ASTROFILES

Auburn Astronomical Society Newsletter

July 2022 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

Moon Phases

July 20 — Last Quarter

July 28 — New Moon

August 5 — First Quarter

August 11 — Full Moon

August 19 — Last Quarter

August 27 — New Moon

September 3 — First Quarter

September 10 — Full Moon

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News and events

Great News!

As we reported in last month's newsletter, the W.A. Gayle Planetarium in Montgomery announced its closure as Troy University had decided to end its long-standing operation of the facility by returning it to the City of Montgomery. At that time, the future of the planetarium was unknown and many in the community were dismayed to see such an important asset possibly close forever. However, a lot of behind the scenes discussions were in the works and recently it was announced that the planetarium would indeed reopen soon and be operated by the Montgomery Zoo. Former planetarium director Rick Evans recently posted the exciting news and we can all rejoice that the community will continue to enjoy this incredible facility. Here is Rick Evan's post on the planetarium's Facebook page where he made the official announcement:

"The plan for the Planetarium is to reopen to the public on or about mid-August time frame!!!! I have been working diligently with the city to transfer all of the infrastructure (personnel, policies, procedures, connectivity, social media, etc.) from the University over to the city of Montgomery. The Planetarium will be under the direction of the Montgomery Zoo. I believe this is a perfect fit and can't thank the Zoo Director enough for being willing to absorbed the Planetarium into her operation. We have been collaborating on some major improvements for the future of the Planetarium. Hopefully we will be able to share some updates on those initiatives once we reopen. I also thank each of you for your positive words of encouragement in support of the Planetarium."

Rick Evans, Director (Interim) W.A. Gayle Planetarium

The James Webb Space Telescope (JWST) is finally operational!

The James Webb Space Telescope was successfully launched on December 25, 2021 and ultimately arrived at its final location in space, one of the LaGrange points approximately 1 million miles from Earth. After a long and complex series of deployments of the sunshield, mirror and supporting structures, the task then moved to the adjustment and calibration of the mirrors and electronics. Finally, on July 11, 2022, the public was treated to the first images from the telescope and they did not disappoint. Astronomers and the public were both astounded with the quality of these first images and I have included a couple here.

The image at the left is a capture of a cluster of galaxies known as SMACS0723. In addition to the sheer number of individual galaxies that are visible, it also shows the effect of gravitational lensing. The combined central mass of galaxies act as a lens to bend the light coming from behind them so that we can actually see what is even farther beyond. In a way, this image could be described as the Webb Deep Field, similar to the now famous Hubble Deep Field image of years past. However, where the Hubble image was comprised of several weeks of continuous exposure, the Webb image here was captured in less than 24 hours.

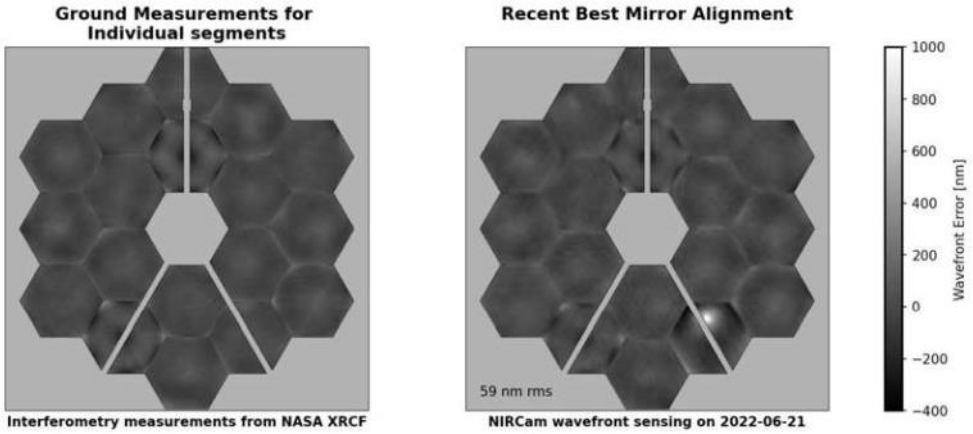
The image below is a star-forming region known as NGC 3324 in the Carinal Nebula. To get a better idea of how much better the Webb images will be as compared to previous efforts such as the Hubble telescope, look on the next page. This region in the Carina Nebula was previously imaged by Hubble, but the wealth of new detail in the Webb capture is truly amazing.

Just how much better is the Webb telescope as compared to Hubble? Here's one example.

