

ASTRONOMY CLUB



OF TULSA

OBSERVER

July 2023

Bringing Stars to the eyes of Tulsa

since 1937 Editor – John Land



Our Tulsa club hosted the 2023 MidStates Astronomy Conference June 9, 10, 11 at the Jenks High School Science building.

79 Participants represented 11 different astronomy clubs from 7 states along with a few individuals not associated with a club.

On Friday we enjoyed a BBQ supper and guest speaker. During the daytime Saturday and Sunday morning we enjoyed a variety of interesting presentations, and two planetarium shows.

Saturday evenings banquet featured our Keynote Speaker, Daniel Kennefick, telling about the historical development of Einstein's ideas and the newly emerging window to the universe revealed by Gravitational Waves

See larger resolution images of the Group photo

[840 K version of above group](#)

[3.8 meg reduction of original photo](#)

For more details on our 2023 conference see <https://www.msral2023.org/>

The 2024 MidStates Conference will be in Omaha, NE June 7-9 <https://msral2024.org/>

Thank you to Jack Reeder for these photos

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Astronomy Club Events Check our website AstroTulsa.com events section for updates

Observatory Stargazing Nights

Two types of Observatory nights. During the Summer Months they are scheduled on a Friday. If weather is poor on Friday, we will try again on Saturday if the weather improves.

Our GUESTS & Members nights are open to anyone. We do ask guests to try to RSVP. Large groups need to make separate arrangements.

Members Only Nights are Open to members and their family
Details, Times and Direction Maps are posted on our Website

<https://www.astrotulsa.com/events>

Observatory Stargazing Nights

Friday July 7 8:15 PM **Guest and Members Night** –
Guest requested to RSVP - Gates Open near sunset

Friday July 14 8:15 PM **Members Only night** * Gate opens after sunset
Open to members and their immediate family

Friday August 11 7:45 PM **Guest and Members Night** –
Guest requested to RSVP - Gates Open near sunset

The Night of Aug 11 -12 is the peak of the Perseid Meteor shower
Plans will be forthcoming to begin a Meteor Watch Party at 11:00 PM

Friday August 18 7:30 PM **Members Only night** * Gate opens after sunset
Open to members and their immediate family



OKIE-TEX is Early This Year !!

<http://www.okie-tex.com>

Get your registrations in by Aug 19

Meals must be prepaid by Aug 25 !!

Nearest café is 34 miles away !!

Each fall amateur astronomers from all over the country gather in the western Oklahoma Panhandle to enjoy a weeklong "Star Feast" under some the darkest Bortle 1 sky on the planet. It's a memory you will cherish for a lifetime and yearn to go again.

National Astronomical Conference July 26 – 29 in Baton Rouge, LA
Registration is now open at <https://alcon2023.org/>



BIENVENUE EN LOUISIANE! (WELCOME TO LOUISIANA!)
Join us for this unique and exciting amateur astronomy gathering!

ALCON 2023

July 26–29, 2023
Hilton Baton Rouge
Capitol Center Hotel
201 Lafayette Street
Baton Rouge, LA 70801

KEYNOTE SPEAKERS
★ David Eicher—writer, editor-in-chief of *Astronomy Magazine*
★ Fred Espenak—co-author of *Totality: The Great American Eclipses of 2017 and 2024*
★ David Levy—author, comet hunter

FIELD TRIPS
★ Irene Pennington Planetarium
★ LIGO (Laser Interferometer Gravitational-Wave Observatory) Livingston*
★ Louisiana State University Physics & Astronomy
★ Highland Road Park Observatory
*Spaces are limited for this trip!

SPEAKERS ★ Pranvera Hyseni ★ Guy Consolmagno ★ Dan Davis ★ And many more!

Brought to Baton Rouge by the **Baton Rouge Astronomical Society**

★★ Registration is now open! Check alcon2023.org ★★



Now that our club has succeeded in hosting a very productive Astronomy Conference, we can return to pursuing our passion for observing or imaging the wonders of the night sky.

The summer skies are a most enjoyable time for observing. The board band of our Milky Way galaxy arches overhead. Along this river of stars lie many interesting sights. Tightly packed bundles of stars called globular clusters, a plethora of glowing nebular clouds of gas, dark lanes of dust that obscure the background of stars, interspersed with interesting star combinations.

This summer the waning crescent phases of the moon is a favorable year for the August Perseid meteor shower. The Oct 14 solar eclipse is on a Saturday giving our club an excellent for public outreach. I hoping several of you will volunteer to come help us greet the public and encourage their interest in astronomy. We also need more volunteers to help out on our observatory nights, opening or closing up, bringing your telescopes for the public. Don Bradford would also welcome volunteers to help in the dome and learn the operation of the telescope and dome system.

Lastly, each October we elect new officers and board members. I would encourage those of you that have been in the club more than a year to consider becoming more involved in the club. Especially our younger members who can bring fresh new ideas and skills to move our club forward **We desperately need one or two social media savy volunteers to take over our Public FaceBook page.** Make regular posting of club events and interesting sky events, astronomy news

Let us continue our 85+ years of
"Bringing Stars to the Eyes of Tulsa since 1937"

John Land - President

Collection of Club Zoom Recordings since Dec 2020 at Jenks Planetarium

<https://www.youtube.com/playlist?list=PLN2wFsTxKXjf6YIUJwBBq4UXsvwY3eV5>

Our MSRAL Planning Team volunteers

A special **Thank You** is in order to our Team volunteers who put in countless hours since November 2022 developing plans to make our conference a success. Meetings, Developing a Schedule, Contacting caterers for the various meal times, Banquet planning, Procuring Guest Speakers - Sponsors and door prizes, Creating a Website, Managing the registration and money, Getting the Observatory Ready and much more.



