A S T R O G A T E R

Volume 1 Number 4

June 2023

Grand Strand Astronomy Club
Monthly Events

General Membership Meeting:
Every 1st Thursday @ 7:00 pm
Meeting: VIA Zoom. Please see email or Facebook for link

Observing Session: June17 @ 8:00 pm
Location: Hampton Plantation
Gates open @ 6:00 pm

Newsletter Contents

Grand Strand Astronomer's Social Media

Grand Strand Astronomers Web Site

Grand Stand Astronomers Facebook

Insights From Ian

Welcome to summer! Unfortunately this time of year often brings clouds and rain for us. That has certainly been the case for the last three observing sessions. What are the chances? About 1 in 3 (29%). I once compiled some simple statistics for another astronomy group in North Carolina based on historical data for 30 or 40 years. The average observing session being a go was about 45% good weather by year or by decade. The longest streaks were 9 in row that were good in 1994 and 4 or 5 good in a row in 96, 99, 2000, 02, and 2015.

The bad weather streaks included two years (1991 and 2011) that had rain/cloud outs for 5 in a row and 4 in row (total of 9)! There were also bad weather streaks of 4 or 5 in 87, 92, 94, 89. 97, 03, 05, and 2009. However, it seems that streaks over 3 only occurred about 14% of the time and streaks over 2 about 29% of the time between 1984 and 2017. Finally, solar activity has been really high, so you can check out the Sun with a solar scope or via the online solar images at the National Solar Observatory at https://gong2.nso.edu/products/tableView/table.php?configFile=configs/hAlpha.cfg and there is a relatively close and bright supernova in M101.
Clear Skies. -I

Summery: Rained out for three months straight. Solar activity is high. Supernova in M101

Call For Volunteers

Grand Strand Astronomy Club is looking for volunteers to help with the social media platforms such as Facebook, YouTube and Twitter if the need arises. Presently Facebook needs a new face lift and be brought up to present time activities.

Our website can also use some TLC and someone responsible to keep it updated with club activities and astronomy related items.

The more members who volunteer, makes the club that more efficient and easier to maintain and more time for everyone to view the heavens!

If anyone would like to help in these categories, please contact Ian Hewitt at the email address below.

Comments and suggestions are welcomed. Send comments to gsastro.org/contact/.

Clear skies to all and remember to always look up!

Welcome To New Members

Join Grand Strand Astronomy Club

Membership in the Grand Strand Astronomers is only $25.00 per year. When you join our group of intrepid astronomers, you get the following benefits:

- Meeting local astronomers who have a wide range of expertise in observing and astrophotography
- Participating in events and discussions about astronomical topics
- Membership in the Astronomical League which includes a subscription to the Reflector magazine
- Finally, knowing you are helping to promote astronomy in the Greater Myrtle Beach area

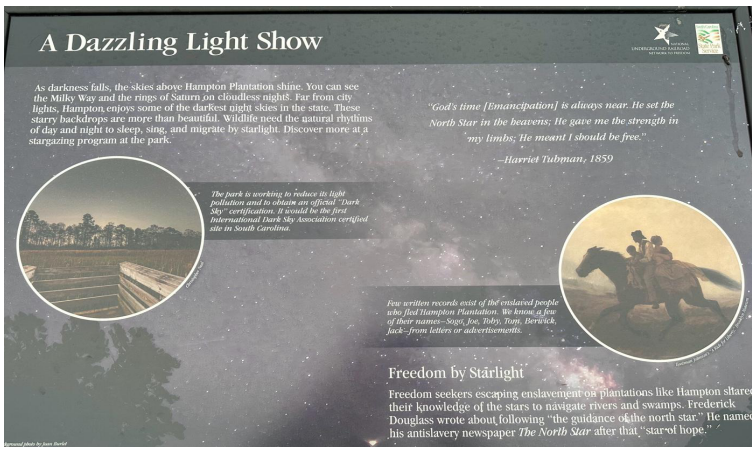
We hope you will choose to join our group. You can either join immediately using this form.
Or contact treasurer@gsa.org for other forms of payment.

New Member:
Grand Stand Astronomers Club welcomes Julie Farrell

Hammpton Plantation - Dark Sky

Many of our members have not been able to make it our dark sky observing location, Hampton Plantation State Park. It's a bit of a drive for Myrtle Beach residents as it is located past Georgetown off of Highway 17. But once you get there, it is well worth the drive.

We have a wide open field and a good view of the horizon. But best of all, it is really dark. As you well know, they are working on being declared the first official dark sky sight in the state of South Carolina. Our club, along with the Lowcountry Stargazers Club have been partnering with them to make this happen. Since we were clouded out of our last observing session, I took some time to walk around and discovered this a plaque mounted just beyond the fence.



I think it is worth sharing since it tells what the park is all about. Hope you can read it. We hope that our membership can make the drive and enjoy the dark sky at Hampton sometime soon. It is really an amazing sight.

