The Astrogator

Grand Strand Astronomers Club Newsletter

Volume #4, Issue #4
June 1, 2026

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Grand Strand Astronomers Leadership

Ian Hewitt – Executive Officer
John DeFreitas – Treasurer
Gerald Drake – Secretary
Tim Kelly – Newsletter Co-Editor

Club Announcements

Club Social Media

Grand Strand Astronomers:
https://www.gsastro.org/

Grand Strand Amateur Astronomy Club:
https://www.facebook.com/groups/gsatro/

Upcoming Club Events

- **Hampton Dark Sky Observing: June 13, 2026**
- **Indoor Zoom Meeting: June 25, 2026**

Membership

Our membership runs from January to December of each year, so now it is time to pay dues for 2026. Membership in the Grand Strand Astronomers is only $25.00 per year. Part of this goes toward your Astronomical League's membership and Reflector Magazine. The rest goes toward our minimal operating expenses. So, please rejoin if you haven't already. You can pay online by going to https://www.gsastro.org/joinrenew/.

As of June 2026, we have 21 dues paying members.

You can also mail in a check to:

Grand Strand Astronomers
1771 Alford Rd
Conway, SC 29526.

June Meeting Recap

The Grand Strand Astronomers held their regular monthly meeting on May 28, 2026, from 7:00 PM to 8:00. It was well attended.

Ian launched the Zoom meeting but was unable to fully participate due to travel. Gerald facilitated the meeting in place of Ian. All of the attendees were welcomed.

Gerald started off with some club business. We have been cleaning up our roster in order to submit our dues to the Astronomical League (AL). Note that the dues we pay them are based on our membership numbers. These support the AL and also funds the Reflector magazine sent to each of our club members. Gerald had sent emails to those on the roster who have not paid our club dues this year, asking if they wish to continue their membership with the club. A few responded, but a total of 15 people did not. With the loss of 15 individuals, we remain with an

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overall number of 21 active members in our club. We hate to lose anyone, but 21 is still a good number given the young age of our club.

In other business, we have two ballots to turn in to the Astronomical League. One is for the election of the president and vice president of AL. Each club gets one vote in AL elections. Gerald suggested that since the officers being voted on are incumbents there is no one running against them, we submit a Yes vote from our club. Tim seconded the motion and all agreed. Gerald will send in the ballot for the club before the deadline of July 1, 2026. The other ballot is about proposed by-law changes suggested by the AL board. Gerald read the proposed changes but then suggested he email them out to the club for comment. The changes deal with elected positions within AL that could be vacated unexpectantly and how to fill those unoccupied positions. Gerald sent an email to all the club members for their review and will wait for comments before submitting that vote.

Gerald posed the question: what can we do as a club to better engage members. There were several suggestions. The first one was to improve the Facebook page and encourage members of that Facebook group to join our club. Ian said that his coworker, Edwin Sanders will be taking over administering our Facebook page. Denise, who used to do the club's Facebook has left the area, so our Facebook page has been on autopilot for a while. We think improvements to this page will help a lot.

Another suggestion was for more public observing sessions. We've had two this year that were well attended. Ian shared that he attended an observing session through Coastal Carolina University at the Pawleys Island Montessori School. Ian said they had a good field for observing with fairly dark skies. Pawleys Island Montessori School indicated they wanted to open this up to a public observing session in the fall in partnership with our club and CCU.

Also, CCU is hoping to hold a public observing session in the Fall on their campus with our club supporting the event. Ian said they had a portable planetarium they could set up and our club members can set up their telescopes and share astronomy with the public.

Since COVID, we've been holding our meetings via Zoom. It was suggested that maybe once a quarter we could hold an in-person meeting. This might encourage more members to participate. A guest at our meeting, named Ricard, stated he teaches at Carlonia Forrest High School, and it may be possible to meet there. We will certainly explore that proposal. Tim suggested we hold an informal public observation session at Market Commons. More like "sidewalk astronomy" from the old days This has proven effective in other clubs he's been a part of.

For our astronomy discussion, Gerald asked if anyone knew what was learned from the recent Artemis II mission. The group discussed and determined that not a whole lot was being shared about it. Gerald did look it up after the meeting and found the following information which is helpful: What We Learned from Artemis II.

In other astronomy topics, Gerald shared his frustration with planetary imaging through his CPC 9.25. Chris, our resident expert for imaging, along with Ian gave a few suggestions. One was to use a Barlow lens. This will magnify the image by filling in more pixels on the camera. Collimation is extremely important when imaging through a telescope. Chris gave a few suggestions of how to do this. One was to take a very strong flashlight, cover it with aluminum foil with a single pinhole in it. Place it about 40 yards away and look at it though your telescope. This mimics the same effect you'd get from looking at a star at night, but you're doing this in daylight where you can work better at aligning the mirror. Chris did an imaging discussion at

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one of our meetings a few years back and suggested reviewing it again.

Gerald also shared an issue he had with the Celestron CPC 9.25 losing its GPS location and time. After consulting Celestron, he reuploaded the firmware. This took a few tries but solved the problem. All is working now.

Steve, a guest attending our meeting, asked if nonmembers were allowed to attend our Hampton Plantation Dark Sky Observing Sessions. The answer is yes! We encourage people who are interested in observing to attend.

With no further discussion, meeting was adjourned.

Why Can't I See Anything Through My Telescope?

Author: High Point Scientific Team
Submitted by: Tim Kelly

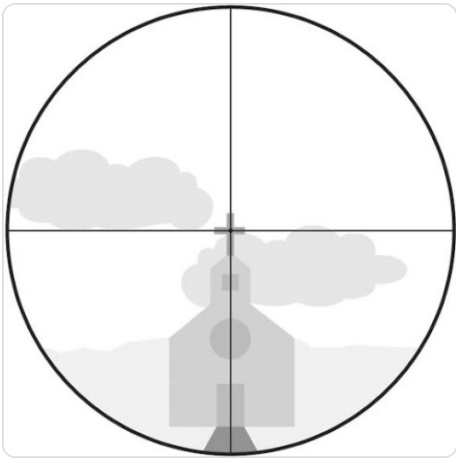
Troubleshooting Your Top Viewing Issues

Nothing is more frustrating than heading outside excitedly to look at the stars, only to realize that you can't see anything through your telescope. Worse, there could be so many causes that it's hard to know where to start troubleshooting. We're going to look at the most common viewing issues and how to solve them, so you can enjoy the night sky without a hitch! Beginners and seasoned amateur astronomers alike can experience these problems, so don't feel bad. The more you know, the better your viewing experience will be.

Many factors are at play when you're using your telescope. You're working with a piece of technology out in the elements, and all manner of hiccups can occur. If you can't see anything when you look through your eyepiece, the very first thing to check is if the cover is still on your optical tube. Yes, it seems silly, but in your rush to focus on that fast-moving star, you may have skipped this step. Everyone has done this at some point! If you've checked and the cover is off, you can move on to the following issues.

Aligning Your Finder Scope

If you're moving your telescope around and not seeing anything but black, and you know the cover is off, you might have an alignment issue with your finder scope. The finder scope is there to help you locate objects in the night sky that you can then view in greater detail through the eyepiece. If your finder scope is misaligned, even a touch, you will have a lot of problems finding the celestial objects you're looking for.



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Foggy, Distorted Image

Sometimes you'll be able to see fairly well when you first start out, but then you'll begin to see a foggy or distorted image. This is most likely due to condensation, which builds up due to temperature differences between the ambient air and your telescope. To combat dew and condensation, you can use dew shields, dew heaters, or a combination of both. It's also a good idea not to keep your telescope in a very warm part of your house, because the larger temperature difference will produce more condensation.

