Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers August 2022

Events: General Meeting, Monday, August 1, 2022, at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, and/or ZOOM, at 6:00 PM.

- **IFI & Gallery by Clark Williams**
- **Slow Death: the Story of Planetary Nebulae by John Garrett**
- **Movie "Search For Planet B" – continued (Time permitting)**
- **Refreshments by Kevin Pahl**

Star Parties at South Coast Winery every Friday evening in August.

For upcoming school Star Parties check the Calendar on the web page.

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Paul Kreitz <pkreitz@sbcglobal.net> by the 20th of the month for the next month's issue.

JWST First Images Released-

On July 12, 2022 NASA released the first images other than test and alignment images from the James Webb Space Telescope This one got the most public media play:

General information:
Subscription to the TVA is included in the annual $25 membership (regular members) donation ($9 student; $35 family).

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Cosmic Comments – August 2022

By Mark Baker

The LONG awaited James Webb Space Telescope (JWST) has been, well, worth the wait…!!! We have gotten to peruse and ponder the First Light images and are party to awe and wonder exponentially greater than what Hubble provided.

But this was just the opening act in what will prove to be an eye opening play… we are already accumulating questions that we didn't know we had just a short time ago. Humanity stands to learn so much, and I'm especially anxious for images involving exo-planets… how many Planet B's will we find?? I lean on the side of conservancy when I say probably more than we can count!!!

But this should only serve to ignite our own contributions to the burgeoning field of Astronomy… I remember how enthralled we were with the deep field image Sam Pitts had provided earlier this year, and we should be inspired by those amongst us that can do such great imaging work. That doesn't mean we have to match or compete with anyone else, but we should push our own personal threshold involved in Looking Up… There is something for everyone in the Cosmos. I'm thankful that TVA has always provided a foundation for all our interests, as well as inspire and encourage members of our communities to do likewise… Here's to keeping the traditions of our past, and enhancing them with a better future, as something as simple as an eVscope can do!!! Besides, darn it… it's fun!!!

Clear, Dark Skies

Looking Up Redux – August 2022

Compiled by Clark Williams
from these sources:
SeaSky.org
Wikipedia.com
in-the-sky.org
The American Meteor Society, Ltd.
cometwatch.co.uk
NASA.gov
TVA App (2.0.1296)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 7 (7.6.3.1373)
SkySafari 6 Pro (6.1.1)
Stellarium (0.18.2)
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME (PST / PDT) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)
hh:mm:ss or hhmmss
hhmm+ (time of the next day)
hhmm− (time of the previous day)
hhmm (seconds not shown)
yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Thursday	**the 11th**	**@ 1836 FULL in CAPRICORNUS**
Thursday	**the 18th**	**@ 2137 THIRD QTR in TAURUS**
Saturday	**the 27h**	**@ 0118 NEW in LEO**
Friday	**the 5th**	**@ 0407 First QTR in LIBRA**

Apogee comes on 2022-08-22 @ **2154 – 405,418 km (251,915 mi)**
Perigee comes on 2022-08-10 @ **1716 – 359,829 km (223,587 mi)**

2022 has: (13) new moons, (13) 1st Qtr moons, (12) Full moons, (12) 3rd Qtr moons
(0) Blue moon and (2) Black moons

Daylight Savings: Starts: 2022-Mar-13 : Ends: 2022-Nov-06

Luna: Luna is waxing crescent on the first of the month, headed for 1st quarter on the 5th rising at **0836**, transiting at **1519** and setting by **2156**. Luna by mid-month is 85% illuminated. Rising at 2208 and transiting at **04361+** setting at **1108+**. By the-end-of-the-month Luna is rising at **1030** transiting at **1611** and setting by **2151**.

Highlights: (distilled from**: SeaSky.org** and **Clark's planetary Orrey** program[s]**)**

August 12 - Full Moon, Supermoon*. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 0136 UTC. This full moon was known by early Native American tribes as the Sturgeon Moon because the large sturgeon fish of the Great Lakes and other major lakes were more easily caught at this time of year. This moon has also been known as the Green Corn Moon and the Grain Moon. This is also the last of three supermoons* for 2022. The Moon will be near its closest approach to the Earth and may look slightly larger and brighter than usual.

August 12, 13 - Perseids Meteor Shower. The Perseids is one of the best meteor showers to observe, producing up to 60 meteors per hour at its peak. It is produced by comet Swift-Tuttle, which was discovered in 1862. The Perseids are famous for producing a large number of bright meteors. The shower runs annually from July 17 to August 24. It peaks this year on the night of August 12 and the morning of August 13. Unfortunately, the nearly full moon this year will block out all but the brightest meteors. But the Perseids are so bright and numerous that it could still be a decent show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Perseus, but can appear anywhere in the sky.

August 14 - Saturn at Opposition. The ringed planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Saturn and its moons. A medium-sized or larger telescope will allow you to see Saturn's rings and a few of its brightest moons.

August 27 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 0817 UTC. 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.

