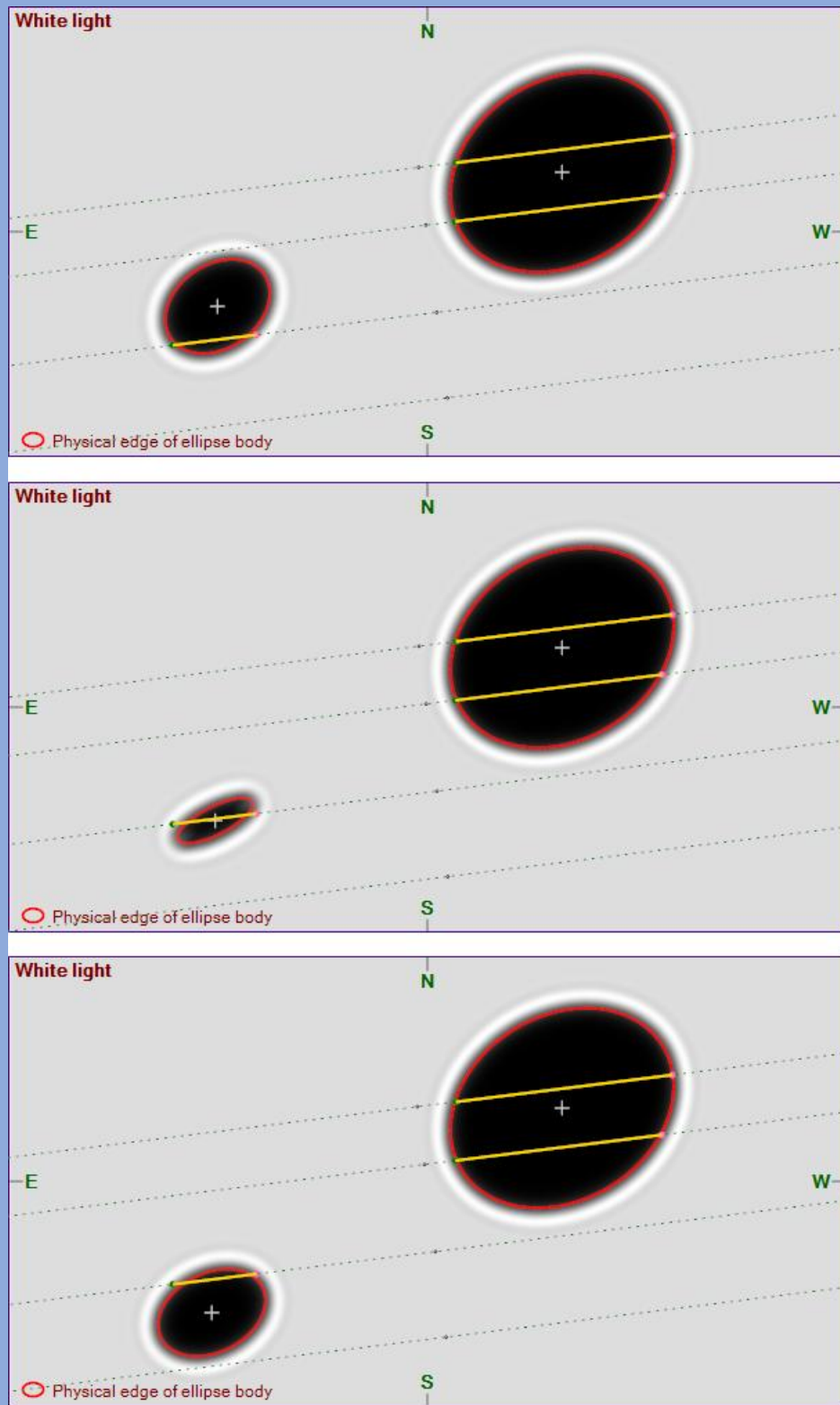


Figure 3: Interpreted size and location extremes for the satellite consistent with Fresnel (diffraction) models. Its maximum size is constrained by the lack of an occultation by it on the two surrounding chords, and Fresnel modeling suggests that the chord that does detect it is not far from the edge .