Blurred Image

Let's say you've aligned your finder scope and identified the object you want to view, there's no condensation build-up, but when you look through your eyepiece all you see is a big blur. No matter how much you adjust your eyepiece, you can't seem to focus. When this happens, take a look at your magnification. Contrary to popular belief, higher magnification doesn't produce better images every time (or any time, in some cases). What a higher magnification does is give you a smaller field of view while also dimming the image. So, you see worse and you see less. Higher magnification does come into play in some scenarios (such as when you're viewing the planets), but in general, you want to stick with lower magnification.

Magnification limits will also depend not only on the telescope you have but also on the Earth's atmosphere. Remember that when you're looking at any celestial object, you first have to look through the atmosphere.

Air currents produce turbulence, and with higher magnification you're also magnifying that turbulence, leading to more distortion. A general rule of thumb is to not exceed 250x magnification.

Poor Seeing Conditions

It's not you, it's the atmosphere. Sometimes, after you've checked everything on your telescope and still can't see well, it's because of factors that are outside your control. Seeing conditions won't always be on your side. You can easily evaluate the night's seeing conditions by looking at the twinkling of stars. The twinkle effect is caused by turbulence in the air, so if stars are twinkling a lot, the seeing conditions are likely poor. If they're not twinkling much at all, seeing conditions are good.

There is one thing you can do to potentially limit atmospheric distortion, however. Getting up high, such as on a mountain top, can produce better seeing conditions since you're cutting down on the amount of atmosphere between you and the stars. That's why large telescopes are built high up and can see things our smaller backyard telescopes can't.

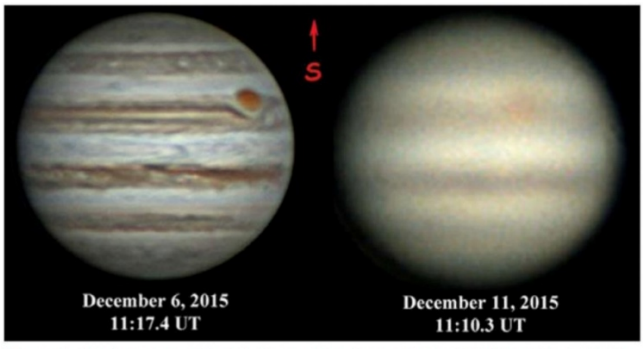

Figure 2. Jupiter, captured with the same equipment in good (left) and bad (right) seeing conditions. *Cliff Ashcraft, New Jersey, USA*

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Operating a telescope can be frustrating at times. They seem like such simple contraptions, but they can be finicky if you don't do exactly what they need to work.

Follow these troubleshooting guidelines the next time you're experiencing issues, and you'll be well on your way to a night of clear observation.

June Events for 2026

Submitted by: Tim Kelly

June Meteor Showers For 2026

The June Boötids reach their maximum at 9 PM ET on the 21st, which is a convenient time in the evening. However, being June, many locations won't see a fully dark sky until close to 11PM. On the plus side, the radiant will be well placed in the evening sky, and with the Moon at first quarter and low in the west-southwest, it shouldn't cause too much of a problem.

Regardless of your location, sometime between 11PM on the 21st and roughly 3AM on the 22nd is your best window of opportunity. The Moon sets around midnight, leaving darker skies and the radiant high for the rest of the session. Scan a wide patch from the northwest through the west and down toward the southwest. The shower is famously unpredictable - in a typical year, you might only catch a handful per hour, with occasionally brighter streaks, sometimes with a warm yellow or orange tint. Fireballs aren't common, but a surprise or two is always possible.

Planet Events

June 3 to 15: Mercury, Venus and Jupiter in Gemini (PM)

This is a great chance to catch elusive Mercury in the evening twilight. Step outside about 30 minutes after sunset and look low over the western horizon for Venus and Jupiter. Venus is the brighter of the two and sits to the lower right of Jupiter. You may also notice the stars Castor and Pollux above Venus and to the upper right of Jupiter.

Venus and Jupiter fit comfortably within the same 10x50 binocular field. Draw an imaginary line down through Jupiter and Venus and you may catch Mercury glinting near the horizon. Mercury will be fainter than Venus or Jupiter, but brighter than Castor or Pollux.

Over the following evenings, Venus and Jupiter draw closer while Mercury climbs a little higher but also grows fainter. Venus and Jupiter are closest on the 8th and 9th, when a little over 1.5° separates them. The gap then widens, with your last good chance to fit both in the same binocular view coming around the 15th.

June 15 to 17: Mercury, Venus, Jupiter, and the Waxing Crescent Moon in Gemini (PM)

Here's a great little "Mercury finder" for the evening twilight. The planet reaches its greatest distance from the Sun in the sky on the 15th. On that date, about 30 minutes after sunset, look low towards the west-northwest; Mercury will be only about 12° above the horizon, so an unobstructed view is a must. If you draw an imaginary line through Venus and Jupiter and keep going, you should come to Mercury, sitting at roughly half the altitude of Venus.

If locating Mercury proves to be tricky, come back the following evening at the same time and use the crescent Moon as a signpost: the Moon appears to the right of Jupiter and about the same distance directly above Mercury. By the next night, the Moon shifts to the upper left of Venus, creating an easy, unmissable string of worlds to follow down toward the horizon.

June 18 to July 3: Mercury and Jupiter in Gemini (PM)

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Mercury continues to put on a show in the evening twilight shortly after sunset, and this time it teams up with Jupiter. From the 18th through to the first few evenings in July, the two appear within the same 10x50 binocular field of view, making this a nice follow-on to the Venus/Jupiter pairing.

You may be able to spot them about 30 minutes after sunset at the start of the run, but as the days pass, you'll find Mercury dipping closer to the horizon and growing dimmer. That means you'll want to start looking a little sooner after sundown, and you'll definitely want binoculars to help pull Mercury out of the twilight. The two are tightest from the 23rd to the 26th, with Mercury becoming especially challenging by late June and into the first few days of July.

June 23 to July 5: Mars Appears Close to the Pleiades in Taurus (AM)

Mars creeps past the Pleiades in the morning twilight, but this pairing will most certainly be a challenge. For starters, you'll want to be outside about an hour before sunrise for the sky to be dark enough for the cluster to be visible. Even then, the Pleiades may be tricky without binoculars at the start, and a clear, unobstructed view low toward the east-northeast will be important.

On the 23rd, the Pleiades sit only about 14° above the east-northeastern horizon, but the view improves as the days pass, with the cluster roughly 10° higher by July 3rd. Mars and the Pleiades fit within the same 10x50 binocular field throughout, with Mars passing to the lower right of the cluster. The pair are closest on June 29th, when about 4.4° separates the pair.

All Events:

May 19 to June 7 - Jupiter appears close to Pollux in Gemini. The pair are closest from May 24th to June 2nd, when 6.3 degrees will separate them. (PM).

June 3 - 15 - Venus, Jupiter and Pollux appear close together in Gemini. Venus appears between Jupiter and Pollux on June 8th and 9th, when 1.7 degrees will separate Venus and Jupiter, and roughly five degrees will separate Venus from Pollux (PM).