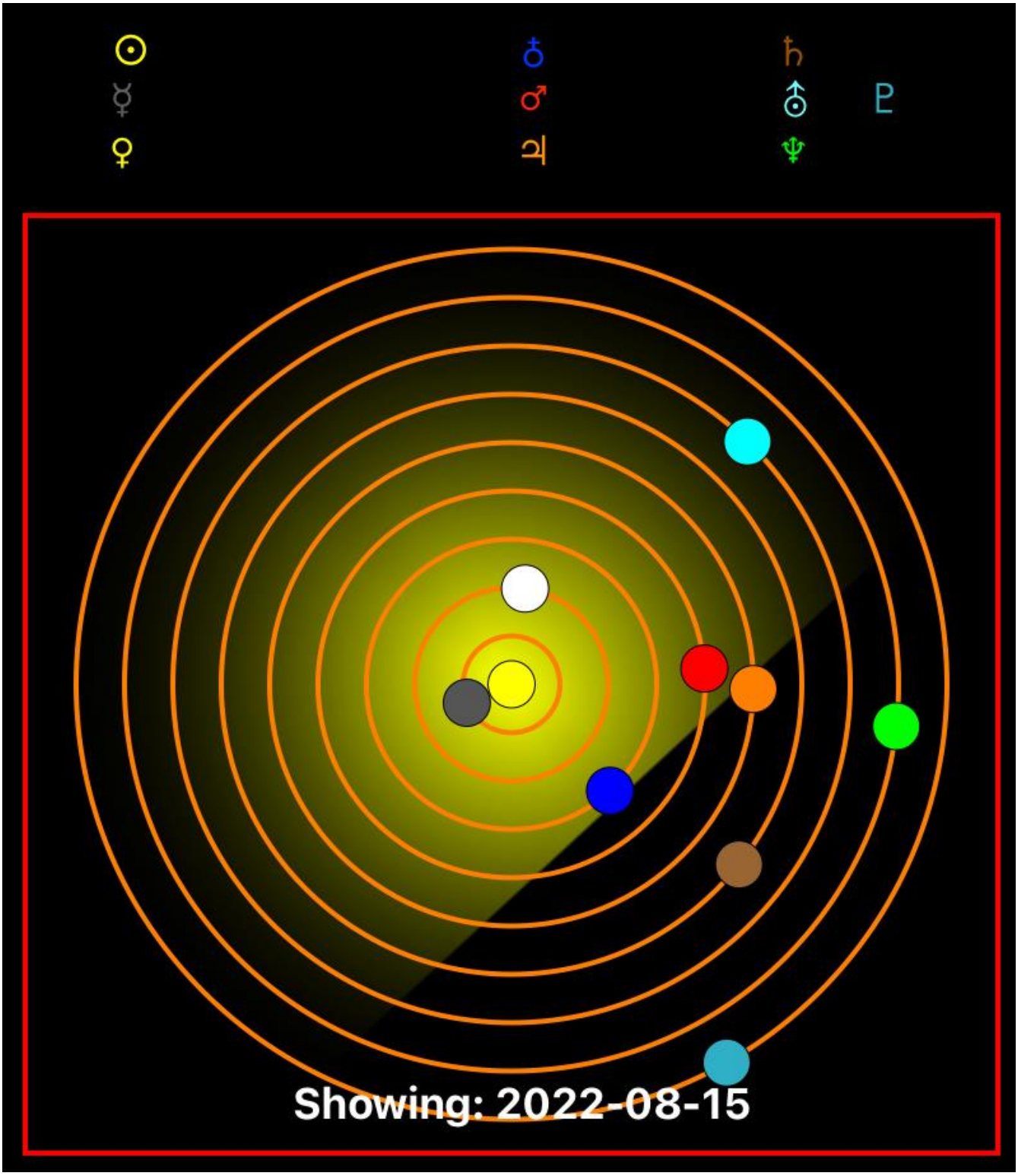
August 27 - Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 27.3 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

* Note: “Supermoon” is an astrological term **NOT** an astronomical term.

Algol minima: (All times Pacific Time)

08/02/2022	**2133**
08/05/2022	**1821**
08/08/2022	**1510**
08/11/2022	**1159**
08/14/2022	**0847**
08/17/2022	**0536**
08/20/2022	**0225**
08/22/2022	**2313**
08/25/2022	**2002**
08/28/2022	**1650**
08/31/2022	**1339**

Planets:
Planetary Positions August 2022: (from TVA App iOS version)



- **Mercury:** Mercury is an evening object in the beginning of the month. It is illuminated at 85% and -0.53 apparent magnitude. Mercury rises at **0717** with the sun preceding at **0559**. Mercury transits at **1401** and sets at **2004**. Mercury by mid-month is still an evening object rising at **0809**, transiting at **1426** and setting at **2042**. By the 31st Mercury rises at **0831** sets at **2014** preceded.
- **Venus:** Is the morning star on the first of the month, rising by **0416**, with sunrise at **0559**. By mid-month Venus is rising at **0442** followed by sunrise at **0609**. By the 31st Venus is rising at **0514** followed by sunrise at **0620**.
- **Mars:** Mars is back in the sky as a morning object; on the first rising at **0027**. Sunrise follows at **0559**. By mid-month Mars is rising at **0000**. End-of-month finds the Warrior rising at **2320**.
- **Jupiter:** Jupiter is an evening object on the first of the month rising at **2230**. By mid-month Jove is rising at **2134.** Come the end-of-month Jupiter is peaking above the horizon by **2027**.
- **Saturn:** Saturn rises at **2025** on the 1st. Saturn transits at **0147+**.and doesn't set until **0709+**. Saturn by mid-month rises at **1927** and transits at **0048+**. By the end-of-the-month Saturn is easily visible by **2000** and transits by **2341**.
- **Uranus:** On the first of the month Uranus is a morning object rising at **0023.** Mars is also rising and at about **0228** the two planets will be 1° 19' 27" apart. By the ides Uranus is rising at **2324**. End-of-month finds Uranus rising at **2222**.
- **Neptune:** Neptune is rising at **2153** in the beginning of the month. Neptune transits at **0348+**. By the 15th Neptune rises at **2058**. Neptune transits at **0252+**. By the end of the month Neptune is rising at **1954**.
- **Pluto:** Pluto on the first of the month is at 14.33 apparent magnitude and rising at **1905**. It won't be truly visible until well after sunset at **1950**. Pluto transits at **0003+**.By mid-month Pluto is rising at **1808** but again the sun will interfere with viewing until it sets at **1936**. Pluto transits at **2307**. By the 31st Pluto is probably not visible until **2000**. Pluto transits at **2203** and sets at **0301+**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2022 with a reasonable magnitude; say less than or equal to +10 in August there is nothing except the regulars: Juno, Vesta. Hebe, Eros and Herculina. So, consult your local planetarium software or try: **https://www.asteroidsnear.com/year?year=2022**

Meteors:

- Delta Aquarids Meteor Shower. (see Highlights August 28-29 above)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
  - Halley Type: The Halley Types are believed to come from the Kuiper Belt and have periods in excess of 20-years.
  - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
  - Short period comets August have a near circular orbit or an elliptical orbit. The latter being far more common.
- 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.

One comet of interest this month, Comet **C/2017 K2**., a comet in **SCORPIUS**, visual magnitude +6.8 on the 15th of August 2022 at **2100**. It rises at **1405** but doesn't set until **0042+**.**Deep Sky:**

Notes:

L/Z abbreviation for ALT/AZ
R/D abbreviation for Right Ascension/Declination
α is right ascension
δ is declination
In each case, unless otherwise noted, you should look for the following on or about the 15th Day of August 2022 at 2100 PDT and you will have about 20 minutes of viewing time total.

