

Our regular monthly meeting will be held at
Round Table Pizza
4200 Gosford Rd, Bakersfield, CA 93313

June 5

Social Hour @ 6:00p
Meeting @ 7:00p



facebook.com/groups/syzygy



kernastro.org



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ANNOUNCEMENTS

SPECIAL GUEST Q&A

Check out the KAS exclusive Q&A with NASA Flight Operations Systems Engineer **Michael Cannistraro** on page 5!



Public Outreach and Events

June 13 - Star Party at the Frazier Mountain Trailhead - [click for map](#)

June 24 - Silver Creek Park solar event from 9-10am - [click for map](#)

Friends of the Club

Our friends at the **Tulare Astronomical Association** would like to remind us that the Tulare County Office of Education has a planetarium with a schedule of shows! [Click here](#) to check it out.



NEO SURVEYOR

Presented by Sarah Elizabeth McCandless

NEO Surveyor will be NASA's first spacecraft built specifically to find large numbers of asteroids and comets that are potentially hazardous to Earth.

As it scans the solar system, NEO Surveyor's sensitive infrared detectors will track the most elusive near-Earth objects. Dark asteroids and comets don't reflect much visible light, for example, but they will glow in the infrared spectrum as they're heated by sunlight.



Sarah Elizabeth McCandless is a navigation engineer for NASA's Jet Propulsion Laboratory in Southern California. McCandless' job involves tracking the location and predicting the future trajectory of spacecraft, including the Mars Perseverance rover, Artemis I, Psyche, and Europa Clipper.

McCandless received a bachelor's in Aerospace Engineering from the University of Kansas in Lawrence, and a master's in Aerospace Engineering from the University of Texas at Austin, focused on orbital mechanics.

McCandless is originally from Fairway, Kansas, and remains an avid fan of sports teams from her alma mater and hometown. She is active in STEM (science, technology, engineering, and mathematics) outreach and education and enjoys camping, running, traveling with friends and family, and piloting Cessna 172s. She lives in Pasadena, California.



UPCOMING SPEAKERS

- Aug 7 Daniel Huecker – Sequoia Parks Conservancy – Dark Sky Festival
- Sep 4 Rod Guice – Club Member
Milankovitch Cycle
- Oct 2 Tim Elam
Roadside Geology of Kern County
- Nov 6 Tom Mason
Mt. Wilson Observatory

