Volume 52 Number 6 June 2026

The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence

Coming Events

Monthly Meeting
No Meeting This Month
Baker Wetlands Discovery Center

Public Observing
No Public Observing
Baker Wetlands Discovery Center

Club Officers

President
Rick Heschmeyer email

NSN Coordinator
Howard Edin email

Faculty Advisor
Dr. Jennifer Delgado email.

Newsletter Editor
Chuck Wehner email

Inside This Issue

Report From the Officers

By Rick Heschmeyer

As I mentioned last month, AAL had applied to participate again this year in the Lawrence Public Library How-To Festival on Saturday, June 6 from 11am-3pm. Our application was approved, so we will be conducting safe solar observation on the library lawn as we have done in the past. Stop by and take a look at Sol through our safe solar telescopes.

We also have two events scheduled at KU Field Station this summer. The first is scheduled for Wednesday, August 12 and will coincide with the peak of the Perseid Meteor Shower. The second will take place on Thursday, August 27 for the Partial Lunar Eclipse. Both events are scheduled to start at 9pm. More information will be sent out as we get closer to the dates. As always anyone wishing to help out with either of these events please contact me. Hope to see everyone at these events.

Sometime in the coming week, Governor Kelly is expected to proclaim June 30th, 2026, as Asteroid Day for the State of Kansas. The Northeast Kansas Amateur Astronomers League (NEKAAL) in Topeka is planning an event at the Topeka Public Library Main Branch to celebrate Asteroid Day from 5:00-7:30 PM. The reason I am mentioning this is that I will be displaying meteorites from my collection, with a special focus on Meteorites from Kansas. If you are not aware, only five states have surpassed Kansas in the number of meteorites found within their borders, and Kansas has more meteorites found per square mile than any other state! Please help us spread the word about this event.

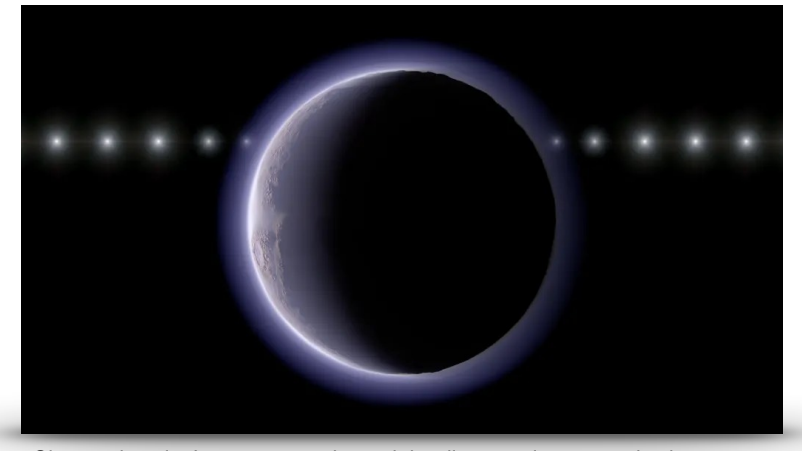
Have a great summer and Clear Skies!

A small object past Pluto may have a thin atmosphere

The possible atmosphere around 2002 XV93 would be a first for a small object beyond Pluto

By Lisa Grossman
SCIENCENEWS, MAY 4, 2026

A small solar system denizen farther from the sun than Pluto may be shrouded in a thin atmosphere. If confirmed, it would be the first object of its size known to host even a tenuous atmosphere.



Observations in January 2024 showed the distant solar system body 2002 XV93 (illustrated) gradually attenuating light from a background star. That suggests the starlight was being filtered through a tenuous atmosphere.

"This discovery suggests that small icy worlds beyond Neptune may not be as inactive or unchanging as we often assumed," says observational astronomer Ko Arimatsu of the National Astronomical Observatory of Japan in Mitaka. "Until now, Pluto was the only trans-Neptunian object with a confirmed atmosphere." He and his colleagues report the observations May 4 in Nature Astronomy.

The team tracked the small body — dubbed 2002 XV93 — using a network of telescopes in Japan. On January 10, 2024, telescopes in three locations recorded it moving in front of a distant star. For other solar system bodies, the details of such tiny eclipses, called occultations, have revealed the presence of atmospheres — and even rings.

If 2002 XV93 were bare, the star would have appeared to blink out and reappear sharply. But Arimatsu and colleagues saw the star's light fade and recover gradually over about 1.5 seconds. That smooth dimming is best explained by starlight passing through and being refracted by a tenuous atmosphere, with a pressure about one ten-millionth that Earth's, Arimatsu says.

