



# Desert Sky Observer

Volume 37

Antelope Valley Astronomy Club Newsletter

October 2017

## Up-Coming Events

- October 13: [Annual Club Business Meeting](#)
- October 19-22: [Nightfall](#)
- October 21: Dark Sky Star Party @ TBA
- October 28: [Prime Desert Moon Walk](#)

\* Monthly meetings are held at the S.A.G.E. Planetarium in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20<sup>th</sup> 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*



## President

### Frank Moore

Hello AVAC members. Are you ready? It's October and you know what that means? No, not Halloween, it means that it's time for our Annual Business Meeting and Board Election. I'm sure you're all anxiously waiting for your chance to volunteer to lead the Antelope Valley Astronomy Club in the New Year and to serve the organization as an officer on the board? Right?

So...let's all show up for the Annual Business Meeting at the SAGE Planetarium, at 7:00pm on Friday October 13, and throw your hat into the ring as a candidate for the Board of Directors. No experience is necessary and we, the current board, will give you free lessons in how to plan events and conduct the business of the club. How much better can it get than that and I hope to see all of you there.

On Saturday, September 9, we had a real wild night at Prime Desert Woodland. When I arrived, Darrell Bennett and Kevin Reilly were already set up for a night of public outreach. Rod Girard and Ellen Mahler showed up a short time later. There were scattered clouds in the sky and it was a little dark in the Southeast but we'd seen these conditions before and expected it to clear off shortly after sunset. That's not what happened though.

About the time I finished setting my gear up we began to hear some thunder and see a few flashes of light from the darkening clouds to the east. Since we had a substantial crowd beginning to arrive for the Moonwalk I tried to be optimistic but when I started to feel an occasional raindrop on my face I decided it was time to take the telescope and accessories down and get them under cover. A few of the others held on a little bit longer than me but finally, with increasing lightning activity, they too decided to put their gear away.

The lightning got more and more intense and just as put my last case into the back of our car the skies opened up with a torrential thunderstorm. Within five minutes, the water flowing across the parking lot was an inch deep. I had wild drive back home to Tehachapi with rain so heavy I could barely see, water standing on Highway 14, and lightning making it appear that "The War of the Worlds" was going on around me.

Darrell Bennet captured a video of the storm, from the parking lot at Prime Desert Woodland, and a frame from it can be to the right.

Our October Dark Sky Star Party is scheduled for Saturday, October, 21 which is the same weekend as the Nightfall Star Party in Borrego Springs which runs from October 19-22. Rose and I, and maybe a few other members, will be attending Nightfall. Before we apply for a Special Event Permit to use the Red Cliffs Natural Area at Red Rock Canyon State Park, we need to know if enough people will attend to make it worth the expense and effort. We've sent out an email to see how many might attend. If the numbers aren't there, we'll look into other options and will let you all know what we decide.

On October 27 the annual "Fall Star Party" will be held at the College of the Canyons, Canyon Country Campus. The event starts at 7:00 pm and runs till approximately 9:30 or as long as the public wants to view. This year's theme will be "Pathways to Space" with guest presenter Jessica Ta, a College of the Canyons alumni, currently working as a Test Operations Engineer with SpaceX.

The October Moonwalk at Prime Desert Woodland will be held on Saturday October 28. Why so late in the month? So it can be held in conjunction with Jeremy Amarant's annual "Scary Science" event which begins at 4:00 pm at PDW. If you've never seen Jeremy make "comets" out of dry ice you owe it to yourself to attend.





## Secretary Rose Moore

I was on the Riverside Club's home page yesterday, and noticed that there was a picture of Robert Hanel, and it said he passed away on July 10th. For those who didn't know him, Bob was a member of our club even though he lived in the Torrance area. He would meet us at RTMC every year, and park his RV in our campsite area. He joined us in the activities there, and the stargazing at night. Bob was a physician and he and I would often talk about medical stuff. Frank and I did not go to RTMC this year, so we don't know if Bob attended. We were so sorry to hear he passed away. I'll be sending out a card to his family and work from the club.

Our Business Meeting is on Friday, Oct. 13th! This meeting is usually poorly attended as members seem to not want to get themselves nominated or feel they have nothing to say. Please make an effort to attend, and get a little involved. This meeting is not only to nominate Board officers, it's also your chance to voice what changes you would like to see with the club. We would appreciate other qualified members to step up and take a Board position. I have been on the Board 11 of the past 12 years. It's time for someone else to do a little of the work to keep this club running.

Coming up October 19-22nd, we have 'Nightfall' in Borrego Springs for those who are interested in attending. I believe the RV spaces are filled and there is a waiting list. The Palm Canyon Resort still has some hotel rooms available. Check on the link if interested. Link: <http://nightfallstarparty.com/>

The weekend of the Borrego Springs Nightfall is the weekend of our usual DSSP. See Frank's note above regarding that weekend.

On Saturday Oct. 28th at 6:30pm is a PDW Moon Walk with Jeremy. We will need members with telescopes to come out and support this event. It will be a waxing gibbous Moon. Set up time approx. 1 hr before the walk. Weather pending. One week later we have another PDW Moon Walk also at 6:30pm, and will also need members to help with this event. It will be one day past the Full Moon.

Don't forget our Christmas Party coming up on Saturday December 2nd, at 6pm at Gino's Restaurant in the Lancaster Marketplace at 44960 Valley Central Way. I'll be starting a sign up sheet at the October meeting as we will need to give them a head count 2 weeks before. There will be a buffet dinner and silent auction and raffle. More info to come!!

Clear skies!

## Astro-Tips: Packing Up

### By Astro-Tom

When it's late, you're tired after a fun night of observing at your favorite dark sky site and it's time to pack up the telescope and drive back home, that's when you're most likely to drop an eyepiece, lose a cap, your car keys, or do something else that you really wouldn't like to do normally. Fatigue can make all of us do stupid things that are expensive to fix or replace later. It's a good idea to pack up before you get to your tolerance points for fatigue or cold. Experience will tell you where these points are for you. If you're driving home late, remember that you'll need to be sharp behind the wheel.

The first thing you should do when packing up the telescope is put the cap or cover over the end of the telescope to protect the mirror or lens and keep anything from dropping down the tube and onto your mirror. Next, put the cap on the exposed eyepiece you were using, then carefully remove the eyepiece, replacing the caps over the focuser and on the other end of the eyepiece. Remember to unscrew any filters that you might have been using on the eyepiece before putting it back in its case.