IN THE SKY

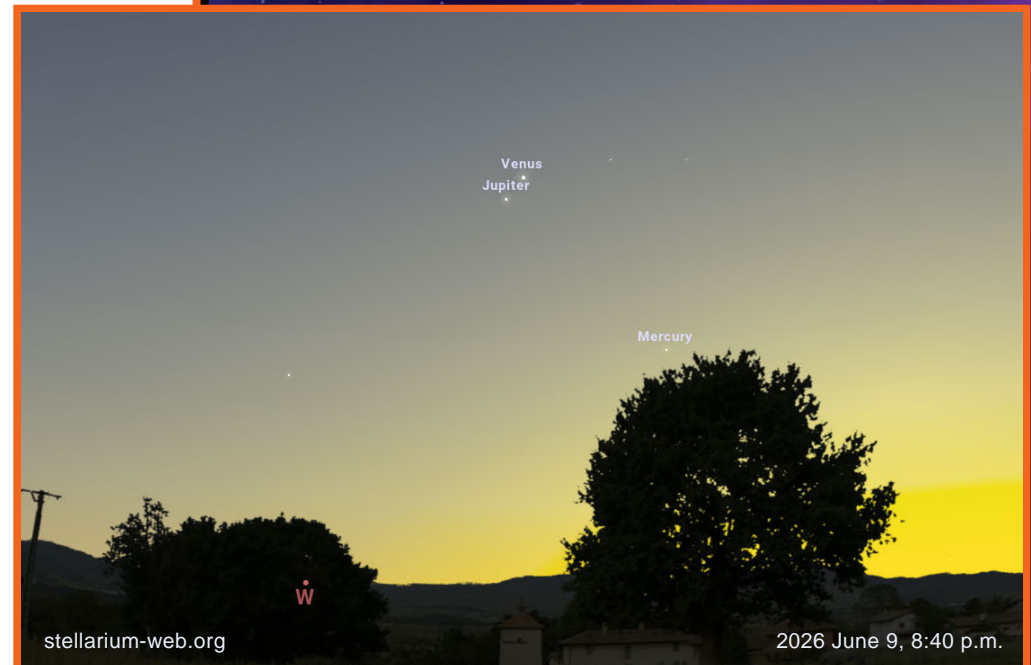
THINGS TO LOOK FOR IN MAY

This month, we'll get two full moons and the Eta Aquariid meteor shower.

- On June 9, Venus and Jupiter will have a close conjunction low in the western sky. Look for them around sunset until they set shortly after 10pm.
- The moon and Venus will have a close conjunction the night of June 17. The moon will actually pass in front of Venus but during the daytime between 11:30am and 2:30pm.
- The Summer Triangle season is here! Late in the evenings, look for the Vega-Deneb-Altair triangle of stars. This area is rich in telescope targets including the Dumbbell, Ring, North America, and Veil nebulas.
- ★ The moon is closest to the Earth on June 14 at 4:20pm - just 3.5 hours before the new moon!

Can you get a picture of this super-slim crescent moon?

Look for more events at the back of this newsletter!



2025-26 KERN COUNTY ASTRONOMICAL SOCIETY SCHEDULE

REMINDER – Below is a list of our upcoming meetings for the 25-2026 club year. Monthly club meetings will be held at the Round Table Pizza at 4200 Gosford Rd. from 6pm to roughly 9pm. Monthly board member meetings are held the Thursday of the week before the monthly club meeting at 5060 California Ave #600 from 6pm to 7pm. We would like to remind everyone that club members are welcome to join our board meetings!

BOARD MEETINGS

October 30
November 20 *
December 18 *
January 29
February 26
March 26
April 23
May 28
June – no meeting
July 30
August 27
September 24

* Moved one week early due to holidays

CLUB MEETINGS

November 7
December 5
January 9
February 6
March 6
April 3
May 1
June 5
July – no meeting
August 7
September 4



Q&A with Michael Cannistraro

In May, Kern Astronomical Society president Scott Herrick had the opportunity to have a question and answer session with Michael Cannistraro, Flight Operations Systems Engineer for NASA's Roman Space Telescope program.

For this Q&A, we covered two main topics. The first part focuses on his role as a flight operations system engineer – from what that job involves to the kinds of challenges that come with operating a NASA mission. From there, we shift to the Roman Space Telescope mission and what makes it special.



Flight Operations Systems Engineer

Q: Thank you so much for taking some time for our club. First, let's start with you and your background. How long have you been in the aerospace industry and NASA and what other missions have you worked on?

A: I've been in the aerospace industry for about two and a half years. I graduated from Embry-Riddle Aeronautical University in December 2023 and was lucky to be immediately hired into this position.

Q: For our readers who may not be familiar, how would you describe your role as a Flight Operations Systems Engineer in simple terms?

A: In simple terms, I'm a flight controller. This means sitting on console in the Mission Operations Center (MOC) performing tests and eventually real-time commanding of the observatory when it's on orbit.

Q: What does a typical day look like for you when a mission is actively operating?

A: While I haven't yet experienced a post-launch mission, we have executed many Mission Readiness Tests (MRTs) that simulate various parts of the mission; Everything from launch day, to commissioning, to a week in the life. While operations aim for a high degree of automation and efficiency, we are always prepared for anomalies. Some of the day will be

taken with observatory health and safety monitoring, including subsystem trending to ensure there are no major anomalies arising. We'll also perform commanding to the Observatory, uplinking science observation plans, among other things.

Q: How do you and your team prepare for problems that might occur during a mission?