"I was genuinely surprised," he says. The object is about 470 kilometers wide, roughly as wide as the Grand Canyon is long — so small that its gravity should be too weak to hold on to gas for long. The atmosphere should dissipate in thousands of years unless something resupplies it, the researchers estimate.

The gas could have been released recently, maybe by an impact from an icy body like a comet, and the astronomers just happened to be looking at the right time. Or the body may release gas regularly through icy volcanoes.

One occultation can't completely rule out other explanations, such as dust, Arimatsu notes. The observations also couldn't tell what the atmosphere is made of or how high above the body's surface it extends.

"Future observations will be important," Arimatsu says. If the atmosphere fades over the next few years, that could mean it was transient and kicked up by an impact. If it persists, or varies seasonally, that favors the volcano scenario. ☀

NASA wants to land astronauts on the moon in 2028. Will SpaceX's Starship or Blue Origin's Blue Moon lander be ready in time?

Both private vehicles have many boxes left to check.

By Andrew Jones
SPACE.COM, MAY 5, 2026

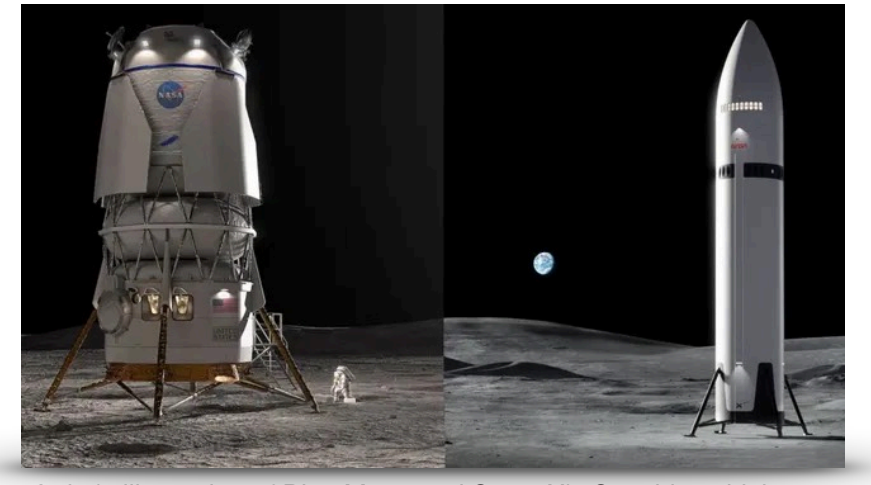
With the Artemis 2 crew back home after their historic circumlunar voyage, attention now turns to getting astronauts back on the surface of the moon. But how are the landers that will make such an ambitious endeavor possible progressing?

NASA recently outlined a revised plan for Artemis 3, which has the mission performing a crewed test in Earth orbit in late 2027 rather than the previously planned 2028 lunar landing. The mission will instead be an Earth-orbit rendezvous of NASA's Orion spacecraft with one or both of the program's moon landers, analogous to the Apollo 9 mission, setting up a lunar landing attempt with Artemis 4 in late 2028. But this plan relies on swift action by NASA's partners.

The agency earlier selected two private companies to provide crewed Artemis moon landers: SpaceX's Starship Human Landing System (HLS) and Blue Origin's Blue Moon lander, both of which are in development and facing tight deadlines for future missions.

SpaceX and Starship HLS

With a number of major milestones on the horizon, the coming months will indicate if these landers can be readied for their planned 2027 orbital tests.



Artist's illustration of Blue Moon and SpaceX's Starship vehicle on an Artemis mission to the surface of the moon.

SpaceX founder and CEO Elon Musk has long talked about getting humans to Mars, but recently he's shifted his attention to the moon, despite earlier calling our natural satellite "a distraction." Now, he's talking about a lunar settlement. First, however, SpaceX needs to get its Starship HLS lander ready.

That vehicle, which NASA selected in 2021, is a specific configuration of Starship, which comprises the 33-engine Super Heavy booster and Starship, or "Ship," upper stage. SpaceX says that, as of late October last year, it has hit 49 milestones related to developing the subsystems, infrastructure and operations needed to land astronauts on the moon. These include lunar life support, Raptor cold start demonstrations, Raptor lunar landing throttle tests, software, debris protection and elevator and airlock tests. The key to the major progress needed in the next 18 months, however, is flying Starship regularly and demonstrating on-orbit docking and propellant transfer.

Starship has flown 11 suborbital missions over the past three years. The 12th flight, expected later this month, will be the debut of the larger and more powerful Version 3, equipped with its new V3 Raptor engines, which will be used for orbital flights and operational payloads.