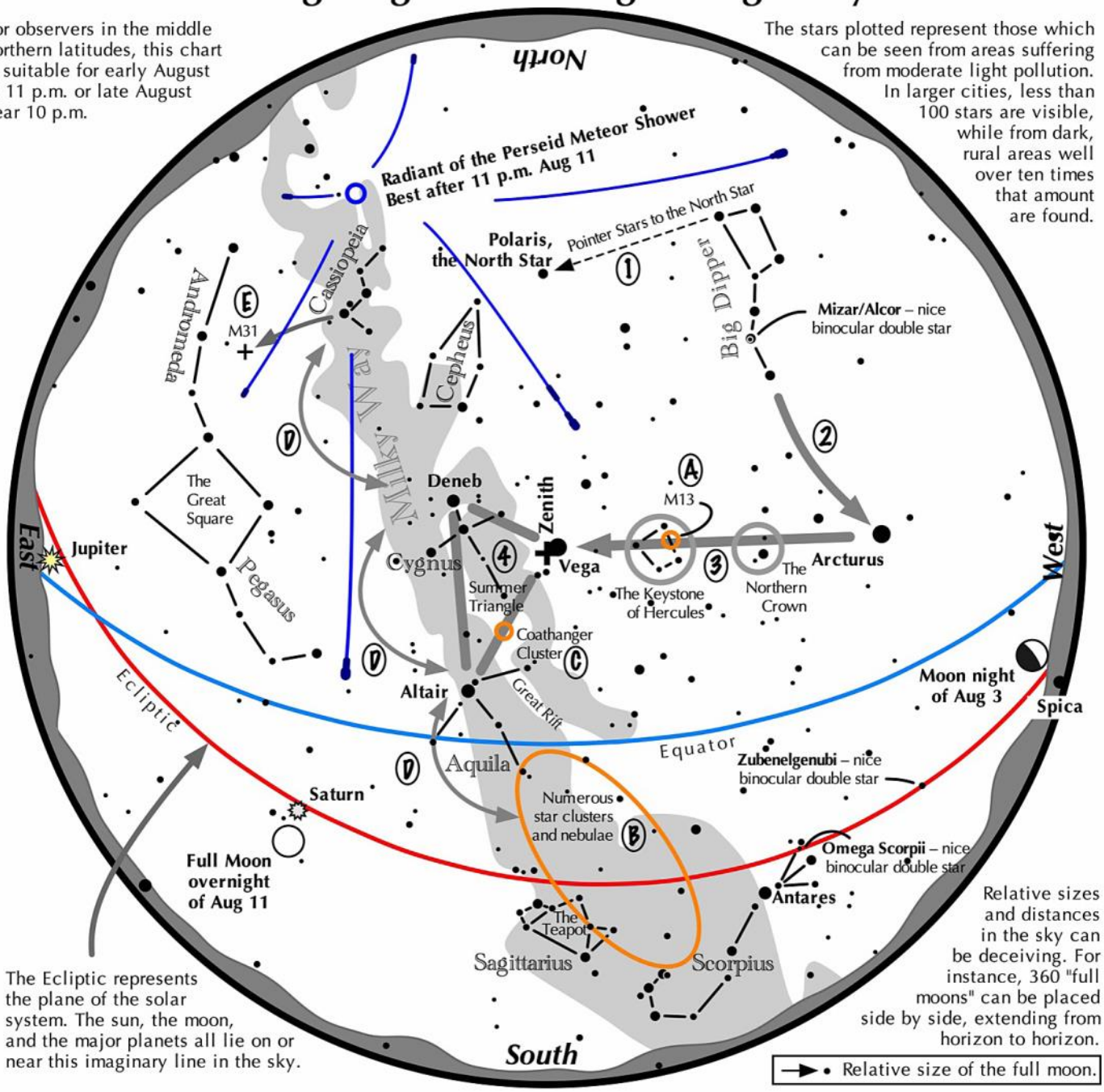
In the image pair above, we see similar sections of the Carina Nebula. The left image was taken with the Hubble telescope and at the time, I'm sure that it was deemed to be an astounding image. The image on the right is the same section of the nebula as viewed with the Webb telescope. In addition to the amazing increase in overall sharpness, the wealth of new detail is breathtaking. There are two main reasons for this. First, the Webb's segmented mirror is many times larger than that of Hubble. As most of us know, a bigger telescope will always result in increased resolution as well as light-gathering power. Second, the Webb telescope operates primarily in the infrared region of the spectrum, and that enables it to see through much of the interstellar dust and gas that blocks a more visible-light instrument like Hubble.

A recent event could possibly spell trouble for the future of the Webb telescope.