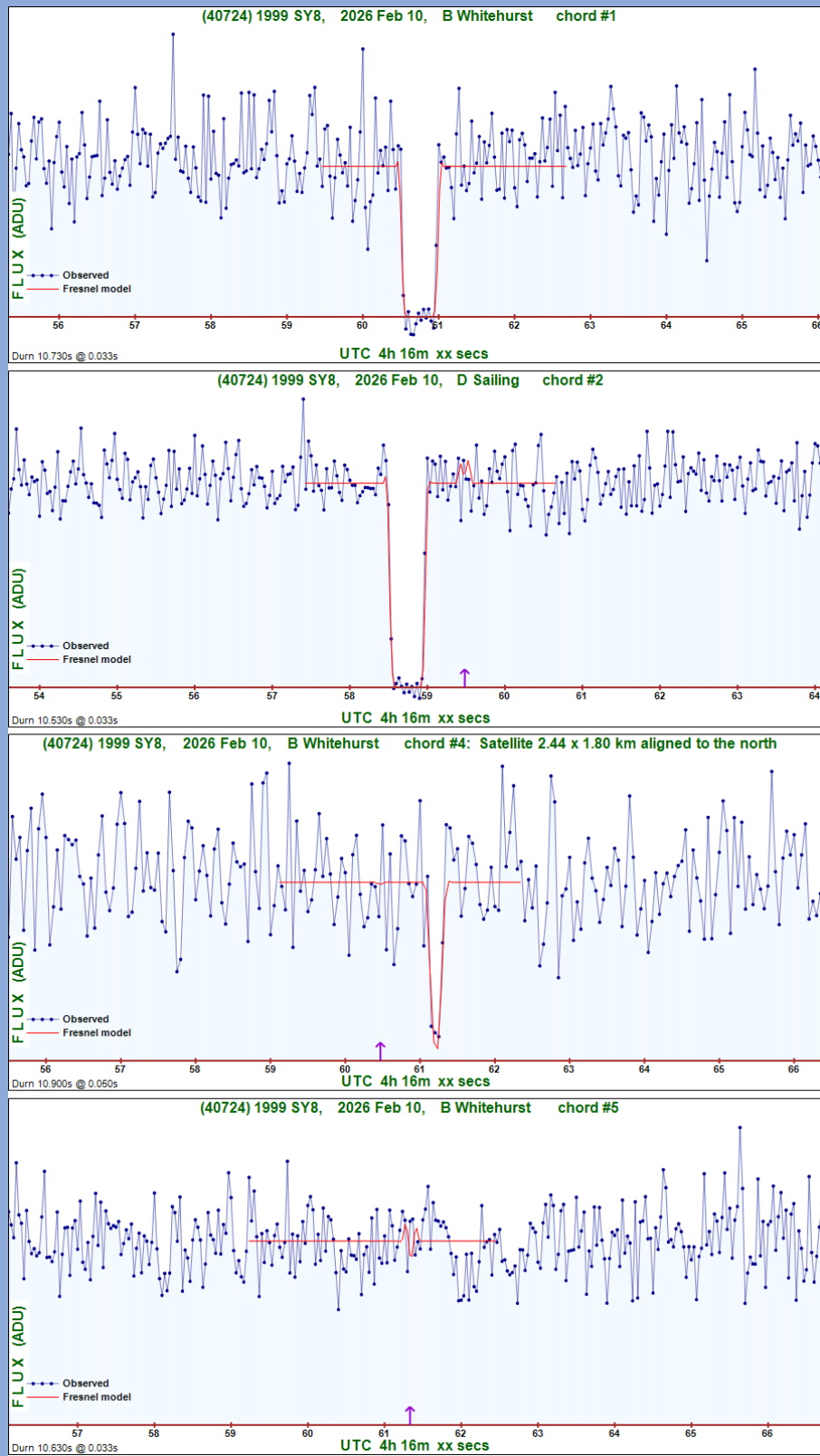


Figure 4: Light Curves. Red line is predicted brightness based on Fresnel diffraction analysis. Purple arrows (bottom of three panels) are the time the adjacent body is nearest the chord.

