Volume 44.9 September 2024

Desert Sky Observer

Antelope Valley Astronomy Club

Upcoming Events

September 7: Lunar Club @ Juniper Hills Community Center
September 13: Club Meeting
September 17: Penumbral Lunar Eclipse 6:55 pm - 9:47 pm
September 21: Moonwalk @ Prime Desert Woodland
September 28: DSSP @ Chuchupate

Every clear night: Personal Star Party

AVAC Calendar

October 5: DSSP Red Cliffs
October 11: Annual Business Meeting
October 11: Public Star Party@ SAGE (after business meeting/election)
October 12: Tehachapi Airport Star Party
October 26: Moonwalk @ PDW

Board Members

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Monthly Meetings

Monthly meetings are held at the **S.A.G.E. Planetarium** in Palmdale, the second Friday of each month except December. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium.*

Membership

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at $30.00 per year.
- Individual membership at $25.00 per year.
- Junior membership at $15.00 per year.

Membership entitles you to ...

- The Desert Sky Observer -- monthly newsletter
- The AVAC Membership Manual.
- To borrow club equipment, books, videos, and other items.

AVAC
PO Box 8545
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www.avastronomyclub.org

Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/

www.instagram.com/av_astronomyclub

The Antelope Valley Astronomy Club, Inc. is a 26 USC §503(c)(3) California Non-Profit Corporation.

President's Message

By Phil Wriedt

Hi There!

Our next scheduled event, the Lunar Club meeting, is going to be on Saturday 7th of September this time at Juniper Hills Community Center. Tim Thompson of the Mt Wilson Institute will be giving a talk on observing the Moon. Tim has asked us to help him out with scopes, because after the Bobcat fire a few years ago, those residents with telescopes seem to have moved away. Sunset is at 7:09 pm There will be a 21%(5 day) moon that will set about 9:20 pm. Directions to follow by email.

Our next Club Meeting is on Friday, the 13th. We have a speaker from NASA Deep Space Network. This is the network that NASA uses to communicate with NASA's interplanetary spacecraft missions. DSN is run by JPL in Pasadena. This is sure to be very interesting.

Our meeting in October will be our mandatory yearly business meeting. We must hold a election of Officers for 2025. If you wish to nominate someone, with their permission, or if you want to nominate yourself, contact a board member by the October meeting. We will have a Parking Lot Star Party after the election.

Our last Moonwalk on the 17th of August had 178 members of the public and 6 club members! Lets do it again on the 21st. Come on out and enjoy a night under the stars, bring your scope, meet the public.

Our next DSSP will be at Chuchupate on the 28th. Keep a look out for email notices for every event on the Club' Calender.

For the next few months you might want to look out for: ***T Coronae Borealis***. This is a recurrent nova in Corona Borealis. It is a binary variable-star system normally of mag. 10. The last time it went nova was February 9, 1946. It's due again between March and September of this year. It's peak mag. of about 2.5 ± 0.5. Look for it on the southern border between C. Borealis and Serpens Caput, at 15h 59m, 25°55'. During September it will transit about 5:45pm.

Stay Cool and Keep Looking Up, Phil

On The Cover

Please note: North is 96.8° left of vertical RA: 18h 19' 16.19" DEC: -13° 45' 23.56" (Serpens Cauda)

Appearing like a winged fairy-tale creature poised on a pedestal, this object is actually a billowing tower of cold gas and dust rising from a stellar nursery called the Eagle Nebula. The soaring tower is 9.5 light-years or about 90 trillion kilometres high, about twice the distance from our Sun to the next nearest star.

Stars in the Eagle Nebula are born in clouds of cold hydrogen gas that reside in chaotic neighbourhoods, where energy from young stars sculpts fantasy-like landscapes in the gas. The tower may be a giant incubator for those newborn stars. A torrent of ultraviolet light from a band of massive, hot, young stars [off the top of the image] is eroding the pillar.

The starlight also is responsible for illuminating the tower's rough surface. Ghostly streamers of gas can be seen boiling off this surface, creating the haze around the structure and highlighting its three-dimensional shape. The column is silhouetted against the background glow of more distant gas.

The edge of the dark hydrogen cloud at the top of the tower is resisting erosion, in a manner similar to that of brush among a field of prairie grass that is being swept up by fire. The fire quickly burns the grass but slows down when it encounters the dense brush. In this celestial case, thick clouds of hydrogen gas and dust have survived longer than their surroundings in the face of a blast of ultraviolet light from the hot, young stars.

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From the Secretary

By Rose Moore

Members:

We have a Lunar Club meeting at ~~Matt's~~ [Juniper Hills Community Center]on Saturday September 7th, starting at approximately 7pm. Set up time is 30-40 mins prior to event. You may bring snacks and drinks. Weather permitting. Further info to follow. Sunset is at 7:11pm. The Moon will be a waxing crescent at 19%, and will be up till 9:21pm. Venus will be up till 8:20pm, Saturn rises at 7:14pm. Open to members and their guests. If you don't have a telescope, come on out anyway, as members will always share!

For our club meeting on Friday September 13th, we have a speaker! Our speaker will be Rémy Morgan from the Deep Space Network/JPL. Rémy will speak on the DSN, and other topics, and will take questions and answers after her presentation. She is a graduate of the University of Colorado in Boulder, with a BA degree in Astronomy. Please come out and enjoy the presentation!

There will be a Prime Desert Moon Walk on Saturday September 21st starting at 7:30pm; weather permitting. Set up time is 30-60 mins prior to event. We need members with telescopes. Come on out to support Jeremy and the club! The Moon will be a waning gibbous and will rise at 9:10pm. Sunset is at 6:50pm. Saturn rises at 6:15pm. Further info in an email prior to event.

On the last weekend of September we have a dark sky star party, scheduled for Saturday 9/28. This will be held at Chuchupate, weather permitting. Check the weather before leaving for the mountains. You may arrive at anytime for the weekend. Bring drinks, snacks, and meals. There are vault toilets, but no running water. Sunset is at 6:41pm, the Moon (waxing crescent) will be down by 5:03pm. Venus down at 8:03pm, Saturn up at 5:47pm, Jupiter up at 10:31pm, Mars up at 12:08am. Further info to follow.

Coming up in October we have a dark sky star party at Red Cliffs; our club Business Meeting: please come out to vote for officers for the Executive Board, and to voice your concerns or questions for the club-this will be followed by a public star party in front of the SAGE; the Tehachapi Airport Star Party; and Spooky Science; and a Prime Desert Moon Walk the last Saturday in October.

The Planetarium is scheduled to begin its cleaning and renovation in October. Also coming up is the Club Christmas Party, scheduled for Saturday December 7th, at Gino's Restaurant.

Come and support your club!! Rose

Vice President's Report

By Matt Leone

I would like to say Mt. Pinos [on the 3rd/4th] was a great time. Saturn was spectacular, and the nights were great. There was rain on Friday but the night was nice until 2. Saturday night was very nice, Sunday was a 9 night. Very pleasant during the day, the night was just right. We stayed up until 4am. Mr. Bacon came out Sunday night and it was great. There was 20 or so great scopes including a 32 inch along with my 24-inch scope.