Let's take a look at some difficult objects (at least for me):

Ring Nebula:

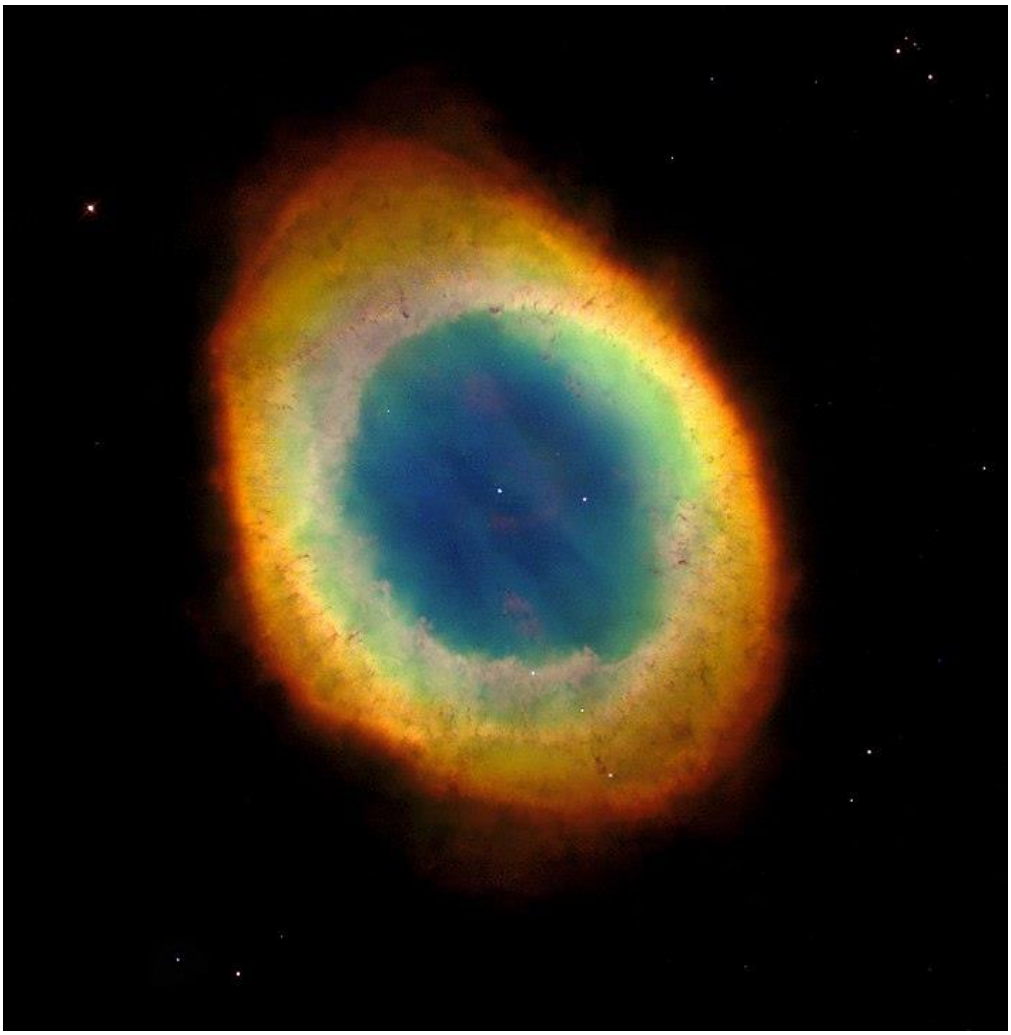


Illustration 1: By The Hubble Heritage Team (AURA/STScI/NASA) - http://hubblesite.org/newscenter/archive/releases/1999/01/image/a/ (direct link), Public Domain, https://commons.wikimedia.org/w/index.php?curid=401569

This nebula was discovered by the French astronomer Charles Messier while searching for comets in late January 1779. Messier's report of his independent discovery of Comet Bode reached fellow French astronomer Antoine Darquier de Pellepoix two weeks later, who then independently rediscovered the nebula while following the comet. Darquier later reported that it was "...as large as Jupiter and resembles a planet which is fading" (which may have contributed to the use of the persistent "planetary nebula" terminology). It would be entered into Messier's catalogue as the 57th object. Messier and German-born astronomer William Herschel speculated that the nebula was formed by multiple faint stars that were unresolvable with his telescope.

In 1800, German Count Friedrich von Hahn announced that he had discovered the faint central star at the heart of the nebula a few years earlier. He also noted that the interior of the ring had undergone

changes, and said he could no longer find the central star. In 1864, English amateur astronomer William Huggins examined the spectra of multiple nebulae, discovering that some of these objects, including M57, displayed the spectra of bright emission lines characteristic of fluorescing glowing gases. Huggins concluded that most planetary nebulae were not composed of unresolved stars, as had been previously suspected, but were nebulosities. The nebula was first photographed by the Hungarian astronomer Eugene von Gothard in 1886.. (Wikipedia)

M13:

Illustration 2: By Sid Leach/Adam Block/Mount Lemmon SkyCenter - http://www.sidleach.com/m13.htm, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=94870755

M13 was discovered by Edmond Halley in 1714, and cataloged by Charles Messier on June 1, 1764, into his list of objects not to mistake for comets; Messier's list, including Messier 13, eventually became known as the Messier Catalog.

About one third of the way from Vega to Arcturus, four bright stars in Hercules form the Keystone asterism, the broad torso of the hero. M13 can be seen in this asterism 2⁄3 of the way north (by west) from Zeta to Eta Herculis. Although only telescopes with great light-gathering capability fully resolve the

stars of the cluster, M13 may be visible to the naked eye depending on circumstances. With a low-power telescope, Messier 13 looks like a comet or fuzzy patch. The cluster is visible throughout the year from latitudes greater than 36 degrees north, with the longest visibility during Northern Hemisphere spring and summer.

It is located at right ascension 16h 41.7m, declination +36° 28'. With an apparent magnitude of 5.8, it is barely visible with the naked eye on clear nights. Its diameter is about 23 arcminutes and it is readily viewable in small telescopes. Nearby is NGC 6207, a 12th-magnitude edge-on galaxy that lies 28 arcminutes directly northeast. A small galaxy, IC 4617, lies halfway between NGC 6207 and M13, north-northeast of the large globular cluster's center.

