

ASTRONOMY CLUB



OF TULSA

OBSERVER

August 2022

Bringing Stars to the eyes of Tulsa

since 1937 Editor - John Land



On July 12, 2022

The First Five Scientific Images from the
James Webb Telescope were released.

You learn more about them and download full resolution images at

<https://www.nasa.gov/webbfirstimages>

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Astronomy Club Events

Check our website AstroTulsa.com events section for updates

Observatory ONLY OPEN for SCHEDULED EVENTS. [Click for Observatory Map](#)

Now that Sunset is later **OBSERVING NIGHTS** will be scheduled on **Friday with Saturday as a backup night for weather cancellations.**

NOTE: Please check our website for Weather Cancellations before heading out.

Friday Aug 19 7:30 PM **Guest and** Members Night - Guest requested to RSVP

Friday Aug 26 7:30 PM **Members Only** night
Open to members and their immediate family

Saturday August 27 6:30 PM **Annual Club Picnic -**

We need volunteers to make this a fun evening

Astronomy Club Meeting - Friday September 9 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - **Guests Welcome**

Friday Sept 16 7:00 PM **Guest and** Members Night - Guest requested to RSVP

Friday Sept 23 7:00 PM **Members Only** night
Open to members and their immediate family



Registrations need to be done in August ! !
for the 39th Annual [Okie-Tex Star Party](#)

Sept 23 – Oct 1 Amateur astronomers from all over the country and beyond come to enjoy a weeklong “Star Fest” under some the darkest sky on the planet.

OBSERVING NIGHT GUIDELINES

Children and young teens need to stay with adult family members. When approaching a telescope ask it owner if you can look at what they are viewing. With the Summer Travel Session well under way the number of Covid cases is on a sharp rise again. We want to keep our guests and members safe. We ask you to please be thoughtful of the health safety of others around you. If you or a person in your household is showing signs of illness, please postpone your visit for another date.

Personal Hygiene, Social Distancing and Mask wearing are effective means of preventing spread.

President's Message John Land



Greetings to all our Astronomy Club of Tulsa Members and Guests.

I want to say a **SPECIAL THANK YOU** to the several members who contributed articles to this month's newsletter. You don't have to be an "expert" to share some astronomical adventure you may have had this summer. Or interesting idea to pass on to your fellow club members.

As I write this message it seems like the heat wave of 2022 will never end. Those of us who have lived in Oklahoma awhile, have survived several of these extended heat spells. The July 27 weather shows that Tulsa will have recorded 20 days in July above 100 ranking number 5 on the records. The summer of 1966, I worked outdoors on a grounds crew at PSO in McAlester. We had a run of 22 days in a row in July above 100 F. I had a tan all the way to Thanksgiving! If you look at the daily High Temperature Records, many date back to the drought days of the 1930's. So Yes, it's Hot - Now - but Autumn is just a couple of months away. That's one of the "perks" of living in the mid-latitude temperate zone. We experience a variety of seasonal temperatures.

Astronomically the Milky Way is high overhead in August and early September. We can enjoy searching for, observing, or imagining many deep sky wonders along this river of starlight. My own "Journey" to the "Dark Side" began by "discovering" a small star cluster in a 60 mm refractor that had been loaned to me. Some experienced observers told me it was named M 11. My brain said 11? Where are the other TEN? Then I discovered there were [110 Messier objects](#) to be discovered. Thus began my passion to learn more about the treasures of the night sky.

You can begin your own "Journey into the Night" by starting one of the [Astronomical League Observing certificate programs](#).

Come September we will resume our IN-Person Club meetings at the Jenks High School Planetarium. We moved our Members and Family Club picnic to Saturday August 27 to hopefully enjoy the time in cooler weather.



SAVE THE DATES !

Our Tulsa Astronomy Club will be hosting the [MidStates Regional Astronomy convention](#) June 9 to 11, 2023. Members other clubs from our five state region have been eager to come to Tulsa for sometime now.

We'll need Lots of Volunteers to Plan and Organize this event to welcome our fellow astronomers and show off our club and attractions in Tulsa.

Let us continue our 85 years of

"Bringing Stars to the Eyes of Tulsa since 1937"

John Land - President

Update On Land Survey by Don Bradford

As previously reported, we are correcting the errors in the legal description of about 37 acres of property surrounding our observatory bequeathed to the club by the Will of a deceased club member. The process, as previously approved by the board and membership, includes a land survey accurately describing and platting the boundaries, an abstract of title to be generated by Okmulgee Land Title, followed, if necessary, by legal action to reform the original deed. The surveyors have now completed their field survey work and are preparing the revised legal description and plat. We expect that work to be completed in a couple weeks. The Abstract of Title will be done fairly quickly, after which we can proceed with securing our legal title.