I believe the meeting in October will be a star party while they are fixing up the dome. New seats will be nice. Sorry I will miss you this weekend but will see you at the meeting. If you get the chance look at the Sun it is great its going crazy.

Have a starry night and see you under the stars. Matthew Leone.

Veil Nebula, part of Cygnus Loop

Triffid Nebula, M20, Sagittarius

Our new member Karl Soule, using a SeeStar S50 on his balcony in North Hollywood (not exactly a Dark Sky site). Each image is stacked with about 30 minutes of 10 second exposures.

On The Cover ... continued

Inside the gaseous tower, stars may be forming. Some of those stars may have been created by dense gas collapsing under gravity. Other stars may be forming due to pressure from gas that has been heated by the neighbouring hot stars.

The first wave of stars may have started forming before the massive star cluster began venting its scorching light. The star birth may have begun when denser regions of cold gas within the tower started collapsing under their own weight to make stars.

The bumps and fingers of material in the centre of the tower are examples of these stellar birthing areas. These regions may look small but they are roughly the size of our solar system. The fledgling stars continued to grow as they fed off the surrounding gas cloud. They abruptly stopped growing when light from the star cluster uncovered their gaseous cradles, separating them from their gas supply.

Ironically, the young cluster's intense starlight may be inducing star formation in some regions of the tower. Examples can be seen in the large, glowing clumps and finger-shaped protrusions at the top of the structure. The stars may be heating the gas at the top of the tower and creating a shock front, as seen by the bright rim of material tracing the edge of the nebula at top, left. As the heated gas expands, it acts like a battering ram, pushing against the darker cold gas. The intense pressure compresses the gas, making it easier for stars to form. This scenario may continue as the shock front moves slowly down the tower.

The dominant colours in the image were produced by gas energized by the star cluster's powerful ultraviolet light. The blue colour at the top is from glowing oxygen. The red colon in the lower region is from glowing hydrogen. The Eagle Nebula image was taken in November 2004 with the Advanced Camera for Surveys aboard the NASA/ESA Hubble Space Telescope.

Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA)

September's Night Sky Notes: Marvelous Moons

by Kat Troche, Astronomy Society of the Pacific, NASA Night Sky Network

September brings the gas giants Jupiter and Saturn back into view, along with their satellites. And while we organize celebrations to observe our own Moon this month, be sure to grab a telescope or binoculars to see other moons within our Solar System! We recommend observing these moons (and planets!) when they are at their highest in the night sky, to get the best possible unobstructed views.

Title image of Jupiter's largest moons, from left to right: Io, Europa, Ganymede, Callisto. Credit: NASA

The More the Merrier

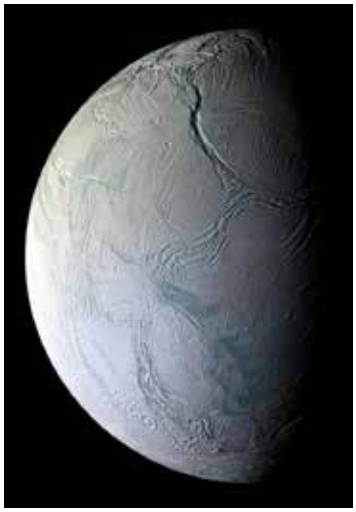
As of September 2024, the ringed planet Saturn has 146 identified moons in its orbit. These celestial bodies range in size; the smallest being a few hundred feet across, to Titan, the second largest moon in our solar system.

The Saturnian system along with various moons around the planet Saturn: Iapetus, Titan, Enceladus, Rhea, Tethys, and Dione. Credit: Stellarium Web

Even at nearly 900 million miles away, Titan can be easily spotted next to Saturn with a 4-inch telescope, under urban and suburban skies, due to its sheer size. With an atmosphere of mostly nitrogen with traces of hydrogen and methane, Titan was briefly explored in 2005 with the Huygens probe as part of the Cassini-Huygens mission, providing more information about the surface of Titan. NASA's mission Dragonfly is set to explore the surface of Titan in the 2030s.

Additional Skywatching Resources

Plan your skywatching with help from our planner page, featuring daily stargazing tips courtesy EarthSky monthly sky maps, and videos from NASA/JPL. You can even find out how to spot the International Space Station! Both Astronomy and Sky and Telescope magazines offer regular stargazing guides to readers, both in print and online. Want to join a group of folks for a star party? Find clubs and astronomy events near you, and may you have clear skies!

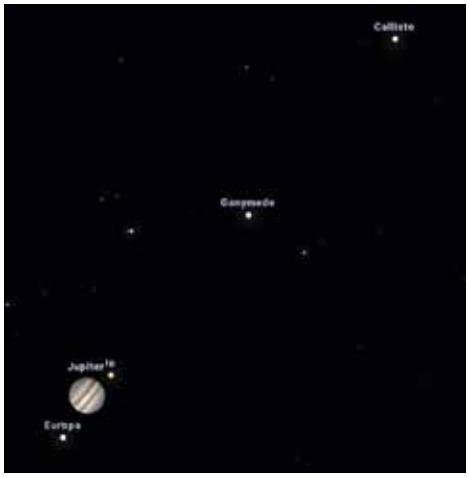


Saturn's moon Enceladus was also explored by the Cassini mission, revealing plumes of ice that erupt from below the surface, adding to the brilliance of Saturn's rings. Much like our own Moon, Enceladus remains tidally locked with Saturn, presenting the same side towards its host planet at all times.

This mosaic of Saturn's moon Enceladus was created with images captured by NASA's Cassini spacecraft on Oct. 9, 2008, after the spacecraft came within about 16 miles (25 kilometers) of the surface of Enceladus. Credit: NASA/JPL/Space Science Institute

The Galilean Gang

The King of the Planets might not have the most moons, but four of Jupiter's 95 moons are definitely the easiest to see with a small pair of binoculars or a small telescope because they form a clear line. The Galilean Moons – Ganymede, Callisto, Io, and Europa – were first discovered in 1610 and they continue to amaze stargazers across the globe.



The Jovian system: Europa, Io, Ganymede, and Callisto. Credit: Stellarium Web

- Ganymede: largest moon in our solar system, and larger than the planet Mercury, Ganymede has its own magnetic field and a possible saltwater ocean beneath the surface.
- Callisto: this heavily cratered moon is the third largest in our solar system. Although Callisto is the furthest away of the Galilean moons, it only takes 17 days to complete an orbit around Jupiter.
- Io: the closest moon and third largest in this system, Io is an extremely active world, due to the push and pull of Jupiter's gravity. The volcanic activity of this rocky world is so intense that it can be seen from some of the largest telescopes here on Earth.
- Europa: Jupiter's smallest moon also happens to be the strongest candidate for a liquid ocean beneath the surface. NASA's Europa Clipper is set to launch October 2024 and will determine if this moon has conditions suitable to support life. Want to learn more? Rewatch the July 2023 Night Sky Network webinar about Europa Clipper here.