In traditional binoculars, the Hercules Globular Cluster appears as a round patch of light. At least four inches of telescope aperture resolves stars in M13's outer extent as small pinpoints of light. However, only larger telescopes resolve stars further into the center of the cluster. (Wikipedia)

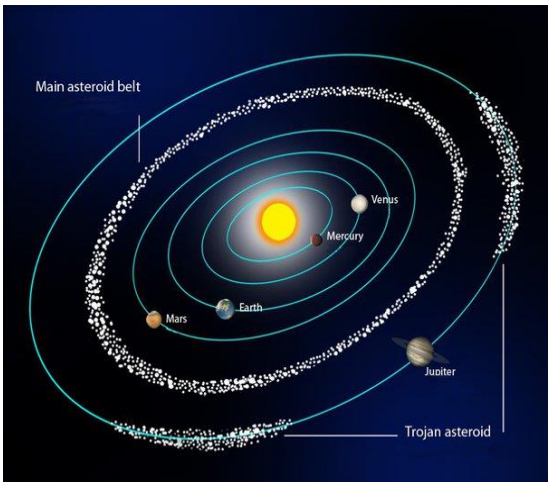
August is great for both viewing and imaging. Spend some time outside with your scope. Summer is here.

For now – Keep looking up.

RANDOM THOUGHT
By Chuck Dyson

SPACE JUNK #1

In the Empire Strikes Back movie I was convinced that Han Solo & Co. would not have made it through that asteroid field without my help, I put a lot of English on my theater seat to get a little tighter turn out of the Millennium Falcon. But, with just a little help from me, the Millennium Falcon made it through the field of dense boulders with insanely chaotic orbits. Is this movie scenario even remotely possible? Space is, after all, really big so it would take a mind boggling amount of stuff to create a large asteroid field as dense as the Star Wars asteroid field.



A good place for us to start our reality check would be the solar system's own asteroid belt. With the understanding that all asteroid belts around other stars may not be the same as ours because other belts, if they exist, may have no Jupiters or the belt may be between two Jupiter-like planets, a virtual Jupiter sandwich, or the belt could be under the dynamic influence of one or two super Jupiter planets. There are now at least 91 known or suspected planets that are ten to thirty times as massive as our Jupiter {Note: it takes at least 80 Jupiter masses to make the smallest type of star}. The reason I mention all of the Jupiter combinations is because our asteroid belt, as mentioned, is a dynamic place with its features greatly influenced by Jupiter. When Alan Stern, the lead scientist on the New Horizons mission to Pluto, was asked "What is the chance of the probe hitting an asteroid?" he replied, "One in a billion." Maybe yes, maybe no because the asteroids are not evenly distributed in the asteroid field and their absolute numbers are estimated and not actually known.

Let us now take a little look at asteroids and where they live, and we will use generally accepted estimates. How big is the home of asteroids? Asteroids are generally considered to reside in an area that is 2.2 Astronomical units (AU) to 3.2 AU from Earth and 1 AU in depth. This gives a volume of space of about 12 trillion cubic miles, not a small space. Thanks to the gravitational influence of Jupiter, with a little help from Saturn, the distribution of stuff in the asteroid belt is not uniform. Asteroids that were, and I emphasize were, in a 2:1, 3:1 4:1,5:2, or a 7:3 resonance with the orbital period of Jupiter are no longer there and we call these areas Kirkwood gaps, after the astronomer who discovered them. [Note: When two orbital bodies have rotational periods that are exact multiples of each other then these bodies will regularly interact, gravitationally, in the same location in the same way at regular intervals and the momentum of each body will be altered according to each bodies mass.]

Just for reference, the mass of the Earth is 82 times the mass of the Moon and the mass of Jupiter is 318 times the mass of Earth; the mass of all of the asteroids is 2% to 4% the mass of

the Moon; so, Jupiter can flick these little suckers all around the solar system and hardly notice them. As Jupiter flicks asteroids out of one area it herds them into areas of high asteroid density. The asteroids in these areas are called asteroid families, there are generally eight recognized families in the asteroid belt, and they are at resonances of 1:1, 3:2, 4:3, 5:1, and 7:4. In the gaps there are approximately 400,000 to 600,000 miles between bodies and in the dense areas there are about 3,321 miles between bodies. In the gaps Alan Stern's estimate is probably reasonably accurate but in the dense regions he could be just a tad optimistic, or two tads, about the chances of his space probe making it through.

Assuming that the Millennium Falcon can go at least as fast as Alan Stern's New Horizons Pluto probe, then at 36,400 mph in the asteroid dense areas of the asteroid belt you would have an asteroid encounter, fly-by, about every 5min 30 sec. This would require a little hands-on flying by Han Solo and Chewie. When we look at how much just one Jupiter has shuffled the asteroids around you start to wonder just what an asteroid belt around a star with one super Jupiter or two Jupiter sized planets, one in Jupiter's orbit and one in Saturn's orbit, or one in Mar's orbit could do to the distribution of asteroids. In addition to the shuffling question, we also have the question of how much stuff there could be in an asteroid belt? This is a highly significant question because when Professor Mike Brown of Cal Tech was discussing solar system formation and evolution in his online class, he mentioned that all computer models, in order to get a planetary system that resembles ours, needed to start out with ten to twenty times the material that we now have in ours. With at least 826 multiple planet systems known, most of which look nothing like ours, you can see how there could be a significant variation in the size and amount of material in other asteroid belts. With so much extra material there to be jostled around and flung into the star or out into inter stellar space one can easily see how a denser asteroid belt than ours could be formed, maybe not Star Wars dense but close.

Unfortunately for our two intrepid space pilots, when we talk about asteroids we generally are talking about things one kilometer (.6 mile) or bigger because we just cannot see telescopically objects smaller than that. With just a little math you can see what a huge problem for Han and Chewie. The formula for the kinetic energy that a moving object has is its mass times the velocity squared divided by two {note: this is the basic formula but in the real ballistic world there are several modifiers that reduce the kinetic energy of the object being measured, sometimes by a factor of 1000, but just for simplicity I will use the raw formula and that will give the reader a ratio of kinetic energies between objects moving at different speeds}. It is the velocity squared that really makes the kinetic energy go up as the speed of an object increases. My favorite gun was, and still is, the Red Ryder lever action BB gun. This gun fires BB's that weigh 0.00072875 pounds and are traveling at 300 feet per second. This combination of weight and speed gives a whopping 5.247 foot pounds of energy. For comparison a 30 caliber 0.030625 pound rifle bullet traveling at 2500 feet per second has 3,036 foot pounds of energy, quite the difference.