In its multiple flight tests, SpaceX has hit some big development milestones, including relighting engines in space, payload deployment demonstrations and spectacular "chopstick" booster recoveries. But many more lie ahead, with time running out. These include not just reaching Earth orbit by also demonstrating orbital refueling, which involves a propellant transfer demo between two Starship upper stages. This is required, as the HLS Starship needs to be fueled up in Earth orbit with tanker missions to allow it to head for the moon.

This requirement alone demands a high launch cadence, with multiple tanker flights needed to fuel a single lunar mission, while there is also a need to verify long-duration life support for astronauts. There's lots on the menu for SpaceX for HLS advancement, and a positive first flight of Starship V3 will be crucial.

Blue Origin's Blue Moon

Blue Origin's Blue Moon Mk2 crewed variant lunar lander is a simpler system compared to Starship HLS, selected in 2023 and intended for the Artemis 5 mission and beyond, rather than what is now Artemis 4. But the shakeup of NASA's Artemis plans has opened the door to an earlier landing, if Blue Moon can be made ready.

Unlike SpaceX, Blue Origin is pursuing a stepwise approach, beginning with an uncrewed cargo lander before attempting a crewed system. The biggest test on the horizon is the launch of the smaller Blue Moon Mark-1 (Mk1) cargo lander, which is expected to

launch to the moon later this year after recently undergoing vacuum chamber testing. One major issue, however, is the grounding of its rocket ride — Blue Origin's powerful New Glenn — after a recent launch anomaly.

Getting the New Glenn launcher and uncrewed Mk1 lander ready and then acing a lunar landing will be crucial to Blue's lunar ambitions with Artemis. As with Starship HLS, there is also the need to develop and test the life support systems for Blue Moon Mk2.

The company is typically reserved in terms of public updates on the program, but recent Congressional meetings have provided some insight into developments.

In a NASA budget hearing held by the House Committee on Appropriations, Subcommittee on Commerce, Justice, Science, and Related Agencies on April 27, NASA Administrator Jared Isaacman said that the companies assured him of their efforts to be ready.

"I've received responses from both vendors, both SpaceX and Blue Origin, to meet our needs for a late 2027 rendezvous docking and test the interoperability out of both landers in advance of a landing attempt in 2028," Isaacman said.

NASA has indicated it is willing to fly with whichever lander is ready in late 2027 for Artemis 3, meaning the race is on, and could determine whether SpaceX or Blue Origin gets to ferry astronauts down to the moon on Artemis 4. ☀

Should Saturn's huge moon Titan be humanity's next destination, after the moon and Mars?

By Leonard David

SPACE.COM, MAY 7, 2026

"It's not too soon to begin thinking about this."

After "re-booting" the moon and establishing a base there, followed by dispatching expeditionary crews to Mars, where should humanity go?

Next month, a first-of-its-kind gathering will blueprint an eventual crewed trek to tantalizing Titan, the largest of Saturn's many moons. That inaugural "Humans to Titan Summit" will make the case for an astronaut outing to that far-off moon, detailing the science goals and concepts of human missions to Titan as well as necessary forerunner robotic efforts.

And there is already a robotic Titan mission on the books — NASA's nuclear-powered Dragonfly octocopter mission, which is targeted to launch in 2028. Could it help fuel a human leap?

Foundational talks

"It's not too soon to begin thinking about this," said Amanda Hendrix, director of the Planetary Science Institute, headquartered in Tucson, Arizona. She is also president of the advocacy group Explore Titan and co-author of "Beyond Earth: Our Path to a New Home in the Planets" (Pantheon Books, 2016).

"The idea of the summit is to bring together people from different communities — engineers, scientists, industry, academia, robotic and human spaceflight experts," Hendrix told Space.com. "We're having foundational talks about what precursor missions do we need in order to get us on the road to Titan, eventually with humans."

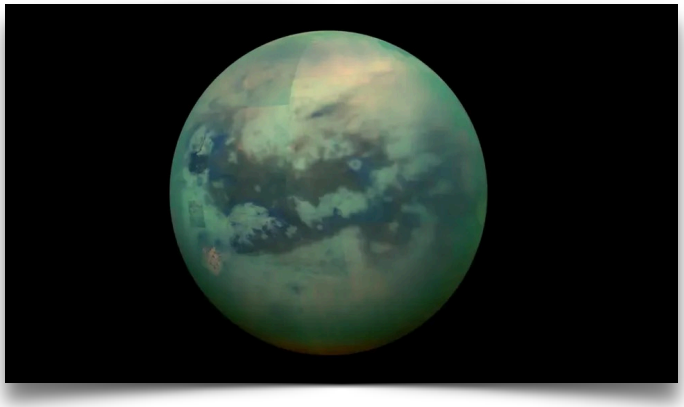
Hendrix noted that, after Apollo's last human foray to the moon in 1972, there was a gap of decades, a lull in launching astronauts beyond Earth orbit — a pause just filled by NASA's recent Artemis 2 mission, which sent four astronauts around the moon and back to Earth.

