Volume 43.12 December 2023

Desert Sky Observer

Antelope Valley Astronomy Club

Upcoming Events

December 9: Moonwalk @ PDW (No Telescopes)
5:00 pm - 6:30 PM
December 9: Christmas Party 6-9:30 PM

Every clear night: Personal Star Party

AVAC Calendar

January 12: Club Meeting/ Space Painting
January 13: Moonwalk @ PDW 5:30 pm

February 9: Club Meeting - Star Party
February 10: Moonwalk @ PDW 6:00 pm

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 Reflector -- the publication of the Astronomical League.
- The AVAC Membership Manual.
- To borrow club equipment, books, videos, and other items.

AVAC
PO Box 8545
Lancaster, CA 93539-8545

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

www.instagram.com/av_astronomyclub

www.avastronomyclub.org

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

The AVAC is a Sustaining Member of The Astronomical League and the International Dark-Sky Association

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www.avastronomyclub.org
ANTELOPE VALLEY
ASTRONOMY CLUB, INC.

President's Message

By Phil Wriedt

Hi There!

On November 3rd, the College of the Canyons hosted a Star Party. The Moon didn't rise till everybody left so it was a dark night. It was great to meet the public and meet other amateur astronomers. The Local Group from Santa Clarita were there. Rose and Rod brought telescopes and I brought my binoculars. Christian also brought a scope but there really wasn't a place to assemble it. The next Star Party at College of the Canyons will probably be in late April; we will know more probably in early March.

On November 18th the last Moonwalk of the year was held. I was late getting there and getting setup, but the sky was relatively clear, so I setup. Rod was already there, setup, waiting for twilight and was worried if he was going to be the only one there. By the time the Moonwalk started, 80-90% of the sky south and west of PDW was overcast. I think it can be said that Rod's scope took it pretty hard. It was scanning to the south and then to the southwest, and then back, for about 45 minutes it tried, before he turned it off. He tried to get it setup after the clouds started breaking up, but, it wouldn't turn on again. There were 39 members of the public there. Jupiter and the Moon (through thin clouds) were visible. Saturn kept disappearing in the clouds.

Our meeting in January will be an Astro painting class. It will held in the Multi-Purpose Room We scheduled it so that the construction in the planetarium would not impact our meeting. Well, the construction was pushed back to June or maybe July. The meeting will start at 6:45PM so everyone can get setup be ready to start painting and finish on time.

See you at the Christmas Party at Gino's on the 9th. May your Holidays be Happy!

Keep Looking Up, Phil

Note: Regrettably this morning, I received a call and email from the brother of former member Bill Schebeck letting us know that Bill had passed in November. Anyone wishing to reach out to the family, let me know and I'll forward you the phone number or email address.

On The Cover

With giant storms, powerful winds, auroras, and extreme temperature and pressure conditions, Jupiter has a lot going on. Now, the NASA/ESA/CSA James Webb Space Telescope has captured new images of the planet. Webb's Jupiter observations will give scientists even more clues to Jupiter's inner life.

This image comes from the observatory's Near-Infrared Camera (NIRCam), which has three specialized infrared filters that showcase details of the planet. Since infrared light is invisible to the human eye, the light has been mapped onto the visible spectrum. Generally, the longest wavelengths appear redder and the shortest wavelengths are shown as more blue. Scientists collaborated with citizen scientist Judy Schmidt to translate the Webb data into images.

This image was created from a composite of several images from Webb. Visible auroras extend to high altitudes above both the northern and southern poles of Jupiter. The auroras shine in a filter that is mapped to redder colors, which also highlights light reflected from lower clouds and upper hazes. A different filter, mapped to yellows and greens, shows hazes swirling around the northern and southern poles. A third filter, mapped to blues, showcases

From the Secretary

By Rose Moore

Members:

We have our Christmas Party coming up on Saturday December 9th, from 6-9:30pm. You may bring a wrapped or bagged gift for the raffle, and it does not have to be astronomy related. Dress is casual. Those who have not paid may pay Rod at the party. See you there!

The night of the Christmas Party will be a Prime Desert Moon Walk with Jeremy. There will be no telescopes at this event, as there will be holiday lights up. Jeremy will do the walk, and then hopefully join us at the party.

For January's meeting we will be having Sue Leone's Astronomy Paint Class. There will be a limited space of about 20 people, members first. There will be a sign up sheet that I will be starting next week, so that members can email me if they want to attend. The cost will be $15 per each member and $25 for each non member (if we have an open spot). Payment is due at the night of the class. The club will be supplying the canvases, paints, and brushes. The painting is yours to take home after the class. Check in time for the class starts at 6:45pm, and the class will start promptly at 7:15pm.

There will be a Prime Desert Moon Walk with Jeremy on Saturday January 13th at 5:30-7:30pm, members are needed with telescopes, weather permitting. Jupiter and Saturn will still be up in the evening sky. The Moon will be a small crescent, up till 7:52pm.

Member Christian A. has set up an Instagram account for those interested. You can post and share pictures and events on the account. The account is: AV_AstronomyClub

Upcoming events for next year: monthly Prime Desert Moon Walks; dark sky star parties, including the Messier Marathon; Lunar Eclipse March 25th; a public star party at the SAGE; and the Solar eclipse April 8th (partial in the Antelope Valley). Matt and I will be working on obtaining speakers for the club's meetings. The NASA Speaker Bureau is not taking requests for 2024 as yet. And I'll be contacting the Night Sky Network regarding speakers. As of now, we are looking at the SAGE remodeling being pushed back to June 2024.