However, if I now accelerate that BB up to the New Horizons probe speed of 36,400 miles per hour I now get a speed of 53,286.7 feet per second and I have it hit the Millennium Falcon, then that BB delivers a whopping kinetic energy hit of 1,038,518 foot pounds of energy; good-by Han, good-by Chewie, and good-by Millennium Falcon. But wait! It definitely gets worse. In the Star Wars asteroid swarm scene the crew is intensely focused on the huge rocks all around them, and that is a good thing, they should take just a little time to realize that if they were to hit just a

two pound pebble at 36,400 miles per hour that that would generate a “tap” of 1,425,068,089 foot pounds of energy and nobody but nobody needs to be in a billion foot pounds of energy fender bender, or should I say fender vaporizer.

Engineers looking at what a spaceship that cruises at “just” 20% of the speed of light {Note: at 20% of the speed of light you would go around the Earth in less than one second} would need to protect it from space dust let alone something as frighteningly large as a BB. The results were very clear you will be traveling behind a really thick space shield of ablative material, no large glass windows like those on the Millennium Falcon. Did you know that the cockpit of the Millennium Falcon is actually the front end of a B29 WWII bomber? Check it out.

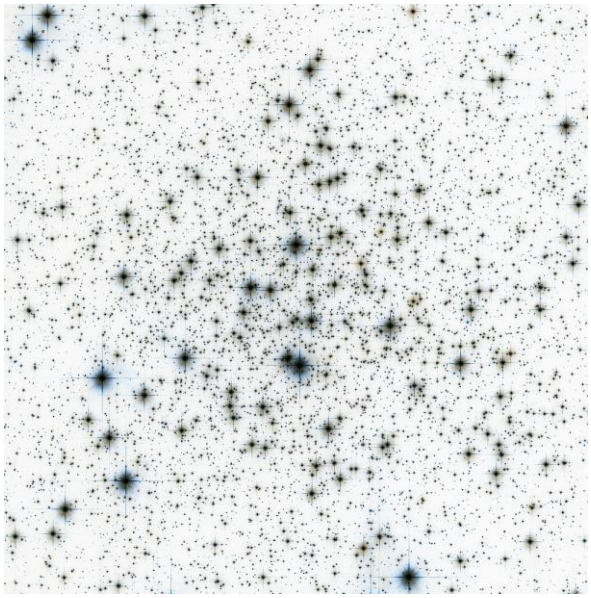
I guess the message of this Thought is the faster you go the more you need to sweat the small stuff.

Next month we will look at a collection of space junk closer to home, much closer.

Cheers, Chuck

Another Look August, 2022

By Dave Phelps



July 28 new moon, August 12 Full Moon,
August 27 New Moon
August: **Sturgeon Moon,** green corn moon, grain moon, and the red moon for the reddish hue it often takes on in the summer haze.

Astronomical Twilight 2052 PDT 08/27/22

High above us on warm summer evenings is one of the linchpins of first year astronomy courses...the Summer Triangle. Made by connecting Vega, Deneb and Altair we help our star party visitors by fixing their eyes on a high, visible, bright star grouping. The triangle includes the constellations of Lyra, Aquila and Cygnus in addition to Sagitta and Vulpecula. I also include Delphinus in with the group, lest it be forgotten.

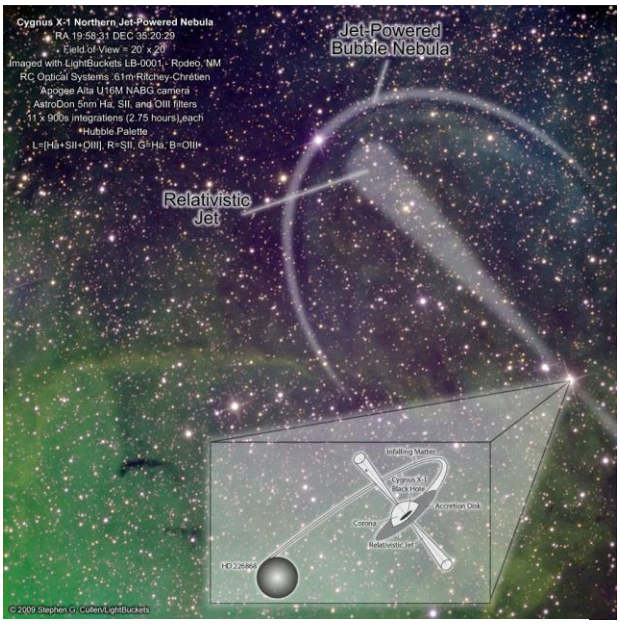
Delphinus has an interesting history and is also one of the original 48 by Ptolemy. In reference, the Greeks attributed two myths and an Italian gentleman may have been guilty of overweening egotism or, perhaps, a practical joke. The Greeks are easy. In one the Dolphin saves a poet and in the other Poseidon searches for his reluctant fiancée.

https://en.wikipedia.org/wiki/File:Sidney_Hall_-_Urania%27s_Mirror_-_Delphinus,_Sagitta,_Aquila,_and_Antinous.jpg

In reference to our Italian gentleman, we have Alpha α Delphini whose name is Sualocin and Beta β Delphini whose name is Rotanev. The names have no meaning. Italian astronomer Niccolo Cacciatore, turned his family name, Venator, backward and gave Beta his family name. He did the same thing to Alpha. He turned his first name, Nicholas, around and named it Sualocin. Somehow it stuck
.
Beta is also interesting as a double star. Very close in separation, about 44” and magnitude a slightly variable 4.1 to 5.0 magnitude.

We also have two Caldwell globulars and two planetaries worth looking for in Delphinus. Caldwell 42, NGC 7006 is a 10th magnitude, rather pretty, globular and Caldwell 47 is a brighter 8th magnitude globular, also rather pretty. Neither NGC 6891, a rather nice planetary or NGC 6805, the Blue Flash planetary, are particularly bright but should be easily seen. N6891 is 10.5 and N6805 is 10.9. Your backyard telescope should find a smallish blueish or blue-greenish blob. An interesting note is that the four star rhombus, Sualocin, Rotanev, Delta δ and Gamma γ Delphini are named Job's Coffin, no one seems to know why.

https://ar.wikipedia.org/wiki/NGC_6891

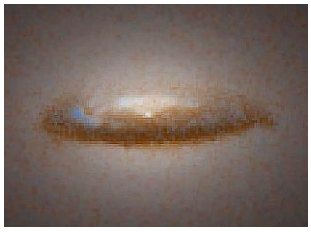


[APOD: 2009 June 8 – Possible Jet Blown Shells Near Microquasar Cygnus X1 (nasa.gov)]

Vulpecula is the home of the first Pulsar discovered in 1967 by PhD student Jocelyn Bell and her advisor Dr. Anthony Hewish. You won't see it, but it's near Brocchi's Cluster and, if you wish, you can stare at its place in the sky. It's given the prosaic name PSR B1919+21. You can check the Sinbad registry and you will find no optical component to the Pulsar.

