Volume 41.9 September 2021

Desert Sky Observer

Antelope Valley Astronomy Club

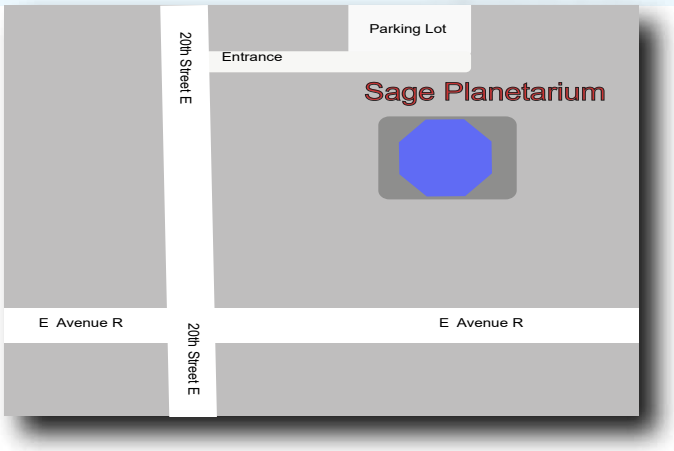
Upcoming Events

September 4: DSSP- Chuchupate
September 10: Club Meeting
September 11: Lunar Club @ Judy's
September 11: Tehachapi Airport Star Party
September 14: Election Day -- Vote!
September 25: Moon Walk 7:30 @ PDW

Every clear night: Personal Star Party

AVAC Calendar

October 2: DSSP -- Red Cliffs
October 8: Club Meeting
October 23: Scary Science 3:00 /Moon Walk 6:30 @ PDW
November 6: DSSP -- Saddleback
November 12: Club Meeting
November 13: Moonwalk 5:30 @ PDW



Board Members

President: Darrell Bennett (661) 220-0122
president@avastronomyclub.org

Vice-President: Matt Leone (661) 713-1894
vice-president@avastronomyclub.org

Secretary: Rose Moore (661) 972-1953
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Treasurer: Rod Girard (661) 803-7838
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Appointed Positions

Newsletter Editor: Phil Wriedt (661) 917-4874
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Equipment & Library:
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Club Historian: vacant
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Webmaster: Steve Trotta (661) 269-5428
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Frank Moore (661) 972-4775
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www.avastronomyclub.org
ANTELOPE VALLEY
ASTRONOMY CLUB, INC.

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.avastronomyclub.org

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

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

President's Message

By Darrell Bennett

Hello Everone,

I hope everybody is doing great. We are slowly, finally, getting back to somewhat normal. On August 7th we had our second Moon Walk of the year at the Prime Desert Woodland. The sky wasn't great but better than last month and we were able to see Jupiter and Saturn. Jeremy told me that there were 103 people for the walk, not bad for being away for so long!

On August 7th we also had our Dark Sky Star Party at Mt. Pinos, Matt was up there representing the club, while Rod, Phil and I were doing the Moon Walk. Our next DSSP will be on September 4th at Chuchupate. I won't be able to make it because my son Nick is getting married that day, and if I don't go to his wedding I'll be in big trouble.

On August 13th we had our first Club Meeting at the S.A.G.E Planetarium. Our speaker was Tim Thompson. Tim gave us the history of Mount Wilson and I learned a lot about the history I hadn't known before. On September 10th we will have our next meeting back at the S.A.G.E. Planetarium.

On September 11th we'll have a Lunar Star Party at Judy's (weather permitting), it just was too windy last time. On September 25th we'll be at Prime Desert Woodland for the Moon Walk. On October 2nd we'll have a DSSP at Red Cliffs, one of my favorites because of the dark sky there.

On October 8th we'll be having our annual Club Business Meeting to vote on new Board Members. Since I'll be going back to work this month and my schedule won't permit me to attend any meetings, I won't be running for the club president again.

Well, hope to see you all at the next meeting and until then keep looking up.

BREAKING NEWS

All National Forests are being closed for public safety starting on Aug. 31st at midnight, until September 17th. *"To better provide public and firefighter safety due to the ongoing California wildfire crisis, USDA Forest Service Pacific Southwest Region is announcing a temporary closure of all National Forests in California. This closure will be in effect from Aug. 31, 2021 at 11:59 p.m. through September 17, 2021 at 11:59 p.m."*

Therefore our DSSP is canceled this weekend.

https://www.fs.usda.gov/detail/r5/news-events/?cid=FSEPRD949139

On The Cover

This image shows a small section of the Veil Nebula, as it was observed by the NASA/ESA Hubble Space Telescope. This section of the outer shell of the famous supernova remnant is in a region known as NGC 6960 or — more colloquially — the Witch's Broom Nebula.