A: Our MRTs serve as the single greatest tests of our systems, our procedures, our contingency plans, and fault trees. Each MRT allows us to uncover issues we might not have seen so we can correct them prior to launch. We also have anomaly-specific MRTs where we purposefully inject anomalies we might see during the mission so that we are forced to recover from them, testing out contingency protocols and fault plans further.

Q: What advice would you give to students or hobbyists who dream of working on space missions one day?

A: My greatest piece of advice is to get involved wherever you can. In college, my campus didn't have a dedicated satellite club yet, so I founded it (the Embry-Riddle Orbital Research Association (ERORA)). This gave myself and now many other students a pathway to early research experience. Clubs and experience like these can be used towards internships and full-time positions. The same philosophy goes for hobbyists too, get involved wherever and whenever you can, experience is everything.

Roman Space Telescope

Q: Briefly, please tell us about the Roman Space Telescope and what makes it exciting for astronomers.

A: The Nancy Grace Roman Space Telescope (or RST for short) is a flagship NASA mission designed to unlock the mysteries of dark energy, dark matter, and exoplanetary systems. Its power lies in two complementary instruments: the Wide Field Instrument (WFI), which provides a field of view 100 times larger than Hubble's (while maintaining the same resolution) to conduct rapid, panoramic surveys of the universe, and the Coronagraph Instrument (CGI), a high-contrast technology demonstration that will directly image and characterize planets orbiting distant stars. Together, these instruments will allow astronomers to map the cosmos with unprecedented scale and precision, fundamentally changing our understanding of how the universe evolves and uncover potentially tens of thousands of new exoplanets in the process.

Q: What kinds of discoveries is RST expected to help us make?

A: RST is expected to revolutionize our understanding of the universe by combining wide-area surveys with high-contrast precision imaging. By utilizing WFI to map the distribution of galaxies across vast regions of the sky, it'll allow astronomers to measure the influence of dark energy and dark matter on the universe's expansion with as yet unseen accuracy. At the same time, RST will transform exoplanetary science. We currently know of ~6,000 exoplanets, Roman is expected to discover over 100,000 new exoplanets through a combination of direct imaging using CGI, transitory discovery, and gravitational microlensing. Together, these capabilities will provide a more comprehensive view of the universe's structure and evolution, helping us understand how planetary systems form, identify new worlds that could potentially harbor life, and bring us closer to truly understanding how dark matter and dark energy work.

Q: What sets Roman apart from telescopes like Hubble Space Telescope and James Webb Space Telescope?

A: What sets Roman apart from Hubble and JWST are its instruments and spectral coverage. Hubble laid the foundation for modern astrophysics and performs observations in UV to visible light. JWST has a larger mirror and observes in near-infrared to mid-infrared. Roman will observe in near-infrared with roughly the same resolution as Hubble. However, with 100x the FOV, it will be able to survey the sky significantly faster, observations that would usually take Hubble 3 years to complete, Roman will be able to do in 3 hours. Roman's CGI is also a groundbreaking technology demonstration that, if successful, will lay the groundwork for future observatories such as the Habitable Worlds Observatory.

Q: Is Roman intended as a replacement for HST?

A: RST is not a replacement for Hubble, but rather a powerful, complementary partner to work in tandem with it and JWST. This partnership allows astronomers to use RST to identify observations candidates from its broad observations across the sky, which can then be targeted by Hubble or JWST for deeper, more detailed investigation. By combining RST's massive survey capabilities with Hubble and JWST's specialized focus, we'll be able to gain a more complete and full-scale view of the universe than any of the observatories could do alone.

Q: How will Roman help us understand things like dark energy or exoplanets?

A: Roman will investigate dark matter, dark energy, and exoplanets using the Wide Field Instrument (WFI) to conduct massive surveys of galaxies, mapping their distribution and shapes to measure how dark energy accelerates the expansion of the universe over time. Simultaneously, WFI will perform vast surveys using gravitational microlensing to detect thousands of exoplanets across the galaxy, while the CGI will block out the light from nearby stars to directly image and characterize the planets orbiting them.

Q: What are some of the biggest challenges in operating a space telescope like Roman?