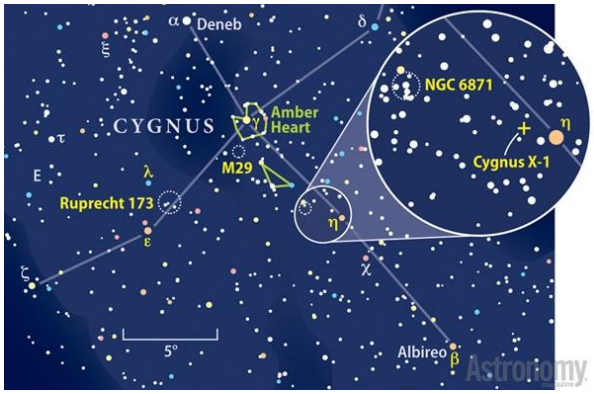
By the way there were those who claimed that Ms. Bell should have been given equal credit for the discovery. Even she disputes that:
Dr. Bell Burnell has had a very vibrant career in science and is honored by her discoveries and her generosity. She was awarded the Special Breakthrough Prize in Fundamental Physics which included a $2.8 million dollar prize. She donated the award to support women, ethnic minorities, and aid refugee students in physics research. ***(Jocelyn Bell Burnell and the Discovery of Pulsars – SciHi BlogSciHi Blog).***

If you are interested in supermassive black holes, and who isn't, look for 13th magnitude NGC 7052 near the border of Vulpecula and Pegasus. I massaged this 1998 Hubble image to show more detail.

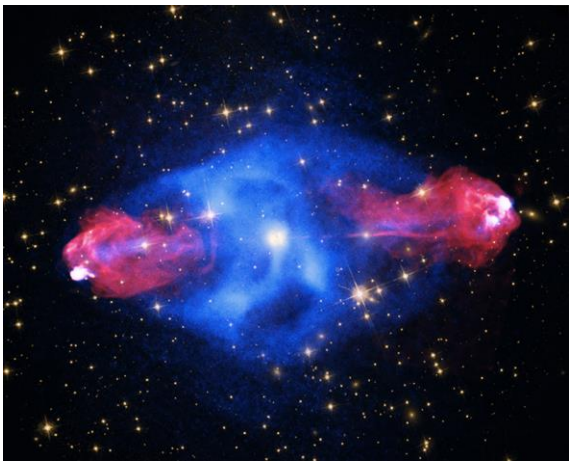


https://apod.nasa.gov/apod/ap980622.html

Another awesome discovery was Cygnus X-1, a distant X-ray binary containing a supergiant and unseen massive companion that was the first object we think is a black hole. If you would like to see for yourself, Cyg X-1 is close to Eta η Cygni, (an inner telrad circle) the middle star in the Neck and is 9th magnitude.



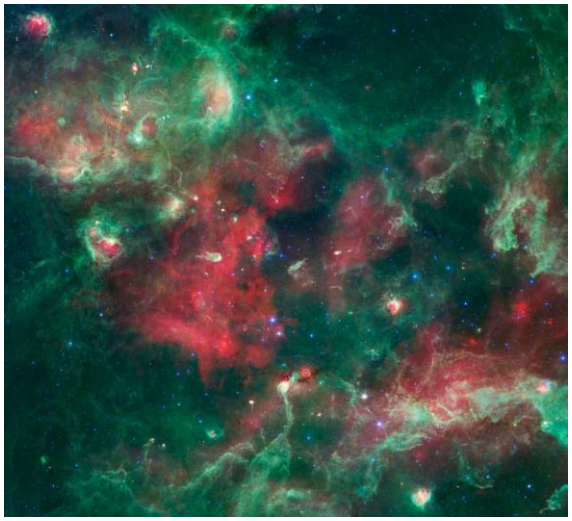
(Credit:AstronomyMagazine Https://astronomy.com/magazine/weirdest-objects/2015/04/37-black-hole-cygnus-x1)



A third major discovery was Cygnus A, the first radio galaxy discovered at a distance of 730 million light-years from Earth, it is the closest powerful radio galaxy but, alas, it shines at only 16th magnitude so you will have to be satisfied with this image.

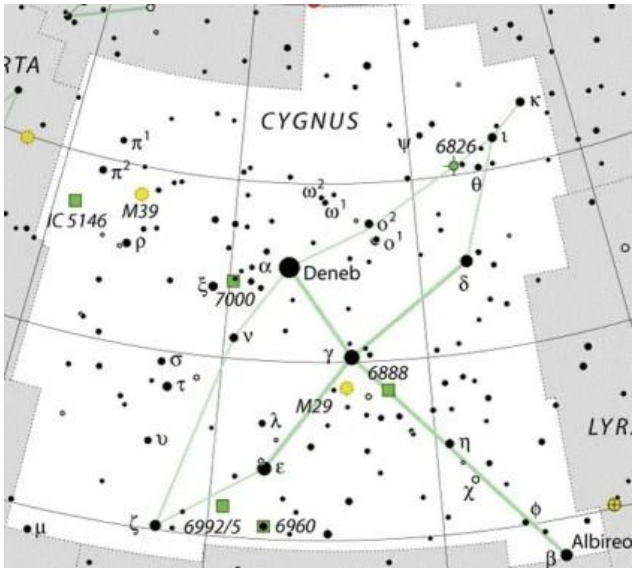
APOD: 2015 January 24 – Light from Cygnus A (nasa.gov)

Cyg A's location is along the left wing of the Swan, not too far from Delta δ. While there, be sure to look more closely at δ. It is a triple star system that is together brighter than 3rd magnitude. Interestingly enough, Delta's proper name is Farwaris, from the Arabic for rider, nothing at all to do with the various Greek myths of the Swan.