Credit:
NASA, ESA, Hubble Heritage Team

From the Secretary

By Rose Moore

Thank you to all the members and public who turned out for the first club meeting at SAGE in over a year and a half. And a big thank you to our speaker Tim Thompson, who did show up for our meeting!! Tim talked about the early history of Mt. Wilson and had a slide show. A very interesting presentation and it was great being in the SAGE again.

We are working on speakers for the next few meetings and will keep you posted. Our next meeting is on Friday, September 10th at 7pm. At this time we still need to wear a mask when entering into the SAGE; this is per the Palmdale School District.

Our dark sky star party for September is scheduled to be on Labor Day weekend, starting on Sept. 4th, Saturday. It will be held at Chuchupate, weather permitting. Further info to come in an email several days prior to the event.

On Saturday September 11th we have 2 events. We have scheduled a Lunar Club meeting at Judy's home in Antelope Acres. Set up time starts around 6pm. The Moon will be up until 10:15pm, and will be 27% illuminated. Sunset is at 7:06pm. Weather permitting. Also on the 11th, we have a star party at the Tehachapi Airport starting at 6:30pm, to approximately 10pm. Set up time is about 1 hour prior to the event. This was organized by Dale and Lauren who are Night Sky Network Solar System Ambassadors. This is free and open to the public. Weather permitting, members needed with telescopes.

Our Prime Desert Woodland Moon Walk is scheduled for Saturday, September 25th at 7:30pm. We will need members with telescopes. Or you can come and take the Moon Walk with Jeremy! Set up time is approximately 1 hour prior to event, weather permitting. Free and open to the public.

We have a dark sky star party the first Saturday of October, Oct. 2nd, at Red Cliffs. Set up time is anytime mid afternoon. We need to vacate the area by approximately 8am, Sunday. Come on out and enjoy the night sky with your fellow members! Weather permitting.

Clear skies, Rose

Getting ready for the Moon Walk August 7, 2021.

Catch Andromeda Rising

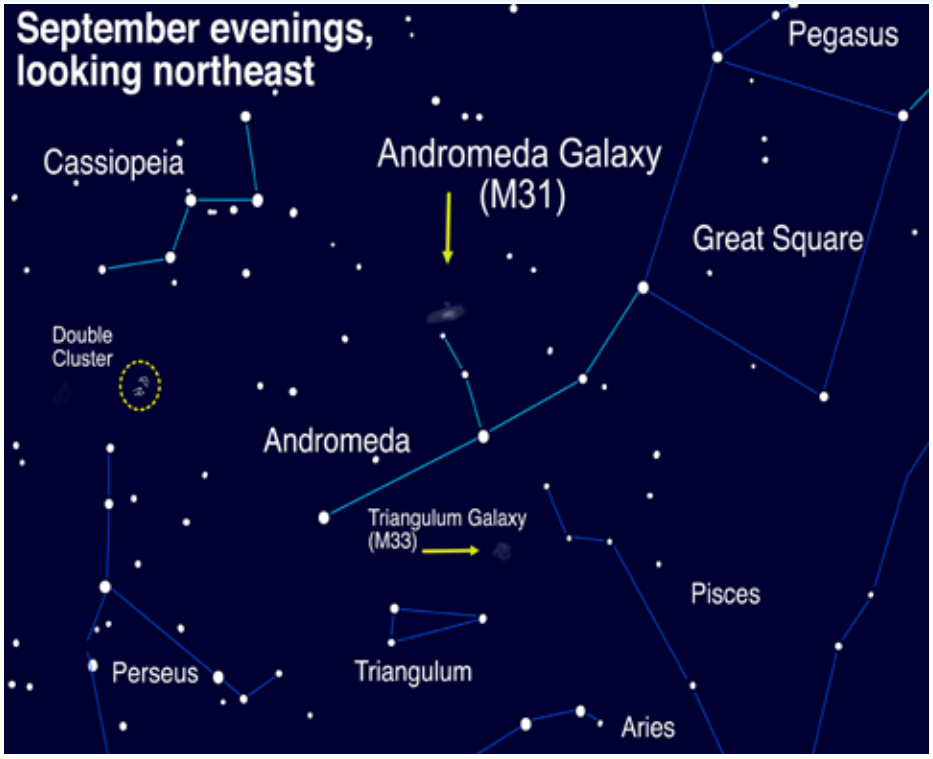
by David Prosper, NASA Night Sky Network