May Meeting Recap

May 4 Meeting Recap

G. Drake

The meeting was held via Zoom with Ian welcoming all who are participating live and those who will watch on YouTube. We've had a lot of clouds lately and it's been hard to do any observing. Hopefully, we can get out soon.

Earth Day was April 27 and we had two locations where we supported activities. Ian was able to do some solar observing at Brookgreen Gardens. He had to work between rain showers, but was able to demonstrate solar observing. Denise moved her event at Ocean Bay Middle School to inside because of the weather. We could not do the planned solar observing there so she focused on indoor activities. Hopefully, we'll get another chance to hold a Brookgreen astronomy night in the fall. Ian was able to talk to the director at Huntington Beach State Park, and they are interested in an observing session there. Not sure when. They do a lot of programs there.

Ian will contact MB State Park for doing a public observing. We've held a successful event there in the past. Ian is planning something for the annular eclipse at Coastal Carolina. It's a partial eclipse. Their astronomy department has H-Alpha scopes on order. He will need volunteers to run those for this event.

Our next outdoor observing session at Hampton Plantation is on May 20th. We are at the end of galaxy season and hoping for clear skis this time. We'll use the usual viewing are**a.** Wear long pants and long sleeves. Mosquito repellent is advised for this time of year.

There is a planned workday for Hampton Plantation on May 13. This will be at the proposed public viewing sight. The work will not be rigorous. Involves picking up debris and placing in the dumpsters provided. It was noted in a follow-up e-mail that this work party is postponed until the fall.

We are looking for contributors to our newsletter. Doesn't have to be a literary masterpiece, but we are needing simple articles about astronomy from our members.
Membership cards were issued this week. We will continue these for each membership renewal period.

Ian gave the presentation: "May the 4th Be With You!" Many astronomers are fans of the Star Wars and Star Trek movies and TV series. There is a Star Trek observing list which is an astronomical index of the celestial objects mentioned in the Star Trek TV series and movies.

June Observations

June 1, 2 - Mars in the Beehive. The planet Mars will pass through the beehive cluster. A good pair of binoculars should be enough to see this rare event all though a telescope will provide a much better view.

June 4 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. T

June 4 - Venus at Greatest Eastern Elongation. The planet Venus reaches greatest eastern elongation of 45.4 degrees from the Sun.

June 12, 13 - Venus in the Beehive. The planet Venus will pass through the beehive cluster. A good pair of binoculars should be enough to see this rare event all though a telescope will provide a much better view.

June 18 - New Moon. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

June 21 - June Solstice. The June solstice occurs at 14:51 UTC. The North Pole of the earth will be tilted toward the Sun.

It was created by Clara Scattolin in August 2010, and featured in Sky and Telescope magazine. The list contains coordinates, finder views, and photographs of the objects mentioned in the series, as well as which episodes they were mentioned in. The list contains coordinates, finder views, and photographs of the objects mentioned in the series, as well as which episodes they were mentioned in. These objects are sorted in her list by Right Ascension. She even used a special Star Trek Font in the write-up. All the galaxies and stars mentioned in the series are listed. She also put together star charts with catalogs and pictures to help you locate them. None of the objects are hard to find, but you will need dark skis for some. Here is the link to the list: https://raleighastro.org/wp-content/files/Star_Trek_Observing_List.pdf.

Note that print-outs will get damp in the night with our humidity. Suggest putting them in plastic sleeves in a notebook to keep them dry. When observing, it's always good to carry a planisphere with star charts. Electronics are fickle. If your computer fails or the battery runs out, then you can still find celestial objects with your star charts.

There are lots of observing programs out there. Many can be found in the Astronomical League (AL) which our club belongs to. These are programs that you can complete and submit for awards. The benefit of these programs is to help you know what to look for in the night sky. Many can be done from home even in light-polluted areas. These help you know what to look at. Highly recommend keeping an observing list for your program with your telescope so that you can roll it out and start observing.

The moon is an excellent object that you can observe in the city or at a dark sky location. The Royal Canadian Astronomical Society has a program to observe the moon just using binoculars. These are easy to come by (you probably have some in your closet somewhere) and will show you a lot of detail. You can find the program at:
https://www.rasc.ca/sites/default/files/EtM_Binoculars_V4_0.pdf

Sky and Telescope magazine featured a Lunar 100 list in its April 2004 edition. It is based on the book by Charles Wood called The Modern Moon. The list starts with objects that are pretty easy to spot, then progressively gets harder. There are also several charts that you can find online. The moon does not have to be full for observing. With a half or quarter moon, you can focus in on the terminator line (separation between light and dark) and see a lot of detail and texture. Here is the link to the Lunar 100 Observing List: https://skyandtelescope.org/observing/the-lunar-100/

The Astronomical League also has a Lunar Observing Program. It is well-balanced because it develops naked eye, binocular, and telescopic observing skills. AL Lunar Observing Club Program can be found at: https://www.astroleague.org/al/obsclubs/lunar/lunar1.html

AL has a Solar System Observing Program, that you can learn a lot from. It starts with observing the sun, moon, inner planets, outer planets, and even asteroids and dwarf planets. You can find the AL Solar Observing Program at: https://www.astroleague.org/al/obsclubs/plantery/plnobscl.html.

