The Bays Mountain Astronomy Club Newsletter

Table of Contents

Cosmic Reflections 3

BMAC Notes 7

- News from the Astronomical League 7

Stellar Observations 11

- Moon Base! 12

The Queen Speaks 19

- Happy Birthday Apollo-Soyuz 20

BMAC Calendar & More 26

- Calendar: 27
- Regular Contributors: 30
- Connection: 31
- Chapter Background Image Credits: 32

Cosmic Reflections

Greg Penner - BMAC Chair

Greetings BMACers!

At our June meeting, we had a great time exploring the cosmos under the dome in the planetarium! We had great attendance of around 25 or so, and we learned about numerous astronomical objects that are visible in the summer sky. We identified where to find some interesting variable stars to keep an eye on this summer in the constellation Corona Borealis (see the June newsletter for details). We pointed out several favorite objects such as the Ring Nebula, Whirlpool Galaxy, Veil Nebula, Trifid Nebula, M13 Globular Cluster in Hercules, and where to look to see toward the center of our Milky Way galaxy. Hopefully, over the summer we will all get a chance to view these objects with our own eyes!

Also at the June meeting, we had our annual election for club chair. Thank you all for once again giving your vote of confidence by electing me to that position. My goal will always be to help our club members pursue their love of astronomy through a variety of programs, activities, outreach, and events. If anyone has requests or ideas for programs or would like to provide a program at a club meeting, please let me know. You can email me at bmac@baysmountain.org. Also, if you would like to contribute something (photos, articles, etc.) to the newsletter, you can

email our newsletter editor Mackenzie Henley Ledbetter at bmacjournal@gmail.com.

Since July is here, it is time for our club to take a pause from the normal meeting and have our annual picnic. This is a members-only (and families) event, so all members will receive an e-mail with info about the picnic. This will be a potluck, although our host will be providing a grill and burgers and/or hot dogs, so everyone should bring some kind of side dish, dessert, drinks, etc. Also, bring chairs for yourselves. The email will have details about the picnic location/facility, date and time. Hopefully, we will have clear skies and do some stargazing with a very nice telescope!

Clear Skies!