If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

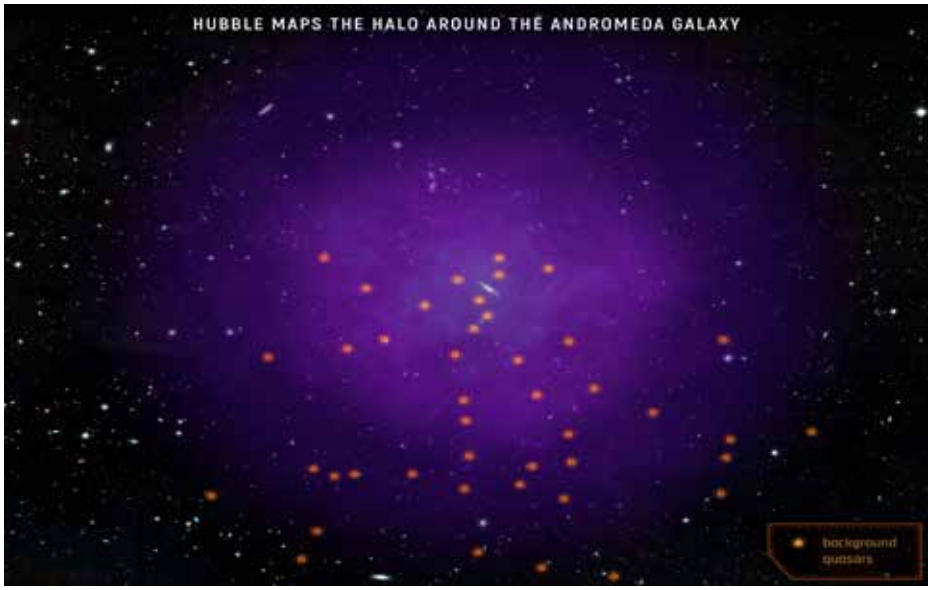
Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Telescopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe – was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): bit.ly/m31phat . Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at nasa.gov.



Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas. Image created with assistance from Stellarium



While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. Credits: NASA, ESA, and E. Wheatley (STScI)
Source: https://bit.ly/m31halo

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

Astronomers Find A 'Break' In One Of The Milky Way's Spiral Arms

Scientists have spotted a previously unrecognized feature of our Milky Way galaxy: A contingent of young stars and star-forming gas clouds is sticking out of one of the Milky Way's spiral arms like a splinter poking out from a plank of wood. Stretching some 3,000 light-years, this is the first major structure identified with an orientation so dramatically different than the arm's. . . . (continued at https://www.jpl.nasa.gov/news/astronomers-find-a-break-in-one-of-the-milky-ways-spiral-arms)

Don't Worry About Bennu (Yet)

The near-Earth asteroid 101955 Bennu is best known as the curious, die-shaped world recently visited by NASA's OSIRIS-REX spacecraft. But Bennu has another claim to fame: It's one of the most hazardous asteroids in our planet's neighborhood. The 500-meter-wide object follows an orbit that keeps it close to Earth, even crossing our planet's path as it travels around the Sun. The two orbits are tilted a mere 6° from each other's planes. . . (continued at https://skyandtelescope.org/astronomy-news/dont-worry-about-bennu-yet/)

Beautifully Dying Stars And The Scale Of The Universe

What can dying stars tell us about the size and age of the Universe? Possibly a lot, if a new technique developed by astronomers can be used routinely. It looks in other galaxies for stars like the Sun but which are at the ends of their lives, and from that determine how far away they are. This method has been used before, but what's new here is a refinement that allows it to more accurately measure their brightness, and also go deeper. (continued at https://www.syfy.com/syfywire/beautifully-dying-stars-and-the-scale-of-the-universe)

The 12-Year Cycle Of Jupiter Oppositions

Jupiter will be at opposition on August 19th among the dim stars of the constellation Aquarius. When at opposition Jupiter appears directly opposite the Sun as seen by us on Earth — which means it'll be at its biggest and brightest of the year. (Saturn came to opposition on August 2nd.) At times like these, it's interesting to think about what's actually happening. After all, everything in space is moving all the time, so there's more going on than Jupiter crossing an invisible finish line. Jupiter is on average five times farther from the Sun than Earth, . . (continued at https://skyandtelescope.org/astronomy-news/jupiter-12-year-opposition-cycle/)

Astronomy Picture of the Day

Does a ball drop faster on Earth, Jupiter, or Uranus? The featured animation shows a ball dropping from one kilometer high toward the surfaces of famous solar system bodies, assuming no air resistance . . . (continued at https://apod.nasa.gov/apod/ap210825.html)

This Is How A Supermassive Black Hole Feeds

At the heart of most massive galaxies in our Universe, there are supermassive black holes (SMBH) that are on the order of millions to billions of times the mass of the Sun. As these behemoths slowly consume gas and dust that is slowly fed into their maws, they release tremendous amounts of energy. This leads to what is known as an Active Galactic Nucleus (AGN) – aka. a quasar. . . (continued at https://www.universetoday.com/152285/this-is-how-a-supermassive-black-hole-feeds/)