June 8 - Last Quarter Moon in Aquarius (AM).
June 10 - The waning crescent Moon appears close to Saturn in Pisces (AM).
June 12 - The waning crescent Moon appears close to Mars in Aries (AM).
June 14 - New Moon in Taurus (NV).
June 14 - 25 - Venus appears close to the Beehive Cluster in Cancer. The two are closest on June 19th, when 0.7 degrees will separate them (PM).
June 15 - Mercury is at greatest eastern elongation in Gemini, 24 degrees from the Sun (PM).
June 16 - The waxing crescent Moon appears close to Mercury and Jupiter in Gemini (PM).
June 17 - The waxing crescent Moon appears close to Venus in Gemini (PM).
June 18 - July 3 - Mercury and Jupiter appear close to one another in Gemini. The two are closest on June 23rd and 24th, when 0.8 degrees separate them (PM).
June 19 - The waxing crescent Moon appears close to Regulus in Leo (PM).
June 21 - First quarter Moon in Virgo (PM).
June 23 - The waxing gibbous Moon appears close to Spica in Virgo (PM).
June 23 - July 5 - Mars appears close to the Pleiades in Taurus. The two are closest on June 29th, when 4.4 degrees will separate them (AM).
June 26/27 - The waxing gibbous Moon appears close to Antares in Scorpius (PM).
June 29 - Full Strawberry Moon in Sagittarius (AN).

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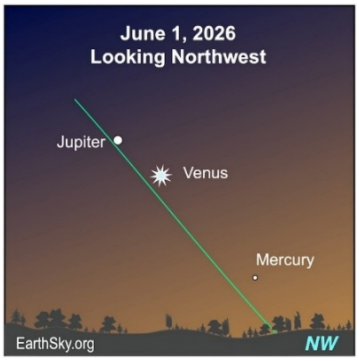
Visible Planets and Night Sky for June

Posted by: Marcy Curran
John Jardine Goss
Deborah Byrd
Kelly Kizer Whitt
Submitted by: Tim Kelly

June evenings: Charts for Venus, Jupiter and Mercury

Venus, Jupiter and Mercury on June 1

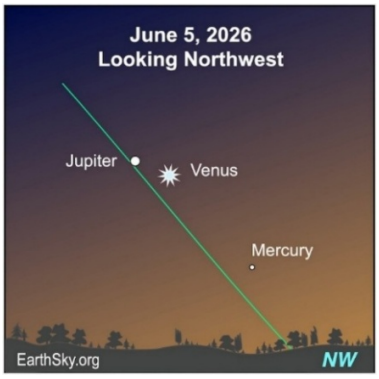


Watch for them in the west shortly after sunset.

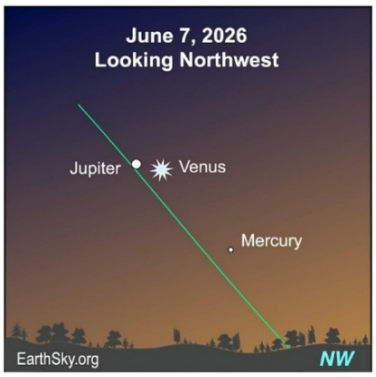
Venus, Jupiter and Mercury on June 3.

Watch for them in the west shortly after sunset

Venus, Jupiter and Mercury on June 5.

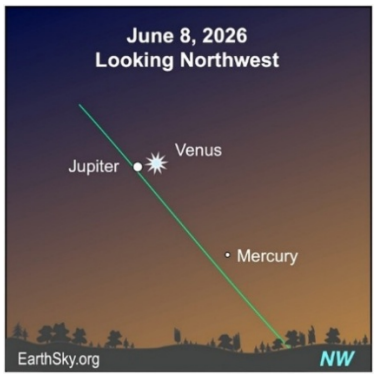


Venus, Jupiter and Mercury on June 7.



Super close now … don't miss them in the west

Shortly after sunset on June 8



Brilliant Venus will appear next to bright Jupiter. They'll be a **spectacular** sight and only 3-full-moon widths apart! Your little pinky held at arm's

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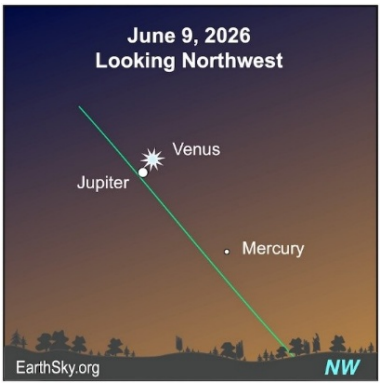
length will fit between them. Meanwhile, little Mercury will lie below them in the evening twilight.

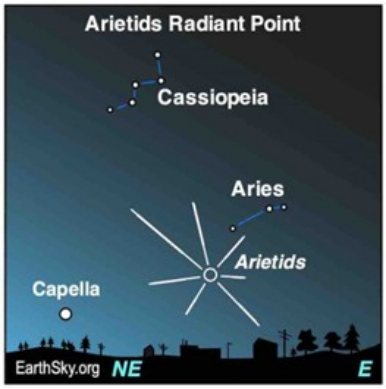
Our charts are mostly set for mid-latitudes in the Northern Hemisphere. To see a precise view – and time – from your location, try Stellarium Online.

Shortly after sunset on June 9



Brilliant Venus will still be near bright Jupiter, forming a dazzling duo that evening. At this point, the conjunction is over, and Venus has begun its ascent away from Jupiter. Venus will get higher in the west after sunset over the coming weeks. Meanwhile, Jupiter will head toward Mercury and the sunset. It'll disappear into the sunset glare by July

June 10 before dawn: Daytime Arietids



Most meteor showers are easy to observe. Just find a dark sky and look up! But what about meteor showers that happen in the daytime, when the sun is up? The Arietids are sometimes said to be the most active daytime meteor shower. In 2026, their predicted peak will be around the mornings of June 10. You might catch some Arietids around that morning in the dark hour before dawn.

June 10 and 11 mornings: Moon near Saturn

On the mornings of June 10 and 11, the waning crescent moon will shine near Saturn. Look for them a few hours before sunrise.

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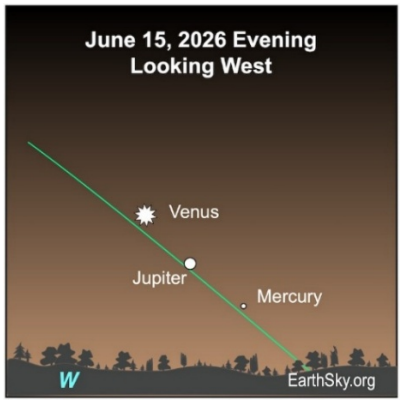
June 15: Mercury at greatest elongation from the sun



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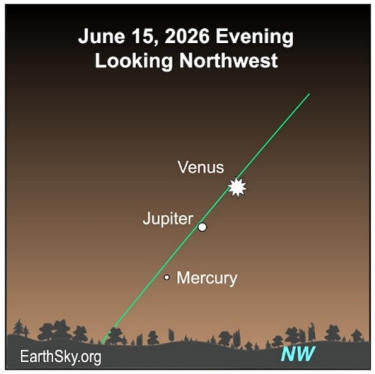
From the **Northern Hemisphere**, shortly after sunset, Mercury will lie below the much brighter planets Venus and Jupiter, low on the western horizon. It'll reach its greatest elongation from the sun at 20 UTC on June 15. At that time, Mercury will be 25 degrees from the sun in our sky. Mercury will slip away before the end of the month.

From the **Southern Hemisphere**, shortly after sunset, Mercury will lie below the much brighter planets Venus and Jupiter, low on the western. It'll reach its greatest elongation from the sun at 20 UTC on June 15. At that time, Mercury will be 25 degrees from the sun in our sky. Mercury will slip away before the end of the month.



June 16 after sunset: Moon, Venus, Jupiter and Mercury

On the evening of June 16, shortly after sunset, check out the pretty waxing crescent moon. It'll hang low in the western sky after sunset.