L-R Robert Davenport, Krystal Reyes, Cathy Grounds, Dan Zielinski – Planetarium Director
John Land – Chair, Brad Young, Jack Reeder, Don Bradford – Vice Chair, Mike Blaylock



Bob Brown, Byron Labadie, Jack Reeder, John Moore, Dana Swift



Congratulations to our Observing Chair,
Brad Young on being chosen as
MidStates Astronomer of the Year
along with Jon Larsen of the Omaha Club

Brad has completed almost all of the League Observing certificates and written two of his own. Writes interesting articles for our newsletter and shares with other clubs. He is currently embarked on observing ALL of the more than 7,000 objects in the NGC catalogue.



Click on these images to links on the Internet



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

Getting Started with Your New Telescope

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

Astronomy for Beginners | Night Sky Facts, FAQs & Resources

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

What to Know Before Buying a Telescope

[kyandtelescope.org/astromy-news/what-to-know-before-buying-a-telescope/](https://skyandtelescope.org/astromy-news/what-to-know-before-buying-a-telescope/)

See [Website Observation Station](#) for a collection of [Interactive Sky Watching Tools](#)

Moon phases - Sun rise & Set - [Make your own custom interactive sky chart](#) and more

Great website for printable Finder Charts of Solar System objects <https://in-the-sky.org/>

JULY - Moon Phases - - Full July 3 - - 3rd Q July 9 - - New July 17 - - 1st Q July 25

July opens with the First of Four “Supermoons” in a row. When the Full Moon occurs close to the time that the moon is closest to the Earth (Perigee) it appears a bit large and this a bit brighter than average. In recent years the Media has dubbed this a SUPERMOON. On July 3rd the moon will be full at 06:38 AM at a distance of 224,895 miles. Perigee occurs July 4th at 17:29 at a distance of 223,652 miles. This full moon was known by early Native American tribes as the Buck Moon because the male buck deer would begin to grow their new antlers at this time of year. For a comparison of the Moon’s Perigee and Apogee size to go <https://apod.nasa.gov/apod/ap161113.html>

JULY PLANETS – July 1 finds VENUS and MARS just 3.5 degrees apart in the western sky in the constellation of Leo. Venus is sinking back toward the Sun as its orbit carries it between the Earth and the Sun. Venus will be at it maximum brilliance on July 7th. Under clear skies it can even be seen naked eye during the daytime and has even accounted for reports of a “UFO” hovering motionless in the sky. I have seen it a few times looking like a tiny silver balloon that some kid lost that the state fair. This is the best time to watch the phases of Venus rapidly change shape and become larger. Its phase can even be detected in a pair of steadily held binoculars in early evening twilight. Venus will pass between Earth and the Sun (Inferior Conjunction) on August 12.

See all the phases of Venus at <https://apod.nasa.gov/apod/ap170317.html>

MARS continues to race eastward through the constellations in its futile attempt to stay ahead of the Sun. It passes on the opposite side of the Sun (Superior Conjunction) on Nov 17 in the constellation of Libra. You will have to wait until the sky is nearly dark to locate it at mag 1.8.

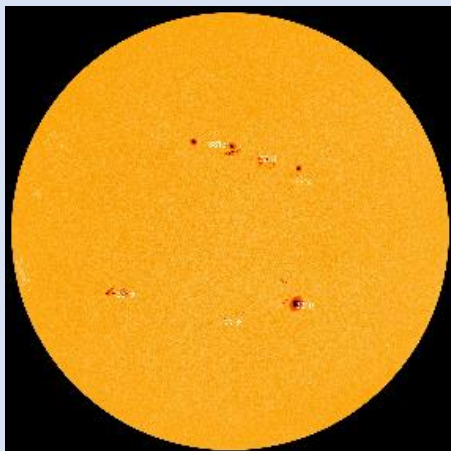
MERCURY enters the evening sky in mid-July. Look for on July 18 with a 1 day old moon on the WNW horizon. It passes 5 degrees above Venus on July 26 and below Mars on Aug 14. The Moon passes Venus on the 19th and Mars on the 20th.

In early **SATURN** rises about 23:30 – by month’s end it rises at 21:47. The most recent count shows that Saturn has 145 moons! The **MOON** will be near Saturn in the predawn hours of July 7.

On July 11 the moon will reach **JUPITER** which rises about 2:00 AM.

The Delta Aquarid Meteor Shower peaks July 29, 30 at about 20 per hour. However, this year will near the full moon on Aug 1.

Solar Cycle 25 is Reaving Up toward an early maximum.



The way scientist count sunspots is a bit confusing to the common person. If you see a number of 153, most people would expect to see 153 spots. Instead, they would see the sun like the one at the left. To see the full image, go to the link

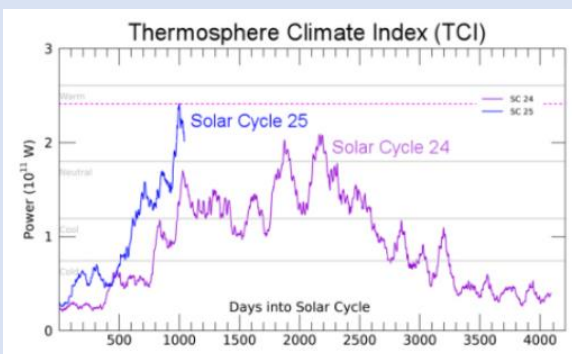
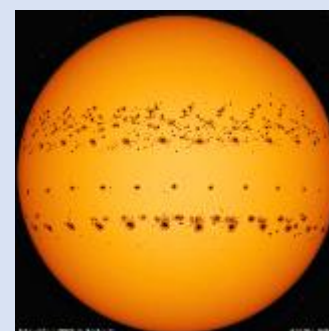
<https://spaceweather.com/images2023/25may23/hmi1898.gif>

Then click on each individual group to enlarge it .