Everyone have a safe and wonderful holiday season! Merry Christmas and Happy New Year!

Clear skies, Rose

For Sale

Oculus Quest Meta Headset with 256 GB and hand controllers in a black carrying case. It also includes a cable that goes from a PC to a slot in the headset. Price: $250 for everything. This includes a headset charging unit and connection for a cell phone. It has been rarely used. It was bought in April of this year. Contact Duane Lewis by email only for further info: Duane Lewis <gurba1826@gmail.com>

On The Cover ... continued

light that is reflected from a deeper main cloud. The Great Red Spot, a famous storm so big it could swallow Earth, appears white in these views, as do other clouds, because they are reflecting a lot of sunlight.

Credit: NASA, ESA, Jupiter ERS Team; image processing by Judy Schmidt

A Flame in the Sky – the Orion Nebula

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

It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being Orion the Hunter.

As we've previously mentioned, Orion is a great way to test your sky darkness. With your naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god Sah. The Babylonians referred to it as The Heavenly Shepard. In most cultures, it is Orion's Belt that has many stories: Shen in Chinese folklore, or Tayamnicankhu in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained The Cosmic Hearth – the fire of creation.

Credit: Stellarium Web

1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the "sword" of Orion, this cloud of dust and gas sits below the first star in Orion's Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.

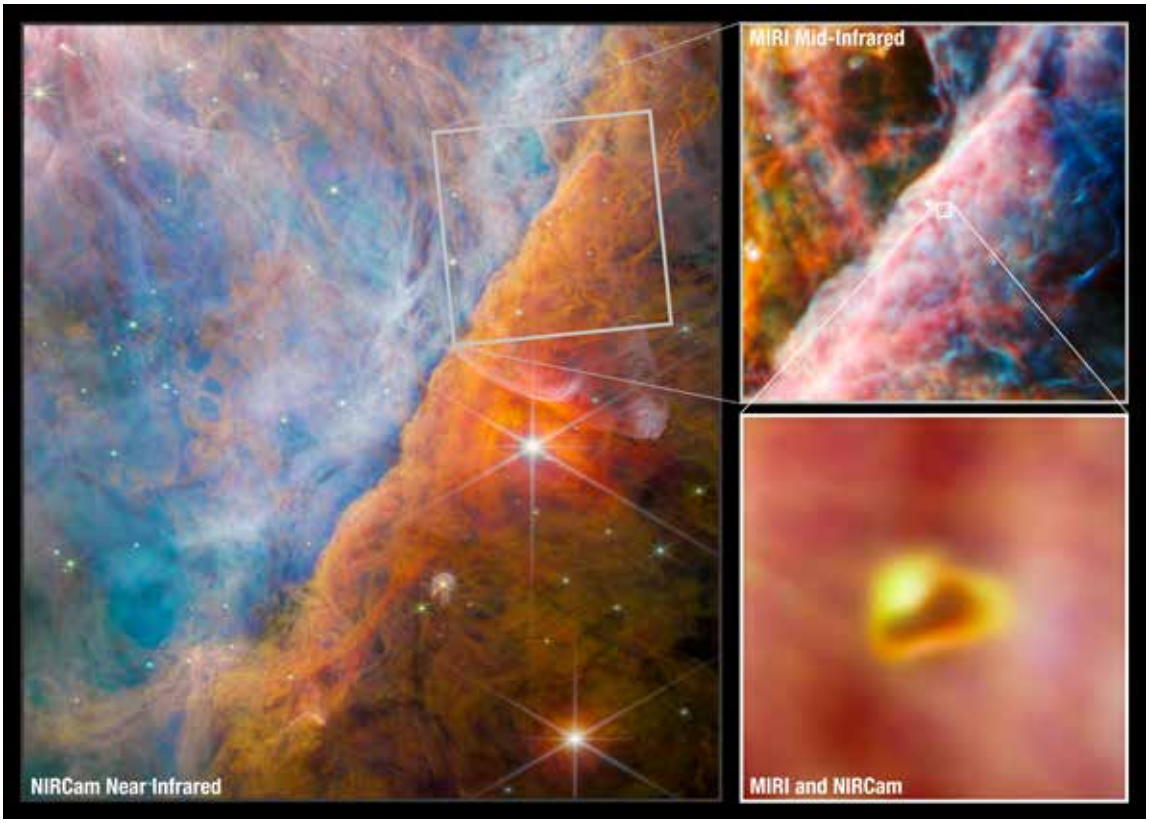
Of course, it's not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space

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!

Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released a new photo of the Orion Nebula taken from JWST's NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.

But stars aren't the only items photographed here. In June 2023, JWST's NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That's right – a solar system



ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team

happening in real time – located within the edges of a section called the Orion Bar. Scientists have named this planet-forming disk d203-506, and you can learn more about the chemistry found here. By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.

In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded MicroObservatory to capture M42 and other objects.

Learn more about what to spy in the winter sky with our upcoming mid-month article on the Night Sky Network page through NASA's website!