A: Some of the biggest challenges for a mission like Roman are data management and thermal stability. RST's wide field surveys will generate huge amounts of data; Every day Roman will transmit back ~1.4 TB of data, over its five primary mission, Roman's data archive is expected to reach 20,000 TB (20 PB) or more. For comparison, from 1990 - 2020, Hubble transmitted 172 TB of data, and JWST's data archive after its five-year primary mission is expected to be ~1,000 TB. This requires a large complex High Gain Antenna System and complementary ground-based processing system to downlink and store the information. From a thermal perspective, Roman is required to be maintain extreme thermal stability for both WFI and CGI, as even minor temperature fluctuations can interfere with the optical components. These challenges become all the more apparent with Roman orbiting at L2, where servicing missions like Hubble had are unlikely for then near-future.

Q: When Roman is up and running, what will a typical “day” of observations look like?

A: A typical day is defined by highly efficient survey cycles to maximize the time spent gathering data. Roman has three core surveys (High Latitude Wide Area Survey, High Latitude Time Domain Survey, and the Galactic Bulge Time Domain Survey), along with general astrophysics surveys it'll perform during its primary mission, so each day will depend on the given survey.

Q: How can amateur astronomers and the public follow along with Roman’s discoveries?

A: The public and amateur astronomers can stay engaged with RST through several official NASA channels. The primary hub is the official Roman Space Telescope website. The NASA and NASA Goddard social media account will also provide updates and mission

milestones as they happen. Lastly, as NASA is committed to open science, Roman's data will be made fully available to the public through the Mikulski Archive for Space Telescope (MAST). This allows researchers, students, and citizen scientists to explore and analyze the mission's findings once the data becomes available.

Biography

Michael Cannistraro is a Roman Space Telescope Flight Operations Systems Engineer at NASA's Goddard Space Flight Center. Cannistraro's expertise lies in the operational readiness of a flagship science mission. They have a proven ability to develop and execute rigorous testing protocols, including Mission Readiness Tests (MRTs) and acceptance tests for critical ground subsystems such as the telemetry and command system. Cannistraro also spearheaded the formal tracking and verification of the Mission Operation Center (MOC) Level 4 requirements, ensuring the MOC systems met operational requirements and are prepared for launch.

Cannistraro possesses a strong background in space exploration and mission development. While participating in NASA's L'Space Mission Concept Academy, they served as a Systems Engineer, supporting mission concept development and project management for a Martian exploration mission. Their collegiate leadership includes founding and directing the Embry-Riddle Orbital Research Association (ERORA), the campus' satellite club, where they oversaw multiple CubeSat projects. Notably, Cannistraro founded the Radiation Orbital Shielding Investigation Satellite (ROSIat) mission and served as the payload team lead for the Tardigrade Bio-Exploration Reproduction Research Satellite (tBEARR).

Beyond club and project leadership, Cannistraro has extensive technical experience in the design and development of small-satellite missions, ranging from initial concept formulation to orbital trajectory modeling. Their work encompasses the design and testing of satellite components, as well as leading teams in the development of life support systems and scientific experiments. By successfully securing early project funding and applying rigorous engineering standards, Cannistraro consistently integrates complex scientific investigation with practical engineering solutions, emphasizing situational awareness and system reliability in space operations.



The Evening Sky Map

FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

Sky Calendar – June 2026

Follow us on Bluesky
[skymaps.com/bsky/](https://bsky.com/skymaps.com)