The link [sunspot number](#) explains the system. Each **GROUP** counts 10, so with 6 groups that comes to 60. Then you count all the individual **SPOTS** within the groups and add that to the number. Finally, a factor “**k**” is figured in to adjust for the skill and instruments of each observer. There is even an Astronomy League certificate for observing sunspots.

TELESCOPES MUST HAVE A CERTIFIED FULL SPECTRUM FRONT SURFACE SOLAR FILTER !!

31 DAYS OF 100+ SUNSPOT NUMBER: Solar Cycle 25 just hit another milestone. Every day last month MAY 2023 (31 days in a row), the [sunspot number](#) exceeded 100. Astronomer Senol Sanli of Bursa, Turkey, used data from NASA's Solar Dynamics Observatory to display all of May's sunspots.



A series of geomagnetic storms in 2023 has pumped terawatts of energy into Earth's upper atmosphere, helping to push its temperature and height to a 20-year high. Air surrounding our planet is now touching satellites in Earth orbit and dragging them down.

See all the information on [Space Weather June 3](#) - be sure to scroll down to see it all



Super-Sized Sunspot AR 3354 appears on the Sun

On June 27 a new sunspot appeared on the sun and within 5 days it had grown to 10 times the diameter of the Earth making it larger enough to make with eclipse glasses without a telescope. [Space Weather June 28](#) See a [movie of its rapid development](#) and solar rotation.

By [June 29](#) it was showing amazing detail and on [June 30](#) Streams of matter moving radially out of the sunspot's core along penumbral filaments--that's the Evershed Effect can be seen

Check out <https://spaceweather.com/> daily to watch the sun's ever-changing appearance as well other interesting space phenomena, such as aurora, comets, meteor showers, high altitude clouds, near earth asteroids and more!



SOLAR ECLIPSES are coming to Tulsa – Oct 14 -71 % - April 8 - 91 % Plus, the April 8, 2024 event will be a **Total Solar Eclipse** over a long path from SW Texas, SE OKLA, Central Arkansas and extending on to Maine. **Our Astronomy Club is selling certified safe Eclipse Viewing Cards – Sets of 5 for \$ 5 at our events**

Caution Advised – in 2017 many unsafe glasses were sold online

Astronomy in the News -

Articles of random astronomy interest.

I have not reviewed all these articles – those from general media may contain less accurate information. My apologies for those that include Ads

Where and when to see the October 2023 annular eclipse | Astronomy.com

<https://www.astronomy.com/observing/where-and-when-to-see-the-october-2023-annular-eclipse>

Total solar eclipse: What to expect during the 2024 event | CNN

<https://amp.cnn.com/cnn/2023/06/23/world/2024-total-solar-eclipse-guide-scn/index.html>

NASA Science in the Shadows: Five Exciting Experiments for 2024 Total Solar Eclipse

<https://scitechdaily.com/nasa-science-in-the-shadows-five-exciting-experiments-for-2024-total-solar-eclipse/>

Time-lapse of Solar Cycle 25 displays increasing activity on the Sun | NESDIS

<https://www.nesdis.noaa.gov/news/time-lapse-of-solar-cycle-25-displays-increasing-activity-the-sun>

HOW BIG WAS THE 1859 CARRINGTON'S SUNSPOT?

On Sept. 1st, 1859, a colossal sunspot on the sun release a solar flare that produced Aurora seen as far south at Hawaii. The massive surge of electrons streamed down telegraph lines causing numerous fires.

If such a Solar event were to occur today, it would have worldwide disastrous effects on our technological dependent world.

Adventures in Astronomy - Series of weekly astronomy lessons for students and teacher

<https://www.astronomyteacher.net/> going through Aug 9

Which moon phase is best for stargazing? That depends.

<https://earthsky.org/tonight/what-moon-phase-is-best-for-stargazing/>

NASA's Mars helicopter 'phones home' after no contact for 63 days

<https://phys.org/news/2023-06-ingenuity-mars-helicopter-home.amp>

It's Time To Admit It, the Ingenuity Mars-Copter Is the Greatest Aircraft To Ever Fly

<https://www.autoevolution.com/news/its-time-to-admit-it-the-ingenuity-mars-copter-is-the-greatest-aircraft-to-ever-fly-216431.html>

Best eyepieces for telescopes 2023 | Space.com

This reviews popular commercial eyepieces with some of their specifications.