More about Asteroid Occultation Timings

By John Land with input from John Moore & Skip Whitehurst

As you can see from Skip and Don's article, amateur astronomers can contribute valuable scientific data by participating in asteroid occultation timings. These timings help to refine the asteroid orbits and are the best and usually the only way to determine the size and likely shape of these small solar system bodies.

Member John Moore contributed this image of the small portable field refractors that can easily be set up and spaced out across the predicted occultation path. These are 80mm f/5 (f/2.5 when using a 0.5x focal reducer). The mounts are made from basic 2020 extruded aluminum and T-slot hardware with some 3D printed parts. They are highly portable and very quick to deploy. These small scopes are normally used for brighter occultation events. Your personal observation telescope can also be paired with a recording camera set up.



Pictured is one of the ASTRID video and timing cameras. They make it easier to set up several telescopes spaced out over several miles across the predicted occultation path. The camera has a Raspberry Pi microcomputer that looks at the star field and plate solves the star pattern to direct you to the target star field.

Scopes can be set up and even left unattended before the occultation actually takes place by pointing at the spot in the sky where the occultation will take place. That spot has the same declination as the target star but is ahead of the target star in RA. As the earth rotates it will bring the target star into the field of view. There is free software available to help with this, and ASTRID has this assistance built in. By setting a timer to automatically start video recording before the event they can catch the event. Afterwards the videos are used to do the measuring and data reduction needed to determine light drop as the asteroid passes in front of the star.



The International Occultation Timing Association has extensive resources for people interested in becoming involved. <https://occultations.org/>
Find a [Printable Observing Here](#)

Asteroid occultations can be observed visually as well. IOTA publishes occultation predictions of a specific star and the path in which it is likely to occur. By pointing your telescope at the target star, the observer simply has to wait until the star dims briefly when the asteroid passes in front of the star. In the days before GPS and digital timings, we would use an audible tape recorder, a stopwatch and a shortwave radio time signal to get rough measurements of the occultations.

Breaking News – Stay Tuned for a September Asteroid Occultation Right over TULSA !!

Those of us with less sophisticated equipment can enjoy visual occultations when the moon passes in front of a planet or bright star. Our March 2026 newsletter has images of the moon skimming past Mercury. On the afternoon of Sept. 8th, the Tulsa area will be able to watch a thin waning crescent moon pass in front of Jupiter.

If you want to learn more and perhaps participate in one of these occultation timing adventures, contact our local club members.

Skip Whitehurst - skip.whitehurst@gmail.com or John Moore - john@jmooreou.com

Observing Chairman Brad Young



A Turning Point in Amateur Astronomy

"It was the best of times." A Tale of Two Cities, Charles Dickens - I choose to end quote there.

I often talk about some of the problems that affect our hobby. And they are legions. However, there are quite a few things going on that are very positive and I'd like to focus on those instead in this article. Although I have been involved in amateur astronomy for 46 years, I have not seen a resurgence quite like this latest one in interest since perhaps the beginning of the Shuttle days.

I think there are three drivers here:

- The ascension of private space activity, good or bad, by private companies and the effect that it has on people who are starting their interest in the hobby. They are perhaps not worried about some of the issues that the use of space brings up, and they see the overall results as affecting their general future positively.
- The other is the return to the Moon. Although this has been decried as just another big waste of time and money, it must be done for us to have any chance to move on to Mars or perform any other space exploration with humans involved.
- The James Webb Space Telescope. Continuation of space telescope programs that are showing wonderful new images of the universe to the public and exploring it in ways we only dreamed of being possible a few years ago. There is a Hubblesque effect that is also bringing more people to the hobby.