"Now we are, hopefully, back on track [with] humans going to the moon, with NASA talking about Mars as the next human destination," said Hendrix. "I think having a concept in our mind after Mars can guide our thinking, give us a path and keep us motivated for the future."

Visits, past and future

The Saturn moon has had visitors already. On Jan. 14, 2005, the European Space Agency's robotic Huygens probe — part of the NASA-ESA Cassini-Huygens mission to Saturn — touched down on Titan.

Making a 2.5-hour descent through Titan's atmosphere, the Huygens probe provided a stream of data for 72 minutes once on the moon's surface. It set the still-standing record as the most distant landing from Earth.



"Huygens showed us many things," Hendrix said. She cited the dynamics of Titan's atmosphere, the look of its surface — which features water-ice "rocks," dry river beds, lakes and dunes — as well as the overall haziness at the landing locale.

"It does look otherworldly," Hendrix said.

Next up for Titan is Dragonfly, now scheduled to launch no earlier than 2028 for a six-year voyage to Titan. Once landed, the craft will spend three years flying from spot to spot to investigate a range of sites, perhaps revealing its potential to host life.

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A dynamic world

"Dragonfly is an awesome, super-important mission to a fascinating and active world," said Hendrix. "Titan is not a static place. It is a dynamic world," she said, "probably a place that's very close to an early-Earth kind of environment."

Dragonfly will give us a leg up in the effort to send humans to Titan, Hendrix said, "but there's still a lot to do and learn."

"Ultimately, we're trying to get humans on the surface and living there. I think that's doable in the long-term, for sure," she said. A precursor mission might involve robotic orbiting of Titan — perhaps even a human crew circuiting the Saturn moon. Radar and infrared scanning of its surface could be done, she said, along with gauging what impact Titan's changing seasons have on the moon's atmosphere.

"A lot can be done, and should be done, robotically. But with humans on the surface, there's work only humans can do," Hendrix said.

Surmountable issues

So, how best to strut the right stuff on Titan?

First, there's more atmospheric pressure than here on Earth. "You don't need a pressure suit like you do on the moon or Mars. What you do need to do is keep warm. It's very cold there. There's also a little more gravity than the Earth's moon," said Hendrix.

Because of Titan's atmosphere, "you can strap wings to your arms and move through the atmosphere under your own power, or strap on a jet pack and power yourself around. You've got that atmosphere and low gravity. There are many options for transport on Titan, which Dragonfly is taking advantage of," Hendrix said.

Also, you'd have to make your own oxygen, Hendrix said, which is not available in Titan's thick, nitrogen atmosphere laced with methane. A Titan-based habitat would need a power source. And, given the precipitation of molecules and gunk that rains down and settles on the surface, there's a need to protect equipment, she said. ☀

The Sun Blasted a Mysterious Radio Signal for 19 Straight Days. Here's What We Know

Four different spacecraft captured the massive surge of energy as it just kept going.

By Passant Rabie

Gizmodo, MAY 19, 2026

On August 21, 2025, the Sun emitted what appeared to be a routine burst of radio-wave energy—the kind astronomers observe regularly and expect to fade within hours or days. But this signal refused to disappear. As scientists continued to track it, the burst stretched on far beyond anything previously recorded, ultimately becoming the longest-lasting solar radio burst ever observed.

A team of researchers analyzed the event using data from four different NASA missions, which all happened to observe the radio burst for a few days over three successive windows. The record-breaking radio burst lasted for a total of 19 days, beating the previous record of just five days.

The team's findings, published in The Astrophysical Journal Letters, helped pinpoint the exact source of the radio burst and could aid scientists in better forecasting space weather.

Solar outburst

The Sun is colossal sphere of superheated plasma that's constantly plagued by violent eruptions. Solar flares, or massive bursts of energy that erupt from the surface, accelerate tiny particles like electrons in the Sun's atmosphere. As those electrons move through the Sun's plasma, they send out intense radiation in the form of radio waves.