If you want to explore purchasing some I would CAUTION against using AMAZON

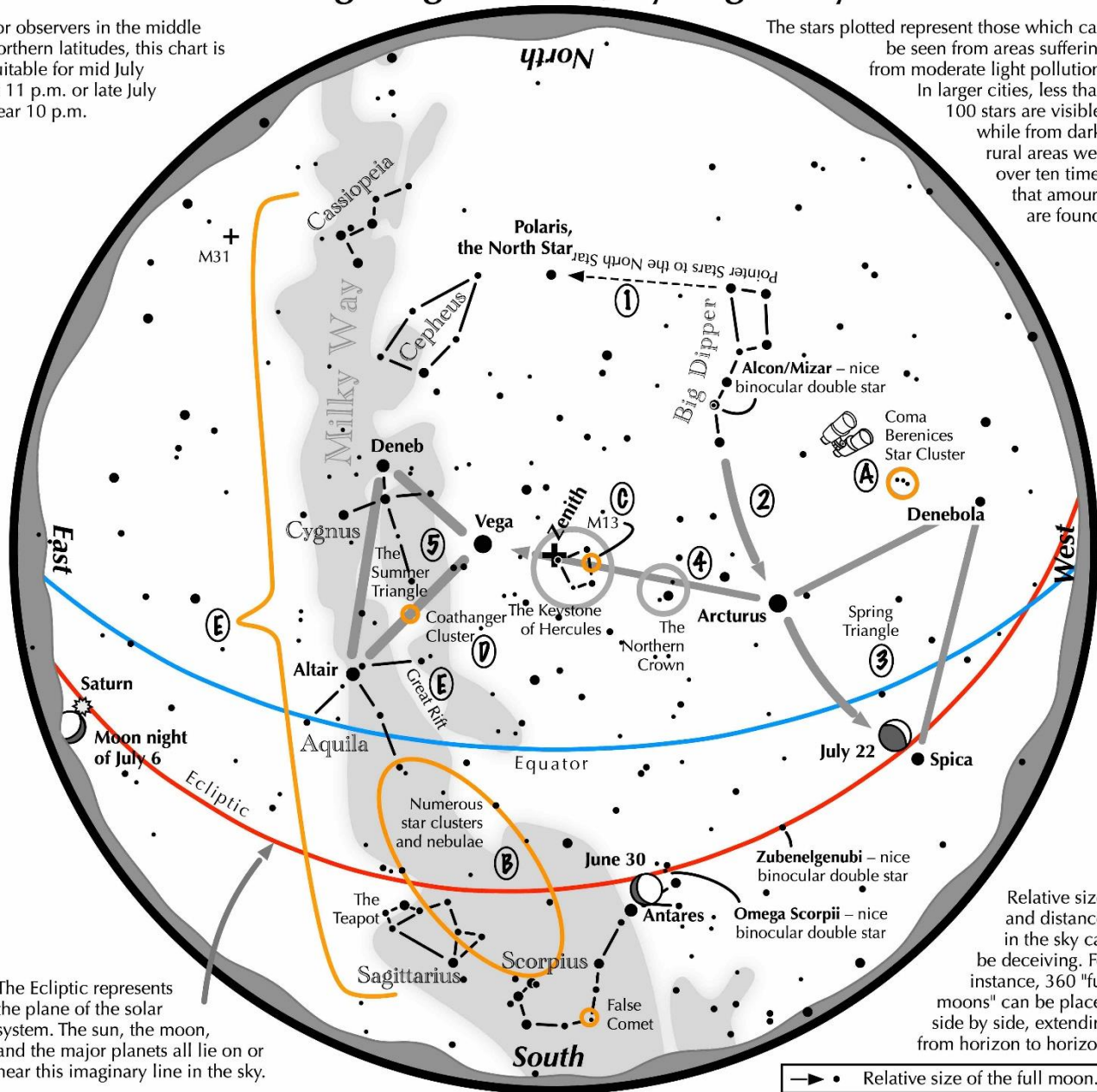
A Reputable astronomy vendor will stand behind their product - isn't necessarily so at Amazon.

<https://www.space.com/best-eyepieces-for-telescopes>

Navigating the mid July Night Sky

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

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



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

→ • Relative size of the full moon.

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

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

Binocular Highlights

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



2023 MidStates Astronomy Conference Photos



Guest arriving for registration and visiting with friends in the lobby



Tamara Green and Debra Chapman helping with registration packets



Cathy Grounds preparing decorations



Enjoying the Saturday Banquet and Keynote Speaker Daniel Kennefick





Enjoying presentations on a variety of topics.



And of course, the many door prizes were a big hit.



Steve Chapman won the grand prize a SkyWatcher 150 P Tabletop telescope

Kathy Machin of Omaha won Celestron 15 x 70 binoculars



Let's stay up all night and observe!

By Brad Young



Linda on Friday Night

Lots of people try to do this and sometimes they succeed. Seeing as many targets as you can and being tired and full of starlight when you finally must stop is an exhilarating feeling. I won't fall into the age-old trap of second person narration and try to tell you what you will see; that is up to you. But I'm pretty sure you will have a wonderful time and although the next day may be quite wearisome, it will be worth it all.

There are a few cardinal points in the year that I especially enjoy choosing for observing. These include the equinoxes and solstices. In this article I'd like to describe the specific attraction each one holds and how I have, over the years, come to especially enjoy them. In years past, it was difficult for me to stay up all night any night unless it was on the weekend, so when I say that you should stay up all night on the June solstice, most of the items involved will be much the same if you observe a few days around the exact date. The only time this makes any difference is when talking about the days when we change our clocks or daylight-saving time. I'm going to discuss these also, although hopefully these will soon come to an end, and this will be a historical discussion.

Another thing to consider is that this article is biased toward those in temperate zones of the Earth. At the equator, where seasons don't mean a whole lot, this may not be much of a subject of interest. Also, if you live very far north or south, it will be a waste to worry about observing around the solstice because one will have bright twilight or the sun will be up all night at the summer solstice, and it will be unspeakably cold during winter.