Greg Penner

Caption

BMAC Notes

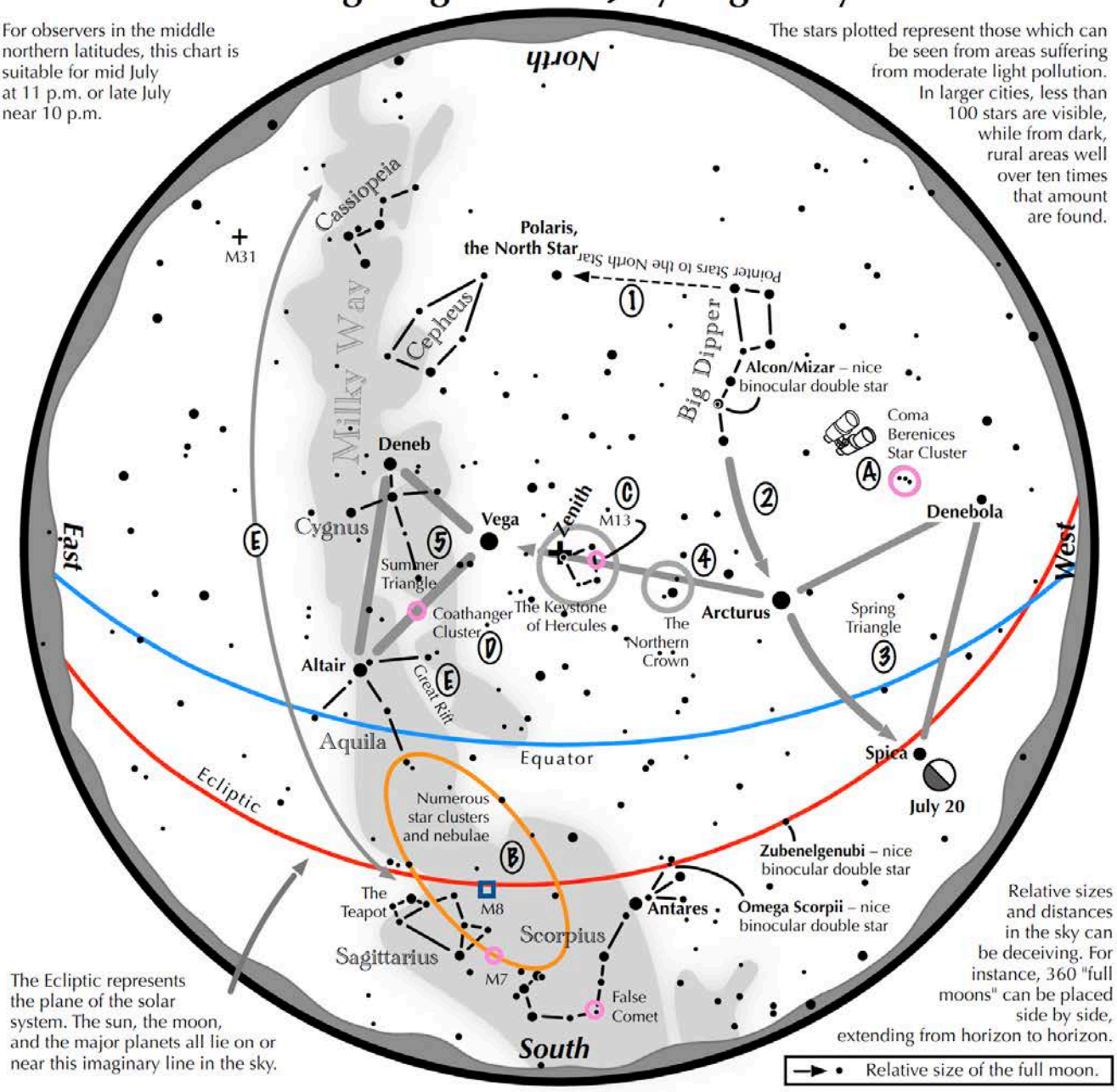
News from the Astronomical League

The Astronomical League has a plethora of educational content to help you learn and enjoy the night sky more. The following inserts are just a tiny bit of what they provide.

Navigating the mid July Night Sky 2026

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

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



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

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

→ • Relative size of the full moon.

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

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

Binocular Highlights

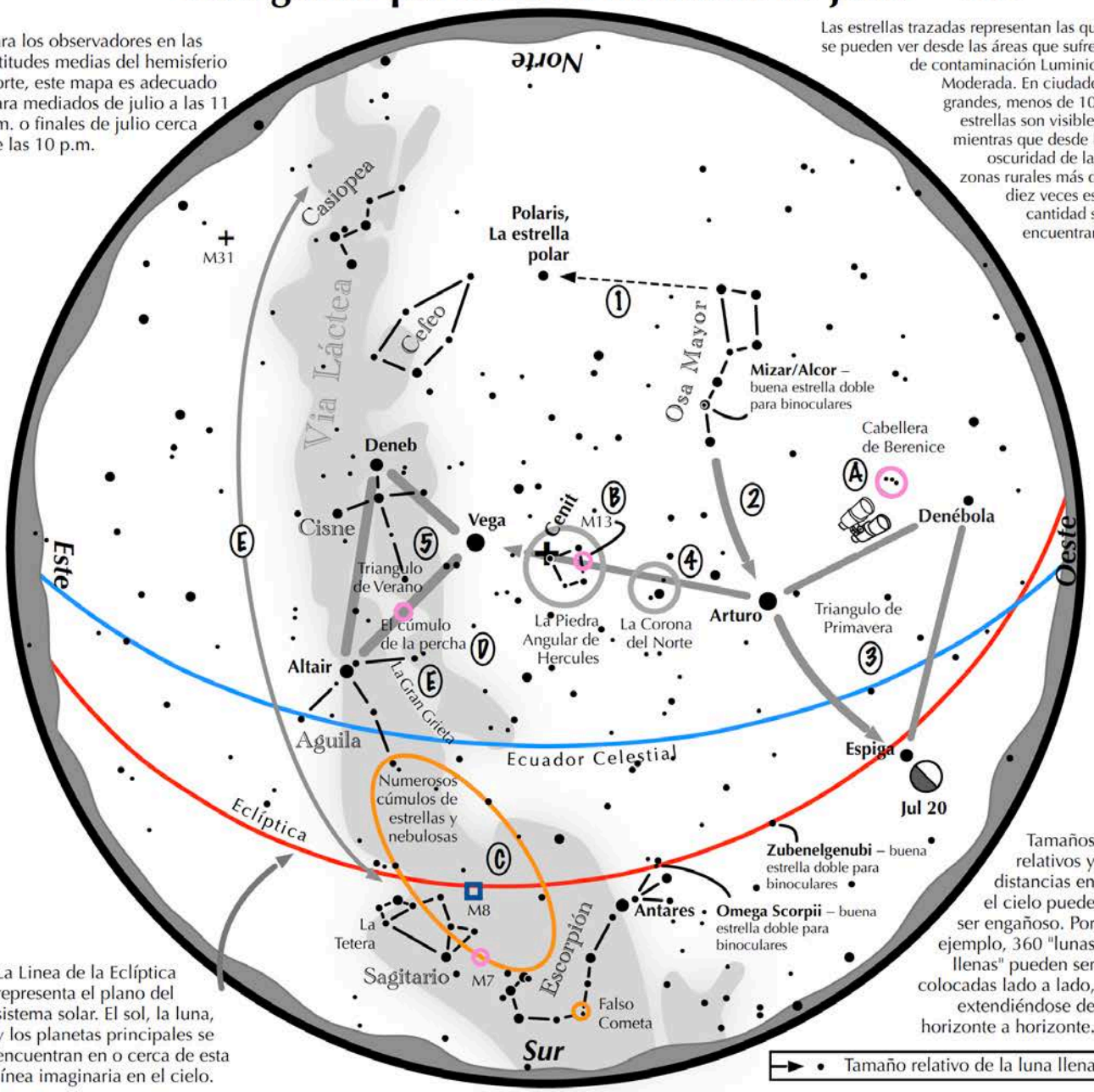
A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly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