And it'll be near the brilliant planet Venus and the bright planet Jupiter. And it'll be close to the elusive planet Mercury. Look for them about 35 minutes after sunset.

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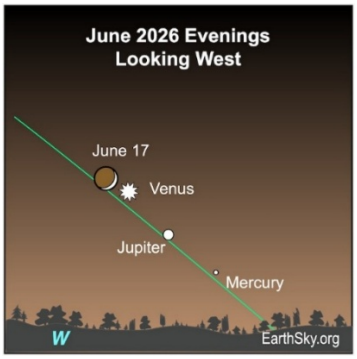
June 17 after sunset: Spectacular! Moon, Venus, Jupiter and Mercury



On the evening of June 17, about 40 minutes after sunset, check out the pretty waxing crescent moon. It'll be close to the brilliant planet Venus and near the bright planet Jupiter. Plus, the planet Mercury is nearby. Also look for the glow of earthshine on the unlit portion of the moon. That's light reflected off Earth.

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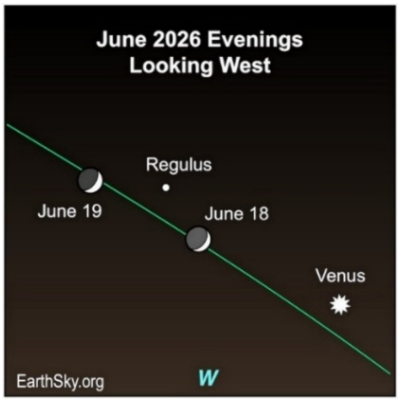
June 18 and 19 evenings: Moon, Venus and Regulus

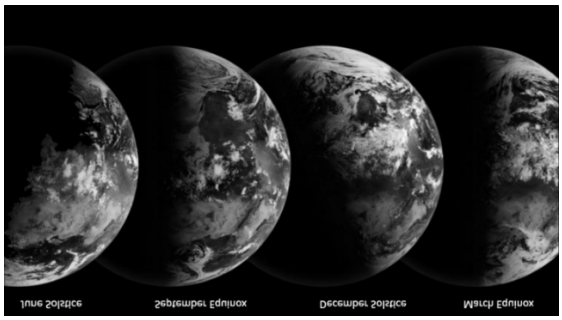


On the evenings of June 18 and 19, the waxing crescent moon will be near brilliant Venus and Regulus, the brightest star in Leo the Lion. Regulus is the bright dot at the bottom of a backward question-mark pattern of stars known as the Sickle. They'll set around midnight.

June 21: 1st quarter moon

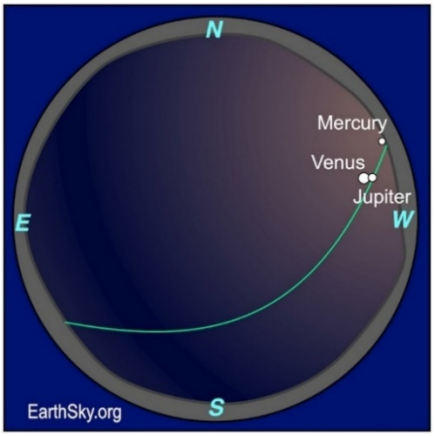
View at EarthSky Community Photos. | Lorraine Boyd captured this view from New York on November 9, 2024. She wrote: "Peeking through tree limbs at the first quarter moon (50% illumination), just after sunset." Thank you, Lorraine. This month's moment of 1st quarter moon will fall at 21:55 UTC on June 21, 2026. That's 4:55 p.m. CDT. A 1st quarter moon rises around noon your local time and sets around midnight. Watch for a 1st quarter moon high in the sky at sundown.

June Solstice



Satellite views of Earth on the solstices and equinoxes. From left to right, a June solstice, a September equinox, a December solstice and a March equinox. To understand these images, look at the poles. Notice that at the June solstice, the North Pole is in sunlight. At the December solstice, the South Pole is in sunlight. In 2026, the June solstice moment will fall at 8:25 UTC on June 21 (3:25 a.m. CDT). Read more about these images, which are via Robert Simmon (Sigma Space Corporation)/ NASA.

June evening planets



Here's an all-sky chart – centered around June 8 – showing brilliant Venus shining in the west about 60 minutes after sunset with bright Jupiter lying next to it. Much closer to the western horizon is the fainter Mercury. Note that these planets lie along the path the sun travels in the daytime (the green line on our chart).

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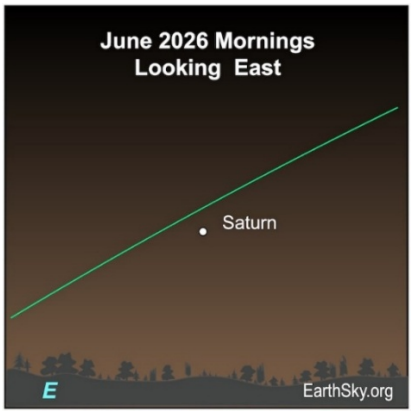
In the 2nd half of June, Venus and Jupiter will move away from each other with Jupiter slowly approaching the horizon. The much fainter Mercury will lie below Jupiter. As the month proceeds, Mercury moves closer to the horizon and becomes even fainter and more difficult to spot.

June morning planets: Northern Hemisphere

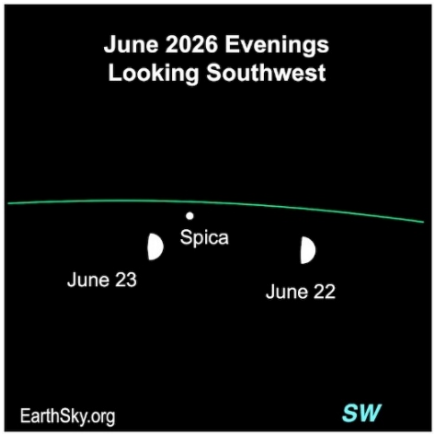
Here's an all-sky chart showing the 2 planets in the eastern sky shortly before sunrise in June. The brightest and highest planet is Saturn. Closer to the horizon is Mars. As the month proceeds, Saturn pulls farther away from the slowly ascending Mars. Note that these planets lie along the path the sun travels in the daytime (the green line on our chart).

In the first half of June, Mars sits low in the bright eastern twilight shortly before sunrise. In the second half of June, it rises higher and moves near the delicate Pleiades star cluster.

In June, Saturn will lie in the east as morning twilight begins.



June 22 and 23 evenings: Moon and Spica



On the evenings of June 22 and 23, the waxing gibbous moon will be near Spica, the brightest star in Virgo the Maiden. You can also catch them until after midnight.

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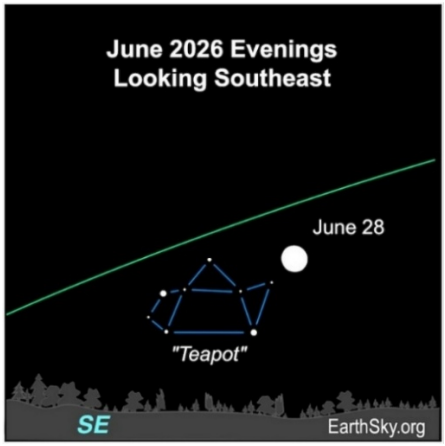
June 26 and 27 evenings: Moon near Antares

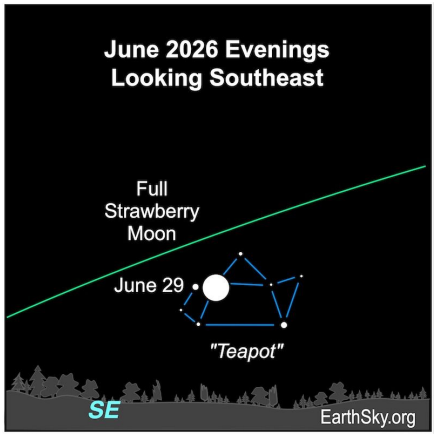
About an hour after sunset on June 26 and 27, the bright waxing gibbous moon will shine near Antares. Antares is the brightest star in Scorpius the Scorpion.