Click on these images to links on the Internet



See our [website observing page](#) for a collection of [Interactive Sky Watching Tools](#) Moon phases - Sun rise & Set - [Make your own custom interactive sky chart](#) and more

August Skies. - Moon Phases -- 1st Q Aug 4 -- Full Aug 11 -- 3rd Q Aug 19 -- New Aug 27
Closest Super Moon of 2022 - Full Moon 13:38 CDT - Perigee 04:09 CDT - distance 357,263 km

August Planets – The beautiful ringed planet **Saturn** reaches **opposition on August 14**. It will rise in the SE by 8:15 PM and be visible all night. Near the time of opposition, it may be possible to discern a marked brightening of Saturn's rings in comparison to the planet's disk, known as the [Seeliger Effect](#). On the evening August 11 the full moon and Saturn will rise within 5 degrees of each other in the SE. **Mercury** begins to emerge in the evening sky reaching its greatest eastern elongation on August 27 but never gets higher than about 10 degrees at sunset.



Jupiter is currently in Pisces near the point of the Vernal Equinox. Look for it low in the East of the evening of July 15th to witness a **Quadruple Transit**. The **shadow of Io** begins to transit at **22:25**. The **shadow of Ganymede** begins its transit at **23:05**. Next comes the **moon Io** transit at **23:24** when it can be seen on the limb very near the Great Red Spot. The **GRS** itself will be visible for about 3 hours with its **central transit at 01:06** on the 16th. All four objects will be visible on Jupiter's surface until about 00:33 on the 16th. Finally, the moon Ganymede itself begins to transit at **03.15**. All these can be seen even in smaller telescopes with at about 100 power. **Imagers – Send in some of your great images !!!**

Finally, **Mars** is rising in Taurus by 00:30. On Aug 19, there is a nice photo op after mid-night to dawn with Mars, the 3rd Quarter moon and the Pleiades within a 6-degree line. Mars is now at **0 magnitude** and brighten each day. By the end of August, the season of good Mars observations will be underway as its apparent diameter exceeds 10" arcseconds. Mars reaches opposition on Dec 7th at minus1.9 mag and 17.1" arcseconds apparent diameter.

The brightest asteroid, **Vesta**, reaches opposition on Aug 22 at magnitude 6 making it fairly easy to follow its daily motion in binoculars or lower power telescopes. Once you find it, make a careful sketch of its position and surrounding stars. Then re-visit the location within a couple of days to observe which object has moved – that will be Vesta. Since it is in retrograde motion it will be moving westward among the stars
Data and Finder Charts <http://astro.vanbuitenen.nl/minorplanet/Vesta>

Comet C/2017 K2 made its closest approach to Earth on July 14. It will still be nicely placed for evening observation until mid-September. It is currently in southern Ophiuchus. It will be skirting the edge of Scorpio's claw from Aug 20 to Sept 20. Currently it is around 8 to 9 magnitude.
Data and Finder Charts <http://astro.vanbuitenen.nl/comet/2017K2>



*Astronomical League
Observing Challenge -
Special Awards*

The Summer [GLOBULAR CLUSTER Observing Challenge](#) Began July 1 and must be completed by Sept 30, 2022. Click the link above for details for to earn the award.



Here is a PDF of the [38 Globular Clusters](#)
You will also want to review details about [Rating Seeing and Transparency](#)
Learn more about other [Astronomical League Observing Certificates](#) available

OBSERVING NOTES FOR AUGUST 2022

Brad Young



I'd love to give you some advice about observing in this hot weather, but unless you are willing to wait until 12:00 a.m., it is rough. However, by then, Saturn is up, and soon Jupiter and Mars follow. Venus is getting a bit low in the dawn. Here are some other things to look for this month:

- On August 1st, Mars and Uranus have a conjunction, appearing $1^{\circ}22'$ apart at their closest. This would be a good opportunity to see Uranus using binoculars
- C/2017 K2 (PANSTARRS) is still visible and may be seen moving from SW Ophiuchus to Scorpius through the month
- The Perseid meteor shower peaks 12 Aug, but under a full moon
- Mercury has a mediocre showing in the evening twilight, but should be visible, low in the west, in mid-month
- Saturn and the bright asteroid Vesta are both at opposition this month. Vesta is near the Helix Nebula in Aquarius and should be easy in binoculars at mag 6.

I went to Mounds on 23 July and, using only binoculars, was worn out by midnight. However, those of us there did see the 46 Starlinks that had been launched earlier that day (!) A young lady said, "What's that line?" and it was them, much to our surprise. We could see them individually in the binoculars.