Astronomical League *www.astroleague.org; duplication is allowed and encouraged for all free distribution.*

Navegando por el cielo nocturno de julio 2026

Para los observadores en las latitudes medias del hemisferio norte, este mapa es adecuado para mediados de julio a las 11 pm. o finales de julio cerca de las 10 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Linea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distancias en el cielo puede ser engañoso. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

→ • Tamaño relativo de la luna llena.

Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

1. Haz una línea hacia el norte desde las dos estrellas en la punta de la Osa Mayor. Pasa por Polaris, la estrella polar.
2. Siga el arco del mango del tazón de la Osa Mayor. Primero cruza Arturo, luego continúa hacia Espiga.
3. Arturo, Espiga y Denébola forman el triángulo de primavera, un gran triángulo equilátero.
4. Dibuja una línea desde Arturo a Vega. Un tercio del camino se encuentra "La Corona del Norte". Dos tercios de esa distancia llevan a la "piedra angular de Hércules." Se necesita un cielo oscuro para ver estas dos configuraciones estelares tenues.
5. En lo alto del este se encuentran las tres estrellas brillantes del Triángulo de verano: Vega, Altair y Deneb.

Puntos destacados con binoculares

A: Mira alto en el este para ver el cúmulo de estrellas perdidas de Cabellera de Berenice. **B:** M13, un brillo redondo de un cúmulo de más de 500,000 estrellas. **C:** Entre las brillantes estrellas de Antares y Altair, se esconde un área que contiene muchos cúmulos de estrellas y nebulosas. **D:** Casi a la mitad de la distancia entre Altair y Vega, Brilla la "Percha," un grupo de estrellas que describe un perchero.

Traducción al español por Dr. Salvador Aguirre

www.astroleague.org/outreach; Duplicación permitida y fomentada para toda distribución gratuita.

Liga Astronómica

The Astronomical League
OC
Open Cluster Program

M6 & M7

When these two big, bright, and beautiful open star clusters appear in the early evening in early July, summer is upon us.

If you have recently begun your journey under the stars, why not whet your appetite by exploring southeastern Scorpius and its two wonderful open star clusters, M6 & M7. You will return to them year after year!

While they are visible to the unaided eye from a dark location, binoculars help greatly.

1. Identify Scorpius standing low in the south-southeast on an early summer evening. As summer progresses, it is ascends low in the south, then swings low in the southwest in the early fall.
2. From red Antares, direct your gaze southward down the scorpion's back, then turn eastward.
3. When its tail hooks northward, continue the length of that hook.
4. M6 and M7 should be plainly visible in the binocular field.

M6:

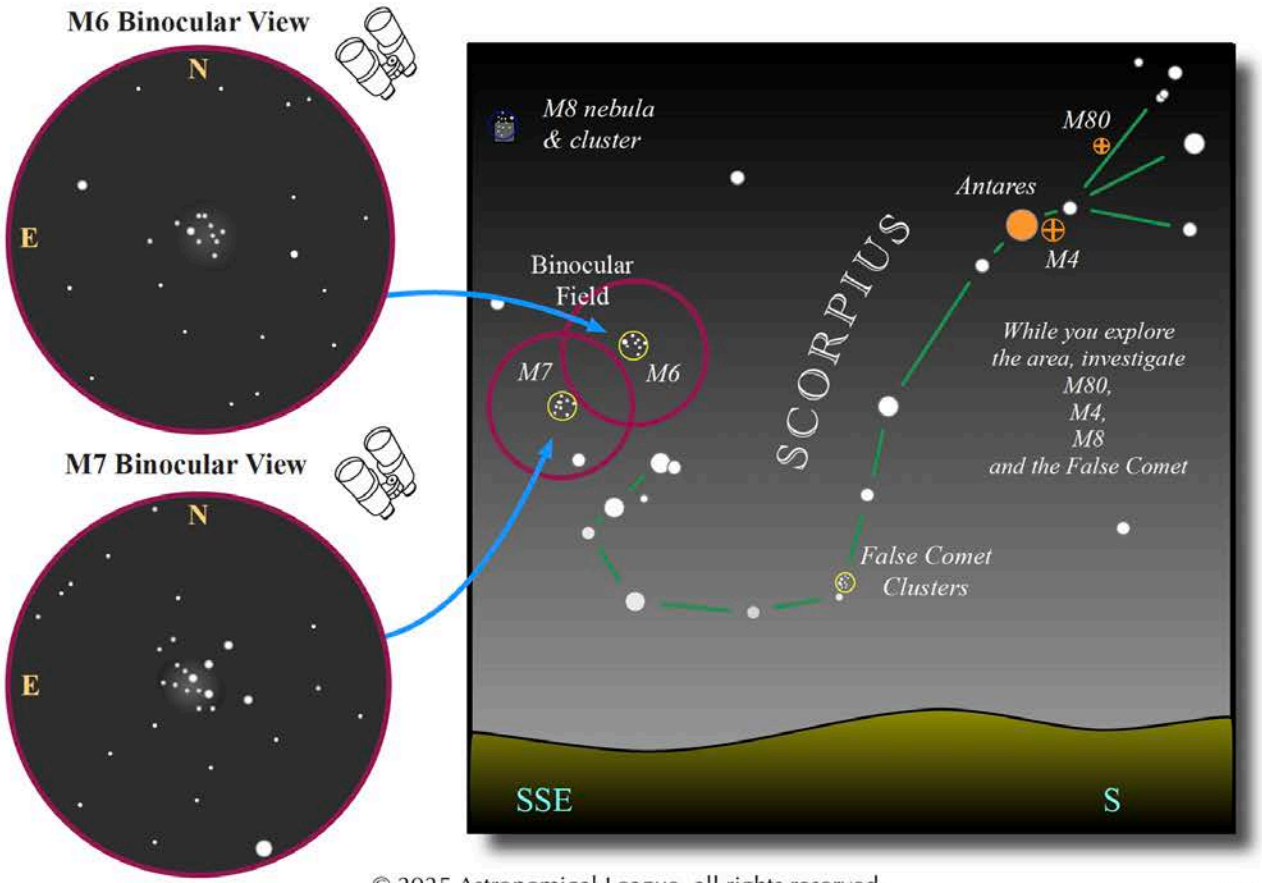
A faint hazy glow is seen by the unaided eye from a dark, clear site. Two dozen stellar lights can be discerned with 10x50 binoculars.

- Integrated Magnitude: 4.2
- Size: 33 minutes

M7:

A glittery glow is easily spotted off the scorpion's tail by the unaided eye. Binoculars reveal many faint stars.

- Integrated Magnitude: 3.3
- Size: 80 minutes



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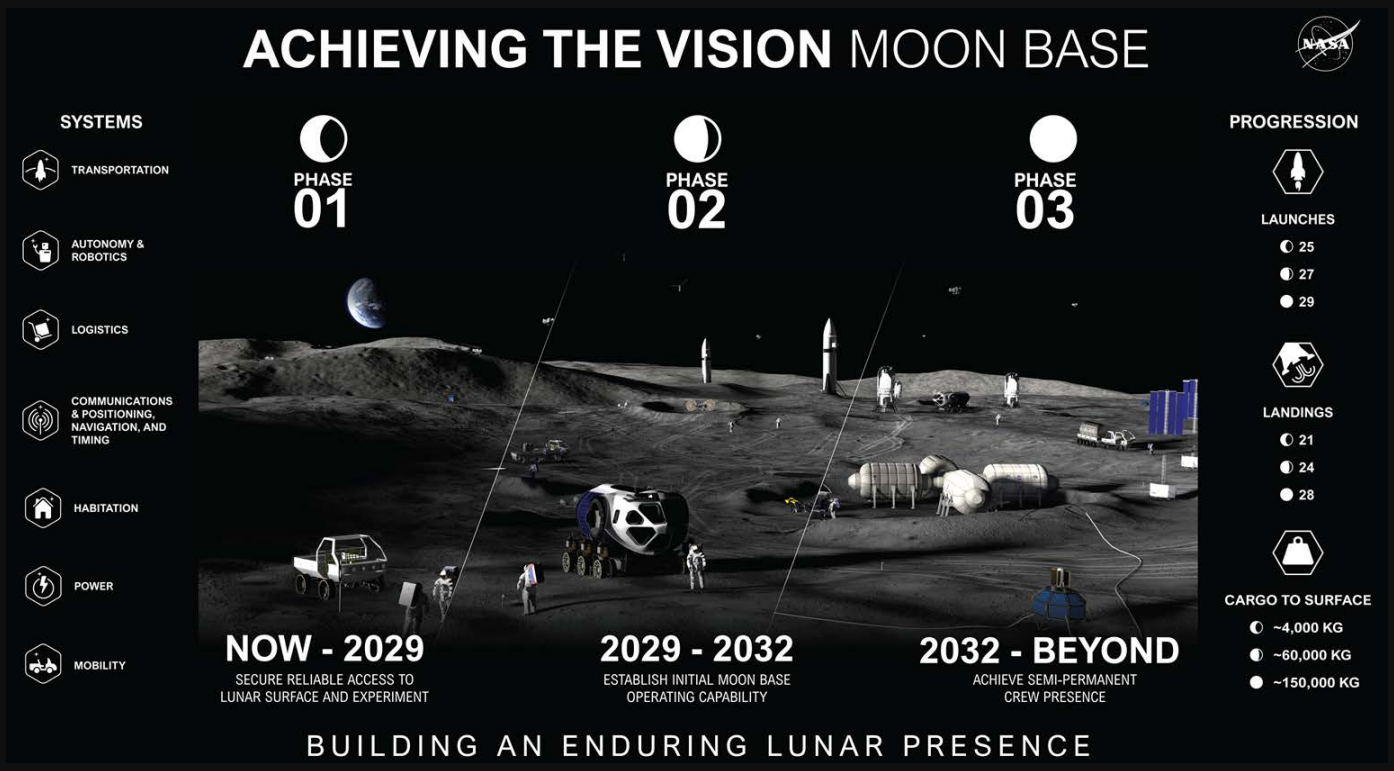
Stellar Observations