"They're closin' down the textile mill 'cross the railroad tracks

These jobs are goin' boys, and they ain't comin' back", My Hometown by Bruce Springsteen

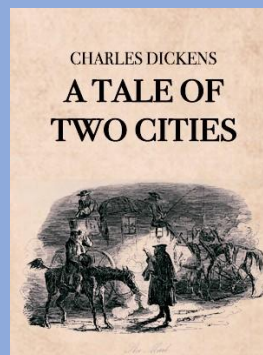
Because of recent shutdowns of Meade and Orion, many people have assumed that visual astronomy is dead. I'm not quite ready to write it off at this point, although it has become more difficult as cities expand and dark skies disappear. But it is still out there if you want to go and get it. With the new technologies such as Seestars that allow people just starting in the hobby to effectively have both a visual experience and begin imaging even if they live in the city, I think we should not write off the hobby quite yet. Just because certain vendors that we were used to are no longer involved in providing the equipment does not mean that the market will not be filled if it exists.



There are a lot of issues with some of my favorite things to observe such as satellites. Recently, satellite observing experienced its own version of Y2K when we finally exceeded the catalog number 9999 which had been expected to never be met or used whenever the software for tracking satellites was developed. Obviously, there will be new software written and modifications made to suit this also. But with so many satellites up there it's almost a situation now where instead of trying to find a satellite, you're trying to distinguish the one you're looking for from the crowd that surrounds it. However, you can still see plenty of satellites and there are still many bright ones such as the ISS and the Chinese space station that don't require any optical aid.

All In all, there is much to be hopeful for in amateur astronomy, but we must keep our eye on the ball. Those of us who are involved in astronomy clubs must meet the people where they're at and meet them with the expectations they have. No one is going to be going out to the middle of nowhere and trying out a telescope for the first time without some guidance. As a teen, I would go to the lock and dam, the state forest or anywhere and feel safe. In this society, such things are considered unsafe or at least unwise. Instead, we should use our knowledge and the new types of equipment available to meet people in the suburbs and even in the city. Yes, as a child, I went to our club and we observed from 51st and Lewis and it was just fine. It was dark enough, and anyone in Tulsa could get there easily. Our current observatory is 45 minutes from downtown and growing more light polluted. We can pine for the old days or make new ones.

My club has recently been doing outreach both at our site and relatively dark skies and at city parks and even some downtown locations where there are many more people available to show the night sky to. If we can think outside the box and develop new ways to invite people to join our hobby, it will be just fine. The old saying of adapt or die is quite relevant here and I have a good feeling that we're going to be able to do it. Let's make the turning point everyone discusses in a turning point that elevates interest in the universe.



"It is a far, far better thing that I do, than I have ever done;" – Dickens – again I'll stop him here. This line reminds me of when you show a child the moon or Saturn the first time.

Chasing Space Rocks by John Land

You can expand knowledge of our solar system while developing new observation skills by searching out the brighter asteroids. Since asteroids appear as starlike points of light instead of diffuse regions, they can be observed from urban or suburban skies. Explore the Astronomical League's Asteroid Observing Certificates <https://www.astroleague.org/asteroid-observing-program/> You can locate and track the motions of smaller distant members of our solar system using fairly simple equipment.

The asteroids 3 Juno and 8 Flora are near opposition now and bright enough to be seen in small to moderate telescopes. (Juno was discovered in 1804 by German astronomer Karl Ludwig Harding using only a 2 inch (50mm) telescope)