June 28 evening: Moon near Teapot



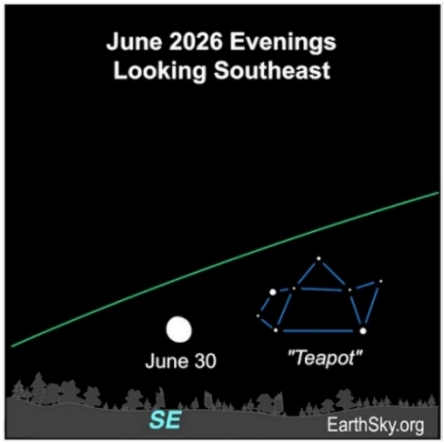
On the evening of June 28, the bright waxing gibbous moon will hang near the stars of the asterism of Sagittarius called the Teapot

June 29: Full Strawberry Moon



At sunset on June 29, the full Strawberry Moon will rise in the east near the asterism of Sagittarius called the Teapot.
Though the moon will be so bright that it will drown out the Teapot's stars. The crest of the full moon falls at 23:57 UTC on June 29. That's 6:57 p.m. CDT. Plus, it's the last of 3 full micromoons – or most distant full moons – in a row in 2026. It'll be 251,811 miles (405,251 km) away. The average moon distance is 238,900 miles (384,472 km) away.

June 30 evening: Moon near Teapot



On the evening of June 30, the bright waning gibbous moon will hang near the stars of

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the asterism of Sagittarius called the Teapot. Look for them a few hours after sunset. They'll be visible all night.

Our charts are mostly set for mid-latitudes in the Northern Hemisphere. To see a precise view – and time – from your location, try Stellarium Online.

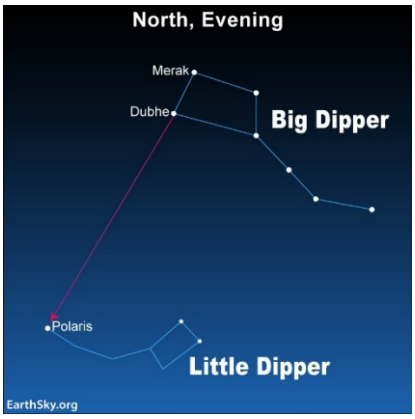
June Stars

If you're out stargazing on any June evening, look for these stars and constellations overhead in the sky

Boötes the Herdsman

Almost overhead on June evenings is the bright orange Arcturus. It's in the constellation Boötes the Herdsman. Boötes has the shape of a kite, and Arcturus is at the point where you'd attach a tail. You can't miss its distinctive shape.

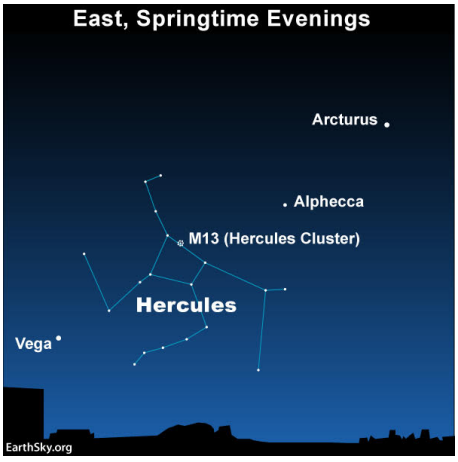
The Big Dipper and Little Dipper



Ursa Major the Great Bear is home to the Big Dipper. The Big Dipper is an asterism – a well-known group of stars – not an official constellation.

You'll find the Big Dipper high overhead from mid-northern latitudes in June evening skies. You can use the 2 outer stars in the Big Dipper's bowl – sometimes called the Pointers – to find Polaris, the North Star. And it's the end star in the handle of the Little Dipper.

Hercules the Hero and the Hercules Cluster



Hercules is a faint constellation. But its midsection contains the easy-to-see Keystone asterism. You can find Hercules between the bright stars Vega in Lyra the Harp

and Arcturus in Boötes the Herdsman. And once you find the Keystone, you can easily locate M13, the Hercules cluster.

Have fun exploring the sky!

Our charts are mostly set for the northern half of Earth. To see a precise view – and time – from your location, try Stellarium Online.

Heliocentric solar system visible planets and more

Heliocentric view of solar system, May 2026. Chart via Guy Ottewell's 2026 Astronomical Calendar. Used with permission. Plus Guy Ottewell explains heliocentric charts here.
Heliocentric view of solar system, June 2026. Chart via Guy Ottewell's 2026 Astronomical Calendar. Used with permission. Plus Guy Ottewell explains heliocentric charts here.
Read more: Guy Ottewell explains heliocentric charts.

Some Resources to Enjoy

For more videos of great night sky events, visit EarthSky's YouTube page.

Don't miss anything. Subscribe to daily emails from EarthSky. It's free!

Visit EarthSky's Best Places to Stargaze to find a dark-sky location near you.

Post your own night sky photos at EarthSky Community Photos.

See the indispensable Observer's Handbook, from the Royal Astronomical Society of Canada.

Visit Stellarium-Web.org for precise views from your location.

Almanac: Bright visible planets (rise and set times for your location).

Visit TheSkyLive for precise views from your location.