The AL has many other programs that you can do from your driveway if you have a good view of the western horizon. They include finding Mercury and Venus in the daytime. Track Venus as it goes through its phases and note the size changes. Mars observing includes retrograde motion observation. AL's outer Solar System projects are pretty neat. They even have programs where you use only binoculars to mimic the same magnification that Galileo would have observed with. There is also a Double Star Club. Most of these are quite bright and you can see them in light-polluted skies. The important thing is to have your list ready when you go observe. That will make your observing more enjoyable.

There is an AL program called the Herschel 400. Obviously, it is a big commitment and considered "next level" observing. With this, you will need a telescope with 10" or greater aperture. So having a structured approach makes a difference when observing. The AL programs can provide that structure. There is one called Two in The View. This shows you 2 cool things in the eyepiece. AL has a lot of free online lists.

At this point, Ian stopped the online streaming.

The discussion continues with suggestions for classes. One member suggested a class on how to use a star atlas. Ian will look into that.

In discussing articles for the newsletter, it was noted that professional articles can be reproduced as long as credit is given and no copyrights are violated.

Ian is still working on the Social event. More to come on that soon.

Ian has the Hampton Plantation Horizon file ready for Stellarium. He will share with the club.

We discussed research that suggests some of the moons of Uranus could have oceans. Seems to be quite a few ocean worlds out there.

There was no club business except for encouraging new membership.

Meeting adjourned!

The Milky Way Spawns Stars

NEWS ASTRONOMY

The Milky Way may be spawning many more stars than astronomers had thought. Gamma rays reveal the galaxy's star-making power**.**

The Milky Way spawns stars in places such as the Rosette Nebula, seen here in a far-infrared image from the Herschel Space Telescope, and does so with much more vigor than astronomers had thought, according to a new study.

By Ken Croswell
FEBRUARY 23, 2023 AT 9:00 AM

The Milky Way is churning out far more stars than previously thought, according to a new estimate of its star formation rate. Gamma rays from aluminum-26, a radioactive isotope that arises primarily from massive stars, reveal that the Milky Way converts four to eight solar masses of interstellar gas and dust into new stars each year, researchers report in work submitted to arXiv.org on January 24. That range is two to four times the conventional estimate and corresponds to an annual birthrate in our galaxy of about 10 to 20 stars, because most stars are less massive than the sun. At this rate, every million years - a blink of the eye in astronomical terms - our galaxy spawns 10 million to 20 million new stars. That's enough to fill roughly 10,000 star clusters like the beautiful Pleiades cluster in the constellation Taurus. In contrast, many galaxies, including most of the ones that orbit the Milky Way, make no new stars at all.

"The star formation rate is very important to understand for galaxy evolution," says Thomas Siegert, an astrophysicist at the University of Würzburg in Germany. The more stars a galaxy makes, the faster it enriches itself with oxygen, iron and the other elements that stars create. Those elements then alter star-making gas clouds and can change the relative number of large and small stars that the gas clouds form.

Siegert and his colleagues studied the observed intensity and spatial distribution of emission from aluminum-26 in our galaxy. A massive star creates this isotope during both life and death. During its life, the star blows the aluminum into space via a strong wind. If the star explodes when it dies, the resulting supernova forges more. The isotope, with a half-life of 700,000 years, decays and gives off gamma rays.

Like X-rays, and unlike visible light, gamma rays penetrate the dust that cloaks the youngest stars. "We're looking through the entire galaxy," Siegert says. "We're not X-raying it; here we're gamma-raying it."

The more stars our galaxy spawns, the more gamma rays emerge. The best match with the observations, the researchers find, is a star formation rate of four to eight solar masses a year. That is much higher than the standard estimate for the Milky Way of about two solar masses a year.

The revised rate is very realistic, says Pavel Kroupa, an astronomer at the University of Bonn in Germany who was not involved in the work. "I'm very impressed by the detailed modeling of how they account for the star formation process," he says. "It's a very beautiful work. I can see some ways of improving it, but this is really a major step in the absolutely correct direction."

Siegert cautions that it is difficult to tell how far the gamma rays have traveled before reaching us. In particular, if some of the observed emission arises nearby - within just a few hundred light-years of us — then the galaxy has less aluminum-26 than the researchers have calculated, which means the star formation rate is on the lower side of the new estimate. Still, he says it's unlikely to be as low as the standard two solar masses per year.