The next installment of the observing presentations had to be postponed along with this month's Public Star Party. Hopefully we can have that in August; it is entitled Seeing the Deep Sky. I recently got good notes from some members on a draft copy and hope to have it much improved by its premiere.

The NEO (Near Earth Object) search team I'm on has recovered one of the three provisional new minor planets we've discovered. 2021 FU23, which I mentioned in the [November 2021 newsletter](#). We are reporting it to the MPC (Minor Planet Center) and will await its confirmation and perhaps will even get to name it. The other two, 2021 QQ60 and 2021 RX175 were just announced, and it will be much harder to recover those, but we'll try.

Telescopes for Sale

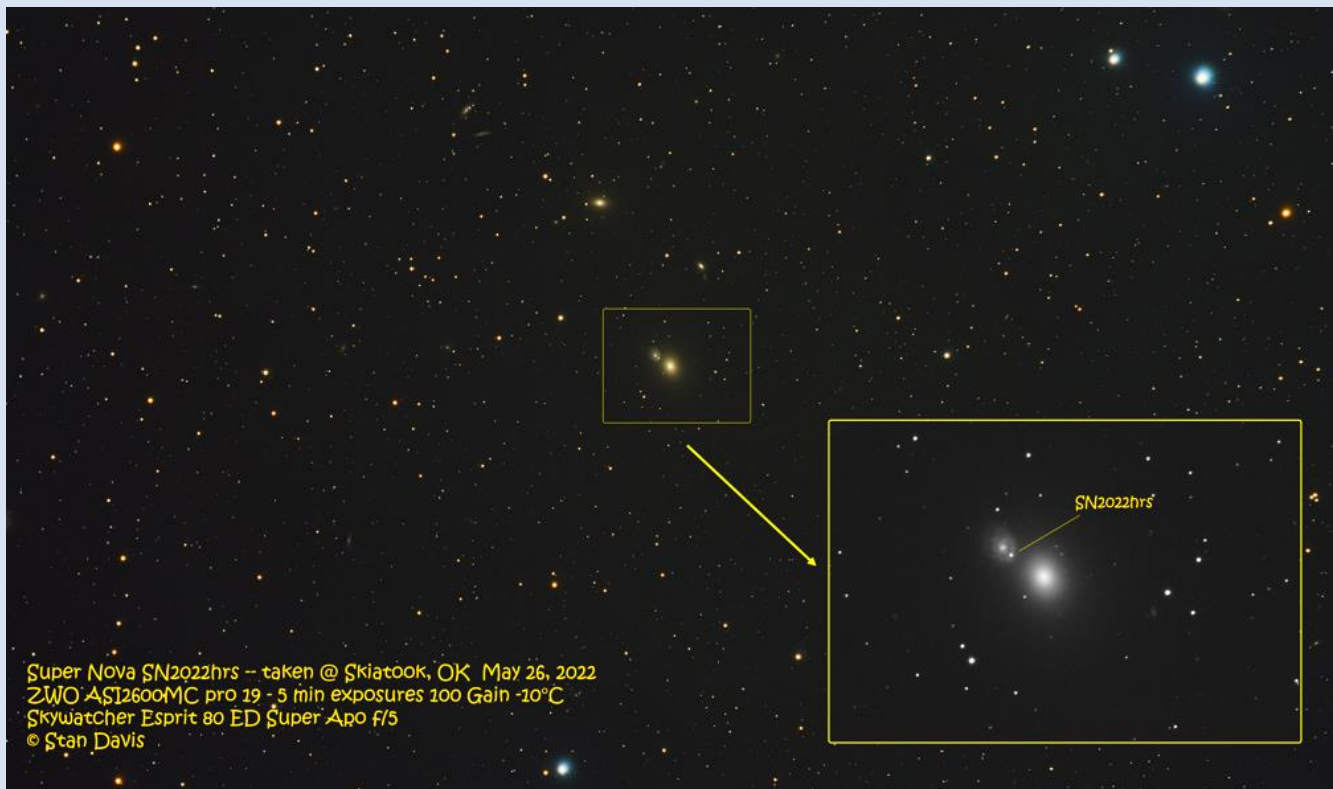
Meade 8" F/10 LX200R SCT with dual fork - GoTo mount
UHTC (Ultra High Transmission Coatings) Builtin GPS

Contact: jrgriamore@icloud.com

Also a classic Celestron C 5 scope – original case etc

Orion XT 10 - 10-inch f 5 \$ 300 Dobsonian Telescope 2 Inch Focuser w 1.25 adapter

Contact John Land Tulsaastrobiz@gmail.com



Super Nova in Virgo by Stan Davis

Amateur astronomer Koichi Itagaki of Yamagata Japan discovered a supernova on April 16, 2022 in NGC 4647, an intermediate spiral galaxy in the constellation of Virgo. He used a 0.5-meter f/6 telescope and a CCD camera. The supernova was around 15th magnitude at discovery. It is classified as SN2022hrs. This supernova is believed to be the result of a collapsing white dwarf star in the galaxy NGC4647, though the larger galaxy NGC4649 (M60) overlaps and interacts and could well be its home. These two galaxies are approximately 63 million light years away.