Greg Penner

Moon Base!

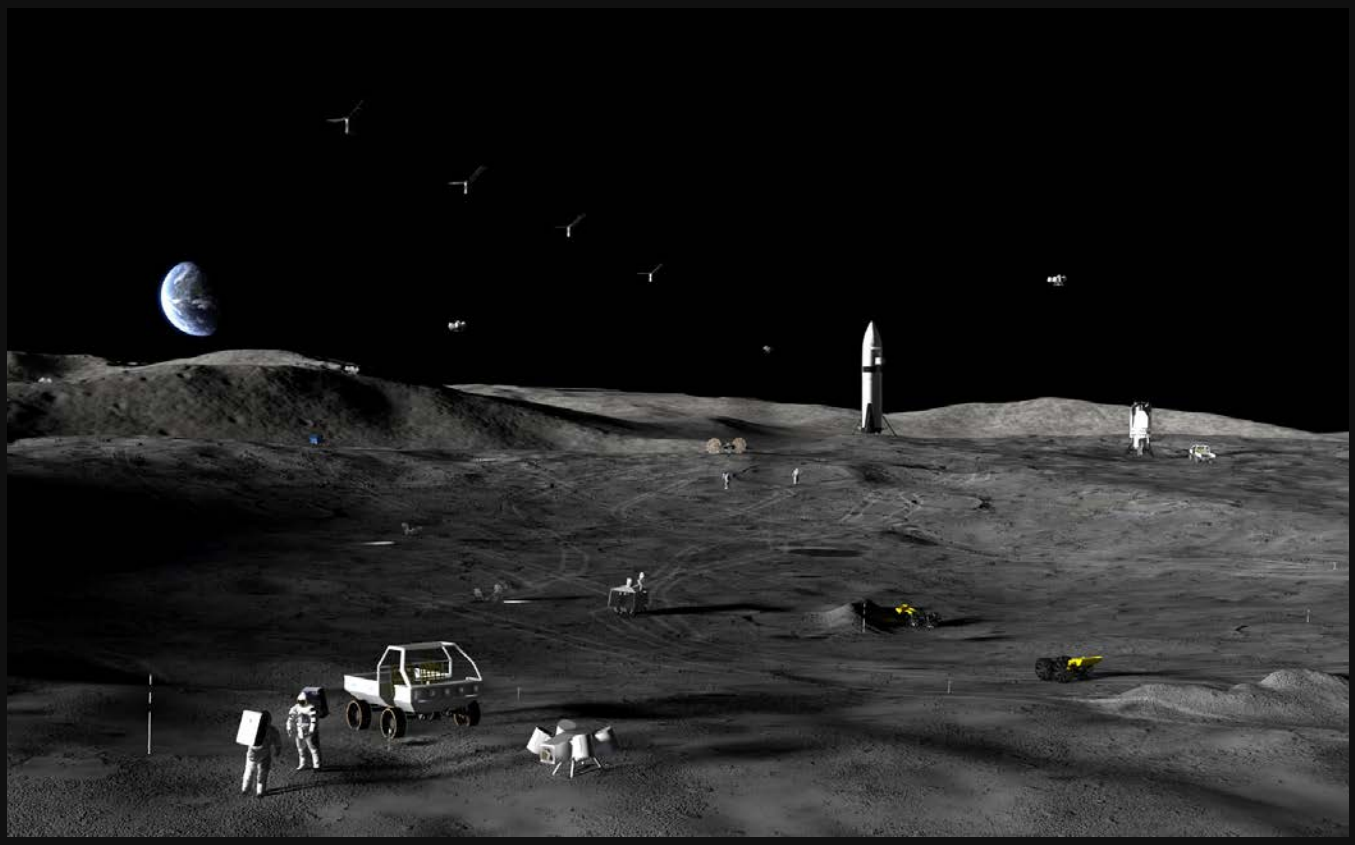
NASA's Artemis program has a goal of not only returning astronauts to the Moon but returning to stay. Establishing a permanent presence on the Moon will, in NASA's words, "allow for scientific discovery, economic benefits, and inspiration for a new generation of explorers. While maintaining American leadership in exploration, we will build a global alliance and explore deep space for the benefit of all". To that end, on May 26th NASA made an exciting presentation giving an overview of the plans for Moon Base, the place at the lunar South Pole where Artemis astronauts will live and work at humanity's first lunar outpost. A total of three phases is planned, utilizing an iterative approach in which they will learn quickly and build capabilities over time.