- 1 **Moon at apogee** (farthest from Earth) at 5h UT (distance 406,366km; angular size 29.4').
- 1 **Mercury at northernmost declination** (25.6°) at 19h UT.
- 8 **Last Quarter Moon** at 10:02 UT.
- 9 **Venus 1.6° NNE of Jupiter** at 21h UT (37° from Sun, evening sky). Mags. -4.0 and -1.9.
- 10 **Moon near Saturn** at 8h UT (morning sky). Mag. 0.9.
- 12 **Moon near Mars** at 19h UT (morning sky). Mag. 1.3.
- 13 **Moon near the Pleiades** at 14h UT (evening sky).
- 14 **Moon at perigee** (closest to Earth) at 23:20 UT (distance 357,197km; angular size 33.5').
- 15 **New Moon** at 2:55 UT. Start of lunation 1280.
- 15 **Mercury at easternmost elongation** at 20h UT (24.5° from Sun, evening sky). Mag. 0.6.
- 17 **Moon near Jupiter** at 9h UT (evening sky). Mag. -1.8.
- 17 **Moon near Venus** at 18h UT (evening sky). Mag. -4.0. Occultation visible from the Contiguous United States, Canada, Brazil and Venezuela.
- 18 **Moon near Beehive Cluster (M44)** at 2h UT (evening sky). Venus nearby.
- 19 **Moon near Regulus** at 13h UT (evening sky). Occultation visible from South Africa, Mozambique, Madagascar and Zimbabwe.
- 21 **June solstice** at 8:23 UT. The time when the Sun reaches the point farthest north of the celestial equator marking the start of summer in the Northern Hemisphere and winter in the Southern Hemisphere.
- 21 **First Quarter Moon** at 21:55 UT.
- 23 **Moon near Spica** at 20h UT (evening sky).
- 27 **Moon near Antares** at 13h UT (evening sky). Occultation visible from Antarctica, south-eastern Australia, New Zealand and Tasmania.
- 28 **Moon at apogee** (farthest from Earth) at 7h UT (distance 406,265km; angular size 29.4').
- 29 **Full Moon** at 23:57 UT.

More sky events and links at [Skymaps.com/skycalendar/](https://skymaps.com/skycalendar/)

All times in Universal Time (UT). (USA Eastern Daylight Time = UT - 4 hours.)



Support The Evening Sky Map

Helping curious minds to explore the night sky since January 2000 •
Recommended Products for Sky Watchers: skymaps.com/store/
 All sales support the production of this free resource. Thank you.

NORTHERN HEMISPHERE JUNE 2026

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY JUN 11 PM

LATE JUN 10 PM

(Add 1 Hour For Daylight Saving)