WINTER SOLSTICE

"This is the night when you can trust that any direction you go, you will be walking toward the dawn."

— Jan Richardson

The winter solstice is of course the longest night of the year and the most difficult to get all the way through. I won't bore you with preparation advice but for safety's sake I will at least remind you to bring lots of layers of clothing and maybe an extra blanket and a little food in case you get stuck. Be sure and take lots of breaks too - you don't have to be outside the entire time, and this isn't a competition. Oftentimes I must run outside look at something and then run right back inside and warm up a little bit before I can base the cold again.

But oh, that sky! If it's very cold and clear and still the stars will almost look like you could reach up and pick one off the wall. In the northern hemisphere we have a view looking out from the Milky Way, so we don't have quite the telescopic gold mine that the Sagittarius direction gives us, but

we have the brightest stars of the year in our winter sky and there are still plenty of wonderful open clusters, nebulae, and other deep sky sites to behold.



Druids Gather for the Autumnal Equinox

EQUINOXES

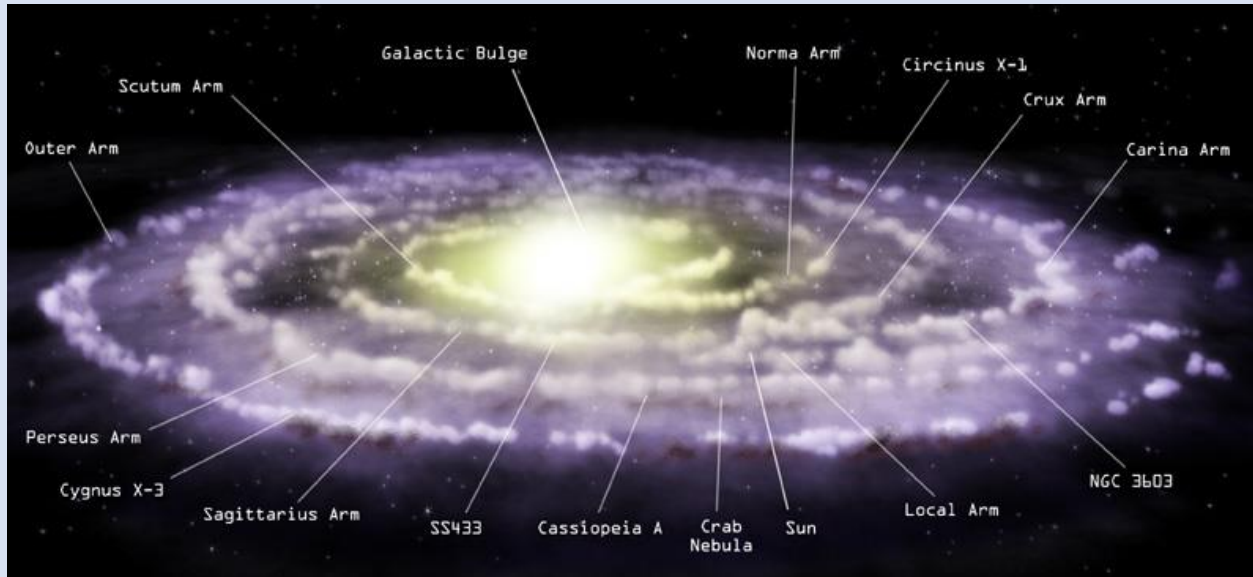
As I said above, the equinoxes are really tied for now to changing our clocks and that is usually when I do my equinoctial observing nights. At a job I had long ago, the older employees got to work graveyard shift on the short Spring night and get paid for the hour that didn't exist, whereas young guys like me had to work the Autumn night. I still got paid for the extra hour, but it still seemed unfair somehow. Now, I always seem to miss out on the short night in March when we change them forward because the weather is always lousy. Luckily though, the date we change our clocks back in early November is often the end of what had been a magnificent late summer and early fall.

Whatever the weather may be, equinoctial observing nights are fun for many reasons. As said, the November one is often a cherry on top of a great Autumn. At both, you can watch the sun rise and set almost exactly east and west. In towns like mine where the streets are laid out on a grid, this means you can look down a long street like the one I live near and see the sun setting behind and between the tall buildings along the street. Depending on how your town is laid out, you may be in the same situation, or it may be at a different date during the year.



Manhattanhenge in mid-May

At both equinoxes, the word of the day is Galaxy. The Virgo supercluster is at its prime in March and not only Virgo, but Leo, Ursa Major, and Coma Berenices also have tons of galaxies and other sights to see. Fall galaxies are in Pegasus, Cetus, Pisces, and all through that area of the sky. We are treated to these views because we are looking either up or down respectively from the plane of the Milky Way and out into intergalactic space. With most of the dust and other matter out of the way, we see distant galaxies and galaxy groups as brightly as we can.



SUMMER SOLSTICE

"This is the solstice, the still point of the sun, its cusp and midnight, the year's threshold and unlocking, where the past lets go of and becomes the future; the place of caught breath." - Margaret Atwood

And finally, my favorite night is the June solstice. It is short, making it easy to get all the way through. It is warm, but I may not have grown weary of the relentless heat by now like I will be by Labor Day. There's lots of bugs, but that's what bug spray is for. I can usually lay down in my hammock when I get tired and, if I take a little nap under the stars, so be it. Of course, the splendor of the sky this time of year usually keeps me wide awake. We are looking at the center of the Milky Way and adjacent arms from our viewpoint. I won't begin to describe all the wonderful objects to be seen in this direction and you're going to need more than one night to see them all. Instead, pick a few favorites and select a few new challenges and make a night out of it. Be sure and take lots of liquids and light snacks to make it through the night. It's important to stay hydrated and don't forget that bug spray whatever you do!