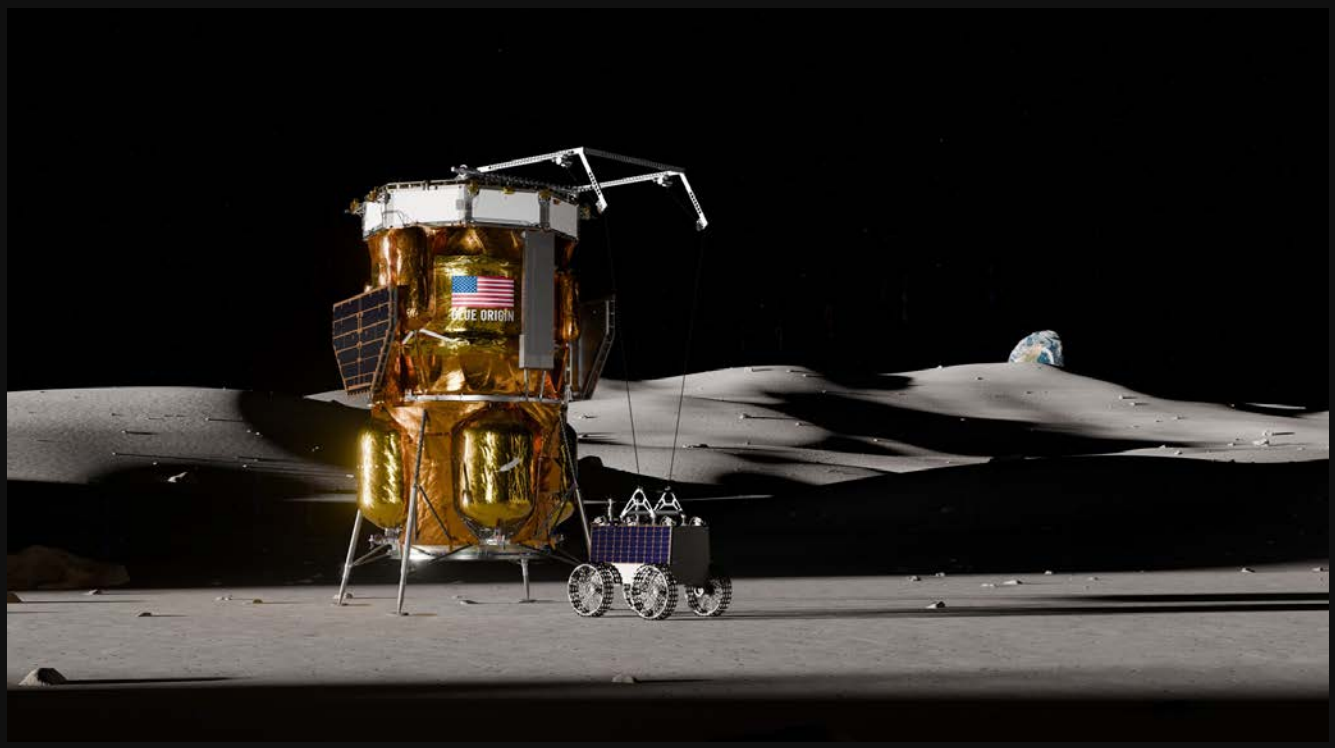
Moon Base - All Phases (image by NASA)

Phase one will take place now through 2029 and will include up to 25 missions, including 21 landings (uncrewed and crewed). The first of these missions is currently scheduled to be Blue Origin's Mark 1 lander, called Endurance. This mission to the lunar South Pole's Shackleton Ridge could launch as early as late 2026 (depending on Blue Origin's recovery from the recent launch pad explosion). Other robotic landers by Astrobotics and Intuitive Machines are expected to follow shortly thereafter. All these landers are delivering payloads to the Moon in support of Moon Base and other scientific investigations. Another key mission that must happen in 2028 before a crewed landing is the MoonFall Drones. Managed by Jet Propulsion Laboratory, these drones will be deployed in the South