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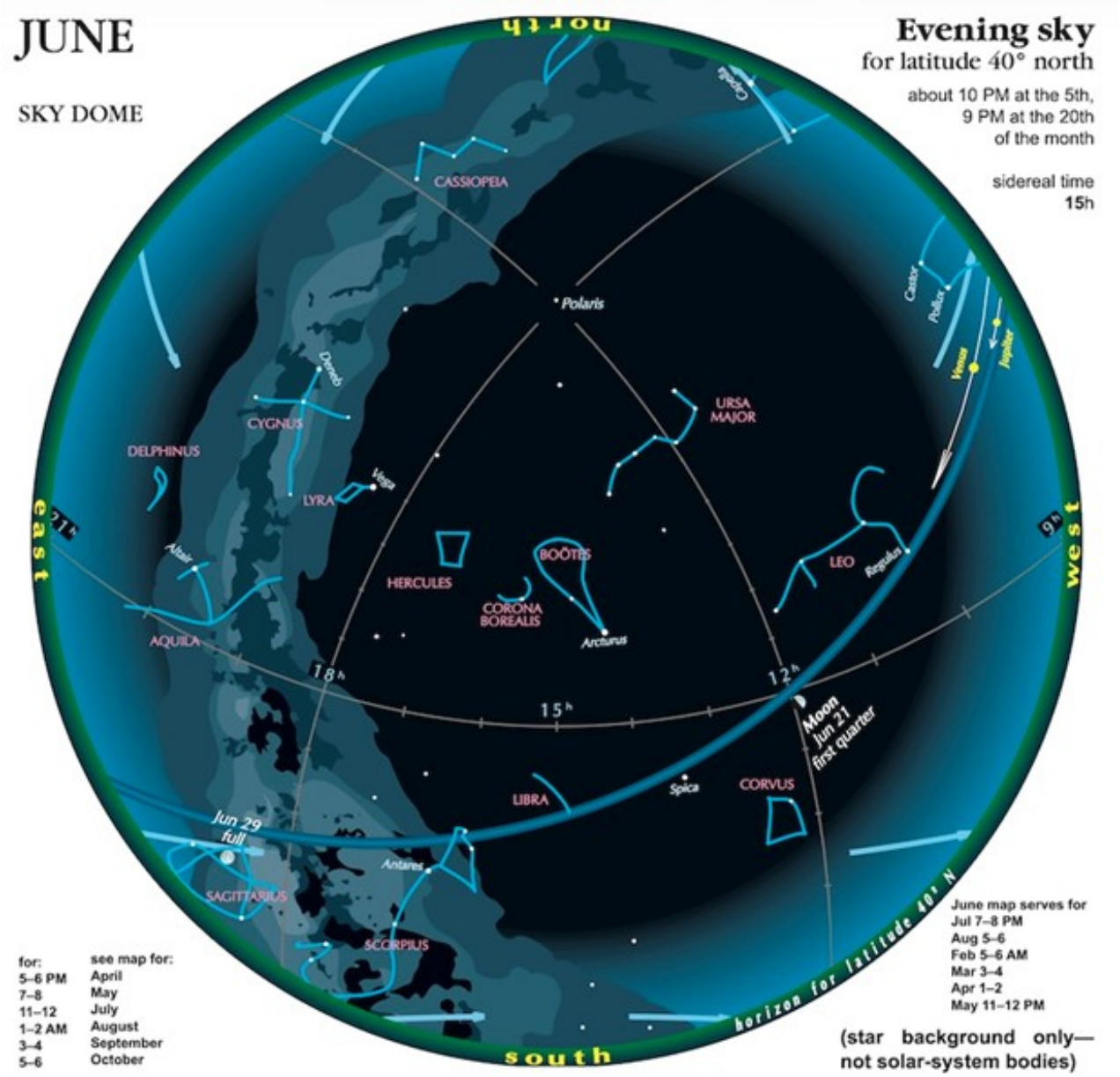
Sky dome map for visible planets and night sky

Here is the sky dome view for May 2026. It shows what is above the horizon at mid-evening for mid-northern latitudes. The view may vary depending on your location. Image via Guy Ottewell's 2026 Astronomical Calendar.



Here is the sky dome view for June 2026. It shows what is above the horizon at mid-evening for mid-northern latitudes. The view may vary depending on your location. Image via Guy Ottewell's 2026 Astronomical Calendar.

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Artimus Moon Base Will Cover “hundreds of miles” with Hopping Drones and New Lunar Rovers.

NASA
By: Mike Wall
Submitted by: Tim Kelly

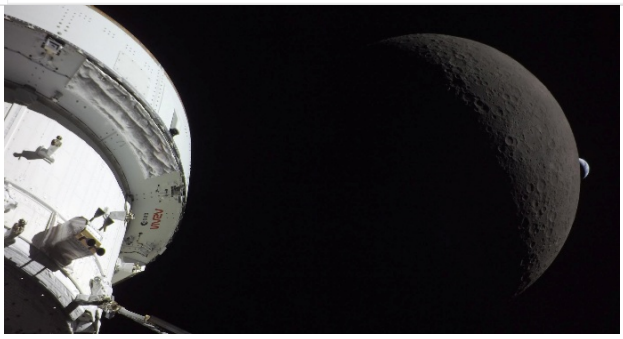
The base's perimeter may be marked by hopping "MoonFall" drones, and new moon rovers built by AstroLab and Lunar Outpost will carry astronauts around the site.

The U.S. space agency plans to build a crewed lunar base over the next decade or so via its Artemis program — and we just got a sense of that project's impressive scope.

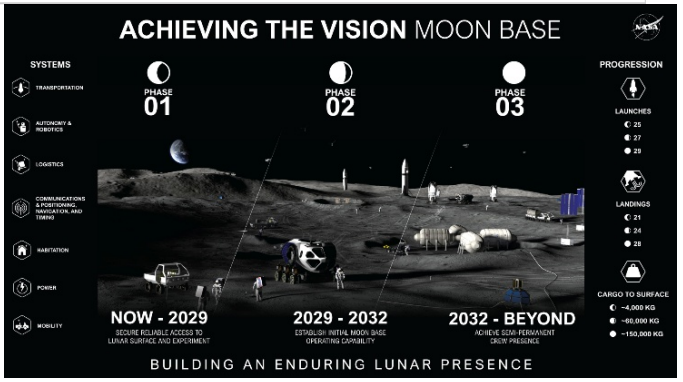
"We envision the moon base to be hundreds of square miles, with different assets all building up to the objective of permanent lunar presence on the moon," Carlos García-Galán, the manager of NASA's Moon Base program at the agency's headquarters in Washington, D.C., said during a press conference Tuesday (May 26).

NASA wants to use a fleet of MoonFall drones to scout the lunar south pole: 'We believe we can do it'

Lunar Outpost has big plans for the moon. The new Pegasus lunar rover is just the start



NASA's Artemis 2 moonshot was just the 'opening act' for America's return to the moon, space agency chief says



This NASA chart outlines the three major steps of NASA's Moon Base program from 2026 through 2032, starting with unpressurized rovers and sorties, and ending with a permanent lunar base. (Image credit: NASA)

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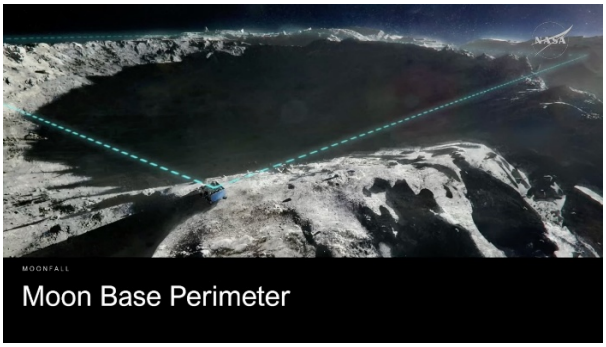
The base will be constructed over the next decade or so near the lunar south pole, which is thought to harbor large amounts of water ice. This precious resource has been accumulating for billions of years on the permanently shadowed floors of craters in the region, scientists say.

NASA didn't go into the moon base-planning process with a big footprint as a priority. Rather, it emerged naturally, as all of the envisioned elements started coming together in planners' heads.

"There's no one spot that covers all the science, all the technology, all the habitation needs of the surface, and even within the local area, you have to consider the terrain," NASA's Nujoud Merancy, chief architect of the Moon Base program, said during today's briefing.



Artist's impression of a NASA MoonFall drone helping to mark the perimeter of the agency's planned lunar base. (Image credit: NASA)

"So, you'll have the habitats on the tops of the hills where they get sunlight," she added. "Power systems — nuclear systems — need to be a kilometer or more away for the radiation protection, so all of these things, when you start putting them together, end up sprawling a little bit more like a city as you start building it out."

And scientists and mission planners still don't know a lot about the lunar south pole, which is another reason for a settlement there to cover a lot of ground, according to García-Galán.

"We're going to want to explore different sites to really maximize the mix of scientific objectives and viability of a permanent presence," he said.

NASA plans to reduce the uncertainty via the use of MoonFall drones — small, hopping robots that will scout out the south polar region ahead of moon base construction. The first MoonFall batch, a set of three or four spacecraft, will launch to the moon in 2028 aboard a lander built by Firefly Aerospace, NASA announced today. (Firefly nabbed a $75 million contract for the mission, the company said.)