I decided I wanted to image was a target. I set up on May 26, 2022 in my backyard using my Skywatcher Esprit 80 mm telescope to image it with my ZWO ASI2600MC. I wasn't sure if it would be too faint for my setup in a rural area. I used M60 as my target in Virgo. That way I knew I was in the correct area. I took 20 five-minute exposures. I stacked the images with Deep Sky Stacker and processed it with Photoshop.

I have been using Astro Photography Tool as my imaging software. So far, I like using it. When I was using my Canon 70D as my imaging camera, I was using Backyard EOS as my imaging software. To me APT had a very similar user interface and I thought it would be easier for me to learn. I do like its user interface, and it has a lot of options for imaging. It works with many astronomical cameras plus you can use a DSLR with it too. I have it setup for my DSLR and my ASI. I mainly use my ASI with it.

The processed image field of view is 3° 21' by 2° 14'. That is a fairly wide FOV and I was not sure if it would be visible. Well, I lucked out and there it was. It is very small and hard to see, so I copied a small area and made an insert of an enlarged view, that way it is more easily seen. I am including the entire image rather than just a zoomed view because there are so many visible galaxies in the entire image. I plate solve it with All Sky Plate Solver. This image contains 15 NGC objects and 41 IC objects. These are estimates because I hand counted them from the solved image. I may have made an error. Anyway, to me this is amazing that there are so many galaxies visible in this image.

Editor Note: I had to crop original image a bit to fit the article onto one page.

After taking this image and thinking about the fact that this supernova from a galaxy 63 million light years away can be imaged is amazing. Can you imagine how bright that supernova must be? What would it look like if we had a supernova erupt in our galaxy? I hope you found this article interesting and try to image a supernova in the future.

ET Called Home by Ed Downs

SETI's (Search for Extraterrestrial Intelligence Institute) recent use of the 100-meter Robert C. Byrd radio telescope has paid off with the apparent intercept of an alien message being transmitted from an alien spacecraft to its home base on Proxima Centauri, a planet in the Alpha Centauri star system, only 4.37 light years from earth. It appears the alien crew of this space craft had a very brief encounter of the third kind in rural Oklahoma. A team of scientist has, to the best of their ability, translated this message, which goes as follows.

"Hi Boss, Happened to make a quick fly-by of a planet our intelligence services say refers to itself as "Earth." We experienced a very brief encounter with what seems to be the ruling species. It appears that Earth is having very high temperatures and, although dependent upon their star for life giving energy, an effort was under way to construct a crude structure designed to shield the ruling species from the sun. This ruling species appears to be fuzzy quadrupeds, with long necks and an accomplished ability to communicate telepathically. They appear gentle and group oriented. No weapons were seen, although they seem able to dislodge a fluid from what we would recognize as a "mouth," which has a strong odor and ability to repel any aggressor. Of course, we tapped into their telepathic conversation, learning they refer to themselves as "alpacas."

This ruling species was standing in a shaded structure, with a device moving the Earth's atmosphere at high speed, as their service class species worked in the hot star's radiation laden light, erecting another shade. While the ruling species is quite visually appealing, their subservient service species, hairless, bipedal creatures that are hard to look at, labored in the hot starlight, uttering unintelligible sounds, some rudimentary form of communication. While clearly suffering, this service species toiled on, apparently convinced that it was they who were making the decision. The ruling "alpaca" species appeared impatient, and immediately occupied the new shaded area, demanding further service in the form of a liquid cooling. The service species immediately complied.

The encounter ended quickly, as the ruling species appeared to be tuning into our own telepathic frequency. In conclusion, we should return in force, and take some of the service species back with us. While it will certainly take time to get used to their ungainly appearance, they could be handy in our social structure for doing work no self-respecting Proxium would stoop to doing.

Now outbound from this minor star system and about to engage dimensional warp. Be home in ten "Earth" minutes."

SETI reports contact was lost but recommends we might start looking for volunteers travel to Proxima Centauri for a fun filled holiday. Just list "opportunity" on the web, as "webbies" will believe just about anything.