Be sure to celebrate International Observe the Moon Night here on Earth September 14, 2024, leading up to the super full moon on September 17th! You can learn more about supermoons in our mid-month article on the Night Sky Network page!

This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.
Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Space News

News from around the Net

Queen Berenice II's Hair Tied Together by Dark Matter

The Dark Energy Camera captures an image of the dazzling Coma Cluster, named after the hair of Queen Berenice II of Egypt. Not only significant in Greek mythology, this collection of galaxies was also fundamental to the discovery of the existence of dark matter. The theory emerged in 1937 when Swiss astronomer Fritz Zwicky noticed that the Coma Cluster galaxies behaved as if they were under the influence of vast amounts of unobservable 'dark' matter.. . . .(continued at https://noirlab.edu/public/news/noirlab2420/?lang)

Meteor Showers Shed Light On Where Comets Formed In The Early Solar System

"The meteoroids we see as meteors in the night sky are the size of small pebbles," said lead author and SETI Institute and NASA Ames meteor astronomer Peter Jenniskens. "They are, in fact, the same size as the pebbles that collapsed into comets during the formation of our solar system." As our solar system formed, tiny particles in the disk around the young Sun gradually grew larger until they became the . . . . (continued at https://www.sciencedaily.com/releases/2024/08/240822130027.htm)

Loosening The Hubble Tension

For almost a decade, astronomers have been struggling with a nagging mismatch between two different ways of determining the Hubble constant — a measure of the current expansion rate of the universe. This mismatch, known as the Hubble tension, has led to claims that new physics might be needed to solve the issue. (Read about the "constant controversy" in the June 2019 issue of *Sky & Telescope*.) But a detailed analysis of a new set of James Webb Space Telescope (JWST) observations now suggests that the problem may not exist. . . . (continued at https://skyandtelescope.org/astronomy-news/loosening-the-hubble-tension/)

Boeing Starliner Astronauts Will Return Home On A Spacex Dragon In 2025, NASA Confirms

On Saturday (Aug. 24), NASA announced its final decision regarding the fates of the two astronauts aboard the International Space Station whose original eight-day space jaunt had turned into a nebulous multi-month excursion. Suni Williams and Butch Wilmore, who launched to the ISS aboard Boeing's Starliner capsule on June 5, will return home no earlier than February of 2025. Furthermore, NASA and Boeing jointly decided that Williams and Wilmore will not head back to Earth aboard the same Starliner capsule that brought them to the ISS. . . . (continued at https://www.space.com/nasa-boeing-starliner-astronauts-will-return-on-spacex-dragon-2025)

Professor proposes how a black hole in orbit around a planet could be a sign of an advanced civilization In 1971, English mathematical physicist and Nobel-prize winner Roger Penrose proposed how energy could be extracted from a rotating black hole. He argued that this could be done by building a harness around the black hole's accretion disk, where infalling matter is accelerated to close to the speed of light, triggering the release of energy in multiple wavelengths. Since then, multiple researchers have suggested that advanced civilizations could use this method . . . (continued at https://phys.org/news/2024-08-professor-black-hole-orbit-planet.html)

What Makes A Supercluster?

By eye, it's impossible to pick out the exact boundaries of the superclusters, which are among the largest structures in the universe. But that's because they are not defined by their edges, but by the common motion of their components. The Milky Way galaxy was long thought to be a member of the Virgo supercluster, a complex, twisting branch containing over 100 individual galaxy groups and clusters stretching for more than a hundred million light-years. . . . (continued at https://www.universetoday.com/168164/what-makes-a-supercluster/)

Space News

News from around the Net

Researchers Start First Low Frequency Search For Alien Technology In Distant Galaxies

The SETI Institute, the Berkeley SETI Research Center and the International Centre for Radio Astronomy Research announced a study using the Murchison Widefield Array (MWA) in Western Australia. Led by Dr. Chenoa Tremblay of the SETI Institute and Prof. Steven Tingay of Curtin University, this research is the first to search for signs of alien technology in galaxies beyond our own, focusing on low radio frequencies (100 MHz). This innovative study used the MWA's large field of view (FOV), allowing the team to cover about 2,800 galaxies in one observation, of which 1,300 we know the distance to. . . . .(continued at https://phys.org/news/2024-08-frequency-alien-technology-distant-galaxies.html)

Physicians Work To Help Prevent Vision Loss Associated With Space Travel

Physicians at the Medical College of Georgia at Augusta University are working with Polaris Dawn, the first of the Polaris Program's three human spaceflight missions, to better understand the eye changes many astronauts experience during spaceflight that can leave them with a wide range of symptoms once they return to Earth—from a new need for glasses to significant loss of vision. The Polaris Program is a first-of-its-kind effort to rapidly advance human spaceflight capabilities while continuing to raise funds and awareness for important causes on Earth. . . .(continued at https://phys.org/news/2024-08-physicians-vision-loss-space.html)

Why We Aren't Alone In The Universe — But Might As Well Be

Are we alone in the universe? The question has tugged at humanity ever since we discovered the enormity of the cosmos. In 1950, Enrico Fermi postulated his famous paradox: If life is common enough in the universe to give rise to us, then where is everybody? Recently, a philosopher has advanced a proposal to resolve this paradox: We are not alone in the universe, and there are many alien civilizations out there. But they wisely choose to keep to themselves. Fermi's paradox relies on an idea called the cosmological principle,. . . .(continued at https://www.astronomy.com/science/why-we-arent-alone-in-the-universe-but-might-as-well-be/)

New Data On Radiation Allows Missions To Jupiter's Moon Europa

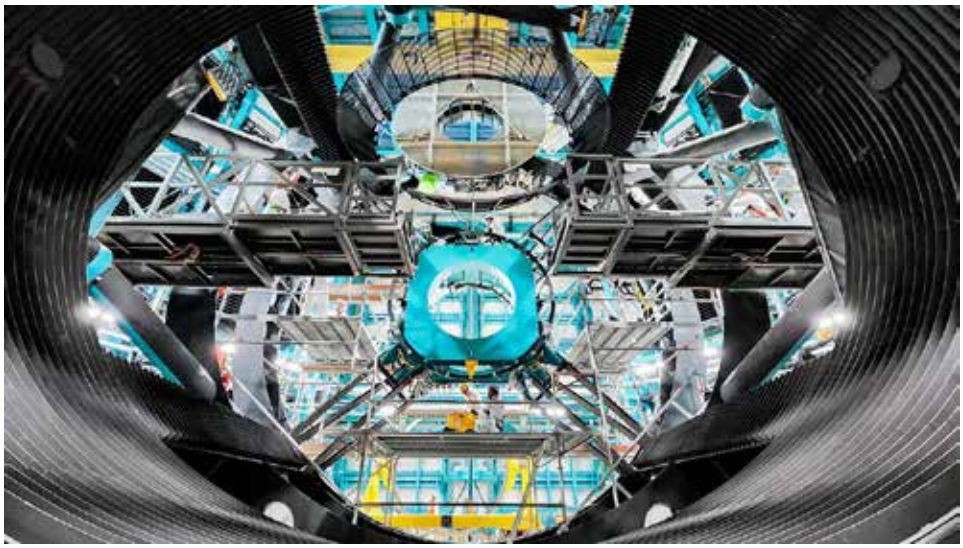
Scientists from NASA's Juno mission have developed the first complete 3D radiation map of the Jupiter system, including characterizing the intensity of the high-energy particles near the orbit of the icy moon Europa, and how the radiation environment is sculpted by the smaller Jovian moons orbiting near Jupiter's rings. The work relies on data collected by Juno's star camera Advanced Stellar Compass (ASC) designed and built by Technical University of Denmark, and Stellar Reference Unit (SRU), which was built by Leonardo, S.p.A. in Florence, Italy.. . . . (continued at https://www.dtu.dk/english/news/all-news/new-data-on-radiation-allows-missions-to-jupiters-moon-europa?id=193f34ed-fd19-4ac3-8c95-5168722ac0ce&ref=19f5e8ce-ef4c-427a-9575-70d321d529f0)