Space News

News from around the Net

Next-Generation Space Telescopes Could Use Deformable Mirrors To Image Earth-Sized Worlds

Observing distant objects is no easy task, thanks to our planet's thick and fluffy atmosphere. As light passes through the upper reaches of our atmosphere, it is refracted and distorted, making it much harder to discern objects at cosmological distances (billions of light years away) and small objects in adjacent star systems like exoplanets. For astronomers, there are only two ways to overcome this problem: send telescopes to space or equip telescopes with mirrors that can adjust to compensate for atmospheric distortion. Since 1970, NASA and the ESA have launched more than 90 space telescopes into orbit, and 29 of these are still active, . . . (continued at https://phys.org/news/2023-11-next-generation-space-telescopes-deformable-mirrors.html)

Astronomers Find A Brilliant Explosion That Just Keeps On Exploding

On September 7, 2022, an automatic telescope picked up a blazing dot of blue light some 1,000 times brighter than a typical supernova. The brilliant blue flare lasted only days before it faded away, but not before an automated system had put astronomers on alert. The system designated the event AT2022tsd, but it some came to be called the "Tasmanian Devil." It joined the short list of a special class of objects discovered in 2018 known as luminous fast blue optical transients (LFBOTs). Astronomers think these explosive flares are a special kind of supernova, but they could also be stars ripped apart in the intense gravitational field surrounding a neutron star or black hole.. . . (continued at https://skyandtelescope.org/astronomy-news/astronomers-find-a-brilliant-explosion-that-just-keeps-on-exploding/)

Astronomers Discover Two 'Hot Jupiters' Orbiting Red-Giant Stars

Using NASA's Transiting Exoplanet Survey Satellite (TESS), an international team of astronomers has discovered two new "hot Jupiter" exoplanets. The newfound alien worlds, designated TOI-4377 b and TOI-4551 b, both orbit distant red-giant stars. The finding was reported November 8 in the Monthly Notices of the Royal Astronomical Society. Launched in April 2018, TESS is conducting a survey of about 200,000 of the brightest stars near the sun with the aim of searching for transiting exoplanets, ranging from small, rocky worlds to gaseous giants. To date, it has identified nearly 7,000 candidate exoplanets (TESS Objects of Interest, or TOI), of which 402 have been confirmed so far.. . . . .(continued at https://phys.org/news/2023-11-astronomers-hot-jupiters-orbiting-red-giant.html)

A Detailed Guide To The Night Sky December 2023

The Next Full Moon is the Beaver, Frost or Frosty, or Snow Moon; the Moon before Yule or the Oak Moon; Kartik Purnima, Karthika Deepam, and Loy Krathong; the Bon Om Touk and Tazaungdaing Festival Moon; Ill (or Il) Poya; and the Child Moon.. . . . (continued at https://science.nasa.gov/skywatching/nasa-daily-skywatching-guide/)

Scientists Uncover Aurora-Like Radio Emission Above A Sunspot

Researchers say the novel radio emission shares characteristics with the auroral radio emissions commonly seen in planetary magnetospheres such as those around Earth, Jupiter and Saturn, as well as certain low-mass stars. The discovery offers new insights into the origin of such intense solar radio bursts and potentially opens new avenues for understanding similar phenomena in distant stars with large starspots, according to the study's lead author and NJIT-CSTR scientist, Sijie Yu. . . . (continued at https://www.sciencedaily.com/releases/2023/11/231113192112.htm)

Space News

News from around the Net

Astronomers Spot Giant Stream Of Stars Between Galaxies

To their surprise, an international team of researchers has discovered a giant and extremely faint stream of stars between galaxies. While streams are already known in our own galaxy and in nearby galaxies, this is the first time that a stream running between galaxies has been observed. It is the largest stream detected to date. The astronomers have published their findings in the journal Astronomy & Astrophysics. The first observations were made with astronomer Michael Rich's relatively small 70-centimeter telescope in California (United States of America). Next, the researchers focused the 4.2-meter William Herschel telescope (La Palma, Spain) on the area. After image processing,. . .(continued at https://phys.org/news/2023-11-astronomers-giant-stream-stars-galaxies.html)

Telescopes Didn't Always Play Nicely With Each Other. That's About To Change

Those readers who have dabbled with astronomical imaging will be familiar with the technique of taking multiple images and then stacking them together to improve the strength of the signal, yielding better images. Taking this technique further many research projects require data of the same object spanning longer time frames than a night's observing. This data is usually captured from different locations and under different conditions. The problem has been matching the observations across all these survey runs. Researchers have shared a new approach to calculate if separate images of the same object will yield additional signals or just generate useless noise. . . .(continued at https://phys.org/news/2023-11-telescopes-didnt-play-nicely.html)

This Newfound Planet Seems Way Too Big For Its Tiny Star

In the annals of planet hunting, astronomers' latest find is a bit of a head-scratcher: a giant exoplanet tightly orbiting a star so tiny, it's hard to understand how the star could have birthed it. The planet, which is named LHS 3154 b and was reported today in Science, tips the scales at 13.2 times the mass of Earth or more — putting it roughly on par with Neptune's 17.2 Earth masses. Yet, its host star has just 11 percent the mass of the Sun. "Previously, it was just thought that, 'Oh, no, there's no way the lowest-mass stars can actually form this type of planet,'" says Guðmundur Stefánsson, an astrophysicist and postdoctoral fellow at Princeton University . . . (continued at https://www.astronomy.com/science/the-planet-lhs-3154-b-seems-way-too-big-for-its-tiny-star/)

An Astronomical Waltz Reveals A Sextuplet Of Planets

CHEOPS is a joint mission by ESA and Switzerland, under the leadership of the University of Bern in collaboration with the University of Geneva. Thanks to a collaboration with scientists working with data from NASA's satellite TESS, the international team could uncover the planetary system orbiting the nearby star HD110067. A very distinctive feature of this system is its chain of resonances: the planets orbit their host star in perfect harmony. Part of the research team are researchers from the University of Bern and the University of Geneva who are also members of the National Center of Competence in Research (NCCR) PlanetS . . . (continued at https://www.sciencedaily.com/releases/2023/11/231129112537.htm)

Do Glaciers On Mercury Suggest Such A Planet Could Be Habitable?