- For an equatorially mounted telescope, next ensure that the counterweights are at their lowest possible point of travel to avoid injury or irreparable damage in the following steps. Once the counterweights are in the 'safe' position, loosen the clamps holding the telescope to the equatorial mount, then carefully remove the telescope and place it in its case. Important - do NOT remove the counterweights before removing the telescope because your telescope could slam down hard causing damage to both your telescope and your mount and perhaps injury to you also. Finally, remove the counterweights one at a time, remove the equatorial mount head from the tripod and place it in its case, then finally, fold up the tripod.
- For a wedge mounted Schmidt-Cassegrain telescope, double check that the cap is securely on the front of the scope and that visual back is also capped tightly. Using the declination axis, lock the Schmidt-Cassegrain so that the optical tube is aligned with the forks and that the front of the tube is faced downward towards the clock drive. Lock the declination axis in this position, and lock your right ascension axis unlocked. Partially loosen the wedge bolts that hold the telescope, then with two hands, carefully lift the telescope off the wedge by grabbing only onto the forks. Place the telescope into its case. For anything larger than an 8" SCT, you should have another person help you with lifting the scope off its wedge or base and placing it into the case to be safe. Finally, fold up the tripod.
- In the case of a Dobsonian telescope, lift the tube assembly off of the rocker base and place the cover over the telescope. Carefully load the telescope and base into your vehicle if transporting the telescope.

You'll be tired at this point. After a great evening of viewing, you'll be thinking about other things, but remember to check around your telescope carefully with your red flashlight. Make sure you haven't dropped any eyepiece caps or anything else.

Put your mind back in Safe Driving Mode if you have to drive back home. Remember, probably the only people out driving this time of night are **drunks and astronomers** ..... and there are **very, very few astronomers**. Drive alert and drive home safely!

## Space Place

### Cassini Says Goodbye

By Teagan Wall

On September 15th, the Cassini spacecraft will have its final mission. It will dive into the planet Saturn, gathering information and sending it back to Earth for as long as possible. As it dives, it will burn up in the atmosphere, much like a meteor. Cassini's original mission was supposed to last four years, but it has now been orbiting Saturn for more than 13 years!

The spacecraft has seen and discovered so many things in that time. In 2010, Cassini saw a massive storm in Saturn's northern hemisphere. During this storm, scientists learned that Saturn's atmosphere has water vapor, which rose to the surface. Cassini also looked at the giant storm at Saturn's north pole. This storm is shaped like a hexagon. NASA used pictures and other data from Cassini to learn how the storm got its six-sided shape.

Cassini also looked at some of Saturn's moons, such as Titan and Enceladus. Titan is Saturn's largest moon. Cassini carried a lander to Titan. The lander, called Huygens, parachuted from Cassini down to the surface of the moon. It turns out, Titan is quite an exciting place! It has seas, rivers, lakes and rain. This means that in some ways, Titan's landscape looks a bit like Earth. However, its seas and rivers aren't made of water—they're made of a chemical called methane.

Cassini also helped us learn that Saturn's moon Enceladus is covered in ice. Underneath the ice is a giant liquid ocean that covers the whole moon. Tall geysers from this ocean spray out of cracks in the ice and into space, like a giant sneeze. Cassini flew through one of these geysers. We learned that the ocean is made of very salty water, along with some of the chemicals that living things need.

If there is life on Enceladus, NASA scientists don't want life from Earth getting mixed in. Tiny living things may have hitched a ride on Cassini when it left Earth. If these germs are still alive, and they land on Enceladus, they could grow and spread. We want to protect Enceladus, so that if we find life, we can be sure it didn't come from Earth. This idea is called planetary protection.

Scientists worry that when Cassini runs out of fuel, it could crash into Titan or Enceladus. So years ago, they came up with a plan to prevent that from happening. Cassini will complete its exploration by diving into Saturn—on purpose. The spacecraft will burn up and become part of the planet it explored. During its final plunge, Cassini will tell us more about Saturn's atmosphere, and protect the moons at the same time. What an exciting way to say goodbye!

To learn more about Saturn, check out NASA Space Place: <https://spaceplace.nasa.gov/all-about-saturn>

*This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit <https://spaceplace.nasa.gov/> to explore space and Earth science!*

## News Headlines

### **First Version of the Eclipse Megamovie Released**

This first-of-its-kind citizen science project is a collection of photos submitted by a group of dedicated volunteers from locations across the United States during the August 21, 2017 total solar eclipse. These individual photos have been stitched together to give us an extended look at the sun's atmosphere as the eclipse traversed the US.

<https://eclipsemega.movie/>

### **Fourth Gravitational Wave Event Detected**

For the first time ever, gravitational waves have been observed simultaneously by three detectors, enabling a relatively accurate localization on the sky. GW170814, as the signal is officially known, was also the very first gravitational wave "felt" by the Advanced Virgo detector of the European Gravitational Observatory near Pisa, Italy.

<http://www.skyandtelescope.com/astronomy-news/fourth-gravitational-wave-event-detected/>

### **NASA-Sciencecast: New Horizons Discoveries Keep Coming**

New Horizons is on its way to new discoveries deep in the Kuiper Belt – a region inhabited by ancient remnants from the dawn of the solar system. NASA's New Horizons – the fastest-ever spacecraft at launch – left Earth in 2006 and hurtled through the void at nearly one million miles per day toward a mysterious world on the solar system's outer edge. Three billion miles (4.8 billion km) and 9 1/2 years later, the spacecraft flew-by its target: Pluto.

<https://science.nasa.gov/science-news/news-articles/new-horizons-discoveries-keep-coming-news>

### **Cassini Grand Finale**

End of Mission, September 15, 2017

After two decades in space, NASA's Cassini spacecraft reached the end of its remarkable journey of exploration. Having expended almost every bit of the rocket propellant Cassini carried to Saturn, operators deliberately plunged the spacecraft into the planet to ensure Saturn's moons will remain pristine for future exploration — in particular, the ice-covered, ocean-bearing moon Enceladus, but also Titan, with its intriguing pre-biotic chemistry.

<https://saturn.jpl.nasa.gov/mission/about-the-mission/summary/>

### **Arecibo, Hurricane Maria Hit Puerto Rico's Giant Telescope**

The storm damage threatens the telescope's future in several ways. It is supported by the National Science Foundation, or NSF, in Alexandria, Virginia, as well as the U.S. space agency, NASA. Funding limitations and the desire to build and operate newer telescopes has made the NSF think about cutting its support for older telescopes. Arecibo could face closure if money cannot be found to repair it and to continue operations.

<https://learningenglish.voanews.com/a/science-in-the-news-puerto-rico-giant-telescope/4047074.html>

### **Hawai'i Gives Go-Ahead to Thirty Meter Telescope**

On September 29th, after five months of public hearings that involved 71 witness testimonies and a review of more than 800 submitted documents, the Board of Land and Natural Resources for the state of Hawai'i announced its decision to allow the construction of the Thirty Meter Telescope atop Mauna Kea to resume.