NASA Announces The 2025 Human Lander Challenge

One of NASA's core mission objectives, though not explicitly stated in its charter, is to educate Americans about space exploration, especially students. As part of that mission, NASA hosts a number of challenges every year where teams of students compete to come up with innovative ideas to solve problems. The agency recently announced the next round of one of its standard yearly challenges—the Human Lander Challenge. The Human Lander Challenge occurs every year, and objectives vary based on the specific problem related to human landers NASA is trying to solve. This year, the focal problem is cryogenic fluid storage. Currently, no technology exists to store cryogenic fluid in space. . . . . (continued at https://www.universetoday.com/168231/nasa-announces-the-2025-human-lander-challenge/)

NSF–DOE Rubin Observatory's Secondary Mirror Installed

1 August 2024 *noirlab2419 — Organization Release*



Vera C. Rubin Observatory's 3.5-meter secondary mirror has been installed on the Simonyi Survey Telescope on Cerro Pachón in Chile. The glass mirror — made by Corning Advanced Optics and polished by L3Harris Technologies — is the first permanent component of the telescope's state-of-the-art, wide-field optical system to be installed and will soon contribute to a better understanding of our Universe.

The summit team at the NSF–DOE Vera C. Rubin Observatory in Chile has installed the 3.5-meter glass secondary mirror assembly on the Simonyi Survey Telescope. This achievement marks the successful integration of the first permanent component of the telescope's optical system, which also includes an 8.4-meter primary/tertiary mirror and the LSST Camera — the largest digital camera in the world. Rubin Observatory, funded by the U.S. National Science Foundation and the U.S. Department of Energy's Office of Science, is poised to kick off a new era in astronomy and astrophysics with the 10-year Legacy Survey of Space and Time (LSST), beginning in 2025.

The installation of the complete mirror assembly was the culmination of many years of hard work and planning by teams in the U.S. and in Chile. After fabrication and polishing, the glass blank and the mirror cell assembly components were shipped to Chile in 2018 and stored inside the observatory while work continued on the telescope mount. The secondary mirror was coated with protected silver at Rubin Observatory in 2019 and integrated with the mirror cell in early July 2024 before being installed on the telescope.

"Working with the mirror again after five years is extremely exciting because it really feels like we're in the home stretch," said Sandrine Thomas, Deputy Director for Rubin Observatory Construction, "Now we have glass on the telescope, which brings us a thrilling step closer to revolutionary science with Rubin."

At just under four meters in diameter, Rubin's secondary mirror is one of the largest convex mirrors ever made. The 10-centimeter-thick monolithic mirror blank was manufactured by Corning Advanced Optics in Canton, New York, using Corning® ULE® Glass (Ultra-Low Expansion Glass).

"Corning is proud of our nearly 20-year collaboration with the Rubin Observatory team," said Claude Echahamian, VP & GM Corning Advanced Optics. *"As a result, Corning's cutting-edge ULE mirror blank for the Simonyi Survey Telescope will help to enable crystal clear views of deep space, revealing millions of previously unknown Solar System objects with more detail than ever before."*

Following delivery in 2009, the mirror blank was stored for five years at Harvard University in Cambridge, MA before being polished and finished at L3Harris Technologies in Rochester, New York. L3Harris used novel measurement techniques in the polishing process to manage such a large precision convex surface. L3Harris also designed and built the secondary mirror cell assembly, which consists of a stiff steel mounting plate, 72 axial and six tangent actuators (that support and control the shape of the thin mirror under gravity), the mirror cell electronics and sensors, a thermal control system, and the

continued on next page

mirror control system.

"Our 55-year legacy of designing and constructing high-end optical systems for space and ground continues with the world's largest active secondary mirror system built for Rubin Observatory," said Charles Clarkson, Vice President and General Manager, Imaging Systems, Space and Airborne Systems, L3Harris. *"With this milestone, we are closer to pushing scientific frontiers and charting the Universe like never before, and we look forward to the science that will be discovered."*

To install the mirror assembly onto the telescope mount the Rubin summit team used a specialized cart to rotate the mirror assembly to a vertical position. They then lifted the assembly off of the cart and onto the telescope mount while maintaining active system control to prevent adding stress to the glass. After bolting the secondary mirror assembly in place the summit team connected the mirror cell to the electronics cabinet on the telescope mount and reactivated the mirror's software control system.

In the coming weeks the Rubin team will re-install the Commissioning Camera, a much smaller version of the LSST Camera, that will be used to conduct a variety of test campaigns on the optical system including both mirrors. The team will also now focus on preparing the primary mirror assembly for telescope integration in August, and the LSST Camera for installation on the telescope later this year.

Rubin Observatory is a Program of NSF NOIRLab, which, along with DOE's SLAC National Accelerator Laboratory, will jointly operate Rubin.

About Rubin

Vera C. Rubin Observatory is a groundbreaking new astronomy and astrophysics observatory under construction on Cerro Pachón in Chile, with first light expected in early 2025. It's named after astronomer Vera Rubin, who provided the first convincing evidence for the existence of dark matter. The 8.4-meter telescope at Rubin Observatory, equipped with the largest digital camera in the world, will take detailed images of the southern hemisphere sky, covering the entire sky every few nights. Rubin will do this over and over for 10 years, creating a timelapse view of the Universe that's unlike anything we've seen before. Rubin Observatory's 10-year survey is called the Legacy Survey of Space and Time (LSST).

More information

NSF–DOE Vera C. Rubin Observatory is a Federal project jointly funded by the U.S. National Science Foundation (NSF) and the U.S. Department of Energy (DOE) Office of Science, with early construction funding received from private donations through the LSST Discovery Alliance. The NSF-funded Rubin Observatory Project Office for construction was established as an operating center under the management of the Association of Universities for Research in Astronomy (AURA). The DOE-funded effort to build the Rubin Observatory LSST Camera (LSSTCam) is managed by SLAC National Accelerator Laboratory (SLAC). France provides key support to the construction and operations of Rubin Observatory through contributions from CNRS/IN2P3. Additional contributions from a number of international organizations and teams are acknowledged.

The U.S. National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 to promote the progress of science. NSF supports basic research and people to create knowledge that transforms the future.