This whimsical story comes to us from member, Ed Downs. Ed and his wife Sue raise Alpacas near the small town of Yale, OK. Ed wrote the story after a hot day in the sun building a new shelter for his "critters"

In Ed's words - - "While undertaking this ill-timed adventure, the alpacas watched attentively from their barn, plenty of shade and a strong fan running. They would occasionally form small groups and come out to survey the structure, as if inspecting. They paced impatiently, showing displeasure that we were not spraying them with cooling water. My neighbor and I were committed to completing the task, although hard work had quickly turned into suffering. As we toiled, my overheated mind began to wonder, "what would an alien visitor think of what was going on?"

An Interesting Equatorial Sundial by Michael Hann

Sundials were developed by the Egyptians as early as 1500 BC and had become common throughout the Western world by 10 BC. In the second century Ptolemy's mathematical and astronomical treatise *Almagest* gave directions for constructing sundials on different surfaces disposed in a variety of different positions (e.g., *horizontal, vertical, slanted, etc.*) based on geometric analysis. But a lack of understanding of trigonometry and the use of unequal hours. (*daylight hours* were divided into twelve equal intervals, which meant that the duration of these equal intervals varied as the time between sunrise and sunset varied throughout the year) limited further development of sundials. Al-Battani, an Arabian astronomer and mathematician, developed trigonometry in about 900 AD, which made the precise calculation of sundial layouts possible. In about 1200 AD, another Arabian, introduced the idea of equal hours that we use today. Arabians made many contributions to mathematics and science in the period 750-1250 AD, as hinted at by algebra (*an Arabian word*) and by the great number of stars bearing Arabian names.

During the Renaissance, about 1350-1550 AD, time keeping using the sun reached its perfection. Sundials became a proper gift for kings and queens. Dial makers vied with each other for supremacy, and sundial construction became a lucrative profession. With the advent of Copernicus's heliocentric model in 1543 AD and Kepler's laws of planetary motion in 1609 AD, sundials became a scientific instrument, more dependable and lasting than any mechanical device. The only disadvantage of sundials was that they were not useful when the sun did not shine. During the industrial revolution, mechanical clocks improved to the point that they replaced sundials as preferred time keepers.

Today sundials are relatively uncommon. A sundial may be installed in a public area as a monument to the memory of a key individual or of a special event. They may be viewed as a form of technical artwork. But few people pay much attention to them, and still fewer understand the operation principles of sundials. This past July I visited an equatorial sundial installed at the William Steele elementary school in Denver, Colorado. Below I describe its elegant operation and comment on its accuracy.



As seen in view 1, the William Steele sundial comprises a circular plate transfixed by a perpendicular rod called a gnomon. (*The gnomon is the part of the sundial that casts its shadow to indicate the time*)The gnomon is aligned parallel to Earth's axis (e.g., *points towards the north star, Polaris*), and the plane of the circular plate is aligned parallel to the plane of Earth's equator. Both the upwards facing side of the circular plate and the downwards facing side of the circular plate are incised with hour lines, with quarter-hour line segments, and five-minute line segments that are used for reading the time indicated by the shadow cast by the gnomon when the sun is shining. During the period from the spring equinox to the fall equinox, the shadow falls on the upwards facing side of the plate or dial, and during the period from the fall equinox to the spring equinox, the shadow falls on the downwards facing side of the dial.

Note in view 1 that the William Steele sundial has a knob on the lower left edge for adjusting the dial for standard time

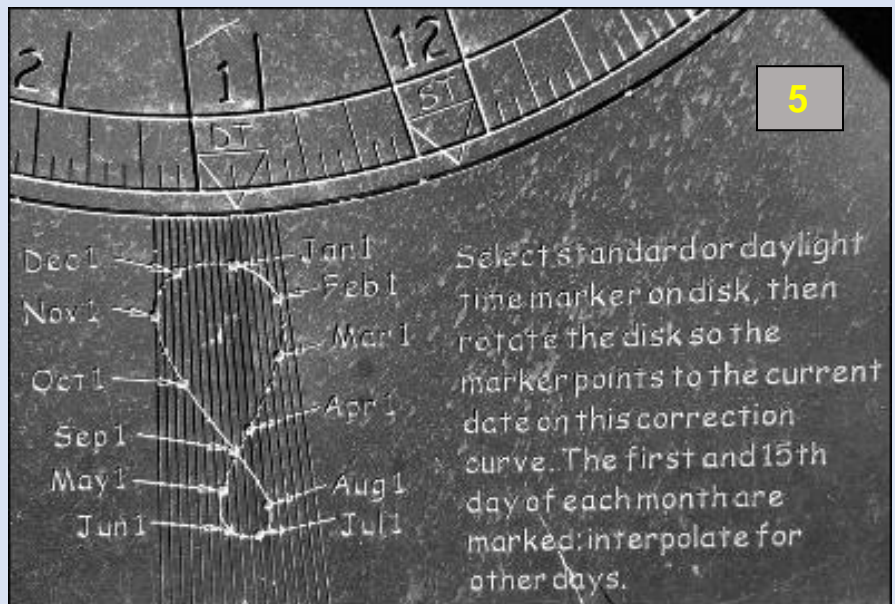
versus daylight savings time and for adjusting the dial in accordance with “the equation of time,” which is discussed further below.