The event was first observed by Solar Orbiter, a Sun-observing probe jointly operated by the European Space Agency and NASA that captures the closest-ever images of our host star. Then, 12 days later, NASA's Parker Solar Probe, a spacecraft designed to fly directly through the Sun's outer atmosphere, and Wind, a satellite observing the stream of particles in solar wind, observed overlapping intervals of the radio burst. A day after on September 9, NASA's STEREO-A, a mission studying the evolution of solar storms, was the last to observe the radio burst.

Radio chatter

The recently observed radio burst was highly unusual in that it lasted far longer than expected, suggesting that it likely originated from a persistent source of energetic electrons or magnetic activity in the Sun's atmosphere.

There are different types of solar radio bursts depending on their frequencies and duration. The record-breaking radio burst falls under the Type IV category, which tend to be prolonged emissions caused by electrons trapped in large magnetic loops in the Sun's corona (the outermost layer of the atmosphere).

The team behind the new study, led by scientists at NASA's Goddard Space Flight Center in collaboration with international researchers, developed a new technique to identify the source behind the radio burst. The scientists used the data from the STEREO-A spacecraft as a tracker, which placed the source near a feature in the Sun's atmosphere called a helmet streamer.

A helmet streamer is a funnel-shaped structure in the Sun's corona. It forms when hot solar plasma becomes trapped along giant magnetic loops that extend outward from the Sun, with long stream-like tails flowing into space.

The scientists have a theory as to why this particular radio burst lasted for so long. They believe that a trio of explosive outbursts, called coronal mass ejections,

within the same region may have fueled the record-breaking event.

While the radio waves themselves are harmless, the same magnetic environment that produced them can result in solar activity that could affect spacecraft and satellites. That's why scientists keep a close watch on the Sun, hoping to better understand its outbursts so they can help protect our assets in Earth orbit. ☀

Galactic starlight will take your breath away | Space photo of the day for May 19, 2026

By Chelsea Gohd

SPACE.COM, MAY 19, 2026

The galaxy M77 looks truly out-of-this-world in a new image by the James Webb Space Telescope.

Is this a galaxy or a movie poster for a sci-fi smash hit?

A new image captured by NASA's James Webb Space Telescope shows the galaxy Messier 77 (M77) in stunning new detail with beams of glowing light shining outward. And the secret behind its incredible glow? A black hole.

What is it?

The galaxy M77, nicknamed the Squid Galaxy, takes center stage in this striking new image snapped by NASA's James Webb Space Telescope. The galaxy's heart shines brightly in the image, with gleaming rays of light radiating from its center while gas and dust swirls around.

M77 is a barred spiral galaxy located about 47 million light-years from Earth and can be found in the night sky in the constellation Cetus. The galaxy is visible to skywatchers, with a magnitude of 9.6, you can typically spot it with the help of a small telescope.

Interestingly, while this object is a Messier galaxy, meaning it was catalogued by astronomer Charles Messier, it was actually discovered by another French astronomer named Pierre Méchain who told Messier of his discovery.

Why is it incredible?

The secret behind this ethereal glow is actually a black hole. Scientists think that at the heart of most galaxies lies a black hole, and in M77, its central black hole's intense gravity is pulling gas inward. This movement causes the gas to heat up, releasing radiation and glowing tremendously as we can see in this snapshot, according to a statement from NASA.

In addition to the glow, the image stands out because of the incredible rays of light shining from its center. But these lines of light aren't caused by the gravitational pull of a black hole, instead they are actually an optical effect caused by the telescope, according to the statement.

Whatever the reason behind its appearance, one thing is certain: this galaxy is truly breathtaking in this new image. ☀