Data on Mercury collected by NASA's Messenger orbiter continue to yield new results long after the end of the mission in 2015. In the latest and perhaps most surprising result, scientists have used Messenger data to discover salt glaciers on the baked planet's surface. New evidence suggests the subsurface layers are rich in volatiles, which might once have created habitable conditions — and the same might be true on Mercury-like exoplanets. . . . (continued at https://skyandtelescope.org/astronomy-news/do-glaciers-on-mercury-suggest-such-a-planet-could-be-habitable/)

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.

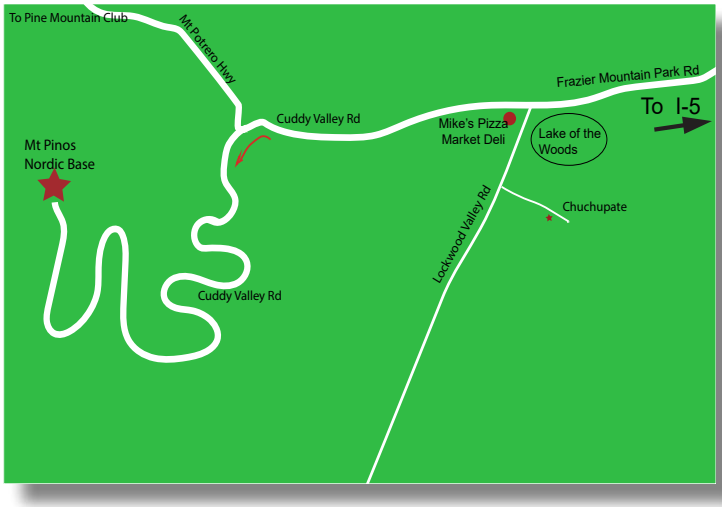
To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike's Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right.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

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.

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.



Solar System Summary

The **Sun** moves from the western edge of Ophiuchus and by the end of the year is above the lid of Sagittarius' tea pot.

The Planets

Mercury begins the month in the evening twilight falling towards the Sun. It reaches inferior conjunction about the 22nd. By the end of the month it is 15° west of the Sun in the morning twilight.

Venus is still prominent in the morning sky. Starting the month at mag -4.2 in central of Virgo, continues its slide back toward the Sun, ending the month on the western edge of Scorpius at -4.1

Mars spends the month recovering from last month's conjunction and is about as far away from Earth as possible. At the end of the year it's 12.5° west of the Sun in the morning twilight.

Jupiter spends the month barely moving in retrograde in southern Aries. On the 22nd the 78% waxing Moon is 2° north.

Saturn moving east in central Aquarius at mag 0.8. The 31% waxing Moon passes almost 3° south on the morning of the 17th.

Uranus continues its retrograde motion in eastern Aries at mag 5.7. On the 23th the 87% waxing Moon passes 2° north.

Neptune is moving east on the border of southern Pisces and Aquarius at 7.8. On the 19th the 46% waxing Moon passes less than 1.5° to the south.

Dwarf Planets

134340 Pluto spends the month, again, on the eastern edge of Sagittarius moving east at mag 14.4 just south of M75.

1 Ceres starts the month, in the morning twilight, on the edge Libra (mag 8.6), heading east crossing the northern limb of Scorpius, crossing into Ophiuchus about the 17th.

2 Pallas at mag 9.5 continues moving east in Virgo. As the month progresses it moves into Serpens Caput.

3 Juno at mag 9.6, moves east across southern Leo.

4 Vesta at mag 6.6, spends the month in retrograde moving across Orion's club and into Taurus.

Moon Phases

First Qtr Dec 19 | Full Dec 26 | Third Qtr Dec 4 | New Dec 12

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2023	20:41	10:44	06:41	16:41
12/5/2023	00:31	12:40	06:45	16:41
12/10/2023	04:30	14:53	06:48	16:42
12/15/2023	09:45	19:41	06:52	16:43
12/20/2023	12:32	00:22	06:55	16:45
12/25/2023	15:34	05:57	06:57	16:48
12/30/2023	20:28	09:49	06:59	16:51

Planet Data*

December 1

	Rise	Transit	Set	Mag	Phase%
Mercury	08:27	13:12	17:58	-0.42	68.9
Venus	03:12	08:53	14:33	-4.17	68.1
Mars	06:24	11:24	16:24	1.42	99.9
Jupiter	14:53	21:30	04:11	-2.84	99.7
Saturn	11:59	17:25	22:52	0.84	99.8