3 Juno is in the constellation of Aquila and reached opposition at mag 9.2 on July 26.

8 Flora is in the constellation of Sagittarius and reached opposition at mag 9.4 on July 9.

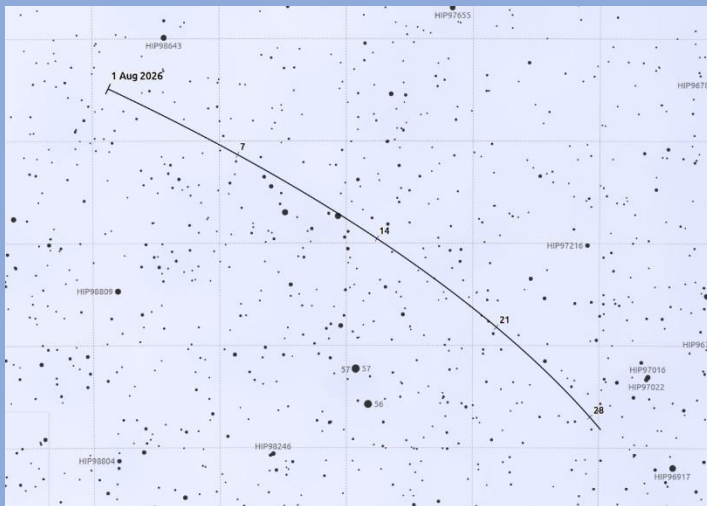
Most phone or computer apps will let you search for the asteroid and show its position in the sky. The online free planetarium <https://stellarium-web.org/> will let you search for an object and zoom in on its location in the sky. At the bottom of the display Click to turn on the constellation lines and equatorial grid. Click off all the others. - adjust the time in far-right corner. Only type the name **Juno** not 3 Juno



The website <https://in-the-sky.org/> will generate printable star charts show the objects position for a whole month. You have to play around with it a bit to get the kind of chart that is useful to you.



3 Juno <https://in-the-sky.org/findercharts.php?obj=A8&duration=5>



This is a Juno finder chart for August 2026.
Using the link above You can print it larger.

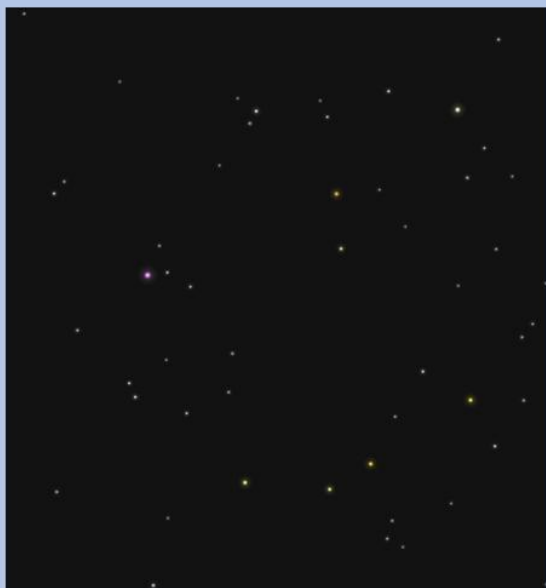
For Best Success USE A LOW POWER EYEPIECE. Once you have located the general star field where the object should be, compare what you see to the star chart. Make a careful sketch of all the stars you see in your field of view. Come back to the same star field location a day or two later. Try to match what you see to the sketch you made earlier. Then draw the stars in the field again. **The one that changed position will be your asteroid !!!**

More Asteroid Data sites

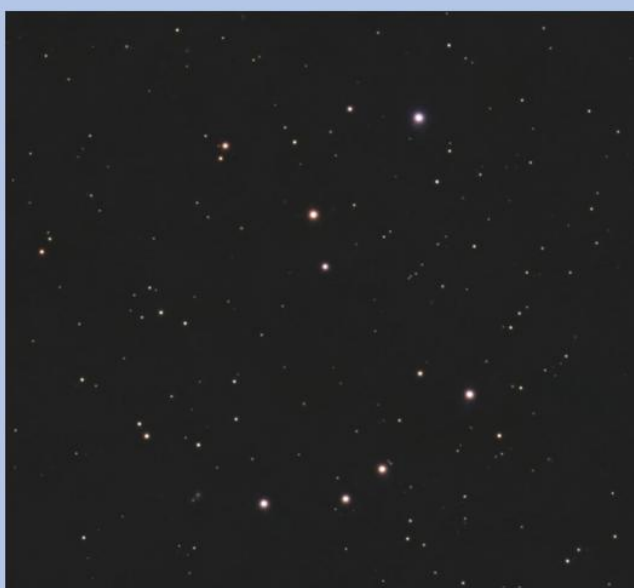
<https://astro.vanbuitenen.nl/asteroids>