Earth rotates on its axis, turning through 360 degrees, in twenty-four hours. This means Earth rotates 15 degrees per hour – (*One degree in 4 minutes*). As a result, the shadow of the sun cast by the gnomon of the Steele sundial moves 15 degrees per hour. The hour lines are laid-out on the dial in accordance with this geometry to read off the hours and short line segments are laid-out to read quarter-hours as well as five-minute intervals, as seen in view 2. But note that the hour lines do not trace back to the center of the gnomon but rather to a point of tangency on the upwards edge of the gnomon, the edge that would cast the shadow at the associated hour. The time is read from the dial based on the upper-most edge of the shadow on the right side of the dial and also on the left side of the dial. But on the right side of the dial, it is the right edge of the shadow that provides the time indication, while on the left side of the dial, it is the left edge of the shadow that provides the time indication.

It is preferred that a sundial tells time that matches to standard time for the time zone where it is located. There is a difference between local sun-time and standard time. Solar Noon can be defined as the time when the sun is highest in the sky for that date. For Tulsa, Solar Noon occurs when the Sun is directly south. The longitude of the central meridian of our Central Time Zone is 90 degrees West. (*same as St Louis, MO.*) Tulsa has a longitude of 96 degrees West. Since the Earth rotates at a rate of 1 degree in 4 minutes, Solar Noon occurs 24 minutes later here in Tulsa.

The change from standard time and daylight savings time throws a minor hitch into the analysis, but this is easily accommodated by providing a means to shift the dial forwards and backwards an hour. The adjustment knob seen at the lower right of view 2 provides just such a means to shift the dial. In view 5, note the inscriptions “DT” and “ST,” which are used for adjusting the Steele dial for use during daylight savings time and during standard time respectively.



But the offset of local sun-time from standard time varies throughout the year. According to Kepler’s laws, the orbit of Earth around the sun is elliptical, and the motion of Earth about the sun traces out equal areas in equal times as it revolves about the sun.

When Earth's orbit is closer to the Sun it travels faster thus the Earth has to rotate a bit more than 360 degrees to line up with Solar Noon the next day. The opposite occurs when Earth is farthest from the Sun. The result is the duration of the solar day (time from solar noon to solar noon) shifting during the year. This shifting leads to an offset between the statically configured hour lines of the dial that accumulates and grows to a maximum offset of about 15 minutes before reversing and decreasing. Using the "[equation of time](#)," a relationship that defines this offset between solar time and uniformly distributed clock time, this offset can be compensated for based on the specific day of the year.

[Solar Analemma over Corinth](#), Greece This image of the Sun's position taken at 9:00 AM local time through out an entire year, shows in a very graphic way how its position changes. In the summer it is high in the sky, in winter low. The lower part shows the sun running faster than average in mid-November and slower in mid-February.

The "equation of time" is represented in a graphical form in view 5 of the Steele sundial along with instructions on using this graph to adjust the position of the dial. I visited the Steele sundial on July 13 and adjusted the dial for daylight savings time and for this date on the "equation of time" graph. When so adjusted, the Steele sundial displayed the time extremely accurately.



As seen in view 7, the Steele sundial indicated time to be about 10:17 AM, while my wristwatch indicated time to be about 10:15 AM. I later determined that my wristwatch was three minutes slow, according to time displayed by my cell phone. Thus, when the photo of view 7 was taken, the actual time was about 10:18 AM. The Steele sundial was telling time to within about a minute of accuracy. That is remarkable! Truth be told, given the imprecision of my own timekeeping and compensation for the error in my wristwatch, the error of the sundial was too small for me to assess.

There are a great many different types of sundials. The equatorial sundial described here is one of the simpler sundials to construct. One can easily make a simple sundial of this design out of cheap materials such as stout foam board and a dial laid-out on paper pasted onto the foam board. Some gnomon needs to transfix the dial perpendicularly and point towards the north star. By moving the gnomon in or out of the foam board, the angle the gnomon makes relative to horizontal can be adjusted to align with Earth's axis. At our latitude in Tulsa, the angle should be about 36 degrees.