December 15

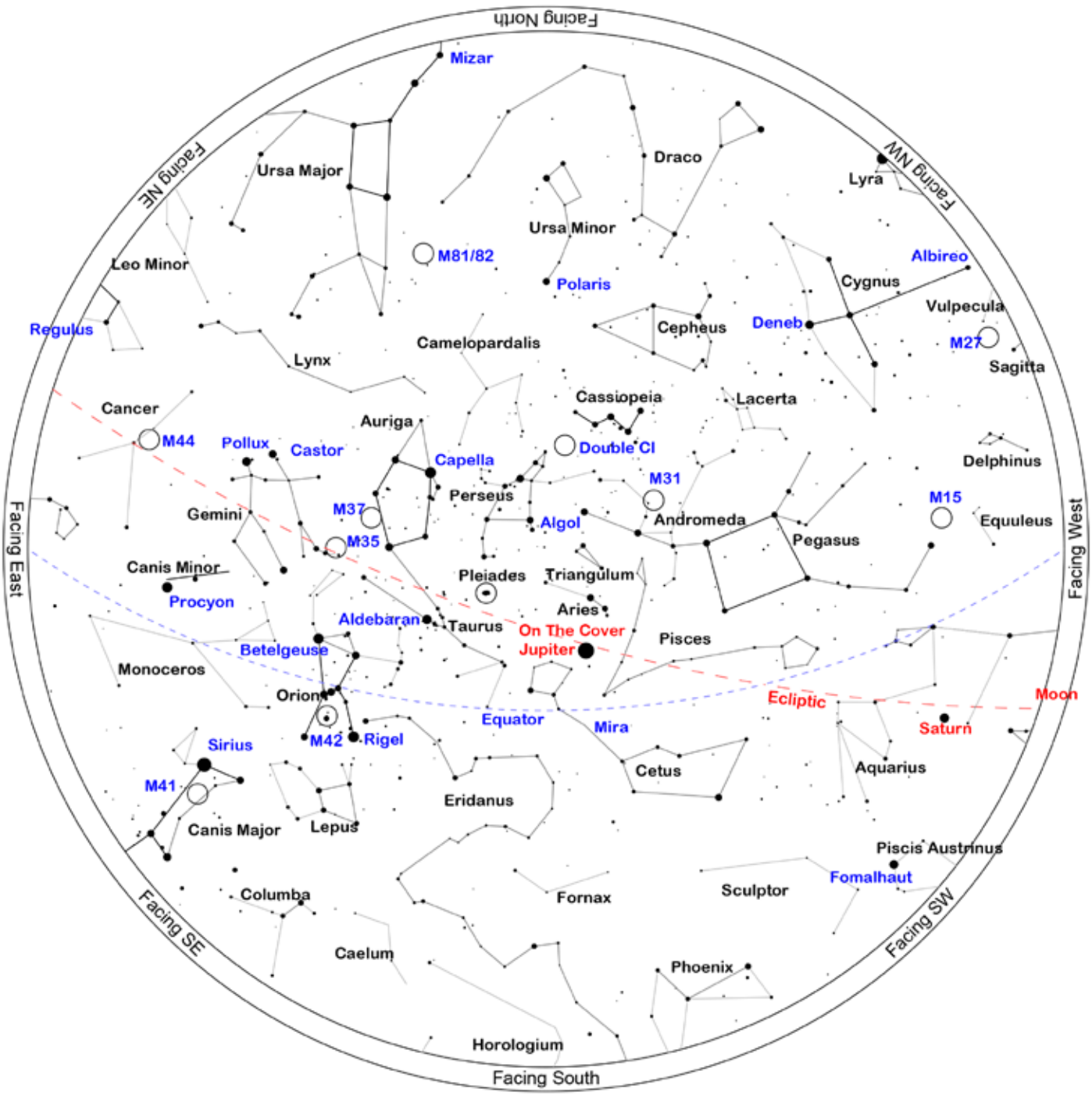
	Rise	Transit	Set	Mag	Phase%
Mercury	07:50	12:44	17:37	1.72	12.4
Venus	03:36	09:01	14:26	-4.12	72.9
Mars	06:18	11:12	16:07	1.41	99.8
Jupiter	13:54	20:31	03:11	-2.74	99.5
Saturn	11:06	16:34	22:01	0.89	99.8

December 30

	Rise	Transit	Set	Mag	Phase%
Mercury	05:42	10:46	15:49	0.81	23.9
Venus	04:04	09:15	14:24	-4.06	77.6
Mars	06:10	11:01	15:53	1.39	99.5
Jupiter	12:54	19:30	02:10	-2.63	99.2
Saturn	10:10	15:39	21:08	0.93	99.8

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

Sky Chart



Location: Set from geolocation service
Latitude: 34° 39' N, longitude: 118° 10' W
Time: 2023 December 16, 21:00 (UTC -08:00)