NASA's lunar Gateway space station is out. Moon bases are in

Beyond Artemis 2: NASA pursuing a 'more achievable' path back to the moon

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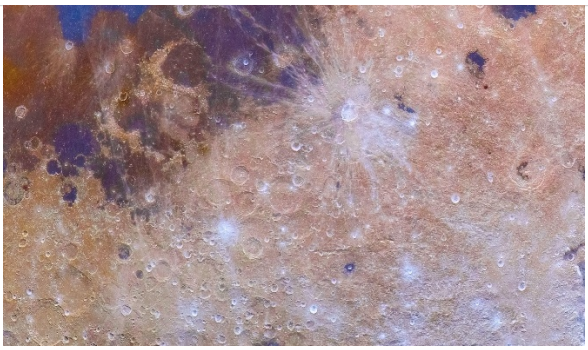

How NASA lunar scientists taught Artemis 2 astronauts to see the moon with different eyes

Those drones, or others like it, could also help mark the moon base's borders, said García-Galán.

"We're going to be able to basically put them at the corners of the areas where we think we have either key scientific objectives or we want to build up the moon base," he said.

China plans to build a base on the moon in the coming years as well (its first astronaut landing is aimed for 2030), and U.S. officials have repeatedly stressed the importance of getting the American one up and running first. The U.S. wants to be the one establishing norms of responsible behavior on Earth's nearest neighbor, the argument goes.
So, during today's press conference, Ars Technica's Eric Berger asked García-Galán and NASA Administrator Jared Isaacman, who also participated in the event, if the MoonFall drones could help delineate a keep-out zone of sorts.

"I think it's important for us to get there first," Isaacman said. "I think the idea that there are areas of great interest on the lunar surface — we do want to get there and explore them, and we also obviously want to be very mindful of the Outer Space Treaty, so that we are respectful of other nations that are putting assets on the on the lunar surface. We would expect that to be reciprocal."

From left to right: Models of the Blue Origin Blue Moon Mark 1 lander, Astrolab Crewed Lunar Rover, Lunar Outpost Pegasus rover and Firely's Elytra Dark orbiter are unveiled at NASA headquarters in Washington, D.C. on May 26, 2026. (Image credit: NASA/Aubrey Gemignani)

The moon base's envisioned size was just a sidelight of today's event. The main purpose was to announce contracts that the agency just awarded to get the ball rolling on the outpost's construction.

Firefly wasn't the only company to win a NASA Moon Base program contract. NASA is giving California-based Astrolab $219 million and Colorado's Lunar Outpost $220 million for production of their lunar terrain vehicles (LTVs).

LTVs are large rovers that Artemis astronauts will use to explore the lunar surface. These vehicles will also be capable of autonomous operation, meaning they can land before crewed missions, be remotely controlled from Earth, and meet up with astronauts at their touchdown sites. And that is indeed the goal: NASA wants to have at least one LTV on the lunar surface before Artemis 4 touches down near the lunar south pole in late 2028.

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Both LTVs will be delivered to the lunar surface by Blue Origin's Blue Moon lander, NASA announced today. Those two contracts are worth $234 million apiece, agency officials said during the briefing.
Blue Origin is also building a crewed variant of Blue Moon, which is in the running to fly the Artemis 3 and Artemis 4 astronaut missions, as well as future flights.

Artemis 3 is a docking test in Earth orbit between NASA's Orion capsule and one or both of the program's privately developed crewed lunar landers — Blue Moon and SpaceX's Starship. NASA aims to launch Artemis 3 in mid-2027, Isaacman said today. NASA plans to build the moon base in three phases. Phase One, which runs from now through 2029, will gather detailed information and "secure reliable access" to the lunar surface, according to the agency.

Phase Two runs from 2029 to 2032 and will set up the base's "initial operating capability." Phase Three, which runs from 2032 far into the future, will "achieve semi-permanent crew presence" on the moon.

“The Moon Base will be America's and humanity's first outpost on another celestial world," Isaacman said in a NASA statement today. "Every mission, crewed and uncrewed, will be a learning opportunity as we return to the lunar surface, build the infrastructure to stay, and master the skills required to live and operate in one of the most demanding and dangerous environments imaginable."

NASA has launched two Artemis missions to date. Artemis 1 sent an uncrewed Orion capsule to lunar orbit and back in late 2022, and Artemis 2 took four astronauts around the moon in Orion last month. Both missions were successful.

Are, Arae, Altar Constellation History

From Wikipedia
Submitted by: Tim Kelly

Ara (Latin for "the Altar") is a southern constellation between Scorpius, Telescopium, Triangulum Australe, and Norma. Under its Greek name Βωμός, *Bōmŏs*, it was one of the 48 classical constellations described by the 2nd-century astronomer Ptolemy, and it remains one of the 88 modern constellations designated by the International Astronomical Union.

The orange supergiant Beta Arae is the brightest star in Ara, with a near-constant apparent magnitude of 2.85, and is marginally brighter than the blue-white Alpha Arae. Seven star systems are known to host planets. Sunlike Mu Arae hosts four known planets. Gliese 676 is a (gravity-paired) binary red dwarf system with four known planets.

The Milky Way crosses the northwestern part of Ara. Within the constellation is Westerlund 1, a super star cluster that contains the red supergiant Westerlund 1-26, one of the largest stars known.

History

In ancient Greek mythology, Ara was identified as the altar where the gods first made offerings and formed an alliance before defeating the Titans.[1] One of the southernmost constellations depicted by Ptolemy,[4] it had been recorded by Aratus in 270 BC as lying close to the horizon, and the Almagest portrays stars as far south as Gamma Arae. Professor Bradley Schaefer proposes such Ancients must have been able to see as far south as Zeta Arae, for a pattern that looked like an altar.[5]

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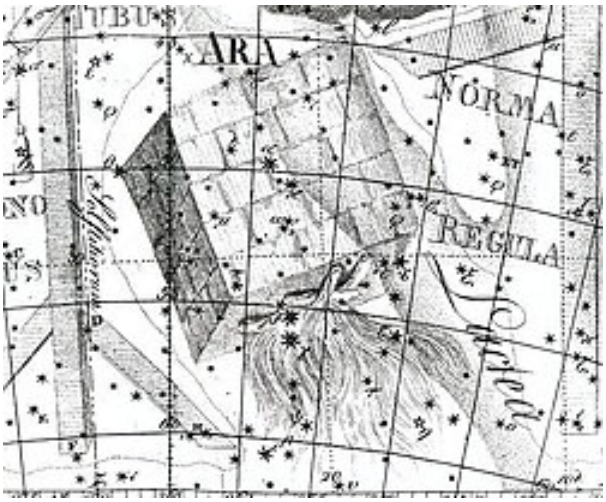


Johann Elert Bode's illustration of Ara, from his *Uranographia* (1801)

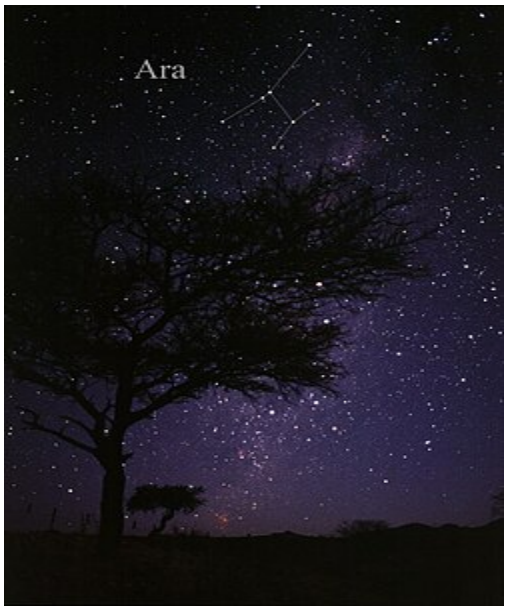
In illustrations, Ara is usually depicted as compact classical altar with its smoke 'rising' southward.[6] However, depictions often vary. In the early days of printing, a 1482 woodcut of Gaius Julius Hyginus's classic *Poeticon Astronomicon* depicts the altar as surrounded by demons.[7] Johann Bayer in 1603 depicted Ara as an altar with burning incense. Indeed, frankincense burners were common throughout the Levant especially in the Yemen, where they are known as Mabkhara. This required live coals or burning embers called Jamra', in order to burn the incense. Willem Blaeu, a Dutch uranographer of the 16th and 17th centuries, drew Ara as an altar for sacrifices, with a burning animal offering unusually whose smoke rises northward, represented by Alpha Arae.