In any event, the Milky Way is the most vigorous star creator in a collection of more than 100 nearby galaxies called the Local Group. The largest Local Group galaxy, Andromeda, converts only a fraction of a solar mass of gas and dust into new stars a year. Among Local Group galaxies, the Milky Way ranks second in size, but its high star formation rate means that we definitely try a lot harder.

Creating a Custom Block Horizon in Stellarium - Part 2

Ian Hewitt

Adding Your Horizon to Stellarium

Stellarium is great tool for planning when your astronomical target(s) will be visible. This will depend on date and time, but it also depends on your local horizon when or if some object or event is observable. Stellarium comes with a number or built-in landscapes you can select, but they will usually not match your conditions. An easy solution for this is to create your own landscape file. There are two types of landscapes that can be created, a block landscape or a photographic landscape. This article covers how to make a photographic landscape that will show an accurate and realistic depiction of your horizon in Stellarium.

Taking a horizon image

The first thing you need is an image of your horizon. You will need an image that covers all 360 degrees of your horizon. The easiest way to do this is to use a mobile phone and to use the panorama mode. This will let you take a 360-degree image of your local horizon. Alternatively, you can take multiple images of your horizon with any camera and use one of the many software packages to "stitch" them together to create a panorama. Just make sure that when taking the individual images, there is enough overlap for the software to work correctly.

Processing the horizon image

Once you have the horizon panorama, you will need to use it to create a special image file for Stellarium. The first step is to resize your panorama image. In an imaging processing application (like Affinity Photo, GIMP, or Adobe Photoshop), open the image and resize it so the horizontal dimension is 1024, 2408, or 4096 pixels. What size you choose depends on the resolution of your system, but the size must be a power of 2.

Once the panorama is resized, you can save that and then create a new blank canvas in your image editing program. This canvas needs to have a horizontal size that matches the one in the panorama and vertical size of one half the horizontal size (e.g., 2048x1024). It is also important the canvas be set to transparent. Once the canvas is created copy/past the panorama into the canvas. Move the panorama until there is no gap on either side so that the actual true horizon in the image is located at the midpoint of the vertical axis. Once the panorama image is located properly, you need to use the selection and deletion tools in your image processing program to remove any portions of the sky that show in the image so that those portions of the image are transparent. The area for the ground in the bottom half of the image needs to not be transparent, so you can use the tools to draw a rectangle with a dark color (like black) to cover any transparent areas in the bottom half of the image. Save the image and export it to a png file.