Earlier this year during the commissioning phase of the Webb telescope, the engineers noted that the scope sustained a larger than expected strike by a micrometeoroid. Some of this was expected, but upon a more detailed analysis it is now apparent that one of the scopes 18 mirror segments has suffered some irreversible damage. The engineering analysis below clearly shows the mirror damage to segment C3 (in the lower right of the right hand image.) For now, the overall performance of the telescope has not been significantly diminished but if similar strikes like this become more numerous than expected, then the long-term future of the telescope could be in jeopardy. Unlike the Hubble telescope mirror which is enclosed within a tube structure, the Webb mirror is out in the open and fully exposed to space with no protection.



Navigating the mid August Night Sky



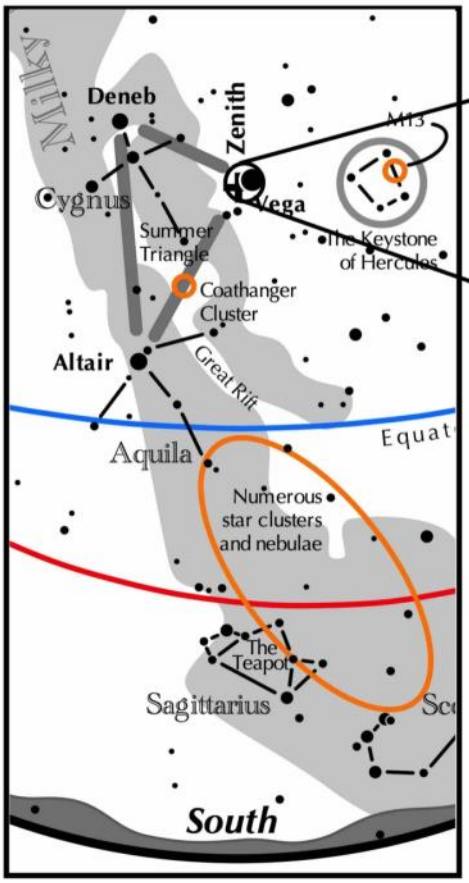
Navigating the mid August night sky: Simply start with what you know or with what you can easily find.

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

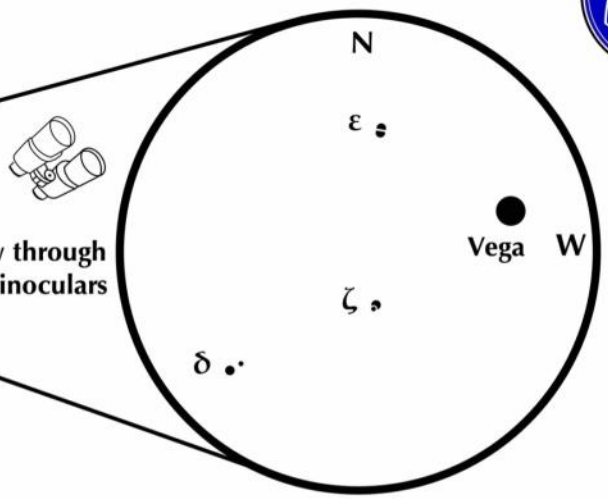
Binocular Highlights

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

If you can observe one evening celestial scene this month, consider this one:



Facing south 90 minutes after sunset



3 amazing double plays

Face directly south and look overhead 90 minutes after sunset. (Bright moonlight may interfere August 4 - 14.)

- Lie on your back and look directly overhead at the bright blue-white star Vega.
- Aim a pair of binoculars at Vega, and place it near the western edge of the field.
- In the field's northern half lies Epsilon Lyrae. Hold the glasses steady and its two similarly bright stars can be seen next to each other.
- Look just below the center of the field for Zeta Lyrae. Keen eyed binocular users can discern two stars, one brighter than the other.
- On the southeastern section of the binocular field shines Zeta. Again, steadily held binoculars reveal two stars.