<https://minplanobs.org/MPInfo/>

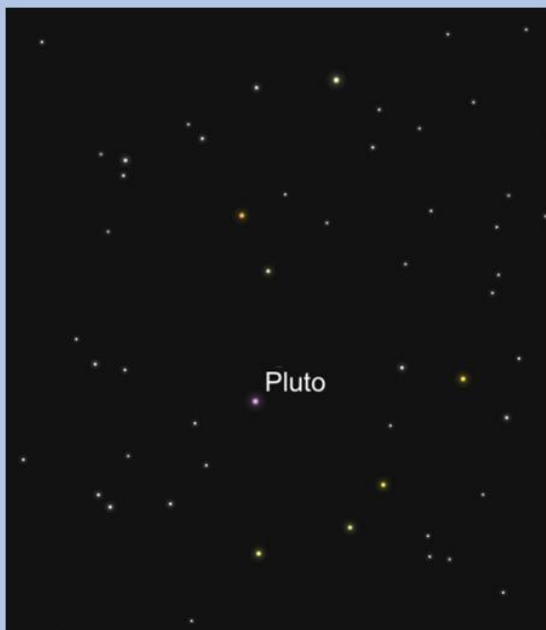
Imaging Pluto from my backyard. For me the **ultimate “Space Rock” to find is Pluto.** I’ve actually seen it visibly once standing near the top of a tall rickety ladder looking into the observatory’s original giant 16” f 6 reflecting telescope. That was back in the mid 1990’s. Pluto had reached its 29.8 AU perihelion point in August of 1989, so it was a 0.5 mag brighter than it is now. A couple of years ago I discovered that I can actually image the location of Pluto using my Seestar S50 telescope. By letting it accumulate and stack about 15 minutes of short 10 sec exposures it can reach stars dimmer than 15th magnitude. Likely other telescopic camera systems that can image and stack multiple images could do the same thing.



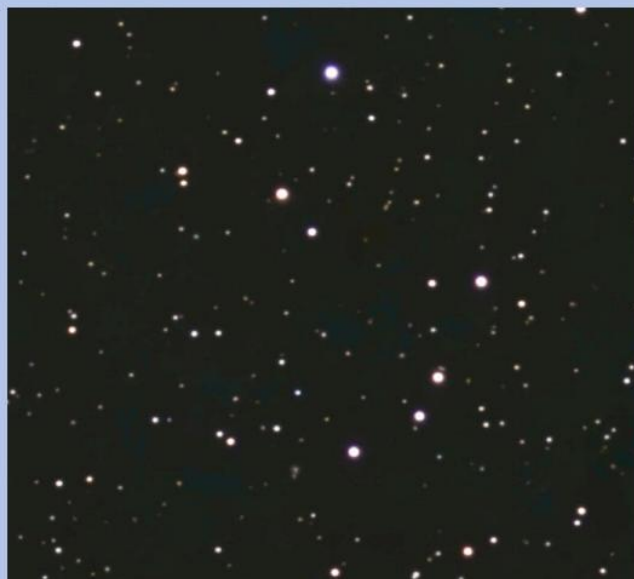
July 13, 2026,
Sky Safari location (colored dot)



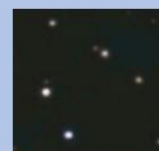
Seestar Pluto image 3:00 AM
13-minute Seestar stacked image



July 17, 2026,
Sky Safari location
It moved 5.5 arc mins to right



Seestar Pluto image 1:30 AM
22-minute Seestar image
Top corner of small parallelogram >
Just a bit below center of image
Note the 15.9mag star beside Pluto



Pluto reached opposition this year on July 27th at a distance of 34.55 AU at +14.45 magnitude. This next month or so is a good time to try image it yourself. Pluto is currently in the constellation of Capricornus. You'll have to choose a couple of nights when the moon is not in that part of the sky. You will need to image the same part of the sky 2 to 5 days apart. Then compare the images to see how far Pluto has moved. I live about 5 miles east of Bass Pro in moderately bright suburban sky. On the nights I took the images above the dimmest stars I could see visually were about 3.6 mag. The 3:00 AM sky of July 13 was really poor with high humidity.