Powered by: Heavens-Above.com

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 December 16, 2023. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M25	M25	Open	Sgr	18h 31m 42s	-19° 07.0'	6.5	07:38	12:45	17:53
IC4725		Open	Sgr	18h 31m 48s	-19° 06.7'	4.6	07:38	12:46	17:53
NGC6642		Globular	Sgr	18h 31m 54s	-23° 28.5'	8.8	07:52	12:46	17:39
NGC6644		P Neb	Sgr	18h 32m 35s	-25° 07.7'	12.0	07:59	12:46	17:34
NGC6647		Open	Sgr	18h 32m 49s	-17° 13.6'	8.0	07:33	12:47	18:00
IC4732		P Neb	Sgr	18h 33m 55s	-22° 38.6'	13.0	07:52	12:48	17:44
NGC6656	Crackerjack Cluster	Globular	Sgr	18h 36m 24s	-23° 54.2'	5.1	07:58	12:50	17:42
IC4756		Open	Ser	18h 38m 54s	+05° 27.0'	5.0	06:35	12:53	19:11
NGC6681		Globular	Sgr	18h 43m 12s	-32° 17.4'	8.1	08:37	12:57	17:17
NGC6694		Open	Sct	18h 45m 18s	-09° 23.0'	8.0	07:22	12:59	18:36
IC4776		P Neb	Sgr	18h 45m 51s	-33° 20.5'	12.0	08:44	13:00	17:15
Barnard318		DkNeb	Sct	18h 49m 42s	-06° 23.0'		07:18	13:03	18:48
M11	Wild Duck Cluster	Open	Sct	18h 51m 05s	-06° 16.1'	7.0	07:19	13:05	18:50
M57	Ring Nebula	P Neb	Lyr	18h 53m 35s	+33° 01.7'	9.5	05:17	13:07	20:58
NGC6715		Globular	Sgr	18h 55m 03s	-30° 28.7'	7.7	08:41	13:09	17:36
NGC6717		Globular	Sgr	18h 55m 06s	-22° 42.0'	9.2	08:13	13:09	18:05
Barnard122		DkNeb	Sct	18h 56m 48s	-04° 45.0'		07:21	13:11	19:00
Barnard123		DkNeb	Sct	18h 57m 39s	-04° 43.0'		07:22	13:11	19:01
NGC6723		Globular	Sgr	18h 59m 33s	-36° 37.9'	7.3	09:13	13:13	17:13
Barnard128		DkNeb	Aql	19h 01m 40s	-04° 34.0'		07:25	13:15	19:06
NGC6729		BrNeb	CrA	19h 01m 54s	-36° 57.0'		09:17	13:16	17:14
Barnard326		DkNeb	Aql	19h 03m 00s	-00° 23.0'		07:15	13:17	19:18
NGC6749		Globular	Aql	19h 05m 15s	+01° 54.0'	11.1	07:11	13:19	19:27
Barnard329		DkNeb	Aql	19h 06m 59s	+03° 11.0'		07:09	13:21	19:32
NGC6760		Globular	Aql	19h 11m 12s	+01° 01.8'	9.1	07:19	13:25	19:31
Abell56		P Neb	Aql	19h 13m 07s	+02° 52.8'	12.4	07:16	13:27	19:38
NGC6772		P Neb	Aql	19h 14m 36s	-02° 42.4'	14.0	07:33	13:28	19:24
Barnard138		DkNeb	Aql	19h 16m 00s	+00° 13.0'		07:26	13:30	19:33
M56	NGC6779	Globular	Lyr	19h 16m 36s	+30° 11.0'	9.5	05:52	13:30	21:09
NGC6790		P Neb	Aql	19h 22m 57s	+01° 30.8'	10.0	07:30	13:37	19:44
NGC6803		P Neb	Aql	19h 31m 16s	+10° 03.3'	11.0	07:14	13:45	20:16
NGC6804		P Neb	Aql	19h 31m 35s	+09° 13.5'	12.0	07:17	13:45	20:14
Abell62		P Neb	Aql	19h 33m 18s	+10° 37.0'	13.0	07:14	13:47	20:20
NGC6807		P Neb	Aql	19h 34m 34s	+05° 41.0'	14.0	07:30	13:48	20:07
M55	NGC6809	Globular	Sgr	19h 40m 00s	-30° 57.7'	7.0	09:28	13:54	18:19
NGC6818	Little Gem	P Neb	Sgr	19h 43m 58s	-14° 09.1'	10.0	08:35	13:58	19:20