This early in the summer, you can often still catch some of the galaxies that you might have missed in Spring, such as the groups in Virgo and Bootes and that area is still high enough early in the evening. Then the Messier parade begins throughout the areas surrounding the spine of the Milky Way. If you're at a dark site, you can see with your eyes only the Great Rift through the Milky Way and other dark nebulae, such as the Pipe Nebula. Then, sweeping through these areas with binoculars, there are smaller patches of both bright and dark clouds to be seen along with a few of the larger globular clusters and other sites you'll soon turn your telescope to.

Early morning, before dawn, brings autumnal sights like Cygnus and Cassiopeia again, with a warmth you may not get when these would "normally" be observed. One of the benefits of

observing late in the night is seeing objects that might usually be seen when it is colder. This way, I see them in a more comfortable situation, and may spend more time on them at the eyepiece and sketch pad. Remember the statement above about running inside after every midwinter glimpse? That can be avoided by catching those objects in a different season, before dawn.

If you do make it till dawn, it's a wonderfully satisfying feeling to see the first tendrils of light reaching into Sagittarius as you try to get that last thing you wanted to see before the sun came up. You may be tired and take a little break before putting the telescope away and going home. That last sip of coffee really helps right now too.

I hope to see you out there this summer equinox, and maybe some other nights too. It really is great to observe, especially if you can make it all the way through the night and enjoy yourself the whole time by pacing your observing and really looking at the objects as you behold them.



Linda on Saturday

References

1. [Linda Belcher](#)
2. [Druids Gathering for Fall Equinox](#)
3. [By Fred Hsu on en.wikipedia - Own work, CC BY-SA 3.0](#)
4. [View of Milky Way](#)
5. [Linda Belcher](#)



Astronomy Picture of the Day for June 21, 2023
Has a great series of photos of the Sun's track for
each Solstice as well as an Equinox

The images were taken from Sicily, Italy at about 37 Deg N Latitude
Similar to the Oklahoma – Kansas border latitude.

<https://apod.nasa.gov/apod/ap230621.html>



Northeast Oklahoma Chapter Mobile Observatory A New Astronomy Outreach venue is now in the Tulsa area.

The traveling observatory will visit local schools, libraries, museums, and other public venues with the goal to inspire local students and generally raise science literacy in the community. It is equipped with an 11-inch Celestron 1100 HP main telescope along with a 70mm Coronado MAX 2 H-alpha scope for safely observing the sun and also computer displays.

Peggy and Rick Walker of Broken Arrow Sidewalk Astronomers have done an excellent job of completing its construction and decorating it with attractive space art. If you are interested in applying to become a volunteer when the observatory conducts its STEM outreach events.

Contact Peggy Walker at BASidewalkAstro@yahoo.com



The Future of Observing Artificial Satellites

Brad Young

Observing artificial satellites has been a hobby among amateur astronomers since the very beginning, with the launch of Sputnik in 1957. At first, the hobby was a well-organized citizen science effort focused on determining the orbits of what at first were seen as elements of terror and supremacy of the Soviets. Later, observations for scientific and tracking purposes were gradually taken over by Baker-Nunn cameras and radar, but the hobby aspect remained. As the 1970s ended, a small group of hardcore observers remained, and the formative years of satellite observing passed with elements and predictions sent through surface mail and later via the early Internet.

Along the way, different categories evolved. As the number of objects grew, people specialized in objects that flashed or periodically flared up to brighter than Venus's magnitude. Or an observer might specialize in tracking and reporting only those payloads that were classified and lacked any published orbital elements or predictions. Instead, predictions were made by amateur orbital analysts, based on the observations sent in by other hobbyists. This symbiotic cooperation kept things going through the 00s. Ultimately, the decision to declassify a large amount of these payloads in the 2010s made this less important to observe.

Satellites were getting smaller too, as along the way improvements were made in technology to serve the ever-present quest to reduce weight. Coupled with this, as space became privatized, the fees for launching were reduced and opened space to a wider group of consumers. Those consumers included NGOs that wanted as much space science as they could do for minimal cost, using CubeSats and Nanosats. More and more, the satellites that were launched became nearly impossible to see without optical aid, and even binoculars were not able to resolve the smaller and dimmer objects. Stricter agreements about LEO debris led to the deorbiting of rockets after the mission was complete. Although some rocket bodies remained in orbit, in general artificial satellites were becoming much more numerous but much less observable.

And then came Starlinks, OneWeb and other communication satellite megaconstellations in prototype and production missions, increasing the number of objects at a startling rate. Starlinks and others (e.g., Blue Walker 3) are, at first, quite observable right after launch. Relatively bright, they could often be seen naked eye or spotted in handheld binoculars.

Therein lay a growing problem; the new objects were so numerous and bright that it became clear that they were interfering with observations by ground-based telescopes. Although the exact effect on the science of astronomy is not yet understood, it was easy to see that with this large increase in objects the situation would become critically damaging in only a few years. The astronomy community, both professional and amateur, voiced their concerns in the media and in space situational awareness forums all over the world.

Luckily, SpaceX has made significant strides in reducing the optical brightness of their newest satellites. Although there is more research to be done, it appears that the Starlink Generation 2 satellites meet the specifications set by the IAU of a standard magnitude of 7.0 or dimmer. There are still some questions as to how well current control can be maintained over time and whether radio frequencies are still in peril, but at least the work is being done to reduce the effect of this new source of interference.