The Backyard Observer, June 2026

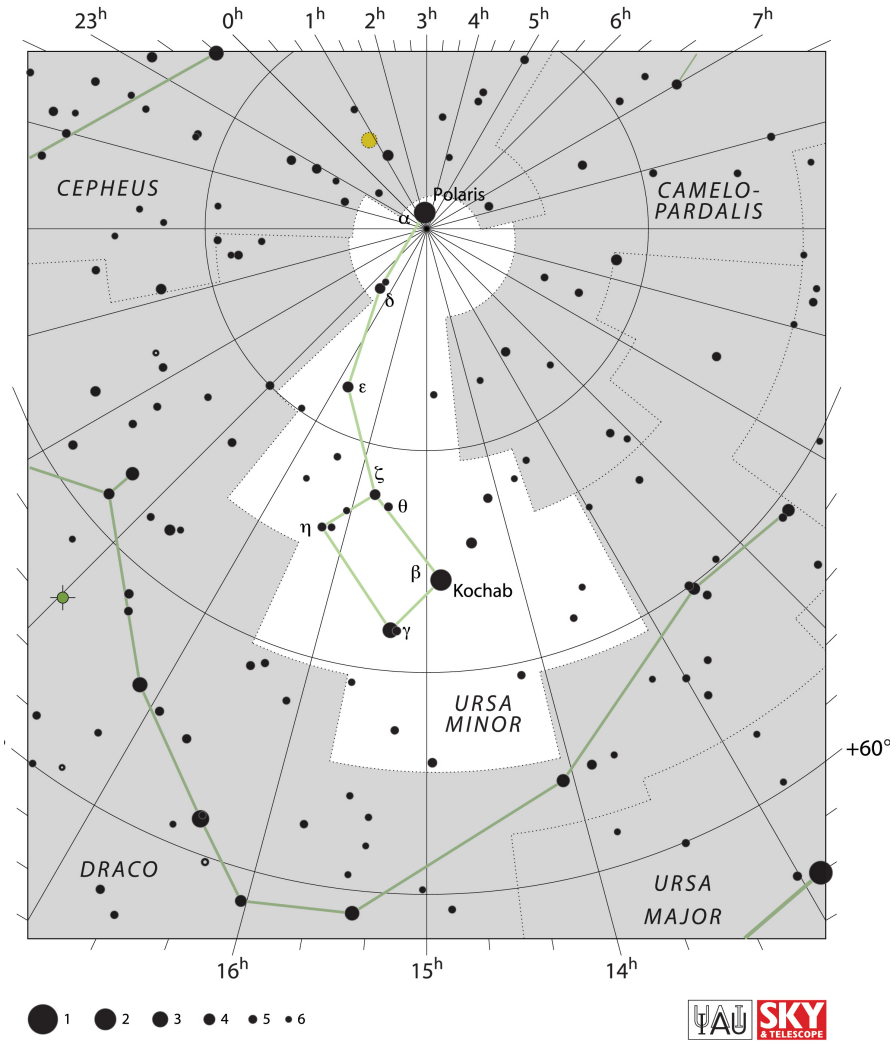
By Rick Heschmeyer

Ursa Minor

Most everyone learns sometime in their life how to use the two stars that form the front edge of the Big Dipper to locate the North Star. That is why those two stars are sometimes called “The Pointers”.

The North Star, known as Polaris, is the brightest star in this month’s constellation, Ursa Minor, the Lesser Bear. Many people probably know this constellation by its more popular name, the Little Dipper.

Polaris, or Alpha Ursae Majoris, is probably the most important star in the night sky for viewers in the Northern Hemisphere. Not only has it been used since the time of the Greeks as a guide to navigation, both on land and at sea, but it lies less than a degree from the North Celestial Pole. If you were to stand on the North Pole and look directly overhead, there would be Polaris, the Pole Star. But Polaris has not always been the Pole Star. The earth’s axis wobbles as the earth spins, just as a spinning top wobbles. This wobble is called precession. The earth’s axis actually traces out a large circle in the night sky over the course of 26,000 years. Polaris is only a temporary Pole Star, currently being the closest star to this processionary circle. In about 13,000 years, Vega in the constellation Lyra will be the Pole Star. About 5000 years ago Thuban in Draco was the Pole Star and was worshipped by the Egyptians as such. Polaris, even if it were not the Pole Star, would still be of interest to astronomers. Not only is it a double star visible in good small telescopes, but Polaris is also a Cepheid variable star. Named after the star Delta Cephei, Cepheid variables are among the most well-known and numerous types of variable stars. These are giant stars which actually pulsate, changing in size, brightness and surface temperature with a period of one to a few days. A relationship exists between the period of the variations and the average magnitude of the star. Because of this fact and the fact that Cepheids are intrinsically bright stars, they have been detected in nearby galaxies and used to calculate distances to those galaxies. Polaris lies 433 light years from us. It is technically a double star, but the brightness of Polaris makes viewing the dimmer companion challenging, even with a telescope.