SLAC is operated by Stanford University for the U.S. Department of Energy's Office of Science. The Office of Science is the single largest supporter of basic research in the physical sciences in the United States and is working to address

continued on next page

some of the most pressing challenges of our time.

NSF and DOE will continue to support Rubin Observatory in its Operations phase via NSF NOIRLab and DOE's SLAC.

NSF NOIRLab (U.S. National Science Foundation National Optical-Infrared Astronomy Research Laboratory), the U.S. center for ground-based optical-infrared astronomy, operates the International Gemini Observatory (a facility of NSF, NRC–Canada, ANID–Chile, MCTIC–Brazil, MINCyT–Argentina, and KASI–Republic of Korea), Kitt Peak National Observatory (KPNO), Cerro Tololo Inter-American Observatory (CTIO), the Community Science and Data Center (CSDC), and Vera C. Rubin Observatory (operated in cooperation with the Department of Energy's SLAC National Accelerator Laboratory). It is managed by the Association of Universities for Research in Astronomy (AURA) under a cooperative agreement with NSF and is headquartered in Tucson, Arizona. The astronomical community is honored to have the opportunity to conduct astronomical research on I'oligam Du'ag (Kitt Peak) in Arizona, on Maunakea in Hawai'i, and on Cerro Tololo and Cerro Pachón in Chile. We recognize and acknowledge the very significant cultural role and reverence that these sites have to the Tohono O'odham Nation, to the Native Hawaiian community, and to the local communities in Chile, respectively.

Links

- Secondary mirror installation multimedia album
- Press release on Rubinobservatory.org
- Vera C. Rubin Observatory website
- Vera C. Rubin Observatory image gallery
- More Rubin images
- Rubin videos
- Check out other Rubin Press Releases

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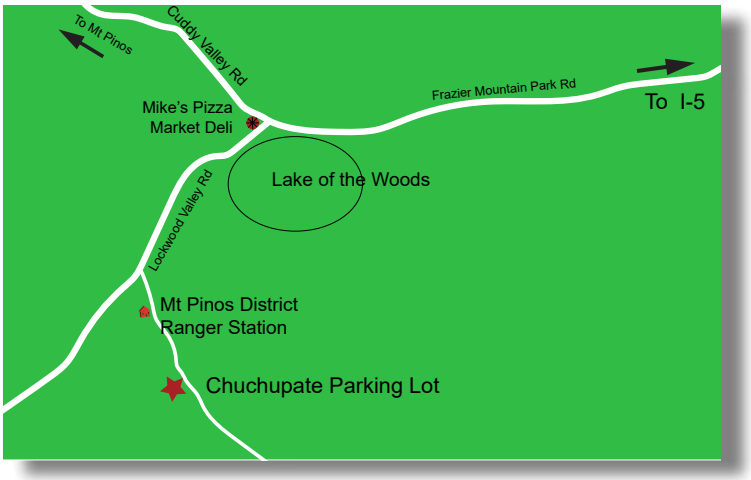
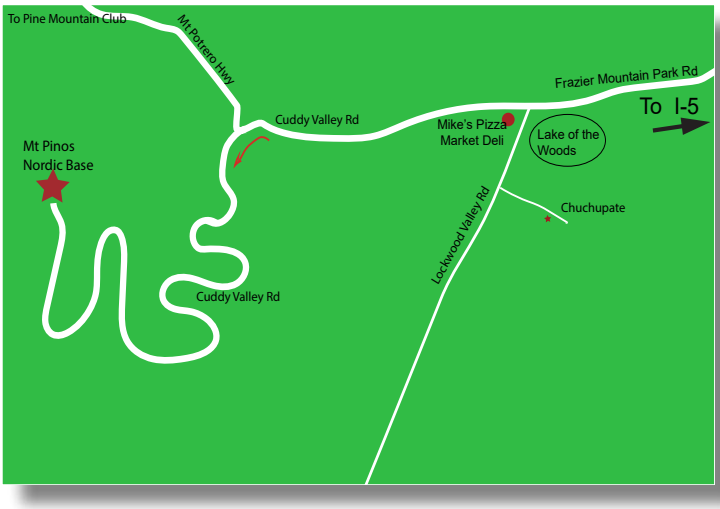
Dark Sky Observing Sites

The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta.), the parking lot is also called Frazier Mountain trailhead.

To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike's Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right. The Club gathers in the upper end of the lot. The Elevation is 5430 feet. There is a vault toilet.





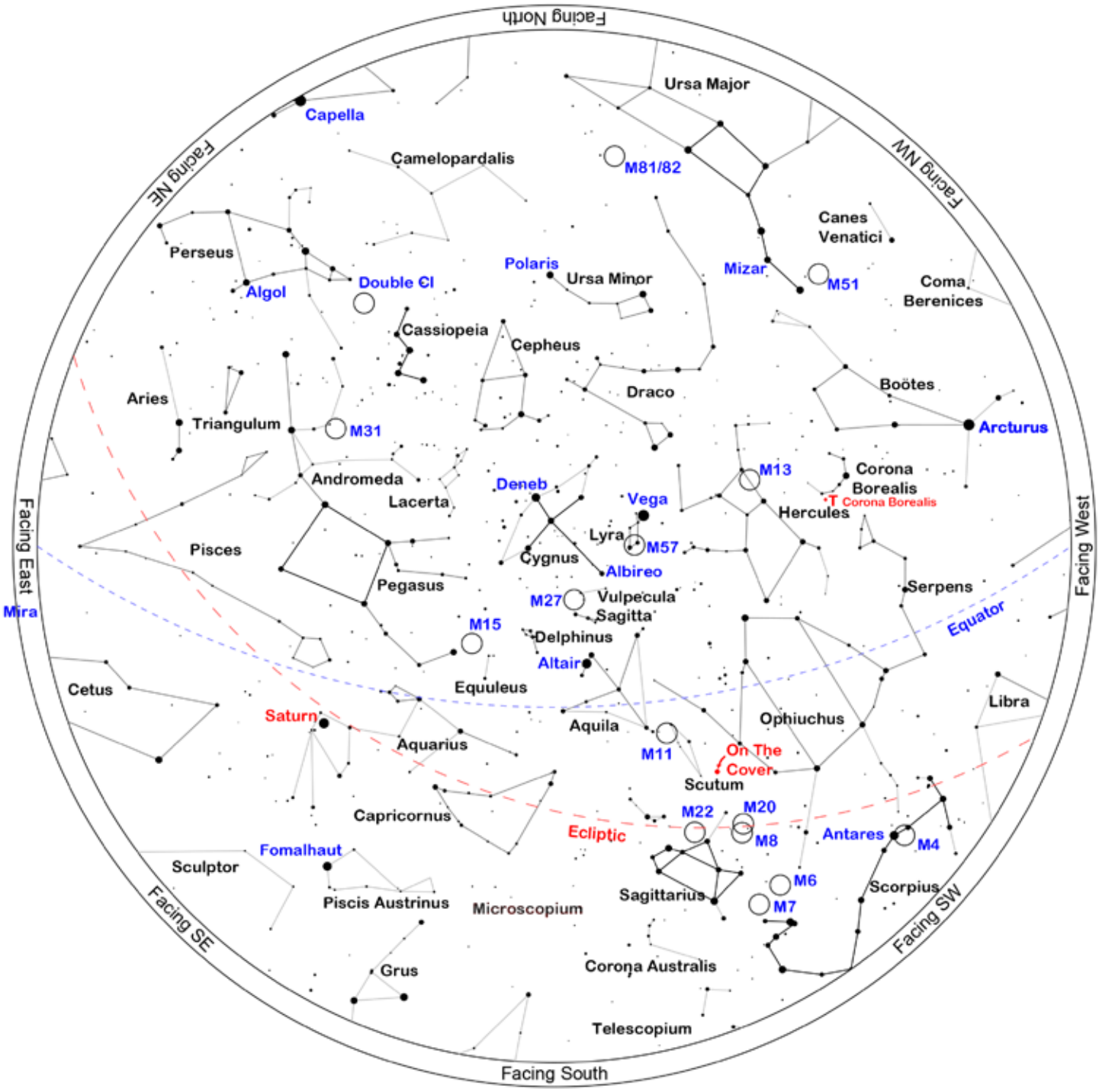
Mt Pinos is a parking lot at 8350 feet for the "Mt Pinos Nordic Base." There is a vault toilet 300 yds to the east in the Chula Vista campground.