Space News

News from around the Net

Incredible Video Shows Super Rare Triple Moon Eclipse

If you consider yourself a bit of an amateur weird sky enthusiast, you are definitely going to want to check out this rad as hell video of three of Jupiter's moons — Europa, Ganymede, and Callisto — causing a rare triple eclipse on the planet's surface as they crossed paths at around the same time. Amateur astronomer Christopher Go tracked the entire experience on his blog and took high-quality photos of Jupiter and the moons at around midnight on August 15 from the Philippines. . . . (continued at https://www.fatherly.com/news/jupiter-triple-moon-eclipse-video/)

Discover Deep-Sky Gems In Ophiuchus The Serpent-Bearer

The constellation Ophiuchus (pronounced off-ee-OO-cuss) the Serpent-bearer isn't all that easy to pick out, primarily because of its large size and the relative dimness of its brightest star, Rasalhague (Alpha [α] Ophiuchi). This giant white star emits about 25 times the light of the Sun, but sits some 50 light-years away, so it glows at magnitude 2.1 — just slightly fainter than Polaris (Alpha Ursae Minoris). That makes it the 56th-brightest nighttime star. . . . (continued https://astronomy.com/magazine/news/2021/08/discover-deep-sky-gems-in-ophiuchus-the-serpent-bearer)

Interstellar Comets Visit Our Solar System More Frequently Than Thought

Just because we don't see them doesn't mean they're not here. Comets are icy bodies in space that release gas or dust. They are often compared to dirty snowballs, though recent research has led some scientists to call them snowy dirtballs. Comets contain dust, ice, carbon dioxide, ammonia, methane and more. Astronomers think comets are leftovers from the material that initially formed the solar system about 4.6 billion years ago. Some researchers think comets might have originally brought some of the water and organic molecules to Earth that now make up life here. . . . (continued at https://www.space.com/53-comets-formation-discovery-and-exploration.html)

Hubble Captures Gorgeous Image Of 'Einstein Ring' From Warped Quasar Light

Einstein predicted the existence of these rings back in 1915. A jaw-dropping Hubble Space Telescope image shows an "Einstein ring" magnifying light from the far depths of the universe. In the image, two galaxies, around 3.4 billion light-years from Earth, warp and deflect light from an even more distant galaxy behind them. The resulting pattern, predicted by Albert Einstein in 1915, shows six points of light — two clustered in the center and four threaded around a ring of distorted light. (continued at https://www.space.com/hubble-capture-einstein-ring-quasar)

Tess: A Behind-The-Scenes Look At Nasa's Latest Planet Hunter

TESS is revolutionizing our understanding of planets in the solar neighborhood. But finding new worlds is only the beginning. In 1995, astronomers discovered the first extrasolar planet orbiting a Sun-like star. Ten years later, exoplanet research remained in its infancy. Researchers still weren't sure whether planets circling other stars were plentiful or rare. So, members of my small satellite research group at MIT's Kavli Institute for Astrophysics and Space Research opened discussions with our neighbors at the Harvard-Smithsonian Center for Astrophysics (CfA). .. . (continued at https://astronomy.com/magazine/news/2021/08/tess-a-behind-the-scenes-look-at-nasas-latest-planet-hunter)

Dark Sky Observing Sites

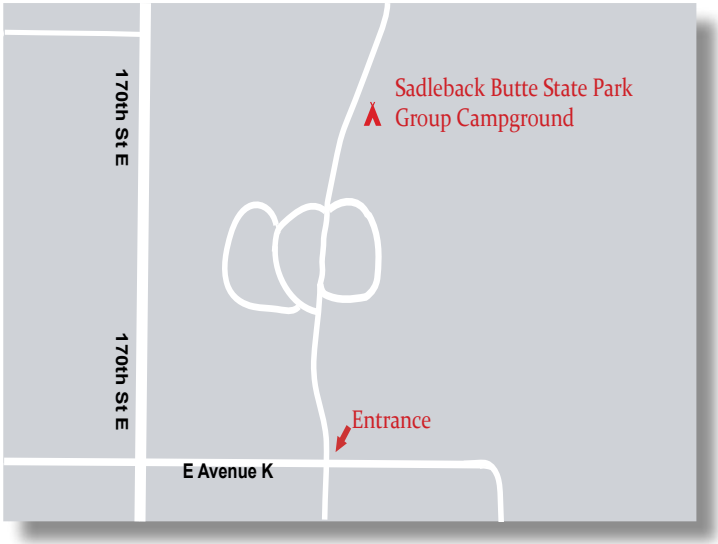
The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta., the parking lot is also called Frazier Mountain trailhead).

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.

Saddleback Butte State Park is east of 170th Street East between Avenue I and Avenue K. Elevation 3651 feet. Temperatures in summer average 95° with a high of 115,° winter average lows are 33° with occasional snow. There are 37 individual campsites and one group campsite. When the club has a star party there the group campsite is used. Individual campsites cost $20 per night. Enter off Avenue K.



Planet Summary

The **Sun** starts September in Leo and crosses into Virgo by the middle of the month.