SKY MAP DRAWN FOR

A LATITUDE OF 40°

NORTH AND IS

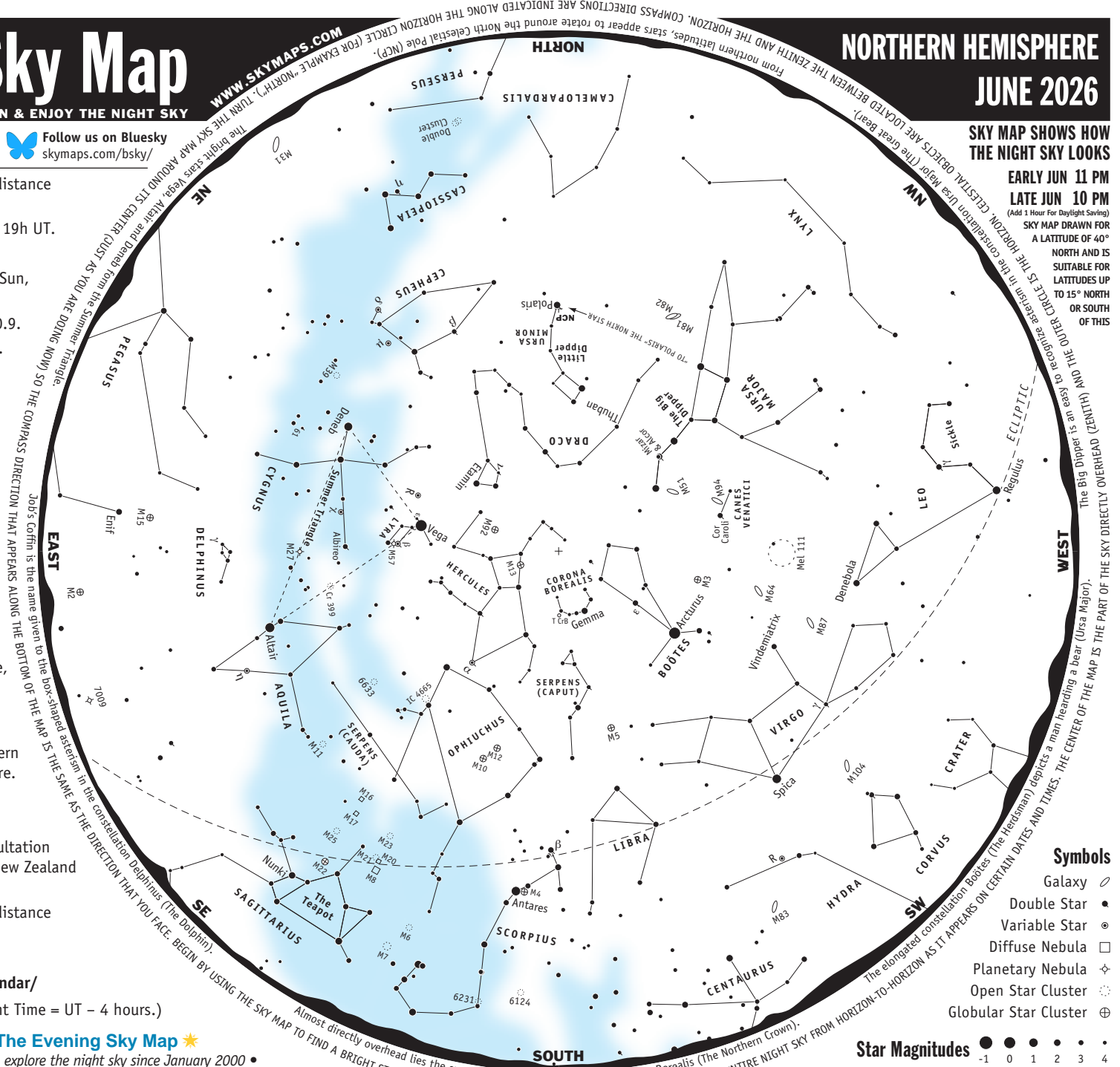
SUITABLE FOR

LATITUDES UP

TO 15° NORTH

OR SOUTH

OF THIS



Symbols

- Galaxy ☾
- Double Star ●●
- Variable Star ⊙
- Diffuse Nebula □
- Planetary Nebula ☆
- Open Star Cluster ○
- Global Star Cluster ⊕

Star Magnitudes -1 0 1 2 3 4

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About the Celestial Objects

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

Tips for Observing the Night Sky

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

Astronomical Glossary

Conjunction – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

Constellation – A defined area of the sky containing a star pattern.

Diffuse Nebula – A cloud of gas illuminated by nearby stars.

Double Star – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

Ecliptic – The path of the Sun's center on the celestial sphere as seen from Earth.

Elongation – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

Galaxy – A mass of up to several billion stars held together by gravity.

Globular Star Cluster – A ball-shaped group of several thousand old stars.

Light Year (ly) – The distance a beam of light travels at 300,000 km/sec in one year.

Magnitude – The brightness of a celestial object as it appears in the sky.

Open Star Cluster – A group of tens or hundreds of relatively young stars.

Opposition – When a celestial body is opposite the Sun in the sky.

Planetary Nebula – The remnants of a shell of gas blown off by a star.

Universal Time (UT) – A time system used by astronomers. Also known as Greenwich Mean Time. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.

Variable Star – A star that changes brightness over a period of time.

NORTHERN HEMISPHERE JUNE 2026 CELESTIAL OBJECTS



Easily Seen with the Naked Eye

Altair	Aql	• Brightest star in Aquila. Name means "the flying eagle". Dist=16.8 ly.
Arcturus	Boo	• Orange, giant K star. Name means "bear watcher". Dist=36.7 ly.
δ Cephei	Cep	• Cepheid prototype. Mag varies between 3.5 & 4.4 over 5,366 days. Mag 6 companion.
Deneb	Cyg	• Brightest star in Cygnus. One of the greatest known supergiants. Dist=1,400±200 ly.
α Herculis	Her	• Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion.
Vega	Lyr	• The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
Antares	Sco	• Red, supergiant star. Name means "rival of Mars". Dist=135.9 ly.
Polaris	UMi	• The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433ly.
Spica	Vir	• Latin name means "ear of wheat" and shown held in Virgo's left hand. Dist=250 ly.