<http://www.skyandtelescope.com/astronomy-news/hawaii-gives-go-ahead-to-thirty-meter-telescope/>



## October Sky Data

Full Oct 5      Last Qtr Oct 12      New Oct 19      First Qtr Oct 27



**Best time for deep sky observing this month:  
October 15 through October 25**

**Mercury** passes between us and the Sun (Superior conjunction) on October 8th so will not be visible this month. It will become visible after sunset during the latter part of November.

**Venus** is visible in the east before dawn this month, rising around 2 hours before sunrise at the start of the month and close to Mars. Its magnitude remains at -3.4 during the month as its angular diameter shrinks from 11.2 to 10.6 arc seconds. However, at the same time, its illuminated phase increases from 91% to 96%

**Mars** has now become a morning object at the start of its new apparition. Initially lying in Leo, it moves into Virgo on the 12th of the month and is still not easily seen in the pre-dawn sky. During the month, Mars has a magnitude of 2.0 and an angular size of just 3.7 (increasing to 3.9) arc seconds so no details will be seen on its salmon-pink surface.

**Jupiter** might just be visible for the first few days of October very low above the west-southwestern horizon after sunset. It passes behind the Sun on October 26th to become visible again in the pre-dawn sky in mid November.

**Saturn** can be seen low in the southwest during twilight this month dropping down towards the horizon a little more each week. Shining at magnitude +1.7, it sets around 3 hours after the Sun on the 1st but nearer 2 hours by month end. It is moving slowly eastwards in Ophiuchus moving closer to the boundary of Sagittarius which it will reach on the 18th of November.

You have a chance to glimpse Orionid **meteors** between about October 2 to November 7. That's when Earth is passing through the stream of debris left behind by Comet Halley, the parent comet of the Orionid shower. The Orionids are expected to rain down the greatest number of meteors before dawn on October 21, with no moonlight to ruin the show.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
10/1/2017	4:26pm	2:34am	6:47am	6:36pm
10/5/2017	6:54pm	6:37am	6:50am	6:30pm
10/10/2017	10:42pm	12:06pm	6:54am	6:23pm
10/15/2017	2:47am	4:17pm	6:58am	6:17pm
10/20/2017	7:46am	7:09pm	7:02am	6:11pm
10/25/2017	12:12pm	10:37pm	7:06am	6:05pm
10/31/2017	4:12pm	3:15am	7:12am	5:59pm

## Planet Data

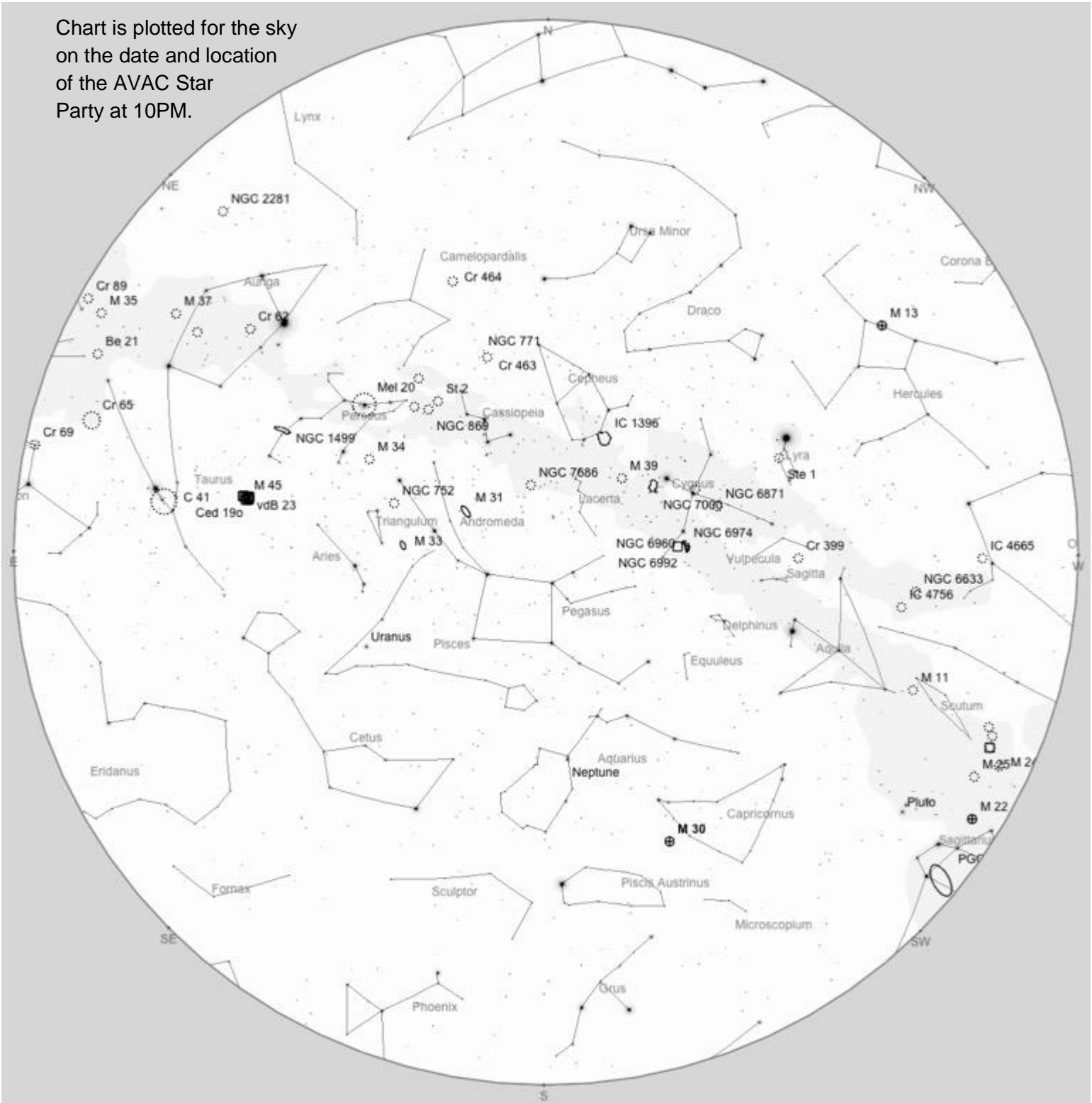
	Oct 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	6:22am	12:26pm	6:29pm	-1.2
<b>Venus</b>	4:52am	11:16am	5:39pm	-3.4
<b>Mars</b>	5:04am	11:24am	5:45pm	2.0
<b>Jupiter</b>	8:22am	1:57pm	7:33pm	-1.2
<b>Saturn</b>	12:40pm	5:38pm	10:36pm	1.6

	Oct 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	7:24am	12:58pm	6:33pm	-0.8
<b>Venus</b>	5:20am	11:25am	5:30pm	-3.4
<b>Mars</b>	4:51am	11:02am	5:13pm	2.0
<b>Jupiter</b>	7:41am	1:14pm	6:46pm	-1.2
<b>Saturn</b>	11:49am	4:47pm	9:44pm	1.7

	Oct 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	8:26am	1:32pm	6:38pm	-0.3
<b>Venus</b>	5:52am	11:35am	5:19pm	-3.4
<b>Mars</b>	4:36am	10:36am	4:35pm	2.0
<b>Jupiter</b>	6:55am	12:24pm	5:53pm	-1.2
<b>Saturn</b>	10:53am	3:50pm	8:4pm	1.7

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.



## Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6833	P Neb	Cyg	19h 49m 47s	+48° 57.6'	14	10:05 AM	7:42 PM	5:20 AM
M71	Glob	Sge	19h 53m 46s	+18° 46.6'	8.5	12:49 PM	7:46 PM	2:44 AM
NGC6842	P Neb	Vul	19h 55m 02s	+29° 17.3'	14	12:13 PM	7:48 PM	3:23 AM
NGC6846	Open	Cyg	19h 56m 28s	+32° 21.0'	14	12:01 PM	7:49 PM	3:37 AM
M27	P Neb	Vul	19h 59m 36s	+22° 43.2'	7.5	12:42 PM	7:52 PM	3:03 AM
NGC6871	Open	Cyg	20h 05m 59s	+35° 46.6'	5.2	11:55 AM	7:59 PM	4:02 AM
M75	Glob	Sgr	20h 06m 05s	-21° 55.3'	9.5	3:00 PM	7:59 PM	12:57 AM
NGC6884	P Neb	Cyg	20h 10m 24s	+46° 27.6'	13	10:50 AM	8:03 PM	5:16 AM
NGC6879	P Neb	Sge	20h 10m 27s	+16° 55.3'	13	1:11 PM	8:03 PM	2:55 AM
NGC6881	P Neb	Cyg	20h 10m 52s	+37° 24.6'	14	11:51 AM	8:04 PM	4:16 AM
NGC6888	Neb	Cyg	20h 12m 06s	+38° 21.2'		11:48 AM	8:05 PM	4:22 AM
NGC6886	P Neb	Sge	20h 12m 43s	+19° 59.3'	12	1:04 PM	8:05 PM	3:07 AM
NGC6891	P Neb	Del	20h 15m 09s	+12° 42.2'	12	1:29 PM	8:08 PM	2:47 AM
NGC6894	P Neb	Cyg	20h 16m 24s	+30° 33.9'	14	12:29 PM	8:09 PM	3:49 AM
NGC6905	P Neb	Del	20h 22m 23s	+20° 06.2'	12	1:13 PM	8:15 PM	3:17 AM
NGC6914	Neb	Cyg	20h 24m 43s	+42° 28.9'		11:35 AM	8:17 PM	5:00 AM
NGC6934	Glob	Del	20h 34m 11s	+07° 24.2'	8.9	2:03 PM	8:27 PM	2:50 AM
NGC6925	Gal	Mic	20h 34m 21s	-31° 58.8'	11.3	4:06 PM	8:27 PM	12:48 AM
NGC6940	Open	Vul	20h 34m 26s	+28° 17.0'	6.3	12:56 PM	8:27 PM	3:58 AM
NGC6941	Glob	Aql	20h 36m 23s	-04° 37.1'	13	2:39 PM	8:29 PM	2:19 AM
NGC6960	Neb	Cyg	20h 45m 58s	+30° 35.6'		12:58 PM	8:39 PM	4:19 AM
M72	Glob	Aqr	20h 53m 28s	-12° 32.2'	10	3:19 PM	8:46 PM	2:14 AM
NGC6992	Neb	Cyg	20h 56m 19s	+31° 44.6'		1:04 PM	8:49 PM	4:34 AM
NGC6997	Open	Cyg	20h 56m 39s	+44° 37.9'	10	11:51 AM	8:49 PM	5:47 AM
NGC6995	Neb	Cyg	20h 57m 10s	+31° 14.1'		1:07 PM	8:50 PM	4:33 AM
NGC7000	Neb	Cyg	20h 59m 18s	+44° 31.0'		11:55 AM	8:52 PM	5:49 AM
NGC7008	P Neb	Cyg	21h 00m 33s	+54° 32.5'	13	9:20 AM	8:53 PM	8:26 AM
NGC7006	Glob	Del	21h 01m 29s	+16° 11.2'	10.6	2:05 PM	8:54 PM	3:43 AM
NGC7009	P Neb	Aqr	21h 04m 11s	-11° 21.8'	8	3:26 PM	8:57 PM	2:28 AM
NGC7026	P Neb	Cyg	21h 06m 19s	+47° 51.1'	13	11:33 AM	8:59 PM	6:25 AM
NGC7027	P Neb	Cyg	21h 07m 02s	+42° 14.1'	10	12:19 PM	9:00 PM	5:40 AM
NGC7044	Open	Cyg	21h 13m 09s	+42° 29.7'	11	12:23 PM	9:06 PM	5:48 AM
NGC7048	P Neb	Cyg	21h 14m 15s	+46° 17.2'	11	11:55 AM	9:07 PM	6:18 AM
NGC7049	Gal	Ind	21h 19m 00s	-48° 33.7'	10.7	6:32 PM	9:12 PM	11:52 PM
NGC7067	Open	Cyg	21h 24m 23s	+48° 00.5'	9.7	11:49 AM	9:17 PM	6:45 AM
NGC7076	Neb	Cep	21h 26m 24s	+62° 53.5'		Circum	9:19 PM	Circum
M15	Glob	Peg	21h 29m 58s	+12° 10.0'	7.5	2:45 PM	9:23 PM	4:00 AM
M39	Open	Cyg	21h 31m 42s	+48° 25.0'	5.5	11:52 AM	9:24 PM	6:56 AM
M2	Glob	Aqr	21h 33m 27s	-00° 49.3'	7.5	3:26 PM	9:26 PM	3:27 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M30	Glob	Cap	21h 40m 22s	-23° 10.7'	8.5	4:39 PM	9:33 PM	2:27 AM
NGC7129	Open	Cep	21h 42m 59s	+66° 06.8'	12	Circum	9:36 PM	Circum
NGC7160	Open	Cep	21h 53m 40s	+62° 36.1'	6.1	Circum	9:46 PM	Circum
NGC7226	Open	Cep	22h 10m 27s	+55° 23.9'	9.6	Circum	10:03 PM	Circum
NGC7220	Gal	Aqr	22h 11m 31s	-22° 57.1'	15	5:09 PM	10:04 PM	2:59 AM
NGC7245	Open	Lac	22h 15m 11s	+54° 20.6'	9.2	10:46 AM	10:08 PM	9:29 AM
NGC7296	Open	Lac	22h 28m 02s	+52° 17.3'	10	11:56 AM	10:21 PM	8:46 AM
NGC7284	Gal	Aqr	22h 28m 36s	-24° 50.6'	13	5:33 PM	10:21 PM	3:10 AM
NGC7354	P Neb	Cep	22h 40m 20s	+61° 17.1'	13	Circum	10:33 PM	Circum
NGC7380	Open	Cep	22h 47m 21s	+58° 07.9'	7.2	Circum	10:40 PM	Circum
NGC7419	Open	Cep	22h 54m 20s	+60° 48.9'	13	Circum	10:47 PM	Circum
NGC7410	Gal	Gru	22h 55m 01s	-39° 39.7'	10.4	7:03 PM	10:48 PM	2:32 AM