To get there: From I-5, get off at Frazier Mountain Park Rd and drive west about 7 miles to Mike's Pizza/ Market Deli at Lockwood Valley Rd. Keep on the main roadway (don't turn left to go to Chuchupate). Continue past Mike's Pizza on Cuddy Valley Rd (the road's new name) about 5 miles. Continue straight (do not turn right on to Mil Potrero Hwy) for another 8 1/2 miles to the parking area.
Note: The entire drive from I-5 is uphill.

The Red Cliffs Natural Area is part of **Red Rock Canyon State Park** is a day use area and is not for use by the public after dark. The Club gets a special permit for a star party and pays a fee.

To get there: Take the CA-14 north 25 miles past Mojave. You will see giant red cliffs on the right side and a small sign that says "Red Cliffs Natural Area" and a dirt road. (If you see the large sign for the Ricardo campground, you drove a mile too far). Follow the road to the large parking lot (that hasn't been graded in a long time). Elevation is 2410 feet. There is a vault toilet.

Sky Chart



Location: Set from geolocation service
Latitude: 34° 39' N, longitude: 118° 10' W
Time: 2024 September 7, 22:00 (UTC -07:00)

Powered by: Heavens-Above.com

Solar System Summary

The **Sun** starts the month in central Leo, ending the month in central Virgo. On October 2nd an Annular will be passing through the South Pacific and southern South America.

The **Moon** will be in a penumbra (only) eclipse Sept. 17 from about 6 pm to 9:45 pm.

The Planets

Mercury is still visible in the evening twilight early in the month. After the greatest western elongation on the 5th, it starts falling toward the Sun arriving at superior conjunction on the 30th.

Venus is still separating itself from the evening Sun. The 3% Moon waxing passes by 3½° southwest at sunset on the 4th.

Mars rising after midnight, starts the month in Taurus, then moving east in to Gemini. On the 8th, it passes less than 1° south of M35.

Jupiter now rising by midnight moving east getting ready to begin retrograde motion in early October.

Saturn is still in retrograde motion in Aquarius, that will last till mid-November. On the 8th Saturn is at opposition and at Mag 0.57.

Uranus moving in retrograde in Taurus, at mag 5.7, where it will remain till the end of the year, about 5° south of the Pleiades.

Neptune is moving retrograde near the southern border of Pisces at 7.8.

Dwarf Planets

134340 Pluto spends the month, in retrograde, on the western edge of Capricorn, south of M75, moving west at mag 14.4.

1 Ceres at mag 8.3 spends the month in central teapot of Sagittarius moving east.

2 Pallas in normal motion passing through southern Hercules at magnitude10.24.

3 Juno continues moving east 4½° north of the ecliptic. By the end of month it is at mag 11.2, still less than half the way across Virgo.

4 Vesta stays the month on the western edge of Leo in the morning twilight still in Leo.

Moon Phases

First Qtr Sept 10 | Full Sept 17 | Third Qtr Sept 24 | New Sept 2

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
9/1/2024	05:00	18:56	06:26	19:18
9/5/2024	08:48	20:30	06:29	19:12
9/10/2024	13:43	23:13	06:32	19:05
9/15/2024	17:51	03:32	06:36	18:58
9/20/2024	20:30	09:42	06:39	18:51
9/25/2024	23:50	15:12	06:43	18:44
9/30/2024	04:50	17:50	06:47	18:37

Planet Data*

September 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:05	11:45	18:25	0.34	32.6
Venus	08:22	14:23	20:24	-3.94	90.9
Mars	00:46	07:59	15:11	0.73	87.8
Jupiter	00:09	07:21	14:29	-2.34	99.0
Saturn	19:37	01:18	07:04	0.61	100.

September 15

	Rise	Transit	Set	Mag	Phase%
Mercury	05:33	12:03	18:32	-1.17	86.4
Venus	08:49	14:31	20:11	-3.92	88.2
Mars	00:26	07:40	14:53	0.63	87.5
Jupiter	23:19	06:31	13:40	-2.43	99.0
Saturn	18:39	00:20	06:04	0.59	99.9

September 30

	Rise	Transit	Set	Mag	Phase%
Mercury	06:46	12:44	18:42	-1.55	99.9
Venus	09:19	14:40	20:01	-3.94	84.9
Mars	00:04	07:17	14:29	0.49	87.5
Jupiter	22:24	05:36	12:44	-2.53	99.1
Saturn	17:37	23:17	05:00	0.64	99.9

*All time mentioned are local and approximate.
*Sun, Moon and Planetary date based on Quartz Hill, CA

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Deep Sky Star Party or the Saturday nearest the New Moon, in this case September 28, 2024. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	01:33	12:25	23:16
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	05:55	12:41	19:26
M99	Coma Pinwheel Galaxy	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	06:02	12:46	19:30
M106	NGC4258	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	03:24	12:46	22:08
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	06:34	12:49	19:04
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	12:49	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	06:02	12:50	19:38
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	06:13	12:52	19:32
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	05:57	12:52	19:48
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	06:14	12:53	19:33
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	06:32	12:57	19:22
M87	Smoking Gun, Virgo A	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	06:20	12:58	19:36
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	06:15	12:59	19:43
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	06:18	13:02	19:47
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	06:24	13:03	19:41
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	06:24	13:04	19:44
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	06:28	13:05	19:41
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	08:25	13:06	17:48
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	07:37	13:07	18:37
M59	NGC4621	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	06:33	13:09	19:45
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	06:35	13:11	19:46
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	04:44	13:18	21:52
M64	Black Eye Galaxy	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	06:16	13:24	20:31
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	06:44	13:40	20:36
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	05:03	13:43	22:23
NGC5139	Omega Centauri	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	11:05	13:54	16:43
NGC5169		Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	04:39	13:55	23:11
NGC5204		Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circ	13:57	Circ
M51	Whirlpool Galaxy	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	04:36	13:57	23:18
Arp85	M51B	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	04:35	13:57	23:18
NGC5182		Galaxy	Hya	13h 30m 41s	-28° 09.0'	13.0	09:22	13:58	18:34
NGC5214		Galaxy	CVn	13h 32m 49s	+41° 52.3'	14.0	05:21	14:00	22:39
M83	Southern Pinwheel Galaxy	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	09:35	14:04	18:33
NGC5283		Galaxy	Dra	13h 41m 06s	+67° 40.3'	14.0	Circ	14:08	Circ
M3	NGC5272	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	06:38	14:09	21:41
NGC5292		Galaxy	Cen	13h 47m 40s	-30° 56.4'	14.0	09:50	14:15	18:40
NGC5356		Galaxy	Vir	13h 54m 59s	+05° 20.0'	14.0	08:04	14:22	20:40