The Castle of Knowledge by Robert Record of 1556 lists the constellation stating that "Under the Scorpions tail, stands the Altar.";[8] a decade later a translation of a fairly recent mainly astrological work by Marcellus Palingenius of 1565, by Barnabe Googe states "Here mayst thou both the Altar, and the mighty Cup beholde."[9]

Characteristics

Covering 237.1 square degrees and hence 0.575% of the sky, Ara ranks 63rd of the 88 modern constellations by area.[10] Its position in the Southern Celestial Hemisphere means that the whole constellation is visible to observers south of 22°N.[10][b] Scorpius runs along the length of its northern border, while Norma and Triangulum Australe border it to the west, Apus to the south, and Pavo and Telescopium to the east respectively. The three-letter abbreviation for the constellation, as adopted by the International Astronomical Union, is "Ara".[11] The official constellation boundaries, as set by Belgian astronomer Eugène Delporte in 1930,[c] are defined by a polygon of twelve segments. In the equatorial coordinate system, the right ascension coordinates of these borders lie between $16^{h}\ 36.1^{m}$ and $18^{h}\ 10.4^{m}$, while the declination coordinates are between −45.49° and −67.69°.[2]

Features



The constellation Ara as it can be seen by the naked eye.

Stars

See also: List of stars in Ara

Bayer gave eight stars Bayer designations, labelling them Alpha through to Theta, though he had never seen the constellation directly as it never rises above the horizon in Germany. After charting

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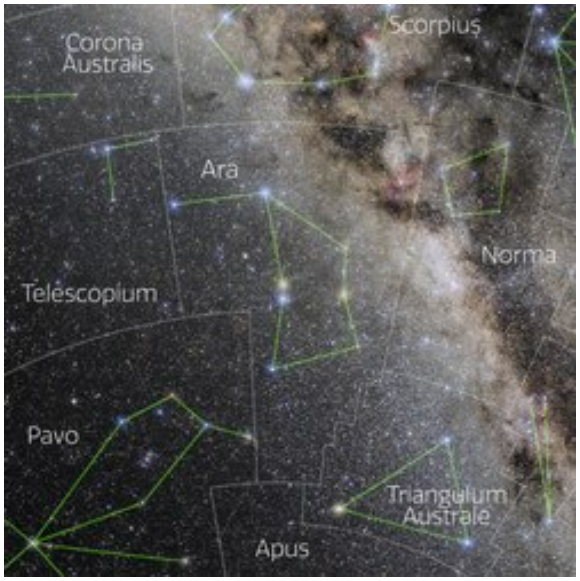
the southern constellations, French astronomer Nicolas-Louis de Lacaille recharted the stars of Ara from Alpha through to Sigma, including three pairs of stars next to each other as Epsilon, Kappa and Nu, and omitted Omicron and Xi.[13]

Ara contains part of the Milky Way to the south of Scorpius and thus has rich star fields.[1] Within the constellation's borders, there are 71 stars brighter than or equal to apparent magnitude 6.5.[d][10]

Beta Arae, apparent magnitude 2.85, is the brightest star in the constellation, about 0.1 mag brighter than Alpha Arae although the difference in brightness between the two is undetectable by the unaided eye.[15] Beta is an orange-hued star of spectral type K3Ib-IIa that has been classified as a supergiant or bright giant,[16] and lies around 650 light-years from Earth.[17] It is over 8 times as massive and 5,636 times as luminous as the Sun.[18] Close to Beta Arae is Gamma Arae, a blue-hued supergiant of spectral type B1Ib. Of apparent magnitude 3.3, it is 1110 ± 60 light-years from Earth.[17] It has been estimated to be between 12.5 and 25 times as massive as the Sun,[19][20] and have around 120,000 times its luminosity.[20]



The constellation Ara showing the IAU boundaries, the constellation stick figure, and labels for its brightest stars. Astrophotograph by Eckhard Slawik, from NOIRLab's 88 Constellations project.

Alpha Arae is a blue-white main sequence star of magnitude 2.95, that is 270 ± 20 light-years from Earth.[17] This star is around 9.6 times as massive as the Sun,[21] and has an average of 4.5 times its radius.[22] It is 5,800 times as luminous as the Sun,[21] its energy emitted from its outer envelope at an effective temperature of 18,044 K.[22] A Be star, Alpha Arae is surrounded by a dense equatorial disk of material in Keplerian (rather than uniform) rotation. The star is losing mass by a polar stellar wind with a terminal velocity of approximately 1,000 km/s.[21][23]

The third brightest star in Ara at magnitude 3.13 is Zeta Arae,[24] an orange giant of spectral type K3III that is located 490 ± 10 light-years from Earth.[17] Around 7–8 times as massive as the Sun, it has swollen to a diameter around 114 times that of the Sun and is 3800 times as luminous.[25] Were it not dimmer by intervening interstellar dust, it would be significantly brighter at magnitude 2.11.[24]

Delta Arae is a blue-white main sequence star of spectral type B8Vn and magnitude 3.6, 198 ± 4 light-years from Earth.[17] It is around 3.56 times as massive as the Sun.[26]

Epsilon[1] Arae is an orange giant of apparent magnitude 4.1, 360 ± 10 light-years distant from Earth.[17] It is around 74% more massive than the Sun. At an age of about 1.7 billion years, the outer envelope of the star has expanded to almost 34 times the Sun's radius.[27]

Eta Arae is an orange giant of apparent magnitude 3.76, located 299 ± 5 light-years distant from Earth.[17] Estimated to be around five billion years old, it has reached the giant star stage of its evolution. With 1.12 times the mass of the Sun, it has an outer envelope that has expanded to 40 times the Sun's radius.[28] The star is now spinning so slowly that it takes more than eleven years to complete a single rotation.[29]

GX 339-4 (V821 Arae) is a moderately strong variable galactic low-mass X-ray binary (LMXB) source[30][31] and black-hole candidate that flares from time to time. From spectroscopic

measurements, the mass of the black-hole was found to be at least 5.8 solar masses.[32]

Exoplanets have been discovered in seven star systems in the constellation.[33] Mu Arae (Cervantes[34]) is a sunlike star that hosts four planets.[35] HD 152079 is a sunlike star with a Jupiter-like planet with an orbital period of 2097 ± 930 days.[36] HD 154672 is an ageing sunlike star with a Hot Jupiter. HD 154857 is a sunlike star with one confirmed and one suspected planet. HD 156411 is a star hotter and larger than the sun with a gas giant planet in orbit. Gliese 674 is a nearby red dwarf star with a planet. Gliese 676 is a binary star system composed of two red dwarfs with four planets.

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Night Sky Chart

Heavens Above
Submitted by: Tim Kelly

Year: **2026** Month: **June** Day: **15** Hour: **22.00** Minute: **00:00** Second: **00:00**