NGC7423	Open	Cep	22h 55m 08s	+57° 05.8'	15	Circum	10:48 PM	Circum
NGC7412	Gal	Gru	22h 55m 46s	-42° 38.4'	11.4	7:22 PM	10:48 PM	2:15 AM
NGC7444	Gal	Aqr	23h 00m 09s	-12° 50.0'	14	5:26 PM	10:53 PM	4:19 AM
NGC7467	Gal	Peg	23h 02m 28s	+15° 33.2'	15	4:08 PM	10:55 PM	5:42 AM
NGC7483	Gal	Psc	23h 05m 48s	+03° 32.6'	14	4:46 PM	10:58 PM	5:11 AM
NGC7492	Glob	Aqr	23h 08m 27s	-15° 36.6'	11.5	5:43 PM	11:01 PM	4:19 AM
NGC7515	Gal	Peg	23h 12m 49s	+12° 40.7'	14	4:27 PM	11:05 PM	5:44 AM
NGC7513	Gal	Scl	23h 13m 14s	-28° 21.5'	11.8	6:30 PM	11:06 PM	3:41 AM
NGC7538	Neb	Cep	23h 13m 38s	+61° 30.6'		Circum	11:06 PM	Circum
NGC7541	Gal	Psc	23h 14m 44s	+04° 32.0'	11.7	4:52 PM	11:07 PM	5:23 AM
NGC7546	Gal	Psc	23h 15m 06s	-02° 19.5'	14	5:11 PM	11:08 PM	5:04 AM
NGC7562	Gal	Psc	23h 15m 58s	+06° 41.2'	11.5	4:47 PM	11:09 PM	5:30 AM
NGC7567	Gal	Peg	23h 16m 11s	+15° 51.0'	15	4:21 PM	11:09 PM	5:57 AM
NGC7604	Gal	Psc	23h 17m 52s	+07° 25.7'	15	4:47 PM	11:11 PM	5:34 AM
NGC7584	Gal	Peg	23h 17m 53s	+09° 26.0'	15	4:41 PM	11:11 PM	5:40 AM
NGC7582	Gal	Gru	23h 18m 23s	-42° 22.2'	10.6	7:43 PM	11:11 PM	2:39 AM
NGC7590	Gal	Gru	23h 18m 55s	-42° 14.3'	11.6	7:43 PM	11:12 PM	2:40 AM
NGC7610	Gal	Peg	23h 19m 41s	+10° 11.0'	15	4:41 PM	11:12 PM	5:44 AM
NGC7635	Neb	Cas	23h 20m 45s	+61° 12.6'		Circum	11:13 PM	Circum
M52	Open	Cas	23h 24m 48s	+61° 35.6'	8	Circum	11:17 PM	Circum
NGC7662	P Neb	And	23h 25m 54s	+42° 32.0'	9	2:36 PM	11:19 PM	8:01 AM
NGC7686	Open	And	23h 30m 07s	+49° 08.0'	5.6	1:43 PM	11:23 PM	9:03 AM
NGC7727	Gal	Aqr	23h 39m 54s	-12° 17.5'	10.7	6:04 PM	11:33 PM	5:01 AM
NGC7793	Gal	Scl	23h 57m 50s	-32° 35.4'	9.1	7:32 PM	11:50 PM	4:09 AM
NGC7822	Neb	Cep	00h 03m 36s	+67° 09.0'		Circum	11:56 PM	Circum
NGC40	P Neb	Cep	00h 13m 01s	+72° 31.3'	11	Circum	12:06 AM	Circum
NGC55	Gal	Scl	00h 15m 08s	-39° 13.2'	8	8:21 PM	12:08 AM	3:54 AM
NGC103	Open	Cas	00h 25m 16s	+61° 19.4'	9.8	Circum	12:18 AM	Circum
NGC134	Gal	Scl	00h 30m 22s	-33° 14.7'	10.1	8:07 PM	12:23 AM	4:39 AM
NGC197	Gal	Cet	00h 39m 19s	+00° 53.4'	15	6:27 PM	12:32 AM	6:37 AM
M31	Gal	And	00h 42m 44s	+41° 16.1'	4.3	4:01 PM	12:35 AM	9:10 AM
NGC234	Gal	Psc	00h 43m 32s	+14° 20.5'	13	5:52 PM	12:36 AM	7:20 AM
NGC246	P Neb	Cet	00h 47m 03s	-11° 52.3'	8	7:10 PM	12:40 AM	6:09 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC188	Open	Cep	00h 47m 28s	+85° 15.2'	8.1	Circum	12:40 AM	Circum
NGC253	Gal	Scl	00h 47m 33s	-25° 17.2'	7.1	7:53 PM	12:40 AM	5:27 AM
NGC288	Glob	Scl	00h 52m 45s	-26° 35.0'	8.1	8:03 PM	12:45 AM	5:28 AM
NGC332	Gal	Psc	00h 58m 49s	+07° 06.6'	15	6:29 PM	12:51 AM	7:14 AM
NGC352	Gal	Cet	01h 02m 09s	-04° 14.7'	13	7:04 PM	12:55 AM	6:46 AM
NGC470	Gal	Psc	01h 19m 45s	+03° 24.5'	11.9	7:00 PM	1:12 AM	7:25 AM
NGC583	Gal	Cet	01h 29m 44s	-18° 20.3'	15	8:12 PM	1:22 AM	6:32 AM
M103	Open	Cas	01h 33m 23s	+60° 39.0'	7	Circum	1:26 AM	Circum
NGC591	Gal	And	01h 33m 31s	+35° 40.0'	14	5:23 PM	1:26 AM	9:29 AM
M33	Gal	Tri	01h 33m 51s	+30° 39.6'	6.2	5:46 PM	1:26 AM	9:07 AM
NGC615	Gal	Cet	01h 35m 06s	-07° 20.4'	11.5	7:45 PM	1:28 AM	7:10 AM
NGC609	Open	Cas	01h 36m 23s	+64° 32.2'	11	Circum	1:29 AM	Circum
NGC632	Gal	Psc	01h 37m 18s	+05° 52.6'	13	7:11 PM	1:30 AM	7:49 AM
M76	P Neb	Per	01h 42m 18s	+51° 34.2'	12	3:22 PM	1:35 AM	11:47 AM
NGC660	Gal	Psc	01h 43m 02s	+13° 38.6'	10.8	6:54 PM	1:36 AM	8:17 AM
NGC661	Gal	Tri	01h 44m 15s	+28° 42.3'	13	6:04 PM	1:37 AM	9:09 AM
NGC669	Gal	Tri	01h 47m 16s	+35° 33.7'	13	5:37 PM	1:40 AM	9:43 AM
NGC707	Gal	Cet	01h 51m 27s	-08° 30.3'	14	8:05 PM	1:44 AM	7:23 AM
NGC700	Gal	And	01h 52m 17s	+36° 02.1'	15	5:40 PM	1:45 AM	9:50 AM
NGC756	Gal	Cet	01h 54m 29s	-16° 42.4'	15	8:32 PM	1:47 AM	7:02 AM