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

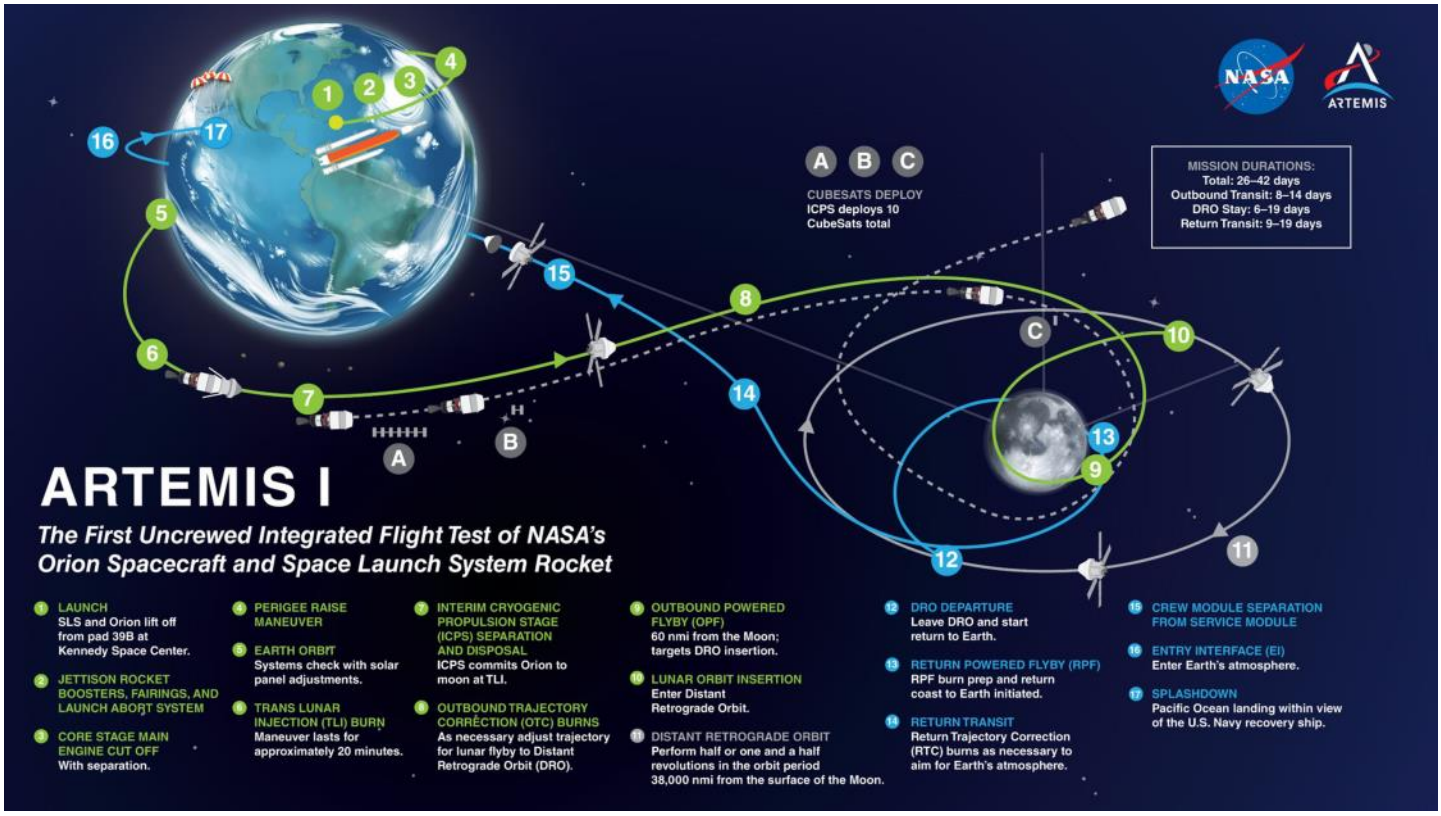
We are returning to the Moon - and beyond! Later this summer, NASA's Artemis 1 mission will launch the first uncrewed flight test of both the Space Launch System (SLS) and Orion spacecraft on a multi-week mission. Orion will journey thousands of miles beyond the Moon, briefly entering a retrograde lunar 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 millions 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!** 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 of this infographic is available from NASA 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/

Auburn Astronomical Society

Membership Application Form

Name:
_____

Address:
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City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Date of Application*** _____/_____/_____

E-mail:
_____

Telescope(s):
_____

_____

Area(s) of special interest:
_____

_____

Enclose: $20.00 for regular membership, payable in January. *Full-Time* student membership is half the Regular rate.

*** For *NEW* members joining after January, refer to the prorated Dues Table below:**

Jan $20.00	Feb $18.33	Mar $16.66	Apr $14.99	May $13.33	Jun $11.66
Jul $10.00	Aug $8.33	Sep $6.66	Oct $4.99	Nov $2.33	Dec $1.66

Make checks payable to: Auburn Astronomical Society and return this application to:

Auburn Astronomical Society
c/o John Wingard
5 Wexton Court
Columbus, GA 31907

For questions about your dues or membership status, contact: jwin1048@gmail.com

Thank you for supporting the Auburn Astronomical Society