Cygnus X (confusing, isn't it) is the largest star-forming region nearby and includes not only some of the brightest and most massive stars known (such as Cygnus OB2-12), but also Cygnus OB2, a massive stellar association thought by some to be a young globular cluster. The nebulosity around Sadr, Gamma Cygni γ is a part of the association. The Spitzer Space Telescope image shows a region of complex and frenetic activity, quite beautiful to the eye.

https://www.spitzer.caltech.edu/image/ssc2012-02a-stars-brewing-in-cygnus-x

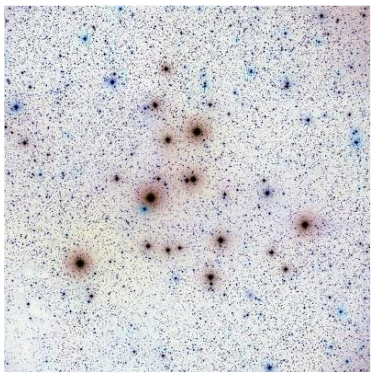


https://www.constellation-guide.com/constellation-list/cygnus-constellation

If you go to **https://skyandtelescope.org/observing/a-trip-down-the-great-rift/** you see where they point out the Cygnus Rift and the Northern Coalsack. Cyg X is partially hidden behind it. It explains why we need the Spitzer.

Cygnus has seven Caldwell objects. Caldwell 12 is known as the Fireworks galaxy, though at least one list puts it into Cepheus. The Fireworks galaxy, NGC 6946 is notable for 10 supernovae but is rather small and 9th magnitude. You will find it by searching among the stars of the Milky Way.

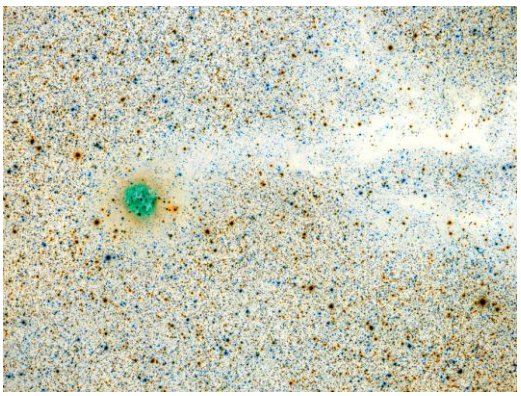
There is an abundance of deep-sky objects, with many open clusters, nebulae of various types and supernova remnants found in Cygnus because it sits right on top of the Milky Way. When you look, be aware that some open clusters can be difficult to make out from such a rich background of stars.



https://freestarcharts.com/messier-39

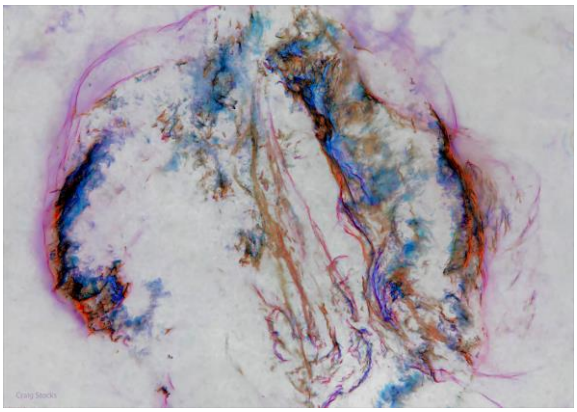
M39 (NGC 7092) is an open cluster 950 light-years from Earth that is visible to the unaided eye under dark skies. It is loose, with about 30 stars spread out You can see that it has a rather triangular outline, something to confirm visually.

Caldwell 15, NGC 6826, was discovered by Herschel way back in 1793. It is in a way a perfect example of visual astronomy. C15 is called the Blinking Planetary. Its bright 8th magnitude central white dwarf takes over the eyepiece. When you use averted vision, the planetary seems to "blink" into view. The 1997 APOD image by J. Balick **(APOD: December 19, 1997 - NGC 6826: The Blinking Eye (nasa.gov)** was also featured in 2001. C15 is located 3 or 4 degrees from Theta θ and can be found easily in your atlas and the chart above. Look for the Open Cluster M39, NGC 7092. It's part of the tour you take with your telescope when you scan the North American and Pelican nebulae. It is a Messier, so you go to it and it's not bad, a bright sprinkling of stars 4th or 5th magnitude and rather pretty to look at. So, there you are and you decide to move your telescope a little westward and Wow! You discover a really great dark nebula: B168, a long cylindrical darkness that leads you right to another two really great objects; Caldwell 19, IC 5146 and Sharpless 2-125. C19 is a mottled light and dark nebula with an open cluster embedded. **APOD: 2011 September 29 – Cocoon Nebula Wide Field (nasa.gov)** The Cocoon is a great name for everything put together. This 2011 wide field by none other than Tony Hallas is a job well done.



Caldwell 20, NGC 7000, the North American Nebula is not as good, I think, in photographs as visually. The camera blows everything out. Visually, with a nebular or pollution filter, you will be able to trace the outlines of the continent and maybe even pick up a little Alaska. Hudson Bay will also be readily visible.

One of the great objects to search for in Cygnus is the Crescent Nebula. It's on the line from Deneb to Sadr to Eta η. Start at Sadr, the center star in the cross and try to find traces of the nebulousity that Sadr is immersed in, Cygnus X. I remember one year a Phoenix, Arizona amateur showed us a black and white image of the whole region between Deneb, Delta and Eta including the northeastern part of Cygnus. It was a spiderweb of nebulousity that I have not seen before or since. It was an amazing piece of work for 30 years ago.
If you start at Sadr and scan down less than a Telrad and you will find the Crescent, Caldwell 27, NGC 6888. Be sure to study it well, with and without filters. It is possible to fill in the area inside the crescent.



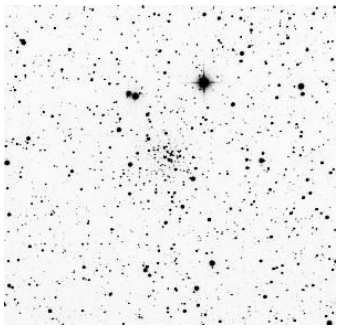
Recently, a fellow amateur, was talking about filters fitted onto his binoculars and how the Veil was tremendous. Still, I remember how pleased I was with myself the first time I found the Veil. I was soon able to move my telescope between the individual pieces and look at the lace-like structure of the east and the west lit up by its embedded star, Caldwell's 33 and 34. While there be sure to find the little triangular notch between the two. There is so much to see in Cygnus, it is worthy of a marathon of its own.