Easily Seen with Binoculars

η Aquilae	Aql	• Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7,166 days. Dist=1,200 ly.
M3	CVn	• Easy to find in binoculars. Might be glimpsed with the naked eye.
μ Cephei	Cep	• Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
Mel 111	Com	• Coma Berenices. 80 mag 5-6 stars in 5 deg. Dist=283 ly. Age=400 million years.
χ Cygni	Cyg	• Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.
M39	Cyg	• May be visible to the naked eye under good conditions. Dist=900 ly.
ν Draconis	Dra	• Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.
M13	Her	• Best globular in northern skies. Discovered by Halley in 1714. Dist=23,000 ly.
M92	Her	• Fainter and smaller than M13. Use a telescope to resolve its stars.
ε Lyrae	Lyr	• Famous Double Double. Binoculars show a double star. High power reveals each a double.
R Lyrae	Lyr	• Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
M12	Oph	• Close to the brighter M10. Dist=18,000 ly.
M10	Oph	• 3 degrees from the fainter M12. Both may be glimpsed in binoculars. Dist=14,000 ly.
IC 4665	Oph	• Large, scattered open cluster. Visible with binoculars.
6633	Oph	• Scattered open cluster. Visible with binoculars.
M8	Sgr	□ Lagoon Nebula. Bright nebula bisected by a dark lane. Dist=5,200 ly.
M25	Sgr	• Bright cluster located about 6 deg N of "teapot's" lid. Dist=1,900 ly.
M22	Sgr	• A spectacular globular star cluster. Telescope will show stars. Dist=10,000 ly.
M4	Sco	• A close globular. May just be visible without optical aid. Dist=7,000 ly.
M6	Sco	• Butterfly Cluster. 30+ stars in 7x binoculars. Dist=1,960 ly.
M7	Sco	• Superb open cluster. Visible to the naked eye. Age=260 million years. Dist=780 ly.
M5	Ser	• Fine globular star cluster. Telescope will reveal individual stars. Dist=25,000 ly.
Mizar & Alcor	UMa	• Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion.
Cr 399	Vul	• Coathanger asterism or "Broccchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.

Telescopic Objects

ε Boötis	Boo	• Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split.
M94	CVn	• Compact nearly face-on spiral galaxy. Dist=15 million ly.
M51	CVn	• Whirlpool Galaxy. First recognised to have spiral structure. Dist=25 million ly.
M64	Com	• Black-Eye Galaxy. Discovered by J.E. Bode in 1775 - "a small, nebulous star".
Albireo	Cyg	• Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4".
61 Cygni	Cyg	• Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4".
γ Delphini	Del	• Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field.
β Lyrae	Lyr	• Eclipsing binary. Mag varies between 3.3 & 4.3 over 12,940 days. Fainter mag 7.2 blue star.
M57	Lyr	• Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly.
M23	Sgr	• Elongated star cluster. Telescope required to show stars. Dist=2,100 ly.
M20	Sgr	□ Trifid Nebula. A telescope shows 3 dust lanes trisecting nebula. Dist=5,200 ly.
M21	Sgr	• A fine and impressive cluster. Dist=4,200 ly.
M17	Sgr	• Omega Nebula. Contains the star cluster NGC 6618. Dist=4,900 ly.
M11	Sct	• Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist=5,600 ly.
M16	Ser	□ Eagle Nebula. Requires a telescope of large aperture. Dist=8,150 ly.
M81	UMa	• Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.
M82	UMa	• Close to M81 but much fainter and smaller.
M87	Vir	• Supergiant galaxy with supermassive black hole at its core. Dist=53.5 million ly.
γ Virginis	Vir	• Superb pair of mag 3.5 yellow-white stars. Orbit=169 years. At their closest in 2005.
M27	Vul	• Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.