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6838		Globular	Sge	19h 53m 46s	+18° 46.6'	8.3	07:10	14:08	21:05
NGC6842		P Neb	Vul	19h 55m 02s	+29° 17.3'	14.0	06:34	14:09	21:44
HR7619	Psi Cyg	Mult	Cyg	19h 55m 38s	+52° 26.3'	4.9	03:42	14:09	00:36
Abell66		P Neb	Sgr	19h 57m 32s	-21° 36.6'	14.1	09:12	14:11	19:11
Barnard144	Fish on the platter nebula	DkNeb	Cyg	19h 58m 00s	+35° 20.0'		06:10	14:12	22:13
NGC6853	Apple Core Nebula	P Neb	Vul	19h 59m 36s	+22° 43.2'	8.1	07:03	14:13	21:24
NGC6857	III-144	Neb	Cyg	20h 02m 48s	+33° 31.4'	11.4	06:24	14:17	22:09
IC4954		Neb	Vul	20h 04m 45s	+29° 15.1'		06:44	14:18	21:53
M75	NGC6864	Globular	Sgr	20h 06m 05s	-21° 55.3'	9.5	09:21	14:20	19:18
Barnard342		DkNeb	Cyg	20h 09m 30s	+41° 12.0'		05:50	14:23	22:57
NGC6885	20 Vulpeculae Cluster	Open	Vul	20h 12m 00s	+26° 29.0'	5.9	07:02	14:26	21:50
NGC6891		P Neb	Del	20h 15m 09s	+12° 42.2'	12.0	07:50	14:29	21:08
NGC6894		P Neb	Cyg	20h 16m 24s	+30° 33.9'	14.0	06:50	14:30	22:10
IC4997		P Neb	Sge	20h 20m 09s	+16° 43.9'	12.0	07:43	14:34	21:25
Barnard345	B345	DkNeb	Cyg	20h 21m 00s	+46° 33.0'		05:21	14:35	23:48
NGC6913	Cooling Tower	Open	Cyg	20h 23m 57s	+38° 30.5'	6.6	06:20	14:38	22:55
Abell70		P Neb	Aql	20h 31m 33s	-07° 05.3'	14.3	09:02	14:45	20:28
Barnard348	B348	DkNeb	Cyg	20h 34m 00s	+42° 05.0'		06:08	14:48	23:27
NGC6940		Open	Vul	20h 34m 26s	+28° 17.0'	6.3	07:17	14:48	22:19
NGC6960	Filamentary Nebula	Neb	Cyg	20h 45m 58s	+30° 35.6'		07:20	15:00	22:40
IC5068		Neb	Cyg	20h 50m 29s	+42° 28.6'		06:22	15:04	23:46
IC5070	Pelican Nebula [2]	Neb	Cyg	20h 51m 00s	+44° 24.1'		06:09	15:05	00:01
NGC6979	II-206	Neb	Cyg	20h 51m 00s	+32° 09.0'	11.0	07:18	15:05	22:51
NGC6981		Globular	Aqr	20h 53m 28s	-12° 32.2'	9.4	09:40	15:07	20:35
IC5076		Neb	Cyg	20h 55m 33s	+47° 23.7'		05:48	15:09	00:31
IC1340		Neb	Cyg	20h 56m 08s	+31° 02.8'		07:28	15:10	22:52
NGC6992	Cirrus Nebula [2]	Neb	Cyg	20h 56m 19s	+31° 44.6'		07:25	15:10	22:55
NGC6996	VIII-58	Open	Cyg	20h 56m 30s	+44° 38.0'	10.0	06:13	15:10	00:08
NGC6997		Open	Cyg	20h 56m 39s	+44° 37.9'	10.0	06:13	15:10	00:08
NGC7000	C20,Gulf of Mexico	BrNeb	Cyg	20h 58m 48s	+44° 20.0'		06:17	15:13	00:08
M73	NGC6994	Open+Ast	Aqr	20h 58m 56s	-12° 38.1'	9.0	09:45	15:13	20:40
NGC7006	C42	Globular	Del	21h 01m 30s	+16° 11.0'	10.6	08:26	15:15	22:04
NGC7009	Saturn Nebula	P Neb	Aqr	21h 04m 12s	-11° 22.0'	8.0	09:47	15:18	20:49
NGC7027		P Neb	Cyg	21h 07m 02s	+42° 14.1'	10.0	06:40	15:21	00:01
Barnard151		DkNeb	Cep	21h 08m 13s	+56° 19.0'		Circ	15:22	Circ
IC1369		Open	Cyg	21h 12m 09s	+47° 46.1'	6.8	06:01	15:26	00:51
Barnard153		DkNeb	Cep	21h 21m 03s	+56° 26.0'		Circ	15:35	Circ
NGC7076		Neb	Cep	21h 26m 24s	+62° 53.5'		Circ	15:40	Circ

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7078	Great Pegasus Cluster	Globular	Peg	21h 29m 58s	+12° 10.0'	6.4	09:07	15:44	22:21
M39	NGC7092	Open	Cyg	21h 31m 42s	+48° 25.0'	5.5	06:14	15:45	01:17
M2	NGC7089	Globular	Aqr	21h 33m 27s	-00° 49.3'	7.5	09:47	15:47	21:48
NGC7090		Galaxy	Ind	21h 36m 28s	-54° 33.4'	11.0	14:38	15:50	17:02
IC1396	Elephant Trunk	Open	Cep	21h 38m 58s	+57° 29.3'	3.5	Circ	15:53	Circ
NGC7099		Globular	Cap	21h 40m 22s	-23° 10.7'	7.5	11:00	15:54	20:48
NGC7128		Open	Cyg	21h 43m 57s	+53° 42.9'	9.7	05:01	15:58	02:55
NGC7142		Open	Cep	21h 45m 09s	+65° 46.5'	9.3	Circ	15:59	Circ
NGC7139	III-696	P Neb	Cep	21h 46m 08s	+63° 47.5'	13.3	Circ	16:00	Circ
Barnard166	B166	DkNeb	Cep	21h 51m 05s	+60° 05.0'		Circ	16:05	Circ
Barnard168	B168	DkNeb	Cyg	21h 53m 20s	+47° 16.0'		06:47	16:07	01:27
IC5146	Cocoon Nebula	Open	Cyg	21h 53m 29s	+47° 16.0'	7.2	06:47	16:07	01:27
IC1434		Open	Lac	22h 10m 42s	+52° 51.0'	9.0	05:49	16:24	03:00
NGC7245		Open	Lac	22h 15m 11s	+54° 20.6'	9.2	05:09	16:29	03:49
NGC7232		Galaxy	Gru	22h 15m 38s	-45° 51.0'	13.0	13:26	16:29	19:33
NGC7261		Open	Cep	22h 20m 06s	+58° 03.0'	8.4	Circ	16:34	Circ
NGC7293	C63,Helix Nebula	P Neb	Aqr	22h 29m 36s	-20° 48.0'	7.3	11:41	16:43	21:45
NGC7380		Open	Cep	22h 47m 21s	+58° 07.9'	7.2	Circ	17:01	Circ
C9	Cave Nebula	BrNeb	Cep	22h 56m 48s	+62° 37.0'		Circ	17:11	Circ
IC1470		Neb	Cep	23h 05m 10s	+60° 14.6'		Circ	17:19	Circ
NGC7492		Globular	Aqr	23h 08m 27s	-15° 36.6'	11.5	12:04	17:22	22:41
HR8872	Omi Cep	Triple	Cep	23h 18m 38s	+68° 06.6'	4.8	Circ	17:32	Circ
IC5308		Galaxy	Gru	23h 19m 21s	-42° 15.4'	12.0	14:04	17:33	21:02
M52	The Scorpion	Open	Cas	23h 24m 48s	+61° 35.6'	8.0	Circ	17:39	Circ
NGC7662	Blue Snowball	P Neb	And	23h 25m 54s	+42° 33.0'	8.3	08:57	17:40	02:22
NGC7686		Open	And	23h 30m 07s	+49° 08.0'	5.6	08:04	17:44	03:23
IC5332		Galaxy	Scl	23h 34m 27s	-36° 06.0'	10.6	13:45	17:48	21:51
NGC7785		Galaxy	Psc	23h 55m 19s	+05° 54.9'	11.6	11:50	18:09	00:28
HR9071	Sig Cas	Triple	Cas	23h 59m 01s	+55° 45.3'	4.9	Circ	18:13	Circ
NGC7822		Neb	Cep	00h 03m 36s	+67° 09.0'		Circ	18:17	Circ
NGC55	C72	S Gal	Scl	00h 14m 54s	-39° 11.0'	7.9	14:42	18:29	22:16
NGC129		Open	Cas	00h 30m 00s	+60° 13.1'	6.5	Circ	18:44	Circ
NGC133		Open	Cas	00h 31m 19s	+63° 21.0'	9.0	Circ	18:45	Circ
NGC146		Open	Cas	00h 33m 03s	+63° 18.0'	9.1	Circ	18:47	Circ
NGC147	C17	E Gal	Cas	00h 33m 12s	+48° 30.0'	9.3	09:14	18:47	04:19
NGC190		Galaxy	Psc	00h 38m 55s	+07° 03.7'	14.0	12:30	18:53	01:15
M110	Satellite of Andromeda Galaxy	Galaxy	And	00h 40m 22s	+41° 41.1'	8.9	10:17	18:54	03:31
NGC210		Galaxy	Cet	00h 40m 35s	-13° 52.3'	10.9	13:31	18:54	00:18
NGC206	V-36	Neb	And	00h 40m 36s	+40° 44.0'		10:24	18:54	03:25