As crucial as that development is, now even Starlinks are barely observable by amateurs. Eventually, the original Starlinks will be deorbited and only the faint ones will remain in orbit. The trend towards smaller, lighter, and less conspicuous payloads will continue, as the goal of weight minimization is still attractive economically and will remain so.

On occasional launches, especially by American and foreign governments for intelligence and security purposes, the payloads maybe similar in size and brightness to the old school launches that were seen when the hobby began. There is also an increased number of manned missions and with both the Chinese and International Space Station in operation, flights of payloads of reasonable size will continue to service and maintain those facilities. But the days of all launches being carried aloft by a large rocket that remains in orbit for years, and a single large payload that is low enough and large enough to be seen easily appear to be ending.

So, what is the amateur satellite observer to do? There are several options if one is willing to think outside the box.

- Geosynchronous satellites will at least for the time being remain large and conspicuously bright during the equinoctial seasons with their solar panels face on to the viewer.
- Listening to satellites has not changed, in fact things have gotten better on this front due to the increased number of sources that have been launched.
- There will still be the occasional large rocket body used to lift the large number of simultaneous payloads that have become commonplace today.
- If you reach beyond modest equipment into widefield photography, the prospects broaden also. Now you can integrate the dim light of smaller satellites, and capture fields full of them instead of concentrating on only one target.
- Remote imaging allows for geosynchronous satellites in longitudes that you can't see at home and will reach much dimmer objects easily. An issue there is that the commercial services available are not set up to accept satellite predictions.

All in all, satellite observing is changing again with the times. In the very beginning there were only a few objects and although they might be bright, it was very difficult to know where and when they would appear, and the equipment available amateurs was very limited usually only their eyes binoculars and perhaps a small telescope. Now, we have much more sophisticated technology to use, and it will probably be needed. The age of large satellites and rockets is over, at least in LEO. Some targets may be easy to see for just a few days after launch, but many will be invisible to anything, but sophisticated imaging equipment used by amateurs who are well-versed in how to develop spot on predictions and make it happen.

Associate Treasurer Report

Mike Blaylock



As of June 26, we had 203 members 22 New members for 2023

We welcome this month's newest members – **Sam Rodgers, Jeff Hammans, Steven Neil, Marcia Halton, Marvin Hudson, Howard Hulen, Holly Baker, Harold Outland**
Hello and welcome to ACT !

Have you changed you Contact Information? Email, Phone, Postal Address ?

Please help us to maintain our records by sending an email to AstroTulsa.Tres@gmail.com

Accounts as of June 26, 2023

Checking: \$ 7,716

Savings: \$ 2,790

Investments: \$ 31,631 (Value tends to fluctuate with markets).

You can JOIN or RENEW memberships or magazine subscriptions ONLINE using ANY MAJOR CREDIT CARD.

The transactions are processed through PayPal but you Do Not need a PayPal account.

Fill out the registration form at <https://www.astrotulsa.com/join>

Click Submit and you will be given the choice of either MAILING in your dues with a check or paying online with most major credit cards. A modest processing fee is added to online transactions.

Membership rates for 2023 are as follows:

Adults: \$ 45 per year, includes Astronomical League Membership.

Sr. Adult: \$ 35 per year for those 65 or older, includes Astro League Membership.

Students: \$ 30 with League membership; Students: \$ 25 without League membership.

**Additional Family membership: \$ 20 with voting rights and League membership.
\$ 15 with voting rights but without League Membership.**

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

Join Online – Add or renew magazine subscriptions. <https://www.astrotulsa.com/join>

MAGAZINE SUBSCRIPTION RATES and PROCESS has CHANGED !

You can get a discount rate as a Astronomy Club member. **However, you will need to do so directly using their discount rate web links.** Both Sky & Telescope and Astronomy have options for DIGITAL as well as PRINT subscriptions.

For club member's Discount subscription rates to [Sky and Telescope magazine](#)
go to [this page](#)

For club member's Discount subscription rates to [Astronomy magazine](#)
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Use the DISCOUNT RATE LINKS above instead of their regular subscription pages to MAKE or RENEW your subscription.



This article is distributed by NASA's Night Sky Network (NSN).

The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Find A Ball of Stars

Linda Shore, Ed.D

French astronomer Charles Messier cataloged over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulae, distant galaxies, and star clusters as optics improved. Messier traveled the world to make his observations, assembling the descriptions and locations of all the objects he found in his *Catalog of Nebulae and Star Clusters*. Messier's work was critical to astronomers who came after him who relied on his catalog to study these little mysteries in the night sky, and not mistake them for comets.

Most easily spotted from the Southern Hemisphere, this "faint fuzzy" was first cataloged by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55 (M55)**, this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