If you are using a Seestar, first focus you scope sharply on some stars in Capricorn and let it do all the Autofocus, Horizontal calibration, and Image Enhancing automatic routines it does when it first starts imaging. Then go to the "Sky Atlas" section not solar system. Search for Pluto and let it go there to begin imaging. I used 10 sec exposures and had it save all of them. I had looked up Pluto's position on my Sky Safari phone app. So once the image was showing enough stars I could see if it was imaging the correct field. Near the end of the exposure time I had it go through is "DeNoise" routine and I usually increase the contrast to about 15 for a darker background and crop it a bit. You can download that image and it will also save the original as well when you stop the image run. To be sure which one of the many dim stars is Pluto you'll need to image the same area again in 2 to 5 days. Enough to see its motion but not for it to move out of the same star field. The width of view in a Seestar S50 is 0.7 degrees (42 arc mins) In the images I made Pluto had moved 5.5 arcmins from July 13 to 17

Learn More about Pluto? The "planet" [discovered by a Clyde Tombaugh](#), an astronomy loving Kansas farm boy with the determination to explore the night sky.

On June 23, 2026, the [New Horizon Spacecraft](#) which flew by Pluto in 2015, awoke from its 321-day long hibernation period that began August 7, 2025. All systems reported back in "good health" and it will resume unprecedented science at the edge of the solar system. These planned hibernation periods allow the craft to conserve energy resources to continue its mission probing the outer regions of our solar system. The New Horizons spacecraft was launched Jan 19, 2006. (Our fastest ever launch taking only 9 hours to reach the moon's distance) Even so still took 9.5 years for it to reach Pluto on July, 14, 2015. The [stunning Pluto images](#) returned revealed a frozen world of ices, with 11,000-foot-high mountains and a frozen nitrogen "sea" larger than Texas. It also discovered five moons and a multi-layer thin atmosphere. After its Pluto encounter New Horizon's flew deeper into the Kuiper Belt where it encountered the distant [double-lobed object Arrokoth](#) on January 1, 2019. As of July 2026, New Horizons is approximately 64.21 AU (5.97 billion miles) from Earth. Follow its flight path as it [continues to travel deeper](#) into the Kuiper Belt.

In July 2025, extensive cuts in [NASA's budget threatened to shut down](#) New Horizon as well as other active deep space missions. It was only saved by the concerted efforts of both professional and amateur astronomers to contact their representatives pointing out the great scientific potential of continuing these irreplaceable decade-long mission.

In 2012, the Voyager I spacecraft, launched in Sept 1997, finally [passed through the Sun's Heliopause](#), the extreme outer edge of the sun's influence, where solar wind collides with the interstellar medium. It is now 15.852 billion miles from Earth traveling at over 37,000 miles per hour. See live [Voyager I distance calculator](#) On November 18, 2026, Voyager I will be **ONE LIGHT DAY** distance from Earth. Its infinitesimally weak radio signal traveling at the incredibly fast speed of light will take 24 hours to reach Earth! Missions like Voyagers 1 & 2 and New Horizons are still actively returning data about the far regions surrounding our solar system. It has taken nearly 50 years for Voyager I to reach these distance regions. Cutting funding now just to meet some politically popular whim would take a whole lifetime again to reach the regions they are currently exploring.

Treasurer Report

Cathy Grounds



As of July 25, 2026, we have **162** members with **34** new members this year.
Please welcome our newest members, Patricia Hickey and Alisha Bratt

Since our July newsletter **51** people have sent email contacts via our website about club events, meetings or other topics.