Creating the files

Landscapes consist of two files. The first is the image file you just created. The second file you need to create is a landscape.ini file. It is easiest to copy this from another Stellarium landscape directory (you can find all the landscape directories in C:\Program Files\Stellarium\landscapes\ [Windows] or ~/Library/Application Support/Stellarium/landscapes/ [Mac OS]). The file will have the format like:

```
[landscape]

name = Hampton State Park 4K
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June - July 2023: Observing with Binoculars

Tim Kelly

Night time observing of astronomical objects with binoculars provides a major step up in seeing an increase of astronomical objects along with more details that can not be seen with the unaided eye. Using binoculars helps to gain observing skills such as learning the constellations, identifying stars and star hopping. Use the Orion's Sky Chart, (found at the end of this newsletter) any star atlas, or free astronomy software such as Stellarium to find the objects listed below**.**

Ly = Light years

Looking North:
Double Star for Binoculars
Mizar/Alcor
Galaxies for Binoculars
M81 & M82 (10 Million Ly)

Looking West:
Double Stars for Binoculars
65 Ursae Majoris (easy)
17 Comae Berenices (wide, easy)
17 Canes Venatici (easy)
Star Clusters for Binoculars
Coma Berenices (naked eye)
M44 (Beehive Cluster)
M67 (small misty patch)
Global Cluster for Binoculars
M3 (compact hazy spot; 35,000 Ly)

Looking South:
Double Stars for Binoculars
Zubenelgenubi (wide, very easy)
17 Canes Venatica (equal)
Mu Bootis (brightness difference)
17 Comae Berenicves (wide, easy)
Star Clusters for Binoculars
Coma Berenices (naked eye)
Global Cluster for Binoculars
M3 (compact hazy spot; 35,000 Ly)
M5 (compact hazy spot; 26,000 Ly)
Galaxies for Binoculars
M104 (Sombrero Galaxy; 50 Million Ly)

Looking East:
Double Stars for Binoculars
Nu Draconis (like miniature headlights)
16-17 Draconius (wide, easy)
Mizar (Alcor; naked eyes companion)
17 Cars Venatici (equal)
Global Cluster for Binoculars
M3 (compact hazy spot 35,000 Ly)
M5 (compact hazy spot 26,000 Ly)
M13 compact hazy spot)

NASA In The News

Tim Kelly

Artemis I Overview

Artemis I, formerly Exploration Mission-1,will be the first integrated flight test of NASA's Deep Space Exploration Systems: the Orion spacecraft, Space Launch System (SLS) rocket, with the newly upgraded Exploration Ground Systems at Kennedy Space Center in Cape Canaveral, Florida.

The primary operations goal of the mission is to assure a safe crew module entry, descent, splashdown, and recovery. In addition to sending Orion on its journey around the Moon, SLS will carry 10 small satellites that will perform their own science and technology investigations. The first in a series of increasingly complex missions, Artemis I will provide a foundation for human deep space exploration and demonstrate our commitment and capability to extend human existence to the Moon and beyond prior to the first flight with crew on Artemis II.

Artemis I is foundational to the space economy, fueling new industries and technologies, supporting job growth, and furthering the demand for a highly skilled work force. Men and women in all fifty states are hard at work building the Deep Space Exploration Systems to support missions to deep space. NASA prime contractors, Aerojet Rocketdyne, Boeing, Jacobs, Lockheed Martin, and Northrop Grumman currently have over 3,200 suppliers contributing to the milestone achievement that heralds the success of America's human spaceflight program.

More details about Artemis I Overview
View Artemis I Map
Watch Artemis I Video Animation

James Webb Space Telescope Science

The James Webb Space Telescope is a giant leap forward in our quest to understand the Universe and our origins. Webb will examine every phase of cosmic history: from the first luminous glows after the Big Bang to the formation of galaxies, stars, and planets to the evolution of our own solar system. The science goals for Webb can be grouped into four themes:

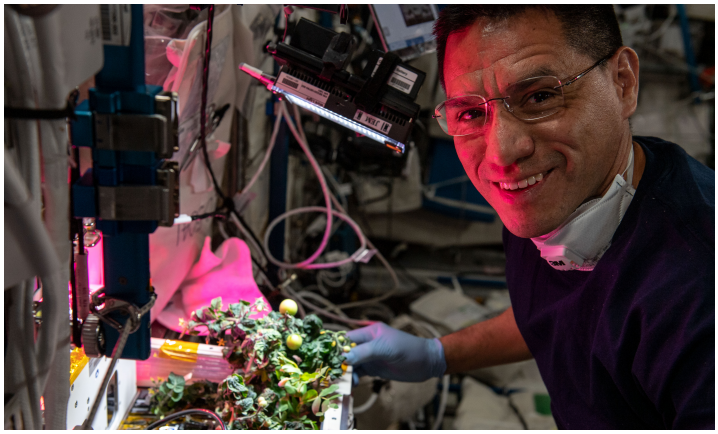
The End of the Dark Ages: First Light and Reionization - Webb is a powerful time machine with infrared vision that will peer back over 13.5 billion years to see the first stars and galaxies forming out of the darkness of the early universe.