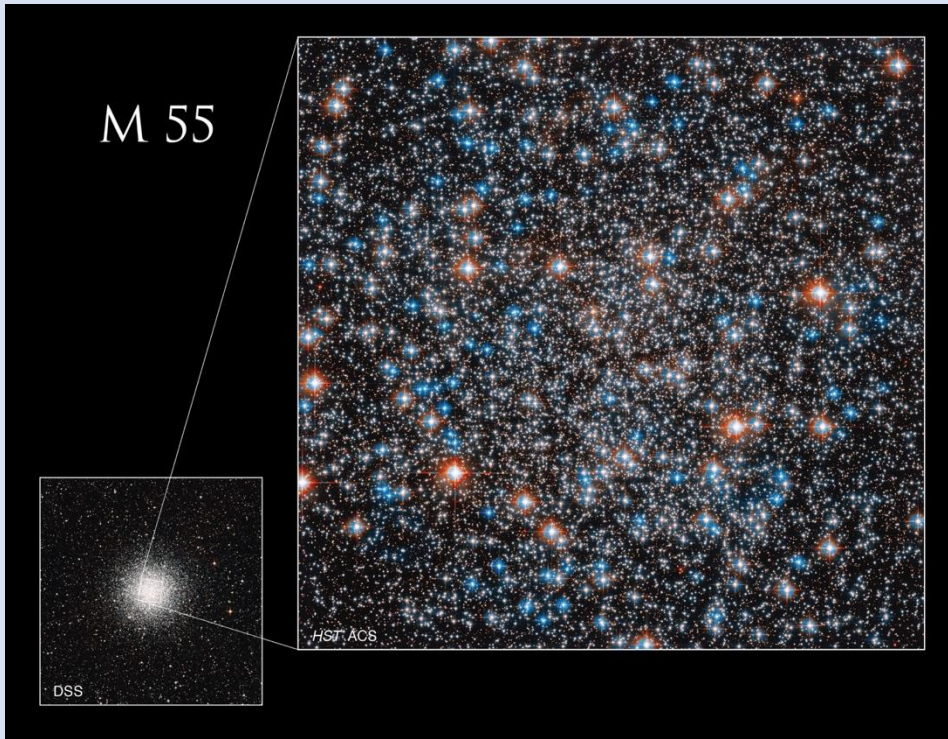
But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the "Summer Rose Star," M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the "teapot" of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the "steam" coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulae and clusters.

As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marveled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colors in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe. Discover even more:

<https://www.nasa.gov/feature/goddard/2023/hubble-messier-55>

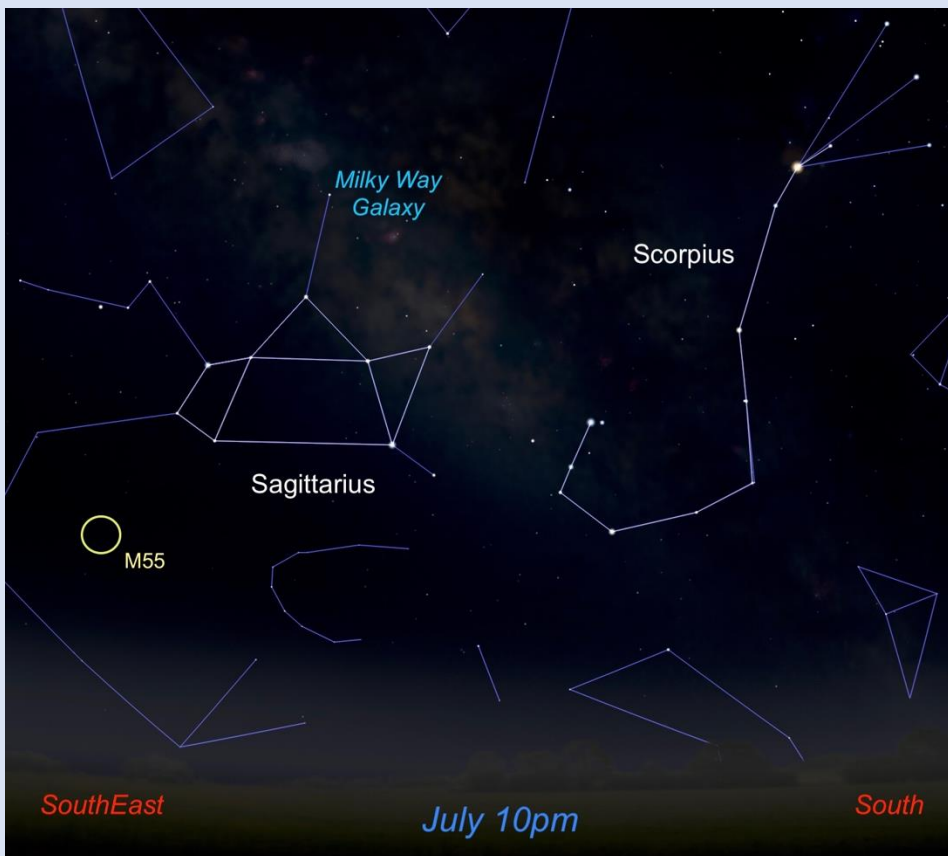
The Hubble Space Telescope has captured magnificent images of most of Messier's objects.

Explore them all: <https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/>



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STScI, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober



Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.

Image created with assistance from Stellarium: stellarium.org

You are invited to come 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/>



During the school year our club holds a **Monthly General Club meetings** at **Jenks Public Schools Planetarium**
105 East B St, Jenks, OK
Located North of the intersection of **1st and B St**

Meetings begin at 7:00 PM

When you enter the building lobby,
take the elevator to the 3rd floor.

[Click for Google Map Link](#)



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 Guest – both individuals and families as well as our regular members.

Several of our club members set up telescope 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

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2023 Summer Shows [Go to Show Schedule](#)
Click the Date Column to sort them by show date

Most Shows take place on
Tuesday evenings from 7:00 PM to 8:00 PM
a few on Saturday

Do you have ideas for our club In Person or ZOOM Meetings?

Want to share an observing experience or astrophoto.
Know someone willing to be a Guest presenter?

We would also welcome YOU to do a short 5-10
minute section of interest or new equipment you'd
like to review.

Create a Cartoon on a Space Theme

Contact our Editor John Land

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