Pole region to provide high resolution imagery of the rugged terrain and provide data about the environment, reducing the risk to future crews and providing information about the type of technologies and operations needed for the Moon Base. Also scheduled to happen by 2028, two Lunar Terrain Vehicles (LTV's) are planned to be delivered to the lunar surface. NASA has awarded contracts to Astrolab and Lunar Outpost to build these LTV's and Blue Origin has the contract to deliver them to the Moon.



Moon Base - Phase 1 (image by NASA)



Blue Origin Lander with Rover - image by NASA

Another critical step in establishing the Moon Base is for scientists to better understand the location of water ice and other volatiles near the lunar South Pole. That goal will be accomplished with the VIPER (Volatiles Investigating Polar Exploration Rover) mission. Originally scheduled to launch in 2024, VIPER was cancelled due to budget constraints, but then in 2025 NASA awarded a contract to Blue Origin to deliver VIPER to the south pole region in 2027. VIPER is a mobile robotic rover with instruments that will drill into the lunar surface to analyze the composition of soil and volatiles. The data gathered about the presence of water, ice, and other volatiles will help NASA plan for a sustainable, long-term presence on the Moon.

MoonFall Drone - image by NASA

VIPER rover - image by NASA

Of course, the most critical piece of the puzzle for establishing the Moon Base is the astronauts and vehicles that will carry the astronauts to the lunar surface. On June 9th NASA introduced the crew that has been selected for the next crewed mission, Artemis III. They are Commander Randy Bresnik, Pilot Luca Parmitano, Mission Specialists Andre Douglas, and Frank Rubio. Artemis III will be a complex mission with 3 launches occurring closely together in 2028. Blue Origin will launch its "lander test vehicle," which will be able to stay in low earth orbit for 90 days. Then the Artemis III crew will launch in the Orion spacecraft and rendezvous, dock, and enter the Blue Origin vehicle. The crew will test the systems in the lander for a couple of days, then undock. Shortly thereafter, SpaceX will launch their Starship rocket into orbit, and the Artemis III crew will rendezvous and dock with it but not enter it. The Starship will not be equipped with life support systems. Then the Artemis III crew will undock and splashdown. The entire mission should take about 2 weeks. If all goes as planned, this mission will have demonstrated the ability to make complicated maneuvers, dock, and operate with the two lunar landers. All these abilities will be necessary for the following Artemis IV mission to land on the Moon in 2028.

Much more information about the subsequent phases of Moon Base development can be found on NASA's **Moon Base website**. NASA has certainly taken on an ambitious program, and it appears they have funding and support from Washington, D.C. as well as capable commercial partners. The next few years could be a huge step forward and outward for humanity's presence in the solar system!

The Queen Speaks

Robin Byrne

Happy Birthday Apollo-Soyuz

This month we celebrate the anniversary of a milestone in the history of space exploration. In 1970, at the peak of the Apollo missions to the Moon, a delegation of Americans went to Moscow to discuss a joint US-Soviet space mission. The intent was to not only officially bring the “Space Race” to a close, but to also test technology needed for future cooperation in space.

Several hurdles needed to be dealt with along the way. The first was to determine how to connect two vehicles with very different docking mechanisms. The solution was to build a special docking device with a US-friendly docking ring on one end, and a Soviet-friendly ring on the other. Another problem was that the Soviet Soyuz capsule used a higher air pressure than the American Apollo capsule, and a different air mixture. To address this difference, the docking mechanism also provided an intermediate pressure and air environment, so that the Soviet Cosmonauts would not get the bends upon entering the Apollo capsule. And, possibly the biggest difficulty of all was the language barrier. Both crews had to learn the

other's language, to allow them to communicate during the tricky docking maneuver.

On July 15, 1975 two launches took place: the Soyuz 19 launched first, with the Apollo 18 launch occurring seven hours later. On board the Soyuz capsule were Alexei Leonov (Commander) and Valery Kubasov (Engineer). Both were veterans of previous flights, Leonov being the first man to walk in space. The Apollo crew were Thomas Stafford (Commander), Vance Brand (Command Module Pilot), and Deke Slayton (Docking Module Pilot). This was Stafford's fourth flight, but the first for both Brand and Slayton. Although Slayton was an original Mercury astronaut, he had been grounded due to a heart fibrillation since 1962. This flight did give Slayton the honor of being the oldest man to fly in space up to that point in time.