NGC752	Open	And	01h 57m 41s	+37° 47.0'	5.7	5:36 PM	1:50 AM	10:04 AM
NGC744	Open	Per	01h 58m 33s	+55° 28.3'	7.9	Circum	1:51 AM	Circum
NGC772	Gal	Ari	01h 59m 20s	+19° 00.4'	10.3	6:54 PM	1:52 AM	8:50 AM
NGC810	Gal	Ari	02h 05m 29s	+13° 15.0'	15	7:18 PM	1:58 AM	8:39 AM
NGC821	Gal	Ari	02h 08m 21s	+10° 59.6'	10.8	7:27 PM	2:01 AM	8:35 AM
NGC827	Gal	Cet	02h 08m 56s	+07° 58.2'	14	7:37 PM	2:02 AM	8:27 AM
NGC869	Open	Per	02h 19m 00s	+57° 07.7'	4	Circum	2:12 AM	Circum
NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4	Circum	2:15 AM	Circum
NGC891	Gal	And	02h 22m 33s	+42° 20.8'	10	5:34 PM	2:15 AM	10:57 AM
NGC904	Gal	Ari	02h 24m 06s	+27° 20.5'	15	6:49 PM	2:17 AM	9:44 AM
NGC896	Neb	Cas	02h 25m 28s	+62° 01.1'		Circum	2:18 AM	Circum
NGC918	Gal	Ari	02h 25m 51s	+18° 29.7'	13	7:22 PM	2:18 AM	9:15 AM
NGC957	Open	Per	02h 33m 21s	+57° 33.6'	7.6	Circum	2:26 AM	Circum
NGC986	Gal	For	02h 33m 34s	-39° 02.7'	11	10:39 PM	2:26 AM	6:14 AM
NGC1034	Gal	Cet	02h 38m 14s	-15° 48.5'	14	9:13 PM	2:31 AM	7:49 AM
NGC1022	Gal	Cet	02h 38m 33s	-06° 40.6'	11.4	8:47 PM	2:31 AM	8:15 AM
NGC1000	Gal	And	02h 38m 50s	+41° 27.5'	15	5:56 PM	2:31 AM	11:07 AM
NGC1042	Gal	Cet	02h 40m 24s	-08° 26.0'	10.9	8:54 PM	2:33 AM	8:12 AM
NGC1027	Open	Cas	02h 42m 40s	+61° 35.7'	6.7	Circum	2:35 AM	Circum
NGC1069	Gal	Cet	02h 43m 00s	-08° 17.3'	14	8:56 PM	2:36 AM	8:15 AM
NGC1058	Gal	Per	02h 43m 30s	+37° 20.4'	11.5	6:24 PM	2:36 AM	10:48 AM
NGC1079	Gal	For	02h 43m 45s	-29° 00.2'	11.4	10:03 PM	2:36 AM	7:09 AM
NGC1084	Gal	Eri	02h 46m 00s	-07° 34.6'	10.6	8:57 PM	2:39 AM	8:20 AM
NGC1077	Gal	Per	02h 46m 01s	+40° 05.3'	16	6:12 PM	2:39 AM	11:06 AM
NGC1156	Gal	Ari	02h 59m 42s	+25° 14.2'	11.7	7:33 PM	2:52 AM	10:12 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1201	Gal	For	03h 04m 08s	-26° 04.1'	10.6	10:13 PM	2:57 AM	7:41 AM
NGC1193	Open	Per	03h 05m 55s	+44° 23.0'	13	6:03 PM	2:59 AM	11:55 AM
NGC1209	Gal	Eri	03h 06m 03s	-15° 36.6'	11.4	9:40 PM	2:59 AM	8:17 AM
NGC1221	Gal	Eri	03h 08m 16s	-04° 15.5'	15	9:10 PM	3:01 AM	8:52 AM
NGC1220	Open	Per	03h 11m 40s	+53° 20.7'	12	4:17 PM	3:04 AM	1:52 PM
NGC1261	Glob	Hor	03h 12m 16s	-55° 13.0'	8.4	2:14 AM	3:05 AM	3:55 AM
NGC1259	Gal	Per	03h 17m 17s	+41° 23.1'	15	6:35 PM	3:10 AM	11:45 AM
NGC1300	Gal	Eri	03h 19m 41s	-19° 24.6'	10.4	10:06 PM	3:12 AM	8:19 AM
NGC1316	Gal	For	03h 22m 42s	-37° 12.4'	8.9	11:18 PM	3:15 AM	7:13 AM
NGC1337	Gal	Eri	03h 28m 06s	-08° 23.3'	11.7	9:41 PM	3:21 AM	9:00 AM
NGC1333	Neb	Per	03h 29m 20s	+31° 24.9'		7:38 PM	3:22 AM	11:06 AM
NGC1357	Gal	Eri	03h 33m 17s	-13° 39.8'	13	10:02 PM	3:26 AM	8:50 AM
NGC1365	Gal	For	03h 33m 36s	-36° 08.4'	9.5	11:24 PM	3:26 AM	7:29 AM
NGC1398	Gal	For	03h 38m 52s	-26° 20.2'	9.7	10:48 PM	3:32 AM	8:15 AM
NGC1426	Gal	Eri	03h 42m 49s	-22° 06.5'	11.4	10:38 PM	3:35 AM	8:33 AM
NGC1448	Gal	Hor	03h 44m 32s	-44° 38.6'	11	12:25 AM	3:37 AM	6:50 AM
NGC1432	Neb	Tau	03h 45m 50s	+24° 22.1'		8:22 PM	3:38 AM	10:55 AM
NGC1435	Neb	Tau	03h 46m 10s	+23° 45.8'		8:25 PM	3:39 AM	10:53 AM
M45	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	8:25 PM	3:40 AM	10:56 AM
NGC1491	Neb	Per	04h 03m 14s	+51° 19.0'		5:47 PM	3:56 AM	2:04 PM
NGC1499	Neb	Per	04h 03m 14s	+36° 22.0'		7:49 PM	3:56 AM	12:03 PM
NGC1496	Open	Per	04h 04m 32s	+52° 39.7'	10	5:25 PM	3:57 AM	2:29 PM
NGC1501	P Neb	Cam	04h 06m 59s	+60° 55.2'	13	Circum	4:00 AM	Circum
NGC1502	Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circum	4:00 AM	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30° 46.5'	10	8:21 PM	4:02 AM	11:43 AM
NGC1513	Open	Per	04h 09m 57s	+49° 30.8'	8.4	6:18 PM	4:03 AM	1:47 PM
NGC1535	P Neb	Eri	04h 14m 16s	-12° 44.3'	10	10:40 PM	4:07 AM	9:34 AM