-

Mercury continues its evening journey away from the Sun achieving aphelion on the 6th and greatest elongation on the 14th at a mag of 0.1. A thin crescent Moon passes almost 6° north on the 8th.

Venus's elongation from the Sun increases from 40° to almost 45° during September. Passes about 1.5° north of Spica in the early evening of the 5th. On the 8th the 12% waxing Moon passes by 3° to the north.

Mars is too close to the Sun to be seen. Mars reaches conjunction on the 5th of October.

Jupiter continues its retrograde motion chasing Saturn, among the stars of eastern Capricorn.

Saturn spends the month moving retrograde among the stars of Capricorn having moved past opposition. On the 16th the 84% waxing Moon passes 4° to the south.

Uranus continues moving west in central Aries for the next several months at mag 5.7. The waning Moon zips by less than 2° to the south on the morning of the 24th.

Neptune will spend the month almost stationary in northeast Aquarius at mag 7.8 . Opposition is obtained on the 14th at 4.0 light-hours(28.9 au) from Earth with a 2.3" disk

Pluto spends the month slowing moving west in Sagittarius at mag 14.3.

*All time mentioned are local

Moon Phases

First Qtr Sept 29 | Full Sept 20 | Third Qtr Sept 13 | New Sept 6

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
9/1/2021	00:58	16:04	06:26	19:18
9/5/2021	04:52	18:56	06:28	19:13
9/10/2021	10:26	21:36	06:32	19:06
9/15/2021	16:01	00:47	06:36	18:58
9/20/2021	19:10	06:12	06:39	18:51
9/25/2021	21:32	11:06	06:43	18:44
9/30/2021	00:32	15:33	06:46	18:37

Planet Data*

September 1

	Rise	Transit	Set	Mag	Phase%
Mercury	08:23	14:20	20:16	-0.01	72.6
Venus	09:39	15:20	21:00	-4.04	72.5
Mars	07:24	13:38	19:52	1.78	99.6
Jupiter	18:37	23:59	05:25	-2.86	99.9
Saturn	17:42	22:49	04:00	0.31	99.9

September 15

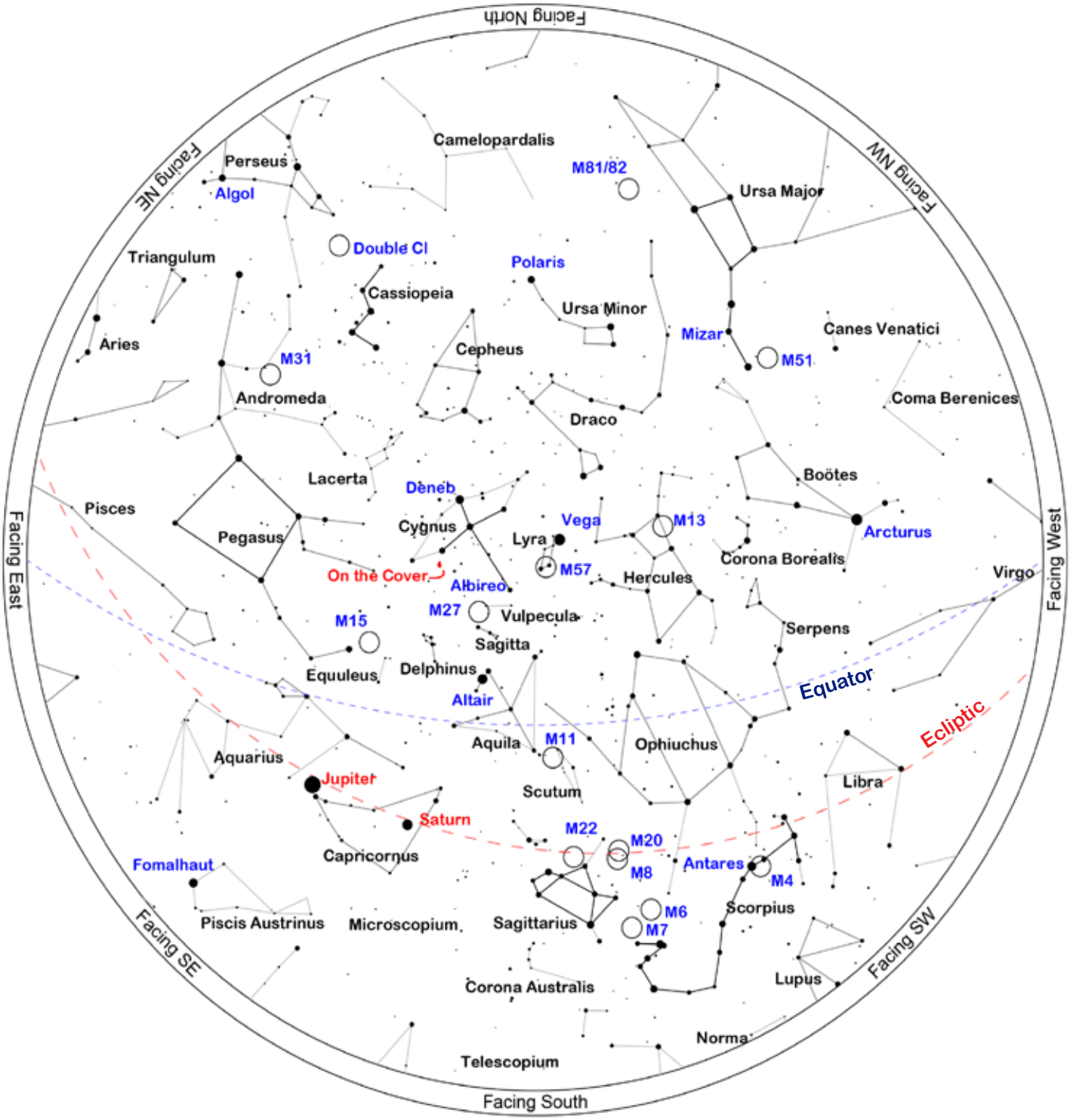
	Rise	Transit	Set	Mag	Phase%
Mercury	08:47	14:21	19:22	0.22	53.5
Venus	10:03	15:25	20:46	-4.10	67.7
Mars	07:12	13:16	19:20	1.74	99.8
Jupiter	17:37	22:58	04:22	-2.82	99.8
Saturn	16:45	21:51	03:02	0.39	99.9