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
Arp168	M32	Galaxy	And	00h 42m 41s	+40° 51.0'	9.0	10:25	18:56	03:28
M32	Satellite Of Andromeda Galaxy	Galaxy	And	00h 42m 42s	+40° 51.9'	9.1	10:25	18:56	03:28
M31	Andromeda Galaxy	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	10:22	18:56	03:31
NGC246	C56	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	13:31	19:01	00:30
NGC254		Galaxy	Scl	00h 47m 28s	-31° 25.2'	11.8	14:38	19:01	23:25
NGC288		Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	14:24	19:06	23:49
NGC281	PacMan Nebula	Open	Cas	00h 52m 54s	+56° 37.4'	7.0	Circ	19:07	Circ
IC59	Gamma Cassiopeiae Nebula	Neb	Cas	00h 57m 29s	+61° 08.6'		Circ	19:11	Circ
IC63	Gamma Cassiopeiae Nebula	Neb	Cas	00h 59m 29s	+60° 54.7'		Circ	19:13	Circ
C51	IC1613	IrrGal	Cet	01h 04m 48s	+02° 07.0'	9.3	13:10	19:19	01:27
NGC474		Galaxy	Psc	01h 20m 07s	+03° 24.9'	11.1	13:22	19:34	01:46
NGC485		Galaxy	Psc	01h 21m 28s	+07° 01.0'	14.0	13:13	19:35	01:58
M103	NGC581	Open	Cas	01h 33m 23s	+60° 39.0'	7.0	Circ	19:47	Circ
NGC598	Triangulum Galaxy	Galaxy	Tri	01h 33m 51s	+30° 39.6'	5.7	12:07	19:48	03:28
NGC604	III-150	Neb	Tri	01h 34m 33s	+30° 47.0'		12:07	19:48	03:29
M74	The Phantom	Galaxy	Psc	01h 36m 42s	+15° 47.0'	9.8	13:02	19:50	02:38
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	09:44	19:56	06:08
NGC651	Apple Core Nebula [2]	P Neb	Per	01h 42m 21s	+51° 34.1'	12.2	09:44	19:56	06:08
NGC637		Open	Cas	01h 43m 04s	+64° 02.4'	8.2	Circ	19:57	Circ
NGC654		Open	Cas	01h 44m 00s	+61° 53.0'	6.5	Circ	19:58	Circ
NGC720		Galaxy	Cet	01h 53m 00s	-13° 44.3'	10.2	14:43	20:07	01:31
NGC780		Galaxy	Tri	02h 00m 35s	+28° 13.5'	14.0	12:44	20:14	03:45
NGC784		Galaxy	Tri	02h 01m 17s	+28° 50.2'	11.8	12:42	20:15	03:48
NGC821		Galaxy	Ari	02h 08m 21s	+10° 59.6'	10.8	13:48	20:22	02:56
Baily191	NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circ	20:36	Circ
IC1795		Neb	Cas	02h 26m 32s	+62° 02.4'		Circ	20:40	Circ
NGC936		Galaxy	Cet	02h 27m 37s	-01° 09.3'	10.1	14:42	20:41	02:41
NGC943	Arp309	Galaxy	Cet	02h 29m 09s	-10° 49.0'	11.4	15:10	20:43	02:15

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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