(Some of the background for this article is derived from the book [Sundials: Their Construction and Use](#) written by R. Newton Mayall and Margaret Mayall. This book describes the history of sundials and provides instructions for designing and building various types of sundials.)

<https://apod.nasa.gov/apod/ap161221.html> This Links to a fascinating video of 116,000 photos tracing out the Sun's daily motion across the sky throughout the year. It also shows the figure 8 pattern the Sun traces when imaged at a fixed time through out a year.

NOTE: A few annotations added by the editor for clarity.

TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON



As of July 22, we had 200 members - 29 New member for 2022

We welcome this month our newest members - **Jamie Elliott, Tom Fitch, Nate Granzow, Theresa Tran, Randy Henry, and Erika Emerson** Hello and welcome to ACT!

In addition, we want to recognize our long-term members who continue to renew their memberships with the club even in these restricted times. Finally, we can breathe easy again soon as restrictions continue to lift. Also, we look forward to seeing everyone at our virtual meetings by Zoom, General Meetings and at club events throughout the year when possible.

Accounts as of July 22, 2022 This month the club paid our annual
Checking: \$ 3,153.98 Liability Insurance policy in the amount of (\$2182.00).
Savings: \$ 15,787.74
Investments: \$ 30,209.73 (Value tends to fluctuate with markets).

The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at <https://astrotulsa.com/page.aspx?pageid=16>
Click Submit and you will be given the choice of either **mailing in your dues** with a check **or using PayPal** which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader. A small fee is also added on to these transactions.

ALSO NOTE: For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by the method you choose.

NEWS NOTE: Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Details - Contact their websites

Membership rates for **2022** 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/page.aspx?pageid=16>

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website. Both magazine now include online access with paid subscription.

Astronomy is \$ 34 for 1 year, or \$ 60 for 2 years. www.astronomy.com

To get the club discount you must go through the club group rate.

Sky & Telescope is \$ 33 per year <https://skyandtelescope.org/>

Sky & Telescope also offers a 10% discount on their products.

You may renew Sky & Telescope subscriptions directly by calling their number -**be sure to ask for the club rate**



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!

Artemis 1: A Trip Around the Moon – and Back!

David Prosper

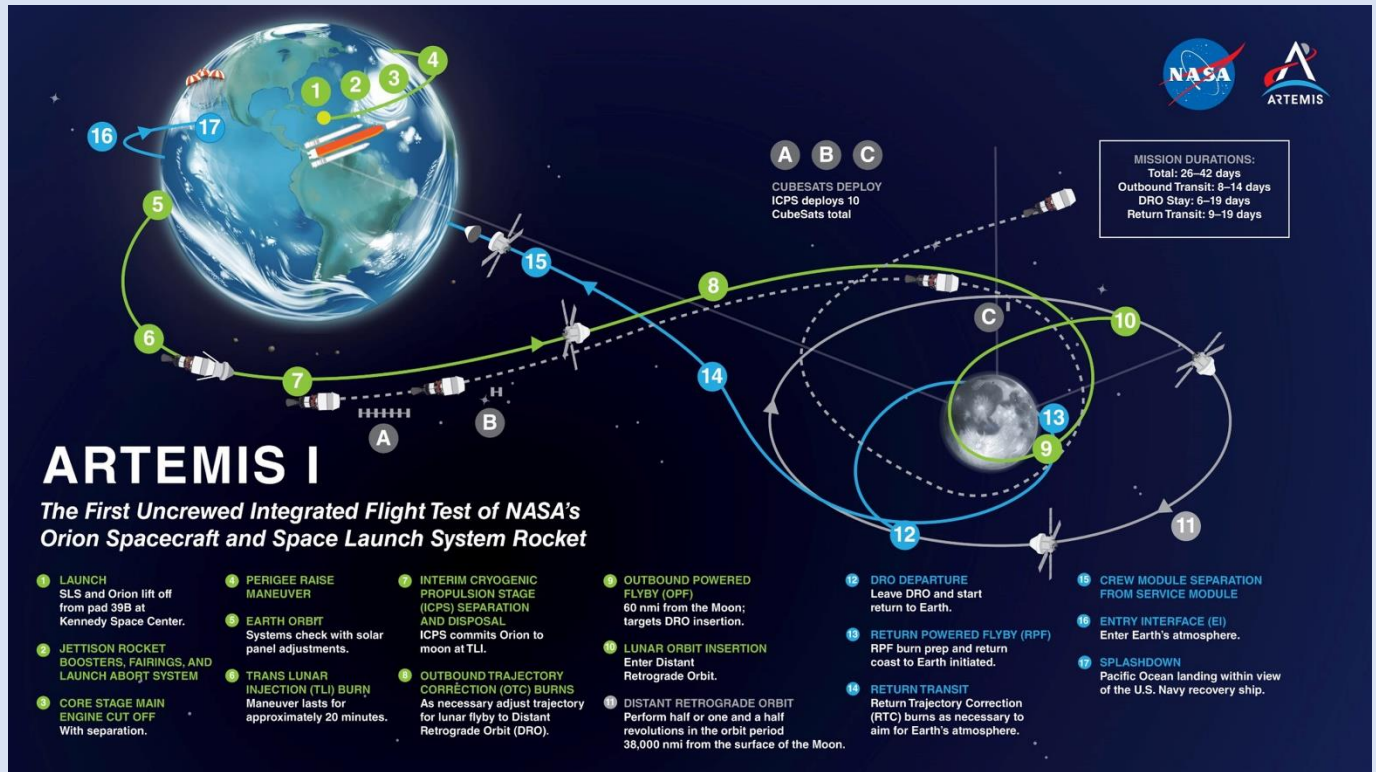
We are returning to the Moon - and beyond! Later this summer, NASA's Artemis 1 mission will launch the first uncrewed flight test of both the Space Launch System (SLS) and Orion spacecraft on a multi-week mission. Orion will journey thousands of miles beyond the Moon, briefly entering a retrograde lunar orbit before heading back to a splashdown on Earth.