NGC1528	Open	Per	04h 15m 23s	+51° 12.9'	6.4	6:01 PM	4:08 AM	2:15 PM
NGC1541	Gal	Tau	04h 17m 00s	+00° 50.0'	15	10:05 PM	4:10 AM	10:15 AM
NGC1566	Gal	Dor	04h 20m 01s	-54° 56.2'	9.4	3:12 AM	4:13 AM	5:13 AM
NGC1579	Neb	Per	04h 30m 14s	+35° 16.7'		8:22 PM	4:23 AM	12:24 PM
NGC1617	Gal	Dor	04h 31m 39s	-54° 36.1'	10.4	3:14 AM	4:24 AM	5:34 AM
NGC1605	Open	Per	04h 34m 53s	+45° 16.2'	10.7	7:25 PM	4:28 AM	1:30 PM
NGC1643	Gal	Eri	04h 43m 44s	-05° 19.1'	14	10:48 PM	4:36 AM	10:24 AM
NGC1662	Open	Ori	04h 48m 27s	+10° 56.1'	6.4	10:07 PM	4:41 AM	11:15 AM
NGC1664	Open	Aur	04h 51m 06s	+43° 40.4'	7.6	7:53 PM	4:44 AM	1:34 PM
NGC1700	Gal	Eri	04h 56m 56s	-04° 51.8'	11	11:00 PM	4:50 AM	10:39 AM
NGC1710	Gal	Lep	04h 57m 17s	-15° 17.3'	14	11:31 PM	4:50 AM	10:09 AM
NGC1746	Open	Tau	05h 03m 50s	+23° 46.2'	6	9:42 PM	4:56 AM	12:11 PM
NGC1811	Gal	Col	05h 08m 43s	-29° 16.5'	15	12:29 AM	5:01 AM	9:33 AM
NGC1851	Glob	Col	05h 14m 07s	-40° 02.7'	7.3	1:25 AM	5:07 AM	8:49 AM
NGC1857	Open	Aur	05h 20m 05s	+39° 19.5'	7	8:50 PM	5:13 AM	1:35 PM
NGC1893	Open	Aur	05h 22m 45s	+33° 24.7'	7.5	9:23 PM	5:15 AM	1:08 PM
M79	Glob	Lep	05h 24m 11s	-24° 31.4'	8.5	12:27 AM	5:17 AM	10:06 AM
NGC1883	Open	Aur	05h 25m 54s	+46° 29.4'	12	8:05 PM	5:19 AM	2:32 PM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1907	Open	Aur	05h 28m 05s	+35° 19.5'	8.2	9:19 PM	5:21 AM	1:22 PM
M38	Open	Aur	05h 28m 40s	+35° 50.8'	7	9:17 PM	5:21 AM	1:25 PM
NGC1931	Open	Aur	05h 31m 25s	+34° 14.6'	11.3	9:28 PM	5:24 AM	1:20 PM
NGC1952	Neb	Tau	05h 34m 32s	+22° 00.8'	8.4	10:19 PM	5:27 AM	12:35 PM
NGC1973	Neb	Ori	05h 35m 05s	-04° 43.9'		11:38 PM	5:28 AM	11:17 AM
NGC1981	Open	Ori	05h 35m 09s	-04° 25.9'	4.6	11:37 PM	5:28 AM	11:18 AM
NGC1977	Neb	Ori	05h 35m 16s	-04° 49.2'		11:39 PM	5:28 AM	11:17 AM
M42	Neb	Ori	05h 35m 16s	-05° 23.4'	4	11:40 PM	5:28 AM	11:16 AM
NGC1976	Neb	Ori	05h 35m 16s	-05° 23.4'	4	11:40 PM	5:28 AM	11:16 AM
NGC1975	Neb	Ori	05h 35m 18s	-04° 41.0'		11:38 PM	5:28 AM	11:18 AM
NGC1980	Neb	Ori	05h 35m 25s	-05° 54.9'		11:42 PM	5:28 AM	11:14 AM
M43	D Neb	Ori	05h 35m 31s	-05° 16.0'	9	11:40 PM	5:28 AM	11:16 AM
NGC1990	Neb	Ori	05h 36m 13s	-01° 12.1'		11:29 PM	5:29 AM	11:28 AM
M36	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	9:33 PM	5:29 AM	1:25 PM
NGC1999	Neb	Ori	05h 36m 25s	-06° 43.0'		11:45 PM	5:29 AM	11:13 AM
NGC2023	Neb	Ori	05h 41m 38s	-02° 15.5'		11:38 PM	5:34 AM	11:31 AM
NGC2024	Neb	Ori	05h 41m 42s	-01° 51.4'		11:37 PM	5:34 AM	11:32 AM
NGC2022	P Neb	Ori	05h 42m 06s	+09° 05.2'	12	11:07 PM	5:35 AM	12:03 PM
NGC2064	Neb	Ori	05h 46m 18s	+00° 00.3'		11:36 PM	5:39 AM	11:42 AM
NGC2067	Neb	Ori	05h 46m 31s	+00° 07.9'		11:36 PM	5:39 AM	11:42 AM
NGC2071	Neb	Ori	05h 47m 07s	+00° 17.6'		11:36 PM	5:40 AM	11:43 AM
NGC2149	Neb	Mon	06h 03m 31s	-09° 43.8'		12:21 AM	5:56 AM	11:32 AM
NGC2158	Open	Gem	06h 07m 25s	+24° 05.7'	8.6	10:45 PM	6:00 AM	1:15 PM
NGC2169	Open	Ori	06h 08m 24s	+13° 57.9'	5.9	11:18 PM	6:01 AM	12:44 PM
M35	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	10:45 PM	6:02 AM	1:18 PM
NGC2174	Neb	Ori	06h 09m 24s	+20° 39.5'		10:58 PM	6:02 AM	1:06 PM
NGC2183	Neb	Mon	06h 10m 47s	-06° 12.7'		12:18 AM	6:03 AM	11:49 AM
NGC2185	Neb	Mon	06h 11m 00s	-06° 13.5'		12:18 AM	6:04 AM	11:49 AM
NGC2186	Open	Ori	06h 12m 07s	+05° 27.5'	8.7	11:47 PM	6:05 AM	12:23 PM
NGC2196	Gal	Lep	06h 12m 10s	-21° 48.3'	11.2	1:06 AM	6:05 AM	11:04 AM
NGC2194	Open	Ori	06h 13m 45s	+12° 48.3'	8.5	11:27 PM	6:06 AM	12:45 PM
NGC2192	Open	Aur	06h 15m 17s	+39° 51.2'	11	9:42 PM	6:08 AM	2:34 PM
NGC2232	Open	Mon	06h 28m 01s	-04° 50.8'	3.9	12:31 AM	6:21 AM	12:10 PM
NGC2243	Open	CMa	06h 29m 34s	-31° 17.0'	9.4	1:58 AM	6:22 AM	10:46 AM