Assembly of Galaxies - Webb's unprecedented infrared sensitivity will help astronomers to compare the faintest, earliest galaxies to today's grand spirals and ellipticals, helping us to understand how galaxies assemble over billions of years.
The Birth of Stars and Protoplanetary Systems - Webb will be able to see right through and into massive clouds of dust that are opaque to visible-light observatories like Hubble, where stars and planetary systems are being born.
Planetary Systems and the Origins of Life - Webb will tell us more about the atmospheres of extrasolar planets, and perhaps even find the building blocks of life elsewhere in the universe. In addition to other planetary systems, Webb will also study objects within our own Solar System.

Want to know more? Visit the James Webb Space Telescope project home page.

Space Station

Smithsonian Latino Museum Students to Hear from NASA Station Astronaut



(Oct. 11, 2022) NASA astronaut Frank Rubio performs fluid management and seed cartridge/plant inspections on the eXposed Root On-Orbit Test System (XROOTS) payload. Credits: Kjell Lindgren/NASA

Frank Rubio, a NASA astronaut aboard the International Space Station, will speak to students associated with the Smithsonian Institution's National Museum of the American Latino.

NASA coverage of the Earth-to-space call will begin at 11 a.m. EDT Thursday, May 18, on NASA Television, the NASA app, and the agency's website.

Rubio, who is on track to break the record for longest single flight mission by a U.S. astronaut, will answer prerecorded questions from Arizona, Georgia, Texas, and Washington, D.C., students. Rubio earned his doctorate from the University of Uniformed Services of Health Sciences in Bethesda, Maryland. Rubio is the first NASA astronaut of Salvadoran heritage to fly to space. The downlink, hosted by the Smithsonian's National Museum of the American Latino will showcase Latino role models in STEM fields and inspire students to pursue science, technology, engineering, and math.

Media interested in covering the event should respond no later than 5 p.m. on Monday, May 15, by contacting David Coronado at: coronadod@si.edu or 202-633-9004.

For more than 22 years, astronauts have continuously lived and worked aboard the space station, testing technologies, performing science, and developing the skills needed to explore farther from Earth. Astronauts aboard the orbiting laboratory communicate with NASA's Mission Control Center in Houston 24 hours a day through the Space Communications and Navigation (SCaN) Near Space Network.

Important research and technology investigations taking place aboard the International Space Station benefits people on Earth and lays the groundwork for future exploration.

As part of Artemis, NASA will send astronauts to the Moon to prepare for future human exploration of Mars. Inspiring the next generation of explorers – the Artemis Generation – ensures America will continue to lead in space exploration and discovery.

See videos and lesson plans highlighting research on the International Space Station at:

https://www.nasa.gov/stemonstation

NASA Science: Observing The Moon Part 1

Viewing Guide

The Moon is Earth's constant companion, the first skywatching target pointed out to us as children. We watch its face change as the month progresses, and see patterns and pictures in its geological features.

It's the object in the night sky that humanity knows best — and the one that's easiest to study. Whether your tools are a telescope, a pair of binoculars, or just your eyes, you can find plenty of features on the Moon.

We only ever see one side of the Moon from Earth. That's because the interplay of gravity between Earth and Moon slows the Moon into a rotation that paces its own. The Moon rotates, but it rotates at the same speed that it orbits around Earth. This keeps the same side always turned toward us. We call this being "tidally locked."

The Moon has no glow of its own, but shines with the reflected light of the Sun. During its crescent phase in the twilight or dawn, you can also sometimes see the dark portion of the Moon glowing faintly in the sunlight that reflects off Earth, an effect called earthshine.