September 30

	Rise	Transit	Set	Mag	Phase%
Mercury	08:15	13:39	19:05	1.60	16.5
Venus	10:29	15:32	20:35	-4.19	62.1
Mars	06:59	12:53	18:45	1.67	99.9
Jupiter	16:35	21:54	03:18	-2.75	99.5
Saturn	15:45	20:51	02:01	0.47	99.8.

*Sun, Moon and Planetary date based on Quartz Hill, CA

Sky Chart



Location: Palmdale, CA 93551
Latitude: 34° 36' N, longitude: 118° 11' W
Time: 2021 September 4, 21:00 (UTC -07:00)

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 September 4, 2021. The list is sorted by the transit time of the object.

ID	Type		RA	Dec	Mag	Rise	Transit	Set
M98	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	07:31	14:16	21:02
M99	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	07:37	14:22	21:06
M106	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	05:00	14:22	23:43
M61	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	08:09	14:25	20:40
M40	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circum	14:25	Circum
M100	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	07:37	14:26	21:14
M84	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	07:48	14:28	21:07
M85	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	07:32	14:28	21:24
M86	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	07:49	14:29	21:09
M49	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	08:07	14:32	20:58
M87	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	07:56	14:34	21:12
M88	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	07:51	14:35	21:19
M91	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	07:54	14:38	21:22
M89	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	08:00	14:38	21:17
M90	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	07:59	14:40	21:20
M58	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	08:04	14:40	21:17
M68	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	10:01	14:42	19:23
M104	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	09:13	14:43	20:13
M59	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	08:09	14:45	21:21
M60	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	08:11	14:46	21:22
M94	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	06:19	14:54	23:28
M64	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	07:52	14:59	22:07
M53	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	08:20	15:16	22:11
M63	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	06:39	15:19	23:58
Baily955	Globular	Cen	13h 26m 47s	-47° 28.8'	3.7	12:40	15:29	18:18
NGC5139	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	12:41	15:29	18:18
NGC5169	Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	06:15	15:31	00:47
NGC5204	Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circum	15:32	Circum
M51	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	06:12	15:33	00:53
Arp85	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	06:11	15:33	00:54
NGC5182	Galaxy	Hya	13h 30m 41s	-28° 09.0'	13.0	10:57	15:33	20:09
NGC5214	Galaxy	CVn	13h 32m 49s	+41° 52.3'	14.0	06:57	15:35	00:14
M83	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	11:10	15:40	20:09
HR5144	Triple	Boo	13h 40m 40s	+19° 57.3'	5.8	08:42	15:43	22:45
NGC5283	Galaxy	Dra	13h 41m 06s	+67° 40.3'	14.0	Circum	15:44	Circum
M3	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	08:13	15:45	23:16