NGC2244	Open	Mon	06h 31m 56s	+04° 56.5'	4.8	12:08 AM	6:25 AM	12:41 PM
NGC2245	Neb	Mon	06h 32m 41s	+10° 09.3'		11:54 PM	6:25 AM	12:57 PM
NGC2250	Open	Mon	06h 33m 49s	-05° 05.1'	9	12:38 AM	6:26 AM	12:15 PM
NGC2242	P Neb	Aur	06h 34m 07s	+44° 46.6'	14	9:28 PM	6:27 AM	3:26 PM
NGC2259	Open	Mon	06h 38m 21s	+10° 53.0'	11	11:58 PM	6:31 AM	1:04 PM
NGC2261	Neb	Mon	06h 39m 10s	+08° 44.6'		12:05 AM	6:32 AM	12:59 PM
NGC2262	Open	Mon	06h 39m 38s	+01° 08.5'	11	12:26 AM	6:32 AM	12:38 PM
NGC2264	Open	Mon	06h 40m 58s	+09° 53.7'	3.9	12:03 AM	6:34 AM	1:04 PM
NGC2272	Gal	CMa	06h 42m 41s	-27° 27.5'	11.9	1:56 AM	6:35 AM	11:14 AM
M41	Open	CMa	06h 46m 01s	-20° 45.3'	5	1:36 AM	6:39 AM	11:41 AM
NGC2286	Open	Mon	06h 47m 40s	-03° 08.8'	7.5	12:46 AM	6:40 AM	12:34 PM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2281	Open	Aur	06h 48m 17s	+41° 04.7'	5.4	10:08 PM	6:41 AM	3:14 PM
NGC2298	Glob	Pup	06h 48m 59s	-36° 00.2'	9.4	2:39 AM	6:42 AM	10:45 AM
NGC2301	Open	Mon	06h 51m 45s	+00° 27.6'	6	12:40 AM	6:44 AM	12:48 PM
NGC2304	Open	Gem	06h 55m 11s	+17° 59.2'	10	11:53 PM	6:48 AM	1:43 PM
NGC2309	Open	Mon	06h 56m 03s	-07° 10.5'	11	1:06 AM	6:49 AM	12:31 PM
NGC2316	Neb	Mon	06h 59m 41s	-07° 46.6'		1:11 AM	6:52 AM	12:33 PM
NGC2355	Open	Gem	07h 16m 59s	+13° 45.0'	10	12:28 AM	7:10 AM	1:52 PM
NGC2359	Neb	CMa	07h 18m 30s	-13° 13.5'		1:46 AM	7:11 AM	12:37 PM
NGC2362	Open	CMa	07h 18m 41s	-24° 57.2'	4.1	2:23 AM	7:11 AM	11:59 AM
NGC2367	Open	CMa	07h 20m 06s	-21° 52.8'	7.9	2:14 AM	7:13 AM	12:11 PM
NGC2368	Open	Mon	07h 21m 06s	-10° 22.3'	12	1:40 AM	7:14 AM	12:47 PM
NGC2384	Open	CMa	07h 25m 10s	-21° 01.3'	7.4	2:16 AM	7:18 AM	12:19 PM
NGC2371	P Neb	Gem	07h 25m 34s	+29° 29.2'	13	11:43 PM	7:18 AM	2:54 PM
NGC2395	Open	Gem	07h 27m 12s	+13° 36.5'	8	12:38 AM	7:20 AM	2:01 PM
NGC2392	P Neb	Gem	07h 29m 11s	+20° 54.6'	10	12:17 AM	7:22 AM	2:26 PM
NGC2401	Open	Pup	07h 29m 24s	-13° 58.0'	13	1:59 AM	7:22 AM	12:45 PM
NGC2406	Gal	Gem	07h 31m 48s	+18° 17.2'	15	12:29 AM	7:24 AM	2:20 PM
NGC2411	Gal	Gem	07h 34m 36s	+18° 16.8'	14	12:31 AM	7:27 AM	2:23 PM
M47	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	2:08 AM	7:29 AM	12:51 PM
NGC2419	Glob	Lyn	07h 38m 08s	+38° 52.8'	10.4	11:11 PM	7:31 AM	3:51 PM
NGC2438	P Neb	Pup	07h 41m 50s	-14° 44.1'	10	2:14 AM	7:34 AM	12:55 PM
NGC2440	P Neb	Pup	07h 41m 55s	-18° 12.5'	11	2:24 AM	7:35 AM	12:45 PM
M93	Open	Pup	07h 44m 30s	-23° 51.3'	6.5	2:45 AM	7:37 AM	12:29 PM
NGC2451	Open	Pup	07h 45m 15s	-37° 58.0'	2.8	3:45 AM	7:38 AM	11:31 AM
NGC2452	P Neb	Pup	07h 47m 26s	-27° 20.1'	13	3:01 AM	7:40 AM	12:19 PM



## A.V.A.C. Information

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...

- Desert Sky Observer—monthly newsletter.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

**AVAC**  
**P.O. BOX 8545,**  
**LANCASTER, CA 93539-8545**

Visit the Antelope Valley Astronomy Club website at [www.avastronomyclub.org/](http://www.avastronomyclub.org/)

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The A.V.A.C. is a Sustaining Member of The Astronomical League and the International Dark-Sky Association.

## Board Members

### President:

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### Secretary:

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### Treasurer:

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## Appointed Positions

### Newsletter Editor:

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### Equipment & Library:

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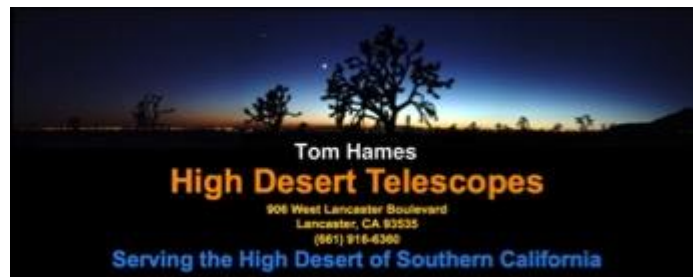


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