Image Credit & Copyright: Craig Stocks (Utah Desert Remote Observatories)
https://commons.wikimedia.org/wiki/File:Johann_Bayer_-_Cygnus.jpg#/media/File:Johann_Bayer_-_Cygnus.jpg

One night I was trekking up through Scutum looking for dark nebulae. The area is full of nebulae and clusters so there is plenty to find. There are a ton of dark nebulae in the area, B-111 B-117 and B-119a are prominent dark nebulae just across the border into Scutum, but I wanted to try to stay in Aquila. Specifically, I wanted to find a triple Barnard's, B-130 B-129 and B-127, a grouping of dark nebulae at the tail of Aquila. Eta η Aquilae is a 3 to 4th magnitude variable at the tail of the Eagle. Close by and between Eta and Lambda is 4th magnitude 12 Aquila, finder star for our Barnard's. They are not all that easy to see except for the dense Milky Way background. While there I noticed that 12 was a part of a hook of stars that led directly to the deepest red star I had seen. V Aquilae is a genuine carbon star, variable from 6.5 to 8.5 magnitudes and a wonderful surprise in your eyepiece.

While on the subject of Red Stars up between Delta δ and Zeta ζ Aquilae you will find R Aquilae, an older orange giant with a wild variable range of between 5th and 12th magnitude. The dimmer R gets, the deeper red it gets. It's a good star on which to hone your AAVSO chops. In that same area are four 11th and 12th magnitude planetaries NGC 6804, 6805, 6807 and M1- 70. These you can use to hone your star hopping skills.

Lastly in Aquila is Palomar 11. It's a difficult star-hop. You will need to find Kappa κ, about 4 degrees south of Theta θ, the left wingtip of Aquila. Pal 11 will be close to the outside circle on your telrad. Once you are in the right position, then comes the hard part, finding it. Pal 11 is fairly big at 10' and fairly bright at 10th magnitude but it is the loosest class IX globular I have ever seen.
Find it at: Palomar 11 (seds.org)
Dark Skies



Dave Phelps

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

by David Prosper (NASA/JPL)

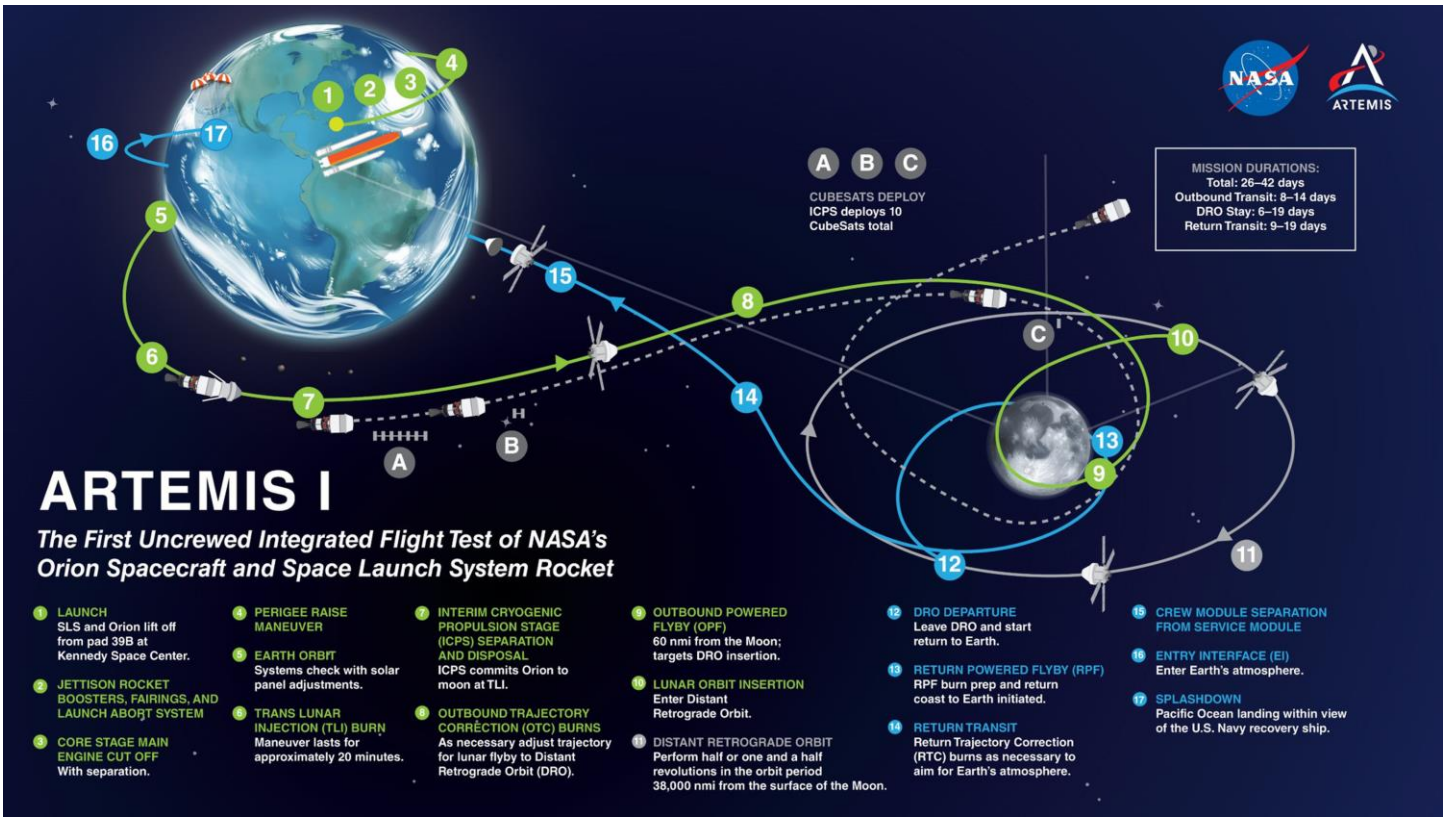
We are returning to the Moon - and beyond! Later this summer, NASA's Artemis 1 mission will launch the first uncrewed flight test of both the Space Launch System (SLS) and Orion spacecraft on a multi-week mission. Orion will journey thousands of miles beyond the Moon, briefly entering a retrograde lunar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

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