The massive rocket will launch from Launch Complex 39B at the Kennedy Space Center in Florida. The location's technical capabilities, along with its storied history, mark it as a perfect spot to launch our return to the Moon. The complex's first mission was Apollo 10 in 1968, which appropriately also served as a test for a heavy-lift launch vehicle (the Saturn V rocket) and lunar spacecraft: the Apollo Command and Service Modules joined with the Lunar Module. The Apollo 10 mission profile included testing the Lunar Module while in orbit around the Moon before returning to the Earth. In its "Block-1" configuration, Artemis 1's SLS rocket will take off with 8.8 million pounds of maximum thrust, even greater than the 7.6 million pounds of thrust generated by the legendary Saturn V, making it the most powerful rocket in the world!

Artemis 1 will serve not only as a test of the SLS and the Orion hardware, but also as a test of the integration of ground systems and support personnel that will ensure the success of this and future Artemis missions. While uncrewed, Artemis-1 will still have passengers of a sort: two human torso models designed to test radiation levels during the mission, and "**Commander Moonikin Campos**," a mannequin named by the public. The specialized mannequin will also monitor radiation levels, along with vibration and acceleration data from inside its mission uniform: the Orion Crew Survival Suit, the spacesuit that future Artemis astronauts will wear. The "*Moonikin*" is named after Arturo Campos, a NASA electrical engineer who played an essential role in bringing Apollo 13's crew back to Earth after a near-fatal disaster in space.

The mission also contains other valuable cargo for its journey around the Moon and back, including CubeSats, several space science badges from the Girl Scouts, and microchips etched with 30,000 names of workers who made the Artemis-1 mission possible. A total of 10 CubeSats will be deployed from the Orion Stage Adapter, the ring that connects the Orion spacecraft to the SLS, at several segments along the mission's path to the Moon. The power of SLS allows engineers to attach many secondary "ride-along" mission hardware like these CubeSats, whose various missions will study plasma propulsion, radiation effects on microorganisms, solar sails, Earth's radiation environment, space weather, and of course, missions to study the Moon and even the Orion spacecraft and its Interim Cryogenic Propulsion Stage (ICPS)!

If you want to explore more of the science and stories behind both our Moon and our history of lunar exploration, the Night Sky Network's **Apollo 11 at 50 Toolkit** covers a ton of regolith: [bit.ly/nsnmoon!](https://bit.ly/nsnmoon) NASA also works with people and organizations around the world coordinating **International Observe the Moon Night**, with 2022's edition scheduled for Saturday, October 1: moon.nasa.gov/observe. Of course, you can follow the latest news and updates on Artemis 1 and our return to the Moon at nasa.gov/artemis-1



Follow along as Artemis 1 journeys to the Moon and back! A larger version at: nasa.gov/image-feature/artemis-i-map



Full Moon over Artemis-1 on July 14, 2022, as the integrated Space Launch System and Orion spacecraft await testing.

Photo Credit: NASA / Cory Huston

Source:

<https://www.nasa.gov/image-feature/a-full-moon-over-artemis/>

Some Observing High Jinks

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Want to share an observing experience or astrophoto.
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We would also welcome YOU to do a short 5-10
minute section of interest or new equipment you'd
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Create a Cartoon on a Space Theme

Contact our Editor John Land

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