You can look at the Moon during any of its illuminated phases, but for better viewing of craters and mountains, try phases other than the full Moon. The shadows on the surface will be more pronounced, and help distinguish features you might otherwise miss.

The near side of the Moon, as seen by the cameras aboard NASA's Lunar Reconnaissance Orbiter spacecraft. Credit: NASA/GSFC/Arizona State University

Mapping the Moon and Mars using QGIS and ArcGIS

By Megan Eskey

Do you have an interest in making digital maps of the planets? If so, the two biggest software competitors today are Esri's ArcGIS, a proprietary solution, and Quantum GIS, an open-source solution. Although both can do most of anything you would need for a planetary project, there are advantages and disadvantages to both, depending on what you want to accomplish.

Quantum GIS, or QGIS, is an open-source solution. The source code is available to add features and extend its capabilities through an international community of developers and end users. It is free, so is widely used by government agencies, and is probably better for individual projects. It has a steep learning curve, but faster processing times. It comes with a suite of plug-ins contributed by the QGIS community, and is compatible with a wide range of data formats.

ArcGIS is a commercial product with a paid licensing model that includes a suite of software solutions including ArcGIS Online and ArcGIS Pro, with an optional set of extensions. The entry point is about $100/year, but that goes up quickly depending on requirements. Most large organizations use ArcGIS because it comes with good collaboration tools, is very well documented, and has sophisticated training modules, some of which are free.

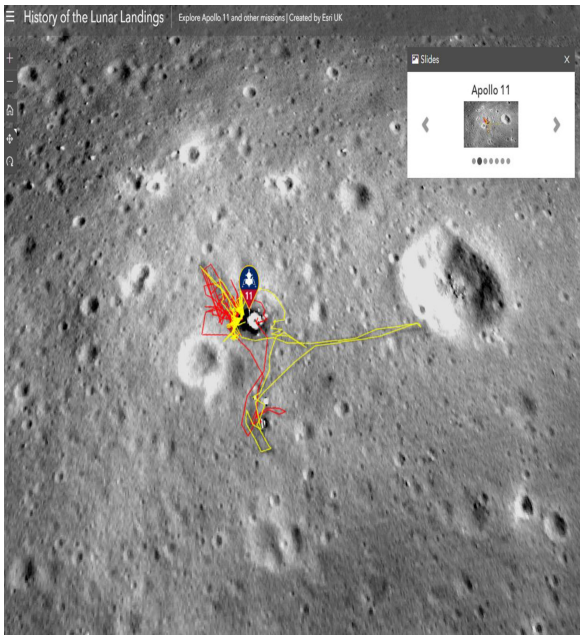
For organizations like the Grand Strand Astronomers, ArcGIS for personal use is probably sufficient to get started, keeping costs low. If members want to share projects easily between themselves, then upgrade to ArcGIS for business. With QGIS, version control is more of a challenge for shared projects, but it is possible to run multiple instances on the same server.

Both ArcGIS and QGIS have good examples of lunar maps, with Esri UK's example marking the 50th anniversary of the Apollo 11 Moon landing:

History of the Lunar Landings 3D Map

QGIS has an example that provides step-by-step instructions:

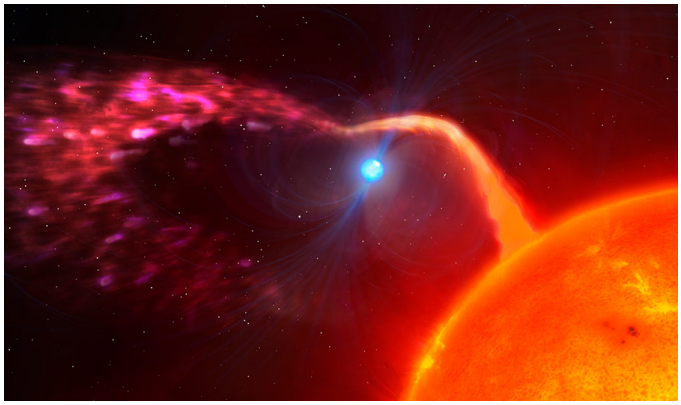
Creating interactive 3D moon models using QGIS



I am a new member to the Grand Strand Astronomers and have recently defined a planetary address framework based on low slope routes and quadrangles. I would love to find people who were interested in helping me to make the first map of the moon to include roads, based on my framework. I have yet to see a map of the moon that includes a system of roads, although the ArcGIS example above does include the historical rover traverses. If interested feel free to reach out to me directly at**:** Megan.Eskey@reloquence.com and I'd be happy to organize a small GIS working group.

Spinning Propeller Star Slingshots Plasma at 7 Million MPH

Charles Q. Choi, Contributor



(Inside Science) -- Astronomers have detected the fastest-spinning white dwarf star found yet -- one that researchers say acts like an extraordinarily powerful magnetic propeller, a new study finds.

White dwarfs are stars that have burnt up all their fuel and shed their outer layers, leaving behind their cool, dim cores. Our sun will one day become a white dwarf, as will more than 90% of the stars in the Milky Way.

In the new study, researchers analyzed the white dwarf in the binary star system LAMOST J024048.51+195226.9. The white dwarf is a stellar remnant about 2,015 light-years from Earth that is roughly our planet's size but at least 230,000 times its mass. The researchers imaged the spinning of the star using the highly sensitive HiPERCAM instrument on the largest functioning optical telescope in the world, the 10-meter-wide Gran Telescopio Canarias in Spain's Canary Islands.

The white dwarf's powerful gravity yanks plasma off its larger companion, a red dwarf star. In the past, this material fell onto the white dwarf's equator at high speed, resulting in its extraordinarily fast spin.