Apollo-Soyuz Painting by NASA/Robert McCall

Once in orbit, the Apollo capsule was rotated to dock with and retrieve the connector module from the rocket booster. Two days later, the Apollo capsule had maneuvered into position for docking with the Soyuz. Three hours later, Stafford and Leonov exchanged the first international handshake in space. For two days, the crews moved freely back and forth between the two spacecraft. Many items were exchanged between the crews, including flags and tree seeds (which were later planted in both countries). The crews ate together, and conversed in both English and Russian. Because of Stafford's southern drawl when pronouncing Russian words, Leonov joked that the crew actually spoke three languages: English,

Russian, and “Oklahomski." The crew also conducted a joint television broadcast. Both President Ford and Premier Brezhnev spoke with the crew members and offered congratulations.

A variety of experiments were performed jointly, the most important being several practice runs at docking and undocking. The skill gained from those activities were used for Shuttle visits to Mir, and for the construction and support of the International Space Station. One of the more interesting experiments occurred after one of the undocking maneuvers. The Apollo craft was positioned to eclipse the Sun so that the Soyuz crew could photograph the Sun’s corona. Apollo-Soyuz was also the first mission that included as part of the equipment a handheld, programmable calculator (an HP-65) to use in case of computer failure. It was never used.

On July 21, the Soyuz capsule successfully landed in Kazakhstan. The Apollo crew remained in orbit for three more days. During splashdown in the Pacific Ocean, complications arose. Brand missed the time to activate two switches needed for deploying the parachutes. Stafford had to deploy them manually, but the swinging

of the craft caused two thrusters to fire. Stafford shut them down, but not soon enough. The firing released nitrogen tetroxide fumes, which entered the crew cabin through a pressure-relief valve. The fumes caused Brand to black out. Stafford quickly pulled out the emergency oxygen masks, first putting one on Brand, then he and Slayton donned theirs. All three men had to be hospitalized for two weeks, receiving treatment for blistering in their lungs.

Apollo-Soyuz marked both an end and a beginning. It was the last flight of an Apollo spacecraft, the last flight launched by a Saturn booster rocket, and the last US flight prior to the Shuttle missions. However, it was the beginning of international cooperation in space. The International Space Station is the legacy of this first attempt to work with another country in the exploration of space. Now that working with Russia and other countries is taken for granted, take a moment to remember our first steps away from competition and toward cooperation that was made a reality by the Apollo-Soyuz mission.

References:

Apollo-Soyuz Test Project

https://www.nasa.gov/apollo-soyuz-test-project/

Wikipedia - Apollo-Soyuz Test Project

https://en.wikipedia.org/wiki/Apollo–Soyuz

Apollo-Soyuz Test Project

https://www.daviddarling.info/encyclopedia/A/Apollo-Soyuz.html

BMAC Calendar & More

Calendar:

MAC Meetings:

- Friday, August 6, 2026 - 7p - Topic: TBA
- Friday, September 4, 2026 - 7p - Topic: TBA
- Friday, October 2, 2026, - 7p - Topic: TBA
- Friday, December 4, 2026, - 7p - Topic: TBA
- Friday, February 5, 2027 - 7p - Topic: TBA
- Friday, March 5, 2027 - 7p - Topic: TBA
- Friday, April 2, 2027 - 7p - Topic: TBA
- Friday, May 7, 2027 - 7p - Topic: TBA
- Friday, June 4, 2027 - 7p - Topic: TBA

SunWatch:

- Every clear Saturday & Sunday - 3p-3:30p - March-October - By the Dam
  - View the Sun safely with a white-light view if clear.; Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

StarWatch:

- Every Saturday in March, April, October and November - By the observatory
  - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

pecial Events:

- **Annual Club Picnic - July 2026**
  - Date and site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.
- **StarFest 2026 - November 6-8, 2026**
  - Our 41st annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt and more!
- **BMAC Dinner - January 2027**
  - This event is for members and their families. Look for an e-mail in January with all the information.

Regular Contributors:

Greg Penner

Robin Byrne

Mackenzie Henley

Greg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a "department store telescope" and viewed Saturn for the first time. He has been a member since 2018.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Mackenzie Henley is our new head editor of the Bays Mountain Astronomy Club newsletter. She is an undergraduate student at the University of Tennessee Knoxville.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Mackenzie Henley**

Dues:

- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- $16 / person / year
- $6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct **link**. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
  - *Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, October 9, 2020.*
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
  - *Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, October 15, 2020.*
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - *Image captured October 23, 2016.*
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - *Painting based on a photograph of the Moon Christa captured October 2020.*
- **Stellar Observations image of Crescent Nebula by David Reagan.**
  - *This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.*
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - *iPhone 7, October 8, 2020.*
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
  - *Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, October 19, 2015.*
- **BMAC Calendar & More image of the Moon by Greg Penner.**
  - *iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.*
- **All background images used with permission by their authors.**