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5286	Globular	Cen	13h 46m 24s	-51° 22.0'	7.6	13:42	15:49	17:56
NGC5292	Galaxy	Cen	13h 47m 40s	-30° 56.4'	14.0	11:25	15:50	20:15
NGC5356	Galaxy	Vir	13h 54m 59s	+05° 20.0'	14.0	09:40	15:58	22:15
NGC5363	Galaxy	Vir	13h 56m 07s	+05° 15.2'	10.2	09:41	15:59	22:16
NGC5447	Neb	UMa	14h 02m 29s	+54° 16.3'		04:42	16:05	03:28
M101	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	04:39	16:06	03:33
NGC5461	Neb	UMa	14h 03m 42s	+54° 19.0'		04:41	16:06	03:32
NGC5485	Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circum	16:10	Circum
NGC5460	Open	Cen	14h 07m 27s	-48° 20.6'	5.6	13:29	16:10	18:51
NGC5500	Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	06:38	16:13	01:47
IC991	Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	10:57	16:20	21:44
HR5362	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	13:00	16:23	19:46
IC4406	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	13:10	16:25	19:41
HR5409	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	10:34	16:31	22:27
NGC5669	Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	10:05	16:35	23:06
NGC5689	Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	07:02	16:38	02:15
M102	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circum	17:09	Circum
NGC5875	Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	06:40	17:12	03:44
NGC5907	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circum	17:19	Circum
NGC5882	P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	14:15	17:20	20:24
NGC5897	Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	12:19	17:20	22:21
M5	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	11:13	17:21	23:30
Barnard228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		13:37	17:47	21:56
IC4593	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	11:37	18:14	00:51
IC4592	Neb	Sco	16h 11m 59s	-19° 27.4'		13:09	18:15	23:21
M80	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	13:25	18:20	23:14
IC4601	Neb	Sco	16h 20m 18s	-20° 04.9'		13:19	18:23	23:27
Abell38	P Neb	Sco	16h 23m 17s	-31° 44.9'	11.7	14:04	18:26	22:48
M4	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	13:44	18:26	23:08
M4	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	13:44	18:26	23:08
IC4603	Neb	Oph	16h 25m 24s	-24° 28.0'		13:39	18:28	23:18
IC4604	Neb	Oph	16h 25m 33s	-23° 26.5'		13:35	18:28	23:21
NGC6124	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	14:50	18:28	22:06
Abell39	P Neb	Her	16h 27m 33s	+27° 54.5'	12.9	11:00	18:30	02:00
IC4605	Neb	Sco	16h 30m 12s	-25° 06.8'		13:46	18:33	23:20
NGC6153	P Neb	Sco	16h 31m 31s	-40° 15.2'	12.0	14:54	18:34	22:14
NGC6181	Galaxy	Her	16h 32m 21s	+19° 49.5'	11.9	11:34	18:35	01:36
NGC6171	Globular	Oph	16h 32m 32s	-13° 03.1'	8.1	13:09	18:35	00:01
NGC6178	Open	Sco	16h 35m 47s	-45° 38.6'	7.2	15:34	18:38	21:43
NGC6193	Open	Ara	16h 41m 18s	-48° 46.0'	5.2	16:07	18:44	21:21

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6205	Globular	Her	16h 41m 41s	+36° 27.5'	5.9	10:37	18:44	02:52
M13	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	10:37	18:44	02:52
NGC6210	P Neb	Her	16h 44m 30s	+23° 48.0'	9.0	11:33	18:47	02:02
Barnard44a	DkNeb	Sco	16h 44m 45s	-40° 20.0'		15:08	18:47	22:27
NGC6204	Open	Ara	16h 46m 09s	-47° 01.0'	8.2	15:56	18:49	21:42
M12	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	12:53	18:50	00:47
NGC6231	Open	Sco	16h 54m 00s	-41° 48.0'	2.6	15:26	18:57	22:28
IC4628	Neb	Sco	16h 56m 58s	-40° 27.3'		15:21	19:00	22:39
NGC6254	Globular	Oph	16h 57m 09s	-04° 05.9'	6.6	13:08	19:00	00:51
Barnard47	DkNeb	Oph	16h 59m 42s	-22° 38.0'		14:07	19:02	23:58
M62	Globular	Oph	17h 01m 13s	-30° 06.7'	8.0	14:36	19:04	23:32
NGC6273	Globular	Oph	17h 02m 38s	-26° 16.0'	7.2	14:22	19:05	23:48
M19	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	14:22	19:05	23:48
Barnard51	DkNeb	Oph	17h 04m 44s	-22° 15.0'		14:10	19:07	00:04
IC4637	P Neb	Sco	17h 05m 10s	-40° 53.1'	14.0	15:31	19:08	22:44
Barnard56	DkNeb	Sco	17h 08m 48s	-32° 05.0'		14:51	19:11	23:32
Barnard59	DkNeb	Oph	17h 11m 23s	-27° 29.0'		14:36	19:14	23:53
NGC6302	P Neb	Sco	17h 13m 42s	-37° 06.0'	9.6	15:19	19:16	23:14
Barnard251	DkNeb	Oph	17h 13m 48s	-20° 09.0'		14:13	19:16	00:20
Barnard63	DkNeb	Oph	17h 16m 00s	-21° 28.0'		14:19	19:19	00:18
M92	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	10:32	19:20	04:07
M9	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	14:13	19:22	00:31
NGC6326	P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	17:22	19:23	21:25
Barnard256	DkNeb	Oph	17h 22m 12s	-28° 49.0'		14:51	19:25	23:58
Barnard67a	DkNeb	Oph	17h 22m 30s	-21° 53.0'		14:27	19:25	00:23
Barnard71	DkNeb	Oph	17h 23m 02s	-24° 00.0'		14:35	19:26	00:17
NGC6357	Neb	Sco	17h 24m 43s	-34° 12.1'		15:16	19:27	23:38
IC4651	Open	Ara	17h 24m 52s	-49° 56.5'	6.9	17:03	19:28	21:52
Abell41	P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	14:12	19:32	00:51
Abell42	P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	13:55	19:34	01:14
Barnard78	DkNeb	Oph	17h 32m 00s	-25° 35.0'		14:49	19:35	00:20
NGC6388	Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	16:28	19:39	22:50
M14	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	13:47	19:40	01:34
M14	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	13:47	19:40	01:34
Barnard276	DkNeb	Oph	17h 39m 39s	-19° 49.0'		14:37	19:42	00:47
NGC6405	Open	Sco	17h 40m 20s	-32° 15.2'	4.2	15:23	19:43	00:03
M6	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	15:23	19:43	00:03
NGC6426	Globular	Oph	17h 44m 55s	+03° 10.1'	11.2	13:36	19:48	01:59
Barnard83a	DkNeb	Sgr	17h 45m 18s	-20° 00.0'		14:44	19:48	00:52