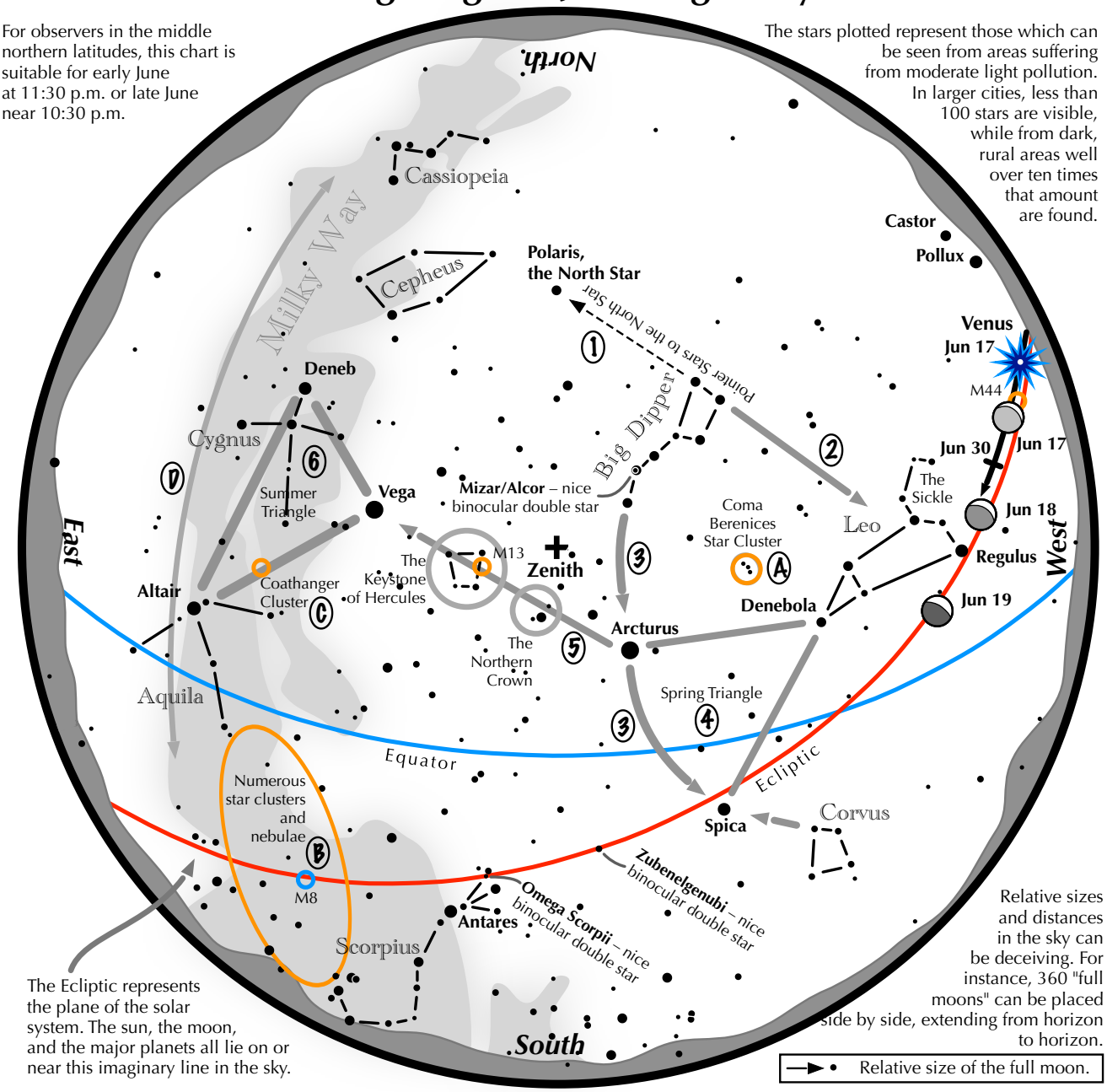
The “Diamond Ring” is a small asterism that includes Polaris. You will need binoculars of a small telescope to find this grouping. Aim at Polaris, which serves as the “diamond” amidst a fainter arc of 9th magnitude stars forming the ring.

The other two stars that are easier to see from mildly light-polluted skies are Beta Ursae Majoris, named Kochab, and Gamma Ursae Majoris, named Pherkad. These two stars mark the end of the bowl of the Little Dipper, just like the “Pointers” mark the end of the Big Dipper’s bowl and are together known as the “Guardians of the Pole”. Pherkad makes a nice, colorful optical double star for binoculars with nearby 11 Urase Minoris. Pherkad shines blue and 11 UMi shines with an orange hue. To view the others stars of the constellation will require you to get away from city lights.

Navigating the June Night Sky 2026

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 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.