The white dwarf also possesses a strong magnetic field, which acts like a protective barrier that causes most of the plasma falling onto it to blast out from the dead star at speeds of roughly 6.7 million mph. This makes this stellar remnant only the second "magnetic propeller" white dwarf ever found, more than 70 years since the first.

Any plasma that doesn't get propelled away from J0240+1952 flows toward the white dwarf's magnetic poles. It gathers in bright spots on the white dwarf's surface, and as these rotate in and out of view from Earth, astronomers observe pulses of light, which they use to measure the white dwarf's rate of spin.

All in all, the white dwarf completes one full rotation in a record-breaking 25 seconds. That is nearly 20% faster than the next fastest-spinning white dwarf, which completes a revolution in just over 29 seconds. "Put into Earth's perspective, it is like the day only lasted for 25 seconds," said study lead author Ingrid Pelisoli, an astrophysicist at the University of Warwick in England.

These findings help support theoretical predictions of how magnetic propellers should behave, which scientists had not been able to confirm until they found a second example of one. "I find it very satisfactory to find exactly what you expected," Pelisoli said.

The scientists detailed their findings online Nov. 22 in the journal Monthly Notices of the Royal Astronomical Society.

The Roman Imperial Army and Its Connection With NASA

Author Unknown

The US standard railroad gauge (distance between the rails) is 4 feet, 8.5 inches. That's an exceedingly odd number. Why was that gauge used? Well, because that's the way they built them in England, and English engineers designed the first US railroads. Why did the English build them like that? Because the first rail lines were built by the same people who built the wagon tramways, and that's the gauge they used.

So, why did 'they' use that gauge then? Because the people who built the tramways used the same jigs and tools that they had used for building wagons, which used that same wheel spacing. Why did the wagons have that particular odd wheel spacing? Well, if they tried to use any other spacing, the wagon wheels would break more often on some of the old, long distance roads in England . You see, that's the spacing of the wheel ruts.

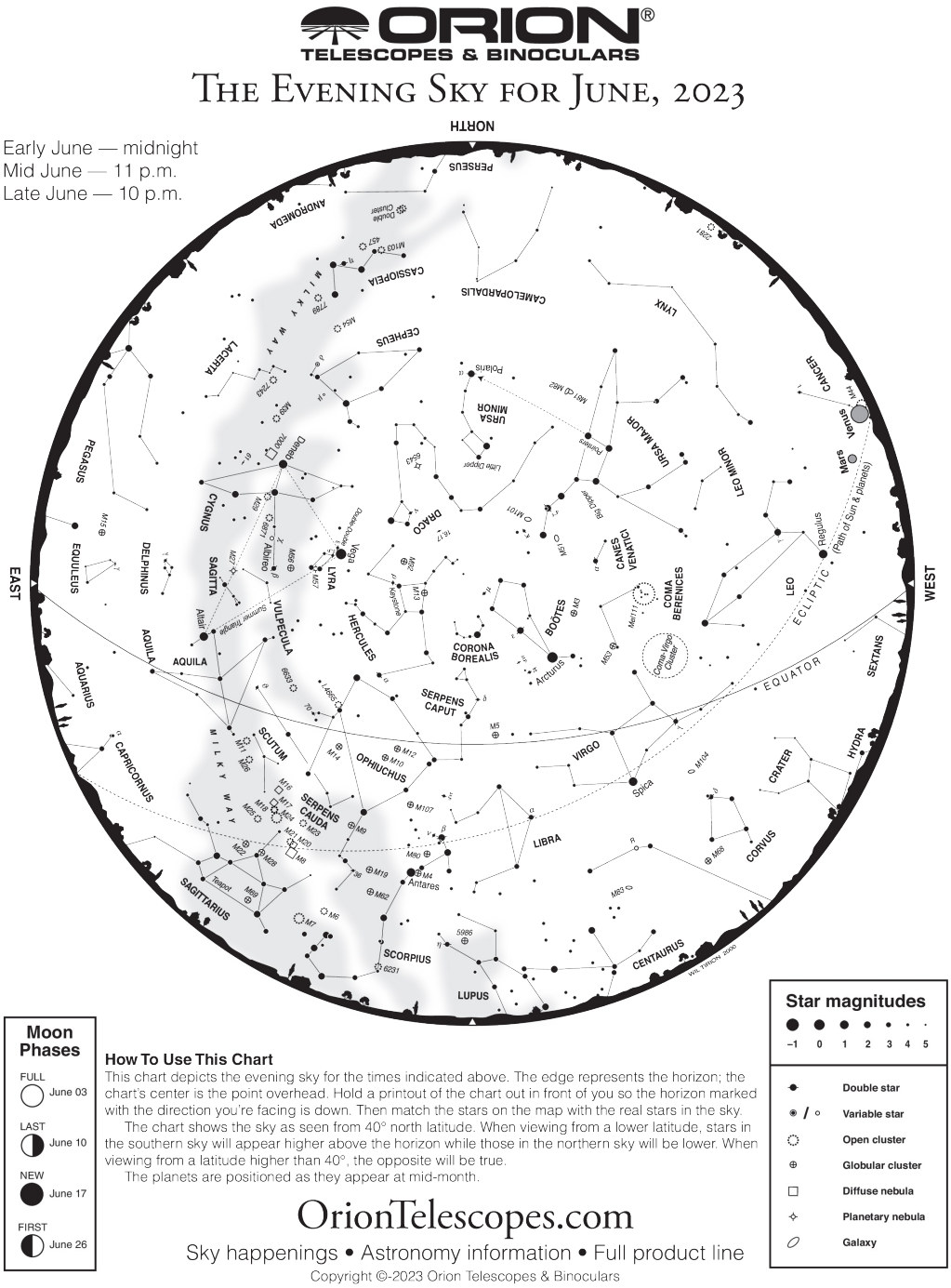
So who built those old rutted roads? Imperial Rome built the first long distance roads in Europe (including England) for their legions. Those roads have been used ever since. And what about the ruts in the roads? Roman war chariots formed the initial ruts, which everyone else had to match or run the risk of destroying their wagon wheels. Since the chariots were made for Imperial Rome, they were all alike in the matter of wheel spacing. Therefore the United States standard railroad gauge of 4 feet, 8.5 inches is derived from the original specifications for an Imperial Roman war chariot. Bureaucracies live forever.

So the next time you are handed a specification/procedure/process and wonder 'What horse's behind came up with this?', you may be exactly right. Imperial Roman army chariots were made just wide enough to accommodate the rear ends of two war horses. (Two horses' behinds).

Now, the twist to the story: When you see a Space Shuttle sitting on its launch pad, there are two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters, or SRBs. The SRBs are made by Thiokol at their factory in Utah . The engineers who designed the SRBs would have preferred to make them a bit fatter, but the SRBs had to be shipped by train from the factory to the launch site.

The railroad line from the factory happens to run through a tunnel in the mountains, and the SRBs had to fit through that tunnel. The tunnel is slightly wider than the railroad track, and the railroad track, as you now know, is about as wide as two horses' behinds. So, a major Space Shuttle design feature, of what is arguably the world's most advanced transportation system, was determined over two thousand years ago by the width of a horse's behind. And you thought being a horse's behind wasn't important? Ancient horse's behinds control almost everything.

Orion's Sky Chart



Newsletter Front Photograph:

Courtesy of Chris Taylor

Horsehead Nebula (also known as Barnard 33 in emission nebula IC 434) is a dark nebula in the constellation Orion.