FAQ: How do I know when to pay my dues? You will receive a notice by email when it is time to renew your membership. Look for it on or around the 1st of the month in which your membership expires. If you are not sure just check with the treasurer.

Don't forget these easy methods to Join or Renew your membership:

<https://www.astrotulsa.com/join> – see the “join” tab at the upper right

1. PayPal (click “join/renew” on the website) and follow the prompts, there is small fee.
2. Mail in a check or money order to
Astronomy Club of Tulsa, PO Box 470611, Tulsa, OK 74147.
3. Direct your bank's bill pay service to send payment to our PO Box address above.
4. Pay cash at any club event or swipe a credit card (there is roughly a 3% service charge).

As always if you have any questions or concerns or if your email, phone, or mailing address has changed please email me at: AstroTulsa.Tres@gmail.com

Membership rates for 2025-2026 are as follows: All include an Astronomical League Membership and you will receive their magazine *The Reflector* each quarter.

Adults: **\$50 per year**

Sr Adult: **\$40 per year** (65 or older).

Students: **\$40 per year**

Additional Family membership: **\$30 including voting rights.**

The regular membership allows all members in the family to participate in club events but only ONE Voting Membership and one Astronomical League membership.

Magazine Subscriptions- You can see subscription info on the “Join” tab at www.astrotulsa.com.

You can get a discount rate as an Astronomy Club member.

However, you will need to do so directly using their discount rate web links.

Both have options for DIGITAL as well as PRINT subscriptions.

To learn about [Sky and Telescope magazine](#) see their home page

Digital \$ 37.05 Print & Digital \$ 45.75 includes a \$ 10 club discount

Use this [Sky & Telescope Subscription Link](#)

To learn about [Astronomy magazine](#) see their home page

Use this [Astronomy Subscription Link](#) Digital \$ 39.95 Print & Digital \$ 49.95 no club discount

You are invited to join us to learn more about Astronomy and view the wonderful sights in the night sky.

Check the EVENTS section at <https://www.astrotulsa.com/>



ASTRONOMY CLUB OBSERVATORY

Located on a hilltop about 25 miles SW of Tulsa

Features: classroom, restroom, dome with 14-inch telescope and an acre to set up your telescopes.

Weather permitting, we host two types of observing nights.

GUEST OBSERVING NIGHT – RSVP requested

This event is open to our Guests – both individuals and families as well as our regular members. Several of our club members set up telescopes for public viewing.

* Groups need to make separate arrangements.

MEMBERS OBSERVING NIGHT usually on a Friday near new moon

Reserved for club members and their families to allow them to pursue observing projects.

The Observatory is ONLY OPEN for SCHEDULED EVENTS.

Check the EVENTS section at <https://www.astrotulsa.com/>

Follow our map directions DO NOT USE GPS

Two Options for travel to the observatory

MOSTLY PAVED ROADS – Hwy 75 to 201st St S – through Mounds OK

Most **DIRECT ROUTE** – Hwy 75 to 241st St S – some coarse gravel & dirt roads



Our Friday evening in town club meetings will resume this Fall.

Meetings are free and open to both members and guests.

Specific Dates will be announced later

We will be meeting at the Tulsa Air & Space Museum Planetarium

Located at [3624 N 74th East Ave, Tulsa, OK 74115](#)

Just south across the road from the Tulsa Zoo entrance

The [Tulsa Air & Space Museum](#) hosts many indoor and outdoor exhibits and events commemorating Tulsa's rich history in Air and Space.

Check out the schedule of stunning full dome shows at the James E. Bertelsmeyer Planetarium. Use this link for [Show Times and Tickets](#)

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astrotulsa.tres@gmail.com

Use the club [CONTACT PAGE](#)
To Send a Message to any of the
officers or board members
or click the CONTACT tab
on the top of our website

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SCOTT BRATT
JERRY CASSITY
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COMMUNITY OUTREACH –
TIM GILLILAND & DON BRADFORD

NIGHT SKY NETWORK – SCOTT BRATT



Scott Bratt loved this T-Shirt logo

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