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5363		Galaxy	Vir	13h 56m 07s	+05° 15.2'	10.2	08:06	14:23	20:41
NGC5447	III-787	Neb	UMa	14h 02m 29s	+54° 16.3'		03:07	14:29	01:52
M101	Pinwheel Galaxy	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	03:03	14:30	01:57
NGC5461	III-788	Neb	UMa	14h 03m 42s	+54° 19.0'		03:05	14:31	01:56
NGC5485		Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circ	14:34	Circ
NGC5460		Open	Cen	14h 07m 27s	-48° 20.6'	5.6	11:53	14:34	17:15
NGC5500		Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	05:03	14:37	00:12
IC991		Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	09:21	14:45	20:08
HR5362	HD125383	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	11:24	14:47	18:10
IC4406	Retina Nebula	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	11:34	14:49	18:05
HR5409	105 Vir	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	08:59	14:55	20:52
NGC5669		Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	08:29	15:00	21:30
NGC5689		Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	05:26	15:02	00:39
M102	Spindle Galaxy	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circ	15:33	Circ
NGC5875		Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	05:05	15:36	02:08
NGC5907	Splinter Galaxy	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circ	15:43	Circ
NGC5882		P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	12:40	15:44	18:48
NGC5897		Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	10:43	15:44	20:46
M5	NGC5904	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	09:37	15:46	21:54
Barnard228	B228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		12:01	16:11	20:21
IC4593	White Eyed Pea	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	10:02	16:39	23:16
IC4592	Jabbah	Neb	Sco	16h 11m 59s	-19° 27.4'		11:33	16:39	21:45
M80	NGC6093	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	11:49	16:44	21:39
IC4601		Neb	Sco	16h 20m 18s	-20° 04.9'		11:43	16:47	21:51
Abell38		P Neb	Sco	16h 23m 17s	-31° 44.9'	11.7	12:29	16:50	21:12
M4	Cat's Eye	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	12:08	16:51	21:33
IC4603	Rho Ophiuchi Complex [1]	Neb	Oph	16h 25m 24s	-24° 28.0'		12:03	16:52	21:42
IC4604	Rho Ophiuchi Complex [2]	Neb	Oph	16h 25m 33s	-23° 26.5'		12:00	16:53	21:46
NGC6124	C75	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	13:15	16:53	20:30
Abell39		P Neb	Her	16h 27m 33s	+27° 54.5'	12.9	09:25	16:55	00:24
IC4605		Neb	Sco	16h 30m 12s	-25° 06.8'		12:10	16:57	21:44
NGC6153		P Neb	Sco	16h 31m 31s	-40° 15.2'	12.0	13:18	16:58	20:39
NGC6181		Galaxy	Her	16h 32m 21s	+19° 49.5'	11.9	09:58	16:59	00:00
NGC6171		Globular	Oph	16h 32m 32s	-13° 03.1'	8.1	11:34	17:00	22:25
NGC6178		Open	Sco	16h 35m 47s	-45° 38.6'	7.2	13:58	17:03	20:07
NGC6193	C82	Open	Ara	16h 41m 18s	-48° 46.0'	5.2	14:31	17:08	19:45
M13	Great Hercules Cluster	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	09:01	17:09	01:16
NGC6210	Turtle Planetary Nebula	P Neb	Her	16h 44m 30s	+23° 48.0'	9.0	09:57	17:11	00:26

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6204		Open	Ara	16h 46m 09s	-47° 01.0'	8.2	14:20	17:13	20:06
M12	Gumball Globular	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	11:17	17:14	23:12
NGC6231	Table of Scorpius	Open	Sco	16h 54m 00s	-41° 48.0'	2.6	13:50	17:21	20:52
IC4628	Prawn Nebula	Neb	Sco	16h 56m 58s	-40° 27.3'		13:45	17:24	21:03
NGC6254		Globular	Oph	16h 57m 09s	-04° 05.9'	6.6	11:33	17:24	23:15
Barnard47	B47	DkNeb	Oph	16h 59m 42s	-22° 38.0'		12:31	17:27	22:22
M62	Flickering Globular, NGC6266	Globular	Oph	17h 01m 13s	-30° 06.7'	8.0	13:00	17:28	21:57
M19	NGC6273	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	12:47	17:30	22:13
Barnard51	B51	DkNeb	Oph	17h 04m 44s	-22° 15.0'		12:35	17:32	22:29
IC4637		P Neb	Sco	17h 05m 10s	-40° 53.1'	14.0	13:56	17:32	21:09
Barnard56		DkNeb	Sco	17h 08m 48s	-32° 05.0'		13:16	17:36	21:56
Barnard59	Pipe Nebula	DkNeb	Oph	17h 11m 23s	-27° 29.0'		13:00	17:38	22:17
NGC6302	Bug Nebula	P Neb	Sco	17h 13m 42s	-37° 06.0'	9.6	13:43	17:41	21:38
Barnard251		DkNeb	Oph	17h 13m 48s	-20° 09.0'		12:37	17:41	22:45
Barnard63		DkNeb	Oph	17h 16m 00s	-21° 28.0'		12:43	17:43	22:43
M92	NGC6341	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	08:57	17:44	02:32
M9	NGC6333	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	12:37	17:46	22:55
NGC6326		P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	15:46	17:48	19:49
Barnard256		DkNeb	Oph	17h 22m 12s	-28° 49.0'		13:16	17:49	22:23
Barnard67a		DkNeb	Oph	17h 22m 30s	-21° 53.0'		12:51	17:49	22:48
Barnard71		DkNeb	Oph	17h 23m 02s	-24° 00.0'		12:59	17:50	22:41
NGC6357	Lobster Nebula	Neb	Sco	17h 24m 43s	-34° 12.1'		13:41	17:52	22:03
IC4651		Open	Ara	17h 24m 52s	-49° 56.5'	6.9	15:27	17:52	20:16
Abell41		P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	12:37	17:56	23:15
Abell42		P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	12:19	17:59	23:38
Barnard78		DkNeb	Oph	17h 32m 00s	-25° 35.0'		13:13	17:59	22:44
NGC6388		Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	14:52	18:03	21:14
M14	NGC6402	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	12:11	18:05	23:58
Barnard276		DkNeb	Oph	17h 39m 39s	-19° 49.0'		13:02	18:07	23:12
M6	Butterfly Cluster	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	13:48	18:07	22:27
NGC6397	C86	Globular	Ara	17h 40m 42s	-53° 40.0'	5.6	16:38	18:08	19:37
NGC6426		Globular	Oph	17h 44m 55s	+03° 10.1'	11.2	12:00	18:12	00:23
Barnard83a		DkNeb	Sgr	17h 45m 18s	-20° 00.0'		13:08	18:12	23:17
IC4665		Open	Oph	17h 46m 30s	+05° 39.0'	4.2	11:55	18:13	00:32
NGC6445	Crescent Nebula	P Neb	Sgr	17h 49m 15s	-20° 00.6'	13.0	13:12	18:16	23:21
NGC6503		Galaxy	Dra	17h 49m 27s	+70° 08.6'	10.2	Circ	18:16	Circ
NGC6441		Globular	Sco	17h 50m 13s	-37° 03.0'	7.4	14:20	18:17	22:15
M7	Ptolemy's Cluster	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	14:13	18:21	22:29
IC4670		Neb	Sgr	17h 55m 07s	-21° 44.6'		13:23	18:22	23:21