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
IC4665	Open	Oph	17h 46m 30s	+05° 39.0'	4.2	13:31	19:49	02:08
NGC6445	P Neb	Sgr	17h 49m 15s	-20° 00.6'	13.0	14:48	19:52	00:56
NGC6503	Galaxy	Dra	17h 49m 27s	+70° 08.6'	10.2	Circum	19:52	Circum
NGC6441	Globular	Sco	17h 50m 13s	-37° 03.0'	7.4	15:55	19:53	23:50
Barnard283	DkNeb	Sco	17h 51m 00s	-33° 52.0'		15:41	19:54	00:06
Barnard285	DkNeb	Ser	17h 51m 32s	-12° 52.0'		14:28	19:54	01:21
M7	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	15:48	19:57	00:05
IC4670	Neb	Sgr	17h 55m 07s	-21° 44.6'		14:59	19:58	00:57
NGC6501	Galaxy	Her	17h 56m 04s	+18° 22.3'	12.3	13:02	19:59	02:55
M23	Open	Sgr	17h 57m 04s	-18° 59.1'	6.0	14:52	20:00	01:07
NGC6543	P Neb	Dra	17h 58m 36s	+66° 38.0'	8.1	Circum	20:01	Circum
NGC6496	Globular	Sco	17h 59m 04s	-44° 16.0'	9.2	16:47	20:02	23:16
M20	Open+D Neb	Sgr	18h 02m 42s	-22° 58.2'	5.0	15:11	20:05	01:00
M8	Open+D Neb	Sgr	18h 03m 41s	-24° 22.7'	5.0	15:17	20:06	00:56
Barnard295	DkNeb	Sgr	18h 04m 05s	-31° 09.0'		15:43	20:07	00:31
M21	Open	Sgr	18h 04m 13s	-22° 29.3'	7.0	15:11	20:07	01:03
NGC6530	Open	Sgr	18h 04m 31s	-24° 21.5'	4.6	15:17	20:07	00:57
NGC6528	Globular	Sgr	18h 04m 50s	-30° 03.3'	9.5	15:39	20:08	00:36
IC4684	Neb	Sgr	18h 09m 08s	-23° 26.1'		15:19	20:12	01:05
IC4685	Neb	Sgr	18h 09m 18s	-23° 59.2'		15:21	20:12	01:03
IC1274	Neb	Sgr	18h 09m 51s	-23° 38.8'		15:20	20:13	01:05
IC1275	Neb	Sgr	18h 10m 07s	-23° 45.7'		15:21	20:13	01:05
NGC6572	P Neb	Oph	18h 12m 06s	+06° 51.2'	9.0	13:53	20:15	02:37
NGC6567	P Neb	Sgr	18h 13m 45s	-19° 04.5'	12.0	15:09	20:16	01:24
IC4701	Neb	Sgr	18h 16m 36s	-16° 38.0'		15:04	20:19	01:34
Barnard93	DkNeb	Sgr	18h 16m 53s	-18° 03.0'		15:09	20:20	01:30
IC1284	Neb	Sgr	18h 17m 39s	-19° 40.3'		15:15	20:20	01:26
M24	Open	Sgr	18h 18m 26s	-18° 24.3'	4.5	15:12	20:21	01:31
M16	Open+D Neb	Ser	18h 18m 48s	-13° 48.3'	6.5	14:58	20:21	01:45

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
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Col - Columba
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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
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UMi - Ursa Minor
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