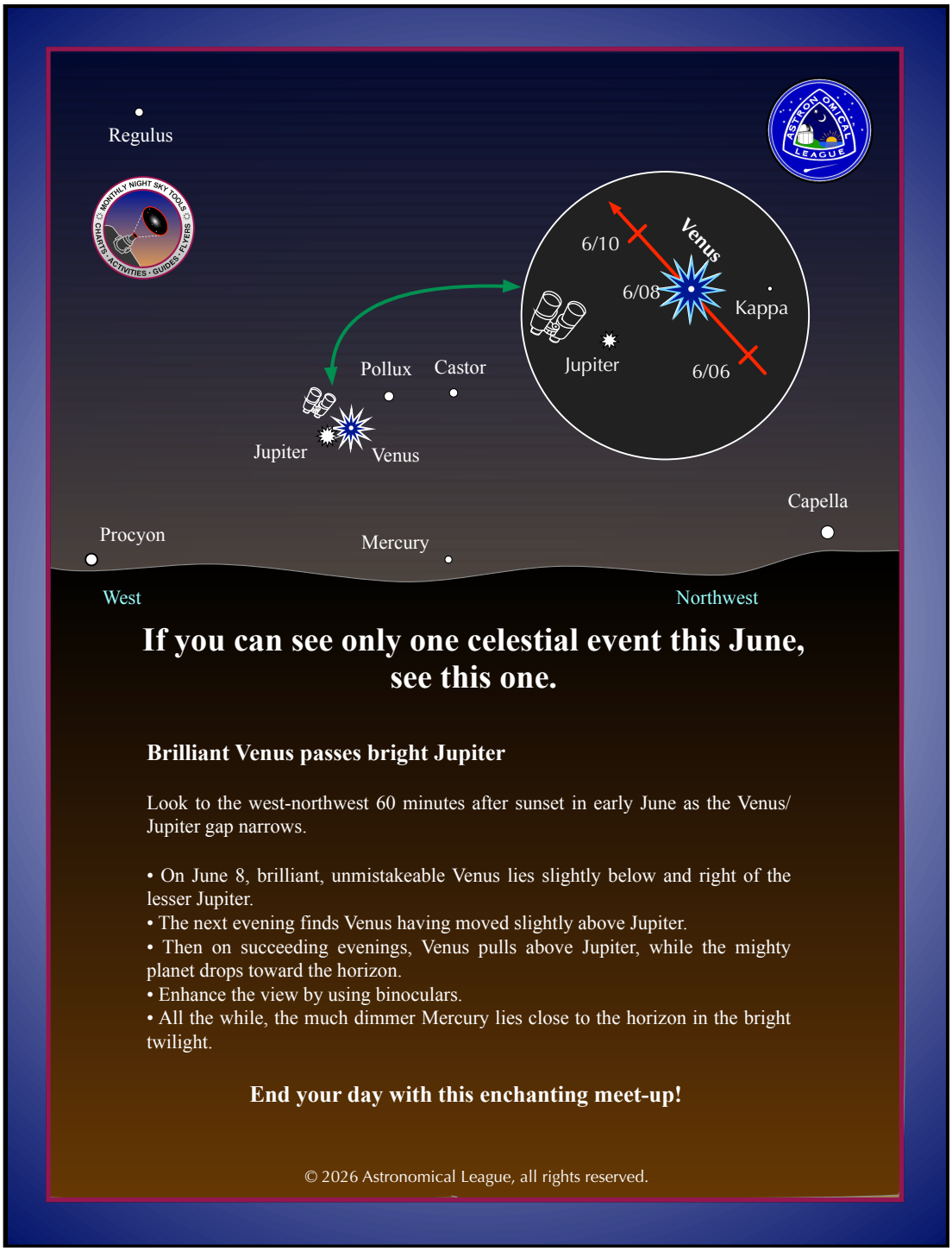
Relative size of the full moon.

Navigating the June 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. Draw another line in the opposite direction. It strikes the constellation Leo high in the west.
3. Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.
4. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
5. To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
6. High in the east are the three bright stars of the Summer Triangle: 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 of Antares and Altair, hides an area containing many star clusters and nebulae.
C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
D. Sweep along the Milky Way for an astounding number of faint glows and dark bays.



About Astronomy Associates

The club is open to all people interested in sharing their love for astronomy. Monthly meetings are typically on the last Sunday of each month and often feature guest speakers, presentations by club members, and a chance to exchange amateur astronomy tips. These meetings and the public observing sessions that follow are scheduled at the Baker Wetlands Discovery Center, south of Lawrence. All events and meetings are free and open to the public. Periodic star parties are scheduled as well.

Because of the flexibility of the schedule due to holidays and alternate events, it is always best to check the Web site for the exact Sundays when events are scheduled.

Copies of the Celestial Mechanic can also be found on the web at newsletter.
Annual Dues for the club are: $12 for regular members; $6 for students Membership forms can be accessed at the club website form.