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6501		Galaxy	Her	17h 56m 04s	+18° 22.3'	12.3	11:27	18:23	01:19
M23	NGC6494	Open	Sgr	17h 57m 04s	-18° 59.1'	6.0	13:16	18:24	23:32
NGC6543	Cat Eye Nebula	P Neb	Dra	17h 58m 36s	+66° 38.0'	8.1	Circ	18:26	Circ
NGC6496		Globular	Sco	17h 59m 04s	-44° 16.0'	9.2	15:11	18:26	21:41
Barnard291		DkNeb	Sgr	17h 59m 43s	-33° 53.0'		14:14	18:27	22:39
Barnard292		DkNeb	Sgr	18h 00m 34s	-33° 20.0'		14:13	18:28	22:42
Barnard293		DkNeb	Sgr	18h 01m 12s	-35° 20.0'		14:22	18:28	22:34
M20	Trifid Nebula	Open+D Neb	Sgr	18h 02m 42s	-22° 58.2'	5.0	13:35	18:30	23:24
M8	Lagoon Nebula	Open+D Neb	Sgr	18h 03m 41s	-24° 22.7'	5.0	13:41	18:31	23:20
Barnard295		DkNeb	Sgr	18h 04m 05s	-31° 09.0'		14:07	18:31	22:55
M21	NGC6531	Open	Sgr	18h 04m 13s	-22° 29.3'	7.0	13:35	18:31	23:27
NGC6530		Open	Sgr	18h 04m 31s	-24° 21.5'	4.6	13:42	18:32	23:21
NGC6528		Globular	Sgr	18h 04m 50s	-30° 03.3'	9.5	14:03	18:32	23:00
IC4684		Neb	Sgr	18h 09m 08s	-23° 26.1'		13:43	18:36	23:29
IC4685		Neb	Sgr	18h 09m 18s	-23° 59.2'		13:45	18:36	23:27
Barnard303		DkNeb	Sgr	18h 09m 28s	-23° 59.0'		13:45	18:36	23:28
IC1274		Neb	Sgr	18h 09m 51s	-23° 38.8'		13:45	18:37	23:29
IC1275		Neb	Sgr	18h 10m 07s	-23° 45.7'		13:45	18:37	23:29
NGC6572		P Neb	Oph	18h 12m 06s	+06° 51.2'	9.0	12:17	18:39	01:01
NGC6567		P Neb	Sgr	18h 13m 45s	-19° 04.5'	12.0	13:33	18:41	23:48
IC4701		Neb	Sgr	18h 16m 36s	-16° 38.0'		13:29	18:44	23:59
Barnard93		DkNeb	Sgr	18h 16m 53s	-18° 03.0'		13:33	18:44	23:54
IC1284		Neb	Sgr	18h 17m 39s	-19° 40.3'		13:39	18:45	23:50
M24	Small Sagittarius Star Cloud	Open	Sgr	18h 18m 26s	-18° 24.3'	4.5	13:36	18:45	23:55
M16	Eagle Nebula	Open+D Neb	Ser	18h 18m 48s	-13° 48.3'	6.5	13:22	18:46	00:09
M18	Black Swan	Open	Sgr	18h 19m 58s	-17° 06.1'	8.0	13:33	18:47	00:01
M17	Omega Nebula	Open+D Neb	Sgr	18h 20m 47s	-16° 10.3'	7.0	13:31	18:48	00:04
HR6923	39 Dra	Mult	Dra	18h 23m 54s	+58° 48.0'	5.0	Circ	18:51	Circ
M28	NGC6626	Globular	Sgr	18h 24m 33s	-24° 52.1'	8.5	14:04	18:52	23:40

And - Andromeda
Ant - Antlia
Aps - Apus
Aql - Aquila
Aqr - Aquarius
Ara - Ara
Ari - Aries
Aur - Auriga
Boo - Bootes
Cae - Caelum
Cam - Camelopardis
Cap - Capricornus
Car - Carina
Cas - Cassiopeia
Cen - Centaurus
Cep - Cepheus
Cet - Cetus
Cha - Chamaeleon
Cir - Circinus
CMa - Canis Major
CMi - Canis Minor
Cnc - Cancer
Col - Columba
Com - Coma Berenices
CrA - Corona Australis
CrB - Corona Borealis
Crt - Crater
Cru - Crux
Crv - Corvus
CVn - Canes Venatici
Cyg - Cygnus
Del - Delphinus
Dor - Dorado
Dra - Draco
Equ - Equuleus
Eri - Eridanus
For - Fornax
Gem - Gemini
Gru - Grus
Her - Hercules
Hor - Horologium
Hya - Hydra
Hyi - Hydrus
Ind - Indus
Lac - Lacerta
Leo - Leo
Lep - Lepus
Lib - Libra
LMi - Leo Minor
Lup - Lupus
Lyn - Lynx
Lyr - Lyra
Men - Mensa
Mic - Microscopium
Mon - Monoceros
Mus - Musca
Nor - Norma
Oct - Octans
Oph - Ophiuchus
Ori - Orion
Pav - Pavo
Peg - Pegasus
Per - Perseus
Phe - Phoenix
Pic - Pictor
PsA - Pisces Austrinus
Psc - Pisces
Pup - Puppis
Pyx - Pyxis
Ret - Reticulum
Scl - Sculptor
Sco - Scorpius
Sct - Scutum
Ser - Serpens
Sex - Sextans
Sge - Sagitta
Sgr - Sagittarius
Tau - Taurus
Tel - Telescopium
TrA - Triangulum Australe
Tri - Triangulum
Tuc - Tucana
UMa - Ursa Major
UMi - Ursa Minor
Vel - Vela
Vir - Virgo
Vol - Volans